SWINGING THE PENDULUM- ACID-BASE CHEMISTRY FOR HERBALISTS

DR. KENNETH PROEFROCK

WHAT IS COMPOUNDING?

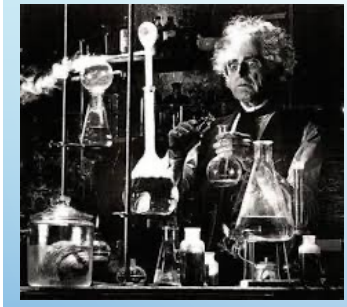
COMPOUNDING WAS THE ART AND SCIENCE OF PREPARING PERSONALIZED MEDICATIONS FOR PATIENTS.

"MADE FROM SCRATCH" – INDIVIDUAL INGREDIENTS MIXED TOGETHER IN THE EXACT STRENGTH AND DOSAGE FORM FOR THE PRESENTING PATIENT ANDTHEIR CONDITION

MEDICINE IS A CONTEXT SPECIFIC ENDEAVOR THAT IS NOT CONDUCIVE TO A 'ONE SIZE FITS ALL' APPROACH.

MASS PRODUCED PRODUCTS ARE THE BLUNTEST INSTRUMENTS TO APPLY TO A HEALTH CONDITION—

THE COMPOUNDER



NEARLY ALL PRESCRIPTIONS WERE COMPOUNDED PRIOR THE ADVENT OF MASS DRUG MANUFACTURING IN THE 1950S AND '60S. THE PHYSICIAN'S AND THE PHARMACIST'S ROLE AS A PREPARER OF MEDICATIONS QUICKLY CHANGED TO THAT OF A DISPENSER OF MANUFACTURED DOSAGE FORMS, AND MOST MEDICAL PRACTITIONERS WERE NO LONGER TRAINED TO COMPOUND MEDICATIONS.

THE "ONE-SIZE-FITS-ALL" NATURE OF MANY MASS-PRODUCED MEDICATIONS MEANT THAT SOME PATIENTS' NEEDS WERE NOT BEING MET.

NATUROPATHIC MEDICINE

MAINTAINED THE ABILITY TO COMPOUND IN THEIR LICENSURES.

- CERTIFICATE TO DISPENSE

HERBAL MEDICINE, ONE OF THE PILLARS OF NATUROPATHIC TRADITIONAL PRACTICE, INVOLVES THE MIXING OF BOTANICAL TEAS, POWDERS AND TINCTURES.

PART OF THAT TRADITION ALSO OFTEN INCLUDED THE IN OFFICE COMPOUNDING OF A MULTITUDE OF SUPPLEMENTAL AMINO ACID, VITAMIN, MINERAL AND CONCENTRATED FOOD POWDERS, THE DISPENSING OF NUTRACEUTICALS AND THE INTRAVENOUS ADMINISTRATION OF NUTRITIONALLY ORIENTED FLUIDS.

Naturopathic Physicians: Natural Medicine. Real Solutions.

TYPES OF COMPOUNDING

- POWDERS/CAPSULES (BOTANICAL AGENTS, EXTRACTS, AMINO ACIDS, NUTRACEUTICALS, NUTRITIONAL SUPPORT)
- TINCTURES (BOTANICAL EXTRACTS, HOMEOPATHIC MOTHER)
- CREAMS/GELS/SALVES
- OPHTHALMIC PREPARATIONS (EYEDROPS, EYEWASHES)
- NASAL SPRAY/IRRIGATION
- NEBULIZER SOLUTIONS
- INJECTABLES (IM/SQ/IV)

DOCUMENTATION

IF IT ISN'T WRITTEN DOWN, IT DIDN'T HAPPEN.

IF IT ISN'T WRITTEN DOWN CORRECTLY, IT STILL DIDN'T HAPPEN—BUT YOU ARE LIABLE

DOCUMENTATION SHOULD BE SIMPLE, UNAMBIGUOUS, EASY TO READ DOCUMENTS SHOULD BE KEPT UP-TO-DATE

DO YOU HAVE:

1. CORRECT FORM
2. CORRECT INFORMATION ON FORM
3. FORM IS COMPLETE
4. INFORMATION IS LEGIBLE AND READILY ACCESSIBLE
5. DEMONSTRATES CONFORMITY: ZEROGAP BETWEEN ACT PERFORMANCE AND ESTABLISHED POLICY

Sumerian pharmacy tablet 3500 BCE

BASIC COMMON SENSE IDEAS

WEAR CLEAN CLOTHING—DON PROTECTIVE APPAREL TO PREVENT CONTAMINATION

PRACTICE GOOD SANITATION—IF YOU ARE SICK OR HAVE OPEN WOUNDS, MAYBE YOU SHOULDN'T BE INVOLVED IN THE MAKING OF PEOPLE'S MEDICINES RIGHT NOW.

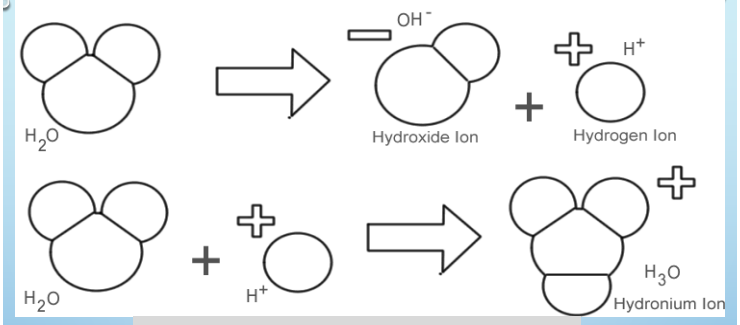
DON'T PICK YOUR NOSE OR YOUR EARS AND THEN HANDLE PRODUCT

YOUR PHONE IS A VECTOR OF CONTAMINATION

DOCUMENT EVERYTHING!!

DISSOCIATION OF WATER

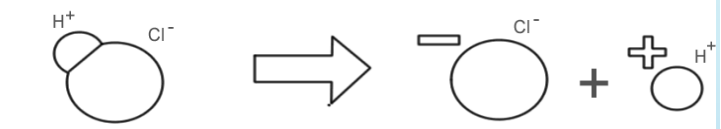
HYDROGEN (yellow)
OXYGEN (red)



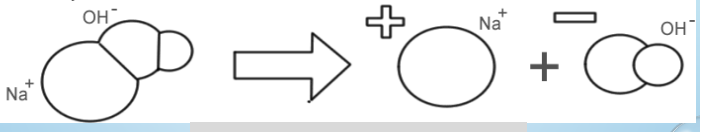
$H_2O \rightarrow OH^- + H^+$

Neutral pH Alkaline Acid

Hydrochloric Acid



Sodium Hydroxide



$HCl \rightarrow Cl^- + H^+$

$NaOH \rightarrow Na^+ + OH^-$

The pH scale is the standard measure of acidity and was developed by the head of the Carlsberg brewery laboratory's chemical department in 1909. Dr. Soren Sorenson (1868-1939) devised the scale while doing pioneering research into proteins, amino acids and enzymes. The meaning of pH is 'power of hydrogen' and the scale provides a simple measurement for the exact amount of hydrogen ions are in a solution.

Pure H_2O at 25.0^0 C has a concentration of H^+ ions that is 10^{-7}M. This places pure water at a 7 on the pH scale—coffee is about a 5, so the hydrogen ion concentration is 10^{-5} or 0.0001M
Because it involves the "decimal logarithm of the reciprocal of the hydrogen ion concentration" those solutions between 0-6 are acidic, and have the highest H^+ concentration and those from 8-14 are alkaline.

pH Scale - Universal Indicator Colours

pH	Example
0	Battery acid
1	Gastric acid
2	Lemon juice
3	Apple juice
4	Tomato juice
5	Black Coffee
6	Milk
7	Water
8	Egg
9	Baking Soda
10	Milk of Magnesia
11	Ammonia solution
12	Soap
13	Bleach
14	Drain cleaner

Increasingly acidic — Neutral — Increasingly alkaline

ACIDS

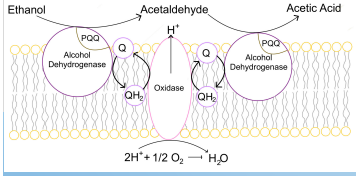
Many fruits contain acids, especially unripe fruit, which creates the sour taste. Most early acids were products of fermentation, dairy products like sour cream and yogurt are rendered more acidic than the milk/cream they are made from as the fermenting organisms create lactic acid as a product of their metabolism. Fermentation of fruits produce wine and grains produce beers/ales. Vinegar is a product of both. Old wine became soured and people used that sour wine as a condiment and preservative.

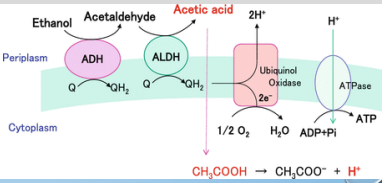
The word "Vinegar" is from a combination of two Latin words—*vin aigre*, "sour wine."

Wines and vinegars have been around since at least 6000 BC in Sumeria. Traces of vinegar have been found in Egyptian urns from around 3000 BC. Egyptian wall paintings contain many representations of viticulture.

