

# Engaging Undergraduates in RESEARCH and INQUIRY: A Scholarly Dialogue

## Interactive Learning in Animal Biotechnology

Course Instructor/Project leader

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CH20

### Project/Course Objectives

Students are expected to learn to think through problems like scientists in animal biotechnology.

### Inquiry Based Learning Activities

- Students (in groups of 4-7) first selected research articles from an assigned topic in the field of animal biotechnology.
- The research papers were presented in front of the whole class for 30-35 minutes.
- The presentation was followed by an interactive question & answer session for 15-20 minutes.
- The PowerPoint presentation files and the research article pdf files were uploaded onto the course website so that the whole class could share the materials.

MBTE 4520 Animal Biotechnology 2010-2011	
Ho-Yu Edwin CHAN Room 5001, Ming Man Wu Building hchan@life.cuhk.edu.hk	
TR: MW 707 F1-2 SC1.2	
Lectures: 24 Interactive learning: 12	
Course Outline (version 6, updated on 14/3/2011)	
Jan	11 (1) Introduction 14 (2) Drosophila 18 (1) C. elegans 21 (2) C. elegans 25 (1) "Interactive Learning" grouping and set presentation schedule
Feb	1 (1) Interim test 4 (2) Interim test 8 (1) Interim test 11 (2) Interim test 15 (1) Interim test 18 (2) Interim test 22 (1) Mid-term exam
Mar	1 (1) Mid-term exam 4 (2) Monoclonal antibodies and antibody engineering 8 (1) Interactive learning 3 (2 days) 11 (2) Interim test 15 (1) Interim test 18 (2) Other transgenic animals 22 (1) Monoclonal Diseases 25 (1) Mid-term exam
Apr	1 (2) Genome Projects (Guest lectures by Prof. TF Chan) 5 (1) Changing Genes and Genomes 9 (2) Interactive learning 5 (Genome projects) 12 (1) Animal models for human diseases 15 (2) Interactive learning 6 (Animal models for human diseases) 19 (1) Revision
Mid-term Exam 40% (11-1 - 22-2) 12 lectures Final Exam 40% (25-2 - 12-4, excluding guest lectures on 1-4) 12 lectures Interactive Learning 20% (Presentation 10%, Discussion 10%)	

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Interactive Learning module in Molecular Biotechnology education at CUHK

Background  
After the Programme Review which took place in May 2006, the Molecular Biotechnology (MBTE) Programme initiated a series of curricular and pedagogical innovations for the course. One of these innovations, the Programme Committee decided to implement interactive learning in the final year MBTE courses in 2009. The purpose of setting up these sessions is to provide more challenge for students to learn "how to acquire final year problem" by interactive discussion in small academic sessions.

Evidence of interactive learning activities in MBTE 4520 Animal Biotechnology:  
(Version 1.0, 2009)  
1) Course outline  
- see attachment 1

2) Mid-term Examinations of version 1.0  
- see attachment 2

3) Challenge based  
- The course was taught by 4 teachers  
- Each teacher had her own way to lead the discussion  
- Although diversity in teaching styles was noted, some teachers only taught for 2 weeks or less  
- Because of the diversity, only some students were able to participate fully in the interactive discussion

4) Feedbacks from students  
(provided in general)  
(Version 1.1, 2010)  
1) Course outline  
- see attachment 3

2) Mid-term Examinations of version 1.1  
- see attachment 4

3) Challenge based  
- Major course discussion management was made  
- Only one teacher was assigned to teach five courses

4) Feedbacks from students  
(provided in general)  
- Students agreed that they would like to select the presentation topics themselves instead of presenting a paper assigned by the teacher  
- Discussion time was well managed to have through discussion after the presentation

5) Feedbacks from students  
- see attachment 5

(Version 2.0, 2011)  
1) Course outline  
- see attachment 6

2) Mid-term Examinations of version 2.0  
- see attachment 7

3) Challenge based  
- Allowed students to pick their own research papers from a defined area

4) Feedbacks from students  
- These comments especially discussion  
- Some students are responsible for selecting the papers, some of them inform the teacher

2009-10 MBTE4520 Learning Journal CNA Presentation (20th session)	MBTE 4520 Animal Biotechnology Progress Form (2009-2010)												
<p>1) Present materials for 10 minutes, and then lead discussion for remaining 10-15 minutes</p> <p>2) Presentation objectives</p> <p>a. In general, summarize information and emphasize the most important details. It is not necessary to state all specific information, but you must include enough information to adequately explain all that you have said and why.</p> <p>b. Have a clear objective of your presentation.</p> <p>c. Have the time</p> <p>3) Methods</p> <p>a. Detailed description b. Fully explain anything that is particularly complicated or not explained in the literature c. Do not highlight anything of your paper or experiment to emphasize the results</p> <p>4) Results</p> <p>a. Quantify experimental results b. Summarize your experimental findings c. State limitations of the paper</p> <p>5) Discussion/Conclusions</p> <p>a. Is this work significant? b. Is there work to do? c. How do you interpret the results? d. How do you interpret the results?</p>	<table border="1"> <thead> <tr> <th>First name:</th> <th>Last name:</th> </tr> </thead> <tbody> <tr> <td>Presenting title:</td> <td>Score:</td> </tr> <tr> <td>Content:</td> <td>A B C D E F G H I J K L M N O P Q R S T U V W X Y Z</td> </tr> <tr> <td>Organization:</td> <td>A B C D E F G H I J K L M N O P Q R S T U V W X Y Z</td> </tr> <tr> <td>Discussion:</td> <td>A B C D E F G H I J K L M N O P Q R S T U V W X Y Z</td> </tr> <tr> <td>Final comments:</td> <td></td> </tr> </tbody> </table>	First name:	Last name:	Presenting title:	Score:	Content:	A B C D E F G H I J K L M N O P Q R S T U V W X Y Z	Organization:	A B C D E F G H I J K L M N O P Q R S T U V W X Y Z	Discussion:	A B C D E F G H I J K L M N O P Q R S T U V W X Y Z	Final comments:	
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Final comments:													

PART 1  
Please give your other comments on the course

The interactive learning is a good idea to learn the best ideas on molecular biology paper. However, presentation time is too long. The time for the presentation is too long. It is hard to follow the main points of the paper. The time for the presentation is too long. It is hard to follow the main points of the paper.

PART 2  
Please give your other comments on the course

The lecture content is interesting. The time of the lecture is long and I have heard it all. I don't think I could do it. I don't think I could do it. I don't think I could do it.

PART 3  
Please give your other comments on the course

Prof. WY Chan gave excellent concepts relating to the topic. It was very clear to understand the topic. It was very clear to understand the topic. It was very clear to understand the topic.

PART 4  
Please give your other comments on the course

The course can really help us to learn more. But other teachers of CUHK should know about the content of the course. They should know the content of the course. They should know the content of the course.

### How did you assess the effectiveness of students' learning?

- Students were assessed according to their presentation performance (content, presentation, organization and discussion).
- For the non-presenting students, they were assessed by the questions they raised in the question & answer session as well as the comments they wrote down on the comment form.

### What were the major outcomes of this project/course? Do they match with your objectives?

- Students enjoyed the discussion session very much as evident by the number of questions raised and the volume of written comments received after each presentation.
- Students' feedbacks also reflected they were very positive about this type of learning activity.