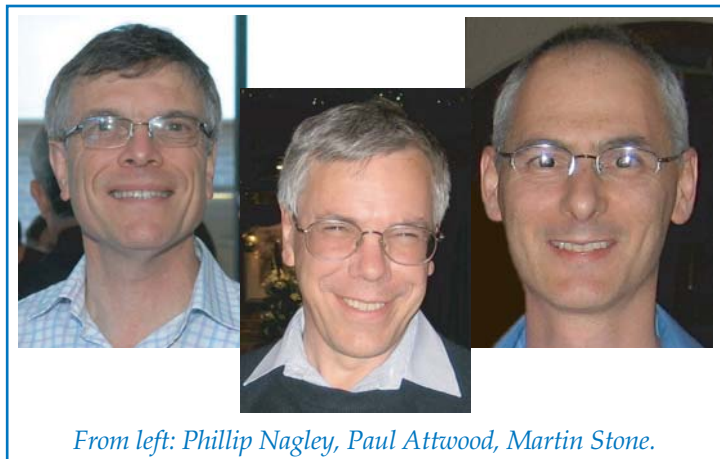


# Developments and Challenges in Education

*Paul Attwood, Liz Johnson and Phillip Nagley report on the recent Heads of Department (Discipline) of Biochemistry and Education Representatives Meeting.*

The most recent Heads of Departments of Biochemistry and Molecular Biology (BMB) meeting was held at Monash University on 10 December 2007. After a gap in some years in the frequency of these meetings, this meeting focussed on the theme of Developments and Challenges in Education in BMB in Australia.



*From left: Phillip Nagley, Paul Attwood, Martin Stone.*

The meeting, organised by Phillip Nagley and Martin Stone, was very well attended. The 37 registrants were either heads or education representatives of departments or other divisions in universities where BMB are taught. The participants represented 21 Australian universities, with speakers from seven different universities. In addition, we were fortunate to have present Trevor Anderson from the University of KwaZulu-Natal, South Africa, who is, amongst his many other educational interests and posts, Head of the Science Education Research Group, member of the IUBMB Educational Sub-Committee and member of the Editorial Board of *Biochemistry and Molecular Biology Education*.

The meeting was opened by Phillip Nagley and the first speaker was Susan Hamilton (University of Queensland). Susan spoke about a project involving a Concept Inventory that aims to establish a set of clear, key concepts underpinning the molecular life sciences and to develop a web-based assessment tool to test students' understanding of these concepts. As a prelude to this, a survey aimed at identifying a set of 'Big Ideas' was presented to those attending the meeting. These big ideas must be unique to the molecular life sciences and need to capture the thinking of experts in the field in a comprehensive and future-looking way. The next step will then be to identify the key concepts that underpin the understanding of these big ideas. One outcome of this project may be to lead to a more uniform curriculum for BMB courses across the country.

Trevor Anderson acted as moderator in the pre-lunch breakout session 'Quality and Effectiveness in BMB Education' that was organised by Liz Johnson (see box).

In the first afternoon session, Charlotte Brack (Monash University) spoke about developing a national electronic

resource for education in BMB. Developments in web technologies have made possible online networking and collaboration; this has led to the proliferation of 'communities of practice'. One possibility for ASBMB is to develop such a community to allow educators to share resources and ideas. However, the success of such a venture will ultimately depend on its ease of use, its usefulness and the maintenance of the level of interest of its users, rather than the technologies used. The second speaker in the afternoon session was Susan Howitt (Australian National University), who spoke about the role of the ASBMB Education Special Interest Group (SIG) and thus continued Charlotte's exposition of building a community of practice. The SIG is considering the development of its own website linked to the ASBMB website. Susan discussed the potential role of this in providing a resource centre (eg. for laboratory practical experiments) and a forum for discussion of a broad range of teaching and learning issues. It is envisaged that such an educational website would foster a sense of community amongst teachers in this area and would thereby avoid the sense of isolation that can often occur in university teaching. Again, the success of this venture will depend largely on the maintenance of interest of its users and contributors.



