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A Brief Note on Nanomedicine

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Editorial

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DESCRIPTION

Nano medicine is the use of nanotechnology in medicine. Nano medicine encompasses everything from medicinal nanomaterials and biological devices to nano electronic biosensors and potentially future molecular nanotechnology applications such as biological machines. Nano medicine's current challenges include determining the toxicity and environmental impact of nano scale compounds.

Interfacing nanomaterial with biological molecules or structures can provide functionality to them. Because nanomaterials are close in size to most biological molecules and structures, they can be used for biomedical research and applications both *in vivo* and *in vitro*. Diagnostic gadgets, contrast agents, analytical instruments, physical therapy applications, and drug delivery vehicles have all been developed as a result of the integration of nanomaterial's and biology thus far.

Nano medicine aspires to provide a helpful collection of research tools and clinically relevant gadgets in the not-too-distant future. New commercial uses in the pharmaceutical business, according to the National Nanotechnology Initiative, might include enhanced drug delivery systems, new therapeutics, and *in vivo* imaging. The US National Institutes of Health Common Fund programmer is sponsoring Nano medicine research and supporting four Nano medicine development centers. Nanotechnology has made it possible to use nanoparticles to deliver medications to specific cells.

By depositing the active pharmaceutical agent solely in the morbid region and at no greater dose than required, overall drug consumption and adverse effects can be greatly reduced. The goal of targeted medication delivery is to eliminate drug adverse effects while also lowering drug intake and treatment costs. Furthermore, focused pharmacological drug delivery decreases the negative effects of crude drugs by limiting unwanted exposure to healthy cells. The goal of drug delivery is to maximize bioavailability in specific areas of the body and throughout time.

This could be accomplished by using nano engineered devices to target molecules. Smaller gadgets are less intrusive and

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can potentially be implanted inside the body, and biochemical reaction times are much faster when using nanotechnology for medical technologies. These devices are more sensitive and faster than traditional medication delivery systems. The efficacy of Nano medicine-based drug delivery is largely determined by; a) Effective drug encapsulation, b) Effective drug delivery to the specified region of the body, and c) successful release of the drug. Several nano-delivery drugs were on the market by 2019.

Drug delivery systems, such as lipid or polymer-based nanoparticles, can be engineered to optimize the drug's pharmacokinetics and bio distribution. The pharmacokinetics and pharmacodynamics of nano medicine, on the other hand, differ greatly amongst people. Nanoparticles offer favorable qualities that can be employed to increase medicine delivery when engineered to circumvent the body's defense processes. Drug delivery systems that can get medications through cell membranes and into the cytoplasm are currently being developed. One technique for medication molecules to be used more efficiently is through a triggered reaction. Drugs are implanted in the body and only activate when they come into contact with a specific signal.

A medication with low solubility, for example, will be replaced by a drug delivery system that has both hydrophilic and hydrophobic environments, enhancing solubility. Drug delivery systems may also be able to avoid tissue harm by regulating drug release, lowering drug clearance rates, or lowering the volume of distribution to reduce non-target tissue effects. However, because to the complex host's reactions to nano and micro sized materials and the difficulties in targeting specific organs in the body, the bio distribution of these nanoparticles is still unsatisfactory. Nonetheless, much work is still being done to enhance nano particulate systems and better understand their potential and limitations. While research shows that nanoparticles can help with targeting and distribution, the concerns of nontoxicity are a critical next step in better understanding their medicinal applications. Nanoparticle toxicity varies depending on size, shape, and substance. These factors also have an impact on the accumulation of waste and the potential for organ damage. Nanoparticles are designed to be long-lasting, but because they cannot be broken down or expelled, they become trapped within organs, particularly the liver and spleen.