**A novel method for immobilization of proteins via entrapment of magnetic nanoparticles through epoxy cross-linking**

Dr. Tessy Iype,

tessy.m@maggenome.com

Principal Scientist, MagGenome Technologies Pvt. Ltd., Kochi, India

Iron oxide nanoparticles are the most prevailing magnetic materials in immobilizing biomolecules because of their unique properties such as superparamagnetism, low toxicity, biocompatibility, high surface area and easiness of separation under an external magnetic field. Immobilization of proteins is a powerful tool in creating high performance reagents with improved stability and reusability. We developed a novel method of immobilization of functional proteins such as affinity ligands, on the surface of iron oxide nanoparticles. In this method, the protein of interest and uncoated magnetic nanoparticles are cross-linked in presence of an epoxy cross-linker to form a matrix in which the particles are embedded.

The separation of the immobilized protein can be easily achieved under an external magnetic field without purification columns or centrifugation. Other advantages include increased binding of protein due to high surface area of nanoparticles, absence of interfering polymeric coating materials and reusability. The finding that epoxy cross-linking can be used to entrap nanoparticles in a cross-linked matrix of protein without impairing the activity of immobilized protein, led to the development of an efficient and cost effective method for large scale purification of antibodies from various biological sources. Using this method, affinity and hydrophobic interaction chromatography resins are being developed for the purification of monoclonal antibodies.

Dr Tessy Iype received her PhD in Biochemistry from the Dept of Biochemistry, University of Kerala, Trivandrum in 2002. She did her postdoctoral research at Beirne B Carter Center for Immunology at the University of Virginia from 2002 to 2010 and studied the regulation of T cell receptor signalling pathways in conventional and regulatory T cells. Her research articles were published in journals like Journal of Biological Chemistry, Molecular endocrinology, Journal of Immunology etc. She returned to India and started career as the principal investigator in the DBT BioCare woman scientist program but later joined SciGenom Labs, Cochin as a Scientist. She joined MagGenome Technologies in 2015 and initiated the development of immobilized functional proteins for various biological applications. She is currently the Principal Scientist of MagGenome and is involved in the development of biomolecules purification kits, immobilized proteins and other related magnetic nanoparticles based products.