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Structural observation of a single protein molecule by AFM

Motivation

Membrane proteins play important roles in biological system. However, the relationship between protein function and structure is not known. In this study, we examined the structure of a single membrane protein in liquid by atomic force microscopy (AFM). This would provide ultra-small devices with biological functions.

Originality

Protein structures have only been examined with crystals by X-ray analysis, or with an inactivated whole protein molecule by electron micrograph. We successfully observed the structure of a single active whole protein reconstituted in an artificial lipid bilayer.

Impact

This study will reveal how protein molecules function in biological systems. It will also allow us to develop techniques for realizing ultra-small devices with biological functions such as nanobio devices, including single protein sensors and implantable communication devices.

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