Nanotechnology

Let us go through nanotechnology!

What is nanotechnology

- science, engineering, and technology conducted at the nanoscale.
-1 to 100 nanometres

Nanomaterials

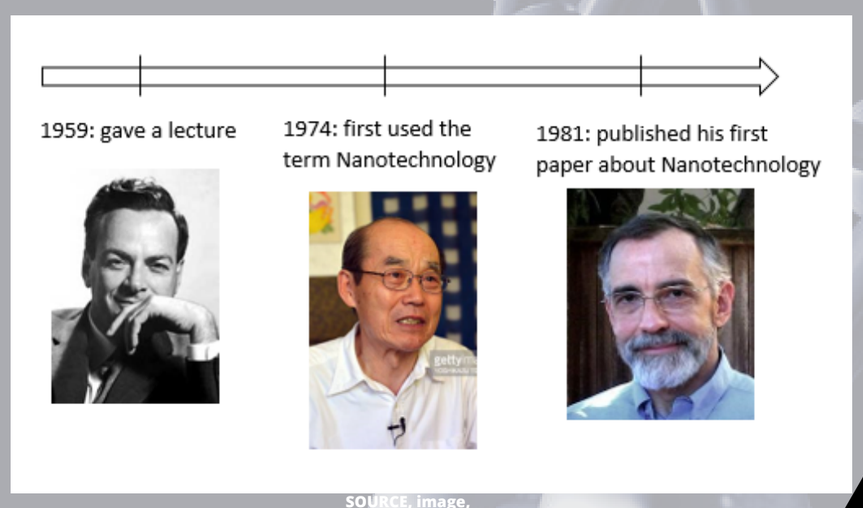
- Naturally occurring materials such as (volcanic) ash, minerals, etc.
- By-products of high-temperature processes such as combustion, industrial processes, welding, etc.
- Synthetic nanomaterials

Nanoparticles

- Carbon-Based Nanoparticles
- Ceramic Nanoparticles
- Metal Nanoparticles
- Semiconductor Nanoparticles
- Polymeric Nanoparticles
- Lipid-Based Nanoparticles

The history of Nanotechnology

In the history of nanotechnology a lot has happened. Throughout the evolution of Nanotechnology, there were three scientists who became the most important. These were Richard Feynman, Norio Taniguchi and Eric Drexler.



SOURCE, image, https://fa.wikipedia.org/wiki/%D9%BE%D8%B1%D9%88%D9%86%D8%AF%D9%87:Richard_Feynman_Nobel.jpg

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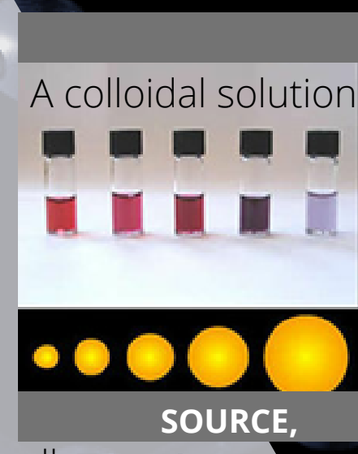
SOURCE, image, https://commons.wikimedia.org/wiki/File:Drexl[illegible]0.jpg

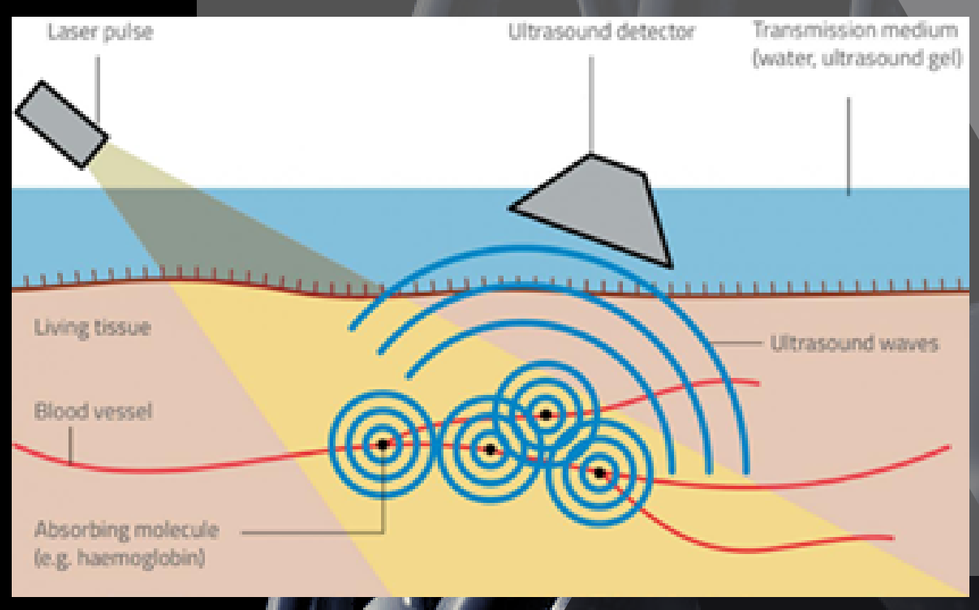
gold in medicine

Immunogold is colloidal gold that consits of gold nanoparticles disolved in a solution that is usually water.



