

## Our Research Activities

Our researches are in the field of:

- Tissue Engineering, especially related to bony and muscular tissues
- Analysis of the immunological and biochemical properties of bacterial adhesins for components of the extracellular matrix proteins
- Interaction of different type of biomaterials with eukaryotic cells such as human osteoblasts, fibroblasts, platelets and macrophages (biocompatibility and cytotoxicity studies)
- Tissue engineering studies using stem cells and different type of scaffolds
- Studies on bacterial infection (caused by *S.aureus*, *S.epidermidis* and *E.coli* strains) to biomaterials and strategies to avoid such infections
- Bioinformatics for Tissue Engineering
- Translational Bioinformatics
- Data warehouse approaches for intelligent exploration of phenotypic data
- Automated and integrated search on biological data and knowledge repositories
- Text mining of scientific literature
- Reasoning and decision support systems, that is, the definition of a workflow management environment following an epistemological model of scientific reasoning, in order to allow researchers to structure and organize each step of scientific discovery and results demonstration
- Genetic Dissection of Complex Traits
- Development of new analytical methods for genomic data analysis using machine learning- and information theory-based approaches
- Genomics
- Temporal clustering of gene expression time series using temporal abstraction-based clustering of gene expression profiles and Bayesian clustering of gene expression profiles
- Gene network reconstruction using methods based on Bayesian networks and precedence temporal networks
- Proteomics
- New strategy for the analysis of SELDI/MALDI-TOF serum data to develop diagnostic methods based on proteomic profiles of body fluids generated by mass spectrometry
- Identification of morphological and molecular markers that define the mammalian oocyte's developmental competence
- Analysis of the pathways of gene expression in oocytes during folliculogenesis, also following the alteration of the expression of genes involved in the acquisition of the oocyte's developmental competence
- Analysis of the meiotic silencing of unsynapsed chromatin during male meiosis in mice carriers of chromosomal structural heterozygosities
- Study of the molecular mechanisms that alter the differentiation of embryonic stem cells into cardiomyocytes cultered in the presence of xenobiotics (e.g., dioxin)
- Pluripotent stem cells (e.g., embryonic stem cells or induced pluripotent stem cells, iPS) as in vitro models for the study of thrombopoiesis and inherited thrombocytopenias
- Biological effects of radiations on pluripotent stem cells
- Scaffolds for tissue regeneration
- Physico-chemical and biological evaluation of new biopolymers for bone regeneration
- Development of scaffolds for bone regeneration made of a new biopolymer
- Development of scaffolds for stem cell delivery
- Study of new scalable preparation methods for 2D and 3D polymeric scaffolds
- Preparation and characterization of drug-hydroxyapatite nanocomposites for target delivery to bones
- Investigations on the influence of gamma irradiation on (biodegradable) polymeric scaffolds in in vitro/in vivo performances
- Drug delivery systems for biotech drugs
- Development of a one shot vaccine formulation based on polymeric nanoparticles
- Development of a microparticulate bioadhesive buccal formulation for the target delivery of anti-caries drugs to teeth