

Plenary Lectures

-**Prof. Dr. Donald Hilvert**, Laboratory of Organic Chemistry, ETH Zürich, Switzerland: *Tailoring the Properties of Properties of Proteins through Laboratory Evolution*

-**Prof. Jonathan Knowles**, President Group Research, F. Hoffmann-La Roche Ltd, Switzerland

-**Dr. Dwight S. Seferos**, International Institute for Nanotechnology, Northwestern University, USA: *Nanomedicine*

-**Prof. Svante Paabo**, Director, Department of Genetics, Max-Planck-Institute of Evolutionary Anthropology, Germany: *The Neanderthal Genome Project*

-**Janez Potocnik**, Commissioner for Science & Research, European Commission, Belgium

-**Dr. Ismail Serageldin**, Director, Bibliotheca Alexandrina; Chairman, BioVision Alexandria, Egypt: *Biotechnology & Society*

-**Sir. Greg Winter**, Acting Director, MRC Laboratory of Molecular Biology, UK: *Antibody Engineering & Therapeutic Antibodies*

Speakers & Chairmen

-**Dr. Tom Adams**, Director of Genomic Technology, Monsanto, USA

-**Dr. Alfredo Aguilar**, Head of Unit Biotechnology, Directorate Food, Agriculture and Biotechnology, Research Directorate General, European Commission

-**Dr. Mohamed Ait-Kadi**, President of the General Council of Agricultural Development- Ministry of Agriculture, Rural Development, and Forestry, Morocco

-**Prof. Lilia Alberghina**, Professor, Dept. of Biotechnology and Biosciences, University of Milano-Bicocca, Italy

-**Dr. Helen Alderson**, Chief Operating Officer of the World Heart Federation, Switzerland

- **Prof. Klaus Ammann**, Chairman EFB Section on Biodiversity, Member Steering Committee PRRI, University of Bern, Switzerland

-**Prof. Leif Andersson**, Professor in Functional Genomics, Uppsala University, Sweden

-**Dr. Siv Andersson**, Head of the Department of Evolution, Genomics and Systematics at the Evolutionary Biology Center at Uppsala University, Sweden

- Dr Wilhelm Ansorge**, ETH Lausanne, Switzerland
- Dr. François Arcand**, CEO, ERA Biotech, Barcelona, Spain
- Dr. Paulo Arruda**, Professor of Genetics, Universidade Estadual de Campinas and Scientific Director, Alellyx Applied Genomics, Brazil
- Dr. Frank Baganz**, Department of Biochemical Engineering, University College London, UK
- Dr. Gerard Barry**, Rice Crop Team Leader, International Rice Research Institute (IRRI), Philippines
- **Dr. Marin Berovic**, Chairman EFB Section on Biochemical Engineering Science; University of Ljubljana, Slovenia
- Dr. Jaume Bertranpetit**, Professor, Dept. of Experimental & Health Sciences, Pompeu Fabra University, Spain
- Prof. Carl Borrebaeck**, Professor & Chair, Department of Immunotechnology, Lund University, Sweden
- Dr. Thomas Bruhn**, Science Officer, European Medical Research Councils (EMRC), European Science Foundation (ESF), France
- Prof. Dr. Jochen Büchs**, Head of Chair of Biochemical Engineering, RWTH Aachen University, Germany
- Dr. Dirk Burdinski**, Bio-Molecular Engineering, Philips Research Laboratories, The Netherlands
- Prof. Manuel Canovas**, Professor, Biochemical Engineering, University of Murcia, Spain
- Dr. David Caparrós-Ruiz**, Consorci CSIC-IRTA, Spain
- **Dr. Johan Cardoen**, CEO, CropDesign N.V., Belgium
- **Dr. Alberico Catapano**, University of Milano, Italy
- **Prof. Zhangliang Chen**, President, China Agricultural University, China
- Dr. Torkil Jønch Clausen**, DHI Water and Environment, Denmark
- Dr. Leo de Graaff**, Wageningen University and Research Centre, The Netherlands
- Dr. Ad de Laat**, Director Cosun Food technology Centre, Royal Cosun, The Netherlands

