FONDAZIONE
FILARETE

FILARETE FOUNDATION FOR BIOSCIENCE AND INNOVATION

www.fondazionefilarete.com

FILARETE FOUNDATION FOR BIOSCIENCE AND INNOVATION

Filarete Foundation is an innovation center focused on the delivery of contract R&D services, technology transfer and startup incubation in the areas of bioscience, advanced biomaterials and agroindustry. Filarete is located in Milan, Italy, one of the most important industrial and financial areas of southern Europe for biotechnology and innovation.

Filarete was launched in 2008 as a partnership between prominent institutions: the University of Milan, Cariplo Foundation, Intesa San Paolo and the Milan Chamber of Commerce. About 100 people work in the headquarters, where 6000 sqm are occupied by proprietary research laboratories and 14 incubated companies and organizations. Filarete plays a pivotal role in fostering the creation of innovative enterprises and by supporting the innovation processes for existing companies, providing technology transfer, business acceleration and incubation services to inventors and entrepreneurs.

The strenghts of Filarete are the wide range of renown and integrated technical and scientific competencies, a consolidated collaborative network, the business oriented management and the strategic location.

Filarete Foundation provides to its national and foreign clients and partners a range of contract research services, including consultancy, feasibility studies, study design and implementation of complex interdisciplinary R&D projects, and sample analyses. Biomaterials, Agro-Industry and Research Services are the Business Units of Filarete, whose eight laboratories, supervised by the scientific director and assisted by the business development team, represent its driving force:

fondazione cariplo

UNIVERSITÀ DEGLI STUDI DI MILANO

INTESA SANPAOLO

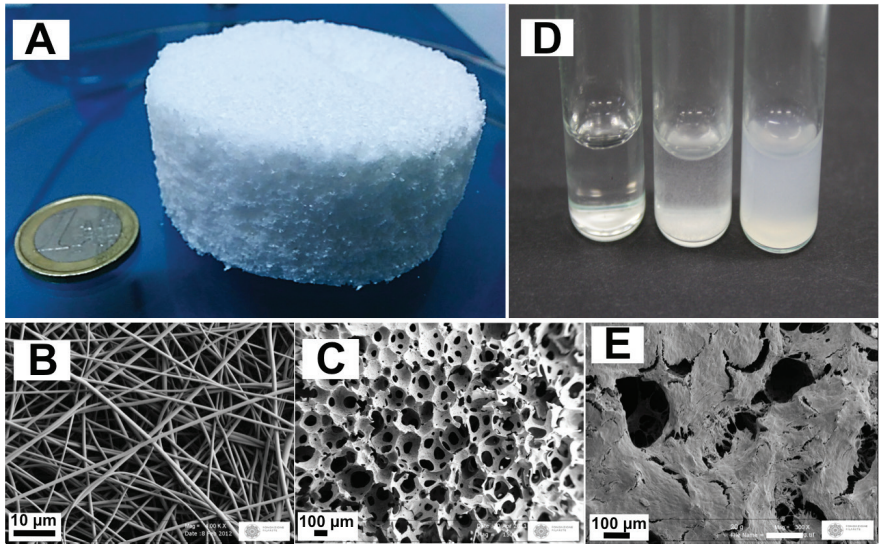
CAMERA DI COMMERCIO MILANO

- **Advanced Biomaterials**
- **Animal Pathology**
- **Cell technologies**
- **Cellular and Molecular Imaging**
- **Genomics and Bioinformatics**
- **Microbiology**
- **Plant Model Systems**
- **Proteomics**

Filarete serves a spectrum of industrial sectors, including medical devices, medications, pharma and biotech, cosmetics, agro-food, agro-environment, agro-chemicals, filtration and advanced materials.

