Over the years, nanotechnology has gone from science fiction to reality. The importance of nanotechnology in the biomedical field is great. Scientists have recently constructed nanomotors using two different methods—one with nanotubes, the other with DNA.

UC Berkeley physicist Alex Zettl has created the first nano-scale motor—a gold rotor on a nanotube shaft that could potentially ride on the back of a virus. The electrostatic motors represent a significant step forward in nanotechnology, and prove that nanotubes and other nanostructures several hundred times smaller than the diameter of a human hair can be manipulated and assembled into true devices.

The motor is about 500 nanometers across, 300 times smaller than the diameter of a human hair. While the part that rotates, the rotor, is between 100 and 300 nanometers long, the carbon nanotube shaft to which it is attached is only a few atoms across, perhaps 5-10 nanometers thick. Its gold blade is 300 millionths of a millimeter long. This sits atop an axle made from a multiwalled carbon nanotube. Gold electrodes at either end of the axle lash the device to a silicon chip. Applying a small voltage between the nanotube and one of three more electrodes around it twists the rotor blade. If an oscillating source is applied to one of the nodes and kept there the blade will rotate at a constant speed. The applications of the motor aren’t fully known yet but Zettl believes one day it will be able to detect the presence of other chemicals.

The other type of nanomotor is made from a single DNA molecule. The motor works by shrinking and expanding the strand. Since the bases on the DNA strand attract to their opposites like magnets we can add bases to the strands to control where they bind. By adding certain bases to the open strand of DNA, the DNA will be bounded together and make a tweezer-like shape. By removing and adding these bases we can technically open and shut the tweezers.

As soon as advancement are made, nanobots can be constructed that could be implemented into the body and act to fight off diseases, repair damaged cells, and rebuild damaged bones and tissues.