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Editorial

SEARCHING TO UNDERSTAND NANOPARTICLES AS NANODRUGS

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EDITORIAL

Sometimes small things have a great performance! Nanotechnology has been proposed as a promising approach to produce nanomaterials with unique properties.

Since the size of nanoscale materials is similar to most biological molecules; it is common to view nanotechnology as nanoscale technologies that can be useful in nanomedical research and other applications including molecular engineering, drug delivery, energy storage, organic chemistry, and molecular biology. Nanoscale Materials Company has been a private US corporation (located at Kansas State University) that has been founded by Dr. Kenneth J. Klabunde in 1995.

Nanoparticle synthesis through green chemistry (also called sustainable chemistry) is a safe procedure that minimizes the use and generation of hazardous substances. In biosynthesis, simple compounds convert into other compounds or form larger molecules through metabolic pathways. Paul Anastas and John C. Warner directed the Green Chemistry Program at the US EPA in 1998 when they published a set of principles to reduce the risk of chemical production.

Nanomedicine as a field of nanotechnology has targeted the production of valuable research tools and therapeutic useful devices. The National Nanotechnology Initiative (a United States federal government program that proposed by Dr. Mihail Roco in 1999) expects the new therapeutic applications of nanomaterials in the pharmaceutical industrial and medical field including effective drug delivery systems and new therapies. Thus, because of the diverse potential of nanotechnology applications (including industrial and medical) in human life,

governments have decided to devote billions of dollars to nanotechnology research. Nanomedicine is growing, and it is expected to have a significant effect on the economy.

Today, the integration of nanomaterials with biology has been a quantum leap in diagnostic devices, therapeutics, and drug delivery vehicles. Nanoparticle-mediated drug delivery has been proposed as an effective therapeutic target to reduce the consumption of conventional drugs. Because of their small size, and high specificity, nanoparticles are capable of delivering diseased tissue without having a negative effect on healthy cells. Also, the utility of the nanoparticles are their high sensitivity, high speed, and low the volume of distribution in drug delivery.

However, nanotechnology faces the same challenges as any new technology, including concerns about the danger of toxicity of nanomaterials in the environment and their potential effects on global economics. Safety concerns have led to a debate between nanotechnology supporters and government officials whether there is a need for specific regulation in the field of nanotechnology?

Globally, synthesis of nanomaterials through green chemistry may improve the quality of life and encourage industry to design products and processes that reduce generation of destructive and contaminated substances in the environment. The use of these biosynthetic nanomaterials in medical and drug technologies may increase the effectiveness of the treatment through successful delivery of drug to the targeted tissues. Biosynthesized nanoparticles may also be suggested to break up multidrug resistance mechanisms.

Sometimes small things really have a great performance!

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