PEDIATRIC INSOMNIA

September 2022

Sharadamani Anandan, MD,
Child/Adolescent Psychiatrist
Evernorth Behavioral

Together, all the way.®

Cigna®

Definition

- Difficulty initiating and maintaining sleep, perceived as a problem by the child/caregiver.[1]
- These symptoms are chronic , severe and frequent and cause daytime impairment in functioning.[1]

[1]Insomnia in Children and Adolescents, Judith Owens, M.D., M.P.H., Pediatric Sleep Disorders Clinic and Brown Medical School, Division of Pediatric, Ambulatory Medicine, Rhode Island Hospital, Providence, RI

Insomnias Unique to Children

- Sleep onset association disorder.[1]
- Limit setting sleep disorder.[1]
- Food allergy insomnia.[1]
- Nocturnal eating/drinking syndrome.[1]

[1]Insomnia in Children and Adolescents, Judith Owens, M.D., M.P.H., Pediatric Sleep Disorders Clinic and Brown Medical School, Division of Pediatric Ambulatory Medicine, Rhode Island Hospital, Providence, RI

Screening

INSTRUCTIONS: *This questionnaire will allow to your doctor to have a better understanding of the sleep-wake rhythm of your child and of any problems in his/her sleep behaviour. Try to answer every question; in answering, consider each question as pertaining to the past 6 months of the child's life. Please answer the questions by circling or striking the number ① to ⑤. Thank you very much for your help.*

