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The Middle European Journal of Medicine

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Gasteditor:

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"The era of the aged"

Aging is not 'lost youth' but a new stage of opportunity and strength.

Betty Friedan

US feminist (1921–2006)

Nothing affects an individual more than its limited life span! Together with the instance that some kind of decay starts rather early we are experiencing a different attitude towards ourselves. However this cycle is not limited to individuals, aging is a normal process also in demographics and population kinetics.

Time has seen the rise of cultures as well as their extinctions as a normal form of evolution in population kinetics. The fitness of the population and its vitality is key of success and survival of our genome. Like individuals populations are also aging, giving room for younger ones. This has shaped history, the rise of new empires and the fall of ancient civilizations. Today we are on a crossroad very similar to the times of the late Antiquity since our population in the Western hemisphere is aging rapidly and looses vitality progressively. But also Asian cultures experience some of the same problems.

It does not come as a surprise that Eurasia-Pacific Uninet is covering this topic since we want to underscore the global impact of this phenomenon in the present and even more important in the not too distant future. We want to combine the wisdom of the East with the achievements of the West. Focusing on the solutions of the obvious problems in regard to age we want to give a guide towards future analysis, the science of aging and necessary adoptions and improvements in everyday's life.

This Supplement "The era of Age" should focus our attention from individual changes towards population kinetics. Health, nutrition as well as age-related diseases are dealt with conventional traditional but also alternative pathways. The global perspective of costs and caring are among the topics as is the background of age-related diseases. There is no other single cause of political transformation than the processes of the aging population in most of the parts of the world. Without knowledge we are stumbling into a severe crisis. There is evidence that a majority of people above 80 years of age in cities throughout the world will not have first line relatives by 2020. This will create an enormous burden to the caring and geriatrics will be an important part of our everyday life.

In 1970, Simone de Beauvoir published a monumental study, which unparalleled in its deep understanding, clear analysis and precious advice. The publication *La Vieillesse* (*The Coming of Age*, 1970) was a landmark in the understanding of this phenomenon long before the political community engaged into this subject. To the first time the neglected problem of the society's prejudices towards the oppressed group of the elderly was highlighted. We have to give our "scientific" voice to a silenced and detested class of human beings to create a pressure group towards an improved understanding of problems related to aging. Beauvoir's notes that, depending on one's work or class, old age can come earlier or later is nowadays common knowledge and should be a raw model for future planning. Those who are materially more advantaged can afford good medicine, food and exercise, and thus live much longer and age less quickly, than a miner who is old at 50. Age and poverty and age and dehumanization are connected in a complex fashion and are often overlooked in modern fast living societies. Although many of the problems can only be described shortly the subject matter include a variety of perspectives including biological, anthropological, medical and sociological aspects.

The process of aging and the decline into death is an inescapable, but those human beings who live long enough to experience this existential phenomenon can help to prevent and cure the sequelae and even advice younger generations. This call for a support group among the aged themselves is a pivotal action for the future.

As a challenge we have to help the aged to engage in creative and meaningful projects and relationships with others. We have to give them the ability to fulfill their meaning of life and to do everything to prevent the loss of their self-esteem. Among other sociological corrections this requires a change of orientation among the aged themselves including the maintenance of a healthy lifestyle and intellectual volatility. Breaking down family ties and ancient ethical values has transformed the aged from the "tribal spiritual leader" collecting all knowledge and experience of their lifetime from the "Mahatma" or wise man to the burden of society. Instead of limiting access to health care in the elderly as it is done in some societies we have to re-establish age as a value for society its source of experience and information for our future.

W. Mohl
B. Winklehner

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About Eurasia-Pacific Uninet

Eurasia-Pacific Uninet is a network that aims at establishing contacts and scientific partnerships between Austrian universities, universities of applied sciences, other research institutions, and member institutions in East Asia, Central Asia, South Asia, and the Pacific region. The network was founded in the year 2000 by Prof. Dr. Brigitte Winklehner and is strongly supported by the Austrian Federal Ministry for Science and Research (BMWF) and the Austrian Exchange Service (OeAD).

The primary goal of Eurasia-Pacific Uninet is to promote multilateral scientific cooperation between its member institutions. This is mainly effected by the initiation of joint-research projects and the organization of conferences and workshops on the one hand and by a scholarship program for Post Docs and PhD students and short-term guest professorships on the other hand. At present, with a total of 116 member institutions in Austria, China, Korea, Mongolia, the Russian Federation, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Bhutan, Nepal, and India, Eurasia-Pacific Uninet is the largest sovereign university network of its kind of a single European country.

Further, Eurasia-Pacific Uninet promotes scientific, economic, and cultural relations between Austria and the target countries in general. It encourages the development of joint curricula, double-degree programs, and research activities, and fosters the reciprocal acknowledgment of study degrees and programs. It also supports R&D activities of multinational companies and supplies contacts between government agencies, educational institutions, and businesses as well as intercultural expertise through intensive programs and courses.

Projects related to Medicine and Health Care

In order to promote scientific cooperation and research in the field of medical sciences in the past years multiple initiatives were taken:

Eurasia-Pacific Uninet organized, together with its member institutions, meetings between Chinese and Austrian medical universities. The Medical Expert Meetings took place between September 11–15, 2006 in Beijing and Shanghai. These meetings aimed at establishing contacts and strengthening relationships and cooperation in the field of medicine and health-related research. Several fields of cooperation, including student and post-doctoral exchange, have been discussed.

The meetings included the visit of hospitals, both in Shanghai and in Beijing, as well as a whole day focused on Traditional Chinese Medicine.

Eurasia-Pacific Uninet understands the Medical Expert Meetings as an important step in fostering cooperation regarding:

- Medical training and education in China and Austria.
- Exchange programs in the field of medical traineeships and internships.
- Strengthening of further cooperation in various fields of medical research.

There were several other Medical Expert Meetings arranged during the last years in the form of delegation visits of EPU-member institutions to Austria.

During the "Plenary Meeting" of the Member Institutions in the Eurasia-Pacific Uninet", 2004 in Beijing, the network members agreed on organizing a conference in the field of health care in rural areas. Many of Eurasia-Pacific Uninet´s member institutions as well as the Chinese Ministry of Health and the Ministry of Education expressed their interest in cooperating in this field. Following these interests the Department of East Asian Studies at Vienna University together with Shihezi University set up a collaboration focusing on health supply in Xinjiang. This project, supported by Eurasia-Pacific Uninet, is aimed at exploring possibilities of capacity building in health care delivery in the Northwestern pastoral regions of China. Therefore, in September 2006 Eurasia-Pacific Uninet organized the international conference "Health Care in Rural Areas" together with Shihezi University and the strong support of the University of Vienna. The conference focused on general issues such as the situation of health care in rural China as well as infectious diseases like hepatitis, Japanese encephalitis, and tuberculosis, and the question of providing health care for rural areas by telemedicine. The conference served as a platform for international participants to discuss the state of the art scientific research as well as practical experience in the field. The conference was the first international meeting at Shihezi University and brought together experts from various fields related to health care in rural areas. As a result of the conference a telemedicine platform was set up. The project already led to a publication of the University of Vienna and also to a close cooperation with the health institutions and authorities in Xinjiang and Shihezi.

The various conferences led to the establishment of different research centers within Eurasia-Pacific Uninet and its member institutions.

An Austrian-Chinese Platform for Biomarker Identification has been founded in 2005 in cooperation with Eurasia-Pacific Uninet, the institute of analytical chemistry and radiochemistry of Innsbruck University and Peking University Health Science Center. The joint center is located at Peking University Health Science Center (PUHSC). The collaboration between the partners includes teaching programs, scientific projects, and scholarships & guest professorships. Aim of the collaboration program at the Sino-Austrian Biomarker Center is to develop new analytical strategies and to find and identify biomarkers for different cancer types, starting with breast cancer, heptacellular carcinoma (HCC), and prostate cancer.

Due to the 150th birthday of the great Austrian psychoanalyst Sigmund Freud, a symposium on his life and work was organized in Beijing in 2006. In the course of the conference, Chinese and Austrian experts in the field of psychoanalysis and psychotherapy presented talks on topics such as the development of psychotherapy, today's influence of Sigmund Freud, education and training in psychotherapy, neurosciences, etc. This symposium served as a platform for experts from China and Austria to discuss theory as well as practical experience and treatment of psychoanalysis and psychotherapy. In the course of the symposium, a letter of intent regarding the future cooperation between Austria and China in the field of psychotherapy and psychology was signed.

In June 2005, Eurasia-Pacific Uninet and the China Academy of Chinese Medical Sciences signed the first Memorandum of Agreement on a close cooperation in the field of Traditional Chinese Medicine (TCM) including all relevant member institutions of Eurasia-Pacific Uninet. The Expert-Workshop "Quality Standards in Traditional Chinese Medicine" was realized in 2005 and took place in Salzburg. The main goal of this workshop, which was joined by experts from China and Austria, was to build a platform for a sustainable exchange of ideas regarding TCM in China and Austria.

In the course of the Medical Expert Meetings in Beijing and Shanghai in September 2006, one day focusing on Traditional Chinese Medicine was organized in Beijing. Experts from China and Austria took the opportunity to exchange further ideas of cooperation and China Academy of Chinese Medical Sciences presented a first proposal about establishing a joint-research platform between China and Austria.

As a next step, the expert conference "Traditional Chinese Medicine – A Successful Concept for East and West" took place in November 2006 in Vienna, Austria. This conference has been a milestone for the medical and scientific research cooperation between China and Austria. The conference focused on the discussion of the interface between TCM and western medicine as well as the scientific research regarding effectiveness and practical appliance, and of course the benefits for the patients. In the course of the conference, experts from Chinese and Austrian universities and institutions as well as from the Austrian Ministry of Health and Women further discussed the implementation of a joint-research platform. The Austrian side introduced its concept of a "TCM Research Cluster Austria", which includes all interested Austrian universities and aims at doing joint research in various fields of TCM. Parallel to the Austrian Cluster a Chinese platform, headed by "China Academy of Chinese Medical Sciences" shall be established, which will also include several interested member institutions of Eurasia-Pacific Uninet.

These conferences on TCM resulted in the common wish of the participants to establish a joint-research center. Therefore on 16 October 2007, the Sino-Austrian Collaborating Center for Chinese Medical Sciences was officially opened. Following the official opening the 2007 Expert Forum on Traditional Chinese Medicine was held at the China Academy for Chinese Medical Sciences. It was jointly organized by Eurasia-Pacific Uninet and the China Academy for Chinese Medical Sciences, and was attended by various experts from Austrian and Chinese research institutions. The aim of this forum was to specify future cooperation plans in conjunction with the Sino-Austrian Collaborating Center for Chinese Medical Sciences. Different projects were therefore presented by various experts from several Chinese and Austrian universities. During the two days of the Forum, the key task was to find researchers on both sides who would work jointly on these projects, which cover the whole range of Chinese Medical Sciences, including theory, application, medicinal plants, and drug safety. The presented research projects all covered TCM and age-diseases as one of the main topics.

From May 28th to 30th 2008 the TCM Research Cluster Austria held a progress meeting with their Chinese counterparts at the China Academy of Chinese Medical Sciences in Beijing. In the course of the meeting presentations were made by the above-mentioned project-groups and their Chinese counterpart. Most important was the signing of the letters of intend of the partners from both countries. It was a very good opportunity for the scientists of both countries to improve mutual understanding and communications, and promote the advance of scientific research. Based on their common interests, about ten projects have been signed under the title "Traditional Chinese Medicine and Age Related Diseases". Financial support is given by both Austrian ministries (Science and Research/ Health) as well as the China Academy of Chinese Medical Sciences for the next three years.

After the Progress Meeting a small delegation from among the Austrian participants left for Mongolia to organize a conference on "Mongolian Traditional Medicine and Aging" together with the Health Sciences University of Mongolia. On the second day, the meeting concentrated on aging research, education and training, and was organized in conjunction with the UNFPA. The aim of the meeting was to review the current situation regarding health and social services for the elderly, as well as the research capacity of the country, and to

identify the key issues involved in establishing a Sub-Regional Aging Research Institute in Mongolia. After the activities in Mongolia, some members of the Austrian delegation, together with representatives from the Health Sciences University of Mongolia, went on to the Russian Federation – to Buryat State University – to jointly organize a conference on "Issues of Aging and Traditional Medicine in Buryatia" and to Irkutsk State Medical University to speak about possible future collaboration.

During the Working group "Medicine and Health" of the 2nd EPU-Plenary Meeting great interest in aging and aging-related diseases was expressed. As a result, "Aging" is one of the main focus areas during the period of 2008–2010. As a continuation of the International Conference "Multifacetal Aspects of Aging and Age-Related Diseases" in 2008, a follow up at the Fudan University, Shanghai is planned for 2009 under the overall topic of "Prevention of Age Related Diseases".

The year 2009 is the start of an exchange program between the Medical universities of Austria and China. The exchange program (student exchange) will begin in summer 2009. Altogether Eurasia-Pacific Uninet (EPU) will provide grants for 20 months of outgoing medical students and 20 months for incoming medical students. On the Austrian side the Medical Universities of Vienna, Graz, Salzburg, and Innsbruck will participate in the exchange program. On the Chinese side, Fudan University, Tongji University, and Beijing University of Chinese Medicine will participate. Students from China and Austria will receive a scholarship of Eurasia-Pacific Uninet. Austrian students are coming usually just for one-month medical clerkship. The period of presence of Chinese students can be blocked for more than 1-month clerkship.

Scholarships and Guest Professorships for Member Institutions of Eurasia-Pacific Uninet

On special request of the Austrian Ministry of Science and Research, the Austrian Council for Research and Technology Development recommended an Eurasia-Pacific Uninet Scholarship Program. Above all, the program is directed toward PhD students and Post-Docs researchers from Eurasia-Pacific Uninet member institutions to conduct scientific research in Austria. With the overarching goal of strengthening students' abilities to compete in the international marketplace, study, research, and teaching opportunities are provided at Austrian member universities and research institutions. In addition, the program makes a valuable contribution to the internationalization of science in a technology-oriented economy.

On-place scholarships are currently available for students in China, Mongolia, and Kyrgyz Republic. For incoming and outgoing academics and scientists short-term guest professorships are provided for research and teaching purposes in Austria or the EPU target countries.

Generally, the exchange of PhD and Post Doc students is an important instrument for the promotion of scientific collaboration between the EPU-member-institutions. In particular, there have been many scholarships granted in different fields of medicine up to now.

Wiener klinische Wochenschrift

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International Conference on "Multifacetal Aspects of Aging and Age-Related Diseases"

Date: October 29–31, 2008

Venue: Peking University Health Science Center, Beijing

Partners

Austria: Medical University of Vienna, University of Veterinary Medicine Vienna, Medical University of Innsbruck, Medical University of Graz, University of Graz, University of Salzburg, Paracelsus Medical University, Salzburg, International Institute for Applied Systems Analysis

China: Peking University, Peking University Health Science Center, China Academy of Chinese Medical Sciences, Capital Medical University, Peking Union College, Fudan University, Shanghai University of Traditional Chinese Medicine, Nanjing Normal University, National University Taiwan, The Chinese University of Hong Kong, University of Macau, Xinjiang Medical University

Mongolia: Health Sciences University of Mongolia, Mongolian University of Science and Technology

Russian Federation: St. Petersburg State University, Novosibirsk State University, Irkutsk State Medical University

Republic of Korea: Konkuk University, Yonsei University, Seoul, Yeungnam University

Japan: Waseda University

India: Guru Nanak Dev University, Amritsar

Nepal: Kathmandu University

Bhutan: Royal University of Bhutan

Ministries:
Ministry of Science and Research, Austria
Ministry of Health, Family and Youth, Austria
Ministry of Science and Technology, P.R. China
Ministry of Health, Mongolia

Austrian Embassy P. R. China

Aging has many facets. Unfortunately, it is not the joy of growing older, but the limitations of the quality of life and health, and decreasing social relationships that cause problems for people.

Eurasia-Pacific Uninet, the Austrian University Network for scientific cooperation with China, Mongolia and many other Asian countries, met this challenge and organised an international conference from October 29 to 31, 2008, entitled "Multifacetal Aspects of Aging and Age-Related Diseases". The venue of this conference was the Health Science Center of the highly prestigious Peking University. The goal of the conference was to present to a diversified audience the implications of the process of aging of human beings, the corresponding changes that take place within the body, as well as related health and social problems.

The representatives of Peking University, the Executive Vice-President Prof. Ke Yang and Vice-President Prof. Fang Weigang, together with the Austrian Ambassador to China, H. E. Dr. Martin Sajdik, the Vice Minister of the Austrian Federal Ministry of Health, Family and Youth, Prof. Robert Schloegel, and the representative of the Austrian Federal Ministry of Science and Research, Head of Department Ms. Christine Buzeczki, all pointed out the importance of this issue which affects people in many Asian and European countries. The high significance of scientific cooperation between various countries and institutions was stressed by the representatives of the ministries. Prof. Brigitte Winklehner, President of Eurasia-Pacific Uninet, mentioned in her welcoming speech the contract for cooperation recently signed between the China Academy of Chinese Medical Sciences and different institutions in China and Austria, which was the result of a three-year research initiative financially supported by the Austrian and Chinese governments.

The conference first focused on demoscopic and socio-economic aspects of aging societies. Further aspects included: the decrease of social care for elderly people within the family, the growing pressure for governmental institutions to increase budgeting for public health care institutions, age-related diseases and therapeutic methods not only of prolonging life but also, in particular, of improving the quality of life. The medical focus was on age-related diseases like dementia, neurodegenerative diseases and cardiovascular and metabolic diseases like adult onset diabetes. Nutritional options for the prevention of age-related processes including well-balanced diets and the role of antioxidants were also discussed.

It was clearly pointed out that physiotherapeutic methods which can help to maintain fitness in old age can also get some highly valuable inspirations from China, the country where exercises like Taiji Quan (Chinese shadow boxing) originated.

The most serious topics – caring for the elderly at home, in homes for the aged and in nursing homes, together with palliative care and terminal care – were discussed from an ethical and economic point of view.

The importance of continuing the discussion initiated during this conference was affirmed in different working groups and later on in the final discussion. The Austrian embassy in Beijing organised a reception for all participants and other invited guests. A farewell dinner was hosted by Executive Vice President of Peking University, Prof. Ke Yang.

The "Wiener Klinische Wochenschrift" (a leading Austrian medical journal) will publish a special volume containing the scientific contributions of the conference. For autumn 2009, a follow-up medical conference on the topic of "Aging and Prevention" is scheduled to be held in Shanghai at Fudan University Medical School.

The construction of long term care system for the elderly in China

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Abstract

Focusing on the question of how to construct the LTC system for the elderly in China, this research analyses the social context in China regarding the care for the elderly, including both cultural context and structural context. This emphasizes on family changes, population aging trend, and the development of social security system. The core of the study forms the construction of LTC system for the elderly in China, and provides a theoretical framework for it. The main conclusions of this study are:

1. The structure of LTC system for the elderly constitutes of goal system, resource system, operation system and support and control system.

The goal system includes to improve the life quality of aging people, and to prevent the occurrence of new disease. Resource system is the substantial component of LTC system, including human resource, funds and facilities. Support and control system includes soft support and hard support. Soft support refers to social policies, laws and regulations, evaluation system, LTC insurance, while hard support refers to quality control and information system. The social and cultural environment, public opinion, moral standard, family strain and intergenerational support enable all the potential resources such as human resource and material resource to transform into operational resources such as time, energy and facilities. Within this structure (refer to graph below), the combined supports form a push force, while the operation system forms a pull force. The two forces mobilize the transformation from potential resources into operational ones, and eventually procure the realization of care goal (Fig. 1).

2. Set up the theoretical framework of "in-home care with multi assistants" for the construction of LTC system for the elderly in China, which emphasizes on the core position of in-home care, while community and institution provide sufficient assistant at all levels. The in-home care in this framework is different from the traditional family care. In-home care is inherent with the grand principle of aging in place, and fully acknowledges the supplementary role of community, market, and institution for the in-home care. Besides the main care pattern, this framework also emphasizes the diversity in different levels of care services (Fig. 2).

3. If the current proportion of the elderly population who are not self-functional with age specific and gender

specific does not change, it is predicted that the elderly population who are not self-functional will increase from the current 12 million to 56 million in 2050. The care pressure we are facing will increasingly prominent.

According to the main research conclusions, this study constructs Chinese elderly LTC system, in which the governments at all levels play leading role in policy-making, standard-making, developing information system, and quality control, etc. The support and control system serves as a basis for the operation of the whole system. Nation, enterprises, and market resource can provide funds for the system either giving allowance for in-home care or building all kinds of nursing institutions, providing community care in all types. The core position of family in care system is emphasized, with all supports from community and institution. All these care resources make effort together to realize the goal by the combined forces of family strain, cultural tradi-
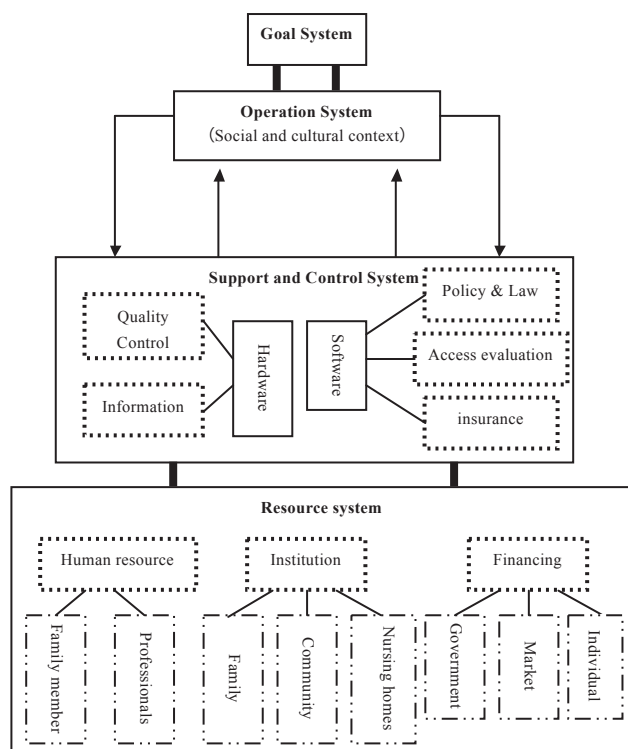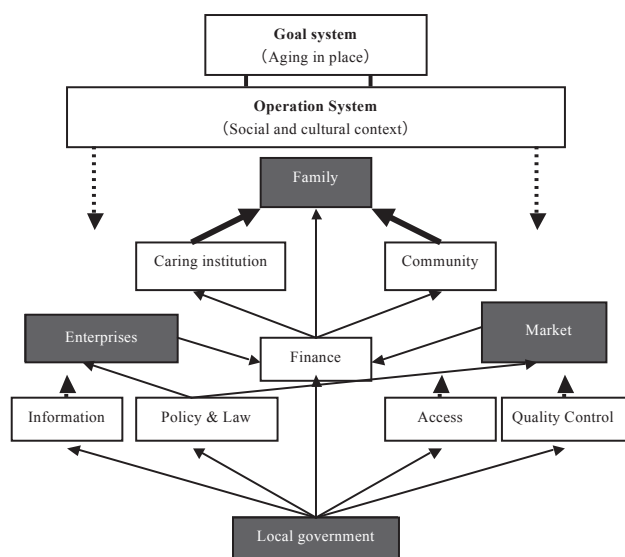

Fig. 1

Fig. 2

tion, moral standard and laws and regulations. The main contributions of this study are as follows:

1. Break through the conceptual understanding of long-term care for the elderly, and undertake a systematically research and analysis regarding the LTC as a system, exploring its components, functional structure, and operational mechanism.
2. Employ the research perspective of social context through adopting cultural, economical and demographic factors into analysis, and provide the comprehensive practical basis for the construction of LTC system for the elderly in China.
3. Expand the self-nursing theory in clinical nursing field, combine with the family strategy perspective in family sociology, and put forward the theoretical framework of "in-home care with multi assistants" for the construction of LTC system for the elderly in China, which emphasizes the core position of in-home care, while community and institution pro-

vide sufficient assistance at all levels. This theoretical framework on the one hand avoids less classification of different levels in the previous pattern, which is a simple combination of family, community and institution, on the other hand, it abides by the principle of aging in place, emphasizing and encouraging the in-home care, at the same time improving the assistant role of community and institution, promoting the realization of high quality care in family, reducing and deferring the using of institutional care.

The deficiencies of this study lie in:

1. There is obvious discrepancy between urban area and rural area, and the demand of LTC for rural elderly people is more urgent. However, the current study only aims at rural area. The construction of LTC system in rural area still needs more empirical research, which will be the future research emphasis.
2. The construction of LTC system is a project of several stages. However, this study is unable to provide guidance for each stage. The future research needs empirical study to set up index and methodology.
3. The analysis of other countries and regions practice of LTC practice is longitudinal, lacking cross-sectional comparison.

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Political strategies in ageing medicine

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As a result of a growing percentage of elderly people in our society, awareness of the topic "Ageing healthily" has increased in social and political discussions. In Western industrialised societies – and consequently also in Austria – the percentage of elderly and even very old people of the total population has continuously increased over the past few decades. And this trend is ex-

pected to continue. As a result of longer life expectancy, a significant number of people can and should experience a "real" benefit in the quality of life during the gained years. However, for many people the gained years of life fail to have any positive effects as many have to spend the last phase of their life in an unhealthy condition. This is because, with increasing age, the like-

liness of having to suffer from diseases and health impairments increases. The problem of multimorbidity grows, degenerative changes occur, chronic diseases with all their effects are experienced, disabilities and other health disorders as well as functional disorders may reduce the quality of life during old age.

Some figures, data and facts on the generation 50 plus in Austria

Austria is facing the major challenge of demographic ageing. In the next few years, Austrian population will age significantly. Life expectancy is anticipated to increase further between 2005 and 2050. According to calculations in this area, life expectancy of men is to increase from presently 76.4 to 84.3 years, and that of women from 82.1 to 89 years. At the same time, the difference in life expectancy between the sexes is to decrease further: from presently 5.7 to 4.7 years. Consequently, the percentage of men over fifty will increase more than that of women between 2005 and 2050. As a consequence, this age group will comprise 1.897 million men and 2.244 million women in the year 2050, for a total Austrian population of 8.3 million. Fortunately, not only life expectancy has increased significantly, but also the number of years that a person can spend without suffering from any major physical or mental impairments. This is reflected in the subjective assessment of one's own health. For instance, the percentage of people who assess their own health as "good" or "very good" has increased considerably for both sexes between 1991 and 1999. The fact that especially in the age group of the over fifties the assessment of the own health has improved more than in the population as a whole can be regarded as very positive. Consequently, not only this generation feels increasingly healthy, but also a disproportionally higher increase in good health can be recorded for this age group. This fact is also reflected by the health behaviour of the Generation 50 plus. This generation remains highly focussed on physical activity to stay healthy (men: approx. 35%, women: approx. 29%). These figures are thus only slightly lower than those for the population in general. A positive point to mention is that this percentage even tends to increase over time for women. Thus, this generation appears to be physically very active and far from becoming exceptionally passive. Measured by mortality, the health condition of the over fifties has constantly improved over the past 20 years. Mortality in this age group has decreased by 32.5% for men and by 34.4% for women between 1986 and 2005. The gain in life expectancy or respectively the reduction of mortality in the age group of the over fifties is accompanied by a continuous increase in the frequency of hospital admissions. Between 1992 and 2005, hospital admissions have increased for the "Generation 50 plus" to one and a half the value. It is basically the same for men and women. On average, every second person over fifty is admitted to hospital for treatment once per year. It appears that the gain in life expectancy in this age group, at least in some cases, is associated with more intensive or more frequent hospital treat-

ments. However, our objective should be to achieve that "ageing healthily" is not merely focussed on "simply" adding years, but rather increases the years that a person can live in good health and without the need for nursing care. The target is a gain in healthy years of life and in years of good quality of life. Achieving this is very important for and desired by the individual, and it is also a prerequisite for ensuring a stable social structure that is worth living in during a time when the population pyramid will consist of a comparably low percentage of young and working people. The target to able to spend as many years as possible in good health is thus not only a target and gain for the individual, but also a priority task for social and health policies. Even though ageing is connected with changes and restricted functions, a wide range of factors are known that may have a positive influence on these changes. Therefore, there is no age limit for prevention and health promotion!

Health promotion and prevention during old age

Health promotion and prevention for elderly people are to prevent that a person's health, physical functions and ability to adapt decrease abruptly. The basic idea in this regard is to achieve that mentioned factors deteriorate only gradually and that this degeneration can be stopped. Another target is the attempt to delay old age morbidity. We speak of so-called "compression of morbidity" in this regard. Promotion of health and prevention during old age aims at an active, independent life, physical and mental fitness, prevention of physical and mental diseases, as well as maintaining or creating adequate support networks. With the adoption of the Ottawa Charta in 1986, the World Health Organisation created the basis for orientating its policies towards health promotion: "Health is created and lived by people within the settings of their everyday life. Health is created by caring for oneself and others, by being able to take decisions and have control over one's life circumstances, and by ensuring that the society one lives in creates conditions that allow the attainment of health by all its members." Health promotion thus also requires age-specific approaches. Health promotion and prevention pursue the same targets, however, with a different orientation. The primary target group of prevention are people at risk or already sick people. The objective is to prevent or to delay the onset of diseases through targeted measures, or to prevent already existing diseases from getting worse. Health promotion, on the other hand, with its salutogenetic approach, targets the entire (old) population and tries to preserve the health of all people, or respectively to increase the health-related resources. Despite this basic difference, prevention and health promotion fundamentally complement each other where elderly people are concerned and promise sustainable success only when working together. On principle, health promotion and prevention approaches make a distinction between personal factors and environmental factors. Personal factors include: Lifestyle, organisation of everyday life, health behaviour, subjective experience and handling of stress,

and the ability to compensate for restrictions. The environmental factors include, for instance, the design of the living space (no obstacles, equipment with helpful accessories), as well as the inclusion of services in the living environment (infrastructure). To promote the health of elderly people, specific measures in the following fields appear to be particularly important:

- Physical activity
- Appropriate diet
- Accident prevention
- Cognitive activity,
- Reduction of social imbalances, and
- Promotion of social capital.

In the following, these areas are discussed in more detail.

Physical activity

Physical activity increases the ability to carry out the activities of daily life, which means that it has a positive influence on functional health. A study has revealed that men aged between 71 and 93 who walked 3 km every day could reduce their dementia risk by half. Besides, physical activity helps preventing falls as it builds up muscles and trains the sense of balance, while also strengthening the cardiovascular system. Concrete possible measures would, for example, include the creation of facilities that offer elderly people the possibility to train their physical fitness and make elderly people interested in movement. Health education measures would be another example.

Appropriate diet

Appropriate nutrition would, for example, include an adaptation of the calorie intake to the changed requirements. Appropriate diet is to prevent nutrient deficiencies and preserve the resources of the own body. Concrete possible health promotion and prevention measures in this context would, for instance, include teaching of knowledge about healthy nutrition (see Federal Ministry of Health Brochure "The Right Diet for People 65+ Made Easy), reducing the cost of food that is particularly healthy, or respectively a targeted support for people who cannot afford to eat healthily, but also legal regulations on food labelling that makes it possible for the consumer to identify potentially harmful ingredients or to assess the quality of the product.

Accident prevention

Falls and accidents play a major role during old age. In this context, possible health promotion and prevention measures could include, for instance, awareness campaigns on safety in old-age, interventions to increase physical activity, as already mentioned earlier, improved or adapted switching of traffic light phases in the streets, advice for the elderly on how to use technology, or traffic safety programmes that are suitable for elderly people.

Cognitive activity

Mental flexibility can be increased through repeated handling of new tasks and challenges. Problem-solving abilities can thus be preserved until a very old age. Diverse studies have revealed that the extent of cognitive activity is significant for the cognitive performance of elderly people.

Reduction of social imbalances

An almost linear relation exists between the social status and the morbidity and mortality rates, disfavouring people of a low social status. As the social status normally correlates with the level of education, we also see a relation between level of education and health. Reducing social imbalances and increasing the level of education must therefore be considered an urgent task in health promotion and prevention. On the one hand, the connection between social status and health is due to class-specific differences in smoking habits, drinking habits, diet habits and physical activity habits. On the other hand, people from lower social classes more frequently carry out work linked with health impairments in the long run. Besides, physical and social environmental conditions for low social classes tend to be more harmful for the health of an individual.

Promotion of social capital

There is a connection between social capital and well-being. In turn, well-being and the associated quality of life are particularly beneficial for good health. A lack of social support increases mortality due to cardiovascular diseases by four times. It is therefore important to encourage elderly people to actively participate in social life. Loneliness and isolation should be prevented through special, target-group specific offers. Suitable offers could include, for example, programmes of adult education centres or volunteer organisations aimed specifically at the elderly, local offers in the communities, as well as possibilities for volunteer work. It has been proven that volunteer work increases mental well-being of both the elderly person who renders the work and those who receive the services. Learner groups and groups that offer social activities are likewise suitable to prevent social isolation and loneliness among old people. A Swedish study has shown that elderly people who live alone without a partner suffer twice as often from Alzheimer's disease as those who live with a partner.

Plenty of evidence exists proving the link between effective health promotion and quality of life in elderly people. In Austria, as in many other countries, the effects in view of how to deal with health care and nursing care requirements for elderly people is being discussed intensively at the moment. However, clear evidence exists proving that health prevention – even if it only starts late in life – can significantly delay the time from when help and nursing care is needed. Normally, the number of years that can be spent in good health can be increased, and this for a simultaneously reduced period

during that the person suffers from chronic and non-chronic diseases and needs help and nursing care. This can improve the quality of life for the individual, while simultaneously achieving considerable savings in social expenditure.

What is being done in Austria in the field of health promotion and prevention for elderly people?

The Fonds Gesundes Österreich (FGÖ: Healthy Austria Fund) is an important partner in target-group specific health promotion. A major priority of the FGÖ consists in developing scientifically founded, practice-oriented approaches, strategies and methods on the topic "Ageing healthily" and providing these as "Best Practice" to experts in health promotion practice and to the community working in health science at national and international level.

The Fund has gained experiences in two model projects that were carried out between 2003 and 2005. These studied health promotion for elderly people in regional settings, urban or rural environments. As the projects are to serve as reference projects for similar initiatives, they were accompanied by extensive scientific research, were documented and evaluated and will be presented at the 8th Prevention Conference of the FGÖ. Besides, sustainable improvement of health opportunities, health potentials and quality of life of elderly people between 60 and 75 was studied in two selected regions as part of the "Living environments worth living in during old age" model project which was carried out by the Institute of Social Medicine and Epidemiology of the Medical University of Graz. The project identifies the opportunities from a health-promoting perspective in a new culture of ageing and in a more intensive debate regarding the question what communities and regions can do to help their inhabitants age actively, and how this can be done. The second model project "Health promotion for elderly people between 60 and 75 in the regional setting – urban area" was carried out under the title "Plan 60" by the Institute of Research of the Viennese Red Cross.

An important part of this project included empowerment courses that were to set a process of self-determination in motion with regard to concerns about the own life and health of the male and female participants. Furthermore, the participants of the course were trained in how to initiate health-promoting activities for people of their own age. The Federal Ministry of Health and the FGÖ also represented Austria as one of 10 international cooperation partners in the EU project "Healthy Ageing" under the direction of the Swedish Institute of Public Health. The main target of this project is to propagate a healthy lifestyle among people over fifty. Last year, the findings of this project were presented in the report under the same name "Healthy Ageing – A New Challenge for Europe". The final conclusion of the report includes recommendations for implementing national healthy ageing strategies. Another interesting project is the EU Project "Health pro Elderly" which is run by the Austrian Red Cross in Austria and is co-financed by the Healthy Austria Fund. The overall aim of the "Health pro Elderly" project is to encourage health promotion for older people by producing evidence-based guidelines with recommendations – at EU, national and local levels – for potential stakeholders in this field. It was started on April 1, 2006 and ran until December 31, 2008. The programme is based on three general objectives: health information, rapid reaction to health threats and health promotion through addressing health determinants. These areas are consequently the basic points of approach of the project. Because a lot of information on health promotion projects has not been collected systematically to date, a database that includes health promotion projects for elderly was started as part of the "Health pro Elderly" project, among other initiatives. Furthermore, the Federal Minister of Health plans to provide major support for the establishment of the so-called "Austrian platform for interdisciplinary questions of ageing". The platform pursues the target of analysing the questions associated with demographic ageing in an inter- and transdisciplinary manner. It intends to promote inter-disciplinary cooperation and the gaining of new findings from a holistic and interdisciplinary perspective within the national and international framework. Besides, it is planned to develop comprehensive and scientifically founded strategies for the Austrian society against an international background. As a last point, a large-scale preventive measure, the so-called preventive medical check-up, is to be mentioned. It was introduced in 1974, and was adapted in accordance with the latest medical and epidemiological findings in 2005. Hereby, Austria has implemented an important health-policy measure. The main association of Austrian social insurance companies and the Austrian Medical Association jointly developed a medical programme with a proven health benefit for the Austrian population. The preventive medical check-up is a preventive programme that all people 18 years and older who live in Austria can use free of charge. It guarantees medical check-ups that are appropriate for the respective life phase. In summary, it should be noted that demographic change and its consequences demand an intensive debate of the topic ageing. Today, we know that even at a later stage in life it is not too late for adopting a health-aware behaviour and for avoiding risks. However, this must be supported and promoted at all levels through health promotion and prevention.

Aging: a new look into an old problem

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The literature on population aging in developed countries is exploding. Serious concerns have been expressed about the challenges to current economic and social arrangements associated with an ever more elderly population. In contrast to the growth of interest in population aging, the concepts used in analyzing it have remained static. In Sanderson and Scherbov [1, 2] we presented a new forward-looking definition of age called "prospective age". The traditional age measure is a backward-looking one. It tells us how many years a person has already lived. But this is an incomplete measure because it ignores changes in life expectancy.

Why is someone aged 60 considered to be middle-aged today while 200 years ago a person of the same age would be considered elderly? The reason is that young and old are relative notions and their common reference point is life expectancy. In 1800 only about 1/3 of women would survive until age 60, while today in developed countries more than 90% of women will celebrate their 60th birthdays. Prospective age measures how old people are, not only from the date of their birth, but also in relation to their lengthening life expectancies.

For many crucial social questions, such as the viability of public pension systems, we need to know not only how old people are, but also how many remaining years of life they are expected to have. From an individual perspective, expected remaining years of life affect a host of decisions from saving and investment to the acquisition of new skills. In an era of increasing life expectancies, we obtain a much more complete picture of population aging by combining the backward-looking approach embodied in the traditional age measure with the forward-looking one using prospective age.

In order to understand the concept of prospective age let us imagine two people, one alive in 1950 and the other in 2000. If these two people both were 40 years old, then naturally each would have lived 40 years by those two dates. People who share a prospective age, on the other hand, share a remaining life expectancy. If a 40-year-old person in 1950 had a remaining life expectancy of 30 years, and a 50-year-old person in 2000 also had a remaining life expectancy of 30 years, then the 50-year-old person in 2000 would have a prospective age of 40, using 1950 as a year of reference. In this case, all people who had a remaining life expectancy of 30 years would have a prospective age of 40 (again using 1950 as the reference year).

As a constant dollar is used to compare values from one period to another by taking inflation into account, prospective age serves an analogous purpose by comparing ages and taking the increase in life expectancy into account. Any kind of financial data that can be represented in dollar terms can be converted into constant dollars by using an appropriate price index. Similarly, age can be converted into prospective age through the use of appropriate life tables.

The most commonly used measure of population aging is the change in the median age of the population. If, for example, the median age of a population were to rise from 40 to 45 over the half century from 2000 to 2050, we are led implicitly to think that the average person in the population of 2050 would behave like a 45-year-old person in 2000, but because of life expectancy increases this is unlikely to be the case. A 45-year-old person in 2050 might well behave in many ways like a 35-year-old person in 2000, because the 45-year-old person could have the same remaining life expectancy as a 35-year-old person in 2000. It is precisely because many behaviors depend on the number of years left to live that it is important to supplement the usual backward-looking definition of age with a forward-looking one.

In Fig. 1 we present median age and prospective median age for female populations of Austria and Germany over the period 1955–2045. The median ages for 2005 are taken from UN projections and we calculated prospective median ages using UN assumptions regarding expected increases in life expectancy [3]. While median ages have been rising for both countries during 1955-2005, prospective median ages have remained virtually constant or even declined.[1]

Even though we consider UN assumptions somewhat conservative with respect to life expectancy growth[2], we see that the increase in prospective median age is much less dramatic than in conventional median age. While, according to UN assumptions, the median age in Austria increases in the projection period from 37 to 50, prospective median age increases only from 37 to 43. The case of Germany is similar.

In Fig. 2 we present median age and prospective median age for two Asian countries – China and Japan for the period 1955–2045. Also in these countries, we see that prospective median age changes much less dramatically than median age. Moreover in China in 2045 it reaches the value similar to what was in 1955.

