



SCIENCE & TECHNOLOGY
CENTER IN UKRAINE

AN INTERGOVERNMENTAL ORGANIZATION
ASSISTING FORMER WEAPONS SCIENTISTS'
TRANSITION TO PEACEFUL PROFITABLE
CONTRIBUTIONS TO GLOBAL R&D

NOLOGY BIOTECHNOLOGY BIOTECHNOLOGY BIOTECHNOLOGY BIOTECHNOLOGY BIOTECHNOLOGY BIOTECHNOLOGY



International R&D Partnerships



Gateway to the Hi-Tech World of Former
WMD Scientists



Business Security, Reliability and Stability



Over Ten Years of Successful Operations

NOLOGY BIOTECHNOLOGY BIOTECHNOLOGY BIOTECHNOLOGY BIOTECHNOLOGY BIOTECHNOLOGY BIOTECHNOLOGY

Azerbaijan | Canada | European Union | Georgia | Moldova | Ukraine | USA | Uzbekistan

The Science & Technology Center in Ukraine (STCU) provides Western companies with the services of highly skilled scientists from Azerbaijan, Georgia, Moldova, Ukraine and Uzbekistan as well as tax-free privileges, duty-free import of equipment and Western-style project monitoring. The STCU is an intergovernmental organization dedicated to the non-proliferation of weapons of mass destruction expertise. Since 1993, private companies and government agencies from Canada, the European Union and the United States have used the STCU to manage over 950 R&D projects, worth nearly US \$140 million.

Welcome from the STCU Executive Director

The STCU is ideally positioned to match an unexploited supply of scientific and technical expertise to meet your commercial or non-commercial needs. Through its primary mission of nonproliferation of WMD expertise, the STCU has compiled a treasure trove of experience and knowledge about the many highly talented scientists and technologists in Azerbaijan, Georgia, Moldova, Ukraine and Uzbekistan. And the STCU is a well-established, western-style organization with nearly 10 years of operational experience that can help steer you through the uncertainties of the business and investment environments in these emerging economies. The STCU has:

- Legal status, diplomatic accreditation, tax and customs exemptions for financed projects and activities, all guaranteed under the international agreement establishing the STCU;
- Proven experience in project management: over 950 research projects totaling nearly \$140 million;

- Over 140 private sector and governmental agencies which have joined the STCU's Partnership Program to finance their own, tailored S&T projects (totaling more than \$40 million) through the STCU.

The STCU's staff of professionals is experienced in working with industry and business representatives, including protecting their business-sensitive information and interests. In this way, the STCU can serve you as a trustworthy and cost-effective bridge to the yet-to-be-tapped opportunities for contract research and technology development in Azerbaijan, Georgia, Moldova, Ukraine and Uzbekistan.

I hope that you will find the STCU worthy of a closer look. It is a win-win-win situation you should not pass up: win for you, win for these former military institutes looking for a chance to perform, and win for the STCU's nonproliferation mission (which, actually, is a win for global security)!



Andrew A. HOOD
STCU Executive Director

A handwritten signature in black ink, which appears to read "Andrew A. HOOD". The signature is fluid and cursive, written over a white background.

Table of Contents

LINKAGES WITH BIOLOGICAL INSTITUTIONS	4
BIOTECHNOLOGY RESEARCH AND PRODUCTION IN UKRAINE (Chart)	5
BIO RESEARCH	6
Institute of Molecular Biology and Genetics	6
Institute of Cell Biology	8
Institute of Cell Biology and Genetic Engineering	10
Institute of Microbiology and Virology	12
Ukrainian Anti Plague Research Institute	14
Institute of Epidemiology and Infectious Diseases	16
Institute of Experimental and Clinical Veterinary Medicine	18
Institute of Animal Breeding and Genetics	20
CHEM RESEARCH	22
Institute of Biochemistry	22

TABLE OF CONTENTS

Institute for Bioorganic Chemistry and Petrochemistry	24
Institute of Biocolloidal Chemistry	26
Institute of Macromolecular Chemistry	28
Institute of Surface Chemistry	30
PRODUCTION	32
State Administration for Drugs and Medical Items	32
JSC FARMAK	34
National Center of the Veterinary Biological and Pharmaceutical Industry	36
Sumy State Biological Factory	38
Veterinary Medicine	40
Dnipropetrovsk Biofactory	42
Kherson State Biological Factory	43
STCU POINTS OF CONTACT	44

Linkages with Biological Institutions



STCU Headquarters
21 Kamenyariv St.
Kyiv 03138, Ukraine

As biology continues to evolve into an integrated, quantitative science with application in many industrial sectors, the expertise of chemical-biological scientists and engineers that were formerly engaged in the development and/or delivery of weapons of mass destruction (WMD) should not be overlooked.

At the STCU we are optimistic about the research capabilities and commercial possibilities existing in biological institutes within the countries we represent. In the present booklet, we have illustrated some of the scientific developments within a number of institutes located in Ukraine. With technology obsolescence proceeding at a rapid pace, the emerging and available scientific innovation within the country may well transform your product development pipeline in fundamental ways. This is not simply a technology offering, it is about innovation, knowledge and the vast possibilities that can be realised through collaboration. There exists a vastly untapped resource for development and commercialization.

Working in partnership with the STCU allows you to minimize the concerns typical of western firms trying to conduct business in former Soviet countries. We can assist in locating qualified specialists in the technology area of your interest, and ensure that their proposals reach you for your consideration and evaluation. Over ten years of experience enables the STCU to confidently recommend and outline various forms of cooperation with particular scientific institutions or divisions. The STCU can facilitate visits to our Center and the institutions of your choice, as well as organize presentations, meetings and negotiations with scientists. Your firm can work through the STCU Partners Program, allowing you to define, design, and finance specific research projects with these Ukrainian and FSU institutes. Furthermore, you can do so with the confidence afforded by STCU's western-style administrative structure and with the benefits of the tax and customs exemptions extended to STCU by the STCU's recipient member governments.

Biotechnology Research and Production in Ukraine



State Administration for
Drugs and Medical Items

National Center of the
Veterinary Biological and
Pharmaceutical Industry

National Academy
of Sciences of Ukraine

Science & Technology
Center in Ukraine

Institute of Molecular Biology and Genetics (IMBG)



150 Acad. Zabolotny St.,
Kyiv 04143 Ukraine
Tel: 380 44 526 1169
Fax: 380 44 526 0759
www.imbg.org.ua
Acad. Ganna Elska, Director
E-mail: elskaya@imbg.org.ua
www.elskaya.org.ua

Founded in 1973, the Institute of Molecular Biology & Genetics (IMBG) of the National Academy of Sciences of Ukraine (NASU) has been at the forefront of basic and applied biomedical sciences in Ukraine.

The Institute has 23 Doctors of Science, 7 with the designation of Academician, and over 115 Ph.D. scientists working in fifteen departments with well-equipped laboratories and core research facilities. The Institute is internationally recognized for its basic and applied research in molecular biology, genetics and biotechnology. IMBG scientists have authored over 3,000 publications, including over 350 in international journals, such as Science, Nature, Biopolymers and others.

R&D Interests of the Institute:

- Structural and functional genomics;
- Proteomics and protein engineering;
- Regulatory systems and signal transduction;
- Bioinformatics and computational modeling; and
- Gene therapy and diagnostics.

The Institute has proprietary technologies protected by key Ukrainian and international patents.

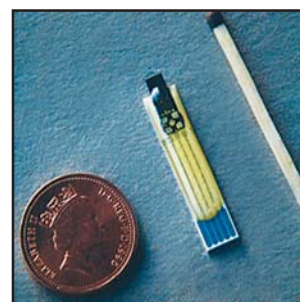
Highlights of Novel Technologies:

- Genetic diagnosis of severe hereditary diseases and hereditary susceptibility to mass pathologies;
- Molecular diagnostics of chronic myelogenous and acute lymphoblastic leukemias using PCR and specific polyclonal antibodies;

- Biomarkers for epithelial tumors and the identification of tumor-associated antigens for the development of immunological approaches for cancer therapy and diagnostics;
- New anti-cancer and anti-viral medications;
- Molecular modeling & drug design of protein kinase inhibitors;
- Structure-based drug discovery against pathogenic bacteria;
- Production of a novel antiangiogenic cytokine;
- Biotechnology of plant secondary metabolites production;
- Biomedical Applications of lectins;
- Production of *Rauwolfia serpentina* cell biomass with high content of ajmaline, used as a source of antiarrhythmic & hypotensive medications;
- Production of *Panax ginseng* cell biomass;

- Skin equivalents based on human stem cells cultivated *in vitro*;
- Bacterial inoculant for plant KLEPS®;
- Electrochemical and optical biosensors for medicine and the control of biotechnological processes;
- Electrochemical mono- and multi-biosensor test systems for environment and food monitoring.

