The Liver
Materia Medica and Therapeutics

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Milk Thistle  
*Silybum marianum*
Liver Functions

- Metabolizes proteins, fats, and carbohydrates, providing energy and nutrients
- Stores glucose polymers in the form of glycogen
- Helps assimilate and store fat-soluble vitamins (A, E, D, K)
- Filters the blood and helps remove harmful chemicals and bacteria
  - regulates the blood according to traditional Chinese medicine
  - Stores extra blood, released rapidly when needed
- Creates bile, which breaks down fats; precursors for hormones
- Creates serum proteins, which maintain fluid balance and act as carriers
- Helps maintain electrolyte and water balance
- Creates immune substances, such as gamma globulin
- Breaks down and eliminates excess hormones like estrogen
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
# Liver Functions, Syndromes in TCM

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<th>Treatment</th>
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<td>Stagnant liver Qi</td>
<td>Depression, anger, frustration, breast lumps, poor digestion</td>
<td>Congested liver, bile stagnation (cholestasis), mood disorders, breast lumps, dyspepsia</td>
<td>Regulate liver: cyperus, boldo, fringe tree bark, bupleurum, artichoke leaf, press or needle Lv3</td>
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<tr>
<td>Deficient liver yin</td>
<td>Dizziness, dry eyes, irritability, tinnitus, fatigue</td>
<td>Chronic liver disease, bile stagnation, dyspepsia</td>
<td>Liver yin tonics: Ligustrum, rehmannia, lycii berries, tribulus</td>
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<td>Liver fire, liver yang rising</td>
<td>Severe headaches, red, burning eyes, anger, bitter taste</td>
<td>Conjunctivitis, migraines, insomnia, asthma, mania</td>
<td>Cool liver fire: gentian, dandelion, chicory</td>
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<td>Liver blood deficiency</td>
<td>Weak tendons, ligaments, menstrual problems</td>
<td>Amenorrhea, anemia, tendon, ligament injuries</td>
<td>Tonify Spleen, blood: nettles, rehmannia, yellow dock</td>
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TCM-Things to Remember

• Yin = vital substance (enzymes, hormones, etc.)
• Yang = vital function (sympathetic tone)
• Qi = vital energy
• Blood = the blood, plus hormones, oxygen, glucose, etc. All the nourishing properties of the blood
• Essence (jing) = ancestral vitality; derived from the kidneys of the mother – mitochondria
• energy = hot, warm, cold, cool, dry, damp
• Deficient, excess, stagnant, phlegm
• Recommend: Web that has no weaver (Kaptchuck or books by Giovanni Maciocia)
Tongue—Stagnant liver Qi

- Emotional lability
- Irritability, no reason
- Depression, anger
- Breast lumps
- Poor digestion (liver attacking spleen)
- Temple headaches
- PMS (liver rules blood); painful periods
Liver Qi stagnation – tongue
Herbs for Liver Qi stagnation

- chai hu (*Bupleurum falcatum*)
- artichoke leaf (*Cynara scolymus*)
- Boldo (*Peumus boldo*)
- ci ji li (*Tribulus terrestris*)
- xiang yuan, citron (*Citrus medica*)
- xiang fu (*Cyperus rotundus*)
- lu lu tang (*Liquidambar spp.*)
- yu jin (*Curcuma longa*)
Some Causes of liver Qi stagnation

- Stress
- Stimulants (caffeine, sugar, fried foods)
- Constitution
- Infections, especially hepatitis
- Lack of body movement (exercise)
Chai hu (bupleurum) Apiaceae

- bitter, acrid, cool
- Channels entered Gallbladder, Liver, Pericardium, Triple Burner
- Key characteristics
  - treats alternating chills and fever, releases heat in the muscle layer, harmonizes lesser yang stage disorders, raises the clear qi of the Stomach and Gallbladder, relieves Liver qi constraint
- Dosage 3-9g
- Cautions & Contraindications
  - Because this is a rising and dispersing herb, it should not be used when the true yin has been severely damaged, or with hyperactivity of Liver yang

Source: Bensky et al.
Artichoke leaf (*Cynara scolymus*)
Asteraceae

- Leaves only
- Bitter, mild taste
- Cooling
- Regulates liver Qi
- Regulates bile, cholesterol
- Promotes normal appetite

