Transcriptomic studies in aquatic organisms of the Amazon: current status

Adalberto Luis Val[1], Sergio Ricardo Nozawa[1], and Vera Maria Fonseca de Almeida-Val[1]

[1]Laboratory of Ecophysiology and Molecular Evolution, INPA, National Institute for Research of the Amazon, Manaus, Amazonas, Brazil

The biological diversity of aquatic organisms of the Amazon occurs over an equally diverse range of habitats. This biodiversity is amplified by functional adjustments to face natural environmental challenges. Indeed, world climate changes can add on such challenges. This "biological gold mine" is a unique tool for biologists as each species respond to these challenges by adjusting/controlling the expression of a set of genes that enhance its adaptability. A key aquatic challenge in the Amazon, for example, is the never ending diurnal and seasonal cycles of hypoxia that requires adjustments at all levels of the biological organization. To face this, fish improve hemoglobin-oxygen affinity by decreasing the levels of the negative modulators ATP and GTP, thought that GTP levels decrease faster than ATP within the first 10 minutes of hypoxia exposure. Why GTP decreases faster? We propose that this is achieved when the eIF2α binds to GTP and then to the initiator. eIF2-GTP is then hydrolyzed to eIF2-GDP. This is in accordance with the changes of red cell GTP levels and suggests that increased eIF2 assures the synthesis of proteins needed to face hypoxia. This and other examples will be discussed. (INCT ADAPTA – CNPq & FAPEAM).