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**In this issue:** The 2019 Thought Leaders Consortium: You are Invited + Get to Know Our Speakers; DNA Upkeep is a Fork in the Road to Wellness or Illness; Know Thyself—Including Thy Chronotype

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**You are Invited to the 2019 Thought Leaders Consortium!**

**INNOVATION and IMPLEMENTATION.** We’re bringing together global thought leaders to discuss evidence-based science, new assessment tools, and clinical approaches to personalized therapeutic nutrition. Join us at the Hyatt Regency Lake Washington in Seattle this October! [Early Bird Registration](#) is now open.

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**Meet Some of Our 2019 Speakers**

More than 20 presenters will take the podium at this year’s Thought Leaders Consortium. The conference, which will be hosted facilitated by PLMI President Jeffrey Bland, PhD, has been carefully organized into four sessions meant to guide attendees on an intellectual and clinical journey that will begin with innovative concepts and conclude with practical applications. Our faculty hail from some of the world’s top academic institutions, leading edge companies, and future forward clinics.
DNA Upkeep is a Fork in the Road to Wellness or Illness

What do diabetes, cancer, atherosclerosis, and obesity have in common? Though each has a particular type of pathology and develops in a unique way in each person affected, they share the following manifestations:

1. Heightened DNA damage
2. Impaired DNA repair
3. Shorter telomeres capping and protecting chromosomes
4. Chronic inflammation

A recent study discovered that obese women had about double the DNA damage of non-obese women. Body mass index (BMI) is one’s weight in kilograms divided by the squared value of one’s height in meters, and this simple calculation identifies whether one’s weight is normal, high, or low. The study found that high BMI was directly related to greater genomic injury, and also showed that higher caloric intake and lower vitamin C intake were key predictors of DNA damage.

The more we learn about communications within and between cells, the more we understand that they truly represent four-dimensional networks whose daily interactions help create health in a completely individualized manner. DNA repair enzymes and telomeres are critical systems for maintaining genomic integrity, and this study points out that in many common health conditions, DNA damage and repair represent forks in the road leading to wellness or illness. Lifestyle choices aren’t only about what we are exposed to and which foods we eat—they also determine how well we take care of our “book of life.”

Know Thyself—Including Thy Chronotype

Biorhythms used to be thought of as a curiosity to compare among friends, with little utility beyond identifying social outliers. But genomic medicine is discovering that chronotype (the diurnal timing of an organism’s biological responses, peak performance, and preference) may be as crucial as gender, eating patterns, socioeconomic background, race, and education in terms of health effects. The emergence of this avenue of science during the Age of Personalization may also cause one to wonder about the
degree to which it, like other partially genetically-defined characteristics, may be influenced by lifestyle interventions. Thus far, chronotype has been divided into three basic types: morning type (MT, comprising about one-fourth of the population), evening type (ET, found in around one-sixth of people), and neither type (NT, found in about 60% of people).

Chronotype is characterized by the time of day at which an individual experiences peaks or troughs in body temperature, cortisol level, feelings of alertness or desire for sleep, and one’s innate preferences for engaging in social, cognitive, and physical activities. Morning types (MTs), as may be expected, prefer to rise and go to bed earlier than other types, tend towards a **shorter intrinsic circadian clock**, tend to prefer a more regular, “clockwork” lifestyle, and experience peak body temperature about 2-3 hours earlier in the day than ETs and NTs. In relation to sleep, MTs tend to show higher cortisol levels upon waking and faster decay of the non-REM (rapid eye movement) slow-wave brain activity of deep sleep that is **crucial for memory consolidation** and usually decreases with aging. ETs generally prefer to get up and stay up later and show shallower peaks and troughs in cortisol level, with greater secretion of cortisol on leisure days. Despite having a longer intrinsic circadian clock, ETs have a shorter interval between minimum body temperature and waking time and show greater overall fluctuation in body temperature, resulting in more flexibility as well as irregularity in daily schedules. ETs are more likely to lose sleep during the work week and to accumulate sleep debt (associated with metabolic disorders and depression), yet are more adaptable to shift work than MTs, who are more likely to experience metabolic and cognitive effects from it.

Chronotype is generally studied in relation to health and function of adults or adolescents (rather than in children), though it has been observed that “morningness” tends to switch towards “eveningness” during puberty and adolescence (with earlier onset of eveningness in girls mirroring their earlier puberty), but that morningness then increases with aging, especially after the age of 50. Morningness has been associated with **lower risk for depression** and insomnia, lower BMI (body mass index), and greater risk for Parkinson’s disease, while evening chronotype is linked with **higher educational attainment** but may possibly also relate to risk for schizophrenia. MTs and ETs show different cognitive strategies and different periods of peak cognitive function, with MTs displaying more of a right-brain, rational thinking pattern and performing better on tests during morning hours (with greater loss of cognitive efficiency after lunch) and ETs showing greater right-brain intuitive approach, cognitive advantage in the evening, and tending towards higher intelligence scores.

Because chronotype predisposes MT and ET individuals to varying performance and feeling at different times of day, coordinating work and social times with innate circadian rhythms may aid mental and physical health, treatment outcomes, and successful aging. Many genes affect circadian rhythm, and chronotype is estimated to be about 50% inheritable. **Variants in clock-related genes** have been linked to bipolar disorder (and response to lithium), depression, alcohol addiction, sleep disorders, schizophrenia, seasonal affective disorder, and altered dopamine metabolism. Drugs like alcohol and cocaine can alter circadian rhythms, and ETs are prone to greater consumption of these and other addictive substances.

Chronobiology research is providing insight into how diurnal rhythms interface with critical health factors such as stress response patterns, cognition, appetite, mood, sleep, hormone and neurotransmitter production, and stages of life. There is little doubt that future health systems will employ this personalized knowledge to optimize individual health assessment and treatment.