Preventing and Treating Infections
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• 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)
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
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
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

- 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

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

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

- 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

Anand et al., 2007
Pharmacokinetics of Gingko

- Ginkgolide A, Ginkgolide B and Bilobalide
- 12 healthy volunteers
- Oral, 60 mg standardized
- Taking with meals increases Tmax, 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
- Heart
- Liver
- Kidney

Right hand
- Lung
- Spleen
- Kidney
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
• 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 bpm
- 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

<table>
<thead>
<tr>
<th>Kind of Pulse</th>
<th>Name of Pulse</th>
<th>Similar Pulses</th>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial pulse type</td>
<td>Superficial</td>
<td>To be felt only by light touch, but grows faint on heavy pressure</td>
<td>Exterior and deficiency syndromes</td>
</tr>
<tr>
<td></td>
<td>Bounding</td>
<td>Surging like roaring waves which come vigorously and fade away</td>
<td>Preponderance of pathogenic heat</td>
</tr>
<tr>
<td></td>
<td>Soft</td>
<td>Superficial, thready, and soft</td>
<td>Deficiency, dampness</td>
</tr>
<tr>
<td></td>
<td>Scattered</td>
<td>Indistinct, scattered without root</td>
<td>Collapse of <em>zang-fu qi</em>, scattered primordial <em>qi</em></td>
</tr>
<tr>
<td></td>
<td>Hollow</td>
<td>Superficial, large, and hollow like pressing the tubal leaf of a spring onion</td>
<td>Loss of blood, injury of <em>yin</em></td>
</tr>
<tr>
<td></td>
<td>Tympanic</td>
<td>Extremely taut, almost rapid and without substance in its center, like pressing the surface of a drum</td>
<td>Depletion of blood, loss of essence, abortion, metrorrhagia</td>
</tr>
<tr>
<td>Deep pulse type</td>
<td>Deep</td>
<td>Hardly felt by light touch, but distinct under heavy pressure</td>
<td>Interior syndrome</td>
</tr>
<tr>
<td></td>
<td>Hidden</td>
<td>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</td>
<td>Stagnation of pathogenic factors in the interior, syncope, severe pain</td>
</tr>
<tr>
<td>Kind of Pulse</td>
<td>Name of Pulse</td>
<td>Pulse Condition</td>
<td>Indications</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------</td>
<td>-----------------------------------------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Deep pulse type</td>
<td>Firm</td>
<td>Forceful, taut and long, felt only by pressing hard</td>
<td>Yin-cold, interior-excess, hernia, mass in the abdomen</td>
</tr>
<tr>
<td></td>
<td>Weak</td>
<td>Extremely soft, deep, and thready</td>
<td>Deficiency of qi and blood</td>
</tr>
<tr>
<td>Slow pulse type</td>
<td>Slow</td>
<td>Only three beats per respiration</td>
<td>Cold syndrome</td>
</tr>
<tr>
<td></td>
<td>Retarded</td>
<td>Four beats per respiration coming slightly faster than a slow pulse</td>
<td>Dampness syndrome, weakness of the spleen and stomach</td>
</tr>
<tr>
<td></td>
<td>Unsmooth</td>
<td>Slow, thready, and short with an uneven flow</td>
<td>Stagnation of qi, blood stasis, deficiency of blood, injury of the essence</td>
</tr>
<tr>
<td></td>
<td>Knotted</td>
<td>Retarded, lose of beats at irregular intervals</td>
<td>Excess of yin, stagnation of qi</td>
</tr>
<tr>
<td>Rapid pulse type</td>
<td>Rapid</td>
<td>More than five beats per respiration</td>
<td>Heat syndrome</td>
</tr>
<tr>
<td></td>
<td>Running</td>
<td>Hasty and rapid with irregular intervals</td>
<td>Excessive heat, stagnation of qi and blood</td>
</tr>
<tr>
<td></td>
<td>Swift</td>
<td>Hasty and swift, seven or eight beats per respiration</td>
<td>Hyperactivity of yang due to exhaustion of yin</td>
</tr>
<tr>
<td></td>
<td>Tremulous</td>
<td>Rolling, rapid, and strong like a bean</td>
<td>Fright, pain</td>
</tr>
<tr>
<td>Feeble pulse type</td>
<td>Feeble</td>
<td>Forceless and empty in the three regions</td>
<td>Deficiency syndrome, usually deficiency of qi and blood</td>
</tr>
<tr>
<td>Kind of Pulse</td>
<td>Name of Pulse</td>
<td>Pulse Condition</td>
<td>Indications</td>
</tr>
<tr>
<td>--------------</td>
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</tr>
<tr>
<td>Feeble pulse type</td>
<td>Thready</td>
<td>Thready like a fine thread, but very distinct and clear</td>
<td>Exhaustion of qi and blood deficiency and dampness syndromes</td>
</tr>
<tr>
<td>Faint</td>
<td>Extremely thin, soft, and barely palpable by pressure</td>
<td></td>
<td>Deficiency syndrome, collapse of yang</td>
</tr>
<tr>
<td>Intermittent</td>
<td>Loss of beat and pausing a little longer at a regular intervals</td>
<td></td>
<td>Exhaustion of zang qi, traumatic injury</td>
</tr>
<tr>
<td>Short</td>
<td>Short extent</td>
<td></td>
<td>Forceful, referring to stagnation of qi, weakness, due to injury of qi</td>
</tr>
<tr>
<td>Forceful pulse type</td>
<td>Forceful</td>
<td>Vigorous and forceful in the three regions</td>
<td>Excess syndrome</td>
</tr>
<tr>
<td>Smooth</td>
<td>Round and smooth like a bead rolling on a plate</td>
<td></td>
<td>Phlegm-retention, retention of food, and excess heat syndrome</td>
</tr>
<tr>
<td>Tense</td>
<td>Tight and forceful, like a tightly stretched and twisted rope</td>
<td></td>
<td>Cold, pain, retention of food</td>
</tr>
<tr>
<td>Long</td>
<td>Large extent, like a tightly stretched string</td>
<td></td>
<td>Excess of yang qi, heat syndrome</td>
</tr>
<tr>
<td>Taut</td>
<td>Taut and long, like the string of a musical instrument</td>
<td></td>
<td>Diseases of the liver and gallbladder, all kinds of pain, phlegm-retention, malaria</td>
</tr>
<tr>
<td></td>
<td>Superficial</td>
<td>Middle</td>
<td>Deep</td>
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<tr>
<td><strong>Floating</strong></td>
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<td><strong>Flooding</strong></td>
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<td><strong>Empty</strong></td>
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<td><strong>Scattered</strong></td>
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### Pulse Waves 2

