

Herbology and Functional Medicine Essential Herbs

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Essential Herbs

1. Cinchona Bark
 2. Berberine (Golden Seal)
 3. Chinese Wormwood
 4. Turmeric
 5. Holy Basil
 6. Ashwagandha
 7. Oregano
 8. Garlic
 9. Chaste Tree
 10. Saw Palmetto
 11. Yarrow
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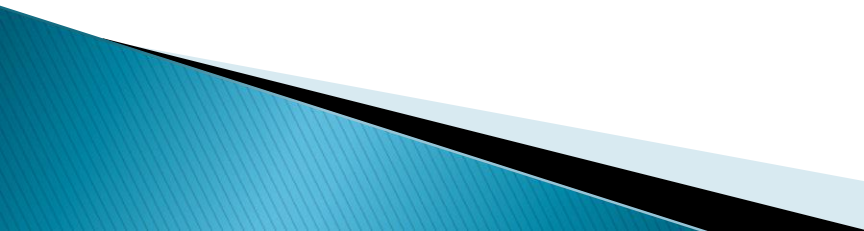
Cinchona Bark (quinine)

- ▶ Since the 1630s, it has been used to treat malaria.
- ▶ *Cinchona spp.* (*C. officinalis*, *C. ledgeriana*, *C. succirubra*) – species with highest concentration of quinine alkaloids
- ▶ Common names: Peruvian bark, quinine, Jesuit's bark, cinchona, fever tree, kinakina, quina–quina, quinine bark tree

Cinchona Bark (quinine)

- ▶ Used for increasing appetite; promoting the release of digestive juices; and treating bloating, fullness, and other stomach problems.
- ▶ Blood vessel disorders including hemorrhoids, varicose veins, and leg cramps.
- ▶ Mild influenza, swine flu, the common cold, malaria, and fever.
- ▶ Cancer, mouth and throat diseases, enlarged spleen, and muscle cramps.
- ▶ Used in eye lotions to numb pain, kill germs, and as an astringent.
- ▶ Applied to the skin for hemorrhoids, ulcers, stimulating hair growth, and managing varicose veins.

Cinchona Bark (quinine)

- ▶ The medicinally active compounds in cinchona bark are mostly alkaloids.
 - ▶ Quinine is the anti-malaria alkaloid. Natives of Peru had been using cinchona bark to treat hypothermia and fever, and later it was discovered that it could be used for malaria.
 - ▶ Quinine is often sourced from the cinchona trees, but since 1944 is also synthesized in the laboratory. Chloroquine is the synthetic version. Some malaria strains have become resistant to chloroquine, while not the case with natural quinine.
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Cinchona Bark (quinidine)

- ▶ Quinidine is the stereoisomer of quinine used in cardiac medicine.
- ▶ The blood and cardiac disorders that have traditionally been treated with cinchona bark are anemia, varicose veins and arrhythmia (since 1749). In the case of **arrhythmia, there is extensive laboratory and clinical evidence to support these claims, and some prescription medicines for arrhythmia are in fact derived from cinchona.**
- ▶ In 2010 quinidine was successfully synthesized in the laboratory.

Chloroquine (1934) vs Hydroxychloroquine (1945)

- ▶ More side effects
- ▶ Used to treat malaria, but not for prophylaxis
- ▶ Used for Amebiasis
- ▶ Contraindications: those sensitive to chloroquine group and hydroxychloroquine
- ▶ Drug: Aralen

CHLOROQUINE

- ▶ Less toxic derivative of chloroquine
- ▶ Used to prevent malaria
- ▶ Used for auto-immune conditions (lupus, RA...)
- ▶ Contraindications: those sensitive to 4-aminoquinolines, cardiac patients, diabetic patients
- ▶ Drug: Plaquenil

HYDROXYCHLOROQUINE

Cinchona Bark Uses

- ▶ Anti-malarial
- ▶ Indian researchers found that cinchona bark was effective in treating these common bacteria: *Staphylococcus aureus*, *Bacillus cereus*, and *E. coli* but not *Streptococcus* β hemolytic and *Pseudomonas aeruginosa*.
- ▶ Cinchona was also effective in killing the yeast *Candida albicans*.
- ▶ Cinchona bark has been used in traditional herbal medicine to treat muscle spasms. There are a few reports of the successful use of cinchona in treating painful leg cramps and spasms, with only tinnitus as a side effect.
- ▶ Quinine can be used to treat babesiosis. However, the treatment should be in combination with antibiotics, because quinine has a bit more potential side effects.

