clocks & sleep

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lights on, and the other group received 14 small meals (SMs) hourly, commencing 1.5 h after lights on. Starting on day 7, both groups entered a 37 h constant routine (CR). Throughout the entire laboratory protocol, interstitial glucose monitors measured glucose every 15 min. In the CR, commencing 3.5 h after waking, plasma samples were collected every 30 min for 30 h (n = 60 samples per participant). Saliva was collected every hour for 30 h, starting 4 h from waking. In these samples, plasma glucose, triglycerides, total cholesterol and HDL cholesterol, and saliva melatonin were determined. Non-numerical, visual analogue scales assessed appetite hourly on days 2, 4 and 6 and throughout the CR. Interstitial glucose and plasma data were corrected to the time of melatonin onset (DLMO). **Results**: Between groups, no significant difference in age, BMI or DLMO was observed. Interstitial glucose concentrations increased in the early morning in both groups on days 1–6. During these entrained conditions, glucose concentrations decreased from 2 h after waking until the first meal in the LM group, but in the SM group, they continued to increase across the day. Average 24 h interstitial glucose concentrations did not differ between groups. In the CR, antiphasic interstitial glucose rhythms were observed (acrophase -6.13 ± 0.64 vs. 6.28 ± 1.01 h, SM vs. LM groups respectively; $p < 0.001$), with low glucose at the time of previous meals in the LM group. Plasma glucose rhythms were delayed 7 h in the LM group compared to the SM group (SM -1.12 h, LM 6.26 h according to DLMO). By contrast, no phase delay was observed for triglycerides, total cholesterol or HDL cholesterol. Triglycerides peaked at approximately 6 h according to DLMO, whereas total cholesterol and HDL cholesterol peaked at approximately 4-h according to DLMO in each group. **Conclusions**: Administration of two large meals significantly phase-shifted interstitial and plasma glucose rhythms in constant routine conditions. By contrast, there was no effect of the large meals on plasma triglycerides or HDL cholesterol.

Keywords: chrononutrition; food anticipation; circadian clock; continuous glucose monitoring; peripheral clocks; circadian rhythms; meal timing; melatonin

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2.60. Modern Lifestyle and Desynchronization—What Factors Do Really Matter?

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Abstract: Introduction: Modern achievements of science and technologies within the last 150 years have changed our lives dramatically: artificial lights overpower the darkness and our cities glow at night, disrupting the natural day–night pattern and shifting the delicate balance of our environment. Increased demand for 24/7 activities has contributed to modification of work schedule and leisure events of the population dramatically in almost all continents. The negative effects of the loss of natural resources and disrupted rhythmicity might seem invisible, but later multiple studies have documented a correlation between night-shift work and the increased incidence of breast and prostate cancer, arterial hypertension, obesity, type 2 diabetes mellitus, cardiometabolic illnesses, depression and anxiety, all of which impose major public health and economic burden on societies. A lot of studies are dedicated to occupational risks, but few pay attention to habits and everyday life routine as potential factors of lifestyle determination. The goal of the present investigation was to establish: (1) age at which the induction of lifestyle modification starts and (2) what factors are playing a key role in day–night reversal in different lifespan periods. **Methods**: Questioning was undertaken among representatives of different age groups: from 14 to elderly people. Target groups included teenagers 14–16 (68 people), 16–18 (46 graduates of school), and students 18–25 (90 people); healthy 25- to 40-year-olds (55); 41- to 60-year-olds (58) and elder ones (47). We used a lifestyle and health questionnaire, a modified wellness and lifestyle questionnaire with a focus on daily activities, and a chronotype determination questionnaire. **Results**: Before 24 February, 2022, teens reported significance of studies till late night hours while studying at school and preparing for entering higher-education

establishments. At around 16–17, younger ones had to follow family rules and cases of late activity were occasional, related mostly to gaming and leisure activities. Students mentioned significance of studying, social activities, night life (especially at weekend), and around 20% were shift workers. Subjects aged 25–40 and 41–60 marked the importance of occupational activities and care of infants, but a majority mentioned that these factors were transient and sufficient sleep was a useful stable habit. Elder people reported significance of sleep disturbances, frequent joint pain and care of family. Since 24 February 2022, the Ukrainian population has been facing new challenges: air raids, increased anxiety, chronic stress, and loss of occupational + volunteering activities. Three months of regular blackouts made people adjust to everyday routine activity to certain hours of access to electricity. **Conclusions**: Frequency of insomnia and depression increased dramatically, and it seems that health consequences as result of chronic desynchronization and desadaptation will require correction for decades.

2.61. Advancing Sleep Timing to Improve Depression

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Abstract: Background: Patients developing a depressive episode often also develop a delayed sleep timing. This is partly thought to be due to diminished zeitgeber inputs to the circadian system from light and other cues such as dieting, social contact, and exercise. This diminished input is partly driven by behavioral changes caused by the depressive symptoms. Another reason for the delayed sleep timing is diurnal variation in depression symptoms, with morning low and evening improvement, luring patients to postpone their sleep timing. There is a powerful relationship between sleep timing and depression, most evident in the acute effect of wake therapy, but also in regimes using sleep phase advance. Wake therapy and sleep phase advance are both effective antidepressant methods, but time-consuming, and require a substantial effort on the part of the patients and the staff in psychiatric services. There is a need for easy-to-implement chronobiological treatments to help patents with depression recover faster and more completely form their depressive episodes. **Methods**: In all, 100 patients with major depression treated in a psychiatric outpatient unit will be randomly allocated to either standard care (TAU group) or standard care plus the newly developed treatment method circadian reinforcement therapy (CRT group). Only patients that have drifted more than 1 h from their habitual sleep schedule will be included (enriched sample). Patients in the CRT group will be psychoeducated on chronobiological principles to help them increase their zeitgeber inputs from daylight, exercise, social contact, and dieting. In addition, they will receive advice on sleep timing/sleep hygiene and CBT-I principles to reduce anxiety-related sleep-onset insomnia. Patients will be followed for 8 weeks and will be wearing a Camntech MotionWatch 8 to assess sleep timing, 24 h activity, night-sleep duration, night awakenings, sleep efficiency, daytime napping, and light exposure. The primary outcome is change in Hamilton Depression Rating scale (HAM-D17) scores from baseline to endpoint. **Results**: The study will begin recruiting in September 2023. **Perspectives**: If the CRT method can induce a correction of delayed sleep timing and an associated improvement in depression, this method can be implemented as part of standard treatment at in- and outpatient psychiatric services. The