If you're like me, and can't even sit still for 2 minutes, check out Utopia. If you liked it, you should like listening to Soba. If you like chill music, check out this track. If you liked that one, you'll probs like aethoro. These are what I listened to when making these awful/awesome notes.

As usual, this is a concise version (about 25%) of the content ma'am sent. If you just wanna pass, go through this this once. If you wanna get 20+, go through it a few times. For 30ish, go through it thoroughly. For more than 35, go get a life.

Ofc you might get 0 with this, who knows, it's just my own shit.

Alright, let's start
rolls up shirt sleeves

What's in the Bio-fluids: Blood- Mechanical systems of the heart, Blood pressure PDF?

What is a circulatory system?

It's a system that passes nutrients, gases, hormones, and blood cells to and from cells in the body to fight diseases and stabilize body temperature.

What's a circulatory system made up of?

1. Heart
2. Blood vessels
3. Blood

What's a heart?

Something the people who made our college don't have 🙂

- It's the strongest muscle in your body (apparently this isn't a D).
- Moves blood.

What're the types of blood vessels?

- Arteries (lead away from the heart)
- Veins (lead towards the heart)
- Capillaries (connect arteries and veins): exchange gases and nutrients

What does blood do?

8% of your weight is due to blood, so it better be doing something important.
It transports nutrients, oxygen, hormones; removes waste, carbon dioxide; provides immunity through antibodies; maintains body temperature and electrolyte balance; and clots wounds.

Explain red blood cells.

They're red.

Cuz they contain hemoglobin (which is a protein).

Explain white blood cells (leukocytes).

They fight infections and are of 5 types, namely:
- Neutrophils
- Basophils
- Eosinophils
- Lymphocytes
- Monocytes

If you're reading this, just promise me that if you ever end up discovering anything in your life, give it a name people can at least know how to pronounce for fucks sake.

Wtf are platelets (aka thrombocytes)?

They form plugs to clot wounds by aggregating around the site. They come out of broken cells in order to simulate thrombin production which does the heavy lifting.
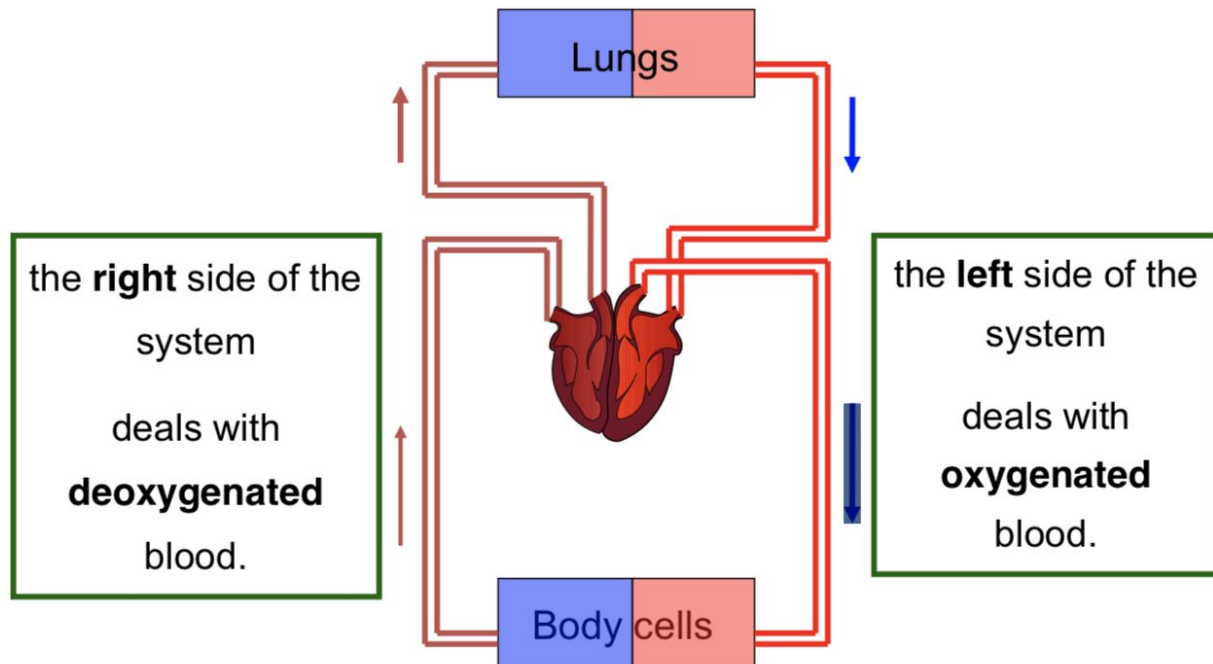
Explain plasma.

