



ICGEB: Leading Research and Beyond

Wendy Craig

Group Leader - Biosafety

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1987-1995
a special project
of UNIDO



1995-today
An independent
international
organisation

The ICGEB mandate

An International
Organisation for research,
training and technology
transfer in Life Sciences to
promote sustainable global
development



ICGEB Director, Arturo Falaschi with UNIDO Director General,
Mauricio de Maria y Campos, 20 February 1996, Transfer of Assets
UNIDO-ICGEB

Developing Knowledge



Biotechnology for global development

Health

Biopharmaceuticals

Vaccines

Diagnostics for viral and genetic disease

Agriculture

Enhance productivity

Pest protection

Herbicide tolerance

Environmental adaptation

Improve nutritional composition of foods

Reduce allergenicity

Environment

Sanitation

Clean water

Bioremediation

Energy

Synthetic biology and biofuels



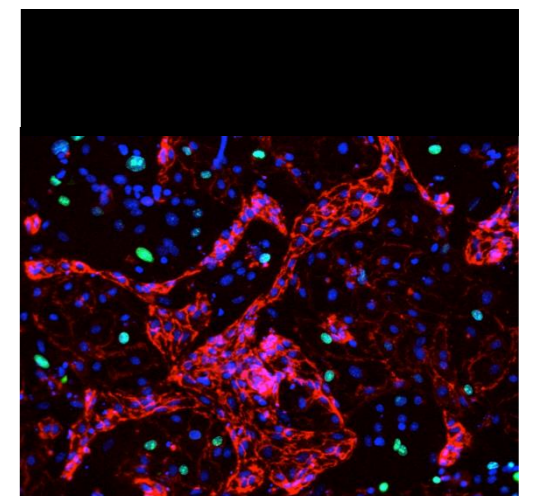
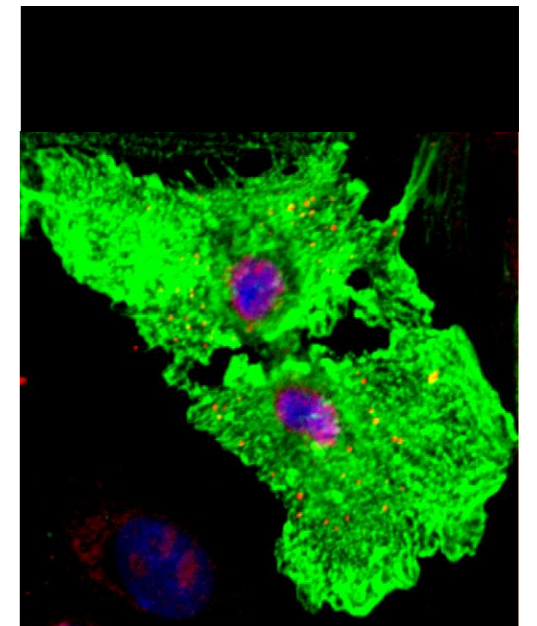
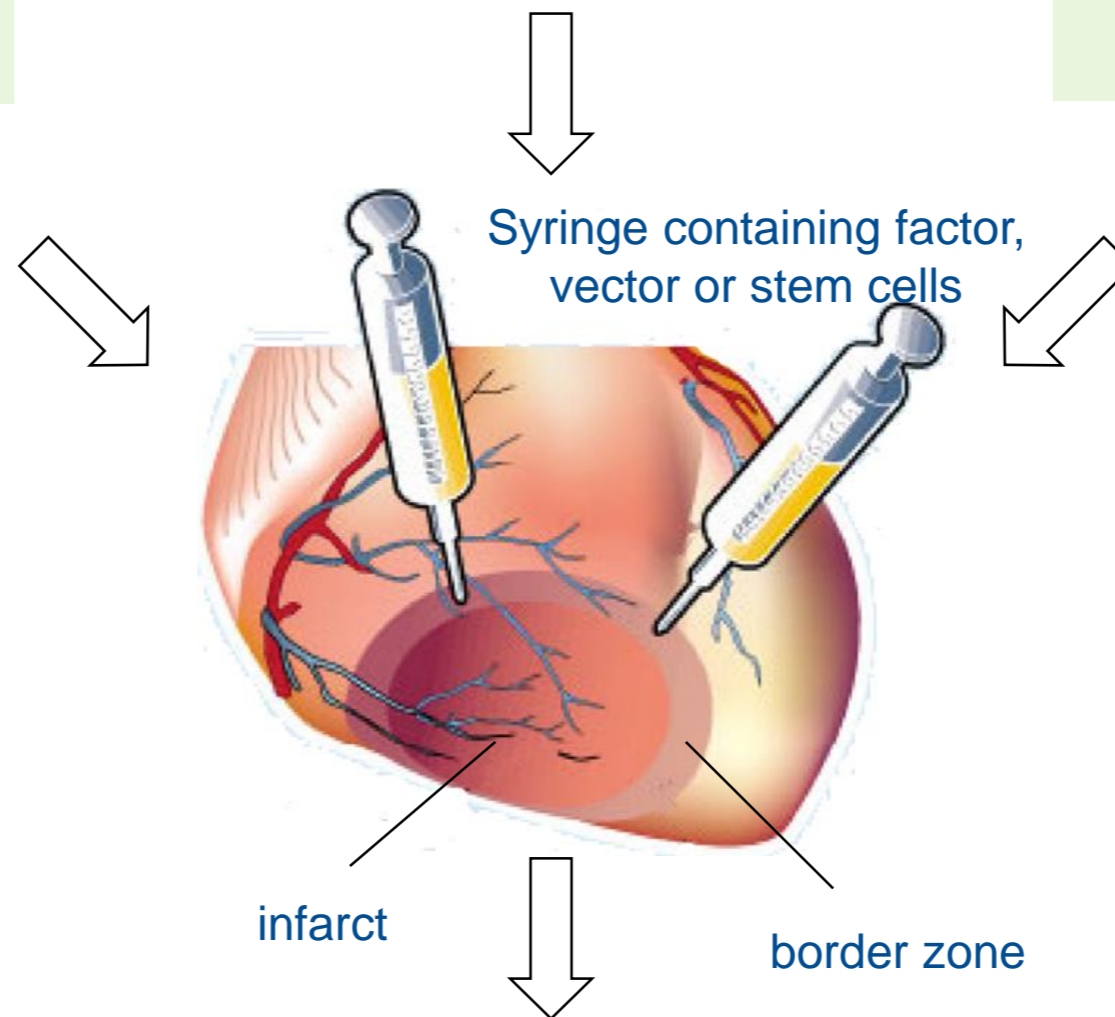
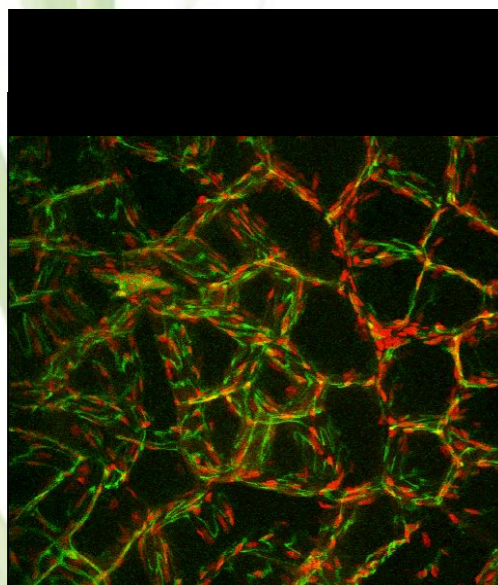
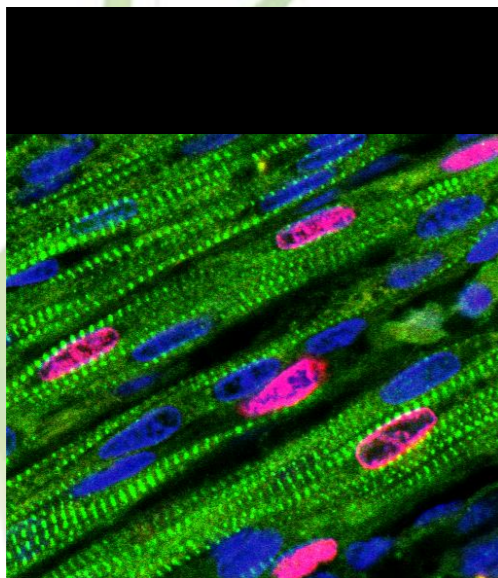
Biotherapeutics for myocardial ischemia and heart failure