- Dr. Robert DiCosimo**, Senior Research Fellow, DuPont Central Research and Development, USA
- Dr. Stefan Diez**, Research Group Leader, Max-Planck-Institute of Molecular Cell Biology and Genetics, Germany
- Ms. Duygu Dikicioglu**, Bogazici University, Turkey
- Dr. Jorgen Dirach**, Dr. Jorgen Dirach, Chairman EFB Section on Medicines Development EFB Section on Medicines Development; Director, Novo Nordisk, Denmark
- Prof. Mike Eaton**, Head of Biological Chemistry, UCB group, UK
- Dr. Jürgen Eck**, Member of the Managing Board and Head of Research & Development (CTO), B.R.A.I.N AG, Germany
- Dr. Michael Egholm**, Vice-President of R&D, 454 Life Sciences Inc., USA
- **Prof. Turkan Eldem**, Vice-Chair EFB section on Medicines Development, Head of Pharmaceutical Biotechnology Department, Hacettepe University, Turkey
- Prof. Paul Engel**, Professor of Biochemistry, Conway Institute, University College Dublin, Ireland
- Prof. Juan Ferre**, Professor in Genetics, University of Valencia, Spain
- **Dr. Pau Ferrer**, Research Associate, Universitat Autònoma de Barcelona, Spain
- Dr. Hans Peter Fischer**, Chief Scientific Officer, Genedata AG, Switzerland
- Prof. Dr. Rainer Fischer**, Senior Executive Director, Fraunhofer IME, Germany
- Dr. David Fischhoff**, Vice-President, Technology Strategy & Development, Monsanto, USA
- Prof. Maria Garcia-Parajo**, Group Leader BioNanophotonics, IBEC- Catalanian Institute for Bioengineering, Barcelona Scientific Park, Spain
- Dr. Dr. Geert Plaetinck**, Head of RNAi Technology, Devgen, Belgium
- Prof. Dr. J.G.E. Gardeniers**, Professor in Mesoscale Chemical Systems, MESA+ Institute for Nanotechnology, The Netherlands
- Dr. Larry Gold**, Dr. Larry Gold, CEO & Chairman of the Board, SomaLogic Inc., USA
- Prof. Wilhelm Gruissem**, Professor of Plant Biotechnology, ETH Zurich, Switzerland

- Dr. Juergen Haas**, Dr. Juergen Hass, Associate Director Upstream Projects Coordination, Boehringer Ingelheim Pharma GmbH & Co. KG, Germany
- Dr. Pierre Hilson**, Principal Investigator, Functional Genomics Group, Ghent University, Belgium
- Dr. Francois Hirsch**, Governance & Ethics, Directorate General for Research (DG RTD), European Commission
- Prof. Sophia Hober**, Professor, Dept. of Proteomics, Royal Institute of Technology, (KTH), Sweden
- Dr. Timothy Holey**, Associate Professor, Technical University Denmark
- Dr. Jörg Hoheisel**, Head of Division of Functional Genome Analysis, German Cancer Research Centre (DKFZ), Germany
- Prof. Stefan Hohmann**, Professor, Dept. of Cell & Molecular Biology/Microbiology, Göteborg University, Sweden
- Prof. So Iwata**, Director of the Centre for Structure Biology, Division of Molecular Biosciences, Imperial College London, UK
- **Dr. Raymond Jacquet**, Head of cell culture, Selexis SA, Switzerland
- Dr. Clive James**, Chairman and Founder of ISAAA (International Service for the Acquisition of Agri-biotech Applications), Canada
- Dr. Alois Jungbauer**, Dept. Biotechnology, University of Natural Resources & Applied Life Sciences, Austria
- Dr. Fotis Kafatos**, President of the European Research Council; Chair of Immunogenomics at Imperial College London, UK
- Prof. Olli Kallioniemi**, Professor VTT Technical Research Centre of Finland & University of Turku
- Dr. Anil Kapur**, Managing Director of the World Diabetes Foundation, Denmark
- Prof. Douglas Kell**, Professor of Chemistry & Director, Manchester Centre for Integrative Systems Biology, University of Manchester, UK
- Dr. Alastair Kent**, Director of Genetic Interest Group; President of European Genetic alliances Network, UK
- Prof. James Kirkpatrick**, President of European Society for Biomaterials; Professor & Director, Institute of Pathology, Johannes Gutenberg University, Germany

