

Poster 16

Zebrafish as a model for biomedical research of acute kidney injury: an ultrastructural study

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Abstract

Background: Acute Kidney Injury (AKI) is a highly lethal health syndrome that results in a sudden loss of kidney function. It leads to nephron epithelial cells destruction and compromises urine output and the excretion of nitrogenous wastes, which are used as biomarkers [1,2]. In most cases, a decrease in mean arterial blood pressure occurs with further activation of other mechanisms to stabilize the blood volume and flow and to maintain body homeostasis [3,4]. **Objective:** Since a gentamicin-induced zebrafish (*Danio rerio*) model has already been used as an animal model for AKI, we aim to exhaustively describe this model regarding the histopathological and ultrastructural renal alterations, being one of the first studies providing this type of description [5]. **Methods:** Two groups of 15 zebrafish, gentamicin and control groups, were retroperitoneal injected and collected to light (four and six fish at 48 and 96h after injection, respectively) and electron microscopy (10 fish in each sampling time) analysis. In addition to the qualitative observation, we performed a semiquantitative analysis of the different renal tubules in the semithin and ultrathin sections. **Results:** We verified that the most affected cells are from the proximal tubule epithelium, mainly due to a damaged brush border that could lead to a defective absorption. Furthermore, using a semiquantitative approach, we verified a decrease in mitochondria quantity and size, while lysosomes and lipid droplets increased. **Conclusions:** This is the first study providing a detailed histological and ultrastructural description of the gentamicin-induced zebrafish kidney, which is essential for studying AKI and other kidney-related diseases. These results allow cellular and subcellular abnormalities identification, which could help the development of new treatments and therapies. This model is a valuable tool for studying kidney diseases, and a thorough understanding of kidney anatomy and physiology is critical for advancing our knowledge of these complex diseases.

Keywords: semiquantitative analysis; gentamicin; electron microscopy; histopathology

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