Celebration of a Lifetime's Achievements in Nutrition by Franz Halberg

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By adding TIME to the existing body of knowledge in all of biology and medicine, and by recognizing the crucial role this new element was to play in all matters of life, Franz Halberg developed the new science of chronobiology. By insisting on an inferential statistical foundation, a microscopy in time was born. Meal timing as a synchronizer of circadian rhythms played an important role in the development of Chronobiology. Franz later added a telescopy in time by his methodical scrutiny of non-photic as well as photic environmental influences on biota, from which chronomics flourished.

Born on July 5, 1919 in Romania, Franz Halberg studied the adrenal as a university assistant in post-World War II Innsbruck, Austria. He did so at Harvard Medical School, where he held a World Health Organization fellowship in clinical endocrinology in 1948. In 1949, he moved to the University of Minnesota, which saw his breakthrough experiments that led to the important discovery that circadian rhythms are partly endogenous and can be manipulated by environmental synchronizers. His results were published in 1969 [1] in a citation classic. By 1958, Franz had recognized the important role played by the cell's RNA and DNA cycles, which he was first to demonstrate as complementing the hypothalamic-pituitary-adrenal system as mediator of photic inputs.

His work earned him numerous awards. Apart from holding professorships in Laboratory Medicine and Pathology, Physiology, Biology, Bioengineering and Oral Medicine at the University of Minnesota, he received honorary doctorates from the University of Montpellier (France), Ferrara (Italy), Tyumen (Siberia), Brno (Czech Republic), L'Aquila (Italy), and most recently People's Friendship University of Russia (Moscow, Russia). At 92.5 years of age and still active 7 days a week in the Center named after him at the University of Minnesota, he is one of the last two recipients of a lifetime career award from the National Institutes of Health. His achievements in the new field of chronomics also earned him the O.Yu. Schmidt Medal and diploma for outstanding merits in development of geophysics, the first such award given to a non-physicist.

Singled out from accomplishments summarized in over 3,300 published titles in cooperation with colleagues from all five continents are the following highlights. First, rhythms are not trivial as they can tip the scale between health and disease and even between life and death. Second, after suggesting the hypothalamus mediated light information, Franz fought from the start the idea that the suprachiasmatic nuclei were "the" master clock. After a debate that lasted more than a decade, Franz's view has been vindicated now that modern molecular biological techniques have shown the presence of oscillators in practically every cell, in the brain as well as in the periphery. Third, as the crowning of a distinguished career, Franz's early vision that rhythms were not trivial but rather constituted the founding block of life itself is being unveiled by findings that alterations in clock genes are not only responsible for alterations in circadian rhythms but are fundamentally involved in a host of diseased conditions from addiction and cancer to cardiovascular disease. Last but not least, his mapping of a much broader time structure includes cycles with frequencies covering 10 orders of magnitude, aligned between biology and physics by means of an armamentarium of analytical procedures, including a remove-and-replace approach extended from endocrinology to a true transdisciplinary endeavor. Franz's most recent work addresses wide-ranging applications from the optimization of individualized health care to concerns for the health of societies. Toward this goal, the automatic monitoring of vital signs, as a start of blood pressure and heart rate, serves the multiple purposes of enlarging the scope of Humboldt's purely physical monitoring into an endeavor advancing both the biomedical field and physics in a truly unified science and leading to a noosphere that is organized by a novel spectrum of congruent cycles in us and around us, photic cycles and non-photic (unseen) ones, some of the latter already mapped transdisciplinarily.

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