

DBT-ILS scientists explore possibilities of exosome as a biomaterial to target bone disorders

New Delhi, May 13: Exosomes (30-150 nm) are nano-sized vesicles secreted by most eukaryotic cells. Studies indicate that these allow exchange of complex biological information involved in intracellular and intercellular communication. This opens up possibilities for their use as potential biomaterials for drug delivery. Exosomes also represent a rich source of novel biomarkers in the diagnosis and prognosis of disease. Their strong cargo loading and cargo carrying capacity, biocompatibility and stable molecular properties have fuelled interest in this field of research. However, currently there is limited information regarding the most efficient methods for obtaining pure and significant amounts of exosomes from cell culture supernatants and complex biological fluids such as plasma. To combat this, a group of researchers led by Dr Mamoni Dash at ILS is investigating exosome isolation protocols for efficiency, yield and purity of isolated exosomes. The different strategies range from magnetization of exosomes to polymer based size exclusion methodologies. Further, the group is also making chemical modifications by conjugating bisphosphonates to exosomes in order to target the bone. Bisphosphonates are the organic analogs of the pyrophosphate. The presence of an additional valency of the carbon atom allows for conjugation of bisphosphonates for further functionalization, which is being utilized for its conjugation to exosomes. The targeting ability of the bisphosphonate-conjugated exosomes is planned to be validated in-vivo in a mouse model.

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