

An Indian-Australian research partnership

Project Title: Dendrimer functionalized magnetic nanoparticles as promising targeted delivery systems for gene and peptides

Project Number IMURA0190 (will be inserted by The Academy)

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Research Academy Themes:

Highlight which of the Academy's Theme(s) this project will address?

(Feel free to nominate more than one. For more information, see www.iitbmonash.org)

1. Advanced computational engineering, simulation and manufacture
2. Infrastructure Engineering
3. Clean Energy
4. Water
5. **Nanotechnology**
6. **Biotechnology and Stem Cell Research**

The research problem

Define the problem

Fabrication of a novel dendrimer based magnetic nanoscopic delivery system as a promising targeted delivery carriers for gene and peptides

Project aims

Define the aims of the project

1. **Synthesis of multivalent dendritic scaffolds**
2. **Functionalization of superparamagnetic nanoparticles with the dendritic scaffolds to be used as nanocarriers**
3. **Synthesis of peptide – nanocarriers conjugates and screening assay**
4. **Efficiency studies of the dendritic nanocarriers system for intracellular delivery of the peptides**
5. **Exploring the possibility to use the developed systems for gene delivery as well.**

Expected outcomes

Highlight the expected outcomes of the project

- A novel nanoscopic delivery system in which the conjugated dendritic nanocarriers facilitated rapid cellular uptake of a peptide – nanocarriers conjugates, thereby establishing new venues for the delivery of proteins and genes.
- These developed nanocarriers system are poised to serve as a powerful delivery platform of other relevant and precious biological cargos that require a rapid and unaltered delivery to unfold its biological activity.

How will the project address the Goals of the above Themes?

Describe how the project will address the goals of one or more of the 6 Themes listed above.

The synthesis of dendrimers and dendritic structures for functionalization of magnetic nanoparticles, provide high density of functional groups which may prove to be an asset while carrying the biological moiety to the desired site. The therapeutic effects of the peptides or the genes may also be evaluated in detail with respect to the cellular response involved. Thus, the project bridges the field of nanotechnology with biotechnology and the results may find extensions in the cancer therapeutics.