Chem 106: Class/ Lab

Week 17

- Sign in
- Pick up papers & Lab Drawer Inventory Sheet & Tag for Lab combination lock
- Sit @ your original Lab Drawer Station

Chem 106: EXAM 3

Last 90 minutes of Lab after Lab Drawer check-in

All Reading, Viewing, & Doing from Week #12 including Acids-Bases: thru Week (#16) including Global Warming

20 Multiple Choice (4pts ea); 10 T/F (2pts ea) plus matching & 5 problems (~5-6 pts ea);

3 pages 2-sided handwritten notes + Periodic Table

FINAL EXAM

MONDAY, December 11th
1:00 - 3:00PM

Comprehensive

3 to 4 Questions taken from today's class material;
Remaining questions based on previous 3 Exams.

30 Multiple Choice (4pts ea); 15 T/F (2pts ea) plus matching & 8 problems; (200 pts TOTAL)

5 pages 2-sided handwritten notes + Periodic Table

Anonymous
End of Course Survey

4-Dec to 11-Dec.

Full Quiz Credit provided on completion.

- Go to http://www.salgsite.org/student
- Fill in your email address
- Enter the instrument number: 80139
- Provide the instrument password: chem106

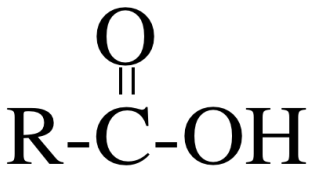
Organic Molecules
Functional Groups

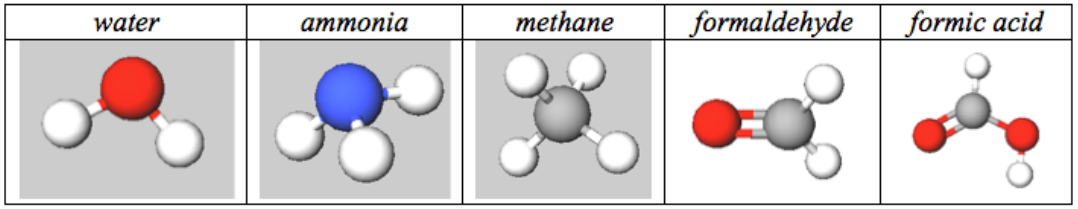
Amines: Weak Organic Bases
Carbon Derivatives of Ammonia

Dr. Ron Rusay

Small Organic Molecules

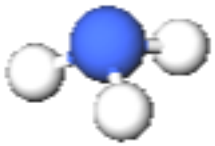
Common Functional Groups

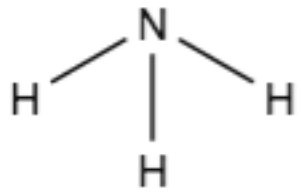
Name	General Formula
Alcohols	R–OH
Ethers	R–O–R′
Amines	$R–NH_2$
Carboxylic Acids	



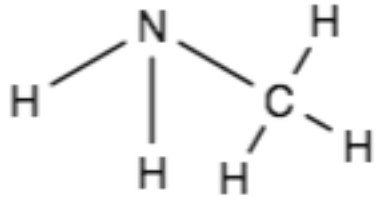
Small Organic Molecules

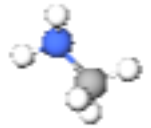
Ammonia & Amines

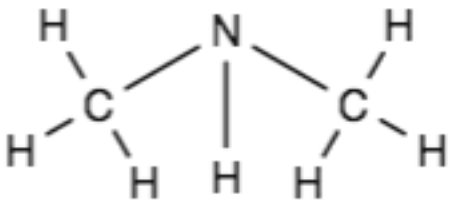


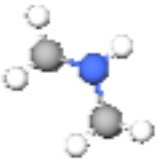


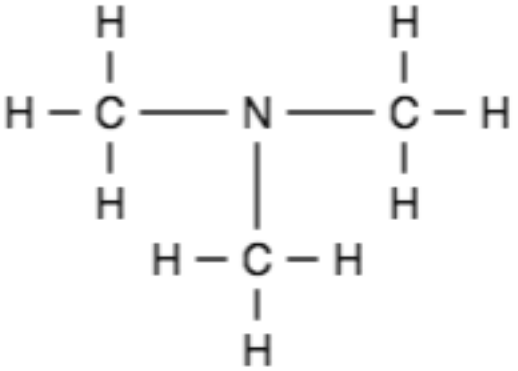
Household ammonia (aqueous)

