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Thank you for subscribing to this newsletter from the Personalized Lifestyle Medicine Institute. Enjoy and share this information, which is for educational purposes only and is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Always consult with a qualified healthcare professional when you are in need of advice regarding a medical condition.

In this issue: Device Validation Might Just Enhance Personal Validation; Personalized Medicine and Tobacco; SNiPpets: Fatty Acids; Early-Bird Registration for the 2019 Thought Leaders Consortium Ends June 30th

Device Validation Might Just Enhance Personal Validation

Smart wellness devices can open up a new world in self-education and long-term health, and encourage us to examine whether or not the way we approach life matches up with the quality of life we wish to experience. Yet relatively few of these tools have been tested for functionality and the accuracy of their measurements and data interpretation.

This 2018 review, published in the medical journal Frontiers in Physiology, examined smart watches, bands, patches, garments, headsets, and other wearables, as well as several non-wearable devices and mobile applications. Out of a total of over 80 devices reviewed, fewer than 20 had been validated in terms of actually doing what they purported to do, achieving this with a reasonable degree of accuracy, and doing so reliably over time. Among those validated to this stringent level of precision included:

- the BSX Insight sleeve for detecting muscle oxygenation and lactate levels
- the Portamon wearable for evaluating blood oxygenation and flow
- the Hexoskin garment for monitoring heart, respiratory, and metabolic performance
- the King-Devick mobile application for testing cognitive function
- the Brite23 wearable for measuring brain oxygenation

Other recent research evaluated four popular wearables’ accuracy and reliability in physical activity measurement, and found that objective values (like number of steps taken) were more consistently accurate than interpretations of more subjective values, such as the amounts of time spent at a moderate versus high level of physical activity. Another recent study evaluated a popular wearable for improving the quality of sleep, compared it against previous work on other sleep devices, and discovered all of them to be more accurate with certain measurements (such as detecting and quantifying sleep time) than others, such as distinguishing among different stages of sleep.
There is little doubt that these devices open up unprecedented insight into how lifestyle variables impact health at the individual level, and shed valuable light on opportunities for beneficial change. Many devices’ designs are based on good science, and while lack of validation does not indicate poor functionality or reliability, positive validation can provide certainty. Several well-known items bearing multiple sensors and making many measurements have received some evaluation, though they may not have achieved a high degree of accuracy and reliability for every single measurement. Such devices may nevertheless prove indispensable for creating personal baselines, noting patterns, and increasing awareness of how behaviors impact the way we look, feel, and function, as long as we understand potential limitations from the outset. And maybe, just maybe, those very limitations can even exercise our essential capacity for knowing what is right for ourselves.

**Personalized Medicine and Tobacco**

Tobacco users may feel that it helps them keep their weight down (though it interferes with long-term metabolic control) or say that it’s a way of maintaining a mental edge (despite negative associations with cognitive function among both young and old), but what begins as a temporary means of coping with stress or enabling social connections easily becomes a potentially fatal habit. The American Lung Association recently estimated that while cigarette smokers pay an average of $5.50 per pack, costs to society amount to over $18 per pack in health care, loss of life, and lost productivity. Annual US costs related to tobacco and smoking total over $300 billion, and now include nearly half a million deaths.

Smoking and tobacco use are well known for contributing substantially to risks for reproductive, cardiovascular, respiratory, inflammatory, neurological, and immune-related disease. It is interesting to note that tobacco alters bacterial balance in the oral cavity, reduces microbial diversity in the gut, and also affects the lung microbiota. Even the “bacteriomes” of tobacco products themselves are under investigation. While use of electronic cigarettes may help some smokers quit and reduce exposure to certain toxins related to the burning of tobacco, this route of ingestion introduces other potentially hazardous compounds. One 2018 study of e-cigarette users found higher urinary levels of organophosphate flame retardant metabolites in them compared to non-users or smokers—but keep in mind that around 20 percent of smokers also vape.

Personalized medicine has the potential to identify susceptibility not only to the use of nicotine and other addictive substances but also for the physical, mental, and emotional inclinations for which they are employed. Individually-targeted therapies and feedback methods can address these needs to enhance both short- and long-term health and function, and might even allow families to reflect upon multi-generational proclivities to addiction. Genome-wide association surveys are drawing links among the addictive potential of nicotine, risk for nicotine-related diseases, and gene networks and polymorphisms. Multiple areas in a gene coding for a particular neurotransmitter receptor have recently been associated with significant risk for nicotine dependence as well as for lung cancer. Testing to determine whether one is a 'slow' or 'normal' metabolizer of nicotine may help predict responsivity to smoking cessation aids and improve treatment outcomes. Tools such as these may add a meaningful dimension to prevention of addictive disorders as well as clarify which avenues of treatment will best facilitate cessation. **In this FMU interview**, oncologist Edgar Staren, MD, PhD, MBA and PLMI President Dr. Jeffrey Bland discuss individualized approaches to cancer treatment and how prevention alters social as well as monetary economics.
SNiPPets

How significant to health are particular single nucleotide polymorphisms, also known as SNPs? SNiPPets is a ongoing exploration of this topic.

These SNPs Alter Fatty Acid Effects on Interleukin-6 Levels

The Framingham Heart Study has revealed much about how lifestyle affects cardiovascular health, and it branched into further study of participants’ eligible children and spouses in the Framingham Offspring Study. Fatty acids are known to modulate eicosanoid metabolism and cardiovascular risk, but gene-diet interactions haven’t yet been extensively studied. A recent genome-wide association study (GWAS) of Offspring Study participants investigated the combined effects of single-nucleotide polymorphism (SNP) and variations in the percentage of red blood cell (RBC) membrane fatty acids on blood levels of pro-inflammatory biomarkers. RBC membrane fatty acid contents are thought to reflect dietary intakes of fatty acids a few weeks prior to blood sampling.

- In individuals having a minor C allele at the rs16838623 locus of the \textit{CHRM3} gene, levels of the pro-inflammatory biomarker interleukin-6 (IL-6) were higher than those in persons with the major A allele at lower RBC percentages of alpha-linolenic acid (ALA, an essential fatty acid), but at higher RBC percentages of ALA, IL-6 levels decreased in persons with the C allele SNP while those in individuals with the major A allele showed slight increases.
- In individuals with a minor T allele at the rs12623456 locus near the \textit{RPL7P61} pseudogene, IL-6 levels were higher than those in persons with the major C allele at lower RBC percentages of docosahexaenoic acid (DHA). However, at higher RBC percentages of DHA, persons with a minor T allele showed significantly increased IL-6 levels, while IL-6 levels in individuals with the major C allele showed very little change. (A pseudogene is a gene that has lost some or all functionality; apparently this nearby region still exerts influence!)

Persons with these SNPs may wish to be evaluated by a Functional Medicine practitioner for risk for inflammation and/or receive dietary strategies for optimizing eicosanoid metabolism and immune balance.

Early-Bird Registration Ends June 30th. Reserve Your Seat Today!

Registering for the 2019 Thought Leaders Consortium is something we suggest you cross off your to-do list right away. It only takes a few minutes and by acting now you will get early-bird pricing, a confirmed seat at the conference, and access to our venue.
reservations link (please note: we expect our room block at the Hyatt Regency Lake Washington to sell out early this year). Use the links below to review conference details:

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