The Institute has established a track record of successful long-term collaboration with internationally known laboratories in North America, Europe, and Asia. The Institute is currently the recipient of 20 international grants, and has participated in a range of projects, supported by the STCU, INTAS, NATO, INCO, COPERNICUS, Howard Hughes Medical Institute, Wellcome Trust, and others.



pH-Sensitive field effect transistor



Conductometric planar transducers

Institute of Cell Biology (ICB)



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.

14/16 Drahomanova St.,
Lviv 79005, Ukraine
Tel.: +380 322 74 0363
Fax: +380 322 72 1648
www.biochem.lviv.ua
Dr. Andriy Sibirny, Director
E-mail: sibirny@biochem.lviv.ua

2 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.

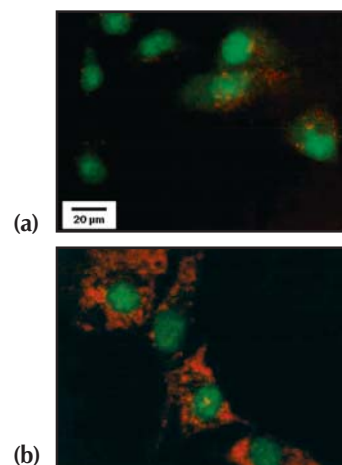
Research at ICB encompasses a broad range of specialized disciplines, such as cell and molecular biology, microbiology, biochemistry, genetics, immunology and biotechnology. The Institute employs over 100 specialists, including 9 Doctors of Sciences and 24 Ph.D. level researchers. Over the last 5 years, 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.



Yeast *Pichia guilliermondii* strain over-producing vitamin B2 (riboflavin)



(a)

(b)

(a) intact cells and
(b) cells treated with cytotoxic mistletoe lectin

Institute of Cell Biology and Genetic Engineering (ICBGE)



The Institute of Cell Biology and Genetic Engineering (ICBGE), established in 1990, is the leading scientific center in the field of plant cell and molecular biology, biotechnology and genomics in Ukraine. ICBGE employs 140 scientists, including 12 Doctors of Science, 6 with the designation of Academician, and 48 Ph.D.s. Together with other highly experienced engineers, they are grouped into 12 departments and labs.

R&D Highlights at ICBGE:

In the area of **plant cell and genetic engineering**, researchers at the Institute discovered the phenomenon of biparental inheritance of cytoplasmic genes as a result of protoplast somatic hybridization. This phenomenon created the basis for the development of new technologies for the production of plant cybrids, and original approaches of plasmid transformation. The efforts are also centered on the development of plant molecular biotechnology. The Institute has pioneered the development of transgenic plants with the traits of many agricultural species for further breeding.

Research in the field of **cell biology and structural bioinformatics** focuses on the investigation of cytoskeletal proteins for novel biotechnological approaches for the improvement of plant resistance to biotic and abiotic stresses. Plant mutants have been created and the genes of microtubule proteins (tubulin) responsible for the resistance to herbicides and fungicides have been isolated and used for the production of cell lines resistant to these substances. The Institute identifies new microtubule proteins and tyrosine kinases of plant origin. A biological approach for the creation of a three-dimensional model of plant tubulin has been developed. These models are used for identifying the interaction of antimicrotubular compounds with different biological activities (antiprotozoan & anticancer; herbicides, fungicides) for chemical designing new drugs.

The Institute specializes in the **safe utilization of the products of plant genetic engineering**. Vertical gene flow from transgenic plants to their wild

148 Zabolotnogo St.,
Kyiv 03143, Ukraine
Tel./fax: +380 44 526 7104
www.icbge.org.ua
Prof. Yaroslav Blume,
Acting Director
E-mail: yablume@univ.kiev.ua

relatives has been studied (rapeseed, sugar beet and flax) and methods for the detection and measurement of genetically modified components in seeds, feed and food have been developed.

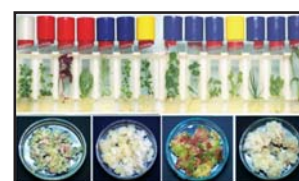
ICBGE research groups also focus on **plant biophysics and radiobiology**, including the role of molecular recognition in the processes of cell repair; investigation of molecular processes induced by chronic irradiation; methods of phyto-microbial decontamination of radionuclides from soils; study of protective signal systems of plants; and the investigation of structural and functional organization of the cell wall of higher fungi to develop new sorption materials for medicine and industry.

To further R&D and commercialization efforts, the Institute has created one of world's largest banks of plant germplasm from world flora. This bank is recognized as a National Scientific Dignity of Ukraine. It includes about 5000 specimens in the seed bank and 2000 cell lines in the *in vitro* bank.

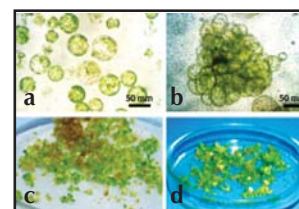
Opportunities for commercialization and collaborative production:

- Creation of transgenic plants with traits of interest based on *Agrobacterium*-mediated and biolistic genetic transformation;
- New gene marker systems for the selection of transgenic plant cell lines;
- Recombinant pharmacological protein production via transient expression in plant systems;
- Chemical design and screening of new antimicrotubule substances with herbicide or fungicide activity;
- PCR based techniques of qualitative and quantitative detection of genetically modified components in plant raw material and food products;
- Technologies for phytoremediation of ecosystems from radionuclides; and
- Sorbents of heavy metals and radionuclides using cell wall components of higher fungi.

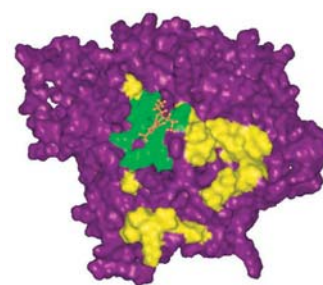
The Institute welcomes collaborative efforts with Western industry in the abovementioned areas.



Aseptically growing plants and callus lines of different plant species from the germplasm bank of world flora



Plant regeneration from mesophyll protoplasts: *Nicotiana africana*



Molecule of alpha-tubulin with docked trifluralin molecule: green – amino acid residues of binding site, yellow – amino acid residues involved in tubulin dimer formation

Institute of Microbiology and Virology (IMV)



The Zabolotny Institute of Microbiology and Virology of the National Academy of Sciences of Ukraine is a renowned scientific centre in the fields of microbiology, virology, biotechnology and ecology.

The Institute was founded in 1928. Currently, the Institute employs 395 staff members, including 30 Doctors of Science, and 110 Ph.D.s. The Institute possesses a National Collection of Microorganisms with over 20,000 strains used for molecular biological research and biotechnology. Since 1934, the Institute has been publishing, “Microbiologichny Zhurnal” (“Microbiological Journal”) in Ukrainian, Russian and English.

Institute’s fifteen research departments focus on the following areas: systematics, biochemistry, genetic of microorganisms; biological activity of microorganisms; molecular biology of viruses; creation of new microbial biotechnologies for public health, agri-

culture, industry and environmental protection.

Highlights of the Institute's Intellectual Property Portfolio:

Agriculture:

- *Laktin, Lactosan, Bovilakt, Bifidim* – probiotics based on lactic acid bacteria for the treatment and prophylaxis of gastro-intestinal diseases in agricultural animals;
- *Endosporin* – probiotic based on spore-forming bacteria for the treatment and prophylaxis of postnatal endometrites;
- *Litosil* – preparation based on lactic acid bacteria for fodder siloing;
- *Azotobakterin, Nitragin, BTF* – ecologically-friendly bacterial fertilizers for improving plant growth and productivity, and increasing crop capacity under open and closed soil conditions;
- *Avercom*- preparation based on soil streptomycetes for the prophylaxis and protection of plants from various diseases and pests; and

154 Academician Zabolotny St.,
Kyiv 03143 Ukraine
Tel./fax: +380 44 526 2379
Acad. Valentin Pidgorsky,
Director
E-mail:
Podgorsky@serv.imv.kiev.ua

- *Gaupsin* – preparation based on spore forming bacteria for prophylaxis and protection of plants from different diseases and pests.

Medicine:

- *Biosporin* – probiotic for the treatment and prophylaxis of dysbacteriosis and acute intestinal diseases in children and adults;
- *Subalin* – probiotic for the treatment of mixed viral and bacterial infections;
- *Beta-carotene* obtained from the biomass of the yeast, *Blakeslea trispora*;
- *Karefol* (beta-carotene and plant ether oils) and *Karoflav* (beta-carotene and quercitrol) – for skin diseases, stomach ulcer and mucous membranes; and
- *Diastaf* of bacterial origin for the express diagnostics of staphylococcus.

