Pre-lab and Post-lab assessment

This assessment will provide critical data on the lab's efficacy and will help us improve the lab. Online versions of this assessment are available at snowflakeyeastlab.com. The question excluded from the analysis (see main text) is not included in this assessment.

1. **In the history of life, multicellular organisms have evolved from single-celled ancestors (select just one):**
   [A] Just once, in animals.
   [B] Just twice, in animals and plants.
   [C] Just three times, in animals, plants and fungi.
   [D] More than 25 times in many different linages.
   [E] None of the above. Multicellular organisms did not evolve from single-celled ancestors, they were created by an omnipotent being.

Answer: D

2. **Which of the statements below about cellular division of labor are true? Select all that apply:**
   [A] Most unicellular organisms exhibit cellular division of labor.
   [B] Most multicellular organisms exhibit cellular division of labor.
   [C] Cellular division of labor allows multicellular organisms to do things that single-celled organisms can't do.
   [D] Evolving cellular division of labor is a key step in the evolution of complex multicellular organisms.
   [E] Cellular division of labor always take a long time (*e.g.*, millions of years) to evolve.

Answer: B, C, D

3. **How do multicellular organisms evolve from single-celled ancestors? Select just one:**
   [A] First, cells must evolve to form clusters. Second, whole clusters of cells need to become 'units of selection', adapting to their environment.
   [B] First, cells must evolve the ability to communicate. Second, cells must evolve to form tissues.
   [C] First, cells must evolve germ-soma differentiation (separation of germ cells that pass genetic material to offspring from somatic cells forming the rest of the multicellular organism). Second, they must evolve a body.
   [D] First, cells must evolve a body. Then they can evolve a brain.

Answer: A

4. **What is required for adaptation (also called Darwinian evolution)? Select all that apply:**
   [A] Individuals in a population must vary from one another.
   [B] This variation must be heritable.
   [C] This variation must affect fitness (*e.g.*, survival and reproduction).

[D] Individuals must ‘struggle’ to survive- the harder they struggle, the faster they will evolve.

Answer: A, B, C

5. **Is the evolution of multicellularity always slow?**
   [A] Yes
   [B] No

Answer: B

6. **Which are the benefits of multicellularity? Select all that apply:**
   [A] Multicellular organisms are always better at dispersing than unicellular organisms.
   [B] Multicellular organisms are larger, which can be beneficial in stressful environments (*e.g.*, UV exposure, drying out, etc.)
   [C] Multicellular organisms may be too large to be eaten by predators that can eat their single-celled ancestors.
   [D] Multicellular organisms can evolve cellular division of labor, which allows them to perform new tasks, or old tasks more efficiently.
   [E] Multicellular organisms usually have larger population sizes than unicellular organisms.

Answer: B, C, D

7. **Which are the costs of multicellularity? Select all that apply:**
   [A] Multicellular organisms require more resources to reproduce than unicellular organisms.
   [B] Multicellular organisms usually have a longer generation times than unicellular organisms.
   [C] Multicellular organisms suffer problems of ‘old age’, while single-cell organisms are immortal.
   [D] Multicellular organisms are subject to a new form of risk- cells within the organism can evolve selfish behaviors (*e.g.*, cancers that spread at a cost to the multicellular host).
   [E] Multicellular organisms can think. This inexorably leads to the creation of complex societies ruled by a powerful few who, in a ruthless struggle for power, finance the construction of more and more powerful weapons, culminating in a war that destroys all traces of multicellular life.

Answer: A, B, D

8. **Which is best described as ‘an individual organism’? Select all that apply:**
   [A] The single-celled microbial ancestors of animals.
   [B] You.
   [C] A skin cell from your arm.

Answer: A, B