

# Institute of Aerospace Medicine

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### **Circadian regulation of metabolism**

Metabolic processes and hormones are subjects of a pronounced day-time dependent regulation which permits an adaptation to the Earth rotation. These rhythms are driven by so-called clock genes which autonomously control their own synthesis via transcriptional-translational feedback loops. The proper functioning of circadian clocks is critical for maintaining of metabolic health and its dysfunction lead to metabolic diseases. Circadian clock could be entrained by external stimuli (zeitgeber) such as the light and food intake. Particularly, changes of the calorie intake and food composition can affect circadian rhythms in humans. Moreover, timing of eating as well as timing of sleep are important factors of metabolic regulation. Epidemiological studies shows that shift work or chronic jet lag acutely decrease insulin sensitivity and increase the risk of obesity, diabetes and associated metabolic diseases. Animal studies demonstrated potent beneficial effects of the time-restricted feeding on metabolic outcomes upon nutritional challenges. Our recent study showed that the day time of the carbohydrate and fat intake strongly affects diurnal patterns of blood glucose, postprandial hormone secretion, blood lipids, inflammatory markers, substrate oxidation as well as metabolic gene expression. Whether these effects are transient or persistent needs to be investigated in future studies. Thus, dietary approaches based on the timing of the food intake might represent a promising strategy for the prevention and therapy of metabolic disturbances in humans.