



# E.I.B.E.

JULY 1999

NEWSLETTER Nº 6

## EDITORIAL

The importance of biotechnology in many fields of human life is undisputed for the next millennium. In our new Concerted Action that started last autumn, representatives of 29 institutions from 17 European countries continue to develop ways of introducing this topic in school education. Previous work focused on the development and testing of particular materials for education that predominantly dealt with scientific knowledge such as methods of genetic modification and their applications. Social and economical aspects were integrated whenever it seemed to be sensible. In the



## European Initiative for Biotechnology Education

*The European Initiative for Biotechnology Education (E.I.B.E.) seeks to promote skills, enhance understanding and facilitate informed public debate through improved biotechnology education in schools and colleges throughout the European Union (EU). It is funded through the Biotechnology Programme of the European Commission's Fourth Framework.*

new Concerted Action these aspects will become the main focus of interest.

One central aim of education is to teach students knowledge. The materials that are available so far mainly focus on this aspect of teaching and learning. From the point of view of researchers in science teaching and of science educators however, education in biotechnology, has also to promote the students's ability to evaluate the different applications of these techniques. For this reason in our further work we will stress ethical and social implications of biotechnology e.g. by adapting our materials to humanities. Drama productions like 'The Gift' (UK) or 'The Cutting Edge' (USA) have already shown novel ways of introducing biotechnology into the curriculum.

The article of Liesbet v.d. Grint reports on a project where students in the

Netherlands dealt with ethical implications of cloning. Another controversial issue concerning the application of biotechnology is the production of food by genetic modification. The European Food Information Council's (EUFIC) role in dealing with this topic is introduced by Paul Wymer. An example of the possibility of using E.I.B.E. materials for non-school education is described by Stefania Uccelli and Alessandra Corda-Mannino using a description of the *Children's Town of Genoa*. Since this newsletter is the first of the new Concerted Action the institutions of the 6 new member states of E.I.B.E. have the opportunity to introduce themselves to our readers.

**Horst Bayrhuber, Ute Harms**  
IPN, Kiel, DEUTSCHLAND

## E.I.B.E. at the *Children's Town of Genoa*

The *Children's Town*, located in the old harbour of Genoa, is the biggest area existing today in Italy (2800 m<sup>2</sup>) devoted to young people from 3 to 14 years old, where play and learning merge into a new dimension of animation and fun. This area has been created not only for recreation but as a tool of study and research for people involved in education. 95 games allow children to have a good time, learning physics, biology and the applications of modern technologies.

One particular section is devoted to *Explore life* (100 m<sup>2</sup>) established by the National Cancer Institute and the Advanced Biotechnology Center of Genoa where visitors undertake a route through the world of genetics. This includes a study of the origin of living organisms, their reproduction, the structure of genes, the hereditary characters controlled by them, and their transmission and distribution

within a population. In this permanent section 2 posters on E.I.B.E. activities and objectives are exhibited and E.I.B.E. Newsletters are disseminated. Visitors are invited to cover this itinerary through multimedia stations, 2 computers which include interactive programs on genetics produced by the DNA Learning Center in New York: *Mendel's law* and *Gene therapy*, the story of *Uncle Scrooge and the biotechnology cotton* a Walt Disney comic strip on one of the applications of biotechnology in the agricultural field and a model puzzle on DNA structure.

This year we made some changes: a new comic character *Drosophila*, the vinegar fly has been introduced to explain what the advanced biotechnologies are, their applications and the associated ethical debate. The cartoon is in fact an didactic



alternative to traditional methods, treating difficult arguments effectively, since it can reach and interest the public at large. For the future, the Italian Ministry of the University and of Scientific and Technological Research has approved the realization of a three dimensional cell model; visitors can enter the cell to understand its features and functions.

**Stefania Uccelli**  
**Alessandra Corda Mannino**  
Centro di Biologie Avanzate, ITALIA

# New member states of E.I.B.E.

## Bulgaria

A few months ago Bulgaria became a new member of E.I.B.E. The teacher's community in Bulgarian secondary schools and experts on biotechnology have met this news with understandable satisfaction.

The involvement of Bulgaria in this European network means a recognition for the level of biological and chemical education in our secondary schools. At the same time it raises important challenges. In order to carry them out, first of all we intend to organise a seminar on biotechnology education for teachers from the Western part of the country. It will be held in Sofia, most probably in the middle of November. A second one will be organised in Varna during May next year (for participants from the Northern-East part of Bulgaria). About 30-35 teachers will take part in each of the seminars.

In the meantime the translation of selected E.I.B.E.-units (1, 3, 5 and 8) into Bulgarian has already started. The whole this activity is under the co-ordination and scientific supervision of Biological Faculty of Sofia University.