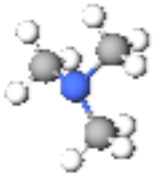






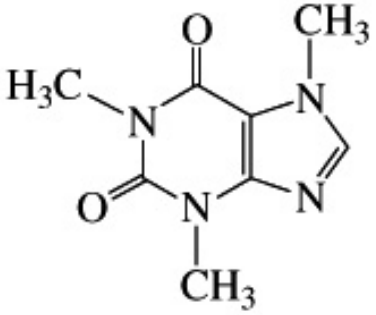




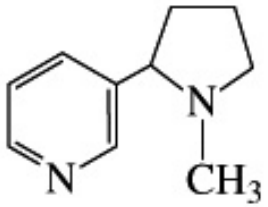


Naturally Occuring Bases

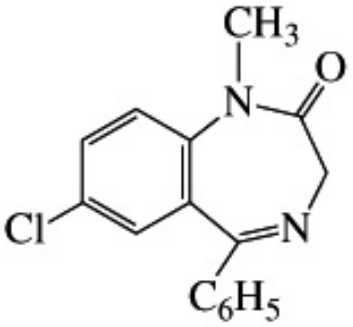
Nitrogen Heterocycles



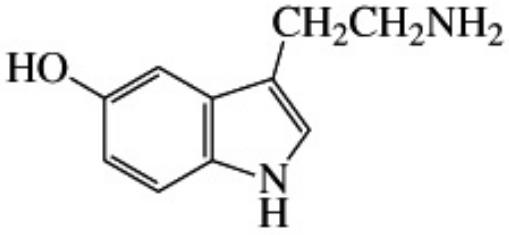
caffeine



nicotine

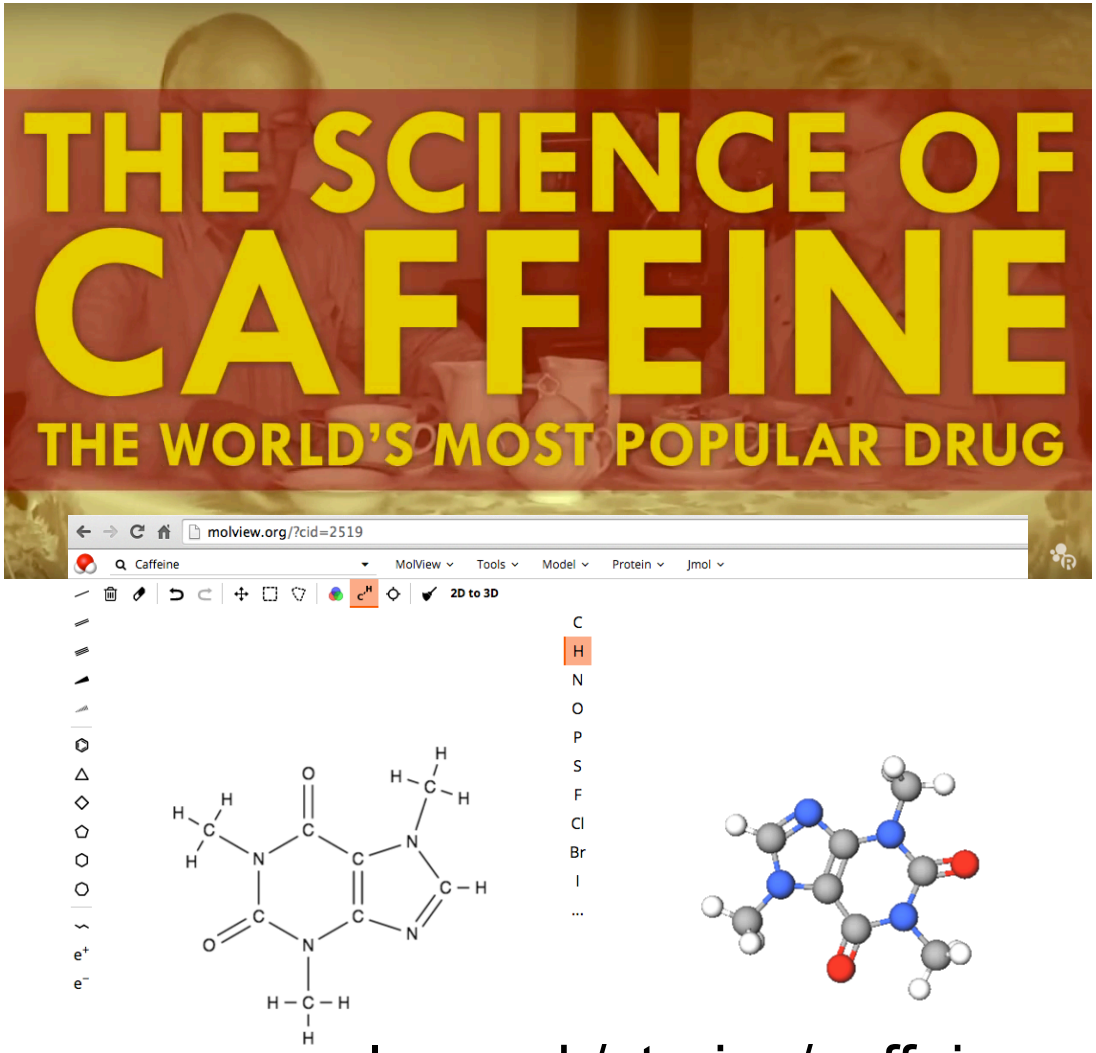


Valium



serotonin

https://www.youtube.com/watch?v=YuJOhpNS0IY



http://www.coca-cola.co.uk/stories/caffeine-counter

https://www.youtube.com/watch?v=YuJOhpNS0IY

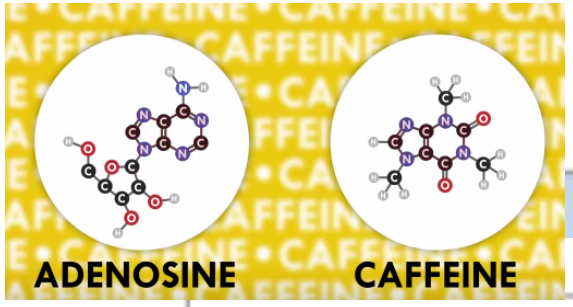
Caffeine: a natural insecticide, LD_{50} = 150 mg/kg

