

# Circadian and sleep dysfunction in Alzheimer's disease

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Alzheimer's disease (AD) is a devastating and irreversible cognitive impairment and the most common type of dementia. Along with progressive cognitive impairment, dysfunction of the circadian rhythms also plays a pivotal role in the progression of AD. A mutual relationship among circadian rhythms, sleep, and AD has been well-recommended. The etiopathogenesis of the disturbances of the circadian system and AD share some general features that also unlock the outlook of observing them as a mutually dependent pathway. Indeed, the burden of amyloid  $\beta$  (A $\beta$ ), neurofibrillary tangles (NFTs), neuroinflammation, oxidative stress, and dysfunction of circadian rhythms may lead to AD. Aging can alter both sleep timings and quality that can be strongly disrupted in AD. Increased production of A $\beta$  and reduced A $\beta$  clearance are caused by a close interplay of A $\beta$ , sleep disturbance and raised wakefulness. Besides A $\beta$ , the impact of tau pathology is possibly noteworthy to the sleep deprivation found in AD. Hence, this review is focused on the primary mechanistic complexities linked to disruption of circadian rhythms, sleep deprivation, and AD. Furthermore, this review also highlights the potential therapeutic strategies to abate AD pathogenesis. © 2020 Elsevier B.V.

Alzheimer's disease

Amyloid  $\beta$

Circadian rhythms

Neurofibrillary tangles

Sleep

almorexant

amyloid

amyloid beta protein

cholinergic receptor

hypnotic agent

melanopsin

melatonin

orexin

Pittsburgh compound B

ramelteon

tasimelteon

tau protein

transcription factor CLOCK

trazodone

Alzheimer disease

amyloid plaque

basal forebrain

biological rhythm

blood pressure

body temperature

bright light therapy

cell loss

chronobiology

circadian rhythm

cognition

cross-sectional study

daytime somnolence

exercise

feeding behavior

histopathology

human

insomnia

molecular clock

nerve degeneration

nervous system inflammation

neurofibrillary tangle

neuropathology

neuroprotection

noise

nonhuman

oxidation reduction state

oxidative stress

pathogenesis

phototherapy

physical activity

positron emission tomography

prescription

protein depletion

protein phosphorylation

retina ganglion cell

Review

sleep

sleep deprivation

sleep disorder

sleep hygiene

sleep pattern

sleep waking cycle

wakefulness