# Synthesis and characterization of antitubercular drug-loaded functionalized nanocapsules

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Nanotechnology can help us to overcome challenging diseases such as tuberculosis (TB) that is still a major global health problem. TB is caused by *Mycobacterium tuberculosis* intracellular bacterium which is able to survive and persist in the host cell macrophages [1]. Our approach is to target the bacteria inside the host cells with nanotechnology-based drug delivery. We have developed antitubercular drug-loaded chitosan-based nanocapsules decorated with host cell targeting molecules to achieve enhanced cellular uptake by the macrophages and to reach the intracellular bacteria as site of action (Figure 1). This approach can lead to increased bioavailability and selectivity of the drugs while reducing their undesirable side effects. For this purpose, the biocompatible and biodegradable chitosan was functionalized with macrophage targeting ligands, such as a formyl peptide receptor targeting ligand and a mannose derivative for mannose receptor targeting. Nanocapsules were prepared from these chitosan derivatives and loaded with a recently approved anti-TB drug (bedaquiline) [3]. The synthesis, physicochemical and *in vitro* characterization of these functionalized nanocapsules are presented.

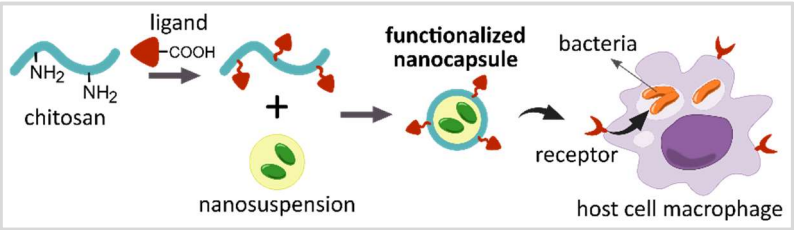


Figure 1. Synthesis of drug-loaded, functionalized nanocapsules for macrophage targeting

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References:

[1] Zs. Baranyai et al., Nanotechnology-based targeted drug delivery: an emerging tool to overcome tuberculosis, *Adv. Therap.*, 2021, 4, 2000113

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