

EDITORIAL

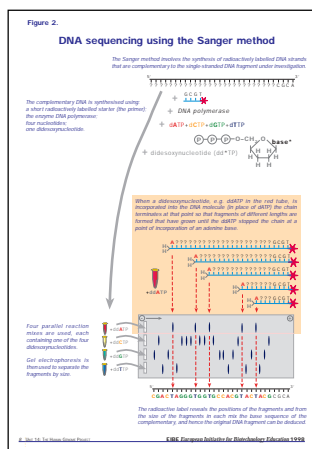
Scientists are racing to complete the Human Genome Project, which aims to map the complete set of genetic instructions for human life. This accomplishment should revolutionise the diagnosis and treatment of a wide range of diseases. At the forefront of this effort are J. Craig Venter, president and chief science officer of the company Celera Genomics (Rockville, Maryland/USA), and the international Human Genome Organisation (HUGO) which uses the services of publicly funded scientist. At the moment it seems Celera has won the race. Recently Venter announced that Celera has sequenced about 99 % of the human genome and has now started closure of gaps. He said, "We will now turn our computational power to the task of ordering the human genome". This refers to the fact that the sequences obtained are only the letters, not the words in the "book of life". It will take some time to bring order to the genetic structure and to repair mistakes.

The rate of progress by Celera is fantastic. HUGO started ten years ago and has spent about US \$3 billion, but Celera started more recently and, by accelerating their sequencing effort in September 1999, are now within sight of the finishing post. Not surprisingly, the media has reflected the success of the Celera scientists and the matter has become a topic of serious interest for politicians. Tony Blair and Bill Clinton have hurried to express their wish that

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.

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E.I.B.E. Unit 14



the biotech industry will handle the progress of genome research for the benefit of the people.

At a HUGO conference in Vancouver in April, the newly appointed president of HUGO, Lap-Chee Tsui (Toronto/Canada), said that "...scien-

tists are extremely close to completing the first draft of the human genome sequence and people are eager to learn about the science and what it means to them, their loved ones and future generations." It is evident that these advances have social, ethical and legal implications for the public. HUGO maintains that downstream developments should not be determined by profit, but immediate health benefits as determined by community needs, should be provided. Recurrent questions of public interest were aired, such as who should have the access to genetic information of individuals: only doctors, or also insurance companies, family members or employers?

E.I.B.E. is contributing to this public debate in Europe especially amongst the youth. Our lives have started to be influenced in different and sometimes subtle ways by knowledge of our genome. At present we should focus on fighting disease, but what of the future?

Ognian Serafimov
DEUTSCHLAND



20 teachers from technical high schools in the Czech Republic recently took part in an E.I.B.E. workshop in Trebic (December 1st-4th 1999). The workshop focused on E.I.B.E. Unit 17, **Biotechnology: past and present** and was presented by Dr. O. Serafimov of the Jorg Zurn Technical High

Workshop for teachers in the Czech Republic

School in Germany. The main aim was to familiarise the teachers with the materials and discuss ways of implementing them in the curriculum.

The opening of the workshop was marked by a press conference, reflecting the high degree of local interest in it. Dr. Serafimov went on to briefly describe all the E.I.B.E. Units and then concentrated on Unit 17, which has been translated into Czech and was available to all participants in hard copy. The resultant discussion with Dr. Serafimov and Dr. Novakova was very productive with the teachers developing several novel ideas for the incorporation of the materials in their classroom teaching. These included the use of biotechnology in career counselling,

the introduction of biotechnology into the humanities, and field trips to biotechnology companies. The latter was doubtless inspired by an adjunct of the workshop, which was a visit to a local cheese factory.

Participants completed questionnaires after the workshop for evaluation purposes. Analysis of these revealed that the workshop was very well received and a desire for further, similar events in future. These will be facilitated by the translation of more units into Czech. Subsequent contact with the teachers has revealed that they are creatively involved in using the E.I.B.E. materials back in their schools.

Hana Nováková
ČESKÁ REPUBLIKA

E.I.B.E. materials across the curriculum

Food biotechnology

E.I.B.E. recently collaborated with the European Food Information Council and Edexcel (a major UK schools examinations group) to organise a one-day INSET workshop on food biotechnology for a multidisciplinary group of 30 teachers of the 16+ age group.