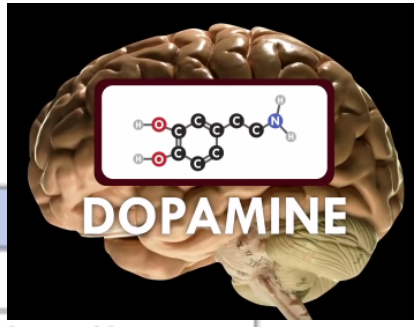
http://www.sacbee.com/news/nation-world/article150611622.html

THE SACRAMENTO BEE

Healthy teen dies of heart problems after too much caffeine

Drank a large Mountain Dew, a latte from McDonald's and an energy drink in the two hours before his heart fell out of rhythm.

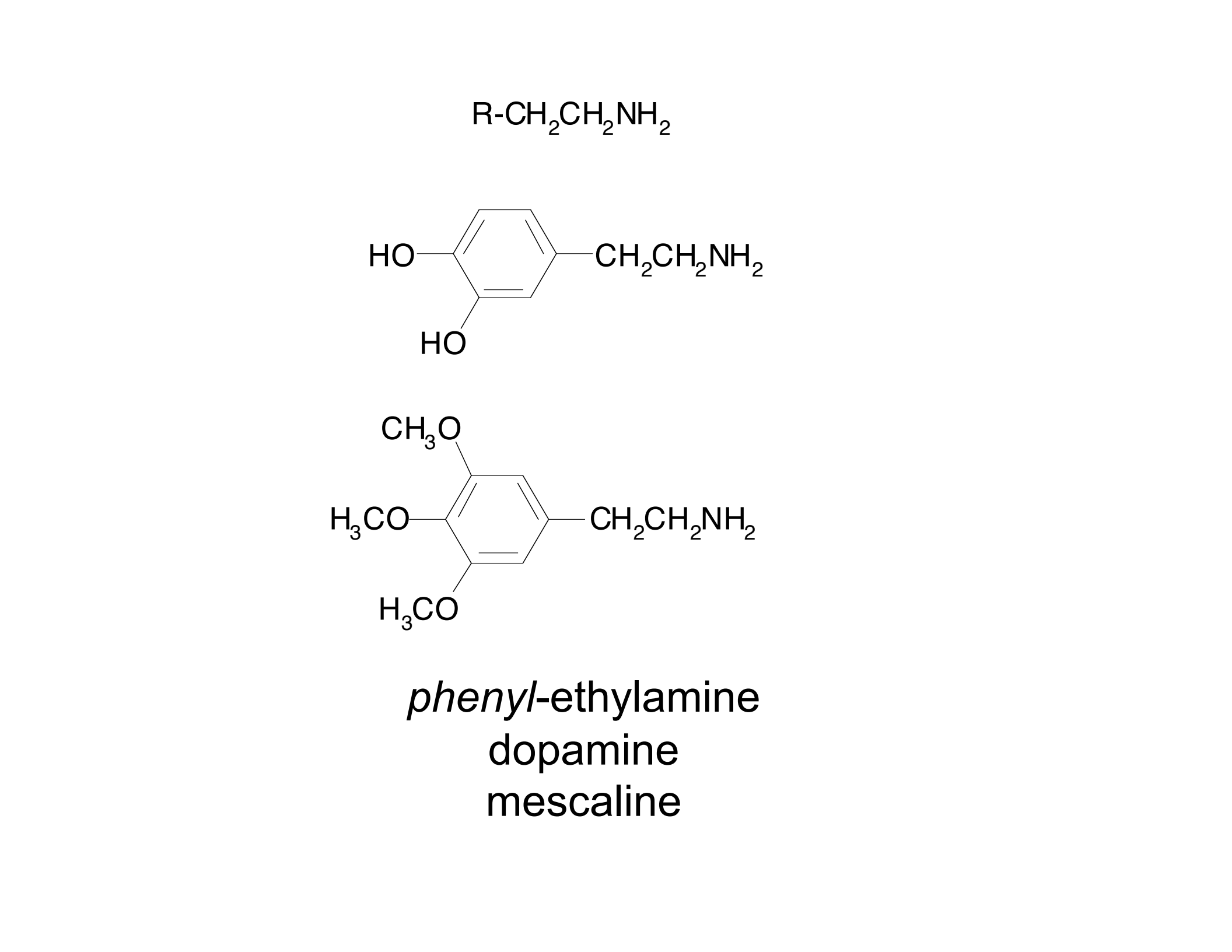




Major Neurotransmitters in the Body [1, 7, 8]