Recombinant proteins

Gene Therapy

AAV vectors, miRNAs

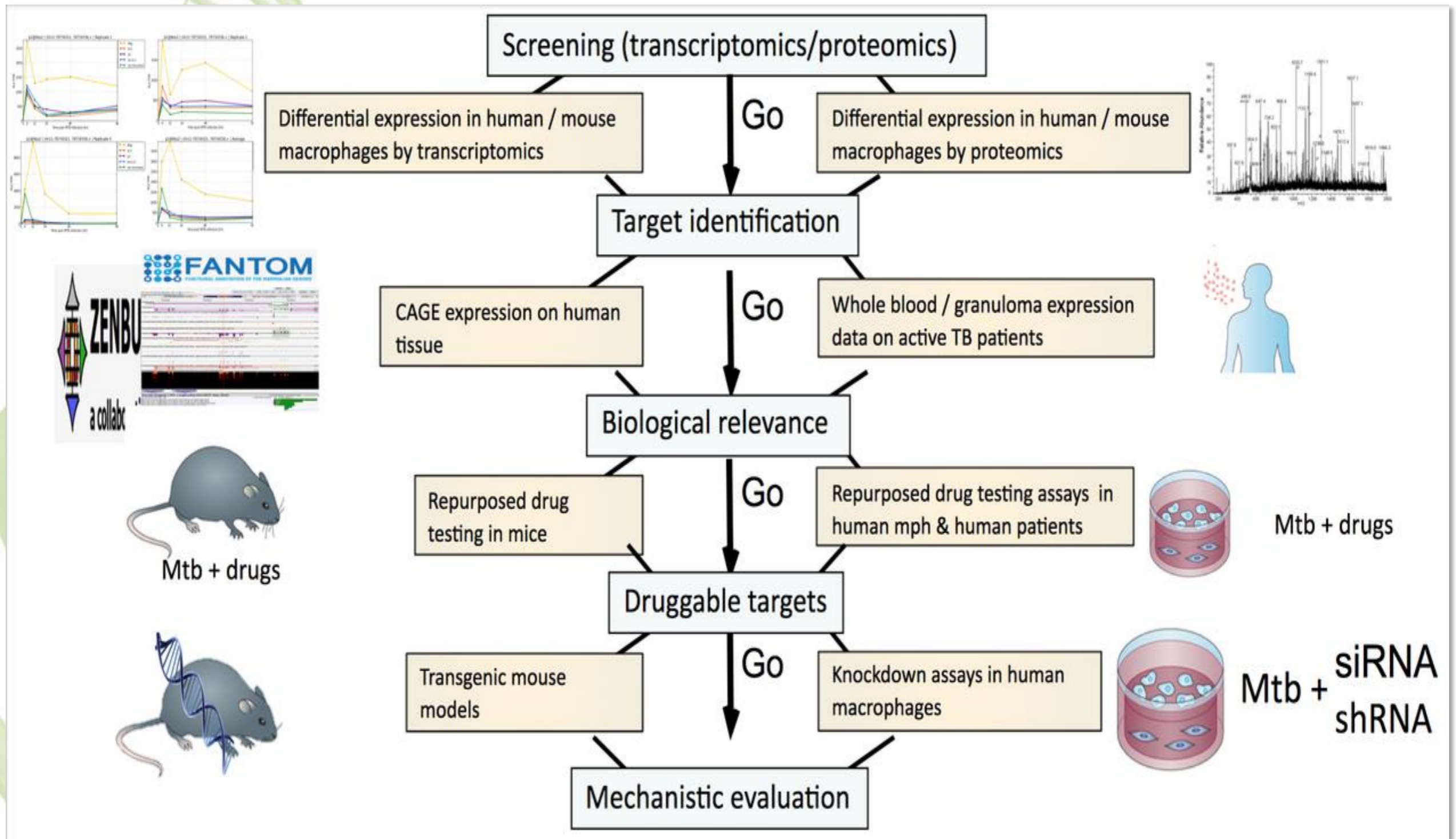
Cells



Neoangiogenesis
Cardioprotection
Cardiac regeneration



Host-directed Drug Therapy (e.g. Tuberculosis)



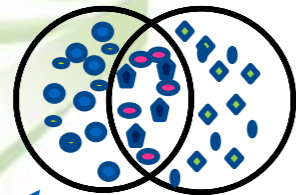
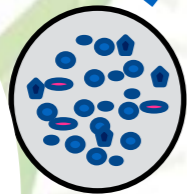


Plant Microbiomes Studies

DISEASED PLANTS



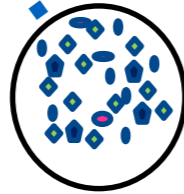
PATHOBIOME



HEALTHY PLANTS



MICROBIOME



Identify

Pathogen Cooperators &
Beneficial Bacteria

How bacteria signal and form stable multispecies communities



Multispecies Community

- *Signals*
- *Cooperation*
- *Antagonism*
- *Stability*

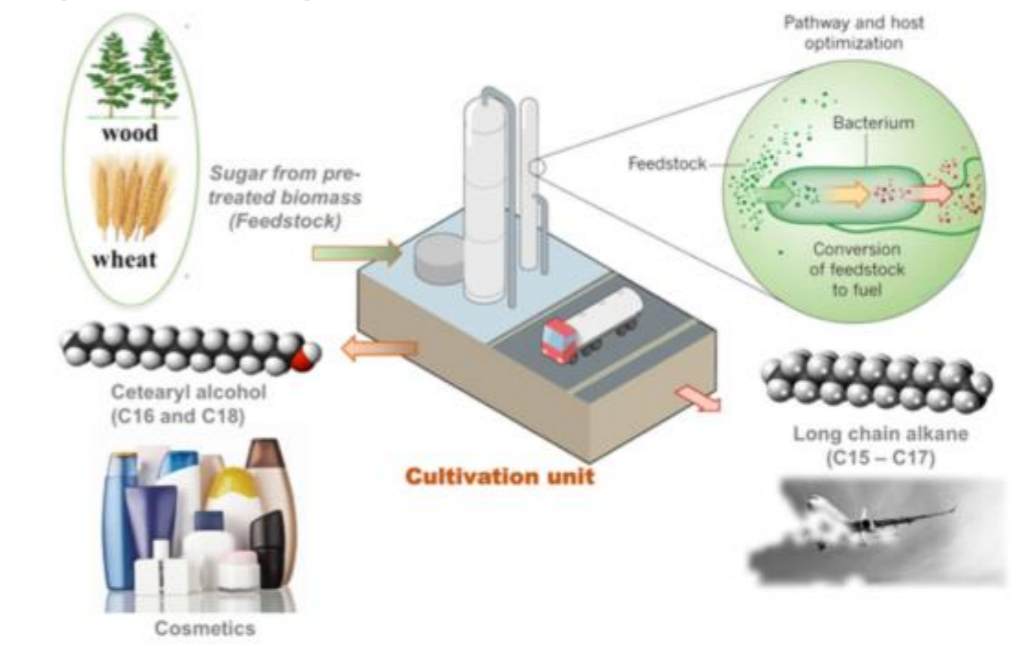
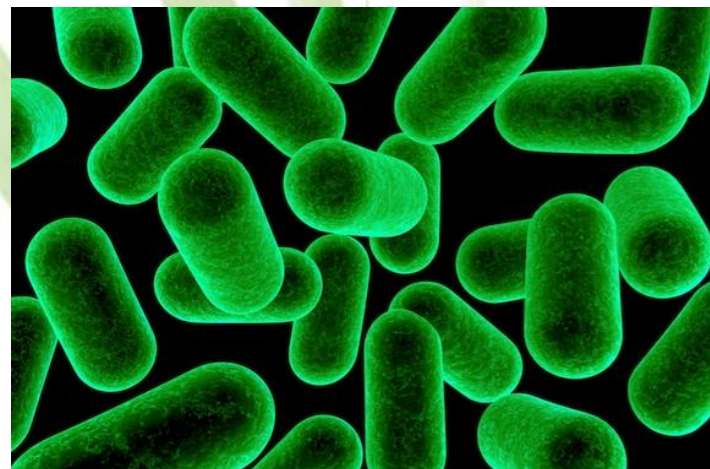
Identify

