SALICIN is the metabolic precursor of salicylic acid, a wonder compound.

Salicin (C13H18O7) is an alcoholic beta-glycoside which contains D-glucose. Salicin is an anti-inflammatory which is produced from all Willow barks. Salicin, chemically speaking, is closely related to aspirin and has a very similar action in the human body. When consumed, it is metabolized to salicylic acid. White Willow (specifically, the bark) is the original source of salicin, a weaker forerunner of aspirin. When extracted from the buds, it yields three times more salicin than when extracted from the adult white willow bark. Additionally, when extracted from the adult bark, there is the inconsistency of phytochemical content not being present in the finished product. Salicin provides the same analgesic and anti-inflammatory benefits that aspirin does, but it does so without producing gastrointestinal bleeding or any of the other potential side effects associated with synthetic aspirin. Embryonic White Willow buds are more effective than its counterpart the adult white willow.
Salicylates were first isolated from the willow by the French pharmacist Henri Leroux in 1829. This gave rise to the eventual development of the drug Aspirin (acetylsalicylic acid) by the German company Bayer in 1899. The first recorded use of salicylates dates back about 4,000 years ago to the Sumerians, who noted the pain remedies of the Willow tree on clay tablets. White Willow (Salix Alba L.) takes its botanical name from the Celtic word “sal”, meaning near, and “lis”, meaning water.

The genus Salix has nearly 450 species. Most willows are found in temperate and arctic zones, but some species can be located in subtropical and tropical zones. They are geographically distributed in all continents except Antarctica and Australia. Willows include small trees, shrubs, and groundcovers, and many species are dioecious with male and female catkins (flowers) on separate plants. The catkins are cylindrical in shape, measuring 6 to 7 cm (3-4 inches) in length.

Gender Anatomy

The male flowers are yellow, and the female flowers are green. Insect pollinated, different species of willow hybridize freely. Willow trees may grow 6 to 18 meters (20 to 60 feet) in height. Medicinal willow bark is collected in the early spring from young branches 2 to 3 years of age. Other species of Salix have similar chemistry and pharmacology. The gender of the bud will have a different phytochemical composition - a male bud will be androgenic and a female bud will contain phytoestrogen. The bisexual plants will have a bit of both. Then you have the Hermaphrodite. A female bud will usually have spike-like clusters pistillate flowers possess a functional pistil or pistils, but lack stamens. Staminate (male) flowers contain stamens, but no pistils; it is more like round ball. The female sex organ looks like a long hair protruding from a calyx, which is a round oval thing. The whitish colored hair is the most important thing in identifying sex. The male sex organ looks like clumps of tiny balls, or sometimes banana like shaped structures that grow in bunches.
Catkins: You can clearly see the difference between the longer hanging male catkins and the smaller upright female catkins.

**White Willow female buds** have a higher concentration of salicin than the male buds. Although salicin is considered the major active constituent, there is research interest in the anticancer activity of other polyphenols and flavonoids that is contained in this plant. Salicin is derived from the salicylate phytohormones. The concentration of salicin is actually much lower in willow bark than in other Salix species. The highest concentrations were found in the White Willow embryonic buds stage of growth which makes perfect sense. Salicylates are stress and immune hormones which are more concentrated at this stage of growth in order to protect their offspring from predators and allow them to grow into a mature plant. Salicylates are also highest when a plant is under stress from herbivores attack. White male buds are more susceptible to herbivore invasion because of their lower content of salicin. All of those “petit détails” (small details) makes the whole difference for optimal extraction rendering much superior products. We are as good as our tools are. For one, we need products that are non-toxic. Secondly, we need reliable and effective products that are potent with a full spectrum of active phytochemicals. Many practitioners are well intended but their tools or agents may not be.

An animal model in rats was used to demonstrate that white willow buds extract, on a milligram per kilogram basis, was as effective as acetylsalicylic acid (ASA) in reducing various inflammatory mediators.8

Modern herbalists or phytotherapists tend to extrapolate the data from studies done on aspirin and apply those findings to willow bark which is misleading as they use the adult extracts. Some of the studies cited by me are as well from aspirin studies but this time with a product that is at least equivalent in its milligram amount to aspirin. Furthermore duplicated and confirmed by in vivo human studies conducted with the novel use of
embryonic white willow bud extracts demonstrating their superiority in comparison to the isolated use of acetylsalicylic acid aspirin (ASA).

