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Models of early and late protocells

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The ease with which vesicles form from chemically simple amphiphiles argues for their existence on the prebiotic Earth. Prebiotic vesicles could have aided Darwinian evolution, in part, by protecting against parasitic sequences. However, to do so, these vesicles would have needed to be able to grow and divide in the absence of highly evolved machinery. Over the years, several such mechanisms have been elucidated. Further, prebiotically plausible vesicles can retain RNA and acquire building blocks for the copying of nucleic acids under laboratory conditions. What has been less investigated is the stability of these model protocells under more environmentally plausible conditions, and their potential role in early metabolic-like processes. As modern-day cell membranes are heavily exploited to maintain concentration gradients for the coupling of endergonic with exergonic reactions, the lack of investigation of the role of protocellular membranes in protometabolism limits our understanding of potential paths from abiotic to biotic chemistry. In this talk, progress from early protocellular studies with an emphasis on Darwinian evolution to more recent work covering early steps towards protometabolism will be discussed.

Session Classification : Plenary