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**BIO
TECH in ITALY**

THE LOMBARDY BIOTECHNOLOGY CLUSTER



GENERAL DATA

Technological Vocation	<i>Molecular medicine, oncology and food biotech.</i>
Locations	Milan, Lodi, Bergamo, Brescia, Varese
Region	Lombardy
Main Players of the Area	<ul style="list-style-type: none"> ■ <i>Tenants of the Technology Park Tuscany Region</i> ■ <i>Lombardy Regional Government</i> ■ <i>UNIMI</i> ■ <i>Milan "Bicocca" University</i> ■ <i>"Vita-Salute San Raffaele" University</i> ■ <i>IFOM-IEO</i> ■ <i>"Mario Negri" Pharmacological Research Institute</i> ■ <i>San Raffaele Biomedicine Park</i> ■ <i>PTP</i> ■ <i>Kilometro Rosso</i> ■ <i>FIIRV</i> ■ <i>POINT</i> ■ <i>IDET</i> ■ <i>Genextra Group</i> ■ <i>MolMed</i> ■ <i>Nerviano Medical Sciences</i> ■ <i>Promos</i> ■ <i>Assobiotec</i> ■ <i>Fiera Milano Tech</i> ■ <i>Artenergy Publishing</i>



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	<ul style="list-style-type: none">■ <i>ITER</i>■ <i>CNR-ITB</i>■ <i>Municipality and Province of Milan</i>■ <i>Milan Chamber of Commerce of Milan</i>■ <i>Other centers registered in the regional system Questio-section biotechnology (www.questio.it)</i> <p>- http://www.questio.it/index.php/it/component/questio/?controller=crtt00&task=search</p>
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TECHNOLOGICAL VOCATION

Lombardy's key strength has been the identification of concrete technological priorities, based on the resources of the region: the presence of highly specialized public and private research centres supplying therapeutical services led to identify oncology and molecular medicine as the main focus of the biocluster. In addition, science parks, universities and companies are investigating the fields of food biotech and nanobiotechnology. Lombardy Regional Government (Regione Lombardia) and the Italian Ministry of University and Research (MIUR) in 2003 (Agreement signed March 22, 2004 on biotechnology - Agreement signed December 20, 2010 on food) have thus created the Lombardy Technological District for Biotechnology, aimed at further integrating research and business in order to enhance regional competitiveness.

The district operates through three strategic axes:

- The development of a regional network of research centres and SME, in order to stimulate technology transfer and innovation, through the QuESTIO project. QuESTIO (Quality Evaluation in Science and Technology for Innovation Opportunity), is a database of research and technological transfer centres (CRTT), a tool designed to map, compare and search services of R&TT. It is not only a repertoire and accreditation system, but also a showcase of research and development of Lombardy and a place of direct dialogue among CRTT, business, associations and people.
- The support to early-stage, pre-competitive R&D activities, facilitating access to venture capital and attracting investments, also through innovative financial instruments.
- Fostering the culture of innovation through new, highly specialized and qualified services, in order to help micro companies and start-ups to take advantage of public and EU incentives.

The District is focused on the fields of medical biotechnology and agricultural biotechnology.

Moreover, the municipality of Bresso supported the development of the Biocity Excellence Pole, which is part of the Biotechnology Meta District. Is a project for research, experimentation and permanent training in the biotechnology sector under development within the Science Park, focused on its centre in connection with the University of Milan Bicocca through the BioBresso



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Consortium. The Zambon Group, CTI, Nicox and Newron are located there. The Parco Tecnologico Padano plays a central role in the Lodi pole of excellence for agriculture biotechnology. It was founded by the Lombardy Region with the support of the regional authorities and the University of Milan. The pole acts as a development engine both for the region and also for the most important green bioclusters in Southern Europe. In addition to a corporate incubator of 2000 sqm and a business park, above all, universities and private research centres are strongly represented in the pole.

The public and private research centres of Lombardy have a long-standing tradition in genetics and pharmacology. Over the last two decades, this expertise has generated a sizeable portfolio of patented drugs and methods, several spin-off companies founded by academic researchers in pharmacology and genetics and a growing number of contacts between Universities and pharmaceutical companies. In the delivery of biotech pharmaceuticals, the ongoing projects provide unique opportunities for the growth of new, small companies and for interacting worldwide with major centers in molecular medicine and drug development.

