

Week 12 Lecture 2

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1 Administrative drivel

- I missed class wednesday – lecture notes to be made; I have slides to go off of.
- still waiting on exam scores from electronic grading
- we might get a review session before the final (depending on profs productivity over break)
 - answering questions brought in
- there will be a review sheet for the final exam

2 Diseases

2.1 protozoal diseases

- malaria – 2nd most common disease that kills a significant number (on order of 1 million)
 - *Plasmodium* (the organism) lives in mosquito salivary glands
 - mosquitos use saliva to anaesthetize their host (so they don't feel the bite)
 - * Almost always a female
 - * they largely eat nectar from flowers, which is low in protein, so the females need blood for protien to make eggs
 - * blood is high water volume, with some protien
 - * lifecycle of plasmodium:
 - plasmodium is taken up into mosquito stomach
 - makes its way into the salivary glands
 - Gets injected into new host via salivary glands
 - eventually destroys red blood cells, entering blood plasma in the millions
 - some communication between plasmodia
 - plasmodia have (usually) 4 day life cycles
 - * immune system isn't great at removing it
 - * some defense can be mounted, but in children under 5 the defenses are minimal, so most children die
 - * every 4 days you're body shuts down (from the red blood cells ruptuing)
 - severe flu-like symptoms
 - 2nd only to tb in terms of deaths
 - largely irraticated from the US
 - is actually a family of organisms, diffeerent ones infecting different species
 - Eukareotic, so looks like our cells... So, the drugs we have attack our own cells as well as the pathogen

- 2015 WHO data:
 - * more than 200 million cases
 - * more than 400k deaths, mostly children in Africa
- prevention:
 - Drink only clean water
 - Avoid organisms that pass the protozoa to you
- Protozoa are extremely diverse, and so there is no one class of drug that can treat them all
- each group of protozoa is treated with its own anti-protozoal drug
- They are eukaryotes, like us – much harder to find unique biochemistry
- E.g. in US: Giardia!
- E.g. Trematodes and flat worms
 - Many attack the nervous system, liver
 - Next to impossible to be rid of them

2.2 Other infectious diseases

- Fungi – ringworm, athlete's foot, thrush, yeast infection
- Parasitic worms – pinworms, hookworms, tapeworms, flukes (the last cause severe symptoms)
- Prions (non living) – infectious *proteins* mad cow (bovine encephalitis), Jakob-Creutzfeldt disease, CWD (ungulates as far as we know)

3 Senses

- What is a sense?
 - Systems where our bodies are able to detect things that are going on in the environment (usually detection of some form of energy)
 - A distinct way we receive stimuli
 - * (a signal from the nearby environment)
 - * 1. A **stimulus** arrives:
 - A molecule enters the nose
 - sound wave enters the ear
 - you touch the tabletop
 - * 2. The stimulus *activates* a **receptor cell**
 - the receptor cell's main job is to wait for a specific stimulus
 - * 3. And then the receptor cell
 - communicates with the **nervous system**
 - Not always the brain
 - e.g. reflex networks
 - ganglia (mini brains) in the spinal cord
 - nervous system decides what to do about the stimulus
- Usually some sort of negative feedback system

- stimulus receptor
 - control center
 - effector
- Sensory systems connect to nervous tissues, which:
 - sense the environment
 - organize the appropriate response
 - keeps things ticking along