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Editorial

**SMART NANOMATERIALS FOR DRUG DELIVERY: PAST, PRESENT
AND FUTURE**

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EDITORIAL

Drug delivery, action and the therapeutic efficacy has been one of the major topics of research over the past century. Increasing works in the development of the drug delivery platforms, with changes to administration profiles as well has increased the expanse from the regular single usage drugs like doxorubicin or tamoxifen to combinations of drugs with immunotherapy, naturopathy and the increasing attention towards the nature-inspired and nature-derived drugs. This has also seen development in the preference towards oligonucleotides and the inclusion of gene editing routes by CRISPR, etc.

Recently, nanomedicine has emerged as a good alternative for overcoming these barriers; drugs are delivered to the molecular site of action directly via injections into the bloodstream. Once they enter into bloodstream, it is rapidly cleared by RES system or it undergoes opsonization to avoid these problems. PEGylation is found to be an effective way to evade premature clearance through RES. This prevents specific binding of Nanoparticle- drug complex surfaces to blood components and lead to prolonged blood circulation times. Gao et al. synthesized targeted, PEG-like conjugates via polymerization of very long polymer chains from one of the protein termini. This approach increased the hydrodynamic radius from 3 nm for the native protein to >20 nm for the conjugate. Thus, nano drug delivery systems offer many advantages over other methods such as improvement of the biopharmaceutical properties in the form of micellar structures which lead to the encapsulation of hydrophobic pharmacokinetics leading to improved efficacy and larger therapeutic drugs, rendering them appropriate for administration; increases its biodistribution and window and minimizing the

systemic side effects as a result of favored accumulation at specific target sites by targeted drug delivery.

Various nanoformulations are currently employed for successful drug delivery system, few of them are from natural sources like gelatin, albumin, phospholipid vesicle, liposomes polymers drug conjugates, polymeric micelles, hydrogel nanoparticles, inorganic nanoparticles like gold, superparamagnetic iron oxidenanoparticles, ceramic nanoparticles like silica [6] and calcium phosphate for gene delivery, carbon based nanoparticles such a Carbon nanotubes (CNTs), fullerene, and nanodiamonds. Here in this review we will discuss the different organic, inorganic and polymeric nanoparticles employing for current drug delivery systems.

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