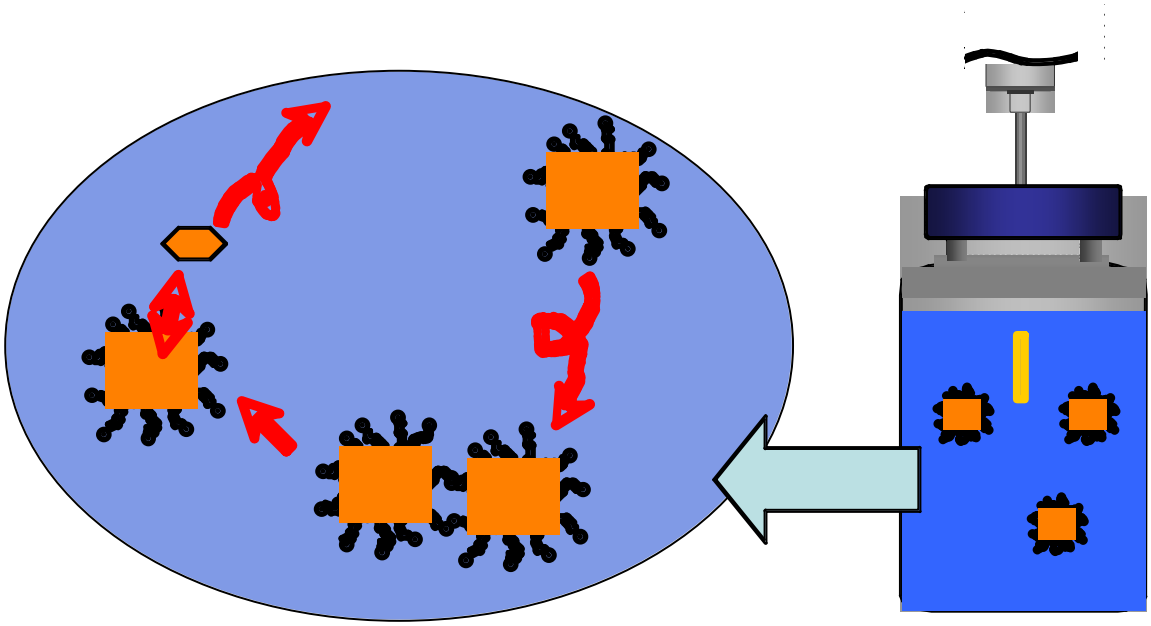
**Nanostructured Vehicles for Delivery of Micronutrients and Flavor Release in Foods**

The delivery of key components such as micronutrients, therapeutic agents or flavor compounds within foods and pharmaceuticals is often limited by their hydrophobic character and low water solubility. In such cases, the components are often incorporated within lipid droplets, whose microscopic structural features strongly influence the release kinetics. These kinetics determine key properties such as bioavailability of bioactives or the flavor release profile in foods. Dr. Stephanie Dungan and her team at University of California, Davis have been developing advanced tools to measure and analyze hydrophobic solute release kinetics from microstructured matrices (emulsions) and nanostructured matrices (microemulsions). The latter are mixtures of lipids and water which self-assemble into thermodynamically stable, tiny (~1-10 nm) structures. Solid phase microextraction (shown below) is one tool they are developing. In that technique, a narrow fiber with a thin absorptive coating is used, in combination with gas chromatography and mass spectrometry, to quantify the concentration of solute in both the vapor phase and the aqueous continuous phase outside of solute-containing micro-emulsion droplets. The experiments are designed to probe multiple scales and regions during solute transport, and to relate transport mechanisms to nanostructure morphology. By understanding these mechanisms, we can change structures in foods or drugs to maximize their nutritional or therapeutic value, or create foods with better flavor profiles.



Ariyaprakai, S. and Dungan, S.R. *Langmuir*, 2008, 24, 3061–3069.

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