Compiled USMLE Step 1
Mnemonics

Email: gpac324@gmail.com
Online Mnemonic Resources

- http://www.medicalmnemonics.com/
- http://www.valuemd/mnemonics.php
- http://www.drkhaldoon.com/e-Books/

General Principles

- Behavioral Science
  - Epidemiology/Biostatistics
    - Case control (odds ratio) is in past, cohort study is in future (relative risk)
      → Odds ratio comes before relative risk alphabetically
    - Evaluation of diagnostic tests
      - SNOT = SeNsitivity rules OUT; SPIN = SPecificity rules IN
      - If can create 2X2 disease/test table (FA 2011 P. 51; note that disease which comes first alphabetically is on top), can use the following:
        - Vertical → Sensitivity/specificity formulas; vagina is VERTICAL slit; the vagina is SENSITIVE
        - Horizontal → PPV/NPV formulas
        - The good value (TP, TN) always goes on top of the ratio, as we want these numbers to be high
    - Incidence is new incidents over a time period, whereas prevalence is just the percentage of the population with the disease at a given time
  - Positive and negative skew
    - Median is always in the middle when mean, median and mode are ranked; mode is logically placed (point at peak), median is middle, mean is on other end
  - Odds ratio vs. relative risk
    - Can again create 2X2 table using the alphabetical order rule; Disease comes before Risk factor; formulas are pretty logical
  - Bias
    - Pygmalion effect → Researcher’s belief in efficacy of Tx changes the outcome of the treatment → Research is such an arrogant
**PYG** (PYG-malion) he let’s his opinions influence the study

- **Hawthorne effect** → Group being studied changes its behavior owing to the knowledge of being studied → When we are being laughed at *(Ha-Ha-Ha-Hawthorne)* and scrutinized by others, our behavior changes

■ Statistical hypotheses and error
- First make a 2X2 table; again, use the alphabetical rule to place *Reality* on top and *Study* results on the side
- Alpha error (Type I) → false *Positive* error → The P in Positive has one (I) vertical line, so corresponds to type I
  - Goes in false positive box in 2X2 table
- Beta error (Type II) → false *Negative* error → The N in negative has two (II) vertical lines, so corresponds to type II
  - Goes in false negative box in 2X2 table

■ t-test vs. ANOVA vs. *ch*²
- t-test checks difference between the means of 2 groups → Mr. T is mean
- ANOVA checks difference between the means of 3 or more groups → ANOVA is ANalysis Of VAriance of 3 or more groups
- *Ch*² symbol looks like a percentage sign (%); thus chi squared is used to compare percentages/proportions

■ Disease prevention
- Primary, secondary and tertiary prevention involve Preventing, Detecting and Reducing disability, respectively → PDR → Prevent Dick Rotting with these prevention techniques

■ Reportable diseases
- **Hep, Hep, Hep, Hooray, the SSSMMART Chick is Gone**
  - Hep A
  - Hep B
  - Hep C
  - HIV (actually varies by state, although AIDS is always reportable)
  - Salmonella
  - Shigella
  - Syphilis
  - Measles
  - Mumps
  - AIDS
  - Rubella
- TB
- Chickenpox
- Gonorrhea

- Leading causes of death
  - Babies → Congenital, SIDS, RSD (logical)
  - 15-24 → These people are fucking idiots; injuries, homicide, suicide

- Medicare and Medicaid
  - MedicalD is for the Destitute; MedicareE is for the Elderly (>65 generally, although < 65 for those with certain disabilities, those with ESRD)
  - Medicare parts
    - Part A → First and most serious! Hospital, nursing, hospice, home health care
    - Part B → Less serious than A! Outpatient, doctors’ services, PT/OT
    - Part D → Drugs

- Ethics
  - Malpractice → The four Ds for Doom (you are Doomed if you get in trouble for malpractice)
    - D → Duty (physician had a duty to the patient)
    - D → Dereliction (physician breached that duty)
    - D → Damage (patient suffers harm)
    - D → Direct (the breach of duty is what caused the harm)

- Development
  - Developmental Milestones
    - Blocks (age in years times 3)
      - 1 year → 3 blocks
      - 2 years → 6 blocks
      - 3 years → 9 blocks
    - Language
      - 15 months → A few words
      - 200 words and 2 word sentences at age 2
      - 900 words and complete sentences at 3 years
    - Toilet training at 3 years → Pee at age 3
    - Rides tri(3)cycle at 3 years
    - Cooperative play at 4 years → Think about co-op videogame; can have up to 4 players
      - At the same time, can have imaginary friend → Cooperate with imaginary friend at 4 years too
• Gender identity → Between 2 and 3 years → 2 = breasts; add 1 penis for 3 years
• Motor milestones
  ○ Four years → Can copy a stick figure → Stick figure has four limbs (can also hop on one foot (limb) → Link to stick figure thing)
    ■ Three years → Copies line or circle; 1 line happens right before multiple lines

■ Tanner Stages:
  • Girls → Blonde Girls Prance And Play
    ○ Boobs
    ○ Growth spurt
    ○ Pubic hair
    ○ Axillary hair
    ○ Period

■ Grief
  • Normal grief stops within 2 months; pathologic after this → After two months it is too long you pussy ass crybaby and you need to move on
• Kubler-Ross grief stages
  - Denial, Anger, Bargaining, Grieving, Acceptance → Death Arrives Bringing Grave Adjustments

  ○ Physiology
    • Sleep
      - Sleep stages
        - At night, BATS Drink Blood
          ■ Beta → Awake (eyes open)
          ■ Alpha → Awake (eyes closed)
          ■ Theta → Stage 1, light sleep
          ■ Sleep Spindles and K complexes → Stage 2, deeper
          ■ Delta → Deepest non-REM sleep; delta waves have lowest frequency, highest amplitude
          ■ Beta → During REM

        • REM
          - REM sleep is like sex → Increase pulse rate, penis/clitoris get hard (tumescence), decreases with age

    • Narcolepsy
      - HypnaGOgic hallucinations → While GOing to bed
      - HypnopoMPic → Just before awakening in the Morning

• Biochemistry
  - Molecular
    • Chromatin structure
      ■ HeteroChromatin = Highly Condensed
      ■ H1 is the linker region between histone octamer balls (beads on a string) → The 1 is like the little piece of string connecting them

    ■ Nucleotides
● Purines → A, G as in “A Gangster”...Tupac taught us how pure gangsters are; **CUT** the **PY** for the **PYr**imidines
  ○ Pyrimidines only have one ring, as the other was “**CUT**” off
  ○ **THY**mine has a me**THY**!
  ○ **Purine synthesis starts with sugar** (Ribose-5P → PRPP), and then this sugar is modified to create the purine; pyrimidine starts with synthesis of the pyrimidine and then later a sugar is added;
    ■ If you are **pure** you are as sweet as **sugar from the start**

■ Methionine is encoded by only AUG, unlike the other AAs where you have redundancy in the code and multiple codons coding for them -- > “Hey (A) you (U), G, I want to buy that **meth** from you because it is so special and **unique**!”

■ **Stop the nonsense! → Nonsense** mutation introduced **stop** codon

■ **Protein synthesis**
  ● **Eukaryotes** → Even → 40S + 60S = 80S (all differ by 20)
  ● **Pr**oKaryotes → Odd → 30S + 50S = 70S (smaller numbers because are smaller, always smaller by 10, all differ by 20)

■ **Start and stop codons**
  ● **AUG** is mRNA **start** codon (rarely GUG) --> **AUG** in**AUG**urates protein synthesis
  ● mRNA **stop codons**
    ○ **UGA** → U Go Away
    ○ **UAA** → U Are Away
    ○ **UAG** → U Are Gone

■ **DNA replication**
  ● **Pr**oKaryotes
    ○ DNA pol I (one) → One (me, number 1, looking out for number 1) → “I always have to do all of the bullshit, like fixing the mess of RNA created by primase”
  ● **E**ukaryotes
    ○ DNA polymerase gamma replicates mitochondrial DNA; beta and epsilon repair DNA
      ■ Gamma (grandma) might (mitochondria) beat-off (beta) elderly (epsilon) repairmen (repair)

■ **RNA polymerases**
  ● **E**ukaryotes
    ○ RNA polymerase I (rRNA), II (mRNA), and III (tRNA) → Numbered as their products are used in protein synthesis

■ **Types of RNA**
  ● **r**RNA is the most abundant type; **m**RNA is the longest type; **t**RNA is the smallest type
    ○ Rampant, Massive, Tiny
- Protein synthesis
  - ATP for tRNA Activation; GTP for tRNA Gripping and Going places (translocation)
- **Cellular**
- Cell cycle phases
  - G = Gap or Growth; S = Synthesis (of DNA, as in replication)
  - PRPP synthetase is inhibited by 6-mercaptopurine → Merc is slang for killing someone; perp (PRPP) is slang for “perpetrator,” used by police → “I am going to Merc the PRPP”
- Microtubule
  - Kinesin moves anterograde to microtubule (same direction it is growing in, i.e. negative to positive); your aunt is your kin
    - Dynein moves retrograde
- Freidreich ataxia → Clumsiness (can remember this from “ataxia” → Due to GAA repeat → When they fall they are like “GAAaaaaaaa"
- X Inactivation
  - The gene that causes it is XIST, making sure that only one functional X chromosome XISTS (exists)
- Laboratory techniques
  - **SNoW DRoP** → Southern blot analyzes DNA (DNA probe); Northern blot analyzes RNA (DNA probe); Western blot analyzes Protein (using an antibody probe, which is logical as DNA/RNA cannot bind a protein)
- Collagen
  - **Strong Slippery Bloody BM**
    - Type I collagen → Strong (Bone, skin, tendon, dentin)
    - Type II collagen → Slippery (Cartilage, nucleus pulposus)
    - Type III collagen → Bloody (highly vascular tissue like granulation tissue, blood vessels, uterus (which bleeds), fetal tissue)
    - Type IV collagen → Basement membrane (BM) (or basal lamina)
  - Be (So Totally) Cool, Read Books --> Bone, Skin, Tendon, Cartilage, Reticulin, Basement membrane
  - Type ONE: bONE
  - Type TWO: carTWOlage
  - Type FOUR: under the FLOOR
- Collagen Synthesis:
  - Terminal cleavage yields Tropocollagen
- Collagen synthesis diseases
  - The rhyming 3 things mnemonics (included in collagen diseases due to Alport’s)
    - **Alport’s syndrome** → Can’t see (ocular disorders), can’t pee (nephritic syndrome), can’t hear (deafness) →
Based on problem with type IV collagen (the BM type) →
Basement membrane collagen is important in kidney, ears, eyes

- **Sjogren’s syndrome** → Can’t see, can’t spit, can’t climb up shit
- **Reiter’s syndrome** → Can’t see, can’t pee, can’t climb a tree

**Genetics**

- **HeteroPLASMy** → Presence of both normal and mutated mitochondrial DNA, resulting in variable expression in mitochondrial inherited disease → Can associate with mitochondrial DNA because it is circular like a PLASMid

- **Imprinting**
  - **Prader-Willi** → Deletion of normally active **P**aternal allele; maternal allele is methylated and nonfunctional
    - Hyperphagia, hypogonadism, hypotonia
  - **AngelMan’s syndrome** → Deletion of normally active **M**aternal allele; paternal allele is methylated and nonfunctional
    - Seizures, ataxia, inappropriate laughter (“happy puppet”)

- **Autosomal dominant diseases**
  - **Achondroplasia** → Midget wants to pretend they are all dominant to compensate → Autosomal dominant disease based on fibroblast growth factor (FGF) receptor 3 mutation
  - **ADPKD** → Due to a mutation on chromosome 16; there are 16 letters in polycystic kidney disease; AD is for autosomal dominant
  - **Familial ADenomatous polyposis** → **A**utosomal **D**ominant; on chromosome 5, and five letters in “polyp”
  - **Huntington’s disease** → Autosomal dominant mutation on chromosome 4; **Hunting 4** food; trinucleotide repeat of CAG, for *Crazy* (dementia) **A**nd **G**yrating (choreiform movements)
  - **Neurofibromatosis type 1** (von Recklinghausen’s disease) → Chromosome 17; 17 letters on “von Recklinghausen”
  - **Neurofibromatosis type 2** → NF2 gene on chromosome 22; type 2 = 22
  - **Von Hippel-Lindau** → 3 words → Chromosome 3

- **Autosomal recessive diseases** → **SAT CPM GASH** (I actually attended class and SAT in CPM for once, and I ended up with a GASH in my head because I shot myself)
  - **Glycogen storage diseases**, **Albinism**, **Sickle cell**, **Hemochromatosis**, **Sphingolipidoses** (except Fabry’s), **ARPKD**, **Thalassemias**, **Cystic fibrosis**, **Phenylketonuria**, **Mucopolysaccharidoses** (except Hunter’s)

- **X-linked diseases**
  - **Muscular dystrophy**
- Duchenne’s = Deleted Dystrophin (due to frame-shift mutation)
- Dystrophin gene is DMD, for Duchenne Muscular Dystrophy,
  - Longest gene known → Damn, Massive Dick!
  - Picture a long penis
- **Fragile X** syndrome → Big fragile balls (macro-orchidism) → This is associated with mental retardation (2nd most common inherited mental retardation, after Down syndrome), as they are so focused on their balls/sex they are dumb (men can only think with one head at once) → Logically have a prominent jaw, as this is masculine and can be associated with the big balls → The ears get jealous of the two big balls so the two ears get big too
  - Causes by CGG repeat; the C is like the penis and GG is like the balls
  - Fragile X → FMR1 gene → Fragile Mental Retardation
  - Fragile X → eXtra-large testes, jaw, ear
- Trinucleotide repeat expansion diseases
  - **Huntington**’s disease, myotonic dystrophy, Friedreich’s ataxia, fragile X syndrome → Try (trinucleotide) hunting for my fried eggs (X)
    - CAG → Huntington’s → Crazy (dementia) And Gyrating (choreiform)
    - CTG → MyoTonic dystrophy
    - CGG → Fragile X syndrome → Have big balls → CGG is like a penis and balls (C is the penis, Gs are the balls)
    - GAA → Friedreich’s ataxia → Ataxia implies falling down → Fall and yell “GAAaaaa”
- Autosomal trisomies
  - Down syndrome: RETARDS
    - Retarded
    - Epicanthal folds
    - Trisomy 21
    - Alpha-fetoprotein is low
    - Retarded
    - Duodenal atresia
    - Simian crease
  - The three trisomies compatible with life are Downs (trisome 21), Edward’s (trisome 18), and Patau (trisomy 13)
    - Down’s → 21 → Drinking age is 21
    - Edward’s → 18 → Election age is 18
    - Patau’s → 13 → Puberty age is ~13
  - Patau’s syndrome --> cleft lip/Palate, holoProsencephaly, Polydactyly
- **Edward's syndrome** → Think Edward from twilight
  - Congenital heart disease because he is a sad little pussy with a broken heart over Belle, severe mental retardation because he is **retarded, rocker-bottom** feet because he gets pussy like a rock star, **clenched hands** because he is all lame and desperately in love with Belle and he clenches her hand, **prominent occiput** (has a big ass head, look at him, it's horrific)

- Cri-du-chat syndrome
  - “Cry of the cat” → High pitched crying/mewing; microcephaly, as cats have small heads
  - Deletion of **short** arm of chromosome 5 → Cats are **short**, 5 letters in "kitty"

- Williams syndrome → Elven facies → Will Ferrel in the movie Elf

- **22q11 deletion syndromes** → CATCH 22
  - C → **Cleft palate**
  - A → **Abnormal facies**
  - T → **Thymus aplasia (T cell deficiency)**
  - C → **Cardiac defects**
  - H → **Hypocalcemia (secondary to parathyroid aplasia)**

- Co-factors for PDH, alpha-ketoglutarate, branched chain ketoacid dehydrogenase: → "**Tender Loving care for Nancy**"
  - Thiamine pyrophosphate (TPP)
  - Lipoic acid
  - Coenzyme A
  - FAD
  - NAD

- Krebs cycle substrates → Citrate Is Kreb’s Starting Substrate For Making Oxaloacetate
  - C → Citrate
  - I → Isocitrate
  - K → alpha-Ketoglutarate
• S → Succinyl-CoA
• S → Succinate
• F → Fumarate
• M → Malate
• O → Oxaloacetate

Glycogen Storage Diseases

• **Very Poor Crackers Acquire More Herpes** → Von Gierke’s (type I), Pompe’s (type II), Cori’s (type III), Andersen (type IV), McArdles (type V), Hers (type VI)
  
  • Von Gierke’s disease (Type 1)
    
    ○ Number 1 is most important; lose the absolutely fundamental thing that allows liver to release glucose to blood; glucose-6-phosphatase

  • Pompe’s disease (Type II) → Pom pom → Cheerleader; cheerleaders lie about everything; thus Pompe is the lysosome storage disease
    
    ○ Pompe’s trashes the Pump (cardiomegaly and systemic findings leading to early death)
    
    ○ Multiply by 2 (for this and type 3) to see which branching enzyme is messed up; type 2*2 = 4; alpha-1,4-glucosidase is messed up here

  • Cori’s disease (Type III)
    
    ○ Multiply by 2 (for this and type 2) to see which branching enzyme is messed up; type 3*2 = 6; alpha-1,6-glucosidase is messed up here

Kwashiorkor → Distended abdomen; plump and distended like a squash (kwash) (vs. Marasmus where they are wasting away; deficient in calories in general, not protein specifically like in Kwashiorkor)

• Kwashiorkor results from a protein-deficient MEAL
  
  ○ M → Malnutrition
  
  ○ E → Edema
  
  ○ A → Anemia
  
  ○ L → Liver (fatty); due to decreased apolipoprotein synthesis

• Marasmus results in Muscle wasting (as well as general tissue wasting, loss of subcutaneous fat)

Cystinuria → Hereditary defect of renal tubular amino acid transporter for the COLA amino acids → Cysteine, Ornithine, Lysine, Arginine

Maple Syrup Urine Disease → Blocked degradation of BRANCHED amino acids (Ile, Leu, Val) → I Love Vermont maple syrup from maple trees (that have BRANCHES)

ABC Enzymes: Pyruvate carboxylase, Acetyl CoA Carbox, Propionyl-CoA Carbox

• ATP, Biotin, CO₂
- **Amino acid/alpha-keto acid pairs**
  - Alanine and Pyruvate → Al A. fucking a pie like the guy in American Pie
  - Glutamate and alpha-ketoglutarate → Glue in a keyhole
  - Aspartate and oxaloacetate → An ass and an ox (like a donkey and an ox)

- **Nutrition**
  - **Vitamins**
    - ACE → Antioxidant vitamins (A, C and E)
    - Water soluble
      - B1 (Thiamine: TPP)
        - Get beri beri when deficient; imagine it spelled as Ber1Ber1
      - B2 (Riboflavin: FAD, FMN)
        - FAD and FMN are derived from riboflavin; B2 = 2 ATP = Amount of ATP derived from FADH2
        - Deficiency causes the 2 Cs --> Cheilosis and Corneal vascularization
      - B3 (Niacin: NAD+)
        - NAD derived from niacin; B3 = 3 ATP
        - The 3 Ds → Diarrhea, Dermatitis, Dementia
      - B4 (WARNING: there is no B4) → B-Whore → Whores are worthless/do nothing → There is no B4
      - B5 (Pantothenic acid: CoA) --> PANTothenic acid --> Finger a girl with 5 fingers, she will pant
        - Pantothen-A is in Co-A
      - B6 (Pyr) → PYRidoxine → Fire → Devil → 666 is devil number
      - B7 → Biotin → Seven = heaven; biology is heavenly because it is so much easier than physics/math/etc.
        - AVIDin in egg whites AVIDly binds biotin (excessive ingestion of raw eggs can cause biotin deficiency)
        - Used in carboxylation reactions (the ABC carboxylation enzymes, B is for biotin)
    - Fat soluble vitamins → KADE, vitamins K, A, D E → Like Arthur KADE (http://arthurkade.com/), who people hate and make fun of by calling him fat
      - K
      - A → Retinol is vitamin A, so think Retin-A (used topically for wrinkles and acne)
      - D → D3 is Cholecalciferol (C is 3rd letter in alphabet; deficient when you are cholecd because it comes from the sun); D2 is ergocalciferol
o Vitamin E → E as in Ecstasy, the drug → TOCopherol → Like taking a joint
  ■ Antioxidant that protects RBCs and membranes from free radical damage → E is for Erythrocytes

○ Metabolism
  ■ SCID can be due to adenosine deaminase (ADA) deficiency, as accumulated adenine is toxic to lymphocytes → “ADA SCID” like “atta kid”; note that this is the bubble boy disease, so can associate with "kid"
  ■ Glycogen synthesis
    ● 1,4 bonds are straight; four = whore = girl = straight
    ● 1,6 NOT straight (branched), 6 → 666 → satan/devil, homosexuality
  ■ ABC carboxylases → Require ATP, Biotin, CO2; 3 of them are relevant to step 1
    ● Pyruvate carboxylase (used in gluconeogenesis)
    ● Acetyl CoA carboxylase (used in FA synthesis)
    ● Propionyl-CoA Carboxylase (used in beta oxidation of odd chain FAs)
  ■ Dietary lipids
    ● Two essential FAs
      ○ Two things are essential in life: getting drunk and getting layed
        ■ Linolenic acid → Lino-LEAN-ic acid → In rap music, “lean” is a slang term for the purple drink they use to get drunk/high (http://en.wikipedia.org/wiki/Purple_drank); purple drink is essential
        ■ Linoleic acid → Lino-LAY-ic acid → Getting laid is essential
  ■ Lysosomal storage diseases
    ● Note that these are all about not being able to break something down; you only need E from 1 of two alleles to break something down; thus most are AR with a few exceptions (Fabry, Hunter, discussed below)
    ● Gaucher disease → Gauche means lacking social grace (http://dictionary.reference.com/browse/gauche)
      ○ Wrinkled cytoplasm in Gaucher’s cells → People lacking social grace wear wrinkled shirts
      ○ Most people lack social grace, so this is most common lysosomal storage disease
      ○ Bone issues (aseptic necrosis of femur, bone crises) → People lacking social grace do not make love; they bone
    ● Fabry disease → Think of a totally fabulous gay man
- X-linked recessive; gay → girly → X chromosome (the other sphingolipidosis diseases are autosomal recessive (except Hunter))
- Burning sensation in the hands because the gay man is so flaming and spends so much time grabbing hot penises; also feet due to foot fetish issues
- Small, raised reddish-purple blemishes on the skin (angiokeratomas) → Like the STD lesions gay men often get
- Gay people are feminine, like Gals → Deficient enzyme is alpha-GALactosidase A
- Ceramide trihexosidase accumulates, as gay men enjoy making things with ceramics
- 
  ![Image of a man working with pottery](image.jpg)

- Eye manifestations, especially **cloudiness of the cornea**; the fabulous gay man is actually using a corneal accessory here to match his cloudy purse (see image below)
- If pt does not get enzyme replacement therapy, at risk for getting renal failure → Think of gay man getting pyelonephritis from anal sex and E. coli
  - Niemann-Pick disease
    - No man **picks** (Niemann-Pick) his nose with his **sphinger** (sphingomyelinase is the deficient enzyme, leading to accumulation of sphingomyelin)
    - Foam cells → Like foamy booger from nose picking
    - Cherry red spot on macula → From picking it
  - Tay-Sachs disease → Think sach's 5th ave, the expensive clothing store
    - Lysosomes with onion skin → Onion skin dress is so hot this season; so is cherry red spot on macula to match red jewel necklace
    - Tay-SaX (Tay-sachs) lacks heXosaminidase A; leads to accumulation of GM2 ganglioside
  - Krabbe's disease → Think crab
    - Crab people from South Park (seen in image above) were from outer space; outer space is galactic; thus Krabbe’s is based on **Galacto-cerebrosidase** deficiency and has accumulation of **galactocerebroside**
- Metachromatic leukodystrophy
  - Metachrom → Color; sulfur has a yellow color; thus deficient enzyme is arylsulfatase A and cerebroside sulfate accumulates (but be careful because sulfate also shows up in Hurler/Hunter’s)
- Hunter’s syndrome
  - X marks the spot for treasure hunter; thus it is X linked
  - Hunter’s = mild hurler’s + aggressive behavior; a hunter is very aggressive
  - Hunters see clearly, so no corneal clouding (unlike Hurlers, the similar but more severe disease)
- Hurler’s syndrome
  - I have an uncle Hurley; he is big and ugly like a gargoyle (gargoylism)
  - Hunter’s and Hurler’s have Heapan sulfate accumulation
- Fatty acid metabolism
  - SYstrate shuttle = SYnthesis of fatty acids
  - CARntine shuttle = CARnage of fatty acids
  - FA degradation occurs where its products will be consumed → The mitochondria
- Metabolism sites
  - Pathways that occur in BOTH mitochondria and cytoplasm → Heme synthesis, Urea cycle, Gluconeogenesis → HUGs take two
- Electron Transport Chain
  - Uncoupling agents → DNP → D-Not-Proton Channel
  - Four things directly inhibit electron transport → RAACC → Retonone, antimycin A, CN, CO → When you see breasts (a rack), you may forget to do when you are supposed to do (make electrons flow)
- Gluconeogenesis
  - The key irreversible enzymes → PPFG → Pathway Produces Fresh Glucose → Pyruvate carboxylase, PEP carboxykinase, Fructose-1,6-bisphosphate, Glucose-6-phosphatase
- Amino Acids
  - Essential AAs → PVT TIM HALL
    - P (Phenylalanine) V (Valine) T (Threonine) T (Tryptophan) I (Isoleucine) M (Methionine) H (Histidine) A (Arginine) L (Lysine) L (Leucine)
    - Ketogenic AAs → The Key to Leu-sing is Ly-iing → The Key-togenic AAs are Leucine and Lysine
    - Glucogenic but not ketogenic → His Valentine (Val) Met Arg → Arg sounds like the name that would be given to a caveman; the caveman stole his valentine; this is a new relationship, so it is sweet (glucogenic); the caveman is
badass, so he is not desperate (for energy at all, so not ketogenic)

- Arg and His are required in growth → Guys (His) want to get big and grow, and when they do they go “Arg” like primitive cavemen

- Urea cycle
  - Ordinarily Careless Crappers Are Also Frivolous About Urination → Ornithine, Carbamoyl phosphate, Citrulline, Aspartate, Argininosuccinate, Fumarate, Arginine, Urea
  - My urea cycle (instead of the lame one in First Aid) Coffee And Alcohol Form Aggressive Urine Overload

- Amino acid derivatives
  - Tryptophan → Used to make serotonin; serotonin is what gets you high in ecstasy; ecstasy “trip” is based on tryptophan;
    - Serotonin is converted to melatonin, kind of like how you are tired/sleepy after a “trip” on ecstasy
  - Histidine
    - Used to make histamine; conversion requires B6 (the evil vitamin, 666); evil vitamin usage here is logical given all of the terrible Sx that histamine can give you
  - Arginine → Picture a scary monster going “Arg!” → Scary monster, “Ur a Creature of the Nit (night)!!” → Arginine is used to make Creatine, Urea, Nitric Oxide
  - Glutamate → Used to make GABA, which slows you down → Glue makes you all sticky and slow, it also makes GABA which slows you down
    - This requires the evil vitamin (B6, 666, mark of the beast) because we have boards to study for so it is TERRIBLE if something makes us slow

- Cystinuria
  - Cystinuria → Defect of renal tubular AA transporter for Cysteine, Ornithine, Lysine, and Arginine (COLA)

- Lipid transport
  - A1 Activates LCAT, which catalyzes esterification of cholesterol → Putting A1 steak sauce on a CAT
  - B-100 Binds to LDL receptor, mediates VLDL secretion; it is the only apolipoprotein left on LDL
    - B-100 gets the bad LDL out of the blood and into liver; thus you have it because you want to B-100 some day (i.e. live to the age of 100), not die from atherosclerosis
  - E mediates Extra (remnant) uptake
  - B-for-eight (B48) is only seen on chylomicron; chylomicron comes from dietary lipid, i.e. the stuff that you ate (8) B-for (B4) all of the other lipid pathways started; logically, it mediates chylomicron secretion
• apoC-II activates LPL, leading to the cleavage of FAs and accumulation of FAs in adipose tissue → “You are so fucking fat it is like I can see two (C-II) of you”
• A1 steak sauce is fucking delicious; HDL uses apoA-1 for cholesterol recovery from fatty streaks in the blood vessels; this is a good (fucking delicious) thing

