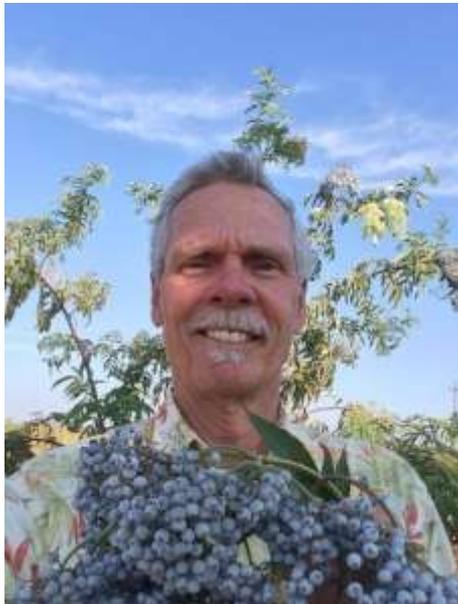


Preventing and Treating Infections

Christopher Hobbs Ph.D. L.Ac., A.H.G.



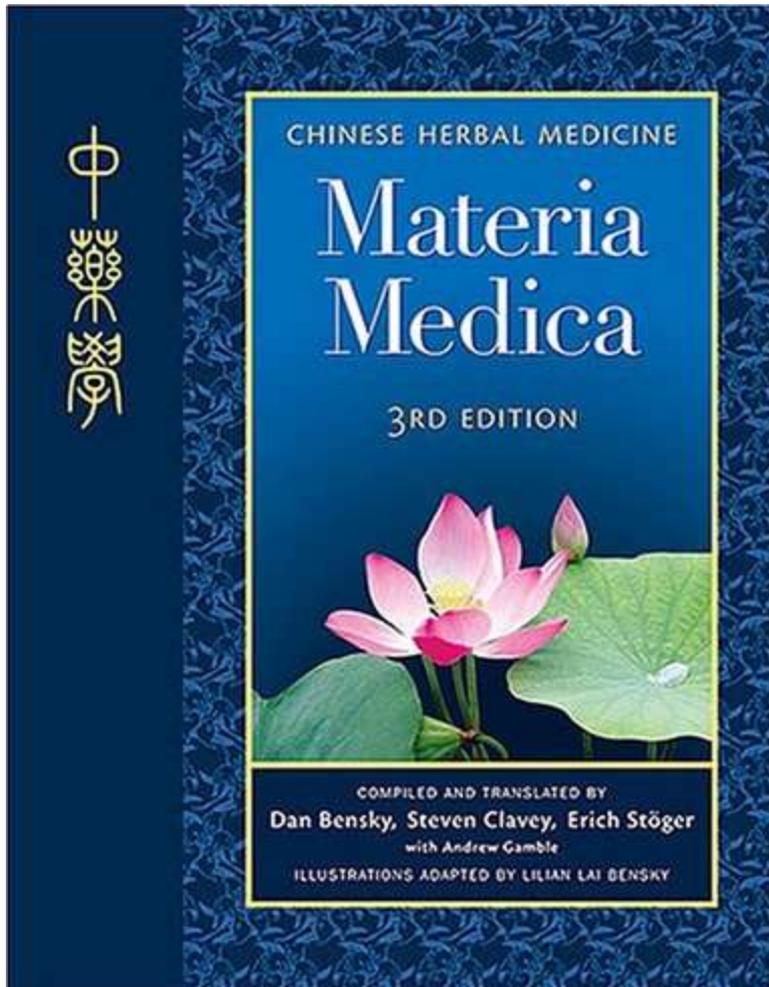
- 4th generation herbalist, 3rd generation botanist
- Ph.D., Evolutionary Biology, Phylogenetics (UC Berkeley)
- Research scientist
- Licensed acupuncturist (California), clinician
- Author of 22 books on herbs and health, including *Peterson's Field Guide to Medicinal Plants of the Western U.S.* (with Steven Foster)

Course Outline

- Overview
- Tongue diagnosis
- Pulse diagnosis
- Host immunity
- Materia medica
 - Antivirals
 - Antibacterials
 - Antifungals



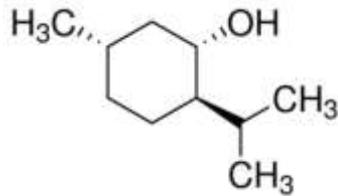
Recommended Reading



- Bensky *et al.* *Chinese Materia Medica: Herbal Medicine*
- Kaptchuck *Web That Has no Weaver*
- Macioccia *Tongue diagnosis, Foundations of Chinese Medicine*
- Hoffmann *Medical Herbalism*
- Williamson *Potter's New Herbal Cyclopaedia*
- Hobbs & Gardner *Grow It, Heal It* (making powdered extracts)

Tx of Infections, Overview

In general, herbs can be thought of as supportive, non-toxic



- Evaluating the evidence, selecting most-supported herbal remedies
 - Historical record (safety)
 - Traditional medical system
 - Scientific evidence for safety, efficacy
 - Standard of herbal practice
- Best preparation for herb
- Pharmacokinetics
- Dosage
- Dx and matching to patient

Historical Record—Herbal Knowledge

460 B.C.E.

“Hippocrates” born; the Hippocratic Corpus begins its formation

334-325 B.C.E.

Alexander the Great conquers Egypt, the Middle East and Western India, bringing Greek culture and learning

330 B.C.E.-100 C.E.

Alexandria serves as a center for Greek scholarship, including medicine

50-70 C.E.

Dioscorides writes *De materia medica*

129 C.E.

Galen born; noted physician

476 C.E.

As the Western Roman Empire falls, Western physicians begin to lose contact with Greek scholars and texts in the East

632-1200 C.E.

Islam grows, eventually taking over Egypt and much of the Hellenized Middle East; Arab medical scholars take an intense interest in the Greek physicians; texts are copied in Greek and translated into Arabic

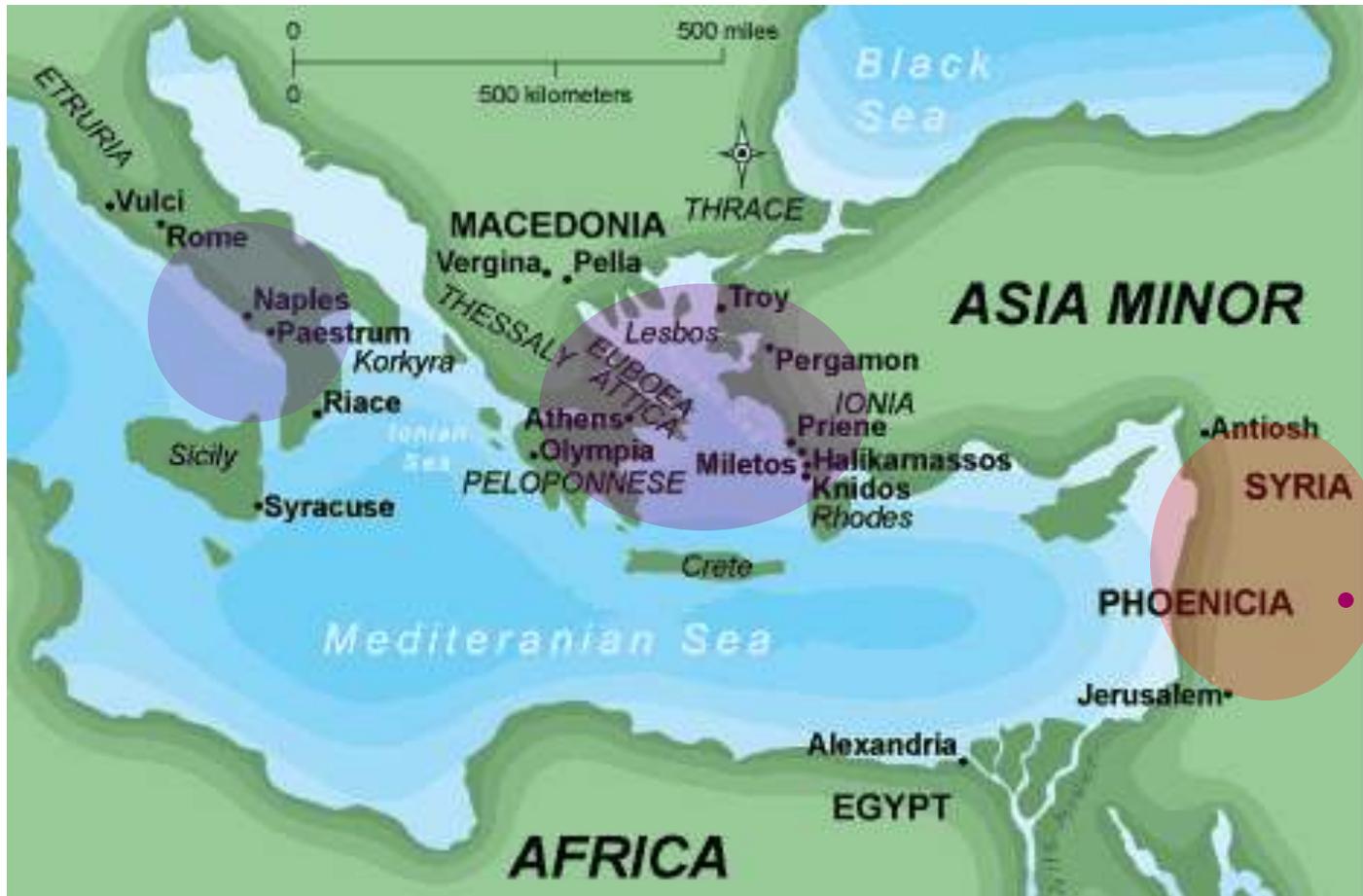
1200-1350 C.E.

News from Crusaders and texts found during their raids renew Western scholars’ interest in Greek medicine; the Greek language is mostly unknown, however

1450-1598 C.E.

With the fall of Constantinople in 1453, many Byzantine scholars emigrate to Italy, bringing Greek texts and teaching the language; Greek medical texts are printed with vigor and studied dogmatically

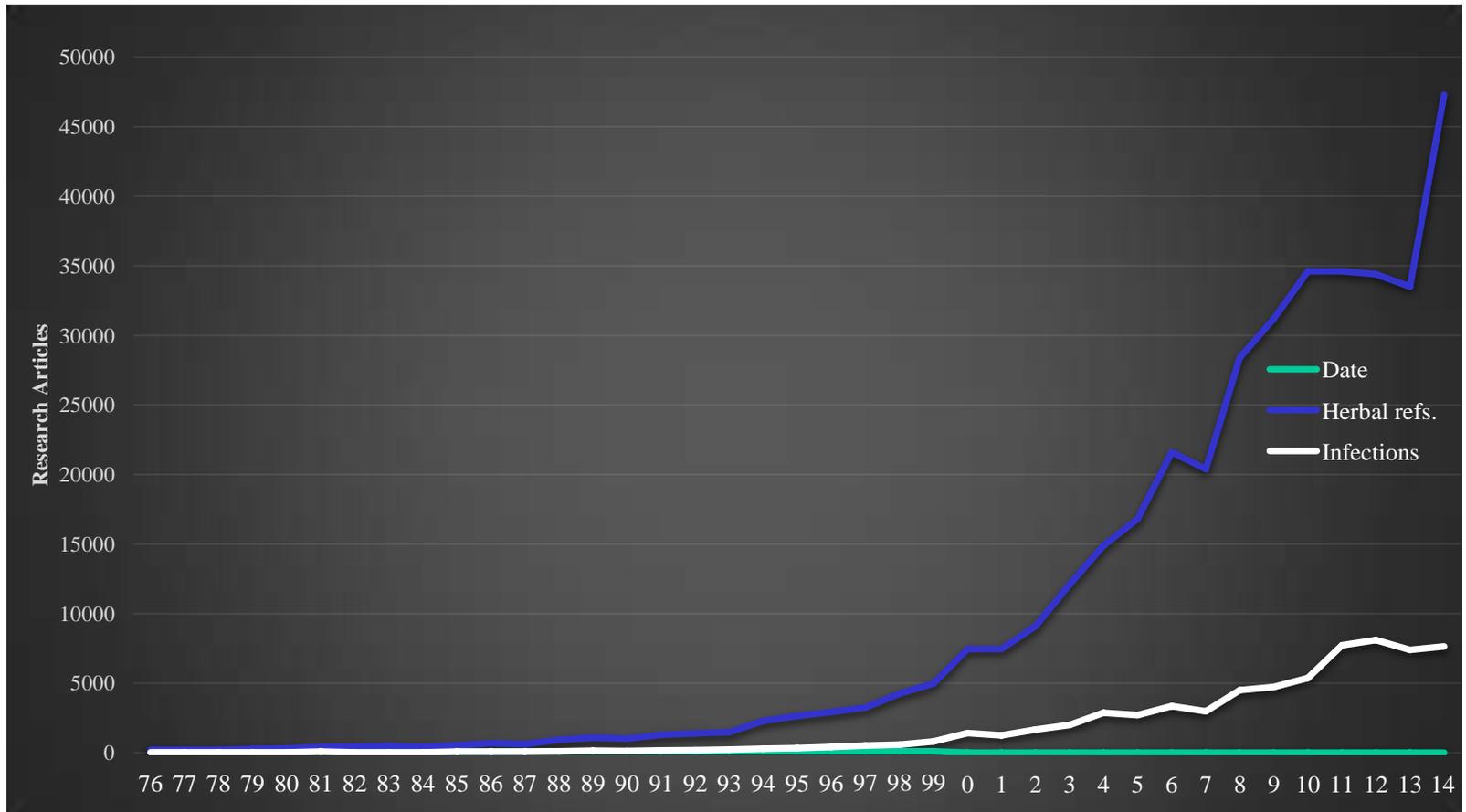




Bagdad

Scientific Basis—Herbal Research

Research articles on Scholar with key words related to science



Original Research, C. Hobbs, 1-25-15

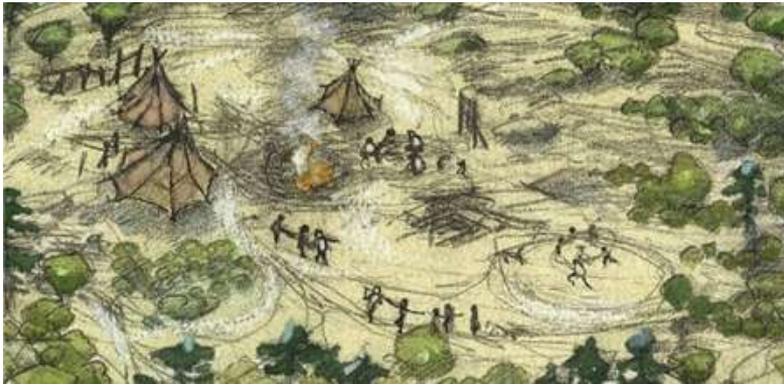
Herbal Medicine—Best Evidence Efficacy, Safety, Use



- Folk Medicine
- Traditional Medicine
- Scientific Study and evaluation
- Current clinical reports

Historical Record

Traditional Medicine



- High value
 - Efficacy
 - Safety
 - Dosage
 - Selection of best genetics for actives
 - Healing human-plant interactions

- New research suggests medicinal plant use older than 5,000 y.a.
- Historical record is a giant epidemiological study—the largest in human endeavor
- The research of millions over thousands of years

Evidence-Based Herbalism

Evaluation of Efficacy and Safety of Treatments

1. Positive randomized, placebo-controlled trials (RPCT) with meta-analyses and enough statistical power to support efficacy for intended uses (variable, by herb)
2. RPCT and/or meta-analyses, but results equivocal, some weak study designs (however, heterogeneity)
3. Open label studies only, not controlled
4. No human studies, *in vitro*, *in vivo* studies demonstrating biological activity that reasonably supports intended uses
5. Extensive and long-standing empirical data for intended uses and/or standard treatment in TCM, Ayurveda

Traditional Medicine Systems



- Systematized
- Scope of practice, methods, body of knowledge
- Traditional Chinese Medicine
- “Western medicine”
- Ayurveda
- Unani (Perso-Arabic)
- Native American
- Shamanism

Delayed, Immediate, no Antibiotics

A Case to be Made for Herbs

- Kenealy & Arroll (2005) found no evidence of benefit for antibiotics for the common cold and acute purulent rhinitis and significant side effects (n=1838; controlled studies).
Conclusion: “*insufficient evidence of benefit to warrant the use of antibiotics for URI in children or adults.*”
- Jefferson *et al.*, 2014 noted modest benefits for Oseltamivir for time to alleviation of first symptoms, outcomes, and complications, but it often caused nausea and vomiting, the risk of headaches and renal and psychiatric syndromes (review of 83 trials)

- Clinical outcomes including duration and severity measures for pain, malaise, fever, cough and rhinorrhoea in sore throat, acute otitis media, bronchitis (cough) and the common cold
- 10 studies, n=3157
- Most clinical outcomes show no difference between strategies
- Delayed and no antibiotics had similar satisfaction rates with both strategies achieving over 80% satisfaction (immediate antibiotics slightly better)

(Spurling *et al.*, 2013)

Selecting the Best Preparation

Preparation	Extraction of actives	Bioavailability of actives	Potency	Shelf-life	Compliance	Notes
Teas	good-excellent	good-excellent	good, depends on extraction time	2-4 days in 'fridge	fair-good; taste	Self-made, takes time
Tinctures	good-excellent	excellent	Fair (1:5 extract)	ca. 3 years	fair-good; taste	contains alcohol
Creams	fair-good	fair-good	fair-good	<1 year	good	external
Salves	good	good	good	<1 year	fair-good	external
Capsules	good-excellent	good-excellent	Capsules should contain extracts, not powders (4:1, 5:1)	<2 years	good	check extraction ratio and standardization
Tablets	good-excellent	good	Capsules should contain extracts, not powders (4:1, 5:1)	<3 years	good, size of tablet, coating	more concentrated than capsules
Syrups	good	good	fair-good	<2 years	good, depends on taste	may contain alcohol, sugar
Baths	good	fair-good	fair	short	good	make a strong tea, add to bath

Dose and Dosage

- A medicinal dose of herbs in traditional cultures tends to be much higher than found with commercial products
- TCM = 6(3) to 9(12) grams/day of a single herb
- >80(100) grams of a formula
- Boil for hour, drink 2-3 strong cups/day
- Therapeutic tincture dose = 5 ml, 5 times/day

- Extracts
 - Teas (all constituents inside the plant are soluble = glycosides)
 - Resins on the outside or in resin ducts (i.e. cannabis, pine bark) more soluble in EtOH
 - 5:1 powdered extracts (dried teas)
 - 1:5 tinctures weakest form
 - Powdered extracts are 25 times more concentrated than tinctures; no alcohol
 - Therapeutic dose (single herb) = 1-2 grams/day (2-4 “00” caps

Quality—a course in itself

- GIGO (herb quality)
 - cultivated, “wild”
 - Parts collected (barks, roots)
 - How processed, dried, stored
- Fumigation, other chemicals
- Storage of herbs (years?)
- Extraction (solvents?)
- Standardization
- Manufacturing process
- Spiking, purity
- Micro



Commercial Products--Issues

- FDA does have regulatory control over dietary supplements (DSHEA)
- Claims and quality are main concerns
- Still, some unproven ingredients are marketed
- No licensure required, like Canada, most European countries
- Products should meet GMPs, identity, purity, potency, consistency
- Still some problems with substitution, reduced actives, testing, purity, but many improvements made

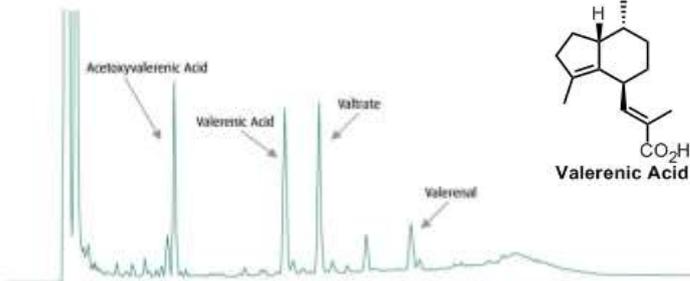


Standardization

- Plants vary considerably in types and levels of actives
- Identify known actives
- Doesn't lead necessarily to purification and isolation of active constituents
- Insure sufficient and consistent levels based on studies
- Stability
- Recommended dose should follow clinical trials
- “pixie dust” effect

Standardization

Quality Assurance of Phytopharmaceuticals

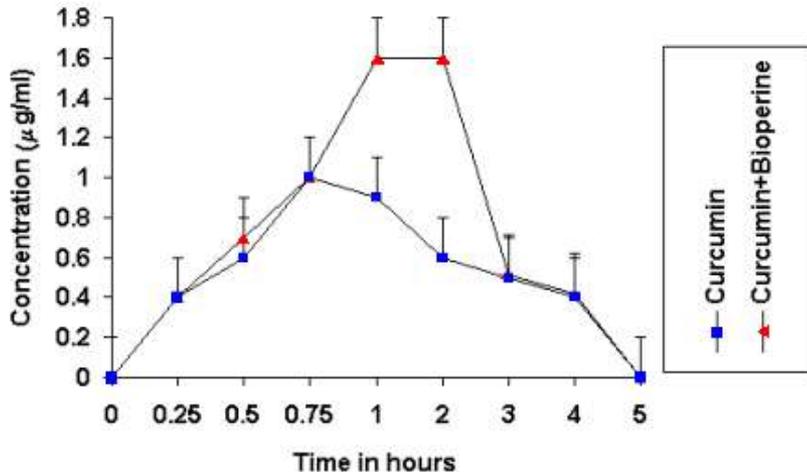
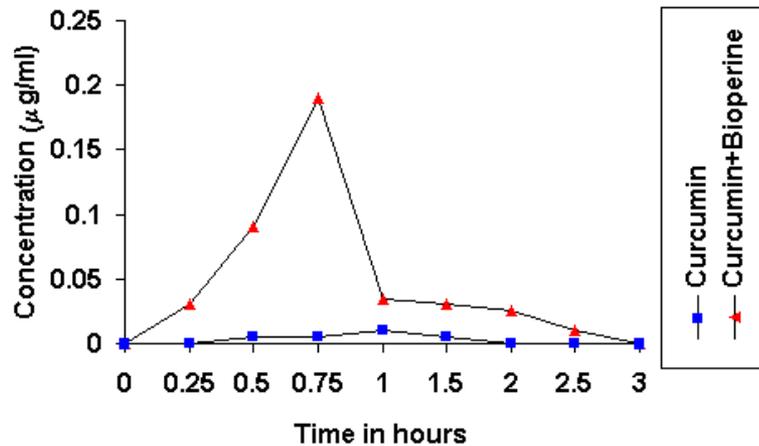


- Growing methods
- Harvesting, processing
- Identification (DNA)
- Determination of active compounds
- Purity considerations
- Product manufacture
- Efficacy, safety testing

Herb Concentration

- When does powdered herb make sense?
- By international standard, a tincture is 1:5
- Homeopathic “mother tincture” 1:10
- Fluid extract, 1:1
- Powdered extract, 4:1 or 5:1
- Standardized extract (up to 50:1, i.e. ginkgo)

Dose and Dosage Regimen

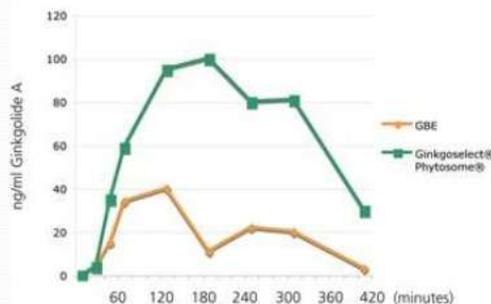


Anand *et al.*, 2007

- Adjust for body weight, age
- Adjust for patient vitality, sensitivity, age
- Consider level of purification and concentration
- Most constituents are usually at active levels in serum between 0.75-6 hours
- Usually take herb capsules, tablets with meals, b.i.d., morning and evening (compliance)
- Curcumin pharmacokinetics—rapid glucoronidation by liver

Pharmacokinetics of Ginkgo

As an example, the here reported chart, reports plasma concentrations of ginkgolide A which, according to AUC, shows a 3.5 folds higher absorption of the Ginkgoselect® Phytosome®.

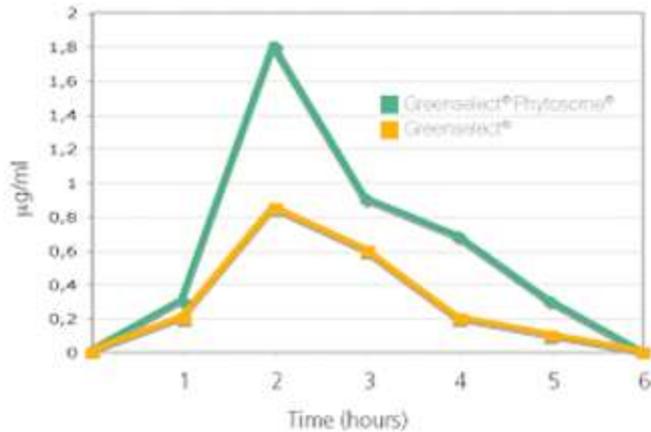


Mauri P, *et al.* 2001. Liquid chromatography/atmospheric pressure chemical ionization mass spectrometry of terpene lactones in plasma of volunteers dosed with Ginkgo biloba L. extracts, *Rapid Commun. Mass Spectrom.* 15, 929-934.

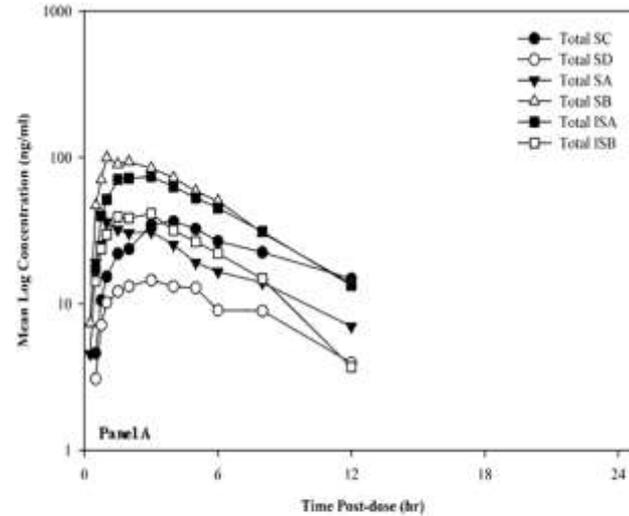
- Ginkgolide A, Ginkgolide B and Bilobalide
- 12 healthy volunteers
- Oral, 60 mg standardized
- Taking with meals increases T_{max}, but not AUC quantitatively (Fourtillan *et al.*, 1995)
- Elimination half-lives vary in the 3 compounds (4.5, 10.57, 3.21 h)

Pharmacokinetics

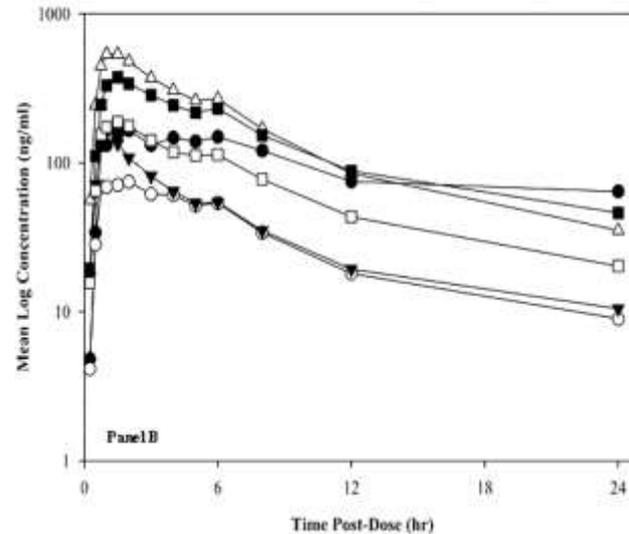
Green tea EGCG and Milk Thistle



Time course of epigallocatechin gallate (EGCG) after ingestion of Greenselect® and Greenselect® Phytosome® (Pietta *et al.*, 1998)



Healthy volunteers



Patients with cirrhosis

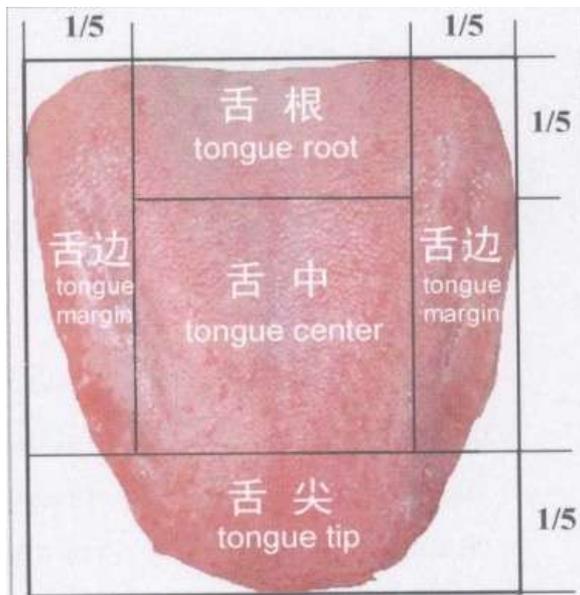
Schreiber *et al.*, 2008.