Industry:

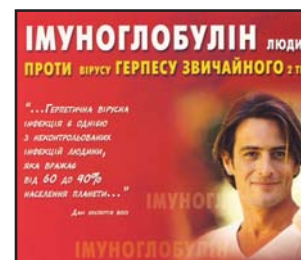
- *Streptosan*, *Gerosan* – ferments used in the dairy industry for obtaining dietary lactic acid products;
- *Lactogerovit* – dietary lactic acid product based on compositions of lac-

tic acid bacteria, typical for normal biocenosis, in particular for Caucasus-livers;

- *Ksampan*, *Enposan* – bacterial polysaccharides used for oil extraction, as well as in the food and perfumery industry;
- *EPAA* – copolymer based on exopolysaccharides for the textile industry (thread sizing) and glue for domestic use.

Environmental Protection:

- *Desna* (based on spore forming bacteria) and *Rodoil* (based on nocardia- and corineformic bacteria) – preparations for the purification of soil, sea and river water from oil and oil products;
- Biotechnology based on the use of *Aeromonas dechloromatica* bacteria and different strains of sulphate reducing bacteria – for the purification of sewage from hexavalent chromium toxic compounds;
- *MBC* – microbial biocatalyst for effective purification of sewage from toxic synthetic compounds, heavy metals and radionuclides.



The types of products developed by the Institute

Ukrainian Anti-Plague Research Institute (UAPRI)



The Institute is the leading Ukrainian research and training organization on quarantine infections and other especially dangerous infections (EDI).

The Institute, established in 1999, was created to strengthen the infrastructure of public health services and to control infectious diseases in Ukraine and Eastern Europe. Its laboratories have administrative and technological facilities for “safe-mode operations” with EDI. The facilities include a specialized clinic and eleven well-equipped laboratories.

The expertise of the staff includes epidemiology, microbiology, virology, genetics and biochemistry. Currently,

the Institute has 195 employees and the staff possesses extensive practical work experience in the natural foci of infections and outbreaks. The Institute specializes in the diagnosis, treatment and prevention of diseases, such as HIV/AIDS, bacterial infections (tuberculosis, nosocomial infections, sexually transmitted diseases) and prion infections. The staff also provides training in epidemiology, epizootology, ecology, diagnosis, and the prevention of EDI.

Areas of Research and Development:

- Principles of the formation and development of EDI natural foci for applications in localization and con-

2/4 Tserkovna St.,
Odesa 65003 Ukraine
Tel./fax: +380 482 23 8172
Dr. Yuriy Boshchenko, Director
E-mail: usas@tm.odessa.ua

trol over new foci formation;

- Biological properties of EDI, in order to estimate their epidemic potential;
- New chemical preparations against EDI;
- Reduction of EDI resistance to antibiotics by joint application of proteolysis inhibitors and antibiotics;
- Methodology for forecasting epidemics and principles of organization of preventive and counter epidemic measures;
- Improved diagnostics for EDI;
- Immuno-biological preparations and vaccines against emerging diseases;
- Evaluation of new antiviral and antimicrobial preparations by computer-assisted technologies; and
- Improvement of the system of sani-

tary protection of the territory of Ukraine from penetration and distribution of EDI.

The Institute has strong collaborative research connections with organizations from around the world, and it receives financial support from a variety of international organizations, including the STCU, SOROS Foundation, Civilian Research and Development Foundation, NEDA and the University of London. The I. I. Mechnikov Anti-plague Institute is included in the list of possible International Cooperative Centers in creating the Global Network for Monitoring and Control over biological pathogenic agents.



Electron microscopy

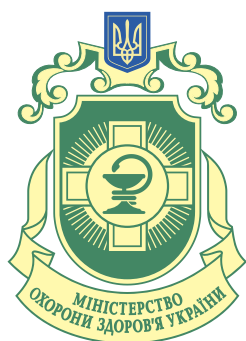


Working in the biosecurity unit



Luminescent microscopy

Institute of Epidemiology and Infectious Diseases (IEID)



Founded in 1896, the Gromashevsky Institute of Epidemiology and Infectious Diseases of the Academy of Medical Sciences of Ukraine is the leading research organization for intestinal, viral, zoonotic and nosocomial infections.

The Institute specializes in the diagnosis, treatment and prophylaxis of sharp intestinal infections, including cholera; infections in children (diphtheria, measles, German measles, poliomyelitis, mumps); viral infections (AIDS, Grippe, viruses hepatitis, meningoencephalitis); zoonotic infections (leptospirosis, rabies, anthrax); and hospital infections.

Currently, the Institute employs 373 staff members, including 27 Doctors of Science and 40 Ph.D.s. The Institute comprises seven research departments of epidemiology, microbiology, immunology, virology, parasitology, biology and biotechnology. The Institute also houses the Center of AIDS Epidemiology and Prophylaxis, Ukrainian Center of Grippe, Ukrainian Center for Infectious Control; Center of Rabies and Leptospirosis; and

the Center of Immune-biological preparations. The Clinic for Infectious Disease, the primary center for the Ukraine, contributes to the improvement of diagnostics and the treatment of infectious diseases. The Institute has a state depository of patentable strains, national collection of pathogenic microorganisms, and a laboratory for quality control and safety of immune-biopreparations.

Areas of Basic Research:

- Microbiological monitoring of antibiotic resistance in opportunistic microorganisms performed with WHONET application software;
- Novel probiotics;
- Prophylaxis, localization and sanitation of cholera sparks;
- Etiologic interpretation of dysbacterioses;
- Investigations into presence of helminthes ova, larvae & parasitic agents;
- Immunoglobulin preparation for the treatment of gram negative sepsis;
- Microbe-free vaccine against anthrax for human immunization;
- Anti-rabies peroral vaccine for

5 Amosova St.,
Kyiv 03038, Ukraine
Tel.: +380 44 275 3711
Fax: +380 44 275 2400
Prof. Olga Selnikova, Director
E-mail: ibdc@i.kiev.ua

immunization of wild animals;

- Assessment for the protection of children with serious chronic diseases from infections by means of specific immunoprophylaxis;
- AIDS, viral hepatitis, meningoen- cephalitis, influenza, parasitoses, entero- viruses, infections in children;
- HIV/AIDS monitoring system; and
- Methodology for the prevention of perinatal Hepatitis B.

Technologies for Commercialization:

- Improvement of polymerase chain reaction (PCR) methods for early diag- nostic of HIV infection;
- Test-systems for revealing antibodies against HIV and Hepatitis B, C viruses;
- Antigenic leptospire erythrocyte diagnosticum;
- Method of strain-specific anti- influenza antibody determination;
- Immunodiagnosticum for antibodies against gram-negative bacteria;
- Human anti-rabies immunoglobulin;
- Herpes virus thymidine kinase activi- ty inhibitor;
- HIV and reverse transcriptase inhibitor;

- HIV inhibitor with immunostimulat- ing property;
- Etiological human immunoglobulin against influenza; and
- Test-system for detecting antibodies against Epstein-Barr virus.

Manufacturing Technologies for Medical Preparations:

IZATIAZON (anti-herpetic prepara- tion), *BIOSPORIN* (anti-diphtheria and anti-candida preparation), *SUBALIN* (regulator of endogenous interferon), *6-AZACYTIDINE* (antiviral and anti- mycoplasma preparation), *BACTERIAL LECTIN* (antiviral preparation), and *ALTABOR* (antiviral preparation – influenza virus neuraminidase inhibitor, HIV and herpes virus inhibitor).

The Institute has been cooperating with research organizations from U.K., France, Denmark, Germany, USA, Cana- da, and other countries, and has been the recipient of grants from multiple international organizations, including the WHO, STCU, INTAS, NATO.



Prof. Olga Selnikova, director of IEID



One of the Institute's labs

Institute of Experimental and Clinical Veterinary Medicine (IECVM)



IECVM is the premier veterinary research institution of Ukraine with a proven track record of excellence in the diagnosis, control, prophylaxis and treatment of infectious, invasive and somatic diseases in animals. Founded in 1922, it is the oldest veterinary research institute in Ukraine. The institute is now a leading organization in the coordination of veterinary medical research in the territories of the former Soviet Union. The staff at IECVM consists of 160 scientists, including 2 Academicians of the Ukrainian Academy of Agrarian Sciences (UAAS), 3 corresponding members of the UAAS, 21 Doctors of Science and 21 Ph.D.s.

