

Nanomedicines: Future Therapy for Cancers and Cardiovascular Diseases

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Metal and metal ions play important role in all living systems. Therefore, various metals/metal ions have been used in biology and medicine since antique time for the treatment of several diseases and biomedical applications. However, they exhibit cytotoxicity at higher concentration when administered for therapeutic and diagnostic purposes. On the other hand, numerous literature support that metal nanoparticles might be employed for *in vivo* medicinal applications due to their unique and unusual physico-chemical and biological properties compared to the same bulk metals. In this context, nanotechnology, which deals with the materials having size in nanometer range (preferably < 100 nm for biological applications), is one of the most emerging fields in modern science and technology. Our group has been extensively working in the field of nanobiotechnology to develop innovative therapeutic strategies that could be useful for the treatment of various diseases including cancers and cardiovascular related diseases.

Our group at IICT is presently pursuing various nanomedicine research projects aimed at developing advanced novel metal nanomaterials and nanoparticles based drug delivery systems (DDS) for treatment of cancer, cardiovascular, ischemic disease. It is well known that cancers and cardiovascular disease (CVD) are globally the two leading causes of morbidity and mortality. Cancer is one of the most frightful diseases, arising from uncontrolled growth of cells due to altered genetic and metabolic functions. According to World Health Organization (WHO) report, 14.1 million new cancer cases were observed and 8.2 million people died throughout the world in 2012. Similarly, report demonstrated 17.5 million global deaths happened in 2012 due to cardiovascular related diseases. Conventional treatment strategies for cancer and CVDs have several limitations and hence more effective alternative therapeutic approaches are urgently needed. In this context, nanomedicine can play a pivotal role.

Our translational nanomedicine research at CSIR- IICT include (i) design and development of advanced nanoparticles /nanobio-conjugates/nanohybrids using chemical & biological approach), (ii) design of novel pro-angiogenic (Angiogenesis: formation of new blood vessels from pre-existing vasculature) nanomedicine) that could be used for the treatment of cardiovascular related diseases using nanomedicine approach, and (iii) design of nanoparticles based drug/gene delivery systems for cancer therapeutics & diagnostics (cancer nanotechnology).