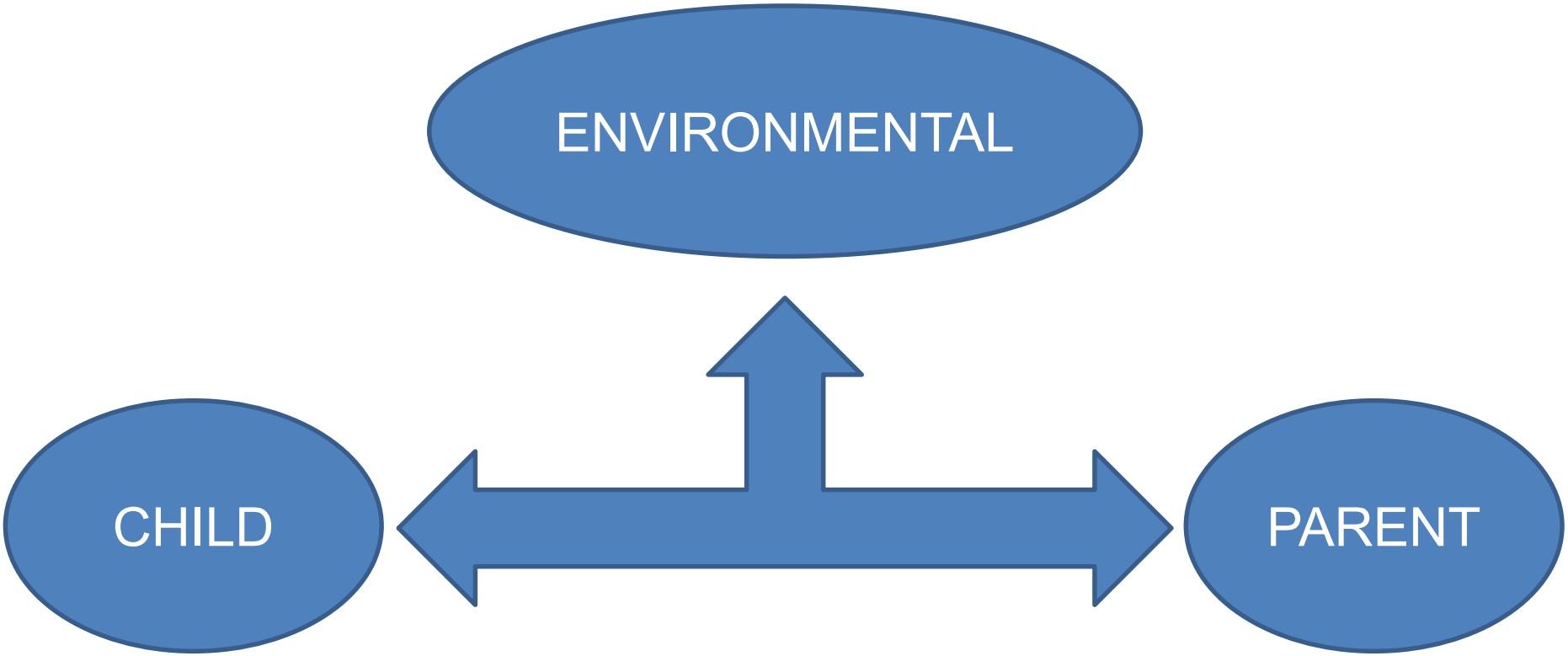
Name:_____ Age:_____ Date:_____

1. How many hours of sleep does your child get on most nights.	① 9-11 hours	② 8-9 hours	③ 7-8 hours	④ 5-7 hours	⑤ less than 5 hours
2. How long after going to bed does your child usually fall asleep	① less than 15'	② 15-30'	③ 30-45'	④ 45-60'	⑤ more than 60'

					⑤ Always (daily)
				④ Often (3 or 5 times per week)	
			③ Sometimes (once or twice per week)		
		② Occasionally (once or twice per month or less)			
	① Never				
3. The child goes to bed reluctantly	①	②	③	④	⑤
4. The child has difficulty getting to sleep at night	①	②	③	④	⑤
5. The child feels anxious or afraid when falling asleep	①	②	③	④	⑤
6. The child starties or jerks parts of the body while falling asleep	①	②	③	④	⑤
7. The child shows repetitive actions such as rocking or head banging while falling asleep	①	②	③	④	⑤
8. The child experiences vivid dream-like scenes while falling asleep	①	②	③	④	⑤
9. The child sweats excessively while falling asleep	①	②	③	④	⑤
10. The child wakes up more than twice per night	①	②	③	④	⑤
11. After waking up in the night, the child has difficulty to fall asleep again	①	②	③	④	⑤
12. The child has frequent twitching or jerking of legs while asleep or often changes position during the night or kicks the covers off the bed.	①	②	③	④	⑤
13. The child has difficulty in breathing during the night	①	②	③	④	⑤
14. The child gasps for breath or is unable to breathe during sleep	①	②	③	④	⑤
15. The child snores	①	②	③	④	⑤
16. The child sweats excessively during the night	①	②	③	④	⑤
17. You have observed the child sleepwalking	①	②	③	④	⑤
18. You have observed the child talking in his/her sleep	①	②	③	④	⑤
19. The child grinds teeth during sleep	①	②	③	④	⑤
20. The child wakes from sleep screaming or confused so that you cannot seem to get through to him/her, but has no memory of these events the next morning	①	②	③	④	⑤
21. The child has nightmares which he/she doesn't remember the next day	①	②	③	④	⑤
22. The child is unusually difficult to wake up in the morning	①	②	③	④	⑤
23. The child awakes in the morning feeling tired	①	②	③	④	⑤
24. The child feels unable to move when waking up in the morning	①	②	③	④	⑤
25. The child experiences daytime somnolence	①	②	③	④	⑤
26. The child falls asleep suddenly in inappropriate situations	①	②	③	④	⑤
Disorders of initiating and maintaining sleep (sum the score of the items 1,2,3,4,5,10,11)					
Sleep Breathing Disorders (sum the score of the items 13,14,15)					
Disorders of arousal (sum the score of the items 17,20,21)					
Sleep-Wake Transition Disorders (sum the score of the items 6,7,8,12,18,19)					
Disorders of excessive somnolence (sum the score of the items 22,23,24,25,26)					
Sleep Hyperhydrosis (sum the score of the items 9,16)					
Total score (sum 6 factors' scores)					

Bruni, O., Ottaviano, S., Guidetti, V., Romoli, M., Innocenzi, M., Cortesi, F., & Giannotti, F. (1996). The sleep disturbance scale for children (SDSC):, Construction and validation of an instrument to evaluate sleep disturbances in childhood and adolescence. Journal of Sleep Research, 5 , 251–261.

