Summary and conclusion

Sleep is defined on the basis of behavioural and physiological criteria dividing it into two states NREM sleep and rapid REM sleep. Behaviorally, sleep is defined as a reversible behavioral state of perceptual disengagement from and unresponsiveness to the environment.

NREM sleep was divided into three stages by The American Academy of Sleep Medicine (AASM) stage 1 sleep generally persists for only a few (1 to 7) minutes at the onset of sleep. Stage 2 NREM sleep, signaled by sleep spindles or K complexes in EEG. Stage 3 where delta waves, associated with "deep" sleep, began to occur.

In contrast to NREM sleep, REM sleep is defined by EEG activation, muscle atonia, and episodic bursts of rapid eye movements. There are two phases of REM sleep referred to as "phasic REM sleep" and "tonic REM sleep". Phasic REM sleep occurs when REM and other phasic activity are high, and tonic REM sleep occurs when REM background activity is present but there is very little phasic activity.

A variety of physiological and behavioural changes occur during normal wakefulness, NREM and REM sleep. These changes are most commonly noted in the somatic and ANS; in the respiratory, cardiovascular and gastrointestinal systems; in endocrine, renal and sexual functions; and in thermoregulation.

Changes in sleep and wakefulness are believed to arise from the activity of chemical agents. These chemical agents involve; serotonin which has

hypnotic effects and increase delta sleep, norepinephrine may inhibit REM sleep, acetylcholine its neurons are located in dorsal tegmentum orchestrate REM sleep GABA which has hypnotic effect, dopamine which mediates alerting effects of amphetamine and cocaine.

Anatomically, at least five sites implicated in the generation of NREM sleep; the basal forebrain, thalamus, hypothalamus, dorsal raphe nucleus, and nucleus tractus solitaries. Mid pons is necessary for REM sleep. Ascending reticular activating systems is important in the generation and maintenance of waking states.

A bidirectional interaction between sleep and endocrine activity is well established. Various hormones exert specific effects on the sleep EEG in several species including humans. Some peptides promote sleep while others increase wakefulness.

The typical maximum release peak of GH, normally present during the first sleep cycle, Deep NREM sleep is reliably associated with the robust elevation of plasma GH concentrations during early night hours. GHRH may have a direct role in promoting NREMS.

SDB affects most patients with acromegaly. Much less work elucidates a relationship between, narcolepsy and GH. GH replacement therapy influenced sleep reaction, and treatment cessation was associated with a significant decrease in slow-wave sleep and with a shift from obstructive to central apnea and hypopnea.

Galanin’s enhancement of SWS and REMS both in young normal men and in patients with depression. In patients of both sexes with

depression sleep latency is shortened after NPY. Hypocretin/ orexin signalling is crucial for maintaining wakefulness and regulating REMS, as deduced from studies in narcoleptics.

Plasma prolactin (PRL) concentrations exhibit a sleep-dependent pattern, with highest levels during sleep and lowest levels during the waking period. Prolactin secretion is reversibly elevated in a hypoxic stress response .altered prolactin rhythms would occur in RLS.

Testosterone levels demonstrate changes over the course of 24 h, as well as changes over the course of life a nadir of testosterone in the evening, between 7 PM and 10 PM. The rise in testosterone occurred approximately 90 min before the first bout of REM sleep. Testosterone levels begin to rise on falling asleep, peak at about the time of first REM, and remain at the same levels until awakening."

The role of menopause has been suggested for several sleep disruptions. In postmenopausal women with depression decreases in SWS and an increase in REMS frequency is observed. Postmenopausal women taking HT had a lower prevalence of SDB.

Melatonin induces sleep when the homeostatic drive to sleep is insufficient, Melatonin also decreases sleep latency and number of awakenings per night and increases TST in individuals with intellectual disabilities.

The human endogenous cortisol rhythm is characterized by a rise at about 2-3 hours after sleep onset that continues into the early waking hours. A cortisol peak occurs at about 09:00. As the day continues, a gradual

decline in cortisol levels occurs leading to the nadir at about midnight.

CRH decreases SWS while it promotes REMS and increases wakefulness in young normal male subjects, Conversely, ACTH suppresses REMS in normal controls, while an anticipatory increase in ACTH in the morning may facilitate spontaneous waking.

Both hypothyroidism and hyperthyroidism can cause or exacerbate such divergent and frequent sleep disorders, such as OSAS and restless legs syndrome (RLS). Hyperthyroidism and overdose of thyroid supplements have been associated with insomnia complaints.

Short sleep duration or chronic partial sleep deprivation may increase the risk of type II diabetes. OSA can affect the metabolism indirectly, by decreasing the quantity and/or quality of sleep. Notably. In patients with OSAS there is a positive effects of CPAP on glycaemic control as decreased glucose levels with significant reduction in hemoglobin (Hb) A1C level.

RLS is frequently found in patients with diabetes, which so far has mainly been explained by the fact that diabetes-induced polyneuropathy predisposes to RLS.

A recent report demonstrated that elevated aldosterone is a cause of hypertension in OSAS, Since ACTH stimulates both aldosterone and cortisol synthesis and secretion, it has been hypothesized that the HPA axis hyperactivity from OSAS may increase aldosterone and thereby contributes to hypertension.

Short sleep may lead to obesity through the activation of hormonal responses leading to an increase in appetite and caloric intake. Short sleep is associated to reciprocal changes in leptin and ghrelin this in turn would increase appetite and contribute to the development of obesity.

Ghrelin levels rise between 0100 h and 0300 h during sleep and ghrelin stimulates the nocturnal rise in growth hormone. Intravenous administration of ghrelin before bedtime can increase non-REM sleep. In men patients with OSAS manifest increased levels of ghrelin. The appetite stimulating effects of ghrelin may contribute to increased caloric intake and weight gain in patients with OSAS.

A marked rise in leptin is noted during sleep. In patients with OSAS demonstrated increased levels of leptin. Serum leptin levels have been shown to be positively correlated with the severity of OSAS in obese subjects.