SOURCE, Image, https://en.wikipedia.org/wiki/Colloidal_gold

- 1. the gold colloids are unified with anitbodies
- 2. the gold nanoparticles attach with the tumor cells
- 3. **Photacoustic** is utilized to visualize the gold particles in the tumor
- 4. the particles can be heated up with an infrared light laser
- 5. energy transmissted by the laser -> causes fluid to reach high temperatures -> liquid vaporizes
- 6. swift expansion and annihilation of the caner cells



Source, Image, https://www.scienceinschool.org/content/photoacoustics-seeing-sound

Hypothermia therapy

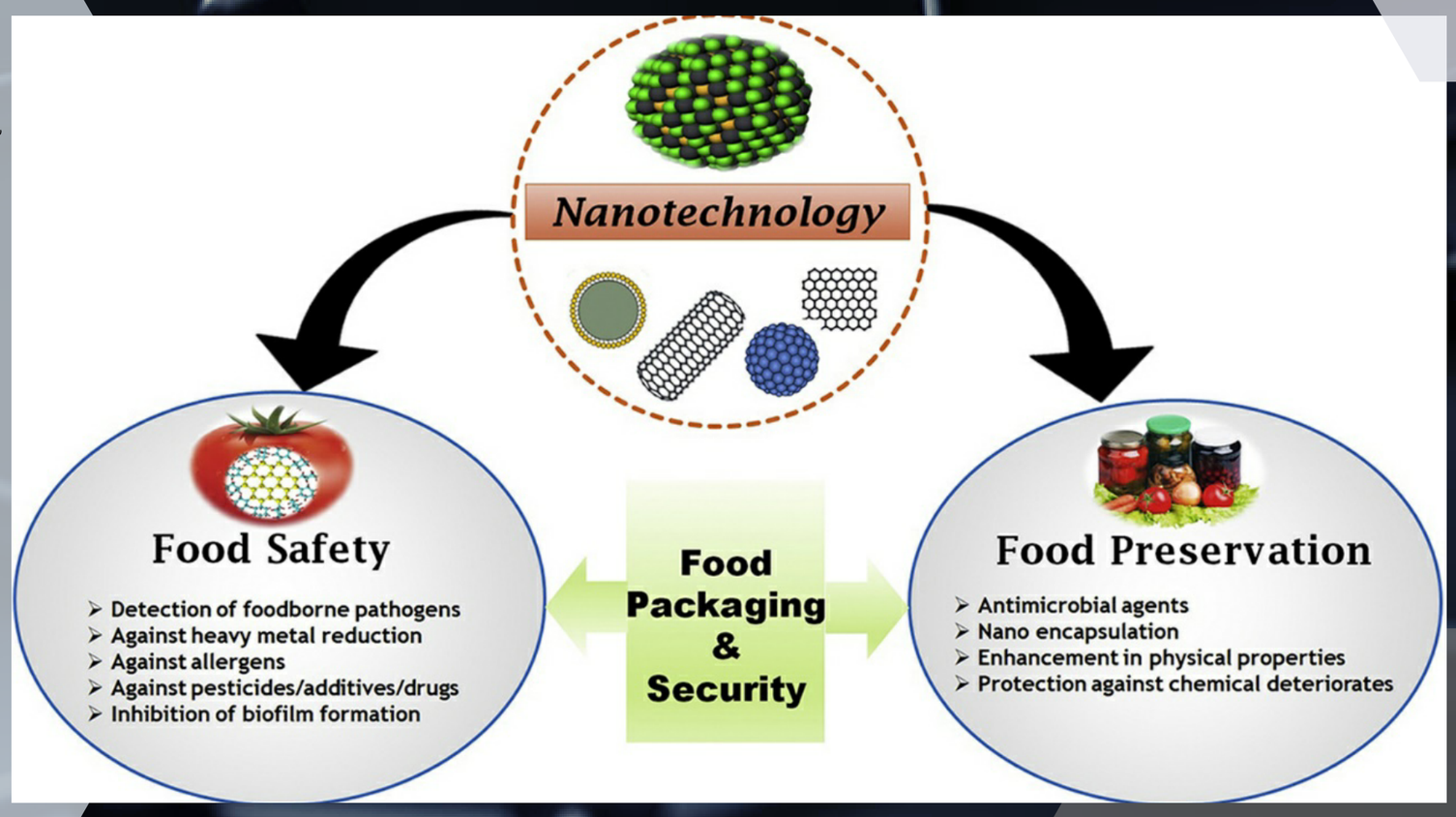
In the apparel industry nanotechnology has recently brought a lot of changes.