For many countries of the world, where the increase of the median age is accompanied by the increase

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[1] In our calculations we used 2000 as a reference year for each country.
[2] In our own projections we usually use scenarios where life expectancy in developed countries grows at a speed of 2 years per decade.
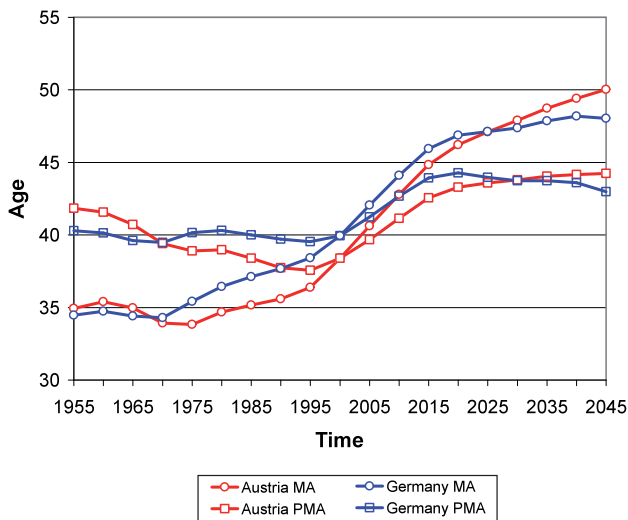
Fig. 1. Median age and prospective median age for Austria and Germany, both sexes, 1955–2045 (United Nations, 2004 and author's calculations)
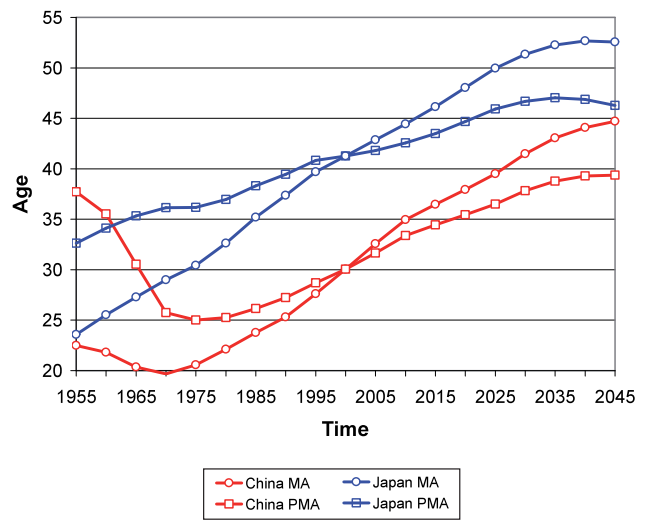

Fig. 2. Median age and prospective median age for China and Japan, both sexes, 1955–2045 (United Nations, 2004 and author's calculations)

in life expectancy, prospective median age will behave as we have observed it here – it will increase, if it increases at all, much less dramatically than median age.

Our calculations show that there will be important dimensions in which aging will occur much more slowly that is apparent from the conventionally computed median age figures. For instance, retired people are already more likely to take courses to help them enjoy new leisure time activities if they have more expected years of life. It is not a big surprise these days to see people studying to get their second or even first university degree at ages approaching 50. That would have been very unusual a century ago, but it will certainly continue to become more common in the future. Requests for and the provision of certain medical procedures also depend on the number of remaining years of life. One example of this is knee replacement surgery, which is now often performed on people above the age of seventy. It would not make much sense to do this if the operation did not significantly increase a person's number of years of mobility.

It is important to have a forward-looking measure of age not only because many behaviors are influenced by a person's expected remaining years of life, but also because important economic and social magnitudes depend on it as well. For example, medical expenditures are especially high in the last years of life. In forecasting these expenditures, it is important to take into consideration that, with increasing life expectancies those last years of life happen at an ever older age. Forecasting medical expenditures only on the basis of chronological age produces figures that are too high and could lead to erroneous policy decisions. The same is true with respect to forecasts for specific health-related items, such as the need for nursing home beds.

Prospective age also helps in assessing future policies concerning the age at the entitlement to a full pub-

lic pension. By computing the prospective age at the current entitlement age and holding it constant in population forecasts we demarcate the border between policies that allow an increase in the expected number of years receiving a pension and those that do not. In the case of Germany, we found that increase in pension age to 73 years by 2050 would correspond to retirement at a constant prospective age. The conventional old-age dependency ratio (OADR) and the prospective old-age dependency ratio (POADR), where the age at retirement would correspond to constant prospective age, are shown for Germany in Fig. 3. Slow increases in the age of eligibility for a public pension to an age less than 73 in 2050 would allow each successive generation to have more years of pension receipt and, at the same time, to help financially those additional years with a longer working life. Sharing the cost of more years of pension
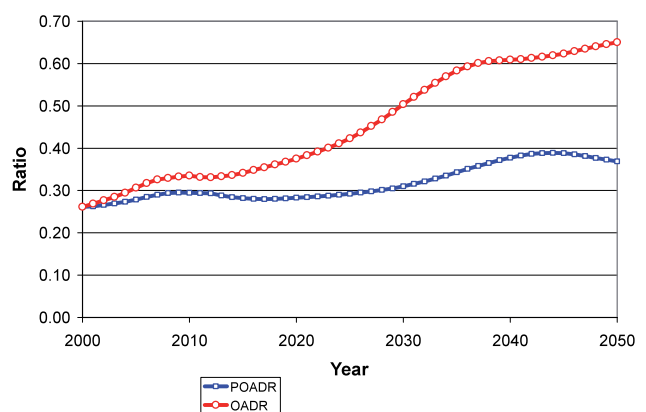

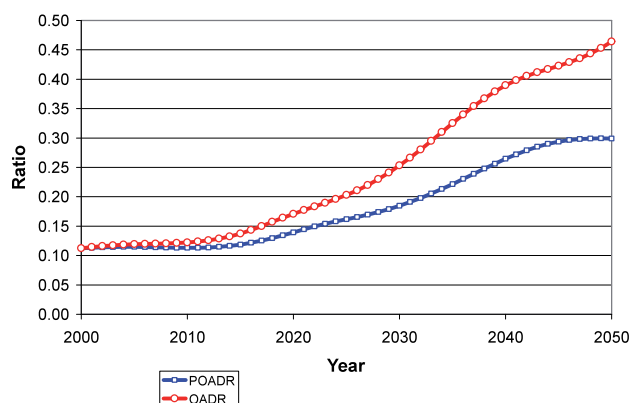**Fig. 3.** OADR and PAODR for Germany, 2000–2050 (Author's projections)

Fig. 4. OADR and PAODR for China, 2000–2050 (Author's projections)

between the older and younger generations is both intergenerationally equitable and would significantly aid in making the public pension system more sustainable.

The OADR and POADR for China are presented in Fig. 4.

Prospective age can also be useful in determining likely changes in the concerns of future voters. Thus, for many reasons, supplementing the concept of age with the concept prospective age allows us to analyze aging more deeply than if we were to use only one age measure. The broader view of aging that we recommend, incorporating both backward-looking and forward-looking measures is crucial if we are to understand and react appropriately to the challenges of population aging.

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Impact of rising dementia frequency in Europe and China, 2000–2050

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Introduction

Several authors have pointed out that in the next decades dementia will affect a considerably increasing number of the elderly. This increasing number of demented persons is due to the ageing population. For Europe and Northern America several studies reported that the numbers of demented persons will increase by more than 200% within the next 5 decades [2]. Until now, only a very small number of studies have compared the numbers of dementia sufferers in Europe and other parts of the World.

Care for demented persons is offered by professional services and by informal caregivers including family members. Of course, professional staff is part of the working-age population. Thus, we assume that not merely the total number of dementia sufferers is relevant. We consider, in addition, the ratio between dementia cases and the working-age population as crucial.

Methods

For the present analyses we used the population estimates of the year 2004 and the most recent population's projections of the United Nations for the period 2010–2050 [3]. For present analyses, the main projections ("medium variant") were used. Besides the main projections other variants (low fertility, high fertility, constant-fertility, constant-mortality and zero-migra-

tion) are available but were not used for analyses for the People's Republic of China.

In order to avoid the bias resulting from single surveys we used only data from systematic reviews and meta-analyses. For this purpose we included all published meta-analyses (based on a MEDLINE search) of studies conducted in Europe, and one very comprehensive meta-analysis based on 25 epidemiological studies in the People's Republic of China [1]. Numbers of prevalent cases according to meta-analyses were obtained by applying the age- and gender-specific prevalence rates of these studies to the data of the United Nations population's projections. The working-age population included all persons between 15 and 64 years of age as defined by the United Nations Population Division. Further details of the methods applied have been reported by Wancata et al. 2003.

Results

European as well as Chinese meta-analyses reported overall similar prevalence estimates, i.e. between 0.6% and 1.0% among those between 60 and 65 years old, rising to more than 20% among those older than 85 years (Fig. 1).

In the year 2000, in Europe 7.1 million inhabitants suffered from dementia and in China 3.8 millions. Within the next 50 these numbers will rise to 16.2 millions in Europe and 23.2 millions in China (Fig. 2). This equals a 2.6-fold increase in Europe and a 6.1-fold increase in China within 5 decades.
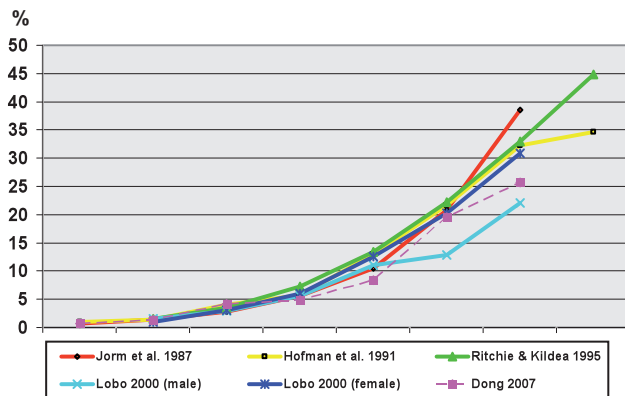
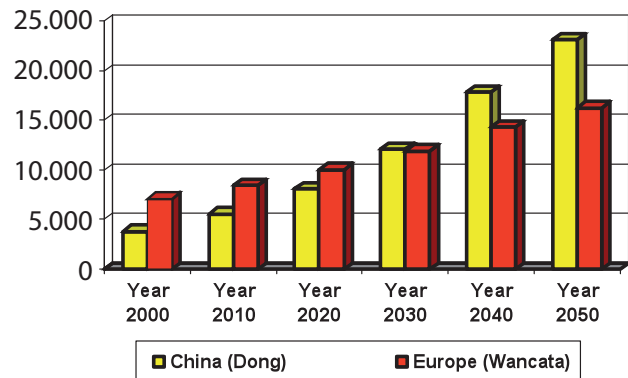**Fig. 1.** Prevalence of dementia meta-analyses in Europe and China

Fig. 2. Numbers of dementia cases in Europe and China (in 1000)

Owing to decreasing fertility in Europe, the working-age population is decreasing by about 30% during the next 50 years, while in China the working-age population will overall be of a similar size as in the year 2000. In the year 2000 in Europe 7.1 million dementia cases faced 493 millions persons in working-age. This equals a ratio of 69.4 persons in working-age per one demented person. Until the year 2050 this ratio will decrease to only 21.1. In China, this ratio will decrease from 229.5 to only 36.5 persons in working-age per one demented person.

Discussion

How accurate are such calculations of dementia cases for several decades? On the one hand, they are based on population projections, and on the other, on meta-analyses of large epidemiological studies. Population projections are based on projections of fertility, mortality and transnational migration. Fertility does not influence the calculations of the numbers of demented because all persons who will reach the age of 60 years within the next five decades are already born. Concerning migration one extreme variant is offered by the United Nations Population Division: setting international migration to zero influences the numbers of demented in Europe only marginally while there are no data available yet for China. Unfortunately, alternative scenarios concerning mortality available from the United Nations are of limited value for performing alternative projections regarding future dementia cases. In contrast, concerning the ratio between demented and the working-age population fertility and migration could be relevant. For Europe, using alternative scenarios of fertility and migration shows that the overall trend remains the same: a markedly lower number of persons in the working-age will have to care for a markedly higher number of demented persons. For China, such analyses have not been performed yet.

These calculations are based on systematic reviews and meta-analyses of epidemiological studies. Among the younger age bands the results concerning dementia prevalence are very similar, but among the

oldest groups in part relevant differences were found. It might be that these differences are caused by the relatively small sample sizes among the oldest age bands. Another important issue is the criteria used for diagnosing dementia: it has been shown that prevalence of dementia is markedly influenced by the diagnostic criteria (e.g. DSM, ICD) used.

Despite these limitations these results show that the number of those suffering from dementia will increase steeply during the next decades. This is in agreement with calculations which had been published previously [2]. While at the moment the number of persons with dementia is lower in China than in Europe, within the next five decades in China more persons will suffer from dementia than in Europe. This is due to the dramatically increasing number of elderly persons in China. A number of approaches have been discussed for preventing or delaying onset of dementia, but none of these interventions have proved their efficacy. Unfortunately, all assumptions concerning a lower number of dementia cases in the future are merely hypothetical.

Dementia significantly increases the risk for needing nursing care, and caring for persons with dementia is very expensive. Furthermore, caring for those suffering from dementia is frequently associated with physical, social and psychological stresses. The fact that the numbers of dementia sufferers will increase while the working-age population is decreasing will place a lot of financial and emotional burden on the working-age population in Europe as well as in China. Nevertheless, nowadays the situation is better for China than for Europe, but the situation will be similar in Europe and in China in the mid of the 21st century. Thus, the need for improved systems of care for people with dementia will become much more pressing in both regions.

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Ageing and genetic disorders: an experience with Down syndrome

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Ageing can be normal or due to genetic diseases in which various tissues, organs or systems of the human body age prematurely. The accelerated ageing diseases that display different aspects of ageing are known as segmental progerias and the examples include Werner syndrome and Progeria. Down syndrome (DS) is a segmental progeroid syndrome and causes premature ageing accompanied by senescence in various organs. The rate of ageing for bone age in DS patients is nearly a two-fold increase as compared to healthy subjects. The DS group shows a lower DNA-repair efficiency and also an accelerated decline in DNA-repair capacity with age. Advanced parental age, ethnical/regional differences and environmental factors also play an important role in the birth of a DS child.

Down syndrome is an autosomal aneuploidy among liveborns. The non-disjunction in meiotic division I in maternal/paternal and/or meiosis II division errors can cause aneuploidy/pregnancy loss. Advanced maternal age, reduced genetic recombination, consanguinity, region (rural/urban), exposure to chemicals, educational status of parents, prenatal scanning, reproductive performance of mother, limited oocyte pool, abnormal metaphase processing, defective spindle formation and MTHFR gene polymorphism are other possible risk factors for chromosomal aneuploidy. Down syndrome is characterized by increased mortality rates, both during early and later stages of life. The causes of increased mortality rates early in life are primarily due to the increased incidence of congenital heart disease and leukemia, while higher mortality rates later in life may be due to an increased risk for Alzheimer's disease (AD) and an apparent tendency towards premature ageing.

Experience with Down syndrome at Centre for Genetic Disorders (CGD)

We carried out chromosomal investigations on 258 mentally subnormal individuals that were referred to the Centre for Genetic Disorders, Guru Nanak Dev University, Amritsar during 1990 to 2007. The age group of the children ranged from 1 month to 18 years and these were from different districts of Punjab. Chromosomal preparations were made from peripheral lymphocytes using RPMI 1640 medium and phytohemagglutinin; G-banding was done using standard protocol. The average maternal age was 27.5 years, similar to the report from Maharashtra [5], whereas in the present study the average paternal age was >30 years. Nearly 51% of the patients were the firstborn and their average maternal age was 24.2 years. Free trisomy 21 was found to be the most frequent autosomal aberration, both among males (70.1%) and females (29.8%). In our study 91.8% cases showed free trisomy, 3.8% showed translocations and

Table 1. Average maternal age in some populations

Country	Number of DS children	Average maternal age in years
USA (California): [2]	516,745	32.1
Czech Republic: [2]	475,834	26.9
Oman: [9]	90	33.4
India (Punjab): [4]	143	27.5
India (Andhra Pardesh): [3]	1001	30.34
India (Maharashtra): [5]	524	26.8

Table 2. Indian studies on Down syndrome cases

States	Number of cases	Trisomy 21	Translocation	Mosaic
Andhra Pradesh: [3]	1001	880 (87.9%)	44 (4.3%)	77 (7.6%)
Delhi: [10]	365	316 (86.5%)	28 (7.6%)	21 (5.7%)
Delhi: [1]	736	699 (94.9%)	23 (3.1%)	14 (1.9%)
Gujarat: [8]	382	324 (84.8%)	34 (8.9%)	15 (3.9%)
Mysore: [6]	150	122 (81.3%)	1 (0.6%)	2 (1.3%)
Maharashtra: [5]	524	498 (95.0%)	17 (3.2%)	9 (1.8%)
Punjab: present study	258	237 (91.8%)	10 (3.8%)	11 (4.3%)

4.3% showed mosaic complement. The regional variation in the percentage of translocations and mosaicism was also observed (Table 2). A study of malformations and DS in Baroda (India) showed an overall prevalence of 1.04% (per 1000) and maternal age specific prevalence of DS increased from 0.54/1000 at 15–19 years to 15.6/1000 at >40 years [7]. The average maternal age for DS cases in India is less than Western population (Table 1). There could be ethnical/regional difference in advanced maternal age but older mothers are at greater risk of having DS child in all the populations. The rise in aneuploid conceptions with maternal age is due to the changes in the ovary as there is an increase in the rate of meiotic errors in the oocyte. Biological ageing of the ovary is accompanied by a decline in both the total oocyte pool and changes in the levels of circulating reproductive hormones.

In a study of live birth prevalence, Dzurova and Pikhart [2] reported 593 and 251 DS infants from California (516,745) and the Czech Republic (475,834) respectively. The mean maternal age of DS children was 32.1 years in California and 26.9 years in the Czech Republic (Table 1). Children born to older mothers were found to be at greater risk of Down syndrome in both the populations. The association with paternal age was also significant in the Czech Republic.

Down syndrome children are also born to very young mothers. The young aged mothers (18 to 29 years) born to their mothers at the age of 30 years and above, produced as high as 91.3% of children with DS. According to Malini et al. [6] for every year of advancement in the age of the maternal grandmother, the risk of birth of DS baby increases by 30%. Hence DS depends not only on the age of the mother but also on the age of the maternal grandmother.

There is an increased trend of mothers and fathers, 35 years old or older opting for parenthood. The paternal age effect is most pronounced when maternal age is 40 years and older. A significant influence of paternal age in DS can be a paradigm for other genetic abnormalities in children of older fathers. The live birth prevalence of DS has decreased despite consistent trends towards delayed childbearing due to widespread prenatal testing. The educational gradient in different populations including India reflects selective impact of prenatal diagnosis, elective termination, and acceptance of prenatal diagnostic measures.

There is a need to understand molecular pathway and the role of environmental factors in the regional and ethnical differences in advanced parental age in DS and other ageing diseases. This may enable us to identify genes/pathways to maintain our system indefinitely and to compress disease and disability into the final days of life.

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Ageing, socioeconomic status and consequences in Nepal

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Situated in the northern hemisphere, known as land of Mount Everest and the birthplace of Lord Buddha, Nepal is a tiny landlocked country. The landscape of the country is characterized by extreme diversity with elevation ranging from 70 meters above sea level in the south to 8848 meters above sea level in the north (CBS 2007). The population is generally poor, and Nepal has limited communication and infrastructures. In Nepal individuals over 60 years of age are considered elderly, but there is some variation for different purposes as 58+ years for civil servant retirement, 63+ years for university teacher and administrator and 75+ years for legal activities and granting of old age pensions. According to 2001 census of Nepal, there were 1.5 million elderly inhabitants constituting 6.5 percent of total population in the country. Nepal has a high population growth and a high infant mortality rate, and it is concurrently attempting to introduce population control program and program on prevention of diseases and promotion of health. The utilization of health care services is also improving. These programs have resulted in a lower birth rate; this will subsequently result in an even greater population of elderly individuals. "The International Plan of Action on Ageing" held in Vienna, Austria in 1982 and "The Second Assembly on Ageing" held in Madrid, Spain in 2002, outlined the study of the elderly and action plan in the regional and national level to increase awareness of ageing issues and develop concrete plan for ageing [5]. Advances in medical technology have led to increases in the life expectancy as well as increases in the number of older people, which makes population ageing an international priority in the 21st century. Very little is known about the elderly in Nepal, one of the poorest countries of the world. Although the proportion of elderly is increasing both in absolute numbers and as a proportion of Nepal's total population, traditional family norms and values of supporting the elderly are eroding at an alarming rate.

Population ageing is a result of fertility and mortality decline, and since such decline is objective of most less developed countries, ageing should be viewed as a by-product of success. Given the high poverty rate and pressing need to provide the still growing numbers of young people, the government of Nepal must make difficult choices as the government allocate its resources, and the needs of the elderly are unlikely to take priority. At the same time, there is a sense that the ability and willingness of families to support the elderly is declining and that the elderly themselves have suffered a loss of status in the course of economic and social change. Rapid population ageing is occurring in many parts of the developing world. Age structures are shifting from a relative concentration of younger to older individuals. Formal and informal health care needs across the developing world are changing concurrently.

Therefore, population ageing has enormous implications for health and social policy. The ageing process alone has no significant adverse consequences. Populations with healthy lifestyles save significantly greater life expectancy than the average normal population. Even in the very old, exercise has been shown to improve muscle strength and function. Nutritional intake and nutritional status in old age is multifactorial and dependent not only on appetite and availability of diverse food, but also on physical activity, body mass, education and involved social lifestyles [2]. Ageing implies a restructuring of the economy. Population ageing is likely to have its most substantive effect on the overall level of productivity in an economy which necessitates a high degree of adaptability of the labor force [1].

The older population of the country is increasing both in terms of absolute numbers and as a proportion of the total population; however, traditional family norms and values of supporting the elderly are eroding. The rapid increase in the number of older people in the population raises various social, economic and health concerns. There is neither a single geriatric hospital in the country nor a single geriatrician. Developing countries like Nepal will face the challenge of their own development concurrently with the ageing of their societies. The increase in the proportion and number of elderly is not matched by any corresponding increase in support measures either through formal channels (pension/health plans) or informal channels (socioeconomic security measures or the provision of subsidies for health care, home help or any other form of nursing care). Traditionally, Nepal's pension plan is the only system of social security for older people. However, the pension coverage is limited. Therefore, the elderly are forced to be dependent upon family support. As in other Asian countries, the responsibility of welfare for the elderly lies with their own children and the government has little obligation to provide care for the elderly in Nepal. Problems of increasing aged people have not only caused the increasing figures but also raised the uncertainty over the way such aged people are being taken care of by the members of a family. Owing to recent socio-economic changes, ageing of the population in the country is emerging as a problem that demands consideration before it destroys the society. Existing provisions for the protection and advancement of senior citizens falls far short of their rapidly growing needs. Not only is social security weak, but also the rights of the elderly have not yet received as much attention as other groups. The elderly are thus one of the most neglected groups in Nepalese society.

In Nepal, the problems arising from ageing is partly economic, partly social and partly cultural. Among the most important ones that have been responsible for

this are globalization, liberalization, constant change in value system, rapid urbanization, increasing number of aged people, intergenerational conflict, and social change. The joint family structure of our society is gradually crumbling and job pressure, individualistic tendency and consumerism have imparted in the young generation a sense of alienation to their ageing parents. Internal migration and out migration are other factors that contribute to this crisis. Most of them abandon their homes and come down to urban centers where they manage their living by begging or doing hazardous works. Though an act was promulgated in 2006 to ensure social security of senior citizens, the same has not been implemented.

We believe that we should develop a two-prong strategy with the objective of easing the lives of elderly people and making them creative force. Older persons should have access to food, water, shelter, clothing, health care, work and other income generating opportunities, education, training and a life in safe environment. They should have access to social and legal services and the health care so that they can maintain an optimum level of physical, mental, emotional and spiritual well-being. This should include full respect for dignity, beliefs, needs and privacy. We believe that the best cares and opportunities to the elderly citizens can be given in their homes and not by brining them out. They should remain integrated into community life and participate actively in the formulation of policies, affecting their well-being.

A rehabilitation of these elderly people away from home may be needed. In Nepal, about 40 agencies, including the government-run old age home (Pashupati Briddhashram), are looking after about 1,500 senior citizens. The 10th five-year plan had outlined the need to establish geriatric wards in governmental hospitals; plans like these have not been executed. The elderly are the pride of society; they are assets. But the younger generation is not aware of this, which has posed as a great challenge for the elderly. We are in a demographic transitional phase, so this is the right time to instill a feeling of responsibility among the younger generation towards their elders. The existing institutions for the old should be upgraded and new facilities added. Not only to accommodate more but also to afford them, entertainment and spend their leisure hours. The children are keeping their parents to have their property, but they hardly spend the property for their health and welfare. The concept of earning one's own property has to be developed rather than eyeing one's ancestral property. A study should be undertaken to assess the situation of older persons living in all the agro-ecological regions of the country, a new strategy should be developed to promote the welfare of the elderly based on Vienna International Plan of Action and the Second World Assembly held in Madrid in 2002.

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Ageing populations: implications for Hong Kong

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This article covers two broad themes: 'desired outcomes' for people who are ageing, and how health and social services could adapt to this demographic change, with the emphasis on the users' perspective. As in other developed countries, the Hong Kong population is ageing rapidly. The percentage of people aged 65 years and over increased from 10.2% of the population in 1996 to 12.3% in 2006, while those aged 85+ years showed a sharper increase from 0.7% to 1.3%. The oldest-old support ratio, defined as the ratio of the population aged 50–74 to 85+ years has fallen from 27.6 to 18.4 during this period. The figure for Japan, Australia, the United States and the United Kingdom for 2006 are 14,15,13,13 respectively. The top three causes of mortality are cancer, cardiovascular diseases and pneumonia, while heart failure, chronic obstructive pulmonary diseases and stroke account for the largest proportion of patient bed days in the Hospital Authority. Dementia affects 6% of people aged 70 and over. The incidence is approximately 1% among those aged 65 years and over, while the prevalence of cognitive impairment is approximately 15% [1]. The ideal situation for ageing populations is that life expectancy increases without increase in disease incidence, while disabilities follow a decreasing trend, with little disparities. Local studies show that the three main concerns of people as they age are health, financial security, and engagement in society, as for other countries. In 2005 the percentage of workforce aged 65 and

over is low (5.4%), having fallen rapidly from 12.8% in 1991. There is income inequality and regional variations in standardized mortality ratio.

The changing demography highlights the importance of informal care in addition to the need for formal care particularly in the primary care setting. Strategies to strengthen the role of informal care-giving such as empowerment, education and training in raising the level of health literacy, would be important. A survey of 2000 people of all ages show persisting gaps in knowledge of ageing processes, coping with common chronic conditions such as dementia availability of services, and negative perceptions of ageing particularly among those age 65 and over, in spite of recent efforts in health education and promotion. There is room for greater effort in health education and promotion, with the objective of empowerment of individuals, using modern educational concepts aiming in behaviour modification, as well as social marketing techniques. There is less importance placed on psychosocial factors affecting health, although these are as important as other lifestyle factors, and little understanding of stress associated with compulsory exit from the workforce. Furthermore, the quality of dying should not be neglected.

It is important to examine service needs from the users' perspective. A series of studies recently covered results from focus groups, from community survey of people requiring long-term care discharged from hospitals, and from a survey of end of life care for non-cancer chronic conditions. Results from focus groups of elderly people with a mean age of 65 years revealed barriers to accessing government services; concern regarding fees; lack of trust of effectiveness of 'cheap' medications; a perception of unhelpful, unfriendly or uncaring staff attitudes; and poor quality of private old age homes. Results from focus groups of service providers highlighted considerable service gaps and inter-organizational barriers; lack of strategies towards prevention of functional deterioration; lack of training of professionals; negative perceptions; and the need for raining health literacy and empowerment among the public. A community survey of those requiring long-term care showed that the main factors influencing the choice for opting for old age homes were: impaired function, dementia, depression, and users of existing community services. Education level, income, geographic region, knowledge of and accessibility to community services did not influence preference. Patients with chronic non-cancer diseases such as gradual organ failure showed a high prevalence of untreated symptoms such as limb weakness, oedema, fatigue, dysphagia and pain. Staff found difficulty in discussing end of life issues with patients and relatives, suggesting that there is room for improvement in staff training in this area. Ideally a seamless one-stop service provided in a transdisciplinary way using a case management approach should be developed. It should be designed from a user's perspective, covering health maintenance, coping strategies for living with chronic diseases, and mental health support. Cost effectiveness and cost benefit studies for such services should also be carried out.

An important feature of service needs is the management of multiple chronic diseases. While the general principles of management of chronic diseases are also applicable to the elderly population (health promotion, self-management, case management, knowledge management, population needs assessment and service planning), special features in elderly people should be noted: a multi-faceted approach covering physical, functional, psychological, nutritional and social domains; involvement of multiple health and social care providers; presentation with the geriatric syndromes such as falls, incontinence, immobility and dementia; and a focus on multiple co-morbidities and the concept of frailty rather than on individual diseases. Currently in Hong Kong the services are heavily hospital based, resulting in limited accessibility as well as increased costs, poor continuity of care, poorly developed self-help concept. There is growing needs of elderly people living in old age homes, poorly developed palliative care in all settings, and problems with barriers resulting from multiple service providers. The lack of a well-structured affordable primary care system aggravates these problems.

New approaches may be considered from the point of view of patients, professionals, as well as systems. Better understanding of patients' perception of illness, empowerment and issues relating to compliance with health advice are needed. Development of non-medical professionals using a transdisciplinary approach may be needed particularly in the primary care setting. From the point of view of health and social service providers, the content, organization and financing of services require constant review and adaptation, based on projection of population needs informed by epidemiological and health economic studies. Results from a study of the use of hospital services in the last 3 years of life would inform the demand on services, based on future population projections of demography and life expectancy, and a trend of compression of morbidity. A declining death rate without parallel decline in incidence of chronic disabling conditions would lead to an increase in the number of frail elderly with or without cognitive impairment. Health and social services would need to develop systems to cater for frail people at the end of life. Community services need to be developed that have a seamless medical and social interface, to act as an effective primary care to enable people to remain at home as long as possible. Newer models of care such as case management support for high risk elders discharged from hospital, and group management of chronic diseases emphasizing empowerment have produced good outcomes, in terms of better disease control and quality of life. Promising results have been shown in pilot studies for people with osteoarthritis, stroke, diabetes, dementia, incontinence, chronic obstructive pulmonary disease, and congestive heart failure. These group activities consist of elements of education, exercise, self-management techniques and mutual social support. Participants showed enthusiastic responses, and objective health and psychosocial outcomes have been demonstrated [2–5]. In spite of improving community care, it is likely that long-term residential care places will need to be increased in parallel to meet

these needs. Affordability and quality of care remain a challenge for long-term residential care. In conclusion, the approach to ageing populations should include the following three main areas: health literacy and empowerment, emphasis on maintenance of health and function and quality of life (and of dying) rather than on curative/restorative goals, and system and culture change towards effective and seamless primary care.

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Bhutanese health system with particular reference to traditional medicine services and aging

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In Bhutan, both traditional medicine and modern medicine are practiced and implemented without any sense of competition and discrimination but complimenting each other. Right from the beginning, it was considered as more effective and economical to integrate the two systems and also other health programs in view of the Government policy to provide comprehensive health care services to its citizens based on primary health care approach.

Bhutan's health care delivery system is based on primary health care approach and it has our tier systems as follows:

1. At the village and grass root level – is the outreach clinics (ORC) which are conducted on a monthly basis by the staff from nearest BHUs and hospitals. The services include immunization, antenatal and post natal checkups, family planning and treatment of common medical problems.
2. At the geog or block level – is the Basic Health Units, manned by three member primary health care team viz. Health Assistant, Auxiliary Nurse Midwife and Basic Health Worker. The BHU is responsible for providing preventive, promotive and curative services.
3. At the district level – the district hospital is responsible for providing back up support and technical advice to the BHU staff in addition to their normal responsibilities of providing medical care and other health care services.
4. At the regional and national level – the referral hospitals provide tertiary level medical care including various specialist services and provide technical support and advice to the district health teams.

The health service in Bhutan is provided free including medical services for both traditional and allopathic medicine. The Royal Government also bears the cost of patient referrals outside the country for advanced medical care in other countries.

The current health facilities includes 30 hospitals, 14 basic health unit grade I, 164 basic health units grade II, 35 traditional medicine units and 519 outreach clinics spread across the entire country. The coverage of health services is estimated at above 90%. There are traditional medicine units in all the hospitals and there is also a plan to establish traditional medicine units in all the basic health units in a phased manner.

The traditional medicine system in this country has come a long way since its inception in 1967 due to strong political commitment of the Royal Government of Bhutan. It is one of the most sustainable methods for the health care delivery system, as all traditional medicines are manufactured in Bhutan, and the human resources are developed within the country whereas, the allopathic system is heavily dependent on other countries for the supply of medicines and also for human resource development.

The Lord Buddha traced the root cause of all suffering to the concept of *marig-pa* (ignorance) which obscures our mind from understanding the law of causality and reality of phenomena. These in turn give rise to *dod-chag* (attachment), *zhe-dang* (hatred) and *gTi-mug* (delusion), known as *dug-gSum* (three mental poisons). These three mental poisons of *dod-chag, zhe-dang* and *gTi-mug* give rise to *rLung* (wind), *mKhris-pa* (bile) and *bad-kan* (phelm) disorders respectively. The traditional medical system is also based on the philosophy of *byung-ba-lnga* (five cosmo-physical elements. They are: *Sa* (earth), *Chu* (water), *Me* (fire), *rLung* (air) and *nam-mKha* (space). The Earth and Water is related to *bad-Kan*, Fire – *mKhris-pa*, Air – *rLung* and the space – all

pervasive. When there are disequilibria of these elements, it gives rise to different disorders.

Although, there is no separate programme for the care of the aging and elderly in Bhutan, the existing health system adequately addresses the need for such services. All citizens irrespective age, gender, caste and creed can avail free health care services from all the hospitals and basic health units in the country. More preference is given to the care of children, women and the elderly in any health settings. Our unique culture and tradition of extended family system also ensures the proper care of elderly by the family members.

Bhutan has a long history of Buddhism and indigenous medical practice, which are deeply rooted in our culture and traditions. Even today, religious and traditional system of medicine command great respect and faith among Bhutanese. Many of our senior citizens and non-western educated individuals prefer to seek treatment from traditional practitioners due to their share knowledge and beliefs.

According to the principles of *so-ba-rig-pa*, old age is a natural phenomenon occurring right from the time of birth. The inherent essences of the five cosmo-physical elements, which constitute the formation of both mental and physical basis of human beings, wear out due to regular metabolic and physiological functions. It is continually replenished with the external cosmophysical elements in the form of food and liquids. The digestive heat makes the external elements homologous to the internal elements. As the age advances the power of digestion diminishes, failing to replenish the internal elements. This leads to loss of body weight, advent of wrinkles, unstable joints and so forth.

The human body is a network of myriad channels and meridians through which the subtle energy known as *rlung* flows. The *rlung* is responsible for all the activities of the body and it is interface between the mind and the body. *rlung* and the channels gradually diminish both in terms of number and efficiency. People of advance age are considered to be *rlung b*iotype and usually suffer from *rlung* disorders like giddiness, loss of eye sight, absent mindfulness, itching of the skin and noisy ears. Other common diseases of the old age are cough, backache, joint pain, gout, arthritis, rheumatism and shortness of breath. According to *gso-ba rig-pa*, there are 42 varieties of *rlung* disorders, 26 varieties of *mkhris-pa* disorders and 33 varieties of *bad-kan disorders*

The care of old age is focused on the diminishing digestive heat, wear out of the five cosmo-physical elements, and decreasing efficiency and vitality of the *rlung* and its channels. *gSo-ba rig-pa* propound multitude of rejuvenation therapy to counteract not only the symptoms of old age but also the process. Rejuvenation therapy constitute of external therapies as well as internal medications and supplements. External therapy includes *kum-nye* (massage), a perfect antidote for *rlung* disorders, heated oil cauterization, physical rest and so on. Tonic preparation for internal consumption include natural formulations like anti aging, immune boosting, aphrodisiacs, mood elevator, detox and many others. These preparations give very less burden to the already depleting digestive heat and more over they can directly replenish the wearing elements since they can be instantly converted to nutritional essence. *rGyud-zhi*, the most comprehensive and authoritative treatise on *gso-ba rig-pa* explains the long term as well as short term observance while taking these rejuvenation therapies.

The Royal Government of Bhutan has placed great emphasis on the social sectors, which are seen as critical for national development and for happiness, as the ultimate aim of the development policy of Bhutan is Gross National Happiness (GNH). The health policy priorities reflect the national policies of equity, social justice, sustainability and efficiency in the context of preservation of national culture and tradition. The stated health policy of Bhutan is "*to facilitate the attainment of a standard of healthy living by the people that permits them to lead a socially, mentally and economically productive life through better health care delivery system*".

Bhutan has achieved an unprecedented peace and progress under the farsighted and dynamic leadership of the successive Monarchs. We have reasons to believe that the future will be even better with the implementation of social and economic programs based on the philosophy of Gross National Happiness.

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Demographic aspects of population ageing in Russia

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It is recognized that while the XXth century was the one of population growth, the XXIst century might come out as the one of population ageing. All developed countries face serious problems connected with consequences of reproduction type change and age structure transformations. Besides, for Eastern Europe and the CIS countries the last decades of the XXth century were marked by radical changes in all spheres of social life affected countries' demographic development.

The paper aims at representing the situation with ageing in the Russian Federation and examining the country's policy responses to multifaceted ageing consequences. The study is based on censuses and vital statistics; materials of the Council of Europe, Eurostat, Population Division of the Department of Economic and Social Affairs of the UN Secretariat, Human Mortality Database (Max Plank Institute for Demographic Research) have been used.

Ageing is one of the consequences of demographic transition, i.e. the manifestation of age structure changes in the course of demographic transition. Thus we start with the analysis of age structure changes in the period 1989–2006. Changes in proportions of the aggregated age groups (children, working age population and the elderly) are going to be considered. A comparison between population pyramids of Russia in 1897 (the year of the first Russian census) and in 2002 (the year of the first census conducted after the collapse of the USSR) shows great changes in the country's age composition: the proportion of children (under age 15) decreased from 37.7% in 1897 till 16.4% in 2002 while that of the elderly (population aged 60+) increased from 7.3% till 18.5%.

In the period 1959 (the year of the first post-war census) – 2006 the proportion of children decreased till 51% (relative to its value in 1959), that of working age population (15–59 years old) has reached 110% (relative

to its value in 1959), the percentage of the elderly has increased till 190% (relative to its value in 1959). Thus in 2006 the proportion of children was 14.9%, the proportion of working age population – 68.1%, the percentage of the elderly – 17.0% and the percentage of the oldest old (80+) – 2.4%.

Steady increase in median age (from 25 years in 1950 till 37.3 years in 2005 [4]) reflects the development of population ageing as well. So, ageing in Russia is progressing. Besides, it may be shown that the pace of population ageing in Russia is more rapid than in developed countries. Thus Russia has less time to adjust to the consequences of this process.

To characterize the situation with ageing in Russia several **ageing characteristics of different types (pro**portions, age-related indicators) have been computed, including proportions of the elderly (e.g. 60+, 80+) in the total population, ageing index, dependency ratios, parent support ratio, life expectancies at older ages, and median age. To understand better ageing development in Russia corresponding ageing characteristics have been compared with those for several countries representing different regions of Europe (i.e. Western, Southern, Eastern and Northern Europe).

Table 1 (computed based on [3]) represents dynamics of ageing characteristics for Russia. Table 2 shows ageing in Russia within the European context. It can be seen that the enumerated ageing characteristics for Russia and considered European countries have been converging, for Russia being lower than for countries of Western, Southern and Northern Europe.

In general Russia is far from being an "old" country. According to [4] in 2007 Russia was the 44th in the percentage of the elderly (60+), the 34th in median age and 30th in ageing index among 192 countries.

It is known that main driving forces of population ageing are fertility decline and life expectancy increase.

Year	60+	Ageing index 60+/(0–14), %	Old age depend. ratio 60+/(15–59), %	Parent support ratio 85+/(50–64), %
1959	9.0	30.8	14.4	2.5
1970	11.9	44.9	19.5	–
1979	13.7	63.1	21.1	3.4
1989	15.3	66.3	24.9	3.4
1995	16.6	77.4	23.8	5.0
1999	18.1	95.0	28.2	6.0
2002	18.5	112.0	29.0	5.6
2006	17.0	114.0	25.0	4.3

Table 1. Ageing indicators, Russia, 1959–2006

Table 2. Ageing indicators for Russia and selected European countries, 1950, 1970, 2005 (computation based on [4, 5])

Country Year	France	Germany	Italy	Spain	Sweden	United Kingdom	Poland	Russia	Ukraine
60+									
1950	16.2	14.6	12.2	10.9	14.9	15.5	8.2	9.2	10.9
1970	18.1	19.9	16.1	14.2	19.6	18.7	12.8	12.0	14.0
2005	20.8	25.1	25.3	21.7	23.4	21.2	17.2	17.1	20.6
Ageing index: 60+/(0–14), %									
1950	71.5	63.0	46.5	40.4	63.7	69.5	28.0	31.8	40.2
1970	73.0	85.4	65.7	50.9	94.2	77.3	47.4	45.1	56.1
2005	113.2	174.5	181.2	150.3	134.3	118.3	105.2	113.3	140.3
Old age dependency ratio: 60+/(15–59), %									
1950	26.5	23.5	19.9	17.6	24.2	25.0	13.1	14.9	17.6
1970	31.7	35.0	27.1	24.5	32.9	32.7	21.3	19.5	23.0
2005	34.2	41.4	41.8	33.9	39.5	35.0	25.8	25.3	31.8
Median age									
1950	34.5	35.4	29.0	27.7	34.3	34.6	25.8	25.0	27.6
1970	32.3	34.3	32.8	30.2	35.4	34.2	28.2	30.6	32.2
2005	38.9	42.1	42.0	38.8	40.2	38.9	36.8	37.3	38.9

But in Russia ageing is developing due to low fertility only. Mortality has effect on population ageing when more people survive till older ages and when life expectancy at older ages increases. In Russia the situation with mortality is quite different – life expectancy at 60 (being 14 years for males and 19 years for females in 2005) is one of the lowest in Europe (e.g. in 2005 in Western Europe life expectancy at 60 was for males 20 and 25 for females).

It should be pointed out that ageing indicators have greater values for female populations, gender disbalance in Russia being more marked than in developed European countries.

Effective social policies cannot be based on ageing values for the whole country. A special attention should be given to heterogeneity of ageing process particularly to the regional differentiation of ageing characteristics. At present there are 86 regions (in the considered census year 2002 they were 89) in the Russian Federation arranging into 7 federal districts (FD) – The Central FD, The North West FD, The South FD, The Privolzhsky FD, The Urals FD, The Siberian FD, The Far East FD. The most populous are the Central FD and The Privolzhsky FD with 26.2% and 21.5% of Russian population while only 4.6% of Russians live in the Far East.

