

## Nanotechnology

“Nanotechnology refers to the branch of science and engineering devoted to designing, producing, and using structures, devices, and systems by manipulating atoms and molecules at nanoscale, i.e. having one or more dimensions of the order of 100 nanometres (100 millionth of a millimetre) or less. In the natural world, there are many examples of structures with one or more nanometre dimensions, and many technologies have incidentally involved such nanostructures for many years, but only recently has it been possible to do it intentionally.

Many of the applications of nanotechnology involve new materials that have very different properties and new effects compared to the same materials made at larger sizes. This is due to the very high surface to volume ratio of nanoparticles compared to larger particles, and to effects that appear at that small scale but are not observed at larger scales.

The applications of nanotechnology can be very beneficial and have the potential to make a significant impact on society. Nanotechnology has already been embraced by industrial sectors, such as the information and communications sectors, but is also used in food technology, energy technology, as well as in some medical products and medicines. Nanomaterials may also offer new opportunities for the reduction of environmental pollution.

Nanotechnology is under active development or already in practical use in several areas: In materials science, nanoparticles allow for the making of products with new mechanical properties, including surface friction, wear resistance, and adhesion. In biology and medicine, nanomaterials are used to improve drug design and targeting. Others are being developed for analytical and instrumental applications. Consumer products such as cosmetics, sunscreens, fibres, textiles, dyes, and paints already contain nanoparticles. In electronic engineering, nanotechnologies are used for instance to design smaller, faster, and less consuming data storage devices.

But these new materials may also present new health risks. Humans have developed mechanisms of protection against various environmental agents of different sizes. However, until recently, they had never been exposed to synthetic nanoparticles and their specific characteristics. Therefore the normal human defence mechanisms associated with, for example, immune and inflammatory systems may not be able to respond adequately to these nanoparticles. In addition, nanoparticles may also disperse and persist in the environment, and therefore have an impact on the environment.”

**Source: (SCENIHR /002/05), a report produced in 2006 by the SCENIHR (Scientific Committee on Emerging and Newly Identified Health Risks) of the European Commission.**

**Exercise 1:** Generate a list of new vocabulary (from text), share it with your classmates and your instructor. Then write a new sentence using one word or more from that list.

**Exercise 2:** Find in the text words that are closest in meaning to the following.

Division:

Controlling:

Important:

Enhance:

**Exercise 3:** Find in the text words that are opposite in meaning to the following.

Accidentally:

Useless:

Natural:

Old:

Exercise 4:

**Exercise 4:** Identify the part of speech of the underlined words in the text.