Mechanism of action, Malaria

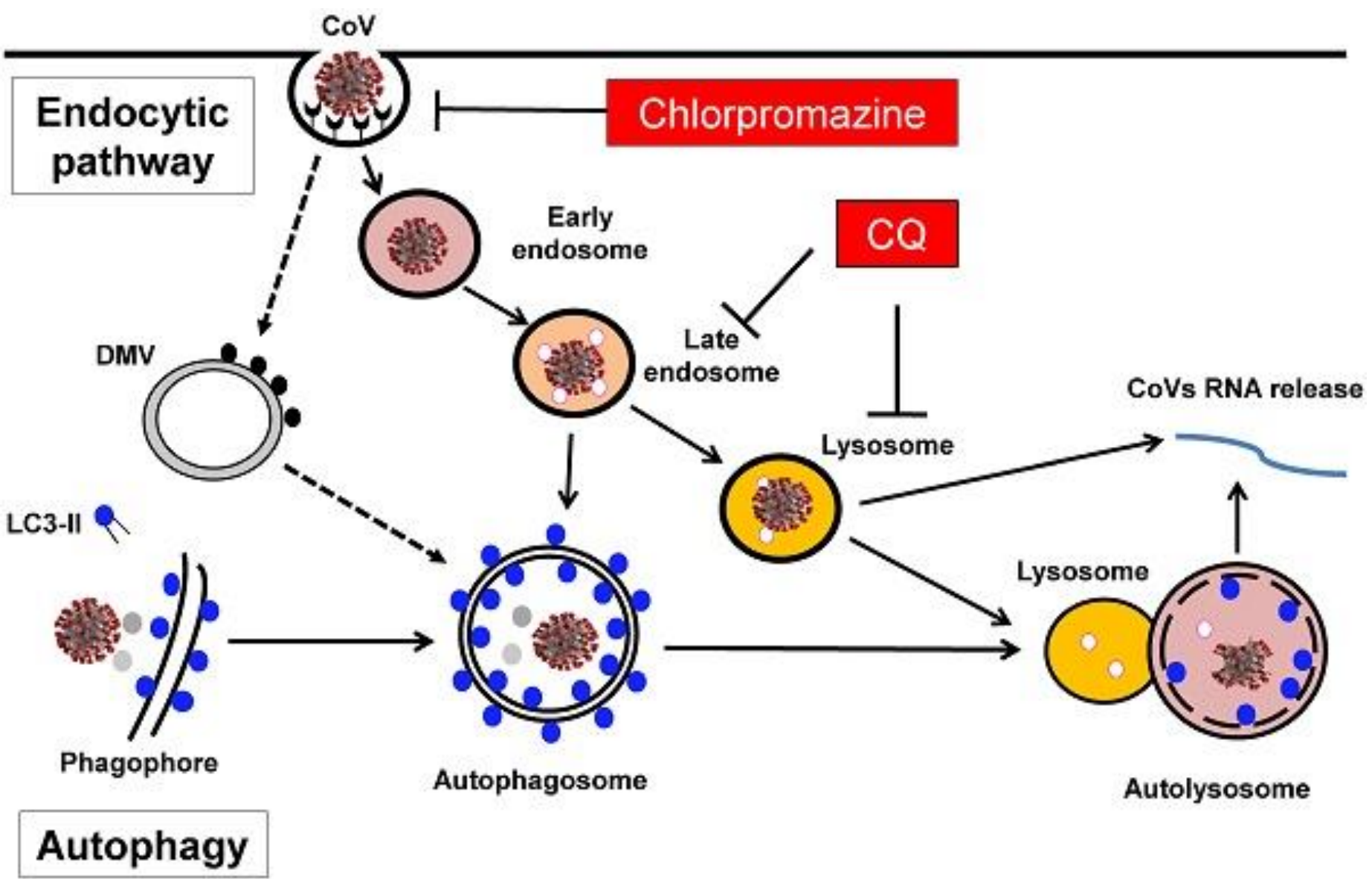
- ▶ It is believed that malaria parasites invade human red blood cells, and chloroquine/hydroxychloroquine may prevent malaria parasites to break down hemoglobin in human red blood cells.