OK.

So blood is basically 55% plasma. And plasma is in turn 90% water (the remaining 10% are proteins).
Plasma contains nutrients, electrolytes, oxygen, enzymes, hormones, and waste. It helps in fighting infections and clotting.

How does blood circulation occur?

Double circulatory system

the **right** side of the system deals with **deoxygenated** blood.

the **left** side of the system deals with **oxygenated** blood.

So there are two types of circulation:
- Pulmonary: This starts with deoxygenated blood in the pulmonary artery and ends with oxygenated blood in the pulmonary vein (where oxygen is refilled into the blood via the lungs).
- Systemic: Starts with oxygenated blood and ends with deoxygenated blood.

How is the heart composed?

There are four chambers, so that there can be complete separation of oxygenated and deoxygenated blood (so that we can have a fast metabolism!).

Why can I hear my heart?

If you're thin or someone special's around you, you're heart starts pumping..a lot. It goes something like this:
Lubb
Dubb
Lubb
Dubb

…and so on and so forth.

The **lubb**s are the first of the two sounds in the cardiac cycle), and occur due to your ventricles (whatever tf those are) contracting along with the valves SNAPPING shut. The **dubb**s are when the atria contract and the pulmonary and aortic valves SNAP shut.

To give you an idea of what all the fancy terms in the above paragraph mean, here's a diagram (not drawn by me, mine would be *way* neater):
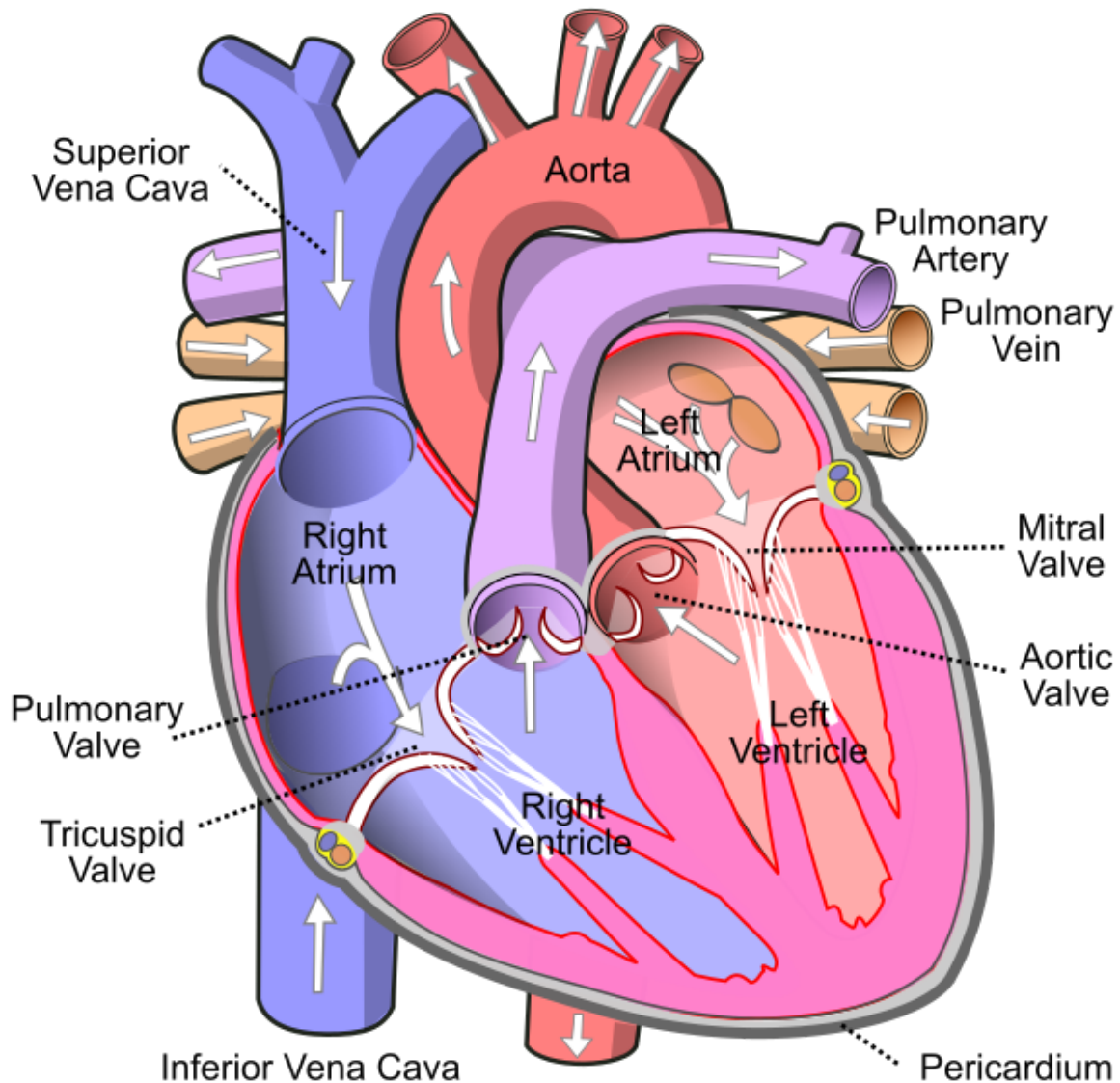
The amount your heart pumps is given by the following snippet.