Other uses
- indigestion, nausea
- Dose, 320-1800 mg
Boldo (*Peumus boldo*) Rutaceae

Popular Latin American remedy for liver, urinary problems
- Gallstones, cystitis, hepatitis, constipation, anxiety
- Pleasant aromatic flavor
- Used as a tea primarily
- Antioxidants in herb protect against cisplatin toxicity in the liver
- One report of boldo associated with increases in liver enzymes
  - identity of tea man was using not confirmed

Dose: 0.5-2.5 g daily as a tea
Contra: existing liver disease, warfarin, pregnancy
**Tribulus terrestris** (puncture vine)

- Sold on the herb market
  - sexual performance
  - muscle-building (scanty evidence)
  - Enhance male fertility (limited evidence)

- Smooths liver Qi, calms ascendant liver yang
  - Expels wind
  - brightens eyes
  - stops itching
  - Pain associated with Qi stagnation, especially menstrual pain
  - Soothes red itchy eyes when associated with liver yang rising
  - Dose, 6-15 g (B&G)
Liquidambar fruits (Lu lu tong)

- Lu lu tong = “all roads open”
- Several species
  - *L. formosana* (Asia)
  - *L. orientalis* (s. Mediterranean)
  - *L. styraciflua* (N.A.)
Lu lu tong

- Spiny fruit is used fresh or dried as a tea, possibly tincture
  - Moves the Qi and blood
  - Treats pain, urine increase
  - Unblocks, facilitates movement
  - expels wind
  - Uses
    - Nasal obstruction
    - Myalgia due to wind-damp stagnation (i.e. flu)

- Used in gynecology
  - PMS, esp. liver-related
  - breast distension
  - pain associated with menses (B&B)
  - Dose: 4.5-9 grams/day
Curcuma spp.

- Invigorates the blood, stops pain
- Constrained liver Qi with heat signs
- Unblocks menstruation
- Flank pain associated with menses
- Benefits gall bladder function
- Dose: 3-9 g
Liver yin deficiency

- Early or late menstruation, scanty in volume, dark
- Abdominal distension
- PMS with breast tenderness
- Mental depression, sighing
- Tongue is red with thin coat
- Pulse is rapid, wiry
- Low energy
Herbs to tonify Liver Yin

- mo han lian (*Eclipta prostrata*)
- nu zhen zi (*Ligustrum lucidum*)
- hei zhi ma (*Sesamum indicum*)
- goji berries (*Lycium chinense*)
- burdock root (gobo) (*Arctium lappa*)
mo han lian (Eclipta prostrata)

- Nourishes yin of liver and kidney
- sweet, sour, cool
- signs of liver or kidney yin deficiency
  - ringing in the ears
  - night sweats
  - chronic low grade inflammatory conditions
  - chronic hepatitis, drug, alcohol use or abuse
nu zhen zi (Ligustrum lucidum)

- nourishes and tonifies liver & kidney
- sweet, slightly bitter, cooling
- relieves yin deficiency of liver and kidney
  - dizziness, night sweats, ringing in the ears, etc.
  - “turns white hair [black], and brightens the eyes”
  - “strengthens the lower back and knees, improves the hearing and vision”
- suitable for long-term use
hei zhi ma, Black sesame seed
*Sesamum indicum*

- tonifies liver, kidney
- augments yin, blood
- lubricates intestines
- use with other yin tonics
- brighten eyes
- “excellent food that augments SP, ST
- dose: 9-30 g
Goji (Lycium chinense)

- Lung, liver, kidney
- Sweet, neutral
- Treats chronic inflammation (yin xu)
- Clears blood heat
  - Protect vessels
  - Acne, skin rashes, etc.
- Zeaxanthin other carotenoids to protect eyes, antioxidant
Gobo (*Arctium lappa*)

- Japanese vegetable
- liver yin tonic
- western herb
  - benefits, cleanses liver
  - when roasted, warmer
  - anticancer effects
Therapeutics
Liver-Related Disorders: HEPATITIS