• Embryology
  o Sonic Hedgehog Gene → In the videogame, sonic could run forward and backward; anterior and posterior (from his perspective); thus Shh gene is involved in patterning along the anterior-posterior axis
  o Homeobox gene → Involved in segmental organization of embryo in craniocaudal direction → Homosexuals (HOMEBox) put their heads (cranio) in the tails (caudal) of other men
  o At week 8, have fetus rather than embryo → Week Ate → The fetus ate the embryo so you are left with a fetus rather than an embryo
  o Week 10 → Genitals have male/female characteristics; 1 is like a penis, 0 is like a vagina
  o Rules of early development
    ■ Rule of 2’s for the 2nd week
      • 2 germ layers (bilaminar disk): epiblast, hypoblast
      • 2 cavities: amniotic cavity, yolk sac
      • 2 components to placenta: cytotrophoblast, syncytiotrophoblast
    ■ Rule of 3’s for the 3rd week
      • 3 germ layers (gastrula): Ectoderm, mesoderm, endoderm
    ■ Rule of 4’s for the 4th week
      • 4 heart chambers; 4 limb buds grow
  o Embryological derivatives
    ■ Neural crest (most important to know) → Think PNS and non-neural structures nearby
      • Odonto = teeth; think crest toothpaste; logical that bones of skull would be from same thing as they are attached, and pia/arachnoid too as they are closely associated with skull
        o Teeth → Skull → Pia/arachnoid
      • Neural structures → ANS, dorsal root ganglia, cranial nerves, celiac ganglion, chromaffin cells of adrenal medulla, Schwann cells
      • Non-neural structures → Melanocyte, parafollicular (C) cells of thyroid, aorticopulmonary septum
    ■ Neuroectoderm → CNS stuff
      • Brain (neurohypophysis, CNS neurons, oligodendrocytes, astrocytes, ependymal cells, pineal gland), retina, spinal cord
    ■ Thyroid follicular cells → Endoderm → Thyroid descends from tongue, so logically relates to gut; parathyroid as well, as so intimately associated
with thyroid

- Teratogens
  - Maternal diabetes → Mothers are filled with sugar and motherly and very sweet → Mermaids are sweet as well → Can cause sirenomelia (mermaid syndrome)
    - More generally, causes caudal regression syndrome (anal atresia, sirenomelia)
- Placental development
  - Cytotrophoblast → Makes cells for developing structure → Cyto makes Cells
    - internal layer like cytoplasm is inside of cell
  - Urachus → Connects bladder to yolk sac → Ur (urine) and achus (achu, sneeze, snot is like yolk)
- Fetal erythropoeisis: “Young Liver Synthesizes Blood”
  - Yolk Sac
  - Liver
  - Spleen
  - Bone marrow
- Regional specification of the developing brain
  - The prosencephalon becomes the telencephalon and the diencephalon, which will become the cerebral hemispheres and the thalami, respectively
    - “A PROfessional assassin can TELy you that you will DIE and still kill you, CunT”
  - M&M → Mesencephalon becomes the Midbrain
  - The RHOmbencephalon becomes the METencephalon and the MYelencephalon; the METencephalon becomes the Pons and Cerebellum; the MYelencephalon becomes the Medulla (this mnemonic, explained below, will be clearer if you look at the ordering of these in FA P. 126)
    - I knew a girl named ROE and things were sort of sexual between us
    - Rho Met My Cock, Penis and Meat
    - Rho → Becomes Met, My
    - Met → Becomes C, P
    - My → Becomes M
- I knew someone named H. Patua (Patau syndrome) (this mnemonic may only work for me, but it may randomly stick in your head as well)
  - He was a big ass nerd who would do nothing but sit around and play videogames (Sonic the Hedgehog) all day (Patau syndrome is associated with Shh; use this to remember connection to holoprosencephaly); he was so lame and nerdy and socially awkward he was definitely very unlucky (chromosome 13, 13 is a traditionally unlucky number)
- CHiari II malformation - Cerebellar Herniation
- Syringomyelia → Think syringe (this is named after the enlarged central canal
being similar to a syringe needle); thus think drug addict shooting heroin with a syringe

- Loss of sensation in upper extremities → This is where heroin junky injects himself
- Loss of pain/temp but not tactile → When you get all high on heroin, you no longer feel pain/temp, but you can still feel sensation (not totally numb, they just get high to numb the pain)
- Cape-like distribution of sensory loss → Bad guys wear capes (Dracula, etc.); the heroin user is an evil caped maniac

- Brachial arch derivatives
  - 1 → MAXillary artery → 1st arch is MAXimal (1st place is best place)
  - 2 → Stapedial artery → Second = Stapedial
  - 3 → common Carotid artery → C is 3rd letter of alphabet
  - 4 → On left, aortic arch; on right, proximal part of right subclavian artery → 4th arch (4 limbs) = systemic
  - 5 → Does nothing → Five is not Alive
  - 6 → Proximal part of pulmonary arteries and (on left only) ductus arteriosus → 6th arch

- Branchial apparatus
  - CAP covers outside from inside
    - Clefts → Ectoderm
    - Arches → Mesoderm
    - Pouches → Endoderm

- Brachial arch derivatives
  - Cartoon below based on the show Archer (useful if you are familiar) (http://en.wikipedia.org/wiki/Archer_(TV_series)):
    - 1 → Ts and Ms (Tucker Max is number 1 (www.tuckermanx.com)) → Ts (Tensor tympani, Tensor veli palatini, anterior 2/3 of Tongue) and Ms (Muscles of Mastication (Masseter, lateral and Medial pterygoids), Mylohyoid, Maxillary (V2) and Mandibular (V3) nerves; Meckel’s cartilage (Mandible, Malleus, incus, sphenomandibular ligament))
  - 2 → Ss (flip 2 a bit and it looks like an S) → (Stapedius, Stylohyoid, CN
Seven, Stapes, Stylohyoid ligament

- 3 → Pharyngeal stuff (Stylopharyngeus, which is innervated by glossopharyngeal nerve; CN IX (stylopharyngeous))
- Five does nothing; five is not alive
- 4-6 → Structures around neck/voice box
  - Cartilages (thyroid, cricoid, arytenoids, corniculate, cuneiform)
  - Cranial nerve X (4th arch (Superior laryngeal branch for swallowing); 6th arch (recurrent laryngeal branch for speaking)
    - 4 for whore → swallow
    - 6 for dicks - men are the ones that get talking (JK)
  - Muscles (Pharyngeal constrictors, cricothyroid, levator veli palatini; 6th arch is all intrinsic mm. of larynx EXCEPT CRICOTHYROID)
  - Branchial pouch derivatives
    - Aberrant development of 3rd and 4th pouches → 22q11 deletion → Catch 22 → CATCH → C (Cardiac abnormality, especially tetralogy of Fallot; Abnormal facies; Thymic aplasia (thus T-cell deficiency); Cleft palate; Hypocalcemia (due to lack of parathyroid development))
  - Cleft lip v. cleft palate
    - Lip - messed up Maxillary and medial Nasal processes (LMN or “Lip Might Not Process“)
    - Palate obv has to have involvement of the palatine processes (lateral and medial + nasal septum)
  - Gastrochisis vs. Omphalocele
    - GAStro → GAS → Having gas is embarrassing and terrible; thus this is the worst of the two; can get liver protrusion, unlike in omphalocele; also NOT covered by peritoneum like omphalocele is
    - Omphalocele → O is like a nice circular, central hole; thus this one is based on the persistence of herniation of abdominal contents into umbilical cord
  - Formation of pancreas → From dorsal and ventral buds; everyone loves getting head, so both contribute to the head
    - Ventral buds → Portion of head; uncinate process
      - Uncinate process is under the rest of the pancreas
    - Dorsal buds → Portion of head; tail (if we had a tail, it would be on our dorsal surface) and body (tail attached to body, so we can associate them)
- Kidney embryology (DIT claims this is extremely low yield)
  - Pronephros → Degenerates at week 4; “pro” things tend to go away
  - Mesonephros → Interim kidney for 1st trimester; later contributes to male genital system (this is the Wolffian duct)
  - Metanephros → Sounds like mesonephric, which we can easily associate with the genitals from repro, but this is the permanent kidney
    - Ureteric bud → Ureter, pelvises, calyces, collecting ducts (BIG stuff; ureteric = “your eater” = my eater has to have a big appetite because my wiener is so big)
    - Metanephric mesenchyme → Glomerulus and renal tubules to distal convoluted tubule (SMALL stuff; this is induced by ureteric bud; the big stuff bosses the small stuff around)
- Potter’s syndrome → Babies who can’t Pee in utero develop Potter’s
  - Based on bilateral renal agenesis due to malformation of ureteric bud (logically it is the big one (see “Kidney Embryology) mnemonic above) that would cause severe issues with fetus not being able to pee)
- Genital embryology
  - Mesonephric duct → Associate with men because of lack of prefix; female stuff has prefix (FE-male, WO-man, PARA-mesonephric); associate Wolffian with male because wolves are masculine and badass
    - Leads to SEED structures (men love spreading their SEED everywhere) → Seminal vesicles, Epididymis, Ejaculatory duct, Ductus deferens
  - Paramesonephric duct → Female due to prefix thing described above
  - Gartner’s cyst = Wolffian duct remnant left in female
    - females often want a part of the gardener (male) in them...
  - Vestibular bulbs → Internal part of the clitoris → Clitoris is where girl gets turned on, like a light BULB
- Congenital penile abnormalities
  - Hypospadias → Urethral on underside of penis
    - Hypo is below
  - Epispadia
    - Exstrophy of the bladder is associated with Epispadia
    - When you have Epispadias, you hit your Eye when you pEE
    - Based on faulty positioning of genital tubercle; EPI-pen used to treat allergy is like a tube
• Descent of testes and ovaries
  ■ Gubernaculum - think of **PetOR Guber**, co-owner of the Warriors.
    ● Ovarian ligament, Round ligament of uterus
    ● and it anchors the balls (like the owner of a bball team is the anchor)
  ■ Processus **vaginalis** → Becomes tunica **vaginalis** in men, obliterated in women

• **Microbiology**
  o NOTE: Tons of excellent mnemonics in Clinical Microbiology Made Ridiculously Simple (CMMRS), some referenced here; better if you have this book and the accompanying mnemonic images
  o **Bacteria**
    ■ Bugs that do not gram stain well → These Rascals May Microscopically Lack Color
      ● Treponema (too thin to be visualized), *Rickettsia* (intracellular parasite), *Mycobacteria* (high lipid content cell wall requires acid fast stain) *Mycoplasma* (no cell wall), *Legionella pneumophila* (primarily intracellular), *Chlamydia* (intracellular parasite, lacks muramic acid in cell wall)
    ■ Giemsa staining - (~Giesha) = “Bitches Tryna Play Chinese”
      ● Borrelia
      ● Trypanosomes (Chagas)
      ● Plasmodium (Malaria)
      ● Chlamydia
    ■ Use **Loeffler’s media** for **diptheriae** → **Dip** your “**loff**” of bread in olive oil
    ■ Which bugs need **cysteine** for growth? The -ella’s, or the girls. Girls really need **cyses** (kisses)
      ● Francisella
      ● Brucella
      ● Pasteurella
      ● Legionella
    ■ **E. Coli** toxins (ETEC): “Labile like the Air, Stable like the Ground”
      ● heat-labile toxin stimulates AC
      ● heat-stable toxin stimulates GC (both causing watery diarrhea)
    ■ Bacteria that produce exotoxins that increase levels of **cAMP**
      ● C → Cholera (Vibrio cholera)
      ● A → Anthrax (Bacillus anthracis)
      ● M → Montezuma’s revenge (popular name for enterotoxigenic E. coli)
      ● P → Pertussis (Bordetella pertussis)
    ■ Spirochete: Leptospira **Interrogans** (shaped like a question mark).
      ● Happens to **surfers** and people in the tropics who get in water contaminated with **animal urine**. Interrogans think **Interrogate**
(asking questions like the **question mark** shape). Think about a surfer asking a group of porpoises “Dudes who pissed in the water”?  
- Spirochetes = BLT (bacon tends to spiral when you cook it) = *Borrelia, Leptospira, Treponema*
- The 4 Fs of S. dysenteriae transmission  
  - Fingers, Flies, Food, Feces
- Obligate aerobes → **Nagging Pests Must Breathe** → *Nocardia, Pseudomonas, Mycobacterium tuberculosis, Bacillis* (B. anthracis, B. cereus)  
  - Pseudomonas **AERuginosa is an AERobe**
- Anaerobes Can’t Breathe Air → *Clostridium, Bacteriodes, Actinomyces*
  - AminO2glycosides are ineffective against anaerobes because these antibiotics require O2 to enter the bacterial cell
- NO StRES: Novobiocin - Saprophyticus Resistant, Epidermis Sensitive  
- OVRPs: Optichin - Viridans Resistant, Pneumo Sensitive
- BBRAS: Bacitracin - B strep Resistant, A strep Sensitive
- Group B strep → Think B for Baby  
  - Baby can acquire these bugs during delivery; causes neonatal **meningitis, pneumonia, sepsis**
  - Pneumococcus is to Parents what group B strep is to Babies  
    - Major cause of bacteria **meningitis, pneumonia, sepsis** in adults
  - or since it’s in females, they cause PMS (pneumonia, meningitis, sepsis)
- Main causes of meningitis in neonate:  
  - **BELIs** - baby born → ring bells → hurt baby’s head like MENINGITIS → gBs, E.coli, Listeria
- No rheum for SPECCulation (the Sx of rheumatic fever) → Subcutaneous plaques, Polyarthritis, Erythema marginatum, Chorea, Carditis
- Treatment of nocardia and actinomyces  
  - **SNAP** → Sulf for Nocardia, Actinomyces use Penicillin
- It takes 2-4 weeks to culture TB on Lowenstein-Jensen agar → Slowenstein-Jensen agar
- **Campylobacteria jejuni grows at 42 degrees celcius (hot)** → Camp fires are hot  
  - a/w Guillan-Barre → sounds like some fancy summer camp you’d send your kids to: Camp Guillan Barre
- Slow fermenters of lactose → **Citrobacter, Serratio** → “They are so lazy and slow, they just cit there and serr into space”
- Lyme disease  
  - **BAKE a key** Lyme pie → Bell’s palsy (bilateral), Arthritis, Kardiac block, Erythema migrans (bullseye lesion)
- E. coli
• **EPEC → Enteropathogenic E. coli** → Diarrhea usually in children, so Pediatric
  - No toxin produced! Aheres to apical surface, flattens villi, prevents absorption
• **Klebsiella → 4 As → Aspiration pneumonia, Abscess in lungs, Alcoholics, di-A-betics**
• **Zoonotic bacteria → Big Bad Bed Bugs From Your Pet named Ella**
  → Bartonella, Borrelia burgdorferi, Borrelia recurrentis, Brucella spp., Francisella tularensis, Yersinia pestis, *Pasteurella* multocida
• **Brucella spp. → Brucellosis/Undulant fever → Transmitted via dairy products, contact with animals → Unpasteurized dairy products give you Undulant fever**
• **VDRL false positives → Intended for use in detection of syphilis; detect nonspecific antibody that reacts with beef cardiolipin**
  - **VDRL → Viruses (mono, hepatitis), Drugs, Rheumatic fever, Lupus/Leprosy**
• **Lactose-fermenting enteric bacteria → Lactose is KEE; test with MacConKEE'S agar → Citrobacteria, Klebsiella, E. coli, Enterobacter**
• **Haemophilus influenzae**
  - Grows in chocolate agar and require factors V (NAD) and X (hematin) → When a child has the flu, mom goes to give (V) and dime (X) store to buy chocolate
  - **HaEMOPhilus causes → Epiglottitis (cherry red in children), Meningitis, Otitis media, and Pneumonia**
• **Gardnerella vaginalis**
  - Causes vaginosis presenting with gray discharge, **fishy** smell, mobiluncus (an anaerobe) is also involved here; see **clue** cells (vaginal squamous cell covered with bacteria; looks ragged)
    - “I don’t have a clue why I smell fish in the vagina garden!”
• **Rickettsial diseases**
  - **Rickettsia vs. typhus** (note that both are rickettsial diseases; former caused by R. rickettsii, latter caused by R. typhi, R. prowazekii)
    - Rickettsial rash starts on hands and feet; typhus rash starts centrally and spreads outward without involving palms or soles → **Rickettsia on the wRists, Typhus on the Trunk’**
  - **Q fever is caused by Coxiella burnetii, another rickettsial species**
    - Q fever is Queer because → No rash, no vector, has a negative Weil-Felix, forms a spore, does not have Rickettsia in genus name
- Palm and sole rash → You drive CARS using your palms and soles → Coxsackievirus A (hand, foot, mouth disease), Rocky mountain spotted fever, Syphilis
- C. difficile → So difficult to kill, have to resort to VANCOMYCIN, and not just any vancomycin, but special orally delivered vancomycin
- Corynebacterium diphtheria grows on tellurite agar → “If you have to tell someone you are right (tellurite), you are corny as hell”
- Group D streptococci can both grow in bile; however, only enterococci are hardy enough to grow in NaCl (S. bovis, the other group D, cannot grow in NaCl)
  - E. faecalis, E. faecium are EXTRA hardy (grow in NaCl) → Have to be hardy to take a facial (cum on the face)
- Systemic mycoses by region
  - Coccidioidomycosis immitis → Southwest US (California, Arizona, western Texas, New Mexico)
    - People in California/LA are fake as fuck and always “imitating” everyone else
  - Histoplasmosis capsolatum → Mississippi/Ohio river valleys, Southeast US river basins
    - hist-O-plasmosis for O-hio
  - Blastomycosis dermatitidis → East of Mississippi river, Central America
- Three main causes of otitis media → nontypable haem Influenzae, moraxella Catarrhalis, strep Pneumo → ICP, like the Insane Clown Posse; their music sucks so much it really hurts the middle ear
  - In order, strep pneumo > haem influe > moraxella cat
Streptococcus InterMeDius and AnginoSus IMMeDiately ASsess for ABSCESS

Rickettsia akari → Causes Rickettsial Pox → Rickettsia ATARI, like the videogame system; nerd with disgusting pox-ridden faces play videogames

Bacteria identification with antibiotics (novobiocin, optochin, bacitracin)
  ● When have it narrowed down to...
    ○ Staph → Novobiocin test → kills EPIDERMIdis but not SAProhyticus
      ■ Scrub Nasty EPIDERMIS Sap
    ○ ALpha hemolytic → Optochin test → kills PNEUMO but not Mutans
      ■ AL OrgasmS PNEUOMOrous times each day...he beats off so much he is like a mutant or something
    ○ Beta hemolytic → Bacitracin → Kills PYogenes but not S. agalactiae
      ■ Bitches Bake PY...and by bitch, I mean a gal

Chlamydia types D-K cause STDs (as well as infant pneumonia, inclusion conjunctivitis in newborns), whereas A, B and C are associated with trachomas (leading cause of blindness worldwide)
  ● D-K → DicK → STD
  ● L subtypes (L1, L2, L3) cause Lymphogranuloma venereum → Painless papule (bump) or ulceration of genitals; heals spontaneously; bacteria migrate to regional lymph nodes, which enlarge; become tender and may break open/drain pus
  ● TRACHoma → Like TRACHion on eyelid pulling it such that eyelashes are in contact with eye; this can lead to blindness

Chlamydia life cycle
  ● Elementary body → Enfectious and Enters cell via endocytosis
  ● Reticulate body Replicates in cell by fission; form seen on tissue culture

Bovis in the Blood → Better Beware, CANCER in the BOWEL
  ● We are not sure if it is a marker or a cause, but when bovis is
seen in the blood, it is likely that the person has blowel cancer (like 50% of people in some studies)

- Corynebacterium → Corny mnemonic from FA (abbreviated CBA so think of the ABCs):
  - ADP ribosylation
  - Beta prophage
  - Corynebacterium
  - Diphtheria
  - EF2
  - Fuck, WHAT ARE YOU THINKING, don’t scrape the gray/white membrane b/c it’ll release the exotoxins
  - Granules

- Spore forming bacteria highly resistant to heat → Need to Boil (Bacillus) and Cook (Clostridium) to kill them

- **HACEK** bacteria → Slow growing bacteria known to cause endocarditis (must let grow for like 2 weeks)
  - H → Haemophilus species
  - A → Actinobacillus species
  - C → Cardiobacterium species
  - E → Eikenella species
  - K → Kingella species

- N.Gonorrhea/C.trachomatis can disseminate and lead to Fitz-Hugh Curtis syndrome = infection of liver capsule = Fucks Hepato Capsule

- N. MeninGitidis → Ferments Maltose and Glucose
  - In contrast to N. Gonorrhoeae, which only ferments Glucose (no M in name)

- Legionella growth requirements: Legionnaire sitting at a campfire (charcoal) with his silver helmet and iron sword - he’s no sissy (cysteine)
  - Also remember the “ella” thing for cysteine-requiring bugs discussed above

- Some important details about **PSEUDO**monas → BE **PSEUDO**
  - B → Burns
  - E → Endocarditis
  - P → Pneumonia
  - S → Sepsis
  - E → External malignant otitis media
  - U → UTI
  - DO → Diabetic Osteomyelitis

- Bacteriodes **MELANIN**ogenicus → Produces a black pigment when grown on blood agar, like **MELANIN** in our skin (may be actual melanin, I’m not sure)

- To differentiate Gardnerella, Trichomonas, Chlamydia:
  - **Gardnerella vaginalis** → Gray discharge
  - **Trichomonas vaginalis** → Trick → Riddler → Green discharge
- **Chlamydia** → Clear discharge
- Candida → Thick cottage cheese discharge, which is logical given the appearance of candida in the throat of an HIV patient; this is the classic “yeast” infection
- Bacteriodes **fragilis** → Infection occurs when organism enters into the peritoneal cavity; it does not get more FRAGILE than the peritoneal cavity
- **CLOStridium** are anaerobes; they multiply in an airtight CLOSet
- **Tzanck test** → Used to assess lesion for herpes → “Tzankcs for the herpes you fucking bitch”
- Encapsulated bacteria → Positive quellung reaction, where capsule swells when specific anticapsular antisera are added → **Quellung** = capsular swelling
  - **Some Killers Have Nice Shiny Bodies** → Streptococcus pneu, Klebsiella pneu, Haemophilus influenzae type B, Neisseria meningitidis, Salmonella, group B strep
  - **SHiN** organisms; can think of shin gaurd being a capsule for your shin (Can use KBS SHiN to add in Klebsiella and group B strep, using my initials K, S., including my middle name “Baller” → Furthermore, a capsule is like a ball) → Note that these bacteria all have an IgA protease that they use to invade respiratory mucosa
    - Klebsiella
    - group B strep
    - Salmonella
    - **S. pneumoniae**
    - **H. Influenzae** type B
    - N. meningitidis (NOT gonnorhea type)
- Pigment producing bacteria
  - **Actinomyces israelii** has yellow “sulfur” granules → **Israel** has yellow sand
  - Serratia marcescens → Has a red pigment like a maraschino cherry
- Urease positive bugs → Klutzy **Prokaryotes Hack Urea** → Klebsiella, Proteus, H. pylori, Ureaplasma urealyticum
- Argyll-Robertson Pupil → Pupil constricts during accomodation but does not react to light → Called a “prostitute’s pupil” because like a prostitute it accommodates but does not react; can be caused by syphilis, which prostitutes commonly get
- **Bloody Diarrhea** vs. watery diarrhea:
  - Bloody: SSEECCCY = Salmonella, Shigella, EIEC, ETEC, Entameba, C. dif, Campylobacter, Yersinia
  - Watery: CCGRAVEN = C. perfringens, Crypto, Giardia, Rota, Adeno, Vibrio, ETEC, Norwalk
**Anti-bacterial Antibiotics**

- Bacteriostatic vs. bactericidal
  - **Bacteriostatic**
    - "We’re ECSTaTiC about bacteriorstatics!" → Erythromycin, Clindamycin, Sulfamethoxazole, Trimethoprim, Tetracyclines, Chloramphenicol
  - **Bactericidal**
    - "Very Finely Proficient At Cell Murder" or "Violent Fucking and Pounding Murders All Cells" → Vancomycin, Fluoroquinolones, Penicillin, Metronidazole, Aminoglycosides, Cephalosporins
- Antibiotics to avoid in pregnancy → **SAFE Moms Take Really Good Care**
  - S → Sulfonamides (kernicterus)
  - A → Aminoglycosides (ototoxicity)
  - F → Fluoroquinolones (cartilage damage)
  - E → Erythromycin (acute cholestatic hepatitis in mom; DIT says this is wrong, however, but is in FA)
  - M → Metronidazole (Mutagenesis)
  - T → Tetracyclines (discolored teeth, inhibition of bone growth)
  - R → Ribavirin (teratogenic)
  - G → Griseofulvin (teratogenic)
  - C → Chloramphenicol (gray baby)
- Protein synthesis inhibitors → “Buy AT 30, CCELL (sell) at 50”
  - 30S inhibitors (AT) → Aminoglycosides (bactericidal), Tetracycline (bacteriostatic)
  - 50S inhibitors (CCELL) → Chloramphenicol, Clindamycin, Erythromycin, Lincomycin, Linezolid
  - All bacteriostatic, except for Linezolid which is variable
- Should use penicillinase-resistant penicillins for S. aureus (assuming not MRSA) → Use naf (nafcillin) for staph
- The anti-PA drugs
  - TCP → Ticarcillin, Carbenicillin, Piperacillin → Takes Care of Pseudomonas
- Tetracycline uses: “VACUUM THe BedRoom”
  - Vibrio
  - Acne
  - Chlamydia
  - Ureaplasma
  - Urealyticum
  - Mycoplasma pneumo
  - Tularemia
- H. pylori
- B. burgdorferi
- Rickettsia
- Beta lactamase inhibitors → CAST → Clavulanic Acid, Sulbactam, Tazobactam
  - Picture the beta lactamase being wrapped up in a CAST so it can’t function
- Cephalosporins
  - 1st gen → Treat the PEcK organisms → Proteus mirabilis, E. coli, Klebsiella pneumoniae
  - 2nd gen → Treat the HEN PEcKS organisms → Haemophilus influenzae, Enterobacter aerogenes, Neisseria spp., Proteus, E. coli, Klebsiella pneumo, Serratia marcescens
- Remembering the generation of the cephalosporin
  - 1st gen → Only ones with a PH (cephalothin, cephapirin, cephradine); cefazolin is an exception, but don’t let that faze you
  - 3rd → Most have a T or tri in their names (ceftriazone, ceftazidime, cefotaxime, ceftizoxime, cefituben)
  - 4th generation → cefepime → fep stands for “for every pussy,” because 4th generation makes it SO easy to kill things, only a pussy would resort to it
- IV beta lactamase resistant penicillins (CMMRS P. 156) → I met a nasty ox → Methicillin, nafcillin, oxacillin
- Imipenem and meropenem
  - Give imipenem with cilastatin; cilasttain is an inhibitor of renal dihydropyridase I; decreases inactivation of drug in renal tubules → With imipenem, “the kill is LASTIN” with ciLASTATIN
  - Imipenem is known for harsh side effects → “IM In the PEN” like prison; get raped (GI distress), which gives you a rash, and all of this trauma results in longlasting psychological damage (CNS toxicity)
    - Meropenem is less harsh, no seizures → Now someone else is in the pen so it’s cool
- Macrolide/Aminoglycoside naming
  - “My Sin” is MACking on the hoes and being “a mean guy”; “-mycin” names → Macrolides, Aminoglycosides
  - CLEan TAG mnemonic in Microbiology Made Ridiculously Simple (P. 168)
    - CLEan for 50s → Chloramphenicol and Clindamycin, Linezolid, Erythromycin
    - TAg for 30s → Tetracycline, AminoGlycosides
• Macrolides
  ○ Using a “mack,” like a pimp
    ■ A mack must be atypical → Treats atypical pneumonia
    ■ A mack can make your heart skip a beat → QT prolongation
  ○ Alternative: USA thinks we’re #1 (macro)
    ■ UTIs
    ■ STDs
    ■ Atypical pneumo
    ■ also obesity is rampant in US → macrolides most common AE is GI discomfort
• Aminoglycosides → Mean GNATS can NOT kill anaerobes
  ○ Mean → Aminoglycosides
  ○ Cannot kill anaerobes → O2 is needed for aminoglycoside uptake, so ineffective against anaerobes
  ○ GNATS → The different aminoglycosides → Gentamycin, Neomycin, Amikacin, Tobramycin, Streptomycin
  ○ NOT covers sides → Nephrotoxicity, Ototoxicity, Teratogen
    ■ CMMRS version
      ● Side effects → A mean guy delivers a punch to the ear (eight cranial nerve toxicity; vertigo, hearing loss) and the kidney (renal toxicity). His opponent is now totally passed out, unable to move
or breath (neuromuscular blockade, a rare curare-like effect that is sometimes seen).