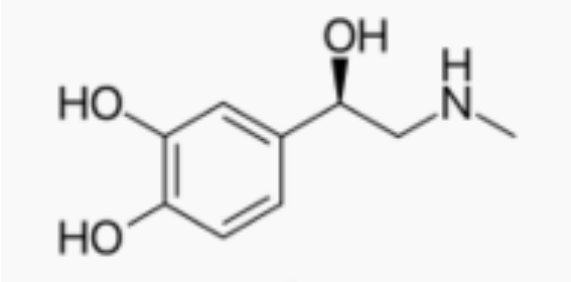
	Role in the body
Acetylcholine	A neurotransmitter used by spinal cord neurons to control muscles and by many neurons in the brain to regulate memory. In most instances, acetylcholine is excitatory.
Dopamine	The neurotransmitter that produces feelings of pleasure when released by the brain reward system. Dopamine has multiple functions depending on where in the brain it acts. It is usually inhibitory.
GABA (gamma-aminobutyric acid)	The major inhibitory neurotransmitter in the brain.
Glutamate	The most common excitatory neurotransmitter in the brain.
Glycine	A neurotransmitter used mainly by neurons in the spinal cord. It probably always acts as an inhibitory neurotransmitter.
Norepinephrine	Norepinephrine acts as a neurotransmitter and a hormone. In the peripheral nervous system, it is part of the fight-or-flight response. In the brain, it acts as a neurotransmitter regulating normal brain processes. Norepinephrine is usually excitatory, but is inhibitory in a few brain areas.
Serotonin	A neurotransmitter involved in many functions including mood, appetite, and sensory perception. In the spinal cord, serotonin is inhibitory in pain pathways.

http://learn.genetics.utah.edu/content/addiction/reward/pathways.html

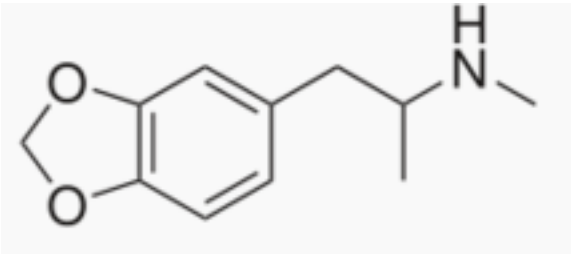


phenyl-ethylamine
dopamine
mescaline

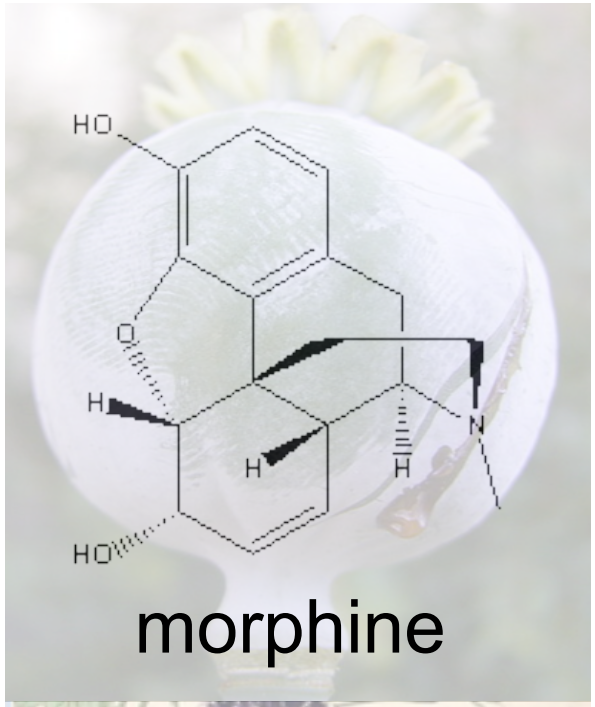
FDA Agrees to New Trials for Ecstasy as Relief for PTSD Patients (Nov. 2016)



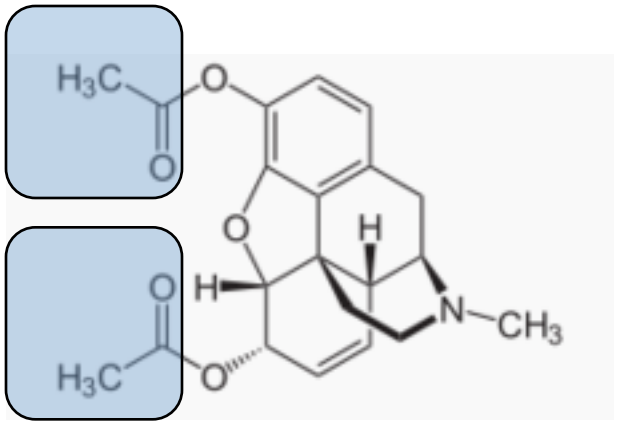
Epinephrine (adrenaline)