The high concentration of tannins in willow bark (8-20%)\(^1\) is higher than almost any other plant on earth, and can lead to gastrointestinal toxicity or absorption problems before any therapeutic concentrations of salicylates can be achieved. Tannins are naturally occurring plant polyphenols. Their main characteristic is that they bind and precipitate proteins and other macromolecules like starch, and cellulose. However, they interfere with the absorption of alkaloid compounds, salicylic acid, iodine, zinc, iron and copper.

As per the American Herbal Pharmacopoeia and the European Pharmacopeia, the consensus on condensed tannins solvency requires no less than 50 % alcohol. In many plants, there is a large fraction (sometimes over 50%) of the tannins that cannot be extracted; these are known as insoluble tannins. Aqueous ethanol 50-70% alcohol to water > you will need at least 50% alcohol to successfully dissolve condensed tannins.

Some herbalists recommend willow bark extract as a natural alternative for aspirin. However, this is incorrect. Only with embryonic willow buds with 60% alcohol solvent can the same and even superior therapeutic benefits than aspirin is achieved. The content of tannins found in the buds is only 1% in comparison to the bark, which can be as high as 20%. Some manufacturers of embryonic plant extract using only 35% alcohol. Additionally, some also do not remove the cataphylls from their raw material, resulting in higher concentrations of undissolved condensed tannins.

Glycerine is a better solvent for some types of tannin than alcohol; some manufacturers add a little glycerine to alcoholic tinctures to inhibit the precipitation of tannins and other constituents that tend towards sedimentation.

The higher the alcohol content, the more preserving power you have. Twenty five percent alcohol is a minimum preservative and 50% or more percent will maximize the preservative potential, allowing a product to have a shelf life of five years on average.

Acetone-water mixtures are more effective solvents than ethanol-water mixtures for the extraction of condensed tannins in most plants, and are equally effective across a range of concentrations from 50 to 70% (v/v). The most effective concentration of ethanol in water was 50% (v/v). At these concentrations, terminal and extension subunit composition was comparable to ethanol and acetone extracts, although average polymer length and polymer number varied. Based on these observations, 50% ethanol in water would be a more suitable substitute for 70% acetone in cases where organic solvents such as acetone are unacceptable for human consumption. The extraction variability reported between the solvents indicates that the selection of solvent mixture is important and depends on the objective of the analyses to be performed on the type of tannin being extracted.\(^17\)

**Location of Tannins in various plant tissues:**

- Bud tissues - most common in the outer part of the bud cataphyll, as protection against freezing for the winter in the spring the cataphylls (scales) are shed before harvesting the buds.
• Leaf tissues - most common in the upper epidermis. However, in evergreen plants, tannins are evenly distributed in all leaf tissues. They serve to reduce palatability and, thus, protect against predators.

• Bark and Root tissues - most common in the hypodermis (just below the suberized epidermis). They probably act as a chemical barrier to penetration and colonization of roots by plant pathogens.

• Seed tissues - located mainly in a layer between the outer integument and the aleurone layer. They have been associated with the maintenance of plant dormancy, and have allelopathic and bactericidal properties.

• Stem tissues - often found in the active growth areas of the trees, such as the secondary phloem and xylem and the layer between epidermis and cortex. Tannins may have a role in the growth regulation of these tissues. They are also found in the heartwood of conifers and may contribute to the natural durability of the wood by inhibiting microbial activity.

Conversion of salicin→ saligenin→salicylic acid

When ingested, salicin, the active glycoside, is hydrolyzed in the intestine and liver to saligenin, which in turn is absorbed and then oxidized to the therapeutically active compound salicylic acid. Then it is excreted as such in the urine, which makes it helpful for treating kidney, urethra, bladder and other urinary tract irritations.

Because of this conversion process, White Willow generally takes longer to act than aspirin, but the effects last for an extended period of time. Salicin provides a more sustained release of salicylic acid than acetylsalicylic acid (ASA - aspirin) itself.