- **Chloramphenicol** can cause aplastic anemia; think of chlorine being poured into bone
  - It can also cause grey baby syndrome; think of a baby falling into a chlorine pool and coming out all grey
- **Clindamycin** and Metronidazole are used to treat anaerobes
  - Clindamycin → Treats anaerobes Above diaphragm → A and C both come first alphabetically
  - Metronidazole → Treats anaerobes Below diaphragm → B and M come second alphabetically
  - Alternatively, cLINDA is a nice girl, but a girl from the METRO bus will go down on you (BELOW your diaphragm)
- Clindamycin and Ampicillin both can lead to pseudomembranous colitis from C. dif b/c they “cleaned up (amp)” your colon removing endogenous flora
- **Trimethoprim** (TMP) → Causes megaloblastic anemia, leukopenia, granulocytopenia → Treats Marrow Poorly
- **TB Drugs**
  - When someone is infected with TB, they are RIPE for treatment → Tx with Rifampin, Isoniazid, Pyrazinamide, Ethambutol
  - I Saw a Red Pyre--BURNING THE LIVER (because these three drugs cause liver damage)
    - **Isoniazid** (INH)
      - Sides → INH Injures Neurons and Hepatocytes
      - INH = I Need Help! = Requires catalase-peroxidase to convert it to an active metabolite
    - **Rifampin** (or Rifabutin, which is similar but slightly different)
      - The 4 Rs of Rifampin
        - Red → Body fluids such as urine, feces, saliva, sweat and tears are colored bright red-orange
        - R for RNA → Rifampin inhibits the DNA-dependent RNA polymerase of TB
        - Revs up microsomal P-450
        - Rapid resistance if used alone
    - **Pyrazinamide** → Effective in the acidic pH
of phagolysosomes (where TB engulfed by macrophages is found) → Picture phagosome as a little pyramid that this is working inside of

- Other drugs for TB not associated with liver damage
  - Ethambutol
    - Reversible ocular toxicity/neuropathy
      → Think of ethane-butane flame torch burning the eye
      - Decreased visual acuity, red-green color blindness
    - Alternatively I think of an ambulance that can run through reds/greens
  - Streptomycin

- Fluoroquinolones
  - All end in -floxacin; so think of a “flock of sinners” at a party; I remember “flock” by thinking of a flock of birds hanging out with Dr. Quinn medicine woman (http://en.wikipedia.org/wiki/Dr._Quinn,_Medicine_Woman)
    - Mechanism: The sinners gyrate their hips and dance and have sex → Inhibits DNA gyrase
  - Adverse effects
    - The sinners get drunk and hungover → GI irritability, vomiting
    - FluoroquinoLONES hurt attachments to your BONES → Tendonitis and tendon rupture in adults; leg cramps and myalgias in kids

- Vancomycin
  - Well tolerated in general, does NOT have many problems → Nephrotoxicity, Ototoxicity, Thrombophlebitis
  - I remember red man easily. A red man is like an Indian. Indian people (native americans) have a TON of medical problems
    - T → Thrombophlebitis
    - O → Ototoxicity
    - N → Nephrotoxicity
  - From Microbio Made Ridiculously Simple (P. 190) → Picture a van (with a plus on it because vancomycin kills like ALL gram positive, i.e. an ambulance van) coming out of IV tubing; it is about to run over an ear (the “D” of D-alanine) and hit a peptidoglycan cell wall; the van is being driven by a native american (the red man)
    - IV tubing → Given IV (except for Tx of clostridium
difficile pseudomembranous colitis, where we want it to stay in the GI tract and give orally)
- Mechanism → Inhibits peptidoglycan production; complexes with D-alanine D-alanine to inhibit transpeptidation
- Sides → **Red man syndrome** (release of histamine causes red rash of the torso and itching skin)
  - **Metronidazole (the metro bus);** also used to treat some protozoa (despite this being the bacteria section)
    - Sides → Because the bus is shaky, you will get stomach upset if you drink while taking it (disulfiram effect); eating the metallic bus can also put a **metallic taste** in your mouth
    - Organisms that can be treated include both bacteria and protozoa→ “GET GAP on the Metro!”
      - G → Giardia
      - E → Entamoeba
      - T → Trichomonas
      - G → Gardnerella vaginalis
      - A → Anaerobes (bacteriodes, clostridium)
      - P → H. Pylori
  - Polymyxins → Polymyxin B, polymyxin E (colistimethate)
    - Mechanism → Bind to cell membranes of bacteria and disrupt their osmotic properties; cationic, basic proteins that act like detergents → **MYXins** **MIX** up membranes
    - Neurotoxicity is seen → They also scramble (**MIX** up) the brain

- **Fungi**
  - **Fungi** grow on Sabouraud’s agar → This mnemonic may only be useful for me, but I know someone named Sabareesh and he is a super **Fun Guy**
  - Actinomyces and nocardia are the “fungi-like” bacteria; filamentous, beaded, branching gram-positive organisms
    - **Actinomyces → Bacteria acting** like fungi
      - Actinomyces Israeliii → Yeow granules called sulfur granules → Granules of yellow sand in Israel
    - Nocardia → Acid fast stain positive, like TB → “NO CARDS for me guys, I have to study for boards and ruin my entire fucking summer **FAST**”
  - For the dimorphic fungi, **cold = mold, heat = yeast**
  - Dimorphic fungi → **Blastomyces dermatitidis,** **Histoplasma capsulatum,** **Coccidioides immitus,** **Sporothrix schenckii**
    - Dimorphic like a penis (cock and balls) → **Blast His Cocc Spores**
  - Histo Hides (within macrophages)
  - **Blastomycosis** → **Broad Based Buds**
- **Histoplasmosis → Histology → Dr. Cotter → Histoplasmosis associated with bat droppings → The rumor is that Dr. Cotter has sex with bats**

- **Paracoccidio Parasails** with the captain’s wheel all the way to Latin America → Paracoccidio has budding yeast with captain’s wheel formation, seen in latin america (there is a show with a pair of cocks in Tijuana)

- **Pneumocystis carinii (P. jiroveci) → Produces PCP pneumonia, so associate with the drug PCP**
  - PCP makes you see totally crazy shit, like UFOs → Pneumocystis is UFO shaped

- Tinea versicolor → Caused by malassezia furfur → Degradation of lipids produces acids that damage melanocytes and cause hypo/ hyperpigmented patches → Logical considering the “versicolor” naming
  - Sphaghetti and meatball appearance on KOH prep → Sphaghetti noodles are white, sauce is colored; can link to versicolor
  
  ![Sphaghetti and Meatballs](image)

- Malassezia furfur sounds Italian → spaghetti/meatballs

- **Wide vs. acute angle in fungi**
  - Aspergillus → A → Acute angle
  - Mucor → Flip M to have a W → Wide angle

- Can treat sporothrix schenckii (the rose gardener’s disease) with potassium iodide → “Plant a rose in the pot”
  - This is a dimorphic fungus that is cigar-shaped when in its yeast form → Rose gardener’s are always smoking cigars while they work

- **Antifungal antibiotics**
  - Amphotericin B is the “Amphibian Terrorist” (CMRSM); terrorizes ergosterol and the kidney
    - Amphi-tear-acin tears holes in the fungal membrane by forming pores
    - Nephrotoxicity → Terrorist bombing the fungal cell membrane and taking KIDs (kidneys) hostage
  - Nyastatin → “Nasty Nyastatin”
    - So nasty it is too strong to take IV (would be highly toxic); thus must use topically/orally
    - Punches holes in ergosterol, much like holes are punched
in the body in anal sex (→ nasty)
  ■ Same mechanism as amphotericin B, but is only used topically → Tx of choice for oral candidiasis (but no GI/systemic absorption)

• Fluconosine is an antimetabolite like 5-FU
  ○ Similarly causes bone marrow depression, nausea/vomiting/diarrhea (→ damage rapidly dividing cells like bone marrow, GI)

• Azoles
  ○ Ketoconazole (and all of the azoles) inhibits cytochrome P-450, which is important in testosterone synthesis; this causes gynecomastia/impotence/etc.
  ■ Ketogenic diets involve starving yourself with extremely low carbs such that you enter ketosis and burn fat; if a guy followed this diet he would be super girly (gynecomastia/etc.)
  ■ Can mentally link this to adrenal suppression, another side effect of ketoconazole

• CASPofungin → Used to treat invasive ASPergilosis
  ○ Inhibits synthesis of beta-glucan → CASPofungin like Casper the ghost → Someone dressing up like casper makes themselves white using a glue-can (glucan)
  ■ Well, this would be one way to make yourself white...I’m reaching...

• Griseofulvin
  ○ From CMMRS: Picture a greasy fulcrum used to lever dermatophyte plaques off of the skin
  ○ Inhibits fungal growth by disrupting spindle formation, thus preventing mi-TOE-sis; picture greasy fulcrum/lever pulling plaque off of a toe; thus logically -static not -cidal, as it just prevents division

• Terbinafine
  ○ Inhibits ergosterol synthesis by blocking Squalene Epoxidase → Wind turbines work best in squalls (high wind)
**Viruses**

- **Negative RNA** is negative/shitty; must be transcribed into positive RNA in order for it to be useful
- **Negative DNA** is negative/shitty and thus not actually read; it is the positive DNA that is used to do something
- **DNA viruses → The HHAPPY viruses** (happy because DNA is in semen and ejaculating is super fun)
  - H → Herpes
  - H → Hepadna
  - A → Adeno
  - P → Papova
  - P → Parvo; break the rules of DNA viruses by having single stranded DNA; so simple it is like playing ONE PAR in golf
  - P → Pox; break the rules of DNA viruses by not having icosahedral symmetry; surrounded by complex structural proteins that look like a box (POX IN A BOX)
- Three of the DNA viruses are naked (no envelope); must be naked for **PAP smear exam; PAPova, Adeno, Parvo**
- **Hepatitis**
  - Five types → ABCDE; A and E are fecal-oral, on the ends like the mouth/anus of the GI tract
  - HAV → A for Asymptomatic (usually, but can cause jaundice in some cases), Acute, Alone (no carriers)
  - HBV → B for Blood borne; the cousin of HCV, as both predispose to chronic active hepatitis, cirrhosis, hepatocellular carcinoma
    - For the markers, I always get HBs and HBc mixed up so on the graph, remember HBs (and it’s subsequent ab) has a space in between marking the equivalence zone
  - HBe for g infectivity
  - HCV → C for Chronic, Cirrhosis, Carcinoma, Carriers
  - HDV → D for Defective, Dependent on HBV
• HEV → E for Enteric, Expectant mothers (normally this virus is mild like A, but has high mortality in pregnant women)

■ The non-enveloped RNA viruses are CPR, as you cannot perform CPR on someone in an envelope; Calici, Picorna, Reoviridae

■ Orthomyxo and paraorthomyxo
  • ORthomyxo causes ORdinary flu; PARAortho causes an influenza like illness in addition to a PARAdigm of distinctly different diseases
  • Antigenic drift → Small change from mutations; like a little drift of a sailboat in water
  • Antigenic shift → Big change due to getting a brand new NA, HA or both as 2 influenza types infect the same cell and swap genetic material; really SHIFTING gears; or “oh SHIFT, this is a problem!”

■ Viral vaccines
  • Live attenuated → Smallpox, Yellow fever, Chickenpox, Sabin’s polio, MMR → “Live! One night only! See small yellow chickens get vaccinated with Sabin’s and MMR!”
  • SailK polio = Killed
  • Killed virus vaccines → RIP Always → Rabies, Influenza, salk Polio, HAV

■ DNA vs. RNA viral genomes
  • All DNA viruses are dsDNA like our cells, except for parovirus (part-of-a-virus)
  • All RNA viruses are ssRNA like our cells, except for repeatovirus (reovirus)
    ○ Another exception is Rotavirus

■ Positive stranded RNA viruses → I went to a RETRO (RETROvirus) TOGA (TOGAvirus) party, where I drank FLAVored (FLAVivirus) CORONA (CORONAvirus) and ate HIPPY (HEPEvirus) CALIFORNIA (CALICivirus) PICKLES (PICOvirus)

■ Viral envelopes
  • Naked CPR and PAPP smear → These viruses are naked (non-enveloped) → Calicivirus, Picornavirus, Reovirus, Parvovirus, Adenovirus, Papilloma, Polyoma

■ Papovaviridae → PA-PO-VA-viridae
  • PApilloma; human warts and cervical cancer
  • POlyomavirus; composed of human BK and JC virus
    ○ JC virus
      ■ JC Polyomavirus → Causes Progressive Multifocal Leukoencephalopathy (PML); memory loss, poor speech, incoordination secondary to CNS white matter damage → Think JC Penneys, person walking around with memory loss/poor speech/incoordination (in CMMRS, Page 283)

• Simian VAcuulating virus; does not infect humans
For these viruses, think "O" (pap-O-viridae)
  o O for circular double-stranded DNA
  o O for round warts
  o O for cervix

- **Adenoviridae** → Picture A DEN full of coughing, sneezing children; this virus causes more than 10% of childhood respiratory infections
- **Parvoviridae** → Really simple, only **one strand of single stranded DNA** → Simple as a **par 1** golf course
  - Golf is for adults not children, so slap child on face if he plays golf (causes *erythema infectiousum* (fifth disease) with fever and a "slapped face" rash on the cheeks)
- **Picornaviridae** → PicORN-a; the porn virus; thus you have the entero virus (poop/anal) and the rhinoviruses (rhino horn is very phallic, used in porn) → Note also that these viruses are non-enveloped (**naked**)
  - Entero → Pole-io (like penis, pole), Coxsackie A and B viruses (cocks), echovirus (porn star has such a loose vagina there is a cave-like echo)
  - **Coxsackievirus type A** → Causes hand-foot-mouth disease → Logical considering porn theme, weird perverse hand/foot/mouth sex

- Negative-stranded RNA viruses
  - **Always Bring Polymerase Or Fail Replication** → Arenaviruses, Bunyaviruses, Paramyxoviruses, Orthomyxoviruses, Filoviruses, Rhabdoviruses
- **Segmented viruses** → **BOAR** → Bunyaviruses, Orthomyxoviruses, Arenaviruses, Reoviruses → A BOAR can rip you into segments
  - OrthoMYXvirus → The boar rips you into mixed up segments
  - Arenaviruses → Compete in an arena with a gladiator, chopped into pieces
  - Reo → I went to reo, got chopped up
  - Bunyaviruses → A boar gave me a bunyon
Rhabdoviridae
- **Rhabdo** is shaped like a **bullet**
  - Old yeller the dog, who was shot by a **bullet**, was shot because he had **rabies**
- Causes rabies; **negri bodies** are pathognomonic → Inclusions of virus in CNS nerve cells; picture a **big black rabid dog in a neuron**
- **ROTA** → **Right Out The Anus** → Most important global cause of infantile gastroenteritis; major cause of acute diarrhea in US during winter (especially daycare centers, kindergartens)
- Arboviruses = arthropod-borne = “flies, ticks, bugs” = flavi, toga, bunya
- PaRaMyxoviruses = Parainfluenza, RSV, Measles, Mumps
- **Ebola** → Hemorrhagic fever → **Bleed from mucous** membranes
  - There is a Turkish singer called “**Ibo**” ([http://www.youtube.com/watch?v=XHqGB0doroU](http://www.youtube.com/watch?v=XHqGB0doroU)); girls love him so much and he gets so much sex and is so wild and animalistic he is always making mucous membranes bleed
- **Rubella** → **Rub Ella**, or rub a girl (ella is girl in spanish) → When I rub a girl in preparation for sex, I kiss her behind the ear (**postauricular lymphadenopathy**); I also begin at the head and move down (rash starts at head and moves down)

**Anti-viral medications**
- Foscarnet → DNA polymerase inhibitor that binds the pyrophosphate-binding site of the enzyme → **FOScarnet** = pyro**FOS**phate analog
  - Logically does not need to be phosphorylated, since is already a pyrophosphate
- HIV drugs
○ Nucleoside/nucleotide/etc. reverse transcriptase inhibitors (NRTIs)
  ▪ Tenofovir → NucleoTide analogue
  ▪ Zidovudine (ZDV), Stavudine → “Have you dined (vudine) with my nuclear (nucleosides) family?”
    ▪ Both are NRTIs
    ▪ ZDV prevents familial transmission from mother to fetus
      ○ “The LAST thing you want to do is get a baby infected with HIV” → Z is last letter in alphabet
  ○ Efavirenz → Causes abnormal dreams that are often scary → Dreaming about axe-wielding elves
    ▪ Think of efavirENZ as “the Ns” → NNRTI that causes Nausea and Nightmares
○ Protease inhibitors
  ▪ Names end in -navir → NAVIR (never) TEASE a proTEASE
  ▪ Ritonavir inhibits cytochrome P-450, and is thus used as a “booster” to make other antivirals last longer → It is like “Right On, other drugs, do your thing!”
  ○ Fusion inhibitors
    ▪ enFUviritide → FU for FUSE
○ Influenza drugs
  ○ Amantadine
    ▪ Treats influenza A, NOTinfluenza B; that is what the “A” in Amantadine is for; in addition, the A is for problems with the cerebellA (ataxis, dizizziness, slurred speech)
    ▪ “A man to dine” must take off his coat; this drug prevents viral genome uncoating in the host cell
      ▪ “A man to dine” on a date also knows he is going to get some pussy later, so he gets a dopamine surge → Thus used in the treatment of Parkinson’s
    ▪ Rimantidine is similar but with extra perks, like it is giving the user a “rim” job; does not require dose adjustments in renal failure, less CNS side effects (anxiety/confusion)
  ○ Neuraminidase inhibitors → Oseltamivir, zanamavir
    ▪ Za-NA-mivir and Osel-NA-mivir(oseltamivir) → Both are Neuro-Aminidase inhibitors.

○ Protozoa
- **Trichomonas vaginalis** → A “trick” and a “moan” → Prostitute → STD; causes trichomonas vaginitis (yellow, thin, watery, frothy, malodorous discharge; can have red *strawberry* cervix/vagina); men are asymptomatic carriers that can give to women
  - Prostitutes are poor so they take the **metro bus** (*metronidazole* is Tx)
  - The trick (prostitute) is happy (she is moaning); she is excited, so her mucous is engorged with blood and “*strawberry colored*”; she is also happy because the client bought her **champagne** (*corkscrew motility*)
- **Borrelia Burgdorferi** (bacteria, lyme disease) can be transmitted with **Babesia** (protozoa, maltese cross in RBC, hemolytic anemia) because both use the ixodes tick
- **Naegleria fowleri** → Known for **FOWL PLAY**, since 95% of patients will die within 1 week (rapidly fatal meningoencephalitis)
  - Will have history of swimming (get this from water)
    - Think **Nalgene** bottle filled with **freshwater** containing **Naegleria**
    - It is also fowl how I am perpetually losing my damn nalgene bottle
  - Causes meningitis; gram stain will show no bacteria, but levels of glucose/protein suggest bacterial
- **Toxoplasma gondii**
  - Think **Gandhi**; he was little and frail, so he could only hurt **immunocompromised** people
  - When his fasting did not work, he actually **TORCHed** himself with a flame thrower to make a statement (a **TORCHES** organism that can cross the blood/placenta barrier, the T)
  - **Ma-CAT-ma Ghandi** → This disease is very commonly spread by **cat feces**; thus **pregnant women must avoid cats** to avoid the **TORCHES** effect
- **Trypanosoma brucei** → Causes African sleeping sickness, which is characterized by standard stuff (enlarged lymph nodes, recurring fever) and **SOMNOLENCE**; **COMA** → When you are tryp-ing on acid, you are totally out of it/in a coma/pretty much asleep; you also may see dead people like **Bruce willis**
  - Treat blood-borne disease with **SUramin**, CNS disease with **MELArsoprol** → It **SURe** is nice to go to sleep; **MELAtonin** helps with sleep
  - Trypanosoma cruzi (Chagas) → everything gets big (DCM, megacolon, megaesophagus) → Cruzi allows organs to crush you with their size
- **Cryptosporidium** - causes diarrhea in AIDS pts (afx CRYPTs of Lieberkuhn in intestine)
- **Malaria**
  - P. falciparum → The most severe type of malaria, causing occlusion of capillaries in brain, kidneys, lungs → P. **FALCe**
  - **Penis (like a dildo)** → This one rapes you like a big dildo
    - Also, causes pretty much continuous damage; daily cycles
  - P. vivax/ovale → These two are always grouped together → 2 like 2 days → Cycle every 48 hours (tertian)
  - P. malariae → The other one; cycles every 72 hours (quartan)
- Giardia lamblia → Causes **foul-smelling fatty diarrhea** → Giardia sounds like the **fatty chocolates Ghirardelli**

- **Anti-Protozoa Antibiotics**
  - **Metronidazole** (the metro bus); used to treat some protozoa
    - Sides → Because the bus is shaky, you will get stomach upset if you drink while taking it (disulfiram effect); eating the metallic bus can also put a metallic taste in your mouth
    - The organisms scream "GET out of the way of the bus!!!" The organisms that can be "crushed by the bus" and treated are:
      - G → Giardia
      - E → Entamoeba
      - T → Trichomonas
  - Treatment of malaria
    - Drugs can be ordered alphabetically based on when you would use them → Chloriquine, Mefloquine, Primaquine
      - Chloriquine → Begin with this
      - Mefloquine → Use this if resistant (can also use quinine in combination with pyrimethamine/ sulfonamide in this case)
      - Primaquine → Use for dormant hypnozoite forms in vivax/ovale
    - Alternatively → I need a chloak for me prom
    - Alternatively: Ceasing Malarial Progression
○ Helminths
  ■ Ancylostoma - penetrate skin of feet (close to ankle)
  ■ Schistosoma
    ● Chronic infection with schistosoma haematobium can cause squamous cell carcinoma of bladder → Chronic infection with schist, cancer where you piss
  ■ Clonorchis sinensis - orca → killer whale → reminds you that you get this from eating undercooked fish leading to cholangiosarcoma (a killer whale in your bile duct)
  ■ Nematode routes of infection
    ● Ingested → Enterobius, Ascaris, Trichinella → You’ll get sick if you EAT these
    ● Cutaneous → Strongyloides, Ancylostoma, Necator → These get into your feet from the SANd
  ■ Anti-Helminth antibiotics
    ● Mebendazole → meBENDazole → Worms bend so treat them with meBENDazole
      ○ Inhibits the synthesis of microtubules (which are BENDY)
      ■ Also inhibits glucose uptake
    ● Ivermectin → Intensifies GABA-mediated neurotransmission, causing immobilization → Iver the pirate is always GABing
      ○ IVERmectin for rIVER blindness (Onchocerca)

• Immunology
  ○ Anatomy
    ■ T cells tend to be in the “P” areas; Paracortex in lymph node, Periarterial lymphatic sheath (PALS) in spleen
    ■ Lymph node → CB PT MMMmmm (CB is my old nick name, PT for patient, MM for delicious...this mnemonic is awful but better than nothing)
      ● Cortex → Follicles with B cells
      ● Paracortex → T cells
      ● Medulla → Macrophages
    ■ If spleen is disfunctioning, have increased susceptibility to encapsulated organisms; these are the S SHiN organisms; can think of shin gaurd being a capsule for your shin
      ● Salmonella
      ● S. pneumoniae
      ● H. Influenzae
      ● N. meningitidis (NOT gonnor)
    ■ Thymus → The Medulla contains the Mature T cells
  ○ Physiology
    ■ MHC I and II
      ● MHC is encoded by HLA genes
- MHC I $\rightarrow$ 1 is simple $\rightarrow$ Thus matched with the simple letters: A, B, C $\rightarrow$ MHC I is encoded by HLA-A, HLA-B, HLA-C
- MHC 2 $\rightarrow$ HLA-DR, HLA-DQ, HLA-DP $\rightarrow$ The DR went to dairy queen (DQ) to get a doctor pepper (DP)
  - MHC2 receptor has 2 transmembrane spanning units compared to MHC1 (however, remember that MHC1 needs beta2 microglobulin...but this is NOT a transmembrane unit)

- HLA subtypes associated with diseases
  - B27 $\rightarrow$ The PAIR diseases $\rightarrow$ Psoriasis, Ankylosing Spondylitis, Inflammatory bowel disease, Reiter's syndrome $\rightarrow$ A pair is 2 (for B27)
    - Also, B looks like a PAIR of tits
  - B8 $\rightarrow$ Associated with Graves disease $\rightarrow$ I like to masturB8 at Graves (disease) because dead bodies turn me on
  - DR3 and DR4 $\rightarrow$ D for Diabetes mellitus type 1; do not see DM-II association with any of the HLA types
    - HOWEVER, DM II has the stronger genetic linkage; it just isn't associated with HLA

- Generation of receptor diversity
  - The beta chain of the T cell receptor is analogous to the heavy chain of the B cell receptor (just IgM or IgD) $\rightarrow$ A beta male is generally fat (heavy) as fuck

- Cytokines and their functions
  - To remember IL-1 through IL-5, use Hot T-Bone stEAK is
    - IL-1 $\rightarrow$ Causes fever (hot)
    - IL-2 $\rightarrow$ Stimulates T cells (for example, released by Th cells in the activation of Tc cells by a virus-infected cell)
    - IL-3 $\rightarrow$ Stimulates bone marrow (growth and differentiation of bone marrow stem cells; functions like GM-CSF)
    - IL-4 $\rightarrow$ Stimulates IgE production (that is, it stimulates class switching; thus both IgE and IgG, as well as differentiation into Th2 cells, growth of B cells)
    - IL-5 $\rightarrow$ Stimulates IgA production (and thus class switching from IgM to IgA; also promotes differentiation of B cells, stimulates growth/differentiation of eosinophils)
  - IL-6 is a pyrogen; 6 is devil number (666), so can associate with heat/fire
    - Also, stimulates class switching to IgG $\rightarrow$ 6 looks like a G
  - "Clean up on aisle 8" $\rightarrow$ Neutrophils are recruited by IL-8 to clear infections (they are the classic clean up cells)
  - IL-10 $\rightarrow$ 10, rhymes with men $\rightarrow$ I don’t like men, so they inhibit me having a boner; especially men that may rape me in a prison cell $\rightarrow$ IL-10 inhibits cell-mediated immunity (inhibits Th1 cells,
macrophages)
  ● Thus logically secreted by regulatory T cells
  ● BUT, it activates Th2 → Thus it prevents cell mediated immunity, encourages humoral immunity

- **IL-11** → Makes megakaryocyte differentiate into platelets; picture the 1 and 1 of 11 as two little platelet particles...look at that shit below, those platelets look like 11.

