

# SCIENCE WORKS

## Membrane Technologies

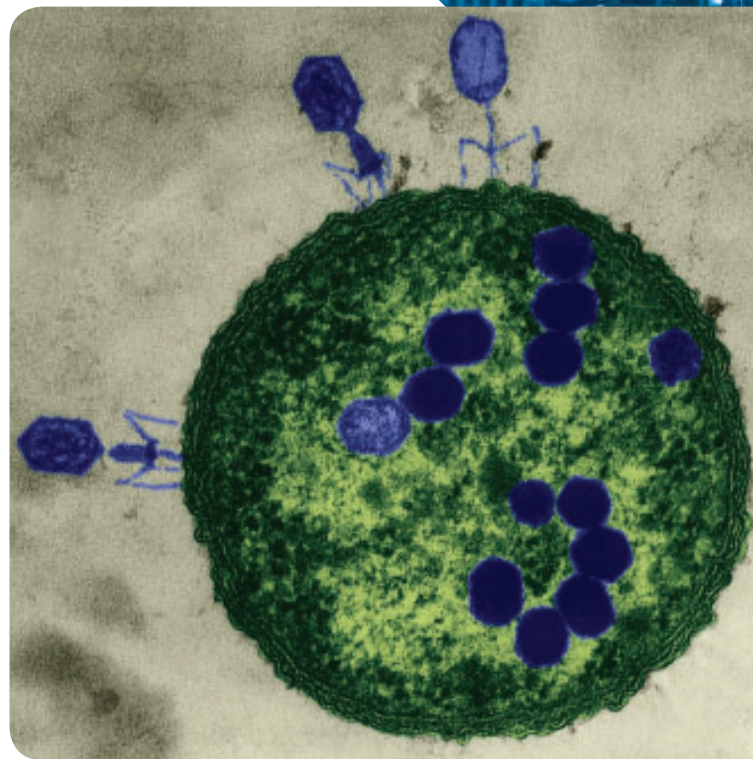
A cell membrane is an amazing structure. It allows nutrients and water to pass into and out of a cell, while keeping out harmful or unwanted substances. Our knowledge of the structure and function of the cell membrane has led to practical applications that use the same processes. Kidney dialysis, for example, is a well-established technology that makes use of our knowledge of the properties of cell membranes (Figure 1).



**Figure 1** Kidney dialysis machines filter blood in the same way the kidneys do.

Cell membrane technologies are being applied to other areas of medicine as well. Doctors around the world are worried about the problem of deadly bacteria that are resistant to antibiotics—“superbugs.” Cell membrane technologies are being applied to help counter this problem. A Montreal biotech company, Biophage Pharma Inc., is developing a new treatment for superbugs using “phages.”

Phages are tiny viruses that infect certain bacteria, which they recognize by their cell membranes. Each type of phage recognizes specific structures on the cell membrane. The phages attach to a bacterium’s cell membrane and inject their genetic material into the cell (Figure 2).



**Figure 2** Phages inject their genetic material into a bacterial cell.

Inside the bacterial cell, the genetic material copies itself, making another generation of phages. Eventually, the new phages break out of the bacterial cell, killing it. The phages remain in the bloodstream, where they search for bacteria to infect. In this way, more phages are produced that are able to target the bacterial cells. This method of fighting bacterial infections is useful because there are no side effects and the phages target only specific cells (based on their cell membranes).

To learn more about phages,

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