Beneficial Bacteria as Probiotics



Microbial Engineering Research

- **Cellulase/hemicellulase** – Genome engineering of fungi to produce high quantities of cellulolytic enzymes for the hydrolysis of agricultural and forestry residues
- **C5/C6 fermentation** – Development of microbial biocatalysts for fermentation of all sugars released from biomass to produce cellulosic ethanol at high yield, titer and productivity
- **Butanol production** – CRISPR/Cas9 technique to develop marker-free strains for butanol production
- **Cetaryl/long-chain alcohols and alkanes** - Metabolic engineering of bacterial strains to produce fuel and cosmetic molecules in high quantities
- **Systems Biology application** to identify gene targets for advanced biofuel production





The ICGEB instruments of action

Cutting-edge **research** in its laboratories in Trieste, New Delhi and Cape Town

- Advanced education supported by long- and short-term **fellowships** for PhD students and post-docs
- Organisation of **meetings, courses and workshops** at the international level
- Competitive **grants** for scientists in Member Countries, including Early Career Return Grants
- **Technology transfer** to industry for the production of biotherapeutics and diagnostics
- Provision of **technical assistance** and capacity enhancement in the regulation of biotechnology and its products





The Arturo Falaschi Fellowship Programme

PhD Fellowships

Hendrina Shipanga, former Student, ICGEB Cape Town

Trieste **New Delhi** **Cape Town**
ITALY **INDIA** **SOUTH AFRICA**

ICGEB offers competitive **PhD Fellowships** in **Life Sciences** to highly motivated scientists wishing to pursue PhD research studies in a **world-class scientific environment**.

Fellowships include:

- Participation in a competitive research programme
- Access to state-of-the-art-facilities
- Participation in ICGEB Meetings, Seminars and Journal Clubs
- A competitive stipend, travel provision plus full coverage of tuition fees and health insurance

Closing date for application:

31 March 2019

Nationals from **ICGEB Member States** are encouraged to apply

Afghanistan, Algeria, Argentina, Bangladesh, Bhutan, Bosnia and Herzegovina, Brazil, Bulgaria, Burkina Faso, Burundi, Cameroon, Chile, China, Colombia, Costa Rica, Côte D'Ivoire, Croatia, Cuba, Ecuador, Egypt, Eritrea, FYR Macedonia, Hungary, India, Iran, Iraq, Italy, Jordan, Kenya, Kuwait, Kyrgyzstan, Liberia, Libya, Malaysia, Mauritius, Mexico, Montenegro, Morocco, Namibia, Nigeria, Pakistan, Panama, Peru, Qatar, Romania, Russian Federation, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia, South Africa, Sri Lanka, Sudan, Syrian Arab Republic, Trinidad and Tobago, Tunisia, Turkey, United Arab Emirates, United Republic of Tanzania, Uruguay, Venezuela, Viet Nam, Zimbabwe

www.icgeb.org/fellowships.html



Information and Applications:

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Loc. Padriciano, 99 - 34149 Trieste, ITALY
Tel: +39-040-3757382/7347

Email: Fellowships@icgeb.org | www.icgeb.org



The Arturo Falaschi Fellowship Programme

Postdoctoral Fellowships

Mohammad Khalid ZAKARIA, Postdoc - ICGEB Trieste

Trieste **New Delhi** **Cape Town**
ITALY **INDIA** **SOUTH AFRICA**

ICGEB offers competitive **Postdoctoral Fellowships** in **Life Sciences** to highly motivated scientists wishing to pursue post-doctoral research in a **world-class scientific environment**.

The Fellowships comprise a very **competitive** package including stipend, travel provision, health insurance and additional benefits.

