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Jennifer A Martin

Air Force Research Laboratories, USA

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.

jennifer.martin.39@us.af.mil

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