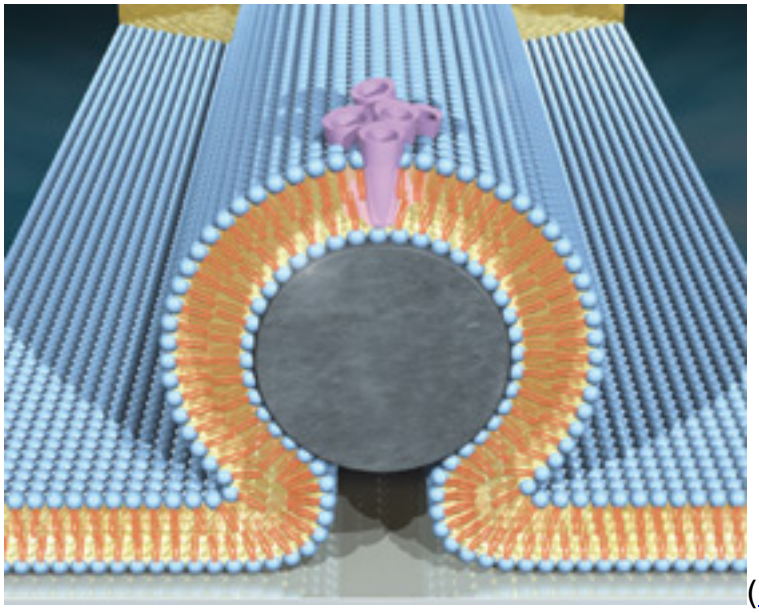
Cyborg Nanoscale Transistor Interface Created



(DiscoveryNews [1]) - Man and machine can now be linked more intimately than ever, according to a new article in the journal ACS Nano Letters. Scientists have embedded a nano-sized transistor inside a cell-like membrane and powered it using the cell's own fuel.

"This device is as close to the seamless marriage of biological and electronic structures as anything else that people did before," said Aleksandr Noy, a scientist at the University of California, Merced who is a co-author on the recent ACS Nano Letters. "We can take proteins, real biological machines, and make them part of a working microelectronic circuit."

To create the implanted circuit, the UC scientists began with a simple transistor, an electronic device that is the heart of nearly every cell phone and computer on the planet. Instead of using silicon, the most common material used in transistors, the scientists used a next generation material known as a carbon nanotube, a tiny straw-shaped material made from a single curved layer of carbon atoms arranged like the panels of a soccer ball.

The scientists then coated the carbon nanotube transistor with a lipid bilayer, basically a double wall of oil molecules that cells use to separate their insides from their environment. The scientists didn't use an actual cell membrane, however.

To this basic cellular structure the UC scientists added an ion pump, a biological device that pumps charged atoms of calcium, potassium, and other elements into and out of the cell. Then they added a solution of adenosine tri-phosphate, or ATP, which fuels the ion pump.

The ion pump changes the electrical charge inside the cell, which then changes the electrical charge going through the transistor, which the scientists could measure

and monitor.

In their initial device the biological pump powered the artificial transistor. Future devices could work just the opposite, where an outside electrical current could power the pump and alter how quickly ions are pumped into or out of a cell.

To read the entire article, CLICK HERE [2].

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