Etiology



Insomnia in Children and Adolescents, Judith Owens, M.D., M.P.H., Pediatric Sleep Disorders Clinic and Brown Medical School, Division of Pediatric Ambulatory Medicine, Rhode Island Hospital, Providence, RI

Prevalence

- 25% of all children are reported to experience some type of sleep problem.[1]
- Common symptoms include difficulties with initiation and maintenance of sleep, short sleep duration, irregular sleep wake patterns, early morning awakening.[1]

[1]Insomnia in Children and Adolescents, Judith Owens, M.D., M.P.H., Pediatric Sleep Disorders Clinic and Brown Medical School, Division of Pediatric Ambulatory Medicine, Rhode Island Hospital, Providence, RI

Sleep Disturbance in Toddlers & School Age Children

- Behavioral insomnia of childhood – limit setting type.[1]
- Child challenges parent around bedtime , disrupting household routines.[1]

[1]Behavioral Treatment of Bedtime Problems and Night Wakings in Infants and Young Children, An American Academy of Sleep Medicine Review, Jodi A. Mindell, PhD1,4; Brett Kuhn, PhD2; Daniel S. Lewin, PhD3; Lisa J. Meltzer, PhD4; Avi Sadeh, DSc5, 1Department of Psychology, Saint Joseph's University, Philadelphia, PA; 2University of Nebraska Medical Center, Omaha, NE; 3Children's National Medical Center, George Washington University School of Medicine, Washington, DC; 4Children's Hospital of Pennsylvania, Philadelphia, PA; 5Department of Psychology, Tel Aviv University, Tel Aviv, Israel

Adolescents and Insomnia

- Delayed sleep phase disorder is the most common disorder.[1]

[1]Okawa M, Uchiyama M, Ozaki S, Shibui K, Ichikawa H., Circadian rhythm sleep disorders in adolescents: clinical trials of combined treatments based on chronobiology. Psychiatry Clin Neurosci. 1998;52:483–490.

Sleep Disorders Co-Occurring With Other Disorders

Specific Syndromes	Psychiatric Disorders	Medical Disorders	Sleep Disorders
ASD	Depression	Asthma	OSA
Angelman	Anxiety	Atopy	Nocturnal Seizures
Rett's	PTSD	Burns	Narcolepsy
Smith-Magenis	ADHD	Juvenile Rheumatoid Arthritis	
Tourette's		Headaches	
		Chronic pain	

Insomnia in Children and Adolescents, Judith Owens, M.D., M.P.H., Pediatric Sleep Disorders Clinic and Brown Medical School, Division of Pediatric Ambulatory Medicine, Rhode Island Hospital, Providence, RI

Treatment – Non-Pharmacological

Sleep Hygiene/Environmental
Optimal temperature
Optimal noise level
Ambient light
Bed time routine
Exercise/meal times/caffeine use

Insomnia in Children and Adolescents, Judith Owens, M.D., M.P.H., Pediatric Sleep Disorders Clinic and Brown Medical School, Division of Pediatric Ambulatory Medicine, Rhode Island Hospital, Providence, RI

Empirical Non-Pharmacological Treatment

Intervention	Target Problems	Description
Extinction	Bedtime disturbances leading to night time awakenings	Put the child in bed and ignore inappropriate crying
Graduated extinction	Bedtime disturbances leading to night time awakenings	Combine extinction with scheduled parental checks
Parent education	Bedtime disturbances leading to night time awakenings	Establish sleep routines – educate parent

