BME/BIOL 178: Student Presentations #2

Format: Debate
Date: March 10

Goals:
To practice evaluating scientific data
To consolidate seemingly contradictory results and different perspectives
To practice designing experiments to solve a controversy
To communicate scientific ideas

Overview:
We will read four articles on two topics: cancer stem cells and pancreatic beta-cell regeneration. The two articles on each topic present apparently contradictory views. All students read all four papers and turn in the standard report for all four. Four teams of 7-8 students each will be formed (see below). Two teams will focus on cancer stem cells, the other two on pancreatic beta-cells. Each team will work together to evaluate the existing data for their focus topic using the guidelines below.

For the in-class presentation, one team for each topic will present evidence for cancer stem cells/pancreatic stem cells; the other team will present evidence against. Teams will take turns presenting arguments and challenging the opponents (items 5-6 below), then each team will conclude the case (item 7 below). The two non-focus teams will serve as mediators, ask questions (item 9), and reach a verdict.

Debates will focus on the core papers. However, I encourage reading related reviews and commentaries, as arguments and perspectives from these will aid your analysis.

Step-by-step instructions:
1. Read and hand in the usual research report for each of the four core papers (individual reports, not done as a group)
   - Schatton report due Feb 12
   - Quintana report due Feb 17
   - Dor report due Feb 19
   - Xu report due Feb 19
2. For each article, submit in writing your strongest one-sentence argument for and your strongest argument against cancer/pancreatic stem cells (total of 8 arguments; individual reports) – due Feb 24
3. Randomly assigned teams (below) are designated a focus topic: cancer stem cells or beta-cells. You will not know whether to argue for or against until the day of the debate.
4. As a team, discuss the 2 papers on your topic using the guidelines below.
5. As a team, select the three strongest arguments for and against.
6. As a team, formulate three questions to challenge your opponents’ case.
7. As a team, prepare a short concluding statement where you state your true opinion.
8. As a team, suggest one specific experiment that has the potential to resolve the conflict.
9. As a team, select one question on your non-focus topic (beta-cells if your team is focusing on cancer) to ask the two teams debating that topic. Make an effort to ask questions that can be answered with experimental evidence.
10. One written report per team covering items 5-9 above (point by point; no essay needed; list additional references used in your research) is due by 9am March 9 (email or drop-off).
11. One self-evaluation form per person is due March 10 in class.

Guidelines for team effort:
- Data analysis. Identify the key experiments of each article. Why are those the most important experiments? Based on these experiments, prepare at least three arguments for cancer/pancreatic stem cells and at least three against. Consider the strengths and weaknesses of the experimental
approaches. Are there serious flaws with the technique, model system or interpretation? Are there alternative explanations for some experiments? Could these experiments be improved technically (same approach, but change of conditions, controls, timepoints, other) to make the data more conclusive?

**Conclusion.** Is one article more convincing than the other? Why? Are the conclusions mutually exclusive? Consolidate the data from the two articles and provide a model that is supported by the data.

**Experimental design.** Design one specific experiment to test your model. Outline possible outcomes and discuss how the results would fit with existing data. *This will be the basis for item 8 in the written report, above.*

**Context with the field.** Put the issue into context with similar questions in different systems within the field. For example, what is the evidence for cancer stem cells in the hematopoietic system? Is the nervous system generated by self-duplication of mature cells or from stem/progenitor cells? What factors other than the data might you consider to reach a conclusion?

**In-class discussion**

To facilitate the group effort, we will dedicate short sessions of class time for group discussions.

**Evaluation:**

**Individual:** Items 1, 2 and 11 will be graded for each individual as usual, separate from the group effort.

**Team:** Evaluation of the team performance will be based on the written report and on the March 8 debate using the following criteria:

1. Item 5: Ability to use scientific data to argue your case
2. Item 6: Ability to evaluate experimental approaches and data interpretation
3. Item 7: Ability to summarize a complex set of data into a short concluding statement
4. Item 8: Ability to design a conclusive experiment
5. Item 9: Ability to formulate a probing question
6. Ability to clearly communicate scientific ideas

You will not be evaluated on whether your team was “right” or “wrong” (if we reach a consensus at the debate), but how well your team used existing data to support your claims.

Every member of each team will get the same score/grade for the team.

**Teams**

<table>
<thead>
<tr>
<th>Cancer stem cells</th>
<th>Pancreatic beta-cells</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Team 1</strong></td>
<td><strong>Team 2</strong></td>
</tr>
<tr>
<td>Erin Klee</td>
<td>Ellen Bridgman</td>
</tr>
<tr>
<td>Anthony Lui</td>
<td>Tony Guan</td>
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<tr>
<td>Hanling Chang</td>
<td>Shawnie Miller</td>
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<tr>
<td>Sho Ketchum</td>
<td>Yasaman Mortenson</td>
</tr>
<tr>
<td>Cory Weast</td>
<td>Zach Morton</td>
</tr>
<tr>
<td>Daniel Dao</td>
<td>Erin LaMontagne</td>
</tr>
</tbody>
</table>

Individuals are allowed to switch groups by mutual agreement; all groups have to consist of 5-6 members.
Self-evaluation (item 11 above):
Each student needs to answer the following and submit by beginning of class on March 10:

1. I contributed ideas and/or constructive criticism to improve the group effort
   Many  Several  Some  I did not contribute

2. I attended all group meetings
   Yes  No  We were not able to meet as a group

3. I was timely and prepared for all group meetings
   Always  Most of the time  Sometimes  I did not attend

4. I completed my assigned contributions in a rigorous and timely fashion
   Always  Most of the time  Sometimes  I did not contribute

5. My input was constructive and focused
   Always  Most of the time  Sometimes  I did not provide valuable input

6. Balance of the group effort was
   Fairly equal  1-2 people did most of the work  1-2 people were freeloaders

7. Based on my own overall performance, I would give myself the following grade:
   A+  A  A-  B  C  D  F