- **Daniel Klein-Marcuschamer**, PhD Candidate in Chemical Engineering, Massachusetts Institute of Technology, USA
- **Dr. Julian Kinderlerer**, Member Steering Committee PRRI, South Africa
- **Prof. Akihiko Kondo**, Kobe University, Japan
- **Dr. Kostas Kostarelos**, Professor & Deputy Head, Centre for Drug Delivery Research, School of Pharmacy, University of London, UK
- **Dr. Alan L. Kriz**, Global Product Manager, BASF Plant Science LLC, USA
- **Dr. Bernhard Kuster**, Vice-President, Analytical Sciences & Informatics, Cellzome AG, Germany
- **Prof. Ulf Landegren**, Professor, Dept. of Genetics and Pathology, Rudbeck Laboratory, Sweden
- **Prof. Peter Leadlay**, Department of Biochemistry, University of Cambridge, UK
- **Prof. Dr. Andreas Liese**, Head of Institute of Technical Biocatalysis, Hamburg University of Technology (TUHH), Germany
- **Dr. Pekka Lindroos**, Chief Counsellor, Biotechnology Policy, Ministry of Trade and Industry, Finland
- **Prof. Jennifer Littlechild**, Professor of Biological Chemistry and Director of the Henry Wellcome Centre for Biocatalysis at University of Exeter, UK
- **Dr. Vito Lorusso**, Imaging Technology Head at Bracco Research Centre, Bracco Imaging S.p.A., Italy
- **Dr. Linda Lua**, Manager of the SRC Protein Expression Facility, Institute for Molecular Bioscience at the University of Queensland, Australia
- **Prof. Dr. Andreas Lübbert**, Head of Centre of Bioprocess Engineering, Martin-Luther-Universität, Germany
- **Prof. Dr. Ing. Reiner Luttmann**, Head of Research Center of Bioprocess Engineering and Analytical Techniques, Hamburg University of Applied Sciences, Germany
- **Prof. Gary Lye**, Professor of Biochemical Engineering, University College London, UK
- **Dr. Stephen Mahler**, Associate Professor, Australian Institute for Bioengineering and Nanotechnology, University of Queensland, Australia
- **Dr. Outi Maki-Ikola**, Senior Scientific Administrator, Pre-Authorisation Human Unit/ Safety and Efficacy Sector, European Medicines Agency (EMA)

- Prof. Carl-Fredrik Mandenius**, Professor, Linköping University, Sweden
- Prof. Seiichi P.T. Matsuda**, Department of Chemistry, Rice University, USA
- Dr. Diethard Mattanovich**, Professor, University of Natural Resources and Applied Life Sciences, Austria
- Dr. Yariv Mazor**, Postdoctoral Fellow, Department of Chemical Engineering, University of Texas, USA
- Prof. David McConnell**, Chairman EFB Task Group European Action on Global Life Sciences (EAGLES), Smurfit Institute of Genetics, Ireland
- Dr. Thomas Metcalfe**, Head of Biomarker Program, F. Hoffmann-La Roche Ltd, Switzerland
- Dr. Kim Meulenbroeks**, Deputy Executive Secretary PRRI, The Netherlands
- Dr. Paul Millner**, Reader in Biotechnology, University of Leeds, UK
- **Prof. Dr. David Mitchell**, Adjunct Professor, Federal University of Parana
- Dr. Maurice Moloney**, Chief Scientific Officer, SemBioSys Genetics Inc, Canada
- Prof. Lars Montelius**, Department of Physics & The Nanometer Structure Consortium, Lund University, Sweden
- Prof. Tom Murray**, President & CEO, The Hastings Center, USA
- Prof. Dr. Dario Neri**, Professor, Swiss Federal Institute of Technology Zurich, Switzerland
- Prof. Peter Neubauer**, Professor for Bioprocess Engineering, University of Oulu, Finland
- Dr. Twalib Ngoma**, Executive Director, Ocean Road Cancer Institute (ORCI), Tanzania
- Prof. Alvin Nienow**, Emeritus Professor of Biochemical Engineering, The University of Birmingham, UK
- Dr. Henk Noorman**, Principal Scientist Fermentation, DSM Anti-Infectives, The Netherlands
- **Dr. Philippe Cupers**, Scientific officer, Unit Major Diseases – Directorate Health Research, DG Research, European Commission
- Dr. Per-Åke Nygren**, Professor, Dept of Biotechnology, Royal Institute of Technology (KTH), Sweden