ADVANCED BIOMATERIALS

We offer a complete path for innovative materials development and production: starting from design and prototyping, followed by chemical-physics and biological characterization and finally optimisation and production follow up for semi-industrial and industrial scale. Synthesized materials are polymeric systems characterized by high biocompatibility and tailored to be adapted to many applications, such as nano-materials for tissue engineering and nano-carriers for drug delivery.
Our expertise allows us to provide the best cost-effective solutions to chemical, pharmaceutical, biotech, cosmetic and health companies.
We also provide consultancies for a wide range of industrial partners, such private companies involved in different biotechnological sectors including drug delivery, tissue engineering, filtration, cosmetics and biosensors.



A) Polyurethane scaffold for tissue engineering
B) Scanning electron microscopy image of electrospun permeable membrane for biological application
C) Scanning electron microscopy image of polymeric scaffold.
D) Polymeric nanoparticles solutions for drug delivery.
E) Scanning electron microscopy image of cells on polymeric scaffold.

Competencies

- Design and synthesis of polymers
- Micro-porous scaffolds
- Synthesis of polymeric templates using 3D printing
- Materials characterization: chemical, physical, morphological, biocompatibility studies in vitro and in vivo
- Nanoparticles synthesis and characterization
- Surface modification and coating

Services

- Innovative synthetic biopolymers with controlled chemical and structural properties
- Scale-up processes
- Polymer-based biodegradable micro and nano particles for controlled release of biomolecules
- Chemical and physical characterizations and analysis
- Non-woven micro and nanofibrous polymeric mats for filtration, tissue engineering and drug delivery
- Nanostructured thin films for cell culture, proteins and enzyme multiarrays

MOUSE & ANIMAL PATHOLOGY LABORATORY (MAPLAB)

The Mouse & Animal Pathology Laboratory (MAPLab) performs integrated research and services based on veterinary pathology, especially aimed at studying and using animal models as biomedical research support.

Competencies

MAPLab aims to offer its services to research groups, pharmaceutical and biotech companies, hospitals, other pathology labs and pathologists involved in animal model studies and, more generally, in veterinary pathology. In addition, MAPLab in collaboration with the animal facility housed at Fondazione Filarete, can perform in vivo preclinical studies in immunocompetent mice and rats with special expertise in testing biocompatibility of biomaterials and assessment of nanoparticles safety.
To pursue its mission the MAPLab includes a small group of highly skilled technicians, scientists and expert board certified comparative pathologists who are knowledgeable in:

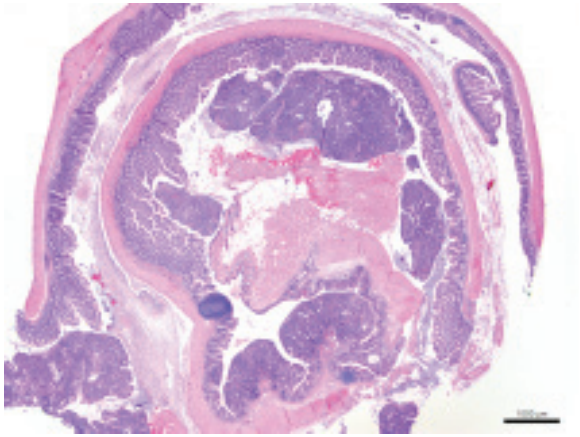
- Histopathological examination of animal tissues
- Histological procedures
- Histochemical and immunohistochemical/immunofluorescence methods
- Digital image analysis.

Services

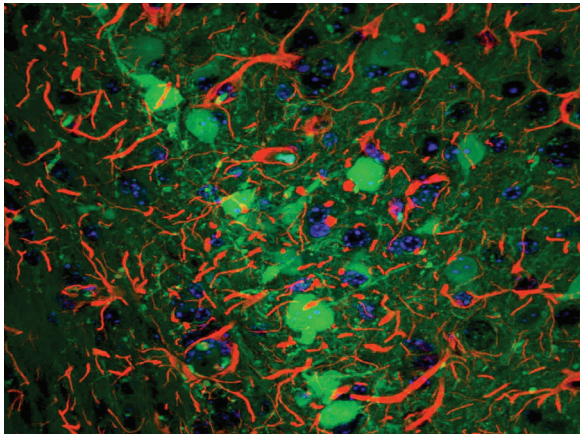
- Necropsy of laboratory animals
- Histology on animal tissues (processing and evaluation)
- Histology of in vitro cell cultures (cytopellets) and biomaterials (e.g. scaffolds)
- Immunohistochemistry and immunofluorescence
- Image analysis (e.g. evaluation of inflammatory infiltrate, proliferative and apoptotic index, angiogenesis)
- In vivo preclinical studies of nanoparticles safety
- In vivo preclinical studies of biocompatibility of scaffolds for tissue regeneration
- Consulting and data analysis in the veterinary pathology field

