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Sweat sample processing, method development, and bioinformatic analysis for biomarkers of physical fatigue

Sweat biomarker discovery is widely recognized as an invaluable goal for biomarker science. Sweat collection is non-invasive and may provide a means for assessing readiness, fatigue, health and fitness, immune status, and a host of other physiological states, though significant research investment is required before application as a diagnostic tool. The novelty of sweat analysis has necessitated our development and optimization of methods for sweat collection, sample handling and preparation, chromatography, global proteomics/metabolomics, and targeted analyses of small molecules in sweat using immunoassay and mass-spectrometric techniques. Preliminary results indicate that the amino acid content, specifically histidine, may be indicative of physical fatigue induced via aerobic exercise while the combination of top-down and classic bottom-up proteomics approaches allowed identification of more than 80 different proteins in sweat. Increasing access to samples collected from study participants across a wide range of research projects will enable future research aimed at identification and validation of novel biomarkers found in sweat with the end-goal of generating wearable sensing technologies for optimization and protection of human performance.

Biography

Jennifer A Martin completed her PhD in 2010 at the University of Florida. She now leads a team of scientists using mass spectrometry to address US Air Force concerns related to biomarker discovery and air quality in the context of human performance. The long-term goal of this work is to collaborate with experts in various scientific fields to develop real-time non-invasive sensors which indicate mission readiness in relevant military theaters. She has approximately 20 peer-reviewed publications in reputed journals, and is a co-author of over 30 presentations at conferences with international audience.

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