- Hepatitis is inflammation of the liver, usually due to a viral infection; hepatitis A, B, C, D
- Hepatitis A is infectious hepatitis
  - Usually does not become active; acute hepatitis
- Hepatitis B is serum hepatitis
  - Exposure is through needles, blood transfusions
- Hepatitis C is the most common cause of chronic hepatitis
  - Exposure through needles, blood transfusions, tattoos, probably not much through sexual contact
  - Up to 5 million people might be exposed in North America
  - Symptoms might be delayed up to 10 years or more after infection
Hepatitis

- **Antioxidants**
  - Milk thistle, vitamins E, C, carotenoids, grape seed extract

- **Hepatoprotectives**
  - Milk thistle, schisandra, artichoke, ginger, turmeric, eclipta

- **Antiinflammatories**
  - Berberine-containing herbs,

- **Antivirals**
  - Shiitake, wild indigo, andrographis

- **Immune-modulators**
  - Shiitake, turkey tails, astragalus

*Eclipta prostrata*
Therapeutics
Liver-Related Disorders: DYSPEPSIA

- Painful or difficult digestion, often with gas
- Worse after eating
- Seek diagnosis: could also be gallstones, diverticuli, colitis, irritable bowel, ulcers, appendicitis, cancer

Wormwood
Dyspepsia

- Bitter tonics
  - Gentian, centaury, goldenseal, bogbean, mugwort
- Carminatives
  - Peppermint, fennel seed, caraway seed
- Cholagogues
  - To regulate bile, alleviate liver Qi stagnation: artichoke leaf, boldo, fringetree

Peppermint
Therapeutics
Liver-Related Disorders: GALLBLADDER

- Gallbladder inflammation (cholecystitis)
- Gallstones (cholelithiasis): gallbladder mucin, stasis, inflammation, cholesterol saturation (ultrasonography)
- Symptoms: many are asymptomatic, sometimes for life; pain, aversion to fatty foods, duct blockage can lead to colicky pain, eventually cholecystitis
- Surgery is common treatment; oral bile acids for months
Gallbladder Herbs

- Move the bile (Cholagogues)
  - Artichoke leaf, wormwood, boldo, chicory, yellow dock, burdock, barberry
- Antiinflammatories
  - Oregon grape root, mugwort, wormwood, yarrow
- Anodynes (relieve pain)
  - Meadowsweet, corydalis
- Relax bile duct to facilitate stone passage: celandine, fumitory, mandrake (caution!)

Celandine
The liver regulates and “rules” the emotions, and is especially associated with anger and irritability.

Liver stagnation can initiate or aggravate mood swings, depression (melancholy = melanos, black; chole = bile), anxiety, insomnia.

Can “attack” different organs such as the heart (mood disorders), digestion (digestive disorders).

Differential diagnosis: other liver signs should be present (temple headaches, eye problems).
Liver Herbs for the Mood

- Nervines that also regulate liver function:
  - Blue vervain, wood betony, wild lettuce, hops, reishi
- Liver Qi-regulating herbs:
  - Fringetree, boldo, artichoke, schisandra

Reishi
The liver regulates the blood in TCM

Liver Qi stagnation often leads to irregular menstrual flow, even amenorrhea

Emmenagogues regulate blood flow (such as blessed thistle)
Liver Herbs for the Menses

- Herbs to relieve liver Qi stagnation:
  - Boldo, fringetree bark, bupleurum, artichoke leaf

- Emmenagogues
  - Mugwort, pulsatilla (highly diluted!), safflower, trillium, false Solomon’s seal, wild carrot seed, blessed thistle

- Emmenagogues with nervine properties:
  - Black cohosh, blue vervain, yarrow, rosemary

Wild carrot, Queen Anne’s Lace
In TCM, the gallbladder channel runs along the sides of the head. Hyperactive liver syndrome or stagnant liver Qi can lead to temple, frontal headaches.
Liver Herbs for Headaches

• Herbs to calm liver hyperactivity
  – Oregon grape root, barberry, coptis, goldenseal, gentian

• Anodyne herbs for headaches that regulate the liver
  – Betony, periwinkle, blue vervain, centaury, fringe tree, mugwort, blessed thistle

Betony
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
Milk Thistle

• Botany
  – Silybum marianum
  – Asteraceae family (daisy, thistles, artichoke)

• History
  – The seed long used to treat liver complaints, back to 1st century C.E.