Nanoscale materials have unique properties of basic interest for biological applications. For example, surface nanotopography can be a viable route for controlling cell response since this material mimics typical extracellular matrix structures. Moreover, the presence of adsorption sites allows surface functionalization with different macromolecules (e.g. DNA, proteins and peptides), thus establishing the relevance of these special materials. Plant, agro-food and veterinary biotechnology has expanded widely in the past decade. Scientific interest and research in these areas focus primarily on developing technologies and methodologies for practical applications, with a specific view to improve biotechnologies in the production and quality of food of animal or vegetable origin for human consumption, the control and eradication of plant and animal parasites, the improved breeding of food-producing and companion animal species, and the development of improved plant species. To do this, plants, animals and microorganisms are dissected using modern research tools in genomics and proteomics, as well as those from classical genetics and physiology. Several techniques have been granted national and international patents. The exploration of plant, animal and food matrices to discover novel microorganisms with potential applications in plant, agro-food and veterinary biotechnology is another research field with a well-established molecular microbial ecology platform.

The current research projects developed in Lombardy, in the field of molecular medicine and drug development, are focused on:

- target discovery, drug design, pharmacological screening and special toxicology.
- New targets identification and validation for drug discovery.
- In yeast, protozoan and fungal genetics, high-throughput systems have been developed for screening novel therapeutics acting as antifungals, in tuberculosis, toxoplasmosis and tropical malaria.
- Novel drugs have been formulated for treating atherosclerosis in cardiovascular disorders.
- Advanced studies currently focus on comparative structural genomics applied to virology and on innovative methodologies to generate bioactive compounds. These technologies



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include protein folding, chemical modification of chemopreventive agents and novel conjugation strategies to increase the half-life of therapeutic proteins.

- Physiological testing, cell reporter assays (applied to Ras-GTPases family members, nicotinic receptors, intracellular receptors and neuroplasticity-related signaling pathways), reporter animal assays (applied to intracellular receptors), tests based on bacterial kinase inhibition.
- Procedures based on innovative biosensors have been developed to monitor genotoxicity, teratogenicity and immune cell toxicity.
- Innovative adjuvant formulations to induce long-immunogenic responses in children and adults have been applied to vaccines against meningitis and pneumonia.
- Novel vectors for gene therapies have been developed for treating genetic diseases (e.g. lysosomal storage diseases and cystic fibrosis). Cell-based therapies foresee the use of stem cells for treating cardiac and immunological disorders in humans. Cell-based therapies have also been experimented to solve fertility problems in farm animals and for human reproductive health.
- New strategies for the inhibition of the HIV infection. The greatest challenges to be faced are the delimitation of the side effects and the struggle to overcome the resistance of the virus against drugs. Particular attention is paid to the investigation of the mother-child infection with respect to the development of vaccines and virus-inhibiting substances for children.
- Neuropharmacology, the identification of molecules for which the new drugs should be developed. Research for prevention, enhancement in the field of neurological impoverishment, for nervous diseases such as multiple sclerosis
- Integrating different sources of clinical and genomic data is a new resource direction for supporting diagnosis, outcome and prediction of patient survival. By drawing on the data from these platforms, the biomarker pipeline can be considerably enriched. The task is to support diagnosis and treatment outcome using new markers for specific diseases.
- Analysis, management and mining of the tremendous volume of images and image data captured from different microscopy and analysis technologies. To do this, however, suitable modeling and statistical methods are required. The main idea is to apply different ensemble methods for each data source (specific receptors, new molecules for DNA recognition, recombinant enzymes, imaging and clinical data).

Current projects in nanobiotechnology are:

- Development of new platforms in nanostructured materials for cell culture.
- Microarray-driven gene expression systems for high throughput phenotype screening.



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- Functionalization of nanostructured surfaces to improve the selective adhesion of biological specimens.
- Testing on nanoparticle biocompatibility and toxicity.
- Nanoparticle-mediated drug delivery as a potential new path for the delivery of drugs.
- Development of reagents and know-how for chromatin immunoprecipitation (ChIP) and its extension to DNA chips (ChIP on chip).

Further patent applications are envisaged for:

- New technologies of artificial insemination in horses, cattle, pigs and dogs.
- New methodologies to render pharmaceuticals and chemicals (proteins, drugs, insecticides, vaccines) amenable to controlled release.
- New approaches to the production of dairy products with enhanced tolerability.
- Safety and wholesomeness of feed and food.
- Control of wine qualità.
- Effects of flavonoids on human health.
- Key enzymes in ammonia assimilation in bacteria and plants.
- Somaclonal variation in transgenic stone fruit trees.
- New methodologies for studying the expression of heterologous genes in plants.

CLUSTER PRESENTATION

Since 2003, biotechnology is a strategic sector for the competitive edge of Lombardy, recently recognized as bioregion in the European Union. Lombardy Region stands-out for the highest rate of development in the sector, with 114 (36%) of the 319 biotech companies located in Italy, a number of employees per company more than 50% higher than the national average and more than 40% of patents filed over the past 10 years. These figures are the result of the technological innovation carried out by 12 universities, 199 (out of 643 total) accredited research centres (and of the financial support of public institutions, such as Lombardy Regional Council. This concentration enabled the creation of a network of collaborations, both at national and international level, producing the synergic effects at the base of the development of the industry.