Main research topics

- Animal models of human diseases
- Spontaneous diseases of laboratory animals
- Biomaterials and tissue engineering
- Nanoparticle toxicology
- Helicobacter spp. infections in animals



Mouse, colon, swiss roll. Multiple intestinal adenomas induced by AOM-DSS treatment (Hematoxylin & eosin, light microscopy).



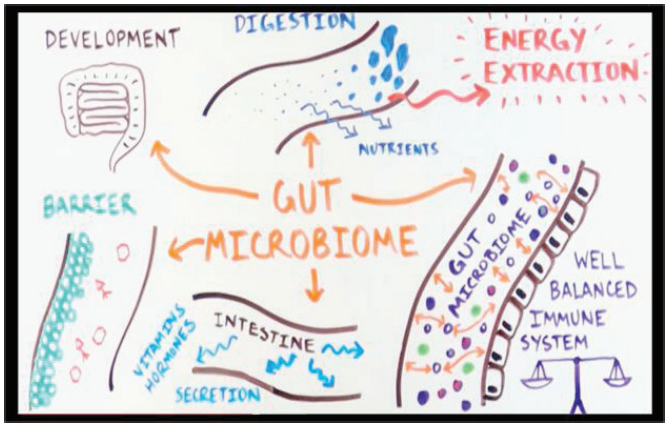
Mouse, brain. Glial fibrillary acidic protein (GFAP)+ astrocytes in red, transfected GFP+ neurons in green, nuclei with DAPI counterstain in blue (IF, confocal microscopy)

MICROBIOLOGY

Our activity is mainly focused on the characterization of bacterial biofilm and pathogenetic factors, development of new antimicrobial devices, evaluation of microbiota metagenomic (i.e. next generation sequencers to study complex environments such as gastrointestinal tract or oral district, identifying new microbial species probably involved in different disease states).

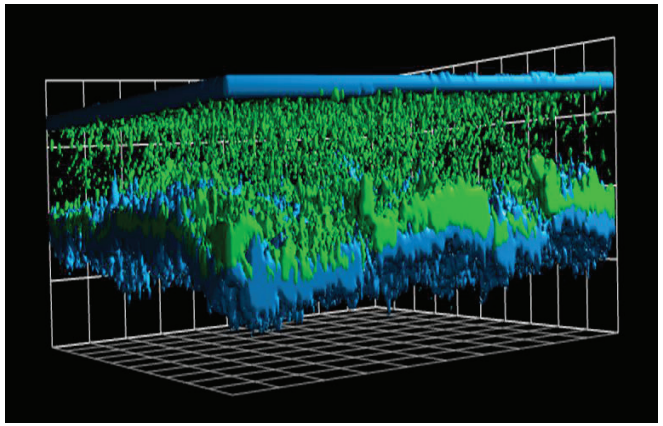
In the recent past we have been involved in a series of international studies aimed to develop novel antibiofilm and antibacterial compounds (gels, bioactivated glasses, photoactivated substances, new implants refractory to biofilm) to be used in dentistry, orthopedics and vascular surgery.

Bacterial Biofilm



Representation of the main interactions by gut microbiome and human wellness maintenance.

Microbiota-different organ axis



Bacterial biofilm by S. aureus (3D reconstruction by CLSM, Green: biofilm, Blue: Titanium substrate and coverslip).

Competences

Microbiological analysis, Confocal Laser Scanning Microscopy adapted to microbiological samples, in particular for biofilm studies. Molecular analysis related to microbes (i.e Metagenomic of human microbioma - oral, gut and vaginal). Molecular Typing and bacterial resistance studies.

