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CHEMBIOCHEM

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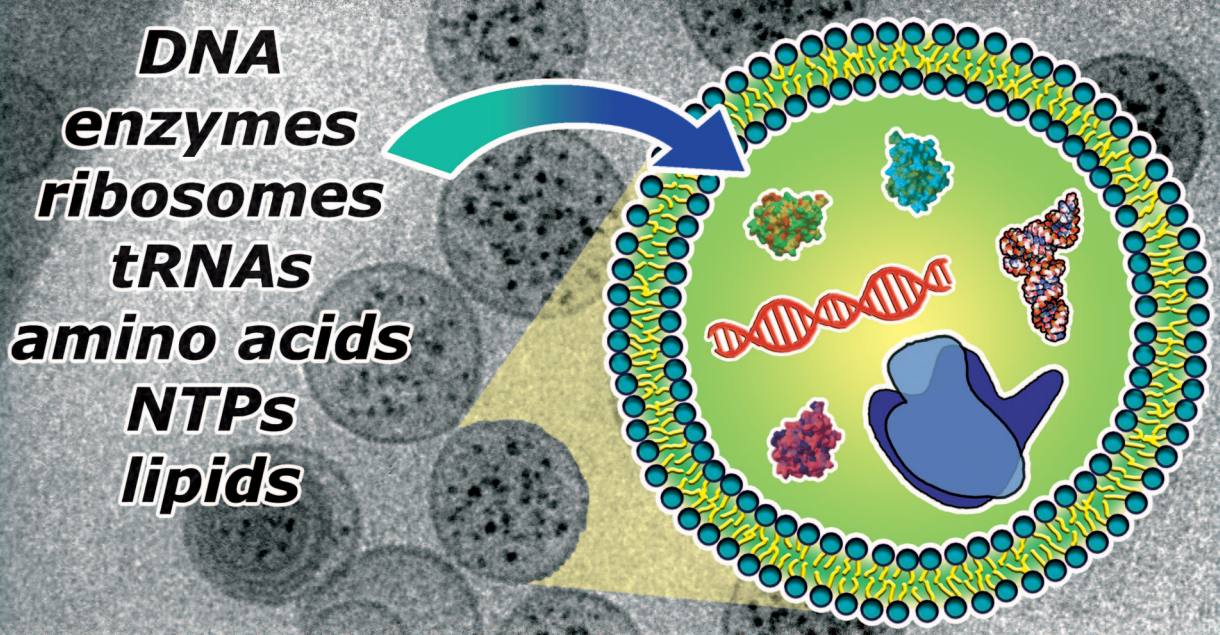
Protein synthesis inside liposomes: insights into the minimal size of cells



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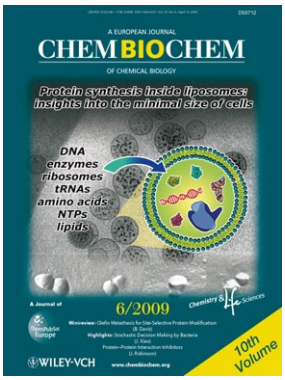
10th Volume

Cover Picture

Tereza Pereira de Souza, Pasquale Stano, and Pier Luigi Luisi*



The cover picture shows the concept of semisynthetic cell construction by co-entrapping DNA, enzymes, ribosomes, tRNAs, and small compounds (amino acids, NTPs, etc.) within a lipid vesicle. In order to be able to synthesize a protein, all components of the translation–transcription machinery must be present in the compartment, which is formed spontaneously by lipid self-assembly. Defined as cells containing the minimal and sufficient number of components to be defined as “alive”, minimal cells have recently become one of the most challenging and attractive goals of synthetic biology. The minimal size of protein-synthesizing liposomes, as determined in this study, is around 100 nm (radius). In the background, electronmicrographs of ferritin-containing vesicles (top) and self-reproducing vesicles (bottom) are shown. The self-reproduction of minimal cells is one of the challenging goals to be achieved by the semisynthetic approach. For further details, see the article by P. L. Luisi et al. on p. 1056 ff.