BioAlexandria
www.bibalex.org/bioalex2004conf

BioAlexandria 2004
THE NEW LIFE SCIENCES ETHICS, PATENTS & THE POOR
3-6 April 2004

The BioAlexandria 2004 Conference Newsletter

September 2003
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The Bibliotheca Alexandrina is proud to host ***BioAlexandria 2004***, an international biotechnology conference, scheduled from 3 to 6 April 2004 in Alexandria, EGYPT. The conference theme is "The New Life Sciences: Ethics, Patents and the Poor".

INSIDE

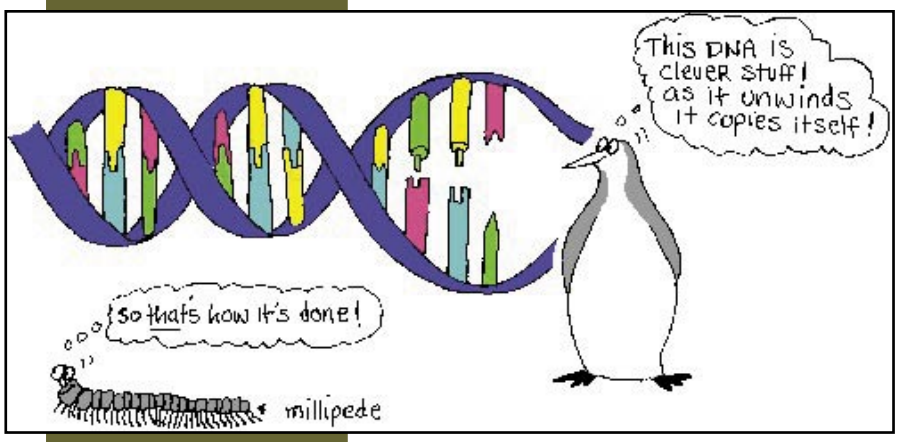
The simplest definition of biotechnology is "applied biology" - the application of biological knowledge and techniques to develop products.

BIOTECHNOLOGY

The Challenge and the Promise

Biotechnology is a versatile science that can be utilized by many different industries ranging from healthcare to forestry. There has been a lot of controversy surrounding it, with both supporters and opposers to this field.

The simplest definition of biotechnology is "applied biology" - the application of biological knowledge and techniques to develop products. It may be further defined as the use of living organisms to make a product or run a process. By this definition, the classic techniques used for plant and animal breeding, fermentation and enzyme purification would be considered biotechnology.



Some people use the term only to refer to newer tools of genetic science. In this case, biotechnology may be described as the use of biotechnical methods to modify the genetic materials of living cells so they produce new substances or perform new functions. Examples include recombinant DNA technology and plant tissue culture.

Few of us realize that bio-related technology has been around since 5000 B.C., when the first achievements occurred in food production. People hybridized plants to create greater genetic variety. They also used it in traditional activities such as making yogurt, cheese, and bread.

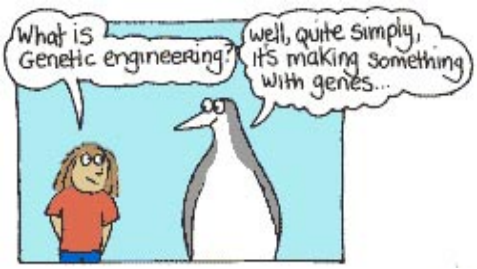
The roots of *modern* biotechnology date back a hundred years, to the work of Louis Pasteur, Robert Koch and Gregor Mendel. Pasteur and Koch set the groundwork for the current science of microbiology, while Mendel was the first to describe the laws of genetic inheritance.

Their work led to the discovery of **deoxyribonucleic acid (DNA)** in the early 1950s. Shortly afterwards, James Watson and Francis Crick presented their double-helix model of DNA. Werner Arber, now a Nobel laureate, discovered special enzymes in bacteria called 'restriction enzymes' that cut DNA strands at specific points.

In the early 1970s, techniques were developed that removed a specific gene from one bacterium and put it in another using these restriction enzymes. This event marked the beginning of *recombinant DNA technology* or *genetic engineering*. Later, Herbert Boyer, Stanley Cohen and others introduced the human insulin gene into the bacterium *Eschericia Coli (E. Coli)*, resulting in the production of large quantities of human insulin protein.

