

## **Investigation of Heavy Metal deposition in Zebrafish by Total Reflection X-ray Fluorescence**

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Heavy metal exposure is becoming more and more common in our industrialized society and with it the potential of heavy metal poisoning. Once in the biological system a heavy metal can manipulate metabolic processes and interfere with organ growth and function leading to disease and ultimately death. Little is known about the impact of heavy metals on vision and ocular development, but studies suggest that heavy metal deposition in the lens tissue can increase the occurrence of cataracts. To understand the toxicity of a heavy metal, animal models, typically mice or rats are used. However, in recent years zebrafish have been emerging as an excellent vertebrate model organism. The fish are considered to be a powerful and innovative genetic, embryological, and molecular model. They are relatively inexpensive to maintain and have a high reproduction rate yielding much faster results than higher vertebrate organisms. Interestingly the morphological and functional development of eyes has been preserved through the evolutionary process and one of the largest visible features in zebrafish embryos are the eyes.

In our study we exposed zebrafish embryos to different concentrations of lead to investigate the presence and concentration of lead in zebrafish eyes. Lead was chosen due to its known toxicity to animals and humans alike and its low detection limits for total reflection X-ray fluorescence (TXRF). The embryos were sacrificed after four days of development, and thin sections of the fish analyzed by TXRF. Different embedding procedures were tested for suitability of TXRF analysis and it was found that paraffin is superior to resin embedding due to its lower blanks of the desiccant used to prepare the fish. Block imaging was carried out in parallel to the chemical analysis to investigate morphological changes in the embryo due to lead exposure.