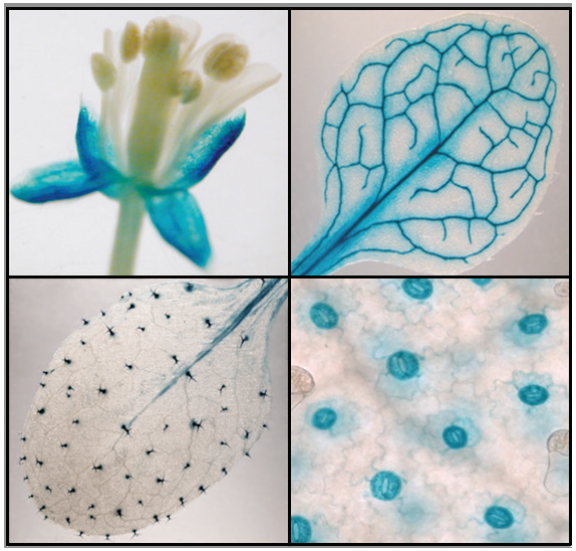
Services

- Repeatable and cheap methods in the microbiology field
- Ability to run tests from one or more materials and substances at the same time
- Ability to obtain biofilm on various prosthetic materials
- Quantification of the biomass volume and of the amount of live and dead cells included in a biofilm matrix
- Evaluation of the interference of different substances with antimicrobial or antibiofilm activity on biofilm and other microbial pathogenetic factors
- Three-dimensional acquiring of images of biofilm development
- Metagenomic analysis of human ecosystems in health and disease
- Development of new devices and biomaterials with antimicrobial properties

AGRO-FOOD

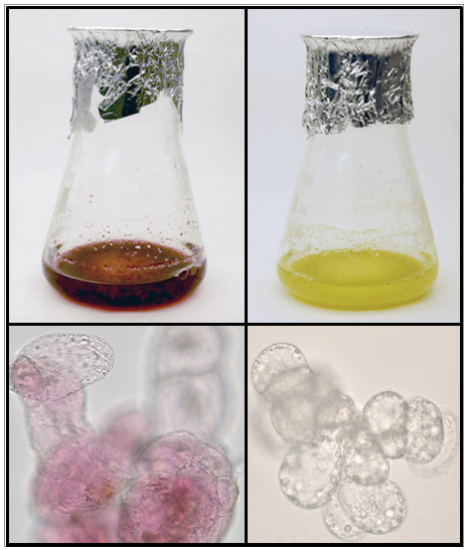
Thanks to our R&D team of international credit with expertise in the most relevant fields of plant biology we are able to develop and validate innovative solutions for the agro-food industries. We offer and provide technological and scientific consulting, support to R&D programs and analysis services in various plant biology area including genetics, molecular biology, bioinformatics, biochemistry and breeding.

Among the current activities, our team is now working on: i) identification, validation and technological transfer of tissue-specific genes and promoters for application in agriculture; ii) development of plant stem cells systems for the ex-planta production of compounds for nutraceutical and pharmaceutical applications.



1. Wide collection of crop validated cell and tissue-specific promoters.
2. Design of plant cell systems for nutra-pharmaceutical compounds production.

Furthermore among our customer-driven services, we offer a wide collection of crop validated cell and tissue - specific promoters.
We can design plant cell systems for nutra-pharmaceutical compounds production.



Competencies

- Plant molecular genetics and genomics
- Gene discovery and functional validation in plant model systems
- Technological transfer of candidate genes to crops (marked-assisted-selection, genetic engineering)
- Plant cell biology and in vitro technologies

Services

- Plant transformation and micropropagation
- Development of cell-based systems for the ex-planta production of nutra- or pharmaceutical compounds
- Quality assessment, chemical and physical characterization and traceability of agricultural products
- Agrochemicals and fertilizers validation contract services

PROTEOMICS

We provide high-throughput proteomic screenings suitable for protein characterization studies, research of new therapeutic targets, biomarkers identification and validation studies and quantitative mass spectrometry analysis.