By the beginning of the XXIst century sufficiently universal demographic situation took place for all Russian regions: fertility declined reaching below replacement level, high mortality determined low life expectancy. Nevertheless considerable regional differences in fertility, mortality and migration characteristics take place. Thus, in 2002 the maximum value of the total

Table 3. Dependency ratio and ageing characteristics for Russia and its federal districts (FD), 2002 (computation based on the 2002 census)

Indicator Russia/FD	60+ Proportion %	Ageing index	Dependency ratio		Parent support ratio
			old-age dep. rat.	dep. rat.	
Russia	18.5	112.8	28.4	53.5	4.7
the Central FD	21.4	155.3	33.0	54.3	5.5
the North West FD	18.8	128.9	28.3	50.2	4.4
the South FD	17.6	91.4	28.0	58.6	5.1
the Privolzhsky FD	18.9	112.4	29.3	55.3	4.9
the Urals FD	16.1	94.7	24.1	49.6	3.8
the Siberian FD	16.2	92.2	24.5	51.2	3.7
the Far East FD	13.2	73.7	19.1	45.0	2.2

Table 4. Ageing characteristics for regions of FDs: the range of change, 2002 (computation based on the 2002 census)

Indicator Regions of	60+		Ageing index		Old-age dep. rat.		Parent support ratio	
	max	min	max	min	max	min	max	min
the Central FD	24.5	19	181.8	135.4	39.4	27.5	7.3	4.6
the North West FD	23.4	10	169.1	43.4	37.6	15	5.9	1.4
the South FD	20.7	6.6	134.7	19.3	33.2	11.3	6	3.5
the Privolzhsky FD	21.8	16.1	148.9	85.3	34.3	24.4	5.7	3.9
the Urals FD	19.8	3.4	119.1	14.8	31.4	4.5	5.1	0.5
the Siberian FD	18.2	7.6	118.7	22.7	27.7	7.4	4.5	0.4
the Far East FD	15.4	4.8	94.9	22.7	20.9	6.5	2.7	0.1

fertility rate (TFR) was observed in Aginsky Burayt autonomous area, the Siberian FD (2.255), minimum – in the largest mega cities Moscow and Saint-Petersburg (1.034 and 1.064 correspondingly); maximum values of the life expectancy (LE) for males and for females were registered in the Republic of Ingushetia and the Republic of Dagestan, the South FD (70.3 and 67.6 for males and 77.8 and 76.0 for females correspondingly), minimum – in the Republic of Tuva, the Siberian FD (48.2 for males and 60.2 for females) [1].

These differences in demographic characteristics result in age-structural differences. For example, such regions as Saint-Petersburg and Dagestan have traditionally had very low and relatively high TFR correspondingly, and their population pyramids look quite different: in Saint-Petersburg the proportion of children was 12.2% and that of population 60+ – 20.7%, while in Dagestan the proportion of children was 28.5% and that of population 60+ – 10.0%. Mentioned structural differences lead in turn to regional differentiation of ageing process. Table 3 shows ageing characteristics for the Russian Federation and its federal districts. Table 4 gives ranges of change (maximal and minimal values) for each considered indicator for regions of each FD. It can bee seen that the lowest values of all considered ageing characteristics were observed in The Far East FD, the highest ones – in The Central FD. Thus on the background of the general trend of ageing development, for regions of the RF ageing characteristics vary considerably. That is why, to be effective, socio-demographic policies should take into account not only age-structural changes in general but regional differences in ageing process in particular.

Future trends of population ageing up to the year 2050 were analyzed in [2] using a probabilistic approach. It was shown that a monotonic total population size decrease is expected. By the year 2050 median total size may decrease (as compared with the initial year) by 23.5% and attain to 110 mln (median). Ageing is expected to continue – the share of population 65+ will increase from 3.7 in 2005 till 20.6% (median) in 2050, i.e. 90% increase as compared with the initial year is expected. It should be mentioned that changes in the proportion of 65+ in Russia will be not monotonous: in 2007–2011 some decrease is expected followed by monotonic increase. Increase of the percentage of 80+ is expected to be more significant than that of 65+: median proportion of 80+ in 2050 will be 3.1 times higher than that in 2005 (6.2% as compared with 2.0), dynamics of the share of 80+ being more complicated than that of 65+.

Population ageing has major consequences and implications for all facets of country's life. Unfortunately in Russia ageing issues are still insufficiently focused. Thus, in the previous Concept of demographic development of the RF for the period up to 2015, approved by the resolution of the government of the Russian Federation of 24.09.2001 N 1270-p (where the aspects of demographic development were traditionally represented in three blocks: fertility/family, health/mortality and migration) challenges of ageing were not even allocated in a separate section. This led to limited opportunities to elaborate adequate economic, social and medical measures. The Concept of demographic policy of the Russian Federation for the period up to 2025 approved by the Order of the President of the Russian Federation N 1351 of 09.10.2007 includes "adoption of special programmes for health maintenance and expanding the healthy period of life for the elderly, development of gerontological service". On the basis of this concept priority measures to adapt economy and social infrastructure of the Russian Federation to the ageing society could be elaborated.

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Present state and tendencies of medico-demographic processes in Irkutsk Region, Russia

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According to the Federal Statistics Service in Irkutsk Region, permanent population on the 1st of January 2007 was 2 million 514 thousand and decreased by 13.1 thousand people (or 0.5%) in comparison with the 1st of January 2006. Irkutsk Region is on the 5th place by the number of permanent population in the Siberian Federal District.

The decrease of population is conditioned by several factors:

1. Increase of population loss due to natural causes.
2. Decrease of birth rate.
3. Increase of death rate.
4. Increase of migration outflow.

Complicated ecological situation, especially in industrial cities, contributes to the worsening of public health.

The Irkutsk Region's state, same as in the whole Russia, reflects unfavorable tendencies: steady population decrease observed from year to year became a constant phenomenon. During the period 2001–2006 the permanent population decreased by 199.1 thousand (Fig. 1).

Size and structure of Irkutsk Region population (Fig. 2)

Population numbers 2 514 thousand
Females – 1 325 thousand. Those of childbearing age – 682 thousand
Males – 1 189 thousand.

Females – 1 325 thousand. Those of childbearing age – 682 thousand

Males – 1 189 thousand.

Fig. 2

City population – 73%
Rural population – 27%
Able-bodied citizens (Males 15–60 years old, Females 15–55 years old) – 63%;
People older their working years (Males above 60, Females above 55) – 20%;
People younger their working years (before 15 years old) – 17%;

Principal demographic peculiarities of Irkutsk region

- The lowest population density in Russia.
- Very high level of urbanization: 73% of the population is concentrated in cities and only 27% live in rural areas.

Natural movement of population in Irkutsk region

In 2006, population loss due to natural causes reduced from "–5.1" per thousand to "–2.9", generally at the expense of the total death rate reduction from 17.0 in 2005 to 15.1 in 2006 (Fig. 3).

	2001	2002	2003	2004	2005	2006
rural areas	560,4	533	530,2	530,8	529,1	527,6
cities	1252,5	2044,7	2030,7	2014,5	1997,8	1986,2
total	2712,9	2577,7	2560,9	2545,3	2526,9	2513,8

Fig. 1. Absolute number of permanent population of Irkutsk Region for the period 2001–2006
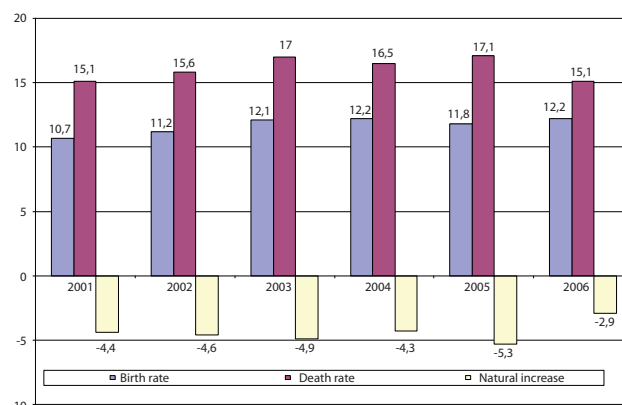

Fig. 3

Table 1. Main demographic indices of Irkutsk Region in 2005 and 2006 (per thousand)

Cities and regions	Birth rate		Death rate		Natural increase	
	2005	2006	2005	2006	2005	2006
In cities	11.5	11.7	16.8	14.9	−5.3	−3.2
In rural areas	13.3	14.2	18.6	16	−5.3	−1.8
Irkutsk region	11.8	12.2	17.1	15.1	−5.3	−2.9
Russian Federation	10.2		16.1		−5.9	

Table 2. Dynamics of birth rate in Irkutsk Region (per thousand) during the period 2002–2006

Areas	2002	2003	2004	2005	2006
Whole Region	11.2	12.1	12.2	12.4	12.2
Urban area	11	11.9	12.1	11.5	11.7
Rural area	12.2	13.2	13.1	13.7	14.2

During the recent 6 years birth rate in the Irkutsk Region increased from 10.7 per thousand in 2001 to 12.2 in 2006. In rural areas birth rate is higher (14.2) than in cities (11.7).

Another cause of demographic problem is a high death rate. For the first time during the recent 5 years it went down and made up 15.1 per thousand in 2006. Decrease of death rate occurred in urban areas (from 17 to 15 per thousand) as well as in rural areas (from 19 to 16).

The Table 1 given below shows that in 2006 birth rate has increased with simultaneous decrease of death rate. As a result, however, natural increase remained negative (–2.9) but its speed has remarkably slackened (from –5.3 to –3.2).

Birth rate

From January to December 2006 the number of newborns increased by 2.1% in comparison with the corresponding index of the previous year and totaled 30.9 thousand people. In total, 24% of the children were born in the countryside and 76% were born in the cities around Irkutsk (Table 2).

In 2007 1.6 million children were born in Russia (11.3 per thousand), which is 123 thousand (8%) more than in the year 2006. Causes of birth rate growth:

- Favorable changes in the structure of population in childbearing age.
- Change in reproductive aims or their more complete realization.
- Increase in the number of marriages.

Death rate (Table 3)

In 2006, general death rate decreased by 12% in comparison with the indices of the previous year and made up 15.1 people per thousand. The same level was observed in 2001 (Table 4).

In spite of death rate reduction the structure of mortality in 2006 has not changed. The main cause of death is still cardiovascular diseases, which totaled 728.5 per thousand in 2006 (cities – 706.3; rural areas – 812.4).

On the second place there are external causes of death. For the first time during recent years in the dynamics of this class we observed the tendency to reduction; the index totaled 272.4 in the Region, 287.8 in the countryside, and 268.3 in the cities. It is important to underline that mortality from "external causes" is almost completely conditioned by social factors and is preventable.

In the class of cancer, which takes the third place, there can be noticed some differences in the indices for the city population and for villagers: in 2006 there were registered 185.6 cases in cities, in rural areas – 159.8 per thousand. The index dynamics of this class also has a positive tendency to reduction. So, 78% of all death cases were caused by the above classes of diseases, which in general reflect the situation all over Russia.

In Irkutsk Region as well as all over Russia there continues the process of population aging, which is characterized by decrease of number of children because of low birth rate. Percentage of people in the age of 50 and older already in 2003 has reached 12%. The

Table 3. Dynamics of death rate in Irkutsk Region (per thousand) during the period 2002–2006

Areas	2002	2003	2004	2005	2006
Rural area	15.9	17.9	17.8	17.9	15.1
Urban area	15.7	16.8	16.3	16.8	14.9
Whole Region	15.8	17	16.5	17	16.1

Table 4. Dynamics of death rate in Irkutsk Region according to the principle causes during the period 2001–2006 (per 100 thousand)

Areas	Years					
	2001	2002	2003	2004	2005	2006
Total in the region	1512.5	1575.3	1687.8	1653.7	1703.4	1514.0
City	1509.9	1572.1	1674.3	1631.8	1679.7	1488.5
Countryside	1522.6	1587.6	1720.3	1737.5	1793.3	1610.2
Including:						
Deaths due to cardiovascular organs diseases						
Total in the region	677.9	733.4	797.5	790.7	817.9	728.5
City	670.1	725.8	786.6	773.1	798.5	706.3
Countryside	708.1	762.6	839.5	858.0	891.7	812.4
Deaths due to external causes, traumas, and poisoning						
Total in the region	301.2	334.1	350.8	335.1	330.8	272.4
City	299.7	332.5	349.1	329.0	326.8	268.3
Countryside	307.0	340.2	357.4	358.4	346.2	287.8
Deaths due to cancer						
Total in the region	173.7	181.0	180.3	174.7	181.3	180.2
City	178.4	187.2	186.2	182.6	187.3	185.6
Countryside	153.8	157.2	157.6	144.3	156.6	159.8
Deaths due to respiratory apparatus diseases						
Total in the region	72.8	82.2	96.1	91.3	90.5	77.4
City	67.3	80.6	91.1	87.3	86.0	74.1
Countryside	94.0	88.3	115.3	106.9	107.5	89.7
Deaths due to alimentary system diseases						
Total in the region	59.0	71.5	78.3	81.5	90.6	85.9
City	58.6	74.2	81.4	82.6	92.8	86.0
Countryside	60.5	61.4	66.8	77.5	82.4	85.4
Deaths due to some infectious and parasitic diseases						
Total in the region	36.7	43.6	44.2	44.5	51.6	46.5
City	38.3	43.3	44.9	44.2	50.7	46.4
Countryside	41.1	44.9	41.6	45.5	54.7	47.1

moment when the vital senility occurs, this index amounts to 26% in Irkutsk Region.

Peculiarities of able-bodied Citizens' mortality

The number of died in their working years during 2006 decreased by 3314 people and totaled 15 263 (in 2005 this number was 18 577). Since 2001 the Region has lost 101 616 people of working age, which is equivalent to the loss of three or four rural regions with the average population of about 30 thousand people.

There is a very high mortality rate from the so-called "unnatural" causes such as: traumas, accidents, and poisoning. People died due to poisoning and traumas in their working years constitute 79% of the total number of deaths. People of working age constituted the significant part of them (Table 5).

Thus, the population of the Region constantly looses its most active part and unnatural causes of death make a major contribution to theses losses.

Irkutsk region population mortality

- In 2007 death rate constituted 14.0 per thousand people, having decreased by 7.3% in comparison with the previous year index (15.1 per 1000)
- Mortality structure remained the same in 2007: I place – cardiovascular system diseases (49.0%), II place – external causes of death (16.7%), III place – oncology (13.1%).

Table 5. Percentage of people of working age in the overall number of died from unnatural causes in Irkutsk Region in 2004 and 2005 (%%)

Area	Total			Males			Females		
	2004	2005	2006	2004	2005	2006	2004	2005	2006
Whole Region	41.6	43.0	39.9	55.3	56.9	54.3	22.8	23.6	21.6
City	42.1			55.9			23.1		
Countryside	40.0			52.8			22.0		

Table 6. Dynamics of natural increase (loss) of population of Irkutsk Region during the period 2002–2006 (per thousand)

Area	2002	2003	2004	2005	2006
Countryside	−3.7	−4.7	−4.7	−4.2	−1.8
City	−4.7	−4.9	−4.2	−5.3	−3.2
Whole Region	−4.6	−4.9	−4.3	−5.1	−2.9

Nevertheless in 2007 death rate from external causes began to reduce and totaled 234.2 per 100 thousand people (2006 – 272.4).

- Mortality of people in working age from unnatural causes decreased from 79.4 per 100 thousand in 2006 to 77.1 in 2007 (in males – from 84.2 to 82.3, in females – from 64.2 to 61.0).
- For the period 2006–2007 the number of suicides in the Region decreased by 9%, including those of people in working age by 13%.

Natural increase

See Table 6.

Dynamics of population movement indices in Irkutsk region for the period 1970–2007 (per 1000 people)

Average life expectancy in Irkutsk Region is 60.43 years (data of 2005), this index is 65.3 all over Russia. There is still a big gap between the meanings of this index in males and females: males' life expectancy is 53.4 years (it is 5 years less than all over Russia), females live for an average of 68.7 years (it is 3.7 years less than the average in Russia) (Fig. 4).

Children's mortality

The index of children's mortality in the age group 0–4 years is 3.08 per thousand newborns of the corresponding year of birth. This index decreased by 4.3% in comparison with 2005. In the age group of 0–14 years old this index is 1.34 per thousand (2004 – 1.34), in adolescents it is (15–17 years old) – 1.3.

The main causes of children's death in the age from 1 to 14 years old are:

- Accidents, poisoning, and traumas – 56.2% of all death causes;

- Congenital anomalies – 8.9%;
- Nervous system diseases – 8.9%;
- Oncologic diseases – 6.4%;
- Respiratory organs diseases – 5.9%;
- Infectious diseases – 3.9%; and
- Cardiovascular system diseases – 2.9%.

In 2006 infant mortality decreased by 6.4% and totaled 11.7 per thousand infants born alive (In Russia – 10.5). Neonatal death rate of newborns is 5.9 per thousand, which is lower than the same index in the rest of Russia.

Analysis of early neonatal mortality structure showed that the leading position among causes of death occupy congenital malformations (34.3%); the percentage of intrauterine infections and asphyxia as causes of death decreased. The number of losses from respiratory distress syndrome remains the same. In the structure of congenital malformations (as causes of death) the first place is occupied by defects of lungs development (40%), the second place by congenital heart diseases (35%), and the third place by multiple congenital malformations (15%) (Table 7).

Infant mortality

- Level of the index in Irkutsk Region is 11 children, died before 1 year old per 1000 newborns (2007).
- Positive tendency – index decrease (in comparison with 2006 by 7%).
- Death rate in the first 6 days of life – 2.1 per 1000 newborns (decreased by 9%).
- Death rate during pregnancy and first 6 days of life – 8.2 per 1000 deliveries (decreased by 8%).
- Mortality – 5.4 per 1000 deliveries (no changes).

Table 7. Perinatal mortality

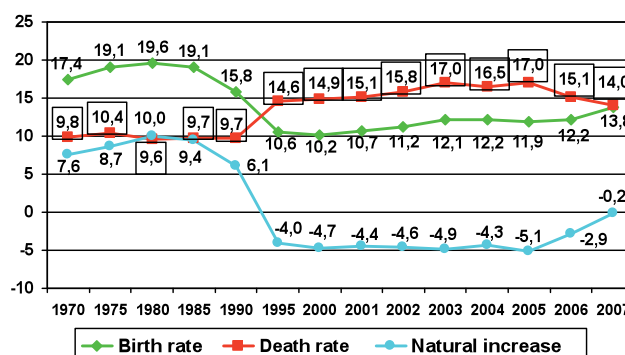| Year	Per thousand people born alive and dead		
	Died in perinatal period	Including	
		Stillborn	Died before 7 days of age
2005	9.1	5.5	3.6
2006	9.1	5.5	3.5

Fig. 4

Main causes of infant mortality:

- Perinatal period diseases – 42.7 per 10 thousand (2005 – 43.7 per 10 thousand), congenital anomalies – 23.6 per 10 thousand (2005 – 19.7 per 10 thousand).
- Respiratory organs diseases – 15.9 per 10 thousand (2005 – 11.9 per 10 thousand).
- External causes of death – 9.7 (2005 – 14.4 per 10 thousand).
- Infectious and parasitic diseases – 4.1 (2004 – 5.3 per 10 thousand).

Among children died during the first year of life every third child lived in a family of high medico-social risk. In 2006 with the introduction of modern perinatal technologies the quality of medical aid has grown, the index of losses connected with perinatal period diseases continue decreasing.

Summarizing the above information we can underline that the demographic situation is unstable on the territory of Irkutsk Region. The biggest concern is that the high death rates of population especially in the working age are mostly conditioned by "guided" causes. It should be also noted that those reforms that are now being performed in Russia in the sphere of healthcare (in particular, realization of national project "Health") are specifically aimed at solving this problem. Owing to that in the near future we can expect positive dynamics of the above public health indices. This presumption is confirmed by the latest data, the analysis of which is being done now.

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Aging scenario and its health problems in Nepal

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Abstract

Nepal is a small, underdeveloped and landlocked country. It is the home of Mount Everest and over 23 million people of different races, tribes, languages and religion. It is situated on the southern slopes of the middle Himalayas. It stretches over a length of 885 Kilometers (east-west) and a width of 145 to 241 Kilometers (north-south) surrounded by Tibetan autonomous of China in the north and India in the east, south and west. The country is divided into three ecological zones namely mountain, hills and tarai.

According to UN convention, old age begins at the age of 65 years. But in case of Nepal different ages are used as starting of aging. At governmental level, the retirement of civil servant is fixed at 58 years. Therefore for civic servants, the aging is supposed to start after completion of age 58 years. But in universities, the retiring age of teachers and administrator is 63 years; therefore for them aging starts after completion of 63 years of age. But for the purpose of legal activities and granting of pension to general mass, the age fixed for a person to be old is 75 years.

Aging is the ultimate manifestation of biological and demographical aspects in individual human being and population at large (Fig. 1). Although aging population is now regarded as a worldwide priority, research in this field is just beginning in Nepal. Elderly population is increasing both in absolute number and as a proportion of total population in Nepal, but traditional family supportive norms and values to elderly are constantly eroding. So, elderly population will be one of the most neglected groups of population in the society if due attention is not paid to address this particular issue in time by government and non-governmental organizations as well as civil society.
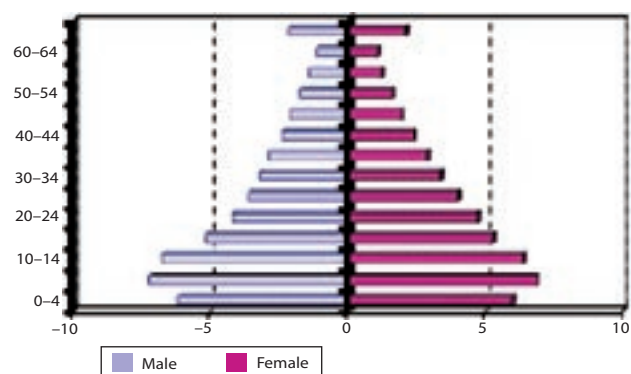
Fig. 1. Scenario of aging in Nepal

The main objective of this paper is to provide the brief description of aging and its health problems in Nepal. All the data presented in this paper were obtained from secondary data, national census, survey and other published sources.

Population pyramid is considered to be one of the best ways to describe age and sex structure of population. Among total population (23,151,432), only 4.21 percent of them are 65+ years. The percentage of 65+ years has increased from 2.43% in 1991 to 4.21% by 2001. For the 75+ years, the increment is from 0.45% to 1.3% for the above period. The elderly dependency rate is also increased from 7.5% in 1991 to 12.01% in 1991 [3].

Index of aging and median age of population

Demographers use the index of aging and median age of the population as an index to measure the population aging. Population is described as young if the index of aging is under 15 percent and old if its value is over 30 percent. In the same way a population is described as young, intermediate and old if the median age lies under 20, between 20 and 29 and equal to or above 30 years respectively.

Table 1 shows that both index of aging and median age are increasing in Nepal. The population of Nepal is moving slowly from young to old. The increase in index aging as well as median age is significant between 1991 and 2001.

In the future, the index of aging and median age can be expected to increase because of changes in birth rate and decline in overall mortality. When we compared the aging situation with SAARC courtiers, Sri Lanka has the highest index of aging (22.22%) followed by Bhutan with a magnitude of 12.86% and least index of aging is observed in Bangladesh with figures of 7.5%. In Nepal, the index of aging at 65+ years is observed as 9.76%. As compared with developed countries (USA, Canada, West Europe and South Europe), the index of aging in Nepal is much less [3].

Expected number of aged person in Nepal

Though there is little expectation of changes in the percent of aged person, the absolute number of aged person is expected to increase rapidly because of continuous rise in population from one census to another. According to projection made based on census 2001, those aged 60+ years in Nepal will increase from 1586 thousands in

Table 2. Projected aged person in Nepal, 2006–2031, in '000's				
Characteristics	2006	2011	2021	2031
Projected Population	25332	27718	33184	39728
% of Pop Aged 65+ Years	4.01	4.09	4.25	4.41
Projected Pop Aged 65+ Years	1586	1763	2177	2690
% of Pop Aged 75+ Years	1.21	1.26	1.35	1.44
Projected Pop Aged 75+ Years	307	349	448	572
Population Monograph, 2003 pp 268				

2006 to 3690 thousands in 2031 (69.6% increase in 25 years). Those aged 65+ years will be increased from 1015 thousands in 2006 to 1752 thousands in 2031 (72.4% in 25 years). Similarly, those aged 75+ years will increase from 307 thousands in 2006 to 572 thousands in 2031 (an increment of 86.3% in the same number of year) (Table 2).

Causes of disability among the aged

As age advances, a person is exposed to many physical and mental defects. According to 2001 census, disability rate including both physical and mental cases for whole Nepal is found only 0.46% with sex wise rate of 0.42% for male and 0.50% for female. The sample survey 2003 done in Bhaktapur and Sarlahi districts of Nepal shows the disability rate of about 3%.

Out of total disabled among age 50+ years, physical disability (31.75%), blindness (30.07%), deafness (25.04%), mental retardation (7.4%) and multiple disabilities (5.09%) were reported by 2001 census. The census does not provide data about the cause of disability. According to the sample survey in Bhaktapur, the major causes of disability among 50+ years aged person were infectious and non-infectious diseases, accidents and mental problems.

Causes of death at aged 65+ years

Death occurs at old age due to many causes. One of the causes is the natural process due to aging. Others are due to various diseases, accidents and suicides, etc. Among twenty five specific reasons of death among 65+ years, the third specific cause is asthma (9.57%), followed by cancer (4.61%). Next to cancer, tuberculosis and heart diseases are the main causes of death among males and heart diseases and cancer among females [2].

Government initiatives for aging

Senior citizens are assets for the nation because they carry social values, tradition and culture. The state should properly honor and protect senior citizens. So the Government of Nepal has taken following strategies for promotion of the health of the elderly.

Table 1. Index of aging and median age of population		
Census Year	Index of Aging	Median Age
1971	13.86	20.30
1981	13.81	19.90
1991	13.58	18.92
2001	16.70	20.00
Population Monograph, 2003 pp 80		

- The experience of elderly will be harnessed for the sake of national development
- Elderly homes will be established in all five developmental regions
- The rights of senior citizens will be assured along with social and economic security
- Reservation of seats and fare concession for senior citizens on public transport
- Use of the abilities and experiences of the elderly in local level policy making
- Motivating the local elderly to participate in social and economic activities
- Involving the elderly in sharing their experience with the young and participation in the local level committees.

(Source: NPC/HMG. The Ninth Plan (Unofficial translation). National Planning Commission)

Conclusion

Since Nepal is in demographic transition, aging index for Nepal is very unlikely to grow rapidly. However, in absolute figures the number of aged 60+ years will increase from expected figures of 1586 thousand in 2006 to 2690 thousand by 2031. Also, the population of the elderly person is increasing rapidly from 10.51% in 1991 to 20% in 2001. Management of this growing number of aged person will be a difficult task for both government and society. Though aging is still not considered social, economical and health burden in Nepal, the changing Nepalese life style from traditional ways to western ways not only may create serious social problem but also give more pressure on demand of health services. Government and non-governmental organization as well as civil society should take more interest in the welfare of the aged people. In national level, government should strengthen the national policy to provide health care and social security for aged and should implement it in action.

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Population changes and aging trend in Taiwan

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According to the projection of the United Nations, the share of the elderly will reach near 30% in the more developed countries, and around 15% in the less developed countries by 2050 [4]. Undoubtedly, population aging will be a universal trend in this century. Like most Western countries, population aging is underway in Taiwan primarily due to low fertility and a prolonged life span (life expectancy was 81.7 years and 75.5 years for females and males respectively, in 2007). Taiwan has a total population of 23 million, ranking 48th in the world. The elderly had reached 7% of Taiwan's total population in 1993, and 10.2% at the end of 2007. The proportion of the elderly in Taiwan is not significant in contrast with the developed countries. However, its rate of increase is projected to be one of the fastest in the world. Nearly 40 percent of the population will be over age 65 in Taiwan in 2050.

This paper is divided into three parts. First, we will show an overview of the changes in population structure and the projection of aging in Taiwan. Second, we will analyze the change in family structure over the recent two decades by using Survey of Family Income and Expenditure (SFIE) data and indicating the living arrangements and the economic situation of the aged in Taiwan. Finally, a few social policies responsive to the challenges of population aging are discussed.

Changes in population structure in Taiwan

Since 1950, Taiwan witnessed a post-war baby boom in which around 400 thousand babies appeared each year between 1950 and 1967. The total fertility rate (TFR) peaked at 7 per woman in early 50s and declined since then. Although the trend of decreasing birth rates started in the 1950s, it was primarily the launching of family programs, the diffusion of contraception in particular, along with urbanization which contributed to the reduction in fertility in the 70s and 80s. In 1984, the TFR reached 2.1 (the population replacement level), marking an important turning point in the demographic transition of Taiwan. The TFRs continued to fall until the year 2000, a Dragon Year, when the TFR ascended to 1.7. The TFR rapidly decreased since then and dropped to 1.1, with 204 thousand babies born and with 2.76‰ natural growth rate, in 2007. In contrast to the overall global average of the TFRs, which is 2.7, and with that of the

Table 1. Percent distribution of population by age and dependency ratio in Taiwan

Year	Total population (million)	Age structure (%)			Dependency ratio (%)			Aging index
		0–14 years	15–64 years	65 years and over	overall	Young age population ratio	Old age population ratio	
1960	11.21	45.85	51.66	2.49	93.6	88.8	4.8	5.4
1980	17.87	32.09	63.63	4.28	57.2	50.4	6.7	13.3
2000	22.28	21.11	70.27	8.62	42.3	30.1	12.3	40.8
2007	22.96	17.56	72.24	10.21	38.4	24.3	14.1	58
2020	23.72	12.8	71	16.2	40.8	18	22.8	126.7
2030	23.78	12	64	24	56.2	18.7	37.5	200.6
2050	21.41	10	54.1	35.9	84.8	18.4	66.4	360.4

1. Ministry of Interior, Population Statistics Yearly ROC, June 2008. 2. Council for Economic Planning and Development, "2008–2056 Population Projection in Taiwan ROC", Sep. 2008.

more developed countries, which is 1.6, Taiwan is at the lowest level in the world.

Like most of the developed countries, Taiwan in the 20th century also showed a decline in mortality that preceded a decline in fertility. However, owing to the very low fertility rates in recent years and the aging of the baby boomers in the near future, the proportion of the elderly population will rapidly increase. It will reach 16.2% in 2020, and 35.9% in 2050, according to the middle projection by the Council for Economic Planning and Development (CEPD) in 2008 (see Table 1). In other words, the aging rates will grow faster in Taiwan than in most of the developed regions in the future. It will take only 24 years for the aged portion of the Taiwan population to rise from 7% to 14%.

Table 1 also shows that the dependency ratio for the aged population was 14.1% in 2007, and will rise to an estimated 37.5% in 2030 and 66.4% in 2050. Needless to say, the labor participation rates and employment rates, the burden for a working age (15–64 years old) person then will ascend to near 5 times that in 2007. The aging index of the population in 2007 was 58% and will reach 127% in 2020, surprisingly, more than 360% in 2050. That is, the elderly population will be at least 3.6 times as large as that of the young population in 2050. As a result, the burden of supporting elderly people will become unbearable for most families in Taiwan, and productivity may be likely to fall in the future.

Change in family structure and socioeconomic impact for the elderly

A decline in family size and the increase in nuclear families were the major indicators of changes in family structure in Taiwan over the last 50 years. With the increase in total population and the decline in the household size, the numbers of total households rose rapidly in these years. In addition, the number and the proportion of heads of household aged 65 or over also increased in recent decades. In 1994, there were 9.0% of total households of which heads were aged 65 and over. The percentage increased to 13.1% in 2000 and to 15.7% in 2007. Those households with the aged cohabiting also increased significantly at the same time. In 2007, around one third of overall households had elderly members cohabiting.

The changes in family structure indicated not only a greater proportion of households with aged heads, but also fewer chances for the elderly to live with their children. Table 2 shows the living arrangements of the elderly from the recent three waves of the Survey of Living Conditions of the Elderly in Taiwan. As we can see, the proportion of the elderly who are living alone and living only with a spouse or partner has been rising, while the proportion living with children has been falling in recent years. It is worth noting, however, that still more than 60 percent of the elderly are living with their child-

Table 2. Living arrangement of the elderly in Taiwan (%)

Year	2000	2002	2005
Total	100.0	100.0	100.0
Live alone	9.2	8.5	13.7
Live only with spouse/partner	15.1	19.5	22.2
Live with children	67.8	63.4	61.0
Others	5.6	7.5	3.1

Ministry of Interior, Survey for the Living Conditions of Elderly People, 2000, 2002, 2005.
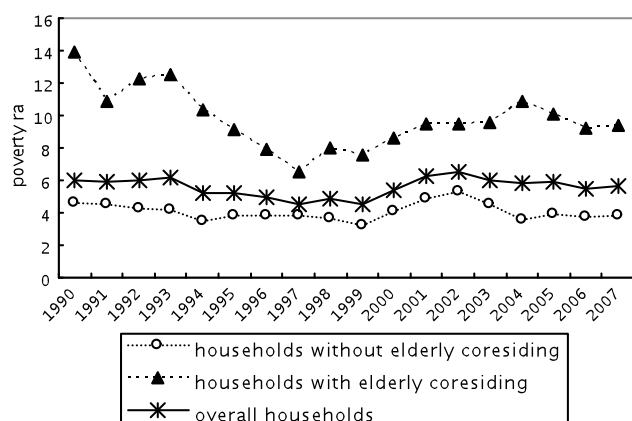
Fig. 1. Poverty rates of households with the aged and the non-aged in comparison (Source: The authors calculated from SFIE data, 1990–2007)

ren, which is relatively high compared with most of the developed countries.

Owing to the changes in family structure along with the trend of population aging, welfare policy on senior citizens has been enhanced in recent years. Whether the rising number of elderly people living alone or separately from their families may deteriorate their economic security is a crucial theme to be considered for social policies.

To examine this issue, we employed data from the Survey of Family Income and Expenditure (SFIE), 1991–2007 waves, to estimate the poverty rates of households with and without the coresident elderly. The poverty line was defined in this paper as below half the median of family disposable income. Figure 1 describes the trend in poverty rates between 1990 and 2007 for households with and without the coresident elderly. As we can see, the poverty rates of the former remained significantly higher than those of the latter. The gap was shrinking before 1998 but grew again after 2000. On the basis of the data in these survey years, the poverty rates of the overall households in Taiwan were between 5% and 7%, which is low compared with developed countries. Likewise, the poverty rates of households with the elderly, although increased in recent years, remained below 10% in most years.

Like most developed countries, the demand for economic security for the elderly in Taiwan keeps rising while the family's function of economic security protection keeps falling. It seems to be an irreversible worldwide phenomenon that challenges the government to reconsider the social policies. Table 3 reports the sources of major living expense for the elderly in Taiwan and shows that the proportion of the traditional major living expense source for the elderly. That is, payment provided by children or children-in-law, was falling in recent years, while the proportion of assistance or allowance by the government was increasing over time. This implies that the government has played an increasingly important role for protecting the economic security of the elderly in Taiwan. Unfortunately, government transfers, although increased in the past decade, seem to have not functioned well, considering that the poverty rates of the elderly households have shown no sign of declining (see Fig. 1).

Conclusions

Mainly due to fertility declining and population longevity, Taiwan has been experiencing a new scenario of increasing lone and poor elderly people that challenges her traditional Confucian values of family support. The function of care and support in the family is deteriorating because of the change in living arrangement and family structure. As a result, government is asked to take more responsibility for taking care of the elderly by delivering services and providing cash allowances. To some extent, the government has in fact paid a great deal of attention on welfare benefits of the elderly to meet the increasing need of aged citizen. Some local governments had launched a program, named senior citizen allowance, in the early 1990s, even before Taiwan reached the aging threshold. Unfortunately, the economy of elderly people is still insecure.

The new government, inaugurated in May 2008, has proposed some measures for creating more friendly and less burden circumstances for young people to marry and raise children. We raise a question regarding the poverty of the aged and suggest a U-turn of government transfers – that is, a shift from increasing senior citizen allowance to encouraging the co-residence of

Table 3. Source of major living expense for the elderly people in Taiwan (%)						
Source Year	Working salary (including spouse)	Retirement pay, insurance payment	Savings, interest, rent, investment earnings	Payment provided by children (including children-in-law)	Assistance by society, relatives, or friends	Assistance or allowance by government
1989	10.95	11.87	16.11	58.37	0.86	1.23
1991	10.78	16.07	17.41	52.37	1.09	1.57
1993	10.85	14.76	19.18	52.3	0.86	1.61
1996	11.64	17.55	15.21	48.28	0.4	6.37
2000	13.72	15.93	9.26	47.13	0.53	12.33
2002	13.4	16.48	10.28	44.11	0.31	14.81
2005	14.49	13.04	9.22	46.48	0.46	15.97
Ministry of Interior, Survey for the Living Conditions of Elderly People, 1989, 1991, 1993, 1996, 2000, 2002, 2005.						

adult children with their elder parents, which may correspond to the traditional value of filial piety and also help improve the economic situation of the elderly.

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Role of poly(ADP-ribose) polymerase in genomic stability and ageing

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Ageing is an universal biological phenomenon in multicellular organisms which is characterised by the accumulation of molecular damage in biological macromolecules including DNA, proteins and lipids. The genotoxic stress induced by reactive oxygen species is believed to be the major driving force for cellular ageing, DNA base-excision repair is a key pathway for eliminating oxidative DNA damage, and is enhanced by PARP-1 (EC 2.4.2.30) [1]. Maintenance of telomere length is also very important for replicating human cells to avoid cellular senescence and replicative crisis. PARPs serve as positive regulators of telomere length, and alleviating its negative influence on telomerase activity, and can help to switch the telomeric structure. In addition, PARPs can interact with proteins, such as WRN (the protein deficient in Werner syndrome), which serve to prevent premature ageing and postpone the onset of age-related diseases. Moreover, several PARPs are components of the mitotic apparatus and appear to have a regulatory function regulating chromosome segregation, and they may also counteract genomic instability at this level. PARPs and their reaction product, poly(ADP-ribose), take an active part in DNA damage surveillance and regulation of cell division by interacting with important cell cycle regulators like p53. A set of correlative data link cellular poly(ADP-ribosyl)ation capacity with life span in mammalian species and also with longevity in humans.

To gain insight into the molecular mechanism by which PARP-1 controls genome stabilization and ageing in vivo, the PARP-1 gene was disrupted in mice. Mice devoid of PARP-1 develop normally, and carry out normal DNA excision repair; however, proliferation of embryonic fibroblast cells was compromised under an environmental stress condition. Although PARP-1 null mice were hypersensitive to the whole body γ-irradiation and alkylating agents, these mice are protected from experimental-induced diabetes, brain stroke, indicating that the massive activation of PARP-1 regulates cell death pathways following acute DNA damage.

Functions of PARP-1 in controlling telomere length and chromosomal stability

Studies on the effects of the inactivation of PARP-1 gene in mice have demonstrated roles for PARP-1 in maintaining chromosomal integrity and in suppressing recombination processes involving DNA end. Telomeres are the natural end of chromosomes and are, therefore, potential targets for PARP-1. We have demonstrated that mice lacking PARP-1 display telomere shortening in embryonic fibroblasts (EFs) and in adult cells compared with wild type mice. Furthermore, cytogenetic analysis of mouse EFs reveals that lack of PARP-1 is associated with severe chromosomal instability. This study reveals an unanticipated role for PARP-1 in telomere length regulation and provides insight into its function in maintaining genomic integrity. Furthermore, we have studied effects of DNA nonhomologous end-joining factors on telomere length and chromosomal stability in mammalian cells.

Genetic interplay of PARP-1 and p53 in epithelial and brain tumor development

Poly(ADP-ribosyl)ation is an important posttranslational modification process of nuclear proteins in response to DNA damage. Biochemical studies have shown that p53 is one of the major targets of PARP-1. To study the biological consequence of their interaction in vivo, we have generated PARP-1/p53 double mutant mice. Although p53 mutant mice develop mainly lymphoma and sarcomas, a high frequency of carcinomas in the mammary gland and prostate was obtained in PARP-1 deficient p53+/– mice, and brain tumors in PARP-1 deficient p53–/– mice. Interestingly, the tumor spectrum of PARP-1/p53 double mutant mice is reminiscent of human Li-Fraumeni syndrome (LFS), a hereditary familiar cancer syndrome. Molecular cytogenetic studies have demonstrated that PARP-1 mediated telomere length maintenance is p53 dependent. In ad-

dition, PARP-1 deficiency facilitates the loss of tumor suppressor p53 in the tumors. This study has identified the synergistic role of PARP-1 and p53 in suppressing epithelial transformation [2]. Therefore, these mice provide a useful tool to study the molecular basis of LFS.

Synergistic role of PARP-1 and Ku80 in suppressing hepatocellular carcinomas

Ku80, a DNA binding subunit of the DNA-PK complex, is one of the DNA damage early response molecules, and has been implicated to interact with PARP-1 at DNA ends. To study the biological significance of the interplay between PARP-1 and Ku80, we have generated PARP-1/Ku80 double mutant mice. Although PARP-1/Ku80 double null mutation results in embryonic lethality at E9.5, haplo-insufficiency of Ku80 in PARP-1 mutant mice promotes hepatoma and hepatocellular carcinoma (HCC) formation. These tumors exhibit a multistage progression associated with loss of E-cadherine, mutation of β-catenin, and high rate of recurrent chromosomal non-reciprocal translocations, mimicking human HCC. Interestingly, haplo-insufficiency of PARP-1 in Ku80 null cells causes more severe telomere shortening and chromosomal aberrations compared with either PARP-1 or Ku80 single null cells. Additionally, DNA-PK and p53 pathways are compromised during HCC development in these mice. This study provides further evidence to support the notion that PARP-1 is essential in suppressing epithelial transformation. PARP-1/Ku80 deficient mice therefore represent a mouse model for human HCC [3].

