Herbal liver support

By
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Functions of the Liver:
- Filtering the blood
- The uptake of nutrients delivered from the digestive tract via the portal vein
- The synthesis, storage, interconversion, and degradation of metabolites (metabolism)
- Metabolizing many medications, such as barbiturates, sedatives, and amphetamines
- The regulated supply of energy-rich intermediates and building blocks for biosynthetic reactions
- The detoxification of harmful compounds by biotransformation
- The excretion of substances with the bile, as well as the synthesis and degradation of many blood plasma constituents
- Fighting infections (Kupffer cells-macrophages)
- Making bile, a substance that helps digest fat and excrete certain fatty substances
- Processing and hooking fats to carriers (including cholesterol), and storing sugars, helping the body transport and save energy.
- Making important proteins, such as most of those involved in blood clotting
- Storing iron, copper, vitamins A and D, and several of the B vitamins
- Making important proteins like albumin that regulate fluid transport in the blood and kidneys.
- Helping break down and recycle red blood cells

Diseases of the Liver:
There are more than a hundred kinds of liver disease. The most widely spread are as follows:
- Hepatitis, inflammation of the liver, is caused mainly by various viruses (viral hepatitis) but also by some liver toxins (e.g. alcoholic hepatitis), autoimmunity (autoimmune hepatitis) or hereditary conditions.
- Fatty liver disease (hepatic steatosis) is a reversible condition where large vacuoles of triglyceride fat accumulate in liver cells. Non-alcoholic fatty liver disease is a spectrum of disease associated with obesity and metabolic syndrome, among other causes. Fatty liver may lead to inflammatory disease (i.e. steatohepatitis) and, eventually, cirrhosis.
- **Alcoholic liver disease** is any hepatic manifestation of alcohol overconsumption, including fatty liver disease, alcoholic hepatitis, and cirrhosis. Analogous terms such as "drug-induced" or "toxic" liver disease are also used to refer to the range of disorders caused by various drugs and environmental chemicals.

- **Cirrhosis** is defined histologically as a diffuse hepatic process characterised by fibrosis and the conversion of normal liver architecture into structurally abnormal nodules. The progression of liver injury to cirrhosis may occur over weeks to years. Cirrhosis causes chronic liver failure.

**Fascioliasis**, a parasitic infection of the liver caused by a Liver fluke of the *Fasciola* genus, mostly the *Fasciola hepatica*.

- **Primary biliary cirrhosis** is a serious autoimmune disease of the bile capillaries.

- **Primary sclerosing cholangitis** is a serious chronic inflammatory disease of the bile duct, which is believed to be autoimmune in origin.

- Centrilobular necrosis of liver can be caused by leakage of enteric toxins into circulation. Salmonella toxins in ileum have been shown to cause severe damage to liver hepatic cells [3].

- **Budd–Chiari syndrome** is the clinical picture caused by occlusion of the hepatic vein, which in some cases may lead to cirrhosis.

- **Hereditary diseases** that cause damage to the liver include hemochromatosis, involving accumulation of iron in the body, and Wilson's disease, which causes the body to retain copper. Liver damage is also a clinical feature of alpha 1-antitrypsin deficiency and glycogen storage disease type II.

- In transthyretin-related hereditary amyloidosis, the liver produces a mutated transthyretin protein which has severe neurodegenerative and/or cardiopathic effects. Liver transplantation can provide a curative treatment option.

- **Gilbert's syndrome**, a genetic disorder of bilirubin metabolism found in about 5% of the population, can cause mild jaundice.

- **Primary liver cancer** most commonly manifests as hepatocellular carcinoma and / or cholangiocarcinoma; rarer forms include angiosarcoma and hemangiosarcoma of the liver. (Many liver malignancies are secondary lesions that have metastasized from primary cancers in the gastrointestinal tract and other organs, such as the kidneys, lungs, breast, or prostate.)

There are also many pediatric liver diseases including: biliary atresia, alpha-1 antitrypsin deficiency, Alagille syndrome, and progressive familial intrahepatic cholestasis.
Signs and symptoms of the liver disease:
Symptoms partly depend on the type and the extent of liver disease. In many cases, there may be no symptoms. Signs and symptoms that are common to a number of different types of liver disease include:
• Jaundice, or yellowing of the skin
• Darkened urine
• Nausea
• Loss of appetite
• Unusual weight loss or weight gain
• Vomiting
• Diarrhea
• Light-colored stools
• Abdominal pain in the upper right part of the stomach
• Malaise, or a vague feeling of illness
• Generalized itching
• Varicose veins (enlarged blood vessels)
• Fatigue
• Hypoglycemia (low blood sugar)
• Low grade fever
• Muscle aches and pains
• Loss of sex drive
• Depression

