ROLE OF THE MITOCHONDRIAL PROTEIN C1QBP IN THE ADAPTATION TO ENVIRONMENTAL STRESSORS

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My PhD project focuses on the study of the role of the mitochondrial protein C1qBP in the adaptation to environmental stressors.

Environmental stressors are usually associated with population decline and extinction. However, they may have a significant impact on the evolutionary and ecological processes that affect the evolution of species. Adaptation to environmental stressors causes changes in morphology, physiology, or behaviour, that improve the survival and reproductive success of the organism (or group of organisms). Mitochondria play an important role in the adaptation to environmental stressors in eukaryotes thanks to their ability to quickly adapt to the metabolic needs of the cell. Mitochondria are the powerhouse of the cell and are involved in essential functions, including ATP production, intracellular Ca^{2+} regulation, reactive oxygen species production and scavenging and regulation of apoptotic cell death. For instance, mitochondria have a crucial role in the thermogenic function of brown adipose tissue (BAT), which is involved in adaptation to cold exposure in mammals as it produces heat by dissipating the stored energy through the uncoupling protein 1 also called thermogenin.

C1qBP (*Complement component 1 Q subcomponent-Binding Protein*)/p32/HABP1 (*Hyaluronan Binding Protein 1*) is a mitochondrial protein which plays a key role in the functioning of mitochondria; in fact, the total absence of this protein is incompatible with life. Homologous genes have been identified in several eukaryotes, such as *Saccharomyces cerevisiae*, *Caenorhabditis elegans*, *Danio rerio*, suggesting that it could have a key function in the mitochondrial-mediated adaptation to environmental stresses. Although it is known that in *S. cerevisiae* this protein is involved in binding the sorting peptide of cytochrome b_2, in *D. rerio* is involved in the regulation of ATP production and in mammals plays a role in controlling mitochondrial OXPHOS machinery, the specific function (or functions) of C1qBP is still obscure.

To investigate the possible role of C1qBP in response to environmental stressors, I will study the effects of different kind of insults (e.g., cold exposure, cold/hot water, nutrient restriction, overfeeding) in *M. musculus* and *D. rerio*.

Moreover, since C1qBP is an evolutionarily conserved protein, I will reconstruct the phylogenesis of this protein in order to identify conserved domain(s) and to understand the function of this protein in different species.