The Institute is organized by 8 departments, 19 laboratories (one of the labs was recently reorganized into the reference laboratory on avian influenza recently), and 7 centers of excellence:

1 Center for the study of bovine infectious diseases;
2 Center for poultry farming veterinary support;

3 South-Eastern Center for the study of prion infections;

4 Center of toxicological monitoring and certification of feeds and quality of animal products;

5 Center for animal parasitic diseases;

6 Center for prophylaxis and control of tuberculosis; and

7 The scientific-informational center.

IECVM has contributed to developments in the areas of malleus, anthrax, brucellosis, plague, swine fever, foot-and-mouth disease, stachybotryotoxicosis, tuberculosis and others diseases. During 80 years of intensive research in infectious pathology, the IECVM has collected and holds in storage a unique collection of microorganisms, including more than seven hundred strains of dangerous infectious diseases in agricultural and wild animals that correspond to the lists "A" and "B" of the International Office of Epizootic Diseases (OIE).

Currently, the IECVM conducts fundamental and applied research aimed at

83 Pushkinska St.,
 Kharkiv 61023, Ukraine
 Tel.: +380 57 707 2054
 Fax: +380 57 704 1090
 Dr. Borys Stegnyy, Director
 E-mail: inform@vet.kharkov.ua,
admin@vet.kharkov.ua

ensuring stable veterinary-and-sanitary health in Ukraine. Epizootological monitoring, forecasting of epizootic situations and the development of means for monitoring of especially dangerous infectious diseases in animals, such as tuberculosis, brucellosis, and leucosis are among the institute's traditional activities. In addition, the IECVM develops biotechnology for the immunoprophylaxis and diagnosis of infectious diseases in cattle, pigs, poultry, bees, fish and small domestic animals. The Institute also pioneers ecologically friendly manufacturing of animal products.

During the last five years, the IECVM has developed 55 immunobiological preparations, produced 36 therapeutic and prophylaxis preparations, deposited 20 strains of microorganisms, and received 164 patents.

The Institute has been actively cooperating in joint research and training activities with leading research centers in Russia, including the All-Russian Sci-

entific Research Institute of Animal Protection in Vladimir, All-Russian Institute of Experimental Veterinary Medicine in Moscow, All-Russian Scientific Research Institute of Control, Standardization and Certification of Veterinary Preparations in Moscow, All-Russian Scientific Research Veterinary Institute of Poultry Breeding in St. Petersburg, and the Kursk Biofactory, as well as with the Europe Federal Centre of Viral Diseases in Animals (BEAV) in Germany and the Warsaw Agrarian University in Poland.

Cooperation with American organizations is of great interest. Initial steps in the development of partnership in the area of molecular-genetic research and biotechnology for veterinary preparations production has been recently facilitated by the DOE's Initiative for Proliferation Prevention Program, Pacific Northwest National Laboratory and STCU.

IECVM welcomes collaborative opportunities with western veterinary institutions and industry.



Centers of excellence



IECVM building

Institute of Animals Breeding and Genetics (IABG)



1 Pogrebniaka St.
Chubinsky, Kyiv Region,
Borispol District, 08321 Ukraine
Tel.: +380 449 53 0035
Fax: +380 449 53 0134
www.aginukraine/UAAS/
Dr. Valery Burkat, Director
E-mail: irgt@online.ua

Established in 1975, the Institute of Animals Breeding and Genetics of the Ukrainian Academy of Agrarian Science (IABG) has been playing a leading role as a coordination centre of selection and genetics of agricultural animals in Ukraine.

The Institute currently employs 119 scientific workers, including 8 Doctors of Science and 50 Ph.D.s. As a group, these researchers have authored more than 2400 publications. The primary focus of the Institute is on the dairy and beef cattle industry. The Institute includes 3 departments and 15 laboratories focusing on the following activities.

Selection, breeding and cultivation:

The Institute is a leading organization in coordinating scientific research of 27 Ukrainian organizations within the framework of the Program “Breeding and genetics of animals,” initiated by the Ukrainian Academy of Agrarian Sciences. The Institute has developed Ukrainian “red-and-white”, “black-and-white”, “red-and-brown” dairy breeds of

cattle; and Ukrainian “poliska” and “volinska” meat breeds of cattle.

Genetics and agricultural biotechnology

The IABG scientists are developing methods of reproductive biotechnology of agricultural animals. The Institute is a leading organization in the program “Agricultural biotechnology 2006-2010”. It aims at developing biotechnological methods of reproduction of agricultural animals with the use of cloning and parthenogenesis. Together with the National Research Institute of Animal Production in Poland, research on biotechnological methods of mammals (*in vitro* production, freezing and cloning of embryos) is carried out.

Preservation of gene pool of agricultural animals:

Since 2004, the Institute has been a leading organization in the new National Program “Preservation of gene pool of agricultural animals”. In 2004, IABG has started the creation of a collection of gene pool of cattle, horse, pigs, sheep,

goats, birds, fishes, bees, and silkworm. Currently it includes 86,467 sperm doses from 106 bulls of 21 breed cattle, 18 sperm doses from horses, about 800 DNA samples of cattle and horses, 360 embryos of 5 breeds of cattle of German and Austrian selection. In 2004, the Institute got a license for conducting genetic expertise of origin and anomalies in cattle, horse, pigs, and sheep, as well as for the storage and selling of pedigree (genetic) resources.

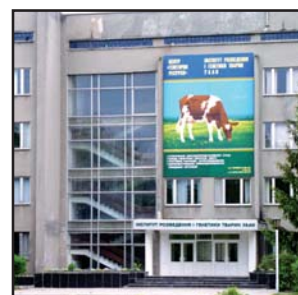
Research programs:

- A non-surgical method of aspiration of immature cow oocytes from donors the ovum pick-up technique (in collaboration with the National Research Institute of Animal Production, Poland).
- Obtaining bovine embryos *in vitro* suitable for non-surgical transfer to recipients (achieved pregnancy) – *in vitro* fertilization of cow oocytes by the use of fresh, well-kept (under cryogenic temperature) epididymal spermatozoa of bulls.
- Activating cow oocytes to ameiotic parthenogenesis. Ameiotic parthenoge-

none *in vitro* develops to early morulae.

- Method to differentiate: **(a)** chromosome of cow oocytes (C-banding technique) in different stages of meiosis and **(b)** mitosis chromosome of *in vitro* obtained bovine embryos.
- Obtaining clones of reconstructed bovine embryos (embryo cloning by nuclear transfer in cattle).
- In vitro production of pig embryos.
- Freezing pig epididymal spermatozoa.
- Activating pig oocytes to ameiotic parthenogenesis (obtaining parthenogone in different stages of development).
- Somatic clone of rabbit embryos with the use of fresh cumulus cells and skin fibroblast as nuclear donor.
- Two-step division of bovine blastocysts without application of micromanipulator.
- Determination of the sex of embryos using differential C-banding of mitotic chromosomes and PCR analysis.

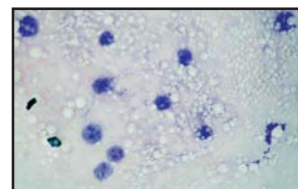
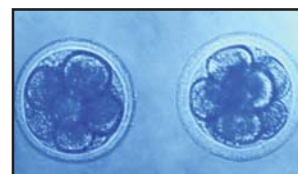
The Institute holds 28 patents, 115 certificates of inventions, and 32 certificates of achievements in the field of selection.



Front entrance of the Institute



Cryobank



In vitro bovine embryos production

Institute of Biochemistry (IBC)



9 Leontovycha St.,
Kyiv 01601, Ukraine
Tel.: +380 44 234 5974
Fax: +380 44 279 6365
www.biochem.kiev.ua
Acad. Sergiy Komisarenko,
Director
E-mail: secretar@biochem.kiev.ua

The Institute, founded in 1925, currently employs 363 staff members, including 117 researchers. IBC is comprised of 9 research departments, namely the Departments of Molecular Immunology, Lipid Biochemistry, Coenzyme Biochemistry, Muscle Biochemistry, Protein Structure and Function, Enzyme Chemistry and Biochemistry, Molecular Biology, Neurochemistry, and Metabolism Regulation, and several Centers of excellence.

Research Focus:

- Structure, physical-chemical properties and biological function of complex proteins and supramolecular systems;
- Mechanisms of metabolic regulation by low molecular weight molecules (vitamins, coenzymes, peptides, metal ions etc.);
- Methods of production and application of biologically active preparations;

- Medical and veterinary diagnostics; and
- Biosensors for medicine, industry and agriculture.

The Institute possesses a unique collection of hybridomas with important medical applications, including the diagnosis of hemostasis and infectious diseases. It also conducts testing for diagnostics of various diseases, chemo- and immuno-sensors for environment monitoring, etc.

Products developed at the Institute:

- *VICASOL* – a water-soluble analogue of Vitamin K₃ to accelerate blood clotting;
- *MEDICHRONAL* – effective anti-alcoholic drug;
- *CALMIVID* -Vitamin D₃ with calcium; and
- Tests and instrumentation for diagnostics.

