

# T's COMPLIED NDBE QUESTIONS 2013-2015

LALALA/V/T Aug 2015 = purple

## FUNGI

1. Organisms that exhibit dimorphism and grow on Sabouraud's medium (low pH): **Fungi**
2. Type of agar used for most fungi? **Sabouraud agar**
3. Organism that causes athlete's foot (tinea pedis) → **Trichophyton**
4. Which fungal infection leads to superficial skin disease? **Trichophyton**  
-Epidermophyton & Microsporum cause dermatophytosis. Tx w/ Griseofulvin
5. Which fungus causes cerebral/brain infarct?
  - a. Cryptococcus → may spread into the meninges and cause Cryptococcal Meningitis
  - b. Aspergillus → causes aspergilloma "fungus ball" in the lungs causing pulmonary infection in ppl with AIDS or have undergone organ transplant
  - c. **Mucormycosis** → Pt's w/ diabetic ketoacidosis, burns, or leukemia are particularly susceptible. It results in black, dead tissue in the nasal cavity and blocks the blood supply to the brain.  
-Mucormycosis is found in blood vessels (endothelium) & is often related to diabetic pts
6. Aflatoxin is what produced by what fungus? **Aspergillus**
7. Cell immunity is most important for? **Intracellular parasite**
8. Which one can be seen as an intracellular organism? **Histoplasmosis**  
-In infected tissues, yeast cells of Histoplasmosis are found within macrophages.
9. Disseminated fungi? **Histoplasmosis**  
**Yeast in macropages, bird-bat drooping, via respiratory droplets different than the rest of them**
10. Which pathogen causes granulomatous lesion in lung resembling TB, similar symptoms? **Histoplasmosis**
11. What doesn't give you granulomas? → **Gonorrhea**  
-Histoplasmosis, M tuberculosis and tertiary syphilis are granulomatous (immune system walls off)
12. What does not cause a mucosal or epidermal rash? **Histoplasmosis**
13. Avian/bird related fungi → **Histoplasma capsulatum**
14. Most common cause of fungal meningitis? **D. Cryptococcosis**
15. What is dimorphism in fungus? **Mycelium (mold) or as yeast**
16. Which fungus are dimorphic?
  - i. Histoplasma capsulatum
  - ii. Blastomyces dermatitidis
  - iii. Coccidioides immitis
  - iv. Sporothrix shenckii
  - v. Candida Albicans
17. Fungal Organisms NOT found in the soil (**know that Aspergillus, Blastomycosis, Histoplasma, Coccidioides, and Cryptococcus neoformans are in soil**)

## BACTERIA

18. Pt has swelling of submandibular, tenderness. Pt is alcoholic. Radiographic-mass radiopaque (sialolith)-circumscribed, 1 cm x 1 cm, what is the reason for swelling? **Bacterial infection**
19. Best method for bacteria to replicate & transfer most genetic information? **Conjugation**  
-Transformation = bacteria takes up extracellular donor DNA  
-Transduction = donor DNA packed into virus (bacteriophage) that infects the bacteria (1 step)  
-Conjugation = plasmid DNA transfer
20. Action of the pilli in organisms pathogenicity → Attachment & adherence to host cells
21. Difference between staph and strep? **Catalase enzyme**  
**Staph has catalase which gets ride of h2O2**

22. Lancefield grouping is a serotype classification (that is, describing specific carbohydrates present on the bacterial cell wall)  
Lancefield is determined by C-carb composition of cell wall
23. Streptomycin inhibits **protein production** (translation)
24. What aspect of Staph is responsible for food poisoning → **Enterotoxin**
25. MOA of Staph aureus for drug resistance → produces enzyme that breaks down penicillin, beta lactamase
26. What bacteria causes endocarditis in IV drug user? **Staph Aureus**
27. Most common type of endocarditis → **Streptococcus Viridian** (α-hemolytic strep)  
Acute → Staph Subacute which is more common is Viridans
28. Which of the following disease has Janeway lesions? **Infective Endocarditis**
29. Which toxin produces scarlet fever → **Erythrotoxin** (erythrogenic exotoxin)
30. Rash for Scarlett Fever → **Erythrogenic Toxin of Group A Beta Hemolytic S. pyogenes**
31. Strep mutans produces dextran, which is glucose linked in alpha 1,6 linkage
32. What enzyme do oral bacteria use to create dextran & participates in bacterial aggregation on teeth?  
**Glucosyltransferase**
33. What enzyme primarily breaks down sucrose? **Glucosyltransferase** (dextran sucrose)
34. Streptococcus breaks down sucrose into what products? **Glucose + Fructose**  
-Glucans → Dextrans + Mutans + Levans
35. Dextrans for polymers of? **Glucose**  
-Dextrans + Mutans are polymers of glucose, Levans are polymers of fructose
36. How is glucose and fructose associated with caries? **Dextrans and levans**
37. Which of the following is not an oral bacterium & not found in dental plaque? **Strep pyogenes**
38. Which of the following does NOT cause pneumonia:  
a. **Strep mutans**  
b. H influenza  
c. S pneumoniae
39. Most common bacteria on the dorsum of the tongue → **S. salivarius**
40. Lipid A with a polysaccharide core is in which organism? **Gram negative bacteria**
41. Gram negative bacteria have **lipopolysaccharides (LPS)**. Gram positive bacteria have **teichoic acids**.
42. N-Muramic acid is part of → **Bacterial Cell Wall**  
-It occurs naturally as N-acetylmuramic acid in peptidoglycan  
-Function is a structural component of bacterial cell walls. Chlamydia has none.
43. Glycan binds what in bacterial cell wall → **D-alanine**
44. **Rickettsia** is a **Typhus**
45. **Rickettsia** diseases are destructive for/target? **Endothelial cells** of capillaries  
-Rickettsia are small, gram (-), aerobic coccobacillary bacteria
46. Which one needs arthropods vector (insects) or fleas? **Rickettsia except Cox Burn**
47. Weil Felix test is used for? **Test for Rickettsia infections**
48. Which is not from an insect/flea bite? **Q Fever Cox Burn**
49. Etiology of Q fever = **Coxiella burnetii** (can be in salivary gland) also CMV can be in salivary gland as well
50. The toxin of the gas gangrene organism has what kind of the enzymatic activity? (*C. perfringens*) **Lipase**  
lecithinase
51. **Clostridium Tetani** are all the following EXCEPT...  
I. Gram-Positive  
II. Anaerobic  
III. Spores  
IV. Rod-shaped
52. Mechanism of action of the tetanus toxin? **inhibition of neurotransmitter release** (prevent release of **GABA** and Glycine)
53. Over-treating with antibiotics, *C. difficile*, would show? **Pseudomembranous Colitis** (?)  
-*Clostridium difficile* causes diarrhea & intestinal colitis. CLINDAMYCIN

54. Spore-forming bacteria → **Clostridium & bacillus**
55. What ion is related to spores? **Calcium dipicolinic** (heat resistance of the endospore)
56. Mycobacterium Tuberculosis has **mycolic acid that block antibiotics from penetrating.**
57. Legionnaires pneumophila is mainly found in **air-conditioning systems.** (prefer aerosolized water)
58. An infection of the epithelial cells of the eye that can sometimes enter back into the nasopharynx? **TRACHOMA** due to Chlamydia trachomatis
59. Blindness results from --> **Chlamydia trachomatis (trachoma and adult inclusion conjunctivitis)**
60. Most common cause of non-gonococcal urethritis → **Chlamydia**
61. **Bacillary dysentery (Shigellosis) is caused by Shigella.**
62. Which produces these toxins: protective antigen (PA), edema factor (EF), and lethal factor (LF)? **Bacillus anthracis** (causes anthrax) →
63. Treponema pallidum bacteria (causes syphilis)? **Dark field microscopy**  
-Syphilis causes oral hard chancre, not painful, use Wassermann test
64. **Hutchinson's teeth** is a sign of congenital syphilis infection
65. What protozoa are spread in cat feces? **Toxoplasma gondii**

## VIRUS

66. How is Arbovirus transmitted? **Arthropods**  
-acronym: **ARthropod-BORne** virus
67. Which virus doesn't have latent phase? **Rhinovirus & Poliovirus**  
-these DO establish a latent infection → EBV, HVS-1 & 2, VZV, CMV (all herpesvirus) **HEH CV**
68. Herpes virus is the only virus that gets its cell wall from? **Host Nuclear Membrane**  
-Herpes Virus → dsDNA, enveloped, nuclear membrane, icosahedral nucleocapsid, establishes latent infection
69. Cytomegalovirus are associated with **salivary glands (TORCHES)**
70. EBV and Varicella Zoster are members of? **Herpesviridae**  
-EBV can cause Burkitt's lymphoma, nasopharyngeal carcinoma, B-cell lymphoma, hairy leukoplakia, infectious mononucleosis
71. What happens with primary exposure to HSV1? **Primary Herpetic Gingivostomatitis**
72. **What virus cause chicken pox? varicella zoster virus (VZV)**
73. Epstein Barr Virus is related to → **Burkitt's Lymphoma**
74. What causes influenza to change year to year? **Antigenic Capsule** (gene reassortment)  
-Influenza Virus is an orthomyxovirus w/ outer envelope has spikes (H & N) for attachment to host cells. Tx w/ Amantadine → inhibits viral attachment and uncoating.  
-The main mode of prevention is the vaccine, which consists of killed influenza A and B virus.
75. What are the virulence factors of Neisseria meningitis? **Endotoxin LPS** (gram negative) **WATERHOUSE FRIDERISCHEN SYNDROME**
76. Which is not associated with N. meningitis? **Enterovirus** (ex. Picornavirus)
77. What disease causing agents have a polysaccharide capsule? **H. influenza, Streptococcus, c neoforman**  
Even Some Super Killers Have Pretty Nice Capsules  
E. coli  
S. pneumonia  
Salmonella  
K. pneumonia  
H influenza  
P. aeruginosa  
N. meningitis  
C neoformans
78. **Rubella** can be transferred from mother to fetus & is associated with congenital abnormalities  
-Teratogen: **TORCHES** (toxoplasmosis, rubella, CMV, Herpes simplex, Syphilis)
79. Measles (Rubeola) & mumps belong to which group of virus? **Paramyxoviruses**  
-Mump cause parotitis & sometimes in adults, **orchitis** (inflammation of testes)

- 80. Koplik's Spots → **Measles** (ssRNA paramyxovirus, transmitted by respiratory droplet)
- 81. Hepatitis B virion: "Dane particle"
- 82. What has the longest incubation period? **Hepatitis B**
- 83. Hepatitis C Virus is an **RNA virus & is blood-borne**. (ssRNA, flavivirus)
- 84. What version of hepatitis is chronic? **Hepatitis C**

## DRUGS

- 85. Penicillin resistance comes from bacteria that contain what enzyme? **Beta-lactamase**
- 86. MOA of amoxicillin? **Disrupts cell wall & inhibits cross-linking between peptidoglycan chains for gram (+)/(-)**
- 87. Why doesn't Amphotericin B work against bacteria? **Ergosterol** (fungi have in cell wall, bacteria don't)
- 88. Polyene anti-fungal are specific to fungus b/c **it attacks the sterol that are present in fungi but not bacteria**
- 89. Aminoglycosides → **Binds to 30s ribosome & inhibits mRNA translation** (protein synthesis, bactericidal)
- 90. What don't you treat patients with penicillin & erythromycin? **Penicillin only works on growing cells**
- 91. Which one is the mechanism of action of Fluorouracil? → **Suicide inhibitor of thymidylate synthase**  
-Fluorouracil is a pyrimidine analog, anti-neoplastic, interferes w/ DNA synthesis by blocking thymidylate synthetase conversion of deoxyuridylic acid to thymidylic acid.
- 92. Naproxen (Aleve) is a reversible non-selective **COX inhibitor** that is more potent than aspirin.
- 93. What medication blocks prostaglandins? **Aspirin**  
-Aspirin irreversibly inhibits cyclooxygenase (COX 1 & 2) to decrease formation of precursor for Thromboxane A2 (a platelet aggregator that is released by blood platelets) & prostaglandins
- 94. Lab test for warfarin? **Prothrombin test** (increases)  
- Warfarin = anticoagulant, inhibits vitamin K reductase → affecting extrinsic pathways & prothrombin conversion so ↑ Prothrombin Time (normal PPT & bleeding time) HAEMOPHILA HAS INCREASED PPT
- 95. Sulfonamides compete with which molecule in their mechanism of action → **PABA** to **inhibit folic acid synthesis**  
**Therefore cannot make purines or pyrimidines**
- 96. Sulfonamides block dihydrofolate & block what? **Purine & pyrimidines synthesis**
- 97. Detergent kills bacteria by interfering with the function of **cell membrane**. (destroy fatty cell parts)
- 98. MOA of **digoxin** is inhibition of Na/K ATPase that causes an increase in intracellular Na levels
- 99. What medication is a DNA gyrase inhibitor? **Ciprofloxacin**  
- Fluoroquinolone, end in -oxacins
- 100. MOA of clindamycin? **Inhibits 50s ribosome**
- 101. Main side effect of clindamycin = **pseudomembranous colitis** (diarrhea)
- 102. **Rifampin works as a RNA Synthesis Inhibitor TX OF TB!!!!**  
- inhibits DNA-dependent **RNA-Polymerase**, which stops mRNA transcription
- 103. What is the most common bacteria vaccine given in the US? **DTP (diphtheria, tetanus, and pertussis)**
- 104. Bordetella pertussis (whooping cough) vaccine is? **Killed vaccine**
- 105. Live attenuated vaccine (ex. Polio sabin vaccine) is an **active immunity**  
- **Polio vaccines**: sabin (oral/attenuated/ alive) vs salk (injection of killed bacteria)
- 106. Antibiotic used for meningitis caused by Haemophilus influenza → Ceftriaxone
- 107. MOA of Viagra: Inhibits cGMP-specific phosphodiesterase type 5 (PDE-5), which regulates blood flow into the penis
- 108. All will depress respiration, EXCEPT?  
a. General Anesthesia  
b. Nitrous Oxide  
c. **Cocaine**

## SALIVA

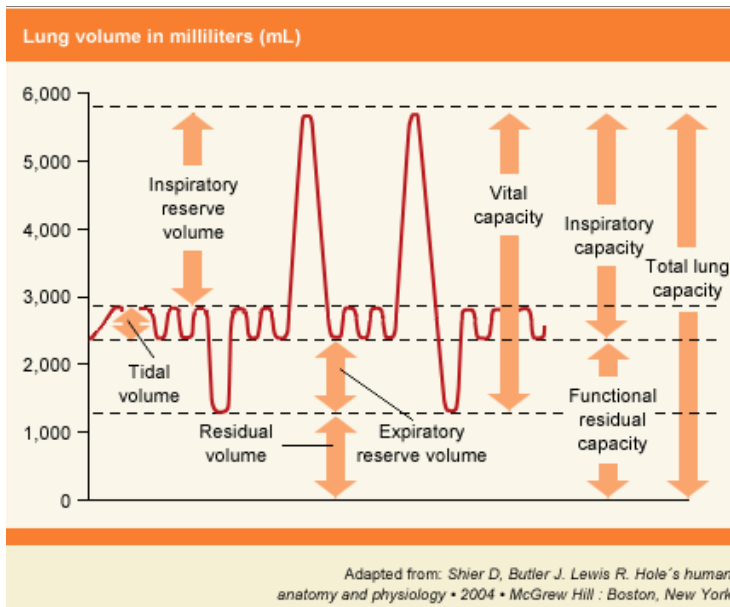
- 109. Why is saliva hypotonic? **Salivary duct cells reabsorb Na+ & Cl- in exchange for K+ and HCO3-**  
- Saliva is hyposmolar b/c **reabsorption of water by striated duct cells is less than reabsorption of Na+**
- 110. What nerve innervates the salivary glands of the palate? **CN 7**
- 111. Which salivary glands are only mucus secreting? **Palatine salivary gland** (in the submucosa)

