Diffusion in Agar Cubes Lab

1. In terms of maximizing diffusion, what was the most effective size cube that you tested?

-The smallest cube, 1cm cubed, was the most effective cube to maximize diffusion as the whole cube turned pink.

1. Why was that size most effective at maximizing diffusion? What are the important factors that affect how materials diffuse into cells or tissues?

-The size was most effective because it had the highest surface area to volume ratio. It was the most effective due to the low volume required to get to the middle and more surface area to diffuse through compared to its size. Important factors that can affect how materials diffuse are volume, surface area, concentration, size and shape of the molecule, and temperature.

1. If a large surface area is helpful to cells, why do cells not grow to be very large?

-Cells do not grow very large because the surface area increases, but the volume does not so the ratio decreases.

1. You have three cubes, A, B and C. They have surface to volume ratios of 3:1, 5:2 and 4:1 respectively. Which of these cubes is going to be the most effective at maximizing diffusion, how do you know this?

-Cube C with ratio of 4:1 will be the most effective at maximizing diffusion because it has the highest ratio. The smallest cube used in the lab had the highest ratio and maximum diffusion so I can hypothesize the same would follow for the 4:1 ratio cube.

1. How does your body adapt surface area-to-volume ratios to help exchange gases?

-The body adapts by dividing cells so they are smaller. The body can also change the shapes of the cells into longer and thinner shapes. This reduces the volume and increases the surface area as the original shape is rounder.

1. Why can’t certain cells, like bacteria, get to be the size of a small fish?

-Cells cannot grow past there maximum size because they need to divide in order to maintain a good surface area to volume ratio.

1. What are the advantages of large organisms being multicellular?

-They can have larger a longer lifespan and continue to live as individual cells die. It’s also ale to grow more complex with a variety of different cell types within an organism.