Sleepy-Time

1. Neurotransmitters involved in **promoting wakefulness** include all of the following **EXCEPT**:

A. FALSE adenosine=sleep promoting; effects blocked by caffeine. Is "sleep factor" that regulates the activity of VLPO neurons; increase firing of VLPO=sleep-onset via inhibiting ARAS nuclei
B. TRUE DA is part of ARAS=wakefulness
C. TRUE major player in wakefulness
D. TRUE ever take an antihistamine? Sleepy time? Found in cells in the tuberomammillary nucleus (TM) of the hypothalalmus. This histaminergic projection reaches thalamus and cortex
E. TRUE think LC and arousal/wakefulness

2. Which of the following nuclei are GABA-ergic?

A. FALSE LC=NE
B. FALSE dorsal raphe-serotonin (5HT)
C. FALSE LDT-acetyl choline
D. FALSE PPT is LDT's cousin=ACh
E. TRUE gee, where is that GABA? Any GABA cells in nucleus basalis? **SURE**! How about VLPO=**SURE**

3. Which of the following nuclei are cholinergic?

A. FALSE LC=NE
B. FALSE DR=serotonin
C. TRUE LDT=ACh
D. TRUE it's good enough for its cousin
E. TRUE see the cousins (C and D)

4. Which of the following nuclei are serotonergic?

A. FALSE LC=NE
B. TRUE DR=5HT
C. FALSE LDT=ACh
D. FALSE PPT=ACh
E. FALSE TMN=histimine

5. Which of the following nuclei/areas contain norepinephrine?

A. FALSE VLPO=GABA
B. FALSE contains GABA-ergic neurons; this is not the same as VLOP/preoptic (is caudal)
C. FALSE basalis=ACh and GABA, but not NE
D. FALSE reticular pontis=ACh
E. TRUE

6. Which of the following occur(s) following destruction of the ARAS in the midbrain?

A. FALSE loss of wakefulness promoting pathways=sleepy time
B. FALSE id you interrupt all of the ascending fibers in the midbrain you basically leave the GABA projections in control. So you will have NREM sleep continually. Remember, the ascending fibers from the reticularis pontis (ACH) are interrupted too, so the REM-promoting pathway is lost too.
C. FALSE the EEG would consist of delta waves
D. FALSE seen only when "brain dead!"
E. TRUE

7. Which of the following statements is/are **TRUE**?

A. TRUE nicotine=cholinergic agonist
B. TRUE TM turns on thalamus and cortex—inhibited by VLPO
C. TRUE because the EEG looks awake!
D. TRUE which means that VLPO does not kick in!
E. TRUE

8. Which of the following is/are **TRUE?**

A. FALSE they are present!
B. TRUE eye movements cease during stages 2-4
C. TRUE sudden muscle contractions, sometimes accompanied by a sense of falling and/or dreamlike imagery=stage 1
D. FALSE sleep spindles and K complexes=stage 2
E. TRUE see B and C

9. Which of the following statements is **TRUE**?

A. TRUE
B. FALSE theta=stage 1; sleep spindles and K complexes=stage 2
C. FALSE occur in phasic REM
D. FALSE occur in tonic REM
E. FALSE eye movements cease during stages 2-4

10. When it comes to sleep, a healthy young medical student:

A. FALSE most time is in stages 3-4 but slowly losing 3-4 for more 1-2
B. FALSE this pattern is limited to older Neuroscience Profs!
C. FALSE occurs at 50-60 minute intervals in human infants and 90-100 minute intervals in middle-aged adults
D. TRUE slow wave sleep (stages 3 and 4) is most prominent early in the night, especially during the first NREM period; diminishes as night progresses.
E. FALSE As SWS wanes, REM sleep lengthen, while showing greater phasic activity and generally more intense dreaming later in the night

11. Which of the following statements is **TRUE**?

A. FALSE this occurs in **phasic** REM
B. TRUE sleepy/restful time
C. FALSE sleepy/restful time
D. FALSE arrhythmias are most prevalent in REM-sleep
E. FALSE temporary breathing instability and/or periodic breathing may occur at **onset** of sleep

