



Solar wind's ~ 15 -month cycle's signature in the human blood circulation: partly built-in, partly driven?

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The resonance of an about-weekly component in human heart rate (HR) studied in 5 subjects is documented by a statistically significant increase in amplitude when the solar activity is also characterized by an ~ 7 -day component, and vice versa. This finding is extended to a wobbly transyear with a period statistically significantly longer than a year, not only in HR and blood pressure (BP), but also in sets of other individual- and population-based physiologic and other archival data. A 72-year-old man (FH) measured his BP and HR at ~ 30 -min intervals, with gaps, for 16 years. Gliding spectral windows with trial periods (τ s) between 2.0 and 0.4 y computed for 8y overlapping data intervals displaced in 1-month increments show no seasonal oscillations, as in other elderly individuals. Far-transyears (FTY, with τ s such as $1.2 \text{ y} > [\tau - \text{CI}] < [\tau + \text{CI}] < 1.9 \text{ y}$, where CI is the 95% confidence interval) – characterize FH's data. A spectral band is found for systolic (S) BP congruent with one in the speed of ionized particles, the solar wind (SW). An abrupt disappearance of a FTY in SW speed is followed (with a FTY lag due to one more resonating cycle?) by the disappearance of part of this band in SBP that was probably driven by SW. The persistence of part of the FTY band in FH's SBP, in keeping with other evidence of a BP FTY free-running from that of the SW, demonstrates an evolutionary acquisition of a solar FTY oscillation that may reflect some of the sun's dynamics for billions of years past. The finding of FTY patterns, along with a cycle of ~ 5 months, i.e., a cis-half-year in sudden cardiac death, in 3 geographic locations (but not in all of those studied), shows the importance of the

earth in modulating solar effects. Chance and *post hoc ergo propter hoc* reasoning cannot be ruled out, but the circadian story is extended to infradians beyond the fact that both components can account for the difference between life and death: an elderly man's BP and HR resonate with the SW's FTY ~ 15 month-cycle. A near-transyear (NTY, $1.00 \text{ y} < [\tau - \text{CI}] < [\tau + \text{CI}] < 1.2 \text{ y}$), found first in biology, is also found in the SW speed, showing the merits of the transdisciplinary approach of chronomics, a discipline aligning chronomes (time structures) in and around us and looking for congruences of periods, amplitudes and phases in a broad set of spectra, one element of chronomes that also include trends and chaos, all three challenges for a biomedicine concerned about the health of nations as well as individuals (chronobioethics). It also serves physics, e.g., by the demonstration of a NTY in solar magnetism, measured by terrestrial telescopes, in the SW's speed, the sigma of the SW speed and its proton content, the geomagnetic index aa, as well as in unicells and human physiology, psychology, pathology and epidemiology. A remove-and-replace approach will have to be applied whenever possible to already mapped transyears found in 1-min estimations collected around-the-clock for over 3 decades, in the incidence of suicides recorded by the date of birth and death, in the incidence of strokes, and in human natality patterns in the Philippines (but not in some other geographic locations).