IBPM
Institute of Biology and Molecular Pathology

The Institute pursues the study of biological phenomena with multidisciplinary approaches and translational objectives. The scientific interest of IBPM is mainly focused on the regulation of gene expression in animal and plants and on the study of molecules of the immune response system. A second line of research concerns synthesis and characterization of biologically active molecules and the development of innovative chemical methodologies. IBPM institute has a head count of 66 personnel, located entirely in Rome, and consists of 47 researchers and 19 administrators/technicians. The IBPM staff are guided by the principle that, in order to progress and be competitive, it is essential to implement and enhance basic research, which is the foundation for applied research and technological innovation. To further develop the inter-disciplinarity, in 2014, IBPM and ICB UOS- Rome merged their strengths with the ambition to bridge studies from single molecules to whole organisms. The mission of the IBPM Institute is to investigate molecular mechanisms underlying fundamental biological processes (such as cell division, proliferation, differentiation and death; development and senescence; stress response), using multidisciplinary approaches that integrate biochemistry, molecular and cell biology, genetics, bioinformatics and chemistry. The Institute stimulates applications in biotechnology and biomedicine, with the final goal to develop new molecules for targeted therapy. The research fields include: the mechanisms of control of gene expression in animals and plants; the identification of the tissue-specific role of non-coding RNAs; the study of the structure and function, dynamics and recognition in proteins; molecular and cellular basis of cancer: development of diagnostic and prognostic biomarkers, nanoparticles and new strategies for targeted therapy of human tumors.

Topics: The structural bases of protein and nucleic acid functions; the regulation of gene expression of enzymatic activities, respiratory proteins and molecules of the immune response in animals and plants; the study of cell cycle and cell differentiation.

The scientific productivity is extensive and of excellent quality, including papers in Cell, Nature journals and PNAS.

The output of publications, in the period 2011-2014, includes a total number of 295 (56 with IF>7) publications; average IF: 5.1; 2220 total citations, and several patents, one of which licensed for exploitation, indicate IBPM excellence. In terms of financial resources, IBPM, in the period 2011-2014, has globally attracted a lot of competitive grant awards from several sources and from the license of one patent, amounting to over 5.000.000 Euros.

Website: http://www.ibpm.cnr.it
E-Mail: segreteria.ibpm@cnr.it
Address: Via Palestro n. 32, 00185 Roma
Sections: Biology and molecular pathoygmnal-Binding Proteins, Identified Compounds And Medical Uses Thereof
RM2013A000295

IBPM-CNR Imaging Platform

The IBPM-CNR Imaging Platform is the only currently present in the area of Rome. It is Nikon Reference Center for Central and Southern of Italy.

The platform includes the latest generation of Nikon microscopes and workstation computing, briefly described below.

1) Nikon 90i microscope: high-definition microscope for the acquisition and quantitative analysis of images from fixed cell preparations.
2) Nikon Eclipse Ti: inverted microscope for the time-lapse video recording of processes in vivo. The microscope is connected to a system that controls the incubation/temperature which guarantees constant conditions of temperature and CO2, thanks to which it is possible to record cell populations in vivo for long periods (up to 5-6 days). The microscope is equipped with two fluorescence channels.
3) Processing Station: The station is equipped with softwares for the acquisition, the processing, the qualitative and quantitative analysis and presentation of the images.

The platform performs demonstration and training at
different levels, overseen by IBPM dedicated staff (Dr. P. Lavia, Dr. G. Guarguaglini, and Dr. I.A. Asteriti). The “IBPM-CNR Imaging Platform”, offering the possibility of coupling dynamic studies for qualitative and quantitative analysis at high resolution of cells and cellular structures, is used in studies of biological mechanisms with strong dynamic-temporal-space components.

An IBPM innovative semi-automatic reference images database for consultation of previous collections of applications and cell phenotypes is available.

References: http://www.ibpm.it
Keywords: Advanced Imaging; cells time lapse
Contacts: Dott.ssa Giulia Guarguaglini; giulia.guarguaglini@uniroma1.it; Dott. ssa Patrizia Lavia; patrizia.lavia@uniroma1.it
Biocrystal Facility

The CNR Life Sciences Department has set up in year 2012 a Protein Crystallography Facility. The Biocrystal Facility staff is provided by CNR-Institute of Molecular Biology and Pathology and by Sapienza University of Rome, with expertise in biochemistry, crystallography, protein production and bioinformatics. The Biocrystal Facility staff sets up scientific problem in the context of structural biology, highlighting success potential and critical points. Their skill gives a great help in structure determination provided by knowledge of functional data about the protein with a focus on stability and homogeneity, existence of ligands and formation of complexes. The staff has the bioinformatics expertise required to perform sequence analysis and prediction of structural propensity and to collect data at synchrotron light sources. IBPM is going to create collaborations with the European Synchrotron Radiation Facility (ESRF) to perform training at doctoral and post-doctoral level at the ESRF facilities, including the Partnership for Structural Biology and taking advantage of the Instruct and BioStruct-X projects.

References: http://www.biocrystalfacility.it

Design and function of Genes, Proteins and Nucleic Acids

Thanks to boost of genomics, IBPM researchers are able to manipulate specific genes, thus changing the structure of the genes and proteins encoded, in order to study their functional properties, so becoming able to design new molecules useful for a clinical target therapy. Strengths have the knowledge developed on the transcription factors and on microRNAs and long non-coding RNA, involved in cell transformation, differentiation and maintenance of homeostasis of synapses of the central nervous system. The ultimate goal of IBPM research is to identify novel molecular targets or bioactive compounds with therapeutic potential.

References: http://www.ibpm.it
Keywords: miRNA networks; non-coding RNA; gene expression.
Contacts: Dott.ssa Elisa Caffarelli: elisa.caffarelli@uniroma1.it
Dott.ssa Barbara Illi: barbara.illi@uniroma1.it
Molecular mechanisms underlying Cell Cycle and Mitosis

We study the molecular mechanisms underlying spindle assembly. Specifically, we are interested in the molecular pathways involved in microtubule growth from kinetochores and the roles of Int6, Ndc80/Hec1 and the Sf3A2 and Prp31 splicing factors in this process.

These research studies are conducted in human cultured cells and in Drosophila. We are also interested in dissecting the mechanisms of cytokinesis. Using Drosophila melanogaster as a model system, we have demonstrated that the oncoprotein GOLPH3 plays a central role in cytokinesis, acting as a key molecule in coupling phosphoinositide signaling with membrane trafficking and contractile ring dynamics.

References: http://www.ibpm.it
Keywords: mitosis; cell cycle;
Contacts: Dott. Patrizia Somma: patrizia.somma@cnr.it; Dott. Maria Grazia Giansanti: mariagrazia.giansanti@cnr.it

1. Drosophila spermatocytes were stained for GOLPH3 (red), tubulin (green) and DNA (blue).
2. Microtubule regrowth from kinetochores after cold treatment in Drosophila S2 cells. Cells were stained for tubulin (green), DNA (blue) and the kinetochore marker Cenp-C (red).