

Appendix 2a: End of semester survey filled out by control group students.

Please rate how the following tools helped facilitate your learning of molecular structure & function this semester	Was of No Help	Helped a Little	Helped Some	Helped a Good Deal	Helped a Great Deal
	1	2	3	4	5
a. textbooks	1	2	3	4	5
b. 303 lecture note packets	1	2	3	4	5
c. lecture problem sets	1	2	3	4	5
d. primary literature (journal articles)					
e. Protein Explorer images of proteins & nucleic acids shown in Biocore 303 lecture	1	2	3	4	5
f. physical models of biomolecules held by professors in Biocore 303 lecture	1	2	3	4	5
g. answering pre-lab questions	1	2	3	4	5
h. conversations with TAs and instructors	1	2	3	4	5
i. conversations with your fellow students	1	2	3	4	5
j. writing lab research papers	1	2	3	4	5
k. the Protein Explorer alkaline phosphatase online tutorial you did for the enzyme lab	1	2	3	4	5
l. answering the Protein Explorer check assignment questions on transcription factors & G-proteins	1	2	3	4	5
m. using Protein Explorer for your own independent investigations	1	2	3	4	5
n. Other tools? Please explain:	1	2	3	4	5

1. If you found the Protein Explorer computer program to be helpful this semester, please tell us how it facilitated your learning:
2. Imagine that you are asked the following question: “*Summarize how a regulatory transcription factor interacts with DNA. What are the secondary protein structures involved in this interaction? What amino acids are interacting directly with the DNA? What stabilizes the transcription factor’s structure?*”

Assuming that you have available all of the relevant primary literature describing this transcription factor, which materials would you most likely use to answer these questions? (Check only one).

- The pdb files for these molecules, displayed in Protein Explorer
- Physical, hand-held models of these proteins and nucleic acids (like those shown by Dr. Day in lecture)
- A combination of both Protein Explorer and hand-held physical models

3. Please answer the following question as best as you can, using concise and clear language. *It is possible for a mutation in a single amino acid sidechain (also known as a residue or R-group) to make a protein non-functional. How might this be possible?*

4. Rate your confidence in your answer to question #3:

1	2	3	4
My answer is purely my answer is right. a guess.	This is a logical guess, so I may be partly right.	My answer is probably right for the most part.	I know

5. Do you have any suggestions as to how Protein Explorer might be used more effectively by students in next year’s class?

Appendix 2b: End of semester survey filled out by experimental group students.

Please rate how the following tools helped facilitate your learning of molecular structure & function this semester	Was of No Help	Helped a Little	Helped Some	Helped a Good Deal	Helped a Great Deal
	1	2	3	4	5
a. textbooks	1	2	3	4	5
b. 303 lecture note packets	1	2	3	4	5
c. lecture problem sets	1	2	3	4	5
d. primary literature (journal articles)					
e. Protein Explorer images of proteins & nucleic acids shown in Biocore 303 lecture	1	2	3	4	5
f. physical models of biomolecules held by professors in Biocore 303 lecture	1	2	3	4	5
g. answering pre-lab questions	1	2	3	4	5
h. conversations with TAs and instructors	1	2	3	4	5
i. conversations with your fellow students	1	2	3	4	5
j. writing lab research papers	1	2	3	4	5
k. the Protein Explorer alkaline phosphatase online tutorial you did for the enzyme lab	1	2	3	4	5
l. answering the Protein Explorer check assignment questions on transcription factors & G-proteins	1	2	3	4	5
m. using Protein Explorer for your own independent investigations	1	2	3	4	5
n. hand-held models of proteins & nucleic acids					
o. Other tools? Please explain:	1	2	3	4	5

6. If you found the Protein Explorer computer program to be helpful this semester, please tell us how it facilitated your learning:

7. If you found the hand-held physical models to be helpful this semester, please tell us how they facilitated your learning:

8. Imagine that you are asked the following question: “*Summarize how a regulatory transcription factor interacts with DNA. What are the secondary protein structures involved in this interaction? What amino acids are interacting directly with the DNA? What stabilizes the transcription factor’s structure?*”

Assuming that you have available all of the relevant primary literature describing this transcription factor, which materials would you most likely use to answer these questions? (Check only one).

- The pdb files for these molecules, displayed in Protein Explorer
- Physical, hand-held models of these proteins and nucleic acids (like those shown by Dr. Day in lecture)
- A combination of both Protein Explorer and hand-held physical models

9. Please answer the following question as best as you can, using concise and clear language.

It is possible for a mutation in a single amino acid sidechain (also known as a residue or R-group) to make a protein non-functional. How might this be possible?

10. Rate your confidence in your answer to question #4:

- | | | | |
|---|---|---|---------------|
| 1 | 2 | 3 | 4 |
| My answer is purely my answer is right. a guess. | This is a logical guess, so I may be partly right. | My answer is probably right for the most part. | I know |

11. Do you have any suggestions as to how Protein Explorer and the hand-held physical models might be used more effectively by students in next year’s class?