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# CHANGING THE NARRATIVE: REDESIGNING A BIOLOGICAL CHEMISTRY UNDERGRADUATE UNIT

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**SUBTHEME:** Modes of Learning

## PROBLEM

CHEM3007 Advanced Biological Chemistry unit is a 3<sup>rd</sup> year unit for Chemistry and Biochemistry Majors at Curtin University that was reintroduced into the degree program to fit with the new BSc structure introduced in 2021. However, the staffing demographic had changed during this time leaving chemistry understaffed. This provided an opportunity to develop a unit which would not rely on staff giving traditional lectures and workshops. Traditionally, the narrative of the unit is spearheaded by the lectures but we decided instead to use the laboratory program to drive the narrative for the unit.

## PLAN

The laboratory program needed to be designed carefully to drive the narrative of the unit and to fulfil the requirements of the degree. The design of a fluorometric enzymatic assay is a surprisingly complex task which requires knowledge in chemical synthesis, fluorescence, enzyme kinetics and development of inhibition assays and this was the basis of the unit. The lecture/workshop timeslot was used to teach fundamental concepts, broaden knowledge and provide a prelab for the laboratory the following day.

## ACTION

The enzymes targeted for this unit were common cysteine and serine proteases such as bromelain, papain and nattokinase as they were cheap, readily available and experimentally robust. The fluorescent substrate was based on the work of Gray and coworkers in the 1970s, who use 7-AMP and 5-AIP as their fluorophores attached to CBz-protected amino acids. The lab program was split into three sections: (1) The class synthesizing a range of fluorescent amino acids, with each student making one type of substrate and obtaining absorption and emission spectra; (2) The kinetics of these substrates with bromelain and rationalizing the result with SwissDock; (3) Making and testing potential inhibitors of bromelain and determining the IC<sub>50</sub>. In the last two sections students pooled their individual results to get a comprehensive class outcome. Two lab reports and a lab notes book formed the basis of the assessment of the unit.

## REFLECTION

The laboratory program worked, as students successfully developed an inhibition assay of bromelain, and could be used to drive the narrative of the unit. Students expressed that the unit was less stressful than the other units in their degree program due to the nature of assessments. However, staff had to concentrate on getting the laboratory working and more work is needed to get the lecture/workshop to mesh into the laboratory program. We would like to evaluate the program using the ASELL framework in 2025 to determine the efficacy of the program.

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