PARP-1 is essential in suppressing mammary carcinoma formation

We have observed that PARP-1 deficiency causes mammary carcinoma formation in mice after long latency. Using primary cultured mammary epithelial cells, we found that PARP-1 deficiency leads to centrosome amplification, chromosomal aberrations, and compromised p53 function, which may represent early molecular and cytogenetic events towards malignant transformation. Notably, introduction of p53 heterozygousity into PARP-1 mutant females accelerates mammary carcinogenesis. In addition, p53-null mutation significantly increases PARP-1 deficiency-induced mammary epithelial cells malignant transformation at young age. Our results demonstrate that PARP-1 deficiency-induced centrosome amplification and chromosomal instability triggers genetic alterations, including loss of p53 wild type allele in mammary epithelium that contributes to tumor formation [5].

Role of PARP-1 in neuronal cell malignant transformation

Primitive neuroectodermal tumors (PNETs) are highly malignant primary central nervous system tumors, which account for 25% of all intracranial tumors, and medulloblastomas are the most common PNET of the cerebellum in children. Although much effort has been made to study the pathogenesis of PNETs/medulloblastomas, their molecular mechanisms remain largely unknown, partly due to the difficulty in obtaining human samples and lack of animal model for this type of tumor. Unexpectedly, PARP-1 deficiency induces a 45% of PNETs/medulloblastomas at the cerebellar posterior fossa, with an early age onset, mimicking human paediatric medulloblastomas, with comprised p53 checkpoint failure [4]. This result implies that DNA repair molecules play a critical role in suppressing neuronal cell malignant transformation. We therefore attempted to understand how PARP-1 deficiency could lead to medulloblastomas. We have identified that re-activation of neuronal specific transcription factor, math1, in PARP-1 deficient medulloblastomas, and granule cell precursors retained at cerebellar external germinal layer (EGL) is the "cell of origin".

Perspectives

A large body of evidence, mainly from rodent studies, shows that PARP-1 and/or poly(ADP-ribosyl)ation play a role in the maintenance of chromosomal integrity and the suppression of neoplastic transformation. Because of limited information in the PARP-1 locus in human and the nature of its large genomic sequences there is insufficient information available for studying its direct involvement in human cancer. We believe that technical advances and the availability of the full human genome sequence, derived by the human genome project, will facilitate our study and advance our understanding of the role of PARP-1 in ageing and tumorigenesis in human. In addition, resolving the precise mechanisms by which PARP-1 mediates genome stabilization and protect cells from malignancy represents a great challenge. Studies proposed here would not only provide mechanistic clues on the function of PARP-1 and poly(ADP-ribosyl)ation in controlling genomic stability but also deliver direct information on the possible involvement in human cancer, which may facilitate development of new therapeutic strategies to combat ageing as well as cancer.

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Yeast mother-cell-specific aging and the intrinsic aging process of human skin

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Over the last 10 years our group at the University of Salzburg has studied intrinsic cellular aging processes, in particular the role of mitochondrially and extramitochondrially generated oxygen radicals in yeast mother-cell-specific (replicative) aging. In this study, we are concentrating on yeast genes that have been functionally conserved in evolution and could shed light on the aging processes in all eukaryotic cells. Recently we have also studied intrinsic aging of human skin and discovered some striking parallels between the differential transcriptomes in the two aging model systems.

We have discovered two yeast mitochondrial proteins, Lrm1p and Mmi1p, which are functionally involved in apoptosis and the determination of lifespan. A deletion mutant of YGR076C (*LRM1*), coding for a mitochondrial ribosomal protein, caused marked resistance to oxidants and led to a 60% increase in the mother-cell-specific lifespan. Further genetic investigation of YGR076C showed a signaling function in a pathway that we propose to call "mitochondrial back-signaling". Components of this pathway are the TORC1 kinase and the transcription factor, Sfp1p.

Mmi1p, the yeast homolog of the highly conserved eukaryotic TCTP (translationally controlled tumor protein) family, in stressed yeast cells shuttles from a cytoplasmic location to mitochondria. At the same time, the mitochondrial network is fragmented forming numerous small roundish mitochondria [3], a process that is also observed in human cells under oxidative stress. Mmi1p prevents apoptosis of yeast cells induced by mammalian Bax. Mammalian TCTP is also anti-apoptotic but does not shuttle to mitochondria. A subfraction of the protein in both systems shuttles to a nuclear localization.

Superoxide radical ions are produced in eukaryotic cells not only by the mitochondrial electron transport chain, but also by specialized membrane bound NADPH oxidases. Superoxide and its reaction products have been discussed previously mainly as waste products that cause cellular aging and numerous pathologies, as well as acting as defense against pathogenic microbes when produced by phagocytes. Recently, superoxide (and/or hydrogen peroxide) is(are) believed to be physiological signaling substances, most probably transmitting a positive signal for growth and/or cell cycle progression. NADPH oxidases were previously unknown in yeast cells. We have identified and characterized the yeast superoxide producing NADPH oxidase (*NOX1*) and are studying the role of this enzyme in aging and apoptosis. This enzyme is located in the perinuclear ER (like NOX4 in endothelial cells), is under control by activated *RAS2* alleles and is partly responsible for the elevated level of superoxide and the extremely short lifespan in the oncogenic $RAS2^{ala18,val19}$ mutant. Deletion of the yeast caspase, *YCA1*, prevents death induced by overexpression of *NOX1*.

We are investigating the transcriptional changes in human skin of elderly and young patients (unpublished work), comparing them with the results of published work on the transcriptome of human skin sebocytes treated with hormone mixes corresponding to serum of young and elderly women [2] and with the transcriptome of young and old yeast mother cells [1]. To exclude photo-aging of skin from our investigation and because of easy availability of skin samples, human foreskin of 3 patients aged 3–5 years, 3 young adult patients, and of 5 patients aged 56–73 years was studied. Care was taken to include only healthy skin in the study. Total RNA was prepared and analyzed on Affymetrix HG-U133PLUS 2.0 microarrays which can measure nearly 55000 different human transcripts, represented by 22 independent probes per transcript. The primary data were analyzed using Array Assist software (Stratagene). All pairwise comparisons of young vs. old skin were performed and analyzed with very high consistency of the results. Quantitative real-time PCR confirmed a high percentage of the microarray results. The expression of vitamin D receptor (VDR), and of vitamin D biosynthetic and catabolic enzymes was differentially regulated in old skin. One striking result was that squalene epoxidase, a key enzyme of steroid biosynthesis, was significantly up-regulated in aging cells in both systems. In yeast, a large number of lipid biosynthetic enzymes and regulators are up-regulated in old cells. In skin, seven genes were found in this functional class. Among the large group of genes that are skin-specific and have no counterpart in yeast, very clear transcriptional changes were found that could explain some of the obvious and medically important changes in aging skin.

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Animal models on counteractive measures against age-associated decline and disease

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Aim

The continuously inverting age pyramid underlines the importance of studies into the effects of interventions in support of healthy aging. These studies are difficult to perform in humans for methodological and ethical reasons, whereas mammals with an appropriate life span provide an excellent model to analyze aging and to study physical and pharmacological measures.

Materials and methods

Species analogies with regard to aging have been analyzed longitudinally in aging cohorts of rodents [3, 4] and dogs as well as by cross-sectional studies in rats, dogs [2] and horses [1]. In addition, the influence of particular interventions on aging e.g. the influences of exercise, diet [3, 4] and cognitive stimuli [5] were determined in general survival studies and in investigations on systems most compromised by age-related decline e.g. the immune [2, 3] and cognitive system [4, 5].

The effects of exercise and/or caloric restriction were studied in male Sprague-Dawley rats, divided into four groups, living from 5 months up to 15, 19 and 23 months of age as follows: voluntary running in wheels (group RW), food restricted by feeding to pair weight with RW animals, forced running on treadmills, and sedentary controls with ad libitum access to food, housed single or in groups of 4. Age-impaired T-cell-mediated immunity was measured by lymphocyte proliferation test (blastogenic response to Con A) and incorporation of tritiated thymidine; data were then expressed as ⯀cpm [3].

The effects of oral L-carnitine supplementation on carnitine palmitoyltransferase I (CPT1; critical enzyme affecting mitochondrial fatty acid oxidation and energy metabolism) were studied in male Sprague-Dawley rats. L-carnitine was administered orally in drinking water to old (21 months) and young (7 month) male Sprague Dawley rats for a period of 3 months, CPT1 was analyzed in hepatic tissue by real-time PCR.

Cognitive stimulation and stimulus deprivation were analyzed in female Sprague-Dawley rats which were stimulated from the age of 9 to the age of 21 months (ìretirement ageî) by operant conditioning tasks, whereas 30 control rats were kept under standard laboratory conditions. At 21 months all rats were tested for learning and memory and the group of cognitively stimulated rats was divided into 2 groups, one which continued to perform operant conditioning tasks, whereas the second group was thereafter kept under standard laboratory conditions without any stimulatory influence, similar to the control group. At the age of 26 months the survivors of all 3 groups were tested again for learning and memory [5].

Results

Analogies between the analyzed species with regard to age-associated changes in clinical (Fig. 1) and laboratory parameters (Fig. 2; [1–3]) were confirmed. We were furthermore able to demonstrate significant positive effects of exercise, diet [3] and cognitive stimulation

[4, 5] on the parameters under investigation such as survival, immune reactivity (Fig. 2), gene expression (Fig. 3) and cognitive performance (Fig. 4). The transcription rate and activity of CPT1 was significantly higher exclusively in old animals supplemented with L-carnitine compared to all other groups (Fig. 3). Animals subjected to lifelong cognitive stimulation show significantly superior results with regard to memory and learning in comparison to animals without cognitive
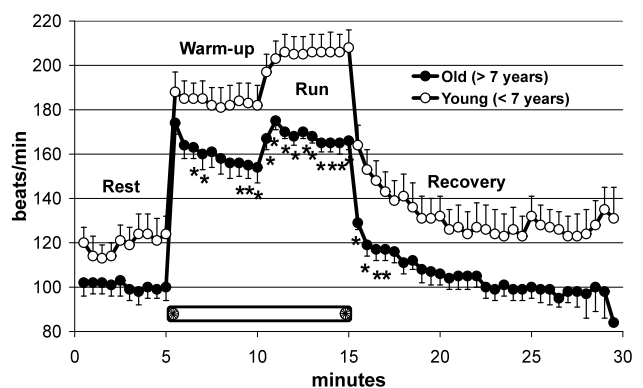

Fig. 1. Data of heart rate (beats/min in ECG; means ± SEM) in dogs during and after exercise on treadmill: The heart rate was significantly lower during exercise (*p ≤ 0.05) in the group of older dogs (> 7 years)
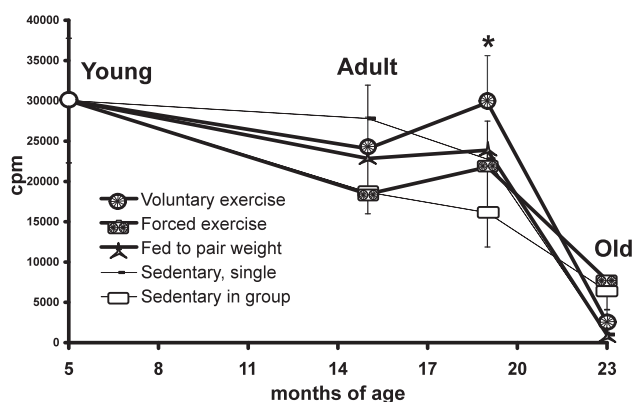

Fig. 2. Data of T-cell-mediated blastogenic reactivity (lymphocyte proliferation; means ± SEM) in 5, 15, 19 and 23 months old Sprague-Dawley rats subjected to different "life styles" (i.e.: voluntary exercise in running wheels, forced exercise on treadmills, caloric restriction and single or group sedentary housing) was significantly higher (*p ≤ 0.05) in the group of rats voluntary exercising in running wheels at the age of 19 months
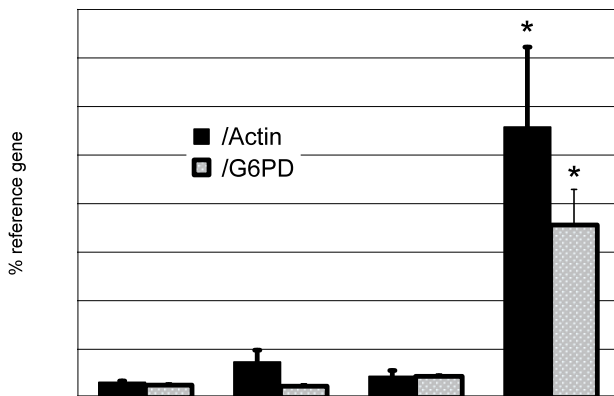
Fig. 3. Data of real-time PCR: CPT1 expression (% of reference genes; means ± SEM) in 10 and 24 months old Sprague-Dawley rats subjected to supplementation with L-carnitine. CPT-1 expression was higher (*p ≤ 0.05) exclusively in the group of old rats supplemented with L-carnitine (old Car)
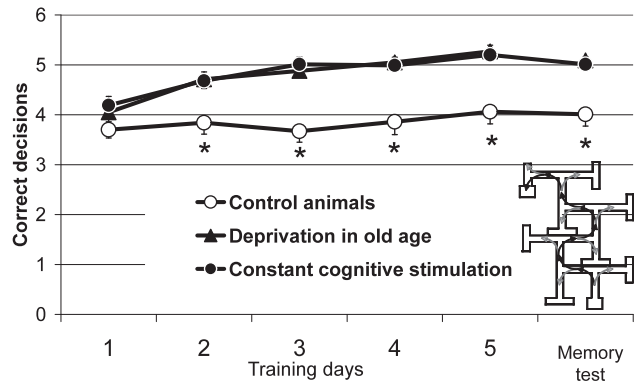

Fig. 4. Data of T-maze tests (5 days learning; memory test 2 weeks later): Correct T-maze decisions (means ± SEM) of rats without cognitive stimulation during aging (O), lateron deprived (▲) and continuously stimulated (●) rats; rats without stimulation did not show any increase in correct decisions, rats with cognitive stimulation took significantly more correct decisions (*p ≤ 0.05)

stimulation lifelong cognitively stimulated rats performed slightly (however, statistically not firm) better than rats deprived of stimulation in older age [5].

Conclusion

With regard to positive effects of interventions on aging in particular physical and/or cognitive stimulation both appear to be most appropriate and promising in order to counteract age-related decline and to delay the onset and progression of age-related diseases.

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Powerful strength of antioxidants is essential for the anti-aging therapy

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Process of aging is defined as the progressive decline in the physiological functions of an organism after the reproductive phase of life. There are two main theories of aging and free radical theory of aging is one of the most likely explanations for many years. Production of reactive oxygen species (ROS) induced by oxidative stress on the level of cellular mitochondria overwhelms the antioxidant defense mechanism of the body and damaged

cell again produce another cluster of ROS. These repeated and continuous damages are a kind of cascade mechanism and going on the whole duration of life. So lifelong cell-killings of ROS end in death of body and we call this the process of aging.

Free radical theory looks very obvious at the cellular level on the biochemical findings. The progress of aging is confirmed by a decrease in antioxidant defens-

es and an increase in oxidative damage in many studies. Mutation of mitochondrial DNA occurs with aging and it is known as the cause of overproduction of ROS. Antioxidant defense mechanism is active with the generation of oxidants and looks like supporting the repair mechanism for the oxidative damage in the body. So many have thought that it may be very easy and clear to protect from aging. Reducing the ROS with the antioxidants seems to be the most reasonable method to delay the aging. And many trials have been applied with various kinds of exogenous antioxidants and materials which enhance the strength of endogenous antioxidants to the treatment of aging process.

However, clinical outcomes of antioxidant therapy are quite controversial now. Some studies highlight the effectiveness of antioxidants and the others describe the disappointing results of ROS scavengers. As a whole, disappointing results for the anti-aging treatment with antioxidants are prominent. A plain truth derived from various experiences of anti-aging treatment with antioxidant is that clinical data of human being itself is not as definitive as in vitro and in vivo models of experiments. It may be due to the longevity of duration before confirming the anti-aging effect in the body of man and ambiguity of clinical results of antioxidant treatment. Other problem is that there is no good biomarker of oxidative damages. Although many biomarkers about oxidative attacks exist, we donot know which biomarkers are proper for detecting the relationships between aging and the oxidative damages.

The other interpretation for the controversial results of anti-aging – antioxidant regimen has somewhat quantitative aspect. We usually count on antioxidant ability of a material only based on the qualitative property. Even if we can find antioxidant property in many materials, we cannot say all these antioxidants can have clinical effectiveness with optimal dosage. On this point of view, singlet oxygen quenching rate can be regarded as the standard scale for the antioxidant effect. It reads the ability of antioxidant to soothe the cellular destruction of ROS and is very diverse among antioxidants. With the use of the quenching rate, for example, the potency of several kinds of carotenoid can be arranged from two or three times to more than ten thousand times greater than vitamin C or vitamin E. So all the antioxidants do not have the same effect to the body and even to the same antioxidants, and change of dosage may even affect whether anti-aging effect exists or not. In my animal experiments, end result of antioxidant effect is very different among antioxidants and these differences are found among various dosages in same antioxidants.

On the choice of antioxidant for the anti-aging treatment, the other point of view is toxicity. If the toxicity is increasing with the maximization of therapeutic dosage, the application of an antioxidant will be hesitated. Among potent antioxidants, many antioxidants should be abandoned because of toxicity. It makes the choice of treatment more limiting.

The standardization method for the evaluation of antioxidant strength should be considered for all the trials of clinical studies of anti-aging-antioxidant treatment in the future. So effectiveness of antioxidant treatment for the aging is described with united scale.

In conclusions, antioxidant therapy may be effective to prevent aging because ROS is probably one of the causes to make aging. However, for successful result of anti-aging, it needs life-long uses of effective antioxidants. Considering the effectiveness and toxicity, to use the antioxidants with powerful strength is much more favorable than those of weak ones with large dosage. To evaluate the effectiveness, more randomized controlled studies among various antioxidants are also essential. Objective criteria such as quenching ability to estimate efficacy of effects should be accepted as standard biomarkers for antioxidant uses for aging.

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Single nucleotid polymorphism for preventive medicine

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Genetic variations became the scientific breakthrough of last year. Preventive Medicine can be improved and individualized by the acknowledgement of single nucleotide polymorphism. As the senator of Illinois, Barack Obama underlined the importance of genomic medicine in 2006: "It is clear that genomics is starting to revolutionize the way in which healthcare is practiced. New research findings are being translated into tests and treatments in all areas of medicine. For many types of cancers, genomics-based medicine has already
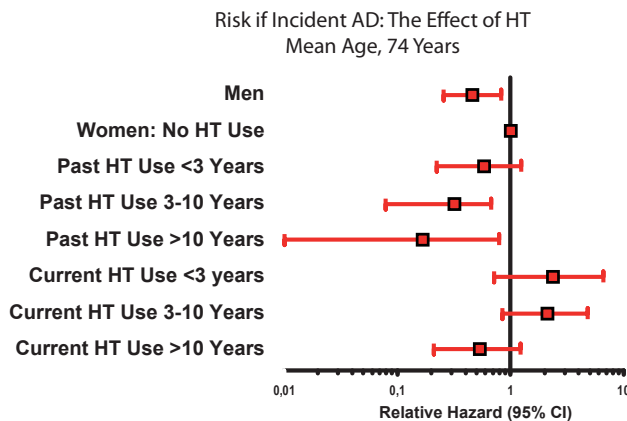
Risk if Incident AD: The Effect of HT
Mean Age, 74 Years

Fig. 1. Prothrombotic genes (such as factor V, factor II) steroid synthetising genes (CYP 17, CYP 19) and steroid metabolising genes (CYP 1 B 1, CYP 1 A 1 COMT) are excellent candidates for a safer and individualized hormone replacement therapy (Zandi PP, et al (2002) JAMA 288: 2123–2129)

had a major impact on the way in which patients are treated" [1].

Age-related macula degeneration (AMD) is a burden in the overaged population. Association studies demonstrated an etiological link between genetic variations in the complement system and this age-related disease.

Single nucleotide polymorphisms in the complement factor H (*CFH*), factor B (*CFB*), and *C2* genes, which probably render the protein products of these genes ineffective in inhibiting or regulating the complement pathway, are associated with 50 to 70% of cases of age-related macular degeneration. Estimates of the relative risk of age-related macular degeneration among carriers of these polymorphisms, as compared with noncarriers, range from 2.7 to 7.4. The CFH protein is involved in inhibiting the alternative complement cascade, in part by binding to the C-reactive protein that is induced by damaged tissue [2].

There are also some preventive trials available, demonstrating the preventive power of scavenger molecules, Omega-3-fatic acids and hormone replacement therapy.

Protective effect was found for soft drusen or neovascular AMD in relation to conjugated estrogens (CEE) and progestins (P). CEE + P may offer a protective effect for neovascular AMD. This is consistent with a case-control study that found a protective effect for CEE use but did not evaluate unopposed vs combination therapy. Cumming and Mitchell reported a lower risk of AMD in women using hormone therapy. A recent article by Freeman et al found a reduced risk of large drusen but not AMD associated with HT use [3].

Neurodegeneration becomes an enormous problem in the western civilisation, prevention of Alzheimer disease is a lifelong commitment. APO-E 4 Polymorphism is associated with a higher cardiovascular risk and also with a high incidence of Alzheimer disease. It is well known, that estrogen replacement therapy in the early menopause is preventive against neurodegeneration, in APO-E 2 and APO-E3 allels, but not in APO-E 4. In this risk population, androgens are investigated intensively for prevention.

By analyzing late-onset Alzheimer's disease (LOAD) in a genome-wide association study (313,504 SNPs, three series, 844 cases and 1,255 controls) and evaluating the 25 SNPs with the most significant allelic association in four additional series (1,547 cases and 1,209 controls), an SNP was identified (rs5984894) on Xq21.3 in PCDH11X that is strongly associated with LOAD in individuals of European descent from the United States. The analysis of rs5984894 by multivariable logistic regression adjusted for sex gave global P values of 5.7×10^{-5} in stage 1, 4.8×10^{-6} in stage 2 and 3.9×10^{-12} in the combined data. Odds ratios were 1.75 (95% CI ¼ 1.42–2.16) for female homozygotes (P ¼ 2.0×10^{-7}) and 1.26 (95% CI ¼ 1.05–1.51) for female heterozygotes (P ¼ 0.01) compared to female noncarriers. For male hemizygotes (P ¼ 0.07) compared to male noncarriers, the odds ratio was 1.18 (95% CI ¼ 0.99–1.41).

Clinical trials should clarify the possible protective role of androgens in this gender-specific genetic variation [4].

Detoxification enzymes such as superoxyddismutase and quinon reductase display also a genetic variation allowing an individualized preventive strategies. This was published for breast and prostatic cancer and lung cancer. Association studies demonstrated furthermore a genetic link between osteoporosis and Rank Ligand polymorphisms, allowing in individualized prevention against osteoporosis polymorphism.

Osteoprotegerin acts as the natural decoy receptor to the osteoclast-derived receptor activator of nuclear factor-κB ligand (known as RANKL) and displays an osteoprosis-associated genetic variation. Denosumab, a monoclonal antibody which mimics the action of osteoprotegerin, prevents bone loss in postmenopausal women, and clinical trials are underway. Furthermore, the identification of genetic variants which decrease both bone mineral density and expression of osteoprotegerin suggests that people with these variants might respond best to medications which increase osteoprotegerin concentrations. The existence of such medications allows the opportunity for personalised medicine on the basis of these genetic markers [5].

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A rapid method for the identification of free radical scavengers in herbs using HPLC coupled with DAD-MS and ABTS-based assay

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Oxygen-free radicals or reactive oxygen species (ROS) are well recognized to play a dual role in biological systems, since they can be either harmful or beneficial to living systems. The high concentration of ROS can induce the damage of cell structures, including lipids and membranes, proteins and nucleic acids, which lead to aging diseases, such as atherosclerosis and cardiovascular diseases, and neurodegenerative disorders. In the search for novel antioxidants, the current focus is toward those of plant origin. However, plants usually contain hundreds and even thousands of compounds, which make the identification of active compounds in them very difficult. Though some active components were discovered using the approach of extraction of herbs followed by pharmacological screening of the purified compounds, the way is time-consuming, arduous, and inappropriate for directly screening bioactive components from herbs.

Herein, a rapid method using HPLC coupled with DAD-MS and ABTS-based assay for the identification of free radical scavengers in herbs was introduced, which has been employed to elucidate the scavengers in essential oil of Danggui, one of commonly used Chinese herbs and Puer tea, a well-known traditional beverage in China.

In vitro metabolic pathway identification for herb medicines – effects of cytochrome P450 isozymes from human hepatocytes on inhibition of Platelet aggregation induced by Ginkgo extract

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For the wide use of the herbs, especially in the elderly, more and more attention is paid to herb metabolism and its interaction with synthetic therapeutics because the adverse effect of herbal medicines by its metabolic interaction alerted public. The effects of herbs on cytochrome P450 metabolizing enzymes (CYP450s) can be evaluated *in vitro* and *in vivo* procedures even the effective component(s) still remain(s) unknown. Hu and his colleagues reported the effects of more than 40 herbs on CYP450 isozymes including CYP1A2, 2A6, 2C9, 2C19, 2D6, 2E1 and 3A4 using both human liver microsomes and hepatocytes. However, it remains difficult to estimate the effects of CYP450s on metabolism of herbs before the effective component(s) of herb medicine is/are identified and/or applicable bioanalytical methods for quantification of the component (s) are developed and validated.

Combining *in vitro* efficacy model with *in vitro* metabolism modes was proposed to estimate metabolic stability of herbs and to identify metabolism pathway(s) for herbs recently. Pre-incubation of the herbs with human liver microsomes and/or human primary hepatocytes (HPHs) can be used for estimating whether the efficacy of test herb is subject to first pass metabolism in liver followed by an applicable *in vitro* efficacy model. Furthermore, chemical inhibition of CYP450 isozymes could be applied to identify responsible pathway(s) in case that *in vitro* efficacy of herbs is confirmed subject to metabolism. Therefore, judgment could be proposed that the effective component(s) in one test herb be metabolized by one or more CYP450 isozyme(s) even their structures are not elucidated and their metabolites and/or not identified yet.

Platelet activating factor (PAF) is an alkyl phosphoglyceride (1-0-alky1-2-acetyl-sn-glycero-3-phosphocholine) naturally synthesized by numerous cells and tissues upon appropriate stimulation and activates aggregation of platelets *in vitro* and *in vivo*. Ginkgo biloba leaf extract (GBE) was reported widely for inhibiting or inducing CYP450 isozymes. However, metabolic pathway of GBE was unknown.

PAF-induced platelet aggregation may be an applicable *in vitro* efficacy model for estimating metabolism and metabolic pathway of GBE in combining with *in vitro* human hepatocyte incubation.

This study investigated metabolic stability of GBE and CYP450 isozymes responsible for metabolism of GBE using preincubation with HPHs in either the presence or absence of selective inhibitors of CYP450 isozymes and *in vitro* assay of PAF-induced platelet aggregation.

Materials and methods

Results

PAF-induced platelet aggregation

Addition of PAF to human PRP prepared from healthy male volunteers activated a concentration-dependent platelet aggregation with a median effective concentration (EC_{50}) of 98 ng/mL.

Inhibition of PAF-induced platelet aggregation by GBE

PAF-activated platelet aggregation was inhibited by incubation of GBE with PAF and PRP and an IC_{50} of 33 μg/mL was estimated accordingly.

Effects on GBE's efficacy by incubation with human primary hepatocytes

PAF-activated platelet aggregation was significantly increased by 30% after preincubation of HPHs that of with GBE (70 μg/mL) ($p < 0.05$) as compared to the incubation in the absence of HPHs, negative controls, suggesting that Gingko extract mediated PAF-activated platelet aggregation was subject to HPHs.

Cytochrome P450 isozymes involvements in GBE mediated PAF-activated platelet aggregation

Effect of HPHs on Gingko extract mediated PAF-activated platelet aggregation was reduced to the level close the negative control by preincubation with α-naphthoflavon (10 μM), selective inhibitor of CYP1A2, indicating that CYP1A2 metabolized the component responsible for mediating PAF-activated platelet aggregation. Such a HPHs' effect was also reduced to about half by preincubation with 4-methypyraole (1μM), suggesting that

CYP2E1 be possibly responsible such a metabolism by HPHs because the difference from negative control was not statistically significant ($p > 0.05$). The results showed that CYP2B6, 2C19, and 3A4 might be not involved in the metabolism of GBE by HPHs.

Discussion

Koch reported PAF activated the platelet aggregation with Km of 92 ng/mL using PRP prepared from Caucasians. This study showed that PAF-activated platelet aggregation with Km of 98 ng/mL, suggesting that this *in vitro* model using PRP from Chinese is similar to that from Caucasians. PAF-induced platelet aggregation is one of the reliable *in vitro* models for estimating efficacy as thrombosis. This model provided the researchers, for investigating metabolism pathways of the herbs, a feasible and affordable way by combining preincubation with human hepatocytes in the absence or the presence of selective inhibitors for CYP450 isozymes.

This study demonstrated that GBE inhibited PAF-induced platelet aggregation with IC_{50} of 33 μg/mL. Preincubation GBE with human hepatocytes enhanced the effects of the test article's inhibiting PAF-induced platelet aggregation by 30%, suggesting that the component(s) for inhibiting PAF-induced platelet aggregation in the Ginkgo is subject to metabolism by human hepatocytes. In order to estimate the metabolic pathway, selective inhibitors for CYP1A2 (α-naphthoflavon), CYP2B6 (orphenadrine hydrochloride), CYP2C19 (omeprazole), CYP2E1 (4-methylpyrazole), and CYP3A4 (itraconazole) were used for turning off or turning down enzyme activity of each CYP450 isoenzyme by preincubation with human hepatocytes. The results indicated that CYP1A2 and CYP2E1 might be the pathways for activating the effective component(s) in GBE. Other isozymes as CYP2B6, 2C19, and 3A4 might not be involved in bioactivating Ginkgo's efficacy of PAF-induced platelet aggregation. Further studies were suggested to elucidate the mechanism of inhibition, e.g. inhibition kinetics, by applying multiple dosing concentrations, and to confirm the metabolic pathway by using cDNA recombinant CYP450 isoenzyme(s).

As summarized, *in vitro* efficacy models such as PAF-induced platelet aggregation combined with *in vitro* drug metabolism system such as human hepatocytes provide scientists a feasible and powerful means for exploring possible metabolic pathway of herbs in case the structure of effective element is not elucidated.

Influence of age and sex on the level of adrenal steroids among Mongolian seniors

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Introduction

Cortisol and Dehydroepiandrosterone are adrenal steroid hormones [1–5]. Authors have postulated that the DHEA/DHEAS concentrations can be viewed as a potential marker of individual function of adrenal cortex and physiologic aging. Their physiological roles are not yet fully identified, but several possible features have been hypothesized. Most popular is the description of the "hormone of youth", as the dynamics of DHEA levels are characterized by an age-related decline. Hypothalamo-pituitary-adrenal axis overactivity is related not only to stress, but also to aging, leading to increased cortisol level [3].

We tried to describe the concentration of DHEAS, cortisol and cortisol/DHEAS ratio, the influence of age and gender on their serum concentrations, and the changes in endogenous concentrations in 32–88-year-old 340 subjects. There are no population-based studies that have assessed endogenous levels of adrenal steroid hormones in Mongolians.

Methods

Subjects. 340 adults, living in Ulaanbaatar city, participated in the present study. All were free of major disease as determined by clinical history, examination, hematological and biochemical testing. Investigation was implemented at Central research laboratory of HSUM. The study protocol was approved by the Ethics Committee of the HSUM, and written informed consent was obtained from all study participants.

Measurement of serum steroids. Hormone assays were performed in the morning (8.00–9.00 AM) baseline blood serum, collected from all participants. After overnight fasting, samples of blood were centrifuged and separated serums were kept frozen in –20 C until assayed. For the determination of hormone levels ELISA kits were purchased from EuCardio Laboratory Inc., (USA) for cortisol and DRG (Germany) for DHEAS, with sensibility 0.036 µg/dl and 0.044 µg/ml, respectively.

Results

Table 1 shows main general characteristics of body measurements and biochemical indicates in 139 men and 199 women aged 32–88 years.

The serum concentration of DHEAS in men subjects was higher than in women. In the 139 men and 199 women, who took part in our survey, there was a significant cross-sectional inverse correlation of DHEAS to aging (r = –0.553, p < 0.01). DHEAS was decreasing by 2.6 per cent per year during aging (Fig. 1).

Cortisol was assayed as an internal control in our participants (n = 240). In fact, the cortisol also had significant, positive correlation with age (r = 0.593, p = 0.000). The serum cortisol level appeared higher in elderly men than in elderly women (p = 0.000) and it was constantly higher in the elderly, who underwent the participation after the riot (p < 0.001) (Table 2).

We compared the serum concentration of DHEAS and cortisol in different BMI groups and defined the lack of DHEAS in overweight women. We used to expect
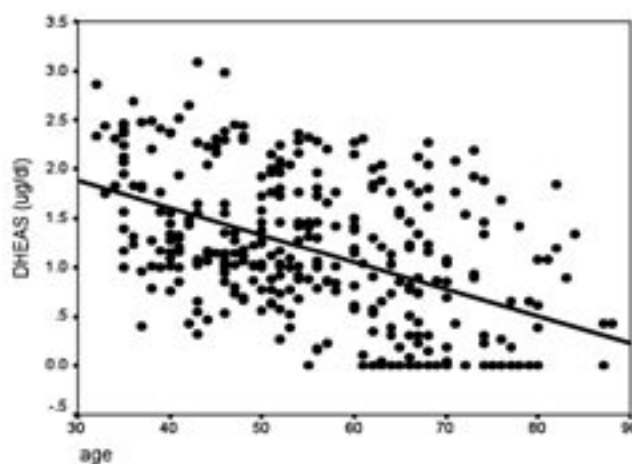

Fig. 1. Decrease in serum DHEAS vs age, in healthy Mongolian subjects

Table 1. General characteristics of research participants (M ± SD)

Parameters	Men	Women
Average age (years)	56.88 ± 14.11 (32–87)	55.22 ± 12.18 (35–88)
BMI (kg/m^2)	25.89 ± 3.92	26.96 ± 4.67
Fasting glucose (mg/dl)	83.93 ± 15.88	86.18 ± 24.74
Total protein (g/l)	72.88 ± 8.41	74.22 ± 8.02
Albumin (g/l)	39.85 ± 5.87	39.56 ± 6.14
DHEAS (µg/ml)	1.51 ± 0.72	0.92 ± 0.35
Cortisol (µg/dl)	27.02 ± 11.1	22.64 ± 10.32

Table 2. Correlation for DHEAS, cortisol vs age

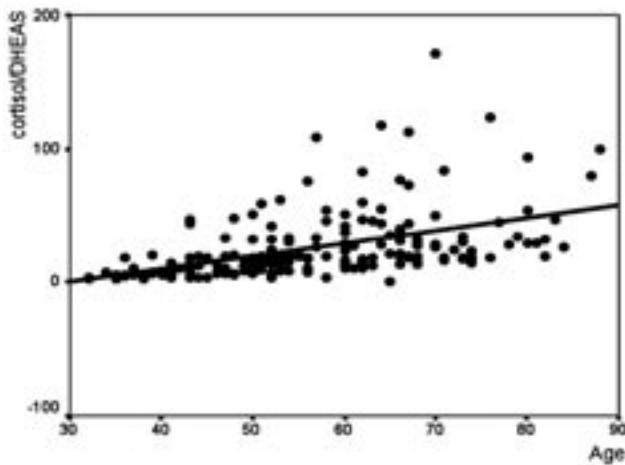| r (Pearson's correlation coefficient)	Men	Women	Average
DHEAS	−0.571**	−0.536**	−0.553**
Cortisol	0.569**	0.652**	0.593**
**ð < 0.01			

Fig. 2. Cortisol/DEHAS ratio increases with age in 240 subjects

high range of DHEAS in smokers, but in our study we did not identify the difference between smokers and nonsmokers. Volunteers who have and had a job requiring a physical activity had higher amount of DHEAS (1.508 ± 0.089 µg/ml, p < 0.05).

Cortisol has catabolic effect on metabolism against DHEAS, which has strong anabolic effect (Fig. 2).

The cortisol and DHEAS ratio is an indication expressing the catabolic rate during aging. In our participants cortisol and DHEAS ratio was increasing with age (r = 0.486, p = 0.000).

Discussion

The adrenal cortex undergoes dramatic steroidogenic changes throughout life and age regulates serum corticosteroid's levels. Therefore the DHEA(S) is recognized as a potential biomarker of aging and a marker of general health status [2, 4].

The normal range proposed by Orentreich et al. [2] for serum DHEAS levels in women over 50 years of age is 0.54–4.07 µmol/l. In our study, DHEAS concentrations were 1.51 ± 0.72 µg/ml in men and 0.92 ± 0.35 µg/ml in women, and our results demonstrate marked sexual dimorphism in the influence of aging on adrenal hormone levels. DHEAS in Mongolians was higher than in Afro-Americans and Hispanic ethnic groups, but lower than

in Chinese [3]; however, mean DHEAS concentrations were in the normal range for all subjects.

The level of cortisol was much higher in our subjects and it might be an evidence of different secretion of glucocorticoids in geographically and dietary different ethnic groups [5]. Another issue is that the some samples were collected after Mongolian postelection riot in 1st July, 2008, which could be a reason for the elevation of cortisol level in aged people. Although in the DHEAS level same pattern was not observed, it leads us to correlate our findings to new research idea related to stress in the aged. The cortisol/DHEAS ratio was increasing with age due to the increase in cortisol secretion. It indicates a metabolic shift to a catabolic state during aging.

In conclusion, our results show that aging, sexual dimorphism and ethnicity are associated with the secretion of adrenal steroids in the morning. Especially cortisol level was higher in Mongolians, which might be strongly associated with stress-induced condition after the riot and a unique diet. DHEAS in Mongolians was higher than in Afro-Americans and Hispanic ethnic groups, but lower than in Chinese.

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Laboratory diagnosis in geriatrics: an unexpected challenge in the medicine

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Demographic changes due to progressive aging of population burden the health care system of many countries of the world, thus justifying the scrutinizing of some generally accepted fundamentals of the medicine. According to Hippocratic principles the task of medicine consists in unequivocal distinction (diagnosis) between *health* (physiology) and *disease* (pathology) in order to ensure a full restitution of patient's *health* [1]. An impor-

tant tool for this purpose is an *in vitro* analysis, since it provides *objective* diagnostic information, which is independent from *subjective* skill of the physician. A biological sample (blood, urine, etc.) is drawn from patient's organism and subjected to analysis of its specific *properties.* The result is then interpreted in terms of clinical diagnosis. Today's laboratory medicine operates by *à priori calibrated quantitative analyses* whose results are considered as reproducible *numerical data*. The extension of such *objectivity* to the clinical interpretation is done *by comparison* of results with *reference intervals,* which in turn are established by previous measurements among healthy (non-diseased) individuals. These are usually taken from members of general *adult* population, who are considered *"normal"* meaning "healthy", as they are involved in active working process. And even this assumption underlines the generally accepted *aim* of the medicine as a full restitution of ability to participate on the active (working) life. However, such approach cannot always be applied to the elderly for the following reasons: **(i)** The elderly are already *retired* from their active life. The medical care aims here at the *conservation* of *quality of life,* rather than the full *restitution* of an active life. **(ii)** By approaching the end of life, inheritances from previous diseases are contributing in a *cumulative* way to the actual clinical status. Moreover, with the forthcoming age, there is increased probability of *manifestation* of the eventual *genetic predispositions.* **(iii)** The aged organism is subjected to various *senescent processes*, which are responsible for continuous and irreversible *decline* of several physiological functions, i.e. renal, pulmonal, cardiac, endocrine, motoric or cognitive. All these processes can be retarded and compensated for long time by prophylactic precautions. But, they can be also triggered and accelerated by *fatal events*. In general they progress with a different *individual* accentuation, contributing to the *individualization* of clinical history and status of the patient. **(iv)** The *multi-morbidity,* as a simultaneous occurrence of several diseases and disorders in one and the same individual, is a very characteristic aspect of geriatric medicine. It represents another individualizing factor of the clinical status of elderly patients. **(v)** The reduction of physiological functional reserves increases *variability*

of several laboratory parameters, which can be characterized as seasonal, circadian, orthostatic, postprandial or dependent from mobility and/or physical constitution of the patient. All these features are thus responsible for the *complexity* and *individuality* of clinical status, which is the most abundant at the most distant time point of the life [2]. Allegorically speaking, an aged individual is like an old car: *"A healthy* old person is perceived as *a biological curiosity* rather than *a normal case."* This is why with the forthcoming age it becomes increasingly difficult to establish approprieted reference intervals. At least, since the recruitment of *healthy* reference individuals of clinical characteristics comparable to those of a patient being examined would require more and more explicit *stratification* (e.g. excluding non-compatible individuals). The *ultimate* stratification will paradoxically end with one, single individual – the patient himself. In other words, there is a change of paradigms: In geriatrics, it is more appropriate not to seek for one diseased individual among a *"normal"* (e.g. healthy) population in the sense of *screening*, but to *monitor* patient's individual status within *longitudinal time course*. Such an approach, however, requires a *long-time quality assessment* of laboratory tests. It also requires *harmonization* of different analytical methods when used for monitoring of the same parameter. Otherwise spurious clinical interpretation could be a consequence (Fig. 1). Unfortunately, until now especially immunology-based tests have not been sufficiently harmonized. Another important aspect, especially in geriatrics, is the change of *diagnostic significance* of laboratory parameters, which is due to altered physiology, specific demographic effects and still-remaining life span prognosis. The best example is the age-course of cholesterol (Fig. 2): Starting with the adult age, there is an age-related increase, which correlates with an increased risk for atherosclerosis. From the 5th decade the cholesterol level begins to decrease. This is caused by successive drop out of high-risk individuals due to their premature death. Finally in old and frail individuals, the low level of cholesterol indicates the *malnutrition.* Its sudden fall can be interpreted as a worsening of the lifetime prognosis [3]. Thus since in geriatrics, the maintenance of quality of life is more important than the resti-
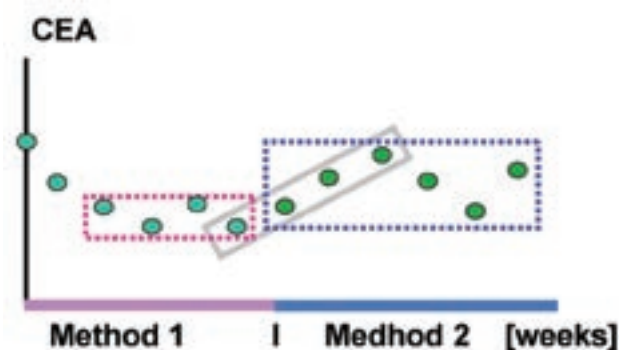

Fig. 1. Monitoring of a tumor remission by serial measurement of carcionoembryonic antigen (CEA) in serum: Switch from one analytical method to other can provide a sequence of results, which can be interpreted spuriously as a tumor relapse
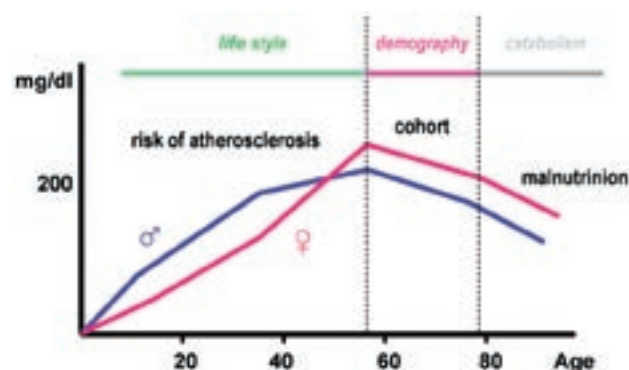

Fig. 2. Age-related changes of diagnostic significance of cholesterol level in serum

tutive therapy, clinicians are often forced to accept *therapeutic compromises* and to exploit optimally all *still available* physiological functionality of the patient's organism. In such situation all diagnostic methods providing such kind of information are especially valuable. In conclusion, *individualization* is an important aspect of geriatric medicine [4]. Not only statistically established *collective evidences*, but also the individual *quality of life* in dimension *of time* and of *social* environment should be the new direction of the geriatrics. Perhaps the growing interest in geriatric medicine will reverse the trend and turn the modern "apparatus-medicine" back to the individual and patient care oriented medicine.