► A rare but severe form of the liver infection called acute fulminant hepatitis causes liver failure. Symptoms of liver failure include:
• An enlarged and tender liver
• Enlarged spleen
• Susceptibility to bleeding
• Encephalopathy, which is a disorder that affects how the brain functions
• Changes in mental status or level of consciousness
• Ascites, which is an accumulation of fluid inside the abdomen
• Edema or swelling under the skin
• Aplastic anemia, a condition in which the bone marrow cannot make blood cells

• **Markers of liver disease**

<table>
<thead>
<tr>
<th>Liver chemistry test</th>
<th>abnormality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alanine transaminase (ALT)</td>
<td>Hepatocellular damage</td>
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<tr>
<td>Aspartate transaminase (AST) &amp;</td>
<td></td>
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<tr>
<td>Lactate dehydrogenase also found in skeletal / cardiac muscle.</td>
<td></td>
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<tr>
<td>Bilirubin</td>
<td>- Hepatic (hepatitis, liver toxic damage, cirrhosis, hepatic failure);</td>
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<tr>
<td>Alkaline phosphatase</td>
<td>- Post-hepatic (Cholestasis)</td>
</tr>
<tr>
<td>Gamma-glutamyl transpeptidase (GGT)</td>
<td>- Pre-hepatic (haemolysis;)</td>
</tr>
<tr>
<td>Bile acids</td>
<td>Impaired synthetic function</td>
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<tr>
<td>Prothrombin time</td>
<td></td>
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<tr>
<td>Albumin (ALB)</td>
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**Prevention:**
Some, but not all, liver diseases can be prevented. For example, hepatitis A and hepatitis B can be prevented with vaccines.

**Acute liver failure**
- Infective: Hepatitis A is commonest
- Toxic liver necrosis:
  - Herbal toxins: Impila
  - Drugs: analgesics, antibiotic (anti TB)
  - cytotoxic, anticonvulsant, anaesthetic, antiretroviral
- Metabolic: Inherited disorders

**Secondary complications:** encephalopathy, bleeding tendency, renal failure, sepsis, metabolic disturbance (hypoglycaemia, acidosis)

►Other ways to decrease the risk of infectious liver disease include:
• Practicing good hygiene, such as washing hands well after using the restroom or changing diapers.
• Avoiding drinking or using tap water when traveling internationally.
• Avoiding illegal drug use, especially sharing injection equipment.
• Practicing safest sex. Practicing safer sex provides less protection.
• Avoiding the sharing of personal hygiene items, such as razors or nail clippers.
• Avoiding toxic substances and excess alcohol consumption.
• Using medications only as directed.
• Using caution around industrial chemicals.
• Eating a well balanced diet following the food guide pyramid.
• Getting an injection of immune globulin after exposure to hepatitis A.
• Using recommended safety precautions in healthcare and day care work.

**Normal values**
- Alanine transaminase: 0–45 IU/l.
- Aspartate transaminase: 0–35 IU/l.
- Alkaline phosphatase: 30–120 IU/l.
- Gamma-glutamyl transferase: 0–30 IU/l.
- Bilirubin: 2–17 μmol/l.
- Prothrombin time: 10.9–12.5 sec.
- Albumin: 40–60 g/l.
Hepatoprotective Herbal treatment

These are generally classified into 3 categories without any strict delineation amongst them.

1. Anti hepatotoxic agents:
   These generally antagonise the effects of any hepatotoxin causing hepatitis or any liver disorder or disease.

2. Hepatotropic agents:
   These generally support or promote the healing process of the liver. In practice these two activities cannot be easily distinguished from each other.