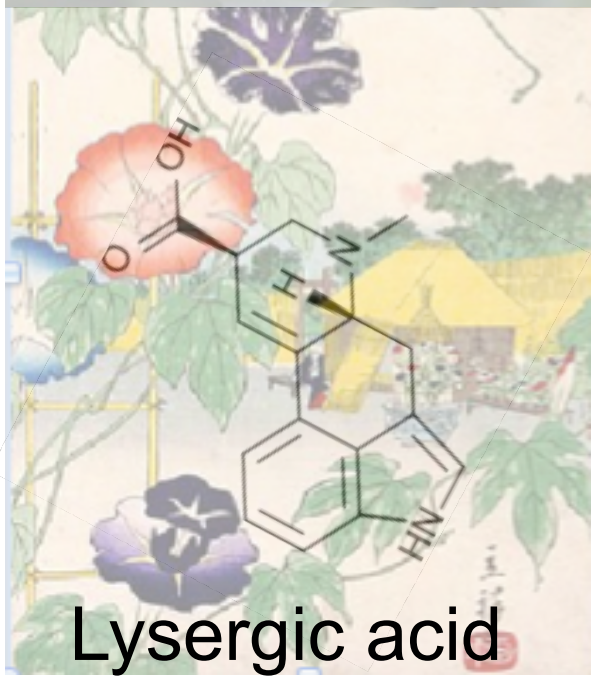
Ecstacy (mdma)



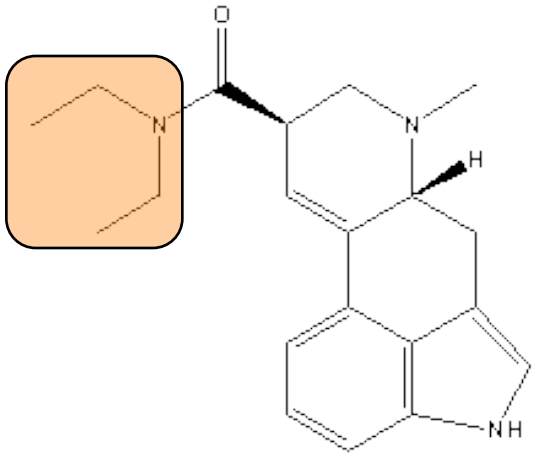
morphine



heroin



Lysergic acid



LSD

Drug Uptake:

Rank from slowest to fastest.

a) injection; b) ingestion; c) inhalation; d) snorting

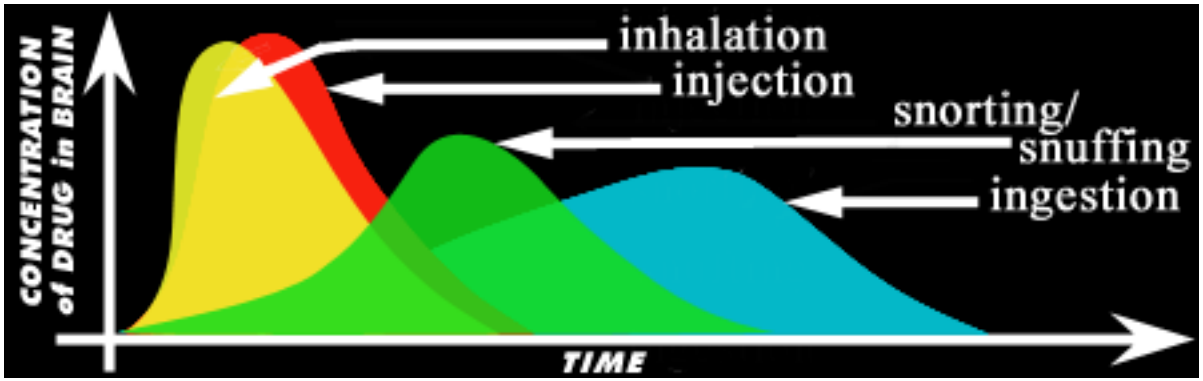
A) a<b<c<d B) c<a<d<b

C) b<d<a<c D) d<b<c<a

Drug Uptake:

Rank from slowest to fastest.

a) injection; b) ingestion; c) inhalation; d) snorting



A) a<b<c<d

B) c<a<d<b

C) b<d<a<c

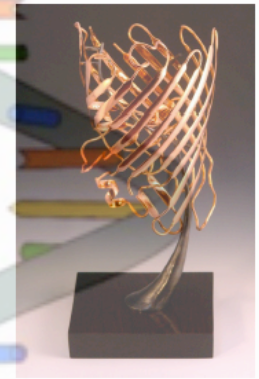
D) d<b<c<a

DNA – RNA

Genetic Bases - Nucleic "acids"

