

Topic 1; intro and history

Science vs. magic

- Science - based on facts
- Magic - based on conclusions you want

Life expectancy

- World avg = 66.6
- Canada avg = 80
- Highest = 84.4
- Lowest = 32

- Throughout history → 30-35yrs
- Last 150 yrs → 82yrs

Main reasons for improved health

- Sanitation
- Refrigeration
- Vaccination*
- Antibiotics
- Clean drinking water

Drugs

- *Dose makes the poison*
- Opium - for pain
- Cocaine - stimulant

Problems with observation

- We search for patterns that might not be there
 - Apophenia: seeing patterns or connections in random or meaningless data; coincidence.
 - Pareidolia: perceiving sound or images as something else.
- Ancient people did not use experiments or statistics
 - Anecdotal evidence: stories
 - Ppl lie
 - Placebo effect
 - No standardizations; no instructions were written down

Doctrine of humours (aka BS)

Body

- Blood - cold
- Phlegm - wet
- Yellow bile - hot

- Black bile - dry

Universe

- Earth - dry
- Air - cold
- Fire - hot
- Water - wet

Healing = balancing the humours

Treatments = harmful and painful

- Bloodletting → cut to get blood, bleed out, infection, etc.
- Purging → emetics ← makes u puke

Doctrine of Signatures

Jacob Bohme

- If things were similar, they were related for a reason
 - Ex. walnuts look like brains
 - Parsley
 - Mandrake roots
 - Rhino horn; ground into powder for sexual stimulant
 - Mercury
 - Things shaped like a pregnant women were good for them

Amputations

- Used to be cut straight
 - Had to do it quickly
 - People would usually die from shock or infection
- Learned to cut into a V shape by trial and error

Sir Humphry Davy

- Discovers **Nitrous Oxide** (happy gas)

William T.G. Morton

- Discovered **Ether**; first anesthetic

Joseph Lister

- Uses **phenol** as antiseptic; killed bacteria that caused disease
- Carbolic acid sprayer - prevent infection
 - Spray the surface of the body
 - BAD for doc: lots of exposure
 - Not too bad for patient bc they had min exposure
- Listerine
 - Household product

- No longer has phenol, replaced by **Thymol**

Thomas Roddick

- Brought antiseptics to Canada
- Specialized clothing and rooms for surgery

William Perkin

- First synthetic dye; came from coal
- Dye companies became pharmaceutical companies

Artificial Drugs

- First artificial drug was aspirin
- Better; make it do specifically what we wanted
- Cheaper
- Most made from oil

- Most active ingredients in past were alcohol, opium & cocaine=feel good

William J.A. Bailey

- Radiator → **radioactivity** kills cancer
 - Truth = caused cancer

Massengill

- Sold **sulfanilamide** as an antibiotic
- Was successful, but was a powder that couldn't be dissolved in water
- Instead they dissolved in **ethylene glycol**, which is very bad for the kidneys and killed many people
- Got it removed because it said "elixir" which means it was dissolved in ethanol

FDA

- Animal testing
- Clinical trials
- Proper directions required

Thalidomide

- Developed as a sedative
- When pregnant women used them, their kids came out phocomelia (seals)
- Tested in rats; didn't have a problem
 - Now require two species; one being a primate
 - Bioavailable; so gets into body

Topic 2: Pain

OTC Meds

- Take more of them
- Take more pain (\$4.1 billion) but cough and cold has a greater cost (\$8.2 billion)

Counter indications

- When you should NOT use drugs
 - Foods
 - Conditions
 - Natural remedies
 - Drug combinations

Salix

- Same genus (similar poisons) as willow
- In the past willow leaves were used for pain, egyptians used them for inflammation
- **Reverend Edward Stone**
 - Tasted willow bark---tasted bitter
 - Similar to quinine ← treat malaria
 - Therefore willow treats fevers
- Active ingredient in willow is salicine
- Converted to salicylic acid after ← meadowsweet flowers
 - Analgesic - reduce pain
 - Antipyretic - reduce fever
 - Anti inflammatory
 - Side effects: stomach irritation
 - Can be manufactured from coal tar

Synthetic vs. Natural

Synthetic = manufactured from petroleum

- Advantages: larger quantities, cheaper to make

Felix Hoffman

- Processed salicylic acid through optimization
 - Made it taste less bitter
 - Less stomach irritation
 - Not effective for pain
- 1897→ converted salicylic acid to acetylsalicylic acid (A.S.A.) ← first artificial drug

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Topic 3: Headaches

Cephalalgias = headaches

- **Trepanation:** Drill holes in head
- *Brain doesn't feel pain, pain comes from tissues surrounding the skull*

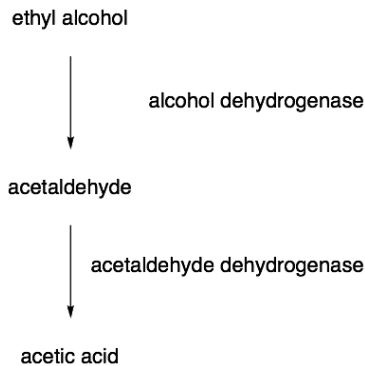
Two types of headaches

Muscular; muscle band around skull

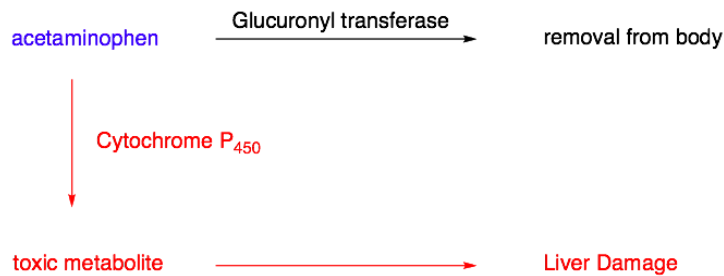
- When muscles contract, squishes the tissue to the bone
- ASA, acetaminophen, Ibuprofen, naproxen

