Week 14 Lecture 0

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1 Administrative drivel

- Answer key to exam 3 will be posted to canvas
- I'd promised flash cards – I don't think I will be able to generate these for you before the exam. Send me an email (jared.brannan@wsu.edu) if you want a csv file of them, since that's how I use them.

2 Digestive system

- Today we'll wrap up, and move on to human ecological impact
- Small intestine – duodenum
  - Further (most) chemical breakdown in preperation for absorbtion
  - duodenum detects acidity and uses bicarbonate (from the pancreus?) to neutralize the chyme (gets the ph to around 7)
  - here chyme is broken down into it's basic molecular form (eg sacharides are broken into simple sugars)
  - makes up the first foot/foot and a half of the small intestine
- Small intnestinen
  - about 5-5.5 meters long
  - continued physical and enzymatic breakdown
  - this is where **absorption** of nutrients from the chyme
  - makes up the bulk of the small intestine to maximize the surface area for absorption to occur
  - parts: jejunum and ileum
  - walls are very thin for allowing greater absorption
  - it's hypertrophied by finger like portrusions int the wall called **villi** which have folds in them called **microvilli**
  - the surface area is proportional to a tenis court
  - simple sugars, amino acids, lipids, macronutrients all taken up by absorptive cells, then passed on to the capillaries and lymphatic system
    - fats get preferentially taken up into the lymphatic system, since it's hydrophobic
- Large intestine (aka colon)
  - No additional macronutrient absoption
  - **Recover water** that was added earlier along with any remaining dissolved **minerals and vitamins**

    - lots of water added in chyme production
    - energy is expended to pull minerals/vitamins
  - Withe water taken out the chyme is now called feces
  - **Feces** build up against anal sphincter
    - creates the urge to defecate
    - regain coscious control

- **Vomiting**
  - typically tirggered by presence of toxic substances in food (e.g. bacterial toxins)
  - close off the intestinal openig and squeeze down the stomach, reverse the peristaltic waves in the esophagus to send chyme back up

- **Ulcers**
  - Holes in the GI tract (stomach and duodenum)
  - Until recently, stress and food were blamed.
  - Now, we know they're caused by bacteria
    - figured out by Warren and Marshall
    - 1982 heliobacter pylori discovered
    - 1984 extreme measures
    - 2005 Nobel prize inn Medicine
    - Marshall drank the bacteria, got ulcers, then took antibiotics, and his ulcers cleared
  - Other risk factor – ceertaain pain meds that include asprin and ibuprofen

- youtube id 5ufESc1bK78 – video tour of digestive system

3 Global Climate Change and Human Impacts

- Been of growing concern since the 1980's, though we were aware that gas change in the atmosphere would change the climate

- If the earth didn't have an atmosphere, the earth would be -300 degreets

- Overview:
  - The intergovernmental panel on climate change (IPCC) was esetablished in 1988 by the UN
    - goal: to see if the change of composition of the atmosphere were going to cause problems
    - in the 50's CO_2 increase measured
  - Panel includes experts in atmospheric and climatic science from around the world
    - Done such that 1st world countries cannot dominate
  - In recognition ofo their efforts to spread "knowledge about man-made climate change," the IPCC was awarded the Nobel peace Prize in 2007
    - They modeled the changes in climate to predict the future climate changes
  - In its third report (2001), the IPCC concluded that the majority of the observed global warming was attributablel to human activites
    - Not telling us what to do, just what's happening and some options of how to proceed
    - what to do will be up to the polititians
  - if the temp increases by 2.0 degrees F, their will be consequences for living organisms
  - In 2018 the IPCC determined warming is occurring faster than predicted a few years ago

  - we have about 10 years to radically change the way we get energy, food, etc, otherwise it may be too late
    * We know this by knowing exactly how much CO_2 we can afford to add to the atmosphere before things get bad
    * so, this 10 year approximation is based on out current rates of gas emmision

- Atmospheric changes:
  - Greenhouse effect (physical component)
  - we've been producing green house gasses much more since we switched to fossil fules for producing goods during the industrial revolution
  - doing so, changed the chemistry of the atmosphere
  - even if we stopped producinng CO_2, we would still produce much more than humans did in the past just from respiration

- Some other consequences that follow:
  - sea-level changes
  - human health consequences
    * mosquitos will do better along with other pests
  - crop production will suffer
  - altered habitats with declines and redistribution of biodiversity