Evolution of adaptation to stress in Arthropoda

To cope with environmental stressors, such as heat, drought, toxicants, etc., organisms possess cellular defence systems which are constitutively present, but which can be mobilized to minimize the effects of possible disturbances and restore homeostasis in the cell. The most important cellular defence systems include stress proteins, antioxidant systems, metallothioneins and P450 enzymes of the mixed function oxygenase system. The aim of this study is to find support for the following two hypothesis: a) The individual stress defence systems are interrelated and are part of an integrated cellular stress defence system, and b) the evolution of stress defence systems is more controlled by a species-specific environment than by the phylogenetic history of these species. Support for these hypotheses will be accomplished by means of a literature study which will provide an up to date and coherent overview of the functioning and regulation of the stress defence systems, to establish patterns in physiological responses by arthropod species in relation to their environment, to determine the phylogeny of stress defence systems, and to evaluate evolutionary patterns of these defence systems in arthropod species in relation to their environment.

Duration:

6 years (1999-2004)

Participants:

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