

# Propolis



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# Propolis



Propolis is a complex compound composed of :

Plant resins/aromatics/waxes

Digestive secretions of bees

Wax secretions of bees

Pollen, other organics, minerals

Components limited to local flora micro season











# Propolis in the Hive - Three States of Matter

Propolis is only a discreet solid outside the hive

At temperatures inside hive it is:

- A viscous liquid covering all surfaces

- A structural solid

- A bio active gaseous vapor that suffuses hive

This is indicative of prominence as a part of the hive



# In the Hive: Multi-Functionality

Propolis used as architectural material

- Space filler and “glue” to bind hive

- Shape/restrict entrances

- Exclude moisture and light

- Inhibit fungal growth in wooden nest

Propolis’ hygienic role

- ‘Doormat’ trapping outside contaminants

- Sterile containment of foreign bodies

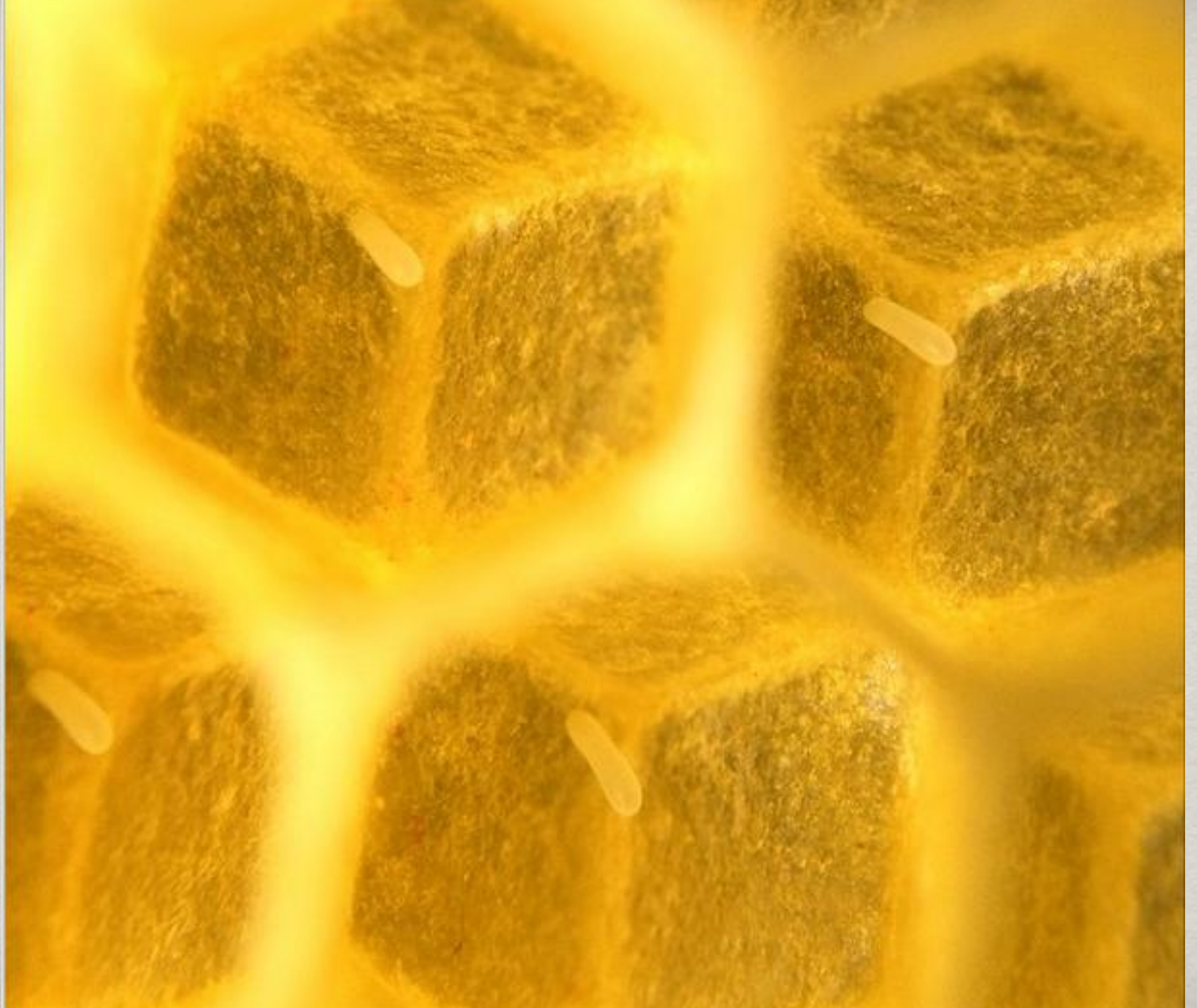
- ‘Disinfectant’ preparing brood cells

Propolis’ role as colony immune system

Social immunity means individual does not carry burden

Evidence that propolis level effects bee immune gene expression

Propolis has been shown to have probiotic properties, supporting micro-organisms in the bee