The most successful fellows will also be eligible to apply for ICGEB **Early Career Research Grants** to support their **own research** programmes as young PIs upon return to an ICGEB Member State.

Closing dates for applications:

31 March and 30 September 2019

Nationals from **ICGEB Member States** are encouraged to apply

Afghanistan, Algeria, Argentina, Bangladesh, Bhutan, Bosnia and Herzegovina, Brazil, Bulgaria, Burkina Faso, Burundi, Cameroon, Chile, China, Colombia, Costa Rica, Côte D'Ivoire, Croatia, Cuba, Ecuador, Egypt, Eritrea, FYR Macedonia, Hungary, India, Iran, Iraq, Italy, Jordan, Kenya, Kuwait, Kyrgyzstan, Liberia, Libya, Malaysia, Mauritius, Mexico, Montenegro, Morocco, Namibia, Nigeria, Pakistan, Panama, Peru, Qatar, Romania, Russian Federation, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia, South Africa, Sri Lanka, Sudan, Syrian Arab Republic, Trinidad and Tobago, Tunisia, Turkey, United Arab Emirates, United Republic of Tanzania, Uruguay, Venezuela, Viet Nam, Zimbabwe

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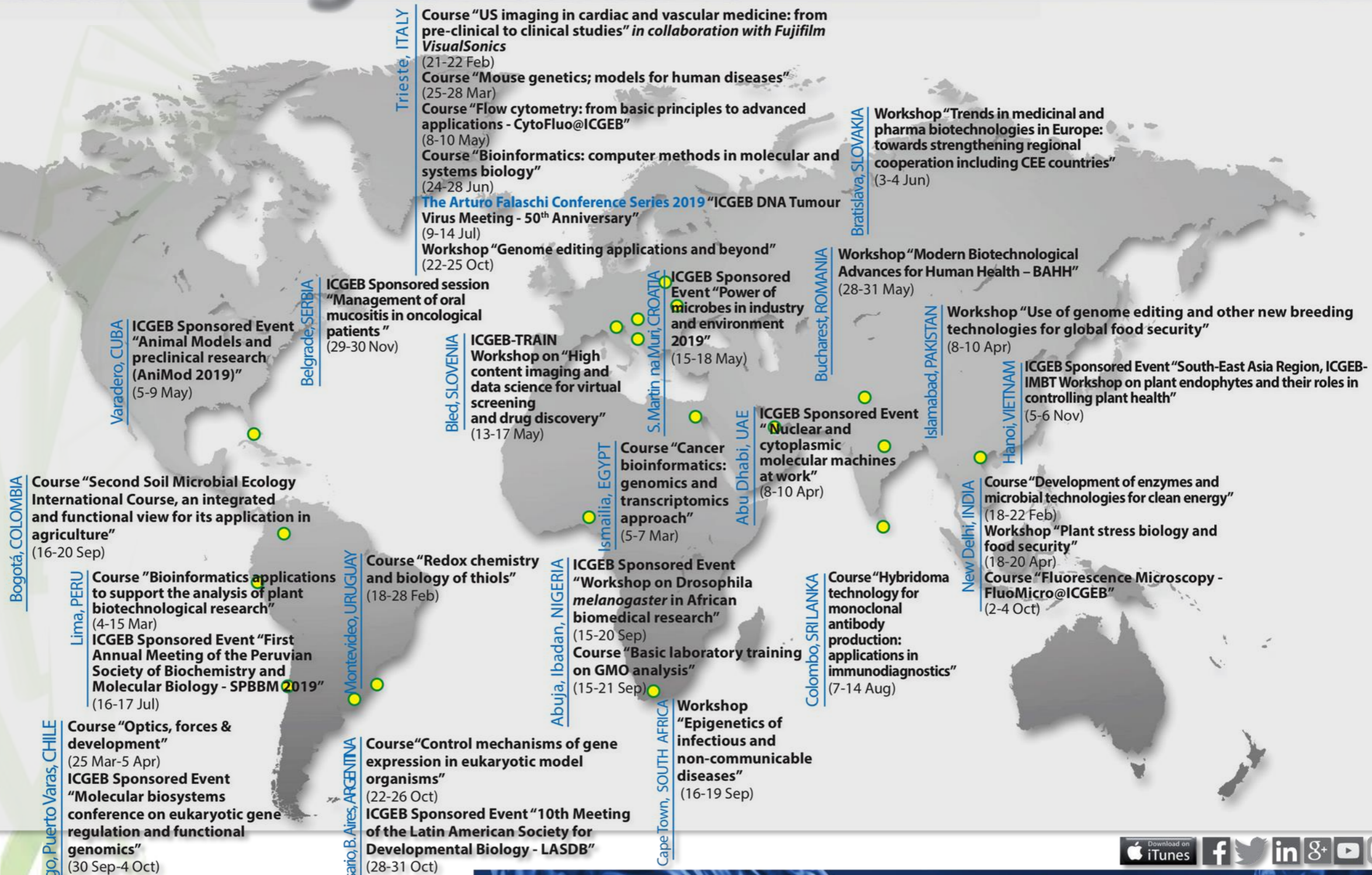
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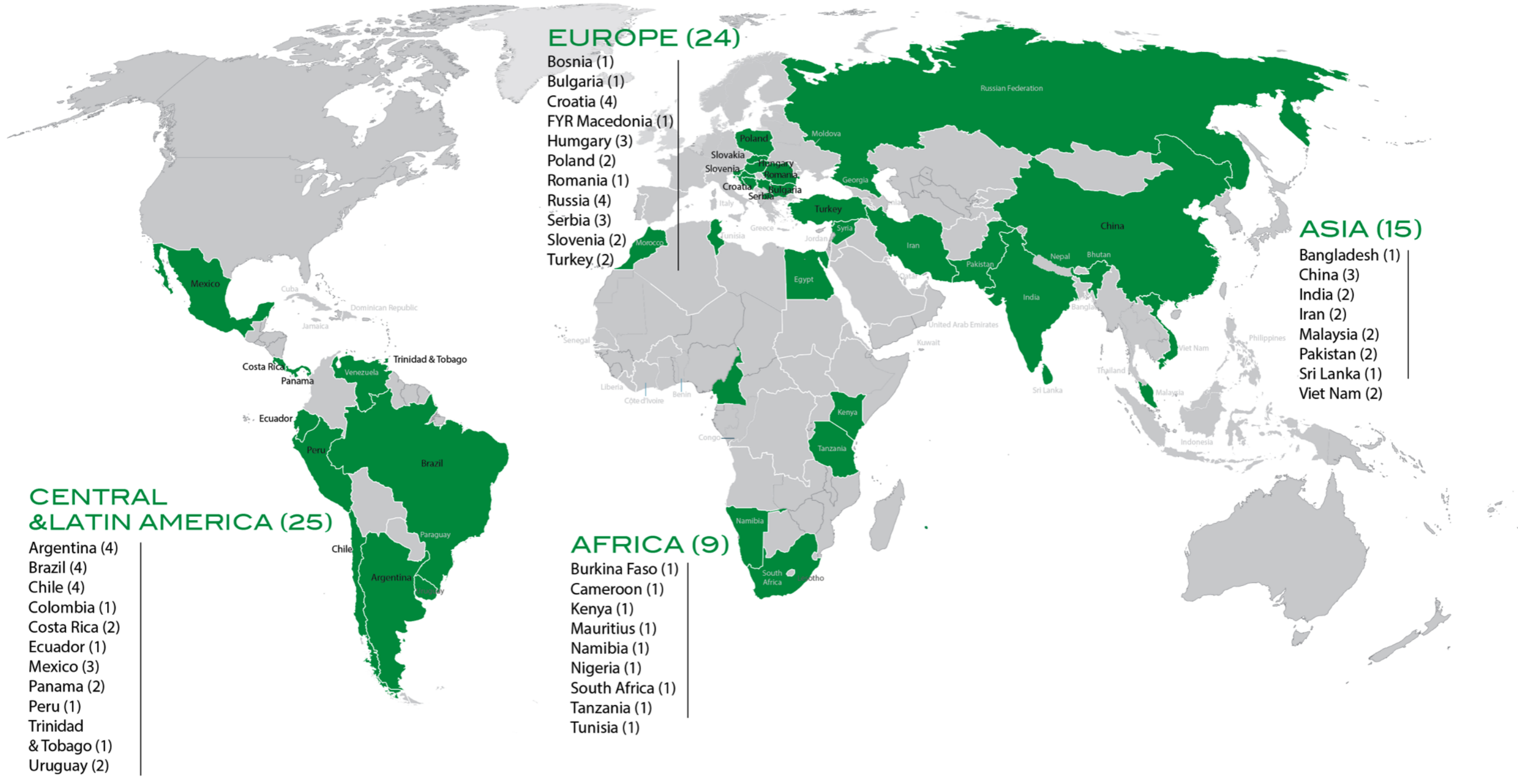
Meetings and Courses 2019