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Neuropathology of age-associated neurodegenerative diseases

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Aging of the brain is associated with a slowly progressing decline in cognitive abilities and the clinical manifestation of dementia depends on the severity of this decline. Dementia can thus be defined as an impairment of previously attained occupational or social functioning due to an acquired and persistent impairment of memory and intellectual function. Dementia is predominantly caused by neurodegenerative processes that evolve over many years. To date, the aetiology of age-associated dementing diseases remains elusive.

The risk of becoming demented is 0.4% at age 65 years while it is 50% at age 95 years. Hence, increased life expectancy and changing demographics (e.g., the aging of baby boomers) will result in an increased prevalence of neurodegenerative diseases. The worldwide prevalence of Alzheimer's disease was 25 mio. in 2006 and is expected to rise to 100 mio. by 2050.

Throughout history various forms of dementia have always been an integral part of the human condition, the efforts for systematic description of the clinical and pathological characteristics of dementing diseases, however, only date back to the 1890s; in 1892 Blocq and Marinesco noticed "miliar foci" (i.e., senile plaques) in the neocortex of demented individuals and described a relationship between these neuropathological findings and senile dementia.

The clinical entity that today is known as Alzheimer's disease (AD) and represents by far the most common neurodegenerative disorder (>60%), clearly existed long before 1906, when Aloys Alzheimer reported the case of Auguste D., a 51-year-old woman with dementia. Consistent with his interest to "help psychiatry through the microscope" Aloys Alzheimer described the clinical as well as the neuropathological characteristics of that case. Indeed, even today the investigation and classification of neurodegenerative diseases is based on the combination of clinical observations with systematic neuropathological analysis of brain lesions and in most neurodegenerative diseases no definite diagnosis can be stated without neuropathological examination of the *post mortem* brain. Therefore the knowledge of the main neuropathological findings in neurodegenerative diseases is necessary to get a deeper insight into their basic concepts with respect to both pathophysiology and clinical treatment.

On gross examination (i.e., macroscopy) brains of AD patients show shrinkage of cerebral gyri and widening of sulci, most prominently in the medial and temporal regions, particularly in the hippocampus but also in the frontal and parietal regions, while the occipital cortex and the motor cortex are relatively spared. The cortical mantle (i.e., grey matter) may appear to be thinned, whereas the white matter is of normal colour and texture. The ventricular system may be considerably dilated, especially that of the temporal horn of the lateral ventricles.

Microscopically, AD is characterized by distinct morphological abnormalities; the most prominent ones are depositions of amyloid-β peptides (Aβ) in the form of plaques (e.g., senile plaques, neuritic plaques) and often also in walls of blood vessels (i.e., cerebral amyloid angiopathy) [1] as well as depositions of hyperphosphorylated protein tau (tau, e.g., neurofibrillray tangles). A large body of evidence now suggests, that the aggregation of misfolded proteins represents a single common pathogenic mechanism underlying many diverse neurodegenerative disorders. Misfolding of proteins results in the deposition of insoluble filamentous aggregates of normally soluble proteins in the central nervous system [2]. In AD both Aβ and tau constitute the majority of such insoluble aggregates.

The formation of Aβ results from cleavage of the amyloid-precursor protein (APP) by both β and γ secre-

tases, while cleavage by α secretase inhibits Aβ formation. Physiologically, APP is an integral cell membrane protein and to date it is unclear whether the accumulation of Aβ is a result of increased β and γ secretases or of decreased α secretase activity. In addition, increased cell death with increased membrane breakdown could lead to accumulation of Aβ, simply as a consequence of over-accumulation of APP with subsequent cleavage of α, β, and γ secretases, which ultimately leads to increased amount of insoluble Aβ. Matters are further complicated by the fact that Aβ *per se* is neurotoxic and could thus lead to neuronal cell death with subsequent accumulation of Aβ (s.a.). The accumulation of insoluble Aβ fibrils could therefore be a consequence of disturbed secretase activity, neuronal cell death or a combination of both [3]. In addition, decreased drainage of Aβ out of the brain could result in accumulation of Aβ peptides [1].

Physiologically, tau is a microtubule-associated protein that binds to and stabilizes microtubules, the latter being a fundamental part of the neuronal cytoskeleton. In inherited diseases mutations in the tau gene, and by analogy tau dysfunction in sporadic disease may be pathogenic through mechanisms involving both loss of function (decreased microtubule stabilization) and toxic gain of function (increased fibril formation). Tau hyperphosphorylation and aggregation leads to the formation of paired helical filaments followed by decreased microtubule-bound tau with subsequent microtubule depolymerization. This in turn results in impaired axonal transport and finally in stasis/aggregation of axonal traffic. Ultimately, synaptic dysfunction and axonal degeneration lead to neuronal cell death [2].

The macroscopic appearance of dementia with Lewy bodies (DLB) brains is similar to that in AD; the most prominent difference, however, is pallor of the substantia nigra and locus ceruleus. Microscopically both DLB and Parkinson's disease (PD) are defined by the presence of so-called Lewy bodies which contain several proteins that are misfolded and thus insoluble; α-synuclein is seen in all Lewy bodies, in addition neurofilament proteins, ubiquitin, αB crystalline, tubulin, amyloid-precursor protein, and synaptic proteins might be present. In PD Lewy bodies are mainly seen in the substantia nigra (sn) and locus ceruleus while in DLB neocortical and limbic regions are affected (alone or in combination with sn) [4].

Vascular dementia can be defined as an acquired intellectual impairment resulting from damage to the brain by cerebrovascular disease. Neuropathologically vascular dementia presents as small vessel disease, large vessel disease or gobal cerebral hypoperfusion. In small vessel disease hyaline arteriosclerosis and artrio-

losclerosis are seen and this may lead to ischemic white matter degeneration and cribriform atrophy of white matter. Large vessel disease results in regional cerebral infarcts, which rarely contribute to cognitive decline. Conditions leading to cerebral hypoperfusion can cause ischemic injury to the hippocampus and hippocampal sclerosis with clinical dementia is seen in some elderly patients.

In brains of cognitively normal elderly individuals many of the changes described above are found. They are usually of limited severity and do not affect regions which are affected in clinically overt dementing diseases (e.g., neurofibrillary tangles in the neocortex in cases of AD). Indeed, nearly every brain of an individual aged over 80 years shows at least some neocortical senile plaques and neurofibrillary tangles in the entorhinal cortex. The severity and the topographical extension increase with increasing age. Therefore it is unclear if these age-associated changes represent an early preclinical stage of the disease or if they are part of the "normal" aging process.

Despite the remarkable progress toward understanding AD and other dementias, there are still many questions that need to be addressed in the near future. In particular, the pathogenesis of AD needs to be further clarified, until now we do not know the exact causes for sporadic age associated AD and other dementias. To further our knowledge worldwide networks of investigators from different specialities working closely and collaboratively are definitely needed. Time is running out and the pandemic of AD will completely overwhelm the health care systems because of the substantial increase of demented seniors. The projected costs in human suffering and public economic burden will be incalculable and unthinkable if we do not achieve substantial advances in understanding and ultimately treating age-associated neurodegenerative diseases [5].

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Role of age related factor for Alzheimer's disease: the important role of the lipid

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Prevalence of Alzheimer's disease in China

Alzheimer's disease (AD) is the most common cause of dementia among neurodegenerative diseases in the elderly population. Our colleagues first identified the S182 (now called Presenilin 1, PS1) gene mutation in Japanese familial AD in 1995. And then his team established the PS1 transgenic mice carrying wild-type as well as mutant-type PS1 gene. Using this model, we first discovered neuronal death related to intracellular Aβ42 [1]. To characterize sociodemographic variations in the prevalence of AD in China, data were collected by Zhang's group in a 1997–1998, cross-sectional, door-to-door prevalence survey of 34,807 community residents of 55-year-olds in Beijing, Shanghai, Chengdu and Xian. Initial diagnoses of AD were assessed by clinicians using standardized protocols, according to the NINCDS-ADRDA and NINDS-AIREN criteria; diagnoses were confirmed after 6 months by repeating neuropsychological evaluations. Prevalence odds ratios were estimated in logistic models adjusting for survey design, age, and other sociodemographic factors. Zhang's group identified 732 prevalent cases of AD. Adjusting for all sociodemographic factors concurrently, prevalence odds of AD were higher in northern than in southern China. Age trends for AD appeared different in western and eastern China. AD also showed an age-adjusted elevation among women and, in the fully adjusted model, a gender education interaction indicating a female preponderance in the highest education group. In the fully adjusted model, for AD, widows had significantly higher prevalence odds; professionals had statistically significant and borderline lower prevalence odds for AD; sales-service occupations had significantly lower odds for AD only. Zhang's group observed variations in the prevalence for AD in different regions and demographic groups in China that persisted after controlling for potential confounding factors. Socio-demographic factors are probable surrogates for conditions such as lifestyle, environment, co-morbidities, and life expectancy [5].

Aging as a risk factor for AD

Although a number of genetic and environmental factors have been demonstrated to be linked with the development of AD, the single greatest risk factor is aging. Several lines of evidence suggest a role for age-related increases in neuropathology as playing a potentially important role in the development of AD. Innate in this line of thinking is that the age-related accrual of AD pathology promotes the progression of AD, and thus age-related increases in pathology provide a clear link between aging and the onset of AD. It is important to point out that most studies linking pathology with the onset of AD have focused solely on the role of AD-related pathology. First principal indications that lipids may play an important role in the amyloid precursor protein (APP) processing and β-amyloid peptide (Aβ) production are given by the common feature that all proteins involved in processing are integral membrane proteins. Moreover, the Aβ γ-secretase cleavage takes place in the middle of the membrane suggesting that the lipid environment of the cleavage enzymes influences Aβ production and hence AD pathogenesis [2].

Cholesterol and AD

The brain is the most cholesterol-rich organ in the body and contains about 25% of total body cholesterol. The homeostasis of cholesterol including synthesis, removal, storage, or transport within the brain is strictly regulated. Hypercholesterolemia is an early risk factor for the development of amyloid pathology and longitudinal, population-based studies demonstrated that cholesterol is associated with AD in later lifespan. Molecular and mechanistic evidence points toward a direct role of cholesterol in AD pathogenesis, e.g. cholesterol enhances γ-secretase-mediated Aβ production. The important role of cholesterol in APP processing is further substantiated by experiments in which cholesterol de novo synthesis is inhibited by pharmacological drugs. Treatment with high statin dosage (80 mg simvastatin/day) was able to reduce cerebral Aβ levels and induced a small cognitive benefit in AD patients. The finding that Aβ aggregates preferentially bind cholesterol and the increase in brain cholesterol levels during early disease progression further supports the importance of cholesterol and lipids in AD [2].

Sphingolipids and APP processing

Sphingolipids represent another major lipid class of eucaryotic cell membranes. The main fraction of sphingolipids is made up by sphingomyelin (SM) whose head group is represented by phosphorylcholine esterified to the 1-hydroxyl group of ceramide (Cer). In contrast to cholesterol SM decreases Aβ production by the inhibition of the γ-secretase which was confirmed by sphingomyelinase (SMase) inhibition experiments. The inhibition of these degrading enzymes leads to elevated SM levels and reduced Aβ-level. Interestingly, SMase activ-

ity is increased in PS-FAD mutations, which demonstrate the involvement of SMases in AD. Apart from SM, other sphingolipids are linked to AD as well. In the presence of GM1 increased γ-secretase and decreased α-secretase activity resulted in up to a 10-fold increase of Aβ levels. Inhibition of one of the rate-limiting enzymes in the ganglioside synthesis, the glucosylceramidsynthase, decreased Aβ production. The effects of (glyco-) sphingolipids on Aβ production underline that not only cholesterol but also various other lipids are influencing APP processing. Thus, pharmaceutical drugs mediating the homeostasis of other lipids might have beneficial effects for AD treatment as well [2].

Sulfatide changes in AD brains

Sulfatides (galactosyl-3'-sulfate ceramides) represent acidic glycosphingolipids containing sulfate esters on their oligosaccharide chains. Sulfatides are depleted up to 93% in gray matter and up to 58% in white matter, whereas ceramides were elevated more than threefold in brains of AD patient at a stage of very mild dementia. Cer-induced apoptosis might play an important role under pathological conditions such as in AD [2].

Lipoprotein lipase (LPL) and AD

The current knowledge on circulating serum and plasma risk factors of cognitive decline of degenerative AD linked to cholesterol homeostasis and lipoprotein disturbances, i.e. total cholesterol (TC), 24S-hydroxy-cholesterol, lipoprotein(a) (Lp(a)), or apolipoprotein E (APOE). Lipoprotein lipase (LPL) is predominantly expressed in adipose and muscle where it plays a crucial role in the metabolism of triglyceride-rich plasma lipoproteins. LPL is also expressed in the brain with highest levels found in the pyramidal cells of the hippocampus, suggesting a possible role for LPL in the regulation of cognitive function. However, very little is currently known about the specific role of LPL in the brain. We have generated a mouse model of LPL deficiency which was rescued from neonatal lethality by somatic gene transfer. These mice show no exogenous and endogenous LPL expression in the brain. Transmission electron microscopy revealed a significant decrease in the number of presynaptic vesicles in the hippocampus of LPL-deficient mice. The levels of the presynaptic marker synaptophysin were also reduced in the hippocampus while post-synaptic marker PSD-95 levels remained unchanged in LPL-deficient mice. Theses findings indicate that LPL plays an important role in learning and memory function possibly by influencing presynaptic function [4].

Protective effect of xylocoside G on Aβ induced neurotoxicity

We studied the protective effect of xylocoside G on Aβ induced apoptosis in PC12 cells. Cell viability was analyzed by MTT assay, and apoptotic neuronal death was assessed by Hoechst 33342 staining. Flow cytometry was used to determine the apoptotic neuronal cells quantitatively. The level of intracellular reactive oxygen species (ROS) was monitored with the fluorescent probe 2',7'dichlorofluoresce in diacetate. We found that PC12 cells treated with 25 μM Aβ for 24 h had a significant decrease in cell viability compared with control, and the percentage of apoptotic cells was increased to 34.26%. The level of intracellular oxygen species was also increased. Coincubation with xylocoside G (10 μM) for 24 h attenuated the damaging effect of Aβ on the cell viability, and the percentage of apoptotic cells was decreased to 22.62%. Moreover, the increase of ROS induced by Aβ was inhibited by xylocoside G (10 μM). We concluded that xylocoside G had protective effect against Aβ induced apoptosis, which might be related to the decrease of the level of ROS [3].

Acknowledgements

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Epidemiological survey of Alzheimer's disease in Xinjiang Uygurs and Hans

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The aim of the study is to understand the situation and distribution of the Xinjiang Uygur and Han nationalities in the middle-aged and elderly population who are suffering from Alzheimer's disease (AD) and offer the fundamental data for further survey of the causes and prevention of AD. From July 2004 to July 2007, according to the DSM-IV diagnostic criteria for dementia and NINCDS–ADRDA criteria and by random sampling in grades, multi-stage, cluster, and stratification, we collected data from six areas in the southern, eastern, northern of Xinjiang and communities in Urumqi and studied the middle-aged and elderly Uygur and Han people older than 50 years suffering from AD. Of the 8284 surveyed, we found that Xinjiang AD crude prevalence rate was 3.66%, and the AD rough prevalence rates of Uygurs and Hans were 3.24% and 4.19%, respectively. According to the age composition criterion of Xinjiang in 2000, the total AD standardized incidence is 3.50% for the Uygurs and Hans, whose AD incidence was 2.68% and 4.31%, respectively, in our study; vascular dementia (VD) crude prevalence rate of Xinjiang is 1.05%, while the VD crude prevalence rates of Uygurs and Hans were 1.11% and 0.97%, respectively, in our study; the VD standard rate of Xinjiang is 0.98%, while, in our study, it was 1.00% and 0.96% for Uygurs and Hans, respectively. The prevalence rate of men and women, which increased with aging, has significant differences among all age groups.

Alzheimer's disease (AD) is a progressive neurodegenerative disorder commonly found in elderly people. With the aging of the world's population and the lengthening of the average human lifespan, the number of developing AD is increasing annually. Researchers in many regions of China have studied the prevalence of AD with quite different figures as their results. What is more among those studies, there were neither sufficient researches about the states of AD epidemiology in Xinjiang province, China, nor any reports about the comparison of AD cases, leaving it a blank both in its conditions and feature analysis. We did some epidemiological analysis of the AD prevalence and its effects among people with different ethnic backgrounds.

Subjects and methods

Subjects

The survey was carried out using a multi-stage stratified random cluster sampling approaches in totally 8284 Xinjiang Uygur and Han residents over 50 years old from seven towns in Yanji, Ba state, south of Xinjiang; six towns in both Meyu county and Hotan city in Hotan area; nine towns in Shanshan county, Tulufan area, east of Xinjiang; 31 towns in Bole and Wenquan county of Butala Autonomy state, north of Xinjiang; three communities and five towns in Changji state and Baishi Bridge community in Urumqi, Xinjiang. Of the 8284 subjects, 4688 are Uygurs (males: 2324, mean age: 65.57 ± 9.95; females: 2364, mean age: 62.63 ± 9.05) and 3596 are Hans (males: 1592, mean age: 64.10 ± 8.03; females: 2004, mean age: 61.71 ± 7.80).

The survey method

The way of combining the questionnaire and household survey, the Mini-Mental State Examination (MMSE) was used for screening in the first stage. In the second stage, a battery diagnostic test was carried on the positive response individuals (MMSE score illiterate ≤17, primary education ≤20, education above junior school ≤24) and those who were suspected of cognitive impairment though their score were in the normal range. The Hachinski Ischemic Score (HIS), activity of daily living scale (ADI), AD diagnosis meter, Nervous system check table, Fuld Object Memory Examination (FOM), Rapid Verbal Retrieve (RVR) were applied for further examination, which were accompanied by brain CT scan and MRI examination. The survey group was made up of two neurological majors, five Geriatrics majors, two mental psychological majors, all of whom were trained strictly about the questionnaire, each scale's Kappa mark is 0.78~0.93.

The diagnostic criteria

The dementia was diagnosed by the DSM-IV criteria. AD was diagnosed by the NINCDS/ADRDA criteria. VD was diagnosed by the NINDS-AIREN criteria and Hachinski Ischemic Score ≤4 score is AD ≥7 is VD (between is the mixed type) each case was diagnosed by the Xinjiang Medical University's survey group according to the disease history, the medical checkup, the scale test results, and the analysis with CT and MRI.

Quality control

The design stage

1. According to the regional distribution character of Xinjiang Uygur and Han's, sampling should abide strictly with the random principle.

Table 1. Comparison of the rough and standardized prevalence rate of AD and VD of Uygurs and Hans

Ethnics	Person	AD			VD		
		Case No.	Prevalence (%)	Standardized rate (%)	Case No.	Prevalence (%)	Standardized rate (%)
Uygur	4688	152	3.24[1]	2.68	52	1.11	1.00
Han	3596	151	4.19	4.31	35	0.97	0.96
Total	8284	303	3.66	3.50	87	1.05	0.98

The standardized rate age composition was based on the national census in 2000. [1]P < 0.05 comparison between Uygur's and Han's present prevalence of AD ($\chi^2 = 5.483$, P = 0.019).

2. The lowest non-response rate should be lower than 20%, and it was set before the survey to avoid the selection bias.
3. Pilot studies were done for the survey plan and the questionnaires.
4. Only the qualified were admitted after being trained in uniform about the investigating scale and the inquiring language.
5. Fine physical examination instruments were used and regulated to avoid the measure bias.

The statistical analysis

Figures of each questionnaire were stored into the computer after being coded, SPSS software version13.0 was used for the data analysis to calculate the crude prevalence rate of different minorities' dementia and AD. ANOVA (analysis of variance) was used for the comparison of prevalence in the same group. T-test was used between the mean numbers.

Result

The comparison of AD and VD conditions between Xinjiang Uygurs and Hans

Table 1 shows the crude prevalence rate of AD in Xinjiang Uygur and Han was 3.66% (the standardized rate is 3.50%), among which the rate of Uygurs and Hans was 3.24% (the standardized rate is 2.68%) and 4.19% (the standardized rate is 4.31%), respectively; the crude prevalence rate of VD in Xinjiang Uygurs and Hans was 1.05% (the standardized rate is 0.98%), among which the

rate of Uygurs and Hans was 1.11% (the standardized rate is 1.00%) and 0.97% (the standardized rate is 0.96%), respectively. The differences of the AD prevalence rate between Uygurs and Hans were statistically significant with Uygur's being lower than Han's; while the VD prevalence rate between Uygurs and Hans was not statistically significant (P > 0.05).

Comparison of AD and VD conditions between Uygurs and Hans in different regions of Xinjiang

The AD prevalence in different regions: Uygurs $\chi^2 = 2.305$, P = 0.316, Hans $\chi^2 = 33.599$, P = 0.000, the VD prevalence in different regions: Uygurs $\chi^2 = 11.285$, P = 0.004, Hans $\chi^2 = 5.275$, P = 0.072.

As can be seen from Table 2, the different case conditions of AD and VD between Uygurs and Hans in different regions in Xinjiang were statistically significant (P < 0.05). The VD prevalence of Uygurs in the South of Xinjiang was 1.55%, which was the highest among the three regions, and it was the lowest in the North of Xinjiang, which was 0.47%. As far as the case conditions of AD were concerned, AD prevalence of the Hans in the North of Xinjiang was the highest, which was 5.38%, and it was the lowest, which was 0.50% in the Eastern region of Xinjiang. The AD case conditions of Uygurs were the same in the different regions of Xinjiang, so the differences were not statistically significant.

The different case conditions of AD between Uygurs and Hans in the same regions were statistically significant (P < 0.05). The AD prevalence of Uygurs in the southern and eastern parts of Xinjiang was higher

Table 2. Comparison of AD and VD conditions between Uygurs and Hans in different regions of Xinjiang (%)

Region	Uygur							Han						
	No.	AD			VD			No.	AD			VD		
		No.	P	Std. rate	No.	P	Std. rate		No	P	Std. rate	No.	P	Std. rate
South	2715	96	3.54	2.96	42	1.55	1.46	772	9	1.17[1]	1.18	2	0.26[3]	0.23
East	1328	35	2.64	1.99	7	0.53	0.37	202	1	0.50[1]	0.31	2	0.99	0.59
North	645	21	3.26	2.92	3	0.47[4]	0.45	2622	141	5.38[1,2]	5.57	31	1.18	1.18
Total	4688	152	3.24	2.63	52	1.11	0.76	3596	151	4.20	2.35	35	0.97	0.67

[1]P < 0.01 comparison of the AD prevalence between Uygurs and Hans in the same region; [2]P < 0.05 comparison of the AD prevalence in different regions.
[3]P < 0.01 comparison of the VD prevalence between Uygurs and Hans in the same region; [4]P < 0.05 comparison of the VD prevalence in different regions.

Table 3. AD and VD crude prevalence of age in Xinjiang Uygurs and Hans (%)

Age (years)	Uygurs					Hans				
	No.	AD		VD		No.	AD		VD	
		No.	Rate	No.	Rate		No.	Rate	No.	Rate
50~	1602	14	0.87	7	0.44	1295	28	2.16[1]	5	0.39
60~	1821	37	2.03	28	1.54	1531	44	2.87	14	0.91
70~	879	48	5.46	13	1.49	671	64	9.54[1]	13	1.94
80~	386	53	13.73	4	1.04	99	15	15.15	3	3.03
total	4688	152	3.24	52	1.11	3596	151	4.20	35	0.97
Crude prevalence (%)			2.68		1.00			4.31		0.96

According to the national census in 2000, the standardized rate composition by age. [1]P < 0.05 the AD 's comparison between Uygurs and Hans at the same age.

than that of Hans, while the AD prevalence of Hans in the northern regions was higher than that of Uygurs. The different case conditions of VD between the two ethnics in the southern part of Xinjiang were statistically significant with the VD prevalence of Uygurs being obviously higher than that of Hans.

AD and VD crude prevalence of age in Xinjiang Uygurs and Hans

Comparison of the AD's prevalence at different ages: Uygurs χ^2 = 186.286, P = 0.000, Hans χ^2 = 77.131, P = 0.009; Comparison of the VD's prevalence: Uygurs χ^2 = 12.301, P = 0.006, Hans χ^2 = 13.871, P = 0.003

Table 3 shows the differences between the prevalence of AD and VD in Uygurs and Hans at different ages were statistically significant (P < 0.01). The prevalence of AD increased with aging, the highest rates were 13.73% (Uygurs) and 15.15% (Hans), respectively, among people over 80 years old; the VD prevalence in Uygurs did not present the increasing trend with aging, and the highest rate was 1.54% in the sixties, while the VD prevalence in Hans increased with aging, the highest rate was 3.03% in the eighties.

By comparison, the differences of the AD prevalence in Uygurs and Hans at the same age were statistically significant in their fifties and seventies, and all the AD prevalence of Hans were higher than that of Uygurs,

among which AD prevalence of Hans was 2.16% at fifties, while the Uygurs' was 0.87%.

AD and VD gender standardized prevalence in Xinjiang Uygurs and Hans

The comparison of VD's prevalence between Uygurs and Hans – Uygurs: χ^2 = 1.110, P = 0.292; Hans: χ^2 = 0.734, P = 0.392

Inferred from Table 4, the differences between AD and VD prevalence of different genders in Uygurs and Hans were statistically significant (P < 0.05): AD prevalence of male and female of Uygurs were 2.54% and 3.93%, respectively; AD prevalence of male and female of Hans were 2.51% and 5.54%, respectively; AD prevalence among females of the two ethnics were obviously higher than those of males. No statistical significance was found in terms of VD prevalence between different genders, which was 0.95% and 1.27%, respectively, in males and females of Uygurs and 1.13% and 0.85%, respectively, in those of Hans.

Discussion

With the lifespan ever lengthening, AD has become one of the most threatening diseases in the 21st century. So far, there are as many as 24.3 million people suffering dementia with around 4.6 million people adding to the

Table 4. AD and VD different gender standardized rate and crude prevalence of Uygurs and Hans (%)

Gender	Uygurs							Hans						
	No	AD			VD			No	AD			VD		
		No	rate	Std. rate	No	rate	Std. rate		No	rate	Std. rate	No	rate	Std. rate
M	2324	59	2.54	1.75[1]	22	0.95	0.86	1592	40	2.51	2.17[2]	18	1.13	1.03
F	2364	93	3.93	3.89	30	1.27	1.17	2004	111	5.54	6.26[3]	17	0.85	0.89
Total	4688	152	3.24	2.68	52	1.11	1.00	3596	151	4.20	4.31	35	0.97	0.96

[1]P < 0.05 comparison of AD between different genders of Uygurs; [2]P < 0.05 comparison of AD between different genders of Hans; [3]P < 0.05 comparison of AD between the same gender of Uygurs and Hans; comparison of AD between different genders of Uygurs: 2=7.272, P=0.007; comparison of AD between different genders of Hans: 2 = 20.1999, P = 0.000.

list annually [1]. Among the Uygur and Han elderly people, the general AD rough prevalence, which remains quite different from home and abroad, amounted to 3.66% (standardized incidence is 3.50%). AD rough prevalence of Uygurs and Hans was 3.24% (standardized incidence is 2.68%) and 4.19% (standardized incidence is 4.31%), respectively, which was lower than AD standardized prevalence (4.4%) given by Lobo [2] about the European elderly people and higher than that of Beijing, Shanghai, Chengdu, and Xi'an (2.0%) given by Zhang Zhenxing [3].

The result also shows that the AD prevalence of Hans in XinJiang was obviously higher than that of Uygurs, confirming the differences existing between the two ethnics. Racial diversify: Uygurs belong to the Caucasians, while Hans belong to the Asiatic Mongoloids. In total, 95% of Hans Y chromosome has genetic heterogeneity character, indicating that the Hans ancestry had the feature of a single fraternal source, so the original differences may lead to different frequencies of disease chart. Different lifestyles: Uygurs is a nation good at singing and dancing, which they often rely on to relax themselves from tenses and pressures. Being optimistic, they tend to live a simple and cozy life. Different environments and diets may also be important.

The AD prevalence of female was higher than that of male and it was in consistent with the former reports. One of reasons may be little education.

Both Uygurs and Hans presented the increase of AD prevalence with aging, and it was the same as the former reports home and abroad [4, 5], which confirmed that aging is the risk factor of AD, and aging is responsible for the increasing of AD prevalence and the decreasing of the cognitive function.

In conclusion, the AD case conditions between the elderly Uygurs and Hans presented obvious differences concerning ethnics, genders, and ages. It is an emergent task for us to pay greater attention to the earlier prevention, the earlier diagnosis, and the earlier treatment of AD.

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Key words: Uygurs and Hans middle-aged and elderly people, Alzheimer's disease, epidemiology.

SPECT and PET imaging in Parkinson's disease

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Parkinson's disease (PD) is the second most common neurodegenerative disorder after Alzheimer's dementia (AD) with a prevalence of 2/1000 in the whole population. This number increases to 2/100 in the aging population and the total number of patients will rise further with increasing life expectancy. Modern imaging techniques such as SPECT (single photon emission tomography) and PET (positron emission tomography) can visualize function and molecular structures in the living human brain and are important clinical and research tools in the evaluation of PD. Because the brain dopamine (DA) system plays a pivotal role in the pathogenesis of PD and related disorders most SPECT and PET studies in PD deal with different aspects of DA-ergic function. However, PD also affects noradrenalin (NA) and serotonin (5HT) producing neurons which contribute to non-motor symptoms. Recent SPECT and PET studies also address this issue.

SPECT is a technique which is widely available and is increasingly used in the clinical evaluation of PD patients. With SPECT and specific ^{123}I labelled ligands pre- and postsynaptic structures of the nigrostriatal DA-ergic system can be labelled and visualized. Thus, it is possible to detect and to quantify lesions of the DA-ergic system on the one hand and lesions of the striatal output neurons on the other. This technique also enables studies of pharmacological interactions at the receptor level. With the help of β-CIT, a cocaine derivative, and other similar ligands DA transporters (DATs) can be labelled on DA-ergic nerve terminals. DAT imaging clearly differentiates between normal controls and PD patients even in early stages of the disease. Patients

with subcortical vascular encephalopathy presenting with symptoms resembling PD ("lower body Parkinson") can be distinguished with high specificity and sensitivity. Patients with essential tremor and dystonia show normal DAT binding. Loss of DAT binding in putamen and whole striatum is strongly correlated with clinical parameters such as rigidity, akinesia and axial symptoms but not with tremor [1]. With a combination of pre- and postsynaptic imaging patients with MSA (multi-system atrophy) and PSP (progressive supranuclear palsy) as well as other multi-system degenerations can be distinguished from PD. Patients with drug-induced parkinsonian symptoms show normal DAT binding, but a dopamine D2 receptor blockade can be demonstrated and quantified with the postsynaptic ligand IBZM (iodobenzamide). In the differential diagnosis of patients in early stages of PD neuroreceptor SPECT has been shown to significantly improve diagnostic accuracy. In dementia with Lewy bodies (DLB) DAT binding is markedly reduced which distinguishes this disorder from AD. Longitudinal studies with DAT ligands can define the progression rate in PD [2] and thus have become a useful tool to evaluate different neuroprotective strategies. A combination of tests of olfactory function and DAT imaging can detect preclinical PD and this strategy might therefore become important in the studies of neuroprotection.

β-CIT and other more specific ligands also bind with high affinity to serotonin (5HT) reuptake sites, which are densely expressed in the brain stem and are located on serotonergic raphe neurons. Some degeneration of these neurons also occurs in PD and this can be shown in vivo with β-CIT SECT.

PET has the advantage of a better resolution and quantification and a larger number of tracers have mainly been used as a research tool. With ^{18}F-dopa and DAT ligands DA terminal function has been studied in different stages of PD. It has been shown that the degenerative process first affects DA-ergic terminals in the posterior dorsal putamen and subsequently targets the anterior putamen and the caudate nucleus. In early PD the DA-ergic input to the pallidum and to limbic regions is upregulated, possibly as a compensatory mechanism. Motor symptoms in PD correlate with the loss of DA-ergic terminals in the putamen, whereas frontal functions such as executive tasks and working memory correlate with DA-ergic function in the caudate nucleus. Fetal mesencephalic transplants and GDNF (glial derived neurotrophic factor) infusions into the striatum lead to an increase in ^{18}F-dopa uptake; this is not directly related to the improvement of motor function. The latter seems to be dependent on the integration of grafted or sprouting neurons into the host brain. With ligands binding to D2 receptors such as ^{11}C-raclopride DA release can be measured indirectly by studying D2 receptor availability. This technique has been applied during certain behavioral tasks or after pharmagological challenges with amphetamine. This way it could be shown that fetal transplants in PD patients can release DA. PD patients with motor fluctuations were shown to have larger fluctuations of DA release than non-fluctuating patients.

Using PET ligands that bind to NA transporters, 5HT transporters or 5HT receptors, such as 5HT1A receptors, the noradrenergic and serotonergic systems can be examined. These studies show a reduction in NA transporters in depressed PD patients and suggest that tremor severity is correlated with the loss of 5HT neurons in the raphe nuclei [3].

Metabolic activity in the brain can be measured with ^{18}F-FDG (fluoro-desoxy-glucose) and provides an index of neuronal activity. Specific patterns of neuronal network activity are observed in PD and the effects of deep brain stimulation on neuronal activity can be studied.

Recently PET markers for β-amyloid have been developed and different amounts of amyloid depositions have been described in patients with PD dementia and dementia with Lewy bodies [4].

SPECT and PET imaging not only have become an important research tool in PD but also have been introduced as valuable diagnostic techniques into clinical routine. Both imaging modalities will provide better insights into the pathophysiology of neurodegeneration in PD and will improve the understanding of certain therapeutic interventions. We hope this will lead to a better therapy, help in the development of neuroprotective strategies and change the course of this disease and the burden on our aging society.

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Neuronal changes in aging, oxidative stress and neuroprotective mechanisms

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The aging process is accompanied by gradual loss of mental and physical functions. For the nervous system this involves gradual loss of cognition, short-term memory and reductions in motoric and sensoric perception. These losses are inevitably connected to degeneration and death of neurons. Macroscopically the atrophy is evident by accentuation of cerebral sulci and enlargement of ventricles. Underlying neurodegenerative processes ongoing for many years are the characteristics for that. Two main forms of cell death as necrosis and apoptosis can be differentiated. Necrosis is the result of cellular "accidents," such as those occurring in tissues subject to chemical trauma and reactive gliosis. The necrotizing cells swell, rupture, and provoke an inflammatory response. Apoptosis is programmed cell death. It is characterized by morphological changes including cell shrinkage, nuclear condensation, and DNA degradation. The apoptotic process follows a cascade of events being triggered by caspases.

The molecular processes causing and underlying neuronal death are at present explained by cytotoxicity leading to apoptosis, oxidative stress, mitochondrial dysfunction, excitotoxicity, neuroinflammation, calci-um-induced injury and involvement of heavy metals as iron, copper and manganese [1]. Medication with cytostatics as well as exposure to pesticides and other environmental pollutants as halogenated hydrocarbons may all contribute to consequences of premature neuronal death.

Models of neuronal aging and cell death have been based on the observation that oxidative stress to the neuronal tissue creates free radicals during oxidative phosphorylation within mitochondria. These short-lived metabolites when incompletely removed can exert damaging action to proteins, lipids and DNA to the adjacent cells. Other exogenous sources as UV-radiation, chemotherapy or mitochondrial inhibition by environmental toxins or chemotherapy can as well produce these excessive radical concentrations. Throughout life of the organism powerful antioxidant mechanisms as
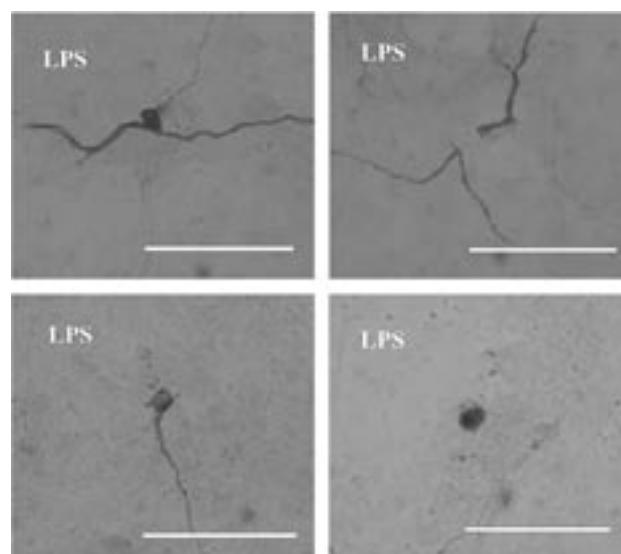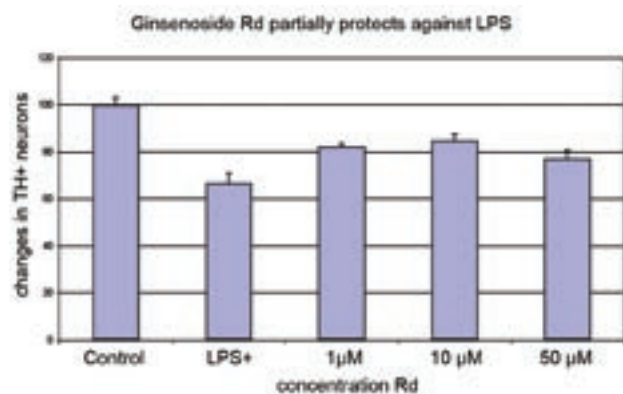
A

B

Fig. 1. Ginsenoside Rd protects dopaminergic cells from LPS degeneration. **A** Reduction of the number of dopaminergic neurons as a response to LPS exposure and partial protection by ginsenoside Rd. Control preparations give approximately 600 TH-positive neurons. A partially protective effect can be measured by adding Rd in concentrations from 1–10 µM. **B** Cell culture specific changes occur to single dopaminergic neurons as swelling and detachment of the nucleus, vacuolisation of the cell membrane and bleb formation finally leading to cellular disintegration (Magnification bar 100 µm)

enzymes or chemical antioxidants as e.g. hydrophilic or hydrophobic vitamins (vitamin C and E, glutathione), are at hand; however, with age these defense lines appear to become insufficient.

Cell death as well as infections releasing lipopolysaccharides will cause neuroinflammation that has been coined as a conspicuous glial reaction, where upregulation of cytokine levels and enzymes associated to inflammation as cyclooxygenase-2 and inducible nitric oxide synthase takes place [2].

Other molecular changes may equally account for neuronal degeneration in aging. Crosslinking of structures by glycosylation appears to lead to cellular damage. Abnormal protein formation as advanced glycosylation endproducts precipitates as fibrils and intracellular inclusions as aging pigments e.g. lipofuscin will develop. Complex structures such as Lewy bodies may be formed and harm the cells from inside.

Neuropathological findings from aging brains and specimens from related neurodegenerative diseases only can reflect the final stage of the processes. Experimental approaches including animal models and various cell culture studies are therefore needed to explain the pre-existing conditions, yet cannot mimic the time frame seen in human aging. Cellular models are as well limited to follow up a single possible trigger condition e.g. of a toxin which could be relevant for aging or in cases of accelerated neuronal death simulate neurodegenerative changes as found in Alzheimer's or Parkinson's disease.

To follow up developing neurodegeneration and taking into account the long lasting time course of aging diseases and the actual difficulty to visualize events in the living central nervous system except at the event of death makes clear that particularly cell culture and animal models are required for the attempt to understand the underlying molecular events. Embryonic neural cells have been found to be particularly resistant to preparatory stress in order to obtain viable neuronal cultures. They can be taken from mice and rat fetuses at gestation day 14, from where the isolated and seeded cells have the ability to differentiate in artificial media into nerve and glial cells. Within our group particularly primary dopaminergic neurons from mesencephalon are studied in vitro as these nigrostriatal cells are in vivo degenerating with aging and pronounced in Parkinson's disease. Such immunohistochemically characterized neurons stained for tyrosine hydroxylase, the key enzymes in the dopaminergic synthetic pathway are dose and time dependently affected by the action of selective dopaminergic toxins as MPTP, as well as by excitotoxins e.g. glutamate or inhibitors of mitochondrial phosphorylation as rotenone and paraquat. Particularly MPP+ as an active metabolite of MPTP has contributed to test a wide variety of neuroprotective candidates and conditions, among them prospective Parkinsonian treatment as dopamine agonists. Conditions simulating "neuroinflammation" by the action of lipopolysaccharides equally results in dopaminergic neurodegeneration, presumably involving microglial activation (Fig. 1).