THE BUSINESS SYSTEM

The biotech companies in the area of Milan vary significantly in size, as the cluster hosts either micro-companies, established recently and growing fastly, or large companies by international standards, well-established and constantly developing. Such a variance in size derives from the



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business model adopted. The medium and large companies are active in the development of therapeutics and require a huge amount of long-term investments in R&D (ten years or more). Their profits derive mainly from the licensing or from the offer of specialized services. The micro-companies are focused on the supply of technological or diagnostic platforms for the *Big Pharma*.

The companies and research centers are concentrated in seven areas:

- Milan-Ripamonti (Campus IFOM-IEO, Congenia, Genextra and Mario Negri Institute);
- Milan-San Raffaele Scientific Park (Axxam, Biozell-Cosmo Pharmaceuticals, MolMed, Primm, Telbios);
- Nerviano (MI) (Nerviano Medical Science, Accelera);
- *Biocity* of Bresso (MI) (Newron, NicOx, Cell Therapeutics, Zambon Group and Z-Cube);
- Baranzate (MI) (Nikem Research);
- Varese-Gerenzano (FIIRV, Areta, Ho.p.e., Vicuron-Pfizer);
- Bergamo (Kilometro Rosso Science Park, Point);
- Lodi (Parco Tecnologico Padano).

Most of the companies originate from the process of M&A, that have often involved a rationalization of activities and resources and gave rise to new enterprises through spin-off processes. These companies can take advantage of pre-existing asst, such as management experience and scientific skills.

Company	Technologies/Applications/Products
Accelera	The company's main activity consists of preclinical services in the fields of toxicology, pharmacology, ADME, pharmacokinetics, drug disposition, Bioanalysis & PK, biomarker capabilities.
Areta International	A biotech company for the contract development and manufacturing of new biologicals for advanced therapies, which acts as <i>one-stop-site</i> for advanced therapies needs, from cells to final dosage forms, through process development and quality control testing, up to the final release.
Axxam	A discovery company focused on pharmaceutical, agrichemical and flavour fields. Its integrated discovery platforms include a wide range of functional screening assays, specific assay development, high-throughput screening (HTS), compound profiling and hits to leads activities.



E.O.S.	A biopharmaceutical company committed to develop novel medicines for preventing cancer through a correct application of the translational medicine approach.
Eurovix	A company active for many years in the field of environmental biotechnologies which produces biological promoters based on selected enzymes and microorganisms for the treatment of organic substances, soil, water and air.
Flamma	A medium size manufacturer of amino acids derivatives, classified as active pharmaceutical ingredients and related compounds, classified as starting materials or key intermediates for the pharmaceutical Industries.
Genextra Group	A private biopharmaceutical holding primarily dedicated to the discovery and development of innovative therapeutics for the cure of cancer, age related and metabolic disorders.
HO.p.e.	Study and development of an integrated kit to define the somatotropic activity, aimed at anti-doping and clinical validation of the realized prototype.
MolMed	A medical biotechnology company with a primary focus on developing novel and superior therapies for treating cancer, which is building up an integrated strategy that provides on one hand effective targeting of the growing tumor mass in the acute stage, and on the other hand highly selective therapies to eliminate residual disease.
NAICONS (New Anti-Infectives CONSortium)	A company focused on research and development activities in the anti-infective field in Italy, creating a strategic and operative hub dedicated to discover and develop novel antibiotics targeting unmet medical needs.
NeED Pharmaceuticals	A new biotechnology Company focusing on the discovery and development of novel anti-infective drugs for the treatment of serious or neglected infectious diseases, where an large unmet medical need and market opportunity is clearly identified.



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<p>Nerviano Medical Sciences</p>	<p>A company dedicated to the discovery and development of breakthrough new molecular entities for treatment of cancer. The company is the largest pharmaceutical R&D facility in Italy and among the largest oncology-focused, integrated R&D sites in Europe.</p>
<p>NeuroZone</p>	<p>A solution provider in the invitro screening area for neuroscience and stem cells. Its physiologically relevant primary cell models reduce false positive emerging from classical high throughput screenings.</p>
<p>Newron Pharmaceuticals</p>	<p>A biopharmaceutical company focused on novel therapies for diseases of the central nervous system and pain.</p>
<p>Nexthera Biosciences</p>	<p>An emergent Italian biopharmaceutical company specialized in infectious diseases and focused on rapidly bringing to market novel drugs which fulfill unmet medical needs and can generate substantial financial returns.</p>
<p>NicOx</p>	<p>A pharmaceutical company focused on the research, development and future commercialization of drug candidates, which is applying its proprietary nitric oxide-donating R&D platform to develop an internal portfolio of NMEs for the potential treatment of inflammatory, cardiometabolic and ophthalmological diseases.</p>
<p>Nikem Research</p>	<p>NiKem possesses state of the art capabilities in drug discovery and is specialized in taking validated targets and creating promising and novel drug candidates ready to enter preclinical development.</p>
<p>Primm</p>	<p>During its 20 years of life, it has become a leading international company in the area of biotechnology services, through investing its own resources in biomedical R&D activities, focused on antibodies and peptides, with industrial applications in oncology and neurodegeneration.</p>



