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Nanomedicine and Drug Delivery: A State of the Art Review

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ABSTRACT: ***In electronics, biology and medicine, the nanotechnology sector now has pivotal positions. Its implementation can be tested since the materials to be designed at the atomic and molecular level are involved. Nano spheres have been shown to be robust drug delivery systems due to the advantage of their size and could be useful for encapsulating drugs and allowing more precise targeting with a controlled release. Specifically, in this study, we highlight the latest advancements in this technology for medicine and drug delivery systems. Organic or inorganic structures (sizes 1-100 nm) equivalent to antibodies and DNA plasmids are nanoparticles. Significant work has been done in nanotechnology in recent decades; the functional properties of nanoparticles for medical diagnostics and biomedical applications can now be manufactured, characterized and modified. Nano-biotechnology bridges the physical and biological sciences with nano-phase and nanostructure applications in various fields of research, especially in biomedicine, where these artefacts are of great interest.***

KEYWORDS: Applications, Gold, Medicine, Nanotechnology, Natural Products.

INTRODUCTION

Throughout human history, natural products have been used as herbal drugs. Around one-third of the top-selling prescription products today are natural products or their derivatives. While many of the medicines used today derive from natural sources, for a number of reasons, large pharmaceutical firms have not paid due attention to these compounds[1].

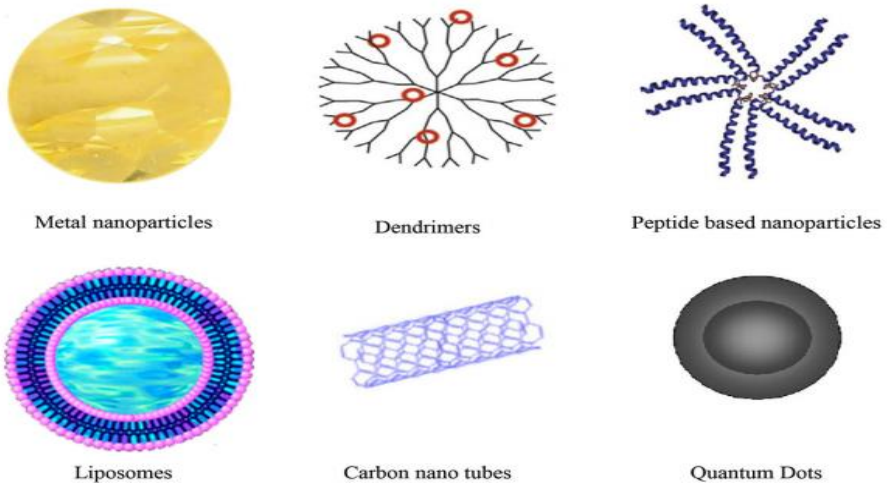

Figure 1: Depicts the metal nanoparticles, dendrimers, peptide-based nanoparticles, liposomes, carbon nanotubes and quantum dots[2]**.**

The lack of interest may be due to the obsolete notion that natural products are only useful as antibiotics: in the post-World War II period, natural products had tremendous success as antibiotics, and the two terms became synonymous[3]. While large pharmaceutical firms have preferred the screening of drug discovery synthetic compound libraries, small businesses have begun to investigate the uses of natural products against cancer, microbial infection, inflammation, and other diseases[4]. Figure 1 depicts the metal nanoparticles, dendrimers, peptide-based nanoparticles, liposomes, carbon nanotubes and quantum dots.

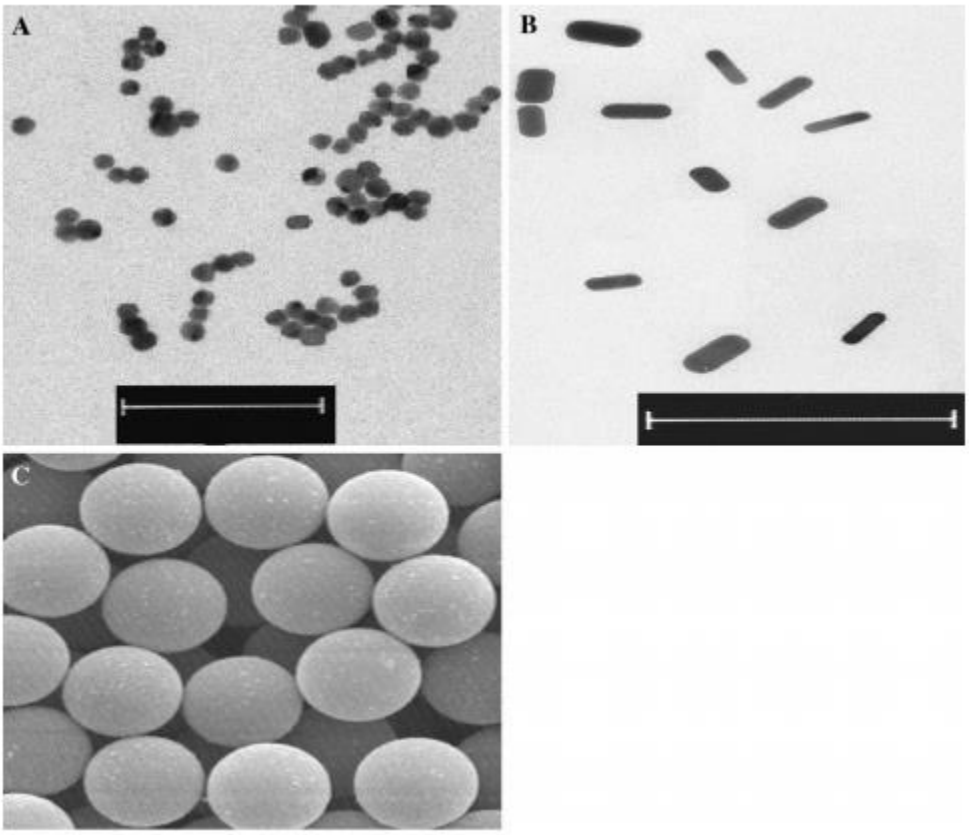

Figure 2: (A) TEM images of gold nanoparticles, (B) Nanorods and (C) SEM images of nanoparticles[5]**.**