12. Which of the following statements is **TRUE**?

A. FALSE they are **down-regulated**
B. FALSE GH release=early part of night
C. TRUE
D. FALSE evening just prior to sleep onset; (you could brush your teeth before going to bed, but you'll be pretty sleepy when TSH is peaking!)
E. FALSE cortisol levels rise at the end of the sleep period
THINK **TGPC**=--TSH—GH—PROLATIN—CORTISOL

13. Which of the following statements is/are **TRUE?**

A. FALSE sleep apnea=**decreased** levels of GH and prolactin
B. TRUE
C. FALSE darkness during the night stimulates the secretion of melatonin; darkness during the day does not stimulate melatonin secretion
D. TRUE
E. TRUE see B and D

14. Which of the following nuclei/areas contain DA neurons?

A. FALSE preoptic area=GABA
B. FALSE anterior hypothalamus=GABA
C. FALSE PPT (and its cousin) LDT=ACh
D. FALSE reticularis pontis=ACh
E. TRUE Classic NB!

15. A complete transection of the brain stem at the level of the spino-medullary junction:

A. FALSE are any major parts of the ARAS interrupted? **NO!**
B. FALSE are any major parts of the ARAS interrupted? **NO!**
C. FALSE are any major parts of the ARAS interrupted? **NO!**
D. FALSE are any major parts of the ARAS interrupted? **NO!**
E. TRUE are any major parts of the ARAS interrupted? **NO!**

16. A lesion of the nucleus reticularis pontis:

A. FALSE reticularis pontis=REM sleep generator. Its loss=inability to enter REM sleep from NREM sleep
B FALSE reticularis pontis projects directly to cells in the medulla that in turn project to the spinal cord
C. TRUE reticularis pontis=REM sleep generating nucleus
D. FALSE its loss=inability to enter REM sleep from NREM sleep
E. FALSE only brain death=flat EEG

17. Which of the following statements is/are **TRUE**?

A. TRUE remember, the DA/VTA neurons project not only to nucleus accumbens, but to cortex
B. FALSE just the opposite—ACh concentrations would be increased!
C. FALSE nicotine=ACh receptor agonist=increase in firing of circuitry that affects wakefulness/arousal
D. FALSE muscarinic receptor antagonists= decrease in firing of circuitry that affects wakefulness/arousal
E. FALSE acetylcholinesterase's biological role is the termination of impulse transmissions at cholinergic synapses---**neostigmine** apposes the action of acetylcholinesterase=wakefulness/arousal (Don't confuse with carbachol =cholinergic (muscarinic) agonist)

18. Which of the following statements is/are **TRUE**?

A. FALSE sleepy time! One or two sprays and turn off the light!!
B. TRUE posterior hypothalamus/TM=histamine=arousal—lesion=no histamine/arousal=sleepy time!
C. FALSE think reticularis pontis/REM/ACh
D. FALSE both inhibit (GABA) reticularis pontis
E. FALSE a GABA-ergic cell group in the pons (has no name that you need to know!) suddenly kicks in to inhibit both DR and LC. This means that DR and LC can no longer inhibit reticularis pontis, which is then free to do its REM-sleep induction.

19. Sleep patterns in infants differ from those in adults in all of the following ways **EXCEPT**:

A. TRUE newborn infant=16-18 hours/day
B. TRUE duh!
C. FALSE can exceed 50% in infants—20-25% in adults
D. TRUE 50-60 minutes=infant; 90-100=adults
E. TRUE so true!

20. All of the following may be associated with aging **EXCEPT**:

A. TRUE replaced by stages 1 and 2
B. TRUE most common=insomnia
C. FALSE napping!!
D. TRUE
E. TRUE

21. The human circadian pacemaker is located in the:

A. FALSE no, suprachiasmatic!
B. FALSE no, suprachiasmatic!
C. FALSE no, suprachiasmatic!
D. FALSE no, suprachiasmatic!
E. TRUE who would ever guess E?

