Experimental report

03/03/2021

Proposal: 9-13-868 **Council:** 4/2019

Title: SANS Characterization of microfluidics-reconstituted HDL particles asa function of apolipoprotein and lipid types

Research area: Biology

This proposal is a new proposal

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Samples: Phospholipid
Cholesterol
deuterated phospholipid
glyceryl trioleate
apolipoprotein

Instrument	Requested days	Allocated days	From	To
D11	3	3	21/02/2020	24/02/2020
D22	3	0		

Abstract:

Atherosclerosis in the primary killer disease of the West. HDL removes cholesterol from foam cells, what decreases the risk of atherosclerosis, but its structure not yet fully characterised. We aim to employ microfluidics setup to produce spherical mature HDL particles of controlled lipid and apolipoprotein ApoE compositions - and to investigate their ultrastructure with SANS using contrast variation. We aim to investigate how ApoE isoform, ApoE conformation and cholesterol content impacts the overall shape of the mature HDL particle, what can impact HDL binding to ApoE receptors. This is important, as understanding particle ultrastructure relation to receptor binding efficiency allows designing better HDL treatments and better lipid-based nanoparticles for targeted drug delivery.

Data from this experiment is currently under evaluation. This was PhD student Yubexi Correa first beamtime, and a new system was tested. In general, microfluidics failed at producing nanoparticles with ApoE and lipids. Mainly vesicles were formed. Plans are now made to produce ApoA1 instead, which is more prone to form nanoparticles.