Developing video learning modules for teaching & learning Cell Biology

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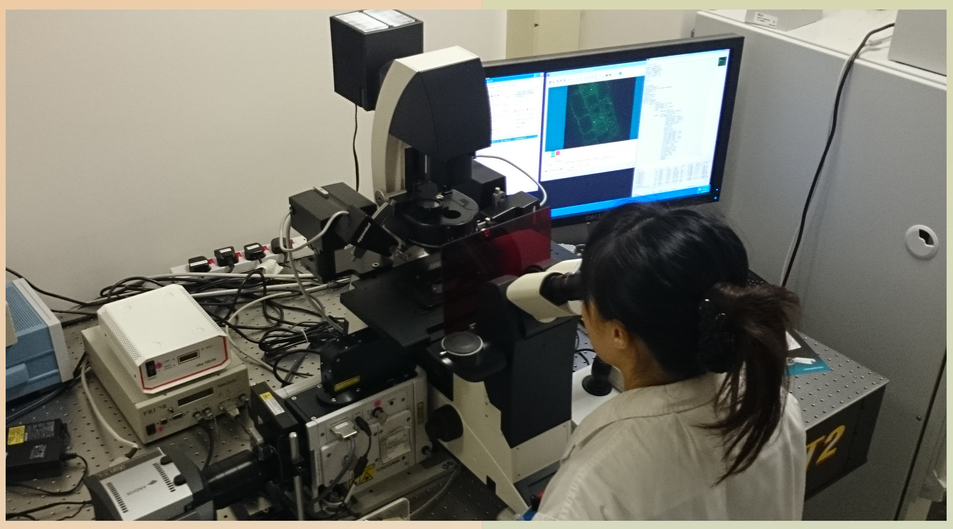
Summary

This project aims at developing teaching tools for Cell Biology using green fluorescent protein (GFP) technology and high-resolution live-cell imaging systems.

Traditionally most of the images of cellular structures or organelles in the Cell Biology textbook are based on chemically fixed (killed) biological samples and so the internal structures are locked in place. Such approach can generate artifacts and thus the knowledge in Cell Biology textbook might be different from the real situation in living cells.



The development of GFP technology in transgenic organisms and advancement of high-resolution live-cell imaging systems have allowed real-time detection of the GFP-tagged proteins, transport vesicles and organelles that are highly dynamics in living cells or organisms.

In this project, collections of real-time images or movies in transgenic cell lines, plants and animals with GFP-tagged organelles are edited and organized to self-explanatory teaching materials to clarify most up-to-date Cell Biology knowledge reflecting the *in vivo* (real) situation.

