

### 43. THE IMPACT OF CIRCADIAN RHYTHMS DISRUPTIONS ON NEURODEGENERATIVE DISEASES' ONSET

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**Introduction.** Circadian rhythm disruptions are common in modern society as result of the hectic lifestyles we lead associated with high stress and anxiety levels, night-shift jobs, inter-meridian travels and the spread use of light/screens in our quotidian. Thus, it has become essential to question how those will affect our cognition over time and will play a role in the development of neurodegenerative disorders.

**Aim of study.** Patients suffering from neurodegenerative diseases (ND) often show, as early signs of the disorder, alterations in their circadian rhythms explained by the progressive brain atrophy. However, less illustrated is the way disorganised biological rhythms could lead to ND. Thus, this review aims to identify the association and pathophysiological mechanisms that could lead to neurodegenerative modifications, subsequently, helping to suggest preventive measures.

**Methods and materials.** The research was based on 32 articles selected from the databases PUBMED from MEDLINE (15 articles) and SCOPUS (17 articles) published in the time frame 2017-2022 using the keywords: "Circadian rhythm and neurodegenerative diseases".

**Results.** The studies lectured profiled a bidirectional relationship between circadian rhythm's disruptions and the neurodegenerative diseases. Therefore, a series of pathogenic mechanisms induced by hectic sleep/wake cycles leading to the onset of ND were portrayed. The protein dyshomeostasis is one of the most recognized and it encompasses: increased amyloid aggregate production, proteostasis due to low autophagy clearance and decreased excretion by the glymphatic system or blood-brain barrier. Other involved pathogenic pathways are: neuroinflammation induced by glial clocks' and immune circadian peripheral cycles' dysregulations; neuronal oxidative stress that leads to metabolic and synaptic malfunction. Thus, the need of regulated circadian rhythms should be a priority for its neuroprotective mechanisms such as: ROS scavenge, BDNF stimulation of neurogenesis, voltage gated Ca<sup>++</sup> and NMDA channels inactivation, stress granule degradation, etc. Most of those cited above are promoted by melatonin's cytoprotective effect during sleep.

**Conclusion.** The association between disrupted circadian rhythms and the development of neurodegenerative diseases has been proven and occurs through various mechanisms that remain to be studied in detail as they still have many secrets to hide. Nevertheless, promoting lifestyles that correspond to the biological rhythms, especially to the sleep-wake cycles, should constitute the basis of all prophylactic measures to be implemented in the matter.