Cardiac output – the volume of blood pumped from each ventricle per minute:

$$CO = SV \times HR$$

cardiac output = stroke volume X heart rate
(ml/minute)   (ml/beat)   (beats/min)

a. Average heart rate = 70 bpm
b. Average stroke volume = 70−80 ml/beat
c. Average cardiac output = 5,500 ml/minute

My mom's always saying I'm increasing her blood pressure. What is that?

It's what you're increasing.
I'm kidding.
It's a vital sign consisting of two numbers, the systolic pressure (force felt in arteries when ventricles contract), and diastolic pressure (force of blood on arteries when ventricles relax). There are a couple of stages.
When you aren't at home, it's <120 <80 (these numbers represent the systolic and diastolic numbers in mm Hg respectively). When you're at home, it's in the range of 120-129 and <80. When you're annoying her, it's 130-139 and 80-89. If you *and* your dumbass sibling are annoying her at the same time, its 140+ and 90+. And if your mom's a chemistry teacher, it can go as high as 180+ 120+. This last one can be fatal, for both your mother, and you.

What's hypertension?

It's high blood pressure (long-term medical condition). This causes everything to be elevated, like when you have to present your client's project on cleavage in front of the whole college in the first week. You get a headache, a heartache, an eye ache, a cock ache; basically, everything aches.

