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A combined X-ray and neutron scattering study examining triglyceride digestion

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In the body, triglyceride oils are digested into amphiphilic fatty acid and monoglyceride. These products subsequently self-assemble into a range of structures, including liquid crystal phases.^{1,2} It is hoped that understanding their digestion and self-assembly processes offers new opportunities for lipophilic drug delivery. Previous studies using small angle scattering and cryo-TEM have identified some of the phases formed during triglyceride digestion.³ Precise details of the digestion process remained an area of uncertainty which the current work aimed to resolve.

Triglyceride digestion has been examined using synchrotron small angle X-ray and neutron scattering as well as chemical methods. Synchrotron SAXS was used for the time-resolved in-situ study of phase formation and phase transitions during digestion. Neutron scattering, on the other hand, allowed the use of contrast variation to identify the specific digestion products involved in different aspects of the phase formation.

Details of the digestion process and the location of the different digestion products within the self-assembled structures will be presented. These results improve our understanding of lipid digestion and provide an excellent case study in the complimentary use of X-ray and neutron methods in the analysis of a single, complex system.

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2. Salentinig S., Sagalowicz L., Glatter O. *Langmuir*, 2010, 26, 11670-11679
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