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Sericin-Chitosan Doped maleate Gellan Gumnanocomposites for Effective Cell Damage in Mycobacterium Tuberculosis

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Polysaccharides are increasingly used as biodegradable nanocarrier to selectively deliver therapeutic agents to specific cells. In this study, maleate gellan gum (MA-GG) formed by addition of free radical polymerizable groups, which can be polymerized presence of acetone to design biodegradable three-dimensional networks, were synthesized by esterification. Natural silk sericin was grafted over the maleate gellan gum surface. Maleate Gellan Gum- Silk Sericin-Chitosan (MA-GG-SS-CS) Nano composites loaded with rifampicin (RF) and pyrazinamide (PZA) to overcome the problems associated with Tuberculosis (TB) therapy. The pH responsive behavior of gellan gumnanocomposites was reposed by silk sericin and exhibited sustained release of 79% RF and 82% PZA for 120 h at pH 4.0. The designed formulations shows higher antimycobacterial activity and rapid delivery of drugs at TB infected macrophage. Nano material effectively aggregated and internalized into the bacterial cells and MH-S cells. Dual drug release inside the cells makes damage in the cell membrane. Green Nano composites studies pave the way for important use of macromolecules in pulmonary delivery TB drugs. MA-GG-SS-CS was new type of green Nano composites and used as delivery of RF and PZA to TB cells. Nano system composed of multifunctional biomaterials loaded with high amount of drug, sustained release and stimuli responsive behaviour. The surface morphology and particle size was representing in HR-SEM and AFM. In addition, the pH responsive release of dual drug at acidic pH which favors the effect on TB infected macrophage of acidic environment. A Nano material effectively binds with TB cells and potent dual drugs break the cell membrane.

Biography:

S. Mehnath, is a PhD student (joined January 2018) in University of Madras, Chennai, India am an enthusiastic, adaptive and fast-learning person with a broad and acute interest in Nano-Biotechnology. To persue his research interest and he did M. Tech in Biotechnology from Bharthidasan University, Trichy, India. He have also gained his hands on experience in Molecular Biology, Cell Biology and Cancer Biology field from Central Institutes in India. He is working as a Junior Research Fellow in SERB Project, Govt of India. All of these experiences are helping him to pursue his research on Nanotechnology and to connect these fields so that a new powerful Nano-drug delivery technique can be developed in the field of Cancer.