The ester glycosides salicortin, tremulacin, and fragilin can be considered to be prodrugs of salicylic acid, which deliver this compound into the systemic circulation without irritating the GI tract or causing bleeding. Salicylic acid inhibits cyclooxygenase enzymes, which are involved in prostaglandin synthesis. This compound inhibits prostaglandins, which induce inflammation, pain, and fever. The anti-inflammatory efficacy of tremulacin, a derivative of salicin, has been well studied.

Salicylic acid compound has been synthesized and mimic synthetically into acetylsalicylic acid, otherwise known as aspirin. Salicylic acid is believed to be the constituent responsible for mediating white willows analgesic biological activities including rheumatism, headache, neuralgia, arthritis, and angina.¹
Today, aspirin is recognized as a particularly powerful drug. Perhaps more powerful than anyone ever thought, suggests Helen M. Arthur, PhD, and colleagues at the University of Newcastle in England.

In test-tube studies, the researchers find that aspirin has the same effects that some of the most cutting-edge new anticancer drugs do. It *keeps newborn cancers from growing the blood vessels they require to become full-blown tumors* - a process called *angiogenesis*. White Willow buds can safely inhibit angiogenesis.4

The following therapeutic biological activities are scientific evaluation not only cited from aspirin studies but from my extensive research with a number of analytical approaches have been used to quantify salicylates in willows, including spectrophotometry, thin-layer chromatography (TLC), high-performance liquid chromatography (HPLC) after enzymatic deglycosylation, capillary electrophoresis, and an electrochemical method known as square wave voltammetry. A method using gas chromatography of silyl derivatives of salicylates gave results comparable to those of HPLC. Nuclear magnetic resonance spectra of the principle salicylates of willows have been reported and assigned. More importantly, the in vivo human studies were conducted with the novel use of embryonic plant extracts. Furthermore documented in vivo before and after blood tests analysis of many inflammatory markers, cytokines (interleukins) and other immunological flow cytometry studies to validate their therapeutic actions and human health benefits.

**Embryonic White Willow Buds Biological Activities:**

- Analgesic, Anti-inflammatory drug NSAIDs and Analgesic. Cyclo-oxidase-2 (COX-2) protein inhibitors.12,13,14
- Angiogenesis inhibitor: destabilizing plaque that builds up in the arteries and prevents by 35% breast, colon, pancreas and prostate cancers.4 Anti-Neoplastic. Suppresses the proliferation in lymphoblastic leukemia, and melanoma in human cancer cells induces apoptosis. A report found that willow extract killed 75% to 80% of abnormal cells harvested from 7 patients with acute lymphoblastic leukemia and 13 patients with acute myeloid leukemia.9
- Anti; Acne, Dandruff, Psoriasis, Calluses, Corns, Keratosis pilaris and Wart's.
Antifungal Agent.

Cosmetic application by inhibiting the heat shock protein 47 expression.\textsuperscript{5} Retards senescence (regulatory role) by preventing photoaging of the skin being anti-melasma.

Hyperglycemic, Hypoglycemic, Insulinic.

Immune reporter’s response signaling pathways.

Increases cell metabolism rate to take advantage of new complete more advantageous nutrient and environmental conditions.

Mild antibiotic and Antipyretic.

NSAIDs (nonsteroidal anti-inflammatory drugs), salicylic acid inhibit the enzyme COX-2, decreasing inflammation. Adult white willow bark has been shown to be effective at inhibiting COX-2. Whereas white willow buds were very effective.

Potent epidermal growth factor receptor (EGF-R) tyrosine kinase inhibitor.

Potentiate NADPH oxidase-mediated reactive oxygen generation in some cancer cells to promote apoptosis.

Prevents heart attack. Reduces the risk of ischemic stroke and indirectly lowers the risk of dementia that complicates vascular disease.

Prostaglandin inhibitor.

Reduce the risk of pregnancy complications in women with pre-eclampsia and in those with antiphospholipid antibody syndrome (APS, Hughes syndrome).

Release of natural endorphins.

Salicylates possess mild diuretic properties.

Salicylic acid and Jasmonic acid: RNA silencing mechanisms systemic response, as they can block virus replication.