Competencies

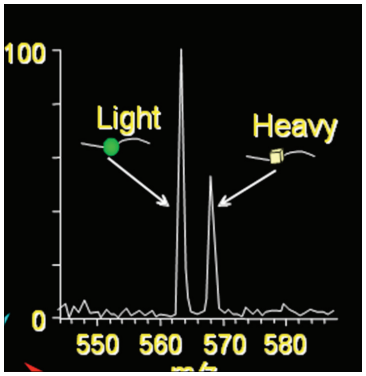
Our team has consolidated technical and scientific expertise on these topics:

- Biomarkers discovery research for early detection, diagnosis and assessment of severity and progression of disorders
- Biomarkers discovery research for identification of new therapeutic targets
- Expression profiling for evaluation of efficacy and toxicity of therapeutics, nanomaterials and NCE
- Screening for novel functional bioactives in food and nutrition science
- Detection and control of food spoilage and allergenic proteins in food and nutrition science
- Development of customized new protocols for proteomic analysis
- Protein expression profiling and screening of post-translational modifications in a variety of samples like biological fluids, tissues, cell cultures, subcellular fractions, protein complexes, microbs
- Quality control of recombinant proteins and synthetic peptides
- Data mining, data quantification, database searches, bioinformatic analysis

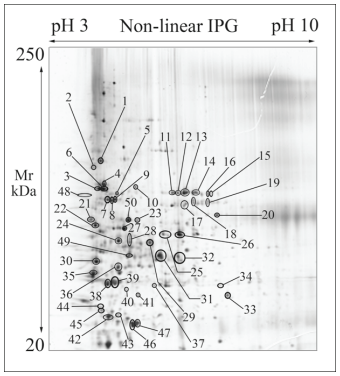
Services

- Electrophoresis-based profiling and identification of relevant protein components and post-translation modifications by MS and tandem MS (MALDI and LC-nanoESI)
- Shotgun proteomics - HPLC/tandem MS-based analysis of peptides obtained by proteolytic digestion of very complex protein mixtures. This allows a global profiling of the protein components of samples without electrophoretic pre-fractionation
- Quantitative proteomics (SILAC and label-free)
- De novo sequencing
- N-terminal sequence analysis
- Amino acids analysis
- 1D and 2D electrophoresys and western blotting, several staining and immunodetection methods

LC-MS/MS analysis by nano HPLC - LTQ-Orbitrap Velos ETD



Quantitative Proteomics

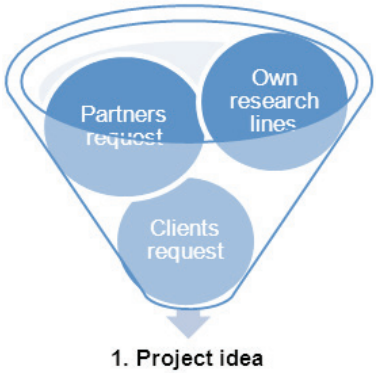


Bioinformatic Analysis

GRANTS: HORIZON2020

Fondazione Filarete is an effective partner for seeking, building, sharing and managing projects in the Horizon 2020 EU program.

We are used to international cooperation, after nearly six years of experience, and thanks to our skilled researchers and high quality facilities we are able to manage our own lines of R&D within the leading biotechnological areas of the Foundation. All business units of Filarete have a reported history of successful grants applications and they are constantly supported by a Business Development unit and by a dedicated Grant Office which provide market analysis, Intellectual Property protection, projects submission and management.



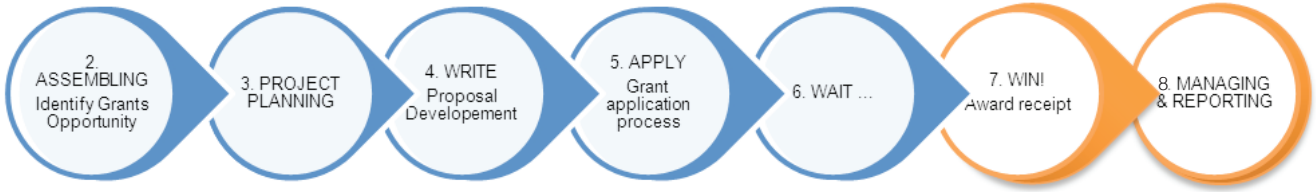
1. PROJECT IDEA: Arising from in-house R&D activities or activities developed with partners or originating from an initiative of a client or third parties.

