

Editorial

Nanotechnology is a technology started as a collection of curiosities (sun screens, stain resistant pans and more). Special properties make nanoparticle so beneficial to medicine, why nanotechnology has entered biotechnological fields so rapidly. Nanostructured material is able to enter cells, cross the blood brain barrier or show a controlled release of drugs from matrix material in the gastrointestinal tract.

But the question arises, what is nanobiotechnology? A clear definition does not exist, and it can be understood as a mixture of nanotechnology and biotechnology. Simply put, nanobiotechnology deals not with special areas and is understood as a matter of nanoscale level varying between 0.1 and 250 nm. Nanobiotechnology is maybe defined as technology concerned with materials and systems whose structures exhibited improved physical, chemical and biological properties in living organisms due to their nanoscale size. Special fields are electronics, telecommunications and life sciences including diagnostics, implantants, drug delivery, molecular biology, medicine, and biotechnology. Especially in nanomedicine research is advancing at several fronts. Creating nanoscaled drug carriers or even milling drug crystals in nanoparticles is one actual approach in nanomedicine as a new drug formulation for poorly soluble drugs. Recently the drugs rapamycin (Rapamune[®]) and aprepitant (Emend[®]) based on the NanoCrystal[®] technology have entered the market. The Second area that is highly influenced by nanotechnology in pharmaceutical biotechnology are diagnostics in clinics, biosensors in food industry and microarrays. The company NanoInk recently released the Nscriptor based on atomic force microscopy technology. An ultra fine probe can deposited liquids directly and in close proximity on nearly all surfaces. Such devices can be used to generate so called “point-of-care-diagnostics” to speed up clinical diagnostics in quality and quantity.

Today we have a very enthusiastic view of nanobiotechnology, and we see a bright future with self replicating nanoscaled robots and artificial life mimicking natural processes as molecular machine. We must be aware, that there is no risk assessment for negative health and environment consequences. Only a few toxicological studies devoted to nanostructured material have been conducted. Properties of drugs are in some ways different at nanoscale, and because of the small size particles enter not only target cells but also healthy cells with unknown consequences. Today complex nanotechnologies are far from FDA or EMEA approval, and it can be expected that drug authorities will have critical view slowing down progress because of risk assessment. Some companies have recognised this problems and spinning their innovations not as drugs but as medical devices providing an easier approval.

In this special issue Nanobiotechnology in pharmaceutical sciences will be highlighted from different experts. Starting with actual topics in fundamental research, drug applications in pharmacy and medicine are discussed to end up with an outlook of upcoming future techniques that have the potential to be moved into to treatment arena. In addition, some proposals for nanoparticles and nanoscale tools and their applications in medicine are reviewed and discussed. The issue presents lot examples, illustrating the progress in multidisciplinary research in nanoscaled biotechnology and nanomedicine. It is focused especially on drug aspects and the wide usage of diagnostics in various fields of science.

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