
一般社団法人日本生物物理学会 第11回 Biophysics and Physicobiology 論文賞受賞講演会
The 11th Award Seminar for outstanding Biophysics and Physicobiology paper

オーガナイザー：日本生物物理学会 Biophysics and Physicobiology 論文賞選考委員会

Organizers: Award committee for outstanding Biophysics and Physicobiology paper

日時：9月28日（水）12:50～13:30 / Sep. 28 Wed.

場所：函館市民会館（大ホール）F会場 / Hakodate Citizen Hall (Big Hall) Room F

形式：講演会 / Lecture

第11回 Biophysics and Physicobiology 論文賞受賞者

北村 朗

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北大・先端生命

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FRAP法を用いた拡散係数測定—夏休みの自由研究—

Diffusion coefficient measurement using fluorescence recovery after photobleaching—a homework during summer vacation with refreshment—

Fluorescence recovery after photobleaching (FRAP) enables the characterization of quantitative dynamic properties such as diffusion coefficients of fluorescent molecules in live cells by analyzing the recovery of fluorescence intensity after photobleaching in a specific cellular compartment or area. Here, to quantify the diffusion coefficient of rapidly diffusing fluorescent molecules such as tandemly oligomerized green fluorescent proteins (GFPs), we propose a procedure that makes use of an epi-fluorescence microscope with a photobleaching laser in combination with established models for diffusion analysis. Photobleaching times shorter than the diffusion speed are not necessarily the only way to obtain appropriate diffusion coefficients of fast-moving molecules. Our results also showed that the apparent spreading of the effective radius of the photobleached area acts as a correction factor for determining the appropriate diffusion coefficients of fast-moving molecules such as monomeric GFPs. Our procedure provides a useful approach for the quantitative measurement of diffusion coefficients in live cells. Furthermore, this research was conducted using the equipment loaned to me by a microscope manufacturer for product evaluation, and is, so to speak, published as an achievement of my summer vacation homework. Consequently, I guess that even so busy professional researchers sometimes need to perform “research with refreshment”.