In order to better understand this, let's go back to the very beginning and start with the gene. Genes are the chemical "building blocks" of life. They are made up of DNA, which encodes the information needed for living cells to make proteins.

The basic mechanism of the genetic code is similar among many organisms. This similarity makes it possible to take a segment of DNA from one organism and get the same behavior when you include it in another organism. A segment of human DNA can be introduced into a host organism, like a bacterium for example, and cause the bacteria to produce the human protein. This is the key to genetic engineering.



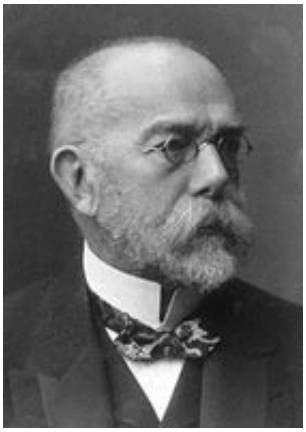
Individual genes are isolated using restriction enzymes. Then they are inserted into a plasmid, a small circle of DNA, which acts as a carrier. Plasmids are also cut with restriction enzymes. The genes are glued into place using an enzyme called 'DNA ligase'. Restriction enzymes and DNA ligase are the scissors and glue of recombinant DNA technology.

The new 'recombinant' plasmid carrying the human gene is then introduced into a bacterial cell. Once inside the cell, the human gene on the plasmid can be read by the bacterial cell's protein-making machinery, resulting in the expression of this protein.

If the gene is responsible for the production of a hormone, such as insulin for example, the bacterial cell will then produce

Louis Pasteur

Gregor Mendel



Robert Koch

Today, over 20 human therapeutic or vaccine proteins, made by modern biotechnology methods have been approved by the Food and Drug Administration

this hormone. This is how 'recombinant human insulin' was developed in 1982.

Most of these proteins don't exist naturally in sufficient amounts. So it has been suggested that through recombinant DNA technology, large quantities of a highly purified protein can be produced. This concept can be applied in many fields, such as healthcare, environment, food industries and more.

Many argue that biotechnology poses too many risks to human health, the environment, and the economic interests of farmers and food companies. They believe that biotechnology should only be undertaken in strictly contained systems, if at all, claiming that the contamination of non-genetically modified crops with genetically modified (GM) ones is difficult to prevent and can have harmful impacts on our lives. Again, the ethical, legal and social considerations are vast. Some state that the regulations regarding GM crops are inadequate believing that they don't fully rule out the risks of genetic modification.

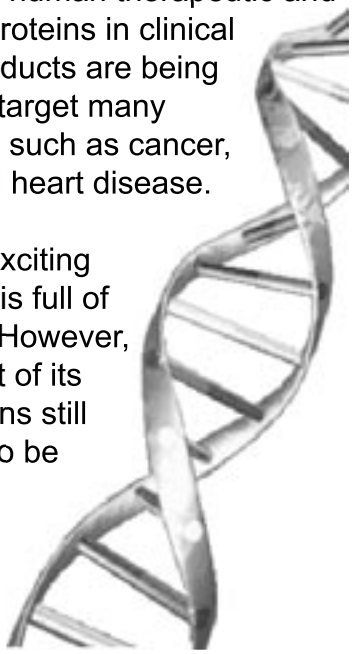
Sites on Biotechnology

www.biovision.org
www.oecd.org
www.fao.org/biotech
www.epa.gov
www.egyptbiotech.com
www.biotechterms.org
www.genengnews.com
www.bio.org

However, it has also been suggested that biotechnology can solve many of the problems faced today. Biotechnology can lessen hunger by tackling the factors that traditionally harm crops (weeds, pests, wind, etc), therefore increasing the amount of crops harvested. It can also be used in healthcare, from hormone production to curing of diseases. Regarding the environment, biotechnology can indirectly help preserve our forests through obtaining greater crop yield from existing land rather than converting *existing forests* into farmland.

Since the manufacture of human insulin using *E. Coli* in the 1980s, many other proteins have been manufactured using biotechnology. Today, over 20 human therapeutic or vaccine proteins, made by modern biotechnology methods, have been approved by the Food and Drug Administration (FDA) for marketing. There are more than 200 other human therapeutic and vaccine proteins in clinical trials. Products are being tested to target many diseases, such as cancer, AIDS and heart disease.

