

MINI MED SCHOOL

Talk 9: Herbal Supplements

DREW SMITH, BSC, UBC MD CLASS OF 2024



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

Faculty of Medicine



University
of Victoria

let's talk  science

TERRITORIAL ACKNOWLEDGEMENT



I would like to begin by acknowledging that I am joining you from the traditional, ancestral, and unceded territory of the ləkʷəŋən (Lekwungen) speaking peoples, including the Songhees, Esquimalt, and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day.

DISCLOSURE



I am a medical student. These talks do not constitute for or substitute medical advice.

This talk is meant to provide information about a number of commonly used herbal supplements. It is impossible to cover all herbal supplements that exist or all of the claims surrounding the herbal supplements discussed in this talk. It is not meant to recommend or discourage the use of any kinds of herbal supplements.

Please consult with your healthcare provider, a pharmacist, or a dietician if you have questions about herbal supplements for yourself.

OUTLINE

- Background on Supplements
- Herbal Supplements
- Summary



BACKGROUND



- Dietary supplements have been used for hundreds or even thousands of years in some cases
- Herbals/botanicals used in Chinese herbal medicine, Indigenous medicine, and other traditional medicines constitute oldest form of dietary supplements



BACKGROUND



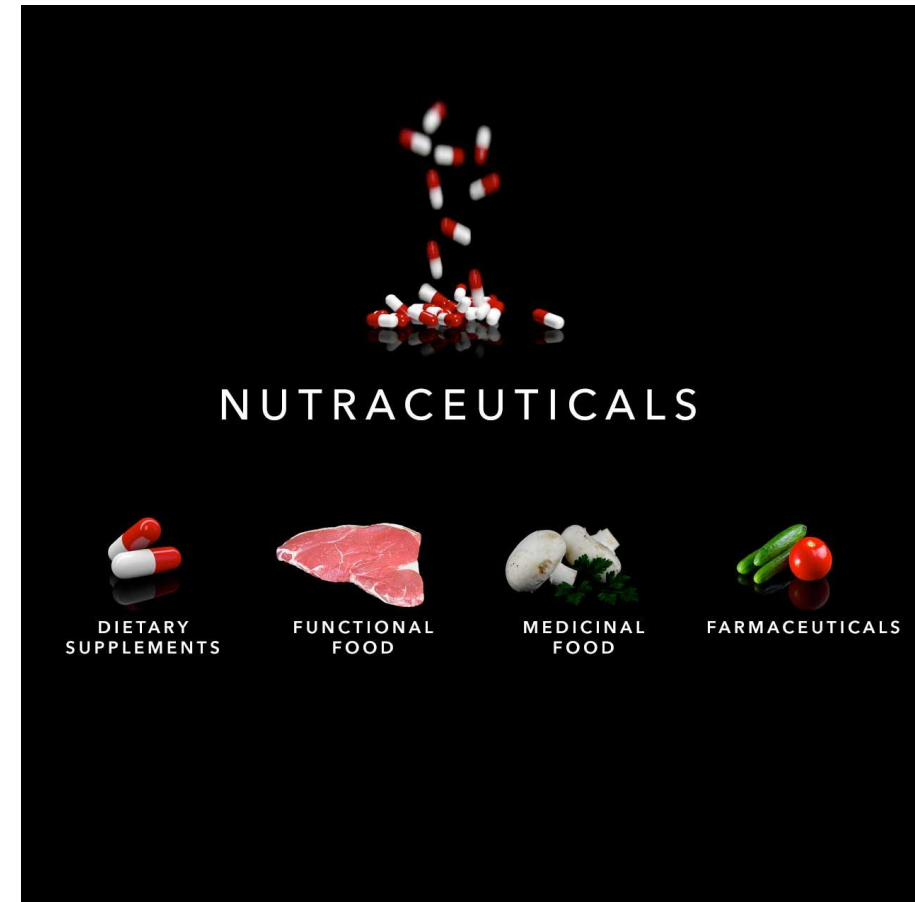
- Newer supplements involve individual or combined vitamins, minerals, chemicals, other molecules, and probiotics



BACKGROUND



- Different terms for dietary supplements used
- Natural health products in Canada
- Complementary medicines in Australia
- Nutraceuticals another common term, but broader term that also includes foods with added components e.g. fortified cereals, yogurt with probiotics, margarine with phytosterols, etc.



SUPPLEMENT INDUSTRY



- Health Stores in Canada is a \$4 billion industry that is continuing to grow (IBISWorld, 2021)
- Large and poorly-regulated industry
- Manufacturing of supplements is not standardized