VIRUSES – MODUS OPERANDI

- ▶ Viruses are the smallest microorganisms in nature. As such, they are **obligate** parasites, which means that they cannot live or reproduce without a host.
- ▶ Viruses are found wherever there are living organisms, including humans
- ▶ What do endosomes do to viruses?
- ▶ The endocytic vesicles **transport the incoming viral particles from the plasma membrane to the perinuclear area of the host cell**, where the conditions for viral replication are optimal.
- ▶ <https://www.nature.com/scitable/topicpage/how-viruses-hijack-endocytic-machinery-14364991/>

VIRUSES – MODUS OPERANDI


- ▶ **Targeting the Endocytic Pathway and Autophagy Process as a Novel Therapeutic Strategy in COVID-19**
- ▶ <https://www.ijbs.com/v16p1724.htm> (International Journal of Biological Sciences, 2020)
- ▶ Key element in viral infection is the process of viral entry into the host cells. In the last two decades, there is increasing understanding on the importance of the endocytic pathway and the autophagy process in viral entry and replication. As a result, **the endocytic pathway including endosome and lysosome has become important targets for development of therapeutic strategies in combating diseases caused by CoVs**



ENDOSOMES

- ▶ Endosomes play key roles in the cellular infection cycles of many viruses. Initially implicated in **virus entry**, recent research has demonstrated that endosomes can also be required at other stages in **viral replication**.
- ▶ Endosomes can provide platforms for viral nucleic acid replication and **virus assembly**, or play roles in modulating anti-viral immune responses.
- ▶ **Viruses exploit various attributes of endosomes such as the low luminal pH**, unique trafficking properties, cellular location and composition. In turn, viruses have become remarkable tools for analyzing endosome function.

VIRAL PATHWAYS MECHANISM

- ▶ **Targeting endosomal acidification by chloroquine analogs as a promising strategy for the treatment of emerging viral diseases**
 - ▶ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5461643/>
 - ▶ Emerging viruses such as HIV, dengue, influenza A, SARS coronavirus, Ebola, and other viruses pose a significant threat to human health.
 - ▶ No effective therapeutic strategies available for the prophylaxis and treatment of these infections.
 - ▶ Chloroquine analogs have been used for decades as the primary and most successful drugs against malaria.
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VIRAL PATHWAYS MECHANISM

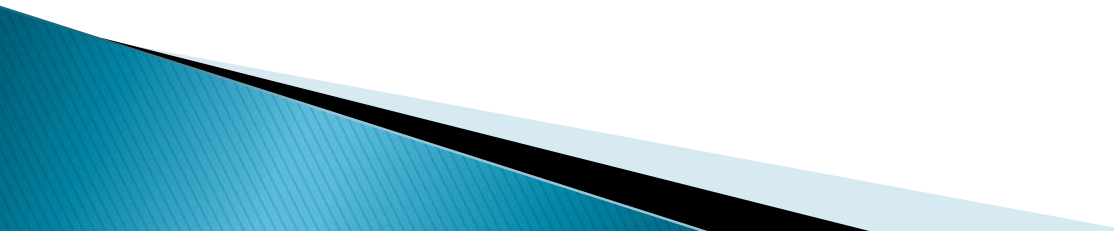
- ▶ Since the analogs have interesting biochemical properties, these drugs are found to be effective against a wide variety of viral infections.
- ▶ Shown to inhibit **acidification of endosome** during the events of replication and infection.
- ▶ **Immunomodulatory** effects of analogs have been beneficial to patients with severe **inflammatory complications** of several viral diseases.
- ▶ One of the successful targeting strategies is the **inhibition of HIV replication** by the analogs in vitro which are being tested in several clinical trials. This review focuses on the potentialities of chloroquine analogs for the treatment of **endosomal low pH dependent emerging viral diseases**.

ZINC IONOPHORE

- ▶ Fluorescent microscopic examination of intracellular zinc distribution demonstrated that free zinc ions are more concentrated in the lysosomes after addition of chloroquine, which is consistent with previous reports showing that chloroquine inhibits lysosome function. The combination of chloroquine with zinc enhanced chloroquine's cytotoxicity and induced apoptosis in A2780 cells. Thus **chloroquine is a zinc ionophore**, a property that may contribute to chloroquine's **anticancer activity**.
- ▶ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4182877/>

Cinchona Side Effects

Common side effects of chloroquine include:

- ▶ Irreversible damage to the retina
 - ▶ Deafness
 - ▶ Tinnitus (ringing in the ears)
 - ▶ Reduced hearing
 - ▶ Increased liver enzymes
 - ▶ Anorexia
 - ▶ Nausea
 - ▶ Vomiting
 - ▶ Diarrhea
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Interactions

▶ Anticoagulant / Antiplatelet drugs

- Cinchona might slow blood clotting. Taking cinchona along with medications that also slow clotting might increase the chances of bruising and bleeding.