This exciting new field is full of promise. However, the extent of its implications still remains to be seen.■



BioAlexandria 2004 and BioVision

The Bibliotheca Alexandrina is proud to host *BioAlexandria 2004*, an international biotechnology conference, scheduled from 3 to 6 April 2004 in Alexandria, EGYPT. The conference theme is "The New Life Sciences: Ethics, Patents and the Poor".

The first BioAlexandria conference was in 2002, entitled the *Egyptian BioTechnology Conference,* to be held every even year. It therefore alternates with its sister conference, *BioVision.*

BioVision is an international biotechnology conference held in Lyon, France, every odd year. It is also known as the 'World Life Sciences Forum', and it encourages constructive dialogue among key players in the development of Life Sciences. They include members of academia, industry, research, institutions, media and society. The goal of BioVision is to provide a platform of exchange and information in order to face the challenges of the 21st century regarding Life Sciences. Life Sciences are one of the areas recognized as vital for economic development and improved lifestyle.

The BioAlexandria conference will focus on the needs and capabilities of the less developed nations of the world. Cooperation and coordination are essential for advancement; therefore, the conference will strive to foster the share of information between developed and developing nations. Its goal is to promote the active exchange of biotechnological information and ideas in order to benefit the global community as a whole.

Both conferences are sponsored by many of the same organizations and they share the same strategy - the exploration and advancement of biotechnology.■

The BioAlexandria 2004 Conference Program at a glance:

Saturday 3 April 2004 Nobel Day	09:00-10:00	***Registration***
	10:00-11:00	***Conference Opening Session***
	11:00-11:30	**Break**
	11:30-12:30	***Session 1***
	12:30-13:30	**Break**
	13:30-14:30	***Session 2***
	14:30-15:00	**Break**
	15:00-16:00	***Session 3***
	16:00-17:00	***Closing Address***
Sunday 4 April 2004	09:00-10:30	*Plenary Session 1:* ***The New Biology: A Survey of the Issues***
	10:30-11:00	**Break**
	11:00-12:30	*Plenary Session 2:* ***EAGLES: An Approach to Collaboration in Science for Humanity***
	12:30-13:30	**Break**
	13:30-15:00	*Parallel Sessions* **Panel 1 A-1: Health** **Panel 2 B-1: Food** **Panel 3 C-1: Agriculture** **Panel 4 D-1: Industry & Environment**
	15:00-15:30	**Break**
	15:30-17:00	*Parallel Sessions* **Panel 5 A-2: Health** **Panel 6 B-2: Food** **Panel 7 C-2: Agriculture** **Panel 8 D-2: Industry & Environment**
Monday 5 April 2004	09:00-10:30	*Parallel Sessions* **Panel 9 A-3: Health** **Panel 10 B-3: Food** **Panel 11 C-3: Agriculture** **Panel 12 D-3: Industry & Environment**
	10:30-11:00	**Break**
	11:00-12:30	*Parallel Sessions* **Panel 13 A-4: Health** **Panel 14 B-4: Food** **Panel 15 C-4: Agriculture** **Panel 16 D-4: Industry & Environment**
	12:30-13:30	**Break**
	13:30-15:00	*Plenary Session 3:* ***Patents***
	15:00-15:30	**Break**
	15:30-17:00	*Plenary Session 4:* ***Hot Topics***
Tuesday 6 April 2004	09:00-10:30	*Plenary Session 5:* ***Reporting on Parallel Sessions***
	10:30-11:00	**Break**
	11:00-12:30	***Closing Session***

bioVision

http://www.biovision.org

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BioAlexandria 2004
List of confirmed speakers

Nobel Day Speakers

Name	Nobel Laureate in	Year
Arber, Werner	Medicine	1978
Black, James	Medicine	1988
Lehn, Jean-Marie	Chemistry	1987
Rowland, Sherwood	Chemistry	1995
Soyinka, Wole	Literature	1986
Zewail, Ahmed	Chemistry	1999

