Centenarians

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Editor

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An Example of Positive Biology

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Preface

People worldwide are living longer.

At global level, the share of 80+ people rose from 0.6% in 1950 (15 million) to around 1.6% (110 million) in 2011, and it is expected to reach 4% (400 million) by 2050. The global population is projected to be 3.7 times bigger in 2050 than in 1950, but the number of 60+ people will increase by 10%, while the number of 80+ people will increase by 26%. The increase in lifespan does not coincide with the increase in health-span, i.e. the period of life free from serious chronic diseases and disability.

Improving the quality of life of oldest is becoming a priority due to the continuous increase in the number of this population who is at risk of frailty. This makes the studies of the processes involved in longevity of great importance.

Most biomedical researches are "negative biology", because the study of the disease is its central heart, focusing on the causes of the diseases. On the contrary, a different approach is possible, called "positive biology". Instead of placing diseases at the centre of research, positive biology searches, for understanding the causes of positive phenotypes, to explain the biological mechanisms of health and well-being. This means understanding why some individuals, namely the centenarians, have escaped neonatal mortality, infectious diseases in the pre-antibiotic era and the fatal outcomes of age-related diseases, thus living more than 100 years. The knowledge born from this approach could allow modulating the ageing rate by providing valuable information on lifestyle to achieve healthy ageing.

Furthermore, the study of centenarians could provide important indications on how to build drugs that can slow or delay ageing, with benefits for those who are more vulnerable to disease and disability. The identification of the factors that predispose to a long and healthy life is therefore of enormous interest for translational medicine.

It is known that the longevity phenotype is the result of a positive combination between genetic, epigenetic, stochastic and lifestyle factors. So, the analysis of all the known parameters that can influence these single elements, or their interaction, can give new possible information to delineate a sort of longevity signature.

In the different chapters of this book (see in Contents), a detailed analysis of the mechanisms involved in achieving longevity is performed. The role of chance, genetics, epigenetics, sex/gender, education and socio-economic level, social support and stress management, diet and nutrition, microbiota and pathogen burden, physical activity, immuno-inflammatory responses and oxidative stress are depicted.

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