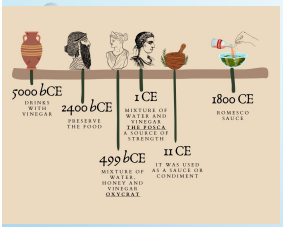
ACETIC ACID

Acetobacter spp. are the main agents of ethanol oxidation into acetic acid in wines, they are common in sour rotten grapes, which may increase acetic acid level in grape juices to values higher than 1 g/L of acetic acid. *Acetobacter aceti* and *Acetobacter pasteurianus* are the most common species recovered from wines. The final outcome is wine acetification by accumulation of acetic acid which, together with ethyl acetate, leads to the 'vinegar' taint. Because of their aerobic nature, the main preventive measure is to avoid contact with air after wine fermentation---unless you want acetic acid.





VINEGAR



Vinegars produced from various fermentations by acetic acid bacteria are a traditional seasoning condiment used all over the world. Various species of acetic acid bacteria, which are mostly the bacteria that inhabit the ingredients, barrels, or pots, are found in vinegar fermentations along with acetic acid. In these fermentation processes, *Acetobacter spp* form a microbial biofilm community with other microbes. This community produces acetic acid, which contributes to preserving fermented foods and producing health-related elements, and is itself a preservative. In Ancient Greece the mixture of water, honey and vinegar was common and known as *oxycrat*, while in Rome the popular drink *posca*, the same condiment mixed with water, was considered a source of strength. It was in Mesopotamia however, around 2,400 BCE, that vinegar became an essential means of preserving food, allowing it to remain fresh for long periods of time. This innovation gave rise to pickles and pickling, a technique still used today to preserve vegetables, meat and fish.

BOTANICAL TINCTURES

- Preserve an ages old system of creating hydro-ethanolic plant extracts.
- In some cases, can be directly translated into other solutions, hydrogels, nebulizers, nasal and eye washes...strategies for removing alcohol and rendering osmolarity and pH into physiologically comfortable/useful ranges become important.

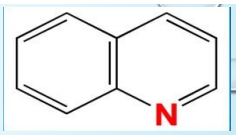
ALKALOIDS AND ACETRACTS

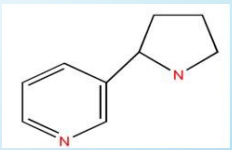
Alkaloids are not a straightforward family of compounds…there is no definitive difference between alkaloids and other naturally occurring complex amines

Generally, alkaloids are plant derived, tend to be alkaline in aqueous solutions (with exceptions) and contain at least one N2- atom

They tend to have a significant physiological effect on the humans and animals who consume them.

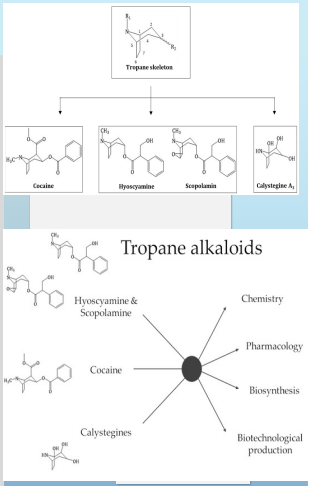
Many alkaloids tend to form acetate salts when processed with vinegar, which renders them more water soluble and amplifies their physiological effects.



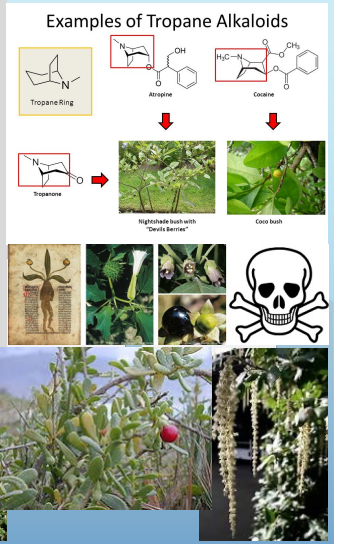


TROPANE ALKALOIDS

Tropane alkaloids (TA) are valuable secondary plant metabolites which are mostly found in high concentrations in the Solanaceae and Erythroxylaceae families. The TAs, which are characterized by their unique bicyclic tropane ring system, can be divided into three major groups: hyoscyamine and scopolamine, cocaine and calystegines. Although all TAs have the same basic structure, they differ immensely in their biological, chemical and pharmacological properties. Scopolamine, also known as hyoscine, has the largest legitimate market as a pharmacological agent due to its treatment of nausea, vomiting, motion sickness, as well as smooth muscle spasms while cocaine is the 2nd most frequently consumed illicit drug globally.



Tropane alkaloids belong to the world's oldest plant medicines and their ethnopharmacological applications include analgesia, hallucinogens, and poisons. These ornithine-derived compounds comprise mono-, di-, and tri-esters, carboxylated and benzoylated tropanes. Several of these alkaloids occur as chiral structures due to the presence of a tropic acid residue attached to the ecgonine nucleus as an ester. The former occurs naturally in its R-form, however, racemic mixtures may appear, especially during alkaline extraction (e.g., the formation of (+)-atropine from (–)-hyoscyamine).



ATROPA BELLADONNA- DEADLY NIGHTSHADE

Atropa belladonna, is named for *Atropos*, one of the three fates in Ancient Greek mythology. This particular fate was responsible for cutting the thread of life. Her second name has associations with the Italian goddess of battle *Bellona*.

Consumption creates a light sensitivity and blurred vision (due to dilation of the pupils), a sense of floating and spatial expansion beyond the body, drying of bodily fluids and inability to urinate, altered heart rate, sweaty hands, and a sense of being surrounded by the dead.

Contains the tropane alkaloids atropine, scopolamine, and hyoscyamine, which are made in the roots of the plant and collect in the leaves and stems after harvesting the plant.

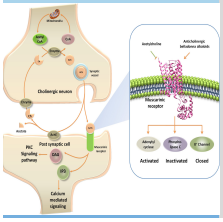
All parts of the plant contain tropane alkaloids. Roots have up to 1.3%, leaves 1.2%, stems 0.65%, flowers 0.6%, ripe berries 0.7%, and seeds 0.4% tropane alkaloids; leaves reach maximal alkaloid content when the plant is budding and flowering, roots are most potent at the end of the plant's vegetation period. Belladonna nectar is transformed by bees into honey that also contains tropane alkaloids. The berries pose the greatest danger to children because they look attractive and have a somewhat sweet taste, each berry can contain 2 mg of atropine. The root of the plant is generally the most toxic part, though this can vary from one specimen to another

BELLADONNA PREPARATIONS

Assuming 1.2-1.3% alkaloidal content in leaves and roots, with a preponderance of the alkaloids in the form of L-Hyoscyamine (87.6% in Leaves and 68.7% in roots), which converts into a less active, more stable racemic mixture of D,L-Hysocyamine. A standard dilution for a tincture is 1:5 dilution of herb in solvent, which produces a product that is 2.4-2.5 mg of alkaloid per ml of tincture. The solvent is usually a higher alcohol percentage, usually 65%, and the addition of an acidic element like apple cider vinegar might help keep the alkaloids in a free base form.

Assuming 30 drops per ml, each drop is 83 mcg of tropane alkaloids, 5 drops provides 415 mcg or 0.415 mg…

Most atropine eyedrops are 1% so they are 10 mg/ml, and one uses 1-2 drops at a time, which is 0.33 mg/drop.



5 drops of tincture is often our dose, and we might do that 3-4 times a day in cases of gastrointestinal cramping, or to relax stiff muscles. It seems to have some affinity for the GI tract and skeletal muscle.

ACETRACTS AND OXYMELS OF NOTE

Lobelia acetract--antispasmodic

Corydalis acetract—pain relief

Datura acetract—antispasmodic

Fire Cider-in some of its incarnations

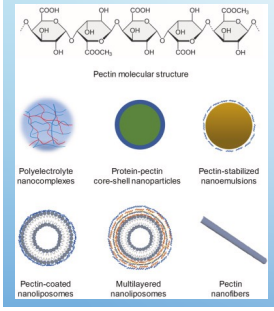
Oxymel (from Latin 'acid and honey', from Ancient Greek oxys 'acid' and meli 'honey') is a mixture of honey and vinegar (5:1 or so ratio), used as a medicine. According to Scientific American, the mixture has been used successfully against an antibiotic resistant biofilm and was as much as 1,000 times more bacteriacidal than vinegar alone and as much as 100,000 times more than honey alone.

GAWRYLEWSKI, ANDREA, SCIENTIFIC AMERICAN NEWSLETTER, OCTOBER 11, 2023

Pectins

Pectin is the primary component of all plants and makes up about two-thirds of the dry mass of plant cell walls where it offers structural integrity, strength, and flexibility. Pectin is a natural constituent of all omnivorous diets and is a significant source of dietary fiber. These oligosaccharides support useful microbiota in the gut and help lipid and fat metabolism as well as glycemic regulation. Marketable pectins are extracted from citrus peel and apple fruit, which contain 20%–30% and 10%–15% pectin, respectively, based on the dry mass. Pectin also comes from sunflower heads, mango peel, soybean hull, passion fruit peel, sugar beet pulp, Akebia trifoliata peel, peach pomace, banana peel, and even chickpea husk.