THE EVIDENCE IN GENERAL

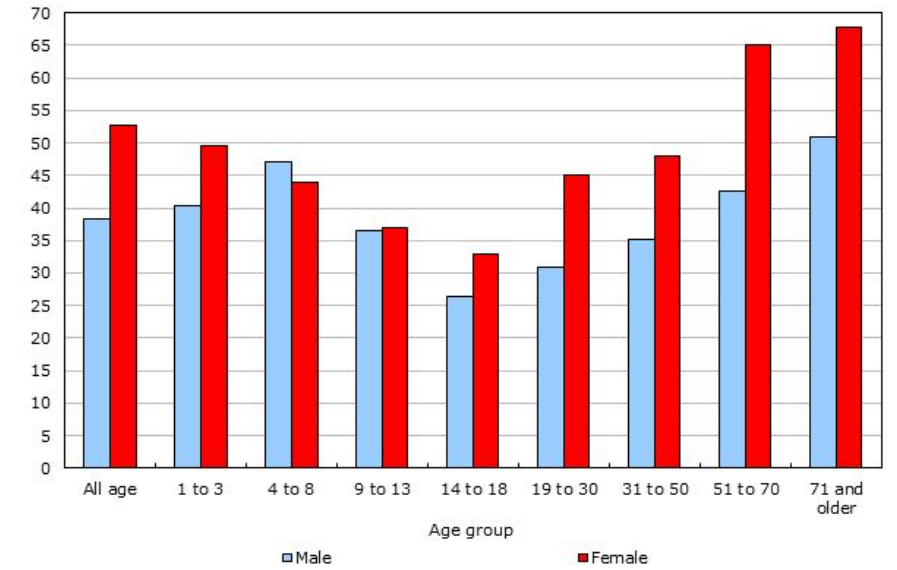
- Lacking and inconclusive in many cases
- Aside from vitamins and minerals, long-term effects of most dietary supplements have not been studied



PREVALENCE/USAGE

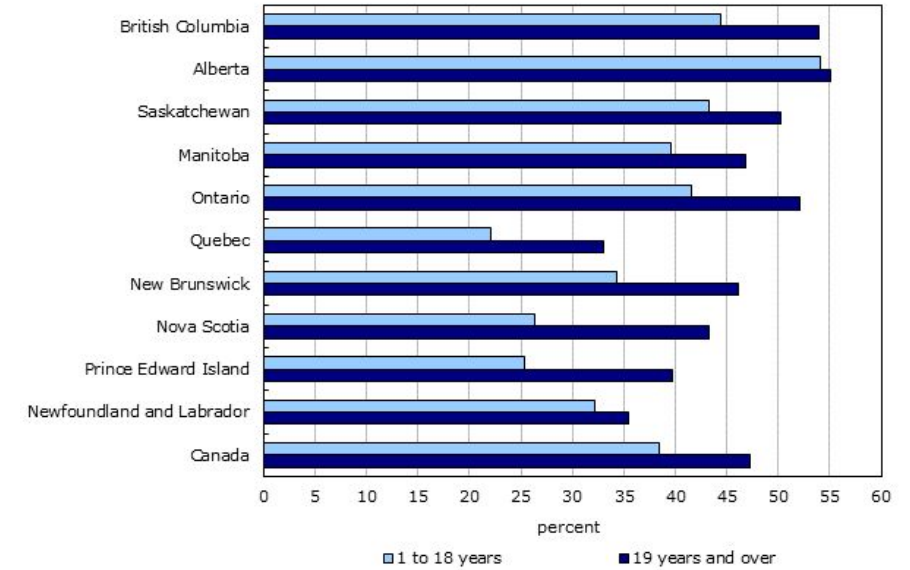
- Depends on population being surveyed, ranges from 10-91% in adults (PEN)
- In 2015, 45.6% of Canadians >1 yr old used at least one supplement (Stats Canada)

Chart 1
Percentage of people taking nutritional supplements, by age group and sex, Canada excluding territories, 2015
percent



Source: 2015 Canadian Community Health Survey - Nutrition.

Chart 2
Percentage of people taking nutritional supplements, by province and age group, Canada and Provinces, 2015
Province



Source: 2015 Canadian Community Health Survey - Nutrition.

WHY DO WE CARE?



- Surveys commonly discover that some people do not disclose use of supplements to their health care providers, and will use supplements in combination with prescription and/or over-the-counter medications
 - This could lead to harmful interactions
- Some supplements are known to have beneficial uses and are regularly prescribed (e.g. iron, folate)



CATEGORIES OF SUPPLEMENTS



- Vitamins
- Minerals
- **Botanicals/Herbals**
- Fatty Acids
- Proteins/Amino Acids
- Chemicals
- Probiotics/Prebiotics



HERBAL SUPPLEMENTS

- Turmeric
- Apple Cider Vinegar
- Green Tea
- Aloe Vera
- Garlic
- Ginger
- St. John's Wort
- Ginkgo





Which part of the turmeric and ginger plants is used for culinary and medicinal purposes?

- A. Flower
- B. Leaves
- C. Stem
- D. Rhizome



Which part of the turmeric and ginger plants is used for culinary and medicinal purposes?

~~A. Flower~~

~~B. Leaves~~

~~C. Stem~~

D. Rhizome

TURMERIC



TURMERIC BACKGROUND

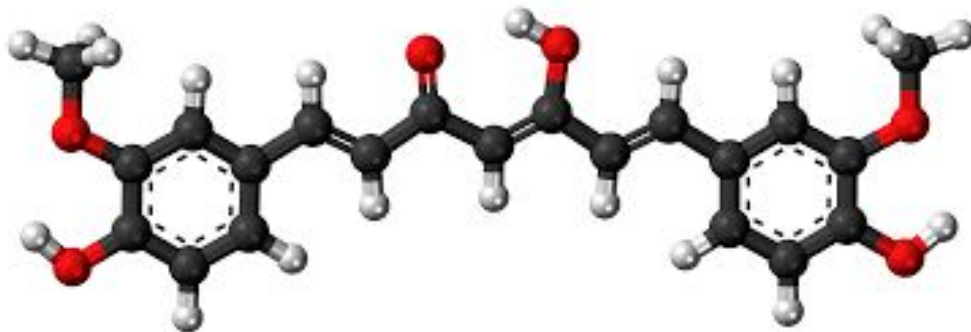


- *Curcuma longa*
- Other common names: Indian saffron
- Part of ginger family
- Native to Southeast Asia
- Rhizome (underground root) is what is used in traditional medicines as well as a culinary spice
- Used in traditional Indian and Chinese medicine



