Biosensors Detecting Disease

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Current gold-standard detection technologies heavily rely on skilled professionals to take and analyze blood samples from patients. Results from these tests (and conformational testing) can take up to two weeks from initial request of the original doctor. Point of care testing focuses on making this process rapid, and not require the use of skilled professionals. Electrochemical DNA (E-DNA) has emerged as a point-of-care technique to detect various pathogenic antibodies on a one-hour time scale. This technique has been used for detecting HIV Antibodies in patient serum. Currently, my research focuses on detecting Lyme disease antibodies in serum. Lyme disease is a bacterial infection from ticks causing symptoms close to that of arthritis and flu-like symptoms. Antibodies created against this disease are often at the pico to nano molar concentration range, and can mimic other disease antibodies. E-DNA scaffold probes are very specific, with minimal binding to other antibodies that can cause false-negatives or false-positivies. Furthermore, because E-DNA scaffold probes can be used in complex samples, we can create testing that has minimal prep work, and is reagentless.