Conference Speakers

Name	Position	Country
Allende, Jorge	Director, Institute of Biomedical Sciences, University of Chile	Chile
Altieri, Miguel	Professor of Agroecology, University of California	USA
Amaral, Weber	International Plant Genetic Resources Institute, IPGRI	Italy
Ammann, Klaus	Director, Botanical Garden	Switzerland
Andersen, Per Pinstrup	H.E. Babcock Professor of Food, Nutrition & Public Policy, Division of Nutritional Sciences, Cornell University	USA
Badr, Effat	Department of Genetics, Faculty of Agriculture, Alexandria University	Egypt
Beachy, Roger	President, Donald Danforth Plant Science Center	USA
Bennett, David	European Federation of Biotechnology	Netherlands
Best, Simon	CEO, Ardana Bioscience Limited	UK
Brechignac, Catherine	Former Director, Centre National de la Recherche Scientifique	France
Carlone, Claudio	Chairman, Hypothesis, Milano	Italy
Catley-Carlson, Margaret	Chair of the Global Water Partnership	USA
Celis, Julio	Secretary-General, Institute of Cancer Biology	Denmark
Christie, Werner	World Health Connections	Norway
Clark, Brian	President, International Union of Biochemistry and Molecular Biology, Aarhus University	Denmark
Choudhary, Muhammud	Professor of Chemistry, University of Karachi	Pakistan
Coffman, Ronnie	Chair, Department of Plant Breeding, Cornell University	USA
Colwell, Rita	Director, National Science Foundation	USA
Dahlstrom, Annica	Professor of Anatomy and Cell Biology	Sweden
Dasgupta, Partha	Faculty of Economics and Politics, University of Cambridge	UK
De Carvalho, Antonio Paes	Secretary-General, Fundacao BIO-RIO	Brazil
De la Cruz, Reynaldo	National Institute of Molecular Biology and Biotechnology	Philippines
Desmarescaux, Philippe	Chairman, Fondation Scientifique de Lyon	France
Diderichsen, Boerge	President, European Federation of Biotechnology	Denmark
Dodds, John	Founder, Dodds & Associates Law Firm	USA
Dryden, R.N. Sam	Managing Director, Emergent Genetics	USA
Egwang, Thomas	Senior Research Scientist, Dept. of Medical Parasitology, Medical Biotechnology Labs	Uganda
El Bagoury, Ismail	Prof. and Advisor, Land and Water Resources Management	Egypt
El Beltagy, Adel	Director-General, International Center for Agricultural Research in Dry Areas, ICARDA	Syria
El-Baz, Farouk	Director, Center for Remote Sensing, Boston University	USA
Feldbaum, Carl	President, Biotechnology Industry Organization	USA
Fraser, Claire	President, The Institute for Genomic Research	USA
Gabr, Mamdouh	Secretary-General, Egyptian Red Crescent	Egypt
Giddings, L. Val	Vice President for Food & Agriculture	USA
Goldmark, Peter	Environmental Defense	USA
Gros, François	Secretaire General, Academie des Sciences	France
Hamze, Mouin	Secretary-General, National Council for Scientific Research	Lebanon
Hautea, Randy	Director, International Service for the Acquisition of Agri-biotech Applications, South East Asia Center	Philippines
Heap, Sir Brian	Master, St. Edmund's College	UK
Herrling, Paul L.	Head of Corporate Research, Novartis International	Switzerland
Hoogendoorn, Coosje	Deputy Director-General, Programmes, International Plant Genetic Resources Institute, IPGRI, Consultative Group on International Agricultural Research, CGIAR	Italy
Imhof, Heinz	Chairman of the Board of Directors, Syngenta International AG	Switzerland
Jaffe, Gregory	Director, Biotechnology Project, Center for Science in the Public Interest	USA
Javier, Emil	Institute of Plant Breeding College, Technical Advisory Committee, TAC	Philippines
Johnson, Brian	Head of Agricultural Technologies Group	UK
Khamis, Ezzat	Vice President, Alexandria University	Egypt
Kurokawa, Kiyoshi	Director and Professor, The Institute of Medical Sciences	Japan
Leisinger, Klaus	Executive Director, Novartis Foundation for Sustainable Development	Switzerland