**Technologies/Products
for Commercialization:**

- Assessment of the human hemostasis system by quantitative immunochemical determination of fibrinogen and D-dimer concentration in blood, and by blood coagulation proteins and enzymes of snake venoms;
- Industrial technologies for virus- and prion-safe proteins extracted from human blood plasma for intravascular administration;
- Isolation of highly purified human thrombin;
- Thrombolytic preparation, based on plasminogen, for treating ophthalmic diseases;
- Organophosphorus compounds with antitumor activity;
- Production technology for glucosylidase and catalase from *Penicillium vitale*;
- *FILOMEK* – a drug for regenerating

cell membranes in intoxication and disruption of visceral functions;

- *PANTERON* – for treating dysfunction of the male genital system;
- *VITAMIN D3* – water-soluble form for babies and for prevention of human osteoporosis;
- *NAE (SAVENORIS, CANTIGIL, BERLOXAR, MESTAB)* – novel cardioprotective, hepatoprotective, neuroprotective and anti-allergic agents;
- *KORECTIN* – pharmaceutical for treating bone damage, hepatitis, and as a part of complex therapy of oncological diseases, in particular leukaemias;
- Analog of vitamin E with shortened side chain;
- Vitamin E based treatment for cataract;
- Fodder admixture kits and premixes for cattle, hogs, poultry, fish and bees.



Professor S. Komisarenko,
Director of the Institute,
with young scientists



Scientists in the Laboratory
of Biopreparations
Technology

Institute of Bioorganic Chemistry and Petrochemistry (IBCP)



1 Murmanska St.,
Kyiv 02094, Ukraine
Tel: +380 44 558 5388
Fax: +380 44 543 5152
E-mail: user@bpci.kiev.ua
www.nas.gov.ua/En/Inst/710.htm
Acad. Valery Kukhar, Director
E-mail: kukhar@bpci.kiev.ua

The Institute of Bioorganic Chemistry and Petrochemistry of the National Academy of Sciences of Ukraine was founded in 1987. Researchers at the Institute are pioneering discoveries in natural products and synthetic chemistry for a wide range of applications from medicine and agriculture to the petrochemical industry.

The Institute's research focus is on the development of chemistry of biologically active peptides, proteins, nucleic acids and their components; chemical models of biological processes, synthesis and study of biological properties of new regulators to be utilized both in medicine and agriculture; and scientific fundamentals and technologies for obtaining practically useful products and materials from hydrocarbon material.

R&D Highlights:

- Synthesis of unnatural amino acids, low molecular bioregulators, peptides, biologically active heterocycles bases, and organoelement compounds;
- Classification of physiologically active compounds and analysis of relations between their chemical structure and biological properties;
- Structure and function of enzymes, proteins and peptides (thrombin, lipoxxygenases and other);
- Metallocomplex and metallocluster catalysis in radical oxidizing reactions of organic compounds;
- Activation of hydrocarbons in alkylation, isomerization, aromatization and cracking reactions;
- Zeolite-based catalyst for hydrocarbons.

Technologies for cooperative development and commercialization:

- Production of novel plant-growth regulators;
- Medical preparation “Teobonditiomicozid” and “Sulfocarbatation-K” substance for treating seeds (sugar-beet, potatoes, corn, wheat etc.);
- Production of fuel and lubricating materials on the basis of hydrocarbons and plant recyclable raw materials; and
- Manufacturing and application of reactants for water treatment.



Main building of the Institute



Novel plant-growth regulators application

Institute of Biocolloidal Chemistry (IBCC)



The Ovcharenko Institute of Biocolloidal Chemistry (IBCC) is a multidisciplinary institution specializing in the study of colloids, including biocolloids, for creating unique technologies for market-driven applications in medicine, environment and industry.

Founded in 1991, the Institute consists of four scientific departments, employing over 100 scientists and technical staff. Since its formation, researchers at the Institute have focused their attention on applying their expertise to market-driven problems; for example, the development of a new type of biosensors for electrochemical detection of heavy metals and toxic organic compounds. Today, a number of tech-

nologies developed at the Institute have been adopted for use in wide-ranging industrial sectors, including medicine.

Research Areas:

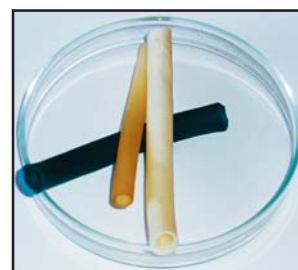
- Physics and colloid chemistry of disperse and nanosized systems; processes of their formation and self-organization (aggregation, stabilization, structure formation); microkinetics, and fractal properties.
- Biocolloidal chemistry, including the investigation of cell membranes (physics of membrane-bonded ferments, membrane transport, energetics of biomembranes, interaction of a bacterial cell with colloids of inorganic nature);

42 Vernadskogo Ave.,
Kyiv 03142, Ukraine
Tel./fax: +380 44 424 8078
Dr. Zoya Ulberg, Director
E-mail: zulberg@bioco.kiev.ua

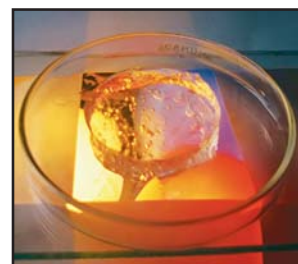
- Development of physico-chemical basis for the creation of fundamental, bioactive, and biocompatible nanomaterials and technologies for their production;
- Colloid and bio-colloid processes for processing mineral raw materials and environmental protection;
- Physico-chemical mechanics of natural and technogeneous disperse systems and materials, processes of phase formation within such systems, and industrial application of these technologies; and
- Biotechnological processes in medicine, biosensor technologies in medicine and environment, and nanobiotechnologies.

Technologies for Commercialization:

- New type of gold-bearing probiotic “Okarin-Au” for prophylaxis and healing of disbacteriosis and other especially dangerous infectious diseases.
- Hydrogel drainage system for maxillofacial and general surgery with nanoparticles of colloidal silver (99,9%).
- Hydrogel applicator with nanoparticles of silver (99,9%).
- Artificial tissue for burn and wound healing applications based on hydrogels containing stem cells.
- Biosensor technologies for medical diagnostics and environmental monitoring.



Hydrogel drainage used in the system for maxillofacial and general surgery with nanoparticles of colloidal silver (99,9%)



Antiburn hydrogel applicator



Anti-burn fine disperse hydrogel

Institute of Macromolecular Chemistry (IMC)



The Institute of Macromolecular Chemistry (IMC) of the National Academy of Sciences of Ukraine is a leading scientific centre, specializing in polymers, composites, and related materials.

Founded in 1958, the IMC includes ten departments and a pilot plant. IMC employs about 300 scientists, including 20 Doctors of Science, three Academicians, and 93 Ph.D.s. During the last 3 years, these researchers have authored more than 430 publications, including 155 in leading international journals.

Key Scientific Foci:

- Chemistry, physical chemistry and technology of functional polymers and composites;
- Theoretical principles of modification of polymers and composites by small-scale chemistry products; and
- Theoretical principles of the fabrication of polymers for medical applications.

Technologies/Products for Commercialization:

- Ecologically-friendly multi-purpose water-based ionomer polyurethane dispersion;
- Materials for personal and equipment protection against chemicals and microorganisms;
- Optically transparent materials for photocuring coatings, UV-glues, adhesives, polymeric active and passive elements, hybrid binders, etc.;
- Multi-purpose glue compounds and glue compositions;
- Electric- and heat-conductive adhesives;
- Liquid rubber with functional terminated groups for antirusting protection, casting compositions and coatings;
- Thermoplastic and thermoreactive polyurethane powder for anticorrosion and insulating coatings, binders and adhesives;
- Heat resistance polyurethanes;

48 Kharkivske Shose,
Kyiv 02160, Ukraine
Fax: +380 44 552 4064
www.macromol.kiev.ua
Prof. Eugene Lebedev, Director
E-mail: ihvsnas@i.com.ua

- Multi-component polymeric binders based on interpenetrating polymer networks;
- Adhesive polymeric materials for oil and gas industry, ship repair, and mining;
- Polymer recycling; and
- Polymers for medical applications.

Highlights of the Institute's intellectual property portfolio of 180 patents, include:

For biomedicine:

- Polyurethane composition for bone-tissue plastic;
- Method for manufacturing biocompatible, hydrophilic bacteriocidal polyurethanes;
- Polymer films for soft tissue implants;
- Breast endoprosthesis;
- Methods for producing forms of drug film with prolonged effects;

For agriculture:

- Method for the manufacture of

ionomeric water-soluble polyurethanes.

