

リポソームで区画化した酵素代謝反応システム

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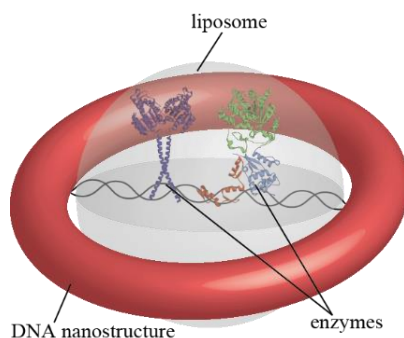
Enzymatic metabolic reactions compartmentalized in liposome with a skeletal DNA nanostructure (¹*Institute of Advanced Energy, Kyoto University*) (²*Graduate School of Energy Science, Kyoto University*)○Futa Komatsubara^{1,2}, Peng Lin¹, Eiji Nakata¹, Hiroaki Konishi^{1,2}, Takashi Morii¹

Metabolic reactions take place with high efficiency and precision in the cell, where an enormous number of molecules are densely mixed. It is believed that increasing the concentration of intermediates enhances the enzymatic reaction rate by compartmentalizing substrates and enzymes in intracellular organelles. Quantitative evaluation of such compartment is necessary for understanding its actual benefit and for the development of artificial organelles.

In this research, we have designed an enzymatic metabolic reaction system on a ring-shaped DNA nanostructure that could be compartmentalized with liposome to construct an artificial organelle. Controlling the number and location of enzymes within a defined size of liposome would allow quantitative evaluation of the metabolic reaction in the compartment.

Keywords : Enzyme metabolic reaction; DNA nanostructure; Compartment; Liposome

細胞内は様々な生体分子が高密度で共存した夾雑な環境にあるにもかかわらず、代謝反応が高精度かつ高効率で進行する。そのひとつの機構として、基質と酵素が特定の区画に分けられることによる局所的な反応中間体の濃度の上昇があげられる。本研究では、リング状 DNA ナノ構造体¹⁾に分子数を制御して配置した酵素^{2,3)}を、リポソームに内包して人工細胞小器官の作製することにより、区画化された代謝反応を定量的に評価する。



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