• Chemistry
  – Seed shells only contain flavonolignans
  – Silymarin is the entire complex of flavonolignans, including silybinin, the best-studied compound
Silybinin is poorly-absorbed from the gut, not water-soluble—it occurs in the seed shell which is not watery
Milk Thistle

• **Pharmacology**
  – silymarin has strong antioxidant properties
  – increases glutathione (endogenous antioxidant)
  – has ability to block toxin entry through membranes
  – stimulates liver regeneration by stimulating ribosomal RNA polymerase
  – undergoes enterohepatic circulation (concentration)
  – has anti-carcinogenic activities *in vitro* and *in vivo*

• **Uses**
  – liver cirrhosis
  – hepatitis A,B,C
  – liver toxin poisoning (e.g. Amanita phalloides mushroom)
  – protection from environmental toxins, chemicals, drugs
Milk thistle-hepatitis studies

• **Viral Hepatitis (A or B)**
  
  • in several studies “normalized” hepatic function was seen faster in patients in the milk thistle group compared to placebo; shorter hospital stay

• **Hepatitis C** – unknown efficacy; Tanamley et al. (Dig Liver Dis. 2004 Nov; 36(11):752-9) were not able to show improvement compared to a multivitamin control at 1 yr (n=141).

• A recent crossover study (placebo or milk thistle) for 12 weeks (n=17) showed no benefit (Gordon et al. J Gastroenterol Hepatol 2006;21:275-280).

• **Toxin and Drug Inducted Hepatitis**
  
  • both animal and some small patient studies show protective effect of milk thistle or silymarin

• The doses used should be questioned—poorly absorbed
  
  – Therapeutic dose should be at least 1 gram/day silymarin up to 2 or 3 g (phytosome)

• A meta-analysis (Am J Med 2002;113:506-15) concluded no strong benefit but more studies needed; animal studies indicate considerable promise for beneficial activities
some improvement in liver function tests compared to placebo in limited studies

- cirrhosis: Pares et al. J. Hepatol 28:615-621, 1998; no effect on survival or clinical course of alcoholics; n=200; 2yr study
- cirrhosis: (Ferenci et al. J. Hepatol 9:105-113, 1989 showed 58% 4yr survival in treated vs 39% placebo (p=0.036); 4 yr study
- Lucena et al. (Int J Clin Pharmacol 2002;40:2-8) showed increase in glutathione and decreased liver peroxidation in patients with alcoholic cirrhosis but no change in routine liver tests in treated compared to placebo. N=60


**Rambaldi et al. Cochrane Database Syst Rev 2007;4:CD003620.** For alcoholic and/or hepatitis B or C liver disease, there were trends for benefit on overall mortality and complications and a statistical reduction in liver-related mortality in all trials (n=13)(RR 0.5, CI 0.29-0.88) but not in high quality trials (n=4)(RR 0.57, CI 0.28-1.19). Our results question the beneficial effects of milk thistle for patients with alcoholic and/or hepatitis B or C virus liver diseases and highlight the lack of high-quality evidence to support this intervention. Adequately conducted and reported randomised clinical trials on milk thistle versus placebo are needed.
Milk Thistle Cautions, Products

• Cautions
  – No known inherent toxicity

• Interactions
  – None of significance reported as yet. Recently shown to not affect indinavir pharmacokinetics or CYP3A4 or P-glycoprotein.

• Products
  – flavonolignans are not water soluble
  – extract used (acetone, methanol, ethanol); supercritical possible
  – Pure ethanolic extracts available, but these are weaker
  – extracts containing at least 70-85% silymarin available
  – A phospholipid complex of silibin has high bioavailability
Other potential uses

• Cholesterol regulation
  – randomized, double–blind, placebo controlled trial (n=51) gave milk thistle extract or placebo for 4 months to diabetics. Glycosylated hemoglobin (HbA1c) and lipid profiles improved. (Huseini et al. Phytother Res 2006;20:1036-1039).