- **Dr. Andreani Odysseos**, Director of Biomedical Research, EPOS-Iasis, R&D; Special Scientist, University of Cyprus

- **Dr. Kirsi-Marja Oksman-Caldentey**, Head of Plant Biotechnology, VTT Technical Research Centre of Finland

- **Dr. Mr. Jose Otero**, Center for Microbial Biotechnology, BioCentrum-Technical University of Denmark

- **Dr. Laura Palomares**, Principal Scientist, Biotechnology Institute, Autonomous University of Mexico

- **Dr. Sven Panke**, Bioprocess Laboratory, ETH Zurich, Switzerland

- **Dr. Ramesh Patel**, Director, Enzyme Technology, Process Research & Development, Bristol-Myers Squibb, USA

- **Dr. Marnix Peferoen**, CropDesign N.V., Belgium

- **Dr. Johan Peleman**, Director R&D, Nunhems BV, The Netherlands

- **Dr. Staffan Persson**, Group Leader, Max Planck Institute of Molecular Plant Physiology, Germany

- **Mrs. Spela Peternel**, Research Assistant, National Institute of Chemistry, Slovenia

- **Dr. Andrea Pfeifer**, Postdoctoral Fellow, Systems Biology of Signal Transduction, German Cancer Research Center (DKFZ), Germany

- **Prof. Luis Joaquim Pina da Fonseca**, Centro de Engenharia Biológica e Química, Instituto Superior Técnico, Portugal

- **Dr. Constantinos Pitris**, Professor, Department of Electrical & Computer Engineering, University of Cyprus

- **Prof. Dr. Igor Plazi**, Associated Professor, Chemistry and Chemical Technology, University of Ljubljana, Slovenia

- **Prof. Andreas Plückthun**, Prof. Andreas Plückthun, Professor, Biochemistry Institute, Zurich University, Switzerland

- **Dr. Aleš Podgornik**, R&D Manager, BIA Separations d.o.o., Slovenia

- **Prof. Dr. Jack Pronk**, Scientific Director, Kluyver Centre for Genomics of Industrial Fermentation; Delft University of Technology, The Netherlands

- **Dr. Antoni Rafalski**, Senior Research Fellow, Pioneer Hi-Bred Intl. – a DuPont Company, USA

- **Prof. Arjen Rizjema**, Wageningen University, Department of Food Technology and Nutritional Sciences, The Netherlands

- **Dr. Joanna Rubinstein**, Executive Director for Health & Science, United Nations Millennium Project and Senior Associate Dean, Global Initiatives; Columbia University, USA

- **Patrick Rudelsheim**, Chairman EFB Task Group Safety in Biotechnology, PERSEUS BVBA, Belgium

- **Prof. Josep Samitier**, Director, NanoBioengineering Laboratory, Institute for Bioengineering of Catalonia, University of Barcelona, Spain

- **Dr. Lisbet Santoni**, Narvalus s.r.l., Italy

- **Prof. Uwe Sauer**, Institute of Molecular Systems Biology, ETH Zurich, Switzerland