Salicylic acid can be listed among antioxidants and phytochemicals. Reducing reactive oxygen species (ROS)\textsuperscript{10,11}.

The mild anti-clotting effect of natural salicylates provides cardioprotective benefits; reduces the production of platelet aggregating factor thromboxane A2. Antithrombotic.\textsuperscript{15}

Triggers systemic immune response.

Works as a keratolytic agent by causing the cells of the epidermis to shed more readily, preventing pores from clogging up, and allowing room for new cell growth regeneration.

**PHYTOPHARMACOKINETICS**\textsuperscript{5}

Salicylic acid is the secondary metabolite of salicin detected in the serum 86% of total salicylates, besides salicylic acid 10% and gentisic acid 4%. Peak concentrations of salicylic acid were reached 3 hours after oral administration with plasma half-life 2.5 hours. Renal elimination occurred predominantly in the form of salicylic acid. Peak
serum levels of salicylic acid were on average 1.2 mg/l, and the observed area under the serum concentration time curve (AUC) of salicylic acid was equivalent to that expected from an intake of synthetic aspirin 81 mg acetylsalicylic acid. Willow bark extracts in the current therapeutic dose leads to much lower serum salicylate levels than observed after analgesic doses of synthetic salicylates.

This is why you should only use embryonic White Willow – Salix Alba (buds) extracts at a 1:20 concentration which clearly resolves the problems of inconsistencies associated with adult herbal extractions and their high tannins content (which prevents absorption and conversion of salicylic acid). As clearly demonstrated in the August 2012 study done by the University of Bari, Italy the conclusive evidence from embryonic White Willow buds having three times the amount of salicin content than adult willow bark extracts. In addition, embryonic white willow bud extractions contain per 1 ml (or 20 drops) 410 mg of salicin which in the body converts into the secondary metabolite salicylic acid. A typical 500 mg dose of aspirin is equivalent to 794 mg of salicin. To round off these numbers, 800 mg of Salicin is equivalent to 500 mg of Aspirin; it will take approximately 38 drops of White Willow buds to equal the 500 mg of aspirin and 19 drops as an alternative to 250 mg of aspirin. All of this is just an approximation and not an exact certification but helps us how to gauge therapeutic levels.

Adult plant crude extractions start at a ratio of 1:4 and up. Having less solvent to the ratio of raw material have been found to have less bioavailable phytochemicals than what is found in embryonic plant extractions which is now proven to have more phytochemicals concentration present and in addition more bioavailable for reaching therapeutic goals.

Crude extractions have a ratio of 1:4 - others as low as 1:20

Furthermore, embryonic White Willow bud extracts ratios are only 1:20 concentrations which represent 1 part of fresh plant tissues to 20 part of solvent. In addition, this 1:20 concentration strength represents only half (5%) of a classical mother tincture Ø which is (10%) of a crude extract and amazingly, resulting in higher phytochemical concentration than any other type of adult crude extracts or mother tincture. Embryonic phytotherapy is more potent than any other type of extraction methods in the world. Embryonic phytotherapy is the answer to all of the problems encountered with adult phytotherapy: inconsistencies, lack of active phytochemicals, lack of bioavailable, lack of effectiveness and too often, even toxic. Giving embryonic plant extracts a new legitimacy. For this as a form of multi-targeted therapy a lot of examples are presented. The exact mechanisms of action underlying these synergy effects are now becoming known. It could be explained by a multi-target action of compounds on a molecular level or partly by an improved resorption rate and a change of phytopharmacokinetic. For many years, the concept of classical phytotherapy using herbal drug combinations with superior efficacy and lesser side effects in comparison with single isolated constituents of plant extracts has been repeatedly assessed clinically as well as pharmacologically.
ASPIRIN

- Low doses is 81mg
- Medium doses is 325mg
- High doses is 650mg

The production of anti-inflammatory effects has been noted at low dosages as many studies have concluded.

The recommended aspirin dosage for adults varies according to the disease being treated. Serum salicylate levels may be useful in gauging therapeutic decisions regarding dosage titration. Serum salicylate levels of 150 to 300 mcg/mL are associated with anti-inflammatory response. However, the incidence of toxicity increases with salicylate levels greater than 200 mcg/mL.

