

GUIDED PRACTICE PRE-CLASS ACTIVITY

Course: BIO4360 Recombinant DNA and Protein Technology

Topic: cDNA cloning strategies

Time estimate to complete this assignment: ~180 minutes.

Overview

The cloning of cDNA is one of the fundamental technologies in molecular biology. In this class, students will learn what is cDNA, the importance of cDNA cloning, the strategies and techniques for cDNA cloning and the applications of cDNA cloning.

Learning Objectives

Basic objectives (preparative activity)

1. Read Chapter X in assigned textbook and be able to
 - a. Define what is cDNA
 - b. Explain what is cDNA cloning
 - c. Explain why we should clone cDNA rather than genomic DNA
 - d. Identify 3 strategies that are commonly used in cDNA cloning and know their pros and cons
 - e. List commonly used techniques for each step of cDNA cloning
2. Complete online quiz 1 on Blackboard before coming to the classroom by Monday 11:59 pm.

Commented [VB1]: Very clear and concise!

Advanced objectives (in classroom)

1. With a given a scenario, i.e. with assigned gene and plasmid, students in each group compare the advantages and disadvantages of three commonly used cloning strategies
2. Select the most appropriate strategy for your cDNA cloning project and provide justification
3. Discuss with your group members and select an appropriate strategy and formulate a detailed cloning procedure for your cDNA cloning project, providing justification for your selection of strategies and documentation for your proposed steps.

Advanced objectives (follow-up)

4. Be able to prepare PPT slides for scientific presentation (Each group prepares a PPT presentation on their cDNA cloning project)
5. Know the applications of cDNA cloning (Each group discusses possible applications of their cloned cDNA at the end of the presentation)
1. Be able to present the project professionally and answer questions from audience

Commented [VB2]: These seems to me more like "activities" than "learning objectives." What are you expecting them to learn from doing the presentation?

IN-CLASS LESSON PLAN-CLASSROOM ACTIVITY

Course: BIO4360 Recombinant DNA and Protein Technology
 Topic: cDNA cloning strategies
 Estimated activity time: 120 minutes.

Overview

The In-Classroom activity is designed to help students to apply textbook knowledge in real-life cDNA cloning projects. Each group of students work on a specific project, but they will also learn different type of cloning projects from other groups' presentations.

Learning Objectives

Advanced objectives (in the classroom)

1. With a given a scenario, i.e. with assigned gene and plasmid, students in each group compare the advantages and disadvantages of three commonly used cloning strategies
2. Select the most appropriate strategy for your cDNA cloning project and provide justification
3. Discuss and determine the detailed cloning procedures

Activities:

1. Student will form groups of 4. Based on their preparation, students work in group to complete the activity.

Time planned	Activity and rationale	Resources needed
10 mins	<p>Activities:</p> <ul style="list-style-type: none"> • Form groups of 4 • Instructor assigns gene to be cloned and the plasmid to be used in the cloning project to each group 	
30 mins	<p>Activities:</p> <p>Based on their preparative reading, students discuss and compare the pros and cons of 3 commonly used cDNA cloning strategies in the cloning of their assigned gene. Instructor will rotate to participate in each group's discussion.</p> <p><i>Rationale: The discussion will reflect student's reading during preparation, and enhance their understanding of molecular cloning strategies.</i></p>	Textbook, laptop with internet to access Genbank database and plasmid map
10 mins	<p>Activities:</p> <p>Instructor will summarize the discussion, and address some common problems.</p>	

Commented [VB1]: It looks to me like there should be a detailed assignment sheet for the students, right? So they have good guidance for their project? This looks like a fairly major piece of work. If that is the case, then this class activity is very appropriate because it's basically "Do your project, you have a class period" which is fine.

The detailed project will be given to each individual group, with information such as gene name with accession number, vector name and map, etc.

Commented [VB2]: Will they really need 30 minutes for this? The ultimate goal is to decide on their strategy for their assigned genome, so I can see them cutting it short if they are able to decide quickly.

My goal for the students is not simply to choose a cloning strategy, but also to know the pros and limitations of other methods, and why they're not suitable for their cloning in this case. This way, they'll know if they have a different project, another method may be more suitable. A thorough discussion may take 30 min.

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Time planned	Activity and rationale	Resources needed
10 mins	<i>break</i>	
50 mins	<p>Activities:</p> <p>Students in group discuss and determine detailed procedures to clone the cDNA and provide their justification for the choice of their method. The instructor will rotate to participate in each group's discussion.</p> <p><i>Rationale: The discussion will reflect student's reading during preparation, and apply textbook knowledge in experiment design.</i></p>	Textbook, scratch paper, laptop with internet access
10 mins	<p>Activities:</p> <p>The instructor will summarize the discussion, and point out some common problems, then, give instruction on how to prepare PPT presentation on student's project.</p> <p><i>Rationale: The preparation of a PPT presentation is to have students to review what they learn from the classroom activity, and pay attention to details during the preparation of the PPT.</i></p>	laptop with internet access