Cardiovascular control by the biological clock
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GENERAL DISCUSSION AND SUMMARY

Part IV
It is the middle of the night. It is dark and you are asleep. Melatonin is at its peak level, keeping your biological clock at a low pace and supporting your low core body temperature and sleep. Cortisol and heart rate are low. Parasympathetic activity prevails, while sympathetic output is low. Some 3 hours before waking, your body temperature reaches its minimum. After this, your body starts preparing for the coming day and autonomic gears are shifted.

Cortisol starts its ascent towards the morning peak. Parasympathetic activity decreases relative to sympathetic activity. Together this aids the liver to increase glucose levels in the blood, and helps metabolism to increase. Melatonin levels decrease, releasing your biological clock, body temperature and sleep from its suppressive effect. Dreams occupy an increasing part of your sleep, until you awaken.

Awakening in dark winter is followed by a steep increase in cortisol levels, with a peak after 30 minutes. Melatonin levels decrease due to its half-life of about 40 minutes. However, if you awaken on a light summer morning, light accelerates the anticipation of your body to the daytime activity period by increasing the cortisol peak even further and by increasing heart rate. Even if you remained in bed the whole day in the dark, your resting heart rate and core temperature would remain high during the day and reach a peak in the afternoon, keeping your body prepared for activity.

Some 3 hours before going to bed, core temperature is high, skin temperature is low, and it is hard to fall asleep. Unless your retina is exposed to bright light, melatonin levels start to increase some 2 hours before sleep. The skin temperature of your hands and feet increase, core temperature and blood pressure decrease and you become sleepy. Then, cortisol levels reach their lowest levels, melatonin peaks, and core temperature steeply decreases. You fall asleep.

See text for more details