Lele, Uma	Senior Advisor, Operations Evaluation Department, World Bank	
MacMillan, Whitney	Chairman Emeritus, Cargill Inc	USA
Madkour, Magdi	President, Agriculture Research Centers, Ministry of Agriculture	Egypt
Magnus, David	Center for Bioethics, University of Pennsylvania	USA
Makhubu, Lydia	Vice Chancellor, University of Swaziland	Swaziland
Matta, Cherif F.	Chemistry Department, University of Toronto	Canada
Mayor, Federico	Fundaction Ramon Areces	Spain
McConnell, David	Department of Genetics, University of Dublin	Ireland
Murphy, Noel	Department of Genetics, Smurfit Institute of Genetics, Trinity College	Ireland
Myers, Norman	Consultant in Environment and Development	UK
Nair, Sudha	Principal Scientist and Head, M. S. Swaminathan Research Foundation	India
Nakhla, Rafik	Bibliotheca Alexandrina	Egypt
Ndiritu, Cyrus	Spacenet Online	Kenya
Nutti, Marilia	Embrapa Food Technology	Brazil
Odhiambo, Thomas R.	Hon. President, African Academy of Science	Kenya
Omi, Koji	Minister of Science and Technology	Japan
Palacios, Marcelo	Chairman, The International Society of Bioethics	Spain
Pardey, Philip	Professor of Science and Technology Policy, Department of Applied Economics, University of Minnesota	USA
Peacock, Jim	Chief, Commonwealth Scientific and Industrial Research Organization, CSIRO Plant Industry	Australia
Persley, Gabrielle	Chair of Doyle Foundation	UK
Pimentel, David	Prof. Emeritus, Entomology, Ecology & Evolutionary Biology, Cornell University	USA
Pineiro, Martin	Director, Grupo CEO	Argentina
Portrykus, Ingo	Prof. Emeritus of Plant Sciences, Institute of Plant Sciences, Swiss Federal Institute of Technology	Switzerland
Prakash, C. S.	Director, Center for Plant Biotechnology Research	USA
Rabbinge, Rudy	Land Resources and Water Resources	Netherlands
Ramphele, Mamphela	Managing Director, Human Development Network, World Bank	
Raven, Peter	Director, Missouri Botanical Garden	USA
Reifschneider, Francisco	Director, Consultative Group on International Agricultural Research, CGIAR	USA
Romeo-Casabona, Carlos	Chair in Law and Human Genome, University of Deusto	Spain
Sadek, Samir	Chairman of Scientific Culture Council	Egypt
Sahai, Suman	Convener, Gene Campaign	India
Sané, Pierre	Assistant Director-General for Social and Human Sciences of UNESCO	France
Schneider, Cynthia P.	Associate Professor of Art History, Art, Music & Theatre, Georgetown University	USA
Serageldin, Ismail	Director, Bibliotheca Alexandrina	Egypt
Simmons, Adele	Vice Chair and Senior Executive, Chicago Metropolis 2020	USA
Sittenfeld, Ana	Vice President, Board of Directors, CR-USA Foundation for Cooperation	Costa Rica
Soliman, Salah	Professor, Faculty of Agriculture, Alexandria University	Egypt
Swaminathan, M. S.	Chairman, MS Swaminathan Research Foundation	India
Tambuyzer, Erik	EuropBio	Belgium
Tandon, P.N.	Co-Chairman, InterAcademy Panel on International Issues	India
Taylor, David	Deputy Director-General, ILRI	Kenya
Thomson, Jennifer	Professor of Microbiology, University of Cape Town	Africa
Van Montagu, Marc	Institute Plant Biotechnology for Developing Countries	Belgium
Vincent, Jean-Didier	Centre National de la Recherche Scientifique, CNRS, Institut Alfred Fessard	France
Von Der Osten-Sacken, Alexander	Former Executive Secretary, Consultative Group on International Agricultural Research, CGIAR, World Bank	Spain
Wambugu, Florence M.	Chief Executive Officer, Harvest Biotech Foundation International	Kenya
Yang, Huanming	Professor & Director, Beijing Genomics Institute/Genomics and Bioinformatics Center, Chinese Academy of Sciences	China
Zehni, Mohamed	Independent Consultant Advisor, International Agriculture Studies, Institute of Agriculture, University of Malta	Malta

