

Aging of brain in hypercholesterolemic mice (ApoE -/-): melatonin receptor distribution

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The protective role of melatonin has been investigated [1]. Some studies underlined its significant neuroprotective action with a role in aging processing. In patients with Alzheimer's Disease, parallel to degenerative tissue changes, there was an overall decrease in the intensity of melatonin receptors in the pineal gland and occipital cortex [2]. Melatonin type 1 (MT1) and type 2 (MT2) receptors disclosed a quite widespread distribution in different brain regions. Recently our group demonstrated that an animal model of hypercholesterolemia, such as ApoE^{-/-} mice, is more susceptible to developing severe liver injury, suggesting that in addition to vascular disease, increased cholesterol products and oxidative stress may also play a role in accelerating aging in the liver [3]. On the basis of this consideration, the aim of our work is to characterize the distribution of MT1 and MT2 in brain of ApoE^{-/-} mice at different age (6 weeks, 16 weeks and 60 weeks) together with senescence markers using immunohistochemical technique to verify the role of these receptors in aging process. The results show an altered distribution of melatonin receptors and synaptic connectivity, indicating a process of aging in ApoE^{-/-} mice and suggesting that melatonin treatment may represent a new approach to reduce brain aging and degeneration.

References

- [1] Rezzani R et al. (2013) Endothelial and vascular smooth muscle cell dysfunction mediated by cyclophilin A and the atheroprotective effects of melatonin. *Life Sci* 92: 875-882.
- [2] Brunner P et al. (2006) Pineal and cortical melatonin receptors MT1 and MT2 are decreased in Alzheimer's disease. *Eur J Histochem* 50: 311-316.
- [3] Bonomini F et al. (2013) Apolipoprotein E deficiency and a mouse model of accelerated liver aging. *Biogerontology* 14: 209-220.

Keywords

Hypercholesterolemic mice, melatonin receptors, brain, aging, immunohistochemistry.