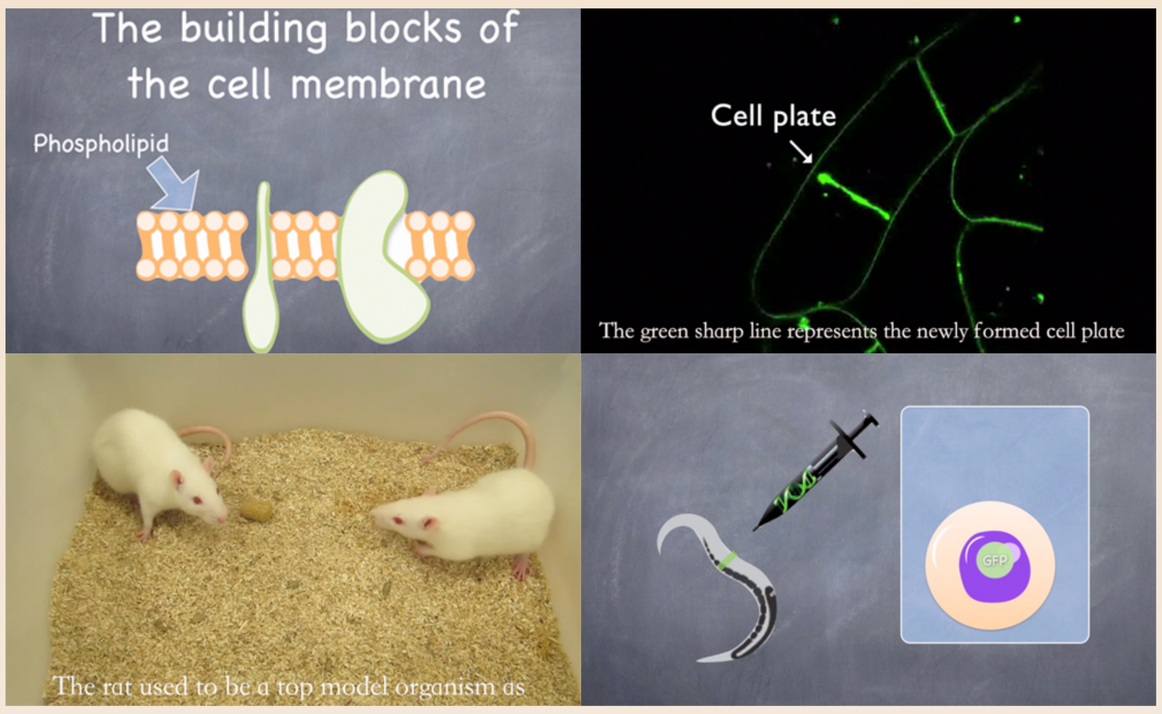
Developing self-learning videos

We have been using transgenic cells or organisms (plant and animals) expressing various GFP (green fluorescent protein)-tagged proteins to study protein trafficking, organelle dynamics, biogenesis and function in both plant and animal models, using the most advanced cell imaging systems (e.g. Confocal Spinning Disk Microscope). Many of these movies recorded reflect the current development and understanding in Cell Biology, and were further developed into self-learning high-quality teaching materials.

Features of self-learning videos

The real-time movies recorded by high-resolution confocal imaging system were processed by computer software to produce self-learning-quality videos :

- **Animated introduction**
- **Concepts explained by image / movies collected in research**
- **Narration and subtitles added**

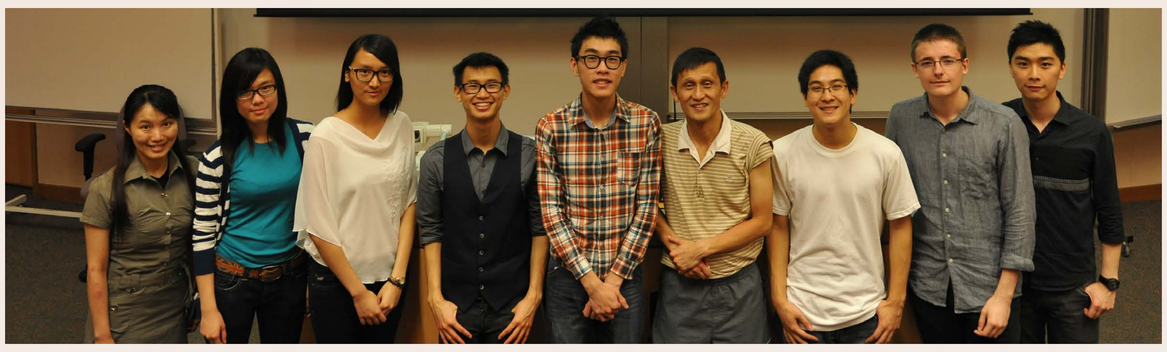


Testing self-learning videos in Class

The movies were used as a teaching tool for BIOL2120 Cell Biology course in the academic year 2013-14, with a total number of 300 university students taken the course. Feedback from students were collected for fine-tuning the movies.

Developing self-learning kit

A self-learning kit including notes, figures, movies and exercises will be developed for students to study important concepts in Cell & Developmental Biology with minimal supervision.



From Left to Right : Vivian Chan, Emily Luk, Amy Leung, Tim Li, Jim Lau, Prof. Liwen Jiang, Jonathan Chiu, J Barlow and Ivan Cheung

Conclusions

With the use of the high-quality real-time movies updating the most advanced concepts of Cell Biology, the knowledge and involvement of students taking this Cell Biology Course are greatly improved.

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