Supplementing Biochemistry learning through rich multimedia online resources

By: Prof. P.C. Shaw, Dr. K.C. Leung, Dr. Kenneth Leung, and Ms. Christy Cheng
From: School of Life Science
Year Starting: 2010

Introduction

In learning biochemistry, students may think some of the concepts abstract and difficult to understand; some of the knowledge hard to relate to real life applications; and some theories arduous to connect to each other. To solve such problems, the School of Life Sciences is developing a resourceful e-learning platform for students in Biochemistry Programme. The platform is composed of six modules and contains different learning media such as videos, animations, quizzes, and interactive games to demonstrate these abstract topics, illustrate their daily-life applications, and show relations among topics. The platform should assist students to become independent learners.

The six modules in the learning platform are: Protein Biochemistry Module, DNA Technology Module, Biochemistry and Life Module, Laboratory Equipment and Techniques Module, Data Presentation Module, and Self-study Skills Module. Here are some examples of the online learning activities within them.

- The Protein Biochemistry Module provides a milk protein separation case study. It will be a game-like virtual experiment. Firstly, students need to drag to remove the fat from a milk sample. Secondly, students will simulate the use of centrifugation and a technique called sodium dodecyl sulfate polyacrylamide gelelectrophoresis (SDS-PAGE) to separate different proteins. Thirdly, students need to rearrange the proteins according to their sizes and their molecular weight. Besides the animated game, the module also includes videos to show the actual experimental process.

- The Biochemistry and Life Module provides the case study of green tea antioxidants effects on lipid oxidation in red blood cell membrane. The module contains videos related to the experiments. The videos show the tests on comparison on the antioxidant effect between green tea and black tea; also between different brands of green tea. This module demonstrates how biochemistry knowledge is related to daily life.

- The Self-study Skill Module provides instructions to guide students to read and write a scientific paper. The module contains explanations of different parts of a scientific paper, including preparation, methodology, results, and so on. There is also a matching exercise for students to choose dissected parts of a scientific paper and match them with the corresponding writing criteria.

- Different modules are cross-linked to show relationships among different concepts. For examples, the Protein Biochemistry Module can be linked to the Laboratory Equipment

and Techniques Module at various places. The videos on experimental procedures will then show students the actual equipment used when they read about protein biochemistry. Other than that, the Biochemistry and Life Module and the data presentation module can be cross-linked in various places too. For example, when students need to present their findings of green tea effect on the anti-oxidation study, they can learn to use the ANOVA statistical tool to analyze the data gathered. Also, many concepts in the Protein Biochemistry Module and the DNA Technology Module are closely related.

Advantages of this learning activity

The learning platform is going to provide comprehensive background knowledge of biochemistry for students. The platform will be used to supplement a number of related courses. The new learning elements like animation games and videos will attract students to use the exercises. The quizzes will provide chances for students to assess their understanding. Students' capability to self-learn will be enhanced too. As students' background and previous knowledge they have had before entering the programme will be much varied especially under the new 3+3+4 curriculum, the online resources will serve as a very important tool to assist students to bridge knowledge gaps.

Feedback from teachers and students

When the platform is launched, online questionnaires will be administered to collect feedback from students and teachers.