Pectin is applied in various food products as a gelling agent, thickener, texturizer, emulsifier, and stabilizer. Pectin grades are based on the number of parts of sugar, which one part of pectin will gel to an acceptable firmness under standard conditions of pH 3.2–3.5, sugar 65%–70%, and pectin at the limits of 1.5%–2.0%. 100–500 grades of pectins are available in the market



Some characteristics of pectin:
Dissolves in water to give a colloidal solution, which, when dehydrated, forms a solid gel. Dehydration may be brought about by 65%–70% sucrose; the pH range should be 3–3.5.

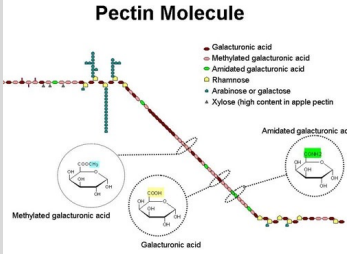
Pectic acid has no gelling properties but calcium pectate has the property of gelling in certain conditions.

When treated with hydrochloric acid, pectin is not precipitated from aqueous solution.

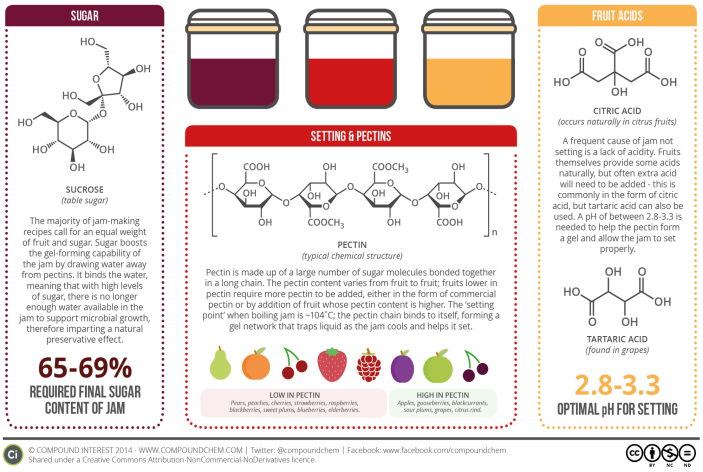
Excess calcium chloride solution does precipitate calcium pectate.

When an aqueous solution of pectin is made alkaline with sodium hydroxide and allowed to stand for 15 min, the pectin is demethylated to pectic acid.

When treated with lime (CaOH) water, a gelatinous precipitate will separate out after some time.



THE CHEMISTRY OF JAM-MAKING



ALKALINE AGENTS

Naturally occurring as mineral sources like limestone-$CaCO_3$ to CaOh—

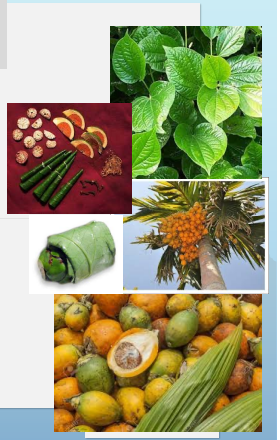
Limestone is a sedimentary rock that is dominantly composed of the calcium-bearing carbonate minerals calcite and dolomite. Calcite is chemically calcium carbonate ($CaCO_3$). Dolomite is chemically calcium-magnesium carbonate ($CaMg(CO_3)^2$).

Snail and shellfish shells are also a source of calcium carbonate that, when heated produces CaOH.

Lime (CaOH)—largely derived from heating limestone or shell debris

hardwood, seaweed and mineral rich plant ash—rich in hydroxides and chlorides…potash, soda ash, sodium and potassium chlorides

ARECA CATECHU/PIPER BETLE BETEL QUIDS



THE CHEWING OF BETEL NUT QUIDS DATES TO ANTIQUITY.

IN THE 1ST CENTURY AD, SANSKRIT MEDICAL WRITINGS CLAIMED THAT BETEL NUT POSSESSED 13 QUALITIES FOUND IN THE REGION OF HEAVEN.

IT IS PUNGENT, BITTER, SPICY, SWEET, SALTY, AND ASTRINGENT. IT WAS SAID TO EXPEL WIND, KILL WORMS, REMOVE PHLEGM, SUBDUE BAD ODORS, BEAUTIFY THE MOUTH, INDUCE PURIFICATION, AND KINDLE PASSION.

BECAUSE OF ITS CNS STIMULATING EFFECTS, BETEL NUT IS USED IN A MANNER SIMILAR TO THE WESTERN USE OF TOBACCO OR CAFFEINE. ARECOLINE IS RESPONSIBLE FOR SOME OF THE EFFECTS OF BETEL QUID CHEWING, SUCH AS ALERTNESS, INCREASED STAMINA, A SENSE OF WELL-BEING, EUPHORIA, AND SALIVATION.

CHEWING THE NUT STIMULATES THE FLOW OF SALIVA TO AID DIGESTION. BETEL NUT ALSO HAS BEEN USED TO STIMULATE THE APPETITE

CULINARY ASH

COLTSFOOT—TUSSILAGO FARFARA
JUNIPER-JUNIPERUS COMMUNIS
HICKORY TWIGS-
FOUR-WING SALTBUSH-ATRIPLEX CANESCENS
DESERT SALTBUSH ATRIPLEX POLYCARPA

Culinary ash—typically of Juniper wood, is burnt completely free of carbon material and sifted. It can be further cleaned up or used as a leavening agent, imparting a unique flavor to the food.

NIXTAMALIZATION

The term nixtamal is an amalgam of the Nahuatl words nixtli (ashes) and tamali (cooked maíz, or corn), and the technique has been practiced for thousands of years in modern day Central America and Mexico. When milled, nixtamal becomes masa, the dough that forms tortillas, sopes, huaraches, tamales, and tlacoyos, among hundreds of other corn-based Mexican staples.

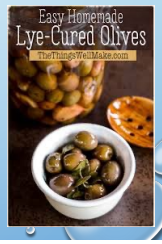
On the East Coast of the United States, Native people traditionally ate nixtamalized corn as a porridge and in stews; European settlers called it hominy, an anglicized version of the Powhatan (Algonquin) term rokahamĕn.

Nixtamalized corn is a miracle food. The process changes the enzymatic structure of corn; it intensifies the aroma and flavor. The kernels' skin (or pericarp) slips off, and the starches start to gelatinize. Critically, it also unlocks corn's most beneficial nutrients: niacin, iron, protein, and dietary fiber.

HOMEMADE LYE SOLUTION

To make lye in the kitchen, boil the ashes from a hardwood fire (soft woods are too resinous and have less minerals) in a little soft water, rainwater is best, for about half an hour. Allow the ashes to settle to the bottom of the pan and then skim the liquid lye off the top. You can do this daily and when you've got enough of the weak solution, boil the liquid down until it'll float an egg. If the egg sank, the concentration of lye in the solution was too low, and it would be poured through the ashes again in hopes of increasing the concentration. DO NOT use aluminum cookware it will eat them.

You can make soap from this lye solution—you can also use it as you would lye…



OPHTHALMIC PREPARATIONS

Must be sterile (0.2 micron filter)

pH between 6-8—7.4 feels best for most

Isotonic saline mostly…

some therapeutic benefits to hypo and hyper and potassium-based products.

Allergy—mast cell stabilization

Cromolyn sodium/Quercetin chalcone

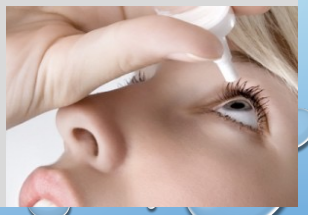
Infection—viral, bacterial, fungal

Botanical extracts—

berberine, Sarracenia,

Euphorbium

H2Ocean-saline/lysozymes



All Purpose Saline Eyedrop/Eyewash

A basic eye drop/eye wash can simply be 0.9% Saline…it can be made more soothing to dry and irritated eyes by adding a little sodium or potassium bicarbonate. The basic recipe looks like 9 grams (2 level teaspoons) of sea salt in 1 liter of water with 1.5 grams (1/4 tsp) of baking soda.

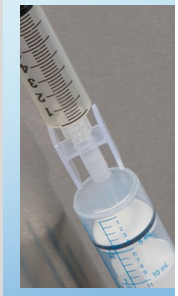
For chronically dry eyes, consider adding a gelling agent or other thickener-
0.1% Hyaluronic acid (fills scratches and other depressions, holds moisture)
0.1% Glycyrrhizic acid (anti-viral, saponin to help lift away debris)

For viral infections of the eye, 2-3% L-Lysine (20-30 mg/ml) with glycyrrhizic acid can be very helpful
Berberine sulfate, 0.1% or any strong Berberis spp water decoction will work, for conjunctivitis and other bacterial infections of the eye.

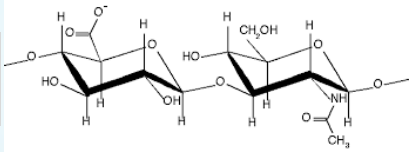
Lysozymes are a wonderful addition that helps break down foreign debris in the eye in chronic cases.

