ciber-bbn
Centro Investigación Biomédica en Red
Bioingeniería, Biomateriales y Nanomedicina
www.ciber-bbn.es

Biomedical Research Networking Center in Bioengineering, Biomaterials and Nanomedicine

MINISTERIO DE CIENCIA E INNOVACIÓN
Instituto de Salud Carlos III

What is CIBER-BBN?

The **CIBER for Bioengineering, Biomaterials and Nanomedicine**, **CIBER-BBN**, is a consortium of the institutions to which the groups forming this CIBER, belong plus the Health Institute Carlos III (ISCIII), responsible for coordinating biomedical research on a national level and attached to the Ministry of Science and Innovation of the Spanish government.

The **mission** of the CIBER-BBN is to conduct quality research providing results which contribute to improving the health care offered to patients and to create wealth in countries by means of transferring the research results to industry, as well as to encourage the implementation in its sphere of action and the participation in competitive development programs on an international level.

The **scientific areas** comprised within the CIBER-BBN are: Bioengineering and biomedical imaging, Biomaterials and tissue engineering and Nanomedicine, and the Centre's research is focused on the development of prevention, diagnostic and follow-up systems and on technologies related to specific therapies such as Regenerative Medicine and Nanotherapies.

Distribution of CIBER-BBN Research Groups

CIBER-BBN is formed by various research groups which belong to public and private institutions and are selected purely on the basis of their scientific excellence and adaptation to the fields in which the CIBER is active. These groups were selected in a national call for proposals by an international panel of experts based on their scientific production, international recognition and capacity to transfer their results to the biomedical field. It is currently formed by 47 core groups and 3 more associate groups all belonging to 28 institutions: universities, research centers, hospitals and technological centers.

Strategic Lines

Eight are highly multidisciplinary priority lines have been defined, and four of them relate more to applied research and the other four to long-term research:

		PRIORITY LINES							
		Basic Research				Applied research			
Area	Strategic line	Integral Modeling of Biological Systems	Intelligent Sensing	Cell Biophysics and Epigenetics	Development of new Active Molecules and Nanoconjugates	Software Utilities Integration Platform	Micro and Nano Devices for *in vitro* and *in vivo* Diagnosis and Monitoring	Specific Tissue Engineering and Implant Applications	Nanoparticles and Drug Delivery
Bioengineering	Multimodal Diagnosis	■	■	■		■	■		■
	Intelligent Devices		■	■		■	■	■	
Biomaterials	Regenerative Medicine	■		■	■		■	■	■
	Implants	■				■	■	■	■
Nanomedicine	Therapeutic Nanoconjugates				■			■	■
	Biosensors		■	■	■		■	■	

CIBER-BBN figures

Yearly budget:	**5.419.000 (2010)**
Core investigators:	**150**
Associated investigators:	**750**
Groups 50.	**Universities (29) Hospitals (9) Others (12)**
Publications:	**515 JCR (2009)**
Patents:	**50 (2009)**

Research Projects

Among the projects that CIBER-BBN has promoted for the period 2010-2011, some of them are directly related to biomaterials and nanoparticles for biomedical applications:

Electromechanic simulation.

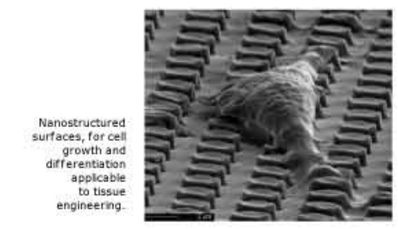
PROGLIO	Improving diagnosis, prognosis and therapy response in human glioma. Preclinical and translational studies.	BIOENGINEERING
RETINA	Development of new therapeutic approaches for retinal dystrophies.	
MICHOR-MON	Advanced micro-chamber for organotypic cell culture monitorization.	
INDI-MUSICA	Indexes obtained from computational models and multiscale-multimodal biomedical signals for the diagnosis of cardiac pathologies.	