Counteracting neurotoxic events in vitro on the long run may be a way to find pharmacological tools to slow neurodegenerative processes of aging diseases. Here long lasting processes do occur spanning some years and hopes for long-term antagonizing of neurodegeneration have been raised. Therefore the search is going on where a multitude of compounds are investigated for their protective potential. Partial neuroprotection for dopaminergic neurons in vitro can be reached by the action of clinically effective dopamine agonists, acting directly on pre- and postsynaptic receptors. Where generation of free radicals and oxidative stress is involved, lipophilic and lipophobic vitamins as tocopherols and ascorbate can be effective [3]. Natural compounds from herbal sources as ginsenosides of Panax ginseng and others as well as tubulosides from the desert plant Cistanche tubulosa and antioxidants as flavones e.g. quercetin or resveratrol have preventive actions [4]. Antioxidative action may not be the only mechanism because effects on glutamatergic receptors, membrane stability or calcium metabolism do exist [5]. As for the future within an ongoing joint project together with the Chinese Academy of Chinese Medicine and Capital University, Beijing and other institutions from a variety of natural compounds from Chinese medicine neuroprotective potentials will be screened. It appears that particularly an antioxidant and anti-inflammatory capacity may relate to neuroprotection in vitro. However to understand complex interactions will be the challenge of the future. Most of all it will be relevant to prove which substances, pharmaceuticals as well as herbal formulations can successfully be proven to positively affect these characteristics of neuronal aging in the human in vivo situation.

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Gender differences in depressive symptoms of aging Chinese in Urban Jiangsu in China

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Introduction

A research on depression in China focuses primarily on the effects of family structure, financial security, chronic illnesses, daily self-care functioning, and cognitive functioning. Very little research has considered gender differences in depressive symptoms among the aging population in China. However, because older women tend to live longer in China, it is important to consider the specific gender effects of depression on the aging female population. This study aimed at examining the correlates of depressive symptoms for both male and female older adults in China.

In this study, two research questions were answered. First, "What are the correlates of depressive symptoms for the older adults in China?" Second, "Are there any differences in the correlates between male and female older adults in China?"

Methodology

Research design

A survey research design was used in this study. The data were obtained from a survey conducted in Jiangsu province in China. Face to face structured personal interview was used in data collection.

Target population and sampling

The target population of this study was older adults at the age of 60 years and older in the Jiangsu province in China. The focus of the study was on older adults living in urban areas. To obtain the sample for this study, proportional probability sampling was applied. The sample was obtained through proportional random selection of the participants from four level of sampling frames including city, street level, resident committee level, and household.

As a result, a total of 501 participants were successfully selected from 50 residents' committees in 16 street clusters in 4 cities in Jiangsu. Among these 501 selected participants, a total of 497 participants (235 males and 262 females) were successfully interviewed to complete this study, representing a response rate of 99.2%.

Measures

A structured questionnaire was used in the study as the data collection tool. The questionnaire consists of a wide range of questions related to demographic, social, financial, and health related characteristics and information of the older adults involved in this study. For the purpose of this study, only variables included in the analysis were discussed.

The dependent variable in this study is the depressive symptoms, measured by the 15-item Chinese version of the Geriatric Depression Scale (GDS). Selected independent variables that were found to be significantly related to depressive symptoms in previous research literature were included in this study. They included age, marital status, education, self-rated financial adequacy, satisfaction toward housing, level of worry, level of social support, number of daily living activities requiring help, and number of illness.

Results

Table 1 presents the comparison of independent variables between male and female participants. Female older adults in this study reported significantly more depressive symptoms than males. On average, fe-

Table 1. Comparison of independent variables between male and female participants

	Male (n = 235)	Female (n = 262)	Test statistics
Age (in yrs), mean (SD)	71.95	71.65	t = −.50
Marital status (%)			
Not married	23.8%	48.9%	$\chi^2 = 33.28$[a]
Married	76.2%	51.1%	
Education (%)			
No formal education	14.9%	42.0%	$\chi^2 = 62.22$[a]
Private tutoring	5.5%	4.6%	
Elementary	30.6%	32.8%	
Junior high	23.0%	9.2%	
Senior high	16.6%	8.8%	
Post-secondary and above	9.4%	2.7%	
Financial adequacy (mean)	3.01	2.86	t = 2.03[c]
Satisfaction toward housing (mean)	2.40	2.41	t = −.07
Level of worries (mean)	2.56	2.70	t = −1.71
Level of social support (mean)	1.96	1.74	t = 2.08[c]
Number of tasks needing help (mean)	2.25	2.61	t = −1.10
Number of illnesses (mean)	2.09	2.07	t = .09

[a] $p < .001$; [b] $p < .01$; [c] $p < .05$

Table 2. Correlates of depressive symptoms of male participants – Results of stepwise multiple regression analysis

	B	S.E	β	R2 Change	R2	Adj. R2
Number of tasks needing help	.251	.044	.316	.251 [a]	.251	.248
Self-rated financial adequacy	−.895	.218	−.231	.093 [a]	.344	.338
Level of overall worry	.565	.184	.168	.035 [a]	.379	.371
Number of chronic illnesses	.273	.074	.196	.024 [b]	.403	.392
Being married	−.996	.369	−.140	.023 [b]	.426	.413
Education level	−.241	.113	−.117	.011 [c]	.437	.422

[a] $p < .001$; [b] $p < .01$; [c] $p < .05$

Table 3. Correlates of depressive symptoms of female participants – Results of stepwise multiple regression analysis

	B	S.E	β	R2 Change	R2	Adj. R2
Number of tasks needing help	.342	.045	.375	.254 [a]	.254	.251
Self-rated financial adequacy	−1.050	.213	−.270	.133 [a]	.387	.382
Level of overall worry	.698	.173	.214	.040 [a]	.427	.420
Number of chronic illnesses	.217	.080	.130	.016 [b]	.443	.434

[a] $p < .001$; [b] $p < .01$

male older adults reported to have 4.87 depressive symptoms while male older adults reported to have 4.17 depressive symptoms (t = −2.52, p < .05). On the basis of the number of depressive symptoms reported (5 depressive symptoms or more), a higher proportion of the older women were reported to be depressive (48.9%) than the older men (39.9%) (χ^2 = 6.08, p < .05).

Stepwise multiple regression analysis was used to further examine the correlates of depressive symptoms of male participants and female participants separately.

Findings on the correlates of depressive symptoms of male participants are presented in Table 2. For the older men in this study, six significant correlates were identified through the use of stepwise multiple regression analysis. The findings indicated that needing help with more self-caring tasks, being more financially inadequate, more worries, more chronic illness, being unmarried, and having a lower education level were the significant correlates of more depressive symptoms.

For the older females in this study, four significant correlates of depressive symptoms were identified (see Table 3). Needing help with more self-caring tasks, being more financially inadequate, more worries, and more chronic illnesses correlated significantly with more depressive symptoms.

Conclusion

The findings of this study have indicated that among the older adults in urban Jiangsu, female older adults at the age of 60 years and older are more vulnerable to being depressive. They report to have more depressive symptoms than their male counterparts.

There are commonalities in the correlates of depressive symptoms for both the older men and older women in this study. The findings have also indicated that the effect of financial inadequacy in the aging Chinese women is more severe than its effect on the aging Chinese men. At the same time, the number of tasks requiring assistance affects the older women more severely than the older men.

The findings show that for dealing with the gender disparities in depressive symptoms, policies and programs should gear toward addressing the older women's financial needs and their need for assistance in daily living activities.

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Medicinal plants and natural compounds for the prevention and therapy of age related diseases

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In the future the developed countries will be confronted with a growing number of elderly people due to a constant increase of life expectation. What is aging? Aging is a complex progressive physiological alteration. As the research and development in this field expands, numerous questions arise how aging should be approached leading to social, moral and ethical implications concerning demands of the society. In the case of most aging diseases certain degree of genetic predisposition can be identified. Additionally life style, stress and environmental conditions can serve as trigger. Further risk factors such as cholesterol, too low fruit and vegetable consumption, obesity and overweight, lack of physical activity and smoking can be identified.

The use of more sophisticated and more effective medicines increase the life expectancy. It can be observed that the popularity of different complementary therapies varies considerably across the world and within Europe depending on the local traditions.

As people are becoming older, mental degeneration such as Alzheimer's disease, Parkinson's disease and different forms of dementia is a major public health concern. Alzheimer's disease is the most common form of dementia diagnosed after the age of 60 worldwide. It is a chronic and progressive process and a multifaceted neurodegenerative disorder affecting different brain areas. Currently, acetylcholinesterase (AChE) inhibitors are the main class of drugs prescribed for symptomatic treatment of Alzheimer's disease. However, these slow down only the disease progression. A cure for Alzheimer's disease has yet to be found. Plants from all over the world are investigated intensively for compounds with AChE inhibiting activity. Already 50 years ago the alkaloid galantamine has been isolated from different Galanthus species. Galantamine is a competitive and reversible AChE inhibitor and is used for the treatment of mild to moderate Alzheimer's disease [1, 2]. It is believed to work by enhancing the cholinergic function and by increasing the concentration of ACh in the brain. In the context of a recent study of our working group focusing on the screening of TCM drugs, Rhiz. Coptidis (huáng lián; IC_{50}= 4.68 μg/mL), Rd. Angelicae sinensis (dāng guī; IC_{50}= 0.13 μg/mL) Rd. Paeoniae alba (bái sháo; IC_{50}= 0.59 μg/mL) and Fr. Viticis (màn jīng ž| IC_{50}= 0.53 μg/mL) showed pronounced effects of AChE inhibition in *in vitro* experiments [3].

A novel drug, the sesquiterpene alkaloid huperzine A is a reversible, potent and selective AChE inhibitor. It has been isolated from the Chinese Club Moss *Huperzia serrata,* which is a medicinal herb used in China for centuries [4]. The potency rivals those of physostigmine and galantamine. The substance also shows antioxidant properties, which is important because reactive oxygen species are strongly involved in aging diseases. Therefore new natural sources for radical scavenging secondary metabolites are of great importance. Clinical trials conducted in China have demonstrated that huperzine A induced significant improvements in the memory of aged patients with Alzheimer's disease. Another multicenter, double-blind, placebo-controlled therapeutic Phase II trial was conducted recently by the National Institute on Aging in the USA.

Gingko biloba is a living fossil. The extract of the Ginkgo leaves contains flavonoid glycosides and terpenoids (ginkgolides, bilobalides). Ginkgo extract has three effects on the human body: it improves blood flow in most tissues and organs including microcirculation in small capillaries; it protects against oxidative cell damage from free radicals and it blocks many of the effects of the platelet-activating factor like platelet aggregation or blood clotting that has been related to the development of a number of cardiovascular, renal, respiratory and central nervous system disorders. The extract has also beneficial effects on the cognitive functions of aging patients. It is mainly used as memory and concentration enhancer.

Panax ginseng is a rich source of various bioactive compounds and activities which may decrease the risk of diseases. The most valuable ingredients in this plant are the ginsenosides. The ginsenosides have anti-inflammatory and immuno-stimulant activities, they are decreasing NO, have anti-apoptotic, antioxidative effects and enhance new synapse formation which represent also important neuron protective factors [5].

Every human being is confronted with oxidative stress during the whole life. Therefore free radicals and related species have attracted a great deal of attention in recent years. Free radicals can adversely alter lipids, proteins and DNA and have been related to aging and to a number of human diseases. Lipids are highly prone to free radical damage resulting in lipid peroxidation that can lead to adverse alterations. Free radical damage to protein can result in loss of enzyme activity; damage caused to DNA can result in mutagenesis and carcinogenesis. These reactive oxygen species are known to cause aging, cancer and many other diseases. There are many antioxidants (e.g. vitamin E and vitamin C) that are able to minimize effects of these reactive oxygen species. For example, phenolic compounds can trap the free radicals directly or scavenge them through a series of coupled reactions with antioxidant enzymes. There is epidemiological evidence correlating higher intake of components or foods with antioxidant abilities to lower the incidence of various human morbidities. Current

research reveals the different potential applications of free radical manipulations in prevention or control of disease. Future approaches include the use of functional foods enriched with antioxidants as novel sources of free radical scavenging compounds. Within the context of a project investigating new sources for antioxidant secondary metabolites of TCM herbs, an interesting result for the radical scavenging activity was observed for the aqueous extract of Rad. Scutellariae (huáng qín).

Medical treatment can symptomatically improve the aging patient's situation, but the ongoing neurodegeneration cannot be stopped. When cellular defence systems start to become insufficient, antioxidant diets, drinks, food supplements, medicinal herbs and herbal medicinal products may help to slow down the neurodegenerative process and provide a better quality of life for the aging patients.

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Mechanism of A30P and A53T α-synuclein mutants potentiated DAergic neurodegeneration: role of microglial Mac-1 receptor and NADPH oxidase

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Background and objective

α-synuclein is a major component of Lewy body, a pathological hallmark of Parkinson's disease (PD). In an earlier study, we demonstrated that exogenous aggregated α-synuclein was selectively toxic to DAergic neurons through microglial activation with resultant morphological alterations as well as NADPH oxidase (PHOX)-produced reactive oxygen species (ROS), including extracellular superoxide ($O_2^{•-}$) and intracellular ROS (iROS) [1]. A30P [2] and A53T [3] α-synuclein mutants were well documented to be associated with early onset familial PD and led to the accelerated DAergic neurodegeneration. However, it is poorly understood whether mutations in α-synuclein could further activate microglia, thereby contributing to the enhanced neurotoxicity in familial PD. In the present study, we used well-established primary rat and mouse midbrain cultures [4] to investigate DAergic neurotoxicity by α-synuclein mutants and underlying mechanism.

Methods

1. Various primary midbrain cultures from rat, PHOX$^{+/+}$ and PHOX$^{-/-}$, Mac-1$^{+/+}$ and Mac-1$^{-/-}$ mice, including midbrain mixed neuron-glia cultures, neuron-enriched cultures, microglia-enriched cultures, reconstituted microglia cultures, and microglia-depleted cultures were used.
2. Measurement of neurotoxicity: DAergic and GABAergic neurotoxicities were measured by determining the uptake of [3H] DA and [3H] GABA as well as counting the cell number after immunostaining to visualize TH-ir and total neurons, respectively.
3. Immunocytochemistry: TH-ir and total neurons were detected with anti-TH and anti-Neu N antibodies, respectively, whereas microglia were detected with anti-OX-42 antibody. Nine representative areas per well of a 24-well plate were counted under the microscope at 100x magnification. A total of 24 wells were counted in each of the independent experiment.
4. Measurement of the production of $O_2^{•-}$: The production of $O_2^{•-}$ in microglia from rat, PHOX$^{+/+}$ and PHOX$^{-/-}$, Mac-1$^{+/+}$ and Mac-1$^{-/-}$ mice was determined by measuring SOD-inhibitable reduction in tetrazolium salt WST-1.
5. Measurement of iROS: The production of iROS in microglia from rat, PHOX$^{+/+}$ and PHOX$^{-/-}$, Mac-1$^{+/+}$ and Mac-1$^{-/-}$ mice was determined by using a DCFH-DA assay.
6. Confocal microscopy: Primary microglia-enriched cultures from Mac-1$^{+/+}$ and Mac-1$^{-/-}$ mice were incubated with fluorescently labeled wild type α-synuclein and visualized according to a methodology previously described by our group [5].
7. Flow cytometry: Interaction between α-synuclein and Mac-1 receptor was studied by a binding experiment using flow cytometric analysis employing fluorescently labeled α-synuclein.

Results

α-synuclein mutants potentiated DAergic neurotoxicity

Both A30P and A53T α-synuclein mutants were more toxic to DA neurons than wild type α-synuclein in neu-

ron-glia cultures when assessed 10 days after treatment was initiated. Furthermore, α-synuclein-mediated neurotoxicity appeared to be relatively specific to DAergic neurons since GABA-uptake and total remaining neurons (i.e., Neu N-ir neurons) were not significantly reduced.

Microglia contributed to the enhanced DAergic neurotoxicity provoked by α-synuclein mutants

Wild type and mutant α-synuclein isomers produced similar DAergic neurotoxicity when neuron-enriched rather than mixed neuron-glia cultures were employed, indicating the important role of glia in mediating the toxicity of α-synuclein isomers. A30P and A53T α-synuclein mutants exerted greater DA neurotoxicity than wild type α-synuclein with increasing percentage of microglia added back to neuron-enriched cultures; in contrast, A30P and A53T α-synuclein mutants-induced DAergic neurotoxicity was essentially abolished in microglia-depleted cultures. These results suggested that the differential toxicity seen in wild type and mutant α-synuclein isomers was mediated primarily by microglia. Additionally, both mutant proteins produced more $O_2^{\bullet-}$ and iROS in microglia than wild type α-synuclein.

Microglial PHOX was essential to α-synuclein mutants-enhanced DAergic neurotoxicity

Deficiency in PHOX activity was associated with a significantly reduced production of $O_2^{\bullet-}$ and iROS by mutant α-synuclein. Accordingly, DAergic neurons were more resistant to A30P and A53T α-synuclein mutants-mediated neurotoxicity in cultures from PHOX$^{-/-}$ mice when compared with that from PHOX$^{+/+}$ mice.

A30P and A53T α-synuclein mutants produced greater production of $O_2^{\bullet-}$ and iROS than wild type α-synuclein, which are decreased by DPI, an inhibitor of PHOX. We further substantiated this finding by demonstrating that DPI also reduced DAergic neurotoxicity in mixed neuron-glia cultures.

These results emphasize the role of $O_2^{\bullet-}$ in microglia-related neurotoxicity, and also suggest a crucial role of PHOX-dependent mechanisms in the enhanced DAergic toxicity induced by mutant α-synuclein.

Mac-1 is required in α-synuclein – elicited microglial activation and neurotoxicity

Fucoidan and polycytidyl acid, scavenger receptor antagonists, substantially blocked the internalization of α-synuclein, however, neither had any significant effects on $O_2^{\bullet-}$ or iROS production. Although there is no difference in the degree of internalization of fluorescence labeled α-synuclein in Mac-1$^{-/-}$ and Mac-1$^{+/+}$ mice, these three α-synuclein isomers produce less ROS and exert less DAergic neurotoxicity in Mac-1$^{-/-}$ mice,

indicating the involvement of Mac-1 in α-synuclein isomers-induced microglial activation and subsequent DAergic neurotoxicity.

The results presented above, though suggestive, do not provide definitive evidence for direct interaction between Mac-1 receptor and α-synuclein. To address this issue, a binding study was performed. Microglia prepared from Mac-1$^{+/+}$ and Mac-1$^{-/-}$ mice were exposed to FITC-labeled α-synuclein, followed by flow cytometry analysis. The mean fluorescence intensity in Mac-1$^{+/+}$ microglia was significantly higher than that in Mac-1$^{-/-}$ microglia, indicating that binding of α-synuclein to Mac-1 receptor was a part of the process leading to ROS production.

Conclusions

In the present study, we used well-established primary rat and mouse midbrain cultures to demonstrate, for the first time, that α-synuclein with A30P or A53T mutation gave rise to more pronounced DAergic neurotoxicity than wild type α-synuclein through the activation of microglial PHOX indicated by increased oxidative bursts. Microglial Mac-1 activation, without the involvement of internalization, is sufficient for the subsequent PHOX activation and ROS production, which in turn causes the propagation of DAergic neurodegeneration. These results provide new insight into the mechanisms of PD pathogenesis and suggest that inhibition of microglial over-activation by targeting Mac-1/PHOX sites is a novel therapeutic intervention for PD.

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Effectiveness of antiviral combination therapy in elderly patients with chronic hepatitis C

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Background and aims

Populations of Irkutsk region have a high prevalence of HCV infection. On the whole prevalence of anti-HCV is 8.5%. The prevalence of HCV infection is very high in people 16–30 years and over 65 years – 12.5%. The most important link in the struggle with chronic hepatitis C and its outcome (cirrhosis and hepatocellular carcinoma) is antiviral therapy. At present the main aims of therapy are: suppressing virus replication and decreasing the activity of inflammation in the liver and, consequently, restraining the further development of the disease. As a result, it prevents the development of cirrhosis and hepatocellular carcinoma, which is a consequence of the chronic hepatitis C. And also we increase patients' quality of life. According to the dates of different authors the effectiveness of antiviral combination therapy in elderly patients with chronic hepatitis C varies. The aim of our study was to estimate the effectiveness and tolerability of antiviral combination therapy in elderly patients with chronic hepatitis C.

Methods

One hundred fifty patients with chronic hepatitis C were treated with combination of α-interferon (standard or pegylated) and ribavirin. Thirty five from these patients were over 50 years and one hundred fifteen were under 50 years. 98 patients were males. The middle age was 39, 12±23 years. 69 patients (46%) of this population were Asian race, and 81 patients (54%) – white race. Supposed duration of HCV-infection according to anamnesis was 8.5±7,69 years (from 1 till 30 years).

Mean weight was 76.1 ± 15.6 kg, with the following weight distribution: < 59 kg – 14.5%; 60–69 kg – 20.6%; 70–79 kg– 25.5%; 80–89 kg – 27.5%; > 90 kg – 12.2%. Mean body mass index was 26.02 kg/m^2.

The analysis of the clinical symptoms demonstrated that 60% people had either syndrome of chronic fatigue or symptoms of dyspepsia, 40% patients had the asymptomatic course.

Only 8.0% patients had normal serum alanine aminotransferase activity; 54.0% patients had ALT which was above the upper limit of normal level in 3 times; 36.0% patients had ALT which was above the upper limit of norm in 3–5 times; 2.0% patients had ALT activity which was above the upper limit of norm in 5 times.

Eighty six (57.3%) patients had 1 genotype HCV, 49 patients (32.7%) had 3a genotype, 15 patients (10.0%) had 2 genotype.

Most of patients – 67.8% had less than 3.3×10^6 copies of HCV RNA per milliliter according to polymerase-chain-reaction; 32.2% patients had above 3.3×10^6 copies of HCV RNA per milliliter.

According to the modern recommendation [1, 2] patient received antiviral combination therapy either standard (3 million ME three time a week) or pegylated interferon (12 kD or 40 kD) and daily ribavirin. Dose of ribavirin depended on patient's weight and HCV genotype. The patients with HCV genotype 1b received antiviral therapy during 48 weeks, the patients with 2 or 3a genotype received during 24 weeks. PEG-interferon received 47% patients. The patients were followed up for 24 weeks after the cessation of therapy.

The effectiveness of the treatment is estimated at the end of 24-week period of observation (SVR). SVR is defined as the absence of HCV RNA and also normal level of serum alanine aminotransferase activity.

Statistic tests included test Kolmagorova-Smirnova, test Student.

Results

Sustained virological response (SVR) on antiviral combination therapy of the patients with chronic hepatitis C was 67.3%. Among the patients with HCV genotype non-1b sustained virological response at the end of follow-up was 84.4%; among the patients with HCV genotype 1b sustained virological response was 54.2%.

In our research the following were demonstrated: if age of patient increased, sustained virological response would decrease. SVR in patients below 19 years was 100%; 20–29 years old – 81.0%; 30–39 years old – 73.2%; 40–49 years old – 62.8%; 50–59 years old – 47.8%; 60–69 years old – 57.0%; 70–79 years old – only 33.3%. In the study patients under 50 years SVR was 73%, patients over 50 years sustained virological response was 47% (p < 0,01).

According to mathematic statistics (method Kolmogorova-Smirnova) these factors significantly associated with achieving a sustained virologic response: genotype other than 1, pretreatment viral load less than 3.3×10^6 copies/ml, small duration of disease (10 years or less), a body weight of 70 kg or less and second blood group.

These factors were not associated with achieving a sustained virologic response: gender, body mass index, ALT level, bilirubin, race, stage of fibrosis, Rh factors, smoking during treatment, consumption of alcoholic drinks and drug abuse before treatment, family status, and place of residence (p > 0.05).

In scientific literature dates about influence blood group on sustained virological response were not found. In our research patients with second blood group had 100% SVR. SVR in patients with first, third and fourth blood groups was 61.1%, 40.0% and 50.0% respectively (p < 0.05).

Tolerability of the therapy was satisfactory. Most adverse events were mild or moderate in severity and all adverse events were typical. Most frequent common adverse events were flu-like symptoms (pyrexia, myalgia, rigor and headache) 98% and lost of weight (50%). Fatigue, rashes, insomnia, gastrointestinal disorders, depression, irritability and local reaction were very seldom.

The therapy was discontinued prematurely because of severe adverse events in fourteen cases – 9.4%. In one case we observed hallucinations and in one case diabetes mellitus. Nine patients had serious thyroid dysfunction.

Neutrophil counts decrease to less than 0.5×10^9 cell/L in 2% of patients. Platelet counts decrease to less than 50×10^9 cell/L in 1.3% of patients. The dose of ribavirin was reduced (till 600 mg) because of the laboratory abnormalities (reduction of hemoglobin, hyperbilirubinemia) in 2 cases.

Frequency of adverse events, reduction of dose preparation and prematurely discontinuation of treatment did not differ significantly between patients under 50 years and over 50 years.

Resume

Tolerability of the therapy was satisfactory independently of age. Effectiveness of antiviral combination therapy in elderly patients with chronic hepatitis C was worse than that in younger patients. The patients who have sustained virological response have been observed for 2–8 years. All patients who have virological response on 24 weeks of follow-up keep this effect subsequently.

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Drug-induced complications of antitubercular therapy at elderly and senile age patients

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Pulmonary tuberculosis at elderly and senile age patients is often diagnosed on a background of a number of chronic mutually burdening diseases [1]. The prolonged, continuous usage of antitubercular drugs (ATD) is a serious problem at such patients and results in various side effects and complications [2, 3].

The aim of our research was to study frequency and characterize side effects of ATD at patients with newly diagnosed pulmonary tuberculosis of elderly (60–74 years, I group) and senile (75-94 years, II group) age patients with the complex of concomitant diseases at different regimens and schemes of drugs administration.

Methods

297 patients with the newly diagnosed pulmonary tuberculosis were examined, group I (patients of 60–74 years old) consisted of 249 patients, group II (patients of 75–94 years old) – 48 patients. Women prevailed in both groups – 69.5% and 85.4%, respectively. Clinical forms of tuberculosis at patients I and the II groups respectively were the following: infiltrative form – 196 (78.7%) and 21 (43.8%), disseminated form – 53 (21.3%) and 27 (56.2%). 83.5% patients of the I group and 100% of patients of the II group were smear positive with bacteriological verification and had destructive changes in lungs.

In all of the patients of the I group pulmonary tuberculosis was diagnosed on a background of a number of diseases: arterial hypertension, ischemic heart disease. For men – also chronic obstructive pulmonary disease (78%), predilection for alcohol (71%), and diabetes mellitus (41%) were revealed. For women, except for the cardiovascular diseases, the chronic diseases of the gastrointestinal system (74%) and polyvalent allergy (32.4%) were revealed. In all of the patients of the II group cardiovascular diseases were the main concomitant ones regardless of gender.

Daily and intermittent (2 and 3 times per a week) regimens of treatment were used in patients of both groups: 1st scheme – mainly oral administration of drugs – isoniazid (H), rifampicin (R), pyrazinamide (Z), ethambutol (E), in solitary incases – ethionamide (Et) or intramuscular injections of streptomycin (S) or canamycin (C); 2nd scheme – mainly parenteral administration of antitubercular drugs – intravenous injections of H and R, intramuscular administration of S or C, oral administration of Z or E or Et.

156 from 297 patients (52.5%) had good tolerance to treatment. Majority of them (93%) were women. Among these patients there were no persons with the burdened narcological anamnesis (alcoholism), with decompensation of cardiovascular system and diabetes mellitus. Majority of them (82.3%) were treated with intermittent regimen (twice a week) with parenteral intake of ATD.

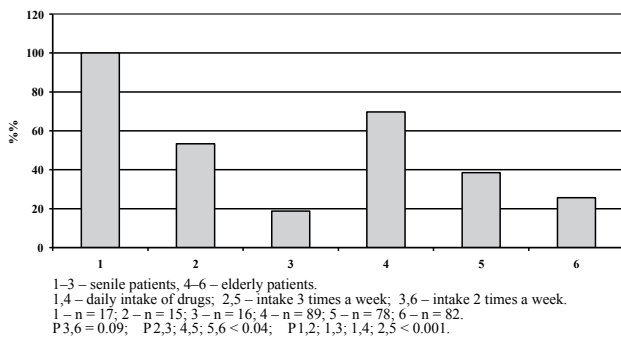A comparative statistical analysis was conducted using Fisher exact test.

1–3 – senile patients, 4–6 – elderly patients.
1,4 – daily intake of drugs; 2,5 – intake 3 times a week; 3,6 – intake 2 times a week.
1 – n = 17; 2 – n = 15; 3 – n = 16; 4 – n = 89; 5 – n = 78; 6 – n = 82.
P 3,6 = 0.09; P 2,3; 4,5; 5,6 < 0.04; P 1,2; 1,3; 1,4; 2,5 < 0.001.

Fig. 1. Frequency of side effects in elderly and senile TB patients depends on regimen of intake of antitubercular drugs

Results

Adverse reactions on ATD were observed in 113 (45.4%) of 249 patients of the I group and in 28 (58.3%) of 48 patients of the II group – (P I, II = 0.05). 136 patients of group I and 20 patients of group II group had no side effects of ATD. Frequency of development of drug-induced complications in patients depending on scheme of drugs administration is presented in Fig. 1.

Adverse reactions were observed more often in patients of both groups at the daily scheme of administration of ATD than at intermittent regimens – 3 and 2 times a week (P < 0.01), intake of ATD 3 times a week resulted in more frequent development offside effects than intake 2 times a week (P < 0.05). Adverse reactions on ATD were observed in 100% of cases of II group on daily administration and more rarely in I group – 69.7% of cases.

Frequency of drug-induced complications was different for men and women. In general, side effects were registered in 81.9% of men and in 34.1% of women (P < 0.01). Adverse reactions were registered in the men of group I more rarely (80.2%) than in II group (100%; P < 0.01). Frequency of drug-induced complications in the men of the I group substantially did not depend on regimens of therapy (at daily 87.1%, 3 times a week 81.8%, 2 times a week 69.6%) and was higher than for the women of this group (P < 0.05).

Frequency of drug-induced complications in the women of group I substantially depended on the different schemes of therapy (P < 0.02). More often side effects were observed at the daily intake of ATD (60.3%), but rare at intermittent regimens (3 times a week – 21.4%, 2 times a week – 8.5%).

Adverse reactions were registered in all 10 women of group II with daily intake of ATD, rare in women with intermittent intake – 3 times a week –53.3% (P < 0.001) and 2 times a week – 18.8% (P < 0.001). We did not register significant difference in the frequency of development of side effects in women of groups I and II in cases of 2 times a week intake of ATD, but in cases of 3 times a week intake side effects were more expressed in women of group II (53.3% vs 21.4% in group I, P < 0.001).

Frequency of development of adverse reactions in patients with daily intake of ATD (mostly orally, scheme 1) did not depend on gender, but in cases of usage of scheme 2 (mostly pareneteral intake of ATD) side effects were revealed in men more often than in women (88.2% vs 50.0%, P < 0.05). Side effects were observed in all patients of group II regardless of schemes of intake of ATD.

There were not found any differences in the frequency of side effects in men of group I in dependence on scheme and regimens of drugs intake. But in women subgroup we revealed that intake of ATD 3 times a week resulted in lower frequency of adverse reactions (scheme 1 – 39.3% and scheme 2 – 3.6%), than daily intake (scheme 1 – 68.8% and scheme 2 – 50.0% P < 0.001). The same results were obtained in women of group II.

We did not find any difference in terms of development of adverse reactions in patients of group I where drugs were administered daily (scheme 1 – 14.9 ± 0.5 day from the beginning of treatment, scheme 2 – 15.9 ± 0.5 day). However, at intermittent regimens of treatment side effects were observed later, especially in cases of usage of parenteral intake (3 times a week: scheme 1 – 22.0 ± 0.9 day, scheme 2 – 31.1 ± 0.9, P < 0.05; 2 times a week: scheme 1 – 37.2 ± 1.2 day, scheme 2 – 42.6 ± 0.7 day, P < 0.05).

The adverse reactions in senile age patients were observed earlier (P < 0.05), depended on regimen of treatment, but did not depend on scheme – daily intake: scheme 1 – 4.9 ± 0.5 day from the beginning of treatment, scheme 2 – 5.4 ± 0.4 day; intake 3 times a week: scheme 1 – 16.7 ± 1.5 days, scheme 2 – 16.0 ± 3.1days; 2 times a week: scheme 1 and scheme 2 – Each 35 days.

Frequency of side effects on some ATD is presented in Table 1.

We have paid attention to high frequency of adverse reactions on S, C, Et in cases of daily intake at group I patients, and complete unbearableness of all drugs at group II patients. Adverse reactions to E were not observed. Thus, optimum regimen of treatment of the patients of both groups is intermittent regimen (2 times a week, parenteral intake is preferable).

ATD were abolished during the development of adverse reactions until their complete liquidation. Frequency of irremovable reactions at the patients of group I at the daily intake was 67.9% on H, 96.8% on S and C, 77.8% on Et, 85.7% on Z and R. Irremovable reactions in 100% cases took place in the patients of group II at daily intake of ATD. Frequency of irremovable reactions was the least at their intake 2 times a week in both groups.

Nature of side effects of ATD at patients is presented in Fig. 2.

Toxic reactions at patients of group I were observed more often at daily intake than at intermittent regimes at reception 3 and 2 times per a week, and more often than allergic and combined (P < 0.001). There were no differences in the frequency of development of toxic, allergic and combined reactions at intake 3 times a week. But in cases of 2 times a week intake combined adverse reactions were more frequent.

As for group II only toxic reactions were registered despite schemes and regimens of treatment.

Clinical manifestations of drug-induced complications were caused by background diseases and features of drugs. Intake of H, S, C caused the development

Table 1. Frequency of adverse reactions in elderly and senile age patients depended on certain drugs and regimens of their intake

Drug	Number of patients	Regimens of administration						P
		daily A		3 times a week B		2 times a week C		
		Group I	Group II	Group I	Group II	Group I	Group II	
H	n	89	17	78	15	82	15	BI,CI; BII,CII
	n_1	56	17	10	8	3	3	< 0.02
		62.9%	100%	12.8%	53.3%	3.7%	18.8%	AI,BI; AI,CI; AII,BII; AII,CII
		$P_{I,II} < 0.05$		$P_{I,II} < 0.001$		$P_{I,II} < 0.04$		< 0.001
S	n	89	5	78	3	82	3	AI,BI < 0.01
	n_1	62	5	30	3	20	3	BI,CI < 0.03
		69.7%	100%	38.5%	100%	24.4%	100%	AI,CI < 0.001
R	n	89	17	78	15	82	16	AI,BI; AI,CI; AII,BII < 0.04
	n_1	21	17	10	8	5	3	
		23.6%	100%	12.8%	53.3%	6.1%	18.8%	
		$P_{I,II} < 0.001$		$P_{I,II} < 0.01$		–		
Et	n	31	17	11	10	12	9	AII,BII < 0.05
	n_1	18	16	3	7	4	5	AII,CII < 0.02
		58.1%	94.1%	27.3%	70%	33.3%	55.6%	
		$P_{I,II} < 0.01$		–		–		
Z	n	89	17	78	10	82	9	AI,CI <0.001
	n_1	21	17	11	9	3	6	BI,CI < 0.01
		23.6%	100%	14.1%	90%	3.7%	66.7%	AII,CII < 0.01
		$P_{I,II} < 0.001$		$P_{I,II} < 0.01$		$P_{I,II} < 0.001$		
C	n	89	3	11	4	10	2	AI,CI < 0.001
	n_1	70	3	8	4	5	2	
		78.7%	100%	72.7%	100%	50%	100%	

n total number of patients; *n_1* number of patients with adverse reactions.
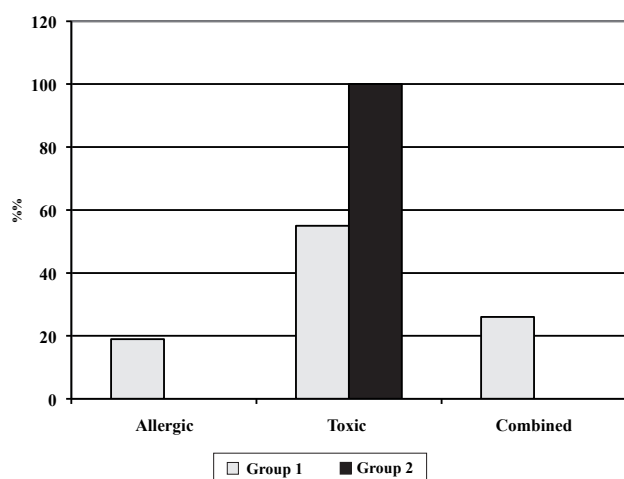

Fig. 2. Nature of side effects on ATD

of vasopressor and neurotoxic effects. Besides, drug-induced liver diseases were revealed in 69% of men of group I with alcoholism and diabetes mellitus. Toxic reactions were observed more often in men than in women (P < 0.001) of group I, but allergic and combined reactions were peculiar mostly for women.

Only toxic reactions were observed in patients of group II, the expression of reactions was higher, than at patients of the I group, and for men, higher than for women.

Resume

In all our patients pulmonary tuberculosis was a comorbident disease. The degree of expression of background diseases was more severe for men, especially for group II. Patients with pulmonary tuberculosis of elderly and senile age with the complex of concomitant diseases are in a risk group on the development of drug-induced complications of antitubercular therapy.

Nature of adverse reactions and time of their development are determined by pathogenetic peculiarities of concomitant diseases, features of ATD, regimens of their administration. It is necessary to conduct antitubercular therapy in intermittent regimen (parenteral intake 2 times a week) for diminishing of risk of development of complications on ATD at the patients of elderly and senile age.

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The human mouth as cause of age-associated disease

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Statement of problem

Poor oral hygiene is closely connected to pneumonia, arteriosclerosis, infection-related diseases and malnutrition. The data of the present investigation suggest that regular dental prophylaxis on a professional basis leads to an increase in quality of life as well as in the general condition and minimizes the risk of morbidity.

Purpose of study

The WHO states that in 2030 COPD is going to be the fourth common cause of death. The oral cavity is among others a definite cause for COPD. Specific mouth-associated germs are verifiable in atheromas of the coronary blood vessel and cerebral vessels.

Over 80 percent of the elderly living in long-term care institutions in Austria, Germany and Switzerland, show acute inflammatory processes located in the mouth. Quality of life among the elderly is associated with analgesia and appropriate mastication. A great deal of annoyance in this area can lead to malnutrition and declines the quality of life as well as the general condition.

It is a proven fact that poor dental health is closely connected with illness generally, e.g pneumonia [1],arteriosclerosis [2] and infection-related illnesses [3]. Furthermore, regular oral hygiene is an important preventative means against infection in the dental and oral region and dietary problems; it also upholds the self-confidence and quality of life for senior citizens who are

in care [4]. Poor oral health affects far more than just the oral region, indeed the whole quality of life can be greatly diminished because of this [5]. One has to consider the recurring pain caused by the pressure of ill-fitting dentures.

While the extent of medical care due to general illness increases with age, dental care tends to be neglected for want of an objective assessment of the need for treatment. The deterioration of dental health can be treacherous and is often unnoticed or ignored in the early stages. Patients are not conscious enough of the fact that supposedly insignificant symptoms can lead to serious illness. The passivity of the health system leaves the question of dental care entirely in the hands of senior citizens living alone and insufficient knowledge may be a reason for infrequent dental examinations.

Dental care and treatment is a greater problem for the hospitalised elderly people than for people in the same age group who are not in institutions; this sets them at a greater risk of suffering a deterioration in dental and oral health. This is owing to a combination of difficulties which include the costs incurred, the lack of oral hygiene offered by homes, the complications of transporting the elderly and the fear of the patients themselves. Added to this is the lack of interest and competence in this field on the part of dental medical science, the non-existence of organised dental care for the institutionalised and the difficult psychological and social conditions prevailing in nursing homes. The imagination of a generalised periodontitis having the same size of a 50 cm² (palm of a hand) decubitus ulcer,
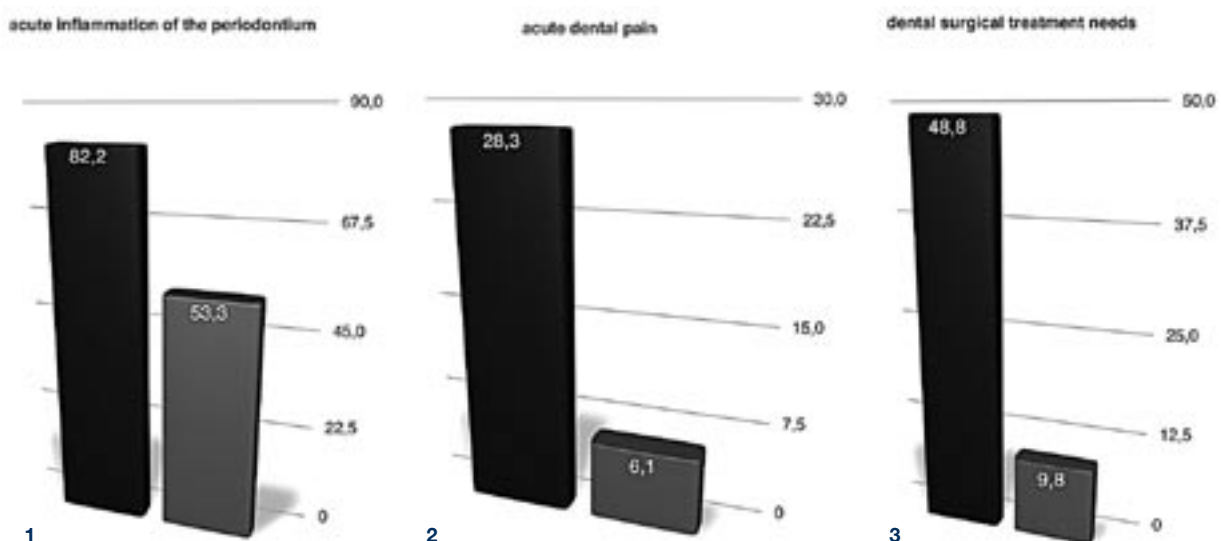
Figs. 1–3. Effect of oral examinations, surgical treatment and professional cleaning of teeth and dentures after one year of intervention

makes the same effect on the general state of health more obvious to the carers.

