Abstract Submitted
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Detection of specific proteins using SnO_2 nanobelt field-effect transistors[1] KAN-SHENG CHEN, YI CHENG, N. MEYER, J. YUAN, Florida State University, L. HIRST, University of California Merced, P.B. CHASE, P. XIONG, Florida State University — Label-free, electrical detection of proteins, including cardiac troponin I (cTnI) which is a clinically important indicator of myocardial injury, has been demonstrated using SnO_2 nanobelt field-effect transistors integrated within microfluidic channels. FETs with single biotinylated SnO_2 nanobelts show pronounced electrical conductance changes in response to streptavidin binding. The pH-dependence of the conductance changes is consistent with the predicted protonation of streptavidin and the specificity of the sensors' electrical responses are further confirmed via subsequent fluorescence imaging from streptavidin-coated quantum dots on the same devices. Finally, devices functionalized with biotinylated anti-cTnI antibodies exhibit high sensitivity to the specific antigen, while showing no measurable responses to control proteins such as BSA and cardiac tropomyosin. This study demonstrates the potential of the nanobelt FETs as portable sensors for rapid, on-site detection of biomedically significant markers.

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