CRP – ICGEB Research Grants

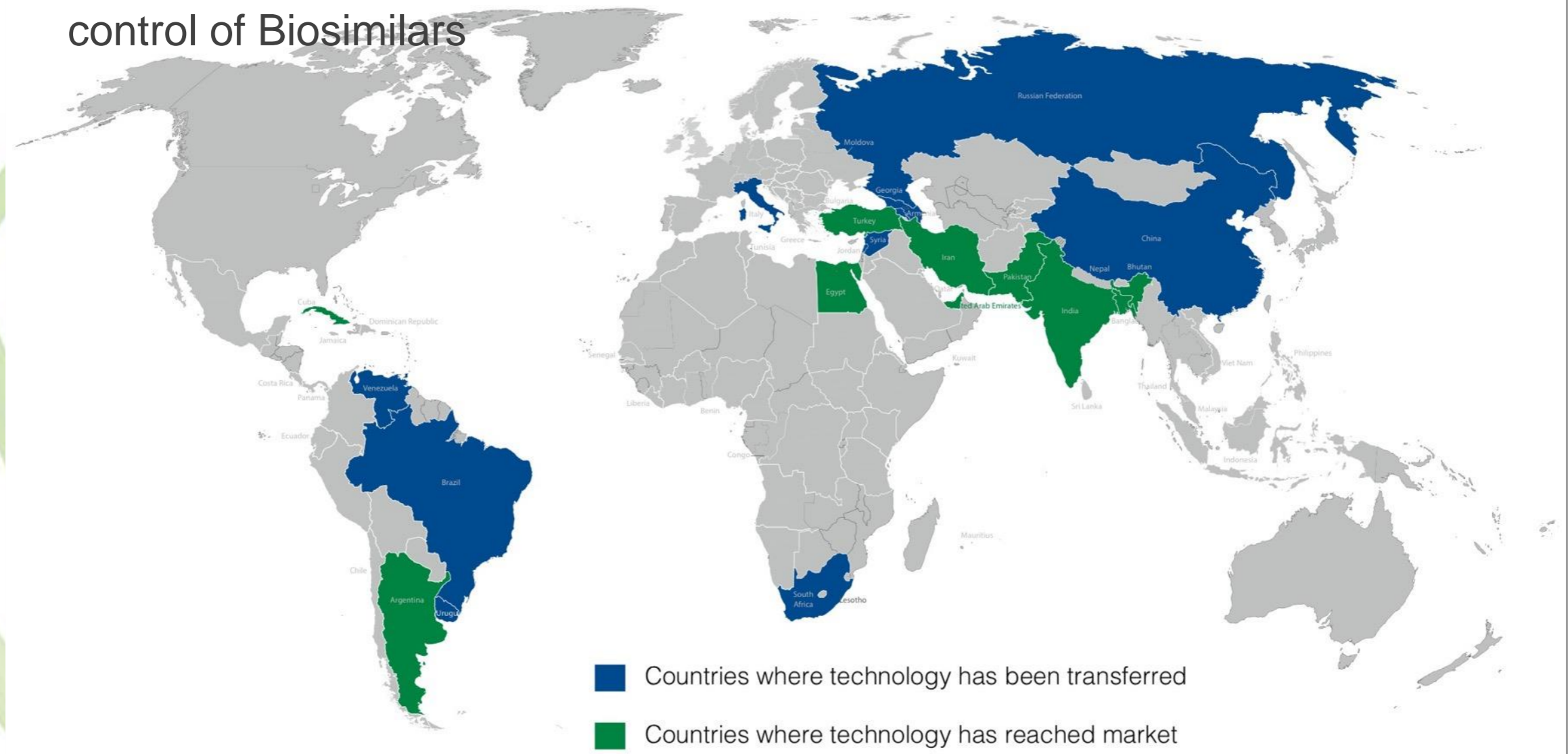
Ongoing Projects (73)





R&D Collaborations and Technology Transfers from 2005

- 70 collaboration agreements
- 20 different countries: Argentina, Bangladesh, Brazil, China, Cuba, Egypt, India, Iran, Italy, Jordan, Pakistan, Russia, South Africa, Sri Lanka, Switzerland, Syria, Turkey, United Arab Emirates, Uruguay, Venezuela
- >100 Scientists trained in our labs in the pharmaceutical production and quality control of Biosimilars





Technology Transfer – Biopharmaceuticals

ICGEB develops simple and innovative technologies for the production of **recombinant proteins for human therapy** (EPO, IFNalpha, IFNbeta, G-CSF and their PEGylated forms; Growth Hormone, Insulin and Insulin analogs)

Supports local biopharmaceutical manufacturing in Member States, by:

1. strengthening competencies of local partners
2. improving the drug availability (more people can be treated)
3. a more affordable price

Most of the companies involved in tech transfers are now producing biosimilars using ICGEB technologies



Technology Transfer - Diagnostics

Ankur Seeds	Okra (<i>Abelmoschus esculentus</i>) varieties/hybrids (development of technology)
Focus Diagnostics	Dengue multiepitope proteins
Biomed Industries	Cell lines Hybridoma -producing monoclonal antibodies against Hepatitis B surface antigen
Qualpro	HCV multi-epitope antigen
JKAgrigenetics	Gall Midge Patent
Nirmal Organo	Sprayable biopesticide
Nirmal Seeds	<i>cry X-1</i> for cotton, <i>cry 1 la5</i> and <i>vip</i> for transformation into aubergine (development of technology)
PDKV	Development of sprayable biopesticide
Sven Genetech	HCV Diagnostic Kit
XCyton	HCV Diagnostic Kit
Federal Ministry Science and Technology Nigeria	HIV/AIDS Diagnostics Technology to Nigeria



Jitendra Singh launches Celiac disease diagnostic kit at ICGEB New Delhi 28/10/14

Technology Transfer: Vaccines & Infectious Disease



Working Group
on Zika Virus

Sun Pharma and ICGEB to develop novel dengue vaccine

Sun Pharma and ICGEB signed an agreement to develop a vaccine targeted against all four serotypes of dengue virus

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Arijit Paladhi



Sun Pharma and ICGEB had, in May, announced another partnership for development of a botanical drug treating dengue. Photo: Hemant Mishra/Mint

BILL & MELINDA GATES foundation

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[India](#) 20 July 2012 [News](#) By BioSpectrum Bureau

Novavax, CPL Biologicals, ICGEB join hands for malaria research

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Do you yield?