TURMERIC BACKGROUND

- Curcuminoids thought to be active chemical substances
- Curcumin is main curcuminoid that gives turmeric its yellow/orange colour
- Turmeric supplements made from the dried rhizome or is made into a paste for skin conditions



CURRENT USES/CLAIMS



- Arthritis
- Digestive disorders
- Respiratory infections
- Allergies
- Liver disease
- Depression
- Many other conditions
- Common spice and main ingredient in curry powder



CURRENT EVIDENCE

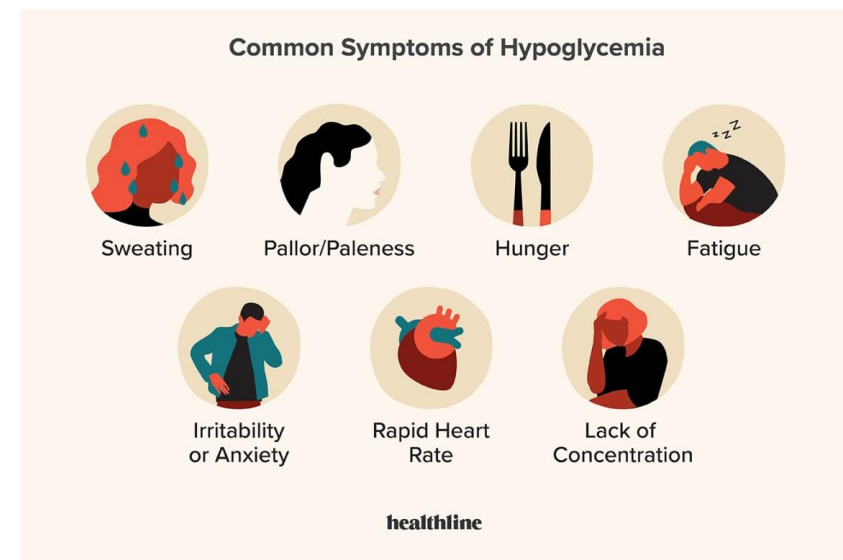
- Not much is known
- Curcumin is unstable (easily changes into other molecules) and does not get absorbed into the blood stream very well
- Lack of standardization in manufacturing of turmeric/curcumin products



SORRY !!!
No Results Found

SAFETY/INTERACTIONS

- Generally considered to be safe
- May reduce blood sugar levels → mixing with diabetic meds may increase risk of hypoglycemia
- Supplementation beyond what is consumed in diet may be unsafe in pregnancy and it is not known if it is safe while breastfeeding



APPLE CIDER VINEGAR



APPLE CIDER VINEGAR BACKGROUND



- Vinegar made from fermented juice of apples
- Acetic acid, the main component of vinegar, supposedly responsible for health benefits



CURRENT USES/CLAIMS

- Appetite and weight loss
- Blood sugar and cholesterol levels
- Digestive health
- Boost immune system



CURRENT EVIDENCE

- No evidence around effectiveness or safety as a supplement
- Research as a food → might improve blood sugar levels and insulin response in diabetic patients, and improve cholesterol levels and weight loss in obese individuals (low quality evidence)



SAFETY/INTERACTIONS



- Household apple cider vinegar generally considered safe when consumed in small amounts
- Could cause low potassium, skin irritation, chemical burns, or tooth erosion
- Apple cider vinegar supplements can have widely different acidity levels, sometimes 10 times normal acidity level, but no studies have assessed safety



GREEN TEA





True or False? Green tea, black tea, and oolong tea come from different species of the genus *Camellia*.

- A. True
- B. False



True or False? Green tea, black tea, and oolong tea come from different species of the genus *Camellia*.

~~A. True~~

B. False

GREEN TEA BACKGROUND



- *Camellia sinensis*
- Comes from same plant as black and oolong teas, just prepared differently
- Has been used for medicinal purposes in China and Japan for thousands of years
- Contains antioxidant components called catechins



CURRENT USES/CLAIMS



- Improve mental alertness
- Digestive symptoms and headaches
- Weight loss
- Heart disease and cancer
- Health Canada approved medication called Veregen that includes extracted components of green tea leaves → treats genital warts