What's in the bionic eye ppt?
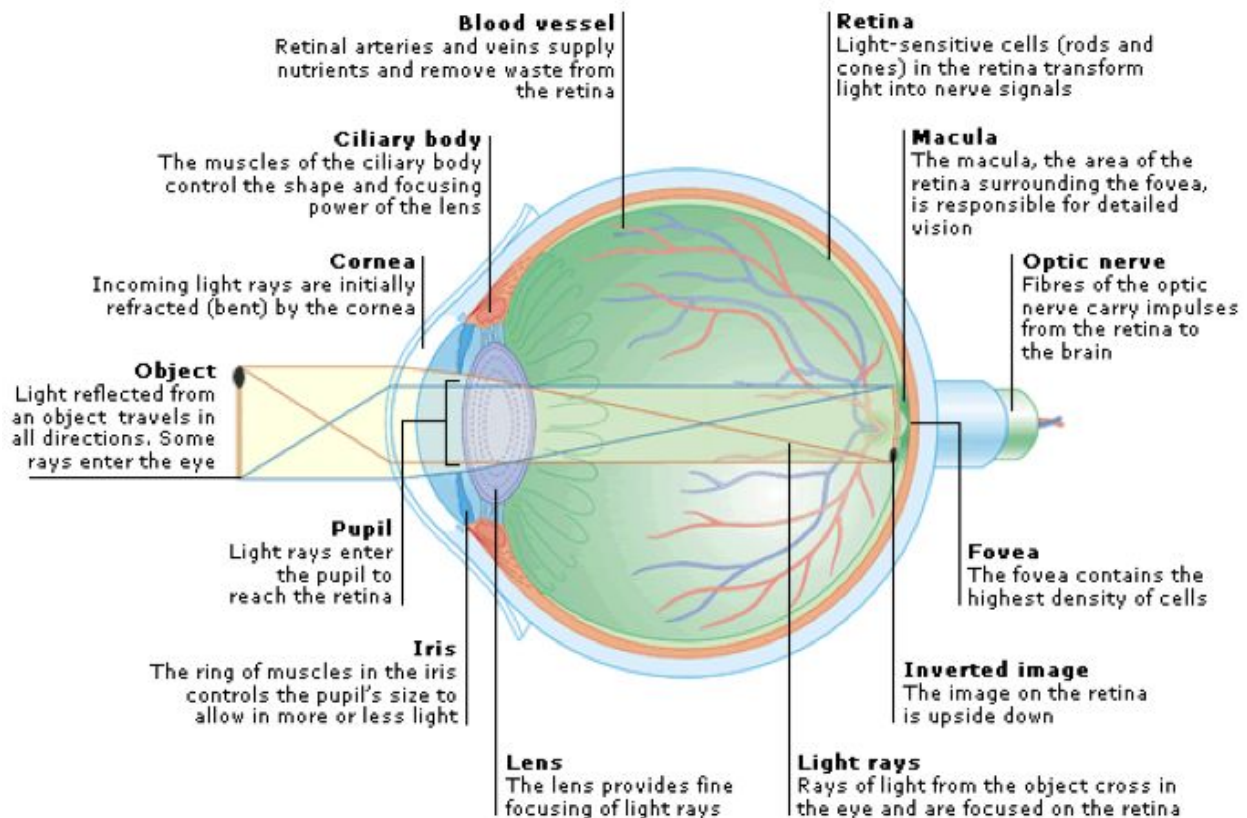
A lot. Let's get started.

Explain how my eyes work.

According to the ppt, human vision is a complex (no shit) physical process of visualizing something that involves simultaneous interaction of the eyes and the brain through a network of neurons, receptors, and other specialized cells.

You know what, in case you can't remember this shit (cuz ik I can't), just write something super obvious in a really fancy way, it'll probably fetch you some marks. I mean, they literally said it's complex and uses a brain. WTF. FU.

What're eyes made up of?

The letters e, y, e, and s. I'm pissed off rn so please bear with my stupid jokes.

Blood vessel
Retinal arteries and veins supply nutrients and remove waste from the retina

Retina
Light-sensitive cells (rods and cones) in the retina transform light into nerve signals

Ciliary body
The muscles of the ciliary body control the shape and focusing power of the lens

Macula
The macula, the area of the retina surrounding the fovea, is responsible for detailed vision

Cornea
Incoming light rays are initially refracted (bent) by the cornea

Optic nerve
Fibres of the optic nerve carry impulses from the retina to the brain

Object
Light reflected from an object travels in all directions. Some rays enter the eye

Pupil
Light rays enter the pupil to reach the retina

Fovea
The fovea contains the highest density of cells

Iris
The ring of muscles in the iris controls the pupil's size to allow in more or less light

Inverted image
The image on the retina is upside down

Lens
The lens provides fine focusing of light rays

Light rays
Rays of light from the object cross in the eye and are focused on the retina

How does the data transfer?

In the brain, the optic nerves from both eyes join at the optic chiasma. The visual info then arrives at the **visual cortex** after processing.

I'm bored. What's up?

Heaven.
Dw, the bio exam's coming and you'll be there soon 😉

What's a fov-blablabla?

A *fovea centralis* contains the high-density tightly packed cone cells and is the area of sharpest vision.

Why do old people go blind?