Treating Infections

TCM Diagnosis

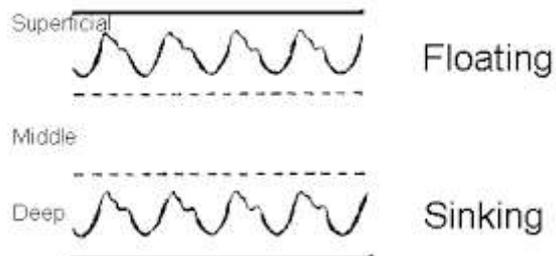
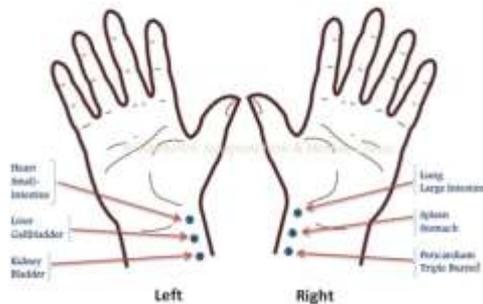


TCM Diagnosis



- Pulse, tongue dx (represents predisposition, not necessarily disease)
- Metaphors for sets of body processes
- Observation
- Questioning

Pulse Diagnosis



- Galen, TCM, Ayurveda
- Difficult to learn, long practice to associate effectively with tx and outcomes
- Thready, wiry, constrained, irregular, tight, bounding, etc.

Pulse Diagnosis

Left hand



Right hand



Pulses—it's all relative

- Strong, rapid (excess condition)
- Weak, rapid (yin deficiency + heat)
- Strong, not rapid (strong constitution)
- Weak, normal rate (Qi deficiency)
- No pulse—check your technique :<)
- For fever, yellow coating on tongue, check pulse—very full or rapid often indicates pathogen is deeper, or pathogen is strong
 - Can be more concerning

Pulse-Taking

First Things

- Warm hands
- Trim nails
- Find 1 pulse at a time, under each finger if necessary
- Use pads or tips of fingers
- General Guidelines:
 - Check overall pulses (6 positions at once) first
 - General stress of one's life can influence pulse, let the patient settle down in clinic; don't take pulse right away
 - Caffeine, physical exercise

“normal pulse”

- Steady, usu. 65-80 bmp
- Continuous sine wave
- Smooth, but not slippery
- Strong, but not forceful
- Not hard or soft under fingers
- Middle pulse, not superficial or deep
- Not tense or nervous
- Strength is not always relevant

Yin and Yang

- Yin = substances that facilitate biochemical processes (hormones, neurotransmitters)
 - Vital substance
- Yang = active biochemical processes
 - Vital process
- Qi = Vital energy
- Blood = the blood and all the substances it contains (hormones, lymphocytes, etc.)

Main Pulse Types

- **Superficial** (attack by pathogen; deficiency syndromes)
- **Deep** (chronic, established syndrome; interior syndrome)
- **Slow** (weakness of spleen and stomach; cold)
- **Rapid** (heat syndromes; exhaustion of yin, substances)
- **Feeble** (exhaustion of qi and blood)
- **Forceful** (excess syndrome, pain, excess yang qi)

Classification of the 28 Pulses

Kind of Pulse	Similar Pulses		
	Name of Pulse	Pulse Condition	Indications
Superficial pulse type	Superficial	To be felt only by light touch, but grows faint on heavy pressure	Exterior and deficiency syndromes
	Bounding	Surging like roaring waves which come vigorously and fade away	Preponderance of pathogenic heat
	Soft	Superficial, thready, and soft	Deficiency, dampness
	Scattered	Indistinct, scattered without root	Collapse of <i>zang-fu qi</i> , scattered primordial <i>qi</i>
	Hollow	Superficial, large, and hollow like pressing the tubal leaf of a spring onion	Loss of blood, injury of <i>yin</i>
	Tympanic	Extremely taut, almost rapid and without substance in its center, like pressing the surface of a drum	Depletion of blood, loss of essence, abortion, metrostaxis
Deep pulse type	Deep	Hardly felt by light touch, but distinct under heavy pressure	Interior syndrome
	Hidden	To be felt only by deep pressure to the level of the bone, and even then the beats seem to come from a deeply located place	Stagnation of pathogenic factors in the interior, syncope, severe pain

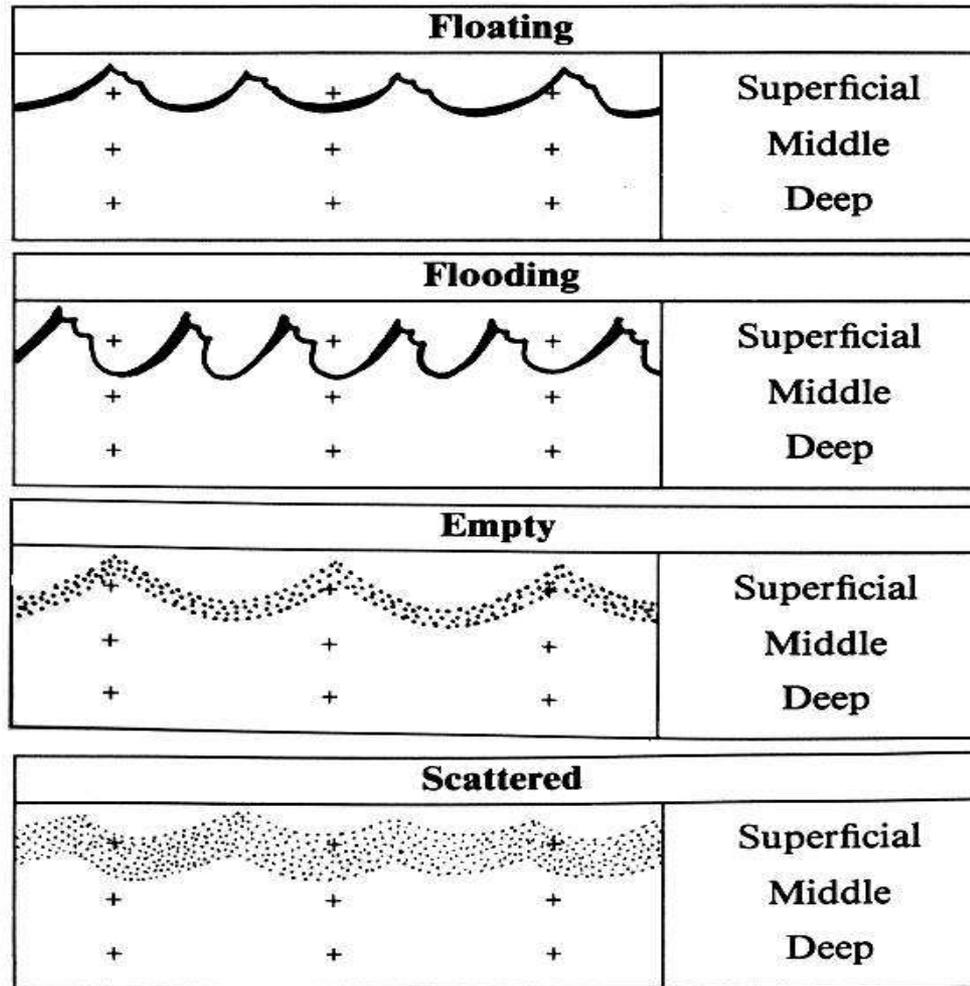
28 Pulses part 2

Kind of Pulse	Similar Pulses		
	Name of Pulse	Pulse Condition	Indications
Deep pulse type	Firm	Forceful, taut and long, felt only by pressing hard	<i>Yin</i> -cold, interior-excess, hernia, mass in the abdomen
	Weak	Extremely soft, deep, and thready	Deficiency of <i>qi</i> and blood
Slow pulse type	Slow	Only three beats per respiration	Cold syndrome
	Retarded	Four beats per respiration coming slightly faster than a slow pulse	Dampness syndrome, weakness of the spleen and stomach
	Unsmooth	Slow, thready, and short with an uneven flow	Stagnation of <i>qi</i> , blood stasis, deficiency of blood, injury of the essence
	Knotted	Retarded, lose of beats at irregular intervals	Excess of <i>yin</i> , stagnation of <i>qi</i>
Rapid pulse type	Rapid	More than five beats per respiration	Heat syndrome
	Running	Hasty and rapid with irregular intervals	Excessive heat, stagnation of <i>qi</i> and blood
	Swift	Hasty and swift, seven or eight beats per respiration	Hyperactivity of <i>yang</i> due to exhaustion of <i>yin</i>
	Tremulous	Rolling, rapid, and strong like a bean	Fright, pain
Feeble pulse type	Feeble	Forceless and empty in the three regions	Deficiency syndrome, usually deficiency of <i>qi</i> and blood

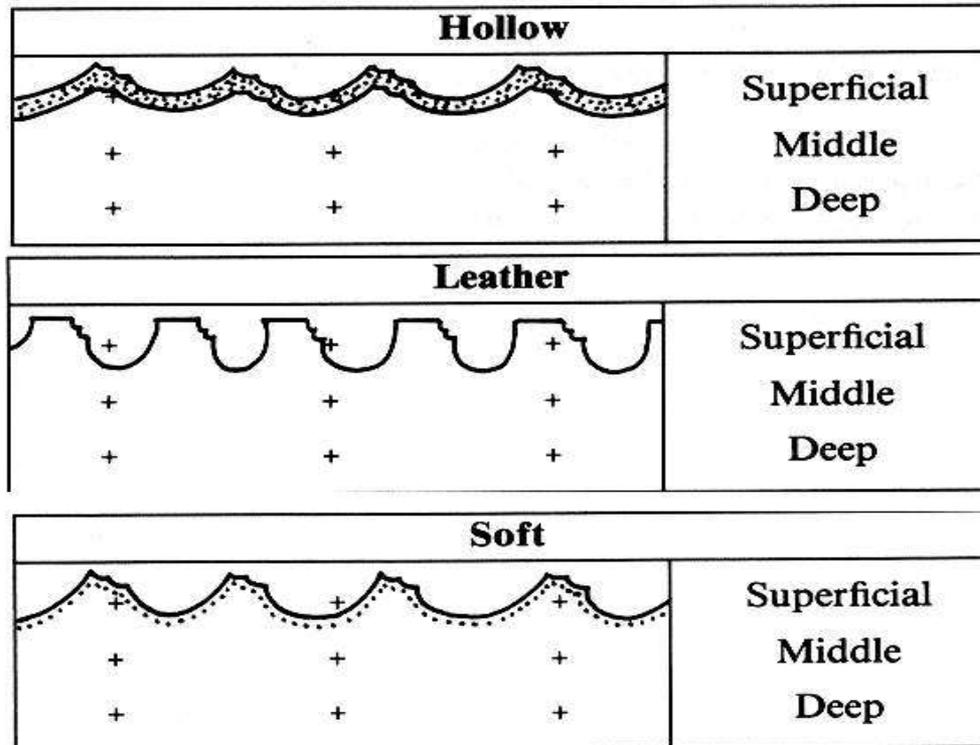
28 Pulses Part 3

Kind of Pulse	Similar Pulses		
	Name of Pulse	Pulse Condition	Indications
Feeble pulse type	Thready	Thready like a fine thread, but very distinct and clear	Exhaustion of <i>qi</i> and blood deficiency and dampness syndromes
	Faint	Extremely thin, soft, and barely palpable by pressure	Deficiency syndrome, collapse of <i>yang</i>
	Intermittent	Loss of beat and pausing a little longer at a regular intervals	Exhaustion of <i>zang qi</i> , traumatic injury
	Short	Short extent	Forceful, referring to stagnation of <i>qi</i> , weakness, due to injury of <i>qi</i>
Forceful pulse type	Forceful	Vigorous and forceful in the three regions	Excess syndrome
	Smooth	Round and smooth like a bead rolling on a plate	Phlegm-retention, retention of food, and excess heat syndrome
	Tense	Tight and forceful, like a tightly stretched and twisted rope	Cold, pain, retention of food
	Long	Large extent, like a tightly stretched string	Excess of <i>yang qi</i> , heat syndrome
	Taut	Taut and long, like the string of a musical instrument	Diseases of the liver and gallbladder, all kinds of pain, phlegm-retention, malaria

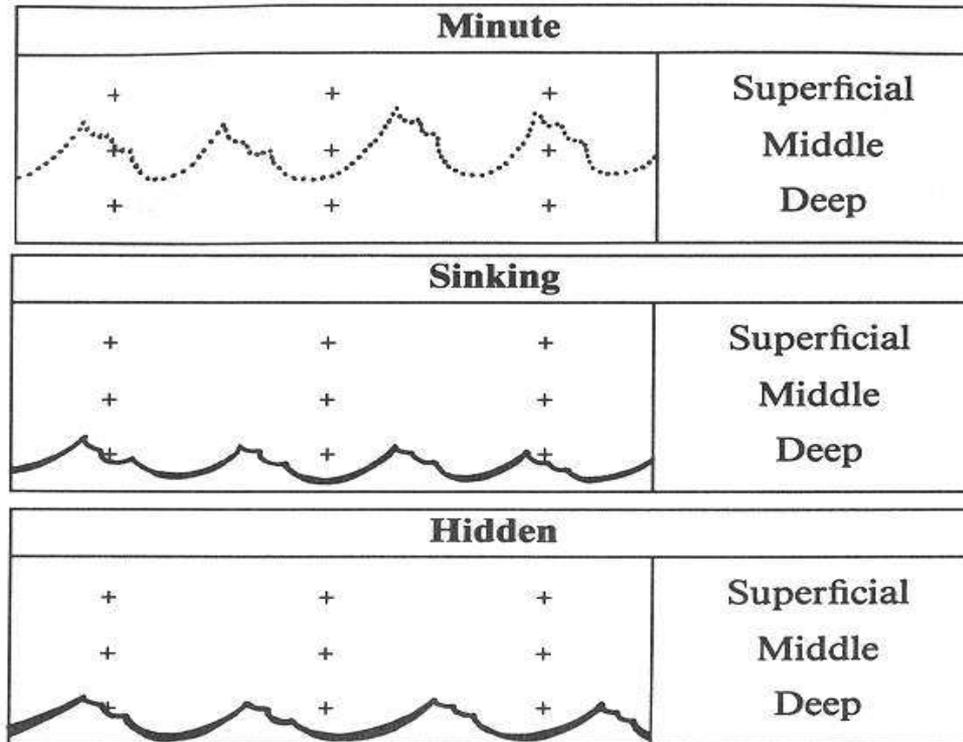
Pulse Waves 1



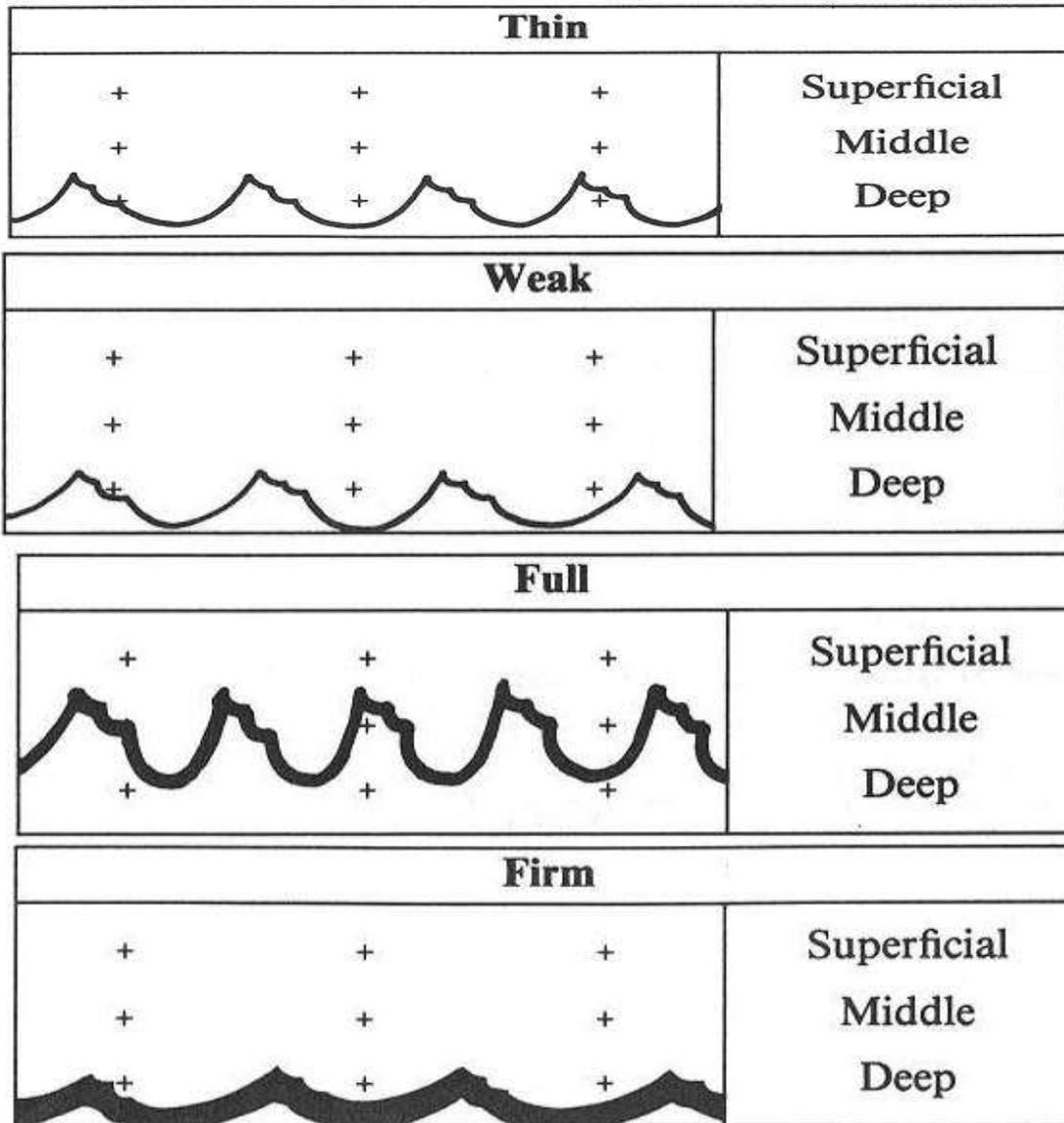
Pulse Waves 2



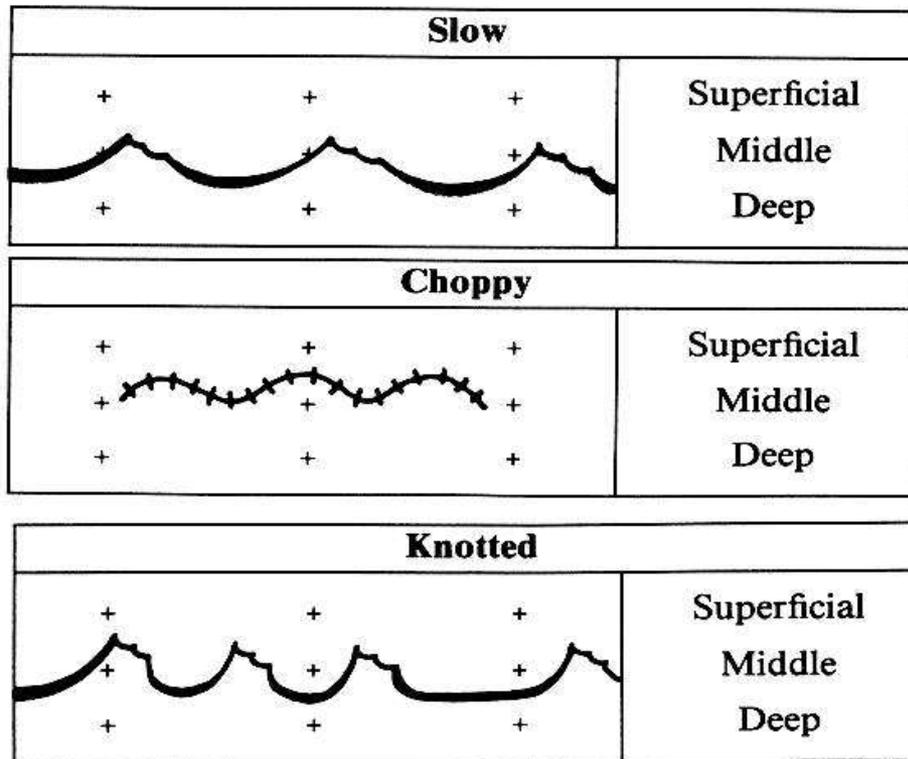
Pulse Waves 3



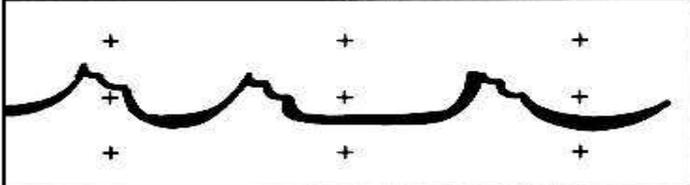
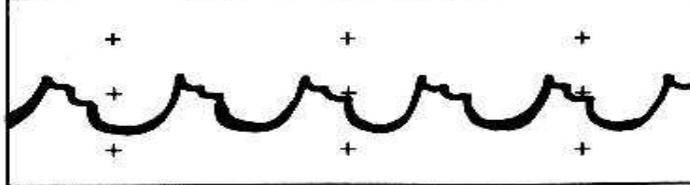
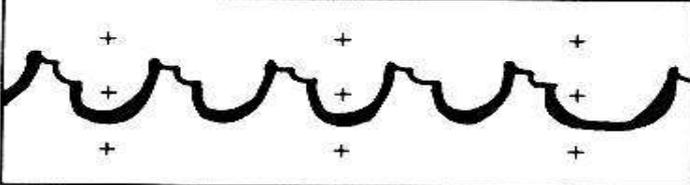
Pulse Waves 4



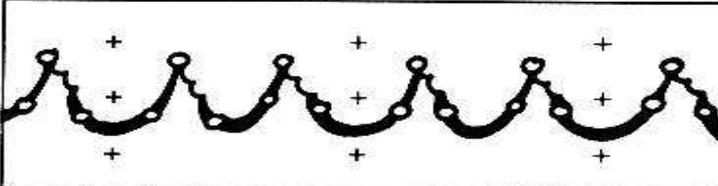
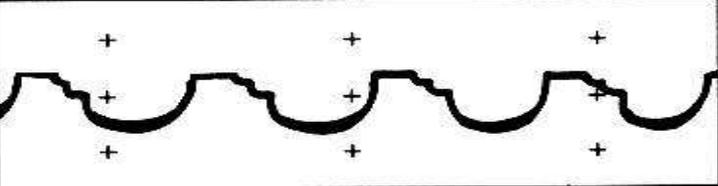
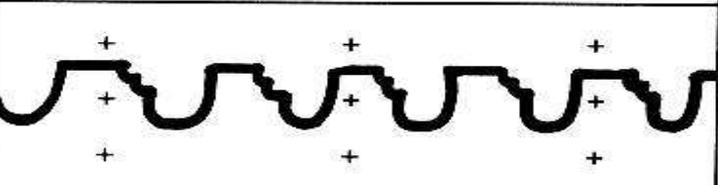
Pulse Waves 5



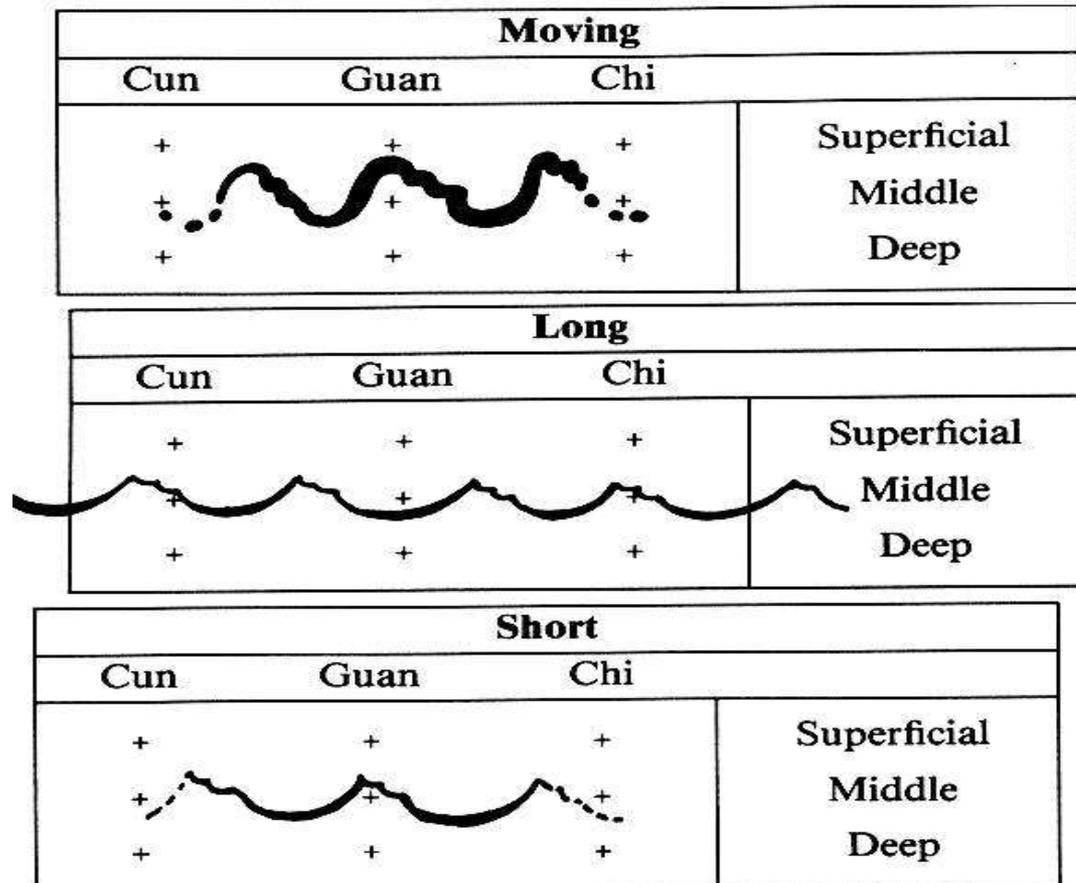
Pulse Waves 6

Intermittent	
	Superficial Middle Deep
Rapid	
Respiration	Depth
	Superficial Middle Deep
Hasty	
Respiration	Depth
	Superficial Middle Deep

Pulse Waves 7

Slippery	
Respiration	Depth
	Superficial Middle Deep
Wiry	
	Superficial Middle Deep
Tight	
Respiration	Depth
	Superficial Middle Deep