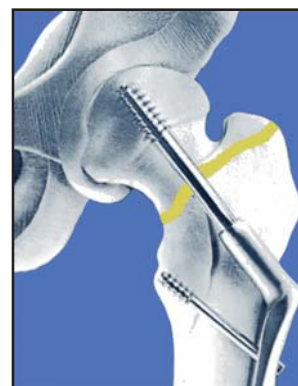
For waste and polymer recycling:

- Composite material;
- Manufacturing of wood-shaving pallets and pressured products; and
- Production of thermoplastic elastomers.

The Institute has participated in international projects supported by INTAS, INCO-Copernicus, NATO, STCU and other international programs, including the Program of Joint Russian-Ukrainian experiments on Russian Segment of International (Russia-USA) Space Station. IMC has maintained long-term collaborations with nine internationally known research organization from Europe. Together with polymer institutes from Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia, the Institute has established the Central and East European Polymer Network.



Dr. Yuri Savelyev, Deputy Director, Head of the Department of Chemistry of Linear Polymers



Medical glue LEVKIN is used for treatment of tumor-caused defects

Institute of Surface Chemistry (ISC)



17 Gen. Naumova St.,
Kyiv 03164, Ukraine
Tel.: +380 44 422 9604
Fax: +380 44 424 3567
Prof. Petro Gorbik,
Deputy Director
E-mail: ucs@ln.ua

The Institute of Surface Chemistry of the National Academy of Science of Ukraine was founded in 1985. The Institute employs 250 research staff, including 10 Doctors of Science and 60 Ph.D.s.

R&D Areas:

- New technology based on Surface Chemistry and Physics;
- Theory of chemical structure and reactivity of the surface of solids, the nature of active sites of surfaces, mechanisms of adsorption, chemical reactions, and other transformations in a surface layer;
- Medicobiological problems of surface;
- Technology for the production of nanomaterials, highly disperse oxides, and composites.

Nano-structured Silica

Development of novel applications of nano-structured silica in medicine, biotechnology and environmental protection is a primary focus at the ISC. Fumed silica, when included in cell suspensions, demonstrates high affinity for the cell surface. Due to interaction with certain terminal carbohydrates of cell

membrane receptors, high-surface-area silica nanoparticles localize at select sites of the cell membrane. As a result, nanoparticles can stimulate or inhibit functional processes in living cells, depending on the silica concentration in the cell suspension. Moreover, chemical and adsorption modification of the surface of nanoparticles by biologically active molecules diversifies the spectrum of possible effects of nano-structured silica. Other medical and biophysical applications of the proposed nano-structured materials include composites with protein molecules for the protection of blood cells from external injury factors and for the synthesis of stable biocompatible surfaces for bioimplants.

Novel Applications for Nano-structured silica and related materials

Novel media for cryoprotection of reproductive cells: The ISC has synthesized biologically active media for cell cryo-protection, and more specifically, to increase viability and longevity of post-thaw gametes for medical treatment and livestock breeding.

Sorbent for removing petroleum products from water surfaces:

Researchers at the Institute have developed sorbents that collect petroleum products from the surface of contaminated water and soil (areas of accidental spillage, polluted earth, sewage waters etc.). Adsorptive capacity of these materials is up to 30 gram of petroleum products per gram of sorbent, depending on the viscosity of hydrocarbons; the sorbent can also be used repeatedly after regeneration.

Plant protection and stimulation:

Mixtures for encapsulating seeds of agricultural plants are used as micro-fertilizers for dry treatment of seeds and cereals, technical and vegetable plants. These mixtures enlarge agricultural yield and ensure ecologically friendly production by reducing the use of fertilizers. Field tests of the mixtures have shown:

- Increase in growth energy and seed sprouts by 30%;
- Increase in yield of cereals, technical and forage plants by 30%; and

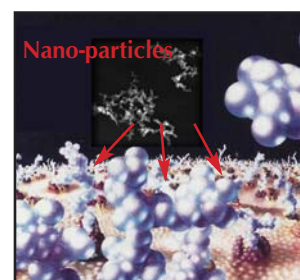
- Increase in yield of vegetables 15-35%.

Nanotechnologies for stabilization and increased efficiency of viral vaccines: ISC has developed universal stabilizers and cryoprotectors for vaccines; the technology has been successfully tested in the case of influenza and rabies vaccines.

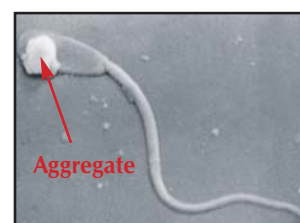
Improved production of pig embryos *in vitro* using nano-bio-composites through improved media for pig oocytes.

Hydro-gel implants for plastic

surgery: Hydro-gel implant material for plastic and cosmetic surgery, in particular for planimetric plastic surgery in the maxillofacial area (correction and reconstruction of nose, auricles, cheekbones and chin). A polymeric material is used in combination with fumed silica. The high water content (close to physiological) in hydro-gels provides for high biocompatibility, increased strength and the added capability of prolonged release of medicinal preparations.



Silica nano-particles are used for stimulation (inhibition) of a living cell functioning: a real image of silica nano-particles (20 nm) and a scheme of cell surface



Nano- aggregate (1000 nm) in cryo-media provides for safety of reproductive cells

State Administration for Drugs and Medical Items



120 Peremohy Ave.,
Kyiv 03115, Ukraine
Tel./fax: +380 44 424 1230
www.drugmed.gov.ua
Dr. Inna B. Demchenko,
First Deputy Head
E-mail: demchenko@iky.org.ua
Mr. Taras Lyaskovsky, Head of
Biologics Registration Sector
E-mail: taras@kw.ua

The State Administration for Drugs and Medical Items, a structural division of the Ministry of Health of Ukraine, is the national regulatory authority of Ukraine in the sphere of pharmaceuticals, biological and medical items.

The State Administration for Drugs and Medical Items contributes to the development and implementation of state policy, provides state regulation and control, including registration and compliance to the legislation in the field of production, import/export, quality control, and distribution control of drugs and medical items, including their sale, storage, application, utilization and elimination.

Functions of the State Administration for Drugs and Medical Items:

- State quality control of the pharma-

ceutical products;

- Licensing of production, retail and wholesale of pharmaceutical products;
- Developing and changing the State Pharmacopoeia of Ukraine, keeping records of the State Registers of **(1)** medical devices and medical items and **(2)** drugs and immunobiological products;
- GMP certification of pharmaceutical products manufacturers; and
- Accreditation of the state control laboratories.

Currently, 137 pharmaceuticals manufacturers participate in the Ukrainian pharmaceutical market. The share of the biopharmaceuticals in the total production volume is about 7%.

Ukrainian Biopharmaceuticals Manufacturers:

- Immunolog Ltd., Vinnytyssa
(ige@svitononline.com,

www.immunolog.com.ua): allergens.

- Indar JSC, Kyiv: insulin.

- Farmak JSC, Kyiv
(admin@farmak.kiev.ua,
www.farmak.ua): insulin.

- Biolik JSC, Kharkiv
(office@biolik.com.ua,
www.biolik.com.ua):
vaccines, antitoxins, blood-related
products (albumin, immunoglobulin),
bacterial products (probiotics), *in vitro*
diagnostics, nutrient medium, inter-
feron.

- Biopharma JSC, Kyiv
(biofarma@iptelecom.net,
www.biofarma.kiev.ua):
vaccines, blood-related products
(albumin, immunoglobulin), bacterial
products (probiotics), *in vitro* diagnos-
tics, nutrient medium, interferon,

interleukin, granulocyte / macrophage
colony-stimulating, erythropoietin,
hormones.

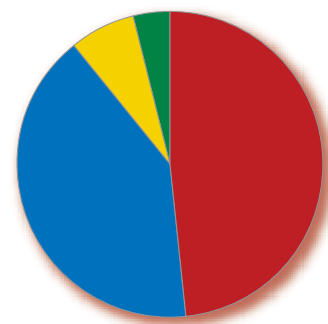
- PharmBiotek Ltd., Kyiv
(biotech@naverex.kiev.ua):
recombinant interferon, granulocyte /
macrophage colony-stimulating, hor-
mones.

- Diaprof-Med JSC, Kyiv
(tech@diapr.kiev.ua,
www.diaprof.com.ua):
in vitro diagnostics.

- State Enterprise “Science Technologi-
cal Center of Immunobiotechnology”,
Kharkiv: national standard control
panels for ELISA *in vitro* diagnostic
tests.

- Styrolbiopharm Ltd., Gorlovka
(src@pharm.stirol.net):
in vitro diagnostics.

Substances of various origin
produced in Ukraine for
human medicine



- Biotechnology
- Animal origin
- Plant origin
- Synthetic

FARMAK

Open Joint Stock Company



JSC FARMAC, a leader in the Ukrainian pharmaceuticals industry, contributes 11% of the total drug production in Ukraine, and about 15% of its production is exported to the Baltic countries, Russia, Bulgaria, Middle Asia, Germany, among others.