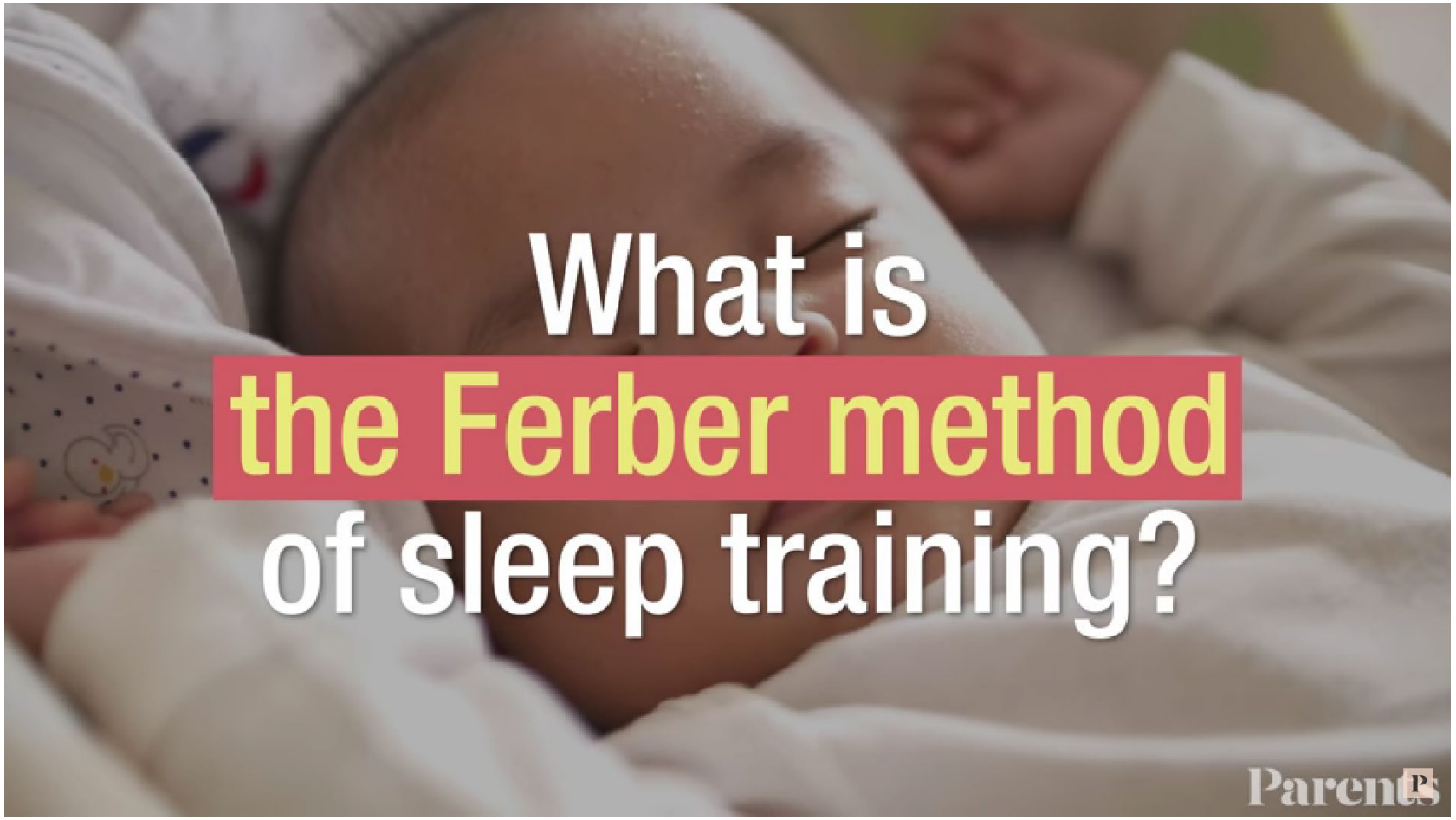
Insomnia in Children and Adolescents, Judith Owens, M.D., M.P.H., Pediatric Sleep Disorders Clinic and Brown Medical School, Division of Pediatric Ambulatory Medicine, Rhode Island Hospital, Providence, RI