- **Dr. Thomas Schäfer**, Senior Director, New Business Development, Novozymes, Germany

- **Dr. Raymond Schiffelers**, Assistant Professor, Dept. Pharmaceutical Sciences, Utrecht University, The Netherlands

- **Mr Harald Schmidt**, Assistant Director, Nuffield Council on Bioethics, UK

- **Dr. Ralf-Michael Schmidt**, Vice President, BASF Plant Science, Germany

- **Dr. Ismail Serageldin**, Director, Bibliotheca Alexandrina, Egypt

- **Prof. Luis Serrano**, Barcelona Biomedical Research Park, Spain

- **Prof. Roger Sheldon**, Delft University of Technology / CLEA Technologies BV, The Netherlands

- **Prof. Dr. Sakayu Shimizu**, Professor, Division of Applied Life Sciences, Kyoto University, Japan

- **Prof. Dr. Wim Soetaert**, Laboratory for Industrial Microbiology and Biocatalysis, Faculty of Bioscience Engineering, Ghent University, Belgium

- **Dr. Anker Sørensen**, Manager Applied Research, Keygene N.V., The Netherlands

- **Dr. Lucia de Souza**, VP of ANBio (Brazilian Biosafety Association), Director of Cutting Edge Solutions GmbH (a Switzerland based consulting company) and a member of PRRI

- **Prof. Friedrich Srienc**, Biotechnology Institute, Department of Chemical Engineering and Materials Science, University of Minnesota, USA

- Dr. Mathieu Streefland**, Scientist / PAT project leader, Netherlands Vaccine Institute, The Netherlands
- Mark Stitt**, Research Group Leader, Max Planck Institute of Molecular Plant Physiology, Germany
- Dr. Michael Taussig**, Head, Technology Research Group, The Babraham Institute, UK
- Prof. Bertrand Tavitian**, Head, Laboratory for Experimental Molecular Imaging, CEA, France
- Mrs. Hanna Tegel**, School of Biotechnology, Royal Institute of Technology (KTH), Sweden
- Dr. Sandy Thomas**, Director of Foresight OSI, UK
- Dr. Eduardo Trigo**, Director, CEO Group, Argentina
- Prof. Roman Tuma**, Professor, Department of Biological and Environmental Sciences, University of Helsinki, Finland
- Prof. Nicholas Turner**, Professor of Chemical Biology & Director of the Centre of Excellence in Biocatalysis (CoEBio3), Manchester Interdisciplinary Biocentre, UK
- Dr. Mathias Uhlen**, Professor of Microbiology, Royal Institute of Technology (KTH), Sweden
- Dr. Alfonso Valencia**, Spanish Nacional Cancer Research Center
- Dr. Albert van den Berg**, Group leader, BIOS/Lab-on-a-Chip group, University of Twente, MESA+ Institute for Nanotechnology, The Netherlands
- **Dr. Piet van der Meer**, Executive Secretary, PRRI, The Netherlands
- **Dr. Menno Van der Waart**, Group leader, BIOS/Lab-on-a-Chip group, University of Twente, MESA+ Institute for Nanotechnology, The Netherlands
- Dr. Jan Maarten van Dijk**, Professor, Dept. of Pharmaceutical Biology, University of Groningen, The Netherlands
- Dr. Johan van Hylckama Vlieg**, Principal Scientist, Fermentation and Flavour, NIZO food research, The Netherlands
- Dr. Michiel Van Lookeren Campagne**, Head of Research – BioScience, Bayer CropScience, Belgium
- Em.Prof. Marc Van Montagu**, EFB President; Scientific Advisor, Department of Plant Systems Biology, Ghent University, Belgium