The workshop took place at the Institute of Education, University of London, UK. The programme consisted of a morning of talks on the place of food biotechnology in new UK syllabuses and on key issues in food biotechnology (*i.e.* the media, applications, the regulatory framework, ethics) from experts in each field. Afternoon group discussions on the question "What do we want food biotechnology to achieve?" addressed the question from the perspective of different stakeholders including industry, pressure groups and the public. E.I.B.E. units (printed and on-line) were demonstrated during the lunch interval and copies of the E.I.B.E. Newsletter and CD-ROM, as well as several other resources, were distributed to delegates.

The workshop illustrated the partnerships that exist at national level between schools and other sectors, e.g. government, examination bodies, higher education, professional organisations, consumer groups and industry, and how these provide valuable support for the teaching of biotechnology. Close co-operation between the partners throughout the workshop development and dissemination apparently paid off. Evaluation of the workshop was very positive and an e-mail network was created to enable delegates to maintain contact with each other. It is anticipated that the workshop will serve as a model for adaptation for use elsewhere in Europe.

Paul Wymer
UK

Special project work

We are always looking for special projects for our students that will allow us not only to teach biology, but also to inspire their curiosity and imagination. Recently we looked for material for small group projects, based on students prior knowledge in biology, which dealt with issues relevant to them as future citizens. For example:

- **the need for autonomy**
the need to feel that one's true wishes can be expressed and fulfilled;
- **the need for competence**
the need to feel that one's competence is developed and not threatened;
- **the need for relatedness**
the need to feel accepted, secure, and loved.

Following these criteria, we chose biotechnology. We offered students the following topics:

Agriculture,
Energy,
Environment,
Health,
Manufacturing/ Bio processing,
Social Impact.

Our main problem was that there are no high school materials in Hebrew for these topics. In a search of the Internet we found <http://www.eibe.org>. We were pleased to find that the E.I.B.E. site includes materials and activities in nearly all the topics recommended by us to our students. Since all students in Israel learn English, it was the perfect solution to our problem: not only did we find 'ready made' materials which were suitable for our students, but it gave them the opportunity to read scientific materials in English.

In order to introduce the subject we used the materials in the unit **Biotechnology: past and present**. As an opening activity we used the protocols in **Microbes and molecules**.

This allowed us to give to the students an overview of microbiology and DNA technology as a rehearsal and a base for the project. After reading the introductions to the units, each group decided on the topic they were interested in. Each group studied the unit chosen and wrote outlines of their suggestion for a project. The suggestions were discussed with the teacher and from this point on the students worked on their own for 3 months. During this time they came to the teacher for help with all kinds of questions and problems.

Three months later, they came back with the projects, very proud to introduce them to the other students. It was amazing to see their work; the projects were impressive! We decided to open a 'Biology Gallery' in the school and invited all the other classes and the parents to enjoy the fruits of the Biotechnology projects with us.

For example, based on the E.I.B.E. Unit **Fermentation** the students produced *Wine and cheese making- an explanation of the processes and products* and *The Jewish perspective of biotechnology: the production of acetone and the state of Israel!*

Based on **Biotechnology: past and present** were reasoned accounts of students' favourite scientists and stories and newspaper articles and presentations produced with PowerPoint.

Other units used for projects were: **Biscuits and biotechnology, Human genetics: a debate of a personal dilemma, Transgenic plants I and II** and **Transgenic animals**.

It was an educative experience for us, for the students and for the parents. We all learnt from it and enjoyed it very much! This is my opportunity to thank the team that made it possible for us, the E.I.B.E. team!

L. Peled.
Science Teaching Center
The Hebrew University of Jerusalem

E.I.B.E. units from a Swiss perspective

Microbiology and biotechnology themes are increasingly common in Swiss secondary schools and in primary school teacher training colleges. New ideas for theoretical lessons and for practical sessions in the laboratory are welcomed. The arrival of E.I.B.E. units has therefore been very timely. A poll among teachers revealed that the excellent graphics and the easy to follow, step by step instructions were particularly well-received, although the latter were criticised by some more heuristically-minded teachers.

For older colleagues, the greater expenditure of time and resources necessary to compensate for their lack

of training in microbiology and biotechnology, has caused some concern. Younger teachers who confronted such topics during their training evidently need less 'activation energy' in order to embrace the new materials. The relatively few units available in German were especially popular, indicating that while Europe should be celebrated, it should be in the mother tongue if possible! Students using materials in English often found the combination of a foreign language and complex biological themes too much to cope with (even though they are always singing English songs during break!)