<table>
<thead>
<tr>
<th>Hollow</th>
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<th>Middle</th>
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<table>
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### Pulse Waves 3

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<tr>
<td>Sinking</td>
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### Pulse Waves

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# Pulse Waves

## Slow

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## Choppy

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<tr>
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<td>+</td>
<td>+</td>
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</table>

## Knotted

<table>
<thead>
<tr>
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<th>Middle</th>
<th>Deep</th>
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<tbody>
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</table>
## Pulse Waves

<table>
<thead>
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<th>Inter mittent</th>
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<th>Middle</th>
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### Pulse Waves

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### Pulse Waves

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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 Diagnosis:
Look for First

Well-rooted coating means good Qi

Look for:
- Coating
- Texture (rooted coating)
- Size (not swoolen or withered)
- Straight
- Cracks minimal
- Color not too red or pale
- Not purple or blue

Tongue has good Shen, when:

- Good Color
- Good Coat
- Not Swoolen
- No Horizontal Cracks
- Good firmness, not too hard
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
- Pale color means coldness or Blood deficiency
- Purple color overall means Blood stagnation
Tongue Coatings

Thick greasy coat means Food Stagnation or Phlegm

Liver
Liver

Absence of coating means Yin Deficiency of Organ

Lungs
Tongue Color - Tip

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

(Red, and/or spotted red)

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

Signs of hepatitis, cirrhosis
Symptoms and conditions associated with tongue types

**Which Tongue Are You?**

**NORMAL**
- Thin white coating
- Teeth marks
- Pale tongue with a few red spots

**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**
- Bloating, 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...