# Compositional Diversity – Functional Stability

Propolis from different areas varies considerably in  
biochemistry

Bioflavonoids, phenols, and esters, vary in nature and  
quantity

Functional medical effect varies much less

The active properties of propolis vary less than the  
constituent parts

# History of Medicinal Use

Ancient use of propolis is documented among the Greeks for skin disorders and wound healing.

Ancient Egyptians used propolis in both medicine and mummification.

The earliest ancient Chinese medical text fragments contain references to propolis use.

Often described as a 'folk' medicine by the scientists who study it, its use has continued at all levels of sophistication.

# Medicinal Forms of Propolis

Principal forms of propolis products marketed

- Alcohol/hydro alcoholic extracts

- Propylene glycol extracts (Often sold as water soluble)

- Water extracts (Seen in research only)

- Extracts as powders, tablets and capsules made from powders

- Water liquefied or hydrolyzed whole propolis

Each form has its own characteristics making equivalence dosing difficult

# General Principles of Use

Propolis is a broad spectrum remedy with effective result for an extremely wide range of conditions

Propolis is a versatile remedy – it can be used safely in combination with allopathic medications

Propolis is a safe remedy

Sensitivity to propolis generally expresses itself as a dermatitis which soon resolves when use discontinued.

Common warnings about propolis and pregnancy seem to originate on U.S. Nat'l Library of Medicine, NIH website.

# Immune Response Modifier

Various researches show increased immune system cell production when subjects given propolis.

Increased immune response directly correlated to dosage

Dosage range can be adjusted to response required

# Cytotoxic and Anti-Carcinogenic Properties

These qualities of propolis and propolis constituents subject of extensive research confirming

Propolis supports apoptosis or arresting the growth of tumor cells

Propolis has significant cytotoxicity, directly killing cancerous cells

Propolis from a wide range of origins show these qualities on a broad range of cancer cell lines



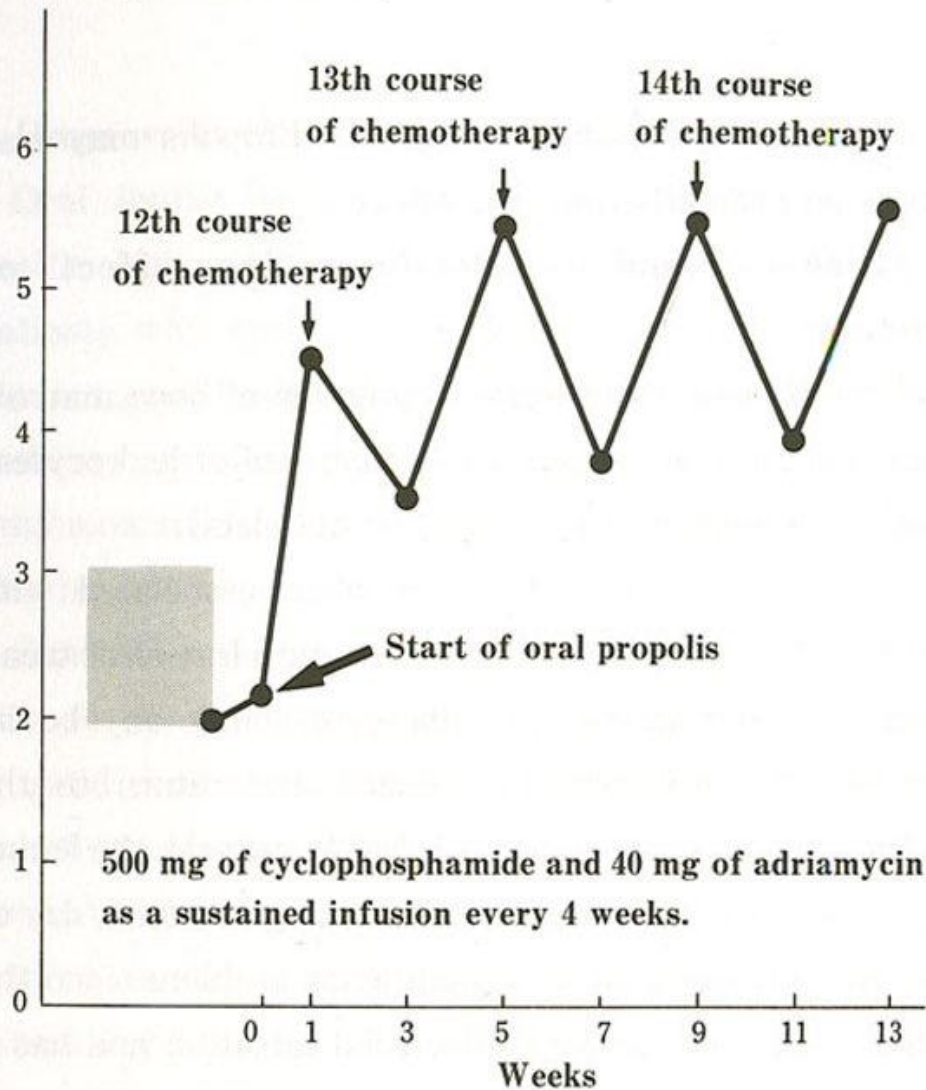
# Propolis and Immune Response to Cancer

