Pharmaceutical nanotechnology of specific sites drug delivery system and gene therapy - a review

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Abstract

Targeting sites can be achieved with different levels of sophistication: first the delivery of drug to a particular organ, second to a specific cell types and third to a structure within the cell. Nanoparticles can serve as carriers for drugs and genes have been successfully delivered to multiple targets including cancerous cells, diseased tissues and gene therapy. It has been widely speculated that image-guided drug delivery can remarkably enhance the localization and selective delivery of therapeutic agents to target cells and tissues. The ability to incorporate drugs or genes into a functionalized nanoparticle demonstrates a new era in pharmacotherapy for delivering drugs or genes selectively to tissues or cells. It is envisioned that the transfer of nano-engineering capability into disease therapy will provide constant and concentrated drug delivery to targeted tissues, minimizing systemic side effects and toxicity. Nano drug delivery systems hold great potential to overcome some of the barriers to efficient targeting of cells and molecules in inflammation and cancer. It is important to choose a suitable gene delivery system that can make the plasmid DNA distributed in specific nucleus and inserted into specific DNA site. This review will discuss the specific sites drug delivery system and gene therapy (types of carriers, mechanisms and treatments). The nanoscale is defined as a size range of below 1 μm. Scientific findings related to micro and macro systems with functionality residing within features defined at the nanoscale are also within the scope of the journal. Manuscripts detailing the synthesis, exhaustive characterisation, biological evaluation, clinical testing and/or toxicological assessment of nanomaterials are of particular interest to the journal's readership. Articles should be self-contained, centred on a well-founded hypothesis and should aim to showcase the pharmaceutical/diagnostic implications of the nanotechnology approach. Manuscripts should aim, wherever possible, to demonstrate the in vivo impact of any nanotechnological intervention. As reducing a material to the nanoscale is capable of fundamentally altering the material's properties, the journal's readership is particularly interested in new characterisation techniques and the advanced properties that originate from this size reduction. Since different cell types have unique properties, nanotechnology can be used to "recognise" cells of interest. This allows associated drugs and therapeutics to reach diseased tissue while avoiding healthy cells. Nanotechnology is helping to considerably improve, even revolutionize, many technology and industry sectors: information technology, homeland security, medicine, transportation, energy, food safety, and environmental science, among many others. There are two ways in which nanotechnology may be able to extend our lives. One is by helping to eradicate life-threatening diseases such as cancer, and the other is by repairing damage to our bodies at the cellular level--a nano version of the fountain of youth. Nanotechnology could eliminate diseases, disabilities, and illnesses such as diabetes, malaria, HIV, cardiovascular disease, damage from injuries and accidents, heal wounds, reduce child mortality, regenerate limbs and organs, eliminate inflammatory/infectious diseases, and so on and so forth. Let's have a glance on how nanotechnology can impact our lives: Faster and more powerful computers, which consume less power. ... Nanotechnology helps to improve vehicle fuel efficiency. The vehicle parts which are made from nanocomposite materials are lighter, stronger, and more chemically resistant comparing to metal. The statement that nanotechnologies do inevitably imply ethical questions. The main problems are public trust, potential risks, issues of environmental impact, transparency of information, responsible nanosciences and nanotechnologies research. In pharmacology, a drug is a chemical substance, typically of known structure, which, when administered to a living organism, produces a biological effect. A pharmaceutical drug, also called a medication or medicine, is a chemical substance used to treat, cure, prevent, or diagnose a disease or to promote well-being. According to the WHO, a drug is a substance that can change how a living organism works. Food is usually not seen as a drug, even though some foods may have such properties. Most of the time drugs are taken to treat a disease, or other medical condition. An example for such drugs may be Aspirin or Paracetamol. drug is any substance (with the exception of food and water) which, when taken into the body, alters the body's function either physically and/or psychologically. Drugs may be legal (e.g. alcohol, caffeine and tobacco) or illegal (e.g. cannabis, ecstasy, cocaine and heroin). Addiction is a disease that affects your brain and behavior. When you're addicted to drugs, you can't resist the urge to use them, no matter how much harm the drugs may cause. The earlier you get treatment for drug addiction, the more likely you are to avoid some of the more dire consequences of the disease. Drug addiction isn't about just heroin, cocaine, or other illegal drugs. You can get addicted to alcohol, nicotine, sleep and anti-anxiety medications, and other legal substances. You can also get addicted to prescription or illegally obtained narcotic pain medications, or opioids.

This problem is at epidemic levels in the United States. In 2018, opioids played a role in two-thirds of all drug overdose deaths. At first, you may choose to take a drug because you like the way it makes you feel. You may think you can control how much and how often you use it. But over time, drugs change how your brain works. These physical changes can last a long time. They make you lose control and can lead to damaging behaviors. Drug abuse is when you use legal or illegal substances in ways you shouldn't. You might take more than the regular dose of pills or use someone else's prescription. You may abuse drugs to feel good, ease stress, or avoid reality. But usually, you're able to change your unhealthy habits or stop using altogether. Addiction is when you can't stop. Not when it puts your health in danger. Not when it causes financial, emotional, and other problems for you or your loved ones. That urge to get and use drugs can fill up every minute of the day, even if you want to quit. Addiction also is different from physical dependence or tolerance. In cases of physical dependence, withdrawal symptoms happen when you suddenly stop a substance. Tolerance happens when a dose of a substance becomes less effective over time. When you use opioids for pain for a long time, for example, you may develop tolerance and even physical dependence. This doesn't mean you're addicted. In general, when narcotics are used under proper medical supervision, addiction happens in only a small percentage of people. Your brain is wired to make you want to repeat experiences that make you feel good. So you're motivated to do them again and again. The drugs that may be addictive target your brain's reward system. They flood your brain with a chemical called dopamine. This triggers a feeling of intense pleasure. You keep taking the drug to chase that high. Over time, your brain gets used to the extra dopamine. So you might need to take more of the drug to get the same good feeling. And other things you enjoyed, like food and hanging out with family, may give you less pleasure.

Biography:

Hussien O Kadi is a Professor of Pharmacology and Therapeutics at Sana'a University, Yemen. His primary areas of research are therapeutics, pharmacology, clinical pharmacy and toxicology. He has professional experience of more than 16 years in teaching, researching and academic administration.