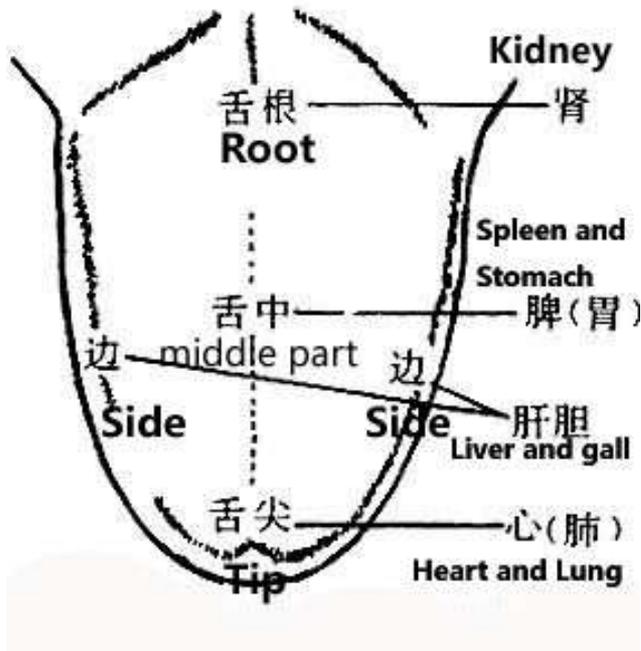
Pulse Waves 8



Summary of Useful Pulses

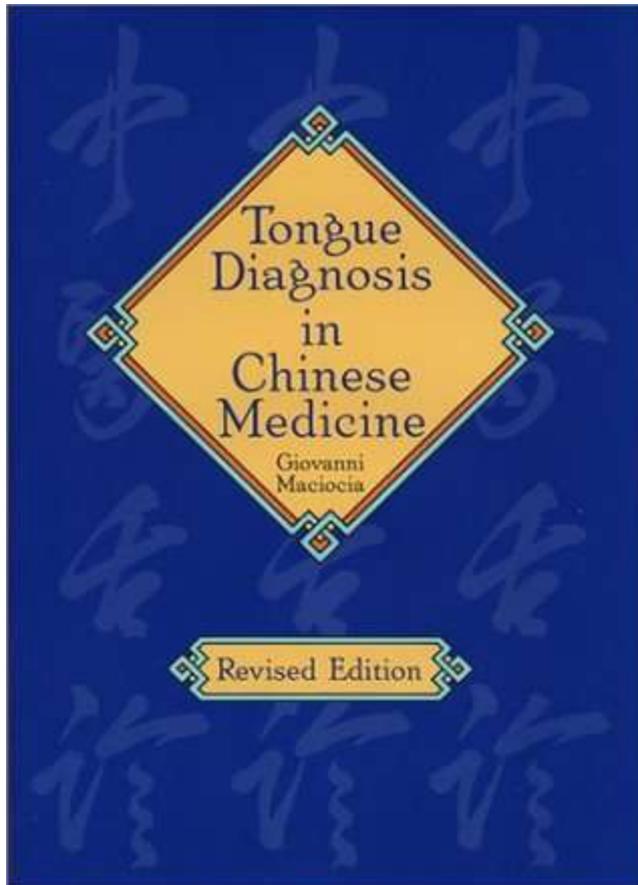
- Surface (infectious agent is present)
- Deep (chronic condition)
- Thready (low vitality, immune function)
- Forceful or bounding (well-established infection; fever, overeating, obesity; constitutional)
- Wiry (liver “constraint,” hepatitis, gall bladder conditions);

Tongue Diagnosis



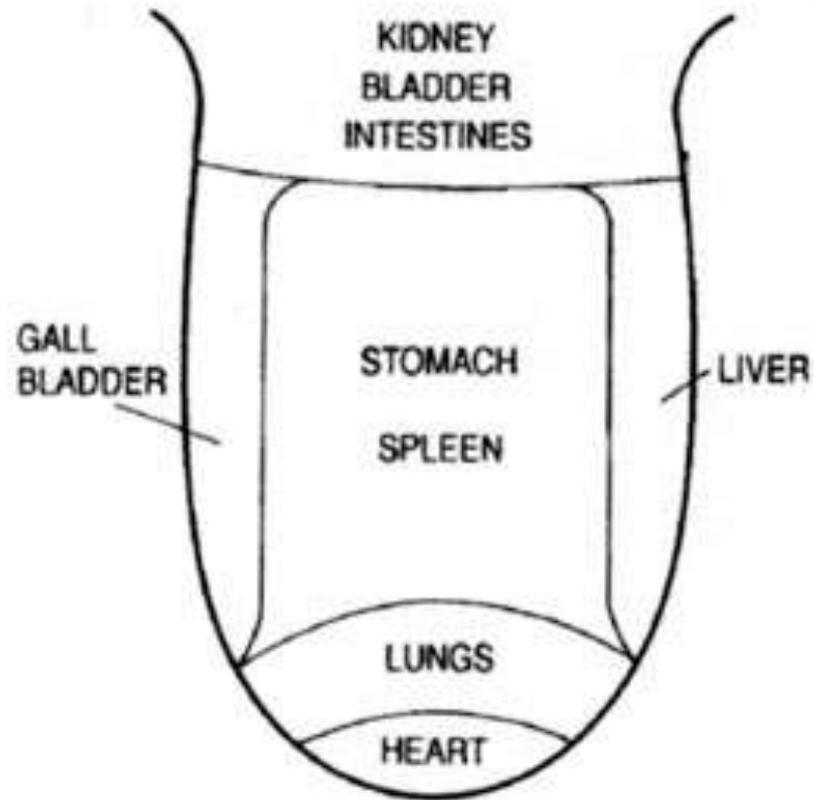
- Previously used in all branches disciplines of medicine
- Developed over 2,000 years in TCM
- Not as difficult to assess as pulses
- Changes more slowly than pulses
- Not to dx disease, but insights to predisposition

Best Reference Texts

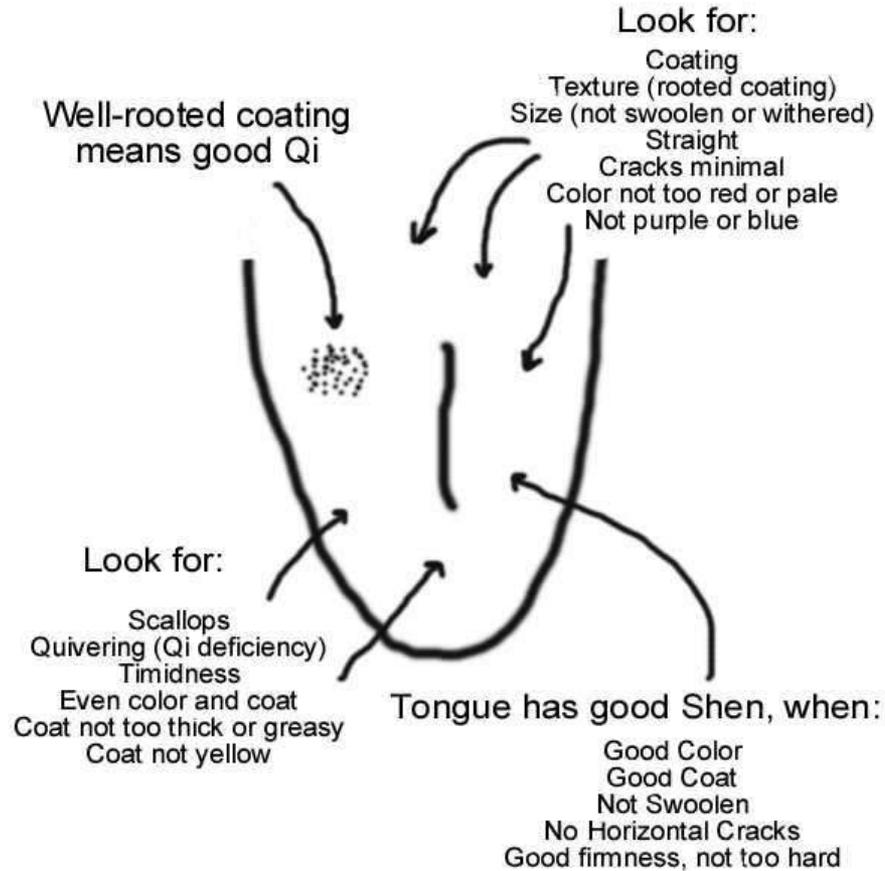


- Tongue Diagnosis in Chinese Medicine (Maciocia)
- Atlas of Chinese Tongue Diagnosis (Kirschbaum)
- <http://www.giovanni-maciocia.com/tonguegallery/>

Tongue Map



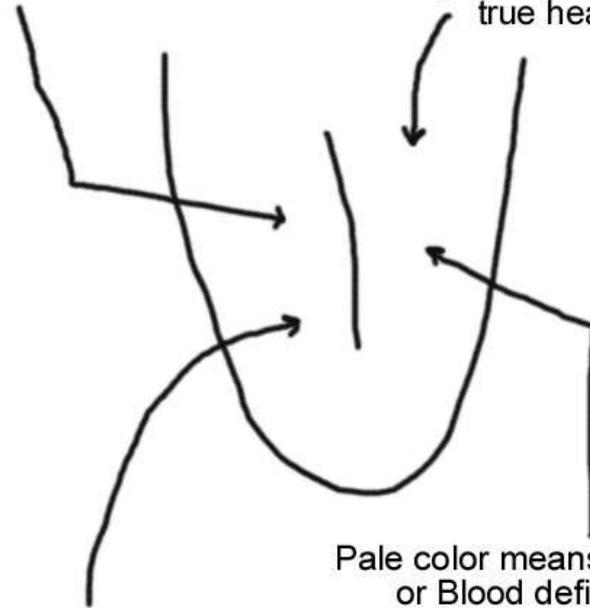
Tongue Diagnosis: Look for First



Tongue Color

Red color overall with no coating means Kidney Yin Deficiency with False heat

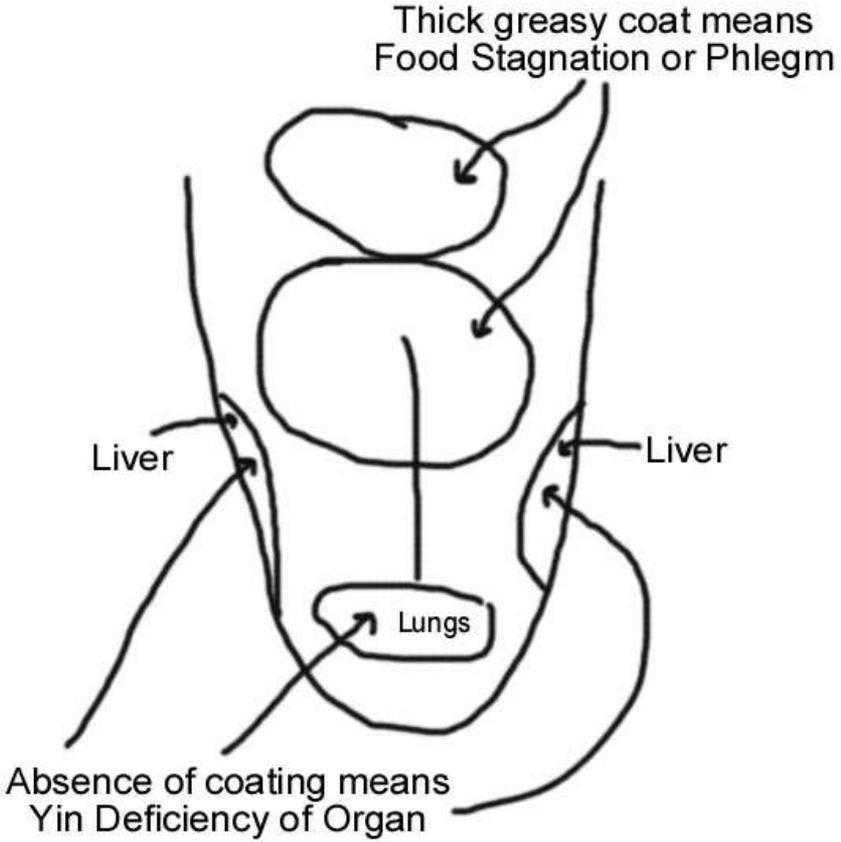
Dark red color overall with yellow coat means true heat



Purple color overall means Blood stagnation

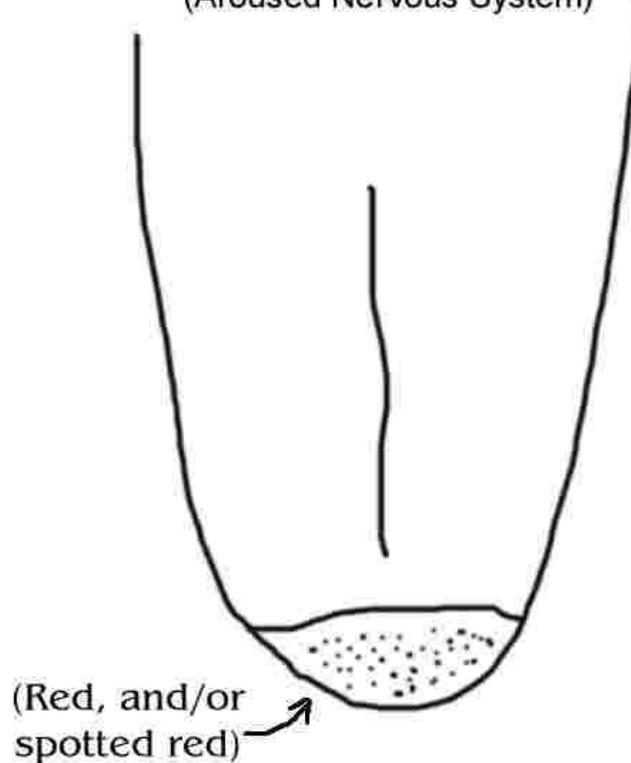
Pale color means coldness or Blood deficiency

Tongue Coatings



Tongue Color - Tip

Red Tip Indicates Heart Heat
or Heart Yin Deficiency
(Aroused Nervous System)



Chronic nervous system disorders (insomnia, anxiety)

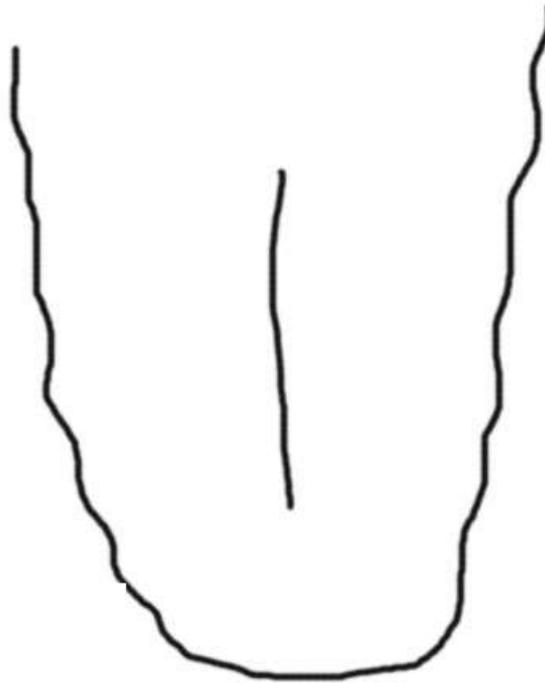
Tongue Coat II: Rear

Greasy Yellow Coat Towards
Back Indicates Damp Heat
In the Intestines



Greasy White Coat Towards
Back Indicates Cold Damp
Excess in the Intestines

Scallops (Tooth Marks) Indicates Dampness



Digestive Weakness
With Water-Retention
*Tongue often puffy as well

Cracks

Kidney Damage or Weakness

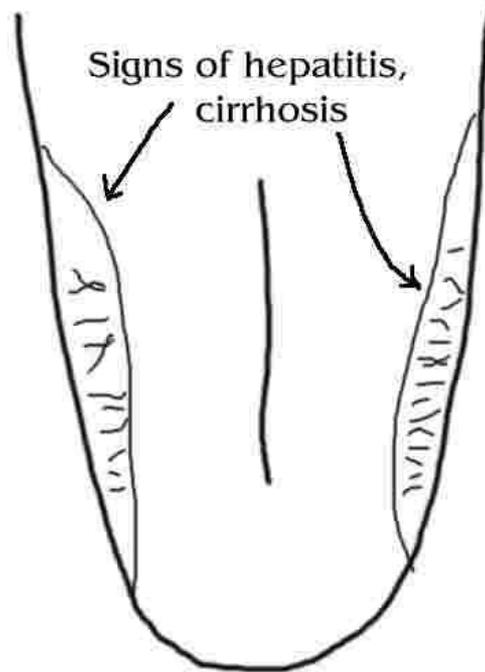
Digestive weakness
or Damage if Deep



Liver Dryness or Damage
if Deep

Stomach or Lung weakness
or Damage if Deep

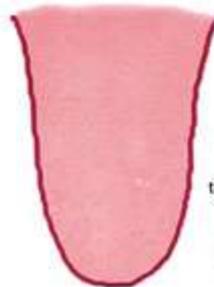
Cracks on Sides Indicate Liver Dryness/Damage



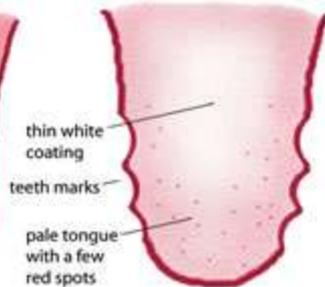
Symptoms and conditions associated with tongue types

Which Tongue Are You?

Nine Common Syndromes & Possible Symptoms.
find out more at www.chinalifeweb.com

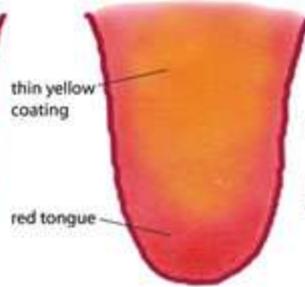


NORMAL



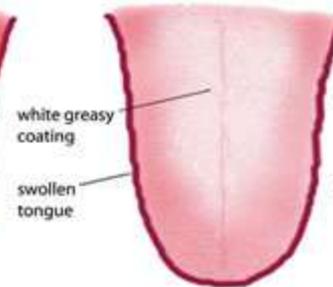
QI DEFICIENCY

Fatigue, Poor appetite, Spontaneous sweating, Shortness of breath, Over-thinking and worrying...



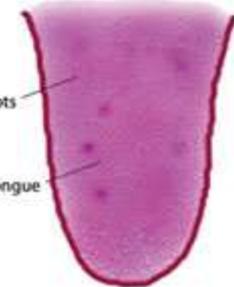
HEAT

Feel hot, Sweat easily, Thirsty, Constipated, Irritable and bad tempered, Skin problems...



DAMP RETENTION

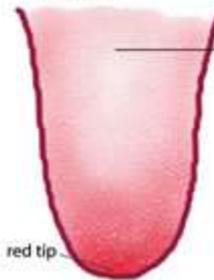
Bloated, Fullness in chest and abdomen, Feel heavy and lethargic...



BLOOD STASIS

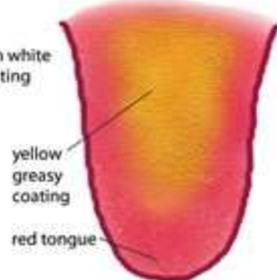
Cold limbs, Varicose veins, Painful legs, Headaches, Chest pain, Liver spots, Lack of skin lustre...

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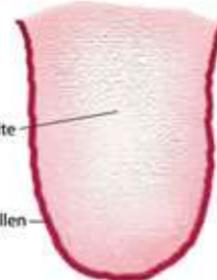
QI STAGNATION

Stressed, Tendency to be depressed and upset, Unstable emotional state, PMT...



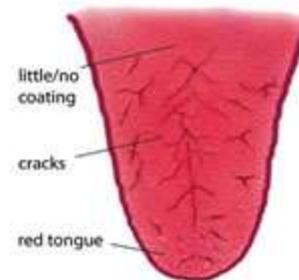
DAMP HEAT

Skin problems, Urinary infections, Clammy skin, Angry and uncomfortable...



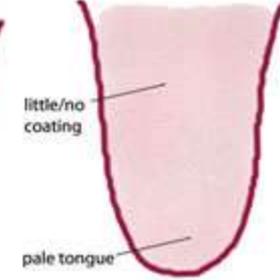
YANG DEFICIENCY

Feel cold easily, Pale complexion, Back pain, Tendency to panic, Emotionally low, Impotence, Infertility...



YIN DEFICIENCY

Hot Flushes, Sweat at night, Insomnia, Irritable, Ringing in the ears, Menopause...



BLOOD DEFICIENCY

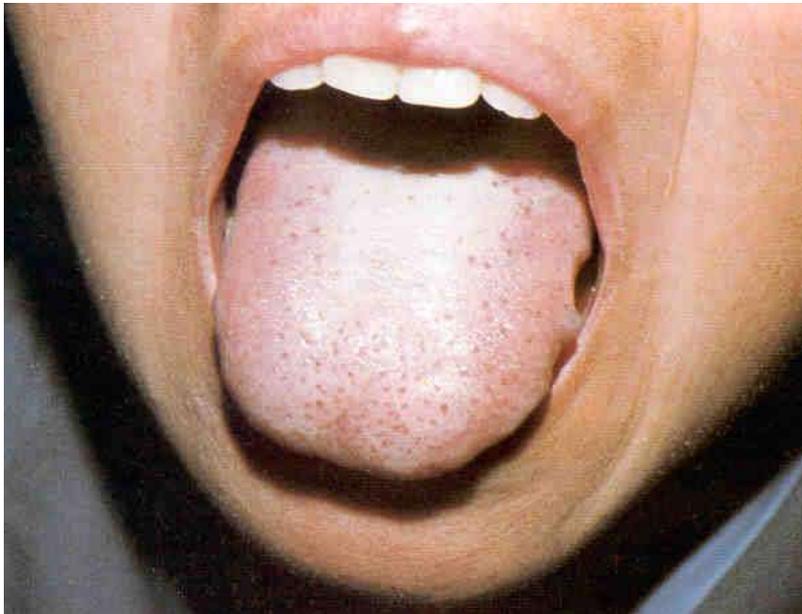
Dizziness, Fatigue, Palpitations, Poor concentration and memory, Insomnia, Women's problems...

Normal Tongue



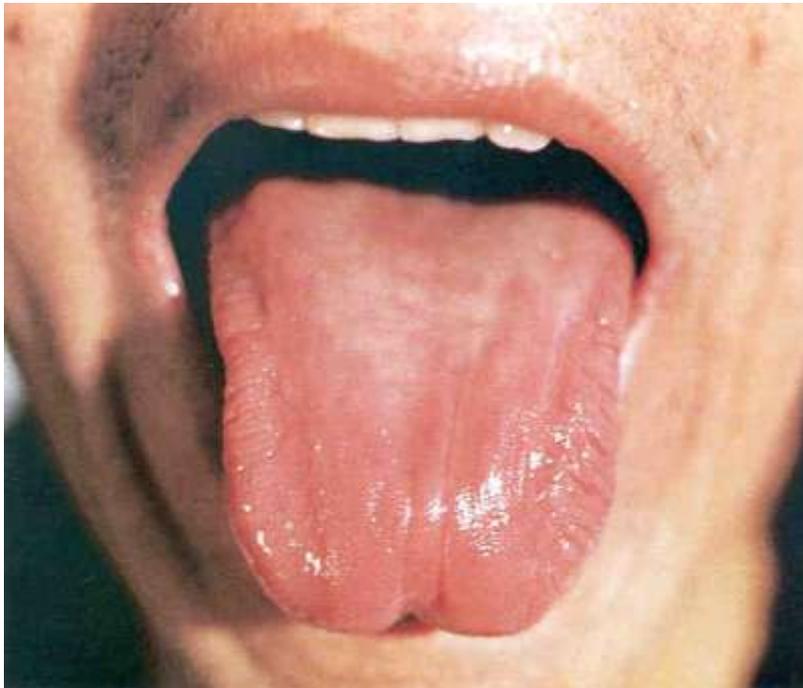
- Good “spirit” (shen)
- Few cracks, even surface
- Thin white, rooted coating
- Not swollen or shrunken
- Not too red or pale
(uniform pinkish red)
- No scallops on edges
- Not too dry or wet
- Free of red dots

Spleen Qi Deficiency



- Reduced production of digestive enzymes and poor motility, immune deficiency
- Tongue: puffy, scallops, shaky
- Indicated herbs:
 - ginger
 - ginseng
 - astragalus
 - atractylodes

Kidney Yin Deficiency



Red, peeled tongue

- Adrenal insufficiency, low cortisol production
- Immune component; interaction with hormones
- Herbs for strengthening:
 - *Panax quinquefolius*
 - *Arctium lappa* rt. (burdock)
 - *Rehmannia glutinosa*
 - *Ligustrum lucidum*
- Associated with chronic inflammatory conditions

Tongue with Influenza



- Red tongue body
- Thick yellow coat
- Acute condition
- Good sign—yellow coat resolves, often after fever breaks
- Indicates “heat” usually signifying body resisting pathogen

Pathogenic Influences, TCM



- Heat
- Cold
- Damp
- Dry
- 5 emotions
- Wind * vector

Heat Pathogen

Season, summer

- True heat
 - robust individual
 - acute infections, inflammation
 - predisposition to abdominal infections
- Deficiency heat
 - chronic inflammation
 - common when older
 - continual stress
 - use of stimulants
 - type A personality

- Yellow coating on tongue, usually acute infection or hypermetabolic state predisposing to infection
- Peeled, red tongue (yin deficiency), usually chronic inflammatory condition

Cold Pathogen

Season, winter



- Hypometabolic state
- “Attack” by external cold, or internal process (hypometabolic state)
- Predisposes to infections (colds), or digestive and metabolic problems

Dampness

Season: spring



- Water, electrolyte imbalance
- Excessive phlegm production
- Associated with allergies, digestive disorders (with diarrhea), immune imbalances, fatigue
- “Many signs indicate Damp-Heat such as oozing skin eruptions, swollen-painful eyes, sty on eyelids, oozing eyes, mouth ulcers.” (Maciocia)

Dryness

Season—fall



- Associated with water, electrolyte imbalance
- Kidney disorders
- Fever
- Digestive imbalances

5 Internal Organs

- Functional organ systems, associated with observed related processes (no dissection)
- Lung—surveillance immunity, respiration
- Heart—cardiovascular, nervous system
- Liver—”free and easy wanderer”
- Spleen—digestion, immunity (stem cells)
- Kidney—storage of vital reserves, produces, regulates enzymes, blood cells

5 Emotions

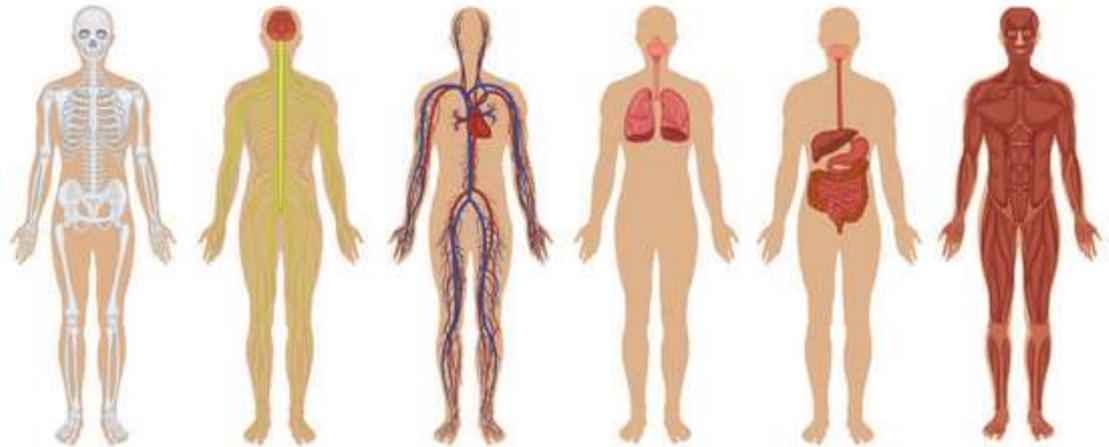


Spleen is not the physical organ, rather a “functional” organ associated with digestion and immunity

- Lung system: grief
- Heart system: joy/mania
- “Spleen”* system: excessive thinking, worry
- Kidney system: fear
- Liver system: irritability, anger

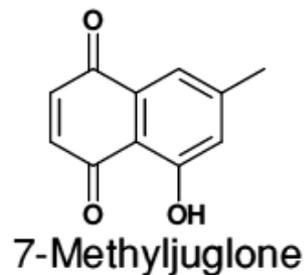
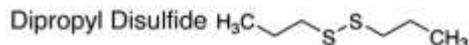
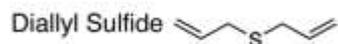
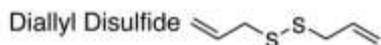
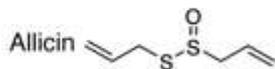
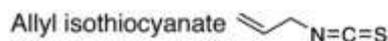
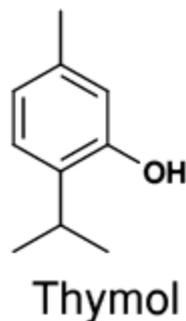
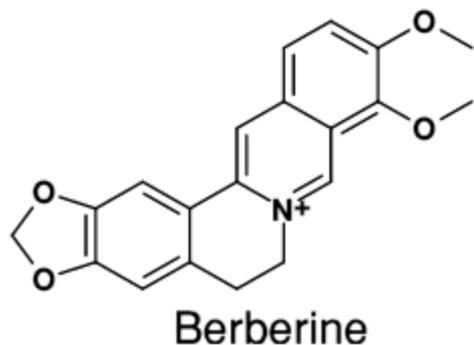
Metaphore-level of pathogen

