## **DIFFUSION RACE!!!**

Now that you have been able to explore the relationship between cell dimensions and diffusion time, let's see if you can put your new-found understanding to good use. Cells do come in many shapes and sizes in organisms. Natural selection has crafted them to do their jobs better with their unique form. You will find that the relationship between structure and function is a recurrent theme throughout biology.

Let's give you the anointed role of "Intelligent Designer" for a competitive Cell Diffusion Race. Each student will get an equal size block of bromothymol blue agar and will have the opportunity to design a cell to **maximize mass** but **minimize diffusion time**. The cell with the greatest mass and the shortest diffusion time will be judged the winner.

## THE CELL DIFFUSION RACE RULES:

- 1. No donut-like holes through the agar cell—this is biologically impossible. 2. Once an agar cell is in the beaker of vinegar, no poking, prodding, touching beaker.
- 3. Teacher determines when 100% diffusion takes place. Diffusion will be considered complete when the blue color completely disappears from the center of the cell.
- 4. Students mass agar at the end of the race and the cell must not break when handled! If a cell breaks upon massing, then entry is disqualified.
- 5. WINNER = highest ratio of mass divided by time.

Table 2. Cell Mass and Time for Diffusion (Part 2)

Student Name	Quick Sketch of their cell	Cell Mass (gm)	Time for Complete Diffusion (minutes)	Mass (g) / Time (min)

1. <u>Explain</u> why cells can't get very, very big.
Describe your cell design. What principles were you basing your design on to decrease diffusion time?
Describe different ways that cell shape can be modified so that diffusion time will be decreased to support life processes.
4. Give an example of a type of cell in a living organism (animal or plant) that is shaped v differently than the classical round or boxy shape that you see drawn in introduct textbook chapters on cells. Explain how that unique shape is tied to the function that the cells perform.
5. Which cell design won the race? Offer an idea as to why.