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
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
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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

#### Pharmaceuticals

- Biolik
- Biopharma
- Diaprof-Med
- Dnipropharm
- Farmak
- Imunolog
- Indar
- L'vivdialik
- PharmBiotek
- Styrolbiopharm

#### Vaccines
- diagnostics
- probiotics
- nutrient media
- albumin
- immunoglobulin
- insulin

#### Vet Preparations

- Biopvetpharm
- Dnipropetrovsk Bioplant
- Kherson Bioplant
- Galeshchyna Bioplant
- Sumy Bioplant
- Vetmedicine

#### Research

- peptides, proteins, nucleic acids
- supramolecular systems
- gene and cell engineering
- microorganisms and viruses for biotechnology
- yeasts-based processes and products
- production of pharmaceutical human proteins in plants
- biologically active substances and preparations
- medical and veterinary diagnostics
- detecting GM materials in plants and food
- biosensors and nanomaterials

- Institute of Biochemistry
- Institute of Biocolloidal Chemistry
- Institute for Bioorganic Chemistry and Petrochemistry
- Institute of Cell Biology
- Institute of Cell Biology and Genetic Engineering
- Institute of Epidemiology and Infection Diseases
- Institute of Macromolecular Chemistry

- Institute of Microbiology and Virology
- Institute of Molecular Biology and Genetics
- Institute of Surface Chemistry
- Ukrainian Anti Plague Research Institute
- Institute of Animal Breeding and Genetics
- Institute of Experimental and Clinical Veterinary Medicine

#### Supporting Institutions

- 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
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 innoculant for plant KLEPS®;

• Electrochemical and optical biosensors for medicine and the control of biotechnological processes;

• Electrochemical mono- and multi-biosensor test systems for environmental 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.
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.

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

(a) intact cells and (b) cells treated with cytotoxic mistletoe lectin
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 plantome 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
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 \textbf{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 \textit{in vitro} bank.

\textbf{Opportunities for commercialization and collaborative production:}

- Creation of transgenic plants with traits of interest based on \textit{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 antimitotubule 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.
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, agriculture, 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
• **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;
• **Karofol** (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 lactic 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 decbranatica* 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
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-
BIO RESEARCH

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 sanitary 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.
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, zoogenic 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); zoogenic 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 depositary 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...
immunization of wild animals;
• Assessment for the protection of children with serious chronic diseases from infections by means of specific immunoprophylaxis;
• AIDS, viral hepatitis, meningencephalitis, influenza, parasitoses, enteroviruses, 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 diagnostic 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 immunoglobin;
• Herpes virus thymidine kinase activity inhibitor;
• HIV and reverse transcriptase inhibitor;
• HIV inhibitor with immunostimulating property;
• Etiological human immunoglobin against influenza; and
• Test-system for detecting antibodies against Epstein-Barr virus.

Manufacturing Technologies for Medical Preparations:
IZATIAZON (anti-herpetic preparation), BIOSPORIN (anti-diphtheria and anti-candida preparation), SUBALIN (regulator of endogenous interferon), 6-AZACYTIDINE (antiviral and antimycoplasma 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, Canada, and other countries, and has been the recipient of grants from multiple international organizations, including the WHO, STCU, INTAS, NATO.
I ECVM 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
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 Scientific 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 (BFAV) 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.
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 parthenogenesis in *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 parthenogenon 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.
Institute of Biochemistry (IBC)

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 glucooxidase 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 leukemias;
- 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.
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 to the petrochemical industry.

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, lipoxygenases 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.

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Technologies for cooperative development and commercialization:

- Production of novel plant-growth regulators;
- Medical preparation “Teobonditiomicozid” and “Sulfocarbation-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.
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 technologies 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);
• 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.
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.

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• 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 organizations 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.
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 nanostructured 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 microfertilizers 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.
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 pharmaceutical 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 devises 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:**
- Imunolog Ltd., Vinnytsya
  ige@svitonline.com,
  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@liky.org.ua
  Mr. Taras Lyaskovsky, Head of Biologics Registration Sector
  E-mail: taras@kw.ua

Ukraine
• Indar JSC, Kyiv: insulin.

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


• Biopharma JSC, Kyiv (biofarma@iptelecom.net, www.biofarma.kiev.ua): vaccines, blood-related products (albumin, immunoglobulin), bacterial products (probiotics), in vitro diagnostics, nutrient medium, interferon, interleukin, granulocyte / macrophage colony-stimulating, erythropoietin, hormones.

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


• State Enterprise “Science Technological Center of Immunobiotechnology”, Kharkiv: national standard control panels for ELISA in vitro diagnostic tests.

• Styrolbiopharm Ltd., Gorlovka (src@pharm.stirol.net): in vitro diagnostics.
JSC FARMAK, 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 “FARMAK” was created on the basis of the Lomonosov Chemical-Pharmaceutical Plant, which was founded in 1925. Nowadays, FARMAK 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 FARMAK 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.
exports are steadily increasing. The list of products exported includes more than 200 drugs, which are used in cardiology, endocrinology, allergology, renitgenology, 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.
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, Dnipropetrivskyi State Biofactory, Kherson State Biopfactory 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
• 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.
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 Control 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 La sota 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

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www.biofabrika.sumy.ua
Dr. Serhiy Nychyk, Director
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• 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 chlamidial 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.
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 rhinotracheitis;
• 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.
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, anthelmintes, 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.
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 again anthrax of animals; and
- Brucellar antigens for Rose Bengal Test, and for circular reaction with milk.

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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.