GELS/HYDROGELS

- Hydrogels can be made as Compounded Sterile Products (CSPs)
  - Hyaluronic acid 5-7.5 mg/ml in distilled water can be made readily in the office on an as needed basis.
  - More or less body can be added to the gel by adjusting the hyaluronic acid content.
  - Luer lock to luer lock adapters between two syringes makes an ideal extrusion tool for making gels quickly and without a mess
  - Our clinic uses a USP Sodium Hyaluronate powder, we suspend 50-75 mg of powder in 10 ml DI water, extrude through a luer lock to luer lock adapter between two 10 ml syringes and filter through a 0.2 micron syringe filter prior to administration.



HYALURONIC ACID



AN EXTREMELY COMMON POLYMER FOUND IN NATURE.

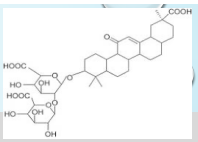
MAKES UP AN ENORMOUS PROPORTION OF THE BASAL LAMINA OF MAMMALIAN TISSUES.

A LINEAR POLYSACCHARIDE CONSISTING OF D-GLUCURONIC ACID AND N-ACETYL-D-GLUCOSAMINE LINKED BY BETA(1,3) AND BETA(1,4) GLYCOSIDIC LINKAGES.

DISTINGUISHED FROM THE OTHER GLYCOSAMINOGLYCANS AS IT IS FREE FROM COVALENT LINKS TO PROTEIN AND SULPHATE GROUPS.

HAS BEEN DEMONSTRATED TO BE IMPORTANT TO TISSUE FUNCTIONS SUCH AS TISSUE HYDRATION, LUBRICATION, SOLUTE TRANSPORT, CELL MIGRATION, CELL FUNCTION AND DIFFERENTIATION.

GLYCYRRHIZIC ACID



- GLYCYRRHIZIC ACID (GLYCYRRHIZIN) IS THE MAJOR ACTIVE CONSTITUENT OF LICORICE ROOT AND HAS BEEN USED IN TRADITIONAL MEDICINE TO ALLEVIATE BRONCHITIS, GASTRITIS, AND JAUNDICE.
- ANTI-HEPATOTOXIC, IMMUNE-MODULATING, ANTIVIRAL AND CHOLERETIC, STIMULATES PRODUCTION OF OF INTERFERON. TOPICALLY ANTI-INFLAMMATORY AND ANTIOXIDANT. ALSO EXHIBITS ANTIFIBROTIC ACTIVITY PERHAPS ATTRIBUTABLE TO ITS INHIBITORY ACTIVITY ON NF-KB.
- STUDIES HAVE FOCUSED ON THE PHARMACOLOGICAL EFFECTS OF GLYCYRRHIZIC ACID AS ANTIULCER, ANTI-INFLAMMATORY, ANTIVIRAL, ANTI-CARCINOGENIC, AND ANTISPASMODIC.
- COMMONLY DOSED AT 50-60MG WHEN LOOKING FOR IMMUNE SUPPORT OR ANTI-VIRAL ACTIVITY
- CAUTION IN PATIENTS WITH UNCONTROLLED BLOOD PRESSURE.

LYSOZYME--MURAMIDASE

- A LYSOZYME IS A NATURALLY OCCURRING ENZYME FOUND IN BODILY SECRETIONS SUCH AS TEARS, SALIVA, AND MILK. IT FUNCTIONS AS AN ANTIMICROBIAL AGENT BY CLEAVING THE PEPTIDOGLYCAN COMPONENT OF BACTERIAL CELL WALLS, WHICH LEADS TO CELL DEATH.
- IN HUMANS, LYSOZYME MAY BE THE MEDIATOR IN THE ANTI-TUMOR FUNCTION OF MACROPHAGES WHICH, IT HAS BEEN SHOWN, SECRETE THE ENZYME.
- WE USE LYSOZYMES THAT ARE MADE FROM CHICKEN EGG WHITE AND IT MAKES A NICE ADDITION TO EYEDROPS FOR CONJUNCTIVITIS, BLEPHARITIS OR DRY EYES.
- CONCENTRATION IS 1% (10 MG/ML) IN A SALINE BASE.

BERBERIS FREMONTII/MAHONIA TRIFOLIATA/HAEMATOCARPA ALGERITA

- Berberine containing plants, similarity in action but not the same…
- Generally, a bitter tonic for digestion, a stimulant for liver metabolism, topically antimicrobial.
- Cold and astringent…long considered to be a helpful lymphagogue and anti-microbial agent in botanical medicine.
- Studies have confirmed an anti-proliferative effect of the root extract on leukemic and psoriatic cell lines, inhibition of IL-8, modulating CD25 lymphocyte activation pathway, interleukin-10 signaling, and tumor necrosis-alpha secretion in human peripheral blood mononuclear cell (PBMC) subpopulations.
- Root extracts exhibit a moderate cytotoxicity and changes in the signaling pathways linked to cell adhesion, proliferation, migration, and apoptosis of tumor cells.
- Dried root tincture 1:5, dosed at 10-60 drops 3-4 time per day…A strong decoction can be used as the base for eyedrops/eyewashes

Crocus sativa-Saffron

Although cultivated since ancient times, the native habitat of this fall-blooming crocus is unknown. It is commercially grown today in a number of locations, but primarily from Spain to Italy to Greece to Iran to India, with almost 80% of world production coming from Spain and Iran.
Each flower has three long style branches tipped with reddish-orange stigmas. The stigmas often protrude beyond the petal cup. It takes about 1/4 million stigmas (75,000 flowers) to produce one pound of saffron which in large part explains why saffron is the most expensive spice regularly sold in commerce today. It is the one of the richest natural sources of water-soluble carotenoids.

Saffron is prescribed as a tea, 1-2 flower pistils in water twice a day, it can be added to other teas like green tea or bilberry tea. It makes a great base for eyedrops.

Vitamin A Eyedrops

We make an aqueous solution by complexing retinoic acid in cyclodextrin—

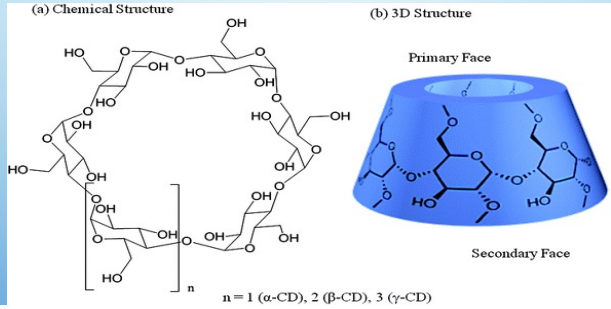
0.25 mg of retinoic acid per ml of 45% 2-hydroxypropyl beta-cyclodextrin will yield a final concentration of 8,333 ius/ml.

This material is added to a strong salinated decoction of saffron—which consists of adding 1 gm of saffron pistils to 1 liter of 0.9% saline.

The eyedrops are a 50/50 mix of these two solutions and typically dosed at 2-3 drops 2-3 times per day

NANO-SIZED STRUCTURED STARCHES

- *CYCLODEXTRINS (2-HYDROXYPROPYL BETA-CYCLODEXTRIN)*
  - *NON-TOXIC, DISSOLVABLE, STRUCTURED STARCH-*
    - *POTATO AND/OR TAPIOCA DERIVED*
  - *CREATES INCLUSION BODIES WITH FAT SOLUBLE MATERIALS IN AQUEOUS MEDIA*



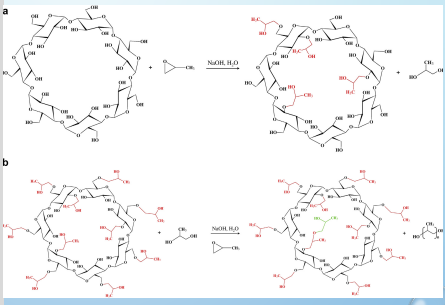
2-hydroxypropyl beta-cyclodextrin (HPBCD)

Patented in 1983 for use as a solubilizing agent—it nests fat soluble materials to render them more water soluble.

Tapioca based structured starch made under alkaline conditions—Cyclodextrin chemistry-Solubilizes more effectively at pH>10…we use 20% NaOH and 45% cyclodextrin.

Then bring pH to desired 6-8 range after complexation.

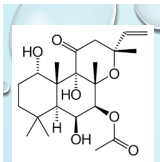
Cyclodextrins dissolve in hot water much more rapidly than cold.



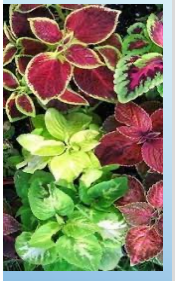
EYEWASHES

Eyewashes are a cornerstone of topical eye therapy, my personal favorite is an eyewash with succus of Cineraria maritima, Dusty Miller, 2-3 times/day. Cineraria has been shown to reduce and possibly reverse cataract formation, it acts to stimulate profound movement of lymph through the eye. It produces a burning sensation and redness when washed into the eye.

