

# Botanical Medicines in the Stages of Fever

Paul Bergner

North American Institute of Medical Herbalism

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- North American Institute of Medical Herbalism
  - <http://naimh.com>
- Resources for Medical Herbalism <http://medherb.com>
- Resources for this lecture: <http://naimh.com/vitalways>

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# Historical view of fever

- Hippocratic corpus
- Thomsonian/Physiomedicalist
- Nature Cure
- Allopathic from Galen to the present

In the older literature of natural medicine, the discussion of fever and inflammation defines the school as vitalist/natural vs allopathic

# Fever

- A **beneficial** rise in the body metabolism and temperature.
- The thermogenic set point is raised.
- Increased manufacture of antibodies and white blood cells -- Antibody production is increased about 20-fold.
- Retards growth and reproduction of bacteria and virus
- Aids body's acute phase reaction
- Increased circulation to surface defenses
- Increased elimination.

# Recent review of pediatric fever

- “Fever . . . is not the primary illness but is a physiologic mechanism that has beneficial effects in fighting infection.”
- “There is no evidence that fever itself worsens the course of an illness or that it causes long-term neurologic complications.”
- “The primary goal of treating the febrile child should be to *improve the child's overall comfort* rather than focus on the normalization of body temperature.”
- “. . . monitoring activity, observing for signs of serious illness, encouraging appropriate fluid intake . . .” are appropriate measures.

Sullivan JE, Farrar HC. Fever and antipyretic use in children. Section on Clinical Pharmacology and Therapeutics; Committee on Drugs *Pediatrics*. 2011 Mar;127(3):580-7.

“Studies of health care workers, including physicians, have revealed that most believe that the risk of heat-related adverse outcomes is increased with temperatures above 40°C (104°F), *although this belief is not justified.*”

# Fever is not hyperthermia

- **Hyperthermia** (heat stroke) has no elevation of set point, but is a failure of compensatory mechanisms, at temperatures from 105.8 to 107.6 damage from hyperthermia occurs
- **Fever** has elevated set point with compensatory cooling mechanisms.
- “For practical purposes except in rare instances, the human oral temperature cannot rise above 106 degrees” *Harrison’s Internal Medicine*
- **Hyperpyrexia** fever above 106 degrees F. “.08% of pediatric emergency center admissions) do not require any more special evaluation by the physician than any febrile child with a temperature below 106.” No more likely to indicate bacterial than viral infection.

# Risks of fever

- While fever itself is not pathological, it may be the sign of non-infectious pathologies that may be serious.
- The chief concern for higher fevers is **dehydration** or **metabolic exhaustion** in elderly or debilitated patients.
- High fever in cardiac patients may destabilize arterial plaques or cause stroke in patients with cerebral arterial disease.

# Normal temperature

- The supposed average of 98.6 was based on inaccurate data. \*
- Meta-analysis of measurements in healthy subjects from 1935 to 1999, showed a median normal oral temperature of 97.7 \*\*
- Typical fluctuation during the day of 0.9 degrees F, from 6AM to 4PM peak.
- Average among elders is 96.8 with a reduced diurnal rise of .5 degrees

\*Mackowiak PA, Wasserman SS, Levine MM. A critical appraisal of 98.6 degrees F, the upper limit of the normal body temperature, and other legacies of Carl Reinhold August Wunderlich. *JAMA* 1992;268:1578-1580.

\*\*Sund-Levander M, Forsberg C, Wahren LK. Normal oral, rectal, tympanic and axillary body temperature in adult men and women: a systematic literature review. *Scand J Caring Sci.* 2002 Jun;16(2):122-8. Review.

# Range of normal temperatures

- Oral 91.8 - 100.8 (Male 96.3 – 99.9)
- Rectal 94 - 100
- Tympanic 95.7 - 100
- Axial 95.9 - 100.4

Sund-Levander M, Forsberg C, Wahren LK. Normal oral, rectal, tympanic and axillary body temperature in adult men and women: a systematic literature review. *Scand J Caring Sci.* 2002 Jun;16(2):122-8. Review.

# Fever range

- Range 98.9 at 6AM to 99.9 At 6PM are the upper range of normal in healthy adults under age 40.
- Lower limits should be considered in elders, for example 98.0 AM to 98.5 PM may indicate a febrile response in an elder.

- 98 - 99 degrees. Influenza virus dies.
- 99.5 The digestive system shuts down.
- 104 degrees. Gonococcus is killed. Polio virus replication is reduced by a factor of 250. Normal temperature may reach 104 degrees under vigorous exercise.
- 106 degrees. Pneumococcus dies. Spirochetes die. (Malaria traditionally induced to fight syphilis)
- 106-110 malignant cells are selectively killed
- 108 brain damage may occur due to denaturation of proteins.
- 110 Human cells begin to die.