Empirical Non-Pharmacological Treatment - Continued

Intervention	Target Problems	Description
Extinction with parental presence	Bedtime disturbances leading to night time awakenings	Parent feign sleep while in child's room and ignore inappropriate child behaviors
Scheduled awakenings	Bedtime disturbances leading to night time awakenings	Parent wakes up child 15-30 min before usual spontaneous awakening
Positive bed time routines	Bedtime disturbances leading to night time awakenings	Establish routine that child enjoys and associate these routines with positive behaviors - story

Insomnia in Children and Adolescents, Judith Owens, M.D., M.P.H., Pediatric Sleep Disorders Clinic and Brown Medical School, Division of Pediatric Ambulatory Medicine, Rhode Island Hospital, Providence, RI

YouTube: What is the Ferber Method of Sleep Training?



Link: https://www.youtube.com/watch?v=wKGwZnKztAA

Recommended Amount of Sleep for Pediatric Populations

Age	Hours of Sleep Recommended
Infants (4 months – 12 months)	12 – 16 hours/day
Children (1 – 2 years of age)	11 – 14 hours/day
Children (3 – 5 years of age)	10 – 13 hours/day
Children (6 – 12 years of age)	9 – 12 hours/day
Teenagers (13 – 18 years of age)	8 – 10 hours/day

Paruthi S, Brooks LJ, D'Ambrosio C, Hall WA, Kotagal S, Lloyd RM, Malow BA, Maski K, Nichols C, Quan SF, Rosen CL, Troester MM, Wise MS. Recommended amount of sleep for pediatric populations: a consensus statement of the American Academy of Sleep Medicine. J Clin Sleep Med 2016;12(6):785–786

Pharmacological Treatment Options

Drug	Application	Dose	Side Effects	Formulation
Diphenhydramine (FDA - 12 yr and older for short term insomnia)	Transient insomnia	0.5 mg/kg – max 25 mg	Anticholinergic	Tab, cap, syrup, injectable
Melatonin	DSPS/sleep onset insomnia	2.5 – 10 mg	Possible exacerbation of autoimmune disease	Tab
Clonazepam	Insomnia with parasomnias	0.5 – 5mg	Impairment of respiratory function	Tab, patch
Zolpidem		5 – 10mg	Sedation – next day	Tab, oral spray, sublingual
Zaleplon		5 – 10mg	Sedation – next day	Cap

Pharmacotherapy of Insomnia in Children Curr Sleep Medicine Rep (2016) 2:38–43

Pharmacotherapy - Continued

Drug	Application	Dose	Side Effects	Formulation
Eszolpiclone		1 – 3mg	Sedation – next day	Tab
Ramelteon		8mg	Dizziness, nausea, nipple discharge	Tab
Clonidine		0.025 – 0.3mg	Bradycardia, hypotension	Tab, patch
Trazadone		25 – 50mg	Cardiac arrhythmias	Tab

