

A Novel Approach to the Laboratory Based Research Project For Pharmacology

Background and Aims: The MSc Pharmacology programme at Glasgow Caledonian University was developed in 2006, primarily to target the International market. The programme offered an extended laboratory-based research project worth 60 credits, running over 12 weeks in Trimester C. However, with the increasing popularity of the programme and consequent growth in student numbers (reaching a maximum of 39 enrolled students in 2008/09), it was recognised that a new method of project delivery was desirable. In response, a novel 'group-based' research project was introduced to replace the traditional 'individual' research project model. The new model was designed to provide students practice in a wider range of techniques, ranging from *in vivo* to isolated tissue to molecular biology techniques, than they are usually exposed to in individual research projects, while sustaining a high level of quality in project provision and the student experience.

Summary of work: The research question was "How does Hillbilly Heroin work?", and the aim of the project was to examine the bioactivity of oxycodone and identify which opioid receptor type(s) mediate its effects. This was achieved using isolated tissue bioassays (the guinea-pig myenteric plexus longitudinal muscle preparation) to determine opioid activity and receptor selectivity of oxycodone using a range of selective opioid agonists and antagonists. Molecular biological techniques (PCR, Western blotting) were utilized to validate the assay systems used and determine the relative opioid receptor populations at peripheral and central sites. Analgesic potency of oxycodone was also assessed in an animal model of post-surgical pain (using a video recording and behaviour-based pain scoring system); thus giving the student practice in designing a pre-clinical investigation for assessing drug effectiveness. The duration of the laboratory work was 4 weeks; students were in the lab full time during this period. This scheduling ensured that all students executed their studies over the same period, which benefited both staff and students. Students were required to work individually to collect data under direction of a supervisor (no more than 6 students per supervisor), and analyse and interpret their own experimental data for compilation into a full thesis. Students were also required to present their findings in oral format at the end of the year.

Outcomes: The group-based research project was enthusiastically received by all Participants (module feedback overall satisfaction increased by 10%), and likewise feedback has been positive from staff and external assessors. Analysis of data over past 6 years shows that although the mean module mark did not improve, this approach did benefit less able students, evidenced by an improvement in the overall pass rate. Students recognise the benefit of team-work and peer-support, as well as the opportunity to acquire a broader range of skills and techniques, which ultimately places them in a stronger position when entering the competitive world of the labour market.

Discussion and conclusion: Although benefiting from working in a group environment, this model also ensured individual accountability through data collection, interpretation and presentation and reporting of findings, thus maintaining the same rigorous academic quality and standards as an individual research project. The success of the group-based project model is evidenced by its adoption in two of our other MSc programmes, and the continued positive feedback from our students