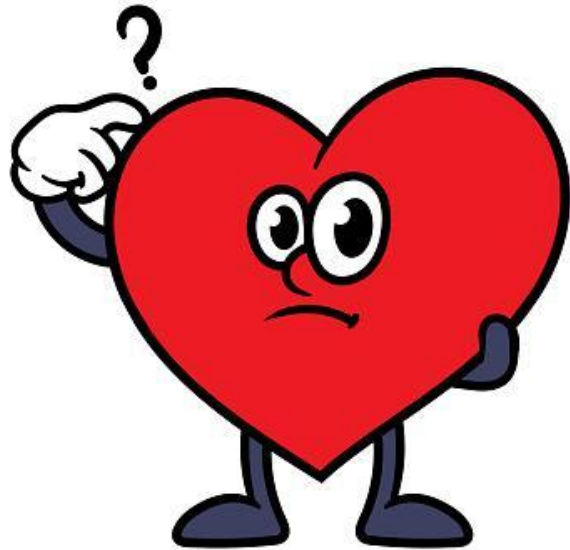
CURRENT EVIDENCE

- Improved mental alertness: probably due to caffeine → study of main catechin of green tea (epigallocatechin-3-gallate (EGCG)) showed no improvement in mental alertness
- Reduced cancer risk: **inconclusive**



CURRENT EVIDENCE

- Reduced heart disease risk: **maybe** → might decrease blood pressure and cholesterol
- Weight loss: **not helpful**
- Digestive symptoms and headaches: **unknown**



SAFETY/INTERACTIONS



- Drinking up to 8 cups/day believed to be safe
- Drinking up to 6 cups/day (no more than 300 mg of caffeine) during pregnancy or while breastfeeding may be safe, but more may be unsafe
- May increase risk of birth defects associated with folic acid deficiency (decreased absorption)
- Note that caffeine does pass into breast milk



SAFETY/INTERACTIONS

- Uncommon cases of green tea extract affecting liver, causing abdominal pain, dark urine, and jaundice → has also occurred in rare cases with some over-the-counter weight loss medications that contain green tea extract



SAFETY/INTERACTIONS



- May reduce blood levels and effectiveness of:
 - Digoxin
 - Lisinopril
 - Nadolol
- May increase blood levels of:
 - Simvastatin (liver damage and rhabdomyolysis risk)
 - Tacrolimus (many negative effects)
- May interfere with bortezomib (chemotherapy agent)

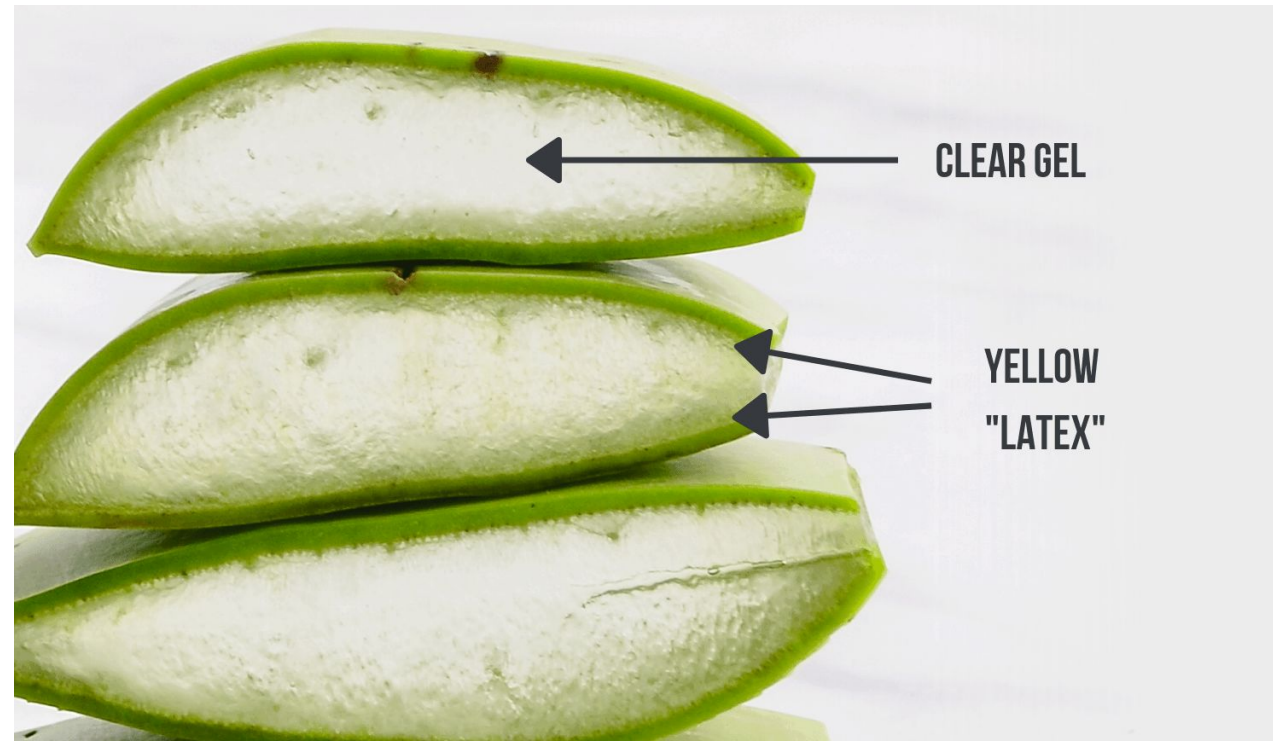


ALOE VERA



ALOE VERA BACKGROUND

- Cactus-like plant that grows in subtropical regions
- Can be used topically and orally
- Aloe leaf extract come in two forms: aloe gel and aloe latex



