

Teaching teachers microbiology and much more: a biotechnology summer school

Ian Sutherland

'Take 50 battle-weary Scottish biology teachers ... and return them to their student days!'
Quote from a recent participant

For the last three years, the Institute of Cell and Molecular Biology (ICMB) at Edinburgh University has hosted a summer school for biology teachers involved in the new Scottish syllabi. Last year the focus was on the Advanced Higher 'biotechnology' programme. Although labelled 'biotechnology' much of this syllabus, especially at the practical level, focuses on microbiology. Our courses have taken 50 teachers each year from a wide geographical spread of Scottish schools and FE colleges. They spend five days living in university halls of residence and attending a mix of lectures and practical sessions. The opening lectures, following registration on a Monday morning, have updated the teachers on molecular biology or have covered a wider range of biological topics. The aim of these has always been to present a modern view of biology at a level suitable for teachers for whom much has changed since they obtained their initial degrees.

The Monday afternoon is spent on microbiology practical work. Here it has to be remembered that with the current age profile of teachers, many will not have handled bacterial cultures before. The teachers are also subject to the very restrictive protocols required in schools. What would seem a simple undergraduate practical has to include very detailed safety instructions, before we can start to look at a number of fairly simple isolation procedures. As nitrogen fixation features strongly in the syllabus, we place considerable emphasis on free-living and symbiotic nitrogen fixers and the spacing of the practical sessions is deliberately aimed at giving time for the isolates to develop.

In the following days, there is a mix of lectures and practical sessions with one day devoted to 'industrial' visits. It was especially appropriate that last year, in the week when the results of the Human Genome Project were announced, the guest lecturers were from the MRC Human Genetics Unit and the Medical Genetics Section, based at the Edinburgh Western General Hospital. Their lectures covered the Human Genome

Project, genetic disorders and gene sequences. A further lecture in this area discussed the use of monoclonal antibodies in human therapeutics.

Evening sessions held in the halls of residence included a showing of the video *The Gift*. This has been produced by the Wellcome Trust as part of its educational programme and deals with inherited human genetic disorders. A representative of the Wellcome Trust outlined some of their projects and initiatives in the area of education and this was followed by an extended discussion on the ethical problems posed by modern human genetics and the ways in which they might be handled within the school curriculum.

A half-day visit to the Scottish National Blood Transfusion Service allowed an insight into the applications of therapeutic proteins and diagnostic products. In previous years visits have included the 'Quest' yeast production facility and a meeting with 'Dolly' the sheep at the Moredun Research Institute. Last year we were able to include another highlight with a guided tour of the 'Frontiers of Science Exhibition' at the Royal Society of Edinburgh. One problem which faces us when organizing visits is that of finding suitable venues within easy travelling range of Edinburgh. We are just too far away from antibiotic production plants in the west of Scotland and several other suitable sites.

The practical sessions in the laboratory have ranged from elementary handling of micro-organisms to DNA extraction and transformation. In these we are fortunate that we currently host a full-time development officer and technician in ICMB, funded by the Science and Plants for Schools (SAPS) programme of the Gatsby Foundation. Another teacher is seconded part-time to develop practical protocols to illustrate the new syllabi. These teachers travel widely within Scotland (and further afield) training teachers and technicians in schools. We have also been able to call on the services of the National Centre for Biotechnology Education (NCBE) at Reading and our attendees have been educated and entertained by Dean Madden and John Schollar.

While the teachers certainly spend an exhausting time catching up with recent advances in these areas of biology, all have found it a worthwhile experience as well as an opportunity to make contact with Edinburgh University. A few even managed to spend some time in the University Library, reading up the background to the material they were working on.

The Summer Schools have been made possible through the financial support of the Wellcome Trust, Unilever plc and ICI plc, for which the attendees and organizers are most grateful. Summer schools such as this enable Scottish teachers to learn of developments in rapidly advancing fields such as genetics and biotechnology. The course also provides a very useful link between Edinburgh University and some of the Scottish schools and FE colleges from which it draws its students.

BELOW:
Participants in one of the Institute of Cell and Molecular Biology (ICMB) at Edinburgh University summer schools for biology teachers.



Feedback from participants has been very positive – *'this event has started the process of producing better informed and more ethically aware students, by doing the same for 50 fortunate teachers'*.

Running the Summer Schools has involved a steep learning curve. It draws on a planning committee from Edinburgh University, the Learning and Teaching Scotland Agency, the two development officers, and local school science advisers. It relies heavily on the voluntary input of individuals. This also means that as far as possible, we use local resources. Hopefully in the future, the Scottish Executive will lend its financial support to this key element in the continuing professional development of a section of the teaching profession in Scotland. Our sponsors are also keen that such opportunities should be extended to other parts of the UK. Although we also invite small groups of school pupils to spend a day in the laboratory, by targeting the teachers we hope that we can spread expertise more rapidly and effectively.

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