- **IL-12** → Activates Th1 cells → Activates 1 in order 2 take care of invaders
- **IL-13** → Isotype switching to IgE; since this causes allergy/rash/etc., it is logical that it would be this very unlucky number (13)

- **CD markers:**
  ● to remember CD40 is on the B cell whereas CD40L is on the T cell, just think a **40** of **Beer**

- **Immunoglobulin isotypes**
  ● When B lymphocyte gets older it can isotype switch; it can then secrete **A, G and E**; does this in its old **AGE**
  ● In the **classic** pathway, IgG and IgM fix complement; General motors (GM) is a **classic**
  ● IgM is a **pentamer** when in blood; note that the letter “M” has 5 points (5 = penta)
  ● IgE activates **Eosinophils** to kill helminths
  ● I want to **B and MD → B cells** have IgM and IgD on their surface acting as receptors

- **Cytotoxic T cells**
  ● **Granzyme and Granulysin** → Trigger apoptosis (programmed death) in target cell
    ○ Like an old **grannie** → When people get really old, they are programmed to die (**apoptosis**)  

- **Antibody structure and function**
  ● The constant **Fc** region
    ○ Constant
    ○ **Carboxy terminal**
- Complement binding occurs at CH2
- Carbohydrate side chains

- Complement
  - C3b → Opsonization; binds bacteria
  - C3a, C5a → Anaphalaxis

- Interferon mechanism
  - Interferon interferes with viruses → All interferons place uninfected cells in an antiviral state

- Cell surface proteins
  - CD21 is the receptor for Epstein-Barr virus; “you can drink Beer at the barr when you are 21” → Binds B cells

- Acute phase reactants → Key overall immune system stimulators → IL-1 and IL-6 (cause fever) + TNF-alpha (remember along with IL-1; that is first interleukin, this is first TNF, logical that both would be released in general acute immune response)

- Passive vs. active immunity
  - After exposure to Tetanus toxin, Botulinum toxin, HBV, or Rabies virus, patients are given preformed antibodies (passive) To Be Healed Rapidly

- Pathology
  - Hypersensitivity
    - 1st (type I) is fast (like 15 minutes); 4th and last is slow (delayed, like 24-48 hours)
    - The various hypersensitivities → ACID → Anaphylactic and Atopic (I), Cytotoxic (antibody mediated) (II), Immune complex (type III), Delayed (cell mediated) (IV)
    - Type 4 → 4 Ts → T lymphocytes, Transplant rejections, TB skin test, Touching (contact dermatitis)

- Autoantibodies
  - AntiCentromere → CREST scleroderma
    - C → Calcification, centromere antibody
    - R → Raynaud’s phenomenon
    - E → Esophageal dysmotility
    - S → Sclerodactyly (tapered, claw-like fingers)
    - T → Telangiectasias
  - Anti-Jo-1 → PolyMYositis, dermatomyositis → MY grandma’s name is JOanne
  - Diffuse SCLeroderma → anti-SCL-70 Abs
  - c-ANCA → Wegener’s granulomatosis → Like that old school tv channel the CW
Immune Deficiencies

- **Bruton's agammaglobulinemia →** Seen in Boys because it is X-linked
  - Defect in BTK, a tyrosine kinase gene
  - Blocks pro-B-cell from forming pre-B-cell → B cells are fucking up in Bruton’s
    - Since B cells are fucking up, there issues will clearly be due to an opsonization defect
- **Hyper-IgM →** B cells cannot Mature → Thus B cells cannot class switch → Thus B cells can only make IgM (not A, G E seen in class switching)
- **DiGeorge syndrome → 22q11 deficiency → CATCH 22**
  - C → Congenital heart/great vessel disease
    - T cell disorder so T-related cardiac problems
      (Truncus arteriosus, Tetralogy)
  - A → Abnormal facies
  - T → Thymic/parathyroid aplasia
  - C → Cleft palate
  - H → Hypocalcemia (and resultant tetany)
- **Selective Ig deficiency → IgA deficiency most common →** It is gAy that despite this being called “Ig deficiency,” only IgA really decreases significantly
- **Hyper-IgE syndrome → Job’s syndrome →** Cannot get a Job because did a TON (hyper) of Ecstasy (E)
  - Ecstasy user is FATED to be a fucking retard (remember, ecstasy messes up the brain)
    - F → coarse Facies
    - A → cold (noninflamed) staph Abscesses
    - T → retained primary Teeth
    - E → increased IgE
    - D → Dermatologic problems (eczema)
- **Wiskott-Aldrich (WA) syndrome →** WA state is ITE (alright, meh, nothing special) → WA is my home state, I would WAY fucking rather be in LA/NYC…Seattle is just aight (ITE).
  - I → Infections
- T → Thrombocytopenia
- E → Eczema
- There is also decreased IgM in this condition; because Washington state has no Muff (pussy)...again, you need to go to NYC/LA for the respectible Muff
  - Note that I needed a good bad word starting with M and I used http://www.noswearing.com/dictionary/m

- Ataxia-telangiectasia → IgA deficiency (this is one part of 3 in triad; the other 2 are extremely obvious from the name of the condition (ataxia, telangiectasia))
- Chediak-Higashi syndrome → CH for cock holder, a gay person → The problem is thus with FAG-ocytosis (defect in microtubular function with decreased phagocytosis)
  - Since gay people are scorned by society, they can’t go outside, have to hide indoors → Very pale → Albinism is associated with CH
- Leukocyte Adhesion deficiency (LAD) → Since it is just a small LAD, you can remember the delayed separation of the umbilicus in a little baby LAD
  - Little LADs are people less than 18 → CD18 defect (LFA-1 integrin, for Little Fucking Adolescent (a slang term for LAD))

- **Pharmacology**
  - Note: Most of these immunosuppressants act by inhibiting the activation of T cells by IL-2; assume this mechanism if cannot remember specifics
  - Cyclosporins
    - Bind to cyclophilins; complex inhibits Calcineurin
    - Nephrotoxicity → If you cycle for too long, you will experience muscle breakdown and myoglobin will cause nephrotoxicity
  - Tacrolimus
    - Peripheral neuropathy → Picture a tack stabbing and destroying a nerve
    - Causes hyperglycemia → Snack-rolimus → A junk food snack raises blood sugar
  - Sirolimus (rapamycin) → Inhibits mTOR, a serine/threonine protein kinase that regulates cell growth and proliferation; thus prevents T-cell proliferation in response to IL-2
    - mTOR is used in advertisements for bodybuilding supplements all the time due to it’s connection to growth → “When someone is all big and buff, you call them Sir; frat boy rapists tend to be big and muscular”
• Drugs that allow recovery of bone marrow after chemotherapy
  • Filgrastim (granulocyte colony-stimulating factor) → Fills the bone marrow; stimulating the production of blood cells
  • Sargramostim (granulocyte-macrophage colony stimulating factor) → Marr-O stimulating
  • ALdesleukin (interleukin 2) → Like ALL of the immune system drugs involve interleukin 2, which is what this drug is

• Pathology
  ○ Inflammation
    ○ Leukocyte extravasation
      • Rolling → Rolling slang for being high on ecstasy (also called “X”); thus this is the process where the leukocyte uses its Sialyl Lewis X; binds E-selectin (ecstasy is also called “E”) and P-selectin
        • Can also remember selectins for initial loose binding because neutrophil has to first select where it wants to extravasate before anything else
• Diapedesis is mediated by PECAM-1 → “I would just Die (diapedesis) if someone used a Pee-Cam (PECAM) to record me while I was peeing”
• Tight binding is mediated by ICAM-1 on endothelium and LFA-1 (integrin) on leukocyte → “She was so tight I-CAME right in-tegrin her and I was LFAffing (laughing)”
• Migration → Neutrophils are attracted to site of interest by C5a, IL-8, LTB4, Kallikrein → Neutrophils like things that are CILKy
  o Hemorrhagic infarct seen in tissues with dual blood supply, including Liver, Intestines, Lung → If a LIL kid has sex, they will bleed (hemorrhage)
  o Transudate vs. exudate:
    • Transudate = Thin = low protein
    • Exudate = Ew = thick, high protein
  o Amyloidosis
    • Primary amyloidosis → Protein is AL, derived from Ig light chains (multiple myeloma) → AL = Light chain
    • Secondary amyloidosis is based on the protein AA
      • I remember this because one of my relative is in Alcoholics Anonymous (AA), and she attends meetings secondary to getting all wasted
      • This is derived from serum amyloid-associated (SAA) protein, which is seen in chronic inflammatory disease → AA = Acute-phase reactant
    • Senile cardiac amyloidosis → The protein that accumulates is transthyretin, which is derived from AF → AF = old Fogies
    • Diabetes mellitus type 2 amyloidosis is based on amylain, which is
derived from AE → AE = Endocrine

- Medullary carcinoma of the thyroid → Protein is A-CAL, which is derived from CALcitonin
  - Can associate medullary carcinoma with bone/calcitonin because bones have medulla
  - Note that calcitonin is made in the C cells of the thyroid, so the calcitonin/thyroid connection is logical

○ Neoplasia
  - Tumor grade vs. stage
    - Stage = Spread; more prognostic value than grade
    - TNM staging (in order of ascending prognostic importance)
      - T → Tumor
      - N → Nodes
      - M → Metastases
  - Disease conditions associated with neoplasms
    - Down syndrome is associated with ALL → We ALL fall DOWN
      - Note that it is also associated with AML → Fall and break the enAML of our teeth
  - Tumor suppressor genes
    - BRCA genes → Code for DNA repair proteins → “Oh, the dna BRCA (broke-a, like an Italian person saying it or something)...BRCA2 will fix it!”
    - p53 is on 17p
    - p16 is on 9p
    - NF2 gene is associated with neurofibromatosis type 2, and is on chromosome 22 → Type 2 = 22
    - DPC gene → Tumor suppressor associated with pancreatic cancer → Deleted in Pancreatic Cancer
    - DCC gene → Tumor suppressor associated with colon cancer → Deleted in Colon Cancer
      - And you can put your DCC (dick) in a colon
  - Tumor markers
    - Beta-hCG → A marker for Hydatidiform moles, Choriocarcinomas, and Gestational trophoblastic tumors
    - TRAP → A marker for hairy cell leukemia, a B-cell neoplasm → TRAP the hairy animal
  - Oncogenic microbes
    - Schistosoma can cause squamous cell carcinoma of transitional epithelium (e.g. bladder) → SCHIST can give cancer where you PISSED
      - Schist → Squamous
    - HTLV-1 can cause adult T cell leukemia/lymphoma → Hurtful T-cell Lymphoma Virus
  - Psammoma bodies (laminated, concentric, calcific spherules seen in
various neoplasms) → The psa-MOMMA is pissed off because she has
PMS → PMS Momma (can alternatively use PSaMMoma)
  ■ P → Papillary (thyroid)
  ■ M → Meningioma
  ■ S → Serous cystadenocarcinoma (ovary)
  ■ M → Mesothelioma
○ Metastasis to brain
  ■ Lung, Breast, Skin (melanoma), Kidney (renal cell carcinoma), GI
    → Lots of Bad Stuff Kills Glia
○ Metastasis to liver
  ■ Colon, Stomach, Pancreas, Breast, Lung → Cancer Sometimes
    Penetrates Benign Liver
○ Causes of carcinoma of the lung → CUNT; “it is a real cunt to have lung
  cancer”
  ■ C → Chromium
  ■ U → Uranium
  ■ N → Nickel
  ■ T → Toking cigarettes
○ Metastasis to bone → Can be osteoblastic, osteolytic, or both
  ■ Prostate, Thyroid, Testes, Breast, Lung, Kidney → P. T. Barnum
    Loves Kids
    • Osteoblastic → Prostate metastasis; getting your prostate
      rubbed makes you BLAST out a bunch of semen and it is
      a BLAST
    • Osteolytic → Lung, Kidney, Thyroid
    • Both → Breast cancer (breasts come in twos)

• Pharmacology
  ○ Pharmacodynamics
    ■ Enzyme Kinetics
      • Competitive inhibitors cross each other competitively, while
        noncompetitive inhibitors do not (note the crossing of the green
        and red lines below)
To remember that Y-intercept is $1/V_{max} \rightarrow \text{“You are still a Virgin? Hahaha, Y?”} 
- The other one, $1/K_m$, is thus the X-intercept

- **Elimination of drugs**
  - Drugs that display zero (0) order elimination (linear decrease in concentration with time) include Phenotoin, Ethanol, Aspirin (at high or toxic concentrations) → PEA; and note that a PEA is round like a 0

- **Phase I and Phase II metabolism**
  - Phase 1 → Cytochrome P-450; first and more basic chemical reactions (reduction, oxidation, hydrolysis)
  - Phase 2 → Getting ready to piss it out → Can associate with glucuronidation
    - All of these reactions involve adding some group, like glucuronide; acetylation, sulfation

- **Urine pH and drug elimination**
  - Drugs that are weak acids → Aspirin, Methotrexate, Phenobarbital → I took acid with A Meth Phien ("fiend" is slang for an addict, like a “drug fiend”)
    - Can also remember aspirin due to the fact that it is a salicylic acid
  - Drugs that are weak bases → Amphetamines → It is just an amine base attached to a hydrocarbon backbone

- **Therapeutic index can be remembered using the mnemonic TILE → Therapeutic Index = TI = LD_{50}/ED_{50}**
  - **Autonomic System and Related Drugs**
    - Ach receptors
      - Nicotinic Ach receptors are ligand-gated Na/K channels; $N_m$ found in Muscle; $N_N$ found in autonomic ganglia (like N for Nerve)
    - G-protein-linked 2nd messengers
      - To remember the protein class of the various receptors: qiss
(kiss) and qi̇q (kick) till you’re si̇q (sick) of sqs (sex)
  - Alpha1 → q
  - Alpha2 → i
  - Beta1 → s
  - Beta2 → s
  - M1 → q
  - M2 → i
  - M3 → q
  - D1 → s
  - D2 → i
  - H1 → q
  - H2 → s
  - V1 → q
  - V2 → s
  - Note that “DHV” is pickup artist community slang for “Demonstration of Higher Value”

- Gq activates phospholipase C → Cutsie (q-C)
  - Associated with H1, Alpha1, V1, M1, M3 → “Hey little cutsie, HAVe 1 M&M”

- Gi is linked to M2, Alpha2, D2 → The “MAD 2s”; they are all pissy, so they try to stop/inhibit everything

- Major functions of the receptors
  - You have 1 heart and 2 lungs → Therefore, beta1 is primarily heart (increase heart rate, increase contracility), B2 is primarily lungs (bronchodilation...but increase HR, contracility as well)
  - V1/V2 are the vasopressin receptors; V1 causes vascular smooth muscle contraction, V2 leads to water reabsorption at the kidney collecting tubules → V2 is found in the 2 kidneys
  - Beta2 causes decreased uterine contraction → If you have 2 Babies (twins), you REALLY don’t want to have them and have to deal with them (give them food, time, money), so you use Beta2
  - Both Beta1 and Beta2 cause lipolysis → Both Betas Beat off the Bags of Bulge

- Cholinomimetic agents
  - Direct agonists → Directly bind cholinergic receptors
    - Tend to have “-chol” in the name; logical given that this is direct stimulation of cholinergic receptors
    - Bethanechol activates Bowel and Bladder smooth muscle → “Beth Anne, call (bethanechol) me if you want to activate your Bowels and Bladder”
    - Carbachol is a carbon copy of acetylcholine; used to treat
glaucoma
  ○ Pilocarpine is a potent stimulator of sweat, tears, saliva → PILe on the sweat and tears
  ○ Methacholine → Remember “methacholine challenge,” a test for asthma; stimulates muscarinic receptors in airway
● Indirect agonists → Does not directly bind receptor; rather, act as anticholinesterases
  ○ Tend to have “-stigmine” in name
  ○ Neostigmine has no CNS penetration → NEO CNS = NO CNS
  ○ neostigmine vs. pyridostigmine - pyridostigmine is longer acting b/c it has the longer name
  ○ Edrophonium is used in the diagnosis of myasthenia gravis, as it is extremely short acting → I find that talking on the phone is awkward, so I make my calls incredibly short; I am much like “socially awkward penguin,” who is seen below
  ○ PIZZA PLACE DOESN'T HAVE ONLINE ORDERING

● Physostigmine
  ○ Treats glaucoma → PHYS is for EYES
  ○ Treats atropine overdose → Physo Phixes atropine OD

■ Muscarinic antagonists
● Benztrapine is used to treat Parkinson’s disease → PARK my BENZ
● Ipratropium is used to treat asthma, COPD → “I pray I can breathe soon!”
● Scopolamine used for motion sickness - think of being in a gyroscope
● Side effects of muscarinic blockade (highly characteristic of atropine, which is an extremely common cause of delerium in the elderly)
- **Hot** as a hare (increased body T due to decreased sweating)
- **Dry** as a bone (decreased secretions in airway, GI, dry mouth)
- **Red** as a beet (flushed skin)
- **Blind** as a bat (extremely far sighted, as ciliary muscle cannot contract and cause accommodation)
- **Mad** as a hatter (disorientation)
- **Bloated** as a toad (constipation)

- Hexamethonium is a nicotinic antagonist; thus it blocks all of the ganglia of the autonomic NS (parasympathetic **AND** sympathetic) → Put a hex on smokers (**nicotine**) to make them quit

### Direct Sympathomimetics
- Epinephrine binds ALL adrenergic receptors, but selective for beta1 at low dosages → **Blow** (snort blow with a straw, which is shaped like a 1, so B1)
- **Isoproterenol** binds beta1 and beta2 equally well → **Isolated to beta**; **iso** implies same
- Dopamine binds as follows: D1 = D2 > beta > alpha → It is obvious that they bind D best; then it just goes down alphabetically
- The selective beta2 drugs (beta2 > beta1) are the **MAST** drugs (easy to link to **albuterol**, as asthmatics use this and they have mast cell issues; thus can easily link **MAST** and beta2 > beta1)
  - **MAST** → Metaproterenol, Albuterol, Salmeterol, Terbutaline
- **rITo**drine binds beta **TO** (beta2)

### Alpha blockers
- **Selective alpha-1** blockers → Prazosin, terazosin, doxazosin → If you are the number 1 **alpha** male, you will do lots of sinning (fucking)
- Pheochromocytoma should be surgically removed in conjunction with phenoxybenzamine and phentolamine → Use **Phe** and **Phe** to treat a **Pheo**
  - Phenoxy**BENZ**amine is the irreversible one → IF someone gave me a **BENZ**, they would never get it back...it would be **irreversible**

### Beta blockers
- **Partial beta-Agonists** → Pindolol, Acebutolol
- **Nonselective antagonists** (beta1 = beta2) all start with letters between **N** and **Z** (with the one exception of labetalol; note the abnormal ending (not -olol)) → Propranolol, timolol, nadolol, pindolol
- Beta1-selective antagonists all start with letters between **A** and
M (if you are selective, you demand grade A) → Acebutolol, Betaxolol, Esmolol, Atenol, Metoprolol
  - A BEAM of beta1 blockers (1 is shaped like a laser BEAM)

- Almost all beta blockers end in -olol; the non-selective beta
  AND alpha antagonists have weird name endings → labetalol, carvedilol
- Partial Agonists → Pindolol, Acebutolol
  - Toxicities and Side Effects
    - Specific antidotes
      - Acetaminophen → Use N-acetylcysteine as antidote
      - Iron (Fe) → deFEroamine → de-Fe, like “remove the Fe”
      - Gold (and also mercury, arsenic) → DIMEcaprol (BAL), dime
        reminds you of money like gold; also succimer because gold
        sucks now and it is all about platinum
      - Copper (and also arsenic, gold) → Penicillamine, pennys are
        made of copper
      - Lead → Can use ALL of the agents that work for the other
        metallic ions (ALL because lead poisoning is so common) →
        Penicillamine, succimer, dimecaprol
        - BUT, can also use CaEDTA → “ED” sound at the end
          of “LEAD”
      - Methemoglobin → Methylene blue
        - Can also use vitamin C, which is logical considering that
          vitamin C is an anti-oxidant and methemoglobin (Fe3+)
          has oxidized Fe
      - Benzodiazepines → Use flumazenil, because if you are so sick
        you are rolling in a benz, you have the motherfucking flu (rap
        music slang)
        - My chain got ammonia, watch
got the bird flu. Came
to the club smellin like
a pound of purple.
- TCAs → Use NaHCO3 (plasma alkalization); pretend the A in
  TCA stands for A; acids are removed using base
  - Heparin → Use Protamine; the H in Heparin is like a Proton
  - Theophylline → Theo is a cock blocker, so we use a beta
    blocker
  - Fomepizole → Foamy pee → Can link this to ethanol, since when
    you get all wasted you produce tons of foamy pee → Inhibits
    alcohol dehydrogenase
  - Use phystostigmine salicylate in the case of antimuscarinic,
    anticholinergic agent toxicity → Phystostigmine phixes atropine
overdose
- Amino-CAP-roc acid is used to treat tPA, streptokinase toxicity → Streptokinase and tPA totally destroy fibrin clots, almost like they are shooting or “CAPping” them
- Prolonged QT interval → Use Mg, because QTs need My Gonads in their mouth
- BG the rapper (always all high) gets high on Beta blockers all the time → Treat with glucagon (BG links Beta-blocker and Glucagon)

- ACh inhibitors, organophosphates → Can use pralidoxime (regenerates ACh-esterase) → Pray that the organophosphate doesn’t kill you; prayer leads to regeneration; a miracle!
- Amphetamines are basic → You have to be a base head (slang for crackhead, as crack is freebase) to get high on amphetamines → Treat with acidification (NH4+)
- Dialated cardiomyopathy → Doxorubicin, Daunorubicin → “I jumped off the Docks at Daun, and my heart filled with water and got all dialated”
- Chloramphenicol causes gray baby syndrome → Picture a baby falling into a chlorine pool, coming out all gray
- Drugs causing Gout operate around the Glomerulus → Furosemide, Thiazides
  - Niacin can also cause gout, as well as others
- Osteoporosis → Your bones are your core, your foundation → Osteoporosis is caused by corticosteroids
- Low platelet levels caused by the H drugs → Heparin, H2 blockers (cimetadine, etc.)
- Focal to massive hepatic necrosis → Halothane, Valproic acid, amanita Phalloides (deadly mushroom), acetaminophen → Hal, Val, Phall...and acetaminophen
  - “I was watching shallow Hal the other day...it was such a shitty movie my liver just died”
Drugs causing aplastic anemia: No Motherfucking Cells to Beat aPlastic anemia
- NSAIDs
- Methimazole
- Chloramphenicol
- Benzene
- PTU

Drugs causing cutaneous flushing → VANC → Vancomycin (red man syndrome), Adenosine, Niacin, Ca²⁺ channel blockers

Drugs causing hemolysis in G6PD patients → Hemolysis IS PAIN
- Isoniazid
- Sulfonamides
- Primaquine
- Aspirin
- Ibuprofen
- Nitrofurantoin
  - NOTE: Also Dapsone and Naphthale...I use the mnemonic DINPAINS

Drugs causing megaloblastic anemia → Phenytoin, Methotrexate, Sulfadiazine drugs
- Having a BLAST with PMS; blood BLASTS out of that vagina in PMS

Drugs causing pulmonary fibrosis: BLAB (it’s hard to blab when you have pulmonary fibrosis)
- BLEomycin
- Amiodarone
- Busulfan (alkylating antineoplastic agent)

Drugs causing gynecomastia → Some Drugs Create Awesome Knockers
- Spironolactone
- Digitalis
- Cimetidine
- Alcohol
- Ketoconazole

- **Drugs causing photosensitivity:** SAT For a photo
  - Sulfonamides
  - Amiodarone
  - Tetracycline
  - 5FU

- **Drugs causing a Parkinson’s disease like syndrome → Halothane, chlorpromazine, Reserpine, Metoclopramide → “To Park his car at the prom, Hal reserved a meto (meadow)”**
  - Can replace Hal with “the angel” and remember Halo

- **Drugs causing SJ syndrome (rash) → Seizure, Cillins, Sulfas → Can’t get any SCS (sex) because you have a disgusting rash**
  - Seizure → Ethosuximide, lamotrigine, carbamazepine, phenobarbital, phenytoin
  - Sulfas → Sulfa drugs
  - Cillins → Penicillin
    - Also, allopurinol

- **Tendonitis, tendon rupture, → Fluoroquinolones; picture Quinn the medicine woman (mnemonic introduced in the microbiology section) tripping on a hike and rupturing her tendon**
  - Also potentially causes cartilage damage destroying the growth plate in kids → Kids all short and close to the fluor-
  - FluoroquinoLONES hurt attachments to your BONES → Tendonitis and tendon rupture in adults; leg cramps and myalgias in kids

- **Drugs causing SLE-like syndrome: SHIPP → The classic mnemonic is “it’s not HIPP to have lupus,” but that neglects the Sulfonamides**
  - Sulfonamides
  - Hydralazine
  - INH
  - Procainamide
  - Phenytoin
  - Quinidine
  - Methyl DOPA
  - Chlorpromazine

- **Drugs causing cinchonism (dizziness, h/a, vision changes, tinnitus) → Quinidine, quinine → It is a cinch to fuck Quin**

- **Drugs causing seizures → “Blliiiiiiiiiiiiiiiiiiii!!!”, you say, as you have a seizure and fall to the ground**
  - Bupropion
  - Imipenem
  - INH
  - !!!!!!
- Drugs causing disulfiram-like reaction → Make Some Chinese Puke ("Asian Glow")
  - Metronidazole
  - Sulfonylureas (1st gen)
  - certain Cephalosporins (cefemendole)
  - Procabazine
- Drugs causing interstitial nephritis: "Stop! Makes Renal Nephrons Flame" or "Makes Renal Nephrons Flame and Smoke"
  - Sulfonamides
  - Methicillin
  - Rifampin
  - NSAIDs
  - Furosemide
- P450 inducers: Queen Barb Steals Phen-phen and Refuses Greasy Carbs Chronically (alternatively, BCGPQRS)
  - Quinidine
    - Can also inhibit, but induction is "most important" per FA → Quin is a girl, they can never make up their minds
  - Barbiturates
  - St. John’s wart
  - Phenytoin
  - Rifampin
  - Griseofulvin
  - Carbamazepine
  - Chronic alcohol use
- P450 inhibitors: PIGCAKES (alternatively, "Inhibit yourself from drinking beer from a KEG because it makes you Acutely SICK"); PIGCAKES sound disgusting though, inhibiting you from eating them
  - Protease inhibitors
  - INH
  - Grapefruit juice
  - Cimetidine/Ciprofloxacin
  - Acute alcohol
  - Ketoconazole
  - Erythromycin
  - Sulfonamides
- Alcohol metabolism
  - Methanol is processed to formaldehyde by alcohol dehydrogenase → "Formaldehyde," or embalming fluid, is a slang name for the drug PCP; can link the drug “meth” (like crystal meth) with PCP → Formaldehyde (PCP) causes severe retinal damage (like being high on PCP and seeing such crazy shit your retina is damaged)
- Drug name suffixes
  - -afil → Erectile disfunction drug (Ex. Sildenafil) → Fil a girl up
with penis, fill the penis up with blood
- etine → SSRI (Ex. fluoxetine) → Teenagers are commonly depressed
- -mustine → Nitroso ureas → Nitros on a Mustang

ORGAN SYSTEMS

- Cardiovascular
  - Anatomy and Physiology
    - Anatomy
      - **LAD** is most common place for coronary artery occlusion → You are most likely to fuck up (get occluded) if you are just a little **LAD** with very little life experience
    - Heart sounds
      - S3 → Associated with increased filling pressures and more common in **dilated** ventricles → Imagine a large ventricle with so much volume it hits the chest wall
      - Early diastole, whereas S4 is late diastole; thus S3/S4 numbering is logical
      - S4 → Associated with a **stiff** ventricle → Imagine an atrium that is so congested it hits the chest wall; 4 is like an A for **Atrium** hitting chest wall
    - Jugular venous pulse
      - a wave, c wave, x wave, v wave, y wave → At Carter’s crossing (X) Vehicles Yield
    - Auscultation of the heart → Aortic, Pulmonic, Tricuspid, Mitral → All Prostitutes Take Money
    - Heart murmurs
      - Mitral prolapse (MP) has the midsystolic click (MC) → Master P (MP) is an **MC** (slang for rapper, http://www.urbandictionary.com/define.php?term=MC)
• Mitral stenosis (MS) has an opening snap (OS) → Microsoft (MS) makes an operating system (OS)
• Aortic stenosis (AS) has the ejection click (EC) → “I just need A SEC”
  ○ Alternative: “He said I had such a nice ASs I get Extra Credit!”