CURRENT USES/CLAIMS



- Topical:
 - Acne, lichen planus, oral submucous fibrosis, burning mouth syndrome, burns, and radiation-induced skin toxicity
- Oral:
 - Weight loss, diabetes, hepatitis, and inflammatory bowel disease (Crohn's disease, ulcerative colitis)
- Other conditions



CURRENT EVIDENCE



- Acne: **maybe**, with medical soap and tretinoin gel
- Burns: **maybe**, speed healing and reduce pain
- Herpes simplex, psoriasis, lichen planus, ulcerative colitis: **maybe**
- Irritable bowel syndrome, diabetic foot ulcers, dental plaques: **inconclusive**



SAFETY/INTERACTIONS

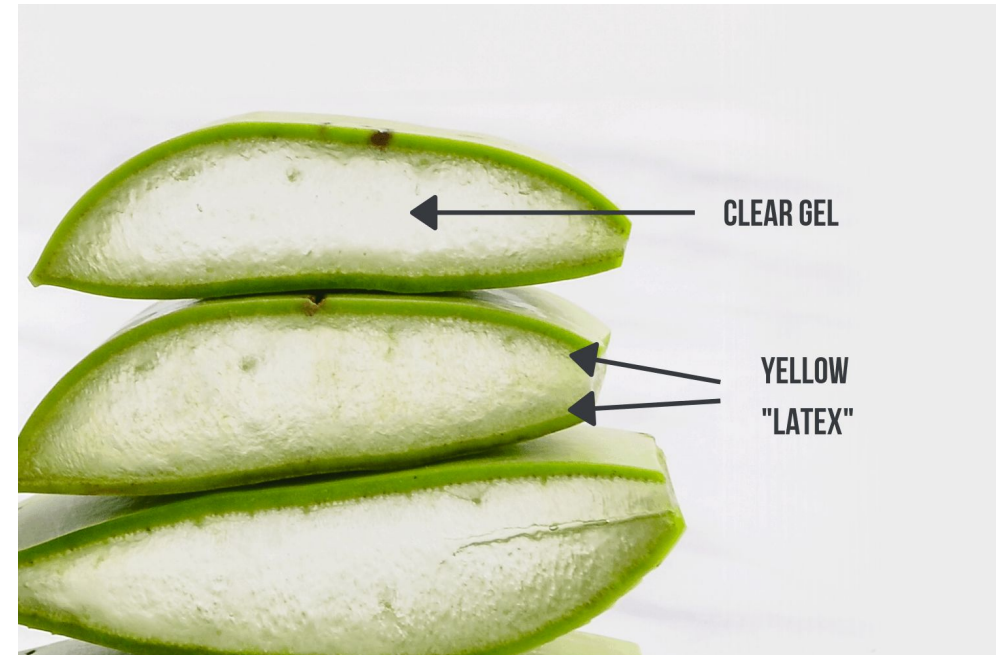
- Generally considered to be safe, but potential interactions
- Topical: burning, itching, eczema
- Aloe leaf extract consumption: associated with cases of acute hepatitis, may be unsafe in pregnancy and breastfeeding



SAFETY/INTERACTIONS



- Aloe latex consumption:
 - Abdominal pain and cramps
 - Overuse may increase risk of adverse events with digoxin (both can reduce potassium levels)
- Aloe gel consumption:
 - May increase risk of hypoglycemia with diabetic medications



BREAK TIME

FOR 10 MIN!



GARLIC



GARLIC BACKGROUND



- *Allium sativum*
- Edible bulb from plant in lily family
- Traditionally used by Egyptians, Babylonians, Greeks, Romans, Chinese, and Japanese
- Used orally and topically



CURRENT USES/CLAIMS

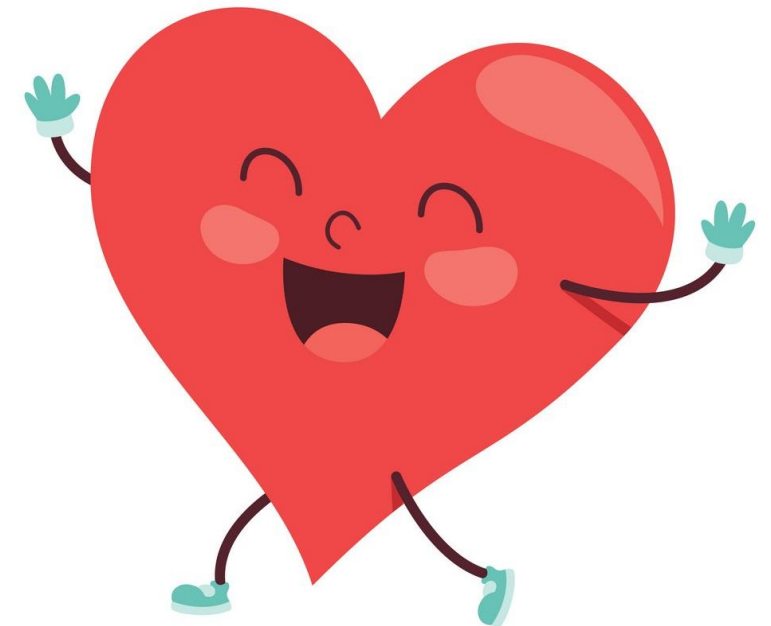


- Blood pressure
- Cholesterol
- Gastric cancer
- Blood sugar
- Antimicrobial (oral and topical)



