

Wearable sweat biosensors

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Wearable sensor technologies play a significant role in realizing personalized medicine through continuously monitoring an individual's health state. Current commercially available wearable sensors can only track physical activities and fail to provide insight into the user's health state at molecular levels. Human sweat is an excellent candidate for non-invasive monitoring as it contains physiologically rich information. Given the complexity of sweat secretion, simultaneous and multiplexed screening of target biomarkers is critical and full system integration to ensure the accuracy of measurements is a necessity. Here, a mechanically flexible and fully-integrated perspiration analysis system is presented that simultaneously and selectively measures sweat metabolites (e.g. glucose and lactate) and electrolytes (e.g. Na^+ and K^+), electrochemically, as well as the skin temperature to calibrate the sensors' response. This wearable system is used to measure the detailed sweat profile of human subjects engaged in prolonged indoor and outdoor physical activities, and infer real-time assessment of the physiological state of the subjects. The scope of platform has also been greatly expanded to monitor a wide panel of analytes including other major electrolytes and heavy metals. The platform enables a wide range of personalized diagnostic and physiological monitoring applications.

Biography:

Wei Gao received his PhD in Chemical Engineering at University of California, San Diego in 2014 as a Jacobs Fellow and HHMI International Research Fellow. He is currently a postdoctoral fellow from professor Ali Javey's lab in the Department of Electrical Engineering and Computer Sciences at the University of California, Berkeley. He has authored 60 journal publications with over 3000 citations. He is the recipient of 2016 MIT Technology Review 35 Innovators Under 35 (TR35) and 2015 ACS Young Investigator Award (Division of Inorganic Chemistry). His research interests include wearable and flexible electronics, internet of things, biosensors, nanorobotics and nanomedicine.