An anthrax toxin biosensor fabricated by integrating pore-forming proteins into electroanalytical interfaces

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The integration of complex biological molecules such as proteins with metal and semiconductor interfaces is limited by several inherent incompatibilities. To develop sensors based upon protein-protein interactions at such surfaces, three significant obstacles must be overcome: 1) the sensing protein must retain its native, or native-like structure, 2) the protein must be in electrical (or optical) contact with the metal surface and 3) the reporter protein much be at a sufficiently high concentration to produce a measurable, unambiguous signal. In this presentation, I will discuss the fabrication of polymer-tethered bilayer membranes, which provides a biomimetic interface capable of addressing each of the three obstacles. With inspiration taken from single molecule nanopore sensors, I will discuss the fabrication and characterization of an anthrax biosensor, and discussstrategies to optimize these sensors.