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Clinical Applications of Nanoparticles Drug Delivery Vehicles

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Abstract

Generally, overeating and lack of physical exercise adds on to put weight in pets. The pet foods available commercially are also having high calorific values which add to this purpose.

Keywords: Pet Animal; Overweight; Obese.

Scientific communities are continuing to discover unique properties of every material at the submicroscopic scale means **nano-meter domain** (Feynman R, 1991; Ball P, 2001) so that the novel properties of material can be exploited for human welfare under the name of **Nanotechnology**. Advances in nanotechnology have propelled innovations in a number of scientific disciplines, including medicine and pharmaceutical formulation. It has the potential to revolutionize medicine, and has already presented new regulatory challenges & innovations are occurring rapidly, as demonstrated by the exponential increase in nanotechnology-related pharmaceutical patents over the past 15 years. Nanoparticles offer several advantages over formulations containing larger particles. For example, as the size of a particle decreases, a greater number of its molecules will be found at its surface rather than inside the particle, (Pison U et al. 2006) giving nanoparticles a large surface area to volume ratio. (Sung JC et al. 2007) Additionally, the saturation solubility of a particle increases as the particle size decreases, which is described by the Kelvin and Ostwald-Freundlich equation. (Muller RH, et al. 2001). Interestingly, this size-dependence only becomes apparent after the particle size falls below approximately 1mm, making it entirely unique to nanoparticles. These phenomena make nanoparticles formulation a highly effective means to enhance mass transfer from the particle into the surrounding medium (Muller RH, et al. 2001). For this reason, nanoparticles formulations have been used to enhance the bioavailability of insoluble hydrophobic drugs (Pison U, 2006). Although, the scope of nanoparticle formulations that have been applied to cancer therapy is far more elaborate. Depending on the chemical composition of the nanoparticles, these can carry a wide variety of compounds, making them efficient drug delivery vehicles.

In medicine, it promises to revolutionize drug delivery, gene therapy, diagnostics, and many areas of research, development and clinical application. Nanoparticles have beneficial properties that can be used to improve drug delivery. Where larger particles would have been cleared from the body, cells take up these nanoparticles because of their size. Drugs are placed in the body and only activate on encountering a particular signal. For example, a drug with poor solubility will be replaced by a drug delivery system where both hydrophilic and hydrophobic environments exist, improving the solubility. Also, a drug may cause tissue damage, but with drug delivery, regulated drug release can eliminate the problem. If a drug is cleared too

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quickly from the body, this could force a patient to use high doses, but with drug delivery systems clearance can be reduced by altering the pharmacokinetics of the drug. Poor bio-distribution is a problem that can affect normal tissues through widespread distribution, but the particulates from drug delivery systems lower the volume of distribution and reduce the effect on non-target tissue. One of the major impacts of our nanotechnology based drugs will be in leading development of completely new drugs with more useful behavior and less side effects.

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