AFM tip functionalization with glutaraldehyde

George Lykotrafitis[1]

[1]University of Connecticut

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George Lykotrafitis

ABSTRACT

Attach ligand protein to the AFM cantilever tip through functionalization. Further use it in the single molecule force spectroscopy to detect corresponding receptors on the sample surface (such as the red blood cell membrane).

MATERIALS TEXT

Silicon nitride AFM probe: MLCT from Bruker Nano Inc., Camarillo, CA.

1 Silanize the tip with 2% v/v 3-aminopropyltiethoxysilane (APTES) in acetone for 10 min at 25°C.

2 Rinse the tip with deionized (DI) water.

3 Immerse the tip in 0.5% v/v glutaraldehyde in DI water for 30 min at 25°C.

4 Rinse the tip with DI water.

5 Incubate the tip in protein solution (100-300 µg/mL, eg. 100µg/mL αvβ3 protein) for 30 min at 25°C.

6 Rinse the tip with DI water.

7 To block remaining aldehyde groups on the probe surface, treat the probe with 100 µg/mL bovine serum albumin (BSA) in tris buffered saline (TBS) for 1 min at 25°C.

8 Functionalized tips can be stored at 4°C in phosphate buffered saline (PBS) for 3 days.