CURRENT EVIDENCE

- Total cholesterol, LDL cholesterol, blood pressure: **maybe**
- HDL cholesterol, triglycerides, blood sugar: **not helpful**
- Gastric cancer: eating high levels of vegetables in garlic family (onions, shallots, chives, leeks, garlic) might reduce risk, but not garlic alone
- Antimicrobial, common cold: **inconclusive**



SAFETY/INTERACTIONS

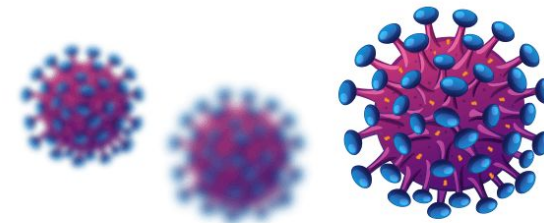
- May increase bleeding risk → don't combine with blood thinners (e.g. Warfarin, apixaban, aspirin, etc.), stop before surgery
- May interfere with the effectiveness of some HIV medications



WHAT IS HIV?

Human Immunodeficiency Virus (HIV)

is a virus that attacks cells that help the body fight infection.



There's no cure, but it is **treatable** with medicine.



SAFETY/INTERACTIONS

- Safety of oral and topical use during pregnancy and breastfeeding unknown
- Side effects: breath and body odour, heartburn, upset stomach
- Some people have experienced allergic reactions



GINGER



GINGER BACKGROUND



- *Zingiber officinale*
- Native to China, Japan, and India
- Spice comes from rhizome of the plant
- Used in China for over 2500 years and used in Chinese, Indian, and Japanese medicine since 1500's



CURRENT USES/CLAIMS

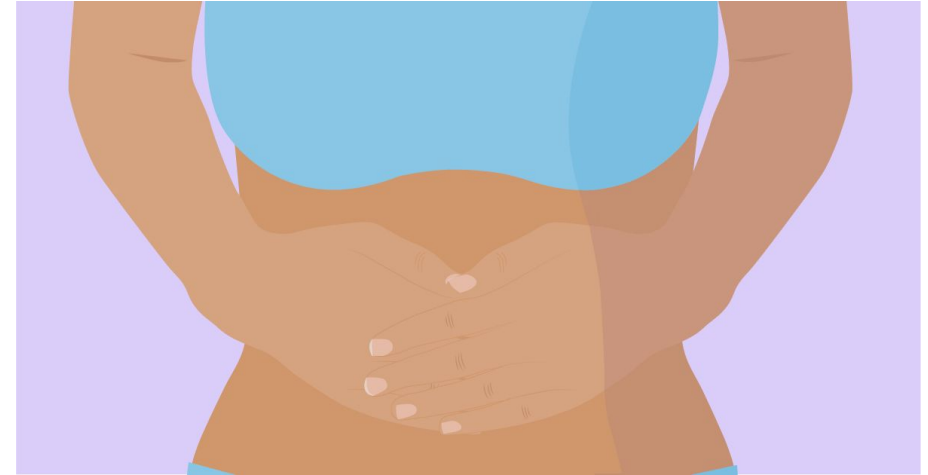


- Various causes of nausea and vomiting
- Menstrual cramps



CURRENT EVIDENCE

- Mild nausea and vomiting in pregnancy, menstrual cramps: **maybe**
- Motion sickness: **not helpful**
- Nausea and vomiting with cancer chemotherapy: **not helpful**, but may be helpful if taken in combination with chemotherapy or drugs used to prevent nausea and vomiting
- Postoperative nausea and vomiting, symptoms of knee osteoarthritis: **inconclusive**



SAFETY/INTERACTIONS

- Generally considered to be safe
- May increase blood levels and side effects of morphine → respiratory distress, profound sedation, coma, death
- Rare cases of increased bleeding → beware if on blood thinner (e.g. Warfarin, apixaban, aspirin, etc.)



World Health Organization

SIGNS OF OPIOID OVERDOSE

1. Pinpoint pupils
2. Unconsciousness
3. Shallow/slow Breathing
4. Pale skin
5. Blue lips
6. Snoring/rasping breath

SAFETY/INTERACTIONS

- Side effects: abdominal discomfort, heartburn, diarrhea, mouth and throat irritation
- Safety during pregnancy inconclusive and safety while breastfeeding unknown



ST. JOHN'S WORT



Which of the following is not another name for St. John's wort?



- A. Goatweed
- B. Klamath weed
- C. Maidenhair
- D. Hypericum

Which of the following is not another name for St. John's Wort?



