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# Melatonin atheroprotective effects *in vivo*

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Chronic inflammatory fibro-proliferative changes leading to atherosclerotic plaques are considered hallmark of cardiovascular diseases [1]. Atherosclerosis pathogenesis is a complex entity, which has not been fully understood; however, many studies have demonstrated the role of oxidative stress and inflammation in its development. Melatonin effects on inflammation and oxidative stress process have been demonstrated in the last ten-year literature [2]. However, its role(s) and mechanism(s) of action as a therapeutic tool against atherosclerosis remain largely unexplored. Our aims were to assess the role of melatonin in the onset and developing of atherosclerotic plaques through radiologic and morphometrical tools in 20 apolipoprotein-E knockout (ApoE) mice fed with Western diet (42% calories from fat). 10/20 mice were treated with melatonin (10 mg/kg per os). $^{18}$F-FDG PET-CT is a widely used tool to assess inflammatory changes, even before macroscopic changes have taken place. Glucose metabolism is known to be higher in areas of inflammation due to an increased expression of GLUT transporters on the cell membranes both in animals and humans. Using this feature PET/CT is able to determinate metabolic cellular changes and therefore it can be used as biomarker of atherosclerosis. All mice were scanned both before starting melatonin treatment and at the end of the study. After the last scan mice were sacrificed and vascular remodeling, oxidative stress and inflammation at aortic arch level were evaluated. CT-corrected PET datasets were used for computation of SUVmax.

Atherosclerotic vascular remodeling, oxidative stress and inflammation levels were significantly more conspicuous in the control cohort, compared to the treated mice ($p \leq 0.05$). $^{18}$F-FDG PET/CT did not show significant difference in SUVmax. In summary, also in vivo, melatonin may have a protective effect in the atherosclerotic pathogenesis.

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## References

[1] Badimon et al. (2010) Nutraceuticals and atherosclerosis: human trials. Cardiovasc Ther 28: 202-215.
[2] Favero et al. (2014) Melatonin and its atheroprotective effects: a review. Mol Cell Endocrinol. 382: 926-937.

Keywords
Atherosclerosis, inflammation, melatonin, oxidative stress, $^{18}$F-FDG PET.