

CELLULAR METABOLISM OF URANIUM AND THORIUM.  
A STUDY BY ANALYTICAL MICROSCOPY

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ABSTRACT

Two actinides, Uranium and Thorium have been injected as soluble form in rats, and tissues (Liver, bone marrow and kidney) have been studied with two methods of analytical microscopy : Electron probe X rays Microanalysis and Nuclear Microscopy. It has been shown that these elements are concentrated in a non soluble form in different varieties of cells. In the liver Uranium and Thorium are observed in hepatocytes, in the bone marrow the elements are in the macrophages and in the kidney they are in the proximal tubule cells. In each of these cells, uranium and thorium are specifically concentrated by the lysosomes where high concentrations have been measured. In these lysosomes, the actinides are precipitated as insoluble phosphates.

The mechanism of intralysosomal concentration is explained by the high phosphatase activity of these organelles.

In the kidneys the intralysosomal concentration and precipitation are followed by a renal elimination of these elements expelled in the tubular lumen as microscopic crystals. In hepatocytes and bone marrow macrophages, the actinides may stay for a long time inside the cells and chronic intoxication may produce high local concentrations of these alpha emitters.