Some medications that slow blood clotting include aspirin, clopidogrel (Plavix), diclofenac (Voltaren, Cataflam, others), ibuprofen (Advil, Motrin, others), naproxen (Anaprox, Naprosyn, others), dalteparin (Fragmin), enoxaparin (Lovenox), heparin, warfarin (Coumadin), and others

Interactions

- ▶ Quinine might increase how much **phenobarbital (Luminal)** is in the body. (Anti-seizure med.)
- ▶ Quinine can cause the body to break down **carbamazepine (Tegretol)** too quickly. (Anti-convulsant.)
- ▶ Cinchona might decrease the effectiveness of antacids [cimetidine (Tagamet), ranitidine (Zantac), nizatidine (Axid), and famotidine (Pepcid)] and PPIs [omeprazole (Prilosec), lansoprazole (Prevacid), rabeprazole (Aciphex), pantoprazole (Protonix), and esomeprazole (Nexium)], as it may increase stomach acid.

BERBERINE

- ▶ It seems to work via multiple different mechanisms:
 - Decreases **insulin resistance**, making the blood sugar lowering hormone insulin more effective.
 - Increases **glycolysis**, helping the body break down sugars inside cells.
 - Decrease sugar production in the liver.
 - Slows the breakdown of carbohydrates in the gut.
 - Increases the number of **beneficial bacteria** in the gut.
- ▶ In one study of 116 diabetic patients, 1 gram of berberine per day lowered fasting blood sugar by 20%, from 7.0 to 5.6 mmol/L (126 to 101 mg/dL), or from diabetic to normal levels.
- ▶ It also lowered **hemoglobin A1c** by 12% (a marker for long-term blood sugar levels), and also improved blood lipids like cholesterol and triglycerides.
- ▶ According to a big review of 14 studies, berberine is as effective as oral **diabetes** drugs, including metformin, glipizide and rosiglitazone.

- **Burns.** Early research suggests that applying an ointment that contains berberine and beta-sitosterol can treat second-degree burns as effectively as conventional treatment with silver sulfadiazine.
- **Congestive heart failure (CHF).** Early research suggests that berberine can reduce some of the symptoms and lower the death rate in some people with congestive heart failure.
- **Diarrhea.** Some early research suggests that berberine sulfate can decrease diarrhea in people with certain bacterial infections. Also, berberine hydrochloride seems to speed up recovery time for people with diarrhea when added to some standard treatments. However, berberine does not seem to enhance the effects of tetracycline in treating diarrhea related to cholera infection.
- **Glaucoma.** Early research suggests that using eye drops containing berberine and tetrahydrozoline for 3 days does not reduce eye pressure in people with glaucoma better than eye drops containing tetrahydrozoline alone.
- **Stomach ulcers caused by Helicobacter pylori (H pylori) infection.** Early research suggests that taking berberine three times daily for 6 weeks is more effective than the drug ranitidine at eliminating H. pylori infection, but less effective at healing ulcers in people with stomach ulcers due to H. pylori.
- **Hepatitis.** Early research suggests that taking berberine daily for 2 months decreases blood sugar, triglycerides, and markers of liver damage in people with diabetes and hepatitis B or C.
- **Liver disease.** Early research suggests that taking berberine for 12 weeks reduces fat in the blood and markers of liver damage in people with liver disease and diabetes.

