



Laboratório Associado ICVS/3B's |

PT Associate Laboratory ICVS/3B's

Member Institutions

- Life and Health Sciences Research Institute (ICVS), University of Minho, www.icvs.uminho.pt
- 3B's Research Group - Biomaterials, Biodegradables and Biomimetics (3B's), University of Minho, www.3bs.uminho.pt

Unit Description

The ICVS/3B's Associate Laboratory (AL) centers its activities in the Health Sciences, namely in Biomedical and Clinical Sciences, and in Biomedical Science & Engineering/Materials Science & Engineering (Biomaterials). This interface Health-Sciences/Technologies pursues the goal of generating value through the development of innovative products and services, resulting from internationally highly competitive research.

Within the structure of the AL, the ICVS group is a R&D unit in Biomedicine and Clinical Sciences, incorporating Clinical Academic Centers in partnership with the affiliated network of Health Care Institutions; while the 3B's research group is a R&D unit in Materials Science and Engineering, mainly focusing on Technologies Applied to Regenerative Medicine, including Biomaterials, Stem Cells, Tissue Engineering and Nanomedicine, being the leader of the European Institute of Excellence on Tissue Engineering and Regenerative Medicine.

The creation of the ICVS/3B's AL potentiated activities within different dimensions, (1) Scientific and technological research and development of applied research in the interface between Health Sciences/Technology; (2) Advanced education and training in order to provide research and training activities to undergraduate and postgraduate students and health professionals; (3) Services, consulting and technology transfer by taking into consideration the vital importance of the industrial/clinical partners; (4) Dissemination, scientific awareness and public perception especially through International scientific journals and conferences.

New technologies, therapies and medical products are emerging in the ICVS/3B's AL, including in the context of vaccination, diagnosis, regenerative medicine, minimally invasive therapeutic procedures, personalized treatments and nanomedicine. Products for advanced therapies are based on genes (genetic therapy), biomolecules, cells (cellular therapies), combinations of cells and biomaterials (tissue

engineering) and minimal invasive surgical approaches. Such solutions have been investigated in collaboration with companies and other research groups, using competitive financial support.

These developments have the potential to cross the complete development pipeline, from the more fundamental in vitro research, testing in animal models and pre-clinical validation, to clinical trials, that can transpose to the market innovative therapeutic solutions.

The research methodology adopted in the ICVS/3B's is organized into the following research lines:

Research Lines mainly centered in the ICVS group:

- 1- Microbiology and infection;
- 2- Surgical Sciences;
- 3- Neurosciences.

Research Lines mainly centered in the 3B's group:

- 4- Materials science and technology;
- 5- Tissue Engineering;
- 6- Nanotechnologies;
- 7- Stem Cells.

Besides these research lines (with ongoing, active interactions), two new joint lines were created, given the additional step of integration:

- 8- Regenerative medicine;
- 9- Nanomedicine.

General Objectives

The general objectives of the ICVS/3B's Associate Laboratory are to:

- Promote basic and clinical research and translation projects in the area of Health Sciences/Technologies, namely in Microbiology and Infection, Neurosciences, Surgical Sciences, Materials science and technology; Tissue Engineering; Nanotechnologies; Stem Cells; Regenerative Medicine; and Nanomedicine;
- Boost the development of new diagnostic systems and new therapies, with added potential value, using concepts associated with Advanced Therapies and Nanomedicine;
- Provide specialized clinical and scientific services to the community, including medical diagnosis and clinical trials, particularly in the context of Clinical Academic Centers, in partnership with the affiliated network of Health Care Institutions;
- Provide specialized scientific and testing services to the community, including novel materials development and testing, in-vitro and in-vivo testing, GMP processing of materials, cells and tissues, and consulting;
- Strengthen the ability to attract competitive funding, at the national and international levels, through an active policy of inter-institutional collaboration with the national R&D network, the MIT-Portugal and Harvard-Portugal programs, the partners of the European Institute of Excellence, different companies,

as well as from international projects and networks, namely the EU framework programmes and U.S. funding institutions;

- Provide training in its specific areas of activity, namely postgraduate courses directed to technical, engineering and clinical staff, involving the School of Health Sciences and the School of Engineering from the University of Minho and the Health Care Institutions from the Minho region, as well as appropriate National and International partners;

- Endorse the awareness of knowledge advances among the scientific community and health professionals, while also promoting the diffusion of scientific and medical culture, science and technology relevance among the general public, developing autonomous initiatives and promoting the collaboration with existing national and international programs;

- Strengthen the capacity of the two groups involved in the partnership to impact the society, in all areas of their activity, as a nucleus to support the development of a national policy for scientific research in the fields of Biomedicine (Microbiology and Infection, Neuroscience, and Surgical Sciences), Regenerative Medicine and other Advanced Therapies, Biomaterials, Stem Cells and Nanomedicine.