3. Hepatoprotective agents:
   These generally prevent various types of liver affections prophylactically.
   In general any hepatoprotective agent can act as an antihepatotoxic or hepatotropic agent but the vice versa is always not true.
<table>
<thead>
<tr>
<th>Plant name</th>
<th>Traditional uses</th>
<th>Hepatoprotective mechanisms</th>
<th>Cautions/contraindications</th>
<th>Interactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curcuma longa; tumeric</td>
<td>• Loss of appetite, • Cholelithiasis, GB stasis • Hyperlipidemia • Inflammation • Osteoarthritis • Rheumatoid arthritis • Scabies • HIV • Uveitis</td>
<td>1-hepatic stellate cells apoptosis by: ↑caspase-3, ↓Bcl-2/↑Bax, ↑PPAR-γ, ↓NF-κB, ↓ERK, ↓JNK and ↑cytochrome c release. 2- Promotes normal cell cycle activity, normal cellular regeneration hepato-protection 3-antioxidant 4- Antiinflammatory 5- Antifibrotic 6-gall bladder contraction</td>
<td>Peptic ulcers.</td>
<td>♦ the effect of some anti-coagulants and can inhibit cytochrome P450.</td>
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<tr>
<td>Phyllanthus</td>
<td>Emetic and purgative, constipation, digestion and abdominal pain liver disorders, rheumatism and inflammatory diseases; edema, and urinary troubles; Hyper-acidity/dyspepsia</td>
<td>1-protection of hepatocytes 2- Antioxidant 3- HIV Replication Inhibition; 4-Lipid Lowering Activity, Anti-Diabetic Activity</td>
<td>pregnant or breastfeeding abdominal pain, nausea, fever or vomiting</td>
<td>angiotensin converting enzyme (ACE) inhibitors or diuretics; Digoxin, oral contraceptive, warfarin, cortisone</td>
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<tr>
<td>glabra (glycyrrhizin-Liquarice)</td>
<td>treat cough, bronchitis, (Expectorant) gastritis and peptic ulcer disease,</td>
<td>1-hepatic stellate cells apoptosis by ↓NF-κB 2- protection of hepatocytes. 3- decrease fibrosis 4- Antioxidant 5-anti-inflammatory 6- anti-viral 7- promote the regeneration of liver</td>
<td>CHF • Arrhythmias • ER positive breast cancer • Consider estrogenic effects in general • Hypertonia • Hypokalemia • renal insufficiency</td>
<td></td>
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<td>Artisock</td>
<td>relieve digestive disturbances, such as dyspepsia</td>
<td>1-protection of hepatocytes 2- antioxidant, 3-choleretic 4- lipid-lowering effects 5- improved endothelial function</td>
<td>Pregnancy/Lactation/ gallstones/ bile duct obstruction / Hypersensitivity</td>
<td></td>
</tr>
<tr>
<td>fenel (Foeniculum vulgare Mill)</td>
<td>Cardiac tonic, Diuretic, Aphrodisiac, General tonic; useful in fevers, Nausea, Indigestion, Abdominal pain, Dysentery, Dysuria expectorant</td>
<td>1-protection of hepatocytes 2- Antioxidant 3-anti-inflammatory 4- hepatoprotective, 5-hypoglycemic, hypolipidemic,</td>
<td>Pregnancy/nursing</td>
<td>inhibit cytochrome P450 3A4 → Used cautiously with medications metabolized by this enzyme.</td>
</tr>
<tr>
<td>Rosemary</td>
<td>central nervous system, cardiovascular system, genito urinary conditions, reproductive system</td>
<td>1-Antioxidant 2-Cholagogues 3-anti-inflammatory</td>
<td>pregnancy; epilepsy; &lt;18 y</td>
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</tbody>
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Hepatic stellate cell (HSC) - myofibroblasts (MFBs) and the factors that regulate HSC activation, proliferation, function, and survival represent important therapeutic targets; likewise, therapies that directly degrade scar and/or promote liver regeneration.; T/B LC, T/B lymphocyte; SAM, scar-associated macrophage; LPS, lipopolysaccharide; PDGF, platelet-derived growth factor; FGF, fibroblast growth factor; VEGF, vascular endothelial growth factor; MCP-1, macrophage chemotactic protein-1; TGF-β1, transforming growth factor-β; CTGF, connective tissue growth factor; TIMP, tissue inhibitor of metalloproteinases; MMP, matrix metalloproteinase; TLR-4, Toll-like receptor; NO, nitric oxide; ET-1, endothelin-1; BM, bone marrow; EMT, epithelial mesenchymal transition; NF-κB, nuclear factor-κB; FAS, apoptosis stimulating factor; NGF, nerve growth factor; TRAIL, tumor necrosis factor-related apoptosis-inducing ligand; ECM, extracellular matrix. AKT: protein kinase B; Bax: Bcl-2-associated X protein; Bcl-2: B-cell lymphoma 2; Bcl-XL: B-cell lymphoma-extralarge; ERK: extracellular signal-regulated kinases; FAK: focal adhesion kinase; JNK: c-Jun N-terminal kinases; MMP: mitochondrial membrane potential; NF-κB: nuclear factor kappa B; NF-κB; PARP: TGF-β1: transforming growth factor beta; TNF-α: tumor necrosis factor alpha; XIAP: X-linked inhibitor of apoptosis protein.

References:
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12. Nabavi SF;Curcumin and Liver Disease: from Chemistry to Medicine; Comprehensive Reviews in Food Science and Food Safety 2010, Vol.13,2014