- Dr. Antonio Villaverde**, Professor of Microbiology, Autonomous University of Barcelona, Spain
- Dr. Andreas von Felde**, Head energy crops, KWS SAAT AG, Germany
- Dr. Neil Weir**, Senior VP, UCB Group, UK
- Dr. Roland Wohlgemuth**, Chairman EFB Section on Applied Biocatalysis, Sigma-Aldrich, Switzerland
- Dr. Wenping Wu**, Director, Microbial Discovery Unit, Novozymes, Denmark
- Prof. Dr.-Ing. Dirk Weuster-Botz**, Institute of Biochemical Engineering, Technical University of Munich, Germany
- Dr. Marcel Wubbolts**, Director at the DSM Innovation Center, The Netherlands
- Dr. Huanming Yang**, Director & Professor, Beijing Genomics Institute (BGI), China
- Prof. Marc Zabeau**, Department of Plant Systems Biology, VIB/Gent University, Belgium
- Prof. Dani Zamir**, Professor, Robert H. Smith Institute of Plant Sciences and Genetics in Agriculture, Hebrew University, Jerusalem

Plenary Lecture

Prof. Donald Hilvert, Laboratory of Organic Chemistry, ETH Zürich, Switzerland



Tailoring the properties of proteins through laboratory evolution

Protein design is a challenging problem. We do not fully understand the rules of protein folding, and our knowledge of structure-function relationships in these macromolecules is at best incomplete. Nature has solved the problem of protein design through the mechanism of Darwinian evolution. From primitive precursors, recursive cycles of mutation, selection and amplification of molecules with favorable traits have given rise to all of the many thousands of gene products in every one of our cells. An analogous process of natural selection can be profitably exploited in the laboratory on a human time scale using protein libraries to create, characterize and optimize artificial catalysts for tasks unimagined by Nature. Recent progress in combining chemical and evolutionary approaches for enzyme design will be discussed, together with insights into enzyme function gained from studies of the engineered catalysts.

Prof. Jonathan Knowles, President Group Research, F. Hoffmann-La Roche Ltd, Switzerland
Personalized Medicine



Jonathan Knowles, Ph.D., is President of Group Research at Roche, member of the company's Executive Committee, board member of Genentech and board member of Chugai Pharmaceuticals. Since June 2004, he has also been Chairman of the Research Directors' Group (RDG) of EFPIA (European Federation of Pharmaceutical Industry Associations). Prior to joining Roche, Dr. Knowles headed the research division of Glaxo Wellcome Europe. He also served as director of the Glaxo Institute for Molecular Biology in Geneva. During his tenure at Glaxo, Dr. Knowles was instrumental in developing and implementing the company's global strategy in genomics. Previously, Dr. Knowles held various research and teaching positions at universities in the U.K., France, Finland, Japan and the U.S. Dr. Knowles received a first-class honors degree in Biological Sciences from the University of East Anglia, Norwich, U.K. and obtained his Ph.D. at the University of Edinburgh, Scotland.

Dr. Dwight S. Seferos, International Institute for Nanotechnology, Northwestern University, USA



Dwight S. Seferos earned his B.S. degree at Western Washington University (2001) and his Ph.D. degree from the University of California, Santa Barbara (2006), where he studied the design, synthesis, and electronic application of pi-conjugated molecules under the guidance of Professor Guillermo C. Bazan. In 2006 he began postdoctoral studies as a member of Professor Chad A. Mirkin's group at Northwestern University and is an American Cancer Society Fellow. His current research focuses on the cellular uptake and application of DNA-modified gold nanoparticles.

Nanoparticle Gene Regulation Agents

We have recently reported that oligonucleotide-functionalized gold nanoparticles act as agents for both cellular transfection and for control of protein expression in cells. These "antisense particles" exhibit a range of unique properties that make them very well-suited for intracellular applications. Antisense particles resist nuclease digestion, have high and tailorable binding constants for target mRNA, and exhibit efficient entry into numerous cell types. Further, we can tailor the chemistry on the nanoparticle surface, and thus control the particles' binding strength for a complementary target sequence, ultimately demonstrating that changing the binding strength or surface chemistry offers a means to control the percentage of protein expression. We have also developed nanoparticle agents for visualizing and quantifying RNA in live cells. These developments represent significant advances in antisense and siRNA technology.