It may be a uniquely Swiss phenomenon, but only a few teachers could find time

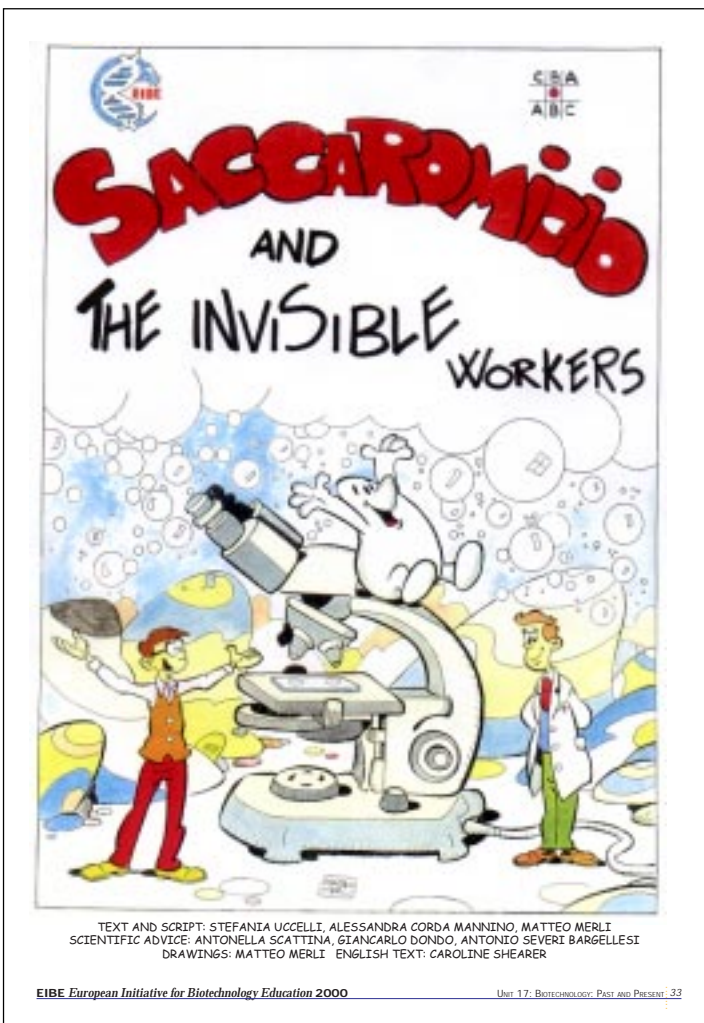
to use more than one E.I.B.E. unit in class. The Swiss school system has for some years been undergoing radical reform and teachers are under constant time pressure. New high school graduation regulations, which incorporate new courses, are especially demanding. It is here however that E.I.B.E. units can be useful, particularly in the three-year introductory testing phase. To this end, the materials need to gain a higher profile. A useful first step has been taken by the *Microbiology and Teaching Working Party* of the Swiss Society for Microbiology (<http://www.expasy.ch/linder/SSM>).

Kurt Frischknecht
ST GALLEN, SCHWEIZ

NEW

Unit 17: Biotechnology: past and present

Cartoon history of yeast now available on the website



The first Bulgarian E.I.B.E. seminar on biotechnology



The seminar took place in Sofia on 6th and 7th of November 1999. E.I.B.E. members from the United Kingdom and Germany were lecturers. 18 teachers attended from different secondary schools in Sofia and the surrounding regions. A set of biochemical, enzymological and genetic protocols were demonstrated by J. Schollar (Reading, UK). These met significant interest from the teachers. Most of the tasks are easily applicable to the conditions in Bulgarian schools.

Bulgaria is among the newly accepted members of E.I.B.E. It was an interesting challenge to organise a meeting for teachers using good practice developed in other countries. The main topic of the event was *Implementation of biotechnology in the biology curriculum at secondary school*. It was particularly relevant bearing in mind the current educational reform in our country.

The meeting also offered an opportunity for the demonstration of E.I.B.E. units by CD-ROM and also dissemination of the first 5 units already translated and printed into Bulgarian. All participants considered that these would be very useful in their schools and that it is

possible to implement the new materials directly in order to improve the quality of biology education.

The agenda allowed discussion of problems such as the relationship between biotechnology, chemistry and laboratory equipment (O. Serafimov, Uberlingen, Germany), the impact of environmental biotechnology (R. Dimkov) and the forthcoming editorial and publishing activity of E.I.B.E. (C. Shearer, Reading, UK). It took place on the second day of this working meeting.

In conclusion, a discussion and evaluation of the course took place. There was a consensus that the seminar was useful for in-service training of staff. The next similar seminar will be held in Varna at the Black Sea during June 2000 with another group of teachers coming from north-eastern Bulgaria.

R. Dimkov
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E.I.B.E.

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