**R. Dimkov**  
*University of Sofia*

## Czech Republic

The Czech Republic as a new member of E.I.B.E. is involved in the Project activities in 1999 and 2000. Having shared the experience with our colleagues from the member countries of EU and with their assistance we are concentrating on workshops using E.I.B.E. units for in-service biology teachers from pilot schools (students aged 16-17) to disseminate and implement the new approaches in biotechnology among students as well as the public. It is a very important phenomenon of scientific and technological progress in the 21st century.

**Hana Novakova**  
*Pedagogical Centre Prague*

## Estonia

The Institute of Molecular and Cell Biology at the University of Tartu is a leading educational and research centre in molecular biology, cancer research and biotechnology in Estonia. The Science Didactics Department teaches biology, geography, health care and integrated science teachers both at pre- and in-service level. The staff of the Department is involved in current educational reform in Estonia by developing curriculum materials, composing textbooks and creating educational software. The Department is concerned with educational research promoting Scientific Literacy in Estonian schools as well as in other Baltic and East-European countries.

The University of Tartu contributes in several E.I.B.E. activities – in translation and updating of E.I.B.E. units, in computer-assisted distance learning, and in evaluation of dissemination and implementation of the materials. During the last few months, two E.I.B.E. units have been translated into Estonian, composition of E.I.B.E. WWW homepage in Estonian is in progress and in autumn 1999 an in-service course for 20 Estonian biology teachers will be organised.

**Tago Sarapuu**  
*University of Tartu*

## Greece

As new members of E.I.B.E. we are giving priority to translations of certain units that fit into subjects covered in curricula and relevant courses during senior high school (Lyceum) in Greece. We are planning to translate units 1, 4, 9, 10 and 11 and we are trying to have two or three of them ready by the end of August.

The second thing we are planning is a workshop activity, probably in autumn 1999, for introducing E.I.B.E. materials to the committee of curriculum development in the Pedagogical Institute of Ministry of Education and to teacher associations. The application and evaluation of these materials in the classroom of Greek schools is our final goal.

**Vasilis Koulaidis**  
*University of Patras*



## Poland

Our purpose as a new member in E.I.B.E. is to make the meaning of biotechnology better understood in Poland. We also want to elaborate research materials for teachers and organise workshops for them across the range of biotechnology.

We are confident that our participation in E.I.B.E. project can support the introduction of a new educational system in Poland.

**Anna Sternicka**  
*University of Gdansk*

## Switzerland

Switzerland is a new partner of E.I.B.E. The costs for participating have been taken over by the Bundesamt für Bildung und Wissenschaft, for which we are very grateful. Our main goal is to spread information about E.I.B.E. teaching material in Switzerland. We would like to encourage teachers to inform their students about biotechnology. The E.I.B.E. units will assist them with present-day information on biotechnology, suggestions for school experiments, role plays and the introduction of social issues. We plan to run special E.I.B.E.-courses for in-service teachers. The first one will be in June 1999 and is a joint initiative of Germany and Switzerland, to take place in Überlingen, next to the Bodensee. In addition, we will introduce the E.I.B.E. teaching material to pre-service teachers during their regular courses at the university. We also would like to contribute some material for the development or updating of E.I.B.E.-units.

**Kirsten Schlüter**  
*ETH, Zürich*

# European Food Information Council

The European Food Information Council, EUFIC, is an independent, non-profit making organisation based in Paris. Its purpose is to promote effective communication with consumers by providing food scientists, health and nutrition professionals, educators, opinion leaders and the news media throughout Europe with balanced, science based information. It works in partnership with national and international nutrition and health education organisations and is supported by leading food and beverage companies in Europe. It plays no part however in marketing ingredients or products, or in stewarding brands. Neither does it represent any particular trade or company.

While aware of the different food cultures and eating habits in Europe, EUFIC focuses on food and beverage topics that transcend national borders. It commits its resources to three of the most important information topics in the food chain:

- safety and quality of food and food products;
- nutrition, diet and health aspects;
- applications of modern biotechnology in the food chain.

EUFIC aims to promote open discussion with relevant opinion formers on all aspects concerning the application of modern biotechnology in food. In this way, it hopes to improve awareness and understanding within the food industry of issues important to consumers. Also, like E.I.B.E., it aims to improve public knowledge about the relevance of modern biotechnology in food products and enable the consumer to take an informed position on food produced with the help of modern biotechnology.

To this end, EUFIC members commit to openness on the use of biotechnology in the food chain. Specifically, they undertake to:

- provide accurate and verifiable information on applications of biotechnology in the food chain;
- respond frankly and responsibly to any expressed consumer interest in biotechnology;
- not make any misleading claims on the use of biotechnology in the food chain;
- stand ready to correct misleading information which may have been provided to consumers concerning the use of biotechnology in the food chain;

- be conscious of any ethical concerns related to applications of biotechnology in the production of food or food ingredients.