- “Surface” level
- Muscle level
- Organ level
- Blood level
- Bone marrow



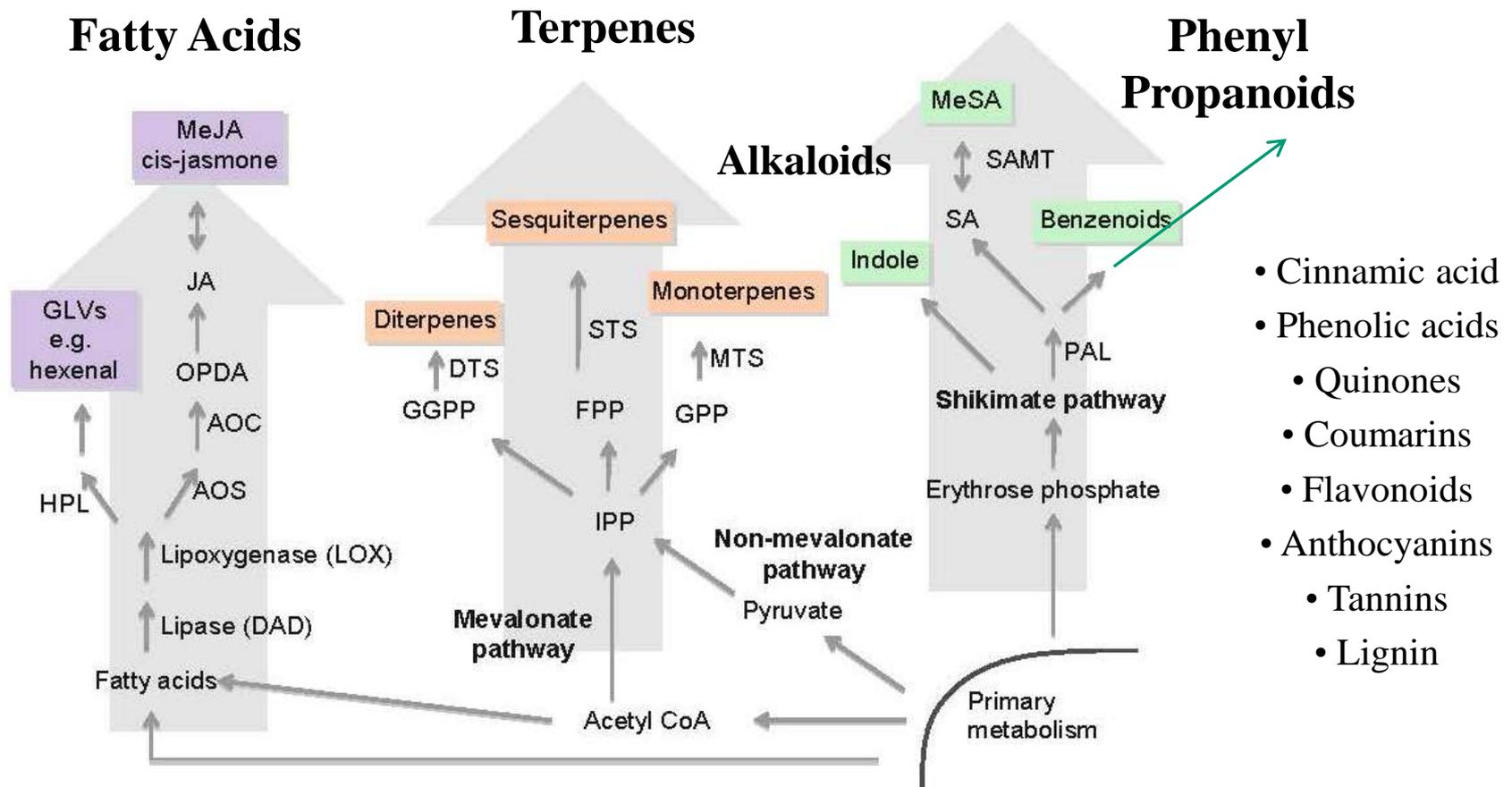
Treating Infections

Most potent constituent classes

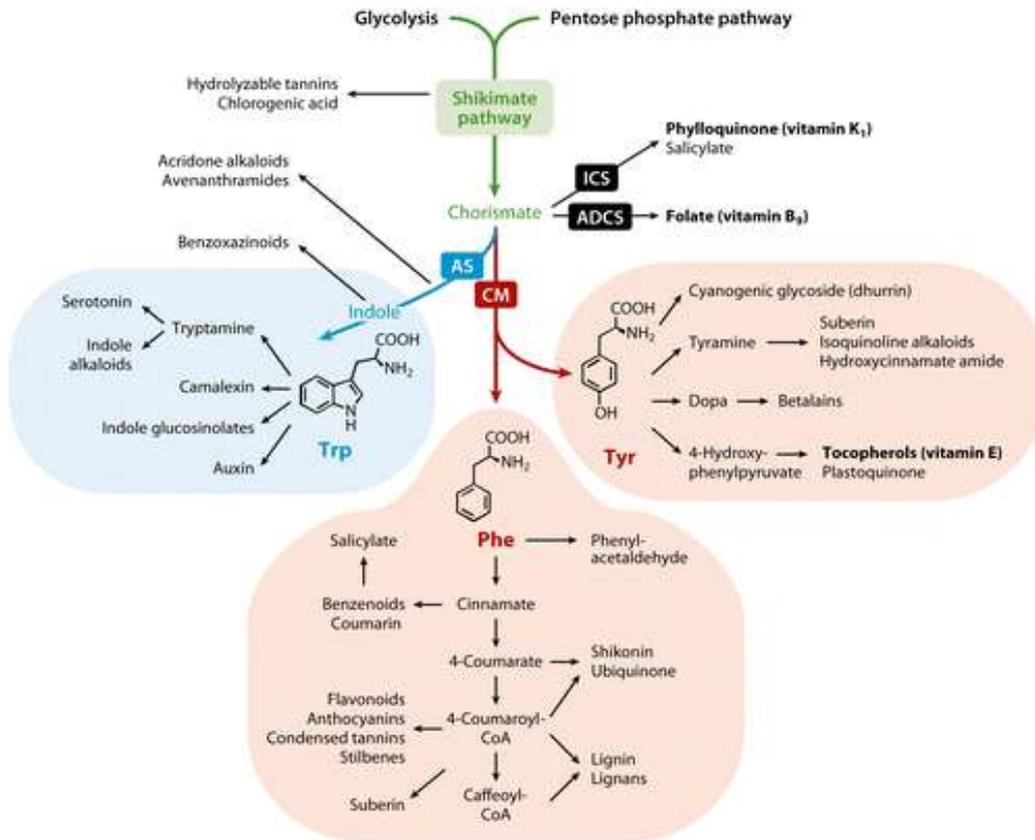


- Alkaloids (berberine)
- Monoterpenes (thymol)
- Sulfur derivatives (allicin)
- Phenolics (curcumin)
 - Phenylpropanoid (eugenol)
 - Tannic acid (Gallic acid) associated with tannins
 - Caffeic acid ester (rosmarinic acid)
 - Quinones (thymoquinone)
 - Thymoquinone (hops) (*Clostridium*)
 - Arbutin
 - Naphthaquinones (juglone)
 - Effective against *Clostridium* (Cetin-Karaca, 2007)

Four Major Chemical Pathways



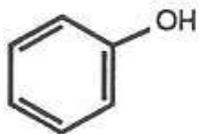
Shikimic Acid Pathway— Phenolics, Alkaloids



- Salicylates
- Serotonin, auxin
- Alkaloids
- betalains
- Tocopherols
- Cinnamates
- Coumarins
- Flavonoids
- Anthocyanins
- Tannins

Phenolic Compounds

- Phenolic compounds are based on an “aromatic” or phenolic ring (benzene ring)
- They tend to have antibacterial, antifungal, antiinflammatory effects
- Examples: plant resins in pitch from pines, other conifers; not water soluble



phenol

SIMPLE PHENOLS

Phenols are one of the largest groups of secondary plant constituents. They are defined as compounds that bear at least one hydroxyl group attached to an aromatic or benzene ring system. In addition the ring system may bear other substitutes especially methyl groups.

Usnea, Lungwort, Iceland Moss



- All contain lichen acids; all cool in nature
- Iceland moss
 - Acrid, expectorant
- Lungwort
 - Doctrine of signatures
 - Demulcent, simmer in milk or marshmallow and licorice
- Usnea
 - Demulcent, immune-activating
 - Look for inner core

Alkaloids Introduction

- Alkaloids are often weakly basic, soluble in water and ethanol (80% menstruum)
- Affect nervous system in some way
- Commonly used medicinal plants containing alkaloids include
 - Goldenseal (berberine, hydrastine): antimicrobial, antiinflammatory
 - Lobelia (lobeline): antispasmodic for asthma
 - Bloodroot (sanguinarine): antitumor, caustic, antispasmodic, expectorant, mucolytic
 - California poppy (californine, etc.): antispasmodic, sedative, anxiolytic...non-narcotic
 - Ma huang from *Ephedra* spp. (ephedrine): stimulant

Common Alkaloids

PHYSIOLOGICAL ACTION	ALKALOID	PLANT SOURCE
emetic	emetine	ipecacuanha
local anesthetic	cocaine	coca
antihemorrhagic	hydrastine	hydrastis
antispasmodic	hyoscyamine, atropine	belladonna
narcotic	morphine	opium poppy
vermifuge	pelletierine	pomegranate
aphrodisiac	yohimbine	<i>Pausinystalia yohimba</i>
tranquilizer	reserpine	<i>Rauwolfia serpentina</i>
cardiac depressant	quinine	<i>Cinchona</i> spp.
diaphoretic	pilocarpine	<i>Pilocarpus pennatifolius</i>
muscle paralyzant	tubocurarine	<i>Chondodendron</i> spp.
nervous stimulant	strychnine	<i>Strychnos nux-vomica</i>

Berberine-Containing Plants

- Used in all cultures
- Has antibiotic, antifungal, antiparasitic, antiinflammatory properties
- Especially good for sinus inflammation (sinusitis, allergic rhinitis)
- Safe. only moderately absorbed from gut



Coptis chinensis huang lian



Hydrastis canadensis goldenseal



Mahonia aquifolia Oregon grape root

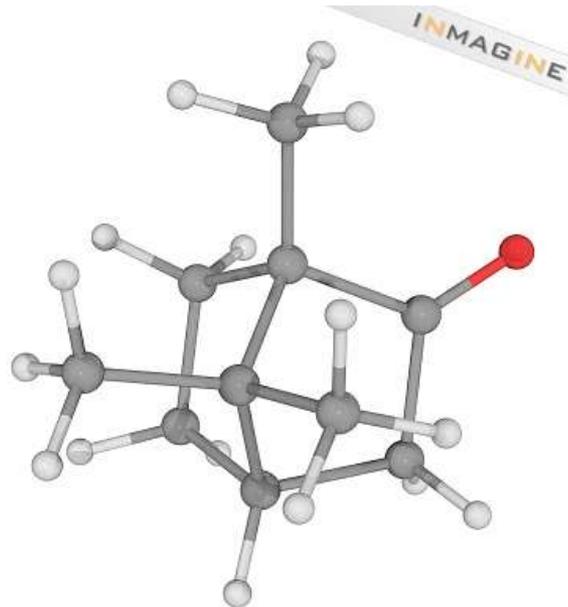
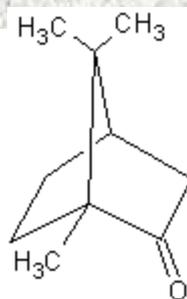
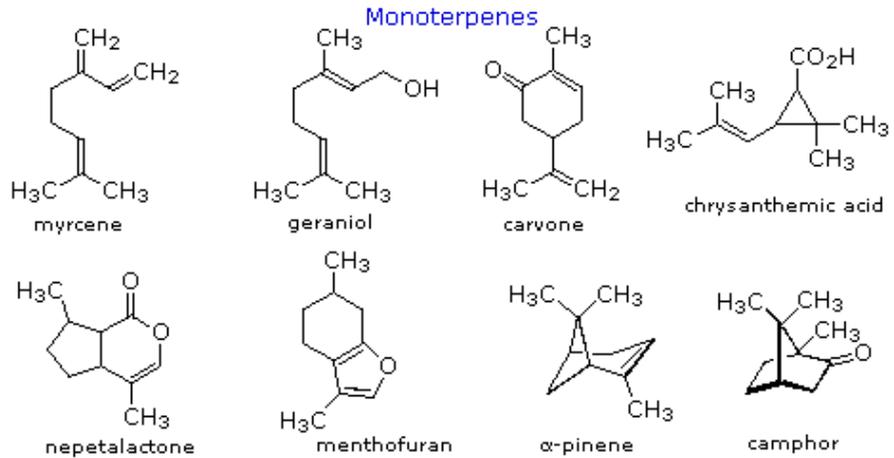
Berberine-Containing Herbs



- Berberidaceae
- Ranunculaceae
- Rutaceae
- Menispermaceae
- Papaveraceae
- *Coptis chinensis*
- *Mahonia* spp.
- *Berberis* spp.
- *Phellodendron amurense*
- *Hydrastis canadensis*
- *Tinospora cordifolia* (India, China)
- *Argemone* spp., *Eschscholzia*

Terpenes

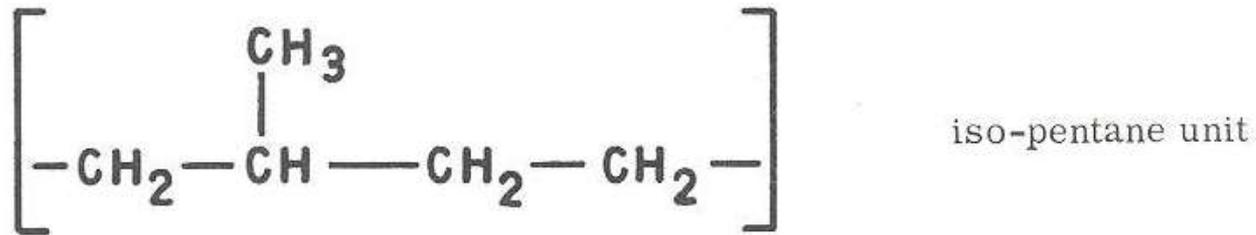
- Basic skeletons contain carbon, hydrogen, oxygen
- Ancient pathway
- Pervasive in most of life
- Essential Oils
 - Aromatic parts of plants
- Sesquiterpenes--bitter
- Steroids, phytosterols
 - Estrogen, Diosgenin
- Carotenoids
- Rubber



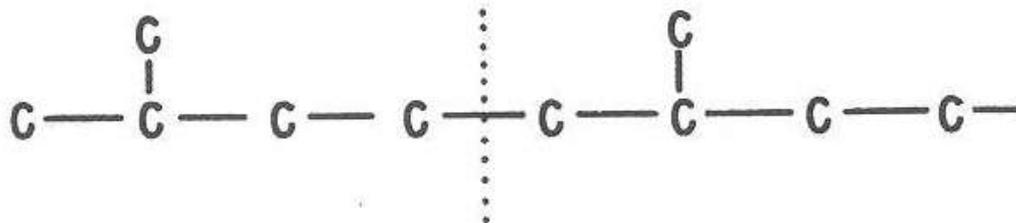
Terpenes: Basic Building Blocks

Isoprenes

- Many terpenes are built up from the isoprene or iso-pentane units (C₅) linked together in various ways with different ring closures, degrees of unsaturation, and functional groups

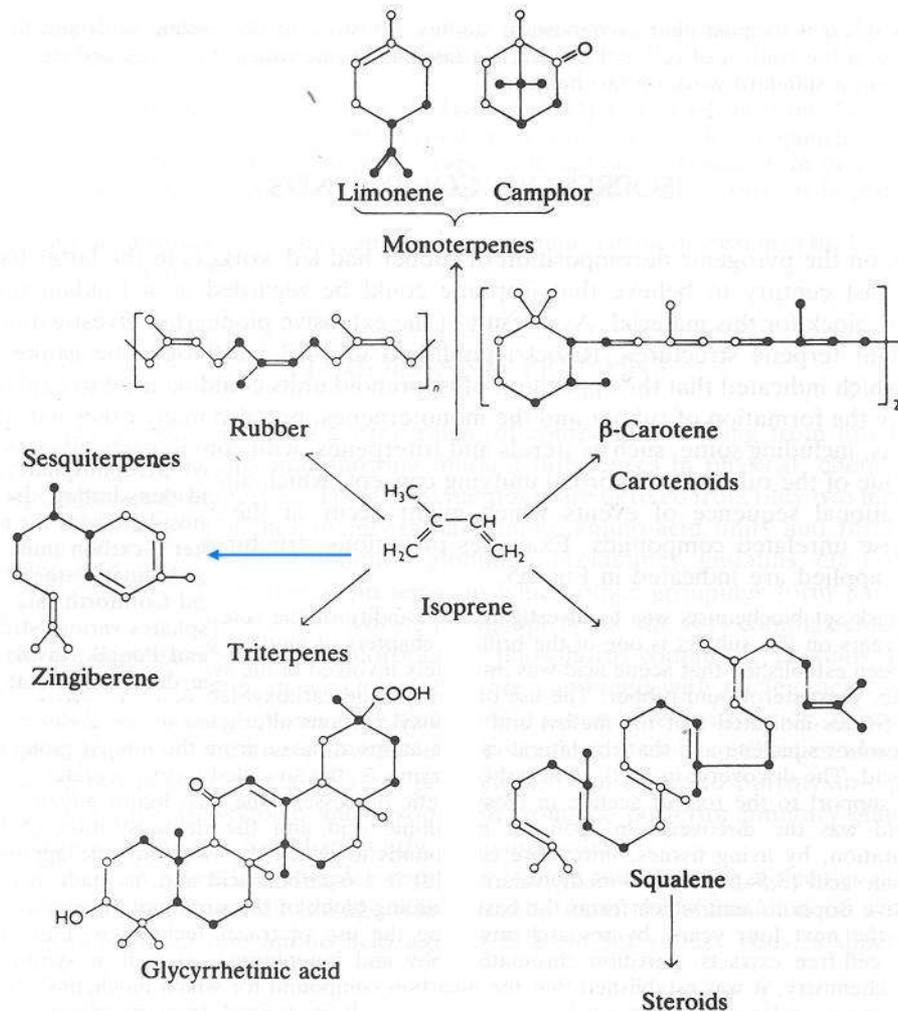


The commonest arrangement appeared to be "head-to-tail":

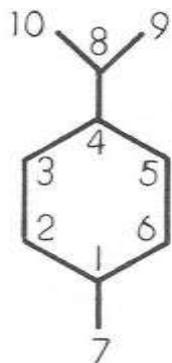


Terpenes Built from Isoprenes

- Plants enzymatically produce:
 - monoterpenes (C₁₀)
 - sesquiterpenes (C₁₅)
 - diterpenes (C₂₀)
 - triterpenes (C₃₀)
 - Carotenoids
- from C₅ isoprene units



Monoterpenes



- Molecules containing 10 carbon atoms
- Monoterpenes are volatile, slightly water-soluble, more soluble in alcohol
- They are a main constituent of most essential oils
- They can occur as an open chain, single ring, or double ring structure
- Many are aromatic, effect the nervous system, and relax smooth muscle like the bowel; other effects

Essential Oils

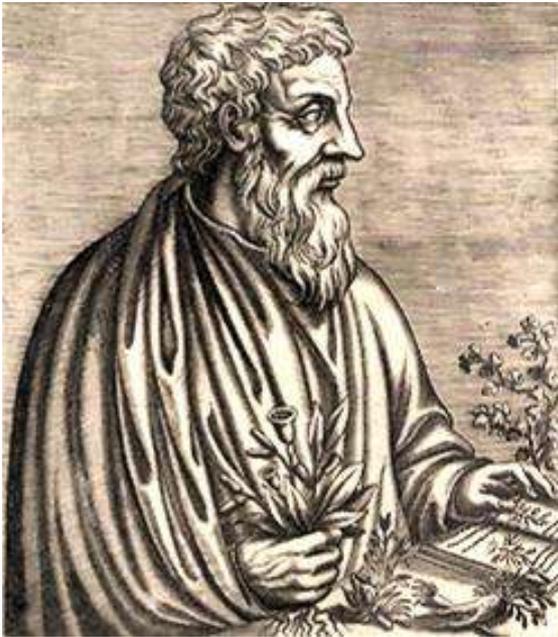
- Complex mixtures of monoterpenes (middle notes, moderately volatile), esters (high notes, very volatile), sesquiterpenes (low notes, not too volatile)
- Some essential oils contain several hundred identified compounds
- Families commonly containing essential oils include the parsley family (Apiaceae), mint family (Lamiaceae), laurel family (Lauraceae), and the eucalyptus family
- Essential oils penetrate the skin, are used topically as antiinflammatory and antimicrobial agents, internally as mild sedatives (lemon balm, chamomile), antiinflammatory and antispasmodics (chamomile, yarrow) and flavor ingredients

Materia Medica

- Choosing the best product
- Quality issues
- Commercial products
- Standardization
- Dosage
- Pharmacokinetics



Materia Medica



- Dioscorides
- *De Materia Medica*
- Physician to Nero's army
- 1st century A.D.
- Absolute authority for 1700 years

Antiviral Herbs



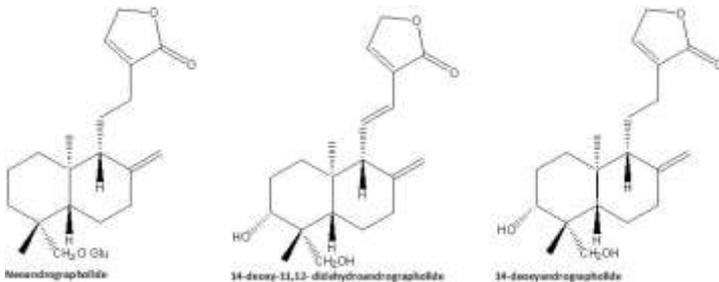
- Andrographis
- Cedar leaf
- Elder fruit, flowers, bark
- Garlic
- Asarum rt, rz
- Isatis root
- Baptisa
- Lonicera fl, stems
- pelargonium

Andrographis paniculata



- Long tradition-popular in se Asia, China, India
- One of the best-studied antiviral herbs for flu
- Antiviral, immuno-modulating, antiinflammatory
- Several positive clinical trials: URI, IBD, 1 systematic review

Andrographis—Traditional Use



- Dosage: 6-15 grams/day
- Energetics: bitter, cold
- Indications: flu, coughing, sore throat; resolves toxicity—urinary infections, skin infections like acne, carbuncles
- Use with *Lonicera* (*Sambucus* fl.) and burdock seed for influenza
- Contraindications: not for long-term use (can injure ST)

Andrographis, Indications, Dosage

- For reducing severity and duration of symptoms of URI
- Sore throat, as well as ease of expectoration, and resolution of nasal discharge, headache, fever, sore throat, earache, malaise/fatigue and sleep disturbance was significantly better in a group receiving andrographis vs. placebo (Saxena *et al.*, 2010); (Melchior *et al.*, 2000).
- Dosage: Standardized extracts with 60 (30-360) mg of andrographolides. (teas and tinctures not practical)
- Systematic review concluded (Coon & Ernst, 2004):
 - “..superior to placebo in alleviating the subjective symptoms of uncomplicated URT infection.”
 - Preliminary evidence for a preventative effect
 - “Adverse eventswere generally mild and infrequent.”

Elder (*Sambucus spp.*)



- Flowers diaphoretic
- Fruits antiviral, antioxidant
- Human study (n=60, RDBPC study), elderberry extract effective for slowing viral replication and earlier relief of flu-like symptoms (Zakay-Rones *et al.*, 2004)
- Two isolated flavonoids from the fruits had much more potent effects, $IC_{50} = 0.13 \mu\text{g/ml}$ and $2.8 \mu\text{g/ml}$ (Roschek *et al.*, 2009), comparable with currently available antiviral drugs, Oseltamivir (Tamiflu®; $0.32 \mu\text{M}$) and Amantadine ($27 \mu\text{M}$)

Elderberry lectins and flavonoids blocks viral infection in two ways

- Human flu viruses from elderberry fruit bind to human immune cell receptors, SA- α -2,6-Gal (Shichinohe *et al.*, 2013)
- Elderberry lectins also bind to SA- α -2,6-Gal with a half-life of 11 days, providing a mechanism for a lasting antiviral effect (Gregorio-Jauregui *et al.*, 2014).
- High concentrations of antioxidant phenolic compounds (purple color)
- Studies--enhance immune response *ex vivo* (Kinoshita *et al.*, 2012)
- Elderberry flavonoids bind to H1N1 virions and compare favorably *in vitro* to activity of Oseltamivir (Roschek *et al.*, 2009)

Pelargonium sidoides

- Traditional south African herb, but may be overharvested due to increasing popularity
- The *Pelargonium sidoides* extract EPs[®] 7630 is an approved drug for the treatment of acute bronchitis in Germany
- Antiviral, antibacterial, antiinflammatory, immunomodulating effects



Pelargonium

- South African research commenced in 1972
- 3-year old roots harvested
- Actives primarily polyphenols
- Cytoprotective effect against virus-induced cell destruction (Kolodziej *et al.*, 2003)
- Increased release of antimicrobial peptides (defensins) from neutrophilic granulocytes (Koch & Wohn, 2007)
- Antiviral, antibacterial effects (Thäle *et al.*, 2010)



Pelargonium

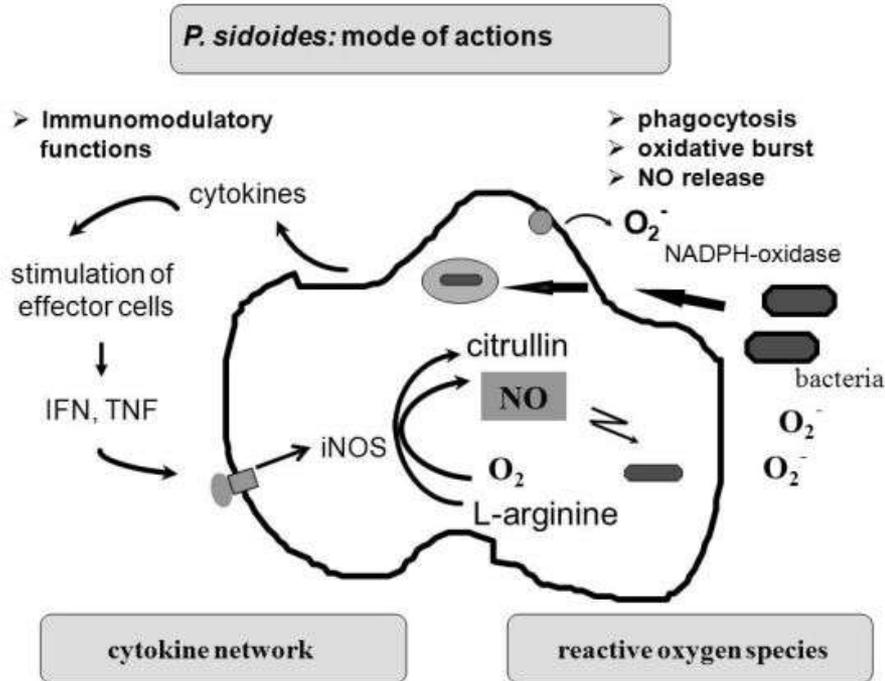
Clinical Indications

- Proprietary extract is an 1:8/10 aqueous ethanolic extract in which 100 g of finished product corresponds to 8 g of extracted plant material
- Tablets, standardized extract also used
- Two clinical trials used 4.5 mL 3 times daily for 7 days
- Children < 6 years of age 10 drops 3 times a day; 6-12 (20 drops t.i.d.; >12 (30 drop t.i.d.)
- 1 tablet = 20 mg root extract
- Dosage: 1 tablet t.i.d.