Pharmacotherapy of Insomnia in Children Curr Sleep Medicine Rep (2016) 2:38–43

Medications and Mechanism of Action

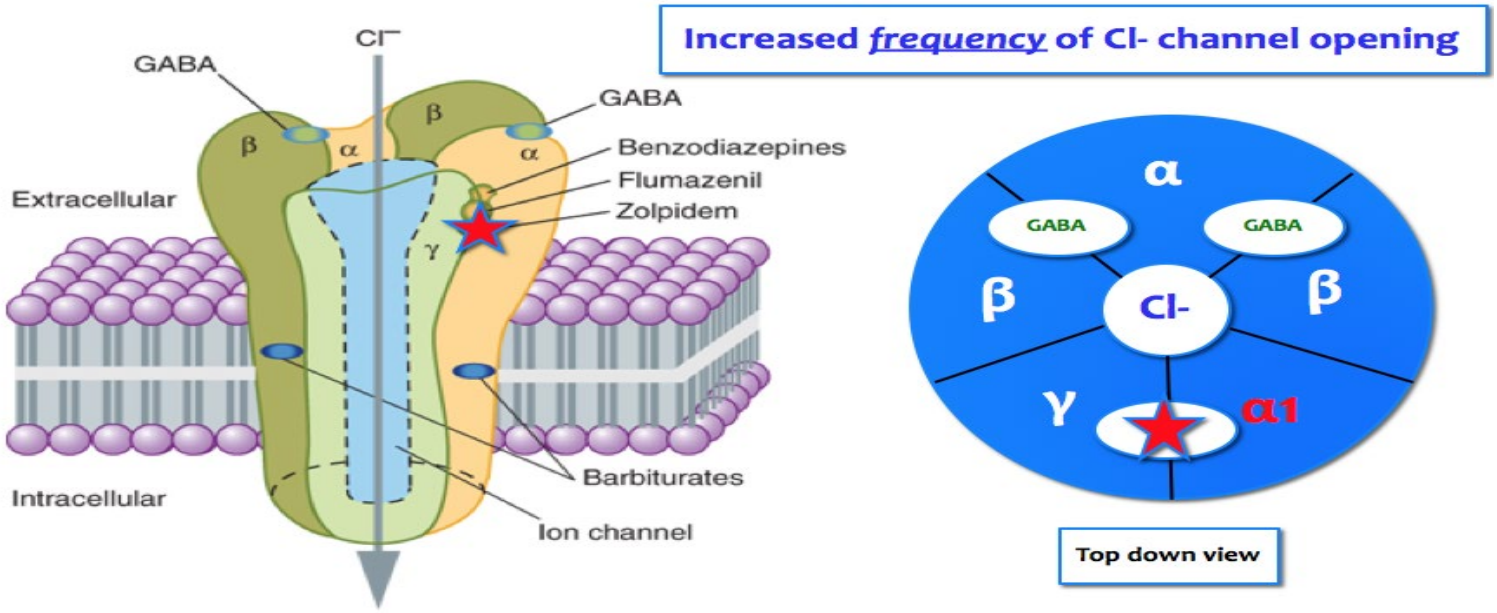
Medications	Mechanism of Action	Anatomical Location
Antihistamine	Histamine – wakefulness promoter	Posterior hypothalamus, frontal lobe, deep structures
Melatonin	Melatonin- hormone – secreted by the pineal gland.	Pineal gland – high levels at night; low levels in the day
Ramelteon (>18years of age)	Melatonin receptor agonist	As above
Tasimelteon	Mt1 and mt2 receptors – higher affinity for mt2.	As above
Clonidine	Alpha 2 agonist	

Pharmacotherapy of Insomnia, David N Neubauer1, Seithikurippu R Pandi-Perumal2, David Warren Spence3, Kenneth Buttoo4 and Jaime M Monti5