SOURCE, image, https://www.nanowerk.com/spotlight/spotid=42713.php

The unique features of nanomaterials give great benefits and advantages to clothes and indeed Nano-based fabrics have plenty of qualities such as water resistance, lightness, anti-ballistic and flame-retardant properties.

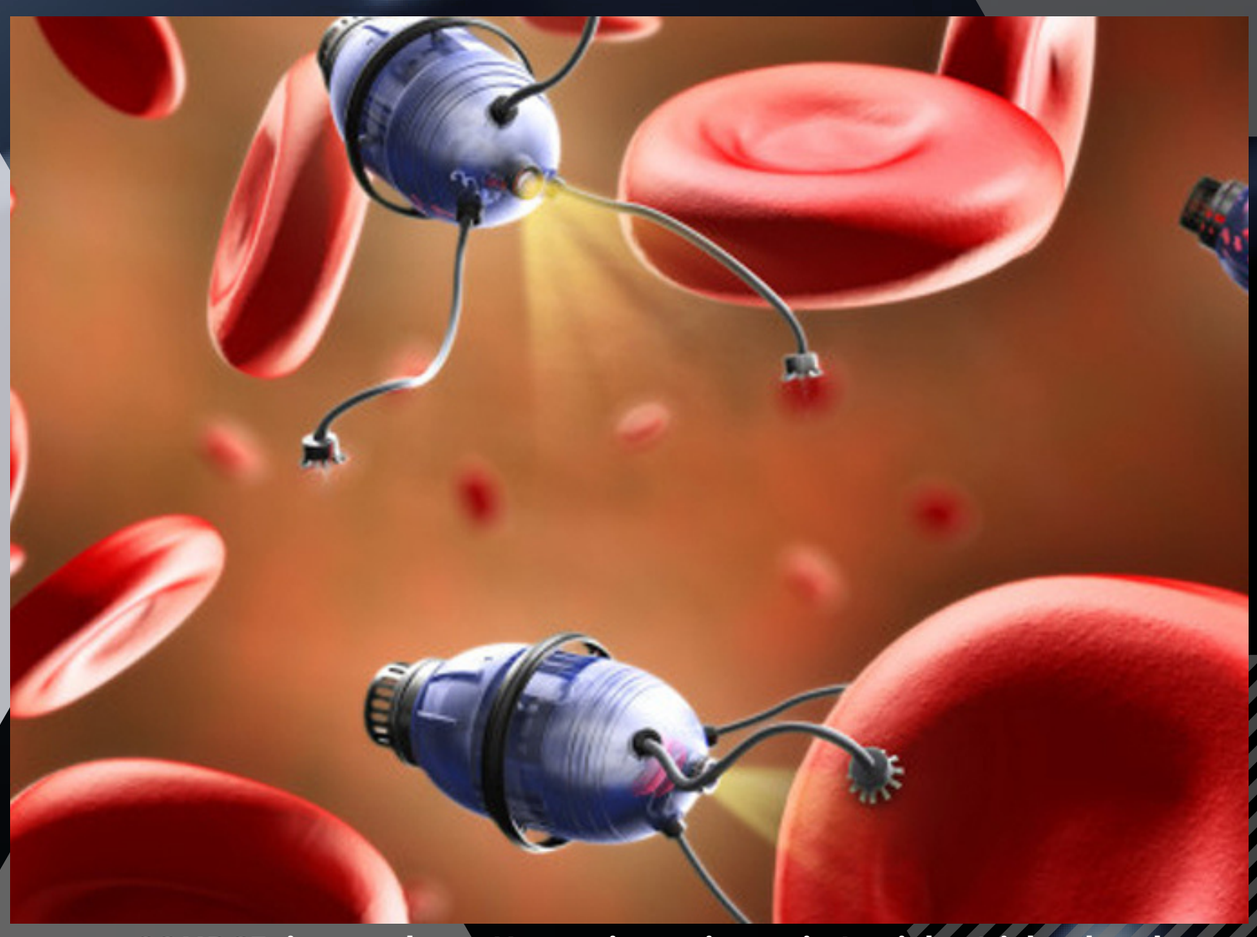
***Nanotechnology* is far closer to us than we might think. Nanoparticles are indeed applied both in the textile industry and in the food field.**

The food industry has achieved a great improvement thanks to the use of nanotechnology. For instance, its physical properties guarantee to food a longer shelf life and a better taste.
In parallel, nanomaterials improve the strenght of food packagings.



SOURCE, image, https://www.sciencedirect.com/science/article/pii/S1021949818301169

Besides the advantages brought about by nanotechnology, it has also some risks for people and the environment. For example, they may damage the lungs, the digestive system and they can also mutate the DNA cause of the small size of nanomaterials and the way their surfaces are modified.



SOURCE, image, http://www.justscience.in/articles/risks-development-nanotechnology-medicine/2017/12/13