

Personalized medicine and predictive health and wellness: Adding the chemical component

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Abstract

Wearable sensors that detect and quantify biomarkers in retrievable biofluids (e.g., interstitial fluid, sweat, tears) provide information on human dynamic physiological and psychological states. This information has the power to transform health and wellness by providing actionable feedback. Due to outdated and insufficiently sensitive technologies, current on-body sensing systems have capabilities limited to pH, and a few high-concentration electrolytes, metabolites, and nutrients. As such, wearable sensing systems cannot detect key low-concentration biomarkers indicative of stress, inflammation, metabolic, and reproductive status.

We are revolutionizing sensing. Our electronic biosensors can detect virtually any signaling molecule or metabolite at ultra-low levels. We have monitored serotonin, dopamine, cortisol, phenylalanine, estradiol, and glucose in blood, sweat, interstitial fluid, and tears. The sensors are based on modern nanoscale semiconductor transistors that are straightforwardly scalable for manufacturing. We are developing sensors for >40 biomarkers for personalized continuous monitoring (e.g., smartwatch) that will provide feedback for treating chronic health conditions, e.g., mental health and stress disorders, phenylketonuria. Moreover, our sensors will enable the adoption of more healthy lifestyles to prevent disease and improve physical and cognitive performance.

Speaker's profile

Prof. Anne M. Andrews is a UCLA professor of chemistry & biochemistry and psychiatry & biobehavioral sciences. She leads efforts in basic and translational research on anxiety and depression, and at the nexus of nanoscience, neurotechnology, and neuroscience. Her interdisciplinary research team focuses on understanding how the serotonin system and particularly, the serotonin transporter, modulate neurotransmission to influence complex behaviors including anxiety, mood, stress responsiveness, and learning and memory.