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## Potentialities of synchrotron radiation (SR) fourier transform infrared microscopy (FTIRM) for environmental toxicology and pharmacology

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The setting up of new methodologies for the assessment of material toxicology is a field of research continuously evolving in order to answer the new and urgent questions of the modern era. In this framework, SR-FTIRM is emerging as a valuable tool for *in vitro* and *ex vivo* toxicological studies. The technique is able to provide biochemical information on the sample under investigation in a label-free, safe and spatially-resolved manner, through the investigation of the vibrational motions of the molecular constituents. In this presentation, a short introduction of Elettra Sincrotrone Trieste, III generation Synchrotron Facility in Italy will be given, focusing on the activities in the toxicology field at SSSI beamline, the infrared laboratory at Elettra. Several topics will be covered, such as: The chemical characterization of asbestos bodies versus environmental particulates (anthracosis) in human lung tissues from asbestos exposed and control patients; the biochemical modifications on crustacean (*Porcellio scaber*) digestive glands upon exposure to diverse nanoparticles, (tungsten, zinc and silver oxides), the concentration of which in environmental systems is increasing as a consequence of anthropogenic activities. The correlation between chemical state, concentration and shape of the nanoparticles on animal toxicity will be highlighted and; an overview on the *in vitro* capabilities of SR-FTIRM will be given, focusing on the possibility to monitor in real-time on live single cells the effects of therapeutics and stressor agents in general. A comparison with more conventional analytical approaches such as flow cytometry will be presented.

### Biography

Lisa Vaccari has been the Leader of the SSSI infrared beamline at the Elettra Sincrotrone Trieste since 2006. She is an expert in Bio-spectroscopy and pioneered the exploitations of microfabrication capabilities for the design and fabrication of IR-suitable microfluidic devices for performing *in vitro* bio-experiments under physiological conditions. She has experience in several other analytical techniques and she is actively involved in several projects in the fields of "Environmental toxicology, toxicology of nanomaterials, cellular toxicology of drugs and chemicals".

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