Chapter 6: Cocaine, amphetamines and related stimulants:

Cocaine:

<table>
<thead>
<tr>
<th>Stimulant and natural insecticide. In the past it was used as an anesthetic.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absorbed by axon and increases the neuron's ability to block ion channels that impulses move through.</td>
</tr>
<tr>
<td>Affects serotonin, ACh and dopamine.</td>
</tr>
<tr>
<td>Causes the release of dopamine in the nucleus accumbens.</td>
</tr>
<tr>
<td>Freebasing cocaine occurred during the 1970's. Freebasing is heating cocaine until it vaporizes and then inhaling the vapors.</td>
</tr>
<tr>
<td>Crack cocaine emerged in 1986. It is mixed with baking soda (hence the cracking sound when heated), then heated and inhaled.</td>
</tr>
<tr>
<td>Street cocaine is a mixture of hydrochloric acid and ground cocoa leaves. It is soluble in water and can therefore be inhaled or injected.</td>
</tr>
</tbody>
</table>

Amphetamines:

<table>
<thead>
<tr>
<th>High levels inhibit the ability of neurons to operate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulate release of dopamine and noradrenaline.</td>
</tr>
<tr>
<td>Alter firing patterns in the reticular formation, cerebral cortex and hypothalamus.</td>
</tr>
<tr>
<td>Methamphetamine has been around since the 1970's. Know as “ice”, “crank”, “crystal” or “meth”. Friend of Tina? In the 80's this was called a “biker” drug - now it is the “club” drug.</td>
</tr>
</tbody>
</table>

Pharmacokinetics of stimulants:

Stimulants such as amphetamines and cocaine are readily absorbed into body when inhaled, but the onset of their action and the peak of their behavior is delayed somewhat (15 minutes) after inhalation. Direct injection acts within 30 seconds.

Stimulants act on monoamine neurotransmitters (dopamine, norepinephrine and serotonin). They block reuptake of these neurotransmitters, so that they (especially dopamine) are available for activity. Because the neurotransmitters do not get reabsorbed, they are left in the synaptic cleft (gap) and are broken down by enzymes. Hence, fewer are available at any given time. This can lead to depression.

Discussion Topics/Questions:

Cocaine and the Incas - p. 118
Methamphetamine and health - p. 129
Cocaine and other drugs - p. 134
Cocaine babies - legacy of the crack era? - p. 136
Khat - a stimulant from the horn of Africa - p. 128
Chapter 7: Nicotine:

Similar in structure to ACh. It causes the release of dopamine in the brain. At low doses it stimulates ACh receptors.

Drug is called biphasic because it has different effects at low and high dosages.

It affects the mesolimbic reward system and therefore is addictive.

Most readily absorbed by inhalation, but can be absorbed through the skin as well.

The liver is responsible for processing and excreting nicotine.

Takes only 10-20 minutes to reach half-life: that’s why smokers get twitchy and need a new cigarette as soon as they finish the one they are smoking.

Passive smoke is a killer! Nobody should smoke.

Discussion Topics/Questions:

* Smoking overseas – p. 155
* Cigarette smoking and health – who’s responsible – p.158
* Harm reduction and nicotine dependence – p. 164

Chapter 8: Caffeine

Xanthines:

A family of stimulants associated with coffee, tea and chocolate. Include caffeine, theophylline and theobromine.

Caffeine blocks the receptors for an inhibitory neurotransmitter known as adenosine. Therefore, caffeine has a stimulatory effect.

*Caffeine* is also present in tea, coffee and chocolate.

Caffeine increases the release of noradrenaline, dopamine, GABA, ACh and serotonin.

Tea-contains theophylline.

Chocolate-contains theobromine.

The liver metabolizes xanthenes, and the kidneys excrete them.

*Caffeinism* (acute effect of caffeine) can result in irregular heartbeat, insomnia, headaches, breathlessness, etc.

