Week 3 Lecture 0

Jared Brannan

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1 Administrative drivel

- Exam 1 – Friday Spt. 17
  - in class on paper up through the first biochistry lecture (carbs/lipids)
  - about 40 questions
  - focus on class note content

2 More on human evolution

- Major glacial events 15k years ago allowed for movement across large bodies of water due to sea level drop
- The rockies were one of the only places that weren't ice in the americas, so movement went along there

2.1 brain size

- Some/all of this was due to our changes in behavior,
- a lot of our domination was due to increased brain size, and it's structure (probably more to do with structure)
- Human astrocytes (brain cells responsible for human brain connections) were injected into mouse brains and they were much better at problem solving as a result.
- in fossiles, we can deetermine a lot about brain size and structure by surface patterns on the skull.
- problem solving abilities allows humans to live in a large variety of enviornments
- Homo erectus was alive after Neanderthal, and so was the last other member of human's genus to be alive, and died out 10k years ago.

Note on filogenetic trees: if a branch doesn't make it to the far right, it went extinct.

2.2 Video on human evolutionary history

- Keurgesagt – What happened before history? Human origins

3 Biochemistry: The Chemistry of Life

Living things "contain materials found only in living organisms"

3.1 How do substances interatct with each other?

- Atoms are the small things that interact with each other and make up all of atoms
  - The fundamental unit of matter
  - every atom is of a particular element (carbon, gold, etc.)
  - atoms can be converted into other elements, but it's hard
  - There are a lot of elements, but life depends on a handfull of the smaller of them.
  - periodic table is organized based on their basic structure (mostly their electrongs), which determine how they interact.
  - each column will react with the other columns in similiar ways
- chemicals are composed of attoms
- All things are made of chemicals

3.2 What elements are you made of

- There are about 120 elements in humans
- rely mostly on oxygen, carbon, hydrogen, nitrogen – top 4 in human mass (96%)
- going down the rows in periodic table, the mass increases
- other important ones: calcium, phosphorus in bones, sodium, clorine in salts.

3.3 Parts of the atom

- Electrons, Neutrons, Protons, nucleus
  - nuclieus: the ball of neutrons and protons
  - nutrons/protons have mass atomic unit of 1
  - protons have +1 charge
  - electrons have -1 charge

  - neutrons have neutral charge
  - almost all of an atom is empty space
- the number of protons define what the element *is*
  - hydrogen has 1 proton
  - helium as 2
  - oxygen has 8
  - carbon has 6
- the number of neutrons can vary, and is ussually about the same as the number of protons
- electrons drive the interactions between attoms, and are very small (essentially no size or mass)

More than half of the human body mass is made up of *Carbon and Oxygen.*