EDITORIAL

The Time for Circadian Medicine

The first issue of JBR in 1986 included reports on studies on the sea slug *Bulla*, the cockroach, the ground squirrel, and three papers on hamsters. By the second issue, several papers reporting studies of human rhythms were included, one looking at meal timing in people housed under temporal isolation, and one studying masking; these two topics continue to be of broad contemporary interest. Over the subsequent JBR issues, the shape of our field becomes apparent. We are a highly interdisciplinary field! We are interested in a wide range of organisms, our techniques vary widely, we are eager to incorporate quantitative analysis and modeling, and we show energy and enthusiasm for applying our knowledge to diverse biological challenges such as changes in seasons, latitude, developmental stage, and reproductive state. Shaped by the thinking of a key founder, Colin Pittendrigh (and his training by Theodosius Dobzhansky), we are often found trying to understand biological rhythms in the light of evolution.

We will likely later point to 2017 as a time when our field made a subtle shift. In 2017, three chronobiologists, Jeff Hall, Michael Rosbash, and Michael Young, were awarded the Nobel Prize in Physiology or Medicine for their discoveries of molecular underpinnings of circadian rhythms. This very public recognition of the excellent work of our colleagues helped attract to our field new colleagues, and helped all of us consider more carefully how the fundamental knowledge we had gained might be applied to improving health.

As we now know, the circadian clock mechanisms are encoded in our DNA, and are fundamentally important to us as organisms living on a planet with a 24-hour day and night cycle. They help us to adapt to cycles of light and dark with well-timed personal cycles of activity and rest. The clocks also regulate daily rhythms important for healthy physiology. Indeed, we have known for some time that there is daily variation in virtually all our major physiologic systems - heart rate, blood pressure, hormones, and the sympathetic and parasympathetic biases of our autonomic nervous system. And now that the basic physiology is understood, leaders in our field are moving to apply circadian biology to clinical medicine, leading to longer and healthier lives.

Importantly, the latest research is revealing a profound role for rhythms in health and disease. These studies have the potential to revolutionize how we treat major clinical conditions including cardiovascular diseases, cancer, infectious diseases, sleep disorders, mental health conditions, and many others. These are leading causes of morbidity and mortality worldwide. In addition, studies also reveal an important interplay between the circadian mechanism and lifestyle choices, leading the way in precision medicine to optimize efficacy or therapeutic benefits for our health (e.g., biomarkers, chronotherapy, circadian lighting), diet and circadian rhythms (e.g., intermittent fasting, metabolism), exercise and circadian rhythms (e.g., when is the best time of day to exercise), the complex nature of sleep and circadian rhythms, and new light is being shed on the role of time of day in pregnancy and birth. Notably, Circadian Medicine applies not just to the health of humans, but to all animals including our companion animals in the veterinary setting, large animals in agricultural settings, and aquaculture environments as well. We have the exciting opportunity as well as the responsibility to improve the lives of people, communities, and the world around us.

In this issue we introduce a new series of review articles, “The Circadian Medicine Review Series”. Our first review sets the bar high! Drs. Derk-Jan Dijk and Jeanne Duffy have collaborated to offer an update on our progress toward what may be the next big prize – a method to determine circadian
characteristics from a single, commonly collected clinical sample. Such a method will be essential to allow us to both research and apply our findings to clinical populations.

As we continue with this series, we will consider a multitude of ways our fundamental understanding of the science of biological rhythms can be applied. We welcome the efforts of our colleagues involved in knowledge translation, and biomedicine, and in these accessible review articles, to translate their knowledge and expertise for our diverse and interdisciplinary field.

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