Clearly EUFIC and E.I.B.E. have many common aims and objectives and moves are afoot to add value to each other's activities by working together where appropriate. As a first step we hope to organise joint E.I.B.E.-EUFIC workshops with teachers. Recent media coverage of food biotechnology, particularly in the UK, suggest that some issues should be put back into a more rational context. Teachers, as multipliers of balanced information to future citizens, will be offered the opportunity to discuss these with international experts, while E.I.B.E. and EUFIC materials will be used to stimulate discussion. A pilot workshop will be held in London in September and if successful, will be repeated in other European centres in subsequent months.

For further information about EUFIC, contact EUFIC, 1, Place des Pyramides 75001 Paris, France. Tel.+33 1 40 20 4440, <http://www.eufic.org>

**Paul Wymer**  
London, UK

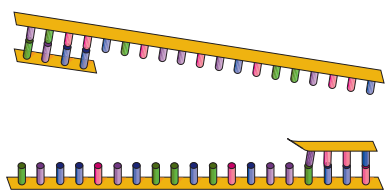
## DNA Profiling

Extract from **Unit 2**. If you want to know more about E.I.B.E. units have a look under the address: <http://www.rdg.ac.uk/EIBE>

### Polymerase Chain Reaction (PCR)

In order to carry out DNA amplification by this method the following are necessary: DNA from the sample to be analysed, DNA polymerase (an enzyme which synthesizes copies of pre-existing DNA), and the four deoxyribonucleoside triphosphates, i.e. the 'building blocks' for the new DNA molecules. Two small, single-stranded DNA molecules, 20-30 nucleotides long are also needed. These oligonucleotides are designed to hybridise, or base-pair, to the DNA on each side of the region to be amplified. These oligonucleotides, called primers, form the starting points for synthesis of new DNA strands, i.e. they initiate polymerisation....

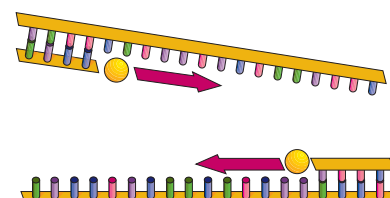
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The temperature is lowered to 50-60 °C. The primers base-pair with complementary sequences in the target DNA.

1 The reaction mixture is heated to 90-95 °C. This denatures the target DNA (makes it single stranded).

The temperature is raised to ca. 72 °C. This initiates the synthesis, by DNA polymerase, of new DNA strands starting from the 3' position of the primers using the single-stranded target DNA as template.



# Internet debate about Genetic Modification and Cloning

One of the aims of E.I.B.E. is to improve public information about biotechnology by means of school, college and related educational activities. The Biotechnology Education Centres in the Netherlands with financial support from the Foundation for Science and Technology shares this aim. Last year they organised an Internet debate about *Genetic Modification* (January 1998 - 1 April 1998) and *Cloning* (November 1998 - July 1999).

A special site ([www.biodebat.nl](http://www.biodebat.nl)) was set up where pupils (14- 16 years) can discuss the use of modern biotechnology. The learning activities are based on the concept of Case Based Learning. For example one group was asked to advise the Minister of Health on cloning human embryo cells. Last year about 40 schools (approximately 600 students) had participated in the debate.

An interactive internet site was specially created for the debate. The main future of the site lies in the discussion pages where pupils can search for information in a database, search the internet and ask question of scientists. They can also chat with pupils in others schools and react to various statements. They can also ask 'Sophie' for advice. 'Sophie' is a button/coach who asks questions about the

statements. (Sophie is based on a popular philosophy book in the Netherlands *Sophie's World*.)

## Why use the Internet?

In the Netherlands there is a new subject of General Science (Algemene Natuurwetenschappen, ANW) dealing with development of Science and Technology. The main aims of General Science are the development of norms and values and the use of Internet in the classroom. This debate incorporates both these aims. The Internet discussion offers a starting point for a debate in the classroom and the pupils have to write a paper in which they give their own opinion about the case discussed.

By using the Internet it is possible to distribute teaching materials easily to schools so they can be used directly in the

classroom. Pupils can search for information and can communicate with others who are working on the same case. Of course the schools need access to the Internet. The Dutch Government has made Information and Communication Technology a priority in secondary schools. At present there is 1 computer available per 20 pupils and by the end of this year it will be 1 per 10 students.

There have been enthusiastic reactions from pupils and teachers about this way of learning and teaching. Pupils like it because the Internet is challenging and they can access the site at home. They also like communicating with other pupils. Teachers like the project because they can combine biotechnology content with discussion and opinion. Of course there have also been some problems. There is so much information on the net that it is difficult to make the right choices, pupils get lost, or cannot judge the importance of the information. But when the use of Internet is more widespread these disadvantages will disappear. Case based learning via the internet will then have a promising future.

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Designed and typeset by: **Caroline Shearer, NCBE, Reading, UK.**  
Printed by: **Alden, Oxford, UK.**

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