■ Cardiac myocyte physiology
  • Phase 0 is the rapid upstroke, where the potential gets really high → “You have to be a total ZERO to get HIGH”
  • Phase 2 is the plateau → Phase 2 is the pla-2

■ Baroreceptors and chemoreceptors
  • Aortic arch transmits via vagus (X) nerve to medulla (reponds only to increased BP) → “My X is my arch nemesis; she responds only to me freaking out and yelling (increased blood pressure)”
  • Carotid sinus transmits via CN nine → The carotid sinus is the carotid nine-us
    ○ Responds to both increased and decreased BP

○ Pathology

■ Congenital heart disease
  • The 5 Ts of right-to-left shunts (“blue babies”) → Use tetralogy, the classic, to remember the T
    ○ Tetralogy
    ○ Transposition
    ○ Truncus arteriosus
    ○ Tricuspid atresia
    ○ Total anomalous pulmonary venous return (TAPVR)

■ Tetralogy of fallot → PROVe
  ○ P → Pulmonary stenosis
  ○ R → RVH (logical given the pulmonary stenosis)
  ○ O → Overriding aorta (overrides the VSD)
  ○ V → VSD
- Coarctation of the aorta
  - Infantile type → Coarctation of the aorta is proximal to the ductus arteriosus (preductal) → Little infants belong in preschool
    - Alternatively: INfantile type is IN close to the heart; ADult type is Distal to the Ductus
- Patent ductus arteriosus
  - ENDOMethacine (indomethacin) ENDS patency of PDA; PGEE kEEps it open
- Congenital cardiac defect associations
  - Down Syndrome (DS) Causes Septal Defects (SD); easy to pair DS and SD
    - Septal defects include ASD, VSD, AV → Due to endocardial cushion defect
  - Turner's syndrome → Associated with Coarctation of the aorta
    - Tina Turner commonly snorted COARC (coke, cocaine)
- Evolution of an MI
  - Coagulative necrosis is seen in Cardiac infarction
  - Key time ranges to remember → None, Five, Ten, Lots. That is:
    - < 1 day (0-24 hours), < 5 days (days 2-4), < 10 days (days 5-10), > 10 days (think months out, FA uses 7 weeks for this final stage)
  - First day
    - No visible change by LM in first 2-4 hours (note that 2-4 is the number of days for the next stage)
    - Coagulative necrosis after 4 hours → Cells die, release contents into bloodstream, attract PMNs
    - Contraction bands visible after 12-24 hours → Due to Ca2+ stimulation of myocytes
  - 2-4 days
    - Acute inflammation with hyperemia, PMNs, lots of coagulative necrosis
  - 5-10 days
    - Granulation tissue and macrophages
• 7 weeks (> 10 days)
  ○ This is the final stage, so just imagine the final state of the heart after an MI → Contracted scar complete, recanalized artery, gray-white region on heart where infarct was

■ Diagnosis of MI
  • In terms of markers of acute MI, trop-PWN-in (troponin) PWNs the competition (pwn is internet slang for “dominating the competition,” http://www.urbandictionary.com/define.php?term=pwn)
    ○ Specifically, it rises first (after 4 hours), and is more specific than other markers

■ Cardiomyopathies
  • Dilated (congestive) cardiomyopathy
    ○ ABCD
      ■ A → Alcohol abuse
      ■ B → wet Beriberi
      ■ C → Coxsackie B virus myocarditis, chronic Cocaine use, Chagas’ disease
      ■ D → Doxorubicin toxicity
      ■ Also hemochromatosis, peripartum cardiomyopathy
  • Hypertrophic cardiomyopathy → A common cause of sudden death in young athletes → Young athletes are always pumping iron to get their muscles all hypertrophied; picture a young athlete lifting weights so much his heart hypertrophies

■ Congestive heart failure
  • Treatment of acute heart failure → LMNOP
    ○ L → Lasix
    ○ M → Morphine (patient chills out, decreases sympathetic activity)
    ○ N → Nitrates (decrease pulmonary congestion)
○ O → Oxygen
○ P → Positioning (sit on edge of bed, pool blood in legs rather than pulmonary vasculature, improves breathing), Pressors (ex. dobutamine)

- Bacterial endocarditis
  ● Tricuspid valve endocarditis is associated with IV drug abuse → Don’t Tri drugs
    ○ Most common organisms here are Pseudomonas, staph Aureus, Candida → PAC, like Tupac, who got high on drugs all the time

- HACEK organisms cause culture-negative endocarditis → Haemophilus, Actinobacillus, Cardiobacterium, Eichenella, Kingella
- Signs/Sx of bacterial endocarditis → “I got bacterial endocarditis FROM JANE!” (note that JANEway lesions are the J)
  ○ Fever, Rother’s spots (round white spots on the Retina surrounded by hemorrhage), Osler’s nodes (tender raised lesions on finger or toe pads; picture the famous physician sir william Osler palpating a patient with his finger pads), Murmur, Janeway lesions (small erythematous lesions on palm or sole), Anemia, Nail-bed hemorrhage (splinter hemorrhage), Emboli

- Libman-Sacks Endocarditis (LSE) → Wartlike, sterile vegetations on both sides of the valve; caused by lupus → SLE causes LSE
- Rheumatic heart disease
  ● Rheumatic fever, caused by Strep pyogenes, can cause a particular type of heart disease. Rheumatic fever occurs due to immune response to Strep pyogenes (type II hypersensitivity).
Remember the heart disease signs/symptoms using **FEVERSS**
(like rheumatic FEVER)

- **Fever**, **Erythema marginatum** (serpiginous skin rash, large rings come and go in hours), **Valvular damage** (vegetation and fibrosis), **ESR increase**, **Red-hot joints** (migratory polyarthritis), **Subcutaneous nodules** (these are the Aschoff bodies, which are pathognomonic on histology), **St. Vitus’ dance** (chorea)

- Alternatively, the **JONES** criteria
  - Joints (migratory polyarthritis), **O** (pancarditis → endocarditis, myocarditis, pericarditis), **Nodules**, **Erythema marginatum**, **Sydenham’s chorea**
    - * → Picture the O changed in shape a bit to become a heart

**Cardiac tumors**

- The most common primary tumors in **ADULTS** is **myXoma** → **ADULT** material is rated **XXX**, like the adult myXXXoma; this type of pornographic adult content makes the **HEART** pound
  - Tumor is described as a **BALL-valve** (acts like a valve, looks like a big ball) → You see **BALLs** in porn
  - **Rhabdomyoma** is most frequent primary cardiac tumor in children → Little kids love **Rhabbits**

**Wegener’s granulomatosis**

- Both Goodpasture’s and Wegener’s involve the kidneys and lungs; however, only Wegener’s involved the **upper** airway (soft and hard palate, sinuses, nasal cavity; thus see Sx like perforation of the nasal septum, sinusitis) → WEGmans is the most **UPPER** end supermarket
  - At WEGmans, can buy **grains**; thus Wegener’s is associated with **GRANulomas** of the lung and upper airway
  - Goodpasture’s → anti-**GBM**

- Remember association with c-ANCA using the CW mnemonic discussed in the immunology section (can find with ctrl + f) → **Link** c-ANCA and Wegener’s using that old school TV channel, the CW

**Sturge-Weber disease** → Congenital vascular disorder that affects capillary-sized blood vessels → Port-wine stain, early-onset glaucoma, seizures, mental retardation, hemiplegia

- My father goes to a motorcycle convention called “**Sturgis**” where there are a bunch of crazy bikers; they get all drunk on wine (port-wine stain), get so high on coke they have **seizures**, get so fucked up they can’t see straight (early-onset glaucoma), are pretty much mentally **retarded** and totally paralyzed (hemiplegia)
- **Buerger’s disease** seen in heavy smokers → Picture of smoking hot piece of hamburger meat on the grill
  - Alternatively → Most of my friends back at home smoke and we like to go to JackintheBox for burgers late-night after going out and it’s usually cold by that time (Raynaud’s phenomenon)
- **Kawasaki disease** → Seen in children; you would have to be a little pussy ass baby **child** to ride a Kawasaki motorcycle instead of a Harley Davidson
  - Associated with Asian ethnicity → Kawasaki sounds all Asian
  - **Strawberry** tongue → You have to be sweet like a little pussy ass strawberry if you are going to ride a lame girly Kawasaki (“sweet” is used in this sense in rap music to denote someone that is weak)
- **Takayasu’s arteritis**
  - Takayasu’s arterities sounds all Asian → Primarily affects Asian females less than 40 years of age
    - “Pulse-less disease” due to granulomatous thickening of aortic arch and/or proximal great vessels → Asian girls are cold and boring in bed, almost like they are pulse-less
    - Symptoms → **FAN MY SKIN** On Wednesday → Fever,
Arthritis, Night sweats, MYalgia, SKIN nodules, Ocular disturbances, Weak pulses in upper extremities

- Temporal arteritis (also called giant cell arteritis, as most ancient temples have giant monsters in them)
  - Temporal arteritis has signs near the temples → Unilateral headache, jaw claudication, impaired vision (due to occlusion of ophthalmic artery, may lead to irreversible blindness)
- Vascular tumors
  - Cherry hemangioma → Benign capillary hemangioma of the elderly → Picture an old woman with a cherry attached to her face saying, “hey there sonny, do you want a cherry?”
    - Can also be in younger people; most common in 3rd-4th decade → Called senile hemangiomas because they do not regress and can increase in number later in life; thus this mnemonic is somewhat misleading

- Pharmacology
  - hydrAlazine causes decreased Afterload at the level of the Arterial (rarely do drugs modulate the afterload like this, although nitroprusside/etc. do it as well)
    - Safe in pregnancy → alazine sounds a bit like “salad”; nothing is safer than salad
- Calcium channel blockers
  - Can work either at the level of the heart or at the vasculature, as both have Ca2+ channels to block
    - Verapamil works at the heart more than any other, vasculature less than any other → Verapamil = Ventricle
    - Nifedipine works at vasculature more than any other → The knights who say Ni (from Monty Python Search for the Holy Grail) were jerks/mean, they didn’t have a heart about anything
- Nifedipine is a dihydroperidine whereas verapamil and diltiazem are nondihydroperidines → The Ni- is the Di-

- Malignant hypertension treatment
  - Drugs include Fenoldopam, Diazoxide, Nitroprusside → “You have malignant hypertension?!? Dude, you’re going to Fucking Di toNit!” (malignant hypertension sounds really scary-serious/ominous)
  - fenolDOPam → Dopamine D1 receptor agonist; relaxes renal vascular SM

- Antianginal therapy
  - Nifedipine is similar to nitrates in effect (logical, since both work on vasculature rather than heart); verapamil is similar to beta-blockers

- Drugs that cause dilated cardiomyopathy → Daunorubicin, doxorubicin, epirubicin, idarubicin → All end in -rubicin, so think ruby → Rubys have roughly the same color as a heart

- Antiarrhythmics
  - “No (class 1) Bad Boy (class 2) Keeps (class 3) Clean (class 4)”
    - Class 1 → Na channel blockers
    - Class 2 → Beta Blockers
    - Class 3 → K channel blockers
    - Class 4 → Calcium channel blockers
  - Class 1 → Na Channel Blockers
    - Three classes (IA, IB, IC), each containing three drugs
      - “Police Department Question The Little Man For Pushing Ecstasy”
        - Class IA → Procainamide, Disopyramide, Quinidine (→ Police Department Question)
        - Class IB → Tocainide, Lidocaine, Mexiletine (→ The Little Man); can make it “The Little Persian Man” to remember Phenytoin as well
        - Class IC → Flecainide, Propafenone,
Encaidine (→ For Pushing Ecstasy)

- Quinidine causes cinchonism → “That girl Quin is a total slut, fucking her is a Cinch”
- iB is Best post-MI; IC is Contraindicated post-MI

- Class 2 → Beta blockers (all end in -olol)
  - Causes impotence → Beta Blocks your Boner
- Class 3 → K+ channel blockers
  - Class 3 works at phase 3
  - amiODarone contains IODine → Thus logically it can mess with the thyroid gland, causes hypo- or hyperthyroidism
    - Also causes pulmonary fibrosis, hepatotoxicity → With amiodarone, check PFTs, LFTs, and TFTs
  - AMiodarone is like the morning (AM) → You are fucking exhausted (neurological defects), the light bothers the shit out of you (photodermatitis), you have a bunch of shit in your eyes (corneal deposits), and you have morning wood so your cock is blue/gray (blue/gray skin deposits)
- Class 4 → Ca2+ channel blockers
  - It is easy enough to remember Verapamil (see mnemonics above). To remember diltiazem, use “Vera is never without her dildo”
- Mg
  - Useful in the treatment of torsades, digoxin
    - Mag likes sadism (marques de sad) and fingering people (digoxin, digit in orifice)

- Endocrine
  - Anatomy
    - Adrenal cortex and medulla
      - Adrenal cortex
        - Layers from outside to inside are GFR, like Glomerular Filtration Rate
        - From outside to inside, have Granulosa (Salt → Releases aldosterone), Fasciculata (Sugar → Releases glucocorticoids), Reticulum (Sex → Releases sex hormone).
          - The deeper you go, the sweeter it gets (salt, sugar, sex)
    - Pituitary gland
      - B-FLAT → Basophils release FSH, LH, ACTH, TSH
      - FLAT PiG → FLAT from above, plus the acidophil products (Prolactin, GH)
    - Endocrine pancreas cell types
      - INSulin (beta cells) INSide the islet (alpha cells for glucagon are
on the periphery of the islet, delta cells for somatostatin at the junction between the two

- Insulin
  - BRICK L organs don’t need insulin for glucose uptake → B (Brain), R (RBCs), I (Intestine), C (Cornea), K (Kidney), L (Liver)
  - GLUT-2 is Bi(2)-directional (and thus not used by tissues that REALLY need glucose) → Beta islet cells, liver, kidney, small intestine
    - GLUT-1 handles those tissues that do REALLY need glucose → RBCs, brain

- Physiology
  - Adrenal steroids
    - Congenital bilateral adrenal hyperplasias → Can have deficiency in 17alpha-hydroxylase, 21-hydroxylase, or 11beta-hydroxylase
      - All have two numbers in the name, we will call them XY. Example: In 17alpha-hydroxylase, X = 1, Y = 7
      - If X is 1 → Hypertension is seen
      - If Y is 1 → Masculinization is seen
      - Thus, for example 11beta-hydroxylase has BOTH masculinization and hypertension
  - Cortisol is BBIIG (awful FA mnemonic) → Blood pressure (permissive effect via upregulation of alpha1 on arterioles), decreased Bone formation, anti-Inflammatory, decreased Immune function, increased Gluconeogenesis (it is a counterregulatory hormone)
  - PTH
    - PTH → Increases Ca levels, decreases phosphate levels → PTH stands for Phosphate Trashing Hormone
  - Calcitonin
    - Calcitonin decreases Ca2+ levels → CalciTONin TONes down Ca2+ levels
  - Signaling pathways of endocrine hormones
    - cAMP → FLAT CHAMP → (same FLAT as before, i.e. the anterior pituitary hormones FH, LH, ACTH, TSH), CRH, hCG, ADH (V2 receptor), MSH, PTH
      - Can make it FLAT CHAMP OF Computer Graphics in Games to include Calcitonin, GHRH, Glucagon
      - Can remember V2 rather than V1 due to the fact that V1 is the vascular one, and it needs to use IP3 to increase Ca2+
    - cGMP → Think vasodilators → ANP, NO (EDRF)
    - IP3 (Gq) → GnRH, Oxytocin, ADH (V1 receptor), TRH → GOAT
      - Note that oxytocin and ADH at V1 both logically need to increase Ca2+, which IP3 can do
      - Link Goat with Gq using this image of Q's face on a goat’s body
- The ONLY hormones binding nuclear steroid receptors are T3/T4; the others bind cytosolic steroid receptors
- Cytosolic steroid receptors → VET CAP → Vitamin D, Estrogen, Testosterone, Cortisol, Aldosterone, Progesterone
- Intrinsic tyrosine kinase (MAP kinase pathway) → Think growth factors → Insulin, IGF-1 (produced by GH), FGF, PDGF
- Receptor-associated tyrosine kinase (JAK/STAT pathway) → GH, prolactin (the acidophil pituitary hormones), also cytokine IL-2

**Pathology**
- Addison’s disease shows Adrenal Atrophy and Absence of hormone production
- Pheochromocytoma
  - **Rule of 10s → 10%** all of these things: Malignant, bilateral, extra-adrenal, calcify, kids, familial
  - The 5 **Ps** of the Pheo → Pressure (elevated BP), Pain (h/a), Perspiration, Palpitations (tachycardia), Pallor
  - Dopamine is metabolized to HVA → DHV
  - Norepinephrine is metabolized to VMA → The rapper Noreaga winning a **VMA** (video music award, like on MTV)
• Epinephrine converted to metanephrine → Easy to remember

■ Hyperparathyroidism
  • A disease of...
    o Stones (stones due to hypercalciuria)
    o Bones (cystic bone spaces filled with brown fibrous tissue)
    o Groans (constipation; gastric ulcers due to increased gastrin, which occurs due to increased Ca²⁺)

■ Hypoparathyroidism
  • Due to hypocalcemia and resultant tetany, see → Chvostek’s sign, Trousseau’s sign
    o Chvostek sign → Cheek → Tapping of facial n. causes contraction of facial mm.
    o Trousseau’s sign → Tight in the cuff → Occlusion of brachial artery with BP cuff triggers carpal spasm

■ Pituitary adenoma
  • Bromocriptine or cabergoline (dopamine agonists) cause shrinkage of prolactinomas
    o When I think prolactin, I think tits. When I think tits, I think girls. Picture a sloppy drunk girl, and to treat it you are like “Bro, call her tits a Cab”

■ Carcinoid syndrome → High levels of serotonin
  • Increases 5-HIAA in urine → People on ecstasy (increases serotonin) are extremely social, always like “HIAA! How are you! Let’s be best friends! I love you!”

• Rule of 1/3s → ⅓ metastasize, ⅓ present with 2nd malignancy, ⅓ multiple

■ Multiple endocrine neoplasia (MEN)
  • Autosomal dominant, because MEN are dominant
  • Medullary thyroid carcinoma and Pheo are seen in 2 (both 2A and 2B) → Medical school is crazy expensive, so the “Med Phe (fee)” is 2, not the lower 1
  • MEN 1 → 3 Ps; MEN 1, so carry just 1 over (Parathyroid)
- Parathyroid tumors
- Pituitary tumors (prolactin or GH)
- Pancreatic endocrine tumors (Zollinger-Ellison, insulinoma, VIPoma, rarely glucagonoma)

- **MEN 2A → 2 Ps; MEN 2**, so carry 2 over (Pheo, Medullary)
  - Parathyroid tumors
  - Pheochromocytoma
  - Medullary thyroid carcinoma

- **MEN 2B → 1 P**
  - Pheochromocytoma
  - Medullary thyroid carcinoma
  - Oral/intestinal ganglioneuromatosis (associated with marfanoid habitus, mucosal neuromas)

- **Pharmacology**
  - Diabetes drugs
    - Pioglitazone (also rosiglitazone) causes weight gain → Pig-glitazone
    - Picture a fat, pig-like, rosy-faced golfer → Use this to remember that pioglitazone and rosiglitazone bind PPAR-gamma (par like golf)
      - -glitazones glitter on your liver → hepatotoxicity
  - Insulin types
    - Fast acting → Aspart (picture an ass shaking all fast), Lispro (picture someone with a lisp talking all fast)
    - Long acting
      - Detemir (like debt, which you are going to have FUCKING FOREVER because of medical school; very long acting)
      - Glargine → Just phonetically sounds all thick and slow
    - Intermediate acting → NPH, like Neil Patrick Harris (also regular insulin) → Intermediate level of celebrity
- **Miglitol** → Inhibits intestinal brush-border alpha-glucosidases → A tiny little miget doesn’t need very much sugar; may as well block brush border enzymes, decrease sugar intake
  - Other endocrine drugs
    - Demeclocycline → ADH antagonist used in the treatment of SIADH → Dem is a Demon, ADH is an Angel; the demon antagonizes the angel
    - Insulin is anabolic, makes you fat; diazoxide decreases insulin release by keeping the K channel open → Dia-t-oxide (diet)

- **Gastrointestinal**
  - **Anatomy**
    - Retroperitoneal structures
      - Most of pancreas is retroperitoneal, but not tail → Picture dog tail wagging around; cannot be constricted to retroperitoneum
    - Important GI ligaments
      - Hepatoduodenal does not contain a DUO at all, but a TRIO → Portal triad (portal vein, common bile duct, hepatic artery); can remember portal aspect from hepato-
      - GastroCOlic ligament contains gastroepiPLOic arteries
        - Digestive tract anatomy
          - Meissner’s → submucosal regulating secretions
          - Muscularis externa → Includes Myenteric plexus (Auerbach’s → Lift weights with Muscles for an Auer) → This muscle plexus handles motility, which is logical (muscle!); the other plexus (submucosal, or Meissner’s) regulates secretions/blood flow/absorption
          - Relative peristalsis frequency works alphabetically → Duodenum
first letter is fastest; 12 waves/min) > Ileum (8-9 waves/min) > Stomach (3 waves/min)

- Abdominal aorta and branches
  - Can remember levels by using the fact that there is one key structure at each level, starting with the celiac trunk at T12 (celiac trunk → SEAL-iac trunk → k. SEAL (a friend of mine, probably not useful to others)→ his favorite movies are Terminator 1 and 2 (T12)
    - T12 → Celiac trunk
    - L1 → Superior mesenteric (very logically follows celiac)
      - L1 is the only one with two structures listed in First Aid; it Lies about having 1
        - Left renal (renal arteries are between L1-L2, but FA says left renal a. specifically is at L1)
    - L2 → Testicular/ovarian; and we have TWO testicles or ovaries
    - L3 → Inferior mesenteric → Inferior in that it doesn’t nicely follow superior mesenteric in the way that superior mesenteric follows celiac
    - L4 → Bifurcation of abdominal aorta

- GI blood supply and innervation
  - Foregut and midgut are supplied by vagus; hindgut (like the butthole) is supplied by pelvic n. (think anal sex)

- Portal circulation: SLIPS - you need SLIPSS (like a pass) to get through the portal
  - Superior mesenteric
  - L gastric
  - Inferior mesenteric
  - Paraumbilical
  - Splenic
  - Superior rectal
Portosystemic anastomoses

- **Portal HTN → Varices of gut, butt and caput**
  - **Gut** → Left gastric v. connects to esophageal v. → Esophageal varices (can rupture and kill via massive hemorrhage)
  - **Butt** → Superior rectal v. connects to middle/inferior rectal vv. → Internal hemorrhoids
  - **Caput** → Paraumbilical v. connects to superficial and inferior epigastric vv. → Caput medusae

Order of things in Femoral Triangle: **NAVEL** (lateral to medial)

- **Nerve, Artery, Vein, Empty, Lymphatic**
- **Veinous near the Penis**
- The **Nerve** is not in the femoral sheath

Hernias

- **IN**direct hernia → Goes through the **IN**ternal (deep) inguinal ring and **IN**to the scrotum and occurs in **IN**fants (due to failure of processus vaginalis to close; can form hydrocele)
  - b/c it goes into the scrotum, this is also the path for testes descent
- **Location of hernias**: Long Island **MD (LIMD)** (or, alternatively, MDs don’t LIE)
  - **Lateral** to inferior epigastric a. = Indirect hernia
  - **Medial** to inferior epigastric a. = Direct hernia
- **FEMoral hernia → FEMinine → More common in women**
  - Can remember that this is the only hernia BELOW the inguinal ligament because the femoral artery is created as the external iliac artery passes the inguinal ligament

- **Physiology**

  GI hormones

- **Ghrelin** makes hungry → Imagine delicious steaks and hamburgers **GHRillin’** on a BBQ, smell makes hungry
- Secretin → SECRET-in → Increases the release of base (bicarb) → It is a SECRET that I smoke so much free **BASE** (freebase = slang for crack)
• Cholecystokinin → Chole means bile; cysto means gallbladder (general term for bladder, sac), kinin implies kinetic/going/increased → This increases pancreatic and gallbladder secretion
  o Chole-cysto-k-I-nin → Has a strong “I” phonetically → Secreted from I cells
• Somatostatin → Said to “shut down everything” (decreases gastric acid and pepsinogen secretion, decreases pancreatic and small intestine fluid secretion, decreases gallbladder contraction, decreases insulin and glucagon release) → statin implies “static” → turning things off
• Duodenum has K cells, I cells, S cells → KISs the duodenum, as it looks sort of phallic
  o K → Releases GIP
  o I → Releases CCK
  o S → Releases secretin

  ■ Salivary secretion
    • Parotids release most serous substance; sublingual release most mucinous substance → Serous on the Sides (parotids), Mucinous in the Middle (sublingual); submandibular is somewhere between the two
  ■ Nutrient absorption
    • Fructose is taken up by Facilitated diffusion by GLUT-5 (unlike glucose and galactose, which undergo cotransport with Na via the SGLT1)
    • B12 requires Intrinsic factor (easy to remember) and is absorbed in the Ileum (more of a bitch to remember)
    • Folate is absorbed in the jejunum → Jewish people are our foes (disclaimer: I am Jewish, this is just a memory tool)
  ■ Bilirubin
- **Indirect/unconjugated** → Both have prefixes (in-, un-), whereas direct/conjugated go together and do not have prefixes
  - *Pathology*
    - Salivary gland tumors
      - MC **Malignant salivary tumor = Mucoepidermoid**
    - Mallory-Weiss → Lacerations at GE junction due to severe vomiting (can be from **alcoholism, bullema**)
      - I just imagine some **drunk, bulimic** girl named **Mallory Weiss**
    - **Boerhaave syndrome** → Transmural esophageal rupture from retching → **Been Heaving**
    - Esophageal **STRICTures** → Can be caused by **lye** ingestion → If you have **STRICT** parents, you get in trouble for **lye-ing**
    - **Plummer-Vinson Syndrome**
      - Mnemonics 1
        - Former 49er and radio commentator Gary Plummer was recently fired for this (http://deadspin.com/#/5791373/ex+49ers-color-analyst-possibly-fired-for-raunchy-labia+lovin-talk-with-nsfw-audio - a great listen if you’re bored) → TL;DL he was a king of cunnilingus hence the glossitis and esophageal webs...and if he was doing that all day, his diet probably wasn’t too good hence the Fe-deficient anemia
          - esophageal webs
          - Glossitis
          - Fe-deficient anemia
        - Alternative mnemonic
          - **Plummer-Vinson syndrome** → Think a plumber
            - **Dysphagia** → Because the plumber is around poop all the time, hard to eat (in disease it is because of esophageal webs),
            - **Glossitis** → Toilet is shiny and GLOSSy)
            - **Iron deficiency anemia** → Plumber accidentally flushed iron tool
    - Risk factors for esophageal cancer (A-H)
      - Achalasia
      - Barrett’s
      - Cigs
      - Diverticuli
      - Esophageal webs/Esophagitis
      - Familial
      - **GERD**
      - Hot Dogs (nitrosamines)
  - Malabsorption syndromes → These **Will Cause Devastating Absorption Problems**
- Tropical sprue → Tails (follows) celiac sprue (similar to celiac sprue)
- Whipple's disease → Based on gram positive bacterial infection → Whip CAN (can is old school slang for ass) → Cardiac problems, Arthralgias, Neurological problems
  - WhipPAS disease → PAS+ macrophages (this is the only bacteria that will result in PAS+)
- Celiac sprue
- Disaccharidase deficiency
- Aβ-lipoproteinemia → Decreased apoB
- Pancreatic insufficiency

- Gastritis
  - Acute gastritis
    - Curling's ulcer → Gastritis due to a burn; decreased plasma volume causes sloughing of gastric mucosa → Burn the stomach with a Curling iron
    - Cushing's ulcer → Brain injury causes increased vagal stimulation, thus increased ACh, thus increased H production, thus ulcer → Always CUSHion the brain
  - Alternatively, Cushing was a famous brain surgeon (http://en.wikipedia.org/wiki/Harvey_Williams_Cushing)

- Chronic Gastritis
  - Type A (fundus/body) found above type B (antrum) because A comes before B
  - Type A → Autoimmune, Autoantibodies to parietal cells, pernicious Anemia, Achlorhydia
  - Type B → Caused by H. pylori infection (most common), a Bacterium
  - AB paring
    - Type A → Pernicious Anemia affects gastric Body
    - Type B → Bacterium affects Antrum

- Menetrier’s Disease → Stomach rugae looks like brain (or like MEninges); due to the fact that they are super hypertrophied

- Gastric Ulcer vs. Duodenal Ulcer
  - Gastric → Pain is Greater with meals (results in weight loss)
  - Duodenal → Pain is Decreased with meals (results in weight gain)

- Inflammatory bowel disease
  - From FA → For Crohn’s, think of a fat granny and an old crone skipping down a cobblestone road away from the wreck (rectal sparing)
    - Fat → Creeping fat
    - Granny → Noncaseating granuloma
    - Skipping → Skip lesions
- **Cobblestone → Cobblestone mucosa**
- **Away from wreck → Rectal sparing**
- The other type of IBD is ulcerative colitis → Always with rectal involvement is implied by “colitis”; starts with rectum and works its way up
- Zenker's diverticulum (~“Stinker's diverticulum”) - presents w/ halitosis (food getting trapped in the diverticulum causing bad breath)
- Meckel's diverticulum → The five 2's
  - 2 inches long, 2 feet from ileocecal valve, 2% of population, commonly presents in first 2 years of life, may have 2 types of epithelia (gastric/pancreatic)
- **Hirschsprung's disease → Megacolon** due to lack of ganglion cells/enteric nerve plexuses in a segment of intestine → Think of a giant spring that has sprung in the colon, making it large
- Colonic polyps
  - The more villous the polyp, the more likely it is to be malignant → **VILLOUS = VILLainOUS**
- Peutz-Jeghers syndrome
- Only big **dominant** men fart → Autosomal **dominant**
- Can associate farting with GI tract → Multiple nonmalignant hamartomas throughout GI tract
  - Increased risk of CRC, other visceral malignancies (for every fart there is a significant risk that it will be an awful malignant one)
- Hyperpigmented mouth, lips, hands, genitalia → Men that fart are pigs
- Colorectal cancer
  - FAP is based on autosomal dominant mutation on chromosome 5q → You fap with 5 fingers
    - Get cancer approximately when you are a senior in high school → Get cancer about when you start fapping
  - **Gardner's Syndrome**
- FAP + osseous/soft tissue masses, retinal hyperplasia → **Gardners** growing shit everywhere
- Turcot’s syndrome
  - FAP + malignant CNS tumor → **TUR**ban around the head

**Carcinoid tumor**
- May have carcinoid syndrome (secondary to 5-HT production from the neoplasm; ONLY seen if has metastasized beyond GI, as 5-HT from GI will be removed by first pass effect) → “I want to **B FDR**” (like the president)
  - B → Bronchospasms/wheezing
  - F → Flushing
  - D → Diarrhea
  - R → Right sided heart murmur/valve lesions/disease

**Makers of GI pathology**
- **AST** is higher than ALT in alcoholics → **AST** is “A Scotch and Tonic”

**Reye’s syndrome** → Give a kid **aspirin** and they develop hepatoencephalopathy → Kids don’t like **Reye** bread; they also don’t like **aspirin**
- An exception is that aspirin CAN be used in Kawasaki’s disease to prevent coronary artery thrombosis
- microvesicular fatty change in Reye’s (micro for kids) vs. macrovesicular fatty change in AFL (adults (macro) drink etoh)
- a/w VZV and influenza B - think rey = King in espanol - the King Chicken (VZV) that flew (influenza)

**Hereditary hyperbiliurbinemias**
- Dubin-Johnson syndrome → Doobie-Johnson syndrome (as in a joint, weed)
  - Smoking weed is pleasant/benign → This disease is benign
  - Black people smoke a lot of doobies → Liver is black; similar to ashes from the doobie (also Dubin and Johnson both sound like Afro last names)

**Wilson’s disease**
- The ABCDs of Wilson’s disease
  - A → **Asterixis**
  - B → **Basal ganglia degeneration** (and thus Parkinson’s disease Sx)
  - C → **Ceruloplasmin decrease, Cirrhosis, Corneal deposits** (Kayser-Fleischer rings), **Copper accumulation, Carcinoma** (hepatocellular), **Choreiform movements** (debatably, DIT claims this is not the case)
  - D → **Dementia**

**Hemochromatosis**
- Hemochromatosis Can Cause Deposits → Cirrhosis, CHF, Diabetes mellitus

- Causes of acute pancreatitis → GET SMASHED
  - G → Gallstones
  - E → Ethanol
  - T → Trauma
  - S → Steroids
  - M → Mumps
  - A → Autoimmune diseases
  - S → Scorpion sting
  - H → Hypercalcemia/Hyperlipidemia
  - E → ERCP
  - D → Drugs (e.g. sulfa drugs)