- **For many years, the succus could be purchased pre-made from Luytie's Homeopathic Pharmacy in Missouri. Now we make it ourselves.**
- **Other eyewash materials that I have used with more or less good effect include urine, rosewater, and salinated teas of triphala, chamomile, and chrysanthemum**



COLEUS FORSKOHLII

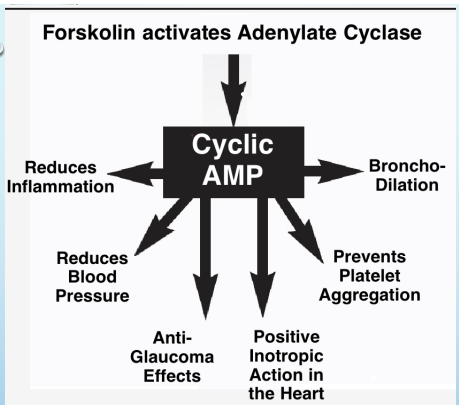


Coleus forskohlii is an aromatic herb growing all over India from the Himalayas to Sri Lanka and Thailand and is probably in your local home and garden store. It has a documented medical usage of over 3,000 years, Sanskrit texts refer to it as "Makandi" and" phashana bedi"

Forskolin (FSK) is a labdane diterpene that is obtained from the tuberous roots of Coleus forskohlii, it is believed to be the plant's most active constituent. it has been used for centuries to promote heart and lung health, it is still used to treat hypertension and respiratory concerns such as asthma.

1% forskolin in saline at a dosage of 2 drops 3 times a day will usually decrease intraocular pressure. In open angle glaucoma.

Available as a bulk powder standardized to 20% forskolin, 200 mg/gm, 1 gm of material will make 20 mls of eyedrop solution.



May have some impact on central nervous system cAMP levels and mitochondrial activity…of interest in inflammatory neurological conditions…PANS/PANDAS, seizure disorders.
Consider a 1% solution administered as a nasal spray.

PILOCARPUS JABORANDI

Jaborandi is the common name for *Pilocarpus*, which comes from the Brazilian Tupi-Guarani language *ya-mbor-endi*, meaning "what causes slobbering". this plant is historically used for medicinal purposes, infusions of jaborandi leaves stimulate the production of sweat and salivation, and they are applied in shamanic rituals for fever treatment, stomatitis and as an antidote for poisons and toxins

the imidazole alkaloid pilocarpine is found in the leaves of the plant and acts as a cholinergic parasympathomimetic agent, stimulating secretions in sweat, lachrymal and salivary glands.

it has also been used to reduce xerostomia induced by head and neck radiation therapy and for the treatment of dry mouth associated with Sjogren's syndrome

It also contributes to hair growth when applied topically to the scalp

The raw powdered herb contains 1-3% pilocarpine—a 1% solution of pilocarpine is the desired strength

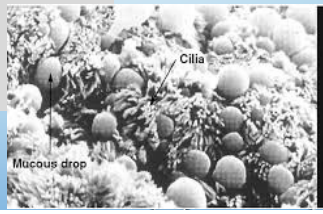
NASAL SPRAYS/NASAL IRRIGATION

NETI-POT/NASAL IRRIGATION

- 9 GMS (2 LEVEL TSP) SEA SALT IN 1 LITER OF CLEAN WATER IS ISOTONIC
- CONSIDER ADDING ¼ TSP BAKING SODA

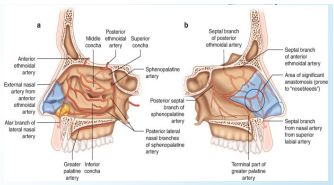
INSTEAD OF JUST WATER:

- GREEN TEA/BLACK TEA-ASTRINGENT
- LICORICE TEA--DEMULCENT
- COLLOIDAL SILVER
- HYALURONIDASE
- BPC-157



Electron micrograph (magnification x 2097) showing surface cell layer of nasal and sinus cavity with mucous drops and cilia.

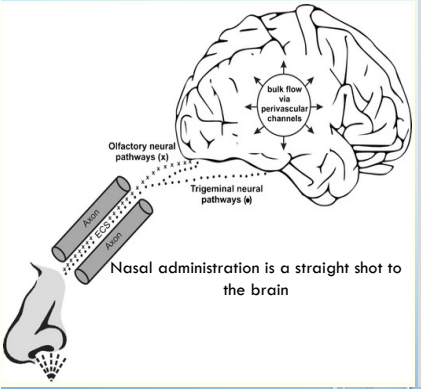
NASAL ADMINISTRATION OF THERAPEUTIC AGENTS



For most nasal spray pumps the dispensed volume per actuation is 0.1 ml, and an administered volume of 0.1-0.2 ml per nostril is optimum in adults, more is prone to drip out immediately.

Standard spray pumps will deposit most of the sprayed dose into the anterior region of the nasal cavity. Surface tension of the droplets and mucus layer will cause the immediate spread of the spray and mucociliary clearance will distribute the liquid layer throughout the nasal cavity. Since the nasal mucus layer is continuously renewed and discarded into the throat, the nasal residence time of the administered agent depends on how fast it dissolves within the mucus layer and penetrates through the mucosa

Nasal Administration



Nasal administration is a straight shot to the brain

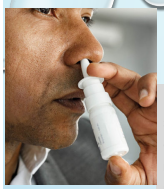
Highly vascularized nasal mucosa and the olfactory tissue is in direct contact with the central nervous system, allowing rapid transportation into the bloodstream & brain for therapeutic agents, with onset of action near that of IV administration.

The trigeminal nerve enters the brain through both the pons and the cribriform plate, which allows for delivery to both the anterior and posterior regions of the brain. Transport of substances along the olfactory and trigeminal nerve pathways can happen through both intracellular and extracellular mechanisms. However, intracellular transport is a slow process, requiring at best several hours and at worst several days. Extracellular transport, on the other hand, is rapid and likely accounts for much of the rapid delivery and onset of action observed with intranasal CNS therapeutics

Jala Neti

To perform jala neti, a neti pot is used with a conical spout and is made of ceramic. The pot is filled with warm salt water. The head is tilted to the side, and the pot's spout is inserted into the top nostril. The individual breathes through the mouth, keeping it open. Water is slowly poured into the nostril, and it is allowed to drain through the lower nostril. The same process is then repeated on the second side. When both sides have been cleansed, the excess water is blown out of the nostrils using kapalbhati, a kriya/pranayama breathing technique.

A Basic Nasal Spray/Nasal Wash



Isotonic saline solutions at a neutral pH are the most comfortable..so, 0.9% saline can be made by adding 9 grams (two measured teaspoons) to a liter of water. It is worth noting that infectious processes and allergies create a more acidic microclimate within the nasopharynx, histamine is an acidic molecule, and mucus tends to become more thick and globular (chunky) under acidic conditions. Adding ¼ tsp baking soda (about 1.5 grams) to the liter of stock solution can be marvelously effective.

Creating the saline solution and then using that for the base of a botanical water decoction can ensure a good extraction of botanical constituents.

To 1 liter of clean water (distilled tends to be acidic) add 9 grams of sea salt (iodized salt is irritating to membranes) and 1.5 gms of sodium or potassium bicarbonate. Warm this solution and add 1-1.5 tablespoons of loose green tea (*Camellia sinensis*) and allow to steep for 10 minutes and then filter through a coffee filter, a French press will eliminate a large amount of debris. To further reduce debris, run the solution through a 0.45 micron filter, to make a sterile preparation, run it through a 0.2 micron filter.

Nasal Spray Considerations for Allergy

2% cromolyn sodium—We purchase a powdered form of this derivative of *Ammi visnaga*, it mixes in water or saline with some urging. Can be used with other agents, stabilizes mast cells, preventing histamine release.

2% Quercetin in cyclodextrin-Similar to other cyclodextrin compounds, a 45% cyclodextrin solution is made alkaline with 20% NaOH and powdered quercetin is added to the solution and stirred until dissolved, usually 30-45 minutes. Bring final pH to between 6 and 8. Like cromolyn, it is a mast cell stabilizer.

1% Glycyrrhizinate is an anti-inflammatory triterpenoid saponin, reduces swelling in the nasal passage, has an antiviral impact, solubilizes mucus. Tastes sweet.

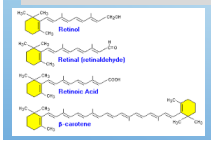
0.1% Hyaluronic acid-Can be topically soothing to irritated mucus membranes. Essentially hydrating in dry climates.

Vitamin A—Increases moisture in the mucus membranes, encourages new tissue growth, immune-stimulating.

Vitamin A Nasal Spray

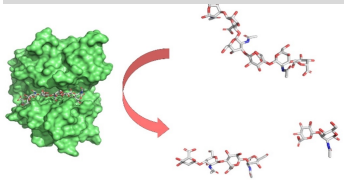
Retinoic acid (RA), a metabolite of vitamin A is a transcription regulator important in tissue development and regeneration. RA signaling is vital during olfactory system embryogenesis and adult neuronal regeneration, intranasal vitamin A treatment has been shown to improve olfactory functions. Nasal secretion protects the airway epithelium from the harmful effects of the external environment and Vitamin A contributes to the maintenance of normal physiology by keeping the mucosa moist and in the regulation of cellular proliferation and differentiation of epithelial tissues.

