Bio and Medical R&D Cooperation with Russia through the International Science and Technology Center (ISTC)

ISTC as a mechanism to stimulate cooperation with Russia on innovation

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ISTC - Background

- Founded in 1992 by the governments of the EU, Japan, USA and Russia; operations began in 1994; Later, Norway, S. Korea and in 2004, Canada joined as Funding Parties
- Comprised of 39 nations, with the status of a diplomatic mission facilitating international R&D projects and commercialisation
- ISTC is one of the largest sponsors of R&D in Russia supporting former defence scientists and the broader scientific community
- ISTC is headquartered in Moscow and has offices in Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan and Tajikistan

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ISTC Main Objectives

- Help to **solve** international science & technology problems
- Promote **sustainability** and reinforce the **transition to the market economy** in Russia, Georgia and other members of the CIS
- **Integrate** Russian and CIS scientists into the global scientific community
ISTC Project Location
R&D Network

- **Network** of over 900 R&D Institutes and research centers in Russia, Georgia and CIS
- More than 70,000 **expert scientists**
- Over 2,750 completed or on-going **projects** to the value of USD $850 Million
- 6,000 **project proposals**
Service Oriented

A wide range of services focused on Business and Research Development:

- Technology Matchmaking
- R&D Project Management
- Commercialization Support Program
- Sustainability Support Program
- Competency Building
- Event and Workshop Management
- Travel and Logistical Support

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R&D Projects via ISTC

• **Regular Projects**
  - Financed by Governments
  - Technical advice from **Collaborators**
  - IP Retained by Institute / Scientists

• **Partner Projects**
  - Financed in full by ISTC **Partners**
  - IP Negotiated between Partner & Scientists
Technological Areas of Projects

USD $854 million (2749 projects)

- Environment: 17%
- Biotechnology: 13%
- Agriculture: 4%
- Medicine: 10%
- Physics: 13%
- Chemistry: 6%
- Materials: 8%
- Information and Communication: 3%
- Fission Reactors: 11%
- Non-nuclear Energy: 3%
- Istrumentation: 4%
- Space, Aircraft and Surface Transportation: 3%
- others: 5%
- EU; 28.4%
- Japan; 7.5%
- USA; 25.9%
- Partner; 31.4%
- Other; 2.7%
- Canada; 4.2%

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ISTC Partners in 2010
430 +

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Japanese Partners of ISTC

ISTC has 74 Japanese Partners:

- 63 Private Companies
- 11 Universities / Research Organisations

USD $ 7.3 million via 66 R&D Projects

Also Japanese Universities & Companies act as ISTC Collaborators on Japan Funded Projects

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Japanese Workshop Series and Japan Promotion

(Japan Workshops)
- Phage Therapy
- Probiotics research
- Infectious Diseases in Russia
- Environmental / Bio / nano technologies
- Radiation Health Effects
- Cytogenetic Biodosimetry
- Brain Science and Technology

(Japan Promotion)
- JETRO BIOLINK FORUM
- Bio Forum & Bio Expo Japan
- “Renewable Energy” International Exhibition and Conference in Japan
- BIOJAPAN and CEATEC

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Technical directions of the Bio-Medical ISTC projects

- Biology and Biosecurity: 14%
- Agriculture and Food: 14%
- Surveillance: 13%
- Omics: 6%
- Diagnostics: 11%
- Vaccines: 6%
- Drugs: 19%
- Medicine: 7%
- Ecology: 4%
- Biodiversity: 3%
- Bioremediation: 3%
- Surveillance: 13%

$220 Million, 600 projects

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ISTC Targeted Initiatives

- Drug Design & Development (3D-TI)
- Probiotics & Health
- Counter Bio-Terrorism
- Fuel Cells
- Law Enforcement Technology
- Laser Technologies
- Nuclear Forensics

→ Develop a portfolio of ISTC projects and support activities toward organized fundings

- Long-term cooperative R&D among Research Institutes and other relevant national/international organizations
Drug Design & Development Targeted Initiative (3D-TI)