- Anal fissures more common posteriorly (our anus is posterior)
- RFs for Gallstones → Fat, Female, Forty, Fertile:
- Porcelain Gall Bladder → Gallbladder w/ dystrophic calcification
  - Porcelain is white like the calcification
  - These patients are at risk for gallbladder cancer

○ Pharmacology
  - H2 blockers
    - Take H2 blockers before you DINE → All end in -dine
      (cimetidine, ranitidine, famotidine, nizatidine);
      ○ Remember the 2 in H2 with “table for 2”
      ○ (heads up that H1 blockers used for allergy in respiratory
        section also end in -dine)
    - Ranitidine and Cimetidine decrease the renal excretion of
      creatinine → “I Ran the Cimulation all day and I was so busy I
      couldn’t pee”
  - Triple therapy → Uses Proton pump inhibitor, Metronidazole, Amoxicillin
    (or Tetracycline), Bismuth → Please MAke Tummy Better
  - Bismuth → Binds to ulcer base, providing physical protection → Bismuth
    gets all up in the ulcers Bis-ness
    - Bismuth and sucralfate do the same thing; to link them use Bi-
      sexual people suck on penis
    - Alternative: you want to suffocate (~Sucralfate) that bitch
      (~Bismuth) of an ulcer
  - Misoprostol → A PGE1 analog → Miso-PROS-tol, similar to a
    prostaglandin
  - Antacids
    - Aluminium hydroxide → overuse causes constipation, or a
      MINIMUM amt of feces
    ○ Cause seizures, osteodystrophy → Albert A. has a
      spasmodic seizure many times each day when he
      masturbates and ejaculates; he works his arm so hard he
develops osteodystrophy

- **Magnesium hydroxide →** overuse causes diarrhea, or a MAGSIMUM amount of feces; also, **Mg2+ for Must Go to the bathroom**

- **Sulfasalazine**
  - Causes reversible oligospermia → If you are such a pussy you are eating salad, you will experience oligospermia
  - Alternatively, **AL masturbates all the time and loses all of his sperm**

- **Ondansetron →** A 5-HT3 antagonist; since serotonin syndrome is based on lots of 5-HT and causes diarrhea, it is easy to remember that a side of this drug is constipation
  - Its function is to control vomiting postoperatively and in chemo patients → With On-Dance-eron you can go ON DANCing, because you will not vomit
  - Easy to connect danse-eron to serotonin due to the fact that people high on ecstasy (which increases serotonin) dance all the time

- **All high on ecstasy, but they go on dansin**

- **Metoclopramide**
  - Used to treat diabetic and post-surgery gastroparesis “Everyone else is pooping, it’s only fair that I get to poop too (me too!!)”
  - **Clop** blocks the dope → D2 receptor antagonist

**Hematology and Oncology**

- **Physiology**
  - WBC differential from highest to lowest → Neutrophils, Lymphocytes, Monocytes, Eosinophils, Basophils → Neutrophils Like Making Everything Better
  - **Eosinophilia (DNAACCP):**
    - **Drugs**
    - **Neoplasms**
- Atopic disease (asthma, allergies)
- Addison’s
- Acute Interstitial Nephritis
- Collagen Vascular Disease
- Parasites (invasive)
  - Hemophilia A and B
    - Hemophilia A is a deficiency of factor 8 → Ate (word combines the two)
    - Hemophilia B is deficiency of factor 9 → Benign, B-9
  - The intrinsic and extrinsic pathways meet at factor X and activate it → Like two teams racing for a treasure, X marks the spot
    - PT comes before PTT alphabetically; extrinsic comes before intrinsic alphabetically; thus PT goes with extrinsic, PTT goes with intrinsic
  - Coagulation cascade components
    - Vitamin K is needed to synthesize 2, 7, 9, 10 AND protein C/S (two things)
    - Heparin activates antithrombin, which inactivates 2, 7, 9, 10 AND 11/12 (two things)
  - Remembering the intrinsic/extrinsic factors
    - 2 (thrombin) and 10 are in both extrinsic and intrinsic pathways; remember that they converge at 10, which activates 2
    - PT → Extrinsic → Fewer letters in PT → Smaller numbers in factors → 5, 7
    - PTT → Intrinsic → More letters in PTT → Higher numbers in factors → 8, 9, 11, 12

- Pathology
  - Basophilic stippling → Baste the ox TAIL → Caused by Thalassemias, Anemia of chronic disease, Iron deficiency, Lead poisoning
    - Alternatively, “Don’t Stip on my TAIL!!”
  - Pathologic RBC forms
    - Causes of target cells → HALT said the hunter to his target → HbC disease, Asplenia, Liver disease, Thalassemia
      - Can also rearrange to THAL to better remember Thalassemia
  - Hb Barts → All gamma (gamma4), or all fetal → Like Bart Simpson, who is a child
    - Can remember gamma chains b/c Bart’s dad works at a nuclear power plant
  - Lead poisoning
    - LEAD → Lead lines on gingivae (Burton’s lines) and on epiphyses of long bones on x-ray; Encephalopathy and Erythrocyte basophilic stippling; Abdominal colic and sideroblastic Anemia; Drops (foot and wrist), Dimercaprol and EDTA 1st line of
treatment
  - **Succimer** is first line of treatment for kids → It “sucks” to be a kid who eats lead

- B12 deficiency causes all sorts of neurological problems, whereas folate deficiency does not → B12 loss messes up the Brain

- TTP vs. HUS vs. DIC
  - TTP and HUS are basically the same, but neural involvement is seen in TTP, whereas HUS spares the CNS vasculature
    - HUS → Head Unaffected Syndrome
  - Remember that DIC is not like the others because no one wants to be like a dick
  - TTP is more frequent in young women → TT for TTs (tittys)

- Autoimmune hemolytic anemia
  - **Warm** agglutinin is IgG → **Warm** weather is **GGGreat**
  - **Cold** agglutinin is IgM → **Cold** ice cream, **MMM**

- Porphyrias
  - **Porphyria cutanea tarda** → Caused by a defect in **uroporphyrinogen dextrarboxylase**, get buildup of **uroporphyrin** (causing tea colored urine)
    - If you are **retardad** (or a **tard**), you are likely so dumb that ur-por; also, poor people can only afford tea
  - Acute intermittent porphyria → Defective enzyme is porphobilinogen deaminase, leading to buildup of porphobilinogen
    - **Por-phob-ilinogen** → **Poor FOB** (like fresh off the boat fob) → They are here **acutely** and **intermittently** because they are deported

- Coagulation disorders
  - **Bernard-Soulier vs. Glanzmann’s**
    - Bernard’s comes first in the alphabet so it affects Gplb
(collagen binding site for platelet) while Glanzmann’s affects GpIIb/IIIa (platelet-platelet binding site)

- Hemolytic Uremic Syndrome (HUS)
  - I think of Gus (the RAT from Cinderella) → Renal failure, Anemia, Thrombocytopenia

- Disseminated Intravascular Coagulation (DIC)
  - Caused by → Sepsis (gram-negative), Trauma, Obstetric complications, acute Pancreatitis, Malignancy, Nephrotic syndrome, Transfusion → STOP Making New Thrombi
  - DIC is really a DICK because not only is it making you hypercoagulable (you are forming tons of thrombi), it is also making you more prone to bleeding (clotting factors and platelets being used up, so cannot respond to actual insult requiring clotting)
  - Clotting factors 8 and 5 are consumed → Chad OchoCinco is a DICK

- Hodgkin’s lymphoma subtypes
  - Nodular sclerosing → More common in females → Breasts can be thought of as nodules

- Non-Hodgkins lymphoma subtypes
  - Mantle cell lymphoma → CD5+ → Men high 5 more commonly (stereotypical frat boy high five), picture a really manly high 5
• Adult T cell lymphoma → Caused by HTLV-1, adult presents with cutaneous lesions

• Burkitt lymphoma: I think of Knight Rider
  o On the show Knight Rider, Michael had a car named Kitt
  o Kitt (Burkitt) and Micheal (c-myc) are driving around. He’s the “night” rider = “starry sky appearance”. Kitt was an 8-cylinder car with 14” rims = t(8;14)
  o Here it gets crazy... I picture Michael making out with an African chick on Kitt’s hood = endemic in Africa + kissing = EBV

■ Multiple myeloma
  • For the Sx of MM, think CRAB (MMmmmm, CRAB is delicious, but I am fucking CRABby about having multiple myeloma)
    o C → hypercalcemia
    o R → Renal insufficiency
    o A → Anemia
    o B → Bone lytic lesions/Back pain
    o Not only do you get delicious crab (MMmmmm) you also get delicious fried egg (monoclonal plasma cells have fried-egg appearance)
    o But wait, there’s more! You also get delicious (MMmmmm) swiss cheese in your bones (lytic punched-out bone lesions)
  • Lots of Ms → Multiple Myeloma: Monoclonal M protein spike that is IgM

■ Leukemias
  • Hairy cell leukemia → Stains TRAP (tartrate-resistant acid phosphatase) positive → There is an Internet joke (http://knowyourmeme.com/memes/Its-a-trap) about transvestites that refers to them as “TRAPs,” often using “It’s a trap!!” to refer to a transvestite; trannies are hairy
    o Can remember it is a B cell leukemia because they have
In addition, old people are generally all hairy; thus this tumor is common in the elderly. Also, TRAP the hairy animal.

- **ALL**
  - TdT+ (marker of pre-T and pre-B cells) → I forget mnemonics ALL The Damn Time
  - Associated with downs syndrome → We ALL fall DOWN
    - Since children have Down’s, it is logical that ALL is seen in children (<15; note however that people with Down’s also get AML)
    - Can also link Down’s to the fact that ALL has a better prognosis when t(12;21) is seen

- ""**ALL** Adolescents CoMpLain about CLeaning"
  - ALL → Kids under 15
  - AML → Adolescents
  - CML → People aged 30-60
  - CLL → People aged 60 and up

- Chromosomal translocations
  - **CML** → t(9;22), the Philadelphia chromosome → Philadelphia CreaML cheese
  - **Burkitt's**: t(8;14) → Uppercase B looks like an 8
  - **Mantle cell** → t(11;14) → II implise 11; Increased cyclin-d1 so crazy increase in cell cycle rate
  - **Follicular** → t(14;18) → Fourteen starts with F
  - **Ewing's sarcoma** → t(11,22) → Patrick Ewing's number was 33, which equals 11 + 22

- Chronic myeloproliferative disorders
  - Myelofibrosis is fibrotic obliteration of the bone marrow; teardrop
cells are seen → The bone marrow is **crying** because it is **fibro**sed

- **Pharmacology**
  - **Heparin**
    - For rapid reversal of heparin effects, use **protamine sulfate** → A positively charged molecule that binds the negatively charged heparin → Positively charged like a **proton**
    - Lepirudin and bivalirudin directly inhibit thrombin, and are used as a heparin alternative in patients with heparin induced thrombocytopenia (HIT) → Lepi-*rudin* and bivali-*rudin* are **rude** in that they take heparins job and make it worthless; heparin is pissed
      - Argatroban has the same mechanism → Heparin is so frustrated by the rude lepirudin and bivalirudin that it is like “ARG! Fuck this!”
    - HePARin → PARtial thromboplastin time (PTT); thus warfarin is the other one (prothrombin time, PT)
  - **Other anticoagulants**
    - Clopidogrel inhibits platelet clops (clots) by blocking ADP receptor
      - Ticlopidine has the same mechanism
    - Abciximab → Blocks GpIIb/IIIa such that it cannot be cross-bridged by fibrinogen → Ab-SIX-imab blocks Gp-TWO-b/THREE-a → SIX = TWO * THREE
      - Note also that SIX is the devil’s number (666), so this drug can be associated with the disease that has the same effect → Glanzmann’s thrombasthenia, a GpIIb/IIIa receptor deficiency) → Glanz like the head of a penis, which is sinful (666)
  - **Cancer drugs**
    - dACTinomycin is used for childhood tumors, including Wilms’ tumor, Ewing’s sarcoma, rhabdomyosarcoma → Children **ACT** out
    - Trastuzumab → Monoclonal antibody against HER-2, treats breast cancer; causes **cardiotoxicity** → "It really, really breaks my heart to see a diseased titty"
    - MethoTREX causes liver damage → MethoTREXate **WRECKS** the liver
      - A T-Rex eats other animals; it is common to eat liver
    - 6-MP is metabolized by xanthine oxidase (XO), so toxicity is increased with allopurinol (an XO inhibitor) → Picture a MP (Military Policeman) blowing kisses = XO
      - PRPP synthetase is inhibited by 6-mercaptopurine → **Merc** is slang for killing someone; perp (PRPP) is slang for “perpetrator,” used by police → “I am going to **Merc** the **PRPP**”
- **5-FU causes photosensitivity** → Photosensitive
  - In addition, say someone is not photogenic and doesn’t want a pic taken of them (sensitive to photos)...this is like “Fuck U!!! I’m taking the pic.”
  - This is the F in "SAT For a photo"
- Cytarabine sounds like turban → Muslims → Egyptians → Pyramids → Pyrimidine analogs
- **Busulfan and Bleomycin both cause pulmonary fibrosis** → The 2 B’s Blow up your Bronchi
  - BLEOMycin can be thought of as "Black LEO," an angry black man. He stabs you in the lung (pulmonary fibrosis), and because he is black and has weird issues with skin, he causes skin changes (rash)
- CYclophosphamide causes hemorrhagic CYstitis (ifosfamide, which sounds like cyclophosphamide, does as well)
- Nitrosoureas (carmustine, lomustine, semustine) → Most have "must" in their names; I picture them as alcoholics that are acting crazy: Those Alky’s MUST be Crazy → Alkylation agents that cause CNS toxicity (dizziness, ataxia)
  - Carmustine → CAR-MUST-ine → "I drove a CAR (Mustang) across the BBB"
- Cisplatin, carboplatin
  - "I heard platinum crosses the kidneys" → Heard (acoustic nerve damage), crosses (cross-link DNA), kidney (nephrotoxicity)
  - CisPLATin, carboPLATin → Causes acoustic nerve damage → When you drop a PLATe it makes a loud horrific shattering sound, damaging your acoustic nerve
- Vincristine/vinblastine
  - VINcristine/VINblastine= anticancer drugs that function to inhibit the mitotic SPINDle → Imagine VIN Diesel shooting machine guns as he SPINS around in circles in an action movie
  - My ex-girl Christina was crazy and clearly had some serious neuroloical problems → Neurotoxicity (Areflexia, peripheral neuritis) → ONLY vinristine, not vinblastine
  - VinCRISTine = "CHRIST, I can’t feel my toes" → Peripheral neurotoxicity
  - Vincristine, vinblastine → Alkaloids that bind to tubulin in M-phase and block polymerization of microtubules so that mitotic spindle cannot form → Microtubules are the vines of your cells
  - VinBLASTine BLASTs the Bone marrow (bone marrow suppression)
- Doxorubicin is more toxic than duanorubicin
- eTOPoside → inhibits TOPoisomerase II, thus increasing DNA degradation
- PaclitAXel and other TAXols
  - Hyperstabilize polymerized microtubules in M-phase so that mitotic spindle cannot break down (anaphase cannot occur) → "It is TAXing to stay polymerized, but the TAXols make it happen"
  - Also, these drugs are used to treat ovarian and breast carcinomas → It is TAXing to be a female, having a period/etc.
  - Also, females are very sensitive about everything, so these drugs cause hypersensitivity
- Tamoxifen and Raloxifene → Selective Estrogen Receptor Modulators (SERMs); tamoxifen is a partial agonist in endometrial tissue, so it may increase risk of endometrial carcinoma; this is NOT seen in raloxifene because it is an endometrial antagonist → "RALOX (relax), you’re not going to get endometrial cancer, it’s Raloxifene"
- Rituximab → Treats CD20 positive non-Hodgkins lymphoma → “You will need to wear a TUX tonight, it is a Corporate Dinner for 20" 
  - Alternatively: “Corporate Dinner with 2 coOs"

**Musculoskeletal and Connective Tissue**

○ Anatomy and Physiology
  - Epidermis layers
    - Californians Like Girls in String Bikinis
      - Stratum Corneum
      - Stratum Lucidum
      - Stratum Granulosum
      - Stratum Spinosum
      - Stratum Basalis
  - Epithelial cell junctions
    - Zona adherens has Actin attached to it; composed of cadherins (Ca2+ dependent ADhesion molecules) which sound like adherens; these cadherens connect to the actin
    - Macula adherens
      - Keratin (intermediate filament) attached to desmoplaKIn
    - Desmosome vs hemidesmosome
      - HEMI-desmosome has more letters; it thus corresponds to the disease with more letters (bullous PEmPHIGOid (10 letters))
        - Also, antibodies to the hemidesmosome are
**BULLOw the dermis**
- Desmosome has fewer letters; it thus corresponds to the disease with fewer letters (PEMPHIGUS (9 letters) vulgaris)
  - Unhappy triad (knee injury)
    - In the knee, you have menisci, collateral ligaments, and cruciate ligaments; in the unhappy triad, you fuck up one of each
      - **MAL** → Like Prof. Mal, who was big like a football player (this is a common football injury when a player is hit from the side)
        - **M** → Medial collateral ligament
        - **A** → Anterior cruciate ligament
        - **L** → Lateral meniscus
    - Positive anterior drawer indicates tearing of the **ACL**
      - The “anterior” and “posterior” refer to attachment sites on the tibia
    - **ACL** runs from **Lateral epicondyle of femur to tibia (AL)**; **PCL** runs from **Medial epicondyle of femur to tibia**
      - **AL** → **AL**, Like Albert A. (the notorious masturbator discussed throughout the document)
      - **MP** → Masturbates Profusely
    - **ACL** runs from the **Lateral epicondyle of femur to Medial portion of tibia (A-L-M)** in alphabetical order
      - **PCL** connects to Medial epicondyle, however, messing this mnemonic up
  - Rotator cuff muscles
    - **Sits** → Supraspinatus, Infraspinatus, teres minor (small t for minor), Subscapularis
      - Picture sitting on a chair that spins and rotating
  - Sweat glands:
    - **Apocrine glands** secrete sweat that when degraded by bacteria make you stinky (smelling like Apu, or smelling like an ape) and also takes part of plasma membrane,
      - Limited to axilla and anus → The stinky areas
    - **Eccrine** → Releases by **Exocytosis** and found Everywhere
  - Upper extremity innervation
    - If you do a **RAD** jump on a skateboard, you may hurt yourself and get crutches → Incorrect use of crutch can cause **RADial nerve compression**
  - Brachial plexus
    - Composed of **Roots**, **Trunks**, **Divisions**, **Cords**, **Branches** → **Randy Travis Drinks Cold Beer**
- Continuing the beer theme, to remember the cords → Labatt (Lateral), Pilsner (Posterior), Miller (Medial)
  - Carpal bones
    - Scaphoid, Lunate, Triquetral, Pisiform, Trapezium, Trapezoid, Capitate, Hamate → Some Lovers Try Positions That They Can't Handle
      - “The thumb swings on the trapezium” → Trapezium is most lateral on thumb side, connected to thumb
  - Upper extremity nerves
    - It is BEST to be rad → Radial nerve innervates the “BEST” muscles
      - B → Brachioradialis (flexion of forearm; beer drinking muscle)
      - E → Extensorts of wrist/fingers
      - S → Supinators
      - T → Triceps
    - Common upper limb nerve injuries from proximal to distal: ARM-U; right now you are studying the arm, you are at ARM-University baby!
      - Axillary → Surgical neck of humerus, dislocation of humerus
      - Radial → Midshaft of humerus
      - Medial → Supracondylar fracture
      - Ulnar → Medial epicondyle fracture
  - Dr. CuMa
    - wrist Drop → radial n.
    - Claw hand → ulnar n.
    - Median n. → Ape hand (lose opposability of thumb)
  - Thoracodorsal n. controls butt-wiping motion (Lattisimus dorsi) = adduction, extension, internal rotation of arm
- **SALT** = Serratus Anterior innervated by Long Thoracic n.
- Erb-Duchenne palsy is waiter’s tip palsy → Waiter’s at restaurants tend to be *douches*
- Klumpke’s palsy → Klum sounds like “cum” → If you came (ejaculated) all over the brachial plexus, it would naturally drip down to the lower trunk by gravity; thus C8 and T1 are messed up
  - When you have an intense orgasm, you squeeze you clench your first; thus **CUM-pkes** total claw hand is seen; all fingers flexed like having an orgasm
    - The first picture below is from googleing “Klumpkes total claw,” and the second is from googleing “orgasm” lol...try it.

  ![Hand muscles](image1)

  ![Hand muscles](image2)

- **Hand muscles**
  - Both thenar muscle groups and ulnar muscle groups have same functions → **Oppose, Abduct, and Flex** → OAF
  - **Dorsal interosseous muscle** Abduct the fingers; **Palmar interosseous muscle** Ad duct the fingers
    - **DAb with a PAd**
  - **Ulnar nerve** supplies the wimpy stuff
    - Tiny wimpy little pinky
    - Tiny wimpy little interosseous muscles

- **Lower extremity nerves**
- Femoral & Sciatic (antagonists)
  - **Femoral for Flexing at the hip**
  - Sciatic n. think of sciatica which is pain in your butt so you’re moving the thigh posteriorly or extending it
- Superior Gluteal & Obturator (antagonists)
  - **Obturate** means to close so Obturator closes your butthole (leg adduction)
- Common Peroneal & Tibial (antagonists)
  - **Common Peroneal** is the nerve you would use if you see the cops - dorsiflex the foot (foot off the accelerator)
- **PED** → **Peroneal Everts and Dorsiflexes**; if injured, foot drop **PED** (dorsiflex = extend foot)
- **TIP** → **Tibial Inverts and Plantarflexes**; if injured, can’t stand on **TIPtoes**
  - **Sarcomere**
    - Z line → Z is at end of alphabet, Z line is at end of sarcomere
    - **H** → Thick letter, so only thick filaments
    - **I** → Thin letter, so only thin filaments
    - **A** band is Always the same length; **HIZ** shrinkage
  - **Types of muscle fibers**
    - **One slow red ox** → Type 1 (One) fiber is slow twitch; red due to increased mitochondria and myoglobin; thus more oxidative metabolism
- *Pathology*
  - **Bone mineralization diseases**
    - **OsteoPORosis** → Decreased primarily trabecular (spongy) bone mass (i.e. the type with pores; also the decrease in bone mass is like creating pores)
    - **OsteoPETrosis** → Failure of bone breakdown → You love your PET and cannot bare to break it down/hurt it
      - alternative: thickened, hardened bones - **Petros Papadakis** really bad radio sports host thinks he’s hard (as in cool/badass...get your mind out of the gutter)
    - **Osteomalacia** → Easy to remember based on this being vitamin D deficiency; low Vit D, low blood Ca2+, low bone mineralization
    - **Page’s disease** → **Page** is a girl’s name → Girls can never make up their minds about anything; thus absorption and resorption at the same time
      - Get a mosaic pattern → Girls love making mosaics
  - **Primary bone tumors**
    - Ewing’s sarcoma
      - Characteristic onion skin appearance → Going out for Ewings and onion rings
      - Associated with 11;22 translocation → 11 + 22 = 33;
Osteoarthritis v. Rheumatoid Arthritis
- RA → Your “room” is very close to home, so RA will affect proximal more than distal → MCP/PIPs as opposed to OA which afx PIP/DIPs

Sjogren’s syndrome → Can’t see, can’t spit, can’t climb up shit
- Can’t see → Xerophthalmia (dry eyes with conjunctivitis, like “sand in the eyes”); Can’t spit → Xerostomia (dry mouth, dysphagia); can’t climb up shit (arthritis; note also that this is associated with rheumatoid arthritis)
- S-JAW-grens → Enlarged parotid, like big jaw
- This mnemonic connects to two other mnemonics:
  - Alport’s syndrome → Can’t see (ocular disorders), can’t pee (nephritic syndrome), can’t hear (deafness)
  - Reiters syndrome → Can’t see, can’t pee, can’t climb a tree

Gout
- Crystals are negatively birefringent; it would be super “negative” to have the awful disease gout
  - Negatively birefringent → yellow crystals under parallel light

Pseudogout
- calcium Pyrophosphate crystals cause Pseudogout and they are Positively birefringent

Infectious arthritis
- Can be caused by N. gonorrhoeae, an STD → Synovitis (eg. knee), Tenosynovitis (eg. hand), Dermatitis (eg. pustules)

Basal cell vs. squamous carcinoma of skin
- Basal cell → Like “free base” the drug → Rolled up edges, like a joint (drug)

Dupuytren’s contracture (in Goljan RRPath margin but not FA) = fibrosis of the palm → Guy Dupuy (one of the greatest dunkers ever) palms the
ball when he dunks

- Systemic Lupus Erythematosus
  - I'M DAMN SHARP
    - I → Immunoglobulins (anti-dsDNA, anti-SM, antiphospholipid)
    - M → Malar rash
    - D → Discoid rash
    - A → Antinuclear antibody
    - M → Mucositis (oropharyngeal ulcers)
    - N → Neurological disorders
    - S → Serositis (pleuritis, pericarditis)
    - H → Hematologic disorders
    - A → Arthritis
    - R → Renal disorders
    - P → Photosensitivity
  - Wire loop lesions seen in kidney → Wire Loop-us (Lupus)

- Sarcoidosis
  - Sarcoid is a GRUELING disease
    - G → Granulomas
    - R → Rheumatoid arthritis
    - U → Uveoparotitis (chronic inflammation of parotid gland and uvea (eye))
    - E → Erythema nodosum (painful nodular inflammation of SubQ fat)
    - L → Lymphadenopathy (hilar, bilateral)
    - I → Idiopathic
    - N → Not TB, noncaseating
    - G → Gamma globulinemia (ACE increase)

- Skin disorders
  - Basics terms
● Macule is a small patch; I want to MACk on PATy mayonnaise from the show Doug
  ○ Note that she is super flat (macule and patch are flat, unlike papule/plaque)

● Papule is a small plaque; I want to get my PAPpy a PLAQUE for being the world’s best dad
  ■ Seborrheic Keratosis → Looks StucK on
  ■ Bullous pemphigoid → Antibodies are to hemidesmisome; that is, antibodies are bullow the epidermis
  ■ PSORiasis has scaling, like a fish → A fishes lip is PSOR after it bites a hook
  ○ See Auspitz sign in psoriasis (bleeding spots when scales are scraped off) → The fish responds by going “AU!!!” and SPITZing out blood
  ○ Increase in stratum spinosum (SS) → just look at how many S’s are in pSoriaSis
  ■ Acanthosis nigricans is hyperplasia of the stratum spinosum → Black people like to break dance; spin around and such
  ■ Staph scalded skin syndrome (SSSS) → SS, like nazis → Affects stratum granulosum; old grannies were around in nazi times
  ■ Lichen Planus → Pruritic, Purple, Polygonal, Papules
  ■ Erythema migrans v. erythema multiforme
    ● Migrans is asasociated with Ixodes tick (Borrelia burgdorferi) & outdoors so “bullseye” rash (b/c bulls are outdoors)
    ● Erythema multiforme = “target” lesion (lacks the bullseye)
  ■ Pemphigus vulgaris vs. bullous pemphigoid
    ● Vulgaris
      ○ Bullae can show up on mucosa, oral MC most common → Bullae in mouth are vulgar and disgusting
      ○ Potentially fatal, serious emergency → Can associate this with it being awful/vulgar
    ● Bullous
Antibodies are to hemidesmosomes, or **BULLOW** the dermis
- Bullae remain intact rather than easily rupturing like in vulgaris; thus logical that bullae would be in the name here
- Melanoma → The super deadly/bad skin cancer → Associated with S-100 tumor marker → It **Sucks-100%** to have melanoma

**Pharmacology**
- Arachidonic acid products
  - Lipoxygenase pathway yields **Leukotrienes**
  - LTB4 → Neutrophil chemotactic agents; neutrophils arrive **B4** other cells
  - PGI2 (prostacyclin) inhibits platelet aggregation → **Platelet Gathering Inhibitor**

- Bisphosphonates
  - Names end in -dronate; “dro” is slang for marijuana; thus bisphosphonates cause corrosive esophagitis and osteonecrosis of the jaw (can imagine weed smoke doing these things)

- TNF-alpha inhibitors
  - Etanercept → **EtanerCEPT** is TNF decoy reCEPTor
  - InfLIximab → Infliximab pain on TNF (anti-TNF antibody)
    - Predisposes to reactivation of TB → Watch **FLIX** on the **TooB** (TV) (or can just link TB and TV)

**Neurology**
- **Anatomy and Physiology**
- CNS/PNS origins
  - These cells derive from neuroectoderm, neural crest, and mesoderm; **microglia, like macrophages, originate from**
mesoderm

- Neural crest → Schwann cells and PNS neurons; think of a family crest with a Pear and a swan