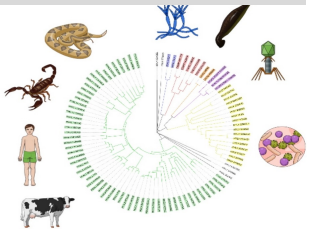
We use a Retinoic Acid nasal spray that is 8,333 ius/ml in 45% cyclodextrin. Each spray delivers 833 ius, administering 2 sprays to each nostril 3 times a day yields the10,000 iu/day dosage recommended in the literature for olfactory neuron regeneration.



Intranasal Hyaluronidase

Intranasal hyaluronidase increases the dispersion rate of agents delivered at the same time, breaks down the hyaluronan components of scar tissue, increases the tissue turnover rate in the mucosal cells, disrupts bacterial biofilm structures.
600 ius added to a 15 ml saline-based nasal spray yields 40 ius/ml or 4 ius/spray which is the lowest level of effective dosing, the higher level of dosing is 20 ius/spray or 200 ius/ml. Hyaluronidase can be administered 4 times a day—it is allergenic with longer term use. It makes a better short-term delivery agent.





Considerations worth taking into account when designing a successful intervention with therapeutic solutions, nasal sprays, eye washes, wound washes, etc.

the pH of the administered solution,

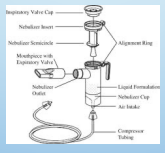
the osmolarity of the administered solution

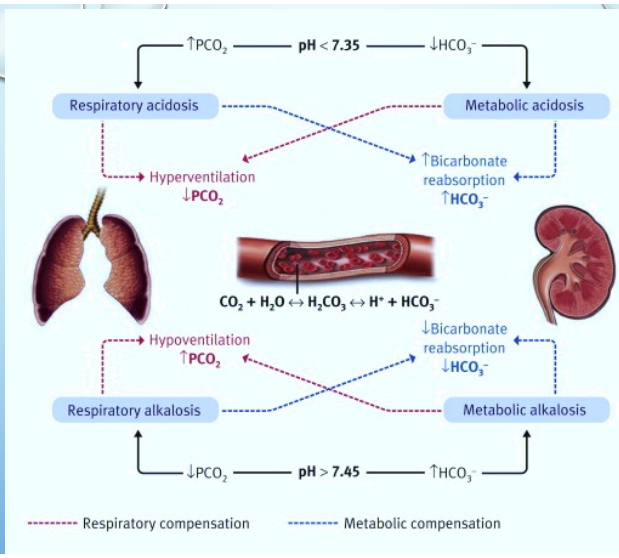
and the concentration of the therapeutic ingredients.

Carbonic anhydrase

The pH buffering impact of the bicarbonate system is based on equilibration of CO2 with carbonic acid, carbonic anhydrase activity, bicarbonate ion, hydrogen ions, the respiratory rate and the ability of the kidney to reabsorb and excrete bicarbonate and hydrogen ions into the urine.

$$CO_2 + H_2O <=> H_2CO_3 <=> H^+ + HCO3^-$$





Nebulization

- A clinical useful strategy for administering a large number of potentially therapeutic substances to the lung field, head and neck
- The solution itself has therapeutic potential
  - Alkaline solutions liquefy mucus and stabilize mast cells
  - Hyperosmolar solutions serve to draw out infectious processes and expectorate
  - Hypo-osmolar solutions are hydrating to lung tissues
- A useful beginning solution (Isotonic and slightly alkaline):
  1 tsp (7.5 grams) non-iodized salt
  ¼ tsp (1.5 grms) potassium or sodium bicarbonate
  per liter of pure water or herbal tea.

Nebulizer Solutions

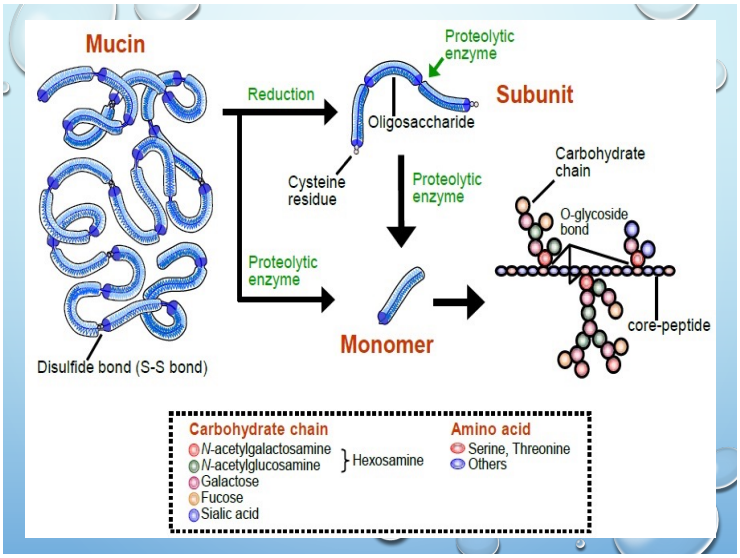
Generally, you want the pH to be alkaline, COPD patients are an exception as they are already accumulating CO2 in their atelectatic lungs spaces.
Mucus is easier to move under alkaline conditions, smooth vs. chunky and sticky

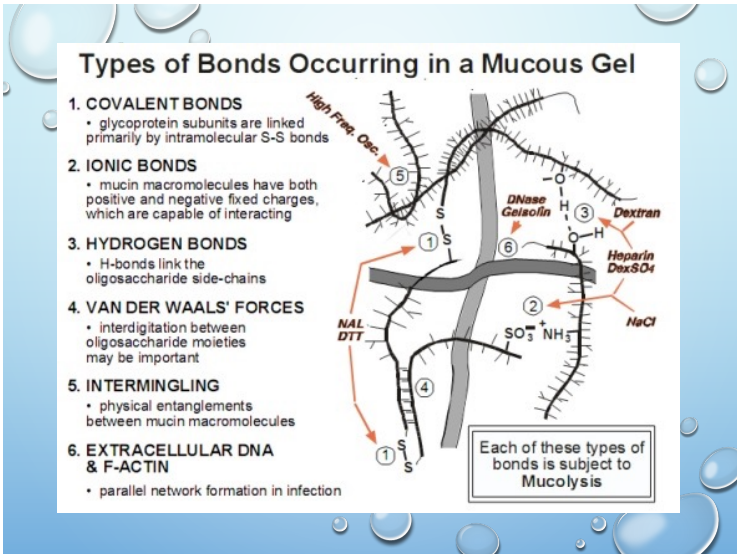
Simply making a 0.9% saline solution and adding a ¼ tsp of baking soda per liter will be an effective nebulizer solution for most needs and can be used 4-10 times a day and will have a moistening, loosening effect on the mucus.

A hyper-salinated solution is also helpful by creating a stronger osmotic gradient, pulling moisture from swollen tissues.

Any number of herbal teas (be careful with flowers) can be made iso-osmolar by adding 9 grams of sea salt and 1.5 gms of baking soda to a liter of tea.

Black and green tea are astringent, which can be helpful for swollen and inflamed lung tissues in bronchitis or after an asthma episode.





Nebulized Solutions

2 tsps sea salt (9 gms)

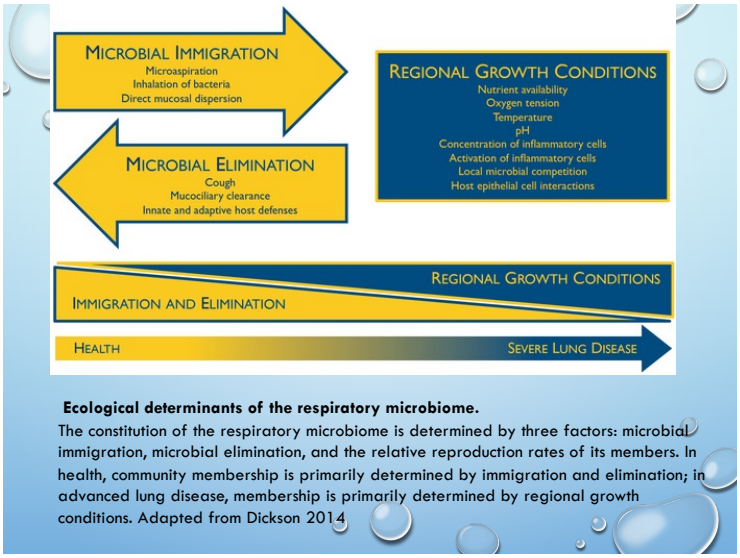
¼ tsp. Baking Soda (1 gm)

1 Liter Distilled water or

Licorice tea and Lobelia tea (for asthma)

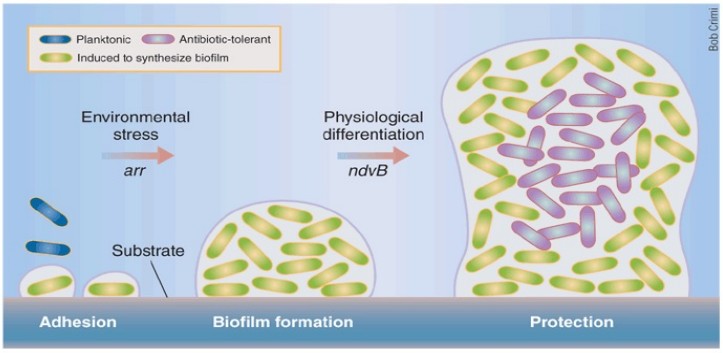
Melissa and Hypericum tea (antiviral)