- **Menopausal symptoms.** Early research suggests that taking berberine and soy isoflavones can reduce menopausal symptoms.
- **Metabolic syndrome.** Taking a combination product (Armolid Plus) containing berberine, policosanol, and red yeast rice might improve blood pressure and blood flow in people with metabolic syndrome.
- **Obesity.** Early research suggests that taking berberine for 12 weeks can reduce weight in obese people by about 5 pounds.
- **Osteoporosis.** Early research suggests that taking berberine together with vitamin D3, vitamin K, and a chemical found in hops for 14 weeks can decrease bone loss in postmenopausal women with osteoporosis.
- **An ovary disorder known as polycystic ovary syndrome (PCOS).** Early research suggests that berberine can reduce blood sugar, cholesterol, triglycerides, testosterone, and waist-to-hip ratio in women with PCOS.
- **Injuries caused by radiation.** Some early research suggests that taking berberine during radiation therapy can reduce the occurrence and severity of some injuries caused by radiation in patients being treated for cancer.
- **Low blood platelet counts (thrombocytopenia).** Blood platelets are important for blood clotting. Early research suggests that taking berberine for 15 days, either alone or with [prednisolone](#), can increase the number of blood platelets in people with low blood platelet counts.
- **Trachoma.** There is some evidence that eye drops containing berberine might be useful for treating trachoma, a common cause of blindness in developing countries.

Chinese wormwood (*Artemisia annua*)

- ▶ Active component: artemisinin
 - reacts with iron to form free radicals causing oxidative stress to the cell.
 - shown to inhibit protein synthesis by the malarial protozoa *Plasmodium falciparum* while inhabiting human red blood cells in vitro
- ▶ Anti-parasitic, anti-cancer, bitter, fever reducer, anti-malarial, highly aromatic
- ▶ Preferentially taken up with iron therefore test for iron, ferritin, TIBC
- ▶ Increases stomach acid, thus interfering with antacids, PPIs, histamine-receptor agonists, and anti-seizure medications

Turmeric (*Curcuma longa*)

- ▶ Turmeric has been used for thousands of years in Southeastern and Eastern Asia as a traditional medicine, coloring agent, and spice.

Reports of its use to reduce occasional inflammation, support healthy digestion, promote cardiovascular health, and support the immune system go as far back as 600 B.C.

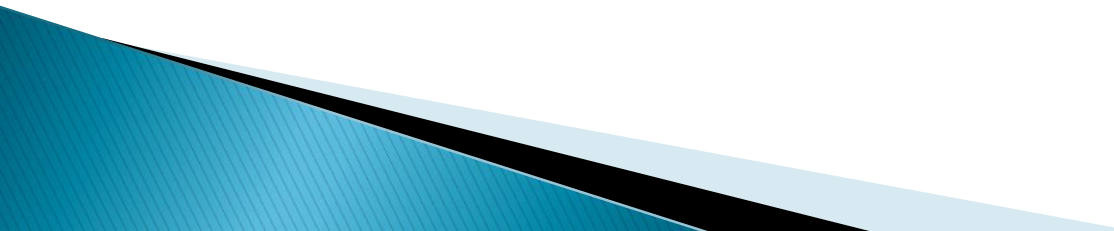
Traditional health benefits of Turmeric:

- ▶ Relieves rheumatic pain & muscle pain
- ▶ Brain and cognitive support
- ▶ Eases nausea, vomiting, diarrhea, bloating, flatulence
- ▶ Treats intestinal worms
- ▶ Relieves indigestion, toothaches
- ▶ Foundational support
- ▶ Immune support
- ▶ Lowers cholesterol

Holy Basil

- ▶ Holy Basil has a history that traces back more than 3,000 years to ancient Ayurvedic texts. Since then, it has been used for a variety of reasons, including to support a healthy response to stress, help maintain already-healthy blood sugar levels, promote longevity, nourish the mind, and elevate the spirit.
- ▶ Holy Basil is classified as an adaptogen.

Traditional health benefits of Holy Basil include:

- ▶ Stress support
 - ▶ Brain and cognitive support
 - ▶ Immune support
 - ▶ Foundational support
 - ▶ Glycemic support
 - ▶ Digestive support
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Ashwagandha

- ▶ Ashwagandha — also known as Indian Ginseng and Winter Cherry — has traditional uses stretching back more than 4,000 years in its native India, Pakistan, and Sri Lanka.
- ▶ In the Middle East, it is still used today to help promote normal sleep patterns and encourage a healthy inflammatory response.
- ▶ In the U.S., Ashwagandha is more commonly known and used as an adaptogenic herb that can help promote balance in many different systems of the body and help the body cope with stress in a healthy way.
- ▶ Traditional health benefits of Ashwagandha include:
 - ▶ Brain & cognitive support
 - ▶ Immune support
 - ▶ Energy support
 - ▶ Stress support
 - ▶ Sleep support
 - ▶ Men's health
 - ▶ Women's health