Material and method

Oral examinations were carried out on 73 men (81.9 yrs) and 336 women (86.1 yrs) from 9 homes in the county of Styria, Austria. All examinations took place on the signed agreement of the patients themselves or a relative with the right of attorney.

All examinations were made by the same dental surgeon; he was equipped with a photo light lamp to achieve maximum visibility within the mouth, a dental mirror, a CPTIN probe and a hooked probe. The results were based on acute dental pain, acute inflammation of the periodontium and dental surgical treatment needs. After the oral examination professional cleaning of teeth, dentures and oral cavity was carried out on all participants.

Results

Of the 409 patients examined with an average age of 85.3 years (73 men and 336 women) in 9 nursing homes for the elderly, it could be shown that regular dental prophylaxis on a professional basis decreases acute dental pain from 28.3% to 6.1%, acute inflammation of the periodontium from 82.2% to 53.3% and dental surgical treatment needs from 48.8% to 9.8%.

The number of transports to a dental clinic due to acute dental pain was decreased by 49.7%.

Discussion

The results show a real need also in Austria to effect changes regarding the institutionalised*** elderly. Oral hygiene is not rated as being of importance either by the patients themselves or the nursing staff, although research has proved the opposite. Regular dental examinations should be carried out by dental surgeons in the nursing homes as the patients are not in a mental condition to be capable of describing symptoms in this field; infections could therefore be diagnosed at an earlier stage. Specialised training in treating elderly patients in need of care is necessary within the field of dental medicine, since the number of such patients is increasing in our society.

Conclusion

Prevention of dental pain as well as acute inflammatory processes in the mouth leads to an increase in quality of life as well as in the general condition and minimizes the risk of morbidity.

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Prevention of cardiovascular disease in elderly: a challenge for Chinese Cardiologist

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At the present time, China has already stepped into an elderly society. People aged over 60 years amounted to 144 million representing 11% of the 1.3 billion Chinese according to a census in 2005. The number of senior population is rapidly increasing by 3.2% per year. According to "Report on Cardiovascular Diseases in China 2006": Cardiovascular diseases are the leading cause of death in China. Cardiovascular deaths in Chinese population were 3 million per year, accounting for 45% of total deaths in China. More than 80% of people who die due to coronary heart diseases or strokes are 65 years or older. The cost of treating cardiovascular disease in China was estimated ¥ 130 billion per year.

Hypertension, diabetes, smoking, overweight or obesity, and high-total cholesterol are important cardiovascular risk factors; and the prevalence increases with age in China. Thus, modifying these risk factors is important to prevent the CVD and cardiovascular events. Increased use of non-acute medications in primary and secondary prevention explains about one-third of the total reduction in cardiovascular disease mortality since 1950. About two-third of reduced mortality from cardiovascular disease is a result of medical interventions. Very few of clinical trials in cardiology represent the population of older adults seen in most hospital wards and community settings.

There are no formal geriatric fellowships or national board certifications in geriatrics health care in China. One of the challenges faced by China in the care of its aging population is how to increase geriatric research and training. Although the number of the elderly with CVD and comorbidities is rising, there is limited focus on primary health care and more concentration on secondary intervention in elderly management. Integrating evidence-based information in elderly management is also lacking in the elderly in China.

Health care service pattern for the elderly, from acute to chronic recovery, until long-term rehabilitation, is underway in China. Chinese cardiologists play a central role in the health care of CVD for the elderly, treating CVD patients and high-risk population, mobilizing public CVD prevention programs organized by the government, creating the supportive environment, pushing the development of community-based care, and developing the health education. Guidelines and experts' consensus on cardiovascular diseases have concerned about the elderly in China.

The health status of old adults differs widely and many remain well and vigorous up to advanced old age. Preventing CVD in elderly and giving the best to older people is a challenge for Chinese cardiologists.

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Cardiovascular diseases and aging: focus on peripheral arterial disease

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Abstract

Aging is one of the major cardiovascular risk factors and the incidence of peripheral arterial disease (PAD) increases with age. Aging is also a risk factor for symptomatic, more severe forms of PAD like intermittent claudication and critical limb ischemia (CLI). Prognosis of CLI is bad, only 50% of patients survive 1 year without amputation, therefore new therapeutic options are needed. Therapeutic angiogenesis might be such a novel therapeutic regimen.

Introduction

Aging is one of the major risk factors for atherosclerosis. Therefore diseases like coronary artery disease, ischemic congestive heart disease, atrial fibrillation, stroke and PAD increase dramatically in the aged population. Owing to other diseases like renal impairment and a general impaired condition, patients at high age often are not suitable for medical or surgical therapy although they would need it. Therefore new therapeutic options are needed for this group of patients.

In the case of PAD, besides smoking and diabetes, age is the main risk factor to develop this disease. Prevalence of asymptomatic PAD (defined as an ankle/brachial index (ABI) below 0.9) was 3–10% in epidemiologic studies but increased to 15–20% in persons over 70 years. Intermittent claudication is characterized by muscular leg pain on exercise that is relieved by a short rest. Also the prevalence of intermittent claudication increases by age and is 2% at the age of 50 and 7% at the age of 70 [1]. Additionally, the risk of developing CLI, characterized by ischemic rest pain or tissue defects like gangrene or necrosis, is doubled by the risk factor age (over 65 years) [1]. Patients with CLI have a very bad prognosis, only 50% survive 1 year without amputation. Therefore new therapeutic options are needed for these patients.

Basic research

It has been shown that age is associated with impaired up-regulation of angiogenic cytokines like vascular endothelial growth factor (VEGF), factors that regulate the growth of new blood vessels (angiogenesis) in ischemic limbs after arterial occlusions [2]. We have preliminary results that the treatment with angiogenic factors like VEGF in aged animals leads to an attenuated activation of anti-apoptotic signalling pathways like protein kinase B/Akt when compared to young animals, indicating that aging also is associated with an impaired action of factors that induce collateral blood vessel development (Fig. 1).

Nevertheless, as treatment with VEGF improved outcome after ischemia also in old animals [2] it is conceivable that angiogenic factors might exert beneficial effects also in age-related impairment of angiogenesis.

Therapeutic angiogenesis-clinical trials

Besides preclinical studies in animal models of ischemia treatment of patients (suffering from CLI without the option of surgical or interventional revasculariza-
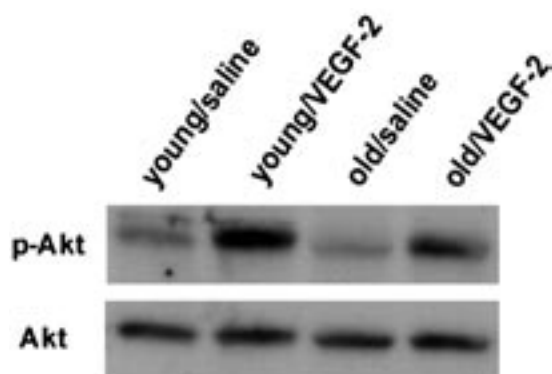
Fig. 1. VEGF-induced Akt activation is impaired in old mice. Young (2 months) and old (2 years) mice were injected with VEGF-2 (10 μg) oder saline (control) intramuscularly and activation of Akt was determined by Western-Blotting by analyzing levels of phospho-Akt (p-Akt, active form) vs. total-Akt (Akt). In young mice VEGF-induced Akt-activation was more pronounced compared to old animals (compare more intensive p-Akt band in young vs. old mice)

Table 1. Large placebo-controlled, double-blinded studies of therapeutic angiogenesis

Clinical trial	Angiogenic factor	Patient number	Outcome
Groningen Kusumanto et al.	VEGF	54	Improvement of ulcers and ABI
TALISMAN Nikol et al.	FGF-1	112	Amputation rate decreased
HGF-STAT Powell et al.	HGF	106	Improvement of transcutaneous oxygen pressure

tion) with angiogenic factors like VEGF in phase-1 studies have shown very promising results. In larger phase-2 studies in patients with intermittent claudication, however, no benefit could be demonstrated for VEGF or fibroblast growth factor (FGF). Recently, phase-2 studies were also published for patients with CLI, and in these patient groups gene therapy using VEGF, FGF or hepatocyte growth factor (HGF) has shown promising results (see Table 1, and for review see also Nikol S., 2008 [3]).

Future perspectives

Severely decreased blood perfusion in CLI indicates impairment of usually "spontaneously" occurring collateral blood vessel development. Double-blinded studies with different angiogenic factors indicate that exogenous application of these factors improves blood flow consistent with the concept of therapeutic angiogenesis. A large phase-3 study using FGF-1 (TAMARIS) is now under way to ultimately prove this therapy and to make it applicable to patients suffering from this disease [3].

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Stress is an influencing factor for cardiovascular diseases among old people

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Due to transitions in surveillance, changes have taken place with regards to population morbidity and mortality rates since 1990, in Mongolia. Accordingly, circulatory system diseases which are including cardiovascular disorders, now called "Life style and behaviorally dependent diseases", have become the leading causes of morbidity and mortality.

The incidence rates of diseases of circulatory system in urban and in rural areas were 563.5 and 586.8, respectively, in 2007. The overall morbidity was higher in urban settings.

In recent years, several definitions of Human stress have been proposed. These definitions vary; though, causing a great contract of uncertainty. Stress can be acute and chronic; it is merely a term human beings use to denote for a lot of specific problems in our life. When we are feeling angry, frustrated, worried, or depressed we often say we are "stressed". Also when we have too many responsibilities, works, and pressures from colleagues we use the same term.

Mental stress is a multifactorial process involving the environment, individual experiences and coping, cardiovascular, and set of the neuroendocrine and other systemic physiologic responses.

Understanding the direct relationship between stress and cardiovascular disease is not very easy. The

research suggests that mental stress causes blood pressure to rise and to have heart attack and other cardiac condition for old people.

Aim of this study is to investigate whether the stress is an influencing factor for cardiovascular disease. Using the questionnaire the analysis was done among 119 people who were admitted (50–81 years old) in the district hospital over a period of 2 years (2006–2007). Among the study group identified: 75% had internal stress including loss of job – 71%, retirement – 68%, divorce\separation 66%, 83% had negative stress, and 53% had physical symptoms, respectively.

The terms of physical symptoms are as follows: 58% headaches, 41% fatigue, 44% digestive changes, 39% sleep pattern changes, 27% palpitations, and 21% dizziness.

Conclusion

Measures such as providing advanced counseling and training method to develop personal physiologic capacity, to acquire the basics of recreation health care, change lifestyles, change thinking, and behaviors will prevent the exposure of negative stress among the old people with cardiovascular diseases.

Continuous counseling, awareness about cardiovascular disease, meditation, relaxation, and family participation in care and support reduce the stress.

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Clinical and laboratory research in atherosclerosis with Chinese Herbs

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Atherosclerosis (AS) is a commonly occurring illness in geriatrics. It is the pathological foundation for coronary heart disease, cerebrovascular accident, and related diseases. Coronary-cerebral-vascular disease ranks first in geriatrics morbidity, and is a major factor resulting in elderly deaths and disabilities. Traditional Chinese Medicine treats atherosclerosis mainly by focusing on transforming "phlegm" and promoting blood flow methods; however, from this research, we have concluded that atherosclerosis as seen in 40-year-old and over middle-aged and elderly patients is due to the beginning of kidney qi and essence deficiency, and the formation of phlegm and stagnation is closely related to the state of kidney qi and essence. Therefore a herbal formula called "RMJ" is used to boost kidney qi in an effort to prevent and treat atherosclerosis.

For several years, through clinical trials and animal testing, we have been searching for the mechanism behind which RMJ helps prevent and treat atherosclerosis. Our findings are as follows:

In clinical trial, AS in common carotid artery diagnosed by color ultrasound Doppler was analysed in 62 cases. Among them, 32 cases were treated with RMJ, 30 cases with simvastatin as positive control for 6 months. In these patients, intima-media thickness, area of arteriosclerotic plaque in common carotid artery were examined by ultrasound Doppler; blood-lipid, ET (Endothelin), NO (Nitrogen Oxide), ox-LDL (Low Density Lipoprotein Oxide), ET/NO were also examined. Clinical data showed that RMJ can decrease intima-media thickness and area of arteriosclerotic plaque in common carotid artery and improve clinical symptoms (compare with before treatment group: $P < 0.01$, $P < 0.05$, $P < 0.01$). It can also decrease plasma TC APOB, LDL level ($P < 0.05$, $P < 0.01$, $P < 0.05$). Ox-LDL, lp(a) decreased after treatment, but without significance. ET, NO, ET/NO had no significant change ($P > 0.05$).

Laboratory research of human navel endothelial cell in vitro cultures, endothelial cell destructed by ox-LDL was used. RMJ can significantly increase the endothelial cell survival rate (examined with MTT method) ($P < 0.01$), decreased endothelial damage, and improved endothelial cell function by decreasing IL-6 (interleukin-6), MCP-1 (Monocyte chemotactic protein-1) (examined by ELISA method), and expression of PDGF (Platelet derived growth factor) mRNA (examined by RT-PCR) ($P < 0.01$).

In thrombin-induced rabbit thoracic aortic vascular smooth muscle cell models, medicine serum was acted on the cell model. Set up normal group, model group, simavastatin group and group of different RMJ dosage. The expression of PDGF-A m RNA was observed and analysed by means of reverse transcriptase-polymerase chain reaction assay (RT-PCR); IL-6 protein and

MCP-1 protein were examined by sandwich ELISA; Survival rate of different groups was determined by MTT method; Micro-structure of the SMCs was investigated by transmission electron microscope. In the model group, rabbit VSMCs showed a heavily pathological changes corresponding to AS, RMJ could inhibit effectively the expression of cells, survival rate ($P < 0.01$), IL-6 ($P < 0.01$), MCP-1 ($P < 0.01$) and PDGF – A mRNA ($P < 0.01$).

In vivo, a rabbit carotid atherosclerosis model was established by the high-fat diet and air-drying method. 38 New Zealand rabbits were randomly divided into four groups: normal control group 8, model group 8, RMJ Group 11, and simvastatin group 11. After 12 weeks, optical microscopy carotid morphology measurement of intima-media thickness, and cells apoptosis in carotid artery vascular smooth muscle by TUNEL method were performed. B-cell lymphoma/leukemia-2 (Bcl-2), Bcl family promote apoptosis gene Bax)caspases-8, matrix metalloproteinase-2 (MMP-2) expression were detected by immunohistochemical method. It was found that the decoction effectively decreased carotid intima-media thickness ($P < 0.05$). It was also found that in the later stage of atherosclerosis, using hetero Bax/Bcl-2 competing Bax with homo Bax-Bax, the herbal decoction was able to reduce the homo apoptosis ($P < 0.05$) which induces the formation of atherosclerosis, and in turn inhibits vascular smooth muscle cell apoptosis, enabling the stabilization of plaque. By interfering with the cellular apoptosis signal transduction pathways of the multi-signaling pathway medium Caspase-8's expression ($P < 0.05$), late-stage atherosclerotic vascular smooth muscle cell apoptosis was inhibited ($P < 0.05$). The reduction of matrix metalloproteinases 2 (MMP-2) over-expression ($P < 0.05$) in the *atherosclerosis plaque further enabled the lowering of the release of extracellular matrix, the increasing of plaque stability, and the lowering of the occurrence of* cerebrovascular events.

In summary, we conclude that kidney qi and essence deficiency is one of the root causes of atherosclerosis, and that boosting kidney qi is an effective treatment principle for this disease. RMJ has been proven to have a certain degree of effectiveness in the prevention and treatment of atherosclerosis. This research has gone one step further in providing theoretical and clinical proof for the study of atherosclerosis.

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Cardiac surgery in the elderly: chances, risks and costs

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Demographics in the 21st century increase the number of aging people requiring cardiac surgery to improve survival and to regain quality of life. Whereas 70 years ago cardiac surgery started to improve and most of the times palliated the life of children with congenital heart disease, the scope is now changing towards the elderly with degenerative cardiac (structural) disease. The current lifestyle and the surplus of nutrition also change the disease status of patients not only in the Western Hemisphere but also in Asian countries. As depicted in figure 1 the majority of cases with heart insufficiency and end stage heart disease occur in the age of 60 years and above. Although it is a question of societal competence whether this age group deserves cardiac operations it is without any question that this procedure reduces the chance of early death as well as improves quality of life significantly.

Several innovations in surgical techniques and the type of operation with less invasive but equally successful alternatives reduce risks but add substantially to health care costs. In the Western hemisphere coronary heart disease and its sequelae are still among the most important causes for debilitating disease as are degenerative changes of the aortic valve. Both are of atherosclerotic origin. Therefore it is of outmost interest how cultural differences of low calory/fat intake reduce the incidence of this disease in a given population.

In regard to the improvement of quality of life in elderly patients three independent parameters can be identified:

- Number of aging people and percentage of diseased patients
- Overall economy and societal status of this population group
- Availability of cardiac surgical experience in elderly patients and the logistic background of perioperative care.

Quality of care is also different in many regions of the Western Hemisphere and is mainly dependent on the health care provider excluding many potential surgical candidates.

Austria can be proud of allowing tertiary care also to elderly patients even in octogenarians and age groups above. Although human rights should demand treatment to all European citizens, reality in many countries is different.

Cardiac surgery in the elderly needs special experience and a well-organized treatment structure since we deal with a multi-morbid population. In my experience one important factor overrules all other influencing parameters:

The patient's own perception of his/her status and role in society and the meaning of his/her own existence is an independent risk factor for any therapeutic procedure in the elderly and can be easily measured as level of depression and represents an "end of life" behavior.

The benefits

Life expectancy increases significantly in patients surviving cardiac procedures as compared to patients in the same age group. The same is true in most of the cases in regard to the quality of life achieved [1].

The risks

It is without question that cardiac operations in the elderly entail special risks. Concomitant to vascular and valve lesions, cerebral deficiencies are common and require special experience and knowledge in treatment regimen sometimes unavailable. The second important question is whether target organ preservation and especially "myocardial, renal and cerebral protection" during cardiac operations is sufficient to achieve the necessary goals. A clear surgical indication taking into account the potential individual benefit and calculations of all possible risks will be required to successfully answer the question on the practicability of cardiac surgery in the elderly [2]. This may deflect common treatment trails and it is sometimes difficult to discriminate what is ultimately the best treatment option. Furthermore we have to understand and apply available alternatives reducing invasiveness and sometimes completeness of the treatment regimen to meet achievable goals in the given age group. Sometimes innovative approaches dedicated as least invasive methods turn out to be even more hazardous in every day's clinical practice. The majority of patients with *end stage* heart disease are in the age group of 60 and above requiring any type of cardiac surgical procedures. Care has to be taken not only to allow patient satisfaction without limiting resources but also to "manage public health costs"
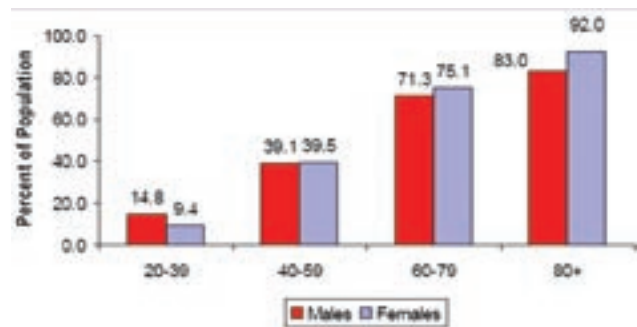

Fig. 1. Prevalence of cardiovascuar diseases in adults age 20 and older by age and sex (NHANES: 1999–2004). Source: NCHS and NHLBI. These data include coronary heart disease, heart failure, stroke and hypertension

In this environment our group has invented and applied clinically an interesting treatment (PICSO) an alternative which is less invasive and supports the notion even to regenerate the aging and failing heart. Further clinical experience will tell us whether these claims can be translated into clinical practice [3].

The costs

It is without debate that treatment in this age group exceeds by far available cost structures of health care providers and underscores the call for an economic understanding and a selective application of "all what is technically doable" to achieve the most important goal [4, 5]:

"Patient satisfaction"

Cardiovascular disease is most prevalent in the elderly. It will be the challenge of the present generation of researchers and clinicians to develop a cost effective and individually satisfying treatment option for this age group.

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Epidemiology, etiology and treatment of pneumoniae in old citizens of St. Petersburg

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Acute infectious pulmonary diseases are common in elderly and old persons. Their unusual course is known for a long time. The reason is senile changes of organism, which mask typical manifestations and symptoms, observed in young patients, with their active immune reactivity. Besides relatively less potency of immune response, some age-related changes of respiration enhance greatly the degree of hypoxia and risk of respiratory failure in the old. Respiratory system in seniors functions less effectively, conditions of ventilation are poorer due to senile change of chest skeleton and muscles, lung vital capacity is smaller, elastic spring effect on exhale is weaker, ventilation/perfusion ratio is higher, alveolar-arterial range of pO2 and oxygen cost of breath – both are greater than in middle aged persons [1]. Owing to this, course of acute pneumoniae in elderly and old patients, as a rule, is severe and quite often causes fatal outcomes. Hence, the very nature of pneumoniae is most dangerous and frequent for old age. Almost all lethal cases of pneumoniae occur in seniors, so pneumonic mortality rates practically entirely belong to eldest age groups. Pneumonia is considered to be 4th major death reason among old people and leading infectious cause of death for them [2]. At the same time, S. pneumoniae was rare etiologic agent of pneumoniae among seniors in the past. More often senile cases of bronchopneumonia were caused by other bacteria or viruses. Obviously, this is related to congestion in lesser circulation due to senile cardiovascular diseases, or to banal senile bronchitis, emphysematous changes in lungs and frequent acute infections of upper respiratory tracts [3]. We have studied clinical manifestation of acute pneumoniae among elderly and old citizens of St. Petersburg (Russia) in the end of XX and onset of XXI centuries. The aim was not only to reveal the specifics of their course, but also to check the effectiveness of their treatment in modern era of broad antibiotics arsenal available to medicine nowadays in plus to sulfanilamides, accessible to physicians of 50s. Catamnesis of 100 elderly and old patients (60–87 years old) treated at lung clinic of St. Venerable Martyress Elizabeth Hospital was studied. All patients were hospitalized by emergency with community-acquired pneumoniae. Acute pneumonia developed in 60% of cases, subacute in 40% with no dependence of age. 35% of patients had chronic obstructive pulmonary disease in anamnesis. In 49% accompanying cardiovascular diseases were observed (atherosclerosis, arterial hypertension, and cor pulmonale). ECG abnormalities were registered in overwhelming (92%) majority of cases (diffuse muscular changes – 19%, coronary ischemia – 26%, right heart hypertrophy – 18%, arrhythmiae – from extrasystoles to cardiac fibrillation – 15%). Fever of 38 ºC and higher was observed in 60% of cases, white blood cell count higher than 9.5×10^9/l – in 51%, toxic granulation of neutrophils – in 10%. Every fifth case was complicated by hepato-renal syndrome with elevation of blood transaminases, bilirubin, creatinine and urea. In 17% of cases lobar pneumonia was diagnosed, it was more common for alcohol abusers and in chronic alcoholism. 13% of patients displayed blood expectoration. Sputum inoculation in culture revealed E. coli (10%), S. aureus (6, 8%), Klebsiella (5%). Fränkel's diplococci, as in senile pneumoniae of past century, still were quite rare finding (1, 7%). In 31% of cases germs of oral microflora were revealed. The rest identified were very versatile agents: Enterococci, Legionellae, Hemophilus influenzae, Chamydiae, Fungi and different viruses. Compared to study [4] performed in Buffalo (NY, USA), our patients had approximately the same contribution of S. aureus, a bit smaller proportion of gram-negative enteric bacilli and considerably minor incidence of S. pneumoniae. All patients were treated with antibiotics in standard doses. In parallel all patients get broncholytics, cardiac glycosides, cardiotonic drugs and physiotherapeutic procedures. In spite of complex treatment, 70% of patients were discharged with incomplete recuperation, although average term of hospital staying was rather long (more than 30 days). Lethality rate from pneumonia was 3%. The results of study witness for big actuality of acute pneumonia as medical problem of the elderly and old people, in spite of achievements and possibilities of modern medicine. This requires new approaches to their prevention, early diagnosis and rational therapy until full recovery.

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Phytostilbene actions on insulin secretion

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The phytostilbene trans-resveratrol (3, 5, 4'-trihydroxystilbene) is a diphenol compound produced by more than 70 plants with the highest concentrations found in grapes, peanuts and the Japanese knotweed. In red wine, resveratrol is found in concentrations up to 8.0 micrograms per gram of wine. Resveratrol has been shown to prevent or attenuate the progression of metabolic disorders, cardiovascular diseases or ischemic injuries and can enhance resistance to various stress stimuli. In streptozotocin-nicotinamide-induced diabetic rats resveratrol decreases hyperglycaemia and hyperlipidaemia, enhances the tissue responsiveness to insulin and delays the development of insulin resistance [Su et al., 2006, Am J Physiol Endocrinol Metab, 290, E1339-46; Palsamy and Subramanian, 2008, Biomed Pharmacother, 62, 598-605]. In isolated pancreatic beta-cells resveratrol has been shown to reversibly and dose-dependently inhibit insulin secretion in a protein kinase C dependent manner consistent with a repression of the amplifying pathway of insulin release [Szkudelski, 2006, Eur J Pharmacol, 552, 176-81; Szkudelski, 2007, Am J Physiol Endocrinol Metab, 293, E901-7; Szkudelski, 2008, Life Sci, 82, 430-5]. We performed whole-cell patch clamp experiments and insulin ELISA (enzyme-linked immunosorbent assay) to study the effects of resveratrol on clonal INS-1E rat insulinoma cells, a frequently used pancreatic beta cell model. We used high concentrations of extracellular glucose (20 mM), extracellular hypotonicity (reduction of the extracellular osmolarity by 30%) or the sulfonylurea tolbutamide (100 µM) to elicit depolarizations of the cell membrane potential and consequently electrical action potential activity. Application of resveratrol at a concentration of 50 µM reversibly repolarized the cells, eliminated electrical activity and prevented the hypotonicity-induced depolarization. Moreover, intermittent application of resveratrol restored tolbutamide-induced electrical activity which ceases after prolonged exposure of the cells to the sulfonylurea due to desensitization. Glucose-induced depolarization was counteracted by resveratrol in the presence of iberiotoxin (50 nM), a specific inhibitor of large-conductance Ca^{2+}-activated K^+ channels, showing that the effect of resveratrol does not depend on the activation of these ion channels. In addition we found that resveratrol dose-dependently inhibits L- and T-type Ca^{2+} currents and Cl^- currents evoked by either hypotonicity or high extracellular glucose ($ICl_{swell}/ICl_{glucose}$) as well as K_{ATP} currents – ion conductances crucially involved in regulating the electrical activity of insulin secreting cells. Further we showed that resveratrol (50 µM) completely inhibits glucose-induced, but not basal insulin release, within 1 hour of incubation with the drug. Preliminary results show that prolonged treatment of beta-cells with resveratrol at concentrations of ≥50 µM for 24–48 hours results in a dose-dependent inhibition of insulin release, inhibition of cell proliferation, accumulation of cells in the G0/G1 phase of the cell cycle, increased cell granularity, apoptotic volume decrease, phosphatitylserine exposure at the outer leaflet of the plasma membrane and activation of caspases. Furthermore resveratrol significantly inhibits Akt (PKB) phosphorylation by ~70% within 1 hour of incubation. Our results show that in INS-1E cells resveratrol inhibits insulin release by altering cellular electrical excitability and hence interferes with the triggering pathway of the stimulus-secretion-coupling machinery. The long-term antiproliferative/proapoptotic effects of the drug are most likely due to resveratrol-induced inhibition of promitotic/antiapoptotic insulin receptor signaling and disruption of auto/paracrine actions of insulin on beta-cells. In line with this hypothesis is the expression of the insulin receptor in INS-1E cells as determined by RT-PCR experiments. The effects of resveratrol on ion conductances and insulin release in beta-cells are illustrated in Fig. 1.
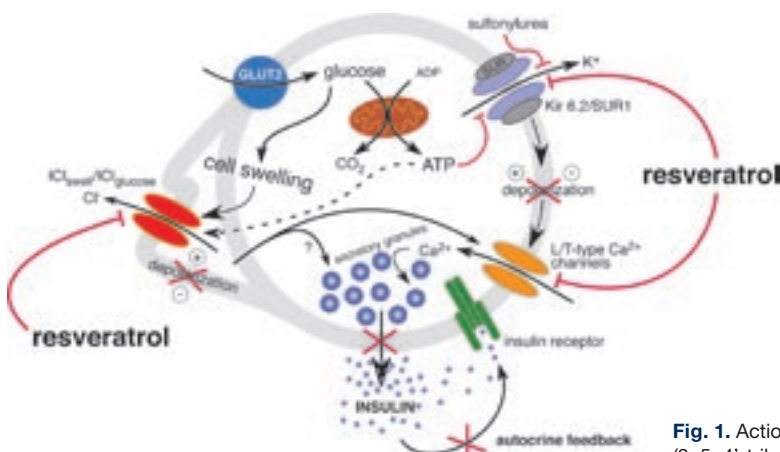

Fig. 1. Actions of the phytostilbene trans-resveratrol (3, 5, 4'-trihydroxystilbene) on clonal rat insulinoma (INS-1E cells)

Ageing, thyroid and autoallergy: new insight into pathogenesis and treatment

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Thyroid hormones (TH) receptors exist in all cells. But, still the sole aim of their broad application is cure of hypothyroidism (HypoT). TH display antioxidant properties and are able to control the rates of genetic information processing [1]. Hence, the thyroid status and anti-thyroid autoimmunity are of great importance for ageing, cell renewal and age-related diseases. HypoT in none-iodine deficient regions is caused worldwide by Hashimoto's chronic autoimmune thyroiditis (AIT), a social disease, whose prevalence in some areas is up to 10–15%, increasing with age. According to Mechnikov's prophecy, autoimmunity impacts greatly on the mechanisms of senescence [2]. AIT, even started in adolescence, is a life-long disease, causing accelerated senescence (geroderma, decrease of mental and physical activity, emotional blunt, hair loss, depression of libido, etc.) after few decades of its course. Prospective clinical and pathophysiological study of 3000 patients with AIT from adolescent to old age revealed the interaction of HypoT and autoallergy in the acceleration of aging (Fig. 1).

Treatment with TH in AIT is regarded as substitutive only. However, autoallergy in AIT is multi-targeted and involves other endocrine and non-endocrine cells as well. Earlier it has been shown that TH in experiment inhibit the development of autoimmune gastritis [3]. HypoT is known to retard programmed cell death [1]. Withdrawal of unwanted lymphoid clones is achieved via apoptosis [4]. Taking all these into account, we suggested that TH deficit in AIT alters the physiological regulation of autoimmunity. It may delay the apoptotic withdrawal of auto-reactive lymphocytes, thus broadening the spectrum of autoallergy with age and aggravating it. New therapeutic method for multi-organic autoallergy

is based on this. We have treated 12 patients (25–67 years) with multi-organic autoallergy (autoimmune: thyroiditis, thrombocytopenia, adrenalitis, gastritis with megaloblastic anemia, insulin-dependant diabetes mellitus and rheumatoid arthritis). All patients were unsuccessfully treated with glucocorticoid hormones (GL). In one case (with severe autoimmune thrombocytopenia) even splenectomy was not effective. In spite of standard prolonged immunosuppressive treatment with GL the number of platelets remained critically low, sometimes falling down to 10×10^9/l. Because all patients had clinical and laboratory manifestations of HypoT, we have administered them a course of L-thyroxine (LT), not canceling former GL therapy. In all patients this resulted in normalization of blood platelet count, in 3 of them total withdrawal of GL became possible, all others have successfully reduced a dose of Prednisolone. In patients with autoimmune anemia and rheumatoid arthritis TH also rendered evident curative effect. This cannot be explained with the stimulation of thrombopoesis, because TH are known to decline it [5]. We suggest that TH accelerate the apoptosis of autoreactive lymphoid clones, thus suppressing the autoallergic thrombocytolysis. Significant decrease in titers of anti-platelet autoantibodies and increase in platelet number were paralleled with visual signs of "rejuvenation" due to disappearance of geroderma and myxoedema (Fig. 2).

Hence, application of LT in AIT produces not only substitutive, but also immune modulating effect. Curative potential of LT in age-related autoallergic disorders
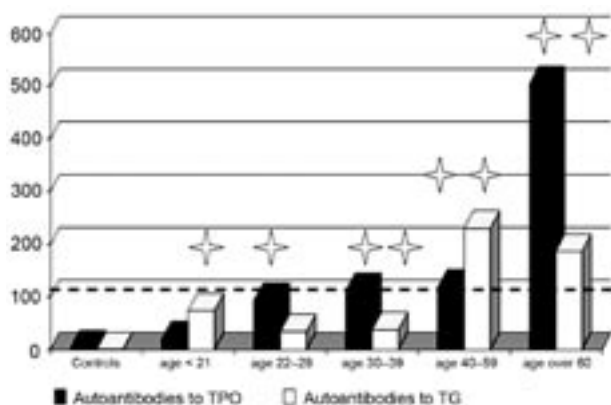

Fig. 1. In AIT titers of autoantibodies to thyroglobulin (TG) and thyroperoxidase (TPO) significantly (asterisks match p<0, 05) increase with age. Dashed line shows diagnostic titer

Fig. 2. Reverse dynamics of accelerated aging after the cure of multi-organic autoallergy with LT. Patient P.N., 59 years; case history № 112; 18.01. – before (left), blood TSH = 200 mcU/ml, T_3 = 0,0 nM/l; 04.06.07 – after treatment, TSH = 54 mcU/ml, 88; T_3 = 1, 18 nM/l

should be re-estimated and, in our opinion, it can rival GL with the advantage of the absence of adverse effects, undesirable for old people and typical for GL.

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Thyroid diseases in senior citizens of St. Petersburg

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Although thyroid gland (Thy) does not undergo senile atrophy, in old age Thy regulation differs from that of young. Aged people are adapted to existence with relatively lower TSH and thyroid hormones (TH) levels and lower reactivity range of pituitary-Thy axis [1]. There is no specific geriatric disease of Thy, but old age impacts on the manifestations of Thy disorders. Hyperthyroidism in old age occurs quite rare and has vague manifestation: without tremor or exophthalmos. We have observed 113 patients (100 females, 13 males, 77.5 ± 0.3 years in average) with different diseases of Thy. Blood levels of TH, TSH, autoantibodies to thyroglobulin and thyroperoxidase were measured, ultrasound imaging of Thy checked. 25.7% of cases had arterial hypertension, 13.3% – type 2 diabetes mellitus, 6.2% – bile stones. One case had prolactinoma, 2 – chronic lymphocytic leukemia, 2 – rheumatic valve disease, and 1 case was 40 years after pheochromocytoma removal. Regular finding was Dupuytren's contracture (20.4%). The most common diagnosis (in 91.2% of cases) was autoimmune thyroiditis (AIT), nodular form in 22.1%. Titers of antithyroid autoantibodies were moderate, with rare exclusions up to 4000 IU/ml. Majority of cases were obviously clinically hypothyroid (with typical habitus, chillness, daytime somnolence and night insomnia, dry skin, hyperkeratosis, hair loss, and weak memory). Most of them had episodes of morsicatio buccarum, rarer – tongue and lip biting, earlier described by us [2] as a sign of myxoedema. TSH level was up to 69.4 mcU/ml (8.26 ± 2.9 mcU/ml in average). Hypercholesterolemia is known to be attribute of unhealthy aging, so increased blood cholesterol level in our study (6.41 ± 0.43 mM/l) was, for sure, related to hypothyroidism. In course of treatment with TH it effectively decreased even without special cure by statins. We did not encounter a case of thyroid cancer, which is considered to be rare in old people. Cardiac disorders (tachycardia in particular) are known to dominate in manifestation of hyperthyroidism in the old [1]. Among our cases cardiac fibrillation was quite common (22.1%), which hardly can be explained with senile atherosclerotic cardiosclerosis only. Apparently, this can be related to disorders of Thy. 17 patients (15%) had signs of thyro-

toxicosis (11 cases of Hashi-toxicosis, 2 – of Graves' disease, 3 – of Amiodarone thyrotoxicosis, 1 – Plummer's disease), 2 – of DeQuervain thyroiditis, 1 – iodine Basedowism. The role of Thy autoimmune disease in cardiac arrhythmiae was already noticed [3]. Thyrotoxic cardiomyopathy (previously related to permissive effect of TH on the susceptibility to catecholamines) was linked to the presence of stimulating autoantibodies towards cardiac histaminic receptor. In hyperthyroidism we successfully applied thyrostatics (Mercazolil, Thyrozol) with β-adrenoblockers. In AIT after withdrawal of thyrotoxicosis we effectively applied individual doses of L-thyroxine. Paradoxically, in some cases of AIT aggravated with cardiac fibrillation, the later could be terminated by cure with small doses of L-thyroxine. This confirms the proposal of autoimmune pathogenesis of arrhythmiae in thyropathies, because thyroxine cure suppresses autoallergic process [see: Churilov et al., this issue]. Hereby, in old patients with Thy pathology leading disorder was AIT, causing hypothyroidism. In AIT patients we revealed deleterious effect of food and drug iodine misuse [4]. Synthetic TH appeared to be most effective in cure of hypothyroidism; their dose depends entirely on individual susceptibility of a patient and degree of Thy functional insufficiency. Maximal blood TH levels exist in the morning, and minimal – in the evening; TSH concentration peak is in night (between 20.00 and 02.00 with acrophase before asleep) and minimum – in daytime [5]. Standard requirement in leaflets for L-thyroxine is to administer it in the morning only. But, the adjustment of its dose often encounters some hardships; people after 60 sustain classic TH therapy poorly, sometimes ischaemic heart attack is provoked with heart failure. Indicated increase of morning dose can produce in day typical symptoms of TH overdose (palpitations, cardialgia, etc.), in spite of contrasting overt signs of their dawn shortage (puffy face, head heaviness, somnolence, etc). Our long experience of AIT treatment in elderly patients has shown that action of L-thyroxine given in the morning lasts no longer than 10–12 hrs, not depending on the dose. That is why attempt to increase morning dose may have no expected result, because patients in fact stay

under effect of drug only through 1st half of the day. In night they stay practically without required level of TH. In such cases we get beneficial effect from split up doses of L-thyroxine. Thus, we give greater part or half of daily dose in the morning (as recommended by supplier's leaflet), and remaining part – tonight. It is in accordance with nocturnal minimum of TH production in health, a fortiori in hypothyroidism. This allows us to achieve euthyroidism even with smaller TH doses. Patients get rid of insomnia; in the mornings they are more alert, getting up without facial oedema and stop to bite cheeks. The method is mostly recommended for elderly and old patients, more so in AIT accompanied by secondary hyperprolactinemia, which is common for hypothyroidism and can be effectively suppressed by such cure. Morsicatio buccarum as well as spontaneous tongue and lip biting serve as early sign of hypothyroidism (not only in endocrinology, but also in general and dental practice). Its disappearance is a criterion of TH dose adequacy.

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Diabetes mellitus: age dynamics of cardiovascular pathology

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Vast majority of diabetes mellitus (DM) patients worldwide are over 50. Among 781 of our cases 91. 5% were over 50. In Central district of St. Petersburg prevalence of DM among 16–19 years old was just 0.046%, in elderly people of 70–79 years old – 2.62%, and in eldest persons over 90 years old it reached 8.11%! Recent global spread of DM is regarded as a component of metabolic syndrome (MS) pandemic. Analyzing mortality in DM [1], we found that leading cause of death (34.3%) was atherosclerosis (AS), arterial hypertension (AH) combined with AS (25.7%) occupied 2nd place. AH altered much the interplay of AS and DM. In DM+AH incidence of myocardial infarction was 3.5 times greater; stroke incidence – 16.5 times greater, than in normotensive DM. Degree of AH in DM patients was strongly correlated to that of peripheral AS. In fact, dyslipidemia of DM results in AS under permissive effect of AH. We studied epidemiology of DM (14.3% – type I, 85.7% – type II) in patients of 19–89 years old. Total prevalence of AH (by WHO criteria) was 56.3%, rising with age (Fig. 1).

