



11.00 - 13.00
Aula Magna

via don Carlo Gnocchi, 3
Roma

Invited Seminar

Some Stem Cells Studies in Orthopedics, Neurology and Cardiology by Synchrotron Radiation

Prof. Franco Rustichelli

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PROPOSER: Prof. Ilaria Cacciotti

ABSTRACT

After a brief presentation of the European Synchrotron Radiation Facility (ESRF) of Grenoble, the basic principles of X-ray microdiffraction in which use is made of Wide Angle X-ray Scattering (WAXS) and Small Angle X-ray Scattering SAXS combined with a very high spatial resolution will be presented. By using this technique it was possible to investigate the structure of engineered bones inside a scaffold pore. Another non-destructive investigation method, being able to offer three-dimensional (3D) reconstructions with a very high spatial resolution, is the micro computed tomography (micro-CT). Then a third technique will be presented: the X-ray holotomography, which was used to visualize, at 3D level, microvascular networks for the first time with no need for contrast agents. The X-ray holotomography is an innovative technique that offers a promising powerful tool to investigate angio and microvasculogenesis in advanced biomedical research areas such as regenerative medicine and antiangiogenic cancer therapies. The 3D visualization of human stem cell muscle homing, in the frame of preclinical research related to the muscular dystrophy of Duchenne will be considered. In particular the 3D visualization of human blood derived CD 133+ stem cells, labeled with magnetic nanoparticles, after intra-arterial transplantation in vivo. In this way it was possible to demonstrate the migration of the stem cells through the arterial circulation into the muscle of dystrophic mice. Another study concerns the visualization of clonogenic cells injected in infarcted mice hearts. Finally, a micro-CT study of ischemic mice brains will be presented.

SHORT C.V.

Prof. Franco Rustichelli is full Professor of Physics at the University of Ancona (Italy). He got the degree in Physics at the University of Milano in 1962, the degree of Specializzazione in Ingegneria Nucleare at the University of Bologna in 1966 and the "Libera Docenza" in Nuclear Reactor Physics in 1970. He published more than 290 papers on international journals and presented several keynote and invited presentations at International Conferences, especially in the fields of Nanotechnology and Stem Cells. He has taken part to more than 40 EU Projects, in some of them as coordinator or task coordinator, exploiting his experience in experimental investigations using small angle scattering (SANS/SAXS), X-ray synchrotron radiation microtomography and other techniques available at European Large Scale Facilities. Since June 2011 he is the European Coordinator of the COST Action MP1005 "From nano to macro biomaterials (design, processing, characterization, modeling) and applications to stem cells regenerative orthopaedic and dental medicine (NAMABIO)" and since March 2011 he is the European Coordinator of the EU project "Immersion in Scientific Worlds through Arts The current research activities are related to material science, biophysics, biomaterials and stem cells research. Since several years he is involved in researchers related to Regenerative Medicine in particular in the field of Bone Tissue Engineering, Muscular Dystrophy and more recently in Cardiology, by Synchrotron Radiation Techniques like X-Ray Computed Microtomography, X-Ray Holotomography (allowing visualization of blood vessels without using contrast agents).