**Prof. Svante Pääbo, Director, Dept. of Genetics, Max-Planck-Institute of Evolutionary Anthropology, Germany
The Neanderthal Genome Project**

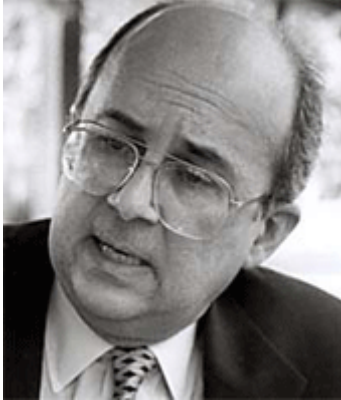


Svante Pääbo's research has focused on understanding the evolutionary history of humans, and other species, by molecular means. He has developed technical approaches to directly examine genetic variation in the past by means of ancient DNA analysis. He also focuses on the comparative genomics of humans and great apes, particularly the evolution of gene activity and genetic changes that may underlie aspects of traits specific to humans. He is currently Director at the Max-Planck Institute for Evolutionary Anthropology in Leipzig, Germany, and Guest Professor of Comparative Genomics at the University of Uppsala, Sweden.

Dr. Janez Potocnik, Commissioner for Science & Research, European Commission, Belgium



**Dr. Ismail Serageldin, Director, Library of Alexandria, Egypt
Biotechnology & Society**



Ismail Serageldin, Director, Library of Alexandria, also chairs the Boards of Directors for each of the BA's affiliated research institutes and museums and is Distinguished Professor at Wageningen University in the Netherlands. He serves as Chair and Member of a number of advisory committees for academic, research, scientific and international institutions and civil society efforts which includes the Institut d'Egypte (Egyptian Academy of Science), TWAS (Third World Academy of Sciences), the Indian National Academy of Agricultural Sciences and the European Academy of Sciences and Arts. He is former Chairman, Consultative Group on International Agricultural Research (CGIAR, 1994-2000), Founder and former Chairman, the Global Water Partnership (GWP, 1996-2000) and the Consultative Group to Assist the Poorest (CGAP), a microfinance program (1995-2000). Serageldin has also served in a number of capacities at the World Bank, including as Vice President for Environmentally and Socially Sustainable Development (1992-1998), and for Special Programs (1998-2000). He has published over 50 books and monographs and over 200 papers on a variety of topics including biotechnology, rural development, sustainability, and the value of science to society. He holds a Bachelor of Science degree in engineering from Cairo University and Masters' degree and a PhD from Harvard University and has received 19 honorary doctorates.

Sir. Gregory Winter, Acting Director, MRC Laboratory of Molecular Biology, Cambridge, Medical Research Council, UK



Sir Gregory Winter has been at the Medical Research Council (MRC) Laboratory of Molecular Biology in Cambridge UK for more than 30 years, and is currently its Acting Director. He was trained as a biochemist, undertook a PhD in protein chemistry and is a pioneer of the science and application of protein and antibody engineering. He is an

academic and also a prolific inventor; most therapeutic antibodies on the market (humanized antibodies) utilize his inventions, which were licensed non-exclusively by the MRC. He also founded two antibody biotech start-ups (Cambridge Antibody Technology and Domantis) to take forward further developments of antibody technology. This led to the development of Humira™ (by Cambridge Antibody Technology), the first human monoclonal antibody to be approved by the US-FDA, and a range of novel antibodies based on human single antibody domains (by Domantis).

Antibody Engineering & Therapeutic Antibodies

Over the last 20 years there has been a revolution in the development of therapeutic antibodies for diseases including cancer, inflammation and disorders of the immune system. This revolution has required several technological advances including (a) the invention of methods to make rodent monoclonal antibodies and to humanize them by transplantation of their antigen-binding sites to human antibodies, and (b) the invention of technologies to make entirely human antibodies from repertoires of human antibodies displayed on filamentous phage or from transgenic mice. The field has been shaped by the patent, licensing and commercial strategies used to work the technologies. I will discuss the development of the technologies for making therapeutic antibodies, the impact of the commercial considerations and speculate on the future of the field.