**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
  – atracylodes
Kidney Yin Deficiency

- 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

Red, peeled tongue
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

• 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

Season, summer

• 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

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

Spleen is not the physical organ, rather a “functional” organ associated with digestion and immunity
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
  - Napthaquinones (juglone)
    - Effective against Clostridium (Cetin-Karaca, 2007)
Four Major Chemical Pathways

**Fatty Acids**
- MeJA cis-jasmone
  - GLVs e.g. hexenal
- JA
  - OPDA
  - AOC
  - AOS
- HPL
  - Lipase (DAD)
  - Lipoxygenase (LOX)
  - Fatty acids

**Terpenes**
- Sesquiterpenes
- Diterpenes
- Monoterpenes
  - IPP
  - Mevalonate pathway
  - Non-mevalonate pathway
  - Pyruvate
  - Acetyl CoA

**Phenyl Propanoids**
- Cinnamic acid
- Phenolic acids
- Quinones
- Coumarins
- Flavonoids
- Anthocyanins
- Tannins
- Lignin

**Alkaloids**
- MeSA
  - SAMT
  - SA
  - Benzenoids
  - Erythrose phosphate
  - Shikimate pathway
  - PAL
  - Indole
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

**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 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. (ephrine): stimulant
# Common Alkaloids

<table>
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<tr>
<td>emetic</td>
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<td>local anesthetic</td>
<td>cocaine</td>
<td>coca</td>
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<tr>
<td>antihemorrhagic</td>
<td>hydрастine</td>
<td>hydrastis</td>
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<tr>
<td>antispasmodic</td>
<td>hyoscyamine, atropine</td>
<td>belladonna</td>
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<tr>
<td>narcotic</td>
<td>morphine</td>
<td>opium poppy</td>
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<tr>
<td>vermifuge</td>
<td>pelletierine</td>
<td>pomegranate</td>
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<td>aphrodisiac</td>
<td>yohimbine</td>
<td><em>Pausinystalia yohimba</em></td>
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<td>tranquilizer</td>
<td>reserpine</td>
<td><em>Rauwolfia serpentina</em></td>
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<td>cardiac depressant</td>
<td>quinine</td>
<td><em>Cinchona</em> spp.</td>
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<tr>
<td>diaphoretic</td>
<td>pilocarpine</td>
<td><em>Pilocarpus pennatifolius</em></td>
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<td>muscle paralysant</td>
<td>tubocurarine</td>
<td><em>Chondodendron</em> spp.</td>
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<tr>
<td>nervous stimulant</td>
<td>strychnine</td>
<td><em>Strychnos nux-vomica</em></td>
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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

*Hydrastis canadensis*  goldenseal

*Coptis chinensis*  huang lian

*Mahonía aquifolía*  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*
• 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
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
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 southeast Asia, China, India
- One of the best-studied antiviral herbs for flu
- Antiviral, immuno-modulating, antinflammatory
- 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 events ….were 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, $IC_{50} = 0.13 \mu g/ml$ and $2.8 \mu g/ml$ (Roschek *et al.*, 2009), comparable with currently available antiviral drugs, Oseltamivir (Tamiflu®; 0.32 μM) and Amantadine (27 μM)
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 \textit{ex vivo} (Kinoshita et al., 2012)
- Elderberry flavonoids bind to H1N1 virons and compare favorably \textit{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

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

- 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.