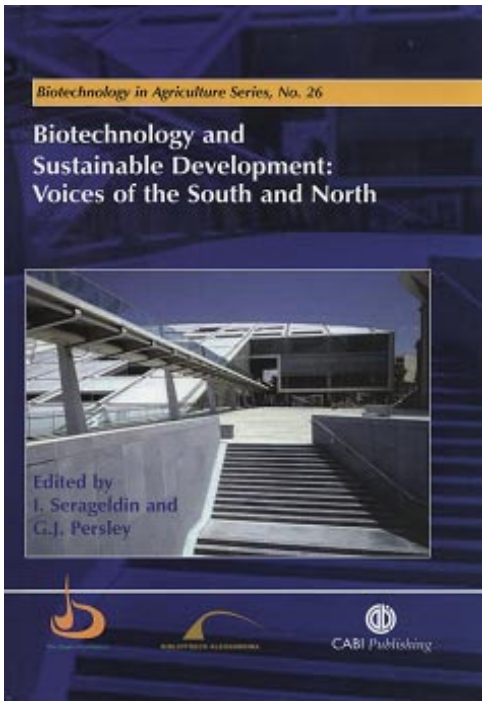
Looking Back at the Biotechnology Conference 2002

Last year we conducted the first biotechnology conference at the Bibliotheca Alexandrina. It was named *Biotechnology & Sustainable Development: Voices of the North and South*. The conference held at the Bibliotheca Alexandrina Conference Center from March 16 to March 20 2002, was one of the first of its kind to be organized by the Library.

The aim of *Biotechnology 2002* was to place a special emphasis on the exchange of views between the people, institutions and governments of the developing countries of the South and those of the industrialized countries of the North. It was designed to increase the mutual benefit of both.

Biotechnology is a field that will surely transform science and will leave no aspect of our lives untouched. However, the 2002 biotechnology conference did not only deal with science. It aimed to increase the awareness of the social, ethical, economic, environmental and legal implications of this revolutionary field.

The conference addressed the many different applications of biotechnology in health, agriculture, food production, industrial processes, and environmental protection. Its goal was to promote the generation of an informed public opinion, and



to set a responsible framework for decision-making regarding these important issues.

These new technologies must be used wisely to serve the needs of humanity, rather than only serving the interests of a few – and that is where the challenges lie.

Looking back, we can say that we are proud to have hosted such an international event, and are even prouder to host BioAlexandria 2004.

Join us, and together let us strive to make a difference! ■

Soon to be available at the Bibliotheca Alexandrina Bookshop !

*A book based on this conference was published by CABI Publishing in 2003. The 26th volume in the **Biotechnology in Agriculture** series consists of presentations converted into chapters, and offers insights into the application of biosciences to serve humanity*

Register Now at
www.bibalex.org/bioalex2004conf

Questions & Answers

What is the Human Genome Initiative?

It is an ambitious effort to identify, clone and sequence every human gene. This is the collective name for several projects by the Department of Energy (DOE) that began in 1986 and were completed in April 2003. This DOE initiative is now known as the *Human Genome Program*. The national effort, led by DOE and the National Institute of Health (NIH), is known as the *Human Genome Project*.

What is a genome?

It is the entire genetic complement of a single organism, i.e. the sum of all of its genes.

What is an amino acid encoded by?

Each amino acid is encoded by a combination of 3 bases. These bases, in the case of DNA are adenine (A), cytosine (C), guanine (G) and thymine (T). In the case of RNA, the thymine is replaced by uracil (U). Three bases together are called a 'codon'. Each codon in a gene encodes one amino acid. For example, ATG encodes the amino acid 'methionine'. There are 64 different combinations, or codons.

What is the "genetic code"?

The genetic code is the dictionary of DNA letters (i.e. arranged bases; ex. AGT) that encode the amino acids.

What is the function of RNA?

RNA is ribonucleic acid, and it plays an important role in the production of protein.

Protein synthesis occurs in the cytoplasm, while the code for making the protein is found in the DNA, present inside the nucleus. So 'messenger RNA' (mRNA), a type of RNA, carries the code of the DNA. It is a single strand formed using one strand of DNA as a template, in a process called transcription. The mRNA is then transported to the cytoplasm where it is translated. Ribosomes hold the mRNA in place, while 'transfer RNA' (tRNA), carrying amino acids, arrange amino acids that are complementary to those of the mRNA strand. The amino acids are then linked, therefore forming the protein originally encoded in the DNA.