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<p>Telbios</p>	<p>One of the first Italian companies engaged in telemedicine, which started its activities in 1996, supporting humanitarian Italian missions abroad. Nowadays, Telbios combines medicine, technology and telecommunication in order to provide solutions for sanitary appliances and healthcare home services.</p>
<p>TechnoGenetics</p>	<p>A company focused on research, development and manufacturing of molecular genetics assays and immunometric and immunological IVD tests, aimed at pre and post natal investigation of chromosomal abnormalities and oncology, using FISH and microarrays techniques.</p>
<p>Tethis</p>	<p>A privately held company active in the biotechnology and nanotechnology fields, committed to the development of novel nanostructured thin layers for innovative tools for environmental monitoring, diagnostics and drug discovery.</p>
<p>T.O.P.</p>	<p>A research biotech company specialized in production of transgenic reporter mice for in-vivo imaging applied to pharmacology. Its proprietary technology integrates imaging techniques into the drug discovery process, for measuring drug effects on target.</p>

RESEARCH INFRASTRUCTURES AND TECHNOLOGY TRANSFER

Among the world-class facilities of Lombardy cluster are worth of mention Milan University, “Bicocca” University and “Vita Salute San Raffaele” University, with a high and increasing number of researchers, about 200. Almost 800 researchers work in the other private research centers of the area.

UNIMI – University of Milan

The University of Milan (UNIMI) plays a major role in promoting sciences at international level. With its consistent commitment to both basic and applied research, UNIMI is a leader in research and scientific productivity. With a proactive role in science, technology and economics networks, UNIMI is involved in national and international research programs and in a collaborating with other scientific institutions. UNIMI has also strengthened its efforts to promote technology transfer, a growth area offering exciting new changes and challenges. The patent portfolio has grown significantly in the last five years, with focus areas in the fields of pharmaceuticals, life sciences and



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biotech, technical and chemical devices and agro-food. As of December 2009 the University's patent portfolio contains over 150 patent applications. The recent spin-off track record is also remarkable with 25 companies founded by UNIMI researchers to exploit internal know-how. The University boasts 21 active spin-off companies to date, developing business opportunities based on the University's new technologies and know-how and operating mainly in the areas of biotechnologies for health, new materials, diagnostics, pharmaceuticals, ICT and environmental protection. Among the spin-offs of the University, are worth of mention Tethis, Genextra and, T.O.P.

UNIMITT

The Centre for Innovation and Technology Transfer of the University of Milan, provides technical assistance in procedural and operations matters in the areas of Intellectual Property protection and spin-off company creation.

CIMAINA

The Interdisciplinary Center for Nanostructured Materials and Interfaces is one of the national Centres of Excellence in the field of the synthesis and characterization of nanostructured materials and their exploitation in biology.

Milan Bicocca University

The DIBIT - Department of Biotechnology and Biosciences, established in 1999, hosts laboratories involved in research in the field of Life Sciences, with particular focus on the molecular aspects, ranging from organic, biomolecular and computational chemistry, to biochemistry, molecular biology, physiology, genetics, pharmacology, microbiology, fermentation technology, immunology, biophysics, zoology, botanic and ecology. The Department is composed by 15 full professors, 17 associated professors, 29 researchers, 24 between technicians and administrative staff and around 150 temporary researchers among PhD students, pre-doc and post-doc. The development of new biotech products and processes requires more and more highly skilled personnel and high-tech structures and instruments. BBC aims at making more efficient the development phase, pointing out since the beginning obstacles and difficulties that typically come out only later in the production process, with evident increment of costs and time.

Biotechnicum (BCC)

It is a biotechnology facility aimed at the development of proprietary industrial strains, fermentation and bioconversion processes for the production of commercially interesting proteins, metabolites and enzyme.

Vita-Salute San Raffaele University

The University is part of the research and clinical-assistance complex of the San Raffaele Hospital and offers new opportunities to students and teachers alike through interaction with the Department of Biological and Technological Research - DIBIT and the San Raffaele Biomedical Science Park. The former houses around 300 researchers, while in the latter are based branches of internationally known companies and private foundations. The San Raffaele Hospital co-operates to a great extent with the European Commission. Its researchers and clinicians have



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been active for many years, both as project evaluators and as work and consulting group participants, in scientific programmes. The hospital is involved in activities promoted by the “Framework Programmes”.

