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Education Posters

E-2000

Effect of Increased Temperature on the Growth of the Corals Montipora digitata and Zoanthus Sp. JAMIE CANEPA. 10426 NW Arcadian Lane, Portland, OR 97229. Email: canepa@comcast.net

The purpose of this study was to determine how an increase in water temperature effects the growth of two species of coral: Montipora digitata and Zoanthus sp. These corals were chosen because of their reputation as hardy corals, making them suitable to this kind of study, as well as being very different morphologically, so as to cover a wider range of species in the results. Three temperatures were selected for testing: 25˚ C, 27˚C and 29˚C. The lowest temperature (control) is typical of the regions these corals are found in nature. Each successively higher temperature was chosen according to forecasted climate models for future ocean temperatures. Three tanks were set up at each temperature, and three colonies of both species of coral were grown in each tank, giving a total of 27 specimens for each species. The corals were grown at these temperatures for 16 wk and data (measured in mass for both species, and also by polyp count for the Zoanthids) was recorded every two weeks. In M. digitata, significantly slower growth was observed at each successively higher temperature. In Zoanthus sp, little growth was observed in any of the tanks raising questions as to whether the conditions were, in fact, suitable for this species. The results given by the M. digitata corals confirm the hypothesis that higher temperatures slow the growth of this species. Further study is necessary to determine whether other Cnidarians react similarly when exposed to prolonged periods of elevated temperature.

E-2001

Finding the Ideal Conditions for Insulin Permeation Through Porcine Intestine. ELIANA CARMONA. 798 Lake Avenue, Greenwich, CT 06830. Email: elianacarm@aol.com

Insulin is a large protein that has historically been delivered into the human body via injection. However, this method is known to be painful and uncomfortable for the many people who suffer from the unfortunate condition, diabetes, and who must inject insulin several times a day. Therefore, the purpose of my research is to find the least painful and most efficient method of transdermal insulin permeation, by finding the ideal conditions in which the molecule could breach the barrier of skin and enter the bloodstream. As a substitute for human skin, porcine small intestine submucosa (SIS) was used, prepared within an Insulin Permeation Chamber—a device with two chambers on either side of the membranous intestine—to imitate the actual skin. One side of the chamber would be filled with a 3.3-unit/ml solution of insulin, and after varying amounts of time passed, I would find the insulin concentration of the solution that permeated through into the other chamber. To find the rate of permeation of insulin through the membrane, a fluorometer would be used to measure the fluorescence of the solution on both sides of the porcine membrane. These fluorescence measurements are compared to a standard curve of insulin fluorescence at 302 nm versus concentration, to determine the insulin concentration surrounding each side of the porcine membrane. The permeation of insulin through the SIS was evaluated as a function of temperature of the delivered insulin solution and membrane, pressure exerted on the delivered insulin dosage, and small electrical current applied across the porcine membrane during permeation. Results indicate that increasing temperature from 4°C to room temperature (23°C) reduces the permeation of insulin through SIS by as much as 11% over a four-day measurement period. At room temperature, the insulin and membrane stability were reduced to three days. Application of 1.5 & 9 volts across the membrane during permeation does not enhance permeation, where the membrane was destroyed within 3 h from the start of the experiment. Application of pressure showed the most promise to enhance permeability. Increase in pressure by as little as 0.02 atm increases the rate of permeation through the SIS by more than 100%, with almost a 30% recovery of the original insulin delivered. A delivery pressure of 1.10 atm increases the rate of permeation from $3.9x10^{-4}$ units/ml min^{-1} (at standard pressure) to 0.11-units/ml min^{-1} (280x that of normal pressure), with a 63.6% recovery of the original insulin dosage. Assuming that a typical Type I diabetic requires 3–5 units/ml per meal, this same dosage of 5 units/ml can be delivered transdermally at 1.10 atm in approximately 70 min.

E-2002

Optimizing the *Senecio Rowleyanus H. Jacobsen* Tissue Culture by Applying Aseptic Techniques and Gas Mixture.
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Senecio rowleyanus H. Jacobsen, commonly called string-of-pearls, is a flowering plant in the family Asteraceae. It is native to southwest Africa. It is cultivated indoors as an ornamental plant for hanging baskets. *Senecio rowleyanus H. Jacobsen* tissue culture is performed under aseptic condition under filtered air. Living plant materials from the environment are naturally contaminated on their surfaces with microorganisms, so surface sterilization of starting materials in chemical solution (alcohol or sodium hypochlorite) is required. However, a distinct disadvantage of using chemical solution is that if the time and concentration are not controlled well materials will die. A new method for minimizing contamination of the tissue culture is by using the gas mixture of oxygen and carbon dioxide. Oxygen sustains plant respiration. Carbon dioxide reacts with water, and then results carbonic acid, which helps antisepsis. Carbon dioxide can also be used as the raw material to produce organic compounds to facilitate plant growth and development. Using and optimizing gas mixture is a new subject in the field of plant tissue culture and further research is needed in the future.