Datura and Lobelia (antispasmodic)

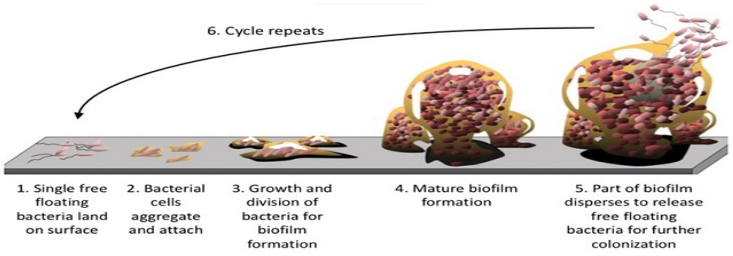


Ecological determinants of the respiratory microbiome.
The constitution of the respiratory microbiome is determined by three factors: microbial immigration, microbial elimination, and the relative reproduction rates of its members. In health, community membership is primarily determined by immigration and elimination; in advanced lung disease, membership is primarily determined by regional growth conditions. Adapted from Dickson 2014

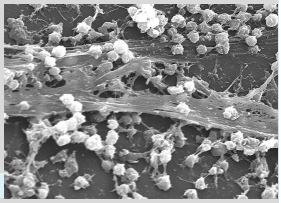
Bacteria normally live in a biofilm state at some point in their life cycle
The biofilm form of bacteria allows for the presence of microbes that would not survive in our milieu on their own.
Most bacteria in and on the human body exist in biofilm form. Most are beneficial commensal bacteria and provide barrier, immune, and metabolic functions



Biofilms that form in the human body are up to ten thousand times more resistant to antibiotics than free-floating bacteria, making them very difficult to treat medically. These biofilms are responsible for the extreme persistence of many difficult to treat illnesses like Legionnaire's disease, Staphylococcus aureus ("Staph"), and infectious bronchitis, that can trouble patients with frustrating symptoms for years.



Pathological biofilms are nearly universally present in:
- ***Oral plaque, periodontal disease, abscess***
- ***MRSA infections and other skin infections***
- ***Chronic wounds and ulcers***
- ***Chronic sinus infection***
- ***GI disturbances***
- ***Vaginal and Bladder infection***



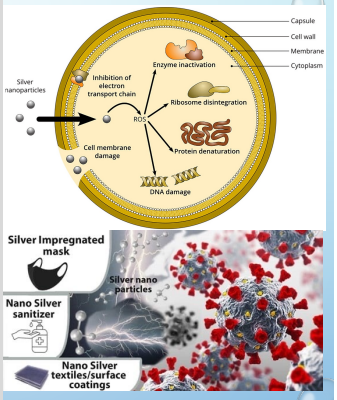
Biofilms are the normal life state for bacteria and many fungi
- ***Biofilms can be viewed as semi-independent multicellular organisms with specialized metabolism and immune defenses.***
- ***They are interlinked by filaments of polysaccharide, protein, or strands of genetic material***
- ***A gradient of metabolism from aerobic at the surface to anaerobic at the core develops, allowing resistance to substances which might attack the metabolism.***
- ***In some species, an attached biofilm layer provides nutrients to a superficial layer, which may the secrete antibiotics, reproduce, etc.***
- ***Once aggregated, bacteria in biofilms can dramatically change their functions and secretions.***

Colloidal silver

Silver can be found as ions in different carriers and salts, but with recent advances in nanotechnology, the synthesis and use of elemental silver nanoparticles has gained special attention.

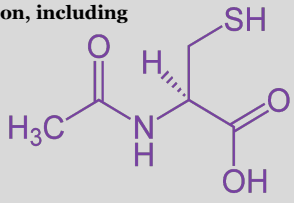
Nanoparticles are clusters of atoms, ranging in size from 1 to 100 nm. Silver nanoparticles exhibit promising chemical, physical, and biological characteristics due to their large surface-area-to-volume ratio, tolerance against corrosion and oxidation, and nonreactivity, which makes them suitable for various applications in medicine, including in diagnostics and imaging, orthopedics, drug and gene delivery, surgical catheters and meshes, medical equipment coatings, and wound dressings.

Several silver-based wound-dressing products have become available for managing wounds and controlling infection. Concentrations lower than 10 ppm are ineffective and higher than 60 ppm are toxic to healthy tissues



N-Acetyl-Cysteine

An antioxidant component of Glutathione
Plays a protective, reducing role in the compound
A major reagent in Phase ll sulfation reactions
crucial for appropriate detoxification, including histamines and heavy metals



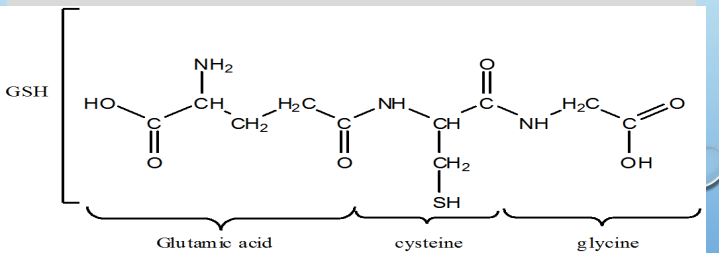
Improves antibody production, esp. IgA
Displays significant antiviral activity against influenza viruses

Exhibits bactericidal properties, breaks down bacterial biofilms of clinically relevant pathogens including Pseudomonas aeruginosa, Staphylococcus aureus, Enterococcus faecalis, Enterobacter cloacae, Staphylococcus epidermidis and Klebsiella pneumoniae

100 mg/ml solution —Dosage 1-5 ml

GLUTATHIONE

- IT IS HIGHLY OXYGENATED, WHICH MAKES IT VULNERABLE TO ENDOGENOUS OXYGEN RADICAL PRODUCTION
  - IT HAS A HIGH PROPORTION OF UNSATURATED LIPID WHICH MAKES IT VULNERABLE TO PEROXIDATION
  - CATECHOLAMINE RICH AREAS OF NEURAL TISSUE ARE EXCEPTIONALLY VULNERABLE TO FREE RADICAL GENERATION AS THE CATECHOLAMINES ADRENALINE, NORADRENALINE, AND DOPAMINE SPONTANEOUSLY AUTO-OXIDIZE



COMPOUNDING POWDERS INTO LIQUIDS

- SOLUBILITY OF SOLIDS IN LIQUIDS CHANGES WITH TEMPERATURE, PRESSURE, AND PH.
- N-ACETYL-CYSTEINE AND L-GLUTATHIONE ARE ACIDIC, IT WILL TAKE HALF THEIR WEIGHT IN BICARBONATE TO NEUTRALIZE THEIR ACIDITY.
- TO MAKE A LITER OF 200 MG/ML L-GLUTATHIONE WILL REQUIRE 200 GMS OF L-GLUTATHIONE AND 100 GMS OF SODIUM BICARBONATE. THIS IS A VIGOROUS CHEMICAL REACTION THAT WILL LIKELY OVERFLOW THE VESSEL YOU ARE MIXING THEM IN, GET A LARGE BEAKER AND ADD THE WATER SLOWLY, ALLOWING THE REACTION TO SUBSIDE BEFORE ADDING MORE WATER.
- ONCE THE REACTION HAS COMPLETED THE PRODUCT WILL BE PH 7 AND, AFTER FILTRATION, ABLE TO BE USED FOR EYEDROPS, NASAL SPRAYS OR NEBULIZERS.

RAW MATERIAL PROCUREMENT AND ASSESSMENT

- YOU ARE OBLIGATED TO ENSURE THE IDENTITY AND PURITY OF THE RAW MATERIALS YOU USE FOR YOUR PATIENTS.
- ALL RAW MATERIALS HAVE TO BE QUARANTINED UNTIL APPROPRIATE TESTING HAS BEEN DONE OR PAPERWORK HAS BEEN RECEIVED. SOME SORT OF IDENTIFICATION HAS TO BE PERFORMED.
- C OF A—CERTIFICATE OF ANALYSIS TELLS YOU WHAT PERTINENT TESTING HAS BEEN DONE ALREADY. YOU MAY HAVE TO DO OTHER TESTING—HEAVY METALS, MICROBIAL CONTENT, PYROGENS.

GLYCYRRHIZIC ACID

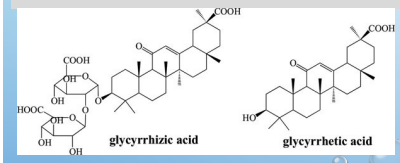
TRITERPENOID SAPONIN FROM GLYCYRRHIZA GLABRA-LICORICE

HYDROLYSED TO THE BIOLOGICALLY MORE ACTIVE COMPOUND GLYCYRRHETIC ACID, WHICH INHIBITS THE ENZYME 11 BETA-HYDROXYSTEROID DEHYDROGENASE LEADING TO INCREASED CORTISOL LEVELS.

THE RESULT IS A HYPER-MINERALOCORTICOID EFFECT OF CORTISOL AS IT BINDS WITH THE SAME AFFINITY AS ALDOSTERONE TO THE MINERALOCORTICOID RECEPTOR.

