Eureka Secondary School

Nano in My Life

Nanotechnology is the science and technology of very small things.
One nanometre is a billionth of a meter.

Nano in Nature

Did you know the unique properties many animals and plants posses are due to nanostructures that exist within them.

- The beautiful colours of some butterflies and moths arise from nano structures on their wings.
- Geckos can walk upside-down even on wet and dirty surfaces. Nano forces created by extremely fine hairs on their feet, which greatly increases the surface area, allows them to walk on walls and ceilings.
- A team of German and Swiss scientists has calculated that nano-forces allow spiders to carry more than 170 times their own body weight.

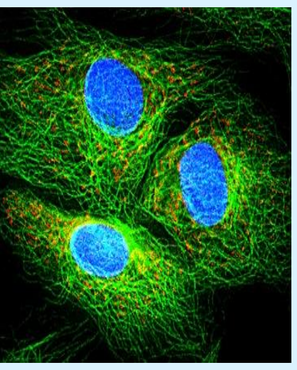
Nano Now

A carbon nanotube is a sheet of graphite, one atom thick, rolled into a cylinder with a diameter over 10,000 times smaller than a human hair. They are at least 100 times stronger than steel, but only one sixth as heavy-so nanotube fibers could be used to strengthen just about any material. These properties make them an ideal material to produce more lightweight, fuel efficient airplanes and cars. They are already in tennis racquets, which is supposed to give the player extra power and control. Tennis balls made of nano-based materials remain pressurised for longer

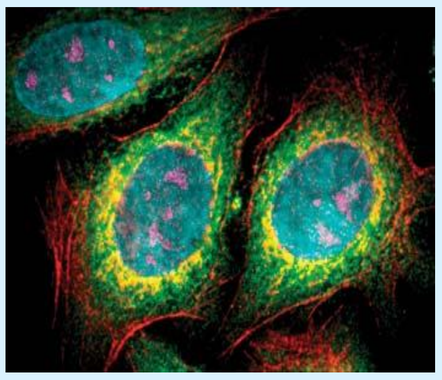
- The cosmetics industry: has invested heavily in nanotechnology.
  New products are claimed to penetrate deeper into the skin or to have other benefits. For example, cosmetics that slowly release vitamins are in development.

- Suncream: Nanoparticles of titanium dioxide are being used to create transparent sunscreens.
- Military: New classes of nanopolymers are being developed that can be sprayed on to a soldier, to form a suit without seams. The fabric is planned to contain embedded enzymes that detect and break down chemical and biological warfare agents, various biosensors to monitor a soldier's health, and nanosized silicon carbide particles for physical protection.

Nano in the Future

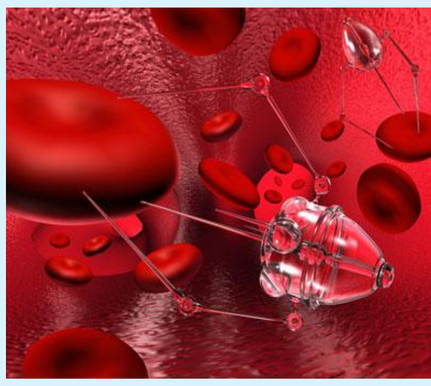


- Quantum Dots: Quantum dots are being used as tiny beacons or markers that can be used to watch and track cells, genes, proteins and other small molecules. In one study, scientists used quantum dots to watch blood flow in the tissues of living mice. Proteins on the surface of cells, such as cancer cells, can be identified.



- Diagnosis: A highly promising use of nanotechnologies is in diagnosis of disease. A technique called bio-barcode amplification has been used to identify tiny amounts of a protein that may be an early hallmark of Alzheimer's disease.

- Nanotrousers: Probably the most visible nanotech products to date are the stain and wrinkle-resistant trousers developed by Greensboro, North Carolina-based Nano-Tex LLC and sold by Eddie Bauer, Lee Jeans and several other retailers. Nanotrousers are garments whose fabric has been treated with a product containing polymer chains to improve their resistance to staining. If you happen to spill coffee or orange juice on your 'nanotrousers' the liquid simply beads off and falls harmlessly to the floor, rather than leaving a stubborn stain.



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