<table>
<thead>
<tr>
<th>CONDITIONS</th>
<th>Aspirin acetylsalicylic acid</th>
<th>White Willow – Salix Alba (buds) salicylic acid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Angina Pectoris</strong></td>
<td>75 mg to 325 mg orally once a day beginning as soon as unstable angina is diagnosed and continuing indefinitely.</td>
<td>6-25 drops once a day</td>
</tr>
<tr>
<td><strong>Blood clots</strong></td>
<td>650 mg bid for 14 days For surgery initiate 1 day prior surgery and continues 14 days</td>
<td>50 drops bid Because of its short half-life it would be preferable to give 35 drops tid</td>
</tr>
<tr>
<td><strong>Cancer Prevention</strong></td>
<td>81 mg once a day</td>
<td>7 drops Because of its short half-life it would be preferable to give 5 drops tid</td>
</tr>
<tr>
<td><strong>Fever</strong></td>
<td>80 mg per kg of body weight, divided into several doses PRN.</td>
<td></td>
</tr>
<tr>
<td><strong>Headaches</strong></td>
<td>Two 325 mg tablets every four hours</td>
<td>25 drops every 4 hours</td>
</tr>
<tr>
<td><strong>Inflammation</strong></td>
<td>60-125 mg per kg of body weight.</td>
<td></td>
</tr>
<tr>
<td><strong>Pediatric Juvenile Rheumatoid Arthritis</strong></td>
<td>2 to 11 years or less than or equal to 25 kg: ml Initial: 60</td>
<td></td>
</tr>
</tbody>
</table>

The production of anti-inflammatory effects has been noted at low dosages as many studies have concluded.
to 90 mg/kg/day orally in equally divided doses. Maintenance: 80 to 100 mg/kg/day orally in equally divided doses; higher dosages, up to 130 mg/kg/day, may be necessary in some cases, not to exceed 5.4 g/day.

12 years or older or greater than 25 kg: Initial: 2.4 to 3.6 g/day orally in equally divided doses. Maintenance: 3.6 to 5.4 g/day orally in equally divided doses; higher dosages may be necessary in some cases.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Dosage</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Migraine</strong></td>
<td>1000 mg, at the first appearance of pain or symptoms.</td>
<td>75 drops</td>
</tr>
<tr>
<td><strong>Myocardial Infarctus</strong></td>
<td>81 mg once a day Acute 650 mg on your way to the ER 160 to 162.5 mg orally once a day beginning as soon as an acute myocardial infarction is suspected and continuing for 30 days.</td>
<td>7 drops Because of its short half-life it would be preferable to give 5 drops tid. 50 drops on the way to ER</td>
</tr>
<tr>
<td><strong>Pain (general)</strong></td>
<td>325 mg - 650 mg Every 4-6 hours PRN Never exceed 4000 mg QD</td>
<td>25-50 drops every 4-6 hours PRN</td>
</tr>
<tr>
<td><strong>Osteoarthritis</strong></td>
<td></td>
<td>25-50 drops every 4-6 hours PRN</td>
</tr>
<tr>
<td><strong>Rheumatoid Arthritis</strong></td>
<td>500-1000 mg, 4-6 times QD at regular intervals. 3-4 grams per day.</td>
<td>38-75 drops 4-6 times QD At regular intervals. 3-4 grams per day</td>
</tr>
<tr>
<td><strong>Rheumatic Fever</strong></td>
<td>80 mg per kg of body weight, divided into several doses PRN.</td>
<td></td>
</tr>
<tr>
<td><strong>Stroke</strong></td>
<td>75 mg to 325 mg orally once a day, continued indefinitely.</td>
<td>6-25 drops once a day</td>
</tr>
</tbody>
</table>
should NOT use aspirin.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Dosage Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systemic Lupus Erythematosus (SLE)</td>
<td>3 grams per day in divided doses 225 drops per day in divided doses</td>
</tr>
<tr>
<td>Pediatric Pain</td>
<td>10-15 mg per kg of body weight, taken every 6 hour, but should not exceed 2400 mg per day.</td>
</tr>
<tr>
<td>Canine Arthritis</td>
<td>5mg to 10mg per pound of the dog’s weight, or about 10-20mg per kg weight for every 12 hour period.</td>
</tr>
</tbody>
</table>


This extract should always be taken on empty stomach at least 30 minutes before meal or 1 hour after a meal into ½ glass quality filtered water and SIP over a period of 5 minutes.

