The unifying theme of ICRM activities is the chemistry of molecular recognition, which can be defined as a multidisciplinary area which studies the principles and strengths that regulate and determine biospecificity and biorecognition at the molecular level. The area involves expertise in organic, bioorganic and computational chemistry, biochemistry and biotechnology.

In order to have molecular recognition phenomena molecules must interact (establishing bonds between them) and exchange information (thanks to the selectivity of the formed bonds). Advances in understanding thus gained will help to discover innovative compounds, materials and biotechnological methods in the pharmaceutical, diagnostic and food fields, as well as to develop knowledge in the areas of biocatalysis, bioseparation and bioregulation. All of these fields are and will be strategic to improve the quality of life.

The mainquarter of the Institute is in Milano. Moreover, some of the ICRM scientists operate in two “Third Parties Research Units” (“Sedi Secondarie”), respectively, at the Department of Chemistry, Milano Politecnico , in Milan and at “Policlinico Gemelli”, Catholic University, in Rome.

What We Are Doing

Presently, the Institute of Chemistry of Molecular Recognition (ICRM) carries out research, technological development and training activities in the following areas:

1. Biomolecules (natural bioactive substances and synthesis of compounds of biological interest);
2. Industrial biotechnologies (bioconversions, enzyme technology and analytical methodologies);

Key words are: Bioactive natural compounds; Peptides and proteins; Green Chemistry; Biocatalysis; Biorefineries; Computational chemistry; Biomolecular Simulations; Structural biochemistry; Analytical microsystems; Proteomics.

Patents


EP 1 567 569 - Chiari M. - Method for Immobilizing Biologic Molecules on Solid Surfaces

US 8,809,071- Chiari M. - Method for Immobilizing Biologic Molecules on Solid Surfaces

PCT/US2016/053015 (pending) - Chiari M., Unlu S., Daaboul G. - Multiplexed phenotyping of nanovesicles

PCT/IB2015/002470 (pending) - Chiari M. - New clickable polymers and gels for microarray and other applications
Our Projects

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Project INDEX (Funded by EU within H2020 FETOPEN) will isolate and characterize exosomes that are as small as 30nm in diameter from human plasma with high purity, and provide in-depth, multi-parameter characterization of the particles through digital counting, size determination, and biological phenotyping. Once completed, Project INDEX will demonstrate a new paradigm in cancer diagnostics.

BIOCODE
The BIOCODE project (funded within the ERANET-LAC Framework) aims to produce high-value extraction compounds, cellulose and emicellulose products (nanocelluloses, soluble cellulosic macromolecules, etc.) and lignin based materials (biochar, soil additives, chemicals) based on main commercial grain crop residues (corn, rapeseed and wheat co-streams). The concept is envisioned to enable flexible and multi-feedstock processing in small-scale units which can be integrated with existing industries in the EU and Latin American regions.

READY
Project READY, supported by Regione Lombardia, is intended to build a regional network of excellence for the rapid response against bioemergencies, designing and developing novel bioagents and analytical platforms for the prompt and rapid diagnosis of emerging tropical diseases. READY joins expertises from both the academia and the biotech industry, and combines skills ranging from the biomolecular area to the optomagnetic engineering.

The research excellence at ICRM can be summarized by the five ACTIVITIES in which our scientists are involved. Specifically:
4. "MICRO: analytical microsystems" for the development of innovative biosensing platforms, particularly based on microarrays (ICRM headquarter).
5. "MODEL: computational biochemistry and drug design". Significant and widely recognized competences in computational chemistry and biochemistry (ICRM headquarter and SS ICRM-Roma).

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