THE INHIBITORY EFFECT ON 11 BETA-HYDROXYSTEROID DEHYDROGENASE IS REVERSIBLE; HOWEVER, DEPRESSION OF THE RENIN-ANGIOTENSIN SYSTEM MAY LAST SEVERAL MONTHS WITH ABERRANT BLOOD PRESSURE EFFECTS.

5-10 MG/DAY THROUGH A NEBULIZER OR NASAL SPRAY GLYCYRRHIZIC ACID REPRESENTS A SAFE DOSE.



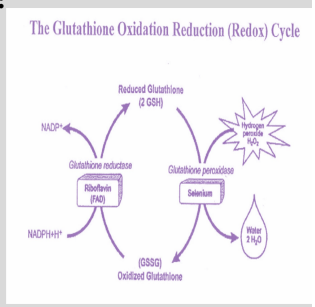
Used in the clinical treatment of hepatitis, bronchitis, gastric ulcer, AIDS, certain cancers and skin diseases. It exerts anti-microbial and anti-inflammatory activity through several different mechanisms. Topically, very helpful topically to inflamed mucus membranes.

Glutacyst

A novel compound consisting of:

Glutathione	200 mg/ml
N-Acetyl-Cysteine	100 mg/ml
Glycyrrhizic Acid	5 mg/ml
Na Bicarbonate	152.5 mg/ml

In distilled water-0.1 micron filter



Rationale: Improved shelf life, able to stay in reduced state under a greater range of conditions.

The presence of a triterpenoid saponin, glycyrrhizic acid, allows for a shift in serum surface tension and STRONGER IMPACT ON DISPERSING THE SUPERFICIAL LAYERS OF BIOFILM.

BERBERIS FREMONTII/ MAHONIA TRIFOLIATA/ HAEMATOCARPA ALGERITA

- Berberine containing plants, similarity in action but not the same…
- Generally, a bitter tonic for digestion, a stimulant for liver metabolism, antimicrobial for intestinal tract and for skin.
- Cold and astringent…long considered to be a helpful lymphagogue and anti-microbial agent in botanical medicine.
- Studies have confirmed an anti-proliferative effect of the root extract on leukemic and psoriatic cell lines, inhibition of IL-8, modulating CD25 lymphocyte activation pathway, interleukin-10 signaling, and tumor necrosis-alpha secretion in human peripheral blood mononuclear cell (PBMC) subpopulations.
- Root extracts exhibit a moderate cytotoxicity and changes in the signaling pathways linked to cell adhesion, proliferation, migration, and apoptosis of tumor cells.
- An effective anti-microbial and biofilm disrupting tea for eyedrops/eyewashes/ nasal sprays and nebulizers.
- Dried root tincture 1:5, dosed at 10-60 drops 3-4 time per day

ROLE OF BERBERINE IN THE TREATMENT OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS INFECTIONS

- MING CHU, MING-BO ZHANG, YAN-CHEN LIU, JIA-RUI KANG, ZHENG-YUN CHU, KAI-LIN YIN, LING-YU DING, RAN DING, RONG-XIN XIAO, YI-NAN YIN, XIAO-YAN LIU & YUE-DAN WANG
- SCIENTIFIC REPORTS 6, ARTICLE NUMBER: 24748 (2016)DOI:10.1038/SREP24748
- BERBERINE IS AN ISOQUINOLINE ALKALOID PRESENTED IN VARIOUS PLANTS WHICH HAS BEEN WIDELY USED TO TREAT BACTERIAL DIARRHEA AND GASTROENTERITIS FOR A LONG HISTORY. RECENTLY, BERBERINE HAS BEEN DEMONSTRATED TO BE A STRONG SYNERGIST FOR ANTIBIOTICS. SYNERGISTIC INTERACTIONS BETWEEN BERBERINE AND COMMONLY USED ANTIMICROBIAL AGENTS EXHIBIT THERAPEUTIC BENEFITS AGAINST A BROAD SPECTRUM OF PATHOGENIC MICROORGANISMS, INCLUDING METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA). MANY REPORTS HAVE SHOWN THAT COMBINED USE OF BERBERINE IMPROVED THE BACTERICIDAL ACTIVITY OF ANTIBIOTICS AGAINST MRSA, LOWER THE MICS OF ANTIBIOTICS, AND NOTABLY DECREASED ADHESION AND INTRACELLULAR INVASION OF MRSA.

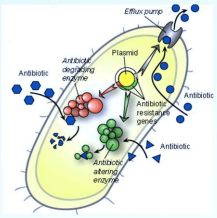
Efflux Pump Inhibitors:

Inhibition of Multi Drug Resistance Pumps

Tannins, berberine, and certain phenolics have useful effects as efflux pump inhibitors.

Research indicates that these botanicals can potentiate conventional antibiotics and increase their effectiveness against a variety of both gram positive and gram negative organisms.

Goldenseal, Black Walnut, White Willow, Raspberry Leaf Bladderwrack, Uva Ursi, and Garlic are a few botanicals that have been studied as Efflux Pump Inhibitors.



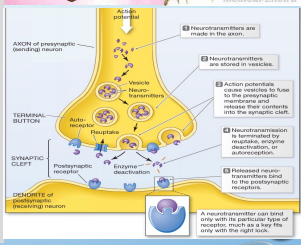



Rauwolfia serpentina-Indian Snakeroot Sarpaghanda

An ancient and highly respected plant ally in Ayurvedic medicine with a history of use that dates back almost 3000 years-Caraka Samhita, circa 400 BC.
Medical practitioners have employed this versatile plant for millennia in the treatment of all sorts of mental disorders including, anxiety and nervousness, headaches, tension, most forms of insanity and snakebites.

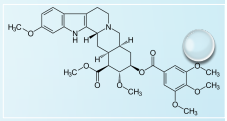
Contains the alkaloid reserpine that makes the pre-synaptic storage vesicles leaky so that the stored contents get broken down by MAO before they are able to be released into the cleft effectively blunting the signal to the next neuron.

Start with low dosage-10-15 drops of tincture—it takes 2 weeks to get to full effect and adjust dosage

Reserpine is an indole alkaloid whose antipsychotic, and antihypertensive effects are a result of its ability to deplete catecholamines.
These substances are normally involved in controlling heart rate, force of cardiac contraction and peripheral vascular resistance.
A bitter tea made from the roots of Rauwolfia serpentina, containing reserpine, have a calming, sedative action that is considered antidepressant.

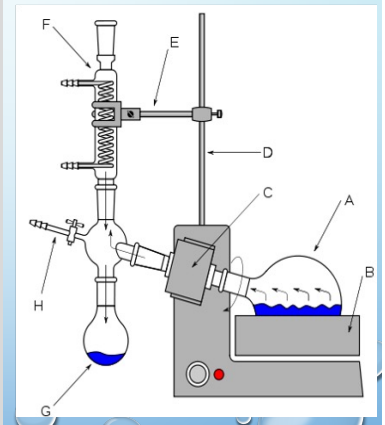
Notably, reserpine was the first compound shown to be an effective antidepressant in a randomized placebo-controlled trial.



Reserpine

Rotary evaporator

A reduced pressure distillation: a solution in a round bottomed flask (A) is placed in the water bath of the apparatus (B) and rotated while the system is partially evacuated by vacuum pump (attached to H). The reduced pressure in the apparatus causes the solvent to boil at a lower temperature than normal, and rotating the flask increases the liquid's surface area and thus the rate of evaporation. The solvent vapor condenses when it comes into contact with a water condenser (F) and drips into a receiving flask (G). When the solvent is removed, the concentrated compound is left in the flask. One difference between distillation and rotary evaporation is that the distillate is most often retained in distillation while the residue is retained in rotary evaporation.



SCALES

Often a trade-off between accuracy and capacity—you might need at least two scales, one that measures milligram amounts—often with a glass cage to protect from air currents. As well as a larger capacity, grams to kilograms—depending on your particular needs. Calibrate scales weekly or even daily…accuracy counts.



PH METERS

When choosing a pH meter, prioritize accuracy, calibration features, electrode type, temperature compensation, and portability based on your specific needs, whether for lab work or field use.
Those models that are made for the field/ecology studies are far more durable and typically last several years if treated well.
You do need to calibrate your pH meter on a regular basis—at least once a month depending on your useage. Keep records of your calibration.



WHY IS PROPER GARBING IMPORTANT?

- STRATUM CORNEUM: SURFACE OF SKIN COMPOSED OF DEAD SKIN CELLS
- PEOPLE ARE "PARTICLE GENERATORS."
- EVEN THOUGH WE CAN'T "SEE" IT, WE SHED OVER 1 MILLION SKIN CELLS PER HOUR AND THOSE CELLS CONTAIN MICROORGANISMS!
- THE HUMAN BODY HARBORS AN AVERAGE OF 150-200 DIFFERENT CLASSES OF BACTERIA.
- THE BODY SHEDS 5 GRAMS OF SKIN FRAGMENTS EACH DAY ALONG WITH SHEDDING 1 LAYER OF SKIN EVERY 5 DAYS (SIZE RANGE 10 TO 300 MICRON – 1000TH OF A MM).