22. The period of the endogenous human circadian pacemaker using the temporal isolation protocol:

A. FALSE no, 25 hours
B. TRUE life in a cave!
C. FALSE no, 25 hours
D. FALSE no, 25 hours
E. FALSE no, 25 hours

23. Which of the following statements is **TRUE**?

A. FALSE more than 50% in one year old's and 20-25% in Mom's
B. FALSE just the opposite is true!
C. FALSE the adolescent decrease in sleep duration may not represent a decrease in sleep need because the decreased sleep duration is accompanied by increased daytime sleepiness
D. FALSE just the opposite is true
E. TRUE approximately. Just get the concept that they are about the same

24. Which of the following statements is **TRUE**?

A. FALSE you lose 3-4 and it is replaced by 1-2
B. FALSE sadly, age!!
C. FALSE duh!
D. TRUE so true!
E. FALSE sadly less, but more napping!

25. Which of the following is/are **TRUE**?

A. FALSE you lose 3-4 and it is replaced by 1-2
B. FALSE insomnia
C. FALSE
D. FALSE as one ages, you lose 3-4 and it is replaced by 1-2
E. TRUE

26. Which of the following statements is/are **TRUE**?

A. FALSE the pacemaker for circadian rhythms=suprachismatic nucleus
B. TRUE the pacemaker for circadian rhythms=suprachismatic nucleus
C. FALSE the greatest circadian propensity for sleep coincides with the temperature minimum
D. FALSE reticularis pontis is in the pons!!
E. FALSE fractured sleep but same total hors sleep

27. Which of the following statements is/are **TRUE** regarding a desynchronized EEG?

A. FALSE desynchronized EEG looks "nervous/jittery/low amplitude/high frequency/awake." Synchronized =relaxed/lazy/low frequency, high amplitude/sleepy time/**delta**
B. FALSE desynchronized EEG looks "nervous/jittery/**low amplitude**/high frequency/awake." Synchronized looks relaxed/lazy/low frequency, high amplitude/sleepy time
C. FALSE desynchronized EEG looks "nervous/jittery/low amplitude/high frequency/awake." Synchronized looks relaxed/lazy/low frequency, high amplitude/sleepy time
D. TRUE desynchronized EEG looks "nervous/jittery/low amplitude/high frequency/awake." Synchronized looks relaxed/lazy/low frequency, high amplitude/sleepy time
E. FALSE see D

28. Which of the following statements is/are **TRUE** regarding a synchronized EEG?

A. FALSE REM=desynchronized/awake-like
B. FALSE desynchronized EEG looks "nervous/jittery/low amplitude/high frequency/awake." Synchronized looks relaxed/lazy/low frequency, **high amplitude**/sleepy time
C. TRUE desynchronized EEG looks "nervous/jittery/low amplitude/high frequency/awake." Synchronized looks relaxed/lazy/**low frequency**, high amplitude/sleepy time
D. FALSE sleepy time
E. FALSE sleepy time

29. Which of the following statements is **FALSE** regarding REM sleep?

A. TRUE tonic REM=generalized atonia of skeletal muscles except for the extraocular muscles and the diaphragm
B. TRUE Classic NB
C. FALSE I have roughly what you have! Lot less than when I was born!!
D. TRUE Classic NB
E. TRUE desynchronized/jittery/awake-like

30. Which of the following statements is **TRUE** regarding the EEG pattern shown above? **Drawing shows a real lazy looking EEG!**

A. FALSE drawing shows an extremely lazy looking EEG!
B. FALSE drawing shows an extremely lazy looking EEG!
C. FALSE drawing shows an extremely lazy looking EEG!
D. FALSE drawing shows an extremely lazy looking EEG!
E. TRUE drawing shows an extremely lazy looking EEG!

