

International Centre of Biodynamics, ICB (www.biodyn.ro)

Presentation of the International Centre of Biodynamics, ICB

ICB has been established by the Romanian Government, according with the Agreement with UNESCO, as a non-profit organisation of general interest and public utility. ICB, a national center of excellence (CE 7 / 12.11.2002), is involved in RTD and training projects at international and national level.

PostGraduate Programs: Together with University of Bucharest and University of New South Wales, Sydney, Australia, ICB is organizing the Master Program in Biodynamics, under the auspices of UNESCO. This Program could be used as an effective platform for small-scale developments, dissemination and training, as well.

ICB infrastructure: consists in several laboratories (electrophysiology and electrochemistry laboratories as well as ones equipped with instrumentation that can be used for impedance spectroscopy, spectrum analysis, epifluorescence microscopy and other analytical techniques) suitable for advanced training and research activities in Biodynamics.

Field of Expertise: fast impedance/dielectric assays (from development of specific instrumentation to microscopic modeling, fitting procedures and nonlinear time series analysis) for characterization of the surface density of active binding sites and analysis of bio-molecular reactions, as well as monitoring cell growth (revealed by the dynamics of relevant -electric and morphologic-cellular parameters). ICB expertise, resources and project portfolio focus on two main research topics:

Development of **sensing platforms** - bioaffinity and cellular sensors; **Noninvasive analysis** - measurement techniques, modelling and data processing. More than 40 papers in peer-reviewed journals, 2 patents and 3 patent applications in the last 5 years confirm the quality of the research achievements in these areas.

Skills

- Rapid Detection of specific analytes using combined bioaffinity and impedance assay.

- Impedance spectroscopy on biosystems (including cells and cellular constituents).
- Accomplishment of dedicated electrochemical instrumentation, e.g., impedance spectrometers, potentiostat/galvanostat (up to prototype scale), including related software (e.g., for data acquisition, signal processing, and representation).
- Development of biochips for Impedance assays.
- Deriving of polarizability of (non) spherical cells.
- (Non) linear data analysis including accomplishment of nonlinear, multi dimensional, multi parametric fitting algorithms.
- Assessment of cellular state and dynamics.

ICBs CV has the following landmarks:

- Principal contractor of "AFRAMILK", project No. GRD1-2000-25801 within FP5;
- Principal contractor "Towards the development of a rapid portable immunoassay device for the detection of Microorganisms and Toxins in Food industry & Ecology"- partner: Prof. O. Sadik, SUNY - Binghamton, COBASE Grant Program/ 2001.
- RTD projects on biomonitoring financed through RTD Programs with Flanders, Germany and Singapore.
- An IP proposal, "CHARPAN", Call identifier "FP6-2003-NMP-NI-3" - Proposal n° 515803-2 - is now in negotiation phase.

ICB has participated within consortia of 8 proposals for FP6/2003-2004 and of 7 proposals for FP6/2004-2005, respectively, (IP, NoE and STREP for FOOD Quality and Safety, Nano-Technologies, NEST): "BIOPATHOGENSWATER" FP6-2003-Food-2-A 007175; RISSOFFI Food-2004-T5.4.5.2 - 016266 (NoE); EnviroProtmed FP6-2003-INCO-Russia+NIS-1 - 013355 (STREP); NanoBiosmart FP6-2003-NMP-NI-3 (3.4.1.3-1) - 011822 (IP), E-Biosens IST NMP 2-3.4.5.1, CHARPAN (FP6-2003-NMP-NI-3) - 515803-2 and BIODYN FP6 - 2002-Mobility 4 - 0013218 (ranked above the threshold, not financed) - (all submitted in 2004).

Contact: Phys. **Eugen Gheorghiu**, email egheorghiu@biodyn.ro

National Institute for Research and Development of Biological Sciences (<http://www.dbio.ro>)



Brief description of the institute.

Our Institute is a public establishment with legal personality, functioning according to the Decret Law of Romanian Gouvernement 1317/1976 by reorganizing the Institute of Developmental Biology, Bucharest and the affiliation of three branches: the Institute of Biological Researches Cluj-Napoca, the Institute of Biological Researches Iasi, and the Centre "Stejarul" Piatra-Neamt; it has been reaccredited according by the Minister Order No. 7293/2001 and it overtook the National Institute of Research for Biotechnology in 2002.

Main Goals.

Development of basic and applied researchers in the field of life sciences and knowledge of living basic processes at cellular and molecular levels; the organisms' reproduction and development under specific environmental conditions; the national genofund biodiversity and preservation of natural environment protection with the aim to regulate, modelling and control the biological processes; improving of the life quality by characterization of elements and biological processes.

Main activities.

- Approach and development of national and international projects based on the goals of the institute with participation of various teams.
- Development of theoretical and applied research with socio-economic target;
- Increasing the technological capital by applying in the economic domain of new bioproducts and biomaterials with application in human and veterinary medicine, chemical-pharmaceutical industry, agriculture, environment protection, biotechnology and s.o.
- Participation with own specialists and laboratories to the university and postuniversity training programs.
- Carrying out a scientific journal -Romanian Biological Sciences (RBS), books, booklet, deskbook.

Scientific Services

National Institute of Biological Sciences- Bucharest;

Center of excellency in Bioanalysis;
Laboratory equipped for cell cultures;
Laboratories of light, electron as well as for image computerized processing.

Flow Cytometry Laboratory equipped with apparatus FACScan Becton Dickinson of 488 nm laser, provided with Macintosh Power Mac G4 informatic system and a BD CellQuestPro acquisition and

analysis programme.

Climatic room for "in vitro" microbiological and plant culture

Institute for Biological Researches - Iasi

Cell culture laboratory

Cell biochemistry and physiology laboratories

Institute for Biological Researches - Cluj Napoca

Pilot installation for massive growth of cyanobacteria and algae

Underground laboratory for pedobiological studies

Laboratory equipped for fauna screening from ground

"Stejarul" Center for Biological, Geological and Geografic Researches - Piatra Neamt

Laboratories for in vitro plant cells' and plants' cultures, analysis for plant extractions

Automatic meteorological station and equipment for taking atmospheric noxious substances

National and International Projects

- 54 running national research projects.
- Programme ERBCHRXCT 920032 - project GLORIA EUROPE - The European dimension of the global observation research initiative in alpine environment - a contribution to GTOS.
- PC5 - project FOSSILVA - Dynamics of forest tree biodiversity: linking genetic, palaeogenetic and plant historical approaches.

Bilateral scientific collaborations

- Biochemistry Laboratory of the University of the Technological Sciences - Lille 1 and MACOPHARMA SA pharmaceutical laboratories, Tourcoing, France.
- University of Perpignan, France, Grant 841/2003
- Project co-ordinated by the Ministry of Education and Research with High School Charlemagne Valonia, Belgium - term preservation of the species in danger, belonging to Belgian and Romanian flora: Arnica Montana, drosera rotundifolia, Lilium martagon

Personnel: 166 from which 130 high qualified specialists: biologists, biochemists, biophysicists, bioinformaticians, physicians and so on.

Contact: General Director: Prof.dr Radu Gabriel Lucian, e-mail: gl_radu@dbio.ro, web: <http://www.dbio.ro>

Address: Splaiul Independentei 296,060031, P.O.Box 17-16, Bucharest, Romania, Tel: +40-21-2207909; +40-21-2207780; Fax: +40-21-2207695;

