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NANOTECHNOLOGY IN MEDICINE

Nanotechnology is the manipulation of matter at the atomic and molecular scale to create materials with remarkably varied and new properties. It is a rapidly expanding area of research with huge potential in many sectors, ranging from healthcare to construction and electronics.

So, the aim of our work is to offer a few insights into the potential of nanotechnology to change medicine, both in the research lab and clinically.

In medicine, it promises to revolutionize drug delivery, gene therapy, diagnostics, and many areas of research, development and clinical applications.

The ability to manipulate structures and properties at the nanoscale in medicine is like having a sub-microscopic lab bench on which you can handle cell components, viruses or pieces of DNA, using a range of tiny tools, robots and tubes [3].

Therapies that involve the manipulation of individual genes, or the molecular pathways that influence on their expression, are increasingly being investigated as an option for treating diseases. One highly sought goal in this field is the ability to tailor treatments according to the genetic makeup of individual patients.

Imagine, for example, being able to stretch out a section of DNA like a strand of spaghetti, so you can examine or operate on it, or building nanorobots that can "walk" and carry out repairs inside cell components. Nanotechnology is bringing that scientific dream closer to reality [2].

Recent years have seen an explosion in the number of studies showing the variety of medical applications of nanotechnology and nanomaterials. But another challenge is how to quickly ensure public confidence that this rapidly expanding technology is safe. And so far, it is not clear whether that is being done.

Many specialists say nanoparticles have been around since the Earth was born, occurring naturally in volcanic ash and sea-spray, for example. They have been present since the Stone Age, in smoke and soot. The National Cancer Institute in the US says there are many nanoparticles naturally present in the environment. In many respects, they point out, "most engineered nanoparticles are far less toxic than household cleaning products, insecticides used on family pets, and remedies," they are much less toxic than the drugs they carry [1].

Nanofiber layers produced from biopolymers can be used as a wound dressing for significant support of the wound healing process. Nanofiber materials have shown significant benefits – when using it on wounds it is possible to add antibacterial material and drugs to the nanofiber structure.

Nanofiber materials made from biopolymers are possible substrates for growing cells suitable for implanting by different types of cells. Nanofiber substrates effectively enable tissue replacement prepared from a patient´s cells.

Barrier textiles containing hydrophobic nanofiber layers, for example, polyuretan or polyvinyldenfluorid are an effective barrier for microorganism penetration. Barrier textiles are usable for surgical gowns, drapes and in disposable face mask production [1].

Conclusion. So, as we have investigated, there are considerable challenges in the variety of medical applications of nanotechnology and nanomaterials, the greatest of which is how to scale up production of materials and tools, and how to fight numerous challenges facing nanotechnology.

References:

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