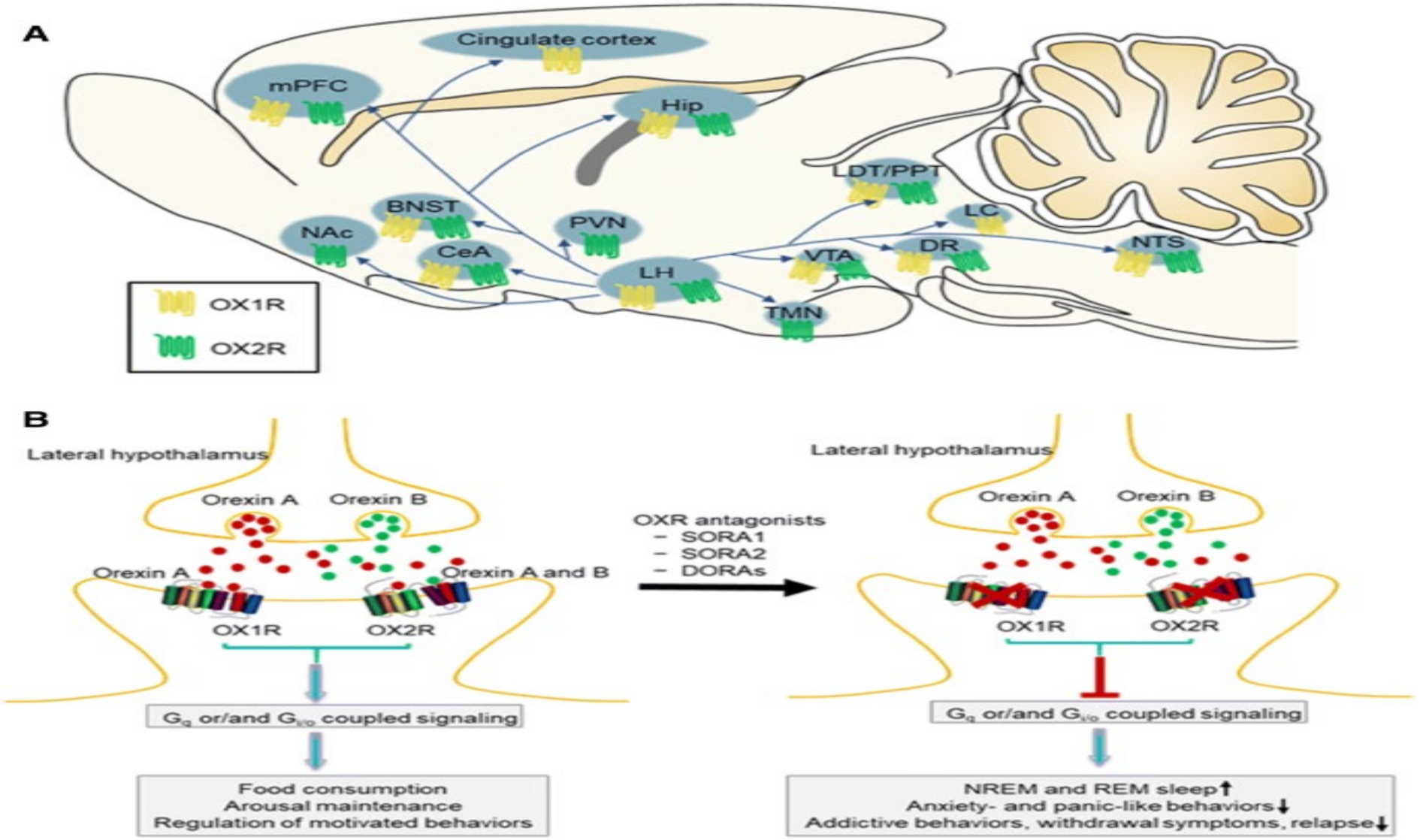
Journal of Central Nervous System Disease, Volume 10: 1–7

Benzodiazepine Receptor

Benzodiazepine Partial Agonists



Source: Bertram G. Katzung, Anthony J. Trevor: Basic & Clinical Pharmacology, 13th Ed.
www.accesspharmacy.com



Neurosci. Bull. April, 2020, 36(4):432–448 www.neurosci.cn, https://doi.org/10.1007/s12264-019-00447-9

Medications and Mechanism of Action

Medications	Mechanism of Action	Anatomical Location
Benzodiazepines	Gaba receptor agonist	Various areas in the CNS
Nbzra	Benzodiazepine receptor	Various areas in the CNS
Hypocretin/orexin receptor antagonist		CNS
Antidepressant	Doxepin (3-6mg) approved in adults	CNS

Pharmacotherapy of Insomnia, David N Neubauer1, Seithikurippu R Pandi-Perumal2, David Warren Spence3, Kenneth Buttoo4 and Jaime M Monti5

Journal of Central Nervous System Disease, Volume 10: 1–7

Conclusion

- Non pharmacological treatment approaches to insomnia in children, have strong supportive evidence in the treatment of child hood insomnia.[1]

[1]Insomnia in Children and Adolescents, Judith Owens, M.D., M.P.H., Pediatric Sleep Disorders Clinic and Brown Medical School, Division of Pediatric Ambulatory Medicine, Rhode Island Hospital, Providence, RI

[1]Journal of Clinical Sleep Medicine, Vol. 1, No. 4, 2005

Questions?

Contact: Sharadamani Anandan
Sharadamani.Anandan@evernorth.com