Open Joint Stock Company "FARMAC" was created on the basis of the Lomonosov Chemical-Pharmaceutical Plant, which was founded in 1925. Nowadays, FARMAC is a leader of Ukrainian pharmaceuticals industry and provides 11% of the total drug production for human medicines in Ukraine. The company has modern equipment and a highly qualified staff. Farmak has been certified in accordance with the ISO 9001:2000. The

company produces competitive products that meet world quality standards. For example, a line for L-Thyroxine production and a line for eye/ear/nasal drops and sprays production have been certified in accordance with GMP; other production lines are in the process of being certified. Biotechnological products include the manufacture of medicinal forms of engineered substances, namely, interferon, erythropoietin and other products.

JSC FARMAC is a leading Ukrainian exporter of pharmaceuticals. About 15% of the production volume of finished medicines is exported to the Baltic countries, Russia, Bulgaria, Middle Asia, Germany, etc. and

63 Frunze St.,
Kyiv 04080, Ukraine
Tel.: +380 44 496 8765
Fax: +380 44 496 8765
www.farmak.ua
Dr. Filya Zhebrovska,
General Director
E-mail:
fzhebrovska@farmak.kiev.ua
Dr. Oleksandr Grynevych,
Director of Biotechnology
E-mail: og41914@farmak.kiev.ua

exports are steadily increasing. The list of products exported includes more than 200 drugs, which are used in cardiology, endocrinology, allergology, rentgenology, oncology, etc. Chemical products and semi-products for substance synthesis are also among the main company's activities. FARMAK imports substances from the EU (Germany, Netherlands) and Asia (China, India).

JSC FARMAK is more actively integrating into the global pharmaceutical industry than other Ukrainian drug manufacturers. The company has an impressive track record in international cooperation. One of the company's foreign partners is the Eli Lilly and Company, USA. A cooperative project

with Eli Lilly on recombinant human Insulin production for the Ukrainian market was successfully started in December 2005. The project includes a full cycle of insulin production in accordance with the technology and substance provided by Eli Lilly.

FARMAK's current focus is the enhancement of biotechnology sector including recombinant technologies development. FARMAK is interested in cooperation with western industry in the field of biotechnology, in particular, manufacturing of vaccines, oncological, cardiological, ophthalmologic, and other products. Partnership in distribution and contract manufacturing are also of great interest.



Ampoules Line (reactors for preparation of solutions for injections)



Spray Line (reactors for preparation of oil solutions)



FARMAK's awards



The National Center of Veterinary Biological and Pharmaceutical Industry (VetBioPharmProm) is a state institution responsible for the consolidation and optimization of advances in the manufacturing of veterinary biological and pharmaceutical products, assessment of the market, and implementation of the national policy for the manufacture of veterinary medical products.

Currently in Ukraine over one hundred thirty organizations manufacture preparations for veterinary medicine, including fifteen manufacturers of biological preparations. Four state biological factories, namely Sumy State Biofactory, Dnipropetrovsk State Biofactory, Kherson State Biofactory and Nova

Galeshchyna Biofactory; three research institutes, including the Institute of Experimental and Clinical Veterinary Medicine in Kharkiv; and eight private companies manufacture biological preparations for veterinary medicine. Biopreparations account for 30% of the total production volume of veterinary preparations in Ukraine. 53 of the 89 products manufactured by Ukrainian biofactories are biological products. Currently, the Ukrainian market of veterinary preparations includes both imported preparations (about 60%) and the products of national manufacturers.

Primary Biological Products:

- Rabies Vaccine

State Department
of Veterinary Medicine
30 Donetska St.,
Kyiv 03151, Ukraine
Tel.: +380 44 244 7815
Fax: +380 44 2499138
www.vetbiopharmprom.gov.ua
Ms. Margarita Piskun, Director
E-mail:
biofarmprom@kv.ukrtel.net

- Anthrax Vaccine
- Cholera Vaccine
- Vaccine against Newcastle disease based on the La-Sota strain
- Monovalent and Polivalent Vaccine against Leptospirosis
- Vaccine “HTT” for peroral immunization of wild meat-eating animals

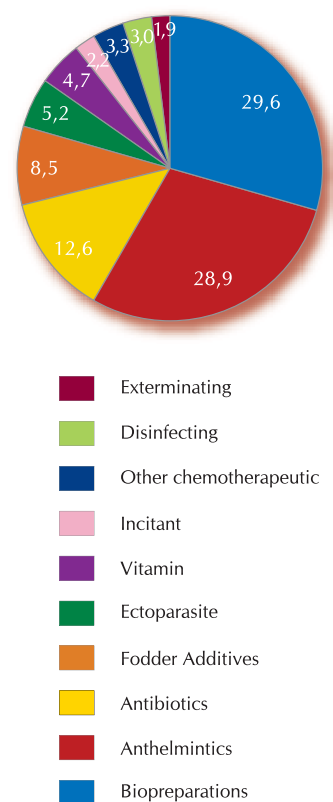
The Dnipropetrovsk State Biofactory has established a growing supply of vaccines and diagnostics for Moldova and Mongolia. The Sumy State Biofactory supplies the most products to Moldova, Uzbekistan, Azerbaijan, and Turkmenistan. The Kherson State Biofactory supplies diagnostics and vaccines for especially dangerous diseases to Kyrgyzstan and Azerbaijan. This factory has also established cooperation

in the development and joint vaccine production with the Czech company Bioveta; the following vaccines will be produced: vaccine “Liswulpen” against rabies, anthrax serum, and vaccine against horse influenza.

Recent enhancement of various foreign relations and the long state borders increase the risk of different infections including especially dangerous ones. The state veterinary service of the Ukraine is monitoring and controlling the epizootic situation in Ukraine.

VetBioPharmProm is implementing a program to facilitate international cooperation and marketing, both in the countries of the former Soviet Union and in the West.

Veterinary products in Ukraine, 2004 (percentage by pharmacotherapeutic groups)



Sumy State Biofactory



The Sumy State Biofactory is a leading manufacturer of biological products in Ukraine.

The Biofactory produces a wide range of products for the protection of people and animals from dangerous infectious diseases, such as, anthrax, rabies, tuberculosis, swine pest, Newcastle disease, etc. The veterinary products address the needs of all the basic groups of livestock.

The Biofactory occupies over eleven thousand square meters. There are four main divisions or workshops for: viral vaccines, bacterial preparations, live samples and glassware preparation, and packaging. Research laboratories provide support to ensure that the products are in line with recent scientific advances and competitive in the global market. The Biofactory's Quality Assurance System, which complies with the Ukrainian State Standards and ISO 9001:2001, ensures the high quality of the products. The Biological Con-

trol Department provides comprehensive monitoring of raw materials and production. The Biofactory is certified by the Ukrainian State Science – Control Institute of Biotechnology and Strains of Microorganisms.

Current Vaccine and Diagnostic Production:

- Live sporulated vaccine against anthrax strain SB;
- Dried virus vaccine against the Newcastle disease in poultry from the Lasota strain;
- Tuberculin – purified for mammals and poultry in standard solution;
- Dry purified allergen of atypical mycobacteria with solvent;
- Monovalent vaccines against leptospirosis in animals;
- Vaccine Rabivac “HTT” for peroral immunization of wild carnivorous animals;
- Inactivated cultural dried vaccine against rabies from “Shelkovo-51” strain (2 million doses with the index of immunization 1.8-2.0); and

25 Hamalii St.,
Sumy 40021, Ukraine
Tel.: +380 542 21 0060
Fax: +380 542 21 0065
www.biofabrika.sumy.ua
Dr. Serhiy Nychyk, Director
Email: info@biofabrika.sumy.ua

- Vaccine against swine pest.

The quality of tuberculin for mammals has been confirmed by comparison with European standards (NIBSC's products). A series of tuberculin purified for mammals has been recognized as the National standard. Allergen of atypical mycobacteria has been successfully compared with the Kursk atypical mycobacteria complex.

Plans for New Vaccine

Production:

- Live spore vaccine against anthrax;
- Cultural vaccine against chlamydial abortion of sheep;
- Cultural vaccine against swine fever;
- Vaccine against Newcastle disease with non-contaminated eggs; and
- Peroral vaccine against Newcastle disease.

The Sumy State Biofactory welcomes cooperation with western biotech manufacturers and research organizations.