Vascular; involves blood circulation

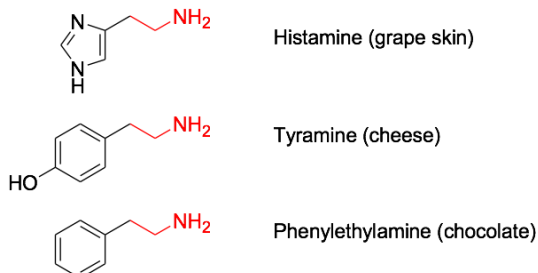
- **Toxic**
 - Caused by poison; induces *vasodilation*
 - Most common type of headache - hangover



- 2nd enzyme is blocked = bad hangover, too much acetaldehyde



- Don't take acetaminophen for hangovers bc it activates unwanted pathway (red)



All three can cause headaches

- Nitroglycerin is a potent vasodilator
- Monosodium glutamate (MSG)
 - Kwok Syndrome; MSG causes headaches, NOT real
 - Normal human metabolite
- Caffeine is a vasoconstrictor
 - Rebound effect: drink too much coffee, stop drinking bc headaches
- Migraine
 - Effects 18% of women, 6% men
 - Two phases
 - Phase 1: Vasoconstriction
 - Phase 2: Vasodilation---pain
 - Migraine headaches follow progression;
 - Prodrome phase
 - Moodswings
 - Aura; makes you go crazy
 - Scotomas; visual disturbances, flashes of light
 - Hallucinations
 - Vertigo
 - Reduced sensation
 - Hypersensitivity
 - Pain
 - Movement makes it worse
 - Sensitivity to light, sound, smell
 - Postdrome; slows you down
 - Hungover
 - Exhaustion
 - Poor concentration
 - Depression or euphoria
 - Treatments
 - A.S.A
 - Acetaminophen
 - Ibuprofen
 - Naproxen
 - Prescription pain meds
- Cluster
- We have Triptans; take this in the early stages of migraines to prevent it

When Rye gets wet; it gets a fungus called ergot

- Gangrene: requires amputation
 - A lot of vasoconstriction, no circulation, limb rots

- **Ergot** was used to induce labor
 - Also was a powerful hallucinogens
 - People who had ergot poisoning deemed possessed, associated with witchcraft
 - Also used for migraines
 - **Arthur Stoll**
 - Isolates **ergotamine**
 - Not druglike
 - Prevents migraine, poison in high dose
 - **Cafergot**: ergotamine and caffeine
- **Albert Hoffman**
 - Discovered **LSD** by accident
 - Bike guy, licked fingers
 - Hallucinogen

Migraine starts with decreased amount of **serotonin**

- Fix by replacing NT artificially
- Serotonin is a poor drug; fits into too many receptors
- There is a blood-brain barrier that serotonin cannot get thru
- **Sumatriptan**; selectively targets migraine
 - Triptan prevents migraines

Topic 4: Colds

Colds are the most common infection

- No cure for the cold bc there are so many viruses that can cause a cold; we can't over 200 cures for all the viruses
 - Cold medicine release symptoms
 - No medication will prevent colds
- Virus destroys tissue, immune system makes symptoms

Research Unit; Salisbury, England

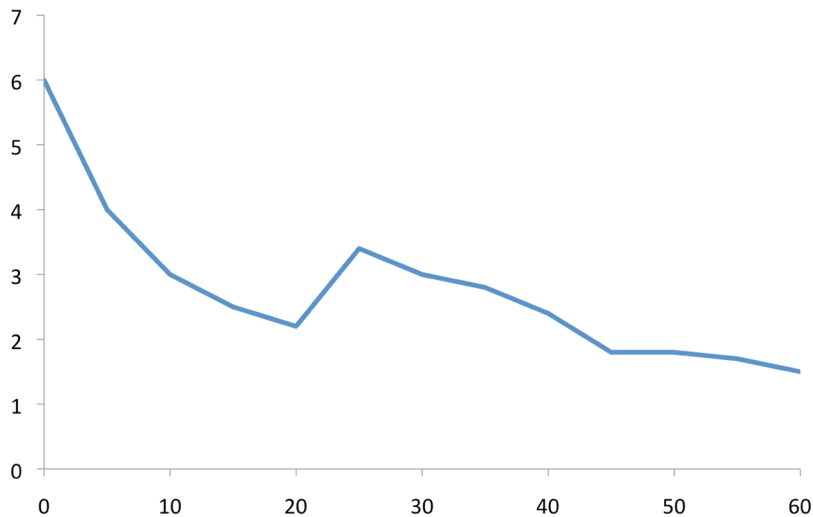
- Wanted to see what caused the common cold
 - Bribed with vacation
- Sneezing doesn't spread colds well, doesn't have enough virus
- Being cold doesn't cause colds
- Direct exposure doesn't always cause colds
- Cold virus transferred by touching → nasal secretions (snot and mucous)

Colds are more common in crowds

- School season is cold season
 - Kids get sick a lot bc they're with other kids
- Tritian ca cunha; isolated island
 - Lots of colds only when ships came
 - During winter not as many colds bc no ships

Washing hands

- Hand sanitizer works for bacteria but not viruses



Mid-peak- when you have kids, you're more likely to get sick

As you age you acquire immunity

- Only get sick from a virus once bc we have memory cells that remember what u had
- Exposure to virus causes illness
- Immune response is too slow and weak to prevent
- Body makes large amounts of antibodies only during infection
- After each infection you build up “memory” cells
- Later exposure to the same virus does not make you sick
- Rapid and strong immune response