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Seamless scale up of liposomal verteporfin formulations using the NanoAssemblr™ platform

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Liposomes are attractive drug delivery systems for formulating low solubility drugs. While several liposomal drugs are presently marketed, liposome production is commonly a multi-step processes that requires significant process development to scale up production through preclinical and clinical development. In this application note, we leverage the reproducible, continuous flow nature of the NanoAssemblr microfluidic platform to reduce scale up process development. Two liposome formulations of the hydrophobic photosensitizer verteporfin were produced as model systems and scaled up in batch volume by an order of magnitude. A process for liposome formation and simultaneous drug loading was initially developed on the NanoAssemblr Benchtop, designed for rapid formulation optimization at volumes between 1mL and 15mL. Optimized formulation parameters were transferred directly to the NanoAssemblr Blaze™, designed for producing pre-clinical batches between 10mL and 1000mL. As a consequence of conserved microfluidic geometry between the two systems, formulation conditions were replicated exactly. Hence, the physical characteristics and encapsulation efficiency were found to be identical between formulations produced on the two systems. This reduces the burden of process development commonly encountered when scaling up traditional liposome production methods.

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