# Antipyretic therapy

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# Aspirin and NSAID may promote infection

- Animal trials: Rabbits infected with *Pasteurella* had a 29% mortality rate. One group had their fever lowered by 1.5 degrees with salicylates, and had 100% mortality. Salicylates alone in uninfected rabbits caused no mortality. Treated rabbits had a lower white blood cell count than their infected but untreated counterparts, and their lung and liver bacterial counts were higher.

Vaughn LK, Veale WL, Cooper KE. Effects of antipyresis on bacterial numbers in infected rabbits. *Brain Res Bull.* 1981 Aug;7(2):175-80.

Vaughn LK, Veale WL, Cooper KE. Antipyresis: its effect on mortality rate of bacterially infected rabbits. *Brain Res Bull.* 1980 Jan-Feb;5(1):69-73.

# Influenza mortality increased

- Animal trials: on meta-analysis of 8 trials, the use of aspirin, acetaminophen, or diclofenac increased mortality from experimental influenza infection by 34%.

Eyers S, Weatherall M, Shirtcliffe P, Perrin K, Beasley R. The effect on mortality of antipyretics in the treatment of influenza infection: systematic review and meta-analysis. *J R Soc Med.* 2010 Oct;103(10):403-11.

# Pneumonia mortality

- Animal trials: In a meta-analysis of 3 studies, antipyretic therapy in pneumonia doubled mortality rate in animals. The *Pneunococcus* bacterium is temperature sensitive.

Jefferies S, Weatherall M, Young P, Eyers S, Beasley R. Systematic review and meta-analysis of the effects of antipyretic medications on mortality in *Streptococcus pneumoniae* infections. *Postgrad Med J*. 2012 Jan;88(1035):21-7.

# NSAID and interferon response

- NSAID inhibit cyclo-oxygenase, which is essential for the production of the interferon response to viral infection, the primary defense against infection.

Pottathil R, Chandrabose KA, Cuatrecasas P, Lang DJ. Establishment of the interferon-mediated antiviral state: role of fatty acid cyclooxygenase. Proc Natl Acad Sci U S A. 1980 Sep;77(9):5437-40.

# Antibody response in humans

- Human trials of experimental rhinovirus infection treated with salicylates and NSAID. Lowering the fever with aspirin and acetaminophen suppressed antibody response and increased the severity of subjective symptoms. Ibuprofen had a strong similar trend (worse than placebo on every measure) but which did not reach statistical significance.

Graham NM1, Burrell CJ, Douglas RM, Debelle P, Davies L. Adverse effects of aspirin, acetaminophen, and ibuprofen on immune function, viral shedding, and clinical status in rhinovirus-infected volunteers. *J Infect Dis.* 1990 Dec;162(6):1277-82.

# Duration of illness

- Patients with experimental infection with *Influenza* or *Shigella* were given aspirin or acetaminophen.
- “There was a striking correlation between antipyretic therapy and duration of illness in subjects infected with influenza A and *Shigella sonnei*”

Plaisance KI1, Kudaravalli S, Wasserman SS, Levine MM, Mackowiak PA.  
Effect of antipyretic therapy on the duration of illness in experimental  
*influenza A*, *Shigella sonnei*, and *Rickettsia rickettsii* infections.  
*Pharmacotherapy*. 2000 Dec;20(12):1417-22.

# Aspirin in the 1918 influenza pandemic

- May have been responsible for a large proportion of excess mortality in the U.S.
- Standard medical regimen in civilian and military population was 8.0-31.2 g per day, levels which today are known to be frankly toxic
- This dose would result in an expected 33% of subjects developing hyperventilation and 3% pulmonary edema.
- Mortality rate in the U.S. from the pandemic was about 3%.
- Antipyretic *suppression of antiviral mechanisms*, in addition to adverse effects of *toxicity*, contributed to the severity of the pandemic.

Starko KM. Salicylates and pandemic influenza mortality, 1918-1919 pharmacology, pathology, and historic evidence. *Clin Infect Dis.* 2009 Nov 1;49(9):1405-10.

# Effects of chronic suppression

- “Post viral syndrome”
- Collapse of vital structures
- Chronic fatigue
- “Lake Tahoe syndrome” and chronic fatigue.

# Stages of fever

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1. Set point elevated, cold and chills predominate
2. Set point peak, elevated pulse and temperature
3. Fluctuating set-point, cycling fever, sweating, and chills
4. Crisis and set point drop, sweating
5. Recuperation

# First stage: Set point rising

- Because the body temperature is now below the set point, the subjective feeling is cold. Skin cold. Symptoms resemble hypothermia.
- Normal range actual body temperature, rising
- Feeling of cold, aversion to cold and wind.
- Shivering raises the metabolism and generates heat.
- Paleness. Closing of the pores to prevent sweating and heat loss.

