

Significance of the Stress Research: “In Memoriam, Richard Kvetnansky”

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This special issue “In Memoriam, Richard Kvetnansky” is dedicated to honor the memory of our long-time friend, colleague, and member of the CEMN Editorial Board, who passed away in Bratislava, Slovakia at the age of 79, on August 18, 2016.

More than his multiple scientific achievements briefly mentioned below, we honor his personal qualities, his warmth, kindness, enthusiasm, honesty, and generosity. We will always remember him not only as a colleague but also as a wonderful, supporting friend. This introduction includes a tribute to Dr. Kvetnansky written by its old friend and collaborator Dr. Nagatsu (Nagatsu 2017).

Dr. Kvetnansky was a recognized World expert in stress research, and an extraordinarily productive scientist. Over a period of 50 years (1976–2016) he published more than 390 scientific papers in the international literature. His work had

a major impact in the field, and his publications collected over 10,000 citations in the international literature. This is an outstanding productivity and impact, and more so given the financial and political restrictions over a large part of his career.

More importantly, his work established the foundations for the key role of catecholamines and other neurotransmitters in stress, the regulation of the central and peripheral sympathetic activity in acute and repeated stress, as well as mechanisms of adaptation and the pathological consequences of loss of homeostasis. The focus of his research adapted to the continuous scientific innovations included an increasing consideration of basic molecular interactions, the use of state-of-the-art transgenic and knock-out models, and more recently a focused evaluation of the effects of chronic stress on neurodegenerative disorders. Thus, Richard’s work not only pioneered the field of stress research, but also made fundamental contributions of major translational value.

In the 1970s, Dr. Kvetnansky trained at the Laboratory of Clinical Science, National Institutes of Health, directed by Dr. Irwin Kopin, and spent the rest of his entire career at the Institute of Experimental Endocrinology of the Slovak Academy of Sciences in Bratislava, Slovakia. He was Head of the Laboratory of Stress Research, and Institute Director during the period 1995–2003. He trained many students in his laboratory, most of them following successful research careers focused on stress research, and established multiple fruitful collaborations around the World.

He significantly contributed to the designation of the Institute of Experimental Endocrinology as a European Union Centre of Excellence via a successful project of the 5th Framework Program of the European Commission, coordinated by his colleagues. He was Chairman of the Czech and Slovak Society for Neurochemistry (1986–1996). In recognition of his major scientific contributions and his role in the development of Science in Slovakia, he was awarded in 2005 the “Pribina Cross” in the second grade, from the President of the Republic of Slovakia. He was also awarded

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the Pfizer Prize of McGill University, Montreal (Canada), and the Honorable Gold Plaque of the SAV, Jan Jesenius, for merit in the medical sciences.

Richard Kvetnansky was particularly interested in the physiological effects of the space travel stressor, and participated in the International Academy of Astronautics and the International Astronautical Federation, contributing to the planning of biological studies in space. The 70 publications that originated from these studies revealed enhanced sympathoadrenal system activity during space flights and, therefore, may be important for planning future space missions.

In addition to his remarkable research findings, Dr. Kvetnansky was well known for his networking activities and his organization of scientific meetings. He organized and was Chair of the First World Congress on Stress in Bethesda, MD, October 2–7, 1994, and 10 International Catecholamines and Other Neurotransmitter in Stress Symposia, held every 4 years in Smolenice Castle, on the outskirts of Bratislava, the last one in 2011. These meetings gathered many World experts in all aspects of stress and were characterized not only by their high scientific quality but also by the warm and friendly hospitality. They provided an ideal venue to share recent advances in stress research and established enduring and successful collaborations. The series of Catecholamines and Stress symposia has not been interrupted; it is being continued by his successors. The 11th Symposium was held with him as an Honorary Chairman, the next 12th Symposium will be held in 2019, unfortunately without him.

