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Interaction of BSA proteins with 45S5 bioactive glass surface

ZACHARY PIGOTT, JOE HARMS, ROMAN GOLOVCHAK, Austin Peay State Univ, HIMANSHU JAIN, Lehigh Univ — Recent advances in bioscaffold engineering reveal a significant role of intermediate proteins layer adsorbed at the surface of bioscaffoldsintroduced into the body fluid. The adsorbed protein layer modifies host responses, such as platelet activation, coagulation and immune responses as well asother interactions between cells and biomaterial. In the present studies we report the first results on the X-ray photoelectron spectroscopy (XPS) and Raman spectroscopy studies of bovine serum albumin (BSA) attachment to the surface of 45S5 bioglass prepared by different fabrication steps. It is shown by XPS that the amount of BSA attached to the surface depends strongly on Ca and P concentration. Thus Ca^+ and PO^- could be identified as main protein binding sites on 45S5 bioglass surface. Conformations of BSA proteins adsorbed on the surface of 45S5 bioglass were studied by Raman microscopy. The Raman shift ofBSA protein layer attached to the surfaces of 45S5 bioglass is found to be different for the glasses ofdifferent structures(e.g. type and degree of phase separation) and from the Raman shift of BSA-attached bioinert surfaces. The observed difference is considered as a signature of different conformation of protein molecules related to the bioactivity of a particular surface.

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