Week 1 Lecture 1

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We'll pick scientists on friday – have 3 in mind.

1 Characteristics of life – continued...

1.1 Homeostasis continuted...

- Homeostasis is mainly maintained via negative feedback systems.
- Maintain a constant *internal* environment in the eface of variable *external* environment.
- This takes energy, hence, work.
- How do we maintain body temperature? What could you do if the external environment is too hot or too cold?
    - there are seperate systems for each
- **Feedback systems** help maintain homeostasis and are (broadly):
    - [usually negative]
    - *stimulus receptor* monitors the environment (e.g. the skin)
    - *Control center* recieves info and decides what to do (e.g. brain)
    - *Effector* receives instructions and carries out response (e.g. muscles contract)
- almost all heat created by the body comes from muscle contraction
- the feedback system(s) for cooling work in tandem with the system for heating.
- similar systems: thermostat or cruise control.
- possitive feedbacks lead to extremes, while negative stabalizes

- 3 ways to adjust the internal env:
    - move to a more favorable env
    - later your env to be more favorable
    - Your body's *homeostatic* controll systems can compensate for the dif between ideal internal and poor external conditions
- maintiaining sensory systems and enacting the response mechanism both have energenic costs
- if not being used for homeostasis, that energy could have been used for other purposes.

1.2 Summary

- 9 characteristics of life
- Homeostasis maintains those 9 characteristics.

2 Characteristics of Kingdom Animalia

- Who's related to whom?
- there are approximately 10 million multicellular speces
- most multicellular life forms are insects.
- Classifying animals is done using a heirarchy, 'kingdoms' is rather large – domain - kingdom - phyla

Humans are in **Kingdom Animalia**, so we are/have:

- Animals
- Multiicellular
- *Heterotrophic* == we get what we need from the food we eat. Energy always comes from plants, which get it from the sun
- Lack rigid cell walls – this allows us to carry out complex motion

- plants are *autotrophic* – self feeding
- plants and fungi have cells with ridgid walls

There are 35 animal **phyla**:

- 34: sponges, worms, insects, molluscs, jellyfish,...
- phylum **Chordata** – where humans are. The closest recent ansestor between chordates and everything else is the sea urchin (or, its ansestor).

Characteristics of **phylum chrodata**:

- *notochord* for support (verts. spinal col)
- Dorsal, hollow *nerve chord* (spinal cord)
- *Pharyngeal gill slits/pouches* (tetrapoda, only in ebryo. There's a rare mutation where human adults have the slits, but usually they are removed during development)
- *Post-anal tail* (in humans, coccyx) (this also means we have a digestive system with an exit. i.e. an anus)