

Life Sciences Connection

Modeling Apoptosis When infected with pathogens such as bacteria or viruses, our bodies mount an immune response to fight the invaders. Part of this response includes generating and activating a large number of immune cells specifically to counteract the current threat. But once the bacteria or viruses have been eliminated, the remaining immune cells must be destroyed, too.



Using library and Internet resources, research how the body destroys excess immune cells after a successful immune response. Draw a model based on evidence to show the role apoptosis plays, and predict possible outcomes if too many or too few immune cells respond to apoptotic signals.

Art Connection

Virtual Agar Art Since 2015, the American Society of Microbiology has sponsored a public competition called “Agar Art.” Scientists from around the world submit artworks created by culturing one or more bacterial or fungal species in nutrient agar on Petri dishes. The rate and color of the growth depend on the species, competition, and nutrients in the agar. With careful planning, the growth can result in an intricate work of art.



Using library and Internet resources, research art pieces made using agar. Make a poster or other presentation of your “agar art.” Include multiple colors and indicate, based on your research, which species would contribute each color. Also explain how growth and reproduction contribute to the work, and identify factors you would need to consider in growing multiple species together.

Medical Science Connection

Heart Regeneration In your body, some cell types—such as skin—can regenerate through cell division to replace lost or dead cells. Many other cell types lack this ability, however. Research suggested for many years that heart muscle is unable to regenerate after damage, and that heart cells lose the ability to divide at a young age. Recent studies have challenged this idea, hinting that some heart muscle cells may be able to divide following tissue damage, though at a very slow rate.



Locate and read at least three sources describing heart regeneration research, with at least one on either side of the debate. Summarize your findings in a report, and using evidence from the sources, give your opinion on whether heart muscle cells can regenerate in adult humans.

FIGURE 1: A cell undergoing apoptosis.



FIGURE 2: An Example of “Agar Art”



FIGURE 3: Heart Muscle