They may have macular degeneration, traumatic injuries, or glaucoma.

What's a photoreceptor?

They contain rods (low light, no color detection), and cones (require light, produce color when combined with 2 other kinds or cones).

What're the kinds of vision degeneration?

Retinitis Pigmentosa (hereditary loss of photoreceptors), and macular degeneration (age and genetic related).

So what's a bionic eye?

It's an artificial eye which either replaces *a part* **or** *the entire* functionality of the eye. It consists of image sensors, microprocessors, receivers, radio transmitters, and retinal chips. It was invented by the awesome and amazing person **Dr. Mark Humayun**.

How does it work?

A computer chip at the back of eye converts the images it receives from the camera in the person's glasses to an electronic signal the brain can interpret.

What're the different technologies used to implement it?

- MIT-Harvard Device
- ASR (Artificial Silicon Retina)
- MARC (Multiple Unit Artificial Retina Chipset)
- ARGUS II
- Holographic Technology
- Alpha IMS

What's in the E-Nose Bio-olfactory mechanisms ppt?

40 slides. Let's see how much I can shorten it.

Where'd the idea of electronic noses come from?

Animals are simply amazing. Some notable noses are listed below.
- A single molecule of pheromone is enough to locate a female if you're a moth.
- If you're a dog, you can find your master through scent trails, and even find buried land mines!
- If you're a rat, you can build complex mental maps of stinks to avoid getting yourself killed.
- If you're an insect, you would have the amazing ability to smell wind (what?) and chemicals!
- If you're our civil teacher, you can smell what food the students are eating during your class.

So how does it do what it does?

Since smells actually make up a significant portion of what you taste as well, electronic noses are fitted to detect both odors and flavors. The magic happens with something called "electronic sensing" or "e-sensing" (now these are the kind of names I like!) technology.
So it consists of an array of electronic sensors for chemical detection as well as an artificial neural network for pattern recognition (ooh, fancy). There's *also* a headspace sampling, to generate signal patterns to characterize smells.

How does the human nose work?

(This is required to reverse-engineer the e-nose).
Since each smell is composed of molecules having different sizes and shapes, our nose has different receptors for processing them (so the brain gets different smells). This is pretty much the same thing we're doing in an e-nose (different receptors for different smells based on the molecule's metadata).

Explain the components of an e-nose.

- Sample delivery system
- Detecting system
- Computing system

What's a sample delivery system?

It enables the generation of headspace, which is a fraction analyzed. This gets sent to the detection system.

What's a detection system?

It consists of a group of sensors which react on contact with volatile compounds, causing changes in electrical characteristics.

What's a computing system?

Each sensor is sensitive to molecules in a specific way. E-noses use sensor arrays which react to volatile compounds. Whenever a smell is sensed, a specific response is recorded and that signal transmitted to a digital value.

How are smells smelt?

- Metal oxide semiconductor (MOSFET)
- Conducting polymers
- Quartz crystal microbalance
- Piezoelectric sensors
- Metal Oxide sensors
- FET Gas sensors
- Optical sensors

This is extremely complicated and ~~hopefully~~ probably won't come. If it does, this should get you at least 1 mark:
My mom is very ill. My father is spending all his money to pay for my education. My sister is not married. Please pass me.

How do we analyze the data the e-nose gives us?

- Graphical analysis: graphically relate unknown smells to known ones
- Multivariate data analysis: generate a set of techniques for the analysis of data that is trained or untrained (it's untrained if a previously built database is nonexistent)
- Network analysis (best)

Give an example of an e-nose.

Cyranose 320

Where are e-noses used, other than for torturing engineering students in examinations?

- Medical diagnostics and health monitoring
- Environmental monitoring
- Food industry
- Detecting explosives
- NASA
- Quality control labs
- Detecting drugs
- Detecting harmful bacteria

List the pros and cons of e-noses compared to human ones.

- Pros
  - Detect poisonous gases
  - Can be done for long periods of time in real time
  - Cheaper than trained human sniffers.
  - E-noses don't vary (unlike human noses)
  - You can digitally represent it
- Cons
  - Time delay between successive tests
  - Insensitivity to certain species
  - E-nose must be changed for different applications

My boyfriend's asking me for nudes but idk if he'll like them. What do i do?