Discussion Topics/Questions:

* Caffeine and Kids – 173
* Combining energy drinks and alcohol – p. 178
* Coffee as the beverage of ideals – p. 180
Chapter 9: Alcohol:

Refer to chapter 12 in the nutrition text!

Taken in by cell membrane of neurons and alters the stability of the cell. At low doses will affect amino acid transmitters.

Greater impact on females than on males, partly due to genetic difference in production of an enzyme known as gastric alcohol dehydrogenase. Women produce less than men.

Increases GABA's ability to inhibit functions.

Decreases the ability of glutamate to excite cell responses, therefore affects memory (since glutamate facilitates memory formation).

Taken in by cell membrane of neurons and alters the stability of the cell. At low doses will affect amino acid transmitters.

Competes for endorphin receptors.

Affects the hypothalamus and therefore the immune response decreases.

Serotonin (which regulates centers that deal with aggression and depression) has undefined relationship with alcohol.

Discussion Topics/Questions:

Ends of the age spectrum and drinking - p. 194
Drinking games and alcohol advertising - p. 195
The hangover's many "cures" - p. 205
Is alcohol dependence a disease? - p. 221
Alcohol and the Japanese - p. 223

Chapter 10: Opiates

Opium comes from poppy plants. Native to the Middle East, but also found in Asia. "Golden Triangle" of Southwest Asia is the main site of opiate production: Afghanistan and Pakistan. It is a milky white sap that is located inside the mature poppy seeds. After drying, this sap turns brown and is "opium".

Narcotics include the opiates and variations of opiates, such as morphine and heroin.

Opiates compete for endorphin and enkephalin receptors in the brain and body neurons.

Opiates will depress the respiratory (pre-Botzinger) center as well as the emotional centers of the brain.

These drugs also cause constipation, the contraction of eye pupillary contractions and other various side effects when used on a regular basis.

The Harrison Narcotic Act (1914) placed the control of opiates in the hands of physicians.

Discussion Topics/Questions:

Poppies of Afghanistan: the Taliban and the heroin trade - p. 233
Fatal attractions: IV drug use and AIDS - p. 235
Chapter 11: Marijuana

Regular marijuana (from the Portuguese word meaning intoxicant) contains delta-6-THC.

Hashish (hash oil) is a Cannabis sativa resin and is twice as powerful because it contains delta-9-THC (THC = tetrahydrocannabinol).

Cannabinoids are highly lipid soluble. They decrease the ACh levels in the hippocampus of the brain (hence memory loss).

THC interferes with REM sleep patterns, increases heart rate and BP and decreases body temperature, is a bronchodilator, has harsh, cancer-causing smoke and also decreases testosterone levels.

Long-term use can damage the hippocampus of the brain, which is the memory-processing center of the midbrain.

Neurons have a receptor that responds to THC. The body must therefore produce a similar compound. In fact it is called anandamide (a/k/a arachidonylethanolamide).

Anandamide is located in the basal ganglia and cerebellum.

Discussion Topics/Questions:

Gautier's experiences at the hashish club - p. 251
Marijuana as a gateway drug to other drug use - p. 258
The San Francisco cannabis buyers club - p. 263
AMP: combining embalming fluid and marijuana - p. 272

Chapter 12: Hallucinogens

The most powerful are ergot (LSD) and Amanita muscaria (fly agaric).

LSD is absorbed in the digestive tract and is the most powerful of the known hallucinogens.

LSD affects the serotonin receptor known as #5HT2.

50 micrograms of LSD has a 3-hour half-life, but the behaviors associated with the drug can linger for up to 8-hours.

LSD can inhibit or excite depending upon the particular neuron it affects.

Discussion Topics/Questions:

Peyote - p. 280
Descriptions of the subjective effects of LSD - p. 287
Hallucinogenic ibogaine: new Rx for addiction? - p. 289
Voices of ecstasy - p. 293