Biol 213L: Genetics Lab (Fall 2000)

Comments on Lab 2: Isolation and Characterization of Plasmid DNA. . .

Again, I have referred to comments printed here and in the attached sheet by symbols (the circled letter/number combinations). This practice also enabled me to comment more fully than time would otherwise permit.

It's so much easier to write a lab report when you have a purpose. That purpose should be the asking and answering of a scientific question. That purpose can tell you what ought to go into a report and what's extraneous. Without any purpose, writing a report is painful.

General remarks

G2. Use proper tense. Results should be given in past tense. Generally recognized facts should be given in present tense. If you give results in present tense you are implying they are God-given truth.

G6. Don't use jargon.

G7. Number Figures and Tables in the order they are presented.

Introduction

I10. Focus on a scientific question. Many began with the wonders of cloning genes or how to cut DNA or similar. WHY?? Why does the reader want to know any of this? Likely answer: you were not thinking of what the reader wants to know but rather what you wanted the reader (i.e. the instructor) to think YOU know. Free yourself! Cast off the chains of the slave -- the student bent to satisfy the whims of the teacher and take on instead the cloak of the true student, who seeks to uncover truth and share it with other true students of the world.

Where were we? Oh yes, each of you were given a scientific question that had some possible import to the world (curing cancer, and the like). THAT'S where you should start a report, with a matter of clear interest to your audience. THEN you go in small steps to the experiments you actually performed. If this sounds like the format for your article summaries, it is no accident. Considering the needs of your reader is a useful strategy for effective communication in general.

Never answer a question that wasn't asked. Don't tell us about how to identify plasmids until you plant the question in our minds. When we readers are begging you to explain the concept, only then should you step in.

See the Lab Manual (Info-3) for perhaps a more sober explanation of the purposes of an **Introduction**.

Results

R10. What problem was solved? Start off with a recap of what problem you were trying to solve. You might add in brief the overall strategy you followed, the results of which are in this section. The whole thing shouldn't take more than a couple of sentences, but those sentences can help greatly in orienting the reader.

R29. Give figures legends. The figure legend should define relevant parts of the figure, like what was loaded in each lane or where the data for the standard curve came from. See the legends to Figs 2.2A and 2.2B in lab manual for pertinent examples.

R30. Don't waste space on graphs. If your values go from 500 to 10,000, there's no point wasting half the graph with a Y-axis that goes down to 1. You can set the range of values to be considered in Excel. Click on the axis and then set the minimum and maximum value.

R31. Consider getting rid of the gray background suggested by Excel. Save your printer and perhaps make the graph easier to read by removing the gray background. Do this by clicking anywhere on the background and setting the color to none.

R32. Make plain why you chose the enzyme(s) you did. The story doesn't make much sense unless we understand the significance of BglI (for example) over other enzymes.

Discussion

D1. Major experimental question. I think the major goal of your experiment was to isolate whatever fragment you were particularly interested in. Therefore, somewhere in the first paragraph I would like to see the answer. Were you successful in isolating the fragment? Later in the **Discussion** you can explain why you think so.

D10. Consider your results quantitatively. What size did you expect for uncut plasmid DNA? What size did you get? How can you account for the difference? Consider that plasmids exist within the cell in a supercoiled form, which is more compact than linear DNA and travels faster in a gel.

D11. Identify the bands of uncut DNA. Compare the bands of uncut total with uncut plasmid DNA and you will find that they are about the same in mobility but not intensity. The faster band is more intense with plasmid DNA but the slower band is more intense with total DNA. This should give you a clue as to the identities of these bands. Bear in mind that total DNA should include plasmid DNA, while the plasmid DNA prep isn't perfect and may include chromosomal DNA. What is the ratio of the intensity of the band you associated with chromosomal DNA to that you associated with plasmid DNA? What is the ratio you would expect from their known sizes?

D12. Test your hypotheses. Why didn't the total DNA cut? If you wonder whether you made a mistake of some sort, neglecting to remove all of the ethanol, then look at the results of others. Everyone wouldn't make the same mistake, yet all the results are about the same.

D13. Test your hypotheses. *"Fragment X would have run off the gel"* How do you know? Extrapolate from the calibration curve to predict how far the fragment should have traveled. Is that distance off the gel?

D14. Test your hypotheses. *"The observed length is very close to the predicted length."* How close is "very close"? Is it close enough so that you would not be able to observe a difference? How small a difference could you observe? Consider things that could confound your measurements, like the thickness of bands, the minimum distance you can measure (somewhere around 0.5 mm, I'd guess).