Dw. It happens. Just send them to me at 3892784857 and I'll tell you which are good.

What's in the Kinesiology: Bio-mechanistic processes Ppt?

Over 40 slides of crap and bullshit.

What the hell is kinesiology?

It's the study of the principles of mechanics and anatomy in relation to human movement. It enables the detection and correction of imbalances relating to things like stress, learning problems, and other day-to-day life issues.

What're the study of mechanics?

The study of variables describing motion (e.g., acceleration), is known as *kinematics.*
The study of variables causing motion (e.g., torques), is known as *kinetics*.

What do muscles do?

- They allow for movement by transmitting forces to tendons, whose forces in turn cause rotation of the bones about the joints.
- Let you beat the crap out of fucking idiots.
- They convert chemical energy into force.
- They maintain posture and muscle tone (who knew! Muscles maintain muscles!!)
- Produce heat (thaz why you sweat from your muscles when you work 'em out)
- Protects bones and internal organs
- Gives you some shit to post to Insta

How do muscles work?

- They shorten and pull.
- They're usually arranged in teams (one team pulls whilst the other relaxes/stretches).

How much muscle do I have?

There are more than 320 pairs (so 640+). They apparently make up 40% of body mass. I say apparently, cuz we're engineering students and I really don't see this as being practical. Maybe like, 4% muscle, and 36% pizza or something.

What're some important muscles?

What's the longest one?

Sartorius

What's the smallest one?

Until Ohil's dick was discovered in his magical forest, it used to be Stapedius. But since our syllabus is outdated, the smallest thing in the universe **cough** I mean muscle, is Stapedius.

What's the biggest one?

Gluteus Maximus (your ass)

Hey Phineas, whatchaa dooin'?

Honestly, even I can't hear chilled music for that long. So now I'm hearing this [Kill Humans Mix](#). You're probably bored af if you've gotten to this point, so if you like dubstep, maybe go headbang to that fucked up shit right there.

How are muscles classified?

Functionally, they're classified as voluntary and involuntary. Structurally, they're classified into striated (striped across they're fiber), and smooth.

What're the muscle types?

- Skeletal: long, cylindrical, fatigue-able muscles attached to the skeleton via tendons; cause movement about the joints
- Cardiac: heart muscles that never tire
- Smoooooth: thin spindle-shaped muscles in the digestive, respiratory, and urinary systems

What's in the Molecular Motors ppt?

What's a molecular motor?

A motor is a device that consumes energy in one form and converts it into motion or mechanical work.
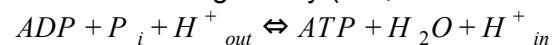
What're the types of cytoplasmic motors?

- Myosins
- Dyneins
- Kinesins

What is ATP synthase?

ATP synthase is an enzyme that creates the energy storage molecule adenosine triphosphate (ATP).

The reaction is given by (btw, I wrote this equation aaaaalll by myself):
$$ADP + P_i + H^+_{out} \Leftrightarrow ATP + H_2O + H^+_{in}$$

It's worth noting that the formation of ATP from ADP and P_i is energetically unfavorable, and would normally proceed in the reverse direction.

What is the structuring and functioning of the ATP synthase complex?

Mitochondrial ATP synthase complex consists of two large structural components called F_1 which encodes the catalytic activity, and F_0 which functions as the proton channel crossing the inner mitochondrial membrane.

Define biology.

The cause for all pain, suffering, and depression on earth is known as biology.

What're the 3 functional units of ATP synthase?

1. Rotor: turns 120° for every H^+ crosses the membrane using the "c" ring.
2. Catalytic head piece: contains enzyme active in each of the 3 β subunits.
3. Stator: consists of a subunit imbedded in the membrane which contains 2 half channels for protons to enter and exit the F_0 component, and a stabilizing arm.

What's in the neural network ppt?

