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Mannosylated chitosan-based pulmonary drug delivery system for targeting macrophages

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As the causative agent of Tuberculosis resides in the alveolar macrophages, hence an effective drug delivery approach is required for the treatment [1,2]. Therefore, the pulmonary route of drug delivery was exploited by using nanotechnology [3]. Nano dry powder inhaler (nano DPI) was fabricated by spray-drying using mannosylated chitosan (MC) and hyaluronic acid (HA). The polymers were chosen because of their affinity for the surface receptors of macrophages [4]. The confocal imaging demonstrated promising uptake of the nanoparticles by the macrophages. Moreover, cytotoxicity studies revealed no toxic effect of the nanopowder on the A549 cells, RAW 264.7 cells, and the primary culture of macrophages. Furthermore, the nanopowder was found to be compatible with RBCs as demonstrated by the hemolysis study. The human macrophage phenotype analysis was also conducted to determine T-cell activation. Also, the immune regulation study was performed by (2,3-Indoleamine dioxygenase) IDO assay. Altogether, the nano DPI was found to be a promising vehicle for targeting macrophages.

References

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