

## Topic 15: Nutraceuticals

- Organic: the use of the word is regulated, to call something organic you must have:
  - No additives
  - No synthetic pesticides
  - No synthetic fertilizer
  - No GMO
- However no regulation over using the word 'Natural' in advertising
- Herbal remedies are used by 40% of the population
  - \$20 Billion industry that is steadily growing
- Herbals
  - Grown industrially
    - Using pesticides
  - There are very few rules regulating the herbal industry
    - They are not standardized, therefore dosage is different
    - Extracting things is inconsistent, you are not measuring the active ingredient but the amount of extract
  - Omega 3 for example don't always say which kind of Omega 3 is in the supplements
  - Testing is limited or nonexistent
    - Safety is based on past history
    - Adverse event reporting not required
    - Efficacy is based on previous reports
    - Quality of the science is highly variable
- Echinacea
  - Used to treat colds
  - Labels are very vague
    - "Immune system support"
  - Has been sold for 200 years
    - Started as snake oil to treat arthritis
  - Has been tested and it has been proven there is no benefit
- Cold FX
  - Clinical studies that have been conducted show no benefit
    - They manipulated the statistics to make it seem there was a benefit
    - They were not blind experiments
    - They excluded people from the study even after it was complete
  - Has ginseng
    - Doctrine of signatures
- Ginko
  - Contains ginkgolides
  - Supposed to improve blood circulation in the brain and thus improve cognitive function
  - Interferes with blood clotting
- Saw Palmetto
  - Supposed to improve prostate health
  - Has been proven to be ineffective

- Garlic
  - Garlic cleansing
    - Adolphus hohensee discovered if you stick a clove up your butt the next day you'll have garlic breath, so he concluded it cleanses you
  - Has a visivel effect
    - We like seeing that something is happening
  - Thought to help with cholesterol
  - Alicin
    - Garlic uses it for protection
    - Found in the bulb
    - It is spicy and makes the animals not wanna eat it
    - Very unstable and doesn't last for very long
    - Causes garlic breath
      - The alicin gets converted to other things and travel through your bloodstream
      - These material get released in your lung when the gas exchange happens
      - And that is what you smell on your breath
    - Can only be found in fresh garlic
    - The plant stores alliin until it needs alicin
    - Supplements will contain various amounts of this since they are not fresh
  - Does not reduce cholesterol
- St John Wort
  - Taken to treat depression
  - Some studies report improvement on mild depression
  - No evidence of improvement on severe depression
- Herbal remedies are regulated as foods
  - Therefore they can still be sold even though they do not do what they claim to do
  - Labels are very carefully written
    - Vague so they are not too closely regulated
  - No efficacy testing is required
    - Many clinical trials involving the herbals are poorly done
      - No placebo is used
      - Small groups of subjects
        - Large sample sizes average out coincidences
      - High attrition rates
      - Publication biases
        - Positive results more likely to be written up
        - Positive results more likely to be published
        - Positive results increase the “quality”
        - Advocate groups unlikely to publish negative results
- The supplements you buy in the store may not necessarily actually contain the active ingredient that has been tested
  - Allows them to sell the stuff to you twice
    - Take an extract out sell you that

- Then in another bottle sell you the parts of the plant that are left
    - The active ingredient
- Purity of natural supplements is questionable
  - Pesticide residues
  - Heavy metal
  - Undeclared pharmaceuticals
  - Some products will contain the wrong plants
    - Studies based on DNA testing found that less than 50% of products contained the right plant
- Natural materials can interact with pharmaceuticals
  - People don't necessarily think to tell their doctor about the herbals they take
  - Ginkoba interfere with blood coagulation
    - Magnifies the risk of bleeding
  - St John's Wort
    - Influences also half of current prescription pharmaceuticals
    - Created more enzymes in the liver
    - Making it work harder
    - Amplifies liver function
    - So less drug gets into the bloodstream
  - Grapefruit
    - Inhibits liver function
    - Therefore you absorb more of the drug
  - Kava Kava
    - Taken for a feeling of well being
    - Contains kavalactones
      - Damage the liver
    - Was banned in Canada in 2002
    - Was still available however you just had to know to ask for it wasn't put up on the shelves
- Weight loss drugs
  - They do not burn fat
  - Appetite suppressants
    - Stimulate the fight or flight response
      - This shuts down digestion
  - People lose the first 10 lbs and then stop losing weight so they up their dose and eventually overdose
  - Ephedra
    - Similar structure as amphetamines
    - Overdose
      - Heart attacks
      - Strokes
      - Seizures
      - Deaths
  - Banned but still available under the counter
- Bitter Orange