~~A. Goatweed~~

~~B. Klamath weed~~

C. Maidenhair

~~D. Hypericum~~

ST. JOHN'S WORT BACKGROUND



- *Hypericum perforatum*
- Other common names: hypericum, Klamath weed, and goatweed
- Traditionally used in Europe since the ancient Greeks
- Supposedly named after St. John the Baptist



CURRENT USES/CLAIMS

- Depression
- Menopausal symptoms
- Attention-deficit hyperactivity disorder (ADHD)
- Somatic symptom disorder
- Obsessive-compulsive disorder (OCD)
- Many others
- Topically: wounds, bruises, muscle pain



Signs and Symptoms of Depression



Persistent feelings of sadness



Loss of interests in activities



Trouble sleeping or oversleeping



Appetite or weight changes



Fatigue or decreased energy



Difficulty thinking clearly or quickly



Irritability, frustration, or pessimism



Physical aches and pains



Recurrent thoughts of death or suicide

CURRENT EVIDENCE



- Depression
 - More effective than placebo, as effective as antidepressants in short-term for mild-moderate depression
 - Unknown for severe depression or more than 12 weeks
 - May cause less side effects than antidepressants



CURRENT EVIDENCE

- Menopausal symptoms, wound healing, somatic symptom disorder: **maybe helpful**
- Irritable bowel syndrome (IBS), chronic hepatitis C infection, HIV infection, social anxiety disorder: **not helpful**
- Smoking cessation, memory improvement, anxiety, ADHD, seasonal affective disorder: **don't know**



SAFETY/INTERACTIONS



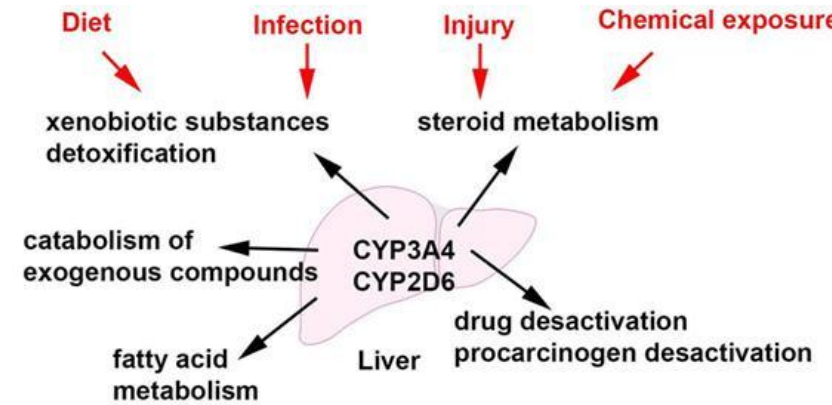
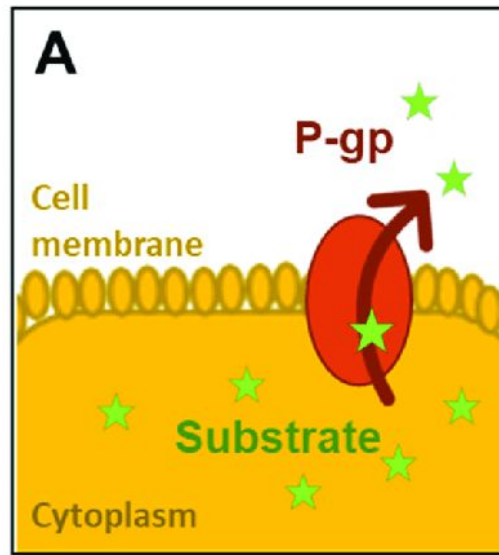
- Generally considered to be safe for short-term (≤ 12 weeks) use...BUT has many drug interactions



EFFECTS ON DRUG PROCESSING



- Inducer of P-glycoprotein → decreased absorption of certain drugs
- Inducer of cytochrome P450 enzymes → increased breakdown of certain drugs
- Hyperforin suspected culprit



SAFETY/INTERACTIONS



- Weaken effects of:
 - Antidepressants
 - Hormonal birth control
 - Cyclosporine
 - Certain heart meds (digoxin, ivabradine)
 - Some HIV meds
 - Some cancer meds
 - Warfarin
 - Some statins
 - Certain diabetes meds (gliclazide aka Diamicon)
 - Some anti-seizure meds



SAFETY/INTERACTIONS



- Serotonin Syndrome
 - Very high levels of serotonin
 - When mixed with antidepressant that elevates serotonin levels (or another drug that increases serotonin)

Clinical presentation of serotonin syndrome

Altered mental status	Autonomic dysfunction	Neuromuscular abnormalities	Serious complications
Agitation	Hypertension	Tremor	Rhabdomyolysis
Confusion	Tachycardia	Clonus	Myoglobinuria
Anxiety	Diaphoresis	Hyperreflexia	Metabolic acidosis
Restlessness	Hyperthermia	Muscle rigidity	Renal failure
Excitement	Nausea	Akathisia	Respiratory failure
Delirium	Vomiting		Seizures
Coma	Diarrhea		Death
	Mydriasis		

Source: References 2-5

SAFETY/INTERACTIONS



- Side effects:
 - Sensitivity to sunlight
 - Insomnia
 - Anxiety
 - Dry mouth
 - Dizziness
 - GI symptoms
 - Fatigue
 - Headache
 - Sexual dysfunction
 - Rash with sun exposure (topical)



SAFETY/INTERACTIONS

- **Not** recommended while pregnant or breastfeeding
- Birth defects in laboratory animals
- Colic, drowsiness, and fussiness in breastfeeding babies



GINKGO



GINKGO BACKGROUND



- *Ginkgo biloba*
- Other common names: fossil tree, maidenhair tree, Japanese silver apricot, baiguo, yinhsing
- One of the oldest living tree species
- Used in Chinese herbal medicine and in Europe



