Aquitaine-Karnataka Collaboration
Scientific Project for Pre-PhD Student Exchange

Scientific Proposal

Project Title	Understanding the properties of cell membrane-derived nanocarriers for the rational design of targeted drug delivery systems	
Scientific Domain	Chemical Engineering, Bioengineering	
Summary (ca. 10 lines)	Cell-derived Nanocarriers have the advantages of a well preserved cell membrane structure and targeting moieties and are attractive carriers for targeted drug delivery. To rationally design such Nanocarriers one needs to understand the interaction between the cell-derived membrane and the drug and its effect on drug loading and release. Hence as a starting point, we seek to characterize the lipid bi-layer derived from different cell types using experimental and modelling studies. Using a convection-driven drug release model in Nanocarriers, we intend to study various mechanisms that affect drug loading and release such as drug-bilayer interaction, convection mass-transfer and free-energy change. Later, we will design drug loading and release experiments using Nanocarriers derived from various cell types such as bacteria and erythrocytes. Convection-driven drug release model will be validated by fitting it with the experimental data and relevant kinetic and reaction parameters would be obtained. In summary, this integrated study would facilitate better understanding and rational design of cell-derived Nanocarriers for targeted drug delivery.	
Student profile wished	Chemical Engineering, Biotechnology, Bioengineering	
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Timing & duration of project (give approximate ranges)	3-6 months	
Representative References	Adv. Mater. 2012, 24, 3757–3778	

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