Construction of Oxygen Permeable Veins From Biogel

Carrillo Ortiz, Katherine (School: Academy for Technology and the Classics)

Oxygen is critical to sustain aerobic life. Scientists are developing methods to deliver oxygen to stagnant water and human bodies when perfusion, or the movement of gasses across a membrane, is impeded. This is a first step to find alternative methods to internal oxygen delivery. The creation of a tube that mimics a blood vessel has broad implications for environmental and medical science. Using the levels of dissolved oxygen required to sustain fish life, this experiment attempts to create oxygen permeable tubes from biogels and deliver oxygen into water in an amount sufficient to theoretically sustain fish life. Various combinations of chemicals were explored in the construction of a tube. Cellulose was isolated and chosen as a water insoluble base for stability. The constructed tube was then inserted into an airtight vessel containing water, and pure oxygen was released through plastic aquarium tubing into the biogel tube. Multiple experiments with varying thicknesses of tubes and increased oxygen pressures provided successful attempts at perfusion; however, while dissolved oxygen levels increased, they did not reach levels necessary to theoretically sustain fish life. These results support further investigations seeking the production of thinner membrane walls on a biogel tube is the likely solution.

Awards Won: