

# 1.61.) DIVERTICULAS & HERNIAS

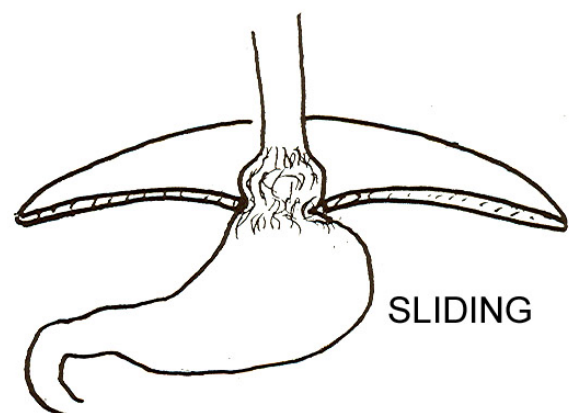
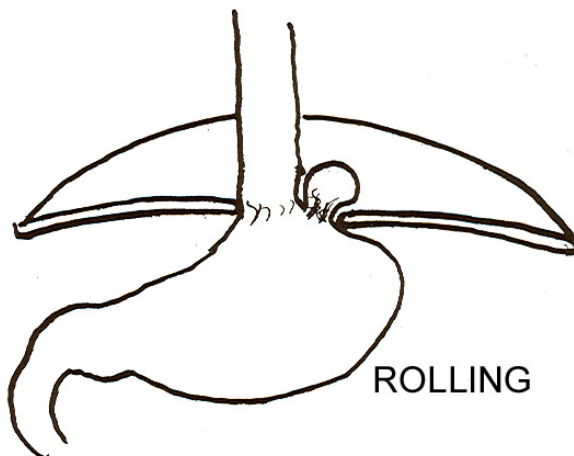
## A) Esophageal Diverticula:

PULSION DIVERTICULA (Zenker's)	TRACTION DIVERTICULA
<ul style="list-style-type: none"><li>• “false” (mucosa only)</li><li>• at junction of pharynx/esophagus</li><li>• dysphagia, regurgitation</li></ul>	<ul style="list-style-type: none"><li>• “true” (all layers)</li><li>• mid part of esophagus</li><li>• asymptomatic</li></ul>



*Compare the anatomic features of the two types of diverticula and review the layers of the gastrointestinal tube: mucosa → lamina propria → muscularis mucosa → submucosa → circular muscle layer → longitudinal muscle layer.*

## B) Hiatal Hernias:



From Zaher: *Pathology Made Ridiculously Simple*, MedMaster, 2007

## 1.81.) CNS DEGENERATION

Alzheimer's is the most common degenerative disease of the CNS. Its pathological features are:

- (1.) diffuse cortical atrophy
- (2.) senile plaques ( $\beta$ -amyloid protein)
- (3.) neurofibrillary tangles (cytoplasmic deposit of tau protein).

Compare with the less common degenerative diseases of the CNS:



	KEY FEATURES
<b>Pick's</b>	<ul style="list-style-type: none"> <li>• lobar atrophy</li> <li>• mainly frontal and temporal</li> </ul>
<b>Parkinson's</b>	<ul style="list-style-type: none"> <li>• bradykinesia, rigidity, resting tremor</li> <li>• dopamine depletion (caudate, putamen)</li> <li>• <b>Lewy bodies</b> (spherical inclusions in melanin-depleted neurons of the substantia nigra)</li> </ul>
<b>ALS</b>	<ul style="list-style-type: none"> <li>• rapidly progressive</li> <li>• degeneration of corticospinal tract (UMN)</li> <li>• degeneration of <math>\alpha</math>-motoneurons (LMN)</li> </ul>
<b>Huntington's</b>	<ul style="list-style-type: none"> <li>• chorea, athetoid movements</li> <li>• atrophy of caudate, putamen and frontal cortex</li> </ul>
<b>Friedreich's ataxia</b>	<ul style="list-style-type: none"> <li>• autosomal recessive</li> <li>• pes cavus</li> <li>• loss of proprioception</li> <li>• tremors, Babinski reflex</li> <li>• spinal cord atrophy</li> <li>• (spinocerebellar, corticospinal, post. columns)</li> </ul>

**Upper motor neuron lesions:** spasticity, increased tendon reflexes

**Lower motor neuron lesions:** paralysis, fasciculations, absent tendon reflexes

## 2.19.) HIGHER BACTERIA

- gram-positive rods
- filamentous, branching growth: were confused with fungi in the past
- cause indolent, slowly progressive diseases



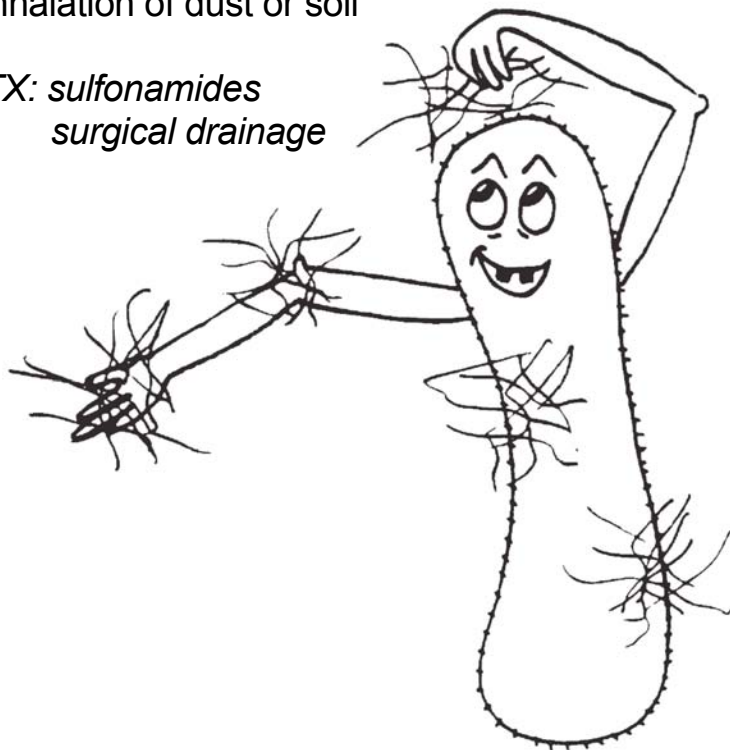
### KEY FEATURES

#### ***Actinomyces*** anaerobe

- growths in normal mouth flora
- **Lump jaw**
  - following tooth extraction
  - inflammatory sinuses → discharge to surface
  - sulfur granules
- *TX: penicillin*  
*surgical drainage*

#### ***Nocardia*** aerobe

- growths in soil
- **Subcutaneous tissue infections**
  - following minor trauma (outdoors)
- **Pulmonary infections**
  - inhalation of dust or soil
- *TX: sulfonamides*  
*surgical drainage*



## 3.5.) ANTIBIOTICS

Bactericidal drugs “kill” bacteria.

Bacteriostatic drugs inhibit bacterial growth and require the host’s immune system to “finish the job”.

BACTERICIDAL	BACTERIOSTATIC
<ul style="list-style-type: none"> <li>• penicillins</li> <li>• cephalosporins</li> <li>• aminoglycosides</li> <li>• vancomycin</li> <li>• quinolones</li> </ul>	<ul style="list-style-type: none"> <li>• chloramphenicol</li> <li>• erythromycin</li> <li>• tetracyclines</li> <li>• sulfonamides</li> <li>• trimethoprim</li> </ul>



*Misuse of antibiotics results in emergence of antibiotic-resistant strains. This creates an ever-increasing need for new drugs...*

GRAM-POSITIVE	GRAM-NEGATIVE	BROAD-SPECTRUM
<ul style="list-style-type: none"> <li>• penicillin G</li> <li>• vancomycin</li> <li>• bacitracin</li> </ul>	<ul style="list-style-type: none"> <li>• aminoglycosides</li> <li>• polymyxins</li> </ul>	<ul style="list-style-type: none"> <li>• ampicillin</li> <li>• cephalosporins</li> <li>• tetracyclines</li> <li>• chloramphenicol</li> <li>• sulfonamides</li> </ul>

### MECHANISMS OF RESISTANCE

Bacteria become resistant to antibiotics if they acquire DNA coding for extra enzymes (e.g.  $\beta$ -lactamase). There are 3 ways in which DNA may be acquired:

<b>transduction</b>	transmission of DNA by bacteriophages that carry plasmids (extrachromosomal DNA)
<b>transformation</b>	uptake and incorporation of DNA from environment
<b>conjugation</b>	direct transmission of DNA from cell to cell through the sex pilus



## 4.30.) STEROIDS

Steroid hormones are made from cholesterol:

CLASS	EXAMPLE	NUMBER OF C-ATOMS
sterols	cholesterol	27
bile acids	glycocholate taurocholate	24
glucocorticoids	cortisol	21
mineralocorticoids	aldosterone	21
gestagens	progesterone	21
androgens	testosterone * androstenedione DHEAS	19
estrogens	estradiol * estriol	18

\* *most potent*

### 17-ketosteroids (dehydroandrosterone and androstenedione) ↑

- 11-hydroxylase deficiency
- 21-hydroxylase deficiency
- Cushing's syndrome
- androgen producing adrenal or gonadal tumors

### 17-hydroxysteroids (cortisol metabolites) ↑

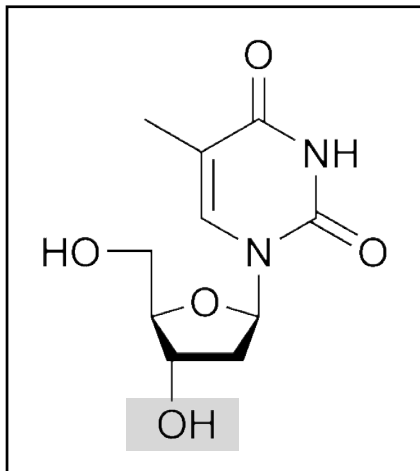
- 11-hydroxylase deficiency
- Cushing's syndrome

## 4.42.) NUCLEOTIDES

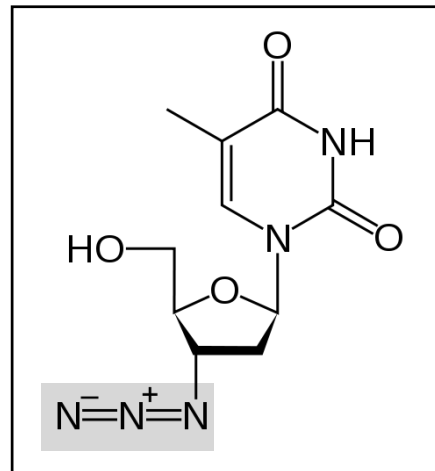
Nucleosides are purines or pyrimidines linked to a pentose sugar.  
Nucleotides are phosphates (mono-, di- or tri-) of the nucleoside.

<b>BASE</b>	<b>NUCLEOSIDE</b>	<b>NUCLEOTIDE</b>
<p><b><u>PURINES</u></b></p> <ul style="list-style-type: none"> <li>• adenine</li> <li>• guanine</li> </ul>	<ul style="list-style-type: none"> <li>• adenosine</li> <li>• guanosine</li> </ul>	<ul style="list-style-type: none"> <li>• adenylate (AMP)</li> <li>• guanylate (GMP)</li> </ul>
<p><b><u>PYRIMIDINES</u></b></p> <ul style="list-style-type: none"> <li>• uracil</li> <li>• cytosine</li> <li>• thymine</li> </ul>	<ul style="list-style-type: none"> <li>• uridine</li> <li>• cytidine</li> <li>• deoxythymidine</li> </ul>	<ul style="list-style-type: none"> <li>• uridylate (UMP)</li> <li>• cytidylate (CMP)</li> <li>• deoxythymidylate (dTMP)</li> </ul>

Thymidine



AZT




*AZT (Zidovudine) can be incorporated into the HIV DNA transcript by viral reverse transcriptase. Lack of the 3'-OH group then inhibits further elongation of HIV DNA.*

*Mammalian polymerase is less likely to mistake AZT for thymidine.*

## 5.2.) FETAL REMNANTS

The umbilical cord contains 2 arteries (deoxygenated blood) and 1 vein (oxygenated blood from placenta). The yolk stalk connects the yolk sac with the GI tract, the urachus connects the urinary bladder with the allantois. These fetal structures disappear and leave remnants.



<b>umbilical arteries</b>	medial umbilical ligaments
<b>urachus</b>	median umbilical ligament
<b>umbilical vein</b>	round ligament
<b>ductus venosus</b>	venous ligament
<b>ductus arteriosus</b>	ligamentum arteriosus
<b>yolk stalk</b>	Meckel's diverticulum

### Meckel's diverticulum: "2-2-2"

- persists in 2% of persons
- located at antimesenteric border of ileum (within 2 feet of the ileocecal junction)
- is about 2 cm long

*Inflammation may mimic appendicitis!*

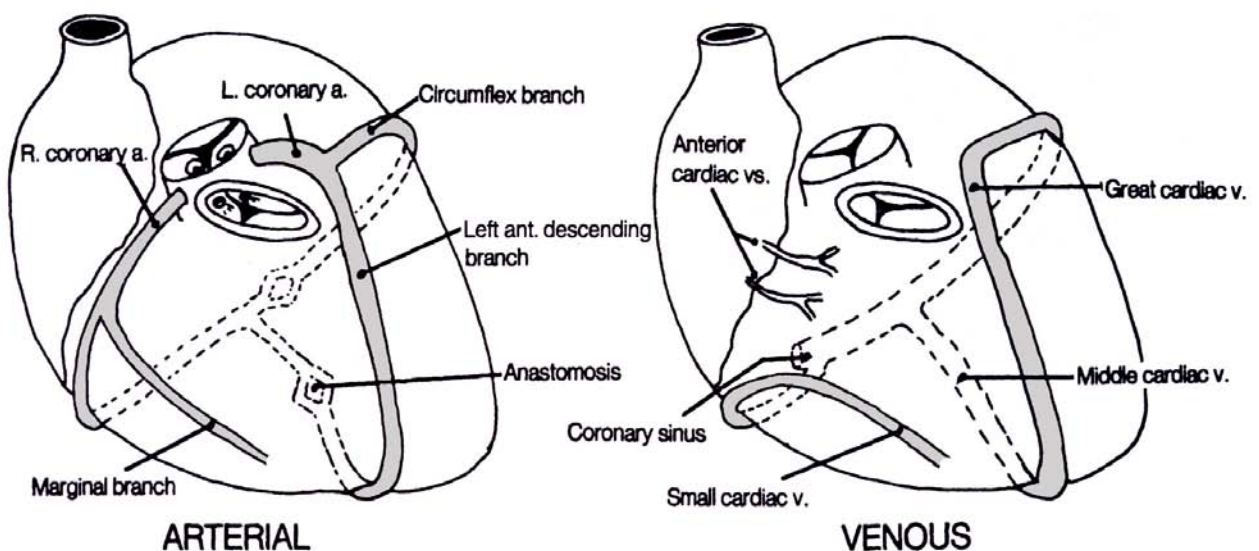
## 5.22.) CORONARY ARTERIES

The heart muscle receives its blood flow from two coronary arteries that originate from the ascending aorta just above the aortic valve.

	<b>SUPPLIES:</b>
<b>left coronary artery</b> → ant. interventricular and circumflex artery	<ul style="list-style-type: none"> <li>• most of the left atrium</li> <li>• most of the left ventricle</li> <li>• anterior portion of septum</li> </ul>
<b>right coronary artery</b>	<ul style="list-style-type: none"> <li>• right atrium</li> <li>• right ventricle</li> <li>• variable amount of left atrium and ventricle</li> <li>• sinus node</li> <li>• AV node</li> </ul>



*Blood flow through coronary arteries is highest during early diastole and lowest during systole!*



From Goldberg: *Clinical Anatomy Made Ridiculously Simple*, MedMaster, 2007



## 6.10.) DEAFNESS

In patients with diminished hearing it is important to distinguish between middle ear from inner ear problems. This can be done with a simple tuning fork test:

### TUNING FORK TESTS:

	WEBER	RINNE
<b>method</b>	Place fork on top of skull	Place fork on mastoid process until tone disappears (= bone conduction).  Then hold next to ear (= air conduction).
<b>normal</b>	Sound is equal in both ears.	Air conduction is better than bone conduction.
<b>conduction deafness</b> <sup>1</sup> (middle ear)	Sound lateralized to sick ear.	Bone conduction is better than air conduction.
<b>nerve deafness</b> <sup>2</sup> (inner ear)	Sound lateralized to normal ear.	Air conduction is better than bone conduction.

<sup>1</sup> *chronic otitis, otosclerosis or occlusion of external auditory meatus*

<sup>2</sup> *cochlear disease or injury to cranial nerve VIII.*



*Unilateral cortical lesions do NOT affect hearing since cochlear nuclei project to both temporal lobes.*

## 7.18.) DRUG ABUSE

**Abuse:** Recurrent use of drugs resulting in (1.) social failures at home, school or work, (2.) legal problems (3.) hazardous situations.

**Dependence:** Tolerance - needs larger doses to achieve effect  
- severe withdrawal symptoms

	<b>INTOXICATION</b>	<b>WITHDRAWAL</b>
<b>alcohol</b>	<ul style="list-style-type: none"> <li>• euphoria</li> <li>• disorientation</li> <li>• unsteady gait</li> </ul>	<ul style="list-style-type: none"> <li>• nausea</li> <li>• tremor, seizures</li> <li>• delusions, hallucinations</li> <li>• delirium tremens</li> </ul>
<b>barbiturates</b>	<ul style="list-style-type: none"> <li>• sedation</li> </ul>	<ul style="list-style-type: none"> <li>• can be severe!</li> <li>• delirium</li> <li>• epilepsy</li> <li>• coma, death</li> </ul>
<b>benzodiazepines</b>	<ul style="list-style-type: none"> <li>• antianxiety</li> <li>• sedation</li> </ul>	<ul style="list-style-type: none"> <li>• anxiety</li> <li>• irritability</li> <li>• insomnia</li> </ul>
<b>amphetamines, cocaine</b>	<ul style="list-style-type: none"> <li>• arousal</li> <li>• euphoria</li> </ul>	<ul style="list-style-type: none"> <li>• fatigue</li> <li>• dysphoria</li> </ul>
<b>opioids</b>	<ul style="list-style-type: none"> <li>• euphoria</li> <li>• apathy</li> </ul>	<ul style="list-style-type: none"> <li>• nausea, vomiting</li> <li>• sweating, fever</li> <li>• muscle ache</li> </ul>
<b>LSD</b>	<ul style="list-style-type: none"> <li>• hallucinations</li> <li>• anxiety</li> <li>• paranoid ideas</li> </ul>	none

**Blood alcohol:** > 0.1% → intoxication  
> 0.2% → fall asleep, anesthesia  
> 0.4% → inhibition of respiration, death



*Typical metabolic rate is 10~20 mg/dL (0.01~0.02%) per hour.*