- Similar structure to amphetamines
- Scientific discoveries are often twisted
  - Glucosamine
    - People take it for arthritis
    - Cartilage is made of glucosamine
    - People think that arthritis is caused by not having enough cartilage in your joints
    - No proven benefits
- Placebos
  - People feel better when you do something they believe is supposed to fix the problem
  - 30% people respond favourably to placebos
  - It is important to compare your drug to a placebo in clinical trials
  - Different types of placebos have stronger effects
    - Colour of pill
      - Pink gives better response
    - Bitter pills work better than sweet pills
    - Capsules work better than tablets
    - Injections work better than pills
    - More expensive placebo work better
      - Can also be applied to name brand vs generic
  - Placebo effect does not work in all conditions
    - Placebos only work if patients are aware that they are getting a ‘treatment’
    - Drugs work better than placebos, so some people figure out whether they are actually getting treated or not
      - Side effects are also stronger
- Some drugs are so effective that placebos are not required, or it could be unethical to not treat the patient
  - Will compare against existing medications
  - Can't test anesthetics for example during surgery
- Placebos effects are seen in areas that can not be measured directly, you have to rely on patient reports of how they feel
  - Pain
  - Depression
- Some placebos can't just be taken because they could have side effects
- If a drug/item is making a claim it should actually do that thing, not cause it due to a placebo effect
  - Coffee and willow bark we can isolate the chemical that has the effect
  - In extracts it is really vague and there are varying amounts of the active ingredient in the extract
- St John Wort
  - The chemical that was believed to treat depression enters the blood but never actually arrives to the brain
- People who take herbals expect to feel better after taking them, that is where the effects come from

- What's the harm?
  - You should get what you pay for
    - In less than 50% of cases the plant that was supposed to be in the bottle were not present
  - Consumer safety
    - There could be contaminants, things that should be in there aren't
  - Is ignorance bliss?
    - You are denying yourself legitimate treatment
- Vitamin C
  - Pauling made the connects between decreasing amount of colds and taking Vitamin C supplements
  - He took 2000x the recommended daily dose of vitamin C
  - He promoted this and it became very popular
  - However clinical research showed no benefit
- The FDA tried to look into the effects of taking vitamins, but then the vitamin supplement industry retaliated and legislation was passed saying that the FDA could not test or regulate the products
  - The only time they could intervene if someone has an issue
- 15 years ago the Canadian government passed legislation for vitamins to be tested
  - However it did not really require the companies to prove good evidence that the product is safe and works
  - There is extreme flexibility for clinical trials
  - Does not require the companies to report adverse effects to the gouvernement
  - Limited or no efficacy testing
    - Standards are “flexible”
  - Limited or no safety testing
    - “past experience”
  - No enforcement
    - No inspections
- Top 10 Health Frauds
  - Arthritis products
    - Copper bracelets, mega-vitamins, herbal remedies
  - Cancer treatments
    - Laetrile, vitamins, minerals
  - AIDS cures
    - Antibiotics, vaccines, herbal tea
  - Weight loss
    - Amphetamines, vitamins, herbals
  - Sexual aids
    - Aphrodesiacs, erectile dysfunction, male enhancement
  - Baldness cures and Bust enlargers
    - Only minoxidil is approved for baldness
  - Chelation therapy
    - EDTA, vitamins, minerals
  - False nutritional schemes

- Bee pollen, wheat germ capsules
  - Muscle stimulators
    - Medical use only
  - Candidiasis
- Many pharmaceuticals are natural, but they have been heavily tested and proven
  - Taxol
  - Penicillin
  - Erythromycin
  - Digoxin
  - Bleomicin
  - Colchicine
  - Ergotamine
  - Morphine
  - Capsaicin
- Three questions you need to consider
  - Does it work?
  - Is it safe?
  - Can you trust the company?
- Homeotherapeutics
  - Samuel hahnemann was the first to oppose bloodletting
  - He then applied the doctrine of signatures to find other ways to treat
  - Thought that substances were more powerful when diluted in water
    - He performed serial dilutions to a point that there was basically no drugs left
    - He thought the water molecules would remember the medication
  - Thought that succussion was important (it had to be shaken a certain way)
  - This lead to homeotherapeutics
  - Homeopaths place emphasis on relationship
    - People leave feeling better because they often have positive interactions with the homeopath
    - This is a placebo effect