[Matthys *et al.*, 2003; 2007; 2010]

- Chronic or lingering URI (immunoactivating, Koch *et al.*, 2002)
- Symptomatic relief of acute URI, including bronchitis, tonsillopharyngitis, sinusitis, common cold (Brown, 2009 (review); Cochrane review—Timmer *et al.*, 2008)

Pelargonium Safety



Kolodziej, 2011

- About 304 million daily doses of pelargonium liquid and tablets were sold between 1994 and 2006, mostly in Germany (Brown, 2009)
- Rate of side effects reported is extremely low: 0.53 per million defined daily doses (DDD)
- No available data on safety during pregnancy

Cedar boughs



- Top remedy for many native American Indian tribes
- See Peterson Guide to Medicinal Plants-western U.S.
- Ingredient in Esberitox
- Thujone-brew as tea

Cedar leaf Combination

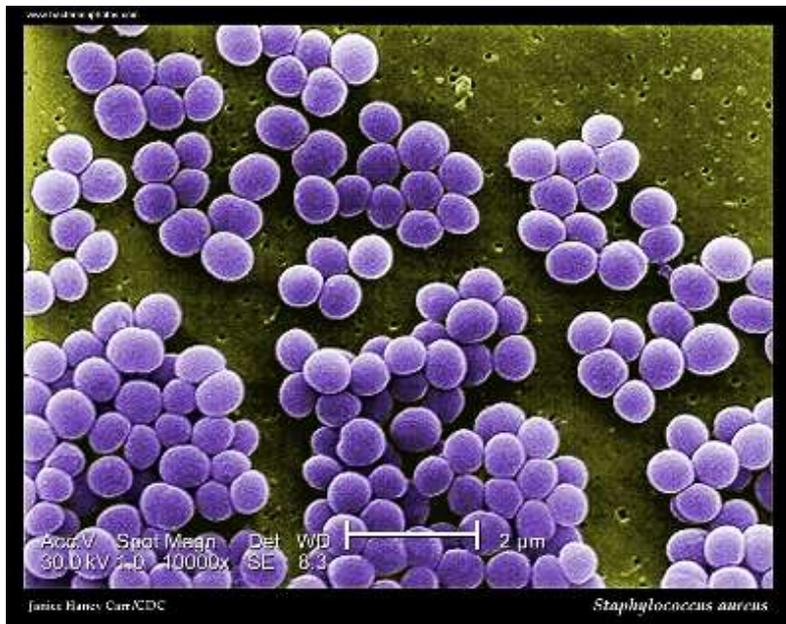
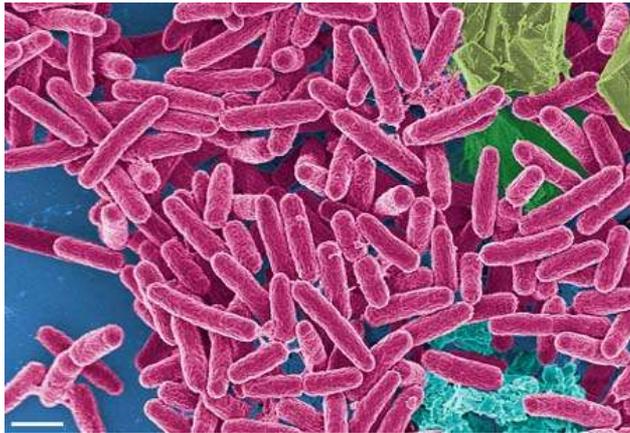
- Widely-utilized in Native American Indian medicine as likely the most widely-utilized herb (Foster & Hobbs, 2002).
- Esberitox is a patent remedy from Germany that contains echinacea, cedar leaf, and wild indigo root.
 - 4 randomized German clinical trials (from 2000 to 2005)
 - In one of the RDBPC studies (n=91), cold symptom severity was determined by the total number of tissues used during the trial. Time to improvement was 1 day, 0.75, and 0.52 days for placebo, low dose esberitox and high-dose Esberitox respectively, with the Jonckneere test showing significance ($p = 0.0259$). In the intention-to-treat analysis, the total number of tissues decreased with increasing extract dose (Naser *et al.*, 2005).

Bacterial Infections 1



- Most common infections:
 - Skin, staph infections, boils (*Staphylococcus aureus*, *Streptococcus pyogenes*, *Propionibacterium acne*)
 - Ear, otitis media (*Streptococcus pneumoniae*, *Moraxella* spp.)
 - Eye, eyelid (blepharitis, hordeola, conjunctivitis (*S. aureus*, *S. pneumoniae*, *H. influenzae*, others))

Infected Wounds



- In one study (670 isolates from clinic patients) >90% of infected wounds:
- *Pseudomonas* spp.- 29.9%
- *S. aureus* - 27.5%
- *Klebsiella* spp.- 18.5%
- *Proteus* spp.- 15.1%

Thanni *et al.*, 2003

Bacterial Infections 2

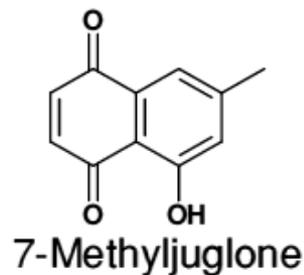
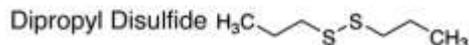
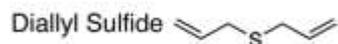
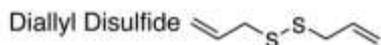
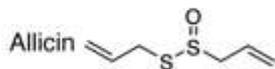
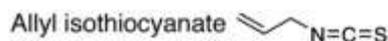
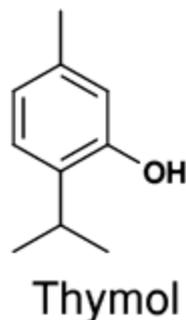
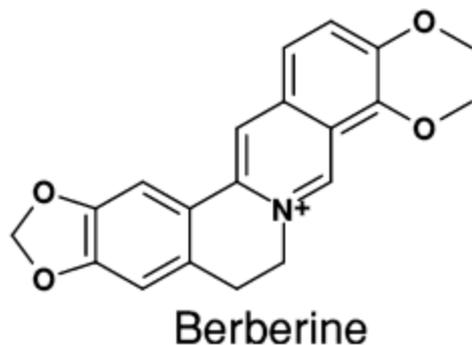
- URI

- Bacterial rhinosinusitis (*S. pneumoniae*)
- Pharyngitis (*S. pyogenes*)
- Bronchitis (*Mycoplasma pneumoniae*, *S. pyogenes*)
- Pneumonia (*M. pneumoniae*, *S. pneumoniae*, *Haemophilus influenzae*)
- Bacterial tonsillitis (strep throat) (*S. pyogenes*)

- Bacterial vaginosis (*Gardnerella vaginalis*, *Mycoplasma hominis*, other anaerobic bacteria)

Treating Infections

Most potent constituent classes



- Alkaloids (berberine)
- Monoterpenes (thymol)
- Sulfur derivatives (allicin)
- Phenolics (curcumin)
 - Phenylpropanoid (eugenol)
 - Tannic acid (Gallic acid) associated with tannins
 - Caffeic acid ester (rosmarinic acid)
 - Quinones (thymoquinone)
 - Thymoquinone (hops) (*Clostridium*)
 - Arbutin
 - Naphthaquinones (juglone)
 - Effective against *Clostridium* (Cetin-Karaca, 2007)

Antibacterials—Major Herbs



三角叶黄连 *Coptis chinensis* C. Y. Cheng et Hsiao (裴鉴绘图)
1. 黄连全株 2. 果序 3. 根茎及根

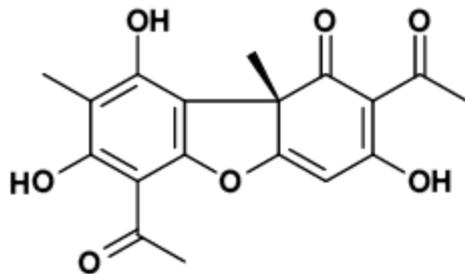
- Coptis, root
- Eucalyptus, essential oil, juvenile growth
- Garlic, bulb
- Goldenseal rhizome, root
- Oregano, oregano oil
- Thyme herb, essential oil
- Usnea thallus
- Yerba mansa, root, rhizome

Many Herbs Have Significant Antimicrobial Properties



- Used for thousands of years
- Varied action because of complex chemistry
- Less likely to produce resistance (complex target)
- Many herbs additionally enhance host immune function (i.e. garlic)
- Herbs are not usually hepatotoxic and immunosuppressive

Usnea, Lungwort, Iceland Moss



Usnic Acid

- All contain lichen acids (phenolics); all bitter, cold
- Broad-spectrum antibiotic for primarily gram + bacteria
- Iceland moss
 - Acrid, expectorant
- Lungwort
 - Doctrine of signatures
 - Demulcent, simmer in milk or marshmallow and licorice
- Usnea
 - Demulcent, immune-activating
 - Look for inner core

Lichen Acids

- Usnic acid and related compounds are found in *Usnea spp.*, *Cetraria islandica*, *Lobaria pulmonaria*
- More potent against gram positive bacteria than penicilin
- Effective against *Streptococcus* spp., *Staphylococcus* spp., *Pneumococcus* spp.

Coccietto *et al.*, 2002

- Weak action against *E. coli*
- Popular in creams, salves (salts) in Europe
- Useful for upper respiratory tract infections, especially Pneumonia and strep throat (in syrups, teas)
- Skin infections
- *Not well-absorbed from the gut
 - Limit to URI, topical use

Usnea Products

- Dosage

- Tea, 4-6 grams/day
- Tincture, 3-5 ml in water or herb tea
- Syrup or elixir (10-20% usnea tincture)
- Avoid use of pure usnic acid (potential hepatotoxicity at high doses)

- Tinctures (95% EtOH)
- Syrups to “coat” throat area
- Creams, salves
- Usnic acid is poorly absorbed from the gut
- (not a systemic antimicrobial)
- Some antiviral, antifungal effects

Berberine-Containing Plants

- Used in all cultures
- Has antibiotic, antifungal, antiparasitic, antiinflammatory properties
- Especially good for sinus inflammation (sinusitis, allergic rhinitis)
- Safe, moderately absorbed from gut



Coptis chinensis huang lian



Hydrastis canadensis goldenseal



Mahonia aquifolia Oregon grape root

Berberine-Containing Herbs



Berberis vulgaris

- Berberidaceae (*Mahonia*)
- Ranunculaceae (*Coptis*)
- Rutaceae (*Phellodendron*)
- *Coptis chinensis*
- *Mahonia* spp.
- *Berberis* spp.
- *Phellodendron amurense*
- *Hydrastis canadensis*

Berberine, Berberine sulfate

- Not very absorbable from GI tract. Best for superficial infections of GI tract, URI, UTI
- Berberine showed activity against several strains of MRSA at 32 to 128 µg/ml
- 90% inhibition of MRSA with <64 µg/ml
- Berberine markedly lowered MICs of ampicillin and oxacillin (Yu *et al.*, 2005)
- Berberine enhanced the *in vitro* inhibitory effects of Azithromycin and Levofloxacin for MRSA strains (Zuo *et al.*, 2014)

- Effective against *H. pylori* (*Biol Pharm Bul* 21:990. 1998.)
- As effective as sulfa drugs or chloramphenicol for bacterial dysentery with few side effects
- Strong antiviral and antifungal effects
- Strong effect *in vitro* against hemolytic *Streptococcus pneumoniae*, *Staphylococcus aureus*, *Shigella dysenteriae*, *S. flexneri*

Amin *et al.*, 1969

Coptis chinensis (huang lian)



图 124 峨眉野连

- Coptis is a good source of berberine because it is cultivated (root and root bark most potent parts)
- Huang lian is indicated especially for infections of the gut, urinary tract, liver
- Clears “Heart” heat for insomnia, mania
- Externally for conjunctivitis
- Huang lian su is berberine sulfate tablets from Coptis

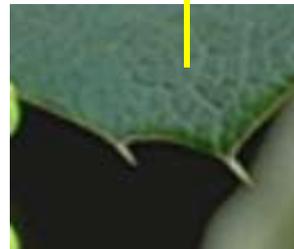
Coptis chinensis – huang lian



- Huan Lian Su is berberine sulfate
- Crude extract of *C. chinensis*
- 100 mg tablets (70% berberine sulfate)
- Take 1-2 tablets t.i.d.
- Useful for acute and chronic allergic rhinitis
- Dilute in saline nasal spray
- UTI, URI
- Colitis, traveler's diarrhea

Mahonia and Berberis

Oregon grape root and Barberry



- Both from Berberidaceae, barberry family
- Mahonia genus has prickly, holly-like leaves; Berberis has smooth, thin and spatulate leaves
- All contain berberine in roots, stem bark, very small amount in leaves
- Native to east and western North America, China, Europe
- Oregon grape root is *M. aquifolium*, *M. repens*; known for psoriasis, acne, other skin conditions

Goldenseal (*Hydrastis canadense*)



- Traditional native American Indian remedy for irritation of eyes, flu, other infections
- Contains berberine, hydrastine
- Best indication is for acute rhinitis, conjunctivitis
- Dose: 20 drops to 1 ml, 3-4 x daily



Essential oils

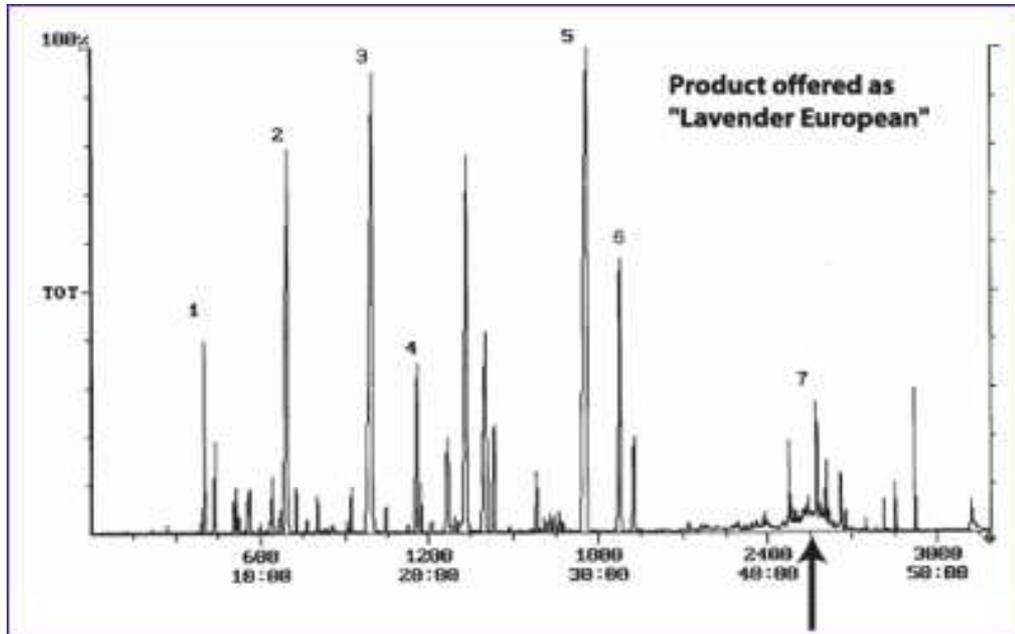
Production



Essential oils also have antimicrobial, sedative, antiinflammatory effects, among others

- Essential oils are volatile, b.p. 130-180 f
- Contain hydrocarbons, monoterpenes, sesquiterpenes
- Families: Lamiaceae, Apiaceae, Rutaceae, Lauraceae, Myrtaceae
- Potent plants containing essential oils: Thymus, Eucalyptus, Salvia, Rosmarinus

Essential Oil Therapeutics



- Some essential oils are very complex mixtures of >200 individual compounds, any number of which are active against microbes

Thyme (and Oregano)

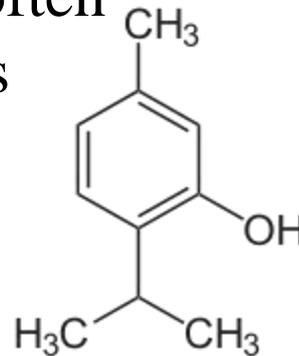
3 *Serpillum majus flore purpureo.*
Great purple wilde Time.



- Spasmolytic, antimicrobial, expectorant
- Bronchitis, colds, pneumonia, whooping cough
- Coughs in syrups, mouthwashes, toothpastes
- Easily toxic with overdose
- 1-2 drops in syrup or lozenges; tincture, 10-25 drops several times daily; tea, ½ tsp dried herb/cup (infusion)
- As a tea, tincture for worms

Oregano

- *Oreganum vulgare*
- Often contains more thymol, carvacrol than thyme
 - Quality varies widely
- Commercial oils often synthetic
- Commercial products often diluted with fixed oils



Thyme & Oregano -- Thymol



Aktug *et al.*, 1986

- Thymol is effective against a wide variety of pathogenic bacteria and fungi, i.e. *S. aureus*, *Vibrio parahaemolyticus*, *Salmonella typhimurium*, etc.
- Effective against *C. albicans*, *Tinea* spp., *Aspergillus* spp.
- Dilute 1:10 in olive oil for external use; or use 1:5 tincture of recently-dried herb, or teas.
- Oil can cause skin irritation (esp. thyme)
- Pure oil is toxic internally, use in syrups, drops, or whole herb in teas

Oregano, Thyme Oils

- Thyme—1.0 – 2.5% volatile oil; minimum 40% should be thymol + carvacrol (Ph. Eur.)
- Oregano—thymol (0-21%); carvacrol (0-85%) Quality!
- Quality—synthetic oils vs. natural oils (GC/MS); natural more complex
- Both more effective than either alone
- Carvacrol + thymol less effective than whole oil *in vivo*
- Action: damage in membrane integrity, which further affects pH homeostasis and equilibrium of inorganic ions
- Strong antioxidant properties of oil + phenolics (rosmarinic acid, etc.)
- Dose: 1-2 drops in tea; gum irrigator; 0.2-0.4 ml enteric

Eucalyptus globulus

Eucalyptus oil



- *E. globulus* native to Tasmania, widely planted as wind breaks, etc.
- Essential oil contains about 85% 1,8-cineol
- Essential oil and 1-8-cineol has proven antibacterial activity (*E. coli*, *Streptococcus*, *Mycobacterium*, etc.)
- Also antiinflammatory (prostaglandin-inhibitory), antisecretory, expectorant
- Dose: 1-3 drops (diluted) or in steam



Thyme, Oregano Indications

- Indications: URI, bronchitis, whooping cough, sore throat
- Taken orally as tea or small amounts of diluted essential oil (1 drop = 44 mg)
- Warnings:
 - Thyme, oregano tea—none
 - Essential oil—follow recommended dose, dilute in a fixed oil for external use; dilute in tea for internal use (1 drop/dose)
- Pharmacokinetics: uptake has been demonstrated in humans (Kohlert *et al.*, 2002)

Rosemary

Rosmarinus officinalis



- Native of Mediterranean area
- Essential oil contains mainly camphor; 1,8-cineol, pinene
- A screen of 21 common essential oils found rosemary, clove, lime, orange, cinnamon oils had the highest activity against *E. coli*, *K. pneumoniae*, *P. aeruginosa*, *Proteus vulgaris*) and two gram-positive bacteria *Bacillus subtilis* and *S. aureus* (Prabuseenivasan *et al.*, 2006)
- Dose: up to 10 drops/day (diluted)

Garlic: Clinically Useful for Infections

- Garlic showed potent killing effects within 1 hour with *Staphylococcus epidermidis*, within 3 hours with *Salmonella typhi*, within 1 hour with yeasts, and stronger anti-candidal activity than nystatin.
- A water extract of garlic showed broad spectrum antibacterial activity. At a concentration of 5.0 microliters/disc, the extract was active against *Bacillus cereus*, *Bacillus subtilis*, *Micrococcus luteus*, *Streptococcus faecalis*, and *Trichomonas vaginalis*.

- Many in vitro, in vivo studies
- Garlic (fresh, crushed first) inhibited *E. coli*, *Pseudomonas*, *Proteus*, *Salmonella*, *Staphylococcus*, etc.



Arora & Kaur, 1999; Khan & Omoloso, 1998

Garlic for URI

- Well-known as a folk remedy to prevent and relieve symptoms of common cold, especially in Europe, Asia.
- Sensitive to garlic *in vitro*: cytomegalovirus, human rhinovirus type 2, herpes simplex 1 and 2, influenza B (Josling, 2001; Guo *et al.*, 1993).
- Lissiman *et al.*, 2014 reviewed 8 trials for inhibition and shortening symptoms of the common cold. Only 1 was found to be of sufficient quality (Josling, 2001). More studies are needed.
- In a PCR survey (n=146; 1 capsule standardized to allicin daily; 12 weeks), Josling (2001) reported that those in the active group had 24 colds diagnosed, and in the placebo group, 65 (p=0.001).

Garlic-Alicin, disulfides

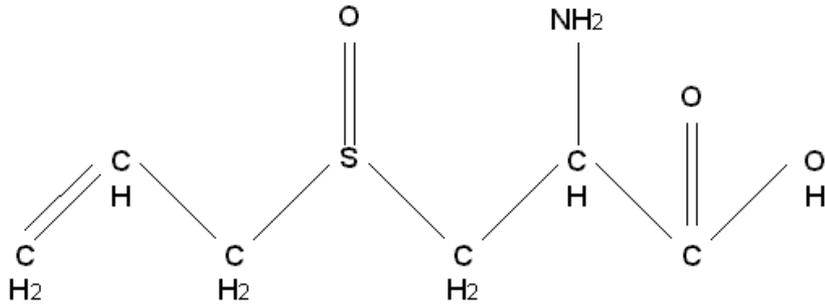


- Kyolic: macerate fresh-crushed garlic cloves in 70% EtOH, 30% H₂O for 2 days
- Alcoholic medium creates maximum ajoene, a breakdown product of allicin (70/30%)
- Alicin and ajoene potent against a variety of pathogenic bacteria, viruses, fungi (Josling, 2001)
- Tablets, capsules: allicin potential
 - Some products do not deliver advertised amount of allicin (Lawson & Wang, 2001)

Garlic Preparations

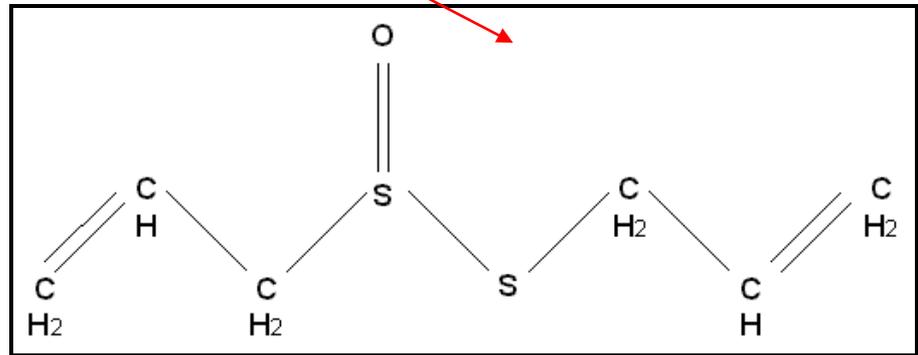
- For antimicrobial effects, don't use “aged garlic” extracts (no allicin)
- Aliin + alianase = alicin
- Crush, let sit for 15 minutes; then cook with it, ingest, tincture
- Tincture has high % of ajoene, effective against *Helicobacter*

Alliin and Allicin



Alliin

Alliin is important
for antimicrobial
effects



Allicin

Garlic Preparations



**Always crush garlic
cloves first!**

- Syrup with honey
 - Crush 5-10 cloves in ½ pint of honey
 - Take ¼ to ½ tsp per dose, every few hours
 - Too much at once—nausea
- Tincture (highest in ajoene)
- Enteric-coated caps
- Cool-dried powder
- Standardized to alicin “potential”
- Aged garlic loses antimicrobial power
- Fresh, crushed has best antimicrobial activity

Antimicrobial Properties of Allicin

Table I. Sensitivity of various bacterial species to allicin.

Bacterial strain	Allicin concentration (LD ₅₀ µg/mL)	Comments
<i>Escherichia coli</i>	15	Sensitive to antibiotics
<i>Escherichia coli</i>	15	Multidrug resistant (MDR)
<i>Staphylococcus aureus</i>	12	Sensitive
<i>Staphylococcus aureus</i>	12	Methicillin resistant
<i>Streptococcus pyogenes</i>	3	Sensitive
<i>Streptococcus β hemolyticus</i>	>100	Clinical MDR strain
<i>Proteus mirabilis</i>	15	Sensitive
<i>Proteus mirabilis</i>	> 30	Clinical MDR strain
<i>Pseudomonas aeruginosa</i>	15	Sensitive to cefprozil
<i>Pseudomonas aeruginosa</i>	>100	MDR mucoid strain
<i>Acinetobacter baumannii</i>	15	Clinical isolate
<i>Klebsiella pneumoniae</i>	8	Clinical isolate
<i>Enterococcus faecium</i>	>100	Clinical MDR strain

LD₅₀: 50% lethal dose.

Ankri & Mirelman, 1999

Comparison of garlic to prescription antibiotics

Table 2
Comparison of the sensitivity of bacteria to antibiotics and aqueous extracts of garlic and clove^a

Bacteria	Zone of inhibition (mm)									
	Pen (10 U)	Tet (30 µg)	Amp (10 µg)	Gent (10 µg)	Cip (5 µg)	Chl (30 µg)	Ery (10 µg)	Amoxy (30 µg)	Garlic	Clove
<i>B. sphaericus</i>	–	15	–	NT	NT	NT	–	–	19.3	–
<i>E. aerogenes</i>	NT	20	25	25	25	29	NT	–	15.6	–
<i>E. coli</i>	NT	20	25	23	25	27	NT	–	20	–
<i>P. aeruginosa</i>	NT	17	–	21.5	27	–	NT	–	20	–
<i>S. aureus</i>	28	30	29	NT	NT	NT	19	–	20	–
<i>S. epidermidis</i>	–	35	NT	NT	NT	NT	20	14	20.3	–
<i>Sh. flexneri</i>	NT	29	30	25	–	35	NT	–	30	17.5
<i>S. typhi</i>	NT	30	28	20	25	28	NT	13	21.3	–

^a –, no inhibition zone; Tet, tetracycline; Chl, chloramphenicol; Amp, ampicillin; Amoxy, amoxicillin; Gent, gentamicin; Cip, ciprofloxacin; Pen, penicillin; Ery, erythromycin.

Arora & Kaur, 1999. Antimicrobial activity of spices. Int J Antimicrob Agents 12:257.

Garlic for yeast infections (*Candida*)

Table 3

Sensitivity of yeasts to nystatin and aqueous extracts of garlic and clove

Yeast	Zone of inhibition (mm)		
	Nystatin (100 U)	Garlic	Clove
<i>C. acutus</i>	17	35	20
<i>C. albicans</i> (MTCC 227)	35	25	13
<i>C. albicans</i> (MTCC 183)	30	40	14
<i>C. apicola</i>	25	35	13
<i>C. catenulata</i>	16	40	13
<i>C. inconspicua</i>	16	40	14
<i>C. tropicalis</i>	16	43	13
<i>R. rubra</i>	18	40	14
<i>S. cerevisiae</i>	34	43	15
<i>T. variabilis</i>	23	30	22

Arora & Kaur, 1999. Antimicrobial activity of spices. Int J Antimicrob Agents 12:257.