The Department of biotechnology houses:

- a European PhD programme in cellular and molecular biology, which has recently been extended to Neuroscience, in collaboration with the London Open University and approved as an international doctorate by the MIUR - Ministry of Education, Universities and Research.
- Furthermore, 2001 saw the launch of an International Doctorate in Molecular Medicine on the part of the Vita-Salute San Raffaele University which requires students to carry out part of their work at prestigious foreign universities.
- The University is twinned with Harvard University for Neurobiological Studies, which are financed by the Armenise Foundation.

San Raffaele Biomedicine Park

The San Raffaele Biomedicine Park is one of the largest science parks in Europe with focal points on biomedicine and biotechnologies. The park is funded by the San Raffaele Foundation, which has been supporting medical and biological research for decades. The park cooperates with the San Raffaele Hospital, the largest private hospital in Italy (1250 beds), the hospital's competence in the conduct of clinical studies is internationally recognised (a team of 400 scientists concludes 120 clinical studies every year). The San Raffaele Biomedicine Park is characterised by outstanding scientific performance levels and first class training chances for talented researchers. The initial areas of research covered by the San Raffaele Scientific Institute were genetics, cell biology and immunology while in the late 90's gene and cellular therapy, stem cell biology and molecular mechanisms of diseases were added. Presently, San Raffaele is expanding its translational research efforts in key disease areas such as regenerative medicine, neuroscience, cardiovascular and oncology. In 1972, the San Raffaele Hospital was granted by the Italian Ministry of Health the status of “Research Hospital” (IRCCS: “Istituto di Ricovero e Cura a Carattere Scientifico”), with a main focus on diabetes and metabolic diseases. In recognition of its status as a center of excellence in Molecular Medicine, in 2001 the Italian Ministry of Health granted the San Raffaele Scientific Institute the status of Molecular Medicine Research Institute.

SPR technology transfer office

It administers the intellectual property of the San Raffaele Research institute, of the companies located in the SR Biomedicine Park and several research organisations in Italy and abroad, which cooperate with the SR-Park. The Institute has 72 international patents, hence 2 licence contracts could be concluded with biotech and pharma companies, 237 industrial research contracts with altogether 97 different companies, among them four Italian.



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PTP - Parco Tecnologico Padano

The foundation Parco Tecnologico Padano (FPTP) is a facility without profit-making intentions. Its aim is the development of biotechnological methods for the agro-food segment to generate a good environment for research and to found new innovative companies in the segment agrar-food-biotechnology. PTP also runs a science park with research laboratories (livestock and plant biotechnologies), a bio-incubator and a technological platform. Its creation is directly related to the transfer of the Faculties of Veterinary Medicine and Agronomical Sciences of the University of Milan on a new campus in Lodi (20 Km south of Milan). PTP is focused on supporting a pole of excellence in biotechnologies applied to the agro-food sector, developing a Technology Transfer Platform for the area, delivering RTDI services to agro-food industries and cattle-breeders in Lombardy, supporting start-ups and spin-offs in the field of biotechnologies with incubator facilities and services, attracting advanced agro-food and biotech industries with high-quality premises in a business park located close to the pole of excellence. Concerning research activities, PTP has its own research centre, CERSA, with six departments (livestock genomics labs, plant genomics, cell and molecular biology, bio-informatics, genomic platform). The park is today already a national and international contact point in the agrar-food segment. Cooperation with it means not only access to scientific competence of very high quality but also entry to a network, which enables the build up and development of own research and corporate ideas. The Park is acknowledged as a Centre of Excellence in Agrobiotechnology by Lombardy Region and as Research Centre by the Ministry of Agriculture.

Its strengths are, among other things:

- 1) Outstanding position in research (the park is involved in the most important international genome projects in the agrar-good sector),
- 2) International network (the park is a member of an international network, which consists of 250 facilities from 50 countries and coordinates in addition the joint actions of the Italian agrar-food park),
- 3) Regional network (the park works integrated with the most important companies and facilities in the sector and promotes the interactions with them also for companies and centres belonging to its network),
- 4) Assistance for new companies (through its incubator, it can support researchers and potential entrepreneurs with the attempt to realise their own ideas),
- 5) Prospects (the park plans an already defined development plan from today to 2015, EXPO – date included and the aim also of growing in the following years).

