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Expanding Cancer Detection Using Molecular Imprinting for a Novel Point-of-Care Diagnostic Device YINGJIE YU, MIRIAM RAFAILOVICH, YANTIAN WANG, YEONA KANG, LINGXI ZHANG, BASIL RIGAS, Department of Materials Science and Engineering, State University of New York at Stony Brook, DIVISION OF GASTROENTEROLOGY, SCHOOL OF MEDICINE TEAM — We propose the use of a potentiometric biosensor that incorporates the efficient and specific molecular imprinting (MI) method with a self-assembled monolayer (SAM). We first tested the biosensor using carcinoembryonic antigen, CEA, a biomarker associated with pancreatic cancer. No change in detection efficiency was observed, indicating that the sensor is able to discriminate for the template analyte even in concentrated solution of similar substances. In addition, we use biosensor to discriminate normal fibrinogen and damaged fibrinogen, which is critical for the detection of bleeding disorder. Computer simulations of the protein structure were performed in order to estimate the changes in morphology and determine the sensitivity of the biosensor to conformational changes in the proteins. We found that even small changes in PH can generate rotation of the surface functional groups. Yet, the results show that only when the detection and imprinting conditions are similar, robust signals occurs. Hence we concluded that both morphology and surface chemistry play a role in the recognition.

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