- Sensory corpuscles
  - Pacine → Associate with tuPAC
    - Sense → Vibration and pressure, like Tupac’s fly ass rap music with thumping bass
    - Tupac’s lyrics were very deep, so these are located in deep skin layers; also seen in joints (Tupac smoked weed (joint), spent time in prison, i.e. the joint); also seen in ligaments
  - Merkel’s disks → Associate with killing, to “merk” someone (http://www.urbandictionary.com/define.php?term=merk); picture an assassin merking someone
    - Hair follicles → The assassin strangles someone with hair
    - Adapts slowly, as it is very difficult to deal with being assassinated and adapt to that
  - Meissner’s corpuscles → Picture an old meisserly gentleman
    - Seen in glabrous (hairless) skin → Old men are bald, hairless
    - Think of this as the opposite of Merkel’s, as the old man has lived for a long time without being “merked” by anyone
      - While Merkel’s adapts slowly, Meissner’s adapts quickly; thus while Merkel’s handles static touch, Meissner’s handles dynamic touch
      - While Merkel’s handles hair follicles, Meissner’s handles glabrous (hairless) skin
  - Free nerve endings → It is pretty logical to think that free, super vulnerable nerve endings would be used to transmit pain
    - Free nerve endings are made up of C and ADelta fibers → “You C an AD for something free”
      - Think about the horrific pain you experience when that BITCH at all the websites says, “Congratulations, you have won a free iPod!”
    - Alternative → “A slow kid gets a C, a bright (fast) kid gets an A(delta)

- Neurotransmitters
  - Nucleus acCUMbens → Reward center, pleasure, addiction; like CUMming
    - Also makes GABA, because GABrielle Union makes you cum (http://www.thehollywoodgossip.com/stars/gabrielle-union/)
- Blood brain barrier
  - Your brain needs some way to know if nasty shit is in your blood and you want to vomit to get it out; this is accomplished with the area postrema, which has fenestrated capillaries and no BBB
    - Area postrema → Like being prostrate, the position at the toilet for vomiting
- And now for a brief intermission: Check out the brain section that looks just like a cooky face
- Hypothalamus
- The hypothalamus wears **TAN HATS**
  - Thirst and water balance, Adenohypophysis control, Neurohypophysis releases hormones from hypothalamus, Hunger, Autonomic regulation, Temperature regulation, Sexual urges
- **Paraventricular nucleus makes oxytocin → Oxytocin handles uterine contraction;** thus you want to make it if you have a **para**
itit
  - Supraoptic nucleus makes ADH, the other neurohypophysis hormone
- The lateral nucleus of the hypothalamus handles hunger → If you zap your **lateral** nucleus, you shrink **laterally**
- The **ventromedial** nucleus handles satiety → If you zap your ventromedial nucleus, you grow ventrally and medially
  - V pointing down to suppress hunger
- Anterior nucleus vs. posterior nucleus
  - Anterior nucleus cools you off → A/C for anterior cooling; Anterior nucleus is pArasympathetic
  - Posterior nucleus → Get fired up; heating, sympathetic (opposite of anterior nucleus)
  - If you zap your Posterior hypothalamus, you become a **Poikilotherm** (cold-blooded, like a snake)
    → For that rare snake enthusiast that actually has this shit memorized...
- Suprachiasmatic nucleus handles circadian rhythm → You need **sleep to be charismatic** (chiasmatic)
  - Posterior pituitary (neurohypophysis)
  - Adenohypophysis → Anterior pituitary
- Thalamus
  - **VPM relays face** sensation and taste; **VPL relays pain/temperature/pressure/touch/vibration/proprionception for the body**
    - **Makeup goes on the face (VPM)**
  - **VA helps you stay Very Active → Regulates basal ganglia**
  - **Mediodorsal nucleus → Memory**
  - LGN → Relays vision information; MGN → Relays auditory information
    - Lateral = Light; Medial = Music
- **Limbic system → The famous 5 Fs, one of which being fucking; you use your "limbs" to finger or fist someone**
  - Responsible for Feeding, Fleeing, Fighting, Feeling, and Fucking
- Cerebellum
  - Deep nuclei, from medial to lateral → Fastigial, Globose, Emboliform, Dentate → Fat Gerbils Exercise Daily (note useful association with movement)
■ Basal ganglia
  ● D1 receptor is involved in the direct/excitatory pathway, whereas D2 receptor is involved in the indirect/inhibitory pathway
    ○ D1-R is used in the D1Rect pathway
    ○ Indirect pathway is Inhibitory
  ● In Parkinson’s disease, you have a messed up substantia nigra and thus decreased ability to move; it is like you are TRAPped in your own body
    ○ Tremor at rest, cogwheel Rigidity, Akinesia, Postural instability
  ● In hemiballismus, have sudden, wild flailing of 1 arm +/- leg
    ○ Hemi implies one-sided (half)
    ○ Half ballistic → As in throwing a baseball
  ● Huntington’s disease
    ○ Expansion of CAG repeats → Caudate loses Ach and GABA
    ○ The Cs of Huntington’s disease → Crazy (dementia), Chorea, CAG repeat, Caudate degeneration, chromosome Cuatro (4), Cuarenta (40) is average age of presentation

■ Cerebral cortex functions
  ● Principle motor area is anterior to principal sensory areas, just like motor is in the front of a car

■ Brain lesions
  ● AMYgdala lesion (bilateral) → Kluver-Bucy syndrome (hyperorality, hypersexuality, disinhibited behavior)
    ○ Think of AMY fisher (shot Joey Buttafuoco’s wife and become a porn star; http://en.wikipedia.org/wiki/Amy_Fisher), or how crazy Gary BUCY is (note that he is making out with a chimpanzee below)
• Cerebellum
  o Cerebellar hemispheres are laterally located and affect lateral limbs (intention tremor, limb ataxia); vermis is centrally located and affects central body (truncal ataxia, dysarthria)
• Contralateral hemiBALLismus occurs due to lesion to SUBthalamic nucleus → “Subs” are like subwoofers in cars, have nice subs if you have a really nice sound system; would have nice subs if you were a baller
• Eye movement problems
  o SUPERIOR colliculus lesion causes paralysis of UPWARD gaze
  o Frontal eye field lesion makes eyes look toward lesion → You look at something that is right in front of you
  o Paramedian pontine reticular formation (PPRF) lesion makes you look away from the lesion → You look toward the paripheny
    - Alternatively, use the fact that PPRF and away both have 4 letters
• Aphasia
  o Broca’s Broken Boca (boca is Spanish for mouth) → Nonfluent aphasia with intact comprehension
  o Wernicke’s is Wordy but makes no sense → Fluent aphasia with impaired comprehension; they just sort of ramble on
• Aneurysms
  o Causes of berry aneurysm include Ehlers-danlos, Marfan’s, and Adult polyCystic kidney disease → Eat Many Appetizing Cranberries
  o Charcot-Bouchard microaneurysms → Associated with chronic
HTN; Chronic-BP problem microaneurysms

- **Ventricular system**
  - Foramina of Luschka → Lateral
  - Foramen of Magendie → Medial

- **Hydrocephalus**
  - In normal pressure hydrocephalus (abnormal CSF accumulation in ventricles), patients are said to be wet, wobbly and wacky → Urinary incontinence (wet), ataxia (wobbly), dementia (wacky)

- **Spinal nerves**
  - There are 31 spinal nerves, just like there are 31 flavors at Baskin Robbins

  - [image of ice cream]

  - 1 coccygeal nerve, just like a man has only one cock

- **Spinal cord, Lower extent**
  - Lumbar puncture is usually performed in L3-L4 or L4-L5 interpsaces, at level of cauda equina → To keep the spinal cord alive, keep the spinal needle between L3 and L5

- **Spinal cord and associated tracts**
  - Legs are Lateral in Lateral corticospinal (voluntary motor), spinothalamic tracts (pain/temperature)
  - Dorsal column is organized as you are when your arms are at your sides
    - Arms outside → The laterally placed fasciculus cuneatus carries info from upper body, extremities
    - Legs inside → The medially placed fasciculus gracilis carries info from lower body, extremities
  - Intermediate horn with sympathetic fibers is in thoracic spinal cord only → You should have SYMPathy for THOR because he is forced to use that stupid hammer (check him out below, he looks ridiculous)
Motor neuron signs

- When the lower MN is lesioned, everything is lowered → Less muscle mass (atrophy), less muscle tone, decreased reflexes, downgoing toes (negative Babinski)
- When the upper MN is lesioned, everything goes up → Tone, DTRs, toes (positive Babinski)

Werdnig-Hoffman disease

- Autosomal-recessive disease also known as infantile spinal muscular atrophy; presents at birth as floppy baby with tongue fasciculations; median age of death is 7 months; degeneration of anterior horns (LMN)
  - werdNIG disease → Black people have a lot of babies; they are real cool/chill, so they are floppy; lower socioeconomic status, so lower motor neuron disease

GABA receptors

- Only GABAB is g-protein coupled; GABAA and GABAC are both ion channels → Thus can again use the idea of the rapper BG to link; “B” is “G” protein coupled (see BG in the pharm section) → He is always high, and GABA receptor modulation can get you all messed up (ethanol, benzos, etc.)

Amyotrophic lateral sclerosis (AML, or Lou Gehrig’s disease)

- Both UMN and LMN signs, but no sensory/cognitive/oculomotor deficits
  - Stephen Hawking has this; highlights the lack of cognitive deficit; he is so smart he is like a superhuman mutant, so can remember that ALS can be caused by defect in superoxide dismutase 1 (SOD1)
Friedrich’s ataxia
- Autosomal-recessive trinucleotide repeat disorder (GAA) in gene that encodes frataxin
  - Freidreich is Frataastic (frataxin) → He’s your favorite frat brother, always stumbling, staggering, and falling (ataxia)
  - Frat brothers are generally GAA (gay)

Horner’s syndrome
- Sympathectomy of the face, causing Ptosis, Anhidrosis, Miosis → PAM is horny (Horner’s)

Landmark dermatomes
- C6 → Stick arm out like crucifixion stance. Curl your thumb and forefinger into an "OK" symbol while keeping your other fingers straight. Your hand should now look like a 6 shape. So C6 dermatome is your thumb and top of arm (reason for crucifix stance)
- C7 includes the middle finger → C7 gives the middle finger to heaven
- T4 is at the nipple → T4 is at the teat pore
- T7 is at the Xiphoid process → 7 has a line that is identical to part of the X of Xiphoid process
- T10 is at the umbilicus (important for early appendicitis pain referral) → T10 is at the belly but TEN
- L1 is at the Inguinal Ligament → L1 is IL
- L4 includes the kneecaps → Down on L4s (all fours)
- S2, S3, S4 are responsible for erection and sensation of penile and anal zones → “S2, 3, 4 keep the penis off the floor”

Clinical reflexes
- Reflexes count up in order, from the bottom to the top
  - Achilles → S1, 2
  - Patella → L3, 4
  - Biceps → C5, 6
    - Biceps before Triceps alphabetically
Primate reflexes
- Rooting reflex → Movement of head toward one side if cheek or mouth is stroked (nipple seeking)
  - Baby is rooting for the titties, like rooting for a sports team you are excited about; I still root for titties to this day
- Moro reflex → “Hang on for life” reflex; baby that is startled will abduct/extend limbs, and then draw together
  - The moro reflex is morbid because you are scaring the shit out of a baby

Brain stem
- CNs that lie medially at the brain stem → 3, 6, 12; 3(2) = 6(2) = 12
  - All motor → Motor = Medial
- Superior colliculi are the conjugate vertical gaze center; inferior colliculi are for auditory information
  - Your eyes are above your ears, and superior colliculus (visual) is above the inferior colliculus (auditory)
- Parinaud syndrome → Paralysis of conjugate vertical gaze due to lesion in superior colliculi; makes you parinaud (paranoid) because you don’t know what’s above you and if something is going to fall on you

Cranial nerves
- To determine if the nerve is Sensory, Motor, or Both → Some (1) Say (2) Marry (3) Money (4) But (5) My (6) Brother (7) Says (8) Big (9) Boobs (10) Matter (11) Most (12)
- Salivation
  - Facial controls submandibular, sublingual; Glossopharyngeal (9) controls Parotid → Flip the 9 over and have a P for Parotid
- Cranial nerve nuclei
  - Medial nuclei are Motor
- Vagal nuclei
  - nucleus Solitarius → visceral Sensory information (e.g. taste, baroreceptors, gut distension)
  - nucleus aMbiguus → Motor innervation of pharynx, larynx and upper esophagus (e.g. swallowing, palate elevation)

Cranial nerve and vessel pathways
- Cranial nerve V has V1, V2 and V3, which leave the skull at the Superior orbital fissure, foramen Rotundum, and foramen Osval, respectively → CN V leaves because it is Standing Room Only

Cranial nerve lesions
- In a CNXII lesion, the tongue deviates towards the side of the lesion → You want to lick your wounds
• 5 and 12, - deficits towards the side of lesion - ppl always gravitate towards the 5v12 matchup in NCAA tournament

■ Facial nerve lesions
  • Bell’s palsy is a complication of AlDs, Lyme disease, Herpes, Sarcoidosis, Tumors, Diabetes → Alexander GraHam Bell with an STD

■ KLM sounds
  • Kuh-kuh-kuh tests palate elevation (CN X); La-la-la tests tongue (CN XII); mi-mi-mi tests lips (CN VII) → It would be a KaLaMiTy to lose Cn X, XII nad VII
  • Note that you can also say these aloud and it is pretty obvious what is what; for mi-mi-mi you can feel your lips working, for example

■ Mastication muscles
  • 3 muscles close jaw: Masseter, teMporalis, Medial pterygoid; 1 muscle opens: Lateral pterygoid
    ▪ M’ s Munch
    ▪ Lateral Lowers (i.e. lowers the jaw down, as in opening the mouth)
    ▪ “It takes more muscle to keep your mouth shut”

■ Glaucoma
  • Open/wide angle (can associate open and wide because of the term "open wide"; “closed wide” makes no sense)
    ▪ Seen in African-Americans, old people most commonly → Black girls have wide asses; old people get fat and have wide asses

■ Extraocular muscles and nerves
  • CN 6 supplies the Lateral Rectus; CN 4 supplies the Superior Oblique; CN 3 supplies the Rest → LR5SO4R3
  • The inferior oblique performs EXcyclotorsion, while the superior oblique performs INcyclotorsion → “My EX is INFERIOR to my current girl” and “the SUP is IN the kitchen”
  • CN III lesion → Eye looks down and out
    ▪ “I’m down and out because I’ve never had a three-some”
  • Testing extraocular muscles
    ▪ To test Inferior Oblique, have patient look Up (also slightly nasal, as the oblique muscles work for elevation/ depression when the eye is adducted) → IOU
      ▪ Superior oblique is down (and a bit nasal), or the opposite
  • Pupillary control
    ▪ Constriction (miosis; can remember that miosis is constriction because it is a tiny little word relative to mydriasis, and thus can better “fit” into the small pupil)
- Pupillary sphincter muscle via Parasympathetics
  - Dilation (myDriosis) → Radial muscle, sympathetic
- Cranial nerve 3 in cross section
  - Middle is Motor; Periphery is Parasympathetic
- Visual field defects
  - Central scotoma is macular degeneration in retina, causes visual defect like a little ball where macula is → Central scrotoma filled with balls
  - Meyer's loop is lateral and goes inferior to lingual gyrus → Mey lats are inferior to Arnold's, but I make up for it by giving awesome oral sex (lingual gyrus)
  - Cuneus → Sounds like “cunt” → Higher up on brain (lingual gyrus is below) → Like “putting the pussy on a pedestal”
- Internuclear ophthalmoplegia (MLF syndrome)
- MLF syndrome is seen in MS
  - **Pathology**
    - Dementia
      - Alzheimer’s disease
        - Early onset form associated with the presenilin-1 and presenilin-2 genes — President Reagen was rumored to have Alzheimer's while in office towards the end of his term
        - Tx → Donepezil (AchEsterase inhibitor) that has different suffix than usual (-stigmine) → Alz patients are done with life
      - Pick’s Disease → Parkinsonism + Personality change + aPhasia
        - also, if someone is picky, that’s part of their personality
        - also stains silver, like the color of a pick (tool)
      - **Lewy** body dementia → alpha-SYNuclein defect seen histologically → Lewd and SYNful
        - Parkinson's + hallucinations → (Lewney ~ looney)
    - Multiple sclerosis
      - MLF is seen in MS
      - Charcot’s classic triad of MS is a SIN
        - Scanning speech, Intention tremor, Incontinence, Internuclear ophthalmoplegia (MLF), Nystagmus
  - Headaches
    - Migraines
      - Based on irritation of CNV and release of substance P, CGRP, vasoactive peptides → Picture slapping yourself on head with five fingers
      - Treatment
        - For acute attack, can use sumatriptan → Migraine is a big bad terrible headache, so need a big bad sumo to take it out (this is used with cluster headaches too)
    - Tension headache
      - Tension headache is described as feeling like a tight band around the head → Follows that it is bilateral, unlike the others
    - Cluster headache
      - Clusters in terms of time → Experience for a while (a cluster), goes away for months, experience them again (another cluster); clusters separated in time
      - Associated with ipsilateral rhinorhea → Cluster of snot/
boogers coming out of nose

- Also ipsilateral Horner’s, lacrimation

- Neurocutaneous disorders
  - Sturge-weber → Congenital vascular disorder with sporadic inheritance (UNLIKE the other neurocutaneous disorders, which are AD) that affects capillary-sized blood vessels → Port-wine stain, early-onset glaucoma, seizures, mental retardation, hemiplegia
    - My father goes to a motorcycle convention called “Sturgis” where there are a bunch of crazy bikers; they get all drunk on wine (port-wine stain), get so high on coke they have seizures, get so fucked up they can’t see straight (early-onset glaucoma), are pretty much mentally retarded and totally paralyzed (hemiplegia); they are incredibly disorganized, so they just sort of do things sporadically (sporadic inheritance, unlike all of the other neurocutaneous disorders); the money hungry people putting it on charge all kinds of fees (pheocromocytoma)
      - He literally got me a t-shirt with the following...

- Tuberous sclerosis → Think wild hot Tub party
  - People fuck in hot tubs, so associated with SHAGreen patches
    - Someone is getting hammered, so this disease is based on hamartomas
  - People are smoking weed in the hot tub, so they have ash
leaf spots
  o Only neurocutaneous disease not associated without pheo
    → Free spirited partiers would never charge a “phees”
  o Neurofibromatosis type 1 (von Recklinhausen’s disease) → Think
    of an old man neurosurgeon that is all concerned about his fiber
    intake
    o They work CONSTANTLY, so drink tons of coffee (cafe-
      au-lait spots)
    o Neurosurgeon has to have a VERY sharp eye to catch the
      tiny brain structures, so pigmented iris hamartomas (Lisch
      nodules)
  o von Hippel-Lindau disease
    o AD, based on mutation of chromosome 3 → 3 words in von
      Hippel-Lindau

Brain tumors
  o Meningioma → Has psammoma bodies; “Your momma is a
    whore, so there are men-in psa (ya’) momma”
    o Second most common primary brain tumor → “Men-in
      your mom is the second most common thing, as she is a
      dyke and more commonly has women in her
  o Pilocytic (low grade) astrocytoma
    o Has Rosenthal fibers (eosinophilic, corkscrew fibers) →
      Picture a Rose on a Pilo (pillow) when a girl is making the
      room all romantic for sex
    o Most commonly in cerebellum → You are all clumsy before
      you fall asleep on a pilo
    o Tumor in children that may be supratentorial → Put
      your head on top of a pillow, like the tumor is above the
      tentorium
  o Medulloblastoma → Med-jew, picture a Jewish physician (note
    that things are about to get real anti-semitic, but I am Jewish
    myself, so I can do that)
    o Highly malignant cerebellar tumor → Jewish people are
      awkward and clumsy and have no athletic ability, thus
      cerebellar
    o Jewish people have tiny penises and they are sad about it
      → Thus tumor is comprised of small blue cells
    o Has rosettes or perivascular pseudorosettes → Rosenberg
      is a very Jewish sounding name; note that polocytic
      astrocytomas ave ROSENthal fibers; must not confuse
      these two
    o A form of primitive neuroectodermal tumor (PNET) →
      Jewish people are extremely frail and scrawny; thus their
      musculature is primitive
- Associated with Turncot syndrome (APC gene mutation, causes a combination of colon cancer and medulloblastoma) → Jewish people will savagely do whatever they can for money; thus they are totally willing to be total turncoats (en.wikipedia.org/wiki/Turncoat)

- Ependymoma
  - Most commonly found in the 4th ventricle → epENDymomas are found at the END of the ventricular system

- Hemangioblastoma
  - Think HEMAN from the cartoon, but he is BLASTED (real drunk)
    - Tumor is most commonly cerebellar → He is so drunk it messes up his cerebellum/balance
    - Foamy cells → He is so wasted he is sloshing his beer around and it is getting all foamy
  - Can remember some things just from the obvious association with “heme” → Highly vascular tumor, can produce EPO and cause secondary polycythemia

- Cranioopharyngioma
  - Pharynx → Pharynx → Tumor derived from remnants of Rathke’s pouch

- +$100 brain tumors include Schwannomas and aStrtocytomas

- Differential diagnosis of brain lesions
  - Heterogeneously enhancing lesion → Glioblastoma MULTiforme (multiple forms, so looks heterogenous)
  - Ring-enhancing
    - Mets (usually, not always), AIDS lymphoma → “I gave her a Ring right after I met her...and she gave me AIDS!”
      - Non-AIDS lymphoma causes uniformly enhancing lesion

- Meningitis
  - Symptoms include fever, headache, nuchal rigidity, and Kernig’s sign
    - Kernig’s sign → With the patient supine, the examiner flexes the patient’s hip but cannot extend the knee without causing pain (maneuver stretches meninges, pain seen with meningeal irritation). Kernig = Knee

- Pharmacology
  - Opioid analgesics
    - Nu receptors bind Morphine; Delta receptors bind ENkephalin; Kappa receptors bind DYnorphin (if you get “capped” (slang for getting shot) you “dy”)
    - Opioid analgesics also can cause (Sphincter of) Oddi contraction
leading to biliary colic

- **Butorphanol** → Partial agonist at opioid mu receptors, causes withdrawal if on full opioid agonist → “But...But...But I’m high on morphine! No I don’t want **Butorphanol**!”

- **Ethosuximide used for absence seizures** → If a girl has an absence seizure and is just standing there staring blankly into space, a guy may **sux** on her nipple
  
  - Ethosuximide acts at Ca channels → Milk (Ca) seems to always be absent from the fridge when you need it most which really **sucks**

- Seizure drugs
  
  - “I payed a **Phee** for **Carbs**, Lam, and Sodium” → **Phenytoin**, carbamazepine, and lamotrigine operate by modulating Na channel activity
  
  - **Trigeminal neuralgia** is the worst pain ever, so bad people often kill themselves → Treat with carbamazepine → “Fuck it, the trigeminal neuralgia hurts too much, just run me over with a car/I am going to park my car in my garage and die from CO poisoning”
    
    - or trigeminal neuralgia = shock like pain → tx w/ the one w/ the “Z” like the sound/feeling of being shocked → carbamazepine
  
  - **The treatment of partial seizures** → 1st line is carbamazepine
    
    - “**Carbs** are only part of a good diet; you need fats and proteins as well!”
  
  - **Valproic acid mechanism** → “**Val** is a **salty** bitch that just GABs and GABs” → Inactivates Na channels, increases GABA concentration

- **Barbiturates vs. Benzodiazepines**
  
  - **Barbiturates facilitate GABA**<sub>A</sub> action by increasing duration of Cl<sup>-</sup> channel opening, thus decreasing neuron firing → BarbiDURATes increase DURATion

  - Benzodiazepines facilitate GABA<sub>A</sub> action by increasing the frequency of Cl<sup>-</sup> channel opening → FREnzodiazepines increase FREquency
    
    - Short acting benzodiazepines → **TOM** Thumb (famous midget from back in the day, so “short”) → Triazolam, Oxazepam, Midazolam
      
      - Alprazolam has exceptionally short t1/2 → Al A. cums very quickly
**Inhaled anesthetics**
- Halothane is **Hepatotoxic**
- Enflurane is a proconvulsant, or it has Epileptic sides
- Methoxyflurane is nephrotoxic → Meth is Neph

**IV Anesthetics**
- Barbiturates, Benzodiazepines, Ketamine, Opiates, Propofol → B. B. King on OPIATES PROPoses FOOLishly
- Midazolam is most common drug used for endoscopy → Use Mid-Az-olam when you want to put an endoscope in the Middle of someone's Az (ass)
- Propofol is associated with high triglycerides, milky blood, pancreatitis → MJ was killed by Propofol and had super milky skin
- Short vs. long acting benzodiazepines
  - Short acting act **ATOMatcally** - alprazolam, triazolam, oxazepam, midazolam
  - Short acting mnemonic relating to Al A., who is famous for his constant masturbation
    - Al Trying to Orgasm → Happens VERY quickly, as Al is a masturbation professional → Altiazolam, Triazolam, Oxazepam
    - Long acting increase the risk of falls, decrease the risk of dependence → Cease Dependence, Commence Falls → Chlorodiazepoxide, Diazepam, Clorzoprate, Flurazepam
    - Also, we aren’t going to Die for a long time → If it has “di” in it, it is long acting

**Local Anesthetics**
- All end in **-caine**; easy to remember because cocaine makes your tongue numb when you taste it
- Either esters or amides; the amides have two Is in the name →
Lidocaine, meplvacaine, bupivacaine

- Opiates
  - **Pentazocine** can be used to cause opiate withdrawal, as it is a partial agonist at the mu receptor → If you are a heroin addict and you go to the **pen** (prison), they give you pentazocine to get you off the heroin

- Parkinson’s disease treatment
  - The drugs used to treat PD are the **BALSAC** drugs (which is logical, since it is fun to expose your ballsac the **park**) → Bromocriptine, Amantadine, L-dopa, Selegiline, Antimuscarinics, Carbodopa
    - A-man-ta-dine with a woman gets a big dopamine surge, as he knows he is going to get some pussy
  - To remember the dopamine agonists: “It would be “**dope**” if my **Bro** could **Rope** in **Pam** → Bromocriptione, Ropinirole, Pramipexole
  - Benztropine is an antimuscarinic that improves tremor and rigidity but has little effect on bradykinesia; useful in Parkinson’s treatment because Parkinson’s has excess cholinergic activity → Park your Mercedes-Benz
  - entaCAPONE and tolCAPONE are **COMT** inhibitors that prevent L-dopa degradation → al CAPONE was a badass gangster that was **COMT** everything at the clubs/restaurants he went to
    - “Comp” is truncation of complimentary used to describe free things given to high rollers at casinos/clubs (http://www.urbandictionary.com/define.php?term=comp)

- Sumatriptan → 5HT\textsubscript{1B/1D} agonist (5-HT being serotonin, hydroxyTRYPtamine), used to treat headaches (cluster, migraine) → A SUMo wrestler TRYPs and falls on your head.

**Psychiatry**

- **Psychology**
  - Intelligence quotient
    - Stanford-Binet → Calculates IQ as (Mental age/Chronological age)*100 → **Standard**-Binet (very standard, classic form of IQ test)
  - Freud’s structural theory of the mind
    - Unorganized part of personality structure that contains the basic drives; food, sex, aggression → The Id is all about the Instincts → “I want it!”
    - **Superego** is all about being just **SUPER** moral → Moral values, conscience → “You know you can’t have it. Taking it is wrong.”
    - Ego → The mediator between primal urges (id) and behavior accepted in reality; can be attacked by superego → Take it and
• you will get in trouble.”