# Therapeutics

- Complete rest.
- Immediate fast.
- Long warm to hot shower or bath.
- Rest in bed with covers.
- Hydrate. Hot drinks and teas.
- Stimulating (hot) diaphoretics.
- Capsicum 500 mg Cinnamon. 5-10g Fresh Ginger 3-10g.  
Osha 3-10g Garlic, onion, scallions 3-10g.

# Thomson's Composition Powder

## Core formula

- Myrica      Bayberry      8 parts
  - Zingiber      Ginger      8 parts
  - Populus      Poplar bark      8 parts
  - Capsicum      Cayenne      1 part
  - Eugenia      Cloves      1 part
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- With Abies, Quercus instead of Populus in some published versions.

# Fasting and Ghrelin

- Secreted by the gut wall of the stomach, small intestine, and large intestine when empty
- Has systemic anti-inflammatory effects
- May act as selective Cox-2 inhibitor
- Has febrifuge effects
- Promotes autophagy in the system and locally in the gut
- **One basis for traditional aphorisms to fast during fever, and for traditions of herbal emesis and catharsis in febrile illness.**

# Second Stage: Peak fever

- Normally 102-104. “A good working fever.”
- Optimizes antibody production.
- The skin hot and dry.
- Patient may not feel hot.
- Pulse fast.
- Patient is drowsy.
- Muscles ache due to elevated cytokines. Tissue of long muscles is broken down to make amino acids available for immune component manufacture and tissue repair.
- Gut motility decreases and the natural appetite disappears.
- Blood concentrations of iron and zinc are reduced (denying food to pathogens).

# Therapeutics

- Rest, well ventilated room, but no draft. Continue fast until fever falls below 99 degrees.
- Emphasize physical and mental comfort of patient.
- Avoid sour flavors and astringents.
- Melissa water.
- Tepid or cool water and drinks.
- Cooling and relaxant diaphoretics
- *Mentha; Mentha / Achillea*
- Eupatorium, Sambucus, Verbena.
- Sedative relaxants; Scullcap, Pedicularis.

## Third stage: Intermittent fluctuations

- Diurnal fluctuations 6AM to 6PM.
- Diurnal fluctuations with cytokine waves.
- Day to day fluctuations over time with cytokine storms.
- Alternating cycles of fever, sweating, and chills.
- May develop food cravings, often for harmful foods.

# Therapeutics

- Continue strategies already in place.
- Use moderate diaphoretics in formulas with mixed stimulant and relaxant effects.
- Keep patient warm when chilled.
- Intermittent short hot showers followed by warm blankets.
- Do not get out of bed too soon.
- See historical formulas with mixed herbal actions in following section.

# Caution on diaphoretics

- Overdose, prolonged use, or inappropriate use may deplete the vitality and promote dehydration
- Caution in depleted or already dehydrated patients.
- Avoid driving excessive perspiration
- The purpose is to encourage *ventilation* not perspiration.
- “Only until normal moisture of the skin is attained”
  - William Cook - Physiomedicalist
- “Intake of these herbs should be discontinued immediately when the desired therapeutic results are attained”
  - Chen and Chen. Classical Chinese.
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# Avoid herbal antipyretic strategy

- Bitter ‘heat-clearing’ herbs may reduce fever/heat.
- It is as much a therapeutic error to use these to reduce the heat of fever as it is with antipyretic drugs.
- Berberine containing herbs, while useful in general for “hot” and infectious conditions, are generally inappropriate during the febrile stage of a disease.
- “Not until the fever has passed” Homeopath and Eclectic Edwin Hale on *Hydrastis*.

# Fourth stage: Crisis and fall

- The set point falls.
- Drop may be abrupt, gradual, or in stages
- Feelings of heat
- Sweating may “soak the sheets.”

# Therapeutics

- “If it ain’t broke don’t fix it.”
- Rest
- Hydrate
- Avoid chill
- Do not get out of bed too soon

# Fifth stage: Recuperation

- Weakness, weak pulse
- Fast thready pulse
- Light headedness, dizziness
- Thirst.
- Possible alternating feelings of hot and cold.