Central Dogma

DNA → mRNA → Protein



~22,000 define a human

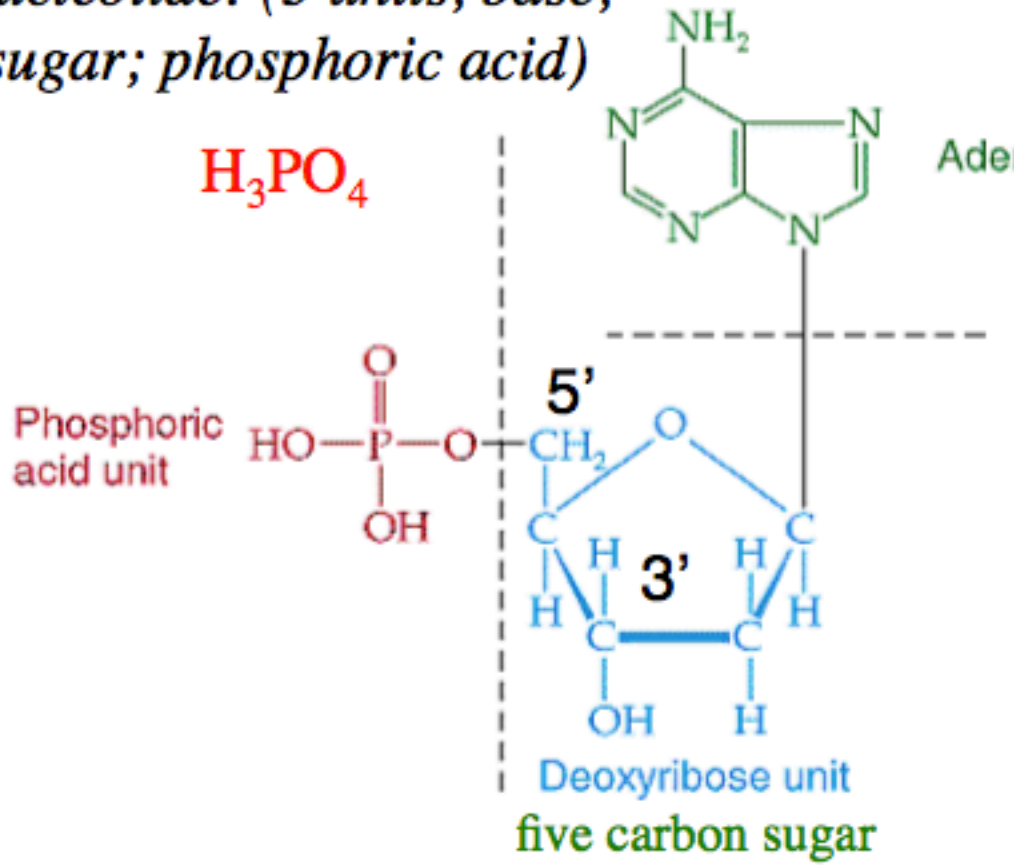
Amanda Ruby

Nucleic "Acids"

Genetic base

Organic base: $R\text{-}NH_2$

Nucleotide: (3 units, base; sugar; phosphoric acid)



Nucleoside: does not include the phosphoric acid

Genetic Bases in DNA & RNA

- DNA and RNA have different sugars (dexoyribose vs. ribose).
- There are only five bases found in DNA and RNA:
  - adenine (A),
  - guanine (G),
  - cytosine (C),
  - thymine (T found in DNA only), and
  - uracil (U found in RNA only).

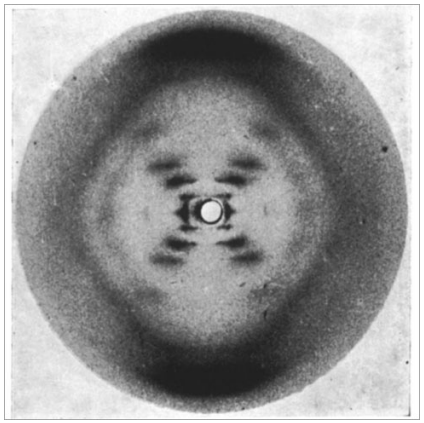
1953

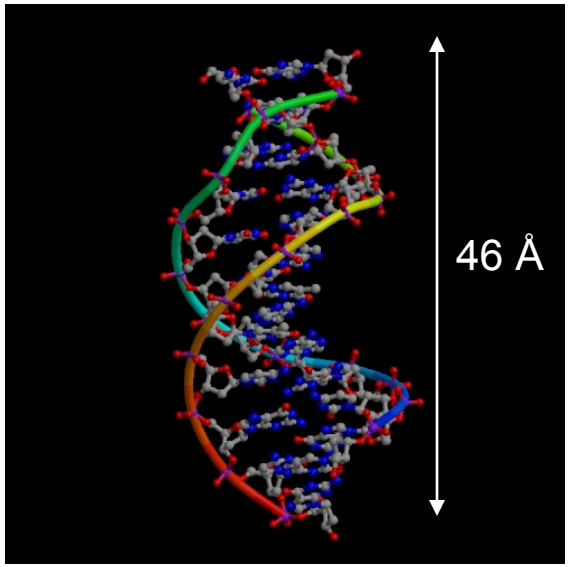
DNA: Molecular Discovery

X-Ray Crystal Structure

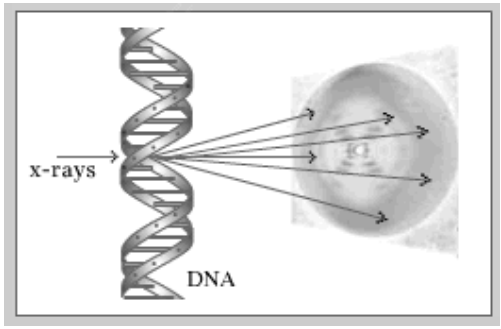
http://info.bio.cmu.edu/courses/03231/ProtStruc/ProtStruc.htm

