

High performance hybrid biosensor for simultaneous detection of glucose, cholesterol and urea based on ZnO nanorods field effect transistor arrays

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An integrated biological hybrid sensor based on the solution-gated field-effect transistors (FETs) was designed by growing three active zinc oxide nanorods arrays between the source-drain selectively on pre-patterned substrates, followed by the immobilization of glucose oxidase, cholesterol oxidase and urease enzymes on each array. The proposed hybrid biosensor has been used for the simultaneous and highly selective detection of glucose, cholesterol and urea without any interference in each sensor response. The hybrid sensor demonstrated wide-linear range, high sensitivity, favorable reproducibility and long-term performance stability. Compared to the analytically measured data, the performance of the FETs-based hybrid sensor was found to be highly reliable for rapid detection of multi-analyte not only in normal mice blood and serum samples, but also in blood samples collected from diabetic dogs. This simple convenient hybrid/integrated FETs biosensor was envisioned to set a potential platform for various disease management.