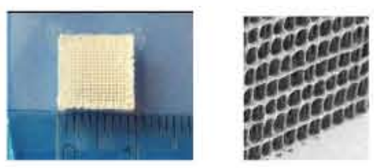
Translational Research Program

Through this program CIBER-BBN develops different ways of collaborating with health institutions, hospitals and medical societies, as well as with the remaining CIBERs and national research centers and CAIBER.

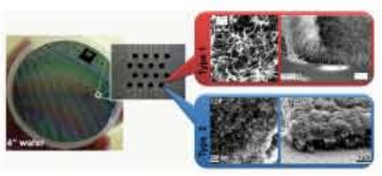
Projects of the translational research program:

MUDIRES	Multimodal Diagnosis by Interpretation of Multiscale Signals in the Respiratory System
NANO RETINA	Nanoscaffolds for the re-implantation of detached RETINA


Nanostructured surfaces, for cell growth and differentiation applicable to tissue engineering.


PLA/PEG/calcium phosphate glass 3D biodegradable porous composite scaffold for tissue engineering.

Biocompatible polymer nanoparticles suitable for drug-delivery


MWNT nanotubes grown selectively in MEAS (multielectrode array system) and in devices in the form of a needle:

BIOSCAFF-EYE	Bio-engineered stem cells (SC) niches in ocular surface reconstruction for corneal blindness: from basic research to clinical trials.	BIOMATERIALS
ES-CELLTHERAPY	Use of human pluripotent stem cells as vehicles for localized delivery of therapy to brain tumors.	
BIOPROTERIAL	Biological activity of matrix proteins at the cell-material interface.	
ABDOMESH	Development and validation of new prosthetic implant concept for the repair of abdominal wall defects.	
CELL-MECHANICS	Cell Mechanics: Understanding mechanotransduction and cell-substrate interaction mechanisms. Applications in cell therapy and tissue engineering.	
BIOELANGIO	Biomimetic extracellular matrices for angiogenic activation and anti-inflamatory activity in regenerative medicine.	
NACRE	Novel Approaches in Cartilage Repair: biofunctionalized scaffolds and iPS cells.	
SCAFFTIDE 3D	Scaffolds and implants functionalized and reinforced with recombinant protein polymers for regenerative medicine.	