[Mattthys et al, 2003; 2007; 2010]
Pelargonium Safety

- 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

Kolodziej, 2011
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).
• 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
  - Napthaquinones (juglone)
    - Effective against *Clostridium* (Cetin-Karaca, 2007)
Antibacterials—Major Herbs

- 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

- 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

Usnic Acid
Lichen Acids

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

Avoid use of pure usnic acid (potential hepatotoxicity at high doses)
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

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

*Berberis vulgaris*
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)

• 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 canadensis*)

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

Production

- 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 oils also have antimicrobial, sedative, antiinflammatory effects, among others.
Some essential oils are very complex mixtures of >200 individual compounds, any number of which are active against microbes.
Thyme (and Oregano)

- 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

- 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

Aktug et al., 1986
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)
• 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 antifungal 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

Allicin is important for antimicrobial effects

Allicin
Garlic Preparations

- 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

Always crush garlic cloves first!
## Antimicrobial Properties of Allicin

Ankri & Mirelman, 1999

<table>
<thead>
<tr>
<th>Bacterial strain</th>
<th>Allicin concentration (LD&lt;sub&gt;50&lt;/sub&gt; µg/mL)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Escherichia coli</em></td>
<td>15</td>
<td>Sensitive to antibiotics</td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>15</td>
<td>Multidrug resistant (MDR)</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>12</td>
<td>Sensitive</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>12</td>
<td>Methicillin resistant</td>
</tr>
<tr>
<td><em>Streptococcus pyogenes</em></td>
<td>3</td>
<td>Sensitive</td>
</tr>
<tr>
<td><em>Streptococcus β hemolyticus</em></td>
<td>&gt;100</td>
<td>Clinical MDR strain</td>
</tr>
<tr>
<td><em>Proteus mirabilis</em></td>
<td>15</td>
<td>Sensitive</td>
</tr>
<tr>
<td><em>Proteus mirabilis</em></td>
<td>&gt; 30</td>
<td>Clinical MDR strain</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>15</td>
<td>Sensitive to cefprozil</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>&gt;100</td>
<td>MDR mucoid strain</td>
</tr>
<tr>
<td><em>Acinetobacter baumannii</em></td>
<td>15</td>
<td>Clinical isolate</td>
</tr>
<tr>
<td><em>Klebsiella pneumoniae</em></td>
<td>8</td>
<td>Clinical isolate</td>
</tr>
<tr>
<td><em>Enterococcus faecium</em></td>
<td>&gt;100</td>
<td>Clinical MDR strain</td>
</tr>
</tbody>
</table>

LD<sub>50</sub>: 50% lethal dose.
Comparison of garlic to prescription antibiotics

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

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Zone of inhibition (mm)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pen (10 U)</td>
<td>Tet (30 µg)</td>
<td>Amp (10 µg)</td>
<td>Gent (10 µg)</td>
<td>Cip (5 µg)</td>
<td>Chl (30 µg)</td>
<td>Ery (10 µg)</td>
<td>Amoxy (30 µg)</td>
<td>Garlic</td>
<td>Clove</td>
<td></td>
</tr>
<tr>
<td>B. sphaericus</td>
<td>–</td>
<td>15</td>
<td>–</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>–</td>
<td>19.3</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>E. aerogenes</td>
<td>NT</td>
<td>20</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>29</td>
<td>NT</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>E. coli</td>
<td>NT</td>
<td>20</td>
<td>25</td>
<td>23</td>
<td>25</td>
<td>27</td>
<td>NT</td>
<td>–</td>
<td>20.6</td>
<td></td>
</tr>
<tr>
<td>P. aeruginosa</td>
<td>NT</td>
<td>17</td>
<td>–</td>
<td>21.5</td>
<td>27</td>
<td>–</td>
<td>NT</td>
<td>–</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>S. aureus</td>
<td>28</td>
<td>30</td>
<td>29</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>19</td>
<td>–</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>S. epidermidis</td>
<td>–</td>
<td>35</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>20</td>
<td>14</td>
<td>20.3</td>
<td></td>
</tr>
<tr>
<td>Sh. flexneri</td>
<td>NT</td>
<td>29</td>
<td>30</td>
<td>25</td>
<td>–</td>
<td>35</td>
<td>NT</td>
<td>–</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>S. typhi</td>
<td>NT</td>
<td>30</td>
<td>28</td>
<td>20</td>
<td>25</td>
<td>28</td>
<td>NT</td>
<td>13</td>
<td>21.3</td>
<td></td>
</tr>
</tbody>
</table>

