

Table 5
Laboratory Assessment Questionnaire Responses

Statement	Response Average \pm S.D.*
Confidence with Bioinformatics Skills	
Before course, I could effectively use the tools on the NCBI website.	1.6 \pm 1
After the course, I understand how to effectively use the tools on the NCBI website.	4.0 \pm 0.8
I understand how to interpret entries on the LocusLink site.	4.0 \pm 0.8
I feel comfortable using DeepView.	4.0 \pm 0.9
I have gained skills in performing web-based research projects.	4.1 \pm 0.8
This course helped me increase my skills in viewing and interpreting 3-D structures of proteins.	4.0 \pm 0.9
This course helped me improve my computer skills.	3.1 \pm 1.2
I understand how web-based bioinformatics tools are used in biomedical research.	4.2 \pm 0.8
Review of Materials	
The guide sheets were too detailed.	2.0 \pm 0.9
I would have liked more detailed instructions for the projects.	2.6 \pm 1.2
The textbook readings were helpful.	3.3 \pm 1.2
I was able to understand my assigned literature readings.	4.0 \pm 0.9
Lab Instruction	
Too much time was spent on the tutorials.	2.3 \pm 1.0
The tutorials given by instructors and TA's provided adequate introduction to the web-based tools.	4.1 \pm 0.9
Projects and Group Work	
Everyone in a lab section should work on the same project in the future.	2.0 \pm 0.9
I would have liked to work more independently throughout the labs.	2.1 \pm 1.1
Future Usefulness of Learned Skills	
The skills I gained in this lab will be useful to me in the future.	3.8 \pm 1.1
I can see myself using the NCBI website (OMIM, LocusLink, PubMed) in the future	3.6 \pm 1.2

* S.D. = standard deviation

In the original questionnaire, the statements in the table were randomly distributed and students were given the following set of directions: "Please select the choice that best describes how you feel about each statement: 1 = disagree completely, 2 = disagree somewhat, 3 = neither disagree nor agree, 4 = agree somewhat, 5 = agree completely." 229 out of 240 students completed the questionnaire. 112 respondents were female and 110 respondents were male; 7 respondents did not indicate male or female. The questionnaire did not ask for any identifying information beyond "male or female", and their choice of major. Students submitted their responses anonymously online.

Table 6
Student Comment Data

Category	Number of Comments	Examples
The lab helped me understand what scientists do	15	<ul style="list-style-type: none"> • “I feel that this is real-life biology.” • “It made me realize how people can dedicate their careers to studying something like a protein or genetic disease.”
Raised awareness of how biological information is shared	12	<ul style="list-style-type: none"> • “(I) learned more about how genetic sequences are organized in a world-wide network.” • “I enjoyed seeing the large amount of biological information that is shared around the world.”
Enjoyed focus of the projects	17	<ul style="list-style-type: none"> • “I enjoyed the fact that we were given a real-life disease and that each lab section is designed for us to learn a little more each time about the disorder.” • “I enjoyed working on a specific protein and learning what diseases are associated with it and how it works on a cellular/molecular level as well as at a phenotypic level.”
Will use websites/tools in the future	19	<ul style="list-style-type: none"> • “I have found the websites helpful, and I am very likely to use them for future projects.” • “Most of the programs I used I can see myself using again in the future.”
Enjoyed partner and group work	7	<ul style="list-style-type: none"> • “I enjoyed working in a group...since I could discuss my results with my group and see if they agreed or had a different interpretation of the data.” • “I enjoyed being able to work with a partner. It made things more fun.”
Felt confident in skills gained in using web-based tools	31	<ul style="list-style-type: none"> • “I’ve actually been able to use some of my skills during research that I’m doing on a protein.” • “I learned a lot about bioinformatics...The project made it clear how to use the programs.”
Better understanding of links between DNA-protein-disease	6	<ul style="list-style-type: none"> • “The best aspect of the lab was seeing in the best way possible how a gene goes from DNA to protein to phenotype.” • “It was extremely interesting and rewarding when we finally figured out how our protein and our disease and our mutation fit together.”
Overall satisfaction with lab	34	<ul style="list-style-type: none"> • “I thoroughly enjoyed this lab.” • “Overall, this was a very meaningful experience.”
Overall dissatisfaction with lab	5	<ul style="list-style-type: none"> • “I cannot truthfully say that I learned much from the lab.” • “It was pretty boring just poking around on the internet.”