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Structural lipid changes and NKA activity of gill cells´ basolateral membranes as response to increasing salinity and atrazine stressors in sea lamprey (Petromyzon marinus, L.) juveniles

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ABSTRACT

In the last decades, several authors have pointed out a reduction in the sea lamprey population abundance in Portuguese rivers. In spite of this, studies concerning downstream migration and the conditions experienced by sea lamprey juveniles during this process are yet to be understood.

Considering that changes in lipid composition of the gill cells´ basolateral membrane (BLM) may disrupt the major transporter Na+K+-ATPase (NKA), this study goals were to detect changes at this level either during seawater acclimation (0 to 35) or after the exposure to atrazine (50 and 100 µg/L atrazine during 30 days). This would give us information about the gill cells´ BLM strategy to response to increasing salinity and atrazine (ATZ) stressors and consequently information on the recruitment success of sea lamprey populations.

BLM phospholipids were extracted by accelerated solvent extraction and Fame Acid Methyl Esters were analyzed by liquid-gas chromatography. Cholesterol content and NKA activities were determined by spectrophotometry.

Our results revealed that both in the presence of higher salinities (25 and 35) or after ATZ exposure, gill cells´ BLM phospholipids presented the same response, i.e., an increase in saturation of fatty acids in relation to control groups (without salinity and not exposed to ATZ respectively). Moreover, at that salinities, NKA activity was significantly correlated ($r=0.890$, $p\leq 0.043$; $r=0.975$, $p\leq 0.005$

respectively) with cholesterol content whereas in presence of 100 μg/L ATZ, activity of NKA was significantly correlated ($r=0.966$, $p \leq 0.001$) with fatty acid saturation.

Modulation of BLM lipids associated with NKA activity seems to be the strategy adopted by gill cells of juveniles to compensate for osmotic and ionic stressors and for contact/resistance to ATZ exposure.

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