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Theranostic approach of hyaluronic acid-based nanoparticle

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Hyaluronic acid (HA) is a non-sulfated glycosaminoglycan organic polymer, found as structural component of the extracellular matrix (ECM) in mammalian bone marrow and loose connective tissues of our body. Hyaluronic acid also plays a major role in cell proliferation, motility, cell adhesion and gene expression. Cellular HA receptors such as CD44+ and RHAMM are over expressed in cancer which makes it a good candidate for tumor targeting purpose. Here we have developed a T1 gadolinium contrast agent based on Hyaluronic acid (HA) that target CD44+ receptor over expression in cirrhosis which also display higher relaxation property than primovist and better contrast-to-noise ratio (CNR) at 20 min and even at 2 hr time period. Superparamagnetic iron oxide nanoparticles (SPION) have emerged as an MRI contrast agent primarily for tumor imaging due to their efficacy and safety, proven by clinical application with a series of marketed SPION-based contrast agents. For the purpose of tumor diagnosis iron oxide nanoparticle coated with Hyaluronic acid (HA-SPION) as T2 contrast agent was synthesized with co-PEGylation strategy for increased bioavailability to tumor region. And finally, hyaluronic acid micelle that can encapsulate hydrophobic anti-cancer drug such as paclitaxel that specifically target CD44+ overexpressing tumor are synthesised which can act as promising drug delivery vehicle.

Bioraphy

Reju George Thomas has completed his MTech in Nanotechnology from Amrita Institute of nanosciences and molecular medicine (ACNSMM), India from 2010-2012. At present he is pursuing PhD under Prof. Yong Yeong Jeong developing Theranostic nanoparticles and conducting pre-clinical testing at Clinical vaccine R&D centre of Chonnam National University Hwasun Hospital.

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