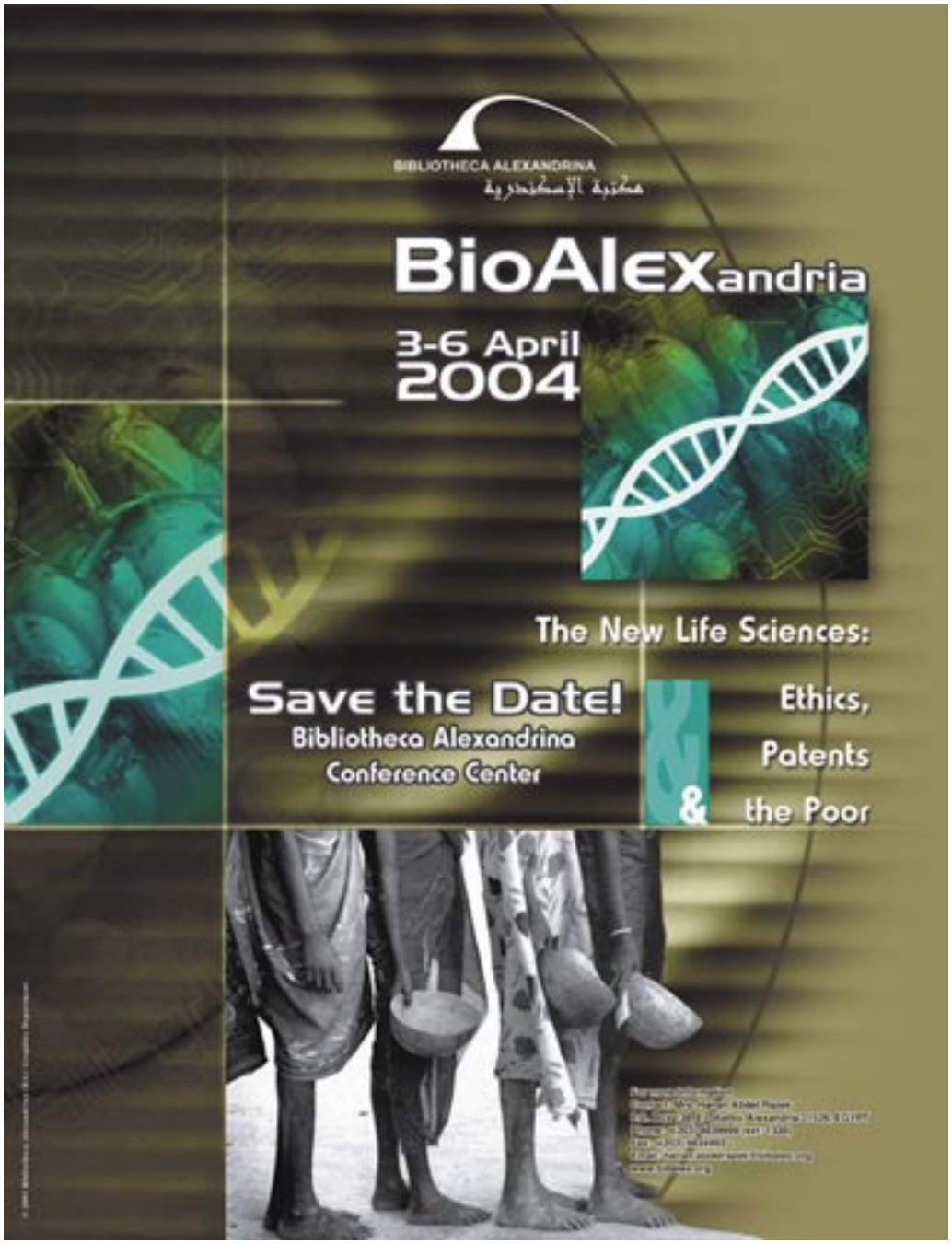
We can sum this up by saying that DNA makes RNA, and RNA makes protein. This is known as the 'central dogma' of modern biology.

What does 'recombinant DNA' mean?

Recombinant DNA is DNA 'recombined' from different sources. This is through the transfer of a gene from one organism into another organism.

What is Biopharming?

'Biopharming' is an application of biotechnology in which organisms are genetically engineered to produce pharmaceutical proteins and chemicals they do not produce naturally.■



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Visit the BioAlexandria 2004 Book Fair during the conference !