• Increased milk production in women (n=50) after delivery (Acta Biomed 2008;79:205-210)
Summary: possibly helpful for liver injury due to hepatitis and drugs and alcohol but evidence is weak. Some promise for diabetics

- Safety: good
- Drug interactions: None of significance reported as yet.
- Product selection: extract containing 80% silymarin is best
- Dose: 200mg TID (maintenance); therapeutic—500 to 1000 mg/day b.i.d.
- Questions remaining include
  - Does milk thistle really work for its hepatitis B or C and for alcoholic liver disease?
  - Will it be useful for diabetic patients?

Reccomendation – milk thistle is the most widely-researched and utilized herbal remedy for liver health and healing

For liver injury, milk thistle is worth a 3 month try coupled with monitoring progress with liver function tests
Selected Liver Herbs: ARTICHOKE

- *Cynara scolymus*
- Contains phenolic acids (caffeic acid derivatives) that stimulate bile flow
- Liver protective effect
- 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
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

- *Taraxacum officinale*
- Used in western herbal medicine and TCM
- Root used for “cooling and cleansing” the liver
- Add root to formulas for hepatitis, cleansing formulas; in TCM, specific for breast, liver cancer
- 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
- A main herb to use with many kinds of liver formulas, both as a yin tonic and gentle regulator for liver Qi stagnation and slightly cooling
- 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: FRINGE TREE

- *Chionanthus virginicus*
- Small native tree of the eastern U.S.
- Favored by early American physicians (Eclectics) for gallstones, bile stagnation, all manner of liver disorders
- Effective in formulas for liver Qi stagnation with dysmenorrhea, emotional swings, hepatitis; liver attacking spleen; jaundice
Materia Medica
Selected Liver Herbs: BOLDO

- *Peumus boldo*
- Small tree native to south America
- Contains alkaloids that stimulates the liver and bile flow, major herb for liver Qi stagnation
- Popular herb in South America for gallstones and all kinds of liver and digestive ailments as a tea
- Dose: 4-6 g as a tea, 1-3 ml tincture, 3 x day
Selected Liver Herbs: BUPLUERUM

- *Bupleurum scorzoneraefolium* (chai hu of TCM)
- Relieves liver Qi stagnation; regulates gallbladder and liver
- Uses: dizziness, vertigo, emotional instability, menstrual imbalances due to liver stagnation
- Dose: 3-12 grams (decoction)
Materia Medica
Selected Liver Herbs: SKULLCAP

- Scutellaria lateriflora of the eastern U.S.
- Local species similar
- Flavonoids, iridoids
- Antispasmodic, bitter tonic, nervine, cools, calms liver; liver Qi stagnation
- Dose: 2-4 ml, 2 x day; 2-5 grams, 2 x/day infusion

Scutellaria californica
Materia Medica
Selected Liver Herbs: OREGON GRAPE

- *Mahonia aquifolium, M. repens*
- Native to western U.S.
- Roots contain berberine
- Cholagogue
- 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
Selected Liver Herbs: CHICORY

- *Cichorium intybus* of Europe
- Weedy in North America
- Root contains inulin, sesquiterpenes (bitter), coumarins
- Mildly laxative, cleansing
- Gout; blended with other liver herbs for its cooling, cleansing effects
- Dose: 2-4 ml tincture, 2-3 x daily; 6-9 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
Materia Medica
Selected Liver Herbs: MUGWORT

- *Artemisia vulgaris* of Europe and North America
- Other species useful
- Dried tops and leaves are strongly bile stimulating to prevent gallstones; antiinflammatory for cholecystitis; liver and bile stagnation
- Dose: 3-5 grams, infusion
Prescription for Liver Health

• Lower your fat intake; eat less refined, cooked oils and fats; obtain essential oils from whole nuts and seeds
• Rest the digestive system whenever possible; don't eat too late at night or too early in the morning
• Liver flushes and drinking lemon-water keep the liver moisturized and free-flowing
• Keep the eliminative channels open and free. Exercise to eliminate toxins via the lungs and skin
• Massage the liver area at least once a day to help remove congestion
• Antioxidants such as vitamins E and C, beta-carotene, zinc, and selenium protect against toxins
End of the Liver Show