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Formulation and characterization of pH-/light-responsive liposomes for macrophage targeted delivery of isoniazid

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One of the leading causes of mortality due to infectious diseases is Tuberculosis (TB). The rationale for formulating controlled delivery of liposomal encapsulated Anti-Tubercular Drugs(ATBDs) include avoiding extended tuberculosis treatment and frequent adverse effects due to poor bioavailability. Liposomes are considered as one of the potential vehicles in the targeted delivery of ATBDs with regards to their fast uptake by macrophages which are also called as main host cells for *Mycobacterium tuberculosis*. As hydrophilic compounds like isoniazid (INH), undergoes leakage through liposomes controlled release of ATBD's need arises. In the present study, INH was conjugated to a highly hydrophobic photosensitizer, zinc (II) phthalocyanine (PC), bonding with hydrazone. The resultant conjugate (PC-INH) was prepared by film hydration method by encapsulating in liposomes. These liposomes were characterized by dynamic light scattering, transmission electron microscopy, energy dispersion X-ray Spectrometry and UV-Vis absorption spectrometry, also used for estimating encapsulation efficiency (%EE). Evaluation of INH release was made using different pH media through dialysis. Zeta Potential, %EE of PILs and Particle size were -55mV, 72 % and 506nm respectively. Within 12 hours duration, PILS showed 22; 41; 97 and 100% INH release in pH 7.4, 6.4, 5.4 and 4.4 media respectively. This behavior of pH dependency attracts site-specific delivery. These research findings showed that phthalocyanines conjugated through chemotherapeutics using pH-labile linkages are the potential strategy for liposomal controlled release.

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