

Measurement of biological adhesion forces for mussel adhesive protein using modified atomic force microscope

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Inside the organism, protein molecule acts as a molecular machine and protein-protein interactions are essential for their biological functions. Therefore, investigation on minute interaction force between protein molecules is important. In this presentation, to study on measurement of adhesion force for biological protein materials, we employed and developed atomic force microscopy (AFM) technique. We employed mussel adhesive protein (MAP) as a target protein molecule. MAPs have been suggested as a basis for environmentally friendly adhesives in aqueous conditions and in medicine. First, we modified AFM cantilevers by attachment of small glass sphere of 20 μm diameter on tip. Second, we fabricated pyrex glass substrate with circular patterns by MEMS techniques. Using this newly modified AFM method, we could successfully reduce variation of determined adhesion forces for MAP molecules since contact areas can be controlled by patterns with known area.