2. ASSEMBLING: Merging project ideas with partners features and budget needs with the contents of the different calls

3. PROJECT PLANNING: definition and harmonization of objectives, budgets, milestones, timeline, partner roles, deliverables and outcomes, impact of the project.

4. WRITING: adapt the project to the format required by the EU: format limitation, criteria…

5. APPLYING: submission of the project according to the guidelines and further application management



7. WINNING: negotiation, grant and consortium agreement drafting. The project can start!

8. MANAGING & REPORTING: monitoring progress, periodic reporting, fiscal reporting, compliance, corrections (if needed). start!

Main EU successful projects since 2010

- SAVE ME - Development of nanotechnology-based systems for detection, diagnosis and therapy for cancer. Leader: Tel Aviv University, Israel.
- CATSENSE: Design of novel high performance catalysts and biosensors based on deposited mass-selected clusters assisted by computational theoretical screening. Leader: Katholieke Universiteit Leuven, Belgium.
- FUTURENANONEEDS: Framework to respond to regulatory needs of future nanomaterials and markets. Leader: University College Dublin, National University Of Ireland, Dublin.
- SHOCKOMICS: multiscale approach to the identification of molecular biomarkers in acute heart failure induced by shock. Leader: Politecnico of Milan

FONDAZIONE FILARETE HUB FOR BIO&HEALTH STARTUPS

Fondazione Filarete offers a business incubation service, combining expertise, facilities and a strategic location in the northern part of Italy, addressed to start-up businesses typically operating in biotechnological and biomedical field. Furthermore the strategic location in Milan, industrial and financial heart of Italy, allows us to provide and to promote constant connections with the commercial and industrial network of Lombardy, one of the most Italian industrialized region, and the principal European hubs. Fourteen startups have already chosen Fondazione Filarete as their headquarter, exploiting the benefits of being in the center of a fertile ecosystem for the development of innovation in the fields of Biosciences, Medical Devices and Healthcare.

Pharmaceutical, Advanced Materials, Biomedical, Agrofood, Green Chemistry, Cosmetic, Implantology, Textile

In-house technology platforms, on-going collaborations with university of Milan and distinguished research hospitals

Strong connections with Venture Capitalists and Business Angels' network. Robust experience in grants' support

Partnership with complementary services and consultancy (legal, IP, fiscal, regulation)

Competencies

The Filarete's business development team provides: technology and business plan consulting services, coaching and financial advisory services, networking with potential strategic partners (investors, suppliers and distributors).

Incubation and Soft Incubation

With the "Incubation", the incubatees exploit the use of the facilities, of high-quality laboratory equipment and of the operational support of our experts. The "Soft Incubation" formula allows companies or entrepreneurial teams to have access Filarete's co-working spaces, exploiting networking, communication and promotion activities of Fondazione Filarete.

Networking Events

"Filarete Healthy Startups" is a monthly pitching session for startups operating in biotechnoloy, pharma and nutraceutical, advanced therapies, medical diagnostics, biomedical inovation, biorobotics, ICT for health, digital health. http://www.fondazionefilarete.com/en/startups/filarete-healthy-startups

Initiative for startups

Fondazione Filarete is the coordinator of the project "Startup Revolutionary Road" funded by Microsoft, within the global YouthSpark initiative, and Fondazione Cariplo. Since January 2013, the project has been providing business and technical training to 40.000 young people in Italy. Fondazione Filarete has been contributing to relevant competitions for startups as a co-organizer or as a sponsor.

Main Partnership

INNOGEST SGR

ATLANTE SEED

Microsoft

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