



## Mini-reviews based on the First Conference of the Institute of Stress Biology & Medicine “Systems Biology-Medicine and Stress”

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Stress, defined as the state of threatened, or perceived as threatened, homeostasis, is normally coordinated by the Stress System, consisting of central and peripheral components and signal mediators. Chronic activation of the stress system has been identified as a major factor related to the so-called chronic non-communicable disorders, including anxiety, depression, obesity, metabolic syndrome, hypertension, autoimmune disorders, type 2 diabetes mellitus, cardiovascular disease, and osteopenia/osteoporosis [1]. Exposure to stress during vulnerable periods of brain and body development may have substantial long-term and even permanent effects on brain development, and later mental and physical health. Persistent neuroendocrine and epigenetic changes, as sequelae of early life stress, represent strong biological risk factors for behavioral and/or somatic disease in later life [2].

We are delighted to introduce this series of mini-review articles on the topic of stress, which are based on the proceedings of the “First Conference of the Institute of Stress Biology & Medicine” that took place in Athens, Greece, on January 20th–22nd, 2017. The Institute of Stress Biology & Medicine (ISBM) (<https://www.stressinstitute.org>) was founded in Athens in 2015 by Professor George P. Chrousos and 23 colleagues with specialized interest and expertise in preclinical and clinical research on stress. The goal of the ISBM is to promote research collaborations, education, and public awareness concerning stress by bringing together scientists from different

fields, eventually at an international level. Therefore, the topics covered during this first three-day meeting ranged from basic neuroscience and neuropsychopharmacology to clinical aspects of exposure to stress, measurements of stress, and diagnosis and therapy of stress-related disorders.

The plenary lectures of the meeting were delivered by two invited speakers, Dr. Debra Bangasser from the Department of Psychology and Neuroscience Program, Temple University, Philadelphia, USA, and Dr. Jodi Pawluski from the University of Rennes/INSERM, France. Their mini-reviews, titled “Sex differences in stress responses: A critical role for corticotropin-releasing factor (CRF)” and “Perinatal Selective Serotonin Re-uptake Inhibitors (SSRIs) and offspring hippocampal plasticity: interaction with maternal stress and sex,” are based on sexually dimorphic differences in the stress responses in rats, findings of major human relevance, as many neuropsychiatric disorders related to stress are more prevalent in women than in men [3]. Specifically, Drs Bangasser and Wiersielis presented interesting sex differences in the secretion and effects of the stress neuropeptide CRF that could ultimately contribute to gender-oriented therapy of anxiety, depression, and other mood disorders. Moreover, Dr Pawluski and Dr Gemmel discussed important preclinical and clinical data on the effects of maternal stress and early exposure to SSRIs on the plasticity of the male and female brain.

The mini-review by Dr. Giannopoulou et al. entitled “Perinatal hypoxia as a risk factor for psychopathology later in life: the role of dopamine and neurotrophins” is based on a session on the “Neuroscience of early stress exposure,” chaired by Prof. Maria Panayotakopoulou. The authors summarized unique data from human studies on the epidemiology of perinatal hypoxia and its effects on the dopaminergic system and neurotrophins in the developing brain.

The article by Dr. Stefanaki et al. discusses the concept of chronic stress and body composition. Adipose, skeletal muscle, and bone masses, i.e., “body composition,” reflect chronic exposure to stress and, hence, human health status. Increased

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adiposity, especially its visceral component, sarcopenia, and osteopenia/osteoporosis reveal a vicious spiral of chronic stress system activation, unrelenting increases in cortisol, catecholamines, and inflammatory cytokine secretion and explain the extremely high prevalence of so-called medically unexplained symptoms (MUS), including, inter alia, fatigue, pain, gastrointestinal problems, dizziness, and sleep problems, that represent the most common reasons that people seek medical care. The article provides new insights into the recently identified nosologic entities “paradoxical and osteosarcopenic obesity” and their relation to chronic stress and inflammation.

It is our hope that this will be the first of a series of meetings and editorials on stress-related basic, preclinical, and clinical studies that will unravel the detrimental effects of chronic

stress on mental and physical health, lead to better prevention and therapy approaches via stress management techniques, and enable longer healthy life expectancies.

## References

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