


## Editorial

# Welcome to *Stresses*: The Only Gold Open Access International Journal Treating Responses to All Stresses in All Biological Systems, with an Interdisciplinary Vision

Luigi Sanità di Toppi 

Department of Biology, University of Pisa, 56126 Pisa, Italy; luigi.sanita@unipi.it

A warm welcome from the Founder and Editor-in-Chief of *Stresses*, Luigi Sanità di Toppi, Full Professor of Botany at the University of Pisa, Italy. I am experienced as an author, reviewer, and leading editorial board member for various international peer-reviewed scientific journals, with particular emphasis on stress responses in plants. I have written (or co-written) more than 200 scientific products, including many peer-reviewed papers in ISI journals. As Editor-in-Chief, I have a large and active network of well-connected scientists to support this new journal with high-level submissions, special issues, topical collections, and reviews.

The thinking behind *Stresses*, this new gold open access international journal, is substantially inspired by the pioneering studies on responses to various stressors performed by the eminent scientist Hans Selye (1907–1982). Almost a century ago, in fact, he already had a clear idea of the crucial concept whereby “different types of stress evoke similar or even identical response mechanisms” [1]. Given that we can define stresses as “more or less marked deviations from the metabolic optimum condition”, it must be said that organisms (and viral particles) are anything but passive when they come to such deviations, namely biotic and abiotic stresses: in fact, they readily perceive stresses at various levels and initiate signaling which, where necessary, alerts the entire biological system. These complex mechanisms can trigger appropriate responses that restore homeostasis, and often promote resistance to unfavorable conditions [2]. In this regard, it is also worth mentioning the fundamental work of Rudolf Virchow (1821–1902), the father of modern pathology, who stated that any kind of damage to the organism arises from damage to the cell [3]. To cite the Encyclopædia Britannica: “He pioneered the modern concept of pathological processes by his application of the cell theory to explain the effects of disease in the organs and tissues of the body. He emphasized that diseases arose, not in organs or tissues in general, but primarily in their individual cells” [4].

It should also be emphasized that strategies of responses to stresses are extremely widespread in all organisms (and even in viruses), if we consider the ways in which metabolic pathways and molecular communication mechanisms evolve. In many cases, for example: (a) a new way of responding to stress arises with the recruitment, in whole or in part, of an existing pathway, to which a different role is subsequently attributed; and (b) the perception of different stresses leads to the formation of identical intermediates in the signal transduction chain.

Furthermore, it has nowadays become evident that the severity of stress consequences can vary, depending on both intensity and duration, as well as the concomitant incidence of several factors. Only very rarely, in fact, are organisms and viral particles exposed to one single stress factor: usually they are targeted by multiple simultaneous stresses, at times in rapid succession. Consequently, biological systems respond to one or more stresses, even concomitant ones, thanks to their ability to activate resistance mechanisms. Stress resistance is therefore a complex process often involving a variety of components in the form of: (a) “avoidance” (or “escaping”) mechanisms-at molecular, cyto-histological, functional, morphological, and ecological levels-which prevent stress; (b) defense mechanisms,



**Citation:** Sanità di Toppi, L. Welcome to *Stresses*: The Only Gold Open Access International Journal Treating Responses to All Stresses in All Biological Systems, with an Interdisciplinary Vision. *Stresses* **2021**, *1*, 1–2. <https://dx.doi.org/10.3390/stresses1010001>

Received: 27 November 2020

Accepted: 2 December 2020

Published: 8 December 2020

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which mitigate stress (especially acute stress), limit its effects, and repair possible damage. Responses of the latter type are generally rapid, often reversible, directly connected with cellular homeostasis (and therefore with metabolic adjustments), and result in the process called acclimatization, which allows transient/rapid fluctuations aimed at counteracting the stress factor(s); (c) “true” tolerance mechanisms (tolerance “sensu stricto”) that allow organisms and viruses to tolerate stress (especially chronic) and to adapt genetically, in the medium-long term, to the unfavorable condition. True tolerance therefore implies selective pressure, is heritable and slow, as well as irreversible in a short time. It is based on responses which have become constitutive, given by genetically determined traits [5].

Finally, due to the close connections between the perturbations conferred by stress and cellular homeostasis, it should also be emphasized that stress itself is not always a negative phenomenon: this is explained by the definitions of “eu-stress” (or “good” stress) and “dis-stress” (or “bad” stress), coined for humans by Selye himself (1). In this respect, the performance of a biological system can improve partially or globally when subjected to a low intensity of one or more stress factors, resulting in a better metabolic condition (i.e., overcompensation phase or “hormesis”) than that characterizing the condition of homeostasis. In fact, this effect is expressed in an overall pro-active condition, or rather in a “positive alert”, the so-called eu-stress. However, as stress persists or intensifies, there is a sudden collapse of the overall metabolic condition where a critical state (at times even fatal), called dis-stress, is reached.

Given the above, the journal *Stresses* aims to publish top-quality research covering all aspects of how humans, animals, plants, algae, fungi, bacteria, and viruses respond to abiotic and biotic stresses. Submissions from basic and applied research are welcome, as long as they are based on a clearly defined mechanistic hypothesis. Molecular, biochemical, physiological, morphological, (ultra)structural, cellular, histo-anatomical, morphogenetic, organismic, community, and ecological aspects are all of interest to the journal, provided that response(s) to the stress factor(s) is(are) clearly focused in the submitted manuscripts. Stresses induced by climate change, exposure to xenochemicals and toxins, infection, or injury, as well as phyto/bioremediation aspects, are also positively considered for publication. Review manuscripts are encouraged, but they must be a critical review of existing literature and not just a summary. All submitted manuscripts will be subjected to a thorough peer-reviewing process.

**Funding:** This research received no external funding.

**Conflicts of Interest:** The author declares no conflict of interest.

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