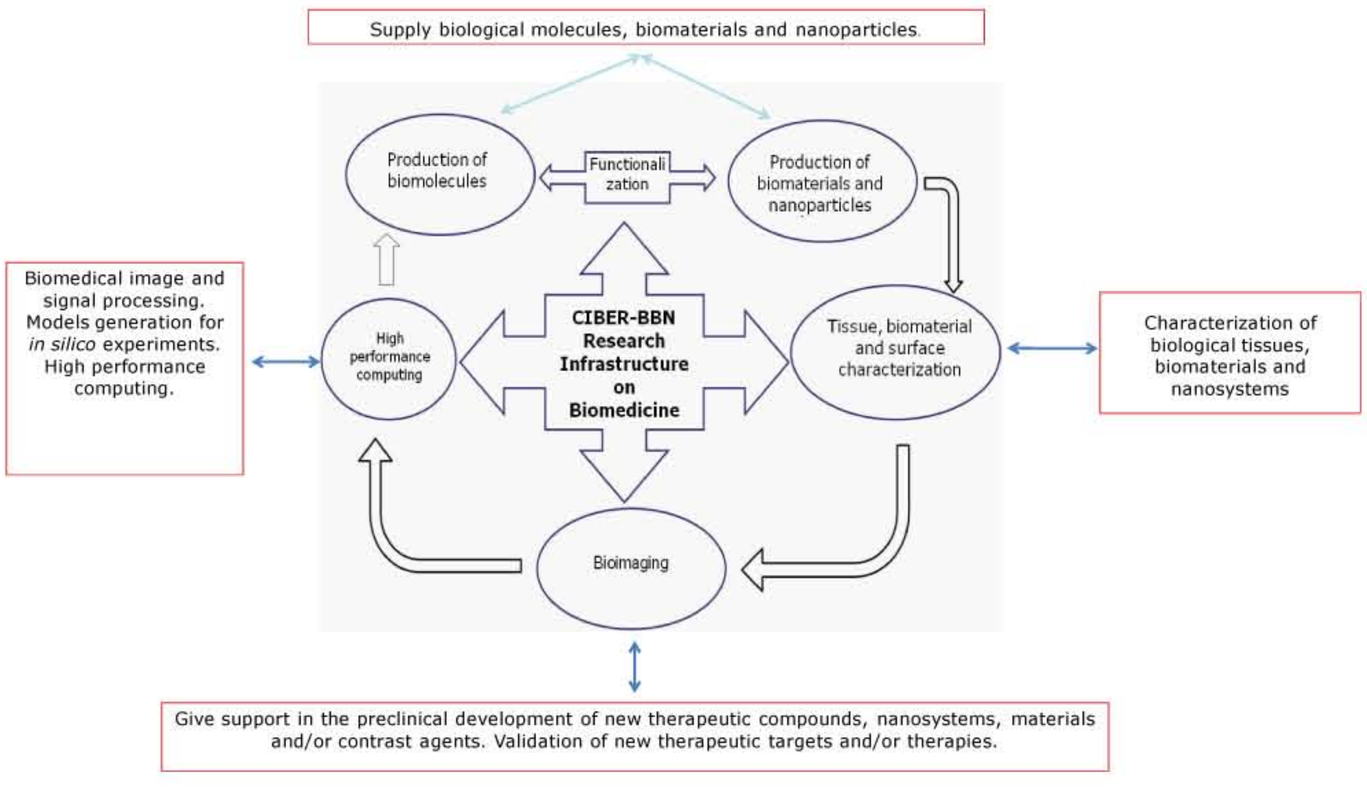
Industrial Transfer Program

Public research organisms, hospitals and universities forming part of CIBER-BBN are important technology-generating centers. To that end, one of the priorities of CIBER-BBN is to strengthen the transfer of said technologies to the business and industrial networks. One research projects has been promoted in this program :

GLAUCO II	Non-invasive monitoring of intraocular pressure through a micronanotechnology based sensor contact lens	

NAINBO	Nano-engineering inclusion bodies as new biomaterials for cell proliferation.	NANOMEDICINE
NANOSTEMNESS	Targeting combined therapy to cancer stem cells.	
LEUKEM-CHIP	Nanobiosensor platforms for prognostic and predictive biomarker detection in Acute Myeloid Leukemia.	
OLIGOCODES	A Universal Diagnostic Platform Based On Oligonucleotide Codified Nanoparticles And DNA Microarray Sensor Devices.	
GLYCOHIV	Glyconanoparticles and glycodendrimers as new tools to fight HIV.	
NANOXEN	Use of optical nanoswitches to control nervous functions in xenopus tropicalis.	
NANOCOMETS	Development of a nanoparticles as vehicles for the treatment of metastatic colorectal cancer.	
HYPERTERMIA	Development of new nanoparticles and protocols for enhanced hypertermia.	
NANOMEGDIAG	Nanobioanalytical platforms for improved medical diagnosis of infections caused by pathogen microorganism.	
CELL-NANO_THYROID	New orthotopic/ectopic nude mice model of human thyroid undifferentiated/analplastic carcinoma: useful tool for new cell-therapies, drug testing and validation in humans.	

Research Infrastructure Program

The CIBER-BBN Research Infrastructure on Biomedicine is constituted as clusters of existing technical-scientific equipment which complement or are complemented by that equipment provided by CIBER-BBN. These clusters offer top-level technological resources to the CIBERBBN research groups, external groups and companies, under established conditions. This Infrastructure includes 20 Units which are distributed through the Spanish geography.

1. **Production of Biomolecules Platform**
2. **Production of Biomaterials and Nanoparticles Platform**
3. **Tissue, Biomaterial and Surface Characterization Platform**
4. **Bioimaging Platform**
5. **High-performance Computing Platform**