Oregano

- ▶ Oregano is native to Europe, the Mediterranean, and southern Asia, where it was — and still is — prized for the flavor it adds to many foods. Oregano was also used to preserve meat before refrigeration was available because it contains high amounts of volatile oils, including Carvacrol and Thymol, which are responsible for its anti-inflammatory, anti-bacterial, anti-oxidant, anti-fungal and anti-viral properties.
- ▶ Oregano has been used for medicinal purposes since ancient times. As an herb for good health, Oregano is high in antioxidants and contains key constituents that function synergistically to support the body's natural resistance and a healthy immune response.
- ▶ Its anti-bacterial properties have been proven by recent studies to treat infections of the reproductive tracts, and which make it ideal to be given to women who have just given birth.

Oregano

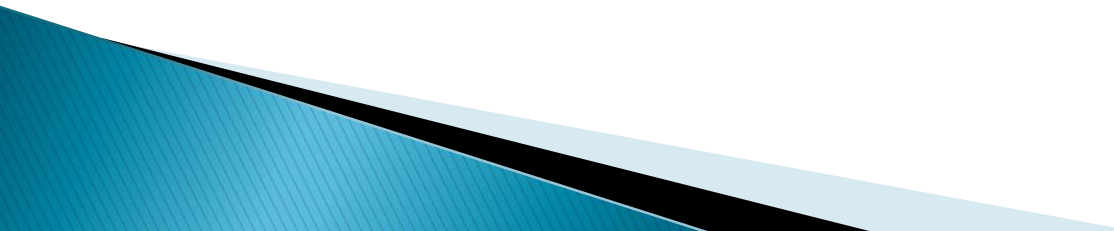
- ▶ The anti-oxidant properties of oregano helps fight free radicals in the body that cause cellular damage and accelerate ageing. Free radicals are believed to be involved with many degenerative diseases like osteoarthritis, atherosclerosis and heart diseases, to name a few.
- ▶ The most useful parts of this plant are its leaves. The extracts and juices of such are used for asthma, dyspepsia, chronic coughs, bronchitis, and rheumatism. Ear aches have also been proven to be cured by the infusion prepared from its leaves. The leaves relieve painful swellings, boils, and sprains, when their poultices are applied directly to the affected area.

Oregano

▶ Health Benefits of Oregano:

- Good for cough and cold relief
- Helps prevent degenerative arthritis
- Has Anti-aging properties
- Helps relieve rheumatism and osteoarthritis
- Bronchitis herbal remedy
- Ease asthma attacks
- Relieves upset stomach
- Treatment of urinary tract problems
- Relief for dyspepsia or indigestion
- Healing wounds, insect bites & stings
- Cure for sore throat
- Avoid infections caused by childbirth by taking decoctions of the leaves by the recent mother.
- For general good health

Garlic (*Allium sativum*)

- ▶ Garlic is known as nature's antibiotic.
 - ▶ Active component: Allicin
 - ▶ Its juices inhibit the growth of fungi and viruses thus prevent viral and yeast infections.
 - ▶ Several clinical tests have shown the efficacy of garlic in lowering cholesterol in the blood, lowering blood pressure, reducing platelet aggregation, and boosting fibrinolytic activities.
 - ▶ Some positive results in anti-cancer activity and AIDS treatment.
 - ▶ Used in WWII to treat wounds and infections.
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Chaste tree (*Vitex agnus-castus* and *Vitex negundo*)

- ▶ Several bioactive compounds have been extracted from leaves, seeds, roots in form of volatile oils, flavonoids, lignans, iridoids, terpenes, and steroids.
- ▶ Exhibits anti-inflammatory, antioxidant, antidiabetic, anticancer, antimicrobial properties
- ▶ Known for its role in the modulation of cellular events like apoptosis, cell cycle, motility of sperms, polycystic ovary disease, and menstrual cycle.
- ▶ Perturbs many cancer-signaling pathways including COX-1, NF-kappaB, TNF- α

Chaste tree (*Vitex agnus-castus* and *Vitex negundo*)

- ▶ Vitex is most often used in the treatment of menstrual disorders. PMS, secondary amenorrhea, oligomenorrhea, menorrhagia, metorrhagia, insufficient lactation, infertility, polycystic ovaries and acne are among some of the conditions that can be helped with vitex. The basic overall indication for vitex is a relative progesterone deficiency, or a relative estrogen excess.



