DRUG EFFECTS ON SLEEP (p.1)

Note: Gained by clinical observation often, not by FDA guidelines as part of a consistent protocol in the preapproval screening of new drugs (unless the new drug’s stated purpose is as a hypnotic)

1. **Stimulants**
   All interfere with sleep:
   - Increase WASO, # awakenings, SOL, stages 1&2
   - Decrease TST, stages 3&4, stage REM

   e.g. caffeine, nicotine, central nervous system stimulants (methylphenidate, amphetamines, cocaine)

   e.g. modafinil (Provigil) decreases EDS, does it interfere with sleep?

   Note: must consider drug half-life and when take drug relative to bedtime

2. **Sedative-Hypnotics**
   All facilitate sleep, but may alter sleep architecture/staging:
   - Increase TST, stage 2 (esp. sleep spindles), next day sleepiness (“hangover”)
   - Decrease WASO, # awakenings, SOL
   - Marked decrease in stage REM with barbiturates
   - Marked decrease in stages 3&4 with BZDs, slight decrease with barbs

   Note: must consider drug half-life, esp. re. SOI, SMI, & hangover effects

   e.g. Ambien (zolpidem)  1.5 – 4.5 hours half-life

<table>
<thead>
<tr>
<th>Drug</th>
<th>Half-life</th>
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</thead>
<tbody>
<tr>
<td>Ativan (lorazepam)</td>
<td>7.9 – 11.4</td>
</tr>
<tr>
<td>Dalmane (flurazepam)</td>
<td>48 – 120</td>
</tr>
<tr>
<td>Doral (quazepam)</td>
<td>48 – 120</td>
</tr>
<tr>
<td>Halcion (triazolam)</td>
<td>2 – 6</td>
</tr>
<tr>
<td>ProSom (estazolam)</td>
<td>8 – 24</td>
</tr>
<tr>
<td>Restoril (temazepam)</td>
<td>8 – 20</td>
</tr>
<tr>
<td>Sonata (zaleplon)</td>
<td>.9 – 1.1</td>
</tr>
<tr>
<td>Xanax (alprazolam)</td>
<td>6.3 – 11.2</td>
</tr>
</tbody>
</table>

   Benadryl (diphenhydramine) 1 - 3
   Unisom (doxylamine) 10
   Ethanol (ethyl alcohol) dose dependent
3. **Antidepressants**
   May either interfere with or facilitate sleep

   **MAOIs:**
   Completely eliminate stage REM
   Slight increase in WASO, slight decrease in TST

   **Heterocyclics:**
   Suppress REM to varying degrees
   Slight increase in stage 3&4, increase TST usually
   Some are sedating --- decrease WASO, # awakenings, & SOL
   Some are activating --- increase WASO, # awakenings, & SOL

   e.g. sedating antidepressants:
   Elavil (amitriptyline), Adapin/Sinequan (doxepin), Tofranil (imipramine)

   e.g. non-sedating (activating) antidepressants:
   Anafranil (comipramine), norpramine (desipramine), Pamelor (nortriptyline), Vivactyl (protriptyline)

   **SSRIs:**
   Suppress REM, may markedly delay REM onset
   May decrease TST
   May increase SOL, stage

   Depends on the individual medication
   Prozac (fluoxetine): increased insomnia reported in 5 – 19% of Ss
   Luvox (fluvoxamine), Paxil (paroxetine): sedation reported in up to 26% of Ss
3. **Antidepressants** (cont.)

Other antidepressants:

Desyrel (trazodone)
- 5 – 45% of Ss report “drowsiness”
- Increased TST, next day EDS, stages 3 & 4
- Decreased SOL, WASO, slight decrease in REM

Serzone (nefazodone)
- 6 – 24% of Ss report “drowsiness”
- Increased stages 3&4

Effexor (venlafaxine)
- 4 – 18% of Ss report “insomnia” at usual dose levels
- 12 – 31% of Ss report “somnolence” at higher dose levels (>150mg)

Remeron (mirtazapine)
- Up to 52% of Ss report “sedation” (about equal to Elavil or Desyrel)

Wellbutrin (bupropion)
- 5 – 19% of Ss report “insomnia”
- No effect on TST or SOL
- Decreased REM latency, increased % of REM

Note: issues re. **REM suppression & REM rebound** upon D/C antidepressants

Note: delaying REM onset to end of night’s sleep & dream recall/vividness

Note: selective REM suppression & antidepressant action of these drugs

**Does REM suppression “cure” depression?…**
4. **Antipsychotics**

Like depressives, psychotics often report poor sleep (increased SOL & WASO, decreased TST, many awakenings, restless sleep, etc.)

Antipsychotics (neuroleptics, antischizophrenic drugs) usually improve sleep. Increase TST, although may have some hangover effects, esp. traditional antipsychotics (Ss c/o drowsiness, sedation)

- e.g. Thorazine (chlorpromazine)
- Mellaril (theoridazine)

May increase or decrease stage 3 & 4

Newer antipsychotics may be sedating
- e.g. Clozaril (clozapine)
- Zyprexa (olanzapine)

5. **Mood Stabilizers**

- e.g. Lithium
  - Increased sedation, TST, may increase stage 3&4
  - Decreased REM
  - Case of induced somnambulism has been reported

- e.g. Tegretol (carbamazepine)
  - Increased sedation (up to 11% of Ss), TST
  - Agitation, restlessness, & insomnia also reported occasionally

- e.g. Depakote (valproic acid)
  - Slight increase in sedation
  - No significant effects on sleep reported
6. **Narcotics**
   Acute use: increased WASO, decreased REM & stages 3&4
   Chronic use: no change in WASO or stages 3&4, decreased REM

7. **Other Drugs**
   Aspirin: acute use decreases stages 3&4
   Catapres (clonidine):
      No effect on TST
      Increases WASO, more fragmented sleep architecture
      Decreases REM
   Tagamet (cimetidine):
      Increases stages 3&4
   L-Dopa:
      No effect on TST or stages3/4
      Increases REM
   Steroids (including Prednisone):
      Increases SOL, WASO, c/o insomnia
      Decreases TST
   Tetrahydrocannabinol (marijuana)
      Acute use: minimal sleep disruption, slight decrease in REM
      Chronic use: marked, long-term suppression of stages 3&4