MORPHOLOGY OF ADSORBED BOVINE SERUM ALBUMIN AND FIBRINOGEN OBSERVED BY ATOMIC FORCE MICROSCOPY

Yi-Ting Wang, Meng-Lun Li, Yih-Pey Yang
Department of Biomechatronic Engineering
National Ilan University
1 Shen-Lung Rd., Sec. 1, Yi-Lan 26047, Taiwan
E-mail: ypyang@niu.edu.tw

KEY WORDS: Adsorbed proteins, albumin, fibrinogen, atomic force microscopy.

The morphology of the plasma proteins adsorbed on solid substrates was modeled as competitive adsorption from a mixture of albumin and fibrinogen has been investigated by atomic force microscopy. Plasma proteins, such as albumin and fibrinogen, are key proteins in blood clotting. Fibrinogen is an adhesive protein with a rod-like structure that has a vital role in blood coagulation. Albumin is commonly applied for blocking the adsorption of other proteins and to prevent the nonspecific adhesion of cells to diverse artificial substrata. In this study, we utilized different substrates such as PMMA, PS, and mica as the supporting surface that the microstructure and the thickness of protein molecules adsorbed onto this surface were characterized. We also exploited the morphology and quantity of the adsorbed protein varied by the concentrations and the adsorption time of protein solutions.

Figure 1: AFM image acquired in air for protein adsorbed on PS from a 10 μg/ml solution of mixed albumin/fibrinogen for 10 sec at room temperature.

The fibrinogen molecules adsorbed onto PS form a network-like fibril structure of randomly distributed assemblies as Fig. 1 demonstrate. These results indicate that a preferential adsorption of fibrinogen occurs compared to that of albumin onto the hydrophobic surface. These results are in good agreement with that of in the literatures [1-3].

* Supported by the Ministry of Science and Technology of Taiwan under contract MOST 103-2120-S-197-001.