- Only serous glands: Von Ebner's & parotid gland
- 112. How would the parotid differ from sublingual (staining/histology) or mucous/serous gland: Parotid = serous, more eosinophilic while sublingual = pale-stain due to mucus, bubbly appearance (**foamy dark nuclei**)
- 113. Serous demilunes are in which gland? **Sublingual gland**
  - Serous demilunes are the serous cells at the distal end of mucous tubuloalveolar secretory unit of sublingual salivary glands. They secrete the proteins that contain lysozyme, which degrades the bacteria cell walls.
- 114. What type of cells make up the demilunes of mucous something of sublingual glands? **Serous cells**
- 115. What is not derived from Neural Crest? **Salivary glands & enamel**
- 116. Epithelium of striated ducts of salivary ducts? **simple COLUMNAR epithelium**
- 117. What parotid salivary glands resemble pancreatic ductal cells? **Serous gland & Intercalated ducts**
- 118. Which salivary gland cell is more like proximal convoluted tubule in the kidney? **Striated Duct cell**
- 119. What is in the Parotid gland? **FEAR**
  - FEAR: Facial N. External Carotid A. Auriculotemporal N. Retromandibular V**
- 120. Parotid gland duct (Stenson's duct) pierces the buccinator muscle & is located near **maxillary 1<sup>st</sup> molar**
- 121. All of the primary ions are in saliva except? **Calcium**

## SUGAR & INSULIN

- 122. What hormone stores glucose in adipose tissue? **Insulin**
- 123. Decreased insulin will result in **increased gluconeogenesis**
- 124. What is phosphorylated in an insulin receptor? **tyrosine**
- 125. What needs a protein transporter to cross the cell membrane? **Glucose** via GLUT 4  
FAC BIDIRECTIONAL TRANSPORTION
- 126. Glucagon signals through? **cAMP** (intercellular 2<sup>nd</sup> messenger)
  - Glucagon receptor is a 7-transmembrane receptor coupled to a G-protein + cAMP
- 127. What is intracellular element of glucagon?
  - a. **cAMP**
  - b. AMP
  - c. ATP
  - d. ADP
- 128. Glucagon & Epinephrine both/have in common? **Glycogenolysis + GLUCEONEOGENESIS**
- 129. Oxidative phosphorylation occurs in what enzyme? **Pyruvate dehydrogenase**
- 130. What enzyme is used for decarboxylation? **pyruvate decarboxylase**
- 131. Rate limiting enzyme for glycolysis? **Phosphofructokinase (PFK)**
- 132. **Glucose-6-phosphate (G6P)** is not found in the muscles
- 133. Glucose is sequestered by which enzyme → **Hexokinase**
- 134. What is NOT true regarding hexokinase & glucokinase? **They have same Km** (glucokinase is higher, more affinity).
  - Glucokinase is a isoform of hexokinase found only in the liver & only uses substrate glucose
- 135. UTP-Glucose reacts with which of the following in glycogen synthesis? **Glucose-1-Phosphate (G1P)**
- 136. What steps restores oxaloacetate in TCA? **Malate, malate dehydrogenase**
- 137. What enzymes produce oxaloacetate? **Pyruvate Carboxylase** (pyruvate → oxaloacetate)
- 138. What is the main source of Glycerol? **Glucose/pyruvate**
- 139. Where is phosphoenolpyruvate found? **Liver**

## LUNGS & BLOOD

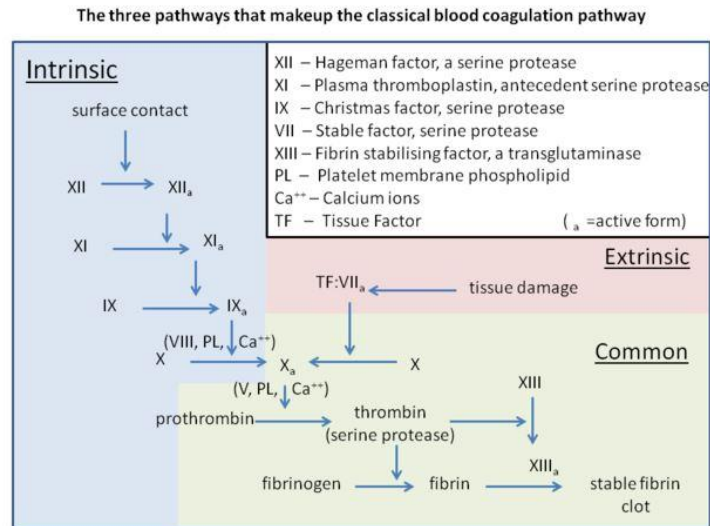


**TV** = air inspired during normal, relaxed breathing  
**IRV** = additional air that can forcible inhaled after TV  
**ERV** = additional air that can be forcible exhaled  
**RV** = air remaining after max exhalation  
**TLC** = max air in a lung, IRV + TV + ERV + RV  
**IC** = max air inspired, IRV + TV  
**FRC** = air remaining in lungs, ERV + RV  
**VC** = IRV + ERC + TV

140. Tidal volume = normal volume of air displaced between normal inhalation & exhalation when no extra effort is applied (500 mg)
141. **Vital capacity = IRV + ERV + TV**
142. Residual volume = air remaining after max exhalation
143. Pressure on a mountain is 250 mm Hg, what is the partial pressure of oxygen? **50 mm Hg**  
 -Oxygen = 20%, Nitrogen = 80% so  $250 \times 0.2 = 50$  mm Hg
144. Epithelium of respiratory tract – pseudostratified ciliated columnar epithelium with goblet cells
145. **Stretch receptors (Hering-Breuer reflex) of the lung is carried by vagus nerve (CN 10) to prevent over-inflation**
146. What produces mucous in lungs → **Clara Cells** (nonciliated bronchiolar secretory cells that make GAGs to protect the bronchiole lining)
147. Obstructive lung disease → **Compliance goes UP**  
 -**Obstructive Lung Disease** is characterized by increased resistance to airflow (lower than normal expiratory flow rates) and high lung volumes. Decreased elasticity, Increases compliance.  
 Examples: Chronic bronchitis, emphysema, asthma  
 -**Restrictive Lung Disease** is characterized by low lung volumes and Slightly Higher than Normal Expiratory Flow Rate (increased lung elasticity). Decreased compliance.  
 Examples are Interstitial Fibrosis (**lung hardening**), Asbestosis, and Tuberculosis
148. In which can we see more squamous epithelial metaplasia? **Bronchus**  
**Another source said ESOPHAGOUS**
149. Which organ most likely to undergo red infarction? **Lung**  
 -White infract affect solid organs (ex. spleen, heart, and kidney) while red infraction (hemorrhagic infarct) affects lungs & other loose organs like testis, ovary, SI due to loose tissues that allow RBC to collect in the infarcted zone.
150. Emphysema can lead to → **respiratory acidosis**
151. **Hyperventation can cause alkalosis**
152. Metabolic acidosis → hyperventilation  
**RUB MUB - Respiratory Uses Bicarb, Metabolic Uses Breathing**
153. After metabolic or respiratory acidosis, which abnormality of electrolytes is more likely? **Hyperkalemia**
154. When is intrapleural pressure the most negative? **End of expiration**
155. When is alveoli pressure the most negative? **Beginning of inhalation**
156. What kind of epithelium is found in the nasopharynx region? **Ciliated Pseudostratified Columnar Epithelium**
157. Infant has trouble breathing, what cells are causing problems? **Type 2 Pnuemocytes**



158. What describes oxygen transport? **Bohr effect**
159. What is true about myoglobin? **Graph is hyperbolic** (hemoglobin = sigmoidal)
160. Carotid body measure **partial pressure of O<sub>2</sub>**
161. Carbon monoxide (CO) decreases O<sub>2</sub> content but PO<sub>2</sub> is normal
162. Patient is on nitrous, best way to measure efficiency? **Reserve minute volume**
163. Mineral for coagulation? **Zinc & Ca<sup>+</sup>**
164. What carries iron in the plasma → **Transferrin**
165. Prothrombin acts with which one to form thrombin? **Ca<sup>2+</sup>**  
 -Prothrombin + Ca<sup>+</sup>/PL/Factor 10a → thrombin (liver)



166. What is the substrate of thrombin? **Fibrinogen**
167. If we put RBC in hypotonic solution → **Hemolysis**
168. Blood type: Anti-A & anti-B both agglutinate. What blood type is it? **AB**
169. Which one of these helps in the retraction of blood clots → **Factor XIII**
170. Boy bleeds during extraction, his maternal uncle & male cousin have same problem. What factor is involved?  
**Factor VIII (Hemophilia A & sex-linked)**  
 -Hemophilia B (Christmas disease) is due to a Factor 9 deficiency, Hemophilia C is NOT sex linked and is due to a Factor 11 deficiency  
 -characterized by having Prolong Partial Thromboplastin Time (PTT) and Normal PT/bleeding time

## RANDOM & ENZYMES & AA

171. Know Cytochrome P450. Choose exception  
 - Present in all tissues of the body & help w/ hormone synthesis/breakdown, cholesterol synthesis, Vit D metabolism  
 - Metabolize toxic compounds, mostly in liver
172. Enzyme: Competitive Inhibitor → **Increase Km & Vmax Remains the Same**  
 -Noncompetitive Inhibitors → Km stays the same and Vmax is reduced
173. In cells, N-glycosylation occurs in where? **Rough endoplasmic reticulum** (in all cells)  
 -N-glycosylation is the attachment of sugar glycan to nitrogen (ex. amide of asparagine)
174. Pyrimidine synthesis begins with what? **Ribose 5 - phosphate**  
 -R5P = Result of pentose phosphate pathway, makes ribose for nucleotide synthesis & NADP for fatty acid/steroid
175. What process makes NADPH? **Pentose Phosphate Shunt**
176. Primary molecule for reduction biosynthesis? **NADPH**
177. Purine metabolism intermediate and precursor of adenosine and guanine → **IMP** (inosine monophosphate)
178. When taking away phosphate group from (named a nucleotide)? → **Nucleoside**
179. What's the difference between thymidine & uracil? **Methyl group** on thymine

180. **Phosphodiester bonds** – connect DNA | **bone** – connects 2 amino acids
181. What's a small molecule that can't elicit immune response on its own? **Hapten**  
-Haptens are antigenic determinants, but are too small to elicit the formation of antibodies by themselves. They can elicit immune response when attached to bigger molecules.
182. What elicits an immune response when bound to carrier protein? **Hapten**
183. **Alpha helix & beta sheets form (2ndary protein structure) via hydrogen bonds**
184. What is the main AA in the tertiary structure of protein? **Cysteine** (disulfide bonds)
185. What kind of force holds proteins in the lipid bilayer? **Hydrophobic Interaction**
186. tRNA wobble is in the 3<sup>rd</sup> position of the codon
187. **Which one plays an important role in detecting the starting codon (initiation) for RNA transcription? Sigma Part**
188. **What determines protein turnover? H-bonds & peptide bonds: breakdown & synthesis of proteins**
189. Product of enzyme isocitrate dehydrogenase in TCA cycle? **Alpha-ketoglutarate**
190. In the amino acid metabolism, what are the 2 primary acceptors of amine groups? **OAA & alpha-ketoglutarate**
191. **Phenylketonuria is a deficiency of phenylalanine hydroxylase (PAH)**  
-Phenylalanine hydroxylase is responsible for the conversion of phenylalanine AA to another amino acid, tyrosine.
192. What amino acid is associated with taste sensation of umami? **L-glutamate**
193. What is the charge of glutamic acid @ pH = 1? **+2**
194. What are the ketogenic amino acids? **Leucine & Lysine**  
-Ketogenic AA can be degraded directly into acetyl CoA, which is a precursor for ketone bodies
195. Nissl body is **rough ER**
196. What residues are phosphorylated to activate/deactivate an enzyme (like glycogen synthase or glycogen phosphorylase)? **Serine**
197. If patient is on a low carb diet, he/she wants low levels of? Reduce production of insulin with low level of **Malonyl CoA**
198. **Apoptosis? Hormone dependent physiologic involution**

## IMMUNE SYSTEM

199. Alternative complement pathway starts with → **C5** (C5a = **Chemoattractant**)
200. **Interferon gamma (IF-γ) receptor complex produces dimerization of chains → secreted by T cells, anti-viral/tumor, part of Class II interferons**
201. **Cytotoxic T cells recognize? MHC I**
202. T-cell receptors (TCR) are similar to which one? **Fab**
203. Which of the following is for a delayed hypersensitivity/latent infection? **T cells & macrophage, lymphocytes**
204. Similarity between Type I & Type II hypersensitivity: **both require previous sensitization**
205. Where does the antigen for MHC I come from? **Virus & infected cells**
206. Which of the following is used to phagocytize bacteria? **Gamma Fc receptor + C3b**
207. The predominant cell in acute inflammatory response & in abscesses? **PMN**
208. **What causes pus? neutrophils**
209. What secretes TNF-Alpha & IL-1? **Activated macrophages**
210. **Which WBC is most abundant? neutrophils**
211. **Which type of WBC shows the lowest in blood? Basophils**  
-**Never Let Monkeys Eat Bananas** (Neutrophil, Lymphocyte, Monocyte, Eosinophil, Basophil)

## NERVES

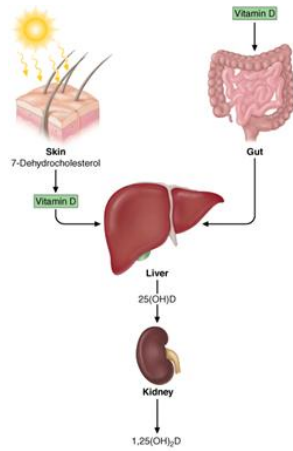
212. Postural Reflex → **Stretch Reflex**



213. Spasticity is defined as **Hyper-Responsive Stretch Reflex**  
 -Spasticity is a hypertonus state of the affected muscles due to a releases of the tonic inhibition of the brainstem, facilitatory info which leads to gamma motor neuron excitation. Thus, hyperactivity of the gamma fibers
214. Where does this arise in the spinal cord: sympathetic preganglionic cervical ganglion (SCG)? **T1-T8**
215. Where are the cell bodies of the preganglionic sympathetic nerves that innervate the head → **Intermediolateral horn of spine (T1-L2)**
216. Norepinephrine is a **post-synaptic sympathetic NT**.
217. What neurotransmitter is found in nerves that transfer pain? **Substance P**
218. **Endomysium** (areolar CT around each muscle FIBER)/**endoneurium** (CT around myelin sheath/neuron axon)
219. CNS myelin sheath formed by **oligodendrocytes**. PNS myelin formed by Schwann cells
220. An impulse can travel from one nerve to another in one direction because the synapse limits the direction of travel.
221. **Absolute refractory period is by NA channel inactivation**
222. What solute affects membrane resting potential? **K+**
223. Na<sup>+</sup> - K<sup>+</sup> pump is an example of what type of transport? **Active transport**
224. Resting potential is -70 mV & extracellular K<sup>+</sup> increases & comes out of nowhere? **No change**
225. What happens when there is a decrease in extracellular K<sup>+</sup>? **Hyperpolarization**  
 -Low extracellular K = hyperpolarization | high extracellular K = depolarization

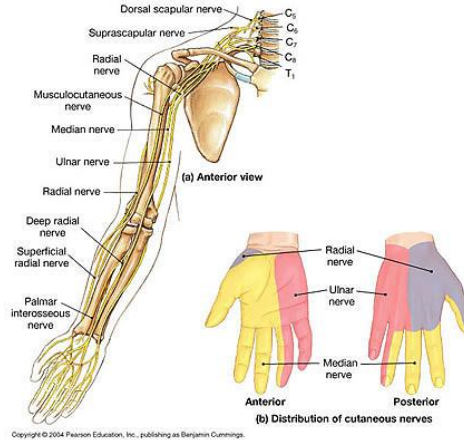
## COLLAGEN & BONES

226. Vitamin C → **Hydroxylation** (of proline & lysine during collagen synthesis)
227. In collagen synthesis, what part happens outside the cell? → **lysyl oxidase (LOX)** for cross-linking collagen
228. Lysyl oxidase – **Cu** is needed (cofactor)
229. What the 3<sup>rd</sup> AA sequence in collagen? **Glycine** – proline – lysine (Glycine-Proline-X or Glycine-X-Hydroxyproline)
230. What amino acids other than glycine is found in collagen? **Proline & Lysine**  
 -Lysine is involved in crosslinking
231. What is present in collagen, that isn't in elastin? Hydroxylysine  
 -tropocollagen is only found in collagen & reticular fibers, also has hydroxyproline & hydroxylysine.  
 -Elastin has glycine, alanine, proline, & hydroxyproline. It also has tropoelastin.
232. What is NOT needed for synthesis for collagen? **Vitamin K or Folic Acid**
233. What is responsible for calcium regulation? **Parathyroid hormone** (Increase Serum Calcium)
234. Main role of calcitonin? **Bone resorption**
235. Osteoclasts → **monocytes**
236. What is not in periosteum? **Osteocytes**
237. What cytokines are found in Osteoclastic Bone? **IL-1, IL-6, PGE2, TNF-alpha, MMPs**
238. What are housed in Howship's Lacunae? **Osteoclasts**  
 -Howship's lacuna = groove/cavity usually containing osteoclasts that occurs in bone which is undergoing reabsorption)  
 -Trabecular bone is 1<sup>st</sup> resorbed by osteoclasts, creating a shallow resorption pit (Howship's lacuna). Then, osteoclast deposit compact bone in the pit.
239. **Endosteum: thin layer of CT that line the surface of bony tissue that form the medullary cavity of long bones**
240. What type of bone do you see after 2-3 years at the site of injury? **Compact bone**
241. Which of the following is not found in compact bone? **fibroblast**
242. What is the chemical formula of the most common salt found in the bone? **HA Ca<sub>10</sub>(PO<sub>4</sub>)<sub>6</sub>(OH)<sub>2</sub>**
243. Vitamin D deficiency → **Kids: Rickets, Adult: Osteomalacia**
244. Vitamin D: 25 hydroxycholecalciferol gets converted to 1,25 dihydroxycalciferol where? **Kidney**
245. Where do you get Vitamin D from? Skin, liver, kidney

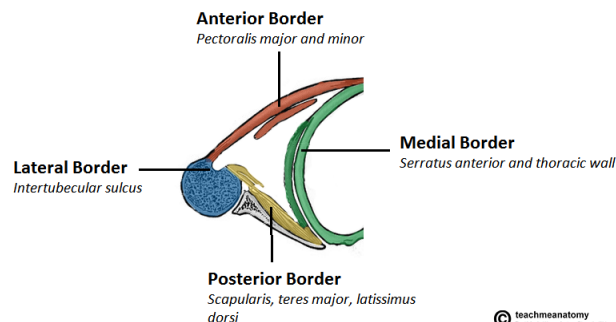


## THE BODY (NERVES & MUSCLES)

246. Innervation of the Thenar muscle (thumb) → **Median Nerve**  
 -Thenar are group of muscles on the palm & at base of the thumb
247. What innervates the anterior wrist? **Median nerve**

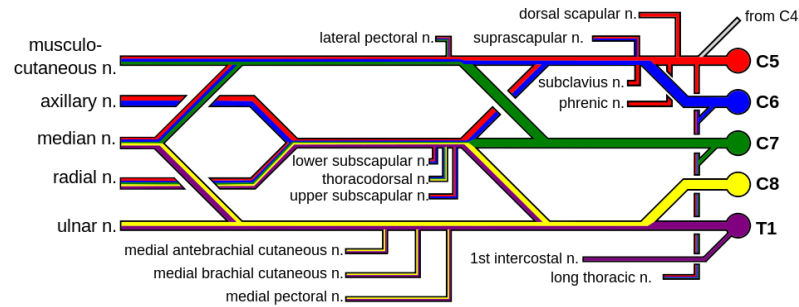


248. What part of the arm is most susceptible to ulnar nerve injury → **Elbow**
249. Which muscle in the arm is innervated by the radial nerve (supplies upper limbs) → **Triceps**
250. What brachial nerve & muscle is for circumduction of the arm? **Axillary** (b/c of **deltoids**)
251. **Supination of the Radio-ulnar joint?** **biceps brachii**
252. What muscle adducts the scapula? **Rhomboids**  
 -Adduct = trapezius & rhomboids (major, minor)  
 -Abduct = serratus anterior, pectoralis
253. Which one does not contributed to the posterior wall of the axilla? **Serratus anterior, Humerus (?)**  
 -Posterior wall = Subscapularis, Teres Major, Latissimus Dorsi, & Scapula

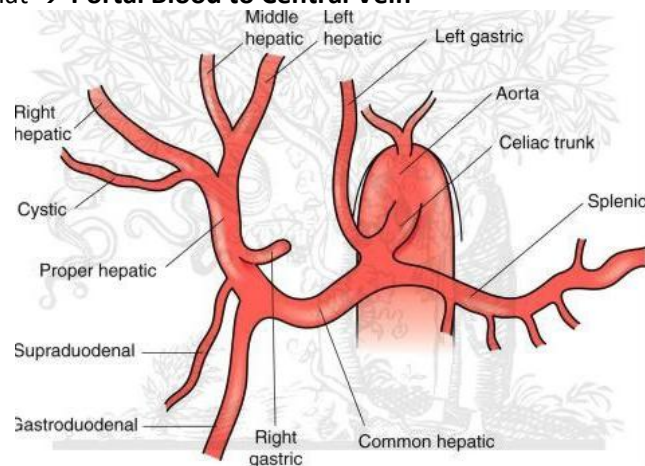


254. Innervation that causes Rotation of the Arm → **C5** (doc says C5-C6)
255. If a person can't flex their wrist, what nerves are involved? **C6-C7 (Ulnar n., Flexor Carpi Ulnaris m)**

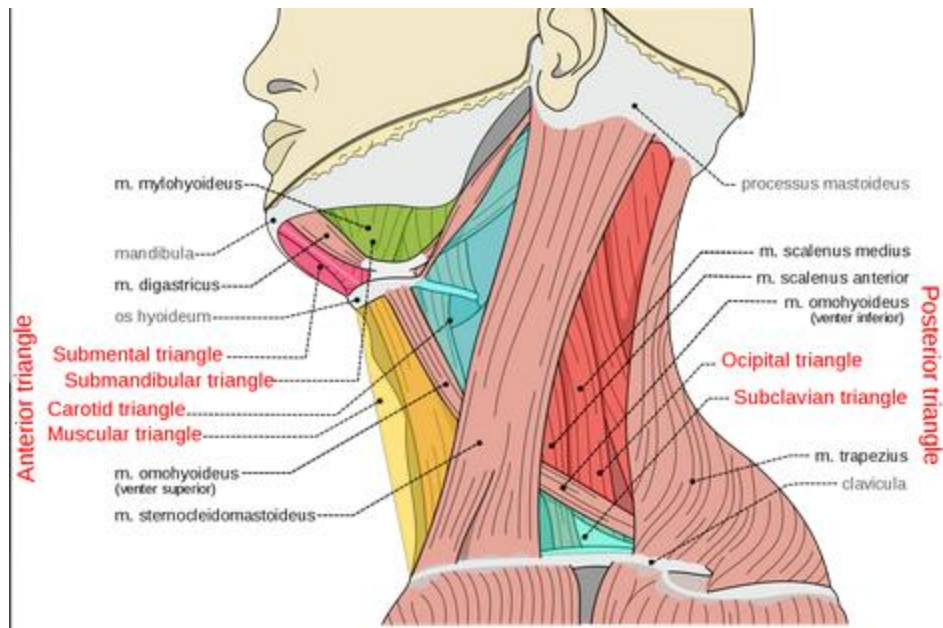
256. What innervates the Brachialis (biceps muscles)? **Musculocutaneous (C5-C7)**
257. What is the most distal portion of the brachial plexus? **Branches** (Musculocutaneous, Axillary, median, radial, ulnar nerve)



258. Axillary sheath surrounds the axillary vein, axillary artery & 3 cords of the brachial plexus → **NOT trunks/roots of brachial plexus**
259. Where do the 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> intercostal veins drain? **Accessory Hemizygous** (formed by the 4<sup>th</sup>-8<sup>th</sup> intercostal veins)
260. Right superior intercostal muscles drain into the right side **azygos vein**
261. Azygous vein leaves impression on right lung
262. What supplies the SA node → **Right coronary Artery**
263. Where is atherosclerosis most common? **Abdominal Aorta**
264. What exits the thorax at T12 → **Descending Aorta**
265. Thoracic duct is behind what? **Esophagus & aorta**
266. Esophagus begins at what level → **Cricoid Cartilage** (at C6), inferior to the cricothyroid
267. What is posterior to the aorta
- Right Kidney**
  - Liver
  - Colon (& pancreas are anterior to the abdominal aorta)
268. What are the visceral arteries of the abdominal/descending aorta? **Celiac trunk & inferior mesenteric**  
-Includes: Celiac trunk, renal & superior/inferior mesenteric (**not inferior phrenic**)
269. Direct branch of the Celiac Trunk? **Splenic Artery** (also Left Gastric and Common Hepatic A)
270. **Hepatic portal vein** contains blood from the? **Superior mesenteric & Splenic Vein**
271. Hepatic Sinusoid drain what → **Portal Blood to Central Vein**

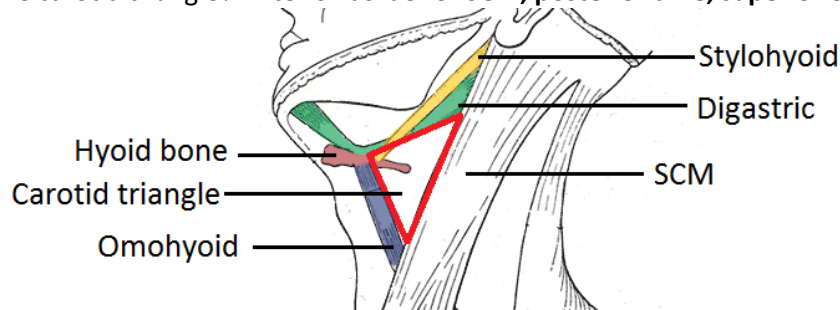


## BODY PART TWO



272. What's not found in epithelium? **Meissner's corpuscle** (fine touch)
273. Meisseiner plexus → only parasympathetic
274. Auerbach's Plexus → **both Parasympathetic and Sympathetic (motor innervation to both layers of tunica muscularis)**
275. Difference between lamina propria & dermis? **Dermis has dense irregular CT**
276. What type of cells are in stratum granulosum layer? **Keratothylain**
277. What is **not** present in an orthokeratinized layer? **Stratum lucidum** (listed all the other stratums)
278. Floor of the mouth is **non-keratinized stratified squamous epithelium**  
-Soft tissue structures that are nonkeratinized? Soft palate, buccal mucosa
279. Epithelium of palate = **keratinized stratified squamous epithelium**  
-hard palate, attached gingiva, dorsum of tongue = keratinized SSE
280. What will cover the hard palate after an ulcer heals? **Parakaratinized Stratum Squamous Epithelium**
281. Most abundant papillae? **Filiform papilla**
282. Taste buds are involved in all papillae except? **Filiform**
283. You only have minor amounts of this taste bud? **Circumvallate papilla**
284. Antibody in mucosal surfaces? **IgA**
285. Tongue moves to the Right → **Right CNXII Damage**  
-Damage/lesion to CN 12 shows deviation towards paralyzed side when protruded b/c of weaker genioglossal muscle.
286. What protrudes the tongue → **genioglossus**
287. What protrudes the mandible? **Lateral pterygoid**
288. What PROTRUDES the hyoid bone → **Geniohyoid** helps move tongue and hyoid anteriorly
289. What narrows the maxillary buccal vestibule when you open your mouth all the way? **Coronoid Process**
290. All of the following elevate the larynx except the **sternothyoid**
291. What creates the Laryngeal Prominence → **Thyroid Cartilage**
292. Most superior part of larynx? **Aryepiglottic fold** (Epiglottis)
293. What muscle constrict to produce sound? **Lateral & transverse cricoarytenoids**
294. What is the only muscle to abduct (contract) the larynx (vocal fold)? **Posterior cricoarytenoid m.**
295. What innervates muscles below the vocal fold & most of the laryngeal muscles → **recurrent laryngeal nerve** (of CN 10)

296. Internal laryngeal nerve innervates **thyrohyoid membrane**
297. What occurs during Tracheostomy? **Reduced Airway Resistance, Reduced Dead Space**
298. Trachea Bifurcation → **Sternal Angle**
299. **Thyroid hormone is stored in the colloid**
300. Where does the INFERIOR thyroid artery come from → **Thyrocervical Trunk**
301. The arteries that supply the thyroid gland are from the **thyrocervical trunk & ECA** (superior thyroid A)
302. **Terminal branches of the external carotid artery? Superficial temporal & maxillary artery**
303. In the carotid triangle, what branch of the ECA wouldn't you see? **Superficial temporal artery**
304. What makes up the carotid triangle? Anterior border of **SCM, posterior dine, superior omohyoid**



305. Submental triangle consist of anterior digastric, hyoid bone & mandible.
306. What structure is posterior to the carotid sheath that runs along the Longus Capitas muscle → **Sympathetic Chain Ganglia**
307. What in the carotid sheath → Common carotid, internal jugular, vagus nerve, **NOT ansa cervicalis or phrenic N**
308. What does the sigmoid sinus drain into? **Internal jugular vein**
309. Where does deep facial vein drain into? **Pterygoid Plexus**  
-Deep facial vein connects the anterior facial vein & the pterygoid plexus
310. What specific organs does the portal vein drain? **Stomach** (Also drains spleen, pancreas, SI, LI)
311. **Which one is not a function of the spleen? Produce plasma cells**
312. The difference between the inferior vena cava & portal veins → **portal contain no valves**
313. Most common cause of portal hypertension → **Liver cirrhosis** (can also lead to esophageal varices)
314. Esophageal varices commonly seen in what? **Alcoholics** or portal hypertension from cirrhosis
315. Esophageal varices can cause **hematemesis** (vomiting blood)
316. Alcoholics & liver cirrhosis → **Mallory bodies** (inclusion found in the cytoplasm of liver cells, damaged intermediate filaments in the hepatocytes, usually found in people w/ alcoholic liver)
317. **Most frequent form of varicosities/varicose veins? Superficial veins in the Legs**
318. Veins → **Thick Tunica Adventitia** | Muscular Arteries → **Thick Tunica Media**
319. Initial venous drainage of the jejunum? **Superior mesenteric vein**

## ADRENAL MEDULLA

320. **Which endocrine gland is not essential for life? Adrenal medulla**
321. What organ is not stimulated by the anterior pituitary? **Adrenal medulla**
322. Which of the following is a cancer of the adrenal medulla? **Pheochromocytoma**  
-Cardinal sign is persistent or episodic hypertension, often benign & results in irregular secretions of epi/norepi
323. Cell producing epinephrine & norepinephrine? **chromaffin cells of adrenal medulla**
324. Which one is the end organ of the sympathetic system? **Adrenal Medulla**
325. Know the function of B1 & B2 receptors.  
-B1 = heart | B2 = dilation, smooth muscle  
-Alpha 1 & 2: nonepinephrine
326. **Cortisol** is produced in zona fasciculata, androgens produced in zona reticularis



## REPRODUCTIVE & DEVELOPMENT

327. Female secreting endometrium – what cycle is she in? **luteal**
328. Which organ DOESN'T make estrogen?
- graafian follicle (after 1<sup>st</sup> meiotic division, 2N haploid stage)
  - corpus luteum → hCG stimulates corpus luteum to secrete estrogen
  - adrenal medulla → the adrenal CORTEX secretes estrogen, the medulla secretes catecholamine**
  - theca interna
329. Which is an intracellular receptor? **Estrogen**  
-Includes steroid, estrogen, progesterone, Vitamin D derivatives
330. Which of the following acts as nuclear receptor? **Vitamin D**  
-Nuclear receptors include endogenous hormones, Vitamin A & D
331. What hormone promotes spermatogenesis → **FSH**  
-FSH promotes follicle development in female & stimulates Sertoli cells to produce androgen-bind protein, which stimulates spermatogenesis.  
-LH promotes testosterone production in males & estrogen production in females).
332. Granulosa cells of females are similar to what cells found in males? **Sertoli Cells**  
-Sertoli cells help with spermatogenesis in the seminiferous tubules, activated by FSH
333. Where is testosterone made? **Leydig cells**
334. Which is not in seminiferous tubules? **Leydig cell** (found adjacent to seminiferous tubules in interstitial tissues, regulated by LH)
335. Sperm stored/mature in **epididymis**
336. What sustains the Corpus Luteum after the 1<sup>st</sup> trimester → **hCG**  
-Human chorionic gonadotropin made by placenta, allows corpus luteum to maintain high progesterone
337. Immunoglobulin transfer from mother to fetus? **IgG via placenta**
338. Cell cycle immediately after fertilization → **Meiosis II**
339. What is not transcriptionally active? **Heterochromatin** (highly condensed, still zipped up in chromosome)
340. What phase is most variable in duration of the cell cycle? **G1**
341. What stage is DNA synthesis in the cell cycle? **S**
342. Histones are synthesized in which phase of the cell cycle → **S phase**
343. Hepatocytes from what embryonic tissue- **endoderm**  
-Endoderm - Gastrointestinal tract, Respiratory tract, Thyroid, Thymus, Endocrine glands and organs, Auditory system, Urinary System, Liver, Pancreas  
-Ectoderm - Epithelium of skin, Nervous tissue  
-Mesoderm - Connective tissue, bone, cartilage, blood cells, all muscles (cardiac, smooth, skeletal), body cavities and some cardiovascular and urinary systems
344. Ureter in kidney = **mesoderm**
345. What are symptoms of Trisomy 21 (Down syndrome)? **Wide neck, Flat nose, Small mouth**
346. Klinefelter syndrome → **47:XXY**
347. Turners syndrome → **45:XO**
348. What is the name of the cellular mass after fertilization but before implantation → **blastula**
349. Which stage of the zygote does implantation on the uterus occur? **Blastocyst**
350. The ligamentum arteriosum is a remnant of what embryological structure? **fetal left ductus arteriosus**  
-Ductus arteriosus connects the pulmonary artery to the descending aorta to bypass the fetal lungs, doesn't disappear immediately after birth
351. What goes with ligamentum arteriosum? **Left recurrent laryngeal N.**
352. Ligamentum venosum comes from what? **Ductus venosus**  
-shunts left umbilical vein blood directly to the inferior vena cava, bypass liver  
-ligamentum teres = remnant of umbilical vein on the liver
353. Structure present in fetal heart that allows blood to pass from right to left atrium? **Fossa ovalis** (remnant of fetal foramen ovale)
354. Crista terminalis is located on the **Right atrium**  
-It is the junction between the sinus venosus & the heart in the embryo



## DEVELOPMENT (ARCHES)

Arches	Tissues	Nerves and muscles	Bones
First (mandibular)	Teeth, middle and lower face, lips, cheeks and body of tongue	Trigeminal nerve, muscles of mastication and some suprahyoid muscles	Mandible, back part of maxilla, secondary palate, zygomatic bones and some bones of middle ear
Second (hyoid)	Back part of tongue, various ligaments between skull and mandible	Facial nerve, muscles of facial expression and some suprahyoid muscles	Middle ear bone, part of temporal bone and part of hyoid bone
Third	Back part of tongue	Glossopharyngeal nerve and some pharyngeal muscles	Part of hyoid bone
Fourth to sixth	Back part of tongue	Muscles of larynx and pharynx and vagus nerve	Laryngeal cartilages

355. Anomalous development of external acoustic meatus? **problem with 1<sup>st</sup> pharyngeal cleft**

-Also 1<sup>st</sup> arch = incus & malleus, 2<sup>nd</sup> arch = stapes

356. Meckel's Cartilage makes what → **Malleus & Incus (1<sup>st</sup> Branchial Arch)**

357. Mandible is **LATERAL** to Meckel's cartilage in development.

358. **Hyoid bone develops from which arch? 2<sup>nd</sup> arch & 3<sup>rd</sup> arch**

359. Buccinator muscle develops from which arch? **2<sup>nd</sup> arch**

360. Reichert's cartilage = 2<sup>nd</sup> arch, makes stapes bone, styloid process, stylohyoid, CN VII

361. **Inferior Parathyroid is from → 3<sup>rd</sup> Pouch**

362. **Thymus gland is from the 3<sup>rd</sup> & 4<sup>th</sup> brachial pouches**

363. What develops from Rathke's pouch (ectoderm)? **anterior pituitary (adenohypophysis)**

364. Philtrum of the lip is formed from **medial nasal processes & maxillary processes**

365. Unilateral cleft lip is caused by the **maxillary prominences** on the affected side joining with the merged **medial nasal prominence**.

366. What forms the palate? **Fusion of Intermaxillary & Palatal Shelves**

367. Macrostomia (large mouth) is failure of fusion of **maxillary & mandibular process**

368. What structure in branchial arches failed if baby has bifurcated tongue? **Tuberculum impar**

369. Hypoglossal nerve (CN 12) comes from occipital somites (not pharyngeal arches)

370. Which one comes from the upper layer of the neural tube → **Ascending Sensory Pathway**

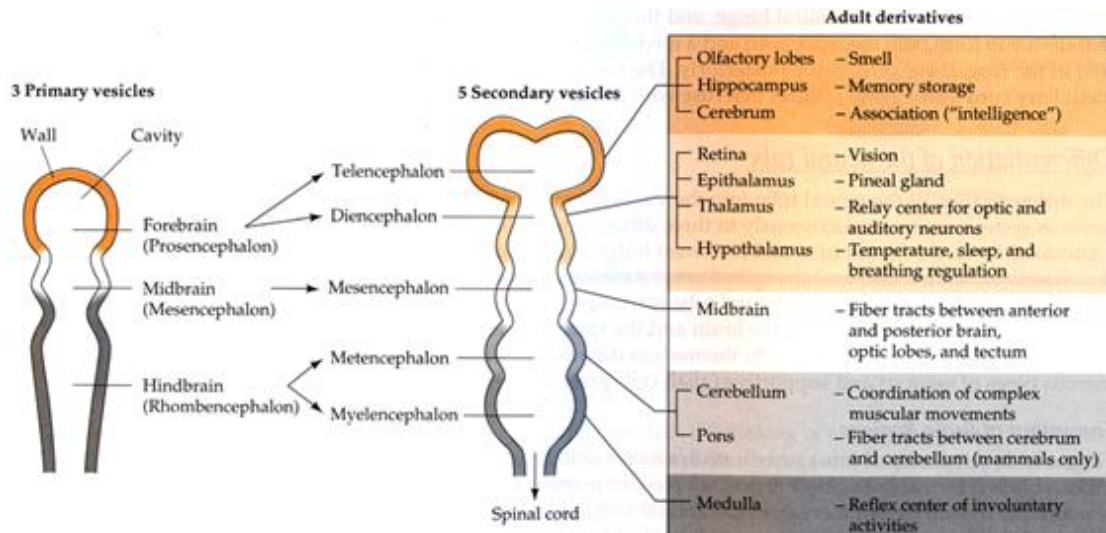
Ascending tracts – the pathways by which sensory information from the peripheral nerves is transmitted to the cerebral cortex. It consist of dorsal column-medial lemniscal pathway (fine touch/proprioception) & anterior/lateral spinothalamic tract.

371. **Origin of the pons and medulla → Rhombencephalon** (hindbrain, includes: medulla, pons & cerebellum)

-3 primary vesicles: Prosencephalon + Mesencephalon + Rhombencephalon

372. What is the pons derived from? **Metencephalon** (pons & cerebellum)

-5 Secondary Vesicles: Telencephalon + Diencephalon + Mesencephalon + Metencephalon + Myelencephalon



## PATHOLOGY

WORDS	DEFINITIONS
<b>ANAPLASIA</b>	Absence of differentiation
<b>APLASIA</b>	Organ or part of organ missing, lack of cell growth
<b>HYPOPLASIA</b>	Inadequate or below average # of cell
<b>HYPERPLASIA</b>	Proliferation/increase in # of cells
<b>NEOPLASIA</b>	Abnormal cell/tissue phenotype, maturation abnormality
<b>DYSPLASIA</b>	Growth, loss of normal tissue arrangement, pre-malignant
<b>METAPLASIA</b>	Reversible conversion in cell type

373. Which term is the best for a carcinoma that doesn't perforate basement membrane? **Dysplasia**  
 -Dysplasia is non-malignant cellular growth, but may precede malignant changes in the tissue. It is associated with chronic irritation of a tissue, tissue appears somewhat structure less and disorganized and may consists of atypical cells without invasion.
374. Most indicative of cancer → **Dysplasia**
375. Which term describes a lack of differentiation? **Anaplasia** (found in more malignant tumors)  
 -Anaplasia is dedifferentiation (less-well differentiated is anaplastic)
376. **Metaplasia** → **Reversible replacement of one tissue type with another**
377. Which of the following would you not expect with a neoplasm/not a characteristic of malignancy? **Aplasia**
378. Neoplasm differences:

<b>Benign</b>	Well differentiated Slow growth <b>Encapsulated/well-circumscribed</b> Localized Moveable
<b>Malignant</b>	Less differentiated (anaplastic) Rapid growth Invasion/metastasis Immovable

379. Multiple Myeloma → **Cancer of Plasma Cells in bone marrow**
380. Having Bence Jones protein in urine indicates → **multiple myeloma**  
 -Multiple myeloma has Bence Jones protein (immunoglobulin light chains produced by neoplastic plasma cells), Russell bodies (IgE inclusion), **punched out appearance**, increased susceptibility to infection

381. What are the lab results of a person that has prostate cancer? **Increased serum acid phosphatase & Increase prostatic specific antigen**  
 -Prostate carcinoma w/ metastases to the bone results in increased PTH, high alkaline phosphatase & increase in Prostatic Specific Antigen (PSA)
382. Man has bony exocytosis with anaplastic glandular epi. What is it? **Prostate carcinoma, which metastases**
383. Most probable cause for prolonged bleeding time in a patient with LEUKEMIA → **Decreased number of blood platelet**  
 -Leukemia is a diseases of the reticuloendothelial system involving uncontrolled proliferation of WBC. People with leukemia may have thrombocytopenia.
384. Reed-Sternberg cells → **Hodgkin's Lymphoma**
385. In addition to Karposi's Sarcoma, which other malignant neoplasm is often observed with AIDS? **Non-Hodgkins Lymphoma**  
 -HIV (retrovirus) is an oncogenic RNA virus. Non-Hodgkin's Lymphoma are cancers of lymphoid tissue with the involved tissue being enlarged and are accompanied by night sweats & fever.
386. Patient has ulcers in the gingiva. Lab values are 1200 WBC, 98% lymphocyte, normal platelet/RBC? What does the pt have? **Chronic lymphocytic leukemia (CLL)**  
 -ALL & CLL have high # of lymphocytes. The leukemia cells survive longer than normal cells, and build up, crowding out normal cells in the bone marrow.
387. What do you find in the sweat of a person with Cystic Fibrosis? **Increased chloride & chloride (NaCl)**
388. Patient with rash on sided of face, droopy eye lid, constriction of pupil, what nerve dysfunction? **Horner's Syndrome = damage to SYMPATHETIC (Superior Cervical Ganglion)**
389. Tay-Sachs Disease is a deficiency is what enzyme → **Hexosaminidase**  
 -Tay-Sachs disease (hexosaminidase A deficiency) is an auto-immune autosomal recessive disorder causing deterioration of nerve cells due to accumulation of gangliosides (spinolipid) causing nerve death.
390. Sphingomyelin/Sphingophospholipid: know characteristics → **Not Responsible for RBC Recognition**  
 -Sphingomyelin Function: Plasma Membrane Constituent, Nerve Tissue Constituent (myelin sheath), lysosomes  
 -Major constituent: **ceremide** & choline, accumulation is Neimann-Pick Disease
391. What diseases are lysosomal deficiency? **Niemann-Pick, Gaucher's, Tay-Sachs**
392. Prions affect which organ → **Brain**
393. Mitral Valve is messed up, what will you see? **Pulmonary Edema**
394. What does not cause edema? **High albumin** (some sources say Shock)
395. Patient had a stroke. What common artery is occluded? **Middle cerebral artery**  
 -Stroke can be caused in **infra**ct in the brain
396. Patient got epidural hemorrhage, which artery was severed? **Middle meningeal artery**
397. Person has acute hemorrhage, what occurs? Heart Rate increases & BP decreases
398. Myocardial Infraction → **Coagulative Necrosis** (ischemia, blood loss, <3/kidney)  
 -Liquefactive necrosis: enzyme digestion, infection (CNS)  
 -Gangrenous necrosis: large areas (lower extremities, bowel)  
 -Fat/calcified necrosis: pancreas, breast etc
399. Which one is autosomal dominant? **Gardner's Syndrome**
400. X-linked → **agammaglobulinemia** (lack of gamma globulin in the blood causing immune deficiency)
401. Atelectasis → **deflated/collapsed alveoli (reduction in gas exchange)**
402. What disease blocks acetylcholine receptors at the NMJ? **Myasthenia Gravis**
403. What tumor is associated with myasthenia gravis? **Thymoma** (tumor in thymus gland, t-cell maturation)
404. What would a tumor of the anterior pituitary cause? affected **ACTH** specifically
405. Excessing secretion of ACTH causes **Cushing's syndrome**
406. Excessive ACTH causes **hyperglycemia & weight gain**
407. Acromegaly as a result of tumor of what → **Anterior Pituitary** (causing high levels of growth hormone)
408. Diabetes insipidus → **Lack of ADH**
409. How would you describe Diabetes Type 1? **Autoimmune & islet cells appear degenerated**

410. What causes microangiopathy in diabetics? **Damage to small capillaries**
411. What is responsible for POLYURIA in diabetes? Capacity of the kidneys to reabsorb glucose is surpassed, glucose is lost in the urine, along w/ of water & electrolytes.
412. Neurofibromatosis is characterized by → **Multiple large pigmented skin lesions** (café-au-lait, light brown spots on the skin)
413. **GERD (Gastro esophageal reflux disease) – Barret’s esophagus** & its premalignant metaplasia?  
Adenocarcinoma  
-Replacement of normal epithelium lining of the esophagus w/ simple columnar epithelium + goblet cells (which are found in lower GI)
414. **Where in GI tract are you most likely to see achalasia? Esophagus**  
-Affects ability to perform peristalsis, nerve related
415. Know these kidney infections:  
-Acute Pyelonephritis: infection of the RENAL PELVIS (kidney and ureters), usually E. coli most often from a UTI or Vesicoureteral reflux → Active infection and abscess can develop, renal pelvis filled with pus (PMNs)  
-Chronic Pyelonephritis → implies recurrent kidney infections & can result in scarring of the renal parenchyma & impaired function, esp. due to obstruction (usually E.coli infection of the renal pelvis).  
-Acute glomerulonephritis (inflammation of the glomeruli of the kidney. Present with hematuria and proteinuria, or acute or chronic renal failure. Primary cause are intrinsic to the kidney)
416. What GI disease is characterized by non-caseating granulomas? **Crohn’s disease**
417. **GI carcinoma/malignancy caused by villous adenoma**
418. What part has the most chance of an adenocarcinoma? **Rectum**  
-Rectum/Sigmoid: assoc w/ Villus Adenomas, such as ulcerative colitis, Crohn’s disease, Gardner’s syndrome & Familial Polyposis. (colorectal: villous polyps)
419. Positive anti-nuclear antibody test (ANA) & positive anti-smith antibody is specific for disease? **Lupus SLE**  
-RH+ factor suggested that the patient has SLE, also has joint problems (RA)
420. Which one is not an autoimmune disease?  
a. Arthus reaction  
**b. Erythroblastosis fetalis** → mom = Rh (+)/baby Rh (-), causes hemolytic anemia  
c. SLE  
d. Multiple Sclerosis
421. Sickle Cell Anemia HbS what happens? (*HbS = hemoglobin S, abnormal β-globin*)  
a. Agglutination & Oxygenation  
**b. Agglutination & Deoxygenation**  
c. Deglutination & Deoxygenation  
d. Deglutination & Oxygenation
422. Sickle cell anemia → **missense mutation** (single point mutation)
423. Pernicious anemia results from what? **Lack of vitamin B12**
424. **Megaloblastic anemia is due to a deficiency of? Folic Acid (B9)**
425. **Most common type of anemia? Iron deficiency anemia**
426. Chronic ulcer with chronic slow blood loss; what is the most likely complication? **Iron Deficiency Anemia**
427. Chronic blood loss from duodenum leads to → **Microcytic & Hypochromic Anemia** (Iron Def Anemia)
428. **Chronic bleeding peptic ulcer, what is a sign/symptom? Fecal occult** (blood in stool)
429. What does NOT cause Cancer → **Anthraxosis**  
-Anthraxosis is caused by chronic exposure to coal, polluted air or cigarettes. Black pigment is deposited in lung parenchyma
430. **Most common cancer of the lung → Squamous cell carcinoma**
431. Most common site in the lung to have Squamous Cell Carcinoma? **Center of the Lung**
432. Patient had dysphonia, dysphagia, weight loss, long term heavy smoker → **laryngeal carcinoma**
433. Where in the lungs does cancer arise if patient smokes cigarette? **Bronchiolar cells**
434. With hypertension, the heart shows **left Ventricular Hypertrophy**
435. All of the following are reasons for HTN except  
a. Renin

b. Angiotensin II

c. **Partial Occlusion of the Renal Artery**

d. Pheochromocytoma

436. The anterior of the right & left ventricles have necrosis, what artery is blocked? **Anterior intraventricular artery**
437. Swollen lymph nodes in the supraclavicular region (Virchow's node) indicate cancer of? **Gastric cancer**
438. What syndrome increase risk of colic cancer? **Peutz -Jeghers syndrome** (causes growths/polyps in the GI)
439. Man is in the sun a lot, develops grown spot to the side of the nose that is growing? **Lentigo maligna**
440. Which disease is caseous necrosis → **Tuberculosis**  
-Caseous necrosis has cheese-like tissue appearance & granuloma, cell death caused by enzymatic degradation.  
Common in TB, Leprosy, Histoplasmosis
441. A girl from Africa had TB, what would not be a cause of a positive TB test? **Leprosy**
442. What do cerebral vascular accidents, Parkinson's, and Alzheimer's have in common? **Dementia**  
-Parkinson's = substantia nigra affected, tremors/uncontrolled movement
443. **Amyloid** deposit related to **Sjögren's syndrome** (and Alzheimer's) → **TRUE**
444. If hypophysis isn't working? **Hypogonadotrophy**
445. Basal cell carcinoma is upper lip & squamous cell carcinoma is lower lip
446. What causes old men to piss a lot? **BPH** (benign prostate hyperplasia)
447. Most common cause of lump/palpable mass on a woman's breast? **Fibrocystic Lesions/changes**  
-Fibroadenoma = most common tumor, benign, unilateral
448. Hypothyroidism causes? **Positive nitrogen balance**
449. **Metastatic Calcification & nephrolithiasis** (renal Ca+ stones) are due to **Hyperparathyroidism**
450. **Adenosine Deaminase** deficiency causes what disease → **Severe Combined Immune Deficiency (SCID)**  
-Adenosine deaminase is involved in purine metabolism & is needed for the breakdown of adenosine from food.  
Primary function in humans is the development & maintenance of the immune system.
451. What is the likely cause of a pulmonary embolism? **Thrombophlebitis** (esp from deep vein thrombosis)
452. Most common endometrial cancer → **Leiocarcinoma**
453. Goiters are due to **hyperplasia** (not hypertrophy)
454. What does hypoplasia most like? **Small organ development**

## HEAD INNERVATIONS

455. Lacrimal gland innervated by → **Superior Salivatory Nucleus**  
-it synapses on the Pterygopalatine ganglion
456. Pain from which tract? **Lateral Spinothalamic Tract**
457. patient is given topical to relieve what fibers: **A delta fibers**  
-NT for A delta fibers = glutamate
458. Sensation on the face and teeth involved what nucleus? **Main Sensory Nucleus of V**
459. What are the primary sensory neurons of termination involved in pain from the maxillary 2<sup>nd</sup> molar? **Spinal Nucleus of V**  
-Nucleus of CN V include  
I. **Mesencephalic nucleus: proprioception** of face, jaw-jerk reflex  
II. **Main sensory nucleus: light touch**  
III. **Spinal Trigeminal nucleus: pain & temperature**
460. Which subnucleus of the spinal nucleus of V is responsible for pain sensation? **pars interparalis**
461. Pain from face goes to? **VPM**  
  
-Facial pain = VPM (Ventral posteromedial nucleus) | body pain = VPL (Ventral posterolateral nucleus)
462. Branchiomeric nerves come from where? **CN 5, 7, 9, 10**



-Branchiomic nerves are nerves to striated muscles of the head & neck that develop from branchial arches.  
Nerves includes CN 5 (1<sup>st</sup> arch), CN 7 (2<sup>nd</sup> arch), CN 9 (3<sup>rd</sup> arch), and CN 10 (4<sup>th</sup>/6<sup>th</sup> arch).

463. What nerve involved in blinking → **CN V1 & CN 7**
464. What nerve innervates the skin above the upper lip? **Infraorbital N**
465. Patient complains about burning sensation in the mandibular anterior? **Mental nerve**
466. What innervates the posterior hard palate? **Greater palatine N** (anterior hard palate = nasopalatine N)
467. Which nerve innervate soft plate? **Lesser palatine nerve** (CN V2)
468. Which is not part of the Cavernous Sinus → **Optic Nerve**  
-nerves that ARE assoc with the cavernous sinus are : CN 3,4,6, V1,V2 (mnemonic: **O TOM CAT**)
- O TOM CAT**
- **O:** oculomotor nerve
  - **T:** trochlear nerve
  - **O:** ophthalmic branch of trigeminal nerve
  - **M:** maxillary branch of trigeminal nerve
  
  - **C:** internal carotid artery
  - **A:** abducent nerve
  - **T:** trochlear nerve
469. What parasympathetic nerve runs through the foramen lacerum? **Greater Petrosal**
470. What foramen transmits pre-ganglionic parasympathetic fibers? **Foramen Ovale** (for lesser petrosal N)
471. Before synapsing in the submandibular ganglion, pre-parasympathetic travel to which nerve? **Chorda tympani**
472. What action of the lingual nerve stays with the nerve through its course? **Sensory to anterior 2/3 of tongue**
473. Which nerve does not transmit taste fibers from the tongue? Answer choices: **V, VII, X**
474. What is the position of the lingual nerve in respect to the inferior alveolar nerve? **anterior & medial**
475. What ganglion does the postsympathetic for the submandibular ganglion? **Superior cervical ganglion**
476. Intraoral approach to get to the submandibular ganglion → cut through the **mucous membrane only**.
477. If someone has motor loss underneath their right zygoma, what nerve is damaged? **CN 7 when exiting the stylomastoid foramen**
478. If you cut the nerve for the stylomastoid foramen, what do you lose innervation to? **Orbicularis muscle (oculi & oris)**
479. CN VII & VIII goes through? **Internal Acoustic Meatus**
480. What nerve brings preganglionic para nerve fibers to the otic ganglion, then eventually to the parotid gland? **Lesser petrosal nerve via glossopharyngeal N (CN 9)**
481. What goes between the superior pharyngeal constrictor & middle pharyngeal constrictor? **CN 9**
482. What nerves goes between Palatoglossus & Palatopharyngeus? **Tonsillar branch of CN9**
483. Circumvallate papilla are innervated by what nerve? **CN 9**
484. What cranial nerve innervates levator veli palatini? **CN X**
485. What nerve does not come out of the jugular foramen? **CN 12**  
-Jugular foramen = CN 9, 10, 11 | hypoglossal canal = CN 12
486. Gag reflex → sensory limb (afferent) mediated by **CN 9**, motor by CN 10
487. What is not innervated by the hypoglossal nerve? **Palatoglossal (CN 10)**
488. Muscles innervated by Ansa Cervicalis (C1-C3) include? **Infrahyoid muscle**

## BRAIN

489. What is the primary sensory relay station of the brain (conduit)? **Thalamus**
490. What part of the brain controls hunger → **Hypothalamus**
491. The swallowing center: 2<sup>nd</sup> stage of deglutination is located → **Medulla**



492. Sectioning of infundibular stalk of hypothalamus w/ normal hypophyseal tract leads to a decrease in what hormones? **ADH**  
 -Infundibular stalk = connection between HT & PP
493. What divides the diencephalon into two? **3<sup>rd</sup> ventricle**
494. What lines the ventricle of the brain? **Ependymal cells**
495. What makes up the blood-brain barrier → **Astrocytes, endothelial cells in capillaries connected by tight junction, water/lipids pass or selective transport**
496. Largest paranasal sinus? **Maxillary sinus**
497. Where does the maxillary sinus drain into? **Semilunar hiatus of the middle meatus**  
 -Nasolacrimal drains into the inferior concha
498. Right maxillary sinus is infected, where does it spread to next? **Right Ethmoid sinus**
499. What is the outer edge of the lateral wall of the ethmoid sinus? **Orbit**
500. Anterior cerebral artery supplies what lobes? **Frontal & Parietal Lobes** (Medial Surfaces of both)
501. Arachnoid villa & granulation transport CSF from subarachnoid space to **venous system**
502. Increase in CSF pressure causes what? brain **herniation**
503. Vertebral artery pass through what foramen? **Foramen magnum**
504. What is not part of the circle of Willis? **Basilar artery**
505. Branches of the maxillary A. go through all of the following foramen except? **Foramen Lacerum**
506. Maxillary vein & superior temporal veins drain into **retromandibular vein**
507. Each of the following structures lie between the hyoglossus & mylohyoid muscle expect one? **Lingual artery** (passes deep to hyoglossus m)
508. What muscle goes between the superior & middle pharyngeal constrictor muscles? **Stylopharyngeus muscle**
509. Know the structure that make up the sphenoid bone: body, 2 greater wings, 2 lesser wings, pterygoid process
510. What forms the Superior Orbital Fissure → **Greater and Lesser Wing of the Sphenoid**
511. Foramen ovale is located in the **greater wing of the sphenoid**
512. Medial border of the Infratemporal fossa? **Pterygomaxillary Fissure**
513. Guy shot in back of the head, bullet exits above eyebrows. Which bone is least likely to get damaged?  
**Maxillary**
514. All of the following pass through the medial & lateral pterygoid except? **Buccal Nerve**  
 -Passes through lateral pterygoid heads
515. What is anterior to the pharyngeal tonsils? **Palatoglossal fold**
516. Where is synovial fluid produced? **Internal synovial layer of the Fibrous Capsule (joint capsule)**
517. What cells are responsible for its (synovial fluid) production? **Type B Synoviocytes**

## KIDNEY

518. What organ is found by the right kidney? **Colon**
519. All of the following are in the kidney medulla EXCEPT? **Glomerulus** (cortex)
520. In a healthy kidney, what does not get passes through? **Albumin & glucose** (clearance = 0 mg/mL)
521. What cells line the visceral layer of Bowman's capsules? **podocytes**
522. Most kidney reabsorption & ATP used in the nephron of kidney? **Proximal Convoluted Tubule** (Contain truncated pyramidal cells)
523. Where is the highest osmolality? **Loop of Henle in the medulla**
524. Macula Densa → **DCT** (sense NaCl concentration in thick ascending limb, can signal afferent arterioles to vasodilate & increase renin released from JG complex)
525. What would increase GFR? **Dilation of afferent arterioles in kidney**
526. Which one is the best for GFR? **Inulin**
527. Kidney substance filtered and secreted. The clearance rate is  
 a. = inulin  
 b. > inulin  
**c. < inulin**
- Inulin (plant starch) is filtered but not reabsorbed or secreted by any parts of the kidney = GFR

528. What is the para-aminohippurate (PAH) test used for? **Measure renal plasma flow**  
 -PAH → freely filtered and secreted by the kidney = Renal Plasma Flow
529. Aldosterone is produced in the **zona glomerulosa** & affects DCT
530. If you inhibit ACE, what hormone is decreased? **Aldosterone**
531. ADH is produced where? **Supraoptic nucleus of hypothalamus**
532. ADH increases **water permeability/resorption** at DCT by inserts Aquaporin-2 channels into the DCT & collecting duct epithelial cells
533. Deficiency of ADH → dilute urine
534. What are the primary stones in gout? **Urate (Uric Acid) crystals** (uric acid deposits in the joints)
535. What do you want to inhibit in a person with gout? **Xanthine Oxidase**  
 -Uric Acid is an end product of purine metabolism, specifically via xanthine metabolism.
536. You could decrease plasma osmolarity by injecting serum? ADH (?)
537. What type of enzyme is Fumerase? **Isoenzyme**
538. **ORINTHINE** is an intermediate of the UREA CYCLE in mitochondria
539. **Fumerase/fumarate connects urea cycle via? TCA Cycle**  
 -**Hydration** reaction
540. In the urea cycle, where does the Nitrogen come from? **ammonia & aspartate**
541. What is an intermediate in the urea & precursor for ornithine? **Arginine**

## CHOLESTEROL/LIPIDS

542. De novo cholesterol involves everything except? **Oxygen** (Need ATP, NADPH, acetyl CoA, malonyl CoA)  
 -acetyl-CoA carboxylase enzyme of fatty acid synthesis → function is to provide malonyl CoA substrate for biosynthesis of fatty acids
543. **Rate limiting step of cholesterol biosynthesis → HMG CoA Reductase**  
 Statin drugs are HMG-CoA reductase inhibitors.
544. **How do animal cells primarily use cholesterol? Cell Membrane**  
 -Aside from phospholipid, cholesterol is the most common cell membrane component
545. LDL Receptor → **APOB-100 (Apolipoprotein B)**
546. Triglyceride is carried from the liver to organs by chylomicrons
547. **Hyperlipidemia: fat in blood; chylomicrons → liver → VLDL → blood → tissue → LDL → HDL**

## GI TRACT

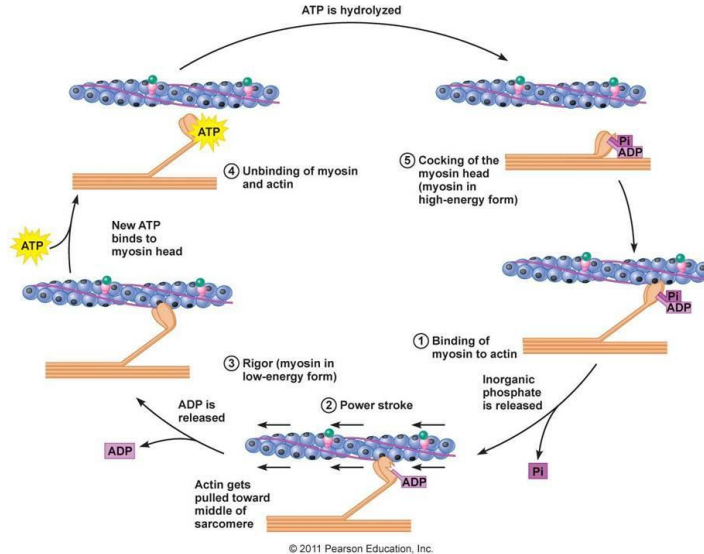
HORMONE	STIMULATION	ACTION
<b>CCK</b>	Fats, fatty acids, AA in duodenum	increase pancreatic digestive enzyme secretion increase gallbladder contraction (bile secretion)
<b>GIP</b>	Fats & glucose in Duodenum	decrease gastric motility decrease acid secretion increase insulin release
<b>Gastrin</b>	Peptide hormones, AAs in gastric lumen, stomach distension released by G cells of stomach & duodenum	Stimulates HCl secretion from parietal cells gastric motility
<b>Secretin</b>	decrease pH in duodenum HCl in duodenum	increase HCO <sub>3</sub> from pancreas (neutralizes H <sup>+</sup> in the duodenum) decrease gastric motility decrease gastric acid secretion

548. What secretes Gastrin → **G cells of the stomach & duodenum**  
 -stimulate HCl from parietal gland, histamine, pepsinogen secretion, and increased gastric blood flow
549. Where are chief cells produced? **Stomach**
550. Where is pepsinogen secreted from? **Stomach** (by chief cells to degrade proteins)
551. What does not secrete bicarbonates? **Chief cells of the stomach**
552. Where is intrinsic factor secreted from? **Fundic portion of Stomach** (by parietal cells for Vit B12)
553. Stimulate Histamine H2 receptor to make? parietal cell (release HCl) in the stomach
554. Where is secretin made? **S cells of the Duodenum**
555. Where is Lactase made? **Brush Border Membrane**  
 -Microvilli brush border of Small Intestine contains enzymes that split disaccharides lactose, sucrose, and maltose into monosaccharides.  
     Lactose → Glucose + Galactose  
     Sucrose → Glucose + Fructose  
     Maltose → Glucose + Glucose
556. **Crypts of Lieberkühn (intestinal glands) are in lamina propria of small intestine**
557. Which sugar is not absorbed in small intestine  
 a. Ribose  
 b. **Maltose**  
 c. Sucrose  
 d. Fructose  
 e. Glucose
558. Main movement in the small intestine is through **segmentation**  
 -segmentation contractions churning & mixing without pushing materials further down
559. What is NOT absorbed in the jejunum? **What IS absorb: iron, Na, K, and Cl**
560. **Mesentery** is a tissue that attaches the posterior wall of the peritoneal cavity to the jejunum.
561. Difference between colon and all other parts of the digestive system → **Colon does not have villi**
562. Which is innervated by Vagus nerve? **Transverse colon & Lung**  
 -It supplies motor parasympathetic fibers to all the organs from the neck down to the second segment of the transverse colon (includes ascending & transverse colon) except the adrenal glands
563. What cells secrete bicarbonate? **Epithelial cells lining the pancreas**
564. **Centroacinar cell** are found in what organ → **Pancreas**  
 -intercalated duct cells, secrete bicarbonate when stimulated by secretion to provide alkaline pH for enzyme activity in the stomach.
565. Trypsinogen (pancreatic enzyme, digest proteins) becomes trypsin by **altering N terminal peptide**
566. What acts adjunctively with lipase? **Bile**

## MUSCLES

567. Which one is around a myofibril? **Endomysium**
568. When cardiac muscles start to contract? **Influx of the Ca<sup>2+</sup> from the outside**
569. **Parasympathetic nerves from vagus nerve (CN 10) acts on the heart by lowering heart rate**
570. Regulation of the contraction in smooth muscle? **calmodulin**  
 -Smooth muscle has calmodulin instead of troponin. All muscles have tropomyosin.
571. Ca<sup>+</sup> binds to calmodulin, which activates **myosin light chain kinase**
572. **ATPase activity for smooth muscle occurs by? Myosin**  
 -No T-tubules, poor SR, no troponin so myosin is always ready to react & can hold long contractions
573. What modulates smooth muscle action potential? **Acetylcholine**
574. What does Ach cause the erector pili to do? → **increase Ca<sup>+</sup> entering the cell** to erects the muscle  
 -Increase in intracellular Ca → greater activation of contractile proteins
575. Skeletal has **multinucleated cells** while smooth/cardiac = 1 nuclei
576. Direct source of energy for skeletal muscle? **ATP → ADP + phosphate**
577. How does ATP get transported out of the mitochondrial membrane? **ATP-ADP translocase (?)**

578. **Sarcolemma/sarcomere is only in striated muscle** (skeletal & cardiac)
579. Isotonic muscle contraction? **H & I band get shorter**
580. Increasing the load of muscles does what to velocity? **Slow it down**
581. **Gamma efferent motor fibers** is for stretch receptors (**spindles**), regulate stretch/muscle length & tone
582. Inorganic phosphate is released from ADP in myosin when? For a **powerstroke**
583. What is responsible for dissociation of phosphate group during muscle contraction? **Cocking Action**
584. Myosin has ATPase action that turns ATP → ADP + Phosphate, release of the phosphate group causes the myosin powerstroke



## HORMONES & VITAMINS

585. Which one is not a glycoprotein hormone?
- GH** (somatotrophin, peptide hormone) → inhibits insulin
  - LH
  - FSH
  - TSH
  - HCG
586. Somatomedins → **Promote cell growth**
587. Growth Hormone stimulated chondrogenesis indirectly by using what? **somatomedians**  
Somatomedians are a group of hormones that promote cell growth & division in response to stimulation by growth hormone (GH, somatotropin)
588. Vit K → **blood clotting**
589. What is biotin used for → **Pyruvate Carboxylase, acetyl CoA** (cofactor)  
-any carboxylase needs biotin cofactor
590. What reaction requires thiamine (B1) → **Pyruvate decarboxylase**
591. B1 (Thiamine) → coenzyme for decarboxylation rxns
592. B2 (Riboflavin) → coenzyme FAD & FMN
593. B3 (niacin) → coenzyme NAD
594. B6 (pyridoxine, PLP) → Transamination Rxn (amino acid and nucleic acid metabolism)
595. What is the cofactor involved in Transamination? **PLP Vit B6**  
-deficiency can lead to peripheral neuropathy and dermatitis
596. B12 (cobalamin) → need **intrinsic Factor** for absorption
597. Lumbar puncture → **L3/L4**
598. Phosphatidylcholine → **Lecithin** (phospholipid + choline)
599. Which does NOT cause Vasoconstriction → **Histamine**
600. Muscarinic ACh receptors effects **sweating & salivation**
601. What hormone is responsible for milk secretion postpartum? **oxytocin**

-Oxytocin EJECTS breast milk, produced in the paraventricular nucleus of the hypothalamus & stored in the posterior pituitary.

## RANDOM

- 602. Advantage of using dry heat sterilization over autoclaving → **No dulling, it keeps instruments sharp**
- 603. **Best method to sterilize instruments without corrosion? Dry heat**
- 604. Ethylene oxide for sterilization is good for? **Heat Labile Tools**
- 605. **If unable to use heat, what method should be used to sterilize instruments? Ethylene oxide**
- 606. What's a way to measure human basal energy? **Temperature**
- 607. What enzymes are not involved in making cDNA? **Telomerase**  
-Reverse Transcriptase & RNA-dependent DNA-polymerase are used
- 608. **DNA fingerprinting? Restriction site**
- 609. Which of the following types of blotting can be used to ID DNA restriction fragments → **Southern blotting**  
-Restriction endonuclease are used to cut DNA  
-Northern = RNA, Southern = DNA, Western = proteins
- 610. **Know the steps of PCR: amplify & make more copies of DNA**
  - 1- Initialization: DNA polymerase that need heat activation
  - 2- Denature: heat reaction for 20-30 sec so DNA melts/disrupt H-bonds to yield ssDNA
  - 3- Annealing: reaction T is lowered for hybridization of primer to strain
  - 4- Extension: DNA polymerase added to synthesize new DNA complement, x2 DNA
  - 5- Final Elongation: ensure all DNA strands have elongated
- 611. When does pH = pKa? **Isoelectric point** (isoelectric point is the pH such that no migration occurs during electrophoresis)
- 612. Mechanism of Fluoride → **Enolase Inhibitor (which inhibits glycolysis)**
- 613. Regulation of F → bone/urine
- 614. What innervates the erector spinae muscles? **Dorsal Branches of the Spinal N**
- 615. Which lymph nodes are along the external vein → **Deep Cervical Lymph nodes**
- 616. Which structure has both afferent and efferent vessels → **Lymph Nodes**
- 617. Tetrodotoxin (pufferfish) is a channel blocker for voltage-gated Na<sup>+</sup> channels = **no action potential**

## DENTAL ANATOMY

<b>DATES OF CALCIFICATION:</b>	<b>Primary teeth calcify in utero (2<sup>nd</sup> trimester)</b>	<b>Birth 1<sup>st</sup> molars</b>	<b>1 year anterior</b>	<b>2 year premolars</b>	<b>3 years 2<sup>nd</sup> molars</b>	<b>7-9 years 3<sup>rd</sup> molars</b>
Tooth erupts when root is ½ formed, primary take ~ 1.5 years while permanent teeth take ~ 2.5 years.						

## CALCIFICATION & ROOT FORMATION

1. Primary teeth calcification start @ 4-6 months (2<sup>nd</sup> trimester)
2. Earliest evidence of enamel formation of permanent teeth? **Birth** (6 year 1<sup>st</sup> molars began calcification @ birth)
3. At what age do all the premolars begin calcification? **2 years old**
4. 8 yr old boy break permanent maxillary central, how long do you have to wait for a root canal? **2 more years**
5. Seven weeks pregnant, what does not occur → **enamel Calcification**
6. What does man 2<sup>nd</sup> molar complete root/apex formation? **15 yrs old**

## PRIMARY TEETH

	Central	Lateral	Canine	1 <sup>st</sup> Molar	2 <sup>nd</sup> Molar
<b>Primary Eruption (General)</b>	6 m	9 m	18 m	13 m	24 m
<b>Characteristics:</b> whiter, less calcified enamel, thinner DEJ, more prominent pulp horns, bigger cervical bulge (especially 1 <sup>st</sup> M), enamel rods that go from DEJ occlusally, more flared roots					

7. What color are primary teeth compared to adult teeth? **Whiter, lighter than adults**
8. Primary teeth are more bulbous & constricted (smaller occlusal table).
9. Where is the primate space on the mandible for primary teeth? **Between the canine & 1<sup>st</sup> molar**
10. Order of eruption in primary maxillary arch? **Centrals > laterals > 1<sup>st</sup> molar > canine > 2<sup>nd</sup> molar**
11. Primary maxillary central is wider M/D than inciso-cervically
12. What permanent tooth is like the primary 2<sup>nd</sup> molar → **permanent 1<sup>st</sup> molar**
13. Which primary tooth has a crown similar to a premolar and roots similar to a molar? **Primary Maxillary 1<sup>st</sup> Molar**  
-3 roots, pre-molar crown
14. Primary maxillary & mandibular 1<sup>st</sup> molar = **prominent cervical ridge**
15. Primary man 1<sup>st</sup> M = unlike any other teeth
16. Primary mandibular 1<sup>st</sup> molar has **2 roots: 4 cusps**
17. Most prominent cusps on a primary man 1<sup>st</sup> molar is between which cusps? **MB & ML**
18. Primary man 2<sup>nd</sup> M has 4 cusps, 2 roots & a prominent cervical ridge on the facial (MB).
19. Which cusp is the tallest cusp of the primary mandibular 1<sup>st</sup> molar? **Mesial Lingual**  
-4 cusps → MB (largest), ML (tallest, sharpest), DB, DL (smallest)
20. 12 year old patient still has which primary teeth? **K, T** (primary man 2<sup>nd</sup> M)

## MAXILLARY

21. Most scalloped tooth? **mesial of max central incisor**
22. If you looked at the midline of the incisal edge of the central incisors, where would it be in relation to the root of the tooth? **Centered**  
-**Rule:** maxillary incisal edges are centered while mandibular incisal edges are lingual to root axis except maxillary canine, which is facial to root.
23. Maxillary central is least likely to have a divided canal.
24. When extracting a tooth, due to its root shape, what is the easiest tooth to rotate? **Maxillary central**
25. Maxillary central incisor is cut @ the CEJ. What shape is the tooth outline? **Triangular**
26. How do permanent max centrals difference from primary centrals?
  - a. Longer Root
  - b. No Mamelons**
  - c. No Cingulum
  - d. No Marginal Ridge
27. Teeth with Mamelons on incisal edge intact on a adult over 30 years old indicates what? **anterior open bite**
28. **Compared to the maxillary central incisor, the maxillary canine is wider faciolingually & longer root**
29. Dens in dente has highest frequency in which tooth? **Tooth # 7 & 10 (max lateral incisors)**
30. Which tooth is most likely to have a peg lateral? **Maxillary lateral incisor**
31. **Girl has no caries except on max lateral. This is due to lingual groove that goes into the gingiva**
32. Maxillary lateral has a lingual groove that extends from enamel to cementum = **palato-radicular groove**



33. Problem with root planning a maxillary lateral? **Inciso-apical fissure**
34. Most likely to be congenitally missing: 3<sup>rd</sup> molars > maxillary lateral incisor > mandibular 2<sup>nd</sup> PM
35. Which tooth is most likely to be trifurcated? **Maxillary 1<sup>st</sup> PM**



36. Maxillary 1<sup>st</sup> PM is the only permanent tooth with a longer mesial slope than distal slope on the facial.  
-Primary maxillary canine = only primary tooth with longer mesial slope than distal slope
37. Lingual cusp of the max 1<sup>st</sup> PM compared to the facial cusp? **Shorter**
38. Max 1<sup>st</sup> PM is most similar to what man 2<sup>nd</sup> PM? **H type, Y type, U type**
39. In which tooth is the lingual dimension greater than buccal dimension? **Maxillary 1<sup>st</sup> Molar**  
-because of the Cusp of Carabelli
40. **On the maxillary 1<sup>st</sup> molar, the oblique ridge is formed between which 2 cusps? ML & DB**
41. What are the 2 obtuse angles of the max 1<sup>st</sup> molar? **ML & DB**  
-2 acute angles are MB & DL.
42. Which tooth is more likely to have 3 cusps? **Maxillary 2<sup>nd</sup> molar & Mandibular 2<sup>nd</sup> PM**

## MANDIBULAR

43. Mandibular central is wider F/L than M/D. (smallest, most symmetrical tooth)  
-Only opposes 1 tooth (max central), incisal edge is lingual tilted, roots have M & D concavity  
-Incisal edge is twisted disto-lingually
44. Mandibular lateral incisor has a **lingual curve on the distal incisal edge** & a cingulum offset to the distal
45. Mandibular canine erupts before premolars (opposite for maxillary)
46. Which anterior teeth is most likely to be bifurcated? **Mandibular canine**
47. You have to do RCT on a mandibular canine, what is the most likely complication you may encounter? **Bifurcated root**
48. Mandibular canine has **mesial outline form that's straight.**
49. Premolar most likely to exhibit pits & has a square occlusal surface? **Mandibular 2<sup>nd</sup> PM**
50. Highest cusp in a mandibular Y-type 2<sup>nd</sup> premolar → **Lingual** (Buccal cusp is shorter and blunter than the lingual cusp)  
-Y shaped = 3 cusp, H or U shaped = 2 cusp  
-U shaped man 2<sup>nd</sup> PM = **crested shaped central groove**
51. Y-shaped mandibular 2<sup>nd</sup> premolar is made by a combination of what grooves? **Central & lingual groove**
52. Roots of the mandibular 1<sup>st</sup> M are spread wider than roots of mandibular 2<sup>nd</sup> M
53. Cusp sizes of Mand 2<sup>nd</sup> Molar → **MB > ML > DB > DL**  
Width: MB > ML > DB > DL  
Length: ML > DL > MB > DB
54. **What is the smallest cusp on the mandibular 1<sup>st</sup> Molar? Distal**
55. What is the 1<sup>st</sup> tooth to erupt after the last succedaneous tooth has come in? **Man 2<sup>nd</sup> molar**
56. Which of the following cusps is not a primary developmental cusp of the maxillary 1<sup>st</sup> Molar? **distolingual (?)**

## MEDICATION

57. Fluorosis causes mottling of teeth
58. **A child has brown pits on their enamel, what is the cause of this? Fluorosis** (stains yellow-brown in pits)
59. Patient had brown & grey tooth discoloration on premolar, canine, and 2<sup>nd</sup> molars but the anterior were spared.  
When was the patient given tetracycline? **Tetracycline before the age of 2**
60. Tetracycline MOA → **inhibits protein synthesis/translation** by blocks 30s ribosome subunit

## ARTICULAR EMINENCE & OVERBITE/OVERJET

**Rule: The steeper the articular eminence, the LONGER the posterior cusps MAY be to prevent occlusal interference in lateral movement**

61. Steeper teeth = **more overlap** (increase overbite, decreased overjet)

62. What does NOT cause flattening of the posterior cusp tips? **Deep overbite**
63. To increase anterior guidance, what would you do the vertical & horizontal overlap → **increase vertical overlap, decrease horizontal overlap**
64. Increase in condyle steepness causes an increases **vertical overlap**
- Increase vertical overlap → steeper posterior cusp, increase in anterior guidance, more vertical component to mandibular
65. Increase contour of maxillary central incisors will do what? **Increase overjet**
66. What happens to the right TMJ when the left canines go from normal occlusion to tip-tip occlusion? **Goes down the eminence**
67. Curve of Spee → **Anterior-Posterior Curvature of the Occlusal Surface** | Curve of Wilson → **Medial-Lateral Curvature of the Occlusal Surface**
68. Sum of Curve of Wilson + Curve of Spee = **Compensating Curve**

\*\*\* Reducing the curve of Spee can **reduce** the vertical overlap of the teeth.

There are **two curves** of the occlusal plane observed from a buccal and a proximal view:

1. **Curve of Spee** – refers to the **anteroposterior** curvature of the occlusal surfaces, beginning at the tip of the lower canine, following the buccal cusp tips of the premolars and molars and continuing to the anterior border of the ramus. An **ideal curve of Spee** would be aligned so that a continuation of its arc would extend through the **condyles**.
2. **Curve of Wilson** – refers to the **mediolateral** curve that contacts the buccal and lingual cusp tips on each side of the arch. It results from inward inclination of the lower posterior teeth, making the lingual cusps lower than the buccal cusps on the mandibular arch; the buccal cups are higher than the lingual cusps on the maxillary arch because of the outward inclination of the upper posterior teeth. For mandibular teeth the curve is also concave and for maxillary teeth it is convex.

**Remember:** Combined, the Curve of Spee and Curve of Wilson form a plane termed the “**Sphere of Monson or the Monson Curve.**”

**Note:** From a frontal view, the plane of occlusion of the mandibular arch in a normal dentition is a concave curve, while the maxillary arch is a convex curve.

## PERIODONTAL DISEASE

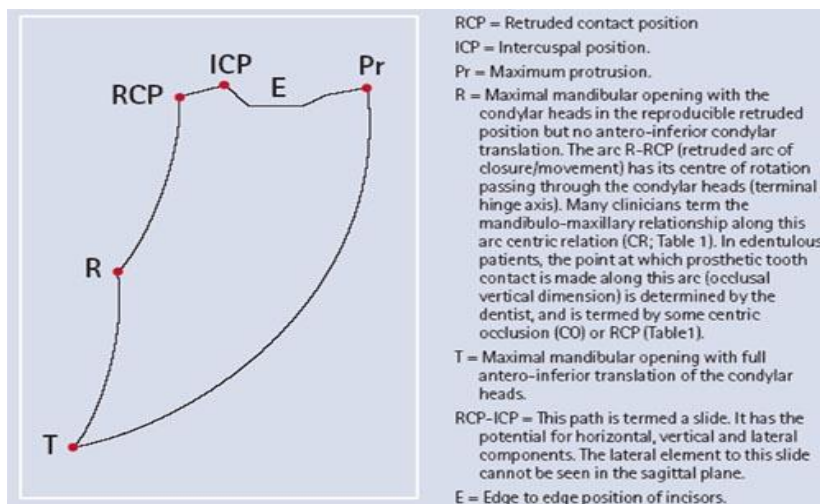
69. Main cause of periodontal pocket? **Bacteriodes gingivalis (P gingivalis)**
70. Immunoglobulin associated with periodontal disease? **IgG**
71. Periodontal disease pathogens are usually **anaerobic or capnophilic**
72. Most common bacteria in periodontitis: **prevotella intermedia** (also in ANUG)
73. What bacteria is likely to cause periodontitis & bleeding gums in a 19 yr old boy? **Actinomyces actinomycetemcomitans** (Aa bacteria)
74. Which pathogen is most likely involved in dental abscess of angle of mandible? **Actinomyces israelii** (Lumpy Jaw)  
-Actinomycosis causes lumpy jaw = growing large abscess that grows on the head/neck.
75. Purulent discharge after extraction & has sulfur granules – **Actinomyces**

## TMJ

76. TMJ is a loading joint & a synovial joint. **Both statements are true.**
77. Inferior compartment of TMJ = **rotation**, superior compartment of TMJ = **translation** (> 25 mm opening?)
78. What part of the condyle is involved in translation? **anterior superior**
79. What ligament restricts protrusive movement? **Stylomandibular ligament**  
-ligament gets taut (under tension) in full mouth opening causing the condyles to move forward
80. When yawning, which ligament tightens up so that the condyle stays in fossa & prevents retrusion? **Temporomandibular Ligament**  
-TM ligament attaches to zygoma & prevent excessive retrusion
81. What ligament is connected the lingual of the mandible? **Sphenomandibular ligament**  
-Origin & insertion of sphenomandibular ligament: Spine of the sphenoid & lingula of the mandible

-Prevents excessive opening

82. Origin & insertion of the pterygomandibular raphe? **Hamulus of the pterygoid plate & mylohyoid line**
83. Origin & insertion of temporomandibular ligament? **Articular eminence/posterior zygomatic arch & neck of condyle**
84. Collateral (Discal) ligaments used during lateral movements & keep articulator cartilage on the condyle head.
85. Disc of TMJ is what to the condyle → **attached laterally**
86. What type of tissue covers the condylar surface of a 10yr old? **Dense fibrous connective tissue**
87. **What covers the articulating surface of the TMJ? Fibrocartilage**
88. Articulating surface of TMJ in older person is covered in? **fibrous connective tissue containing chondrocytes**
89. **Where is the phagocyte located in the TMJ? Synovial membrane**
90. What is the direct source of nutrients to the articulating surfaces? **Diffusion from synovial fluid**
91. What type of connective tissue is in the middle portion of the retrodiscal pad? **Loose CT with blood supply**
92. Patient is anesthetized & pain at the TMJ is gone, what nerve is was anesthetized? **Auriculotemporal N (CN V3)**
93. **TMJ innervation is from? Auriculotemporal N**
94. **Which criteria determines the progressive shift of nonworking condyle? Medial wall anatomy of the glenoid fossa**
95. Cusp tip of tooth #6 & 27 touch on laterotrusive movement, where is the condyle on the non-working side? **medial wall of glenoid fossa**  
-Laterotrusive rotates while mediotrusive side translates forward and opens a bit
96. When restoring a lingual cusp of man 2<sup>nd</sup> Molar, which movement is most likely to cause interference? **Mediotrusive**
97. On your articulator, altering horizontal condylar guidance will affect all of the follow except? **Laterotrusive (?)**
98. Patient with a Class III crossbite does retrusion. What mandibular teeth will the maxillary lateral incisor contact? **Canine & lateral incisor**
99. In Class II occlusion during protrusive movement, which teeth does the mandibular canine occlude with? **Max man canine & 1<sup>st</sup> PM**
100. #13 lingual cusp broke, what movement caused it & with what tooth did it break against? **MF cusp of #19 in a right lateral non-working side movement**
101. **Pt's condyle had ankyloses so can only do the hinge motion, no translation. What is the max opening? 30 mm**
102. **When swallowing, teeth should be in ICP**
103. Centric Relation → **Most repeatable position**
104. Rest position → **by musculature**
105. **Space between teeth in the rest position is? 2-4 mm**
106. What is not seen in Posselt's envelope? **Rest position**



-Most anterior point = protrusion, most inferior = maximum opening

## MUSCLES

<u>Muscle</u>	<u>Origin/Insertion</u>	<u>Action</u>	<u>Innervation</u>
<b>Masseter</b>	O: maxillary process of zygomatic bone I: lateral ramus of mandible	Elevates the mandible	CN V3
<b>Temporalis</b>	O: temporal fossa of parietal bone I: coronoid process	Elevates the mandible (posterior fibers) retrude	CN V3
<b>Medial Pterygoid</b>	O: lateral pterygoid plate of sphenoid bone I: medial ramus of the mandible	Elevate the mandible	CN V3
<b>Lateral Pterygoid</b>	O: lateral pterygoid plate of sphenoid bone I: neck of mandible	Protrude, depressing/opening mandible, Lateral movements	CN V3
<b>Geniohyoid</b>	O: hyoid bone I: mandible	Raises hyoid bone, assist in depressing mandible	C1 via hypoglossal N
<b>Digastric</b>	O: mandible I: hyoid bone	Assists in depressing/opening the mouth Raises hyoid bone	Anterior (CN V3) Posterior (CN VII)

107. What muscle inserts into the pterygoid hamulus? **Tensor veli palatini**

108. What inserts into coronoid process? **Temporalis muscle**

-Elevate mandible (anterior, superior fibers), Retrude mandible (posterior fibers)

109. Which of these muscle retracts the mandible? **Temporalis muscle**

110. Right mandibular excursion is done by the **left lateral pterygoid muscle**

111. Failure of the left lateral pterygoid muscle causes the mandible to deviate to the **left**. (Ipsilateral damage)

112. What makes the sling of the mandible? **Medial pterygoid & masseter muscle**

113. What mandibular movement are the digastric muscles primarily involved with? **depression/retraction**

114. **What movement is being done when both the lateral pterygoid & both the digastric muscles are involved?**

**Depressing (open) & retract the mandible**

-lateral pterygoid muscle is responsible for protruding & depressing/opening the mandible

115. Which group of muscles is used in opening the mouth? **Suprahyoid muscles** (includes digastric)

-muscles involved in depressing the mandible: Geniohyoid, mylohyoid, digastric, lateral pterygoid, infrahyoid

## DEVELOPMENT & ANATOMY OF TEETH

116. First stage of tooth development? **Differentiation of odontoblast**

117. DEJ is developed at what stage? **Bell stage**

-DEJ = 1<sup>st</sup> site of enamel formation

118. Dental lamina is formed around **6 weeks**

-proliferates into bud @ week 8

119. Dentin & pulp is formed from what? **Dental papilla (DP)**

120. What comes from the dental follicle? cementoblast, **osteoblast** (AV bone), fibroblast (PBL)

121. All of the following come from dental sac except **epithelial attachment** (comes from reduced enamel epithelium/enamel organ)

122. Stratum intermedium is needed for **enamel formation**

123. **Which cells are not found in the pulp? Cementoblasts** (found in PDL)

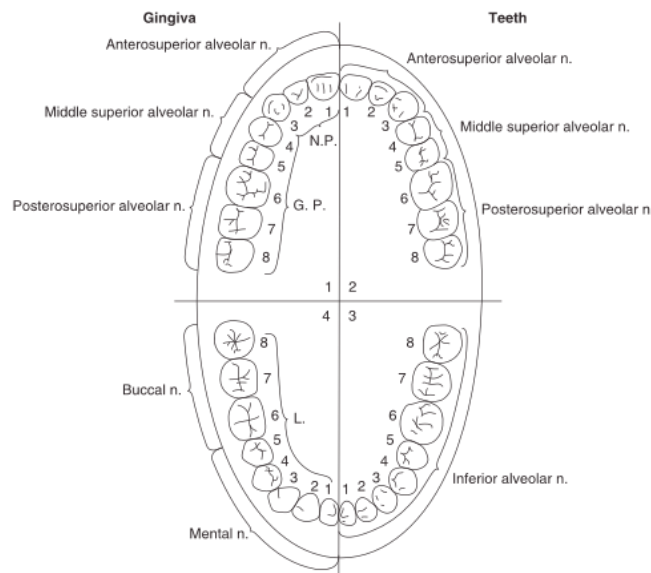
124. Lines of Owen resemble → Striae of Retzius (enamel)

-Contour Lines of Owen = incremental lines in dentin | Striae of Retzius = incremental lines in enamel

125. What are affected in Lines of Owen? **odontoblasts**
126. Secretion of ameloblasts is dependent on? **Laying down of predentin**
127. Crack that goes from the enamel to the DEJ? **Enamel Lamellae**  
-Enamel Lamellae are defects in the enamel resembling cracks or fractures which transverse the entire length of the crown from the surface to the DEJ. Hyocalcified, can contain oral debris.
128. What is dentin called when a patient has chronic disruption by bacteria? **Reparative dentin**
129. Secondary dentin contains no cells
130. **Rashkov's plexus** are **next to odontoblastic process**  
-Fibers concentrated in plexus underneath odontoblast, monitors painful sensations
131. Know **granular layer of tomes**: Thin dentin layer adj to cementum, granules are transverse section of coiled dentinal tubules
132. Peritubular dentin is more calcified than intertubular dentin
133. **Primary cementum = acellular, secondary cementum = cellular**
134. Which of the PDL fibers is most abundant & most load bearing? **Oblique**
135. What type of collagen is predominates in PDL fibers & not in bone or dentin? **Type III**
136. Bit hard on a popcorn kernel, what stops the biting → **Periodontal Mechanoreceptors**

## RANDOM

137. What nerve innervates #3-5? **Middle superior alveolar N & posterior superior alveolar N**  
-PSA: M3, M2, M1 (DB root)  
-MSA: MB root of M1, PM2, PM1  
-ASA: canine to central



138. What is the prominence on the surface of the maxillary bone caused by the canine tooth? **Canine eminence**
139. **Mesiodens** = supernumerary tooth located between maxillary central incisors.
140. Swollen lip or puffy face after amalgam filling? **angioedema**
141. Patient's condyle can be obstructed by **tuberosity**
142. Patient had a heart stent placed 6 years ago & hip replaced 10 years ago, which of the following do you NOT do?  
**Antibiotic prophylaxis**
143. What allows the radicular pulp to communicate with the periapical tissue-radicular? **apical foramen**
144. **Cervical ridge** is the only ridge that can't be seen from the incisal view.
145. Know contact points  
-Max lingual cusp will contact central fossa + distal MR of man  
-Man buccal cusp will contact central fossa + mesial MR of max
146. Height of Contour on teeth

-All facial HOC & anterior lingual side = cervical 1/3

-All remaining lingual HOC = middle 1/3 (except man 2<sup>nd</sup> PM HOC is in occlusal 1/3)

147. Lingual height of contour of maxillary 1<sup>st</sup> molar? **Middle 3<sup>rd</sup>**

148. Contact point of mesial of man canine → **incisal 1/3**

149. Contact point on distal of max lateral incisor → **middle**

150. 17 yr old patient has 2 molars, permanent PM, & primary molars on in the right mandibular quadrant, what tooth is likely missing? **Permanent man 2<sup>nd</sup> PM**

-Most likely reason for still having primary teeth = successor is missing

151. What is the 1<sup>st</sup> succedaneous premolar to erupt? **Man 1<sup>st</sup> PM**

152. How many posterior teeth are succedaneous? **8** (all premolars)

153. What is formed by the marginal ridge & cusps of the teeth? **Developmental grooves** or occlusal table (?)

154. Patient has infected man 1<sup>st</sup> premolar, which lymph node will be infected first? **Submandibular**

155. Lymph of anterior mandibular teeth (#24) drain to where? **Submental**

156. What is the most common cause of infection in dental clinics? **Air borne inhalation**

157. Child has central incisor, lateral incisor, and canine erupt with brown pits in the incisal third of enamel, what happen? **Hypoplastic** (pitting)

158. All of the follow should be considered before an extraction except? **Density of the mylohyoid line**

159. What would be the radiolucency above the first maxillary molar? **Maxillary sinus**

160. What would be the radiolucency between the maxillary central? **Intermaxillary suture**

161. The part of the hard palate that is directly posterior to the maxillary centrals formed from? **Intermaxillary Segment**

162. What is the cause of half facial paralysis after Inferior Alveolar Nerve Block? **Injection into parotid gland**

163. Pt comes in 1 day after extraction of max 3rd molar with a hematoma. What is the cause of the hematoma? **Needle has violated in pterygoid plexus**

164. Mandibular Tori is made of? **Dense lamellar bone**

165. After a dental prophylaxis, **bacteremia** is when bacteria gets into the blood from scaling of teeth. (Not septicemia)

166. What happens as a tooth ages → **Decrease in Cellularity** (?)

167. Where is fat found in the palate? **Anterolateral**

168. Which root shape is most likely to have one canal? **Round**

169. **Taurodontism** - body & pulp chamber of a molar is enlarged vertically at the expense of the roots/moved apically down the root. MOA is the failure or late invagination of Hertwig's epithelial root sheath, which is responsible for root formation and shaping, causing an apical shift of the root furcation.



