

Melatonin reduces blood pressure and tunes up disrupted circadian rhythms in the seniors

The older we get the more likely our circadian rhythms are disrupted. For example, blood pressure not only tends to increase but as well become more irregular. Luckily, as we show here, melatonin helps to ameliorate both trends.

Rationale is that plasma concentration of melatonin, especially its nocturnal peak also declines with age in humans. Therefore, experiments were performed on retired elderly volunteers to investigate whether age-dependent changes of circadian rhythms can be reversed, their consequences be attenuated by the ingestion of timed single melatonin doses.

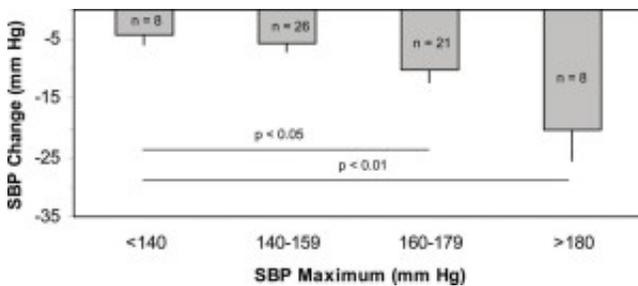


Fig. 1. Change of systolic blood pressure (SBP) during melatonin treatment depending on the individual value before treatment

63 seniors – 13 men and 50 women, Veteran house residents of mean age 80 (ranged 64-91), were studied during 3 consecutive weeks. First week control data were collected for 7 successive days. Next 2 weeks seniors took low dose of melatonin (1.5 mg) each day by night, always at the same time, 10:30 p.m. On the third week data were monitored again.

Melatonin significantly reduced blood pressure. Hypotensive effect was dependent on time. Remarkably, maximum systolic blood pressure-lowering effect of melatonin falls between 3:00 and 8:00 h in the morning, the time of the highest risk of heart attacks and strokes. Even a small reduction of systolic blood pressure of 2-3 mmHg was shown to be clinically relevant. However, nighttime and morning blood pressure decreased more profoundly on average -8/3.5 mm Hg for systolic/diastolic blood pressure, respectively.

Moreover, the higher was mean systolic blood pressure during the first week, the more it dropped on the third week (second week of melatonin administration)! Figure 1 helps to get the idea how much was the difference.

Further, melatonin decreased the overall variability in blood pressure, measured via standard

deviation of the mean. We showed previously that with age systolic blood pressure has higher overall variability, accompanied by less predictable daily pattern. As high standard deviation values are also correlates with many adverse cardiovascular events and with left ventricular hypertrophy, the observation that melatonin reduces deviation of systolic blood pressure is clinically valuable.

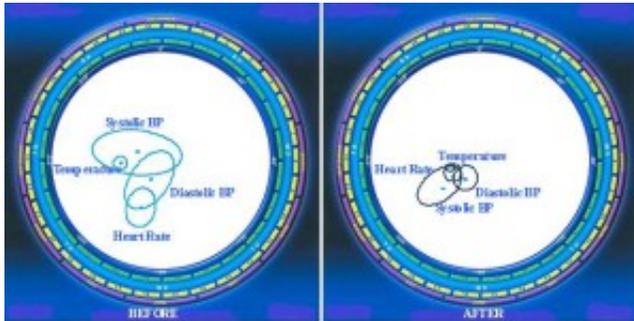


Fig. 2. Population-mean cosinor validates that, melatonin treatment compensates intrinsic circadian disruption in the elderly by synchronizing scattered phases of systolic blood pressure (SBP), heart rate (HR) and temperature. Notably, melatonin not only synchronizes different physiologic variables, but also helps to reestablish SBP and diastolic blood pressure (DBP), DBP rhythms, lost due to phase instability

Also, melatonin did a good job in synchronizing disrupted circadian rhythms of blood pressure, heart rate and body temperature, making these circadian rhythms smoother and less irregular. Figure 2 shows how much less scattered circadian rhythms' phases and amplitudes became. None of these effects was found in 34 placebo treated seniors, thus ruling out the possibility that rhythms could be improved just because of regular schedule and presence of medical personal who took measurements.

To resume, melatonin can be of great value for aged people suffering from hypertension as an adjuvant substance complementing basic medication. Common antihypertensive drugs do not restore the normal circadian blood pressure “dipper” profile in more than a half of patients. On the other hand we have shown in this paper that melatonin is able to stabilize circadian blood pressure and heart rate profiles and their phase relationships. The improvement of circadian pacemaker function may provide a new strategy in the treatment of hypertension. Moreover according to recent reviews, prolonged melatonin add-on appears to be effective and safe for the treatment of insomnia in patients with cardiovascular morbidity and therefore may be the first choice hypnotic for patients with hypertension.

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Publication

[Daily Melatonin Administration Attenuates Age-Dependent Disturbances of Cardiovascular Rhythms.](#)

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