

Supplementary Table S3: Impact of Specific Sleep Abnormalities on Neurological and Mental Health

Sleep Abnormality	Health Outcomes	Mechanisms
Insomnia	Depression and anxiety disorders Cognitive impairment and memory problems	Dysregulation of stress systems (HPA axis), altered neurotransmitter balance Reduced hippocampal neurogenesis and synaptic plasticity
Obstructive Sleep Apnea (OSA)	Increased risk of depression and anxiety Increased risk of neurocognitive decline and dementia	Hypoxia-induced alterations in brain function and neurotransmitter systems Intermittent oxygen deprivation affecting neural circuits involved in cognition
Circadian Rhythm Disorders	Increased risk of depression, bipolar disorder Cognitive dysfunction and poor	Disruption of circadian regulation of mood-regulating neurotransmitters (serotonin, dopamine) Altered sleep architecture impacting restorative sleep
Sleep Deprivation	memory Increased risk of anxiety and mood disorders Cognitive decline and attention deficits	stages (e.g., REM) Altered meal timing and insulin resistance Reduced lipolysis and elevated hunger hormones like ghrelin