## ETHICS

<b>Veractiy (Truthfulness)</b>	The dentist has the duty to communicate truthfully
<b>Justice (Fairness)</b>	Dentists (1) shall not refuse to accept pts into their practice or deny dental service to pts bc of the pt's race, creed, color, sex, or national origin(2) have the general obligation to provide care to those in need (ex. refusing to treat HIV+ pt is unethical)(3) shall be obligated to make reasonable arrangements for the emergency care of their pts of record.



<b>Autonomy (Self-Governance)</b>	Dentist has a duty to respect the pt's rights to self-determination & confidentiality
<b>Beneficence (Go Good)</b>	Dentist is obliged to (1) give the highest quality of service of which he or she is capable(2) preserve a healthy dentition unless it compromises the well-being of other teeth(3) participate in legal and public health-related matters.
<b>Non-maleficence (Do No Harm)</b>	The dentist has a duty to refrain from harming the pt.

170. You extract a primary tooth and you injure the permanent tooth bud, what is the ethical word listed above that describes the fact that you have to inform the patient what happened? **Veracity**
171. A case of a child with evidence of child abuse and they asked you what you should do? **Report your suspicions.**
172. If the doctor doesn't feel comfortable practicing on someone? **Non-maleficence**
173. During extraction, you break the adjacent marginal ridge of an amalgam treated tooth?
- Continue with extraction.
  - Stop everything and notify patient.**
  - Smooth out edges of broken amalgam so you don't lacerate tissue.
  - Call patients emergency contact.
174. Besides maintaining a patient's oral health, what would a dentist prioritize? **Autonomy**

## CASE STUDY/TESTLET QUESTIONS

- (Case Study)** Exam of cadaver. Trauma victim with broken bone & evidence of "woven bone repair" (?)
  - How long as it been since the trauma? **Woven bone = a few days, 3 weeks**
  - What facial bone did she break if it was adjacent to the canthus? **Zygomatic bone**
  - Penetration at lower left (stab), which organ was most likely hurt? **Kidney**
- (Case Study)** Dead girl has swollen right cheek with hematoma on the lateral rim of the right orbit. Erupted upper canines but not lower canines. Rattlesnake bites her lateral of the right forearm.
  - What's the age of this girl? **9-10 yrs** (max canine = 11-12 yrs)
  - Which bone of the orbit is probably broken? **Zygomatic**
  - On the x-ray, there is a line of radiolucency on the left orbital lateral margin? **Normal suture**
  - What would the coup contrecoup injury be (opposite side of impact) **Right sphenoid**
  - What nerve is most prone to injury in the forearm? **Radial nerve (elbow)**
- (Case study)** Patient with pain in the shoulder that extends down to the arms & hands.
  - What nerve is damaged? **T1-T2**
  - What innervates the middle finger? **C7**
  - What innervates the Ring Finger? **C8**
  - What nerve is involved when she has pain turning her head? **Accessory N**
- (Case Study)** Diabetes case: Patient has an HbA1C = 11%
  - How to tell her status for the past few weeks (HbA1C test for what condition)? **Diabetes (Type II)**
  - All are likely to be associated with this person's existing condition except? **Angioedema**

-HbA1c (glycated hemoglobin assay) is proportional to blood glucose concentration.
- (Case study)** Female with hypothyroidism that suffers from dry mouth & is taking thyroid medication.
  - What happens if she overdoses on medication? **Tachycardia**
  - What is the cause of her dry mouth? **Sjogren's Syndrome**

- Sjogren's syndrome is the 2<sup>nd</sup> most common autoimmune rheumatic disorder after RA. Characterized by diminished lacrimal & salivary gland secretion (sicca complex)
- Can cause distortion of taste (**dysgeusia**)
- Hypothyroidism: Positive nitrogen balance (intake > loss), cold intolerance (Decreased blood flow to skin), weight gain, fatigue

- (**Case Study**) Man has fair skin and has a mole rapidly growing lateral to nose (or on alar part of nose). The lesion is growing fast.
  - What is it? **melanoma**
- (**Case Study**) Exam of cadaver: Female. LEFT backstab at L1-L2, adjacent to vertebrae, 12 cm deep. Has Mallory-Weiss tear on her esophagus and multiple mass on her uterus.
  - What is the cause of the Mallory-Weiss tear? **Alcoholism** (Mallory-Weiss tear = bleeding from tears at esophagus/stomach jxn)
  - What is the multiple mass on her uterus? **Leiomyoma** (benign neoplasm of uterus)
  - Which organ is most likely damaged/hit → **Kidney**
- (**Case Study**) Patient has gestational diabetes & is 10 weeks pregnant.
  - What has not formed? **TMJ formation** (12 weeks)
 -Palate closes @ 10 weeks, tooth bud forms @ 8 weeks
  - What happens to her hormones? **↑ in HcG, ↓ in FSH & LH**
- (**Case Study**) 6 weeks pregnant lady.
  - How long do you wait to treat her? **6 weeks**
  - Tell her to take care of oral health, why? **Gingival bleeding**
- (**Case Study**) Patient has asthma & is on Albuterol and high blood pressure meds.
  - What is a dental complication? **Orthostatic Hypotension**
  - Asthma treatment = Beta-2 agonist causes bronchiolar relaxation
- (**Case Study**) Woman comes into your office complaining that every time she eats, she gets a swelling that is painful and large. X-Ray shows radioopacity, 1 cm x 1 cm. Inflammation of the submandibular duct/gland, tenderness.
  - What is the reason for swelling? **Bacterial infection**
  - What's the diagnosis? **Sialolith** (calcified mass in salivary gland, usually submandibular. Symptoms: pain/swelling when salivary gland is stimulated)
  - What kind of cells would you find when biopsy the salivary duct/gland? **neutrophils**
- (**Case Study**) Dentist is asked to help w/ an autopsy. There were 2 bullet wounds, evidence of TB. One bullet hit above the ear & the other was a bullet through the ribs that injured the lower lobe of the lung.
  - The bullet that hit above the ear came out of where? **Temporal bone**
  - Man is shot & a bullet entering between the right 7<sup>th</sup> & 8<sup>th</sup> intercostal ribs & exits to the right of T7. What lobe of the lung did it puncture → **Inferior Right lobe**
  - T/F → **hemothorax** (blood in pleural cavity)
- (**Case Study**) Patient has Myasthenia Gravis
  - Mechanism: autoimmune disease, **antibodies against post-synaptic NMJ Ach receptor**
    - Causes **decreased acetylcholine receptors**
    - How to medicates treat/help overcome symptoms: **acetylcholinesterase inhibitor helps increase amount of available acetylcholine receptors**
    - Patient refuse treatment & can only afford to do a prophylaxis, what do you do? **Present him with all options & refer him to specialty as needed.**

14. **(Case Study)** Girl with from another country has TB; know about the drug & dental problems.
- What antibiotic is most frequently used in treatment of TB? **rifampin** = inhibits RNA synthesis (transcription), used for 6-9 months
- Elective dental Tx should be deferred until the patient has been declared non-infectious by a physician.  
-Urgent dental care should be provided in a facility that has the capacity for airborne infection isolation (OSHA).
15. **Testlet:** 50yr old man comes in for ortho treatment. He has an FPD on #12-14. Need to remove the anterior abutment.
- What of the following is not likely to be a complication in the extraction of this tooth? **One root**
    - #12 is max 1<sup>st</sup> PM, 2 roots
  - What's a complication of Coxsackievirus Virus that can be manifested in oropharynx? **Herpangina**
    - Herpangina affect soft palate & oropharyngeal mucosa
16. **(Case Study)** Obese man with Type II diabetes mellitus & drinks alcohol comes in for extraction of #3.
- Why does he have bad breath (halitosis)? **Oral hygiene**
  - What is it most related to? **Overweight/diet**
  - All of following are related to diabetes Type II except? **Autoimmune, no destruction of Beta cells**
  - After extraction of the tooth, you notice histological pseudostratified ciliated epithelium at the root tip, what is it from? **Maxillary sinus**
17. **(Case Study)** 6 weeks pregnant women taking tetracycline for rosacea.
- What does not occur during 6 weeks of fetus? **Palatal shelves fusion** (7 weeks)
  - Which one is seen in the fetus but not the mother? **Ductus venosus**
  - What is the problem with using tetracycline for the fetus? **Changes the color of the teeth/discoloration**
  - At what time is best for elective dental tx as it would after organogenesis of the fetus? After 10 weeks
    - organogenesis occur embryonic weeks 3-8 & is completed by 10 weeks
18. **(Case Study)** Diabetic firefighter with a bad upper left bridge looking for an implant.
- When placing an implant in bone, what epithelium is encountered? **Pseudostratified columnar ciliated epithelial cells** (that line the maxillary sinus, similar to respiratory epi)
  - If patient wants an implant but it is too close to the sinus, what ethics are involved? **Non-maleficence & autonomy**
  - Implant patient: Which cells will be most actively dividing → **Osteoprogenitor**
19. **Testlet:** Left maxillary canine experiences sharp shooting pain.
- What kind of fibers are responsible for the pain? **A-delta**
  - No sign of decay. What is the most likely cause of the pain?
    - Maxillary Sinus Infection**
    - Broken root
20. **(Case Study)** Patient with Grave's disease
- Mechanism against Graves' Disease: binding **Ig antibodies to TSH receptor in the thyroid** (mimic TSH) → stimulate production of thyroxin
- Graves's disease causes/lab test show? **High T3/T4, low TSH** (on a graph)
  - What are the symptoms of Graves' disease? **Exophthalmos** (bulging eyes)
21. **(Case Study)** Dental assistant whose hand's shakes due to Parkinson's disease
- Which part of brain affected? **Substantia nigra**
  - Neurotransmitter affected? **Lack of dopamine**
  - This dental assistant is still performing work so what moral value? **Maleficence**
- Common symptoms: Loss of automatic movements, such as smiling and blinking (dry eye) & loss of facial expression

22. **(Case Study)** HIV patient had an ulcer near tooth #15 that is very sore.
- Biopsy was done on ulcer & it was undifferentiated something, what is it most likely? **Kaposi Sarcoma** (?)
  - Which injection would u give? → PSA
  - Opportunistic infections associated & not associated with AIDS
  - How to treat patient ideally? **Limit/control infection** (?)
23. **(Case Study)** Patient has RPD
- What would diagnosis be for slight red inflammation below RPD? **Denture stomatis**
  - What is this mainly caused by? **Ill-fitting RPD device**
  - Type of epithelium of hard palate under dentures? Parakeratinized/orthokeratinized stratified squamous epithelium (?)
  - Type of epithelium found on buccal mucosa? **Nonkeratinized squamous**
24. **(Case Study)** Some girl got HPV vaccine
- Linked to cervical cancer
  - Type of epithelium in vagina that would be susceptible to metastasize? Stratified nonkeratinized
25. **(Case Study)** Patient with RCT #3 & the radiolucency did not resolve. The histological section showed non-keratinized epithelium
- What is the radiolucency? **Cyst** (Other answer options were abscess, granuloma, etc)
    - Cyst is a fluid-filled sac = don't resolved after RCT (abscesses tend to), non-keratinized stratified squamous epithelium w/ PMNs. Both abscess & cyst are non-keratinized epithelium
  - Where would the infection go? **Infratemporal**
26. **(Case Study)** Patient has Alzheimer's with cervical caries.
- Alzheimer's –all of the following are true except? **Most people experience dementia before age 50**
  - You fracture the adjacent tooth during a prep, you can? **Tell the wife who is the legal guardian**
  - What would you least recommend to an Alzheimer's patient? **Bleaching Trays**
- Depression is a risk factor for Alzheimer
27. **(Case Study)** Hygienist accidentally cuts patient distal to mandibular 2<sup>nd</sup> molar, 1 cm from midline.
- Which muscle is not damaged? **Musculus Uvula**
28. **(Case Study)** Woman walks into dental office, complaining of TMJ pain. She is taking NSAIDs for TMJ and taking Prednisone. She has Polymyalgia Rheumatica and Osteoarthritis.
- She has crepitus in the TMJ, what is the cause? **Osteoarthritis** of the condyle
    - All of these are correct about osteoarthritis, EXCEPT? **Fever**
  - Where would she have pain? **Pectoral girdle** (shoulder/neck) & hips
  - What kind of disease is polymyalgia rheumatic? **Inflammatory disease**
  - Patient with polymyalgia rheumatic, what problem might she not have now? **Splenomegaly**
- You perform a dental procedure on person who is taking NSAIDs and is Anemic and she starts to hemorrhage, why? Because platelets aren't sticking due to NSAIDs – NSAIDs inhibit platelet aggregation (Tbx2), Due to her Anemia (if APLASTIC ANEMIA, body doesn't make enough RBC, WBC, & platelets)
29. **(Case Study)** 65 yr old patient is hypertensive, has high cholesterol, and is on diuretics. Dad died of a heart attack at 55 yrs old. He needs 3 extractions of the maxillary.
- Which of the following is the most immediate necessary referral? **Hypertension** (increased risk of bleeding during extraction)
30. **Testlet** - lady had rheumatoid arthritis, osteoarthritis on hip and knees and couldn't open her mouth affected her talking and eating. She took lots of meds for arthritis and antidepressant. 20 pack- year smoker.
- What is cause of her xerostomia? **Medication**

- b. What is dysguesia associated with? **Xerostomia** from anti-depressant meds
  - c. All of these are correct about osteoarthritis, EXCEPT? **Fever**
  - d. What is cause of her chief complaint? – her TMJ prob from osteoarthritis?
  - e. She has pain on the posterior part of her 2nd molar, what might this mean? Trismus
  - f. Pt complains of waking up stiff every morning, what is cause of this? **Rheumatoid arthritis**
31. **Testlet** - 75 yr old lady has type 1 diabetes mellitus & takes insulin. She also has medications for high BP and hypercholesterolemia.
- a. She comes in with her breath smelling “fruity” what is the cause for this? **Hyperglycemia** (ketoacidosis)
32. **(Case Study) Ethics:** Man comes in with herpes virus.
- a. Which of the following two principles would demonstrate non-ethical complication with referring the patient? **Justice & Beneficence**
  - b. What principle is violated if you refer a patient because he has hepatitis? **Justice**
  - c. Patient wants to put in composite even though not needed, what do you do? **Put composite (autonomy)**
33. **(Case Study)** Male patient comes in with pain on his maxilla tuberosity by #3. It get worst at night, sharp pain and comes suddenly and leaves suddenly. He comes to your office for a clinical exam. Everything is NORMAL except palpation of the buccal gingiva hurts.
- a. What is the diagnosis for the case? **Trigeminal neuralgia.**
  - b. Patient comes back and can't take the pain anymore, so he asks you to take all his teeth out and make him a removable. Which two principles conflict? **Autonomy & non-maleficence.**
- Trigeminal neuralgia (**Tic Douloureux**) - axon demyelination in gasserian ganglion, dorsal root or both

## Random STUFF TO KNOW:

- Bronchi (psuedostatified epi), bronchiole (simple columnar epi), alveolus (squamous epi)
- Adenosine nucleoside crosses mitochondria how? Cotransport?
- Which one as the right relationship between cycle, enzyme & positive Allosteric regulator of glycolysis?  
**Glucose: PFK: AMP?**
- Glut-1 transporter is what kind of transporter? active or co?
- Arginine – can be converted back into glucose how & where?
- Chronic granuloma is ccaused by what type of organism?
- Most square PM?
- Know everything about maxillary lateral, maxillary canine, & mandibular lateral.
- Scoliosis = lateral deviation of spine
- what's in birth control (estrogen + progesterone)

### EDEMA

$$\text{Flux} = K_{fc} [ (P_{iv} - P_{is}) - \sigma_d (\pi_{iv} - \pi_{is}) ]$$

- $K_{fc}$  capillary filtration coefficient
- $P_{iv}$  intravascular pressure
- $P_{is}$  interstitial pressure
- $\pi_{iv}$  intravascular oncotic pressure
- $\pi_{is}$  interstitial oncotic pressure
- $\sigma_d$  reflection coefficient

Osteomalacia: softening of the bones due to deficiency of Vit D

Osteosarcoma: malignant bone cancer

**Osteomyelitis**: bone infection (**common w/ stap aureus**) → what bacteria/virus is involved in this?

Osteopenia: low bone density, before osteoporosis