Elecampagne

Inula helenium



- Common western garden herb for centuries
- Warm, spicy
- Coughs, bronchitis, expectorant
- Antibacterial (*S. aureus*, including MRSA (O'shea *et al.*, 2009))
- Antiinflammatory (Park *et al.*, 2013)
- Teas, pills, liquid extracts

Antifungals

Out of 26 common herbs and spices tested, cloves, cinnamon, mustard, allspice, garlic, and oregano at the 2% level in potato dextrose agar, completely inhibited growth of all 7 mycotoxigenic molds for various times up to 21 days (Azzouz & Bullerman, 1982)

Most commonly used in practice:

- Berberine sulfate
- Coptis, root
- Goldenseal, root, rhizome
- Oregano oil
- Oregano oil (thymol)
- Thyme, flowering herb, essential oil (thymol)
- Garlic
- Black walnut (juglone)
- Sage (Badiee *et al.*, 2012)

Thymol, carvacrol (isomers)

- Oregano and thyme herb demonstrated antiaflatoxigenic activity (Salmeron *et al.*, 1990)
 - Antifungal assays showed that oregano oil, carvacrol and thymol completely inhibited mycelial growth of 17 phytopathogenic fungi and their antifungal effects were higher than commercial fungicide, benomyl (Kordali *et al.*, 2008)
- Oregano and thyme oils
 - Some oregano oils up to 90% thymol or carvacrol
 - Look for standardized
 - Caution with internal use
 - Not during pregnancy

Essential Oils for Candida

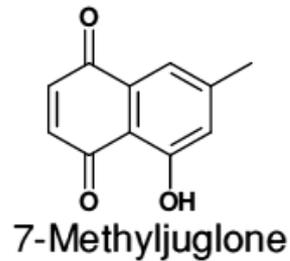


- Ahmad *et al.* (2011) found that thymol and carvacrol exhibited fungicidal effects against all 111 sensitive and resistant candida isolates
- Inhibition of ergosterol biosynthesis

Juglone (black walnut hulls)

- Clark *et al.* (1990) showed that juglone was strongly active against strains of *Candida albicans*
- MICs of the methanol extract of *Juglans regia* bark were obtained for vaginal *Candida* isolates (MIC = 12 microg/ml, as compared to amphotericin B (MIC = 97 microg / ml (Noumi *et al.*, 2014)
- Phenolic compound highest in walnut leaves, fruit hulls
- Commonly used in patent remedies for candida, fungal infections
- Husein *et al.* (2012) found strong activity against 3 dermatophytes (*Microsporum canis*, *Trichophyton mentagrophytes*, and *T. rubrum*)

Walnut bark, leaves, fruit hulls



- The fruit hulls contain the highest concentration of juglone, but the bark and leaves are also active
- Products with black walnut hull extract include tinctures, salves, creams, and elixirs

Active Therapeutic Categories for Treating Infections

To help organize Tx plan:



Mullein

- Antibacterial
- Antihistamine
- Antiinflammatory
- Antinauseant
- Antipyretic
- Antispasmodic
- Antitussive
- Antiviral
- Bronchodilator
- Calmative
- Demulcent
- Diaphoretic
- Expectorant
- Immunomodulators
- Mucolytic
- anodyne (Sore throat)

Active Categories

- Antibacterial: berberine-containing herbs, oregano, thyme oil
- Antihistamines: eucalyptus oil
- Antiinflammatory: berberine, turmeric, ginger, bromelain
- Antinauseant: ginger, lavender
- Antipyretic: willow bark extract
- Antispasmodic: California poppy extract, thyme herb, oil
- Antitussive: coltsfoot herb, loquat leaf, wild cherry bark
- Antiviral: andrographis, elderberry, shiitake
- Bronchodilator:
- Calmative: California poppy, kava, valerian, scullcap

Active Categories 2

- Demulcent: marshmallow root, plantain leaf, barley tea
- Diaphoretic: elder flower, yarrow herb, peppermint
- Expectorant: poplar buds, pine bark, yerba santa, grindelia
- Immunomodulators: mushrooms, astragalus
- Mucolytic: primula root, ivy tips
- anodyne (Sore throat): kava, sage leaf

Respiratory Herbs by Energy

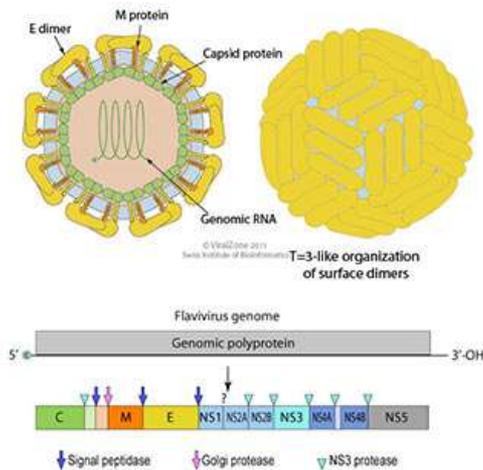
Hot, Warm Herbs

- Ginger
 - Yerba santa
 - Grindelia
 - Cinnamon
 - Cayenne
 - Eucalyptus
 - Thyme
 - Ground ivy
 - Skunk cabbage
 - Yerba mansa
 - Osha
 - Elecampagne
- Garlic
 - Cedar boughs

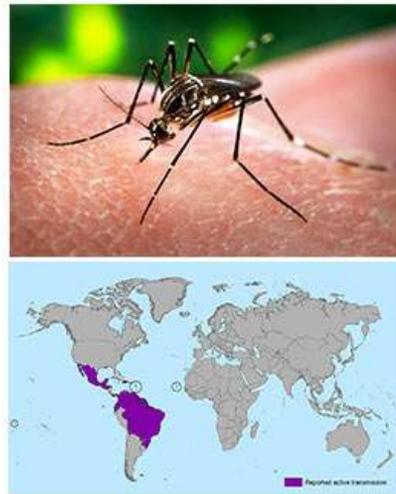
Cool Herbs

- Andrographis
- Usnea
- Iceland moss
- Lungwort
- Baptisia
- Blue vervain
- Life everlasting
(*Gnaphalium* spp.)
- Elder fruit, flowers

Treating Infections, Part 2

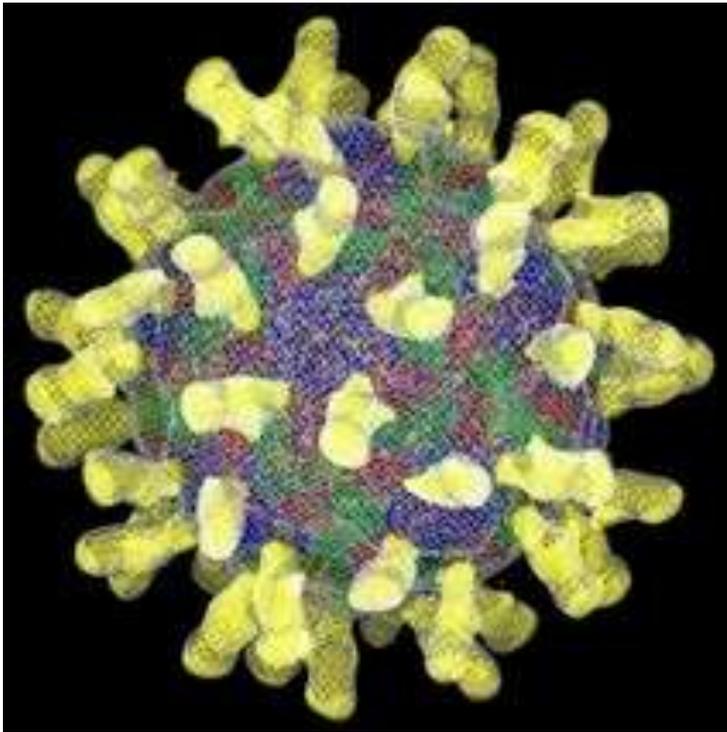


Zika



- Common colds
 - Additional herbs, symptomatic relief
- Sinusitis
- Flu
- Pneumonia, bronchitis
- Immune tonics
- Urinary tract infections
- Hepatitis
- Lyme's
- Herpes
- UTIs

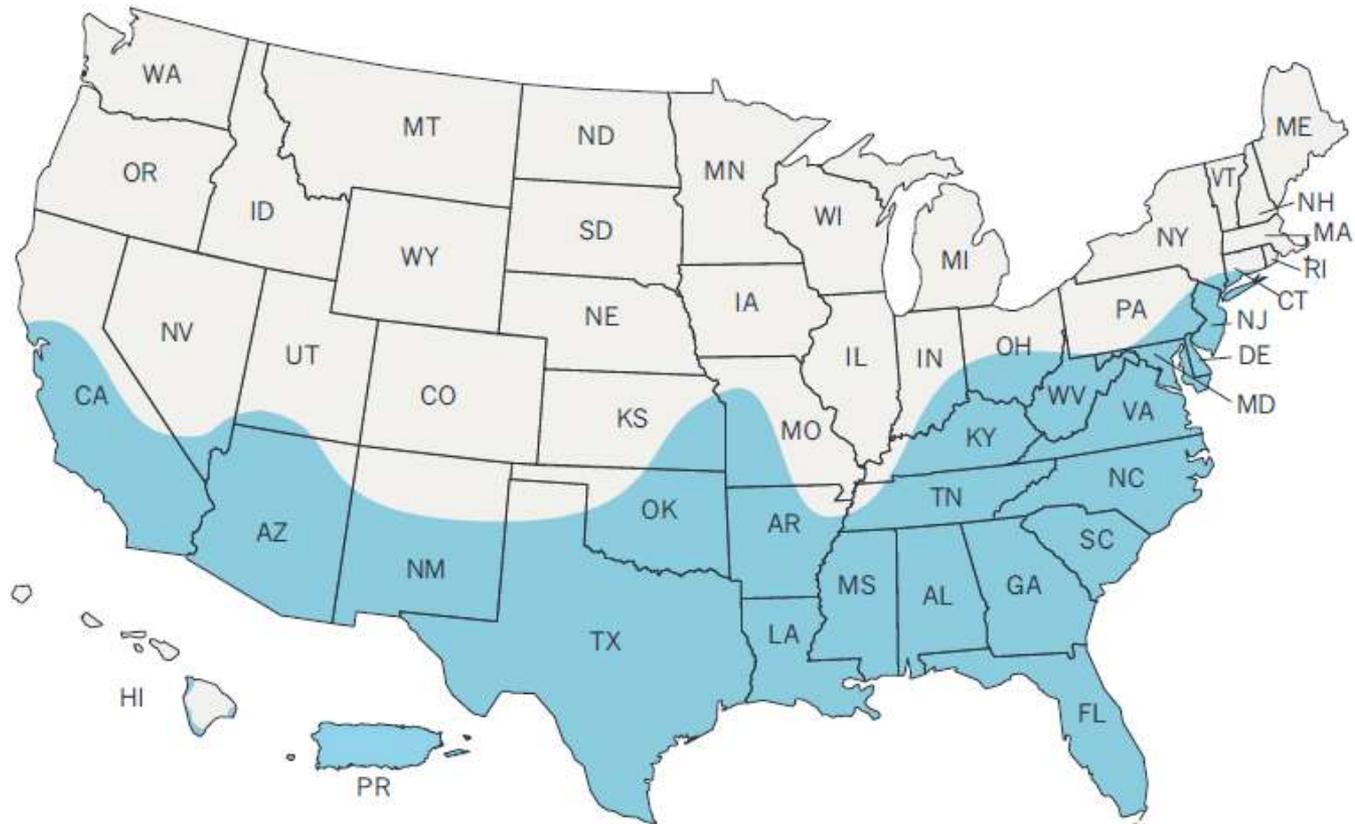
Viral Infections



- Respiratory tract infections
- All likely viral, with subsequent bacterial infection possible
 - Common cold
 - Sinusitis (viral subsequent to cold)
 - Influenza
 - Bronchitis
 - Pneumonia

Aedes aegypti range

Most likely spp. Spread Zika



Aedes aegypti



Aedes albopictus

Zika Transmission--sex

CDC's Response to **Zika**

Zika and Sex: Information for Men with Pregnant Partners Living in Areas with Zika



What we know

- Zika virus can be spread by a man with Zika to his sex partners.
- In known cases of sexual transmission, the men had Zika virus symptoms. From these cases, we know the virus can be spread when the man has symptoms, before symptoms start, and after symptoms end.
- The virus can stay in semen longer than in blood.

What we don't know

- How long Zika virus can stay in the semen of infected men or spread through sex.
- If men infected with Zika who never develop symptoms can have Zika virus in their semen or spread Zika through sex.
- If a woman can spread Zika virus to her sex partners.

What you should know about Zika and sex

Because of the link between Zika and birth defects, take steps to prevent your partner from getting Zika during her pregnancy.





Zika virus

Fact sheet

Updated 15 April 2016

Key facts

- Zika virus disease is caused by a virus transmitted primarily by *Aedes* mosquitoes.
- People with Zika virus disease can have symptoms that can include mild fever, skin rash, conjunctivitis, muscle and joint pain, malaise or headache. These symptoms normally last for 2-7 days.
- There is no specific treatment or vaccine currently available.
- The best form of prevention is protection against mosquito bites.
- The virus is known to circulate in Africa, the Americas, Asia and the Pacific.

Zika Facts

- Incubation—a few days
- Symptoms are similar to other arbovirus infections such as dengue
 - Fever
 - skin rashes
 - Conjunctivitis
 - muscle and joint pain
 - Malaise
 - Headache
 - Symptoms usually mild and last for 2-7 days.
- Potential neurological and auto-immune complications of Zika virus disease
- Substantial new research has strengthened the association between Zika infection and the occurrence of
 - fetal malformations
 - neurological disorders
 - Others under investigation

Zika Virus



Transmitted by
mosquito bite

No treatment
or vaccine is
available



ABOUT
1 in 5 people

infected will become ill

SYMPTOMS:
fever, rash,
joint pain
conjunctivitis
(red eyes)



SYMPTOMS
normally last
2-7 days

ILLNESS
is usually mild
and **death is rare**

Mosquitoes known to
transmit the virus are
not present in Canada



Zika Treatment

- Symptoms usually relatively mild and requires no specific treatment. People sick with Zika virus:
 - should get plenty of rest
 - drink enough fluids
 - treat pain and fever with common medicines
- If symptoms worsen, they should seek medical care and advice.
- There is currently no vaccine available.

Source: WHO

Zika

Recommended Natural Treatment

- The flavone baicalein exerts potent activity against DENV adsorption to the host and post-entry viral replication
- Chebulagic acid, punicalagin (from *Terminalia chebula* -- chebulic myrobalan or he zi) are hydrolysable tannins with strong anti-DENV activity

- Quercetin and narasin, as well as marine seaweed extracts have been observed to possess significant anti-DENV properties
- Chebulagic acid and punicalagin can directly inactivate free DENV particles and interfere with the attachment and fusion events during early viral entry

From Lin *et al.*, 2014

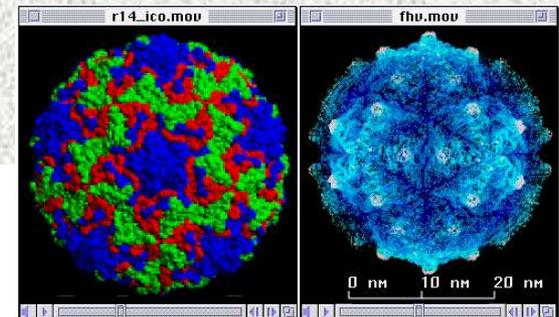
Haritaki



- Baicalein from (*Scutellaria baicalensis*)
- Quercetin is very high in apples and onions
- Available as a stand-alone supplement
- Chebulagic acid
- Chebulic myrobalin (also called haritaki)
- Antibacterial, antioxidant, hepatoprotective, aquaretic
- Dose: 1-6 grams of the powder

Common Cold

- U.S. average—2.5 colds/year = 0.75 billion
- Myalgia, fatigue, rhinitis, excessive mucus discharge (watery), sore throat, usually no fever
- Pulse and tongue often normal, “surface” condition
- Appetite often not affected



Treatment Plan-common cold

- Warming herbs to dispel wind and/or cold from surface (ginger, cinnamon, elecampane)
- Antiviral herbs (direct or by host immunity)
- Symptomatic relief (cough, sore throat, energy, mucus, pain, etc.)
- Ephedra (and moderating herbs)

Suggested Herbal Protocol

Common cold (standard practice)

- **Antiviral herbs** (andrographis, elderberry, pelagonium, etc.)
- **Diaphoretics** (to ease symptoms of myalgia, congestion
 - *cup of hot chamomile, elderflower, yarrow, linden tea (Weiss)
 - *elder flower (lowers fever, increases non-specific resistance, antiviral)
 - *linden flower tea (calming, diaphoretic)
 - *ginger tea (warming, diaphoretic, anodyne)
- **Baths:** lavender, ginger, rosemary, camphor (diaphoretic, anodyne, calming, invigorating)
- **Immunomodulating**
 - echinacea (immune enhancement, antiviral through host immunity)
 - Thyme tea (reduce chance of secondary bacterial infections, expectorant)
- *Licorice tea (expectorant, reduces inflammation, immunomodulating)
- *Sage tea (a gargle for sore throats)

Common Cold (science-based)

- **Antiviral** (also can reduce symptoms, shortens duration)
 - Andrographis, standardized extract (dose)
 - Elderberry syrup or concentrated extract (tablets, capsules)
 - Pelargonium, standardized extract (liquid or tablets)
 - Garlic syrup (with honey and orange oil), allicin-insured capsules
- **Antibacterial** (helps prevent secondary infections)
 - Thyme, oregano tea, essential oil in tea (1-2 drops)
 - Berberine (in goldenseal, coptis, or berberine sulfate tablets)
 - Garlic syrup, garlic enteric-coated allicin-insured capsules, tincture

Colds—symptomatic relief

- **Expectorant**
 - Licorice, yerba santa, elecampane, cayenne, lemon tea or tincture
- **Congestion**
 - Eucalyptus (steam, tea, baths, use oil, 2-3 drops in tea or bath)
 - Cang er zi (cocklebur fruit, extract in tablets, capsules)
- **Cough**
 - Coltsfoot tea, yerba santa tea, peppermint, eucalyptus, pine bark, mullein leaf tea, loquat syrup
- **Prevention**
 - Turkey tail, shiitake, cordyceps, reishi extracts, teas

Colds/Flu

Symptomatic Relief 2

- **Myalgia**

- Peuraria, meadowsweet, wintergreen, willow bark (standardized or not; high salicin content), cayenne liniment, St. John's wort oil, hot bath with strong yarrow, meadowsweet, rosemary, and/or lavender tea added (consider adding essential oils also)

- **Headache**

- Liver/GB (temples and over eyes): blue vervain, centaury, feverfew, fringe tree, blessed thistle, boldo, wormwood tea, mugwort tea
- Tension (occiput, general): rosemary, willow bark, meadowsweet, wintergreen tea, shepherd's purse, betony*, greater periwinkle*, hops, *kava*, birch bark tea or tincture, catnip, chamomile (both), skullcap
- External application, baths: rosemary, lavender essential oils (30-70 with fixed oil), liniment, or tea compress, St. John's wort oil, liniment

Symptomatic Relief 3

- **Fever**

- Diaphoretics: yarrow, elder flower, blue vervain, ma huang, boneset, catnip, mormon tea, life everlasting, lobelia, feverfew
- Antipyretics: willow bark, meadowsweet, birch bark, dogwood bark (either pacific or streamside), quaking aspen bark
- With deficiency of yin: coral root (*Coralarrhiza* spp.), American ginseng
- With fast pulse: add linden flower, passionflower

- **Fatigue:**

- With fever: eat lightly, especially broths made with green leafy vegetables, barley, a little fish or chicken; add herbs like American ginseng, turkey tails, cordyceps, witch's butter; use gentian or centaury tincture before meals sparingly
- With deficiency of Kidney yin or Qi or Spleen Qi deficiency: American ginseng, codonopsis, burdock root, false Solomon's seal

Symptomatic Relief 4

- **Rhinorrhea**

- Clear mucus: magnolia buds, cayenne, sage leaf, eyebright
- Highly viscous mucus: saponin-containing herbs (violet leaf, evening primrose root, *Trillium* spp., *Smilacina* spp., fenugreek, licorice, cayenne, primrose root (cowslip), starflower (*Trientalis* spp.), shooting stars (*Dodecatheon* spp.), *Eryngium* spp., English ivy tips)

- **Nasal congestion**

- Antihistamines: nettle leaf, goldenseal, Oregon grape root, goldthread, goldenrod, ginger*, lemon, orange, tangerine peel, aged tangerine peel (also contains a sympathomimetic alkaloid, synephrine), *Eucalyptus*, and steams
- Sympathomimetics: ma huang tincture, tea; tangerine or orange peel

Additional warming Herbs

Warming herbs, release surface

- Elecampane
- Wild ginger
- Ginger
- Pine bark
- Yerba mansa
- Osha
- Grindelia
- Cinnamon

- Echinacea
- Chinese Patents



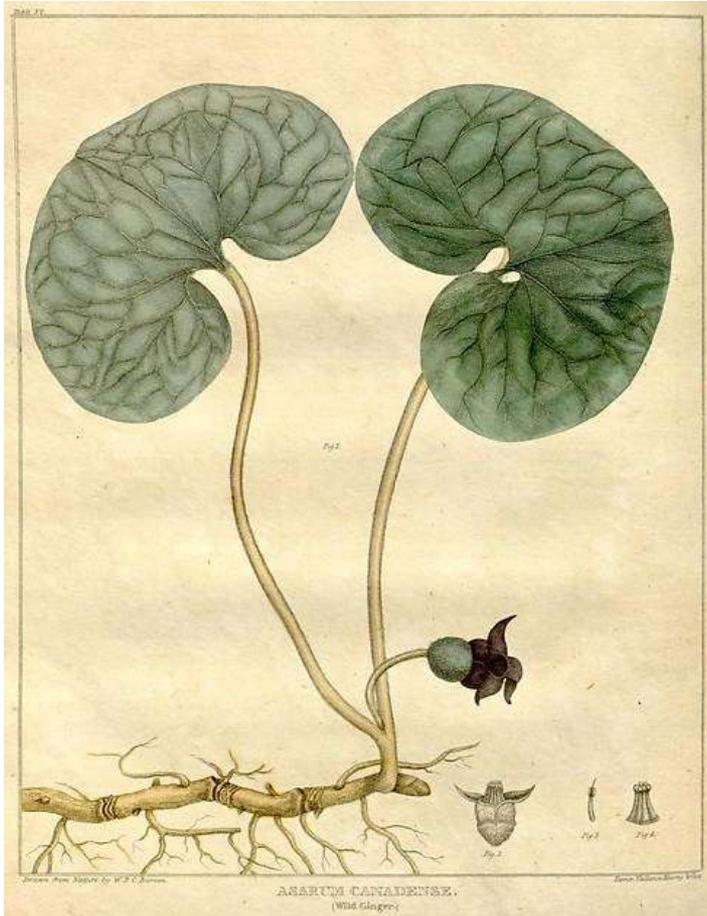
Elecampagne

Inula helenium



- Common western garden herb for centuries
- Warm, spicy
- Coughs, bronchitis, expectorant
- Antibacterial (*S. aureus*, including MRSA (O'shea *et al.*, 2009))
- Antiinflammatory (Park *et al.*, 2013)
- Immunomodulating
- Teas, pills, liquid extracts

Wild Ginger (*Asarum* spp.)



- *A. sieboldii* and other spp. is Chinese herb, xi xin
- spp. are likely interchangeable
- “Powerfully aromatic...relieves pain”
- “Disperses cold, releases the exterior” (B&G, 3rd)
- “An excessive dosage will exhaust the qi and increase the pain” (use 1-3 g with other herbs only)

Wild ginger as a western herb

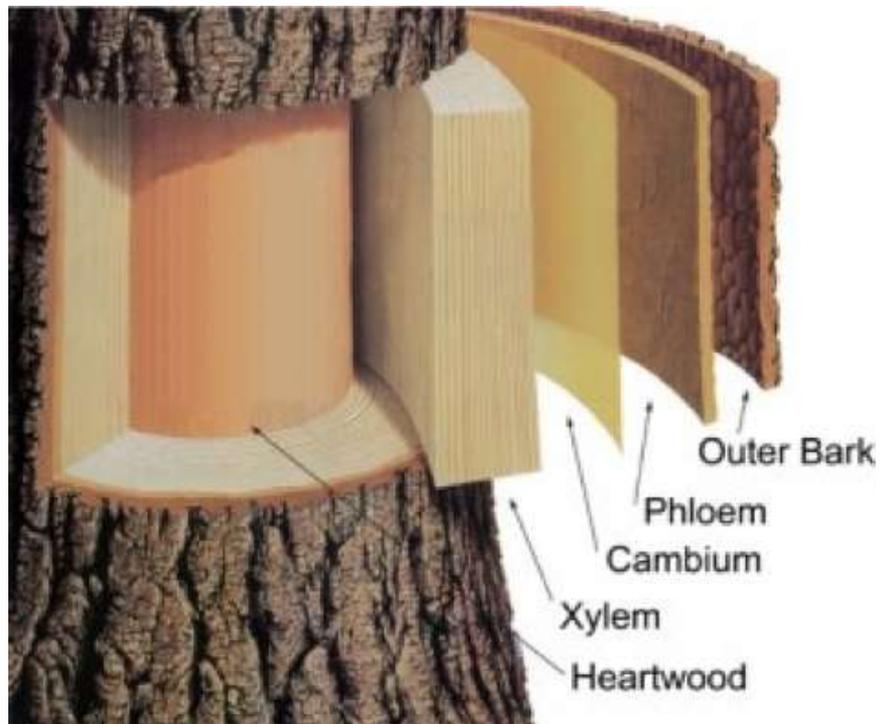
- Aristolochic acid
 - Powerful immune stimulant
 - Chronic, higher dose uses associated with several deaths (kidney failure)
 - Mutagenic, carcinogenic
 - *Asarum* spp. contain much less AA than *Aristolochia* spp.
 - *Aristolochia* (snake root) is used to treat toxic bites, etc.; contains higher amounts of AA
 - Used for 2,000 years at least
 - Essential oil with asarone
 - Use lower doses in herb mixtures for acute symptoms only
- Leaves are powerfully emetic
 - “warm stimulant and diaphoretic (Bigelow, 1817)
 - Used in chronic pulmonary affections” (Felter-Lloyd)
 - “Warm infusion promotes profuse sweating”
 - “Sudden colds”
 - Dose: ½ ounce (14 g) to 1 pint water (infusion); drink 2-3 x daily (freely in original)

Ginger (*Zingiber officinale*)



- Warm, spicy
- Benefits digestion
- “dispersing in nature, benefits the Stomach, alleviates nausea, stops coughing, transforms phlegm”
- “Releases the exterior and disperses cold: for exterior cold patterns (B&G)
- Warms, benefits digestion, relieves nausea
- “Warms the Lungs and stops cough: for cough due to both acute wind-cold cough patterns and chronic Lung disorders with phlegm” (B&G)
- Dose: 3-9 g (make your own extract!)

Pine bark



- Inner bark of 2-3 year old growth; leaves; oxidized pitch
- Contains polyphenols, antioxidant
- Resins, essential oil
- Antibacterial, expectorant, decongestant
- Pleasant taste (infusion)
- Dose: 9-12 g/day; infusion

Yerba Mansa

(*Anemopsis californica*)



- Native to many sites around sw U.S. in boggy areas
- “natives frequently carry the root with them, chewing it and swallowing the juice, and consider it a certain remedy for cough and pulmonary affections (F&L).
- Dose: 3-6 g, infusion or light decoction; 1 mL tinc. in water or tea, every 2-3 hours

Osha (*Ligusticum grayi*, *L. porteri*)



L. porteri



L. grayi

- Chuan xiong in TCM
- Not particularly for URI; does not enter lung channel
- Strongly potentiates antibiotics against MDR *S. aureus*
- “most popular "remedio" in San Luis Valley for treating colds, sore throats and stomachaches” (Bye *et al.*, 1986)
- Root chewed or tea decoction consumed
- Hispano Americans in the San Luis Valley of south-central Colorado, USA

Grindelia spp. (gumweed)



“At non-cytotoxic concentrations, the *G. robusta* extract inhibited dose-dependently the secretion of IL-6, RANTES, MCP-1 and, to a lesser extent, PGE(2) and TNF-a (La *et al*, 2010)

- Widespread along roads throughout the western U.S.
- *G. camphorum*, *G. squarrosa*
- Tincture, infusion
- Lung channel
- Warm, sticky, resinous
- Efficient in bronchial affections, in pertussis
- *Asthmatic breathing, with soreness and raw feeling in the chest; cough, harsh and dry; breathing labored*” (F&L)
- Resin made up of diterpenes; flavonoids, saponins
- Expectoating, antimicrobial

Cinnamon bark



- The beneficial health effects of CZ:
- “a) anti-microbial and anti-parasitic activity
- b) anti-oxidant and free-radical scavenging properties” (Ranasinghe *et al.*, 2013).
- Test of cinnamon essential oil against respiratory pathogens:
- inhibitory and bactericidal concentration against *Streptococcus pyogenes*, *S. agalactiae*, *S.pneumoniae*, *Klebsiella pneumoniae*, *Haemophilus influenzae*, *Staphylococcus aureus* isolated from clinical specimens
- Cinnamon and thyme showed the strongest action followed by clove”
- A lot of cinnamon on the market is *not* true cinnamon (*Cinnamomum verum*, *C. zeylanicum*), but *C. cassia*

Two cooling Chinese herbs that are also western herbs



- Antiviral herbs with a cooling nature
- *Taraxacum officinale*
- *Prunella vulgaris*

Prunella vulgaris (xia ku cao)

Self heal, heal-all

- Antiinflammatory and antihistamine triterpenes
- Antiviral phenolic acids
- Anti HSV polysaccharides
- Phenolic compounds (flavonoids, caffeic acid derivatives) with antiviral activity
- Dose: 9-15 grams (fresh or freshly-dried)

- Indications:
 - Clears liver and brightens the eyes
 - ascending liver fire with red, painful, swollen eyes, headache, dizziness
 - Clears heat and dissipates nodules - neck lumps, scrofula, lipoma, goiter, swollen glands due to phlegm fire.
 - Hypertension accompanied by liver fire or yang rising

New research on pu gong ying



- Dandelion (*Taraxacum officinale*)
- Clears heat and relieves “fire toxins”
- Leaf and root used
- Dose: 15-30 g in decoction
- Impedes influenza A infection and decreases its polymerase activity as well as the nucleoprotein (NP) RNA level

Echinacea Background

- Most widely-used herbal remedy for colds
- 1800s, native Indian uses
- Years of research back to the 1930s in Germany
- Hundreds of studies, but past studies are usually of poor design
- Tincture from fresh tops and roots typically preferred



Echinacea—Immunomodulation

- Positive, shortened duration of symptoms (Linde, 2006)
- Negative, no statistically sound benefits shown (Turner *et al.*, 2005)
- Early use at first signs of infection may be more effective (Schoop *et al.*, 2006)

- Activates cellular and humoral immune functions (Ritchie, 2011)
- Acute-phase immune activating proteins (IL1- β , IL-6, IL-12 and TNF- α)
- Recent studies equivocal
- Positive, shortened duration of symptoms (Linde, 2006)

Echinacea

Safety, meta-analysis

- Appears safe for children (>5 years old, Saunders *et al.*, 2007)
- Most recent, largest meta-analysis (Karsch-Volk *et al.*, 2014)
 - 24 RDBPC trials (n=4631), 33 comparisons of echinacea with placebo concluded that clear statistically-significant benefits for reducing symptoms of common cold were not found
 - Large heterogeneity in study designs, plant parts, species, extraction methods makes conclusions less satisfying; many positive individual studies
 - Few side effects
 - No significant herb-drug interactions

Other supported interventions

- Vitamin C
 - Incidence only (500 mg daily)
- Zinc lozenges
 - Shortens duration (15 mg, chelated)
- Probiotics
 - 20 billion or 200 billion *L. pentosus*; n=300, elderly adults; incidence of colds = 47.3, 34.8, 29% (placebo, low-dose, high-dose)
- Beta-glucans (yeast, mushrooms)

Vitamin C



- 5-year, PCDB study (Sasazuki *et al.*, 2005)
- n=439 (244 finished)
- (50 mg or 500 mg daily)
- Regular vitamin C significantly reduced incidence of colds, but did not affect severity or duration.
- Similar study found that 1 g/day did not reduce severity or duration (Audera *et al.*, 2001)

Zinc chelate

- 23 clinical trials on www.pubmed.gov
- 7 meta-analyses (1997-2013)
- Typical dose is 15 mg zinc chelate
- Lozenge or syrup most common preparations
- Some studies show lozenges work best, but have taste issues; syrup is also effective in some studies (Kurugöl *et al.*, 2006)

Zinc trials 1

- RDBCT (n=100, 3 mos., school age children, 8-13)
- 15-mg chelated zinc (zinc bis-glycinate) given once a day for 3 months during the winter season to healthy school children aged 8-13 years
- No difference in incidence of common cold between groups
- Duration of cough, rhinorrhoea, having 2 or more symptoms was significantly improved in intervention group
- Rerksuppaphol & Rerksuppaphol, 2013

Zinc trials 2

- RDBPC study (n=50, 24 hours after first symptoms of common cold; 7 days duration)
- Zinc group had a shorter mean overall duration of cold (4.0 vs. 7.1 days; $P < .0001$) and shorter durations of cough (2.1 vs. 5.0 days; $P < .0001$) and nasal discharge (3.0 vs. 4.5 days, $P = .02$)
- Symptom severity scores were decreased significantly in the zinc group. Mean changes in plasma levels of zinc, sIL-1ra, and ICAM-1 differed significantly between groups.