How does a human neuron look like?
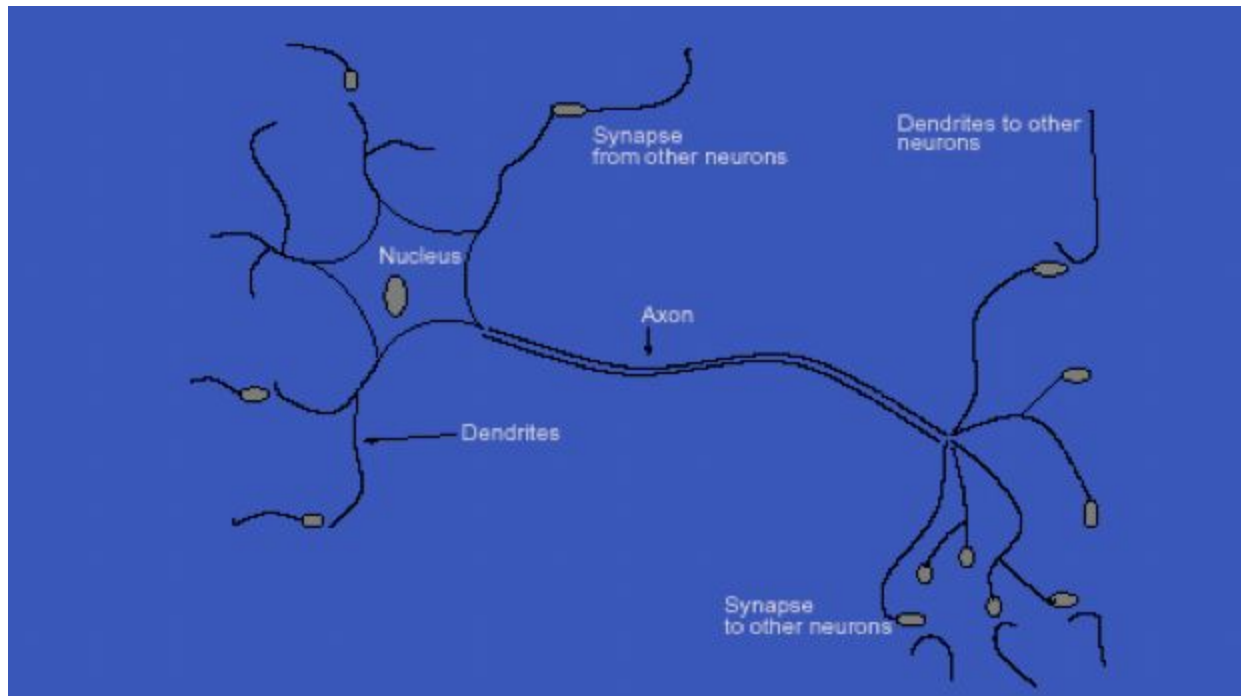
What's a *biological neuron* made out of?

- Dendrites: Receive signals from other neurons
- Axon
- Soma: Sums the incoming signals; if there's enough input, it transmits a signal over its axon to the other cells (it can only send one signal at a time, but that signal gets transmitted to several other neurons)

What're *you* made out of?

Pure, undiluted, oversaturated *awesomeness*.

How does the human brain learn?

A neuron collects signals from others through a host of fine structures called dendrites. The neuron sends out spikes of electrical activity through a long, thin strand known as an axon,
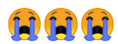
which splits into thousands of branches. At the end of each branch, a structure called a synapse converts the activity from the axon into electrical effects that inhibit or excite activity in the connected neurons.

So what does a neuron model look like?

If a neuron receives excitatory input greater than its inhibitory input, it sends a spike of electrical activity down its axon. Learning occurs by changing the effectiveness of the synapses so that the influence of one neuron on another changes.