β-DNA: Rosalind Franklin

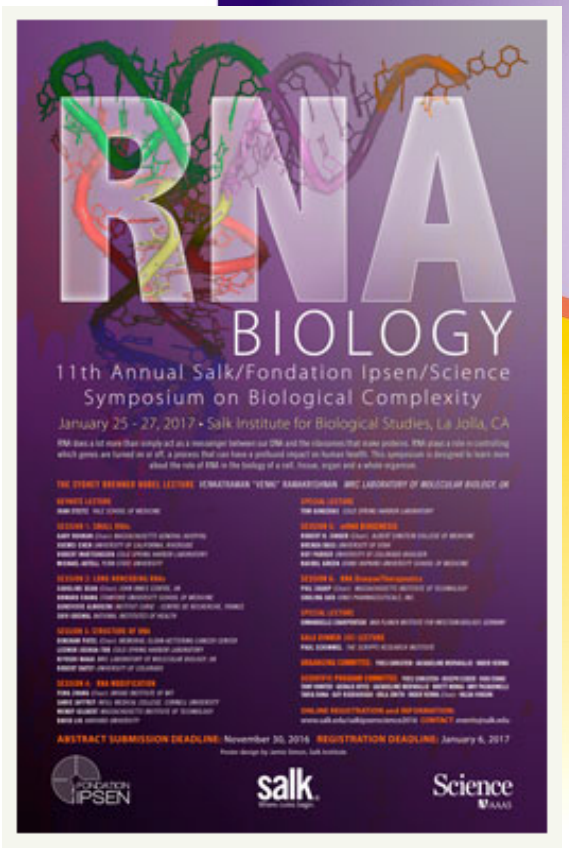




12 base sequence



http://molvis.sdsc.edu/pdb/dna_b_form.pdb



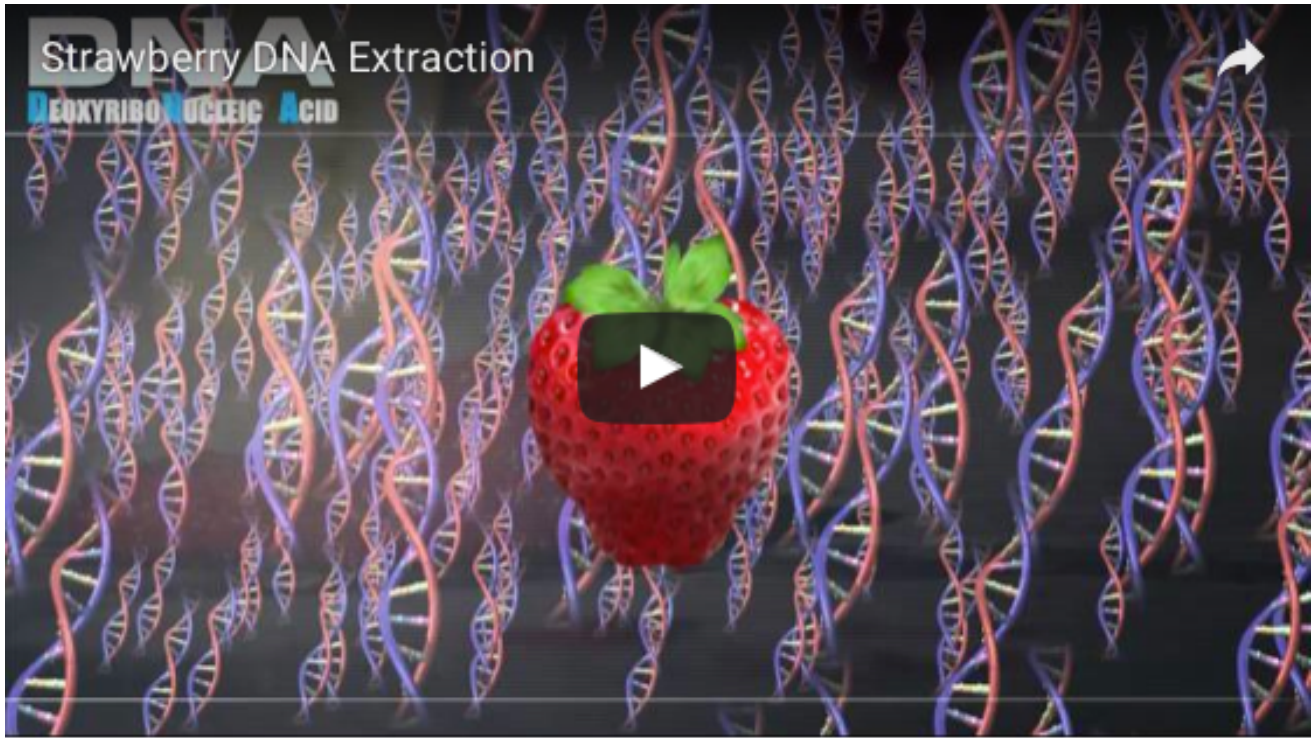
~22,000 define a human

http://chemconnections.org/general/chem106/Tech%20Prep/DNA-2016.html

Chem 106: Class/ Lab

Week 17

https://www.pbslearningmedia.org/asset/tdc02_int_creatednafp2/



https://www.youtube.com/watch?v=usaE_XZx-a8&feature=iv&src_vid=vPGKv53zSRQ&annotation_id=annotation_3345669325

