Variation of DOX-loaded Liposomes Size with Pressure via SPG Membrane Emulsification

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Nano-scale liposomes were successfully produced using a Shirasu porous glass (SPG) membrane emulsification technique. Primary liposomes prepared by a film-hydration method were treated using SPG membranes with different pore sizes for control over the liposome size. The liposome sizes were confirmed using dynamic light scattering method and their morphologies were observed using an optical microscopy and transmission electron microscopy. As a passage number of liposomes through SPG membrane increased, the size and its distribution of liposomes gradually decreased. A smaller pore size of SPG membrane and a higher applied pressure resulted in the liposomes with a smaller size. After preparation of nano-scale liposomes containing ammonium sulfate (AS), doxorubicin (DOX) was encapsulated in the liposomes by a remote loading method, where AS served as a precipitant for DOX. Encapsulation efficiency of DOX was maximized to be 94%, when the concentrations of AS and DOX were 250 and 0.045 mM, respectively. These nano-scale liposomes encapsulating an anti-cancer drug can potentially be employed as drug delivery vehicles for intravenous injection.