31. Which of the following statements is **TRUE** regarding the EEG pattern shown above? **Drawing shows an intermediate looking EEG (not real jittery but not lazy) with SLEEP SPINDLES and K COMPLEXES=STAGE 2!**

A. FALSE drawing shows an intermediate looking EEG (not real jittery but not lazy) with SLEEP SPINDLES and K COMPLEXES= STAGE 2
B. FALSE drawing shows an intermediate looking EEG (not real jittery but not lazy) with SLEEP SPINDLES and K COMPLEXES= STAGE 2
C. FALSE drawing shows an intermediate looking EEG (not real jittery but not lazy) with SLEEP SPINDLES and K COMPLEXES= STAGE 2 **NEURO EXAM=REAL JITTERY**
D. FALSE alpha=8-12 cps
E. TRUE drawing shows an intermediate looking EEG (not real jittery but not lazy) with SLEEP SPINDLES and K COMPLEXES= STAGE 2

32. Which of the following statements is **TRUE** regarding the EEG pattern shown above? **Drawing shows an intermediate looking EEG (not real jittery but not lazy) with THETA ACTIVITY/WAVES=STAGE 1**

A. FALSE pretty similar
B. FALSE jittery versus lazy
C. FALSE 18-24 cps=beta
D. TRUE more jittery than lazy delta
E. FALSE sleep spindles and K complexes=stage 2 while theta waves=stage 1

33. Which of the following statements is **TRUE** regarding the EEG pattern shown above? **Drawing shows an intermediate looking EEG (not real jittery but not lazy) with SAWTOOTH waves=REM**

A. FALSE very similar
B. FALSE REM=dreaming Classic…….
C. FALSE is more jittery(asynchronous) than lazy stage 4/delta
D. FALSE SAWTOOTH WAVES
E. TRUE except for the extraocular muscles and the diaphragm

34. Hypocretin (orexin):

A. FALSE hypocretin (orexin) is produced by cells in the hypothalamus that provide **excitatory input** to all components of the ARAS and the LC is part of the ARAS.
B. FALSE hypocretin (orexin) is produced by cells in the hypothalamus that provide **excitatory input** to all components of the ARAS
C. FALSE animal models of narcolepsy are related to deficits in the hypocretin system; canine narcolepsy is caused by a mutation in the hypocretin type 2 receptor gene.
D. FALSE hypocretin (orexin) is produced by cells in the hypothalamus
E. TRUE hypocretin (orexin) is produced by cells in the hypothalamus

35. Which of the following statements is **TRUE**?

A. FALSE process S" increases the longer one stays awake. It (process S) behaves like an adjustable hourglass, filling more with increased wakefulness.
B. FALSE the circadian process C reaches its peak during the latter half of the night. It is confusing but C reaches its peak at trough; C1 in the illustration
C. FALSE process S increases the longer you are awake; see A
D. TRUE
E. FALSE see D

Epilepsy

1. Seizures that begin in one area of the cortex are called:

A. FALSE generalized seizures begin diffusely throughout the cortex
B. FALSE an absence seizure is a generalized seizure, and generalized seizures begin diffusely throughout the cortex
C. FALSE there is no such thing as a primary seizure—don't confuse with partial
D. TRUE partial (also called focal) seizures start in one region of the cortex
E. FALSE see D

2. Generalized seizures:

A. TRUE
B. TRUE
C. TRUE
D. TRUE **A, B and C are correct.**
E. FALSE

3. Partial seizures that impair consciousness:

A. TRUE
B. FALSE impairment of consciousness=involvement of limbic structures
C. FALSE any seizure that begins in one area of the cortex (partial or focal) may spread and the seizure may evolve into a generalized tonic-clonic or grand mal seizure.
D. FALSE- there is significant dysfunction of the hippocampi during the seizure that blocks memory formation.
E. FALSE see A

4. Which of these mechanisms have anti-epileptic actions?

A. TRUE seizures appear to begin because of an imbalance between synaptic inhibition and excitation, with too much excitation resulting in the seizure activity
B. TRUE
C. TRUE an effective drug for absence seizures is ethosuximide, which **reduces** low threshold calcium currents
D. TRUE
E. FALSE this would increase overall excitation