Zinc meta-analysis

- Latest (Science *et al.*, 2012)
- 17 trials, n=2,121
- Oral zinc formulations appear to significantly shorten the duration of symptoms (mean, 1.65 days, some trials greater); some show reduction in symptoms
- Adverse effects—bad taste, slight nausea

Human Biome/Probiotics

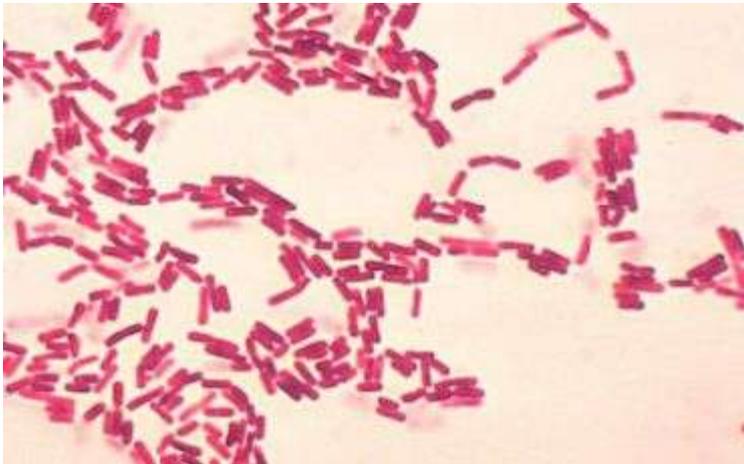


- Traditional fermented foods
 - Sauerkraut, yogurt, kefir, sourdough bread, many fermented breads (nan) in India, kim chee, miso, pickles, olives
 - “Intestinal gardening”
- Prebiotics
- Probiotics
- An estimated 100 trillion microorganisms representing more than 500 different species inhabit every normal, healthy bowel

Probiotics—URIs

- Meta-analysis (13 RCTs)
 - “Probiotics were better than placebo in reducing the number of participants experiencing episodes of
 - acute URTI
 - the mean duration of an episode of acute URTI
 - antibiotic use
 - cold-related school absence.
 - This indicates that probiotics may be more beneficial than placebo for preventing acute URTIs” (Hao *et al.*, 2015)
 - Studies are not high-quality
- “probiotics may have a beneficial effect on the severity and duration of symptoms of RTIs but do not appear to reduce the incidence of RTIs.” (Vouloumanou *et al.*, 2009)
 - *L. fermentum*; 6 mo infants; 6-month duration of the study; 27% reduction in the incidence of upper respiratory tract infections; 30% reduction in the total number of infections.
 - RDBC; n=281 children who attend day care centers; 3 month duration of study (Hojsak *et al.*, 2010)
 - RDBCT; N=479 healthy adults....reduced the duration and severity but not the incidence of common cold episodes (De Vrese *et al.*, 2006)

Common Species Used



Bacillus coagulans

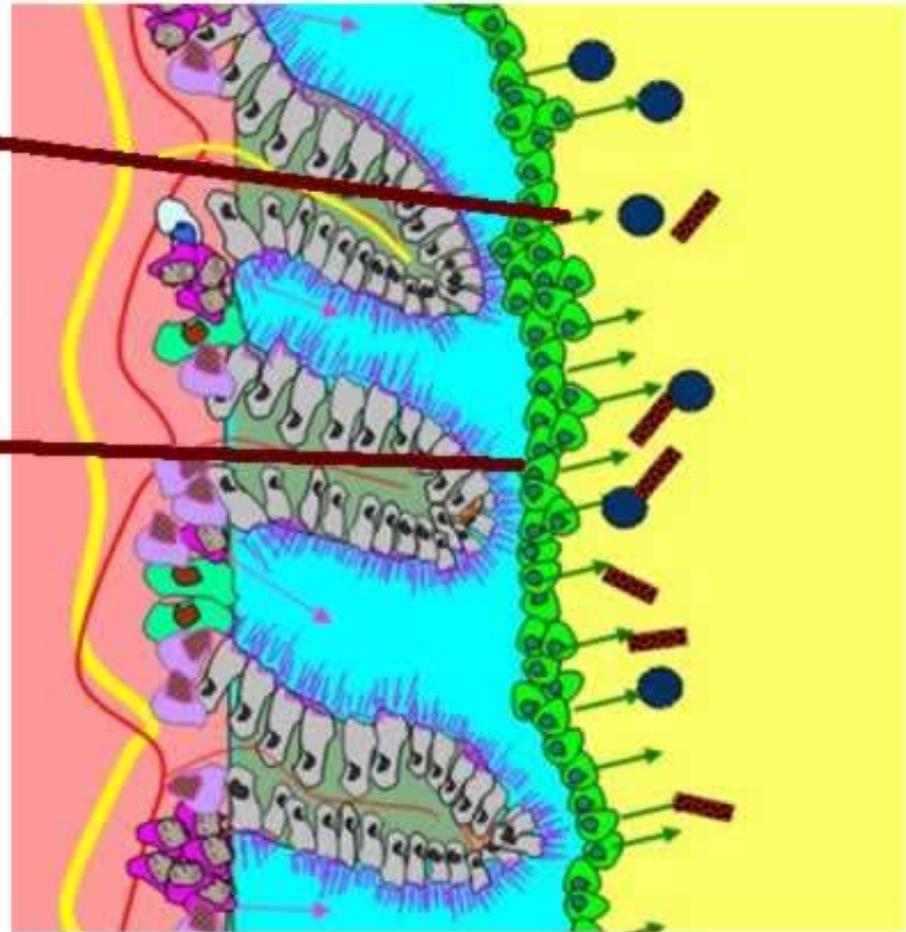
- *Bifidobacterium bifidum*
- *L. caseyi*
- *L. rhamnosus*
- Spore-forming species (heat stable; *Bacillus coagulans* (*S. sporogenes*))

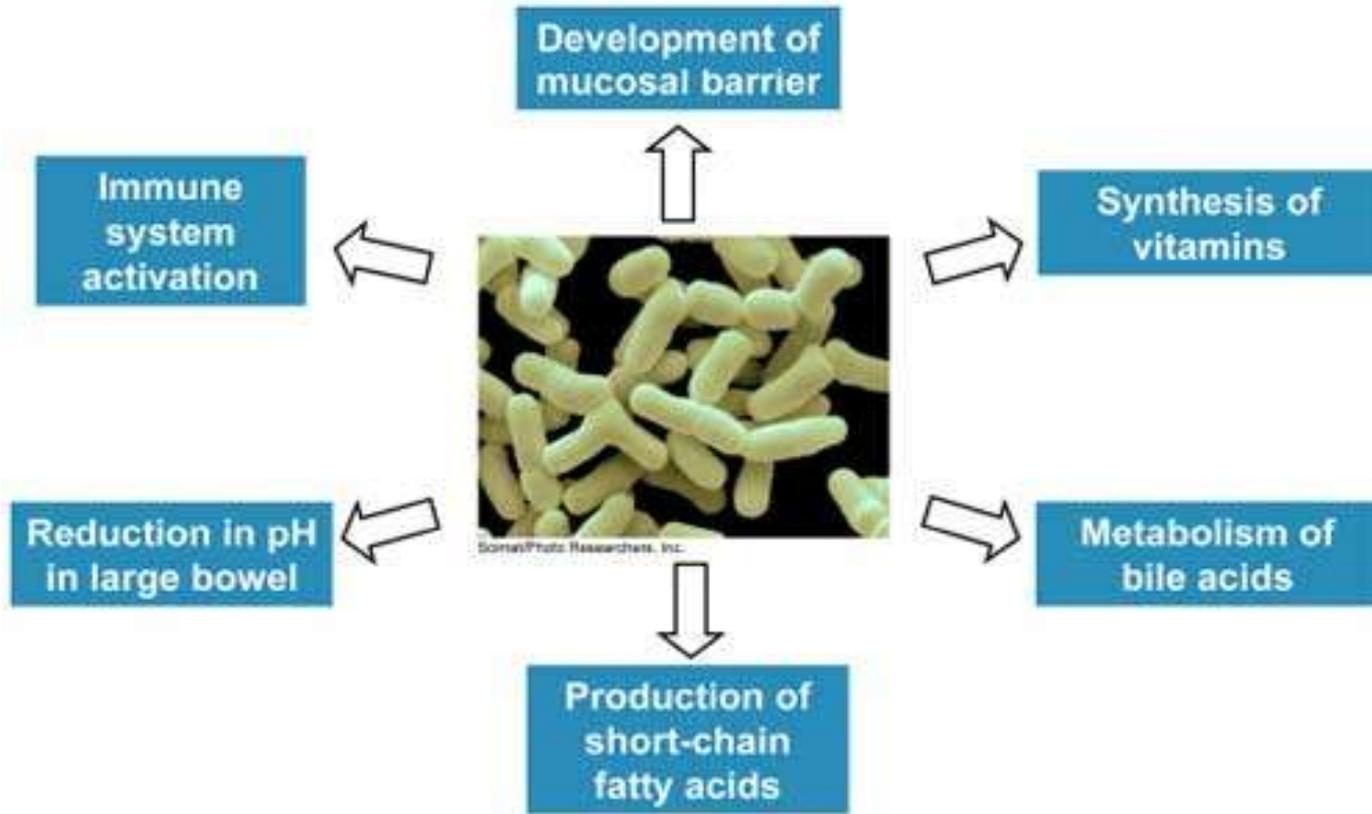
Probiotic Benefits

ACIDOPHILUS AND OTHER PROBIOTIC BACTERIA SECRETE: ANTIVIRAL ANTIBACTERIAL AND ANTIFUNGAL CHEMICALS.

PROBIOTICS FORM A PHYSICAL BARRIER TO HINDER INVASION OF BACTERIA AND YEASTS

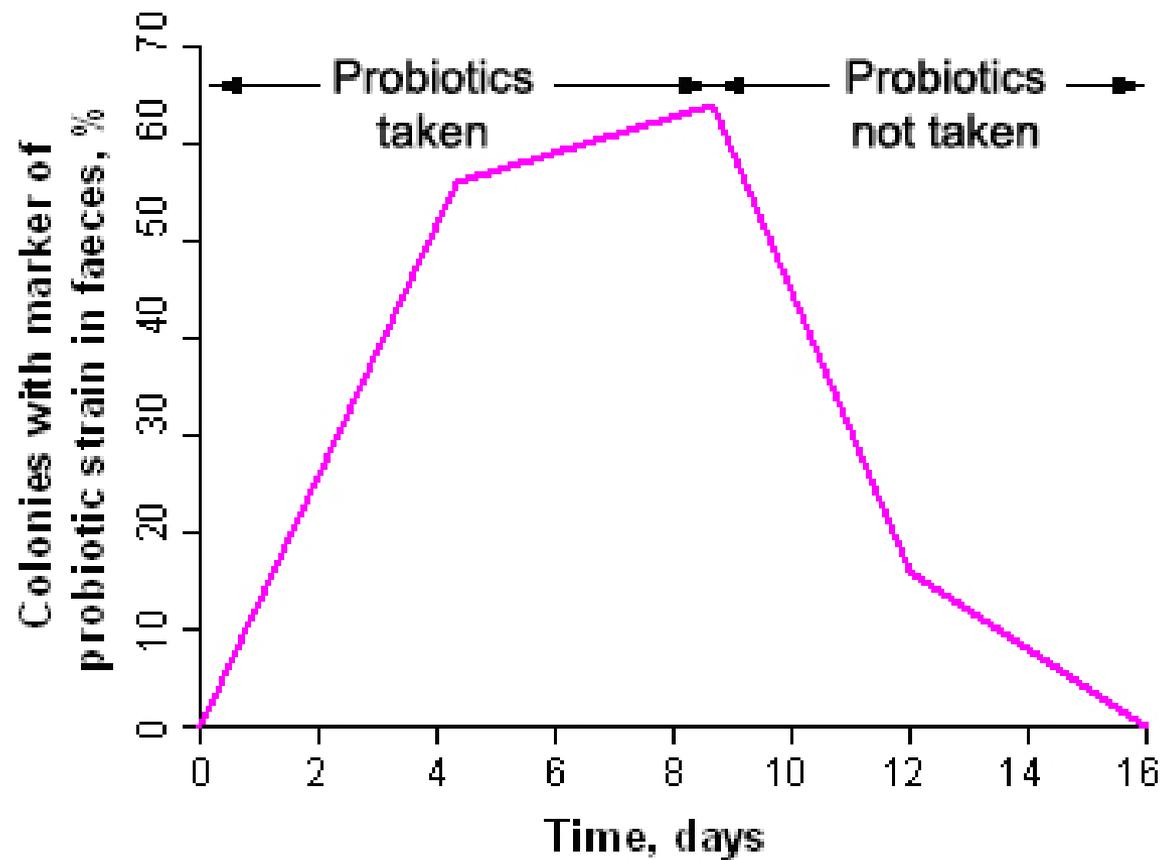
PROBIOTICS LIKE ACIDOPHILUS CREATE AN ACIDIC MICROENVIRONMENT WHICH PROMOTES IRON AND OTHER MINERAL ABSORPTION.





Fate of Ingested Probiotics

The appearance of ingested probiotics bacteria in faeces



Probiotic Research Summary

- 1,475 clinical trials (Pubmed)
- 151 meta-analyses
- 6,047 studies published in the last 5 years
- 3,027 review articles

Current Areas of Research

- Digestive health (poor absorption of nutrients, reduction of gas, bloating, loose stools, constipation)
- Irritable bowel syndromes
- Urogenital health (vaginal infections, UTIs)
- Allergies
- Immune support
- Antibiotic-associated diarrhea (positive results from systematic review and meta-analysis) (Hempel *et al.*, 2012)
- Many more

Chinese Patents for Colds, Flu

- Lonicera and Forsythia Formula (*Yin Qiao San*)
- Morus and Chrysanthemum Formula (*Sang Ju Yin*)
- Ilex and Evodia formula (*Gan Mao Ling*)-antiviral
- Jade Screen Powder, *Yu ping feng San*-astragalus, atractylodes, Ledebouriella



Yin Qiao San

Early stage of a wind-heat common cold, marked by sore throat, slight fever, and slight stuffy nose

developed by Wu
Jutang in 1798



- **Cold & Flu Formula
(Yin Qiao San)**

- Forsythia (Lian Qiao)
- Honeysuckle (Jin Yin Hua)
- Platycodon (Jie Geng)
- Mint (Bo He)
- Bamboo Leaf (Dan Zhu Ye)
- Licorice (Gan Cao)
- Schizonepeta (Jing Jie)
- Soy Bean (Dan Dou Gu)
- Arctium (Niu Bang Zi)

Gan Mao Ling—Common Cold

Strong formula for wind-heat cough with fever and chills

"Common Cold
Efficacious-Remedy".



Stronger antiviral

- *Ilex asprella*
- *Evodia lepta*
- *Vitex negundo*
- *Chrysanthemum indicus*
- *Isatis* spp.
- *Lonicera japonica*

Sang ju yin

Morus and Chrysanthemum

Common cold, influenza, pneumonia, whooping cough, measles, and acute tracheitis



- Morus Folium (Sang Ye)
- Armeniaca Semen (Xing Ren)
- Platycodon Radix (Jie Geng)
- Phragmites Rhizoma (Lu Gen)
- Forsythia Fructus (Lian Qiao)
- Chrysanthemum Flos (Ju Hua)
- Mentha Folium (Bo He)
- Glycyrrhiza Radix (Gan Cao)

Jade Screen Formula

Deficiency of protective Qi,
sweating, shortness of breath,
frequent URI, immune deficiency

- Astragalus
- Atractylodes
- Siler (fang feng)



Sinusitis

- **Herbal and general treatment measures**
 - All patients with respiratory tract infections should drink plenty of fluids.
 - Nasal douches with isotonic saline solution (+ berberine sulfate) are helpful, especially in the first two stages of acute rhinitis.
 - The sooner herbal remedies are administered, the better the chance of successful treatment.
 - Different herbal remedies have different effects. Some stimulate the immune system, whereas others counteract inflammation. Combinations of remedies can therefore be very useful.
- **Clinical value of herbal medicine:** Herbal remedies for acute rhinitis (head colds) are cheap and safe. They do not damage the mucous membranes of the nose, even when used for long periods of time, if administered at low doses.
- In the case of sinusitis, a qualified physician should determine whether antibiotic treatment is necessary. Herbal treatments are always useful adjunctive measures.

Source: Kraft & Hobbs

Sinusitis 2

- **Chamomile flower (Matricariae flos tea rinse, tea).**
- *Indications: Acute rhinitis.*
- - *Contraindications: Known allergy to plants from the Asteraceae (aster Ir daisy family).*
- - *Action: The essential oil in chamomile is not irritating to the mucous membranes.*
- Two of its constituents, ~ -bisabolol and chamazulene, counteract inflammation.
- - *Dosage and administration: Inhalation: Add 2 to 3 tablespoons dried chamomile flower, 1 teaspoon chamomile extract, or 5 drops of the essential oil to boiling water and inhale, several times daily (seep. 18). If this is not possible, administer chamomile nose drops or chamomile cream to each nostril, 3 to 4 times a day.*
- - *Side effects: None known.*

Sinusitis 3

- Cold Receptor Stimulators (as tea or rinse with ear syringe)
- Peppermint oil (from the leaves of *Mentha piperita L.*); menthol; camphor tree
- *Action: These preparations stimulate cold receptors in the nose, making it easier to breathe. They also have secretolytic, antimicrobial, and antiviral effects, but do not reduce swelling of the mucous membranes. The remedies are generally safe, except in the specified contraindications.*
- *Indications: Acute rhinitis*
- *Contraindications: Exanthematous skin and childhood diseases, bronchial asthma. Infants and small children should not inhale peppermint oil or use nasal ointments containing menthol. Camphor should not be used during pregnancy or lactation. Individuals with hypertension or heart failure should use it with caution.*

Sinusitis 4



- Nasal washes
 - Saline + berberine
 - Prefer ear syringe over neti pot
- Use 1 pt to 1 qt canning jar
 - Blend 1 tsp/pint salt
 - 1 table/qt berberine sulfate (huang lian su)

Influenza Dx

- Fever
- Myalgia
- Appetite affected
- Weakness, reduced feeling of well-being
- Yellow mucus
- Tongue is affected
- “excess, deeper”

- “Wind-Heat” is excess condition
- Tongue
 - Body is red
 - Coating is thick, yellow
- Pulse
 - Fast
 - forceful

Treatment Plan-flu

- Fever-managing herbs (diaphoretics, anti-pyretic, drain heat; i.e. salicin-containing herbs—meadowsweet, poplar, willow)
- Antivirals (based on patient energetics, dx)
- Antibacterials (garlic, berberine, thyme herb tea, oregano oil)
- Symptomatic relief (more later)

Suggested Herbal Protocol

Flu (standard practice)

- Antiviral herbs
 - Andrographis, elder berry, Thuja
- Diaphoretics
 - Elder flower, yarrow tops, linden, ginger, cayenne, peppermint, ma huang (best as hot teas)
- Antipyretics
 - Salicin-containing herbs (willow bark extract, meadowsweet)
- Anodynes
 - Corydalis, Calif. Poppy

- Expectorants
 - Yerba santa, licorice, thyme tea
- Antitussives
 - Loquat leaf, ivy tips
- Digestive aids
 - Gentian root, artichoke leaf
- Prevention, immunomodulators
 - Medicinal mushrooms

Further Flu Herbs

Cooling antivirals

- Blue vervain or wild vervain (*V. lasiostachys*)
- Isatis
- Baptisia
- Sophora



Treatment plan, bronchitis, pneumonia

- Cold, bitter heat-clearing herbs (berberine)
- Antiviral + antibiotic herbs (elder, thyme, berberine)
- Host immunity (tonics, fungi, astragalus)
- Excess conditions—tonify?
 - Is deficiency present? How much?

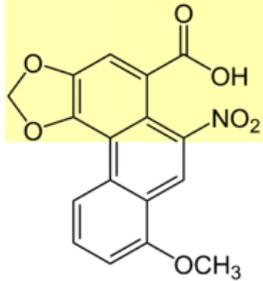
Sidebar—*Asarum*, *Aristolochia*

- Chinese herb, *Asarum* (xi xin)
- Wild ginger, “Snakeroot”
- Grows around the world, used in several cultures
- Ancient—enhances resistance to toxins, pathogens
- Aristolochic acid, potent immune stimulant
- Chinese medicine—brief use only, small dose for acute phase of an infection only (releases exterior, disperses cold; stops pain; warms the lungs)
 - 4-6 grams/day as an infusion with other herbs

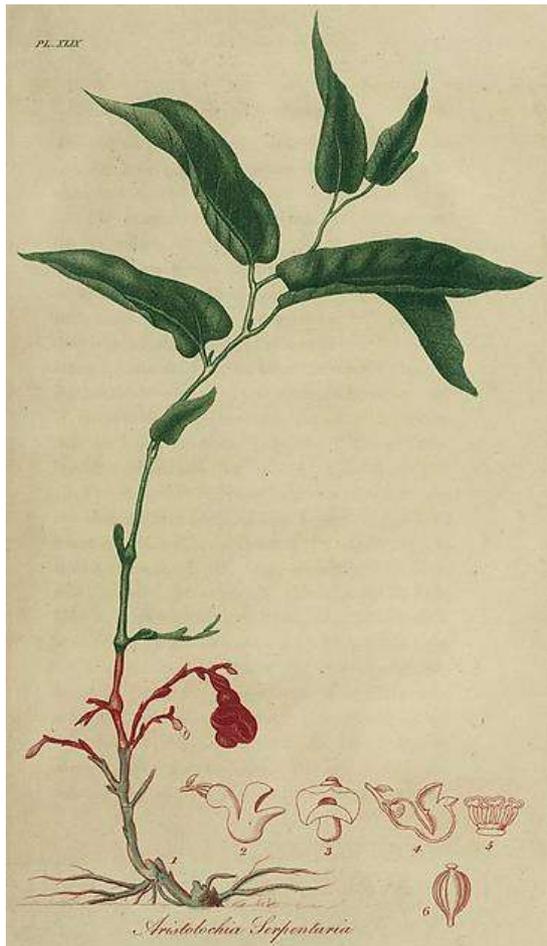


Asarum canadense





Aristolochic Acid



- Aristolochic acid (AA) is toxic in larger amounts (nephrotoxic and mutagenic); low dose as a tea, and for <5 days; AA is not very water soluble, so low amounts in tea
- Much smaller amounts in *Asarum* than *Aristolochia* (snake root)
- AA is nephrotoxic in larger amounts, resulting in some clusters of morbidity in about 2001
- One of the most potent immune stimulants

Salicylates

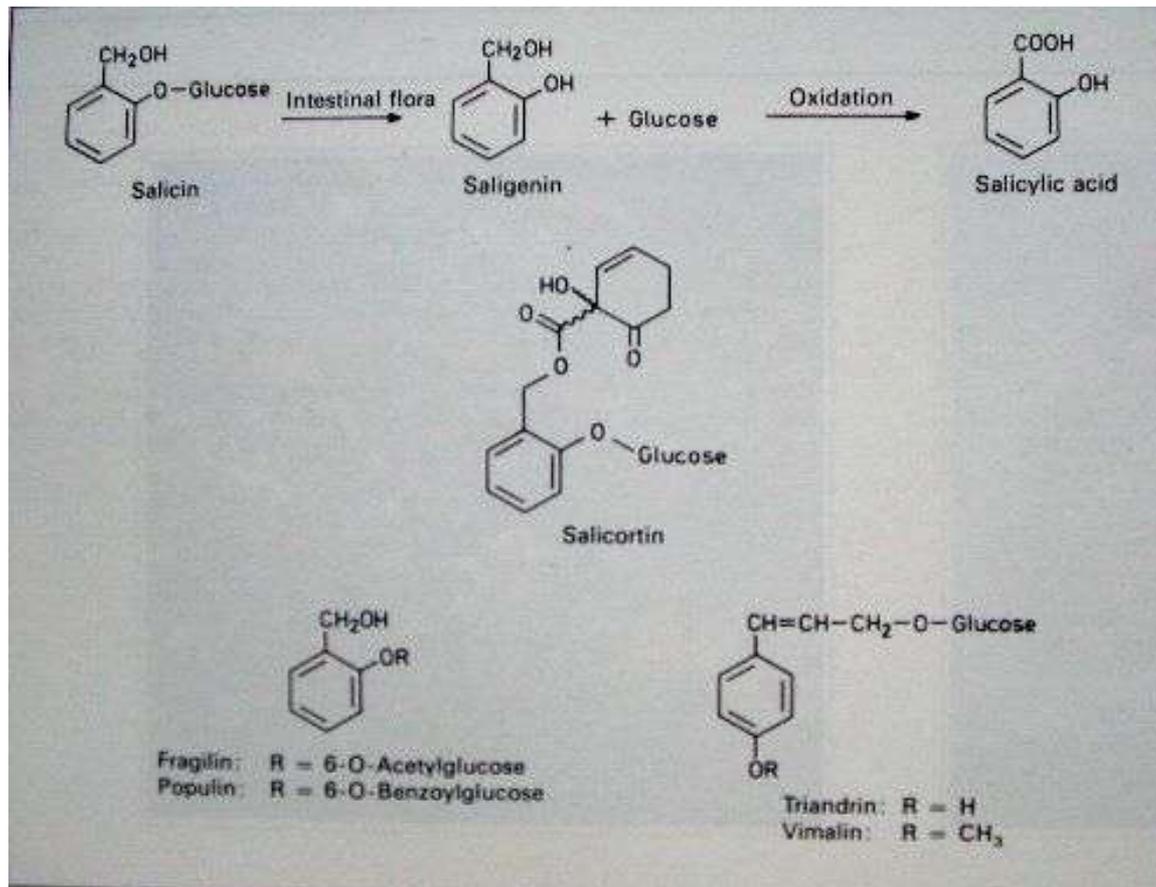
- Use described by Dioscorides, 56 A.D.
 - Salicin is a glycoside that does not cross the blood-brain barrier as well as acetylsalicylic acid
 - Side effects probably nil
- Found in *Betula* spp. (leaves, bark, buds)
 - *Filipendula ulmaria*
 - *Gaultheria procumbens*
 - *Populus* spp.
 - *Salix* spp.
 - *Actaea racemosa*

