

# Biomedical Applications of X-ray Microscopy and X-ray Absorption Spectroscopy

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Hard X-ray microprobe techniques: synchrotron-induced X-ray emission (SRIXE) for elemental mapping at a sub-micron level; and micro-XANES (X-ray absorption near-edge structure); are providing unprecedented information on biotransformations of drugs, toxins and carcinogens, as well as normal biological processes and disease conditions at the molecular and cellular levels. These microscopy-based techniques have been combined with X-ray absorption spectroscopy (XAS) on isolated proteins and bulk cell samples in a variety of biomedical applications.

Specific applications of XAS and microprobe X-ray techniques will be discussed with respect to:

- the biotransformations of Cr carcinogens,<sup>1,2</sup> Cu anti-inflammatory drugs,<sup>3,4</sup> Cu-anti-melanoma drugs in cells;
- aorta endothelium cells in maintaining cardiovascular health and in arteriosclerosis; and
- mercury migration in dental fillings from teeth.

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