5. Which of the following statements is **FALSE** regarding complex partial seizures?

A. TRUE
B. TRUE
C. FALSE
D. TRUE
E. TRUE

6. Consciousness is **normal** during which type of seizure?

A. FALSE
B. FALSE
C. FALSE
D. TRUE
E. FALSE see D

Consciousness

1. The most common cause of **coma** is:

A. TRUE the most common cause of coma= metabolic dysfunction (drugs or endogenous)
B. FALSE the most common cause of coma=metabolic dysfunction (drugs or endogenous)
Supratentorial lesions are lesions of structures above the tentorium cerebelli. The most common causes of coma are metabolic derangements. We term this condition **encephalopathy**. The cerebral hemispheres, thalamus, basal ganglia, lateral and third ventricles, and hypothalamus are considered **supratentorial**. (About 73% of cavernous angiomas are supratentorial). **Infratentorial** = below the level of the tentorium=cerebellum, pons, medulla, midbrain, and fourth ventricle. (About 27% of cavernous angiomas are infratentorial).
C. FALSE the most common cause of coma= metabolic dysfunction (drugs or endogenous)
D. FALSE the most common cause of coma= metabolic dysfunction (drugs or endogenous)
E. FALSE the most common cause of coma= metabolic dysfunction (drugs or endogenous)

2. Which of the following occurs in **locked in syndrome**?

A. FALSE this refers to persistent vegetative state, not locked in
B. TRUE ARAS is not affected, as pathways run in tegmentum of pons, not basilar region (where cortico-bulbars and -spinals are!)
C. FALSE ARAS is not affected
D. FALSE UMN lesion, so reflexes are present
E. FALSE UMN lesion, so reflexes are present

3. Which of the following occurs in **coma**?

A. FALSE this is true for persistent vegetative state, not coma!
B. FALSE coma=abnormal EEG
C. TRUE
D. FALSE the reflexes affected would depend on the brain stem level of damage
E. FALSE reserved for Brain Death only

4. Which of the following occurs in **brain death**?

A. FALSE refers to persistent vegetative state, not brain death
B. FALSE brain death=flat EEG
C. FALSE brain death=son a respirator
D. TRUE brain death=no brain stem reflexes
E. FALSE brain death=no reflexes

5. Which of the following occurs in **persistent vegetative state**?

A. TRUE
B. FALSE the EEG is abnormal
C. FALSE there is relatively normal respiration due to intact brain stem
D. FALSE relatively normal brain stem reflexes due to intact brain stem
E. FALSE sleep wake cycles are relatively normal

6. Which of the following statements is **FALSE**?

A. TRUE
B. TRUE you can have everything else working for you but without the cortex you are not conscious
B. TRUE
D. TRUE
E. FALSE it is the part that keeps you awake!

7. Which of the following statements is **FALSE?**

A. TRUE this causes interruption of the ARAS and the thalamus
B. TRUE central herniation that pushes on the midbrain=mid-sized that are unreactive to light (fixed; bilateral interruption of the descending autonomics and stretching of CN IIIs.
C. TRUE any ARAS pathways ascending from the spinal cord? None that I know of!
D. TRUE Classic NB
E. FALSE ARAS is traveling in the upper/dorsal part of the pons known as the tegmentum, while cortico-spinals and -bulbars are in the basilar or lower/ventral part of the pons

8. Which of the following statements is **FALSE** regarding the clinical deficits that can result from a cortical mass in the **left** cortex and **left** uncal herniation?

A. TRUE
B. TRUE this is the first sign of uncal herniation
C. TRUE
D. TRUE once the left side uncal herniation pushes the opposite, right cerebral peduncle against the free border of the tentorium=left hemiplegia added to the earlier right hemiplegia=quadriplegia
E. FALSE would such a lesion affect the ARAS? Sure!