http://chemconnections.org/general/chem106/Tech%20Prep/DNA-2016.html

Chem 106: Class/ Lab

Week 17

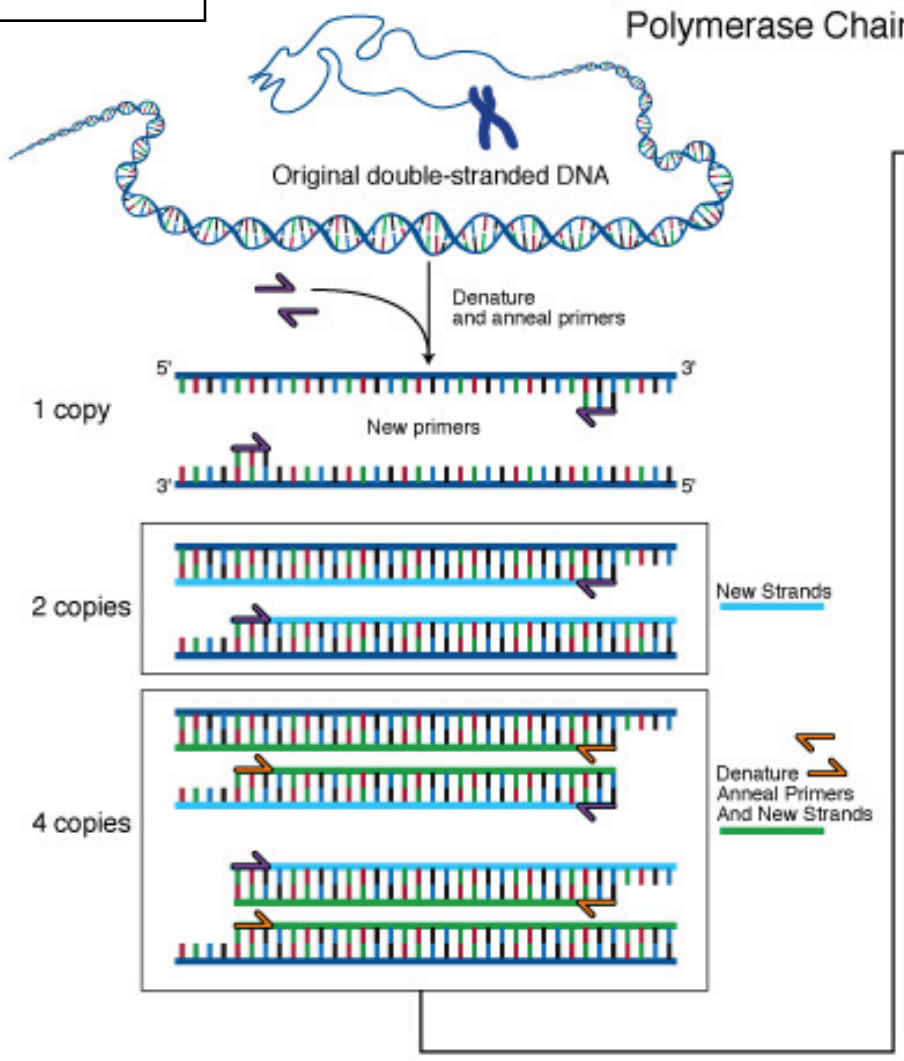
Reading & Doing: Strawberry DNA Extraction
(Course/ Lab Manual pp. 107-109)

Spooling Strawberry DNA @ home:
https://www.youtube.com/watch?v=67KXatgoNKs
Banana DNA @ home:
https://www.youtube.com/watch?v=23jSj-B18gM
Australian Banana DNA @ home:
https://www.youtube.com/watch?v=ew9-YGrgpWo
(Substitute chilled rubbing alcohol)

1989

PCR: Polymerase Chain Reaction

Kary Mullis, Cetus-Chiron-Roche, Emeryville



The Nobel Prize in Chemistry 1993

Kary B. Mullis
Prize share: 1/2

Michael Smith
Prize share: 1/2

Ken Myambo
Cetus Research
Associate

https://www.dnalc.org/resources/3d/19-polymerase-chain-reaction.html

Check in lab drawer

Chem 106: Class/ Lab

Week 17

(Return loaned i-clickers)

1. Check that you have everything on the inventory sheet: clean & not broken
2. Go to stockroom to replace any missing or broken items.
3. Replace the paper @ the bottom of the drawer with clean paper towel
4. Take a tag, write the combination number on the tag & fasten to lock
5. Write your name on the board. Dr. R. will check in order & sign off your inventory sheet
6. Take the combination lock & signed sheet to the stockroom to be stamped

Chem 106: EXAM 3

Pick up Scantron & calculator (if needed)

20 Multiple Choice (4pts ea); 10 T/F (2pts ea) plus matching & 5 problems (~5-6 pts ea);

3 pages 2-sided handwritten notes + Periodic Table