

SciBlog – Nanotechnology – teasing introduction: 3 min read

Ines Nikolić

I suppose you have heard the word *nanotechnology* many times so far. And how do you perceive it? Tiny or invisible? Is it unconditionally associated to modern technologies and the creation of the products with better performance than usual? Contemporaneous? Maybe you think of the nano SIM card in your mobile as a good *nano* representative.

Well, although not immediately recognised under that name, the evidence-based story about *nanotechnology*, the so-called "science of the small" dates literally 100 years ago. Can you imagine?

I can tell you that nanometer size is actually 10^{-9} m, it is 1000 times smaller than a micrometer, 1 000 000 time smaller than a millimeter...But, still, this information doesn't bring too much of the explanation. For illustration, you can imagine that 1 nanometer compared to 1 meter is like a fifth of an average human step towards the diameter of the Earth!

Even when size relations are clear, it appears remarkable that nanoscale materials and technologies exhibit unique physical properties and phenomena that cannot be derived by simply scaling down the associated macroscopic structures. So, *nano* is much more than just another step of miniaturisation. For instance, would you believe me if I said that, due to nanotechnology, gold is not always shiny and yellowish? We all know what gold is. Chemically, that is a shiny yellow metal in the 11th group of the Periodic Table of Elements (*Au*, Lat. *Aurum* – glowing dawn), having atomic number 79, and being one of the least reactive elements (at "normal" conditions). If I said that pure gold could be red, or even blue, would that sound right to you? When gold is nanosized, it can express some dramatically different properties (depending also on particle shape and interparticle distance), and just one example is the colour shift – due to the phenomena called *surface plasmon resonance*. The explanation is far beyond the scope of this text, but you can get the point.

Such a property might not seem so spectacular to you, but the fact that gold nanoparticles, as many other nano-enabled medicinal products, are nowadays being intensively investigated as cancer treatment modalities, brings additional light to the story of *nanoscience*.

I hope this sounds as a catchy introduction to *nanotechnology*. Even though it has already changed the paradigm in different industrial sectors (IT, transportation, energy, food, medicine...) in our blog, we will talk about *pharmaceutical nanotechnology* and how scientists actually "see" the invisible.

Interested? Stay tuned until our next *SciBlog* comes out!