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# Therapeutics

- Wait for natural hunger to return.
- Rest. Do not go back to work too soon.
- Demulcent foods and drinks. Fruit. Soups. Easily digestible stews. Seaweeds.
- Replenish omega-3 fatty acids.
- Althea water. *Althea* 3 with *Ulmus* 1 and *Glycyrrhiza* 1
- *Asparagus* (shatavari) and *Lycium* tea.
- Mild bitter tonics sparingly. *Populus* or *Salix*.
- This stage at least the length or double the length of the actual fever, possibly longer

# Materia medica categories

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# Strong heating diaphoretics

- Capsicum
- Eugenia
- Cinnamomum (cassia)
- Zingiber (fresh)
- Asarum
- Zanthoxylum

# Milder stimulating diaphoretics

- Ligusticum (osha)
- Achillea (as hot tea)
- Monarda

# Mixed stimulating and relaxing

- *Mentha arvensis*
- *Mentha piperita*
- *Mentha spicata*
- *Melissa*
- *Nepeta*

# Relaxant diaphoretics

- *Eupatorium*, warm tea
- *Sambucus*
- *Verbena spp.*
- *Asclepias tuberosa*
- *Lobelia*
- *Dioscorea villosa*
- *Corallorrhiza spp*

# Classic formulas

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Generally combine mild stimulation with relaxation or sedation

# Classical combinations

- Many traditional formulas contain combinations of *Mentha*, *Achillea*, and *Sambucus*
- Two mixed diaphoretics and one relaxant

- *Mentha* and *Sambucus*
- mild stimulant, mild relaxant

**Edward Shook - Physiomedicalist**

- *Mentha* and *Achillea*
- Mild mixed stimulant/relexant

**Herbert Nowell – Physiomedicalist and Naturopath**

- *Eupatorium* 1
- *Asclepias* 2
- *Scutellaria* 1

pure relaxant plus a sedative

- To the above, 1 part *Capsicum* if chills are predominant  
stimulant

**R Swinburne Clymer - Physiomedicalist**

- *Zingiber* and *Nepeta*
- Stimulant with modification for children

**Priest and Priest - Physiomedicalist**

- Thymus, Nepeta, Eupatorium
- stimulant, mixed, neutral

**Tommie Bass - Appalachian**

- *Zingiber* and *Lobelia*
- Stimulant and relaxant

**Wm Cook - Physiomedicalist**

# Some individual herbs

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Select those herbs which increase patient comfort and also enhance immunity and or mildly reduce inflammation, something which antipyretic drugs can never achieve.

# General considerations

- Administer diaphoretics as hot teas.
- If using the tincture, deliver in hot water.
- Many diaphoretics have a hot/cold polarity – diaphoretic when given hot in mild concentration, but alterative/diuretic when given cold in strong concentration.
- Many warming diaphoretics are also emmenagogue.
- Many warming diaphoretics are also carminative and benefit the digestion.

# *Eupatorium perfoliatum*

- The most famous and extensively used diaphoretic/febrifuge in North American history.
- Learned from Native Americans by European Colonists
- Became the panacea herbs for febrile illness in the colonies and through the mid-19<sup>th</sup> century.
- Used for malaria, yellow fever, influenza, and garden-variety fevers. Improved survival in influenza epidemics.
- Uses imply that it enhances immunity and reduces cytokine storm.
- Consider the tea may be much more effective than tincture. (See research on polysaccharides).
- Potentially emetic.
- Very bitter flavor, combines well with zingiber for flavor and effect.

# *Sambucus* species

- Berries or flowers used. Traditional indications are equivalent.
- Recent research shows that a syrup shortens the duration and severity of the fever of influenza. For most patients, the fever is gone by the end of the second day.
- May have direct activity against influenza virus (speculative).
- Traditional indication indicate that it enhances antiviral defenses in the body.

# Achillea

- Diaphoretic in hot delivery media
- More tonic, astringent, and diuretic in cold media.
- Aromatic bitter, warming through effects of essential oils, cooling through bitter principles
- Combines well with *Mentha* to enhance diaphoresis.

# Mentha species

- *Mentha arvensis* (corn mint, poleo mint), most stimulating, contains the most menthol.
- *Mentha piperita*, intermediate stimulation, mid range menthol
- *Mentha spicata*, least stimulation, lowest menthol

# *Asclepias tuberosa*

- “pure relaxant”
- Relaxes pores, allows you to “sweat for free”
- Affects mucous, serous, and synovial membranes, cooling inflammation, and facilitating normal secretions.
- Combines well with a little *Zingiber*

# *Lobelia inflata*

- A non-toxic plant. See series of articles at <http://medherb.com>
- A powerful relaxant to both smooth and skeletal muscle
- A relaxant diaphoretic
- A strong relaxant expectorant
- Relaxes the cough reflex
- Emetic and/or cathartic in higher doses.
- Combines well with a small amount of Capsicum or a somewhat larger amount of Zingiber.

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