Front entrance of Sumy State Biofactory



Sumy Biofactory research lab

Veterinary Medicine (VetMedicine)



83 Pushkinska St.,
Kharkiv 61023, Ukraine
Tel.: +380 57 707 2005/2053
Fax: +380 57 704 1287/1090
Dr. Borys Stegnyy,
Director, IECVM
E-mail: admin@vet.kharkov.ua
Dr. Sergey Vovk, Director,
SU "Veterinary Medicine"
E-mail: vetmed@vet.kharkov.ua

Veterinary Medicine's mission is to bring novel technologies developed at the Institute of Experimental and Clinical Veterinary Medicine (IECVM) to the Ukrainian agricultural market.

Since its establishment in 1922, IECVM has contributed to the development and production of many indispensable preparations for veterinary medicine including tuberculin, malein, Tsenkovsky's anthrax vaccine, Konev's erysipelas vaccine etc. An excellent track record of developing novel technologies in veterinary medicine has resulted in the establishment of an IECVM-based subsidiary production unit "Veterinary Medicine," (VetMedicine) in 1999.

Veterinary Medicine has been issued the state license series AA 128867, and its products are manufactured in accordance with the order by the State Department of Veterinary Medicine of

Ukraine, i.e., diseases of high priority are targeted. The Ukrzoovetsnab, an agency in charge of the delivery of veterinary products within Ukraine, the Central State Lab of Veterinary Medicine, regional state labs of veterinary medicine, state-operated and private farm holdings, and the owners of personal subsidiary plots, are among the customers of Veterinary Medicine products.

Veterinary Medicine is gradually building up production volume and the quality control system for products targeting farm animals, poultry, and bees. The preparations conform to national and international standards, as well as to customer requirements.

VetMedicine Product Line:

- *Tuberculin* – purified for mammals, for atypical mycobacteria, and for *Mycobacterium avium* indications;
- Inactivated vaccine against ND, IBD,

REO (Trivirvak Ukraine);

- “*Rokokol*” vaccine against esherichiosis, rota- and coronaviral infections;
- Inactivated vaccine against Newcastle disease of poultry;
- Inactivated vaccine against bovine infectious rhynotracheitis;
- Divalent vaccine against Marek's disease;
- Subunit inactivated vaccine against animal salmonellosis;
- Immunofermental test-systems for diagnostics of tuberculosis, brucellosis and bovine viral diarrhea;
- *Aulergin Aujeszky*;
- Test-systems for diagnosis of leukosis;
- Nutrient cultural media – 199 and Eagle;
- Antiseptic preparation “*Bimastin*”; and
- Antiphlogistic preparation “*Savejodim*”.

Veterinary Medicine welcomes collaborations with western companies.



Centers of excellence



Sergey Vovk, director of Veterinary Medicine

Dnipropetrovsk State Biological Factory



The Dnipropetrovsk State Biological Factory was created in 1931 on the basis of the Ekaterinoslav veterinary-sanitary bacteriological institute. The Biofactory manufactures veterinary products for Ukrainian and foreign markets.

Currently, the Biofactory produces veterinary preparations in collaboration with the company VETOQUINOL-BIOWET, Poland. The iron-containing preparation “Suiferon” for pigs is produced at the factory in accordance with the license. On behalf of Dnipropetrovsk Biofactory, the preparation is sold in Poland and other countries. “Biowet-Ukraina” Ltd, a company with foreign investments, was founded to develop this collaboration.

The factory also cooperates with SC “Reagent” to manufacture the following products: Injection and powder-like

forms of preventive preparations for animals, such as, antibiotics, anti-helminthes, and vitamin preparations; and chemical reagents for monitoring the quality of vegetable and animal products, namely meat, milk products, fish, vegetables, fruits, honey, and others.

The Factory's team plans to create a modern pharmaceutical facility for the production of veterinary preparations in accordance with world standards.

Other Specialized Products:

BESHIVAK – vaccine against erysipelas of pigs;

BESHIFORM – concentrated aluminum hydroxide vaccine against ugly erysipelas;

Vaccines for pasteurism of livestock, buffalos, sheep, pigs, ducks, geese; and Inactivated vaccine against Newcastle disease of birds.

18 Rogaleva St.,
Dnipropetrovsk 49044,
Ukraine
Tel.: +380 562 45 5168
Fax: +380 56 776 2570
Mr. Yakov Zorin, Director
E-mail: zorin_max@mail.ru

Kherson Biological Factory

The Kherson Biological Factory, a state-owned enterprise, is the oldest biological factory in Ukraine. It was established on the basis of the Kherson Province Bacteriological Laboratory, which was founded in 1892.

The Biofactory occupies an area of 12 hectares in the city of Kherson. It subordinates to the Ministry of Agrarian Policy of Ukraine. The Biofactory manufactures modern veterinary products, including diagnostics, prophylactic preparations, and biological preparations for veterinary medicine. High product quality, the employment of new technologies, and a thorough quality control system ensures steady consumer demand for the products of Kherson Biofactory. The Biofactory is a regular participant in

many specialized conferences and exhibitions; it has been awarded the diplomas AGRO 2002, AGRO 2003, and AGRO 2004.

During 1998-2004, the Kherson Biofactory has launched commercial production of seven new highly efficacious veterinary preparations.

Specialized Products:

- Hog cholera – dry lapinized viral vaccine (ACB) of strain K;
- Anthrax live tissue-culture vaccine of strain K-79Z against anthrax of animals; and
- Brucellar antigens for Rose Bengal Test, and for circular reaction with milk.



9 Admiral Makarov St.,
Kherson 73011, Ukraine
Tel./fax: +380 552 29 2322
Mr. Yuriy Yakovlev, Director
E-mail: bf@ist.com.ua

STCU Points of Contact

POINTS OF CONTACT

CANADA

Angela Bogdan

Board Member
Director, Global Partnership Program (GPX),
Department of Foreign Affairs and
International Trade of Canada

Contact person at the Canadian Government

Stephane Lessard

Senior Project Manager,
Science & Technology Programs,
Global Partnership Program (GPX),
Department of Foreign Affairs and
International Trade of Canada
125 Sussex Drive, Ottawa,
Ontario K1A 0G2, Canada
Tel.: +1 (613) 944-0827
Fax: +1 (613) 944-1130
E-mail: stephane.lessard@
international.gc.ca

EUROPEAN UNION

Zoran Stancić

Chairman of the Board
Deputy Director-General,
Directorate-General for Research,
European Commission

Contact person at the European Commission

Barbara Rhode

Head of Unit
Directorate-General for Research, Direction
N: International Scientific Cooperation,
Unit N3: Multilateral Cooperation activities,
European Commission

Square de Meeus 8, B-150 Bruxelles, Belgium
Tel.: +322 295-9888
Fax: +322 296-9227
E-mail: barbara.rhode@cec.eu.int

UKRAINE

Yaroslav Yatskiv

Board Member
Academician,
National Academy of Sciences of Ukraine

Contact person at the Ukrainian Government

Borys Atamanenko

Principal Deputy Executive Director,
STCU Secretariat
Tel.: +380 44 490-7150
Fax: +380 44 490-7145
E-mail: borys.atamanenko@stcu.int

USA

Victor E. Alessi

Board Member
President & CEO,
United States Industry Coalition, Inc.

Contact person at the US Government

Jane J. Tannenbaum

Coordinator, Science Centers Program
NP/PTR, Bureau of Nonproliferation,
Office of Proliferation Threat Reduction
US Department of State
2201 C Street, NW
Washington, DC 20520, USA
Tel.: +1 202 736-7693
Fax: +1 202 736-7698
E-mail: tannenbaumjj@state.gov

STCU SECRETARIAT

Science & Technology Center in Ukraine Headquarters

21 Kamenyariv St., Kyiv 03138, Ukraine
Tel.: +380 44 490-7150
Fax: +380 44 490-7145
E-mail: stcu@stcu.int
Website: www.stcu.int

Andrew A. Hood

Executive Director (USA)
E-mail: andrew.hood@stcu.int

Borys Atamanenko

Principal Deputy Executive Director
(Ukraine)
E-mail: borys.atamanenko@stcu.int

Landis Henry

Deputy Executive Director (Canada)
E-mail: landis.henry@stcu.int

Michel Zayet

Deputy Executive Director (EU)
E-mail: michel.zayet@stcu.int

Curtis "B.J." Bjelajac

Chief Financial Officer (USA)
E-mail: curtis.bjelajac@stcu.int

David Cleave

Chief Administrative Officer (EU)
E-mail: david.cleave@stcu.int

Lyubov Taranenko

Governmental Partnerships Manager
E-mail: lyubov.taranenko@stcu.int

Boris Komarov

Non-governmental Partnerships Manager
E-mail: boris.komarov@stcu.int

STCU-funded projects cover a wide range of disciplines, including over forty on-going projects in the fields of biotechnology, agricultural sciences, and medicine. For forward-looking organizations, the STCU offers a great opportunity to examine the many products and services available at our member institutes.