DISCUSSION

Major multifunctional platforms for biomedical applications have been provided by nanoparticles. Varieties of nanoparticles, such as nanoparticles of silica, quantum dots, nanoparticles of metal and nanoparticles of lanthanide, have special properties suited to various applications in the field of bio-analysis[6]. Not only does a nanoparticle imply drug delivery, but it is also important to validate the target delivery.It is important to control nanomedicine from the systemic to sub-

cellular level. There are several florescent markers present, but nanoparticles not only benefit from improving fluorescent markers for medical imaging and diagnostic applications, but also from in vivo imaging of tumours and other diseases[7]. Figure 1 depicts the metal nanoparticles, dendrimers, peptide-based nanoparticles, liposomes, carbon nanotubes and quantum dots. Figure 2 (A) TEM images of gold nanoparticles, (B) Nanorods and (C) SEM images of nanoparticles. Figure 3 illustrates the Visible-NIR spectra of gold nanoparticles. Figure 4 illustrates graph for the Nanorods.

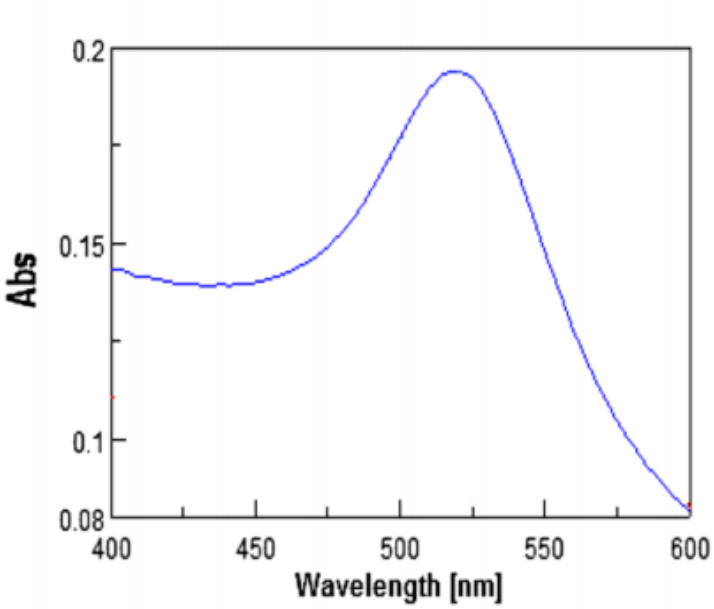

Figure 3: Illustrates the Visible-NIR spectra of gold nanoparticles[8]**.**

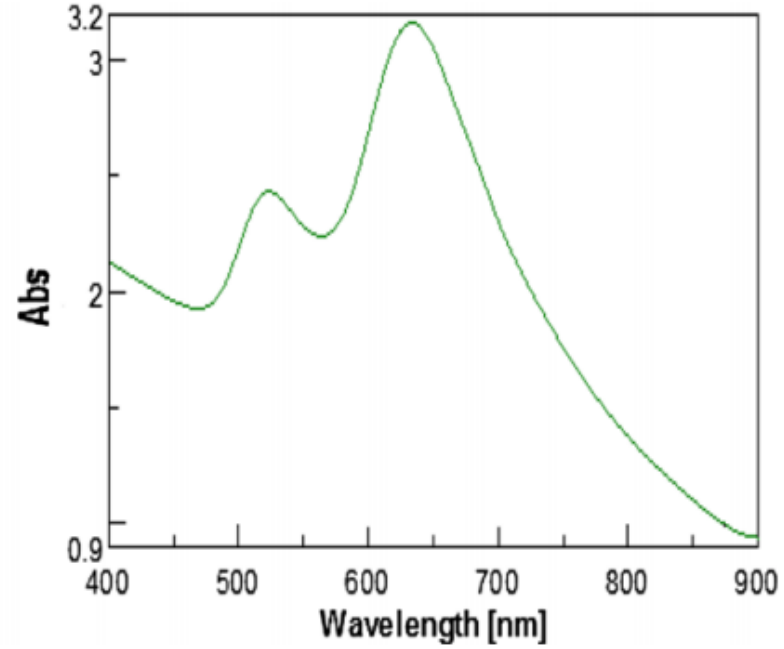

Figure 4: Illustrates graph for the Nanorods[9]**.**

CONCLUSION

In most attempts to target target targets and site-specific drug delivery, nanoparticles are increasingly becoming the priority. The ability of nanoparticles to target depends on certain variables such as particle size, surface charge, modulation of the surface and hydrophobicity. It is still important to solve several problems related to selective binding, targeted delivery and toxicity. Weak awareness of nanoparticles' toxicity is a major concern and undoubtedly needs further attention. In the world of therapeutics and science, if these nanoparticles are carefully designed to address problems relating to the aim and route of administration, they could lead to a new, more effective paradigm. Using supercritical fluids that are environmentally friendly and free of harmful solvents is the most promising study in nanoparticle manufacturing. A lot of research is currently being carried out to address these challenges, which would undoubtedly create the delivery of nanoparticle-based drugs as the gold standard for site-specific therapeutics.

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