Input units	Connection weights	Summing function	computation
(dendrite)	(synapse)	(soma)	(axon)
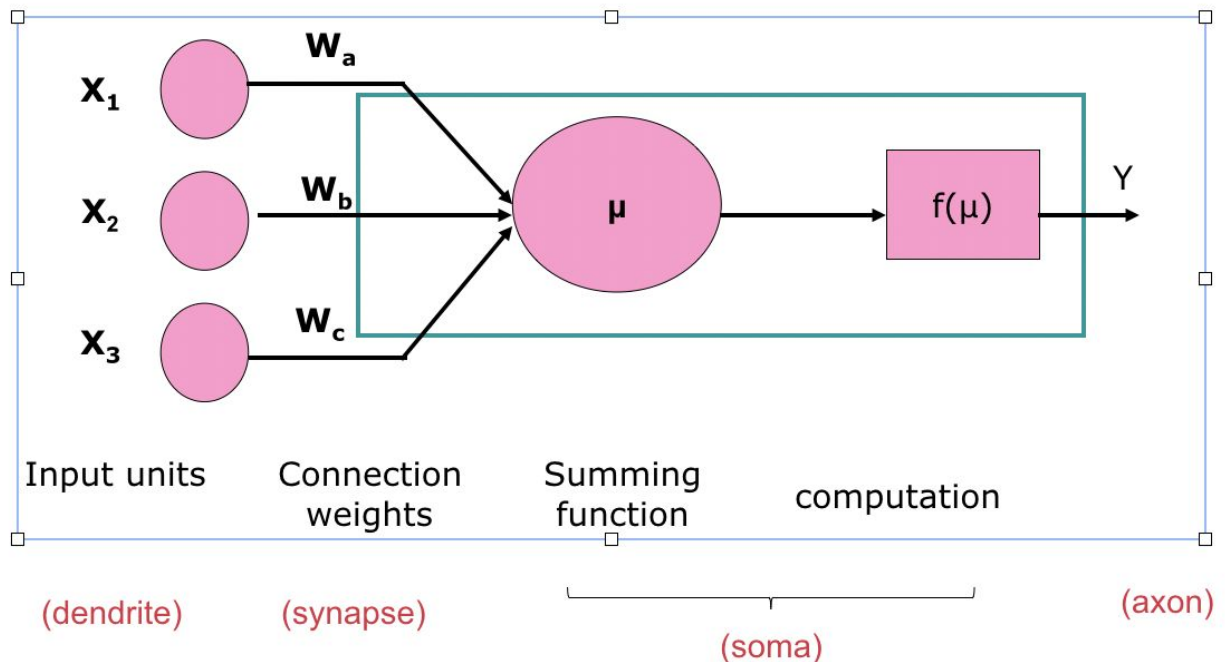
Speaking about models, I asked Siri if she was single.
And she replied *I'm married to my work.*
😭😭😭

How does an artificial neural network work?

1. The processing element receives many signals.
2. Signals may be modified by a weight at the receiving synapse.
3. The processing element sums the weighted inputs.
4. Under appropriate circumstances (sufficient input), the neuron transmits a single output.
5. The output from a particular neuron may go to many other neurons.

This is because the following assumptions have been made:

1. Information processing occurs at many simple elements called neurons.
2. Signals are passed between neurons over connection links.

3. Each connection link has an associated weight, which, in typical neural net, multiplies the signal transmitted.
4. Each neuron applies an activation function to its net input to determine its output signal.

Characterize neural stuffs.

- Architecture: there are patterns of connections between neurons-
    - Single layer feedforward
    - Multilayer feedforward
    - Recurrent
- Strategy/Learning Algorithm: method of determining the connection weights-
    - Supervised
    - Unsupervised
    - Reinforcement
- Activation function: function to compute output signal from input signal

What are the network layers?

- Input: the input units represent the raw info fed to the network
- Hidden: the activity of each hidden unit is determined by the activities of the input units and the weights on the connections between the input and hidden units
- Output: behavior of the output units depends on the activity of the hidden units and the weights between the hidden and output units

Do we use this shit in medicine?

Yaah we do.

It's a hot area in medical and is expected to be used shitloads in the coming years. Atm, it's being utilized for recognizing diseases from CAT scans, etc.

We achieve diagnosis by building a model of the cardiovascular system of an individual and comparing it with the real time physiological measurements taken from the patient. A regular carrying out of this routine can allow for harmful medical conditions to be detected at earlier stages.

Gimme some properties of artificial neural networks.

- There is no memory since info is stored in connections
- It's massively parallel
- Massive connectivity
- Fault tolerant

- It has a learning and generalization ability
- Robust

Note that not all these properties may be present in each network.

Can I go to bed now?

Yes, we're done Johnny. Good night. Sweet dreams. I hope you die of fatal insomnia 🙂