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Tumor targeted Hyaluornan grafted liposomes – Design and process development challenges

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Hyaluronan grafted liposomes were developed to provide long circulation of the loaded drugs while also providing the receptor CD44 mediated internalization by target tumor cells. Investigations were carried out *in vitro* and *in vivo* to determine the effect of polymer molecular weight, grafting density along with presence or absence of PEGylated lipids on the liposome. Classical radiopharmacokinetics and Near Infrared Animal imaging techniques were used to track the biofate of the injected liposomes in healthy and tumor bearing mice. We observed that presence of surface hyaluronan negatively impacts the circulation and thus tumor accumulation of liposomes. When PEGylated lipids were incorporated in the hyaluronan liposomes a decrease in clearance of these liposomes was seen which correlated well with longer circulation and enhanced tumor accumulation. Enhanced tumor internalization was associated with the hyaluronan moiety of the liposomes and they had nearly two fold higher internalization compared to Pegylated liposomes devoid of Hyaluronan. Enhanced cell kill was then demonstrated by a Caspase-3 staining of the tumor slices suggesting the enhanced efficacy of hyaluronan grafted tumor targeted liposomes compared to PEGylated liposomes. This study was then analyzed for the industrial feasability was outlined with discussion on the generic reverse engineering concepts.

Biography

Hussaini completed his PhD in Pharmaceutical Sciences from Texas Tech University Health Sciences Center in 2013. He has over 10 years of research experience in Pharmaceutics. He is currently working as a senior scientist in the Formulation Department at DPT Laboratories where he is tasked with Pre formulation, formulation and process development of Generic and Branded Small Volume Parenterals, Semisolids and Aerosol Foams.

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