The Institute of Cell Biology (ICB) was established in 2000 as an autonomous research institute of the National Academy of Sciences of Ukraine. Its mission is to develop and foster a vibrant research culture for “cutting-edge” basic and applied biomedical research and for training high quality PhD students. Located in the central part of the Lviv region, the Institute is ideally situated for interaction with world-leading groups throughout Western Ukraine as well as in the neighbouring countries of Central Europe. The Institute has quickly established itself as a major research facility at home and abroad.

Whereas the Institute receives most of its funding from the Government of Ukraine, it has been very successful in attracting financial support from a variety of international sources including; STCU, INTAS, CRDF, FIRCA, NATO, National Cancer Institute (US) and the Royal Swedish Academy of Sciences. The Institute has a very dynamic research environment with state-of-the art laboratories and core facilities. The teaching and research activities are focused on the following:

- molecular-genetic and biochemical mechanisms of regulation of metabolism in yeasts, and development of new biotechnological processes and products based on these microorganisms.
  - genetic construction of strains over-producing:
    a) fuel ethanol from lignocellulose wastes;
    b) vitamin B2 (riboflavin);
    c) flavin coenzymes.
  - construction of yeast strains producing heterologous proteins of biomedical significance:

(a) intact cells and (b) cells treated with cytotoxic mistletoe lectin
• molecular mechanisms of the regulation of proliferation, differentiation and apoptosis in normal and tumour cells; development of novel approaches that will affect tumour growth and monitor the effectiveness of cancer treatment. For example, diagnostic evaluation of the expression levels of novel molecular markers in human cancer (specific signaling protein ruk/cin85) and cell apoptosis.

Research at the Institute encompasses a broad range of specialized disciplines, such as cell and molecular biology, microbiology, biochemistry, genetics, immunology and biotechnology. Currently the Institute employs approximately 100 specialists, including 9 doctors of sciences (Habilitation Doctors) and 24 candidates of sciences (PhDs). Over the last 5 years ICB scientists have published 2 monographs, 183 scientific articles, including 60 articles in the international journals and have obtained 3 Ukrainian and 4 international patents from the European Patenting Agency. 2 US patents are pending.

Other examples of technologies developed at the Institute of Cell Biology with commercial potential include the following:

• genetically engineered vaccines against dangerous infections;
• immunological tests for marker proteins of malignant tumours;
• development of cell- and enzyme-based biosensors selective to measure important analytes (ethanol, methanol, glycerol, formaldehyde, lactate, biogenic amines, such as methylamine, di-methylamine, and others);
• production of polyclonal immune anti-sera to be used for determination of species-specific proteins in biological samples (investigations conducted in the forensic medicine);
• development of molecular (DNA integrity and chromatin structure tests) and cellular systems for evaluating tumor cell response to different actual and perspective chemotherapeutic drugs;
• development of novel convenient and cheap methods for fast detection, isolation and quantification of apoptotic cells; development of monoclonal antibodies against specific signaling proteins and their application in diagnostic KITs.
The Institute of Cell Biology's mission is to develop and foster a vibrant research culture for "cutting edge" basic and applied biomedical research, and for training high quality postgraduate researchers.

ICB was established in 2000 as an autonomous research institute of the National Academy of Sciences of Ukraine. Located in the central part of the Lviv region, the Institute is ideally situated for interaction with leading scientific institutions throughout Western Ukraine, as well as in the neighboring countries of Central Europe. The Institute has established itself as a major research facility at home and abroad.

In addition to primary funding from the Government of Ukraine, ICB has been very successful in attracting grants from a variety of international sources, including the STCU, INTAS, CRDF, FIRCA, NATO, National Cancer Institute (U.S.) and the Royal Swedish Academy of Sciences. The Institute has a dynamic research environment with state of the art laboratories and core facilities.

**Research and Training Foci:**

1. Molecular, genetic and biochemical mechanisms of regulation of metabolism in yeast, and the development of new biotechnological processes and products:
   
   **(a)** Genetic construction of strains overproducing:
   - Fuel – ethanol from lignocellulose wastes;
   - Vitamin B2 (riboflavin); and
   - Flavin coenzymes.

   **(b)** Construction of yeast strains producing yeast and heterologous proteins of biomedical interest:
   - Human pro-insulin, human liver arginase;
   - Hepatitis B surface antigen (HBsAg);
   - Fungal glucose oxidase;
   - Yeast enzymes – alcohol oxidase, amine oxidase, formaldehyde dehydrogenase.
Molecular mechanisms of the regulation of proliferation, differentiation and apoptosis in normal and tumor cells; development of novel approaches that will affect tumor growth and monitor the effectiveness of cancer treatment. For example, diagnostic evaluation of the expression levels of novel molecular markers in human cancer (specific signaling protein ruk/cin85) and cell apoptosis.

Research at ICB encompasses a broad range of specialized disciplines, such as cell and molecular biology, microbiology, biochemistry, genetics, immunology and biotechnology. The Institute employs over 100 specialists, including 9 Doctors of Sciences and 24 Ph.D. level researchers. Over the last 5 years, ICB scientists have published 2 monographs, 183 scientific articles, including 60 articles in leading international journals, and have obtained 3 Ukrainian patents, 4 international patents from the European Patenting Agency, and 2 pending U.S. patents.

Technologies for Commercialization:

- Genetically engineered vaccines against dangerous infections;
- Immunological tests for marker proteins of malignant tumors;
- Cell- and enzyme-based biosensors to measure important analytes (ethanol, methanol, glycerol, formaldehyde, lactate, and biogenic amines, such as methylamine, dimethylamine, etc.);
- Polyclonal immune anti-sera production for the determination of species-specific proteins in biological samples in forensic medicine;
- Molecular (DNA integrity and chromatin structure tests) and cellular systems for evaluating tumor cell response to chemotherapeutic drugs;
- Novel, convenient and inexpensive methods for rapid detection, isolation and quantification of apoptotic cells; and
- Monoclonal antibodies against specific signaling proteins for diagnostic kits.