**Physiological and genomic mechanisms of resilience to multiple environmental stressors**

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One of the grand challenges in organismal biology is effective integration of molecular through whole animal responses to habitats representative of natural habitats. Though much attention has been focused on single environmental variables, most notably temperature and acidification, global climate change is most realistically to manifest as co-occurring and sustained variations in multiple environmental variables, or in more frequent, but episodic, fluctuations in stressors. The impacts of multiple stressors on complex systems, such as organismal biology, remain relatively little explored, and may emerge in additive, synergistic, or antagonistic ways. Unfortunately, little is known of how multiple stressors may interact, and of the mechanisms through which they interact to limit physiological resilience in at-risk populations. Furthermore, much physiological variation is harbored within species, yet little is known of how variation for physiologies relevant for climate change may be manifested and how natural variation for resistance or resilience to one stressor may be attenuated by co-occurrence of likely additional stressors. This chapter will review the organismal responses of species to a comprehensive range of stressors, including chemical, acidification, hypoxia, thermal and salinity stressors relevant to global climate change. It will then investigate how chronic exposure to altered baseline environments will sensitize or buffer organisms from acute fluctuations in environmental parameters, and how natural evolved variation among populations and species may sensitize or buffer wild animals from altered environments.