- Support Innovative Medicine R&D

- Enhance Preclinical Development and Production Capacities

- Identify Drug Design and Development Projects w/Commercial Potential
Science and Technology in the Prevention of Biological Threats Targeted Initiative (STPBT-TI)

- Prevention of Biological Threats:
  Microorganism Tracking, Counter-Action, Containment

- New Techniques and Technologies for
  Detection of biological threats
  Diagnosis in the case of incidents

Special attentions to Safety of Food Supplies

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Probiotics & Health Targeted initiatives (TI-PROBIO)

- Russian Nobel Laureate E. Metchnikoff initiated the Concept of “Probitics”

- Preservation and improvement of human health through the use of Probiotics
  Development of efficient treatment and prophylactic microbial preparations
  Development of food stuff for functional nutrition

- Coordination among research institutes, government organizations, and business

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Large Scale Data Analyses

• New Methods of Computational Annotation of Bacterial Genomes: Development and Application

• Comparative Genomics and Metagenomics: Models, Algorithms and Large Scale Analysis;
  • Institute of Strategic Stability, Moscow, Russia (ASJ) Russian Academy of Sciences / Institute of Problems of Information Transmission, Moscow, Russia
  • Forschungszentrum för Umwelt und Gesundheit GmbH / Institute for Bioinformatics, Neuherberg, Germany
  • INRA-UEPSD, France
New Quality of Disease Surveillance

RF Pandemic Flu Preparedness with participation of WHO & CDC

Research Institute of Influenza, St Petersburg
Ivanovsky Institute of Virology, Moscow
+50 regional RF laboratories

Main tasks:
• improving reporting to RF MOH, WHO
• Comprehensive and standard methods of flu diagnostics
• Training of lab staff

Result – front line of pandemic flu detection in RF May-August, 2009
Training Centre for other regional labs including Rospotrebnadzor
New Diagnostics Tools

**BIOCHIPS:** 9 projects for $3 million
Application: MDR/XDR-TB orthopox virus, herpes virus, HCV/B, HIV, STD, biosecurity, individual genetic identification, blood safety, seasonal & pandemic flu

New company created to produce microchips for RF MOH (OOO Biochip-IMB, www.biochip.ru)
**Drug Discovery**

*in silico* modelling:
- Search of structures
- Prediction of biological properties and toxicity
- Screening (HTPS)
- New targets & docking
- Delivery systems

**Support of Consortiums & Clusters:**
- ORCHEMED Consortium - Established in 2004 to advance drug development efforts of its members for licensing to pharmaceutical companies
- TB Consortium – Established in 2007 to advance TB research in RF
- Creating of the RF “National System of Biological Screening (NSBS)"
- CIS Collaborative Drug Discovery Hub

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Vaccine Development

Main directions:

- Socially important infections (16) – HIV (5), TB (2), hepatitis (2), influenza (2), measles, hantaviruses, pertussis, rubella (5);
- Extremely dangerous infections (15) – glanders, TBE, tularemia, legionellosis, rabies
- Animal diseases (9) – Marek’s disease, PRRS, classical swine fever, postweaning diarrhea and salmonellosis, avian laringothracheitis, sheep pox, FMD, brucellosis,
- Cancer (2)
- Delivery systems (1)
- Adjuvants (1)
Probiotics

• Study of Biodiversity of Lactic acid bacteria
  Danone Research
  w/ Moscow State University
  the Institute of Immunology Engineering in
  Lyubuchany

• Yamamura Georgia Yogurt
  Yamamura milk Co.
  w/ Prof. Dalakishvili
  Georgian Academy of Sciences /
  A. Natishvili Institute of
  Experimental Morphology
Allocation of Research Funds in Bio-Med fields

Biotechnology
- Biochemistry: 40.0%
- Biodiversity: 30.0%
- Radiobiology: 20.0%
- Other: 10.0%
- Microbiology: 0.0%
- Industrial Biotechnology: 0.0%
- Cytology, Genetics and Molecular Biology: 0.0%