- Extend the political influence towards international organizations and agencies, in order to be effectively involved in critical decisions related to regulatory aspects, ethical and legislative issues, and in the definition of scientific priorities in the European research scenario.

Activities

The ICVS/3B's AL was created to address its scientific objectives through highly interdisciplinary projects, bringing innovation to the national R&D network by joining two groups of excellence from two complementary areas: Health Sciences and Science & Engineering of Materials (Biomaterials).

The AL is strategically located in the Northern part of the country, within a growing Cluster of Biomedical Science, Technology and Healthcare institutions, creating synergies in many dimensions that involve scientists, MD's and entrepreneurs. Among the collaborating institutions, we highlight the network of affiliated Hospitals in which dedicated clinical research takes place in the context of Clinical Academic Centres; the International Iberian Nanotechnology Institute (INL); the Avepark; and several research units at U. Minho.

Research members with diverse scientific backgrounds were recruited to the AL. This was the basis for the development of strong Research Lines, combining scientists able to approach problems using complementary perspectives. The AL aims at developing biomedical and clinical research in the frontiers of the knowledge in the fields of health science and technology, medical sciences, regenerative medicine and tissue engineering, biomaterials science and nanomedicine. An increasing number of projects are developed transversely across the different lines. An integrative policy was established in order to increase the critical mass within a setting that favoured intra- and inter-group collaborations and complementary experimental approaches. Two new research lines were created to enhance the interface health-sciences / technologies: Regenerative medicine and nanomedicine - two areas, already with interesting outputs in 2011, that require multidisciplinary approaches and state-of-the-art scientific skills. An internal scientific meeting attended by all the researchers of the AL encouraged the discussion of topics and the definition of future projects.

The scientific background of the AL researchers includes MDs, Biochemists, Engineers, Biologists, Pharmaceutics, Mathematicians, Microbiologists, Veterinarians, etc. As such, the research questions hosted in the AL benefit from a vast technical platform that includes, among others, imagiology, electrophysiology, cytometry, cellular/molecular biology, GMP facilities to process cells and materials, mathematical modelling, tissue engineering, facilities (including clean rooms) for materials synthesis/modification/characterization.

Another reflex of the high interdisciplinary at the ICVS/3B's AL are the advanced education/training activities, directed to a vast audience, include undergraduate and postgraduate students and health professionals. The AL is involved in several interdisciplinary educational programs at the Master and PhD levels. Interdisciplinary advanced courses, symposia and other training activities on the interface Health-Sciences/Technologies are also periodically organized.

Main Achievements (during the year of 2011)

The main achievements of the ICVS/3B's Associate Laboratory during 2011 were:

- Increase of the effort in translating the research into products with added economical and therapeutic value through the enhancement of the patents portfolio and intensification of translational activities, including the granting of several directly funded industrial projects and projects funded by QREN;
- The formal establishment of two mechanisms to offer services: (i) a "Molecular Diagnostic Service", permitting to offer services to the general and the clinical communities at the ICVS and (ii) the "3B's Services and Consulting", that offers high quality technical and consulting services in the fields of regenerative medicine, biomaterials and medical devices;
- The launching of the process for certifying the activities of the 3B's group according to the ISO 9001 standard;
- Pursuing the execution of the large European projects (FP7) in which the ICVS/3B's AL is coordinating or participating;
- Increase the budget of the overall projects in which the ICVS/3B's AL is involved (4.46 MEuros - with a very relevant figure: 43% of the funding was obtained out of FCT programs);
- To foster the conclusion of 16 PhD theses, all with relevant scientific publishable outputs;
- To obtain 6 International and 8 National Awards, being some of them the most relevant in their respective field;
- To organize two large international congresses;
- To organize an increasing number of Advanced Post-Graduation Courses (28), with 530 participants. More than 90 % of the participants rated courses as "Very Good" or "Excellent" and some of the courses were part of training activities of European schools or training actions;
- To formally establish a Clinical Academic Centre in partnership with the Hospital of Braga, with infrastructures located at both the Hospital and the ICVS with specific staff devoted to the development of clinical research, including clinical trials;

The researchers from the ICVS/3B's have exerted relevant functions in several international scientific societies and were members of the editorial boards of relevant international journals related to their fields of activities;

The researchers from the ICVS/3B's AL maintained a strong record of publications in international journals, both in number and quality of the journals, and in invited lectures in important international conferences. The average impact factor of the works and the number of citations increased with respect to the previous year. The ICVS/3B's AL published around 140 papers in international journals (ISI) (45% in Q1 and 90% in Q1+Q2);

The Journal of Tissue Engineering and Regenerative Medicine-TERM launched in 2007 by John Wiley & Sons (editor in chief: Rui L. Reis) is indexed in ISI WebOfScience (IF 3.53). In 2011, the number of submissions dramatically increased with respect to the previous years.

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