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

Garlic for yeast infections (Candida)

Table 3
Sensitivity of yeasts to nystatin and aqueous extracts of garlic and clove

<table>
<thead>
<tr>
<th>Yeast</th>
<th>Zone of inhibition (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nystatin (100 U)</td>
</tr>
<tr>
<td>C. acutus</td>
<td>17</td>
</tr>
<tr>
<td>C. albicans (MTCC 227)</td>
<td>35</td>
</tr>
<tr>
<td>C. albicans (MTCC 183)</td>
<td>30</td>
</tr>
<tr>
<td>C. apicola</td>
<td>25</td>
</tr>
<tr>
<td>C. catenulata</td>
<td>16</td>
</tr>
<tr>
<td>C. inconspicua</td>
<td>16</td>
</tr>
<tr>
<td>C. tropicalis</td>
<td>16</td>
</tr>
<tr>
<td>R. rubra</td>
<td>18</td>
</tr>
<tr>
<td>S. cerevisiae</td>
<td>34</td>
</tr>
<tr>
<td>T. variabilis</td>
<td>23</td>
</tr>
</tbody>
</table>

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

- Antibacterial
- Antihistamine
- Antiinflammatory
- Antinauseant
- Antipyretic
- Antispasmodic
- Antitussive
- Antiviral
- Bronchodilator
- Calmative
- Demulcent
- Diaphoretic
- Expectorant

To help organize Tx plan:
- Immunomodulators
- Mucolytic
- Anodyne (Sore throat)

Mullein
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

- 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
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 be 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

About 1 in 5 people infected will become ill

Symptoms normally last 2–7 days

No treatment or vaccine is available

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

Illness is usually mild and death is rare

Mosquitoes known to transmit the virus are not present in Canada

Health Canada / Centers for Disease Control and Prevention
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
- 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

- **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

- 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)

- 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
- Aristolochic acid is a powerful immune stimulant.
- Chronic, higher dose uses are associated with several deaths, specifically kidney failure.
- *Asarum* spp. contain much less AA than *Aristolochia* spp.
- Aristolochia (snake root) is used to treat toxic bites and contains higher amounts of AA.
- It has been used for at least 2,000 years.
- Essential oil contains asarone.
- Use lower doses in herb mixtures for acute symptoms only.

- Mutagenic, carcinogenic
- Asarone is a powerful immune stimulant.
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 tincture in water or tea, every 2-3 hours
Osha (*Ligusticum grayi, L. porteri*)

- 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)**

- 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
- Expectorating, antimicrobial

“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)
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
Echincea—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, rhinorrhea, having 2 or more symptoms was significantly improved in intervention group

- Rerksuppaphol & Rerksuppaphol, 2013
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.

Prasad et al., 2008
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

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

*Bacillus coagulans*
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

Colonies with marker of probiotic strain in faeces, %

Time, days

Probiotics taken
Probiotics not taken
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, atracylodes, 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 leptta
- 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
Chamomile flower (Matricariae flos tea rinse, tea).

- **Indications:** Acute rhinitis.
- **Contraindications:** Known allergy to plants from the Asteraceae (aster 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 (see p. 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
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

Salicin → Saligenin → Salicylic acid

Fragilin: $R = 6'-O$-Acetylgucose
Populin: $R = 6'-O$-Benzoylgucose
Triandrin: $R = H$
Vimalin: $R = CH_3$
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

- 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 response (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

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

Normal tongue
Immune Tonics

- 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

Gentiana lutea
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

- 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
• 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

- **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

*Eclipta prostrata*
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
• complex of MT is a constituent from the seeds of the plant and is composed of three isomer flavonolignans (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
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% caffeylquinic 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

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
- Glycerhiza 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 dissapear 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 recurrance 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!