AH was primary in 48% of cases. Increase of systolic arterial blood pressure (SABP) correlated with age, body mass index and duration of DM. The highest SABP was registered in eldest group (171±4 mmHg). Diastolic ABP also raised with age from 83±5 mmHg in 20–29 years old to 93±1 mmHg in 50–59 years old, than gradually decreased to 84±3 mmHg in eldest group. AH was more common in female DM patients (58.9%), than in males (48.7%). In elder groups it regularly joint to obese DM. Perhaps, combination was resulted from MS with its decreased ability of vascular endothelium to produce vasodilators. In DM patients prevalence of combination "ischaemic heart disease+AH" also increased with age. Prolonged course of DM was accompanied by progressing of microangiopathy (MiAP) and macroangiopathy (MaAP). Vascular involvement pattern depended on DM type, contributing into its clinical polymorphism. In DM type I immune complex mechanisms elicit prevalence of MiAP; in DM type II accelerated atherogenesis involved big arteries, causing predominance of MaAP. Because both processes depended on advanced glycation, de facto in every case of poorly compensated DM they were combined in some equation. Disorders of peripheral circulation due to MiAP and MaAP were monitored by thermography. Results of infrared monitoring evidently correlated to impedance pletysmography, biomicroscopy of capillaries and histochemical methods. Diabetic MiAP
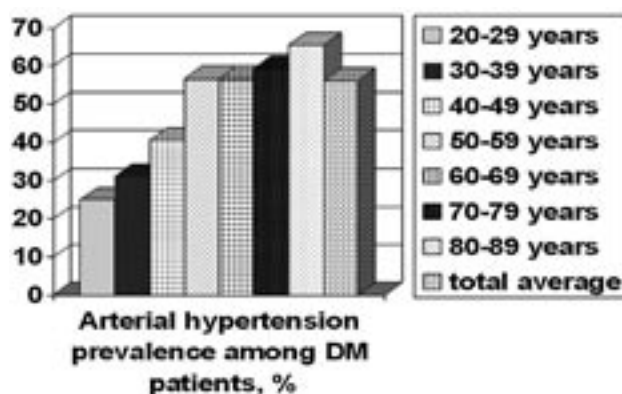

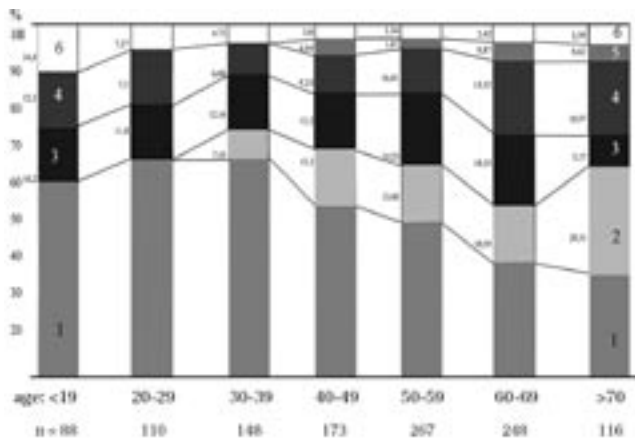**Fig. 1.** Prevalence of AH (%) in DM patients

Fig. 2. Age-related structure of lower extremities vascular pathology, as checked by thermovision. Horizontal axis – % of various thermo-patterns: *1* MiAP; *2* MaAP; *3* congestion; *4* MiAP + congestion; *5* MaAP + congestion; *6* normal

characterized by symmetrical abruption of infrared radiation over distal parts of lower extremities; MaAP (AS) manifested in asymmetrical abruption of radiation on involved side. Thermography of lower extremities in 1150 DM patient aged between 10 and 88 showed that MiAP and MaAP kept opposite age dynamics: 1st predominated in young and 2nd – in elderly patients (Fig. 2). DM patients with AH displayed abnormal thermopatterns 1.7 times more often, than normotensive ones.

So, combination of MaAP+MiAP+AH represents for DM patients dangerous "Bermuda triangle", really fatal for many of them, while ageing.

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The determinants of menopause among Mongolian women

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Introduction

The topic of menopause has been given an international attention increasingly since the first International Menopause congress in the late 70s, in France, as a result of the growing interests in women's health and the worldwide increase in ageing women. Although menopause is a natural physiological phenomenon, but women at menopause get many signs and health-related problems [Speroff 2006]. One-third of a women's life is spent in the estrogen-deficient, postmenopausal state. It has been estimated that, by the year 2000, there were 35 million women over age 65 and 5 million over age 85, and this will be increased by the year 2040 to approximately 65 million over 65 and 10 million over 85 [Rogerio A 2003]. The population of Mongolia has reached 2.6 million and more than 10% of them are women of age 50 and over [Health indicators 2003]. The average life expectancy for Mongolian women was 65.7 [Population census 2000] and it has slightly increased up to 67.3 [Health indicators 2005], which is still less than the increase in other countries. Although both numbers and proportion of postmenopausal women are increasing, understanding about menopause in Mongolia is very limited: no information is available about the determinants of menopausal symptoms including its prevalence and severity. There is no service and no program.

The experience and severity of menopausal symptoms are different from society to society and even within the societies. Therefore, the findings from other countries cannot be applied to Mongolia, simply because of the differences in lifestyle and culture. Therefore, it is high time to explore the prevalence and severity of menopausal symptoms and associated factors, including knowledge and health practice.

Study objectives

To describe the prevalence of menopausal symptoms, severity and common symptoms. To determine the factors associated with the knowledge of menopause and health practice among Mongolian women.

Materials and methods

This is a randomized cross-sectional study involving 259 women aged between 45 and 55 years old from four geographical regions and four districts of capital of Mongolia. The study was done in two steps: survey on menopausal determinants followed by clinical study with hormone replacement therapy. In the first part of study we had used standard survey questionnaire adapted from international menopausal society and second part was clinical observation of symptomatic patients with HRT in different dosages.

Descriptive component

This component used the cross-sectional study using population-based survey. A structured questionnaire was used for

Table 1. Prevalence of menopause-specific symptoms

Symptoms	Pre-menopause		Menopause		Post-menopause		Total	P-value
	n	%	n	%	n	%		
Hot flash	8	9.1	41	46.6	39	44.3	88	0.0001***
Night sweats	14	13.5	36	34.6	54	51.9	104	0.001***
Skin itchiness	7	10.9	29	45.3	28	43.8	64	0.003***
Irritation	21	24.1	33	37.9	33	37.9	87	0.396
Dryness in vagina	15	25.9	20	34.5	23	39.7	58	0.902
Loss of libido	7	17.9	11	28.2	21	53.8	39	0.248
Painful sex	20	15.4	47	36.2	63	48.5	130	0.001***
***P< 0.0001								

face-to face interviews by researchers from HSUM and Maternal and Child health research center (questionnaire adapted from North American Menopause society)

Study population for the first component: 259 women were interviewed by random selection by household numbers. *Study sites:* Study was conducted in four geographical regions and four district centers from UB by random selection.

Study duration: 2006–2007 (two years) This study was supported by State Science Technology Fund and conducted by the team from HSUM in collaboration with MCHRC.

Inclusion criteria:
- Eligible women aged between 40 and 55 years old. The 40-year-old women were chosen as the first cutting point based on the WHO definition on natural menopause (WHO 1980).
- Women who have no menses for the past one year.
- Women who are willing to participate (written consent form)

Exclusion criteria: All women with surgical menopause were excluded.

- All symptoms were divided into three groups: Age-related, menopause related and age and menopause related according to AOCOG recommendations.
- Severity of menopausal symptoms was evaluated by MI.
- Lab. testing was done in "Onosh med" center using by ELISA kits.

- *Statistics:* All information was entered in personal computer using the SPSS 13 software and descriptive statistics and student – t test was used for independent and dependent variables relationship. The multiple regression test was used to examine the determinants of menopausal symptoms.

Study results

The results had showed that the mean age of menopause among mongolian women is 49.23 ± 3.2 which is synonymous with Asian studies. We had divided the menopausal symptoms into three groups: age-related, menopause specific and age–menopause related. There 45.7% of study women had menopause and age-related symptoms appeared more in pre-menopausal women and specific symptoms were observed more in menopausal and post-menopause periods.

Summary findings and conclusions

Provided important database for Mongolian women at menopause. Mean age at menopause of Mongolian women is 49.3, which is consistent with similar studies.

Table 2. Main determinants of menopausal symptoms

Factors	Case		Control		OR	CI
Marital status	98	(49.5%)	100	(50.5%)	0.9*	0.5–2.1
Residence (ref. urban)	76	(46.9%)	69	(53.1%)	0.8*	0.5–1.3
Education (ref. high)	30	(45.5%)	36	(54.5%)	1	
Low	3	(75%)	1	(25%)	3.6	0.4–3.4
Secondary	55	(51.4%)	52	(48.6%)	1.2	0.7–2.3
Technical	41	(50.6%)	40	(49.4%)	1.2	0.6–2.4
Alcohol (ref. no)	3	(45.2%)	5	(63%)	2.8	1.7–6.4
Smoking (ref. no)	6	(36.2%)	2	(50%)	3.0	1.4–5.2
Headache (No)	34	(58.6%)	24	(41.4%)	1.5	0.9–2.8
CVD (Yes/No)	28	(66.7%)	14	(33.3%)	2.1**	1.1–4.3
History of diarrhea (Yes/No)	21	(70.0%)	9	(30.0%)	2.5*	1.1–5.6
Stress (Yes/No)	40	(61.5%)	25	(38.5%)	1.9*	1.1–3.5
Hysterectomy (Yes/No)	20	(74.1%)	7	(25.9%)	3.1**	1.3–7.7
Exercising (Yes/No)	27	(77.1%)	8	(22.9%)	3.8**	1.7–8.8
Knowledge (Yes/No)	33	(70.2%)	14	(29.8%)	2.8**	1.4–5.6
*P< 0.05; **P< 0.001						

Menopause symptoms are likely to be an important issue among Mongolian women. Almost 90% of study women have experienced at least one symptom. Psychological symptoms (96.3%) are most frequent among study women followed by musculoskeletal (92.9%) and vasomotor (68.6%). The factors that are found related with the number of symptoms include: knowledge of menopause, source of information, level of education, basic health condition followed by residence. Regarding education, those who have no education report a higher number of symptoms compared to those who have some education. It is suggested that serum triglyceride and calcium levels can be used as HRT indication for women with menopause. Both prevalence and severity of menopausal symptoms among Mongolian women imply that menopausal symptoms are an important health issue and need intervention. In view of high prevalence of menopause-specific urinary symptoms suggests that HRT should be considered in further women health care program. Knowledge on menopause should be provided to everyone, especially rural and low educated women.

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Developing a comprehensive interdisciplinary Healthcare Program for the elderly in senior residence

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Introduction

Korea is one of the rapidly ageing societies in the world. Coupled with a falling birthrate, increase of the life span of Koreans accelerates aging of the society. By 2008, an average Korean man would live up to 76.1 years and an average Korean woman, up to 82.7 years. In 2050, more than one-third of the population will be over the age of 65.

Recently, there has been a growing concern over potential health problems and medical care needs of the elderly in Korea. The increase of the elderly population requires more medical services, especially for chronic diseases and disabilities. The percentage of health expenditure per person over 65 years has increased from 12.9% to 18.2% and average admission days, from 2.13 days to 6.59 days in recent 10 years, respectively. It is important to provide a healthcare program for the elderly to maintain better functional status without comorbidities.

Konkuk University Hospital developed a new comprehensive interdisciplinary healthcare program for the elderly living in the senior residence as a model system for this end. This program consists of periodic healthcare screening, geriatric assessment, health promotion, and disease management.

Periodic health screening

In Korea, major leading causes of death in the elderly population are listed as malignant neoplasm, cerebrovascular disease, heart disease and diabetes mellitus. These are the target diseases of the health screening. We considered epidemiology of the diseases, needs of the elderly and evidence-based approaches for the construction of health screening items. The screening program consists of the basic screening per year and the detailed screening per 5 years (Table 1).

Geriatric assessment

A geriatric assessment is a comprehensive evaluation designed to optimize the ability to improve the quality of life, to reduce the need for hospitalization and to live independently. The categories of the assessment are 1) physical, mental, and psycho-social health; 2) functional status including activities of daily living and 3) socio-economic and environmental status (Table 2).

Health promotion

Health promotion can be defined as the science and art of helping people change their lifestyle for optimal health, which includes systematic evaluation and modification of risk factors. We included 7 specific areas of health promotion: 5 lifestyle problems such as smoking habits, alcohol drinking behaviors, physical activities, nutrition/dietary habits, and sleeping patterns, and 2 health risk factors such as emotional disorders (stress, anxiety, and depression) and cognitive functional impairments. Each individual area of the program is coordinated and managed by the multidisciplinary team composed of a physician, nurse, exercise specialist, physical therapist and clinical dietitian.

Table 1. Periodic health screening program

Category	Item
Physical examination	body mass index, blood pressure, eye and ear exam
Laboratory test	CBC, liver function test, electrolyte, glucose, lipid panel, hs-CRP, *homocysteine, folate, vitamin B12, TSH (thyroid function test), hepatitis serology*, tumor marker, urinary assay, *urine microalbumin*, stool occult blood test
Cardiovascular exam	ECG, arterial stiffness test (ABI/PWV), *treadmill test, echocardiography, coronary CT*
Pulmonary exam	pulmonary function test, chest x-ray, *low-dose lung CT*
Gastrointestinal exam	abdominal USG, gastrofiberscopy, *colonoscopy*
Hormone	*testosterone, E2, FSH/LH, IGF-1*
Male/female cancer	mammography, *breast USG, pelvic USG*, PAP smear, *HPV test, prostate USG*
Cerebrovascular exam	*brain MRI/MRA + dementia MRI + neck MRA*
Musculoskeletal exam	bone densitometry
Italic items are the screenings done per 5 years.	

Table 2. Geriatric assessment tools

Category	Contents
Medical	disease status, major health risks(smoking, drinking, physical activity)
Psychological	cognition, mood, anxiety, stress
Functional	ADL, IADL, balance/gait
Socio-economic	familial/social support, health insurance, ability for medical payment
Environmental	home/environment safety
Other	sleep, pain, fatigue, sexual function, fall-down risk

We organized a smoking cessation program based on the globally adopted 5A approach (Ask, Access, Advice, Assist, Arrange) together with tailored services for each individual according to Prochaska's Model[3] on the Readiness of Change (Precontemplation, Contemplation, Preparation, Action, Maintenance stage). We evaluated nicotine dependency, smoking-inducing environments and mood status of smoking with structured questionnaire to provide practical and comprehensive assistance.

For At-risk drink program, we provide the individualized service based on 5A approach with Prochaska's Model on the Readiness of Change. After screening with AUDIT (Alcohol Use Disorder Identification Test)-K questionnaire, the person at risk is confirmed by the DSM-IV criteria and managed to modify drinking habit, alcohol abuse, and alcohol dependency.

Exercise program is important for the prevention of frailty syndrome and maintenance of physical, psychological and social function at advanced age. After medical assessment for physical activity and screening of risk factors associated with exercise, exercise program is tailored and prescribed individually. IPAQ (International Physical Activity Questionnaire)-K for daily physical activity and PARQ (Physical Activity Readiness Questionnaire)-K for screening of the risk of heart disease exacerbation are the examples of screening tools. Blood test results and diagnostic imaging data from periodic health screening will give additional information for the tailoring of exercise program. For the elderly people with specific diseases such as cerebrovascular disease, heart disease, pulmonary disease, hyperten-

sion, diabetes, dyslipidemia, obesity, osteoporosis and osteoarthritis, specialized exercise program with different type, intensity and frequency is prescribed and carefully monitored.

Nutrition management program, together with exercise program, is crucial for the maintenance and enhancement of physical function, and for the effective management of chronic disease. Nutrition management program is composed of 3 steps: 1) dietary habit assessment, laboratory surrogate marker evaluation and nutrition prescription by the physician, 2) intake assessment and recipe preparation by the clinical dietitian, and 3) tailored catering by the chef. We use Mini-Dietary Assessment Index for Koreans and The Nutrition Screening Initiative for screening of nutritional risk. Dietary plan is made with various clinical indicators reflecting nutritional status of the individual. Clinical dietician evaluates the intake of calories and nutrients for the given period of time and presents the balanced diet with recipes, incorporating the dietary prescription done by a physician.

Sleep problem is common in the elderly population. Proper assessment and management of sleep disorder is important for the health promotion and better quality of life. We assess the sleep pattern and quality with the help of simple algorithm which presents the specific sleep disorders within limited environments (ICSD: International Classification of Sleep Disorder). After identification of the sleep problem, we provide with individualized sleep enhancement program such as cognitive behavioral counseling, relaxation technique, neuro-feedback, and multisensory environmental therapy along with the pharmacological treatment.

Mood management program is proposed for the evaluation of stress level, early screening of anxiety and depressive disorder, and appropriate management. Screening tools incorporated are BEPSI (Brief Encounter Psychosocial Instrument)-K for stress assessment, Goldberg's Short Screening Scale for Anxiety-K and GDS-SF (Geriatric Depression Scale Short Form)-K for depression. We make efforts to detect the early changes in emotion of the elderly people to minimize the functional impairment due to emotional disorders.

Cognitive function management program aims at the early detection of cognitive decline to preserve the

cognitive function. We use periodic evaluation with K-MMSE (Mini-Mental Status Examination) and MoCA (Montreal Cognitive Assessment)-K questionnaire as screening tools.

Besides these specific programs for health promotion, accident prevention to avoid the fall and accidents such as the safety assessment of home-environment and fear for fall assessment are also included in this healthcare program.

Disease management

Population aged 65 or over in Korea has more than 3 chronic diseases in average. We conducted a preliminary screening for the elderly people who volunteered for this healthcare program. Subjects were 33 (males 15, females 18) and average age was 67.4 years. Average number of abnormal findings in the screening was 3.4 (males 3.7, females 3.0). 51.1% of them have coronary artery stenosis and high calcification index score on cardiac CT imaging. In the second place, 48.5% of the group showed ischemic changes in the cerebral white matter and cerebrovascular occlusions on brain MRI and MRA. 36.4% of them had osteoporosis which increases the risk of fracture. These results suggest the need for the meticulous management of risk factors exacerbating the chronic degenerative diseases as well as the comprehensive approach and systematic management of current diseases.

Disease management program is composed of the management of chronic diseases and emergency care for each individual. Exclusively assigned physicians and nurses follow up the health profiles of the individual and plan the disease-specific management. Appropri-ate consultations to specialists via coordination and referral of primary care physician enhance the timed and proper management of the diseases. In addition, U-Health system which collects the data on blood pressure, blood sugar and body weight at home via automated measurement and transmission facilities will provide the accurate monitoring of the disease status and appropriate care. This disease management program will minimize the disability from chronic disease and prolong healthy life, eventually leading to improvement in quality of life of the elderly people.

Conclusion

During development of the healthcare program, evidence-based and patient-centered approach was used to identify senior healthcare service needs. The program emphasizes integration of prevention and wellness program and individualized interdisciplinary approach. The elderly who have complex problems are known to be mostly benefited by the interdisciplinary geriatric assessment and active management. The program is suggested to be a new model for comprehensive geriatric healthcare program.

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Care dependency of the elderly – a great challenge for nursing care

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The experience of physical or psychological restraints can affect every person at one point in their lives. Reasons can be illness [1], chronic diseases or psychological changes, which may induce care dependency.

Elderly persons are particularly affected by this phenomenon due to the growth of chronic illness, disability and a decreasing health status. By the year 2020 more than 1 billion people in the world will be aged 60 years and older [2], wherefore care dependency is a topic of global importance, especially for countries with a large population of elderly persons.

The prospect of needing support from other persons or to be care dependent is one of the main fears of elderly persons [1]. Studies also show that dependency leads to serious consequences, like a high psychological burden, restrictions in quality of life as well as the loss of autonomy and self worth, which can result in an earlier death [3, 4].

Therefore, it is a necessity for nurses to know what their patients really need and to provide patient-centred and comprehensive nursing care to reduce dependency, support or recover independency[4-9]and to help elderly persons maintain an active life [10]. This is indeed one of the biggest challenges for nursing professionals in all nursing settings.

In this context, assessment instruments can help to evaluate where a person is (in)dependent or needs support from other persons, thus building the basis for

The Care Dependency Scale

	Completely dependent	To a great extent dependent	Partially dependent	To a limited extent dependent	Almost independent
Eating and drinking	O	O	O	O	O
Continence	O	O	O	O	O
Body posture	O	O	O	O	O
Mobility	O	O	O	O	O
Day and night pattern	O	O	O	O	O
Getting dressed and undressed	O	O	O	O	O
Body temperature	O	O	O	O	O
Hygiene	O	O	O	O	O
Avoidance of danger	O	O	O	O	O
Communication	O	O	O	O	O
Contact with others	O	O	O	O	O
Sense of rules and values	O	O	O	O	O
Daily activities	O	O	O	O	O
Recreational activities	O	O	O	O	O
Learning ability	O	O	O	O	O

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an individual care planning and appropriate interventions.

However, there is a lack of psychometrically tested instruments for the assessment of care (in)dependency which are applicable in different settings of nursing care. Some instruments were developed for a special field of nursing care or specific diseases. Other instruments mainly pay attention to physical aspects. Psychosocial aspects are often not included, despite of the fact that they are very relevant in situations where people have to deal with illness, disability and dependency from others. Additionally, a comparison of data is not possible if every setting uses another instrument. This complicates communication in an (inter)disciplinary team as well as the discharge and transfer of patients, which is relevant for elderly care, since elderly patients are frequently treated in several settings within a short time.

One instrument, the Care Dependency Scale (CDS), allows to assess patients' care (in)dependency in several nursing settings. The original scale was developed in the Netherlands by Dijkstra et al. [11] and is based on the Human Needs according to Virginia Henderson [12]. The CDS measures various physical and psychosocial aspects by means of a 5-point Likert Scale ranging from *completely dependent* to *completely independent*. The scale exists in 12 languages (e.g. Arabic, English, German, and Japanese) and in several versions, for professionals, patients and relatives. The CDS has been psychometrically tested in several settings with satisfying results regarding its reliability and validity. In addition, patients and relatives can use modified versions of the CDS. Thus, the CDS helps to solve the issue of different perspectives regarding patientsí care dependency and supports an individual, patient-centred and comprehensive assessment. On this basis, nurses can plan adequate interventions which help elderly persons to reduce their dependency, support or recover independency and increase their quality of life.

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Some study of functionalities of food

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Traditional Orient knowledge about humans, diseases, seasons and nutrition shows that the approach to any problem had the very system character at that time. This is very positive in relationship to the today's scientific approach, which may affect frequently the one-part jobs of a system.

If we would see that the human body as α-,β-,γ-Bodies by the cell membrane conditions and see them as a system, and its food as the warmer (α) and colder generator (β), its power production like the energy serves for the maintenance of the bodily balance, we would take two with each other's working systems and their action's principles.

The humankind may be classified into seven groups only by their energy and cell membrane conditions as α-,β-,γ-persons, and their nutritional status will correspond to the accumulation and consumption abilities of human body which can correspond to their energy values.

There were found the functionalities of food. The food functionalities are described as the abilities of food to change the membrane conditions of cells.

Dr. P. Kane (Johns Hopkins, Peroxisomal Diseases Laboratory) after blood red cell lipid analysis concludes that: "Healing the membrane is virtually healing the body, and healing the brain".

We have some ideas how to healing the cell membrane by using the food functionalities (Figs. 1, 2).

We can have a "Body $\rightarrow$ Cell $\rightarrow$ Membrane, their α, β, γ-Conditions"-*system* from a side, and the participating system-"Food $\rightarrow$ its α, β, γ-Effect" from the other side. The correct cooperation "Body and Food" systems be can seen in the following example.

On "body $\rightarrow$ cell $\rightarrow$ membrane $\rightarrow$ α-Condition"-System would have the "β-Food"-system his stabilizing effects, to them will be belong the meat of cattle, goats and camel, as well as honey, water etc. \On "body $\rightarrow$ cell $\rightarrow$ membrane $\rightarrow$ β-Condition" – system would have the "α-Food "-system his stabilizing effects, to them will be belong the meat of horses, fish and milk of horses, camel, goats and sheep as well as kumis etc. From these examples we could see that the functionality of food will not correspond to the cell membrane condition each other as $\alpha+\alpha$ and $\beta+\beta$, and in this way loses balance and the membrane condition is changed to hot /$\alpha+\alpha$/ or to cold /$\beta+\beta$/, or correspond as $\alpha+\beta$, $\alpha+\gamma$ and $\beta+\alpha$, where the balance is normalized and the membrane condition will take the right or normal position (Fig. 3).

This is the basic principle of accordance of right or healthy food with the human biological requirements. There will take place also the neutralizing effects of food (Fig. 4).

Our research results showed the energy and informational characteristics of milk and meat of the Mongolian domestic animals. These research results are corresponding to the traditional knowledge of oriental
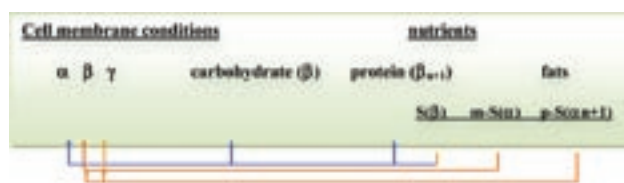

Fig. 1. The corresponding functionalities of food/nutrients/to cell membrane. Where: fatty acids: S = saturated, m-S = monounsaturated, p-S = polyunsaturated
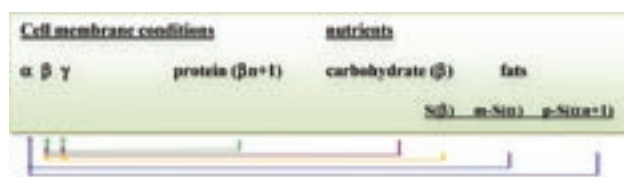

Fig. 2. The non-corresponding functionalities of food/nutrients to cell membrane Where: fatty acids: S = saturated, m-S = monounsaturated, p-S = polyunsaturated

Fig. 3. Basic principle of accordance of right or healthy food

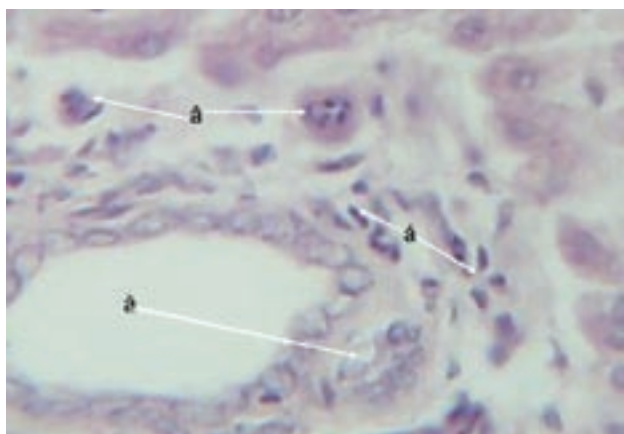**Fig. 4.** Basic principle of accordance of food with diseases

Fig. 5. Summer. (Magnification-160, Hematoxillin-eosin staining) Inflammatory cells and adipocytes anlong bile tracts. Proliferation of cells in the walls of bile duct. **a** Proliferated epithelial cells of bile duct; **b** Inflammatory infiltration; **c** adipocytes mast cells
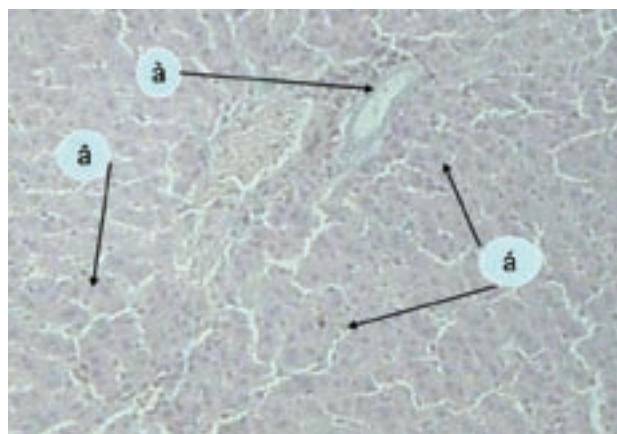

Fig. 6. Autumn. (Magnification-160, Hematoxillin-eosin staining) Dystrophic chenges of liver tissue & infiltration of vascular region. **a** Signs of Granular dystrophy in the duct; **b** Liver of acinus; **c** Nucleus of and cytoplasm hepatocytes

medicine. The traditional knowledge so mentioned "hot" meat (Horse) has the 1.2-times more polyunsaturated fatty acids content than as so mentioned "warm" meat (Sheep)", and this content is 1.3-times more than the "cool" meat (Rind), as well as 1.8-times more than as "cold" meat (Camel).

The liver morphological structures of rat, feeding with same food (camel meat) but in deferent seasons (summer and autumn) (Figs. 5, 6).

Conclusion

- The food as generators will not only course oxidation and reduction reactions, but also change the cell membrane conditions at the same time. This can be described as the functionalities of food, as we see.
- We developed the food classification by their functionalities.
- The polyunsaturated fatty acids content of the horse meat is 2.6-times more than mutton, 2.9-times more than beef and 4-times more than camel meat, and the role of α_{n+1}-Food was implemented in the organism. Just opposite that camel meat serves as β_{n+1}-Food, beef as β-Food and mutton as α-Food.
- From the functionality reason in the autumn or in α-season the camel meat acts through β_{n+1} mechanism as a very adequate regulatory and protective agent of liver diseases.
- This principle does not only serve for the development of new conceptions about the functional food, but also becomes a basic technology of food processing if we would see the food as the information. In this case the food processing will become a processing of right "information".

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Use of some medicinal plants in ageing

Narantuya Samdan

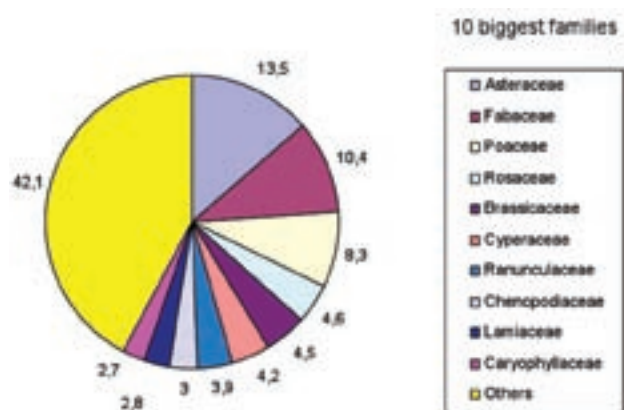Health Sciences University of Mongolia, Ulaanbaatar, Mongolia

Botanic-geographical regions of Mongolia were made at the beginning of last century for the first time. Until that, whole country had been accepted as one region of the world regionalization. As a result of botanic-geographical study, held for more than 30 years, regionalization of several provinces and regions was renewed.

Rh. quadrifida occurs in Mongolia of the central regions in Hentii, Hangai, Hovsgol and west party of Mongolia Hovd (Zuun and Baruun Jargalant mountain chains), Mongol Altai, Govi-Altai (Ikh Bogdo mountains, Baga Bogdo mountains). Mongolian name of *Rh. quadrifida* is "Ere-gombo" and Tibetian name is "Tsan". In the

1. Khuvsgul mountain taiga
2. Khentii mountain taiga
3. Khangai mountain forest-steppe
4. Mongol-Daurian mountain forest-steppe
5. Khyangan mountain meadow steppe
6. Khovd mountain desert-steppe
7. Mongol Altai mountain steppe
8. Middle Khalkh steppe
9. Eastern Mongolian steppe
10. Depression of Great Lakes/ semi-desert/
11. Valley of Lakes /semi-desert/
12. East Gobi/semi-desert/
13. Gobi-Altai mountain /semi-desert/
14. Alashaa Gobi/desert/
15. Transaltai Gobi/desert/
16. Zuungarian Gobi/desert/

Around 3000 species of vascular plants, belonging to 662 genera, 128 families and 5 types are registered in the Mongolian flora.

10 biggest families

□ Asteraceae
▪ Fabaceae
□ Poaceae
□ Rosaceae
▪ Brassicaceae
▫ Cyperaceae
▪ Ranunculaceae
□ Chenopodiaceae
▪ Lamiaceae
▪ Caryophyllaceae
□ Others

traditional Mongolian and Tibetan medicines it is used for treating fatigue and for normalizing the blood pressure.

An analysis of the roots of *Rh. quadrifida* shows the content of biologically active compounds such as tyrosol, β-sitosterol, salidroside, gallic acid, flavonoids: caempferol, quercetine coumarins: umbelliferon, and scopoletine.

Rhodiola rosea (also known as golden root and Arctic root) has been categorized as an adaptogen due to its observed ability to increase resistance to a variety of chemical, biological, and physical stressors. It is a popular plant in traditional medical systems in Eastern Europe and Mongolia, with a reputation for stimulating the nervous system, improving depression, enhancing work performance, improving sleep, eliminating fatigue, and preventing high altitude sickness.

Ligularia sibirica (L.) Cass. [**Asteraceae**] mongolian name: Sibiri zayakhai

Chemical constituent: Sesquiterpene: germacren D, monoterpene: cis-ocimen, pyrrolizidine alkaloids: tussilagine, isotussilagine, tussilaginine and isotussi-

laginine, flavonoids: hyperin, essential oil, steroid, and saponin.

Use in Mongolian Traditional Medicine: The taste is sweet and potency is cool. It is used as the following: Kills the bacteries, heals wound, cures a disturbed activities of digestive system, and gives strength. It is an ingridient of the following traditional prescription: Durjid-3

Polygonatum odoratum (Mill.) Druce. [**Liliaceae**] mongolian name: Ankhiluun mukhar tsagaan. Use in Mongolian Traditional Medicine: The taste is sweet and potency is warm, light. It is used as the following: Heals cool wind of kidney, prevents from the atherosclerosis, gives and improves strength. It improves the power of kidney. It is an ingridient of the following traditional prescription: Bawru-3, Briyangu-9, Brega-14, Vanlag-37, Braivu-15, 17, Braisa-15, Dowchen-13, Dosel-22, and Dudzi-5.

Adonis mongolica Simnowicz. [**Ranunculaceae**] mongolian name: Mongol khundag. Use in Mongolian Traditional Medicine: The taste is bitter and potency is severe, cool. It is used as the following: Heals salmonella typhi, of poison, fever of blood and wound. To treat heart hypertrophy, arhythm, provocation of heart. It is an ingridient of the following traditional prescription: Banjan-25, Banzdo-11, Bashaga-7,Gavar 7, Banzi-12, Degd-8, and Tanchin-25.

Cynomorium songaricum Rupr. is a classic Mongolian pharmaceutical plant. It is distributed over the desert zone of southern Mongolia. The succulent stems are used as Mongolian medicines in which the pharmacological properties are similar to Herba Cistanches. In traditional Mongolian medicine, its efficacy was described as reinforcing the "kidney," enhancing *hot*, and lubricating the bowels.

Judlen

Judlen is used in traditional medicine as an energy supplying, physical power increasing natural compounds. These medicines increase the immunological status of

the body, work capacity, organism reaction against the disease risk factors and have anti-ageing, longevity actions. Judlen is classified as:

- Oil Judlen
- Fluoride Judlen
- Mineral exudates judlen (a sticky rock exudates)
- Mercury Judlen
- Water Judlen
- Plant Judlen
- Animal Judlen
- Composed Judlen

There are some recipes of preparation the Judlen in Mongolian traditional medicine.

Fatty composition: Doing the body massage by Fatty oil, raw lanoline, marrow oil, turnip or carrot corn oil, milk clarified butter. Various oils from animals and plants are used for massaging purposes.

Water Judlen: The taste of waterfall from the sky is perfect like spring. If the rice is boiled in same water and it does not get damaged, then it is the water judlen.

Garlic Judlen: Dry the root in the shadow, pill down and solve with milk, add oil and honey to be used correctly

Phlomis oriophila, Phlomis tuberose: The ageing effect is delayed if you use this judlen in the morning for one month. Preparation: take the flower at the beginning of dryness and dry, pill down, serve with milk oil

Longevity recipe: The recipe of the "youthful elixir" in Tibetan temple, which was written in BC. Garlic extract clarifies and softens the vascular wall, prevents the cardiac shock, cancer, increases the eye vision, and reduces the headache.

Mash 35 g of new garlic, add 200 ml of pure ethanol, close tightly, keep in dark, cold place (not in refrigerator) for 10 days, filtrate it and keep again for more than 4 days in the same place. Serve it following the schema: complete this treatment once in a year, take in 25 droplets at last 3 days, always have 50 ml sour dairy products with it.

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![EURASIA-PACIFIC UNINET]

International Conference – Prevention of age related diseases

Shanghai, Fudan University, China

October 28–31 2009

As soon as the baby boomer generation reaches the age of 65 years in 2025 over one billion people worldwide will require treatment for age related diseases.

Eurasia-Pacific Uninet is pleased to announce an international interdisciplinary expert-conference on "Prevention of age related diseases".

Age and age related changes even in "healthy individuals" put an enormous burden on public health services and the younger generation which has to support and care for their elderly. There is a marked change ongoing in our societies, which not only requires new thinking about aging populations but also measures to cope with inherent problems. Many of those are not disease related, as the need of elderly people not to lose their independence. There are two interrelated problems linked to the self esteem and the way to live a fulfilled senescence. Much has to do with the spirit and purpose of life itself which is also related to the cultural and socioeconomic environment. This includes the classical meaning of ethical or religious values and as important to be part of a group, related to its values and everyday commodities.

Common aging processes initiate the separation of an aging individual from every day life. Loss of mobility, deterioration of eyesight and hearing loss isolates the elderly. The consequence of isolation is disease and therefore the sharp rise of the needs in providing care.

The burden on the public health service and society to support and care for the elderly is thus increasing. Prevention of age related diseases goes therefore far beyond classical curative medicine, it involves the society as a whole and targets age related health measures. The goal to reach the status: "Forever young" is a misunderstanding which has to be overruled by today's knowledge. Although physical age related fitness is important, mental health is equally important. Depression in this age group does not only stem from degenerative brain disease as Alzheimer or Parkinson disease, but has its origin in isolation and the inability to cope with a fading organism.

The prevalence of diseases such as heart disease, cancer and arthritis increases with advanced age. Arthritis is a serious problem not just because it restricts movement but because there's also a lot of pain and suffering. While cures are important, help living with these conditions today is what people need. The goals of prevention are therefore to reduce consequences of age related diseases, disorders and disabilities.

It is therefore an important challenge of global importance to gather the whole range of issues related to aging and age related disease.

*We therefore call for a conference on all aspects of the prevention of age related diseases. This conference is organized in joint cooperation of Eurasia-Pacific Uninet and its member institutions, hosted by Fudan University, Shanghai, China **from October 28th to October 31st, 2009.***

Topics include:

1. Molecular and cell related changes in aging as origin of degenerative structural disease. A variety of diseases of the elderly has been traced to variations in genes influencing longevity and health. Insight into the pathophysiology of molecular changes is paramount to prevent age related diseases. Targeting these changes will provide curative concepts in diseases like heart disease and cardiovascular disorders, cancer, neurological diseases, macular degeneration and osteoporosis.
2. Immunity and aging: immunosenescence has a variety of age related consequences in health related to above mentioned diseases.
3. Methods to promote longevity and health: nutrition, physical and intellectual activities are important to prolong a healthy life and to ensure longevity.
4. Longevity and models for healthy aging: Gender, socioeconomic and environmental parameters influence the dynamics of individual aging phenomena. Balanced dietary measures contribute significantly to extended life span and later onset of diseases. Further measures include abilities of the information age, optimal living conditions and staying active and mobile as long as possible. Age-adapted sport activities are also within this category.
5. Mental health and preventive measures to degenerative brain disorders will be a core topic of this conference. Topics will include aging diseases as Parkinson's and Alzheimer's disease, dementias and depression. Concepts how to cope with psychoses and difficult old patients in health care are often neglected.
6. The growing roster of disabling conditions in the elderly requires providing sufficient pain relief. Many perioperative mental conditions are the consequence of inadequate therapies not adapted to the aging organism and its structural and functional changes in the brain.
7. Death and dying: all our efforts in prevention end at a certain point and it seems unavoidable to present concepts of "dying in dignity". Thus palliative care will get special appreciation in this context.

Today's curative medicine discriminates between primary, secondary and tertiary prevention. We would like to span this horizon even broader towards environmental consequences. The targeted audience involves professionals focusing on related areas interested in future concepts of longevity and models of healthy aging. Eurasia-Pacific Uninet is therefore organizing this conference in China to promote a mutual exchange of ideas of experience and wisdom from East and West on these topics.

Please note the ABSTRACT DEADLINE: June 30th, 2009

Interested research scientists and clinicians of the Member Institutions of Eurasia-Pacific Uninet are invited to participate in this conference. Abstracts (minimum 4500 maximum 6400

characters including space characters) for presentations shall be submitted **until Tuesday, June 30th, 2009**. The travel and accommodation costs for accepted speakers (maximum EUR 1500) will be covered.

Speakers will be informed about the acceptance of papers by August 15th 2009

Contact: Ms. Teresa Achleitner, Eurasia-Pacific Uninet Office, Kaigasse 28, 5020 Salzburg, E-mail: teresa.achleitner@ sbg.ac.at, Tel: +43 662 8044-3907, Fax: +43 662 6389-4469.

All necessary information can be found on: www.eurasia-pacific.net

Could I kindly ask you to distribute this information within your university, institution, department and your group.

The tentative program and further details on this conference will be forwarded after the reception of all proposals.

We would very much appreciate your participation and contribution.

I am looking forward to seeing you in Shanghai!

Yours sincerely,

Prof. Dr. Brigitte Winklehner, Eurasia-Pacific Uninet, President

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☞ **RETURN FAX**
To: **Eurasia-Pacific Uninet**
 Attn. Ms. Teresa Achleitner
Fax: +43-662-8044-3909
Abstracts must be returned via Email also!

EURASIA-PACIFIC
UNINET

REGISTRATION FORM
INTERNATIONAL CONFERENCE – Prevention of Age-related Diseases
Fudan University, Shanghai, China
October 28–31, 2009

Please complete and return by June 30th, 2009 at the latest

PARTICIPANT:
Surname: _____ Given Name: _____
Institution: _____
Address: _____
Country: _____ Zip code: _____
Phone: _____ Fax: _____
E-mail: _____
I am a speaker at the conference: ☐ **yes** ☐ **no**
Participation in the Sightseeing Trip on Oct. 31st: ☐ **yes** ☐ **no**
Accommodation: I need a hotel room from Oct _____ to _____ 2009.

Flight Bookings:
Booking over Eurasia-Pacific Uninet with Austrian Airlines or Lufthansa
Outward Flight: ☐ **October 26th** ☐ **October 27th** ☐ **other _____**
Return Flight: ☐ **November 1st** ☐ **November 2nd** ☐ **other _____**

Connection Flight from/to the following destination in Austria:
☐ **Salzburg** ☐ **Graz** ☐ **Innsbruck** ☐ **other _____**

Other Bookings:
Arrival in Shanghai: DATE: _____ TIME: _____
FLIGHT NUMBER: _____ COMING FROM: _____
Return Flight: DATE: _____ TIME: _____
FLIGHT NUMBER: _____ GOING TO: _____

Please return the completed registration form by June 30th, 2009 at the latest
by fax: +43 662 6389-4469 or +43-662-8044-3909 or email to: teresa.achleitner@sbg.ac.at – thank you!

Abstract
Minimum 4000 Maximum 6400 characters including Title, Authors, Affiliation and References;
If you want to include 1 Figure (900 characters have to be included in the Maximum characters allowance of 6400 inclusive space characters)
Please include the Topic Number in the separate box provided in the right corner