**Salicylic acid, a multifaceted phytohormone to combat disease.**

**A Plant Immune Hormone (PIH) and A Plant Stress Hormone (PSH)**

Salicylic acid is perhaps the only compound on the surface of the earth to mediate so diverse functions as ranging from having many biological activities in human ailments to protect the plants from various biotic and abiotic stresses and affecting various physiological and biochemical processes of plants.

COX-1 has one very crucial function. It is responsible for the proper functioning of the stomach and intestinal lining. Specifically, it promotes the production of the natural mucus lining that protects the stomach, the duodenum, and the small intestine. With the use from isolated aspirin inhibit COX-1; you compromise the integrity of the intestinal tract. With embryonic plant extracts this detrimental COX-1 inhibition does not occur if not needed since embryonic phytotherapy for one by pass the stomach altogether and only after being metabolize in the liver to its secondary metabolite does it then turns to salicylic acid. Second it is not used isolated and other phytochemicals are present, plant stem cells and phytohormone plays a novel adaptive and modulating role which is never found in any other type of therapy in the whole world. The highest concentration of Salicin content is not found in a laboratory, but in nature.

The benefits from embryonic plant extracts of White Willow (buds) do not stop here. It is also good for the following conditions:6

**Topical Use**

Controls dandruff by adding 10-15 drops to your shampoo and leave it on for 2-3 minutes, then wash it out.

Fungus infections on the skin (or in your garden plants and/or soil): Take 1 quart (1 liter) of distilled water and add 30 drops and with a cloth, treat affected area once or twice a day until gone. Continue for an additional two to three days to prevent relapsing.
Helps fresh cut flowers last longer: add 15 drops to your water and change every 2 days.

Insect bites and stings: apply 1 drop for each bite as needed 2-4 times per day.

Mouthwash for sore gums, and as a gargle for tonsillitis. Dosage 15 drops into ¼ cup lukewarm water; gargle, then spit several times - the last gargle should be swallowed.

Pimples: apply 1 drop per and gently rub in till absorbed nightly and repeat until gone.

Remove egg stains from your clothes: first, remove debris of the egg excess and put a few drops mixed with lukewarm water and cream of tartar enough to cover area and wait 30 minutes, then wash normally.

Restore hair color: equal parts of White Willow buds extract 50 drops and 50 drops of lukewarm water mixed well and keep away from the eyes. Rub the solution thoroughly into your hair, and let it set for 10-15 minutes.

Soften hard calluses on your feet: at bedtime, put as many drops as needed to cover area and massage into the skin and sleep with it all night and shower in the morning as usual.

**Contraindications:** Patients with known hypersensitivity to aspirin-salicylates should avoid any willow-containing product. This caution also applies to patients with asthma, impaired thrombocyte function, and vitamin K antagonistic treatment. Do not let the thought of Reye's syndrome fool you either - there is no real conclusive evidence to say that Bayer Aspirin was responsible for the disease. The whole Idea is ridiculous; Reye's syndrome typically follows an acute viral infection. Epidemiological studies show that children found with this disease had an increased use of aspirin. They had the flu, so their mother gave those aspirin—Their mother gave aspirin, because they knew knowing full well that it was the only drug that worked. The fact that children died from the disease after taking the aspirin just shows that they were not given the right drug, and that the choice was made because of popular belief in the drug. Definitive contraindications are with a glucose-6-phosphate dehydrogenase deficiency (G6PD), low platelets as in idiopathic thrombocytopenic purpura (ITP), acute hemorrhaging.

Tylenol, despite its popularity, can be a dangerous drug, especially for children. It stays in the liver, and accumulates until it has reached poisonous levels. Tylenol is one of the only drugs we know that will cause cirrhosis of the liver all by itself.

