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# Structural Characterization of Lipid Nanoparticles Using Deuterated Ionizable Lipid SM-102

We report the synthesis of deuterated ionizable lipid SM-102 (13 steps, 96% deuteration). Empty and RNA loaded lipid nanoparticles, composed of deuterated SM-102, 1,2-distearoyl-sn-glycero-3-phosphocholine, cholesterol, and 1,2-dimyristoyl-rac-glycero-3-methoxypolyethylene glycol-2000, are synthesized using a syringe pump and a microfluidic chip. The particle size, uniformity, and internal structure of the lipid nanoparticles are characterized by dynamic light scattering, small angle x-ray scattering, and small angle neutron scattering experiments. The syringe pump and microfluidic chip yield small, monodispersed particles, due to the control of flowrate and mixing. Scattering experiments are consistent with a core-shell structure.

## Topical Area

Biology and life sciences

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