

Comparative study of the intracellular behaviour of four trace elements in the lactating mammary gland cells

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Key words: lanthanides, III A group element, conventional transmission electron microscopy, mammary gland cells, lysosomes.

Some mineral elements such as aluminium, indium (IIIA group elements), gadolinium and terbium (two lanthanides) are increasingly used in medicine and modern industry, reason for which many previous works have attempted to study their behaviour in many organs such as liver, kidney, intestine,... but the precise intracellular localization of these four elements remain poorly understood in the lactating mammary gland cells. We undertake, in this work to study and compare the intracellular behaviour of the four elements in the lactating mammary gland cells.

Lactating rats were given intraperitoneally a soluble solution of aluminium chloride, indium sulphate, gadolinium nitrate or terbium nitrate.

Histological studies were performed using regular techniques of conventional transmission electron microscopy.

Our ultrastructural investigations have demonstrated that the four studied elements have been concentrated in the glandular epithelial cell lysosomes. However, a difference between the cellular consequences of the two group elements has been noticed. Many cellular damages have been observed in the glandular epithelial cells of the aluminium and the indium treated rats such as an expanded ergastoplasm and many altered mitochondria. No damage had been observed in the mammary cells of gadolinium and terbium treated rats, as well as of the control ones.

IIIA group elements: aluminium and indium known for their high toxicity seem to be more noxious than lanthanides. More sophisticated methods such as ion mass spectrometry and electron probe microanalysis have to be carried out to more understand the toxicity of these elements.

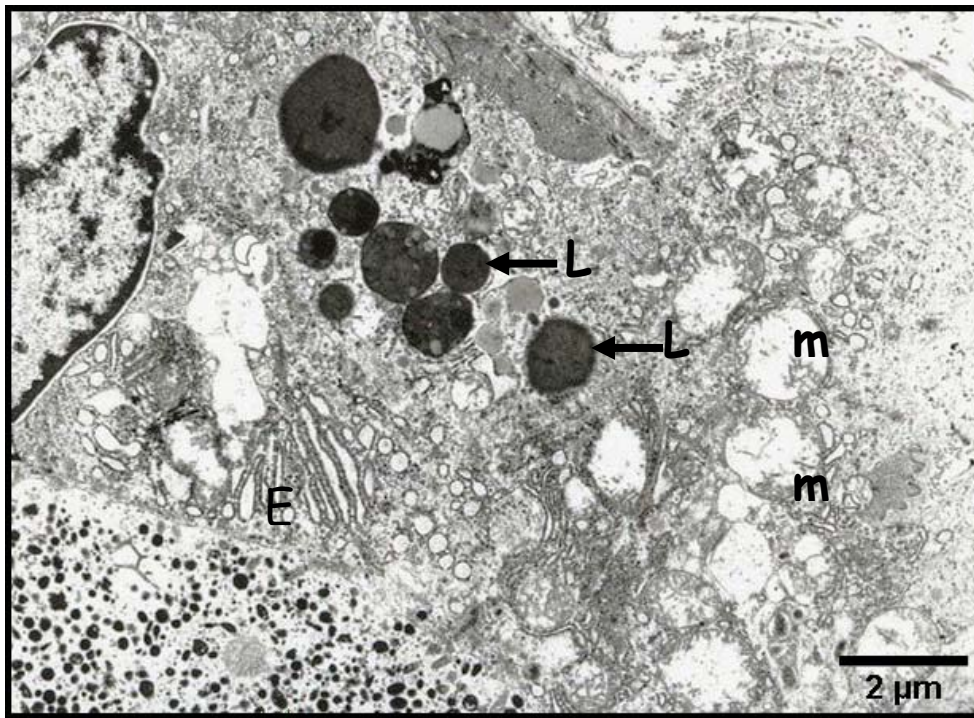


Figure 1. Contrasted section of the lactating mammary gland cell of aluminium treated rat. This image showed expanded ergastoplasm (E), altered mitochondria (m) and loaded down lysosomes (L).

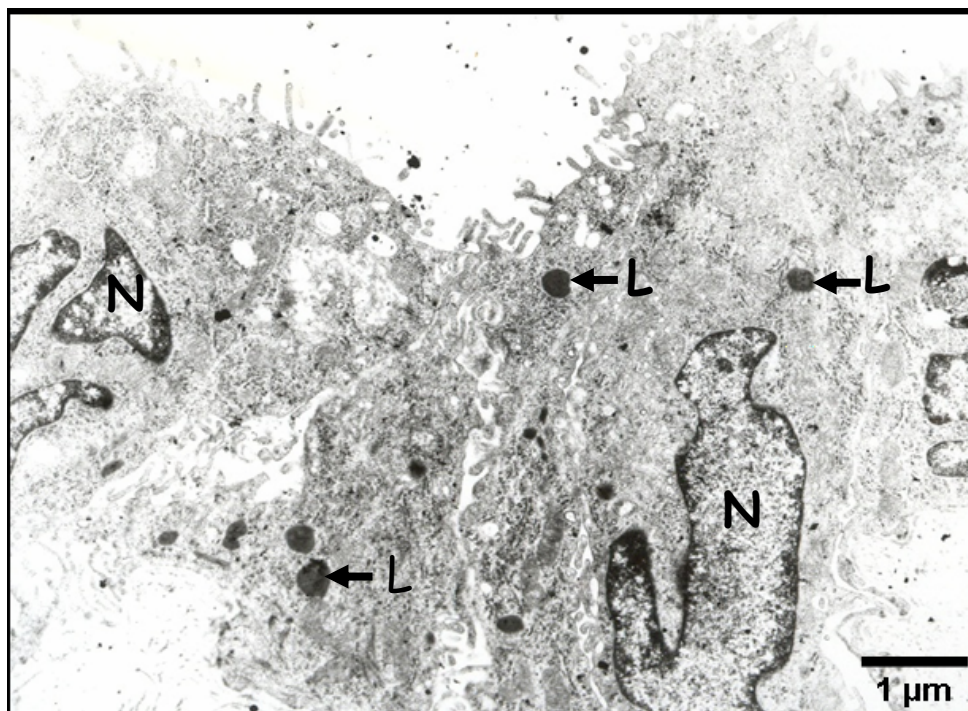


Figure 2. Ultrastructural study of the lactating mammary gland of gadolinium treated rat. This image showed glandular epithelial cells with nucleus (N). We observe lysosomes (L) with electron dense materials from variable sizes and forms.