Growing anti-malaria drugs in tobacco plants

How to increase the supply of artemisinin

Oct 22nd 2016

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Getty Images

ONE of the most valuable weapons in the war on malaria is artemisinin, a drug derived from the leaves of sweet wormwood. Its discovery, inspired by wormwood's use as a

Patents

- Dengue subunit vaccine quadrivalent candidate DSV against all four DENV serotypes (PCT/IB2015/056352 Khanna *et al.*)
- Anti-dengue activity of *Cissampelos pariera* extracts (PCT/IB2010/050299 - Bhatnager *et al.*)

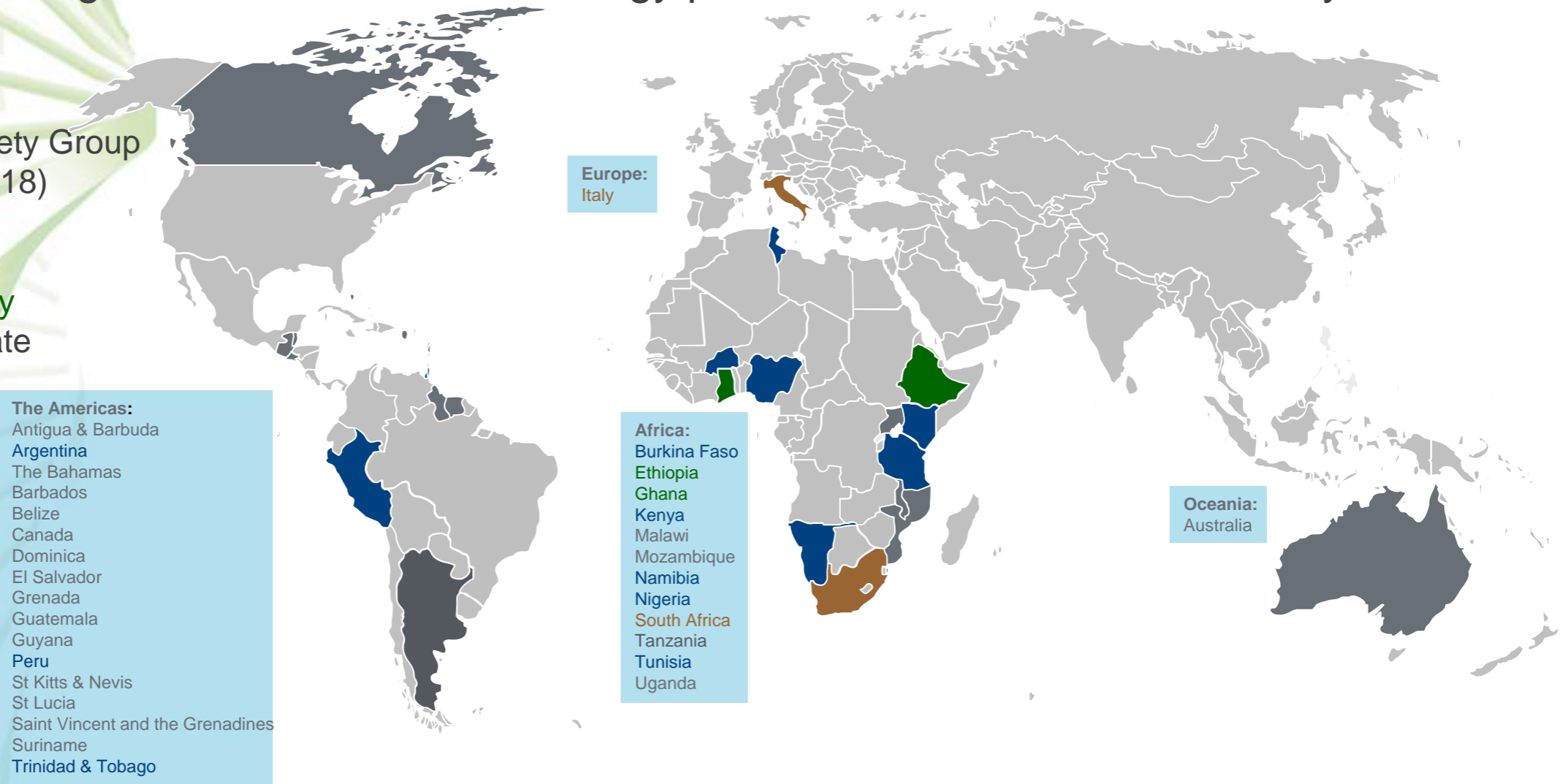


The Role of the Biosafety Group

Enhancing the capacity of ICGEB Member States to identify, regulate, manage, and monitor biotechnology products within their own territory

Location of Biosafety Group activities (2012-2018)

- Member State
- Signatory Country
- Non-Member State



- **Biosafety legislation and administrative systems**

In-country working partnerships, mentored fora

- **Communication strategy and tools**

Devising tailored public education and outreach strategies and technical content, e.g. radio spots, brochures, videos

- **Training, both academic and vocational, in all aspects of GMO regulation**

Regulatory experience exchange opportunities, in-country working partnerships, Masters in Biosafety fellowships, eLearning modules, mentored fora





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Council of Scientific Advisers CSA

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