9. Which of the following statements is **FALSE** about **brain death**?

A. TRUE brain death=no reflexes
B. FALSE brain death=flat EEG
C. TRUE brain death=no respiraton
D. TRUE brain death=sleep wake cycles
E. TRUE brain death=no reflexes

10. Which of the following statements is **TRUE** about the lesion shown here? **Lesion involves entire basilar pons at level of superior cerebellar peduncle.**

A. FALSE the ARAS is traveling in the tegmentum
B. FALSE no corticobulbars are working
C. FALSE no corticobulbars or corticospinals are working
D. FALSE this is locked-in syndrome. Classic NB!
E. TRUE

11. Which of the following statements is **FALSE** about the **persistent vegetative** state?

A. TRUE
B. TRUE
C. TRUE
D. FALSE abnormal/irregular EEG
E. TRUE

12. Which of the following statements is **FALSE** regarding **locked-in** syndrome?

A. TRUE
B. TRUE
C. TRUE
D. TRUE after the period of spinal shock
E. FALSE bilateral lesion of corticobulbars—basilar pons blow out!!

13. Fill in the blanks in the table below.

Sleep Waking cycle in coma=abnormal/absent
EEG in brain death=flat!
Respiration in PVS=normal
EEG in locked-in=normal

14. Which of the following statements is **TRUE**?

A. FALSE decerebrate=arms extended, legs extended
B. FALSE the legs are EXTENDED in both decerebrate and decorticate rigidity
C. FALSE lesion in decerebrate lies caudal to the ruber
D. FALSE the lesion lies between the superior and inferior colliculi in DECEREBRATE rigidity
E. TRUE I can't find one!

15. In brain death:

A. FALSE brain death=no reflexes
B. FALSE brain death=no reflexes
C. FALSE brain death=no reflexes
D. FALSE brain death=no reflexes
E. TRUE lots of falses!

16. Which of the following is **TRUE** regarding Kernohan's notch?

A. TRUE the notch is in the cerebral peduncle opposite to an uncle herniation. There is a Babinski contra to the notch!
B. FALSE the notch is in the cerebral peduncle opposite to an uncle herniation, and the subdural is ipsi to the uncal herniation
C. TRUE
D. FALSE in the cerebral peduncle
E. TRUE see A and C

17. Which of the following associations is/are **correct** regarding the four different stages of damage shown here? **A=**damage to right cerebral hemisphere and underling diencephalon (includes hypothalamus; **B**=central herniation; **C**=lesion between superior and inferior colliclui; **D**=lesion rostral medulla

A. TRUE all of the circuitry for the VOR is intact, from the semicircular canals (SCCs) to CN III
B. FALSE decorticate; lesion needs to be south of the ruber fro decerebrate
C. FALSE the pupil are mid-sized. The descending hypothalamic fibers that are headed for T1-L2 are interrupted=constricted pupils but CN IIIs are shot too=dilated pupils
D. FALSE they are midsized as the lesion shown at D includes all of the damage rostral to it!
E. FALSE the pupils following A are constricted since the descending hypothalamic fibers that are headed for T1-L2 are interrupted=constricted pupil (miosis)

18. Which of the following associations is/are **correct** regarding the four different stages of damage shown above? **A=**damage to right cerebral hemisphere and underling diencephalon (includes hypothalamus; **B**=central herniation; **C**=lesion between superior and inferior colliclui; **D**=lesion rostral medulla

A. TRUE
B. TRUE **B**=decorticate rigidity
C. FALSE since in C CN III is damaged, the action of the VOR is affected. Thus stimulation of the right ear with warm water will result in movement of the left eye to the left, (right vestibular apparatus, right vestibular nuclei, left PPRF and left LR6 are fine). However, the right medial rectus cannot contract as CN III is shot. No DOLL'S EYES
D. FALSE lesion shown at D includes all of the damage rostral to it. So CN III is wiped out. **The pupils cannot be reactive without CN III!**
E. TRUE see A and B