*Gareth Denyer and Trevor Bailey comparing shirt homology.*

There then followed a series of short presentations on Best Practice in Education in BMB, selected from a number of submitted abstracts: Brett Lidbury (University of Canberra – applying techniques used in foreign language learning to assist students' understanding of the language of molecular biology); Gareth Denyer (University of Sydney – recorded free-ranging discussions with colleagues as sort of 'director commentaries' on online lecture presentations and past-paper examination questions); Phil Dickson (University of Newcastle – developing students' capacity to critically analyse research articles using an interactive tutorial and open book examination to test understanding); Janet Macaulay

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(Monash University – the use of online clinical case studies and research to prepare answers to questions that are discussed in tutorials with a clinical dietician and a biochemist, to integrate concepts in nutritional biochemistry and make them relevant to Dietetics students); Jenny Mosse (Monash University – a discussion of the teaching of laboratory skills to distance education students using home laboratory kits, computer simulations and attending residential schools and comparing the outcomes with those in campus-based students); and Marie-Paule Van Damme (Monash University – the development and use of an online, student-centred, case-based approach for learning basic principles of practical biochemistry to foster collaboration, critical thinking and problem-solving). Denis Crane (ASBMB President; Griffith University) then spoke about the increasing role of the ASBMB in teaching and learning and how this might foster greater interest in the Society from students and staff in university departments of BMB. On the other side of the coin is how might university departments have more active roles in ASBMB to enhance recruitment and retention of ASBMB members.

After concluding remarks by Rob Pike (Head of BMB at Monash University) that closed the meeting, we retired to the nearby Bruce County Motor Inn for drinks and a very pleasant dinner.

**Plans are being developed for an educational website to be run in conjunction with ASBMB. All the Best Practice abstracts will be available on this website, as well as Liz Johnson's discussion paper on Quality in BMB Education. In addition, as an outcome of this meeting, Trevor Anderson has compiled a detailed list of key issues in undergraduate BMB teaching, how ASBMB could support such teaching, and ideas for some interactions with other disciplines and groups that could take us further in this important area.**

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*Liz Johnson ready for the breakout session.*

## **Probing the Issues about Quality in Biochemistry and Molecular Biology Education**

A discussion paper was circulated to participants in advance of this meeting. The paper, written by Liz Johnson, considered BMB Education in the perspective of tertiary science education, with the current challenges in funding models and demands for excellence. BMB educators not only train future researchers in our field, but also teach many students who will end up doing a variety of different things in their professional lives. The discussion paper raised a series of issues concerning the possible roles that ASBMB might undertake in relation to tertiary education. Delegates to this meeting discussed these teaching issues in small groups formulated as a breakout session.

### **Group discussions**

Each group was asked to identify key issues in undergraduate teaching in BMB and to explore possible roles that ASBMB could have in developing and supporting teaching. After a lively session, groups reported back to produce an aggregate view of teaching and learning in our discipline. Trevor Anderson introduced the reporting session by noting that improving quality and effectiveness in teaching and learning relies on good measurement methods. Universities must use a range of tools to obtain meaningful results including student evaluations, diagnostic testing, external evaluation of courses, employer feedback and peer review.

### **Major issues in teaching in BMB**

Groups identified many issues common to all university disciplines such as large class sizes, increased diversity amongst students and limitations of physical facilities. Participants noted that teaching, although a fundamental and scholarly activity of universities, is less prestigious than research and that 'all-rounders' are increasingly disadvantaged relative to specialist researchers. The groups also looked at the possibility of an agreed curriculum for BMB. This would include core concepts and laboratory skills and would need regular revision to remain current. A core curriculum might also define standards for a major in the discipline. Some delegates noted that in some cases core teaching in BMB has drifted into other disciplines and weakened its status in universities.

### **What can ASBMB contribute?**

There were two major roles defined for ASBMB. First, the meeting as a whole strongly supported the idea of a national network that could support teaching and learning by providing a framework for sharing excellent practice, new ideas and resources. The information that would be good in this respect included details of successfully implemented lab classes and assessment tasks for undergraduates, as well as international links to similar materials. The educational network envisaged for ASBMB would work through the internet nationally and also through local groups in each state. The ASBMB Special Interest Group in Education can provide an ongoing, informal forum to stimulate discussion and innovation.

The second role envisaged for ASBMB was in advocacy for BMB as a core discipline for life sciences within tertiary institutions and in the broader community.