Kilometro Rosso Science and Technology Park

Kilometro Rosso was founded in 2000 in Bergamo, 50 km from Milan and has very good infrastructure and offers a wide variety of services (technology, logistics, It and telematics, subsidies, further training and consulting). Kilometro Rosso developed an effective system to strengthen the relations between the companies and the region to promote research, development and technological innovations. Lombardy belongs, due to its intense industrial density, to the four



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economic engines of Europe. A centre in Kilometro Rosso deals intensively with the foundation of new companies. Further training courses are offered specifically to managers and entrepreneurs with the focal point on innovations. This initiative was set up by other training centres and national and also foreign universities. The research centre in the advanced materials field deals with the development of new technologies and industrial processes of shaping and compression of advanced ceramic materials for structural applications. It was initiated by private and public industrial and research institutions also as partners of Kilometro Rosso. The excellence centre with the focal point on mechatronics in biomedicine results from the effort of 70 private and also public research and industrial institutions. The Institute for Cereals Cultures in Bergamo is integrated into Kilometro Rosso in order to support the scientific and technical new orientation with regard to its economic interests in the production area. The new centre is sponsored by diverse local and national institutions.

FIIRV - Foundation Istituto Insubrico di Ricerca per la Vita

The Foundation Istituto Insubrico di Ricerca per la Vita (FIIRV) was established by the Province of Varese in 2007 to support medical-scientific research by promoting initiatives for the development of the medical and industrial biotechnologies, with the main focus on its own territory, the Insubric Region, in the North of Italy. The Foundation is focused on the management of the bioincubator Insubrias BioPark on one side, and on its own research activities on the other side. The Foundation inherited the Research Centre in 2006, when Vicuron-Pfizer granted it to the Province of Varese, and also a collection of 166.000 microbial extracts, unique in the world, as a source of new antimicrobial agents. Currently the Foundation is going through biotech researches on coeliac disease, new antibiotics and new anti-cancer drugs.

Insubrias BioPark

It is located in a wonderful eighty thousand square meters green area north to Milan, with thirty thousand square meters of offices and high-tech laboratories. The Foundation's focus is maximize the BioPark technological potential, hosting companies that can take part to the creation of an added value for both the territory and the scientific community, and improving the Park function as a meeting point where entrepreneurial and scientific cultures can have a dialogue.

SER.VI.RE.

Located within Insubrias BioPark intends to promote the dialogue between scientific and entrepreneurial culture and to bring together universities, cultural and scientific associations and entrepreneurial world. The aim of this centre is the development of the intellectual property inherited from famous pharmaceuticals companies like Gruppo Lepetit, Dow Chemical and Pfizer.

POINT - POlo per l'INnovazione Tecnologica della provincia di Bergamo

The POINT Institute in Dalmine was founded in 1996 as an innovation hub by Servitec, a technology pool for regional development which is now the administrator of the Innovation Centre. The task of POINT is the site modernisation by promoting the transfer of technological innovations in local companies.



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IDET

The IDET Excellence Centre was founded with the aim of promoting activities in the field of molecular medicine at the University in Brescia. These activities are characterised by interdisciplinary research in immunology, oncology, molecular genetics and neurobiology and take place in close interaction with clinical practice in paediatrics and gynaecology. The aim of the IDET Centre is the development of new technologies and molecules with diagnostic and therapeutic use in the named fields. IDET is focused on the use of technologies for the analysis of the genome and the transcriptome and on the development of new analysis software. The focus for the proteomics lies in the investigation of the protein-protein or protein-ligand-interactions (plasmon resonance technology [BIAcore]). Cell and molecular biology, genetics, the production of recombinant proteins in eukaryotic and prokaryotic systems are particular strengths of the centre.

IEO

The European Institute of Oncology was established to implement an innovative model for health and advanced research in the international oncology field. Its Division and Unit Directors come from eight European countries. Conceived by Umberto Veronesi and inaugurated in May 1994, the Institute became a research hospital and treatment centre (IRCCS or "Istituto di Ricovero e Cura a Carattere Scientifico") through the Ministerial Decree issued in January 1996. The European Institute of Oncology adopts the non-profit private-law organisation model and provides services through agreements with Italy's National Health Service. In keeping with the standards of the most advanced international oncology centres, the Institute fully integrates different activities involved in the fight against cancer: prevention and diagnosis, health education and training, research and treatment.

IFOM-FIRC

The IFOM Foundation is a highly technological, non-profit research centre. The research conducted at IFOM aims to understand the molecular processes responsible for the onset and development of cancer. IFOM was established in 1998 by FIRC (the Italian Foundation for Cancer Research). The aim was to create a research environment where scientists from the major National scientific institutions in the Milan area (European Institute of Oncology, National Institute for Cancer Research, Mario Negri Pharmacological Research Institute, San Raffaele Biomedical Sciences Park, University of Milan) could collaborate and pool their organisational, economical and cultural resources, in order to meet the demands of modern-day science. The creation of this "network" between research institutes is the first of its kind in Italy and has made IFOM, 10 years after the beginning of its scientific programme in 2000, an internationally competitive Research Centre in molecular oncology and functional genomics. The shared research environment and the availability of cutting edge technologies have allowed IFOM scientists to obtain first-rate scientific results at the international level. IFOM has been recognised as a Centre of Excellence for Research by the Lombardy Regional Council, which also contributed to the realization of the Centre. There are approximately 200 research scientists working at IFOM, 25% of whom come from 25 other European or non-European Countries. The average age of researchers is 30, and 60% are female. Having established a solid base in basic research, IFOM is now concentrating its



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efforts on translational research, with the goal of promoting the rapid transfer of scientific findings from the laboratory to diagnostic and therapeutic clinical practice.

