

Metals in the Brain and the Male Reproductive System - Investigated with XANES and μ -SRXRF

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Brain and testes are crucial for human evolution [1]. In comparison with other organs, they have in common a high energy metabolism and blood barriers. With its high oxygen supply and its large concentrations of polyunsaturated fatty acids which are susceptible to peroxidation, the brain is especially vulnerable to oxidative stress. Oxidative stress is also linked with male infertility.

Metals and metalloids are involved in the production of free radicals, the causing factor for oxidative stress. However, metals and metalloids are also necessary components of specific antioxidant enzymes. In brain tissues, knowledge about the spatial distribution of these elements may help to explain the etiology of neurodegenerative disorders. The investigation of their distribution in the testis helps to understand their role for fertility.

Synchrotron radiation x-ray fluorescence analysis (SRXRF) allows the determination of the metal distribution in cryosections of tissues. Microprobe-synchrotron radiation X-ray fluorescence (micro-SRXRF) has been applied to determine the distribution of several metals and metalloids in cryo-sections of 10 μm thin tissue sections by scanning with a focused beam of synchrotron radiation at HASYLAB beamline L. The results of the XANES measurements at the beamline A1 provide valuable information about the role of metals in neurodegenerative disorders.

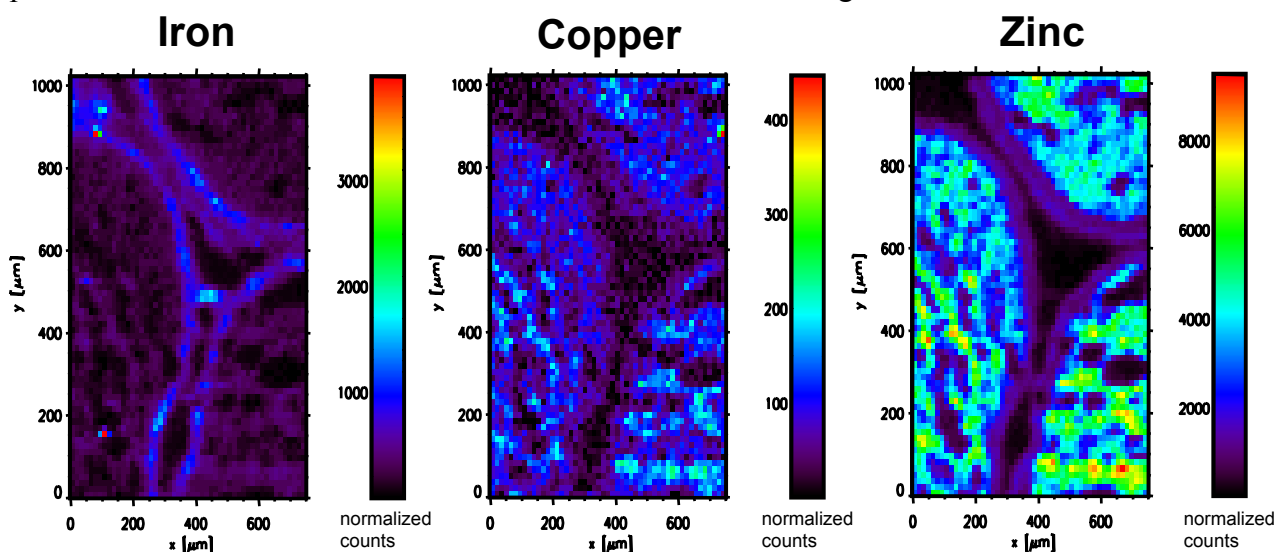


Figure 1: Distribution of metals determined by μ -SRXRF across a cryo-section of a hamster testis.

The figure 1 illustrates the distribution of iron, copper, and zinc (counts are normalized to the argon-peak area) determined by XY mapping across a cryo-section of a TSE infected hamster testis.

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