CURRENT USES/CLAIMS



- Anxiety
- Allergies
- Dementia
- Peripheral artery disease
- Tinnitus
- Memory and concentration
- Mood
- Raynaud's syndrome
- Many others



1. Fingers can become white due to the lack of blood flow



2. The fingers may turn blue as the blood vessels dilate to keep the blood in the tissues



3. Finally the fingers may turn red as the blood begins to return

CURRENT EVIDENCE

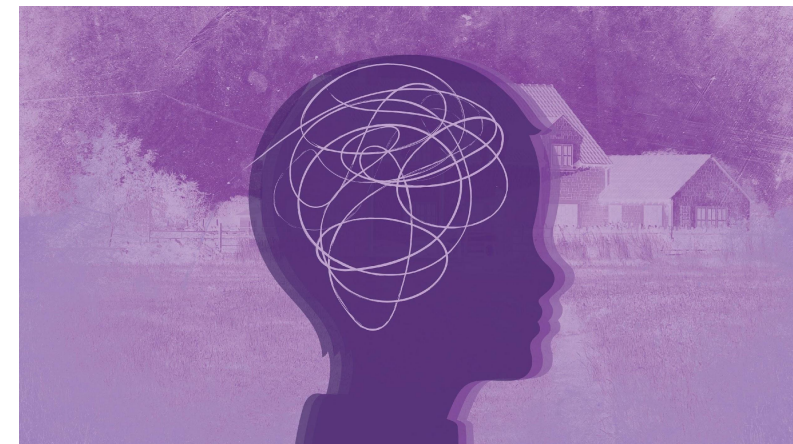
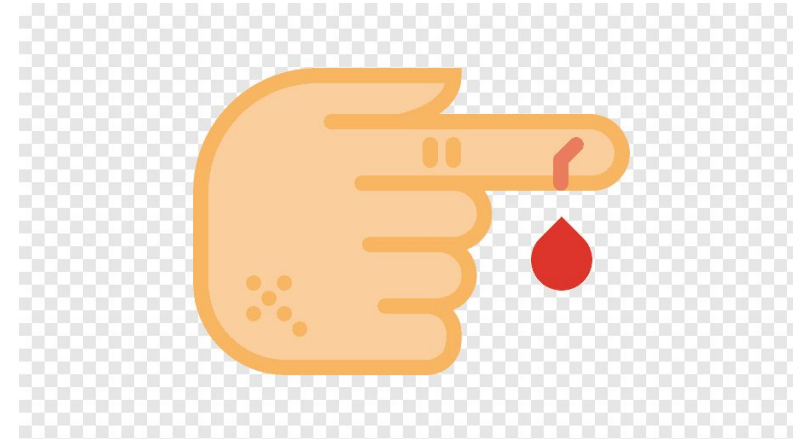
- Not conclusive in general
- Dementia/cognitive decline: **inconclusive**
- Anxiety, diabetic neuropathy, glaucoma, peripheral artery disease, premenstrual syndrome, schizophrenia, vertigo: **maybe**
- Memory enhancement, high blood pressure, tinnitus, multiple sclerosis (MS), seasonal affective disorder, preventing heart attack or stroke: **not helpful**



SAFETY/INTERACTIONS



- Generally considered to be safe, but has drug interactions
- Increases bleeding risk → don't combine with blood thinners (e.g. Warfarin, apixaban, aspirin, etc.), stop before surgery
- May interfere with anti-seizure meds and increase risk of seizures → avoid mixing with other meds that can cause seizures (e.g. antidepressants, stimulants)



SAFETY/INTERACTIONS



- Side effects:
 - Headaches
 - Stomach upset
 - Dizziness
 - Heart palpitations
 - Constipation
 - Allergic skin reactions



SAFETY/INTERACTIONS



- May be unsafe during pregnancy
 - May induce early labour or increase bleeding at delivery
- Safety during breastfeeding unknown
- Direct contact with tree pulp may cause reaction similar to poison ivy
- Ginkgotoxin in raw or roasted seeds and unprocessed leaves
 - Seizures, vomiting, loss of consciousness



TO SUMMARIZE

- “Makers of natural health products cannot legally say that natural health products can diagnose, cure, treat, or prevent disease. But they can say that they contribute to health maintenance and well-being.” – Health Link BC
- Buyer beware, some supplements are pricy!



TO SUMMARIZE

- Look for products with a Natural Product Number (NPN) or a Homeopathic Medicine Number (DIN-HM) on the label as this will indicate Health Canada finds the product to be safe and useful if you follow the directions on the package



HELPFUL RESOURCES

- Your healthcare provider, pharmacist, or a dietician (dial 811)
- Health Link BC <https://www.healthlinkbc.ca/>
- NIH Office of Dietary Supplements – Dietary Supplement Fact Sheets
<https://ods.od.nih.gov/factsheets/list-all/>
- NIH National Center for Complementary and Integrative Health
<https://www.nccih.nih.gov/health/atoz>
- Drugs.com interaction checker
https://www.drugs.com/drug_interactions.html
- Mayo Clinic, Cleveland Clinic, etc. (.gov, .org)





THE UNIVERSITY OF BRITISH COLUMBIA

Thank you!

Any questions?