IFOM-IEO Campus

To achieve this objective, in 2007, IFOM merged its scientific and educational activities, and its technology platforms with the European Institute of Oncology. IFOM and IEO are thus establishing a technology transfer company aiming to commercialize valuable research results and patents in the field of oncology. The resulting IFOM-IEO Campus is the biggest molecular oncology research centre in Europe, with a surface area of 24,000 m², 12,000 m² of which are dedicated to laboratory space. The Campus hosts approximately 600 researchers, belonging to 39 research groups that collectively follow 40 lines of research.

Mario Negri Pharmacological Research Institute

The Mario Negri Institute for Pharmacological Research is a not-for-profit biomedical research organization, founded in 1961. The Institute's main aim is to help defend human health and life. To achieve this goal, a fuller understanding of the innermost workings of living organisms is required. The Institute's research programs therefore span from the molecular level to the whole human being, and the findings help build up the basis for developing new drugs, and making existing ones more effective. The main research headings are the battle against cancer, nervous and mental illnesses, cardiovascular and kidney diseases, rare diseases and the toxic effects of environmental contaminants, mother and child's health. The Institute is also involved in research on pain relief and drug addiction. Parallel to its biomedical investigations, the Mario Negri Institute runs training schemes for laboratory technicians and graduate researchers. It takes part in a range of initiatives to communicate information in biomedicine, on a general level and with the specific aims of improving health care practice, and encouraging more rational use of drugs.

The Institute for Biomedical Technologies – National Research Council (CNR-ITB)

The ITB is the largest institute of its kind in Italy and was established to pioneer new types of cross-disciplinary biomedical research by bringing biology, engineering, medicine, and the basic sciences together. This is achieved by means of collaborations between industry and basic scientists and clinicians from a broad range of disciplines. One of the most important aims of its research mission is translating fundamental discoveries into new technologies. The Core Research Overview and the major focuses of the institute are: Cancer/Stem Cell research, Neurodegenerative Diseases, Cardiovascular medicine and Immunology combined with the development of high-throughput bioscience research such as Micro-Array and Proteomic-based technologies, novel high-throughput sequencing projects and Bioinformatics. The National Research Council (CNR) is the primary government agency with the task to foster exceptional basic, biomedical and clinical research through its participating intramural and extramural programs. Within the CNR, the National Institute of Biomedical Technologies (ITB), a newly re-established institute in May 2002, derives from the merge of different institutes and units of the CNR, among which was the ITBA (Institute of Advanced Biomedical Technologies). The main location of the ITB is in Segrate near Milan at the Advanced Technology Interdisciplinary Laboratory (LITA). This facility hosts various departments of the University of Milan that formally collaborate with the ITB Associated branch sections also include the Department of Bioinformatics and Comparative Genomics in Bari, the Department of



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Biochemistry of Metal-Proteins in Padova and the Immuno-Biology and Cell Differentiation Unit in Pisa.

Other centers: www.questio.it

SERVICES, SUPPORT AND FINANCING SOURCES

Regione Lombardia

It is a regional public institution entitled to work in the fields of research, business support, technology transfer and higher training, and recognizes the growth and enhancement of human capital as one of the main level to strengthen the scientific basis and to improve the technological level of the productive system; to be implemented through the development of research-based partnerships between scientific institutions in Lombardy and abroad. In view of Expo 2015, Regione Lombardia intend to continue in this direction by promoting instruments and initiatives that develop biotechnologies and the creation of businesses in the sector. From this perspective, the World Expo hosted in Milan represents an extraordinary accelerator of the work done to date and, at the same time, a real opportunity to exchange and compare information with other key players working around the world in this sector. Lombardy Region (through also its regional agencies: Finlombarda and Cestec) with the local authorities and institutional supports and promotes research and innovation in the biotechnology sector in additionality of resources.

Promos – Special Agency of Milan Chamber of Commerce

Promos is the Special Agency of the Milan Chamber of Commerce dedicated to the development of international activities. Its mission on the one hand is to promote the local entrepreneurial sector abroad, facilitating the insertion of Milanese and Lombard companies in foreign markets and on the other hand, to strengthen the competitiveness of the economic system at an international level, encouraging the attraction of foreign resources into the area.

Underlying its actions is a solid system of now consolidated alliances with leading bodies, institutions and international government agencies, representative organs of the interests and categories present in the territory.

