Life science applications of Scanning Transmission X-ray Microscopy at Elettra

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Understanding the biochemistry and functionality of complex biological systems at subcellular length scales requires multidisciplinary approaches able to correlate the morphology of such complex systems with the chemistry involved in the biochemical processes. Scanning transmission X-ray microscopy combined with microanalytical techniques has already proven to be a powerful tool for exploring biological systems at submicron length scales [1]. The presentation will illustrate the most recent achievements of the soft X-ray spectromicroscopy research carried out at the TwinMic beamline at Elettra Laboratory. Selected results of tissue, cellular or subcellular analysis obtained by imaging with low-energy X-ray fluorescence spectroscopy [1] and micro-spot X-ray absorption spectroscopy represent research fields such as biotechnology, biomaterials, food science, nanotoxicology, neuroscience and clinical medicine [3-7]. They have provided new insights on brain energy metabolism [3], on cellular distribution, internalisation and degradation of engineered nanoparticles in fibroblast cells [4] and in digestive gland epithelium [5], on the chemical make-up of asbestos fibres in lung tissues [6-7] and on the distribution and correlation of the elements resulting from growth of plants under altered environmental conditions [8].

References.

6. L. Pascolo et al. Particle and Fibre Toxicology, 8:7 (2011).