Willow Bark



- Effective dose of salicin in trials typically 60 to 120 mg
- Standardized extract (15 to 60%, spiked)
- Plasma half-life, 2.5 hours
- Slowly absorbed, doesn't cause gut erosion
- More for chronic pain, myalgia and inflammation, not fast-acting
- Lowers fevers, slow-acting

Salicin metabolism in humans



Willow bark extract for pain



- 39 volunteers with osteoarthritis took extract with 240 mg salicin, 39 a placebo for 2 weeks
- The willow bark showed moderate superiority over placebo for pain (2% increase in WOMAC pain score vs. 14% reduction in Salix group)
- Several trials showing efficacy for low back pain

Chrubasik *et al.*, 2001

Respiratory Wellness



玉竹

Solomon's seal

- Deep belly “Qi” breathing
- Clean air to breathe
- Singing for breath support and building lung Qi
- Flush sinuses (syringe)
- Respiratory tonic herbs
 - Codonopsis
 - American ginseng
 - Mullein
 - Solomon's seal root

Immune Tonics

First, “Restoring the normal”

Host immunity

- Tonify
 - Medicinal mushrooms (esp. reishi)
 - Qi tonics (astragalus, etc.)
 - Echinacea, etc.?
- Stimulate?
 - Echinacea, wild ginger (aristolochic acid)
 - Others, cedar, elecampane, marshmallow rt., garlic, elder, etc. (See Wagner, 1995)

Spleen Qi Tonics

“Restoring the Normal”

- Huang qi (*Astragalus membranaceus*)
- Da zao (*Ziziphus jujube*)
- Dang shen (*Codonopsis pilosula*) –promotes functions of the spleen and lung systems
- Ren shen (*Panax ginseng*; untreated) –promotes energy, tonifies the primal qi of the 5 internal organs (B & G)

- Importance of host immunity
- The Spleen system is a functional (not anatomical) system
 - Includes digestion, assimilation
 - Converts nutrition to “raw” Qi
 - Also the “deep” aspects of the immune respons (bone marrow, immune stem cells, etc.)
 - Spleen tonics used for many centuries to restore strength and vitality, including immunity

Astragalus, ligustrum

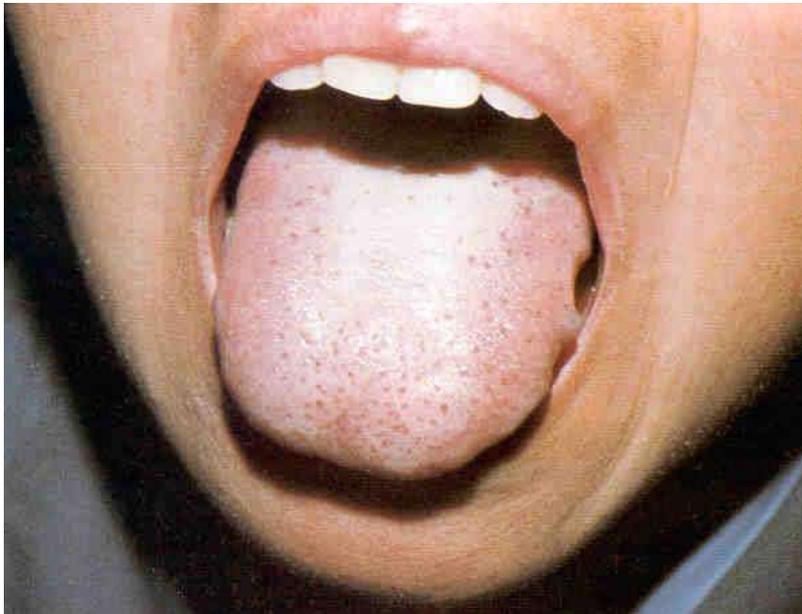
Astragalus membranaceus, Ligustrum lucidum



- Included in Wei Qi tonics in China
- Studied at the Texas medical center in Huston for over 10 years
- “Significantly enhances human immune function”
- Longer survival rate in China when used with chemo and radiation



Spleen Qi Deficiency

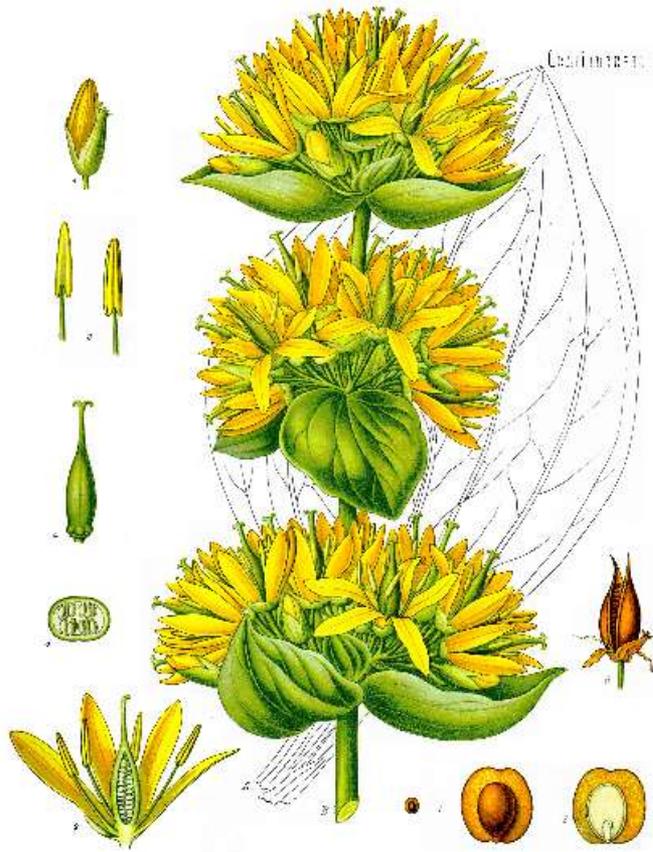


• Normal tongue

- Reduced production of digestive enzymes and poor motility
- Tongue: puffy, scallops, shaky
- Western herbs:
 - Gentian root
 - *Angelica archangelica*
 - Artichoke leaf
 - Ginger, ginseng combo



Immune Tonics



Gentiana lutea

- Tonics are taken long-term (up to several years)
- Not typically during acute phase of infections, except sparingly when necessary
- Water extracts are best because polysaccharides and proteins are denatured by alcohol
- Dose is 6-12 grams of the herb for tea, or 2-5 grams of powdered extract

Health Benefits of Mushrooms

- Very little fat, no cholesterol
- Valuable mineral content; high trace minerals
- High in vitamins, especially B vitamins
- Pleurotus provides a better supply of B vitamins than any common food, except meat
- Great slimming food
- Cholesterol regulation! Shiitake, Pleurotus
- Very high in fiber—cellulose, lignan, chitin

Most Clinically-Relevant Medicinal Mushrooms

- *Lentinus edodes* Shiitake
- *Trametes versicolor* Turkey tails
- *Ganoderma lucidum* Reishi
- *Grifola frondosa* Maitake
- *Wolfiporia cocos* Hoelen, Fuling
- *Pleurotus* spp. Oyster mushroom
- *Cordyceps sinensis* dong chong xia cao

- **Other interesting species:** *Agaricus blazei*, *Tremella fuciformis*, *Inonotus obliquus*, *Heiricium*

Beta-glucans

- Large molecular weight heteropolysaccharides, a component of the cell walls
- Specific receptors exist in the gut
- Activates immune response
- RDBPC study (n=162; 16 weeks; 25 % reduction in symptoms in glucan group (Auinger *et al.*, 2013))

Mushrooms as medicine

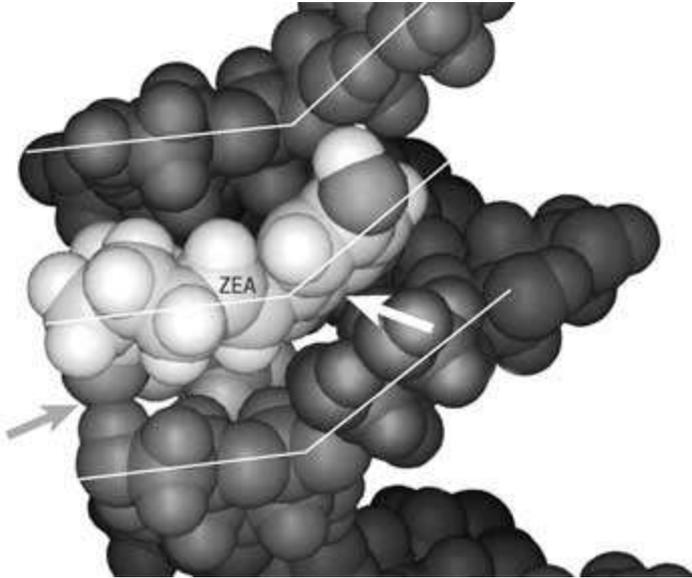
- Medicine—
approved drugs in
Japan, China for
cancer treatment
adjuvants (with
chemo)
- Health
supplements to
support immunity



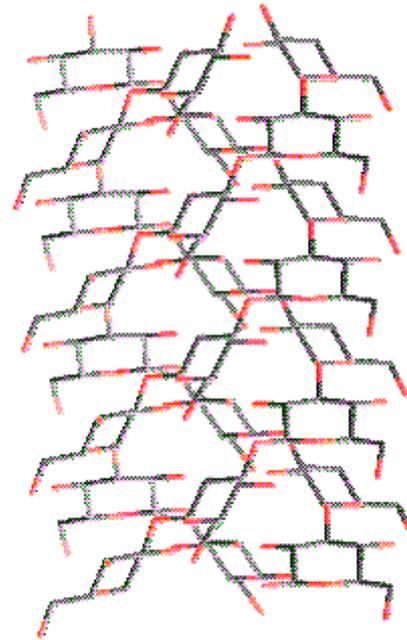
Biological Activity of Fungi

- All fungi and yeasts have triple helix polysaccharides (beta-glucans) in cell walls
- Heat breaks down chitin, exposes active molecules
- Binding of large molecular weight fungal compounds to gut receptors (60% of total)
 - complex immune activation
 - Dectin, toll-like receptors, other receptors

Triple Helix of beta (1->3) glucan

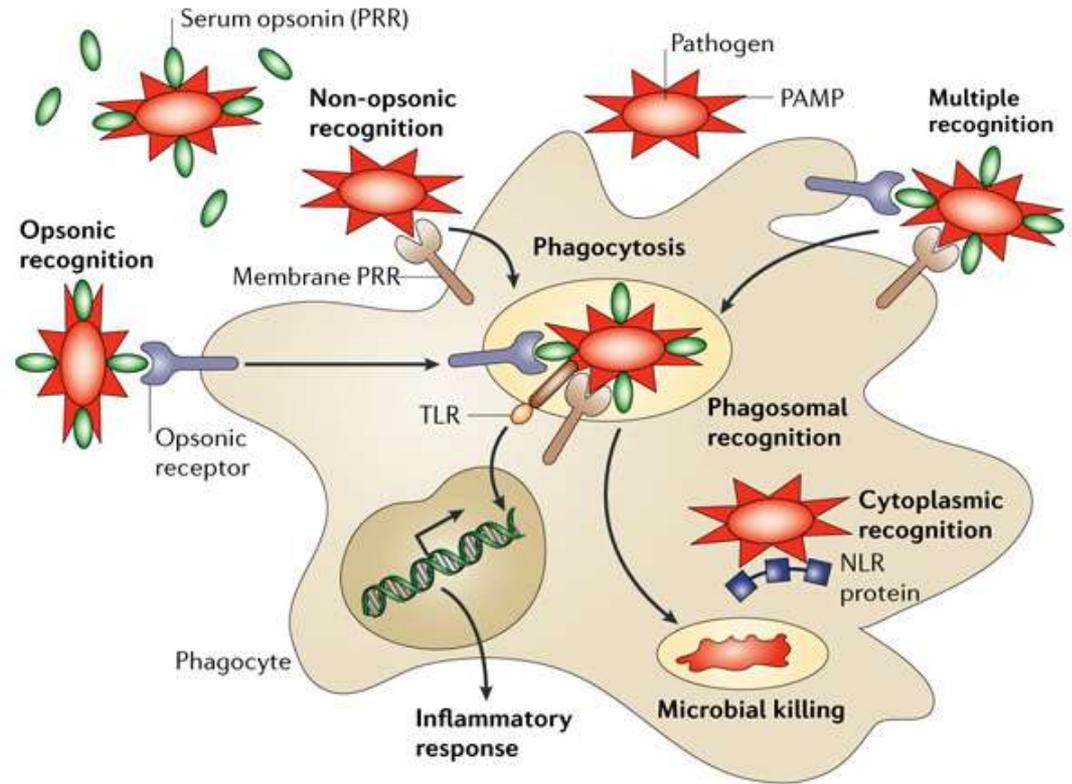
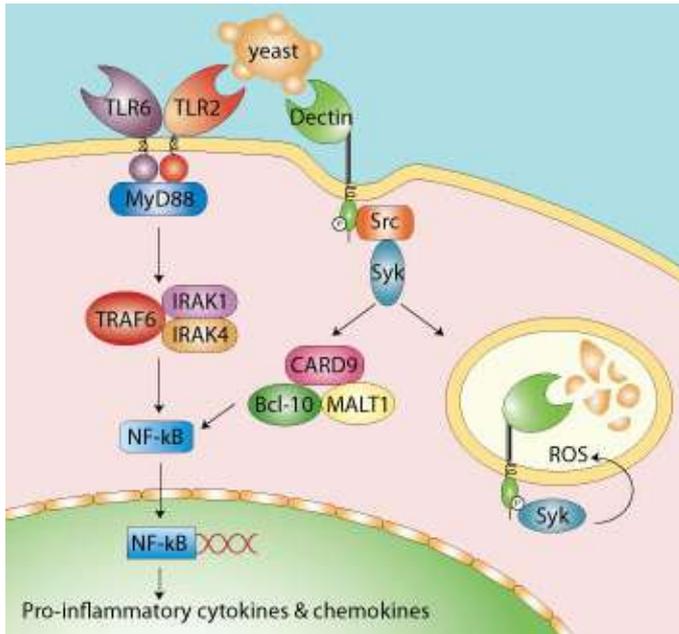


β -(13)-D-glucan geometry



- Triple helix conformation might give flexibility to cell wall
- Intact tertiary structure can confer increased immunomodulation
 - Alcohol, excessive heating could disrupt tertiary structures

Beta-glucans → Dectin Receptor



Some Possible Indications

- Shiitake for immune weakness, infections
- Shiitake, Turkey Tails for Cancer
- Viral Syndromes: Hepatitis C, herpes, HIV
- Cordyceps for fatigue, performance, “adaptogen,” antiaging supplement
- Reishi for insomnia, anxiety, nervous system disorders related to stress
- Reishi for respiratory problems

Conclusion

- More controlled human clinical trials needed
- Counteract immune suppression
- Preliminary published research, as well as clinical reports show effectiveness for hepatitis C and other viral syndromes
- More high-quality studies are needed to confirm species, dose and dosage, scope of activity, and safety
- Shiitake useful for preventing bacterial, viral infections
- Products—Many products are made from dried mycelium and cooked rice (or other grain residues)-up to 60% starch
- From fruiting bodies only—about 30-55% fungal glucans, 5-10% starch

Boils

- *Coptis chinensis* (antibacterial, antiinflammatory)
- “clear blood heat toxins”
 - Elder flower, gardenia, forsythia fruit, cleavers, dandelion
- Liver “cleansing” [Natural Therapy for Your Liver]
 - Burdock root, dandelion root, yellow dock root
- Juicing
 - Green juices (kale, cabbage); apple, carrot
- Cleansing diet
 - Liver flush (lemon, grapefruit, ginger, garlic) in the morning,
 - Cleansing tea (burdock, flax, fennel seed, fenugreek, licorice)
- Probiotic regime (100 to 200 billion organisms/day)

Infected Wounds

- Study: keep wound moist, faster healing
- Externally
 - Calendula cream or salve
 - Propolis
 - Diluted thyme, oregano oils (also in creams, salve)
 - Allantoin (comfrey, aloe, large-leaved plantain)
 - Comfrey leaf cream or salve
- Internally
 - Immune support (medicinal mushrooms)
 - Astragalus
 - Shiitake

UTI, Cystitis

- More common in women than men because of length and situation of opening of urethra; 50% of women will experience sometime in life
- 4 out of 5 women will have recurrence within 12-18 months
- Second most-common infections in U.S. besides upper respiratory tract infections
- 5-8 million physician visits/year in the U.S.

Symptoms of Cystitis

- An intense urge to urinate
- An increased frequency of urination, even if only a few drops of urine are passed
- Burning or stinging during urination
- Cloudy or malodorous urine, or urine tinged with blood
- Pain in the pubic area
- Nitrite dipstick tests are available from pharmacies

See your care provider if symptoms are severe or persist; silent kidney infection can be dangerous

Urinary Tract Infections

- Main herbs
 - Uva ursi (diuretic, antimicrobial, arbutin)
 - Pipsissewa (diuretic, demulcent)
 - Cleavers (antimicrobial, antiinflammatory)
 - Dandelion leaf (“aquaretic”)
 - Cranberry extract (antiattachment, deodorizing; unsweetened cranberry concentrate)
 - D-mannose
 - Vitamin C
 - Goldenrod tops
 - Juniper berry, corn silk, horsetail herb

Dysuria



- All conditions associated with painful or difficult urination

- Pipsissewa (*Chimaphila umbellata*)
- Cleavers (*Galium aparine*)
- Parsley leaf, root (*Petroselinum crispum*)
- Juniper berry (*Juniperus* spp.)
- Mallow leaf (*Malva* spp.)
- Marshmallow root (*Althea officinalis*)
- Plantain leaf (*Plantago major*, *P. lanceolata*)

Irritable bladder

- Frequent urination
 - Nocturia
- More common in women

- Do differential diagnosis; usually KI xu, sometimes liver hyperactivity syndr.
- Chinese dogwood fruit

- Plantain leaf
- Chinese dogwood fruit
 - Marshmallow rt.
 - Wild yam
 - KI tonics:
 - Rehmannia
 - American ginseng
 - Burdock root
 - Nettle leaf and seed

Cystitis (Bladder Infection)

- More common in women
- *E. coli* most associated
- Hygiene important
- Predisposing factors:
 - Damp heat lower jiao (internal heat and damp pathogens)
 - Sugar, stress
 - Weak immune status
 - Poor hygiene
 - Disordered bowel flora
 - Processed foods, caffeine

Treatment Strategy

- Soothing, demulcents
 - Plantain leaf, marshmallow root, slippery elm bark
- Aquaretics
 - Uva-ursi, dandelion leaf, juniper berry, green tea, asparagus root
- Antiseptics
 - Pipsissewa, uva-ursi, cranberry, garlic tincture, usnea, berberine-containing herbs
- Bladder tonics
 - Saw palmetto, nettle root

Common Symptoms of Liver Imbalance

- Frequent headaches not related to tension and stress in the neck and shoulders (from poor posture when sitting and studying, or from eyestrain)
- Jaundice
- Ongoing menstrual problems
- Weak tendons, ligaments, and muscles
- Acne, psoriasis, and other skin problems
- Tenderness or pain in the liver area
- Emotional excess, especially anger and depression; moodiness; irritability for no apparent reason

Hepatitis



Eclipta prostrata

- Antioxidants
 - Milk thistle, vitamins E, C, carotenoids, grape seed extract
- Hepatoprotectives
 - Milk thistle, schisandra, artichoke, ginger, turmeric, eclipta
- Antiinflammatories
 - Berberine-containing herbs, turmeric
- Antivirals
 - Shiitake, andrographis
- Immune-modulators
 - Shiitake, turkey tails, astragalus

Hepatitis—most credible herbs

- Milk Thistle
- Phyllanthus (13 clinical trials for hepatitis, but the most recent are Narendranathan *et al.*, 1999; Chan *et al.*, 2003; no significant benefits for chronic hepatitis B)
- Other herbs
 - Artichoke leaf
 - Ginger
 - Turmeric
 - Schisandra
 - Shiitake, turkey tails



Materia Medica

Selected Liver Herbs: MILK THISTLE



- *Silybum marianum*
- The seed shells only contain a flavanolignan complex that promotes liver cell regeneration and protects cell wall
- Antitoxin, antioxidant effects
- Use 240 to 1000 mg/day for hepatitis, to protect the liver from damage from pharmaceutical drugs, alcohol, environmental toxins



Silybum marianum

- complex of MT is a constituent from the seeds of the plant and is composed of three isomer flavanolignans (silybin, silydianin, and silychristin) collectively known as silymarin
- The ancient herbalist Dioscorides wrote about milk thistle for liver complaints about 2,000 years ago (Dioscorides et al., 1959)
- Reduced the death rate to lethal *Amanita phalloides* mushroom poisoning to zero
- Flavanolignans shown to stabilize and protect hepatocyte membranes, and stimulate RNA synthesis

Milk Thistle Clinical Trials

- Milk Thistle (>1 gm/day standardized extract)
 - Many older studies (to 1970s are of poor quality)
 - Newer studies are equivocal
 - Dose is often not high enough in trials because of very poor absorption of silymarin
 - Some evidence and continued use, coupled with high safety and antioxidant, antiinflammatory and anticancer effects
 - (Mandegary et al., 2013) found that silymarin (140 mg, t.i.d. for 1 month) reduced liver enzymes in patients exposed occupationally to hydrogen sulfide gas leading to oxidative liver stress significantly

Milk Thistle, meta-analysis

- Recent meta-analysis (Yang et al., 2014) of 5 RCTs that included 389 patients was equivocal, reporting moderate reductions in HCV RNA levels vs. placebo, but not statistically significant. *Of the 5 studies, the two that included over 1,000 mg/day had the best results, and heterogeneity was seen on some measures among all studies*
- Silymarin-loaded nanoparticles appear to be one method to achieve increased blood levels and hepatoprotective effects (Yang et al., 2013)

Materia Medica

Selected Liver Herbs: ARTICHOKE



- *Cynara scolymus*
- Contains phenolic acids (caffeic acid derivatives) that stimulate bile flow
- Liver protective effect noted, study not controlled (Sannia, 2010)
- Reduces blood cholesterol
- Dose: extract standardized to 13% to 18% caffeoylquinic acids calculated as chlorogenic acid, 160mg to 320 mg three times daily with meals



Materia Medica

Selected Liver Herbs: GENTIAN



- *Gentiana lutea* often used, but others species as well
- The root contains bitter substances called iridoid glycosides (gentiopicroside)
- Traditionally used to stimulate appetite, promote strong digestion, speed convalescence from chronic illness, allay nausea
- Chinese species, *G. scabra* is used for hepatitis

Materia Medica

Selected Liver Herbs: DANDELION



- Used in western herbal medicine and TCM
- Root used for “cooling and cleansing” the liver
- Root added to formulas for hepatitis, cleansing formulas; in TCM, specific for breast, liver cancer
- Leaves hepatoprotective *in vivo* (Hfaiedh, 2014)
- Dose: 4-8 ml/day tincture; 6-12 grams in decoction

Materia Medica

Selected Liver Herbs: BURDOCK



- *Arctium lappa*
- Root contains caffeic acid derivatives, lignans that are bile-stimulating, antitumor
- Hepatoprotective *in vitro* (Predes *et al.*, 2014)
- Uses: menstrual irregularities, mood swings, red, itchy eyes, skin problems like acne related to liver excess
- Dose: 6-9 grams dried root in decoctions; 6-12 ml tincture/day

Materia Medica

Selected Liver Herbs: OREGON GRAPE



- *Mahonia aquifolium, M. repens*
- Native to western U.S.
- Roots contain berberine
- Hepatoprotective *in vivo* (Chao *et al.*, 2013)
- Uses: specific for psoriasis, acne, other skin ailments related to liver and intestinal heat
- Dose: 2-3 ml, 2-3 x daily; 4-6 grams/day decoction

Materia Medica

Selected Liver Herbs: SCHISANDRA



- *Schisandra chinensis* fruit from China
- Vine related to magnolias
- Calms the spirit; useful for insomnia, nervousness related to liver excess conditions
- Relaxes liver function, hepatoprotective; allergic skin disorders; hepatitis, lowers liver enzymes
- Dose: 6-9 grams, decoction

Lyme—herbs, supplements

- Allicin
- Dragon's blood
- Cat's claw
- Devil's claw
- Echinacea
- Citriodiol
- Astragalus
- Nettle
- Ginkgo biloba
- Curcumin
- Oregano tea
- Artemisinin

- Boswellia
- Parsley extract
- Red chili pepper (capsaicin)
- Quercetin
- Quassia bark

- Omega-3 Fatty Acids
- Coenzyme-Q10
- SAM
- α -Lipoic acid
- Hydrolytic enzymes
- Mushroom extracts and Beta-glucan

Vogdani *et al.*, 2009. *Evid Based Complement Alternat Med.* 2009 Sep; 6(3): 283–295.

Lyme formula-Example

Brian Weissbuch's KW formula

- *Gentiana lutea radix* Gentian Root
Long Dan Cao CHDW
- *Anemone pulsatilla planta*
Pulsatilla Bai Tou Weng CHCT
- *Gardenia jasminoides fructus*
Gardenia Zhi Zi CHPF
- *Smilax Glabra radix* Sarsaparilla
Tu Fu Ling CHCT
- *Aristolochia serpentaria radix*
Birthwort Ma Dou Gen RCA,
CHCB
- *Usnea barbata thallus* Old Mans
Beard PWPW, CHCT

- *Althaea Officinalis radix* Marsh
Mallow TYin
- *Glycyrrhiza glabra radix* Licorice
Root Gan Cao TQ
- *Bupleurum falcatum radix* Hares
Ear Chai Hu SCRS
- *Raeonia alba* Paeony Root Chi Shao
Yao TB
- Symptoms frequently disappear rapidly during first week of treatment with Lyme Formula. Nonetheless, it is essential to continue with this formula for a minimum of 8 weeks to avoid recurrence of the symptoms of infection.

Herpes



- Lemon balm herb
- Lysine
- Vitamin C
- Zinc
- Vitamin E
- Adenosine monophosphate,

Lemon Balm Cream

- Penetration of herpes viruses into cells was inhibited by Melissa extract at 80% and 96% for drug-sensitive and drug-resistant viruses, respectively. Melissa extract exhibits low toxicity and affects attachment and penetration of acyclovir-sensitive and acyclovir-resistant HSVs in vitro (Astani *et al.*, 2014. [Phytother Res.](#) 2014 Oct;28(10):1547-52)
- 10 other *in vitro*, *in vivo* studies show inhibition of replication,

Herbs related to *Melissa*

- Related herbs in the Lamiaceae with rosmarinic acid and associated phenolics with Herpes simplex type 1 and type 2 inhibitory effects in vitro (Nolkemper et al., 2006. *Planta Medica* 72:1378)
- Peppermint (*Mentha x piperita*)
- Prunella (*Prunella vulgaris*)
- Rosemary (*Rosmarinus officinalis*)
- Sage (*Salvia officinalis*)
- Thyme (*Thymus vulgaris*)

General References Consulted

Regarding Indications, Safety, Dosage

- Journal literature (see accompanying reference lists)
- Botanical Safety Handbook (Gardner and McGuffin 2013)
- The Essential Guide to Herbal Safety (Mills and Bone 2005)
- Clinical Guide (ABC) (Blumenthal 2003)
- German Commission E monographs (Blumenthal, Gruenwald et al. 1998)
- Herbal Medicine (Weiss, Fintelmann et al. 2000)
- Herbal Drugs and Phytopharmaceuticals (Wichtl 2004)
- Chinese Herbal Medicine: Materia Medica (Bensky, Clavey et al. 2004)
- Hager's Handbook for Pharmaceutical Practice (Hager 1999)
- Lehrbuch der Biologischen Heilmittel (Madaus 1979)
- King's American Dispensatory (Felter and Lloyd 1898)
- Merck's Index (Merck and Co 1907)

Thanks for watching!