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リポソームで区画化された酵素代謝反応システム

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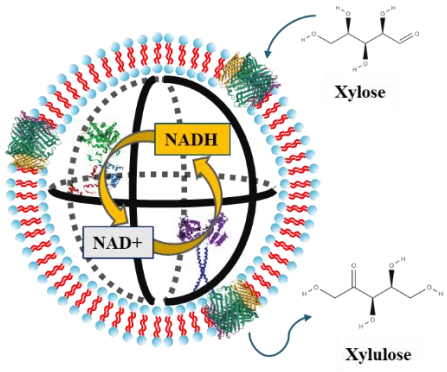
Enzymatic metabolic reactions compartmentalized in liposome with a skeletal DNA nanostructure ([1]*Institute of Advanced Energy, Kyoto University*, [2]*Graduate School of Energy Science, Kyoto University,* [3]*Faculty of Health Science, Kyoto Koka Women's University*) ○ Futa Komatsubara[1,2], Eiji Nakata[1], Shiwei Zhang[1], Peng Lin[1], Takashi Morii[1,3]

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 wire-framed 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 : Enzymatic metabolic reaction; DNA nanotechnology; 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、基質と酵素の特定区画への集積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、DNA ナノ構造体に分子数を制御して配置した酵素 [1]を、一定サイズのナノリポソーム [2)3)]に内包して区画化された代謝反応を定量的に評価する。



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