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## **Polymeric Lipid Hybrid Nanoparticles (PLN): Versatile Carrier System for Antigen**

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Polymer Lipid Hybrid Nanoparticles (PLN) having the liposomes as well as polymeric nanoparticles features. Polymeric core (hydrophobic) and a polymeric shell (hydrophilic) separated by a single layer of lipid. In addition to potential applications in drug delivery and PLN can also be used as novel adjuvants in the field of vaccination. Biodegradable poly (lactic-co-glycolic acid) and phosphatidylcholine are used as the polymer and lipid models, respectively. PLN has been formulated by the DESE (Double Emulsion Solvent Evaporation) method. Antigen Bovine Serum Albumin (BSA) which is aqueous solubility has been used. The three-factored factorial design with three levels was used in this study. The drug encapsulation efficiency (EE), drug loading (DL) percentage and particle size of BSA-PLN were investigated with respect to three independent variables including BSA concentration (F1), polymer concentration (F2) and lipid concentration (F3). The optimal formulation for BSA-PLN was composed of BSA concentration (F1) of 35 mg/ml, lipid concentration (F2) of 50mg and lipid concentration (F3) of 15mg. BSA-PLN under the optimized conditions shows Entrapment Efficiency - (91.95±1.4) %, Drug Loading - (66.62±1.3) %, mean diameter (199±2.5) nm, polydispersity index - 0.134 and zeta potential value - (-22.5±1.2) mV. TEM of the optimized PLN showed spherical particles.