SAW PALMETTO

Health Benefits Of Saw Palmetto

Treats Benign Prostatic
Hypertrophy (BPH)

Reduces Risk of
Prostate Cancer

Protection against
Hair Loss

Treats Impotence

Urinary Frequency

Increases Muscle Mass

Boosts Immunity



Yarrow (*Achillea millefolium*)

- ▶ One of the best diaphoretic herbs and is a standard remedy for **aiding the body to deal with fevers**. A peripheral circulatory stimulant, it is utilized in any febrile condition, including acute, chronic and recovery phases and will increase the body's sensitivity to adrenaline.
- ▶ **Lowers blood pressure** due to dilation of peripheral vessels. It stimulates digestion and tones the blood vessels, and is specific for thrombotic conditions with hypertension.
- ▶ Urinary antiseptic it is indicated in infections such as cystitis. Achillea is both a **relaxant and tonifying agent for the smooth muscle of the pelvic viscera**.
- ▶ Used externally it will **aid in the healing of wounds**. It is astringent and used as a hemostatic in a variety of **bleeding conditions associated with mucous membranes** (wounds/ulcers)



Yarrow (*Achillea millefolium*)

- ▶ Cardiovascular Conditions: Varicose veins, elevated diastolic blood pressure.
- ▶ Gastrointestinal Conditions: Being predominately bitter, is used for atonic states of the stomach. The German Commission E lists indications as loss of appetite and dyspeptic ailments, such as mild, spastic discomforts of the gastrointestinal tract. Mills and Bone include the use of *Achillea* as a diaphoretic herb to control fever in gastrointestinal infections and viral hepatitis.
- ▶ Gynecological Conditions: Considered a universal regulator of female reproductive function. It achieves this effect through vitalizing the venous circulation to remove uterine and pelvic congestion. It is a uterine stimulant, and relieves delayed, painful menses and has a spasmolytic effect allaying dysmenorrhea. Is also used as a hemostatic in dysfunctional uterine bleeding. Will check excessive bleeding (eg. menorrhagia) if taken long-term and is used as a supportive herb for uterine myomas. As sitz bath *Achillea* can be used in the treatment of painful, cramp-like psychosomatic conditions in the lower part of the female pelvis.
- ▶ Respiratory System Conditions: Indicated as a diaphoretic in acute and chronic bronchitis.

Yarrow active components:

- ▶ **Thujone** is present in low amounts, however in high doses is toxic to the nervous system and an abortifacient. Low doses are anti-fungal, anti-microbial, emmenagogue and immuno-stimulant.
- ▶ **Volatile oils:** **Chamazulene** is soothing, anti-allergic and anti-inflammatory. **Borneol** is anti-microbial. **Cineole** is antispasmodic, carminative and antiseptic. **Caryophyllene** is anti-allergic, anti-inflammatory and hepatic.
- ▶ **Sesquiterpene lactones** are anti-inflammatory, antimicrobial, cytotoxic and can cause contact dermatitis.
- ▶ Tannins are astringent and anti-hemorrhagic.
- ▶ Flavonoids are antispasmodic and anti-inflammatory.
- ▶ Alkaloids **betonicine**, **stachydrine**, **trigonelline** are anti-pyretic and hypotensive.
- ▶ Alkaloid **achilletin** reportedly stops bleeding in animals. It soothes the digestive system by relieving muscle spasms in the intestines, promotes the flow of digestive bile, fights bacterial invasion, and firms and tightens tissues.
- ▶ **Furanocoumarins** are anticoagulant.
- ▶ **Achillein** (a bitter glycoside) is a choleric and digestive stimulant.
- ▶ **Alkamides** (also found in Echinacea) are anti-inflammatory.
- ▶ Three antitumor sesquiterpenoids, **achimillic acids A, B and C**, were isolated as methyl esters from and found to be active against mouse P-388 leukemia cells in-vivo.

Yarrow contraindications

- ▶ Avoid during the first trimester of pregnancy as it has a mild uterine stimulant effect. Long-term use (months) may lead to photosensitivity and that sensitive individuals may develop a rash. The essential oil is contraindicated in pregnancy due to its emmenagogue and abortifacient effects. Increases gut motility, thus may theoretically decrease absorption of drugs if taken simultaneously.
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