Do not use in patients with known allergy to aspirin, anti-seizure medications, anti-inflammatory or bleeding disorders and do not use it with *Maidenhair - Ginkgo Biloba (buds)*. If you are taking blood-thinning medications such as Coumadin® (warfarin), heparin, Plavix® (clopidogrel), Ticlid® (ticlopidine), Trental® (pentoxifylline), or aspirin; methotrexate; metoclopramide; Dilantin® (phenytoin); Wellbutrin sulfonamide drugs; spironolactone and other Potassium-sparing diuretics; or the antiseizure drug valproic acid: It may be wise to avoid combining white willow with these substances.

Salicylates are *contraindicated* in gout, as with the above functions, they also lead to foster uric acid discharge in the kidney and have a mild diuretic consequence. Salicylates can aggravate rosacea. Pregnant women and those with chronic
gastrointestinal conditions such as ulcers, colitis, or Crohn's disease should not use this herb.

**Black Poplar – Populus Nigra (buds)** is the alternative for people whom have known intolerance to salicylates, salicin, and salicylic acid found in Aspirin and White Willow bark or buds. It contains the alternative phytochemical called **Populin** which is a cousin of salicylic acid. Populin is also a NSAID, but will not increase or retain elevated uric acid nor cause the side effects associated with salicylates, or salicylic acid intolerance. To the contrary, it will greatly improve gout sufferer. Populin has been determined to be antipodagra. Tremulacin has been determined to be analgesic and anti-inflammatory.

![POPULIN](image1.png) ![SALICIN](image2.png)

Populin is used to augment the general adaptation syndrome (GAS), which suggests it increases adaptation energy by improving resistance to infectious disease. Also, it is a remedy those who suffer from exhaustion as it increases the vital force of the body. Additionally, it helps healing wounds and old ulcers that just won’t heal otherwise.

Salicylates are generally contraindicated during uricosuric therapy. Although large doses of salicylates (more than 5 or 6 grams daily) have uricosuric activity, smaller doses less than 2 or 3 grams daily of ASA will depress uric acid clearance and may induce hyperuricemia and gout. Salicylates also decrease the uricosuric effect of sulfinpyrazone and probenecid. There is data suggesting that these drugs decrease salicylate excretion, possibly leading to salicylate toxicity.

**Uricosuric drugs** are substances that increase the excretion of uric acid in the urine, thus reducing the concentration of uric acid in blood plasma.

**Antiuricosuric drugs** raise serum uric acid levels and lower urine uric acid levels. These drugs include all diuretics, pyrazinoate, pyrazinamide, ethambutol, and aspirin. The NSAID diclofenac has an antiuricosuric action.

Antiuricosuric drugs are useful for treatment of hypo-uricemia and perhaps also hyper-uricosuria, but are contraindicated in persons with conditions including hyper-uricemia and gout.

**Interactions:**

Anticoagulants may potentiate the effects of drugs and other herbs with blood thinning properties, and increase the risk of bleeding.

Beta blockers: including Atenolol (Tenormin), Metoprolol (Lopressor, Toprol-XL), Propranolol (Inderal, Inderal LA). White Willow renders these drugs less effective.

Diuretics: White Willow may make these drugs less effective.
Methotrexate and phenytoin (Dilantin) White Willow will increase the levels of these drugs in the body, resulting in toxic levels.

Other non-steroidal anti-inflammatory drugs including ibuprofen (Advil, Motrin) and naproxen (Aleve). Taking White Willow with these drugs may increase risk of stomach bleeding.

References:
2. Cochrane Database Syst Rev. 2006; (2):CD004504 (ISSN: 1469-493X). Gagnier JJ; van Tulder M; Berman B; Bombardier C. Provincial Medical Centre, 5955 Ontario St., Unit 307, Windsor, Ontario, Canada, N8S1W6.
3. Ann N Y Acad Sci. 2004; 1019:223-7 (ISSN: 0077-8923). Nizard C; Noblesse E; Boisd C; Moreau M; Faussat AM; Schnebert S; Mah C. LVMH Branche Parfums et Cosmetiques, 45804, Saint Jean de Braye, Cedex, France.

17. Comparison of Ethanol and Acetone Mixtures for Extraction of Condensed Tannin from Grape Skin
M.O. Downey, R.L. Hanlin Department of Primary Industries Victoria, PO Box 905, Mildura, VIC 3502, Australia.April 2010 PDF.

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