303P IMPLEMENTING TECHNOLOGY-BASED TEACHING AND LEARNING IN PHARMACOLOGY

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A consortium of pharmacologists was funded by the Teaching and Learning Technology Programme (TLTP) 2 to develop computer-assisted learning (CAL) packages. A major outcome was 40+ packages covering most areas of pharmacology of which 1200 copies have been supplied worldwide. However, staff reported that there were constraints to the implementation of such technology based teaching materials, such as lack of time to develop support materials and use these methods, and a culture which did not promote non-traditional approaches (Markham, Jones & Sutcliffe, 1997). In one study, student usage of CAL increased if it was integrated into the course and if it was assessed (Dewhurst & Hughes, 1999).

Funding has been obtained under TLTP3 to encourage implementation of such CAL packages into courses. The primary aim is to develop flexible Teaching and Learning Resource Packs (TLRPs) for selected CAL packages. A TLRP is a pack of courseware that provides staff with teaching materials and gives students tasks and exercises to do, based around one or more CAL packages. Thus, TLRPs may constitute sets of multiple choice questions, workbooks, problem-solving exercises, problem-based learning exercises and assessments. The intention is to make the work of staff easier by providing teaching materials, which can be readily customised for a variety of their courses, be useful for a number of student groups (science, medical, and para-medical), and which stimulate learning by students. In year 1, June 1998 to June 1999, 6 teams have developed and initially trialled 6 TLRPs. The topics covered in year 1 are: inflammation/asthma, practical exercise on agonists/ antagonists, recombinant DNA technology, pharmaco-epidemiology, drug targets/G-protein coupled receptors as drug targets, drug metabolism. Each TLRP will contain the teaching material, worked examples and tutor notes. These TLRPs are to be trialled and formally evaluated by members of the TLTP3 consortium in further Universities in year 2, June 1999 to June 2000, and will be generally available from September 2000. In addition, the software directory previously provided via the Education committee of the British Pharmacological Society will be updated and should be ready this September via the BPS web site (www.bphs.org.uk).

Markham, A., Jones, S.J. & Sutcliffe, M. (1997) *Br. J. Pharmacol.*, 120, 376P.
Dewhurst, D.G. & Hughes, I.E. (1999) *Br. J. Pharmacol.*, 127, 89P.

304P CALCIUM CHANNELS

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High voltage activated (HVA) calcium channels are cornposed of the products of 4 genes coding for the α_1 subunit (7 genes), the β subunit (4 genes), the γ subunit (2 genes) and the α2δ subunit (1 gene). Low voltage activated (LVA) channels are composed of an unknown number of subunits. To date, three genes for an α_1 subunit have been identified.

We have cloned and expressed two additional genes for the α2δ subunit and three for the y subunit. Northern and in situ analysis indicated that the mRNA of the α2δ-2 and α2δ-3 genes are expressed predominantly in heart and brain, respectively. The mRNA of the α2δ-3 gene and that of the α_{1G} subunit (a brain LVA calcium channel gene) are not co-expressed in brain. Expression of the α_{1G} subunit in the absence or presence of the α2δ-1 or α2δ-3 suburiit in HEK293 cells yields T-type calcium currents, which are not affected by the presence of the α2δ subunit. The mRNA of the γ3, γ4 and γ5 subunit is predominantly found in brain and heart respectively.

The functional effect of the new γ3,4 and γ5 subunit on expressed HVA current are minimal. It is likely that the α2δ subunits are expressed only with the various α_1 subunits of the HVA channels, whereas the new γ subunits are part of the native LVA channel complex.

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