Medicine
- Diagnostics & Devices: 50.0%
- Vaccines: 40.0%
- Disease Surveillance: 30.0%
- Drug Discovery: 20.0%
- Radiomedicine: 10.0%
- Other: 0.0%

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Opportunities are here! from recent Promising Technologies

• Studies and Evaluation of Entomopathogenic Fungi as Bio Pesticides Producers
• Determination of epidemiological factors and control of fungal disease complex on cereal crops in Russia using biotechnology and information technology
• New diagnostic test-system for anti-cancer therapy
• New approaches to bacillary spores disinfection with the help of integrated influence with minimal-optimal radiation doses
• Diagnostics of Colorectal Cancer
• Incapsulation of Pre- and Probiotics
• Biodegradable Fe-stents
• Probiotics of Georgia and “Caucasian Longevity” Phenomenon
• Bionanomaterials
• Substances for Plant-Based Medicine
• Hepatocelullar carcinoma in the Republic of Tajikistan

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Opportunities are here!
from recently Completed Projects (1)

- Development of Electrochemical Biosensors Using Nano Structured Materials Involving Carbon-Containing Compounds
- Multi-functional Bioactive Nano-structured Coatings for Load-Bearing Implants
- New Approaches to Bacillary Spores Desinfection with the Help of Integrated Influence with Minimal-Optimal Radiation Doses
- Development of Test Kits to Diagnostically Significant Antigens of Yersinia Pestis with the Use of Combinatorial Phage Libraries of Miniantibodies
- Microflora of Inflammatory Process in Chronic Prostatitis and Urogenital Tracts in Men and Phage Therapy Prospects
- Development and Production of Reagents for Diagnosis of Dangerous Bacterial Zoonotic Infections
- Production and Usage of Polyvalent, Polycomponent Clinical - Prophylactic
- Bacteriophage Preparation for Treatment of Diseases Caused by E. coli, Salmonella and Shigella
- The Surveillance of New Antibiotics from Kazakhstan Soils Actinomycetes, Active Against Methicillin-Resistant Staphylococci with Multiple Drug- Resistances
Opportunities are here!
from recently Completed Projects (2)

- Development of New Effective Pharmaceuticals for Combined Chemotherapy of Infections
- Methylation as Epigenetic Factor in Progression of Cervical Tumors Associated with Human Papilloma Virus Infection
- Electronic Structure and Conformational Dynamics of Biologically Active Organic Compounds and Proteins Related to Developing New Diagnostic Express Methods for Biomedical Applications
- New strategy of anti-tuberculosis BCG vaccination: oral administration in conjunction with heterologous protective antigens prime-boost delivery strategy
- Development and Research of New Biomaterials on the Basis of Polymers and Metal-Polymer Nanocompositions
- Implementation of an Irradiation Base for Clinical Studies on Neutron Capture Therapy at the IRT MEPhI Nuclear Reactor with use of an Epithermal and Thermal Neutron Beam Contrast Agent Dynamics in Ultrasound Biomedical Applications
Opportunities are here!
from recently Completed Projects (3)

• Smart Biosensor Systems for Analysis of Blood Esterases, Assessment of Esterase Status of Organisms, and Biomonitoring
• New approaches to designing anti-HIV compounds targeting late steps of HIV-1 replication
• Recombinant Human Interferon-Beta
• Double-Stranded RNAs
• Viral Gastroenteritis in Russia
• Early Nonphototoxic Luminescence Diagnostic of Cancer
• HIV-1 integrase inhibitors
• Bionanotechnology for Bacteria Detection
• Porous Dental Implants
• Monolithic Sorbents for Biochromatography
• Thromboresistant Polymers for Implantants
• National Tuberculosis Reform Program, Republic of Armenia
• Foot and Mouth Disease Control Program in Kyrgyz Republic
• Pectin Production
Thank you for your attention!

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