Dr. Kvetnansky was admired by his many colleagues because of his industrious, energetic, and enthusiastic approach to Science, and his scientific integrity, curiosity, and unbounded energy. His multiple seminal findings contribute to set the basis for further studies on stress, of increasing translational significance. The field of catecholamines and stress grew from a few dozen publications prior to Dr. Kvetnansky's contributions to over 7000 publications according to PubMed as of October 2017. Dr. Kvetnansky was a major contributor to the exponential growth of a subject of major medical importance.

This Special Issue contains 33 publications contributed by his former students and collaborators, and by members of CEMN Editorial Board, including four posthumous manuscripts reporting Dr. Kvetnansky's ongoing work at the time of his passing.

Although naturally the focus of the Special Issue is on stress, it includes reports on novel central mechanisms that will expand the stress field in new directions.

Novel factors include the role of ghrelin and butyrylcholinesterase (Brimijoin and Tye 2017), miR-132-3p (Haviv and Soreq 2017), glutamate transporters (Horváth et al. 2017), CRH-R1 and CHR-R2 in the pituitary gland, using

CRH knock-out mice (Klenerova et al. 2017), the role of CRH in short-term memory (Varejkova et al. 2017), the acid sensing ion channel 1 as a regulator of central sympathetic activity (Li et al. 2017), osteocalcin (Patterson-Buckendahl et al. 2017), doxycycline (Shishkina et al. 2017), the role of nonpathogenic bacterium administration in serotonergic neurons and antidepressant behavior (Siebler et al. 2017), the participation of sirtuin and beta-adrenergic receptors in the stress response (Spadari et al. 2017), and the role of diet in the development of autonomic dysfunction (Mukerjee et al. 2017).

Reports on the role of brain and peripheral Angiotensin II include the analysis of the role of Angiotensin receptors in the cardiovascular response to stressors (Silva Brasil et al. 2017) and a review of the role of AT2 receptors on the regulation of the sympathoadrenal and hormonal reaction to stressors (Saavedra and Armando 2017).

Advances on the role of specific circuits during stress include a report on alterations in gene expression in the locus coeruleus-amygdala circuitry during stress (Sabban et al. 2017) and the role of the nucleus of the solitary tract/dorsal vagal complex (Herman 2017).

Several contributions are focused on the application of basic research in stress on clinical disorders, a direction of significant translational value. They include clinical studies on the neuroendocrine response to stressors (Kapsdorfer et al. 2017), the role of genetic factors in rheumatoid arthritis (Vernerová et al. 2017), and the response to stressors in patients affected by multiple sclerosis (Vlcek et al. 2017). Preclinical studies include alterations in coronary activity (Lazuko et al. 2017) in animal models of post-traumatic stress disorder, potentiation of inflammatory responses by repeated stress (Laukova et al. 2017), the association of stress with immunomodulatory mechanisms (Vargovič et al. 2017), and a report of novel antianxiety and antidepressant compounds with central activity (Koprdoва et al. 2017).

There is an emphasis on the relationship between stress and neurodegenerative disorders, including a comprehensive review on the linkage between stress, catecholamines, and neurodegenerative disorders (Goldstein and Kopin 2017), the role of miRNA in Alzheimer's disease and inflammatory degeneration (Zhao et al. 2017), the influence of stress in Alzheimer's disease (Mravec et al. 2017), the role of stress on alterations of immune profiles in animal models of neurodegeneration (Novak et al. 2017), reports on the basic approach to study demyelination (Tan et al. 2017), and the role of Sirt2 in oligodendroglial differentiation (Thangaraj et al. 2017).

Factors regulating neuroplasticity, of major importance during stress, include reports on the role of haloperidol in neuroplasticity (Kubickova et al. 2017) and that of oxytocin in neurite outgrowth (Zatkova et al. 2017).

This volume also includes comprehensive reviews on regulatory factors of significant roles in the reaction to stressors, but that have not been adequately studied in this context before, such as the role of peroxisome proliferator-activated receptor gamma (PPAR γ) (Villapol 2017) and an updated analysis of the role of microglia in the brain (Kabba et al. 2017).

This Special Issue honors the personal qualities of a splendid and delightful man, including what he would have considered the best tribute to his extraordinarily career: many novel and significant contributions ensuring that his legacy will continue to be fruitful in the future.

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