Promos's network is made effective and efficient by the network of economic and institutional relations, by the presence of marketing offices and desks in the most strategic business zones in the international panorama, enabling it to be functional in the striving for competitiveness that is characteristic of the global market.

Assobiotec

Assobiotec is the Italian Association for the Development of Biotechnology, representing more than 100 companies and science & technology parks operating in Italy in all fields of biotechnology such as pharmaceuticals, diagnostics, agro-food, fine chemicals, environment, processing industry, and equipment.

The mission of Assobiotec is to be the reference for Italian companies involved in R&D, production, and marketing of products/services derived from biotech applications.



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Assobiotec also represents the Italian bioindustry at National and International levels through close interactions with various institutions, trade, and scientific organizations.

SEMM - European School of Molecular Medicine

SEMM is a private Foundation for higher education in biomedicine, established in 2001 by a joint ministerial decree of three Italian Ministries (Health, Treasury, and University & Research), which:

- promotes training and research within emerging sectors of biomedicine, such as genomics, molecular medicine, nanotechnologies and bioethics;
- operates within centres of excellence and promotes the integration of basic research and clinical practice,
- collaborates with Italian Universities to create its training programmes.

SEMM has:

- 6 educational programs:
 - Ph.D. in Molecular Oncology;
 - Ph.D. in Human Genetics,
 - Ph.D. in Computational Biology;
 - Ph.D. in Medical Nanotechnology;
 - Ph.D. in Life Sciences: Foundations & Ethics;
 - International Post Doc program.
- 3 international events per year.
- 70 scientific seminars per year.
- 117 students, 20% of which are foreigners.
- 66 teachers.
- 5 research centers.

Z-Cube

Z-Cube was founded in 2003 to support young life-science start-up and spin-off companies with novel therapeutics to address significant unmet medical needs. Z-Cube has achieved the launch of 3 start-ups based on projects with the goal to develop highly innovative medicine: PharmEste s.r.l., SuppreMol GmbH and ProtAffin Biotechnologie AG. Following four years of success with investments in new start ups, Z-Cube has decided to update the business model with the objective to identify opportunities to boost the parent Company portfolio. The new Z-Cube business model is based on the selection, investment in and validation of innovative Drug Delivery Technology concepts. The technologies of interest are those showing the potential to generate innovative products bringing real benefits to patients in the therapeutic areas relevant for the parent company. In this new position, Z-Cube will capitalise the acquired knowledge of the biotech world and of



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innovative technologies together with the wide international network of investors and industry leaders.

Fiera Milano Tech

Fiera Milano is a system of companies that besides managing the exhibition spaces of the two trade fair districts fieramilanocity (in the city) and fieramilano (the new complex in Rho), organises exhibitions and congresses and provides any kind of specialised and promotion services required by companies for a successful participation to exhibitions. Fiera Milano Spa manages the Milan exhibition complex, by optimising its facilities on the basis of the calendar of events. Fiera Milano projects and organizes special promotional events for companies and exhibitions both in Italy and abroad and assists them in achieving success in export markets through its global network of 43 offices. Fiera Milano Tech spa is a Fiera Milano Group company specialised in organising exhibitions in the fields of chemistry, healthcare and medicine. Exhibitions organised by Fiera Milano Tech occupy 520.000 sqm space, hosting over 4.200 exhibitors and 310.000 international visitors.

Artenergy Publishing

Since 2002, Artenergy Publishing has organized fairs and conferences aimed at trade and industry. As of this year, the range of fairs by Artenergy Publishing also includes high-technology, biotech and chemistry. The 23 fairs organized by Artenergy Publishing provide a captivating range of exhibitions able to promote thousands of sector companies.

Biotech

An event dedicated to the biotech industry held annually at the Milan Fair Centre. Supported by the major sector bodies and the Ministry of Education and Research as well as the Ministry of Development, has attracted the attention of companies thanks to its program, which includes:

- conferences, workshops and case histories to take place throughout the show, involving sector experts;
- a dedicated exhibition area;
- a partnering area, which facilitate meetings between the originators of new ideas and those able to develop and market them;
- an R&D area, where universities, technology transfers, research and excellence centers are able to meet companies in order to develop projects.

ITER

Since 1989, ITER has been organising b2b events about innovative topics such as corporate information management, nanotechnologies. Its aim is to be a meeting point between demand and supply through the publication of quarterly magazines. It edits books, handbooks and does market research on topical issues, availing itself of qualified experts. It disseminates knowledge of topics connected with CTI and biotechnologies through newsletters ITERnews and Bioforumnews.



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**BIO
TECH in ITALY**

Bioforum

Born in 2004, is an expo-conference concerning biotechnologies. This event aims at promoting the meeting between science and business through a faster innovation and the launching of new products and services. Therefore, it is not only a scientific congress, but also a moment of a more and more international technological transfer of knowledge.

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