■ Ego defenses
  • Projection vs. Sublimation
    ○ Projection is immature and is considered “unacceptable”
    ○ Sublimation is a mature defense (ex: abused actress uses it to enhance her acting) → Actions put to good use (sublime usually has positive connotation)
  • The mature ego defenses are Sublimation, Altruism, Suppression, and Humor; commonly found in emotionally mature adults (in contrast, the other ego defenses are immature/pathological)
    ○ Mature women wear a SASH
    ○ Can use SASHA to include “Anticipation,” another mature defense mechanism
Pathology

- Infant deprivation effects
  - The 4Ws, because deprived babies say Wah, Wah, Wah, Wah → Weak (decreased muscle tone, weight loss, physical illness), Wordless (poor language skills), Wanting (socially; poor socialization skills), Wary (lack of basic trust)

- Childhood and early-onset disorders
  - Conduct disorder vs. Oppositional defiant disorder
    - Conduct disorder → Child does really serious criminal-level things, like a Convict. Ex. Destruction of property, theft, cruelty to animals.
    - Oppositional defiant disorder → No serious defiance of cultural norms, just more standard rebellion

- Orientation
  - Order of loss → 1st time, then place, then person last
    - Clinically, we say "orientation to person, place, and time"
      - We start with the easiest and go to the hardest to make it easier on the patient

- Delirium vs. Dementia →
  - Delirium is characterized by changes in sensoRium (waxing/waning consciousness, hallucinations, disorganized thinking, illusions, misperceptions); dementia is characterized by Memory loss
  - del-EE-rium has an abnormal EEG, whereas dementia does not

- Hallucination types
  - Hypnagogic hallucination → Occurs while going to sleep
• hypnoPOMPic hallucination → Occurs while waking up from sleep (POMPous upon awakening; no one can be pompous while sleeping)

■ Schizophrenia
• Need symptoms for at least 6 months; 666 is devil’s number; schizophrenia can be associated with devil voices/visions

■ Delusional disorder
• You are the ONE person that believes your dumbass delusion, so you only need to have the belief system for > ONE month

■ Manic episode
• Maniacs DIG FAST
• Distractibility, Irresponsibility, Grandiosity, Flight of ideas, increase in goal-oriented Activity/psychomotor Agitation, decreased need for Sleep, Talkativeness or pressured speech
  ○ need 3 or more (DIG) is 3 letters
  ○ Treatment → LiVe CAImer → Lithium, Valproate, Carbamazepine, Atypical antipsychotic

■ Depression
• SIG E CAPS is classic depression mnemonic → Sleep disturbance, loss of Interest (anhedonia), Guilt or feelings of worthlessness, loss of Energy, loss of Concentration, Appetite/weight changes, Psychomotor retardation or agitation (leaden paralysis where arms/legs feel like lead and don't want to move), Suicidal ideations
• ATypical Depression is FATypical depression → Characterized by hypersomnia (fat person is lazy and sleeps all the time), overeating (fat), weight gain (fat), sensitivity to rejection (happens to fat people a lot)

■ Panic disorder
• Symptoms of panic disorder are PANICS (technically PANIICCCSSS)
  ○ Palpitations, Paresthesias, Abdominal distress, Nausea, Intense fear of dying or losing control, Liight headedness, Chest pains, Chills, Choking, disConnectedness, Sweating, Shaking, Shortness of breath → From FA, what a bullshit mnemonic

■ Somatiform disorders
• Somatization disorder → Need 4 pain, 2 GI, 1 sex, 1 pseudoneurological → Picture a BDSM advertisement for the “neuro sex shop”: “For (4) pain, Gl 2 neuro (1) sex (1) shop”
• conVersion disorder → Sudden loss of motor or sensory function; V for Voltage implies motor/sensory problem

■ Personality disorders
• Cluster A
- In general, type A is “Weird” → Accusatory, Aloof, Awkward
- Schizoid, Schizotypal, Paranoid → Scary Street People
- Schizoid people avoid others → schizOID = avOID people
- Schizotypal people are eccentric in appearance, odd beliefs, magical thinking, interpersonal awkwardness → SchizoTYPAL goes to work dressed as a pICKEL; schizoTypal = magical Thinking
- Cluster B
  - In general, type B is “Wild” → Bad to the Bone
    - Antisocial personality disorder means disregard for and violation of rights of others, criminality → antiSOCial = SOCiopath
- Cluster C
  - In general, type C is “Worried” → Cowardly, Compulsive, Clingy
- Compiled time definition mnemonics
  - Schizophrenia → Need symptoms for at least 6 months; 666 is devil’s number; schizophrenia can be associated with devil voices/visions
    - Anxiety disorder is six months as well; can imagine someone experience extreme anxiety worrying about devil/hell/satan and connect to 6
      - < 1 month is brief psychotic disorder; 1-6 months is schizophreniform disorder (will probably become schizophrenia)
  - Delusional → You are the ONE person that believes your dumbass delusion, so you only need to have the belief system for > ONE month
  - Manic episode lasts at least 1 week → If you have a manic episode, you are not a man at all, you are week
  - Cyclothymic disorder → Milder form of bipolar disorder lasting
at least two years; “My bicycle has two wheels, and it is an 03’ (year)”

- Depression → TONS OF TWOS
  - Major depressive episode → Symptoms last for 2 or more weeks; “If you are a little whiny pussy and you have a depressive episode, you are 2 WEEK to hang out with me”
  - Major depressive disorder
    - Can stick with the “two” from “two week”; two or more major depressive episode with a symptom-free interval of two months
    - Note that dysthymia, the milder form of depression, lasts at least two years and needs two of the SIG E CAPS symptoms (standard depressive episode requires five)

- PTSD vs. acute stress disorder
  - PTSD is 4 words → Thus, it must last at least 4 weeks
    - Alternative: In PTSD, disturbance lasts > 1 MONTH
      → “I was pretty good when I was in the war (associate with PTSD) stationed in Thailand, I only fucked ONE MinOr”
  - Acute stress disorder → Less than a month (2 days-1 month)

- **Pharmacology**
  - Antipsychotics (neuroleptics)
    - These drugs are haloperidol and the -azines (ex. fluphenazine, thioridazine) → Haloperidol is easy to remember, and for “-azines” just remember how crazy Azine (Asian) people are
JAPAN
No further description required.

- Low Potency neuroleptics:
  - Chlorpromazine → Corneal deposits
  - Thiordazine → Retinal deposits
- These drugs can cause neuroleptic malignant syndrome (NMS), which can have hyperpyrexia (fevers great than 106.7 degrees!!!)
  → Thus the mnemonic for NMS is FEVER
  - F → Fever
  - E → Encephalopathy
  - V → Vitals unstable
  - E → Elevates enzymes (muscle breakdown, myoglobinuria)
  - R → Rigidity of muscles
- Atypical antipsychotics
  - Atypicals include olanzapine, clozapine, quetiapine, risperidone, aripiprazole, ziprasidone → It’s atypical for old closets to quietly risper from A to Z (and the worst fucking mnemonic in First Aid award goes to...)
    - “Quietly (quetiapine) Risper (risperidone) (sexy sweet nothings) as you unzip (ziprasidone) Ari’s old (olanzapine) clothes (clozapine)” → Think Ari from Entourage hooking up
Olanzapine and clozapine may cause significant weight gain, such that you can’t ear your OLd CLOZ (clothes) anymore
- Also, Olanzapine can be used to treat numerous conditions → OCD, anxiety disorder, depression, mania, Tourette syndrome → “Ol-anz-apine has OL (all) of the Anzswers (answers)"
- Clozapine may cause agranulocytosis (requires weekly WBC monitoring) → Must watch clozapine clozely

- Lithium
  - Side effects → LMNOP, with L signifying Lithium:
    - M → Movement (tremor)
    - N → Nephrogenic diabetes insipidus (is an antagonist of ADH, thus can treat SIADH, causes polyuria)
    - O → hypothyroidism
    - P → Pregnancy problems (fetal cardiac defects, including Ebstein anomaly and malformation of the great vessels)

- Buspirone
  - Treats generalized anxiety disorder → ”I’m always anxious if the BUS will be ON time, so I take BUSpirONE”

- Tricyclic antidepressants
  - Names end in -pramine, -tiptyline → “I wore a ty to pram, but I arrived by tricycle” → Note also that -tiptyline starts with “tri” like “tricyclic”
  - Side effects
    - The TRI-Cyclics cause the tri-Cs → Convulsions, Coma, Cardiotoxicity (arrhythmias)
    - Old people can get confusion and hallucinations due to the anticholinergic side effect of TCAs, so must give them nortriptyline (this is a secondary TCA; they have fewer anticholinergic effects) → To prevent the old person from have a bad trip, give them NO-r-TRIPtyline
Renal

- **Anatomy**
  - Ureters pass **under** the uterine artery and under the ductus deferens (retroperitoneal) → Water **(ureters)** **under** the bridge (uterine artery, ductus deferens)

- **Physiology**
  - **Acidosis/alkalosis**
    - In metabolic acidosis, check the anion gap. Causes of increases anion gap → **MUDPILES** (remember that when a pile builds up, something is increased)
      - M → Methanol (formic acid)
      - U → Uremia
      - D → Diabetic ketoacidosis
      - P → Paraaldehyde/Phenformin
      - I → Iron tablets or INH
      - L → Lactic acidosis
      - E → Ethylene glycol (oxalic acid)
      - S → Salicylates/Shock
      - **NOTE:** Can also use **CUTE DIMPLES** to include Cyanide, Toluene
    - Renal tubular acidosis
      - Type 1 → “Distal” renal tubular acidosis → Defect is at the level of the collecting duct; it cannot excrete H+ → The number 1 is a big straight line similar to the way the collecting duct is always drawn
      - Type 2 → “Proximal” renal tubular acidosis → Remember that proximal comes right after distal
        - Pro-two-type (like pro-to-type) → This word links “pro” and “to”
      - Type 4 → Hyperkalemic.
  - **60-40-20 rule**
    - TBW is 60% of body weight; ICF is 40% of body weight; ECF is 20% of body weight

- Electrolyte disturbances
  - K is all about the heart
    - The T wave is proportional to the K level
      - Low K → Low, flat T wave
      - High K → Peaked T waves
  - Na is all about the brain
    - Low Na → Low brain excitability → Totally out of it → Disorientation, stupor, coma
    - High Na → High brain excitability → Irritability/delirium/
coma

- Measuring fluid compartment volumes
  - Mannitol measures ECF → Mann-E, like the name Manny
  - INulin → Measures total extracellular volume → INulin measures everything not IN the cells
  - Evans BLUE measures Plasma → BLUE-Per → Bloopert
    - Radioiodinated serum albumin also measures plasma volume → Logical given that albumin will be in the plasma

  - Pathology
    - Hartnup’s disease → Deficiency of neutral amino acid (tryptophan) transporter → I love getting high on acid...in other words, “I hart tryping”
    - Results in pellagra (diarrhea, dermatitis, dementia) → This is due to the fact that NAD is synthesized from tryptophan

- Nephritic syndrome
  - Nephritic syndrome → Inflammatory process; vs. Nephrotic → Massive prOteinurias
  - Rapidly progressive (crescentic) glomerulonephritis (RPGN)
    - RPGN → Like an RPG video game → These games are notorious for having good music → Caused by Goodpasture, Wegener’s, Microscopic polyangiitis → Games With Music
    - Remember crescent MOON shape because of the classic RPG game Harvest MOON
  
  - Berger’s disease → Think of as “boogers” disease
    - Increased synthesis of IgA → Boogers are in the nose; the nasal mucous membrane is associated with IgA antibodies; boogers have lots of IgA in them
    - Often presents/flares with a URI or acute gastroenteritis → Often have lots of mucous/boogers when you are sick
    - LM and IF show ICs deposited in the mesangium → Picture boogers in the mesangium
    - Most common in children/young adults → Children commonly pick boogers out of their noses
  - Diffuse Proliferative Glomerulonephritis (DPG) → The nephritic
syndrome presentation of SLE

- Dogg Pound Gang (DPG) is a rap group affiliated with Snoop Dogg; Snoop’s daughter had SLE

- Note also that the deposits are subENDOthelial here → ENDO is slang for marijuana (http://www.urbandictionary.com/define.php?term=endo) → Snoop Dogg smokes a lot of ENDO

- See “wire looping” of capillaries on LM → This condition is caused by lupus → Wire-lupus lesion

- Alport’s syndrome → Can’t see (ocular disorders), can’t pee (nephritic syndrome), can’t hear (deafness)
  - Modeled after “can’t see, can’t pee, can’t climb a tree” mnemonic for Reiter’s phenomenon
    - Have another one for Sjogren’s → Can’t see, can’t spit, can’t climb up shit
  - Mutation in type FOUR collagen → Al-FOUR-ts syndrome
  - Split basement membrane → Picture a bunch of frat guys living together: “We split up the porn costs guys...All porn is split right down the middle”

- Nephrotic syndrome
  - Nephritic syndrome → Inflammatory process; vs. NephroOtic → massive prOteinuria
  - Membranous Glomerulonephritis (MGN) → “Spike/dome” on EM like MGM Epcot
• Minimal change disease → The change is so minimal, it looks totally normal on LM (but on EM can see foot process effacement)
  o Minimal change disease is most commonly seen in minimal age people (children, <10 yo)
  o Based on GBM polyanion loss (specifically, sialic acid) → Anions are absolutely tiny; thus the change is minimal
  o Also called lipoid nephrosis → Lipid = fat; fat people NEVER change, they are always fat
  o Selective protein loss, so minimal variety in what proteins are lost → Almost entirely albumin
• Focal segmental glomerulosclerosis → Most common glomerular disease in HIV patients (Fags)

  ■ Kidney stones
  o Of all kidney stone types (Ca, ammonium Mg phosphate, uric acid, cystine), only Uric acid is radiolucent → All others are radiopaque
  o Uric acid is star shaped → “Ur a star!”

  ■ Kidney cancers
  o Renal cell carcinoma → Most generic, basic name imaginable → Most common renal malignancy
  o Wilm’s tumor → May be part of WAGR complex → Wilms tumor, Aniridia (absence of the iris), Genitourinary malformation, and mental-motor Retardation
    o Alternatively, since Wilm’s is a tumor of kids and that is horrific, it can be part of the GWAR complex (like the
horrific band **GWAR**

- **Causes of transitional cell carcinoma**
  - Transitional cell carcinoma is associated with problems in your **Pee SAC** → Phenacetin (old school analgesic), **Smoking**, **Aniline dyes**, and **Cyclophosphamide** (alkylating agent chemotherapy drug)

- **Renal papillary necrosis**
  - causes: think pap like the smear which you need PADS to smear with
  - Phenacetin (ACM derivative)
  - Acute pyelonephritis
  - DM
  - Sickle Cell

- **Renal cysts**
  - Autosomal Dominant Polycystic Kidney Disease (ADPKD)
    - ADPKD (the autosomal dominant one, D is for dominant) was originally called adult polycystic kidney disease → Adults are more **dominant** than infants → Thus can remember that this is adults, and ARPKD is seen in infants
  - Autosomal Recessive Polycystic Kidney Disease (ARPKD)
    - Significant renal failure in utero can lead to Potter’s → Atypical physical appearance due to oligohydramnios (logical since messed up kidneys mean baby cannot pee) → The baby is like maleable clay being used by a Potter, messes up due to abnormal fluid levels

- **Pharmacology**
  - **Diuretics**
    - Acetazolamide → **ACIDazolamide causes ACIDosis**
    - Loop diuretics (furosemide, bumetanide, torsemide, ethacrynic acid) → **Loops Loose Ca2+, thiazides don’t**


- **“OH DANG, I am absolutely FURious (FURosemid)!”**
  - Sides of loop diuretics → **O**totoxicity, **H**ypokalemia, **D**ehydration, **A**llergy (sulfa), **N**ephritis (interstitial), **G**out
- Ethacrynic acid → Phenoxycetic acid derivative, NOT a sulfonamide; essentially the same action as furosemide
  - If someone is being a little bitch and CRYIN about sulfonamide drug, give them etha**C**RY**N**ic acid
    - Can also use in case of gout, whereas furosemide causes gout
- **Thiazide diuretics (Hydrochlorothiazide, metolazone)**
  - Toxicity → **H**yper**G**luc → hyper**G**lycemia, **h**yper**L**ipidemia, hyper**U**ricemia, hyper**C**alcemia
- **K** sparing diuretics → The K **ST**Ays → **S**pironolactone, Triamaterene, Amiloride (also **E**plerenone, perhaps remember as **STAEs** although this is kind of stupid)
  - ACE inhibitors → Captopril, enalapril, lisinopril
    - Sides → **CAP**TOPRIL (it is possible that P is inaccurate, although this mnemonic is in FA...DIT says it is wrong and this confirmed by my internet search...thus may want to use CAT-OPRIL, which is kind of easy to remember because cats are cute) → Cough, Angioedema, Proteinuria (again, this seems to be wrong...ACE inhibitors actually treat proteinuria), Taste changes, hyp**O**tension, Pregnancy problems (major congenital abnormalities), Rash, Increased renin, Lower angiotensin II

- **Reproductive**
  - **Anatomy**
    - Round ligament of the uterus does not contain any structures → A **z**ero is **r**ound; it contains **z**ero structures; travels through the **r**ound **i**nguinal canal
    - Pathway of sperm during ejaculation → **S**EVEN **U**P → **S**eminiferous tubules, **E**pidymus, **V**as deferens, **E**jaculatory duct, **N**othing, **U**rethra, **P**enis
    - Mesonephric ducts → Male, Paramesonephric ducts → Female; the female one has the added prefix of "para-", just like FEmale and WOman
    - Autonomic innervation of the male sexual response
      - Erection is **P**arasymathetic, ejaculation is **S**ympathetic → **P**oint and **Sh**oot
      - Erection, Emission, Ejaculation → **P**elvic n., hypo**G**astric n., **P**udendal n. → **P**enis **G**oes in **P**ussy
    - Derivation of sperm parts
      - **M**iddle piece (neck) has **M**itochondria
      - Feeds on **F**ructose
      - **A**crosome is derived from **G**olgi apparatus → The sperm is a **G**
(G as in the slang for “gangster”; note the thugged out gangster ass sperm below)

- **Physiology**
  - Spermatogenesis
    - Spermatogonium is **going** to be a sperm → Lowest level of differentiation
    - Spermatozoan is **Zooming** out of the cell → Final stage of differentiation, ready to impregnate someone
  - Regulation of spermatogenesis
    - FSH → Sertoli cell → Sperm production
    - LDH → Leydig cell → Testosterone
  - PROGESTerone is **PRO-GESTation** → Decreases myometrial excitability, increases endometrial gland secretions, increase cervical mucous, increases body temperature (when you have a bun in the oven, you want the oven to be hot), etc.
  - Estrogen types
    - Placenta produces estriol → Tri-ol like Tri-mester of pregnancy
  - Menorrhagia → Frequent but irregular menstruation → Like a metro bus making frequent but irregular stops
  - Menometrorrhagia → Heavy, irregular menstruation at irregular intervals → Vagina is releasing a bunch of nasty stuff, it needs a **mento**
  - Oogenesis
    - Meiosis I is arrested in prOphase for years until Ovulation (stuck as primary oocytes)
    - Meiosis II is arrested in METaphase until fertilization (stuck as a secondary oocyte) → An egg MET a sperm
  - Menopause
    - Menopause causes **HHAVOC** → Hot flashes, Hirsutism, Atrophy of the Vagina, Osteoporosis, Coronary artery disease

- **Pathology**
  - 47XXX clinically silent aside from low IQ → You’re probably not too smart
if you’re in porn (XXX)
- 5-alpha reductase deficiency → “Penis @ 12” → Associate the alpha with the @
- Hydatidiform mole
  - Complete vs. Partial Mole
    - Partial → Fetal PARTs; complete mole has no fetal parts
    - You are COMPLETEly fucked in a COMPLETE mole, because it can convert to choiocarcinoma
    - Also, DNA is COMPLETEly from sperm, whereas have both maternal and paternal in partial
- Preeclampsia
  - Pre-eclampsia → HTN + Proteinuria + Edema
  - Associated with HELLP syndrome → Hemolysis, Elevated LFTs, Low Platelets
- Pregnancy complications
  - Abruptio placentae → Premature detachment of placenta from implantation site → Abrupt detachment/death; this abrupt death is a real DICkish thing for the body to do (may be associated with DIC)
  - In placenta accreta, you exccreta a shitload of blood because the placenta is attached to the myometrium
- Endometrial proliferation
  - Risk factors for endometrial carcinoma → HONDA → Hyperplasia, Obesity, Nuliparity, Diabetes, Anovulatory
- Ovarian germ cell tumors
  - Dysgerninoma → Elavated LDH, hCG → There are a lot of germs on a Large Cock
  - Choriocarcinoma has elevated hCG only → This logical given that chorion is one of the membranes surrounding the fetus
  - Yolk sac tumor → AFP is tumor marker → Semen is a bit like runny egg white/yolk; FAP is internet slang for masturbate

![MUST... NOT... FAP](image)
- Yolks are round, as are the Schillar-Duval glomeruli bodies found in YS tumors
- Ovarian non-germ cell tumors
  - **Brenner tumor** → Benign and looks like Bladder

- Benign breast tumors
  - Intraductal Papilloma → discharge
  - **Phyllodes Tumor** → Present later in life (6th decade), large/immobile (PhyOLDIES, immobile/fat when you’re old) compared to fibroadenoma (mobile)

- Malignant breast tumors
  - **Invasive Lobular** = cells “In Line”
  - **Invasive Ductal** = InDurated
  - Comedocarcinoma → A comedo is a disgusting black head; causeous necrosis is nasty cheesy necrosis; thus comedocarcinoma is the breast cancer with causeous necrosis
    - Or comedo means glutton in Latin → Cheesy caseous necrosis
  - Inflammatory breast cancer → Has peau d’**orange**; picture something all inflammed that is red/**orange**

- Drugs that cause gynecomastria
  - **Some Drugs Create Awesome Knockers** → Spironolactone, Digitalis, Cimetidine, Alcohol, Ketoconazole
  - Also, **PHEM** (like **PHEmine**) → Psychoactive drugs, Heroin, Estrogen, Marijuana

- Testicular Germ Cell Tumors
  - **Teratoma** malignant in males (benign in females)

- Penile pathology:
  - **Bowen’s disease** - gray plaques on dick (Bruce Bowen is an old (gray), retired bball player)

- **Erythroplasia of Queyrat** → Red velvety plaques (Erythro - = red like erythrocyte)

  - **Pharmacology**
    - **Leuprolide** → GnRH analog with agonist properties when used in pulsatile
fashion; antagonist properties when used in a continuous fashion → Leuprolide can be used in lieu of GnRH

- Tamoxifen for the titties (antagonist on breast tissue)
- Raloxifene for the pickety (tx osteoporosis)
- Anastrozole = aromatase inhibitors in postmenopausal women = nastier than Tamoxifen b/c for older ppl
  - An-ass → Picture a big hairy ass → This is like the least estrogen-y thing imaginable
    - Note: Can be confused with "finasteride," but this is definitely not a “fine ass”

- Dinoprostone → Prostaglandin agonist for inducing labor → Like giving birth to a dinosaur
  - Also just remember the concept that prostaglandins are pro-birth
- Ritodrine → Beta2-agonist that relaxes the uterus → Ritodrine allows the fetus to “return to dreams” by preventing early delivery
  - Terbutaline does the same thing
- Tamsulosin (Flomax) is selective for alpha1A,D receptors (found on prostate); does not bind vascular alpha1B receptors → The prostate one binds the Asshole, Dick receptor whereas the vascular one binds the Blood receptor as well
- Sildenafil (Viagra), vardenafil → Used to give an erection → Sildenafil and vardenafil fill the penis
  - Sides → These drugs make you Hot and sweaty, but then cause Headache, Heartburn, Hypotension
  - Impaired blue/green vision → Viagra is the “little blue pill” (see the Viagra picture below)


Respiratory

○ Anatomy

□ Pneumocytes → Lecithin to sphingomyelin ratio can be used to assess maturity of fetal lungs; mature when lecithin:sphingo is > 2
  □ Lecithin = surfactant so obviously want that to be high to indicate fetal maturity
  □ Type I cells are thin like “I”; type II are cuboidal
  □ Type II cells are precursors to both type I/II cells, 2 as in your are given a 2nd chance
□ Bronchopulmonary segments
  □ Arteries run with Airways; veins do not
□ Lung Relations
  □ Left lung has 2 lobes (due to heart “replacing” one) and a Lingula (homologous to the right middle lobe)
  □ RALS describes the relation of the pulmonary artery to the bronchus at each lung hilus → Right Anterior, Left Superior
□ Diaphragm structures
  □ C3,4,5 keep the diaphragm alive → The phrenic nerve, which supplies the diaphragm, is made up of these nerves
  □ Number of letters = T level where structure perforates diaphragm:
    ○ T8: Vena Cava
    ○ T10: (o)esophagus
    ○ T12: Aortic hiatus
  □ Another T level mnemonic: “I (IVC) ate (8) ten (10) eggs (esophagus) at (aorta) twelve (12)”
    ○ Modified version to include more: I (IVA) ate (8) ten (10) vagina (vagus) eggs (esophagus) at (aorta) twelve (12).
      Assy (Azygous vein) Taste (thoracic duct) (ass-like taste because of vagina thing of course, the ass is like RIGHT there)
        □ 8 → IVC
        □ 10 → Vagus n., esophagus
        □ 12 → Aorta, azygous vein, thoracic duct

○ Physiology
- Lung volumes
  - Remember that capacities are combinations of volumes; only 4 basic volumes exist → Tidal volume, inspiratory reserve volume, expiratory reserve volume, and residual volume; everything else combines these, so start with these as an easy-to-remember logical framework
    - Total lung capacity is obvious (all volumes combined); vital capacity is easy to remember because of the FVC measurement, where someone breathes in and then breathes out maximally (thus it is everything but residual volume)
    - The two remaining volumes are just combinations of the top two volumes (TV + IRV, or inspiratory capacity) and bottom two volumes (ERV + RV, or functional residual capacity)

- Hemoglobin types
  - METHemoglobinemia can be treated with METHylene blue

- Neural control of breathing
  - DIVE → Dorsal respiratory group handles Inspiration, Ventral respiratory group handles Expiration;
    - DIVE into water and can't breath (remember this to link to breathing)
  - APNEUstic center → Used for deep and prolonged inspiratory gasp → Get a NEU AP on phone and have excited inspiratory gasp
o In the pons, since you can pawn an iphone

Pathology

o Inactivating BMPR2 gene mutation causes primary pulmonary hypertension
  ■ Big Money Players Respire 2 much and get pulmonary hypertension; “primary” because they demand the prime in everything (cars, clothing, jewelery, etc.)

o Embolus types → An embolus moves like a FAT BAT → Fat, Air, Thrombus, Bacteria, Amniotic fluid, Tumor

o Deep venous thrombosus
  ■ Homan’s sign → Sign of DVT → Dorsiflexion of the foot causes tenderness in the calf muscle
  ○ Hoe-man’s sign → Hoe man is always getting his dick sucked so much he gets DVT from the stasis of sitting there

o Obstructive lung disease
  ■ chronic Bronchitis → Blue Bloater
  ■ Emphysema → Pink puffer

o Tension vs. Spontaneous pneumothorax
  ■ Tension → One way valve into pleura creates TENSION or pressure on that side causing the mediastinum to shift to the contralateral side of the pneumothorax
  ■ Spontaneous → The opposite; do not have this pressure effect, so the mediastinum shifts to the ipsilateral side in order to fill in the vacant space

o Carcinoid Syndrome (I want to “B-FDR”) → Also in GI section, but just a reminder
  ■ Bronchospasm
  ■ Flushing
  ■ Diarrhea
  ■ R sided heart probs

  ■ Wind = pneumonia, aspiration, PE (atelectasis is NOT a cause of
post-op fever despite popular belief)

- Water = UTI from Foley
- Wound = infection
- Walking = DVT
- “Wein” = thrombophlebitis from infected IV line
- Wonder = abx

- Pneumoconioses
  - Asbestosis affects lower lobes, other pneumoconioses (coal miner’s lung, silicosis) affect upper lobes → Asbestos body looks like dumbell, so it is so heavy it falls to the lower lobe
  - Silicosis → Eggshell calcification of hilar nodes → Eggshell surface feels silicy
  - Coal miner’s causes Caplan’s syndrome (combination of rheumatoid arthritis and pneumoconiosis)

- Lung cancer
  - SPHERE of lung cancer complications
    - S → Superior vena cava syndrome
    - P → Pancoast’s tumor
    - H → Horner’s syndrome
    - E → Endocrine (paraneoplastic, such as Lambert-Eaton, etc.)
    - R → Recurrent laryngeal symptoms (hoarseness)
    - E → Effusions (pleural, pericardial)
  - Squamous Cell Carcinoma → Squamous, Sentral, Smoking
  - Atypical pneumonia (“walking” aka interstitial pneumonia) - where CXR looks worse than sx (CALMeR than other pneumonias)
    - Chlamydia pneumo
    - Adenovirus
    - Legionella pneumo
    - Mycoplasma pneumo
    - RSV

- Pharmacology
  - Anti-Histamines
    - 1st gen → Diphenhydramine, chlorpheniramine → Have greater side efx of sedation, anti-muscarinic → They have suffix -mine b/c they’re selfish and don’t give a fuck about their side efx
      - Alternatively, they end in a phonetic “mean” because they have mean side effects
      - Exception to rule → Dimenhydrinate → Still has “mean” hidden in there
    - 2nd gen → Loratadine, fexofenadine, desloratadine → Used for allergy and are less sedating - they have the suffix -dine b/c they can be used to tx an allergic rxn to food while you dine, and they are nicer so they take you out to dinner
- **Exception to rule → Cetirizine → Dine while reading a magazine**

**Asthma drugs**
- **Prophylaxis**: Cromolyn
- **Acute**: Albuterol (or Agonists of beta)
- **Chronic**: Corticosteroids
- **Zafirlukast, montelukast**
  - **Luk → Leukotriene blockers**
  - **Kast → Last → Last** step in leukotriene pathway; that is, leukotriene actually binding to receptor
  - **Monte → Approved for as young as 1 year, must be like 5 to use zafir → Think of Montey character from Tiny Tunes show, which was for young kids (and he was a kid)**

**Expectorants**
- **GUAifenesin → An expectorant, removes excess sputum → Nasty sputum is like bat GUAno; this drug removes it**
- **BOSentan → Treats pulmonary hypertension by competitively antagonizing ENDOthelin-1 receptor → The BOSS keeps his employees in line by making sure they don’t smoke ENDO (slang for marijuana)**
What to sip while smokin’ endo

![Bar chart showing drink preferences](chart.png)