Propolis enhances adaptive immune response to cancer with increased production of T-cells along with other responses

Strengthens overall organism and innate immune response

Increasing evidence that propolis inhibits some cancers protective mechanisms

Leukocyte count ( $\times 10^3/\mu\text{l}$ )



Breast cancer patient receiving 30 ml propolis per day during chemotherapy.

Fig. 1-5. Increase of the leukocyte count in a cancer patient taking propolis

# Propolis and Cancer Prevention

## Anti-Cytogenesis

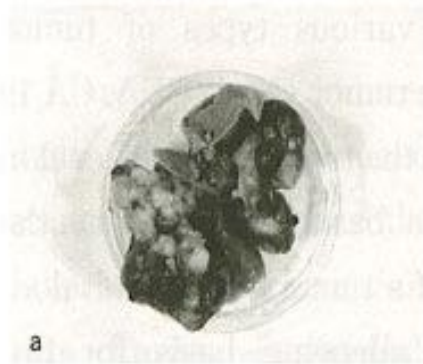
Propolis has significant anti-oxidative and radio protective qualities

Several studies in which highly carcinogenic agents were introduced to mice with and without pretreatment of propolis

Pretreated animals developed cancer at dramatically lower rate

**Control group**

**Propolis-treated group**



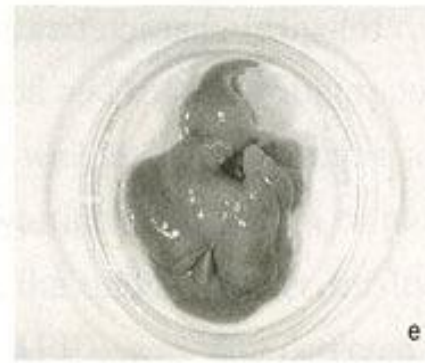
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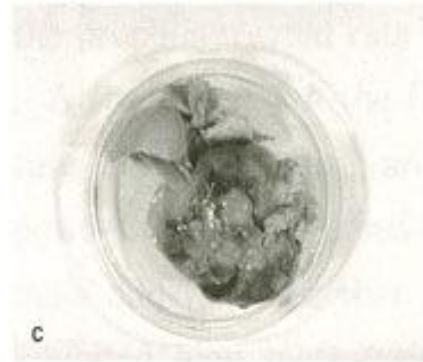
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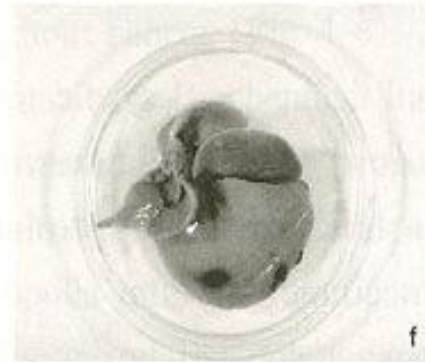
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**e**



**c**



**f**

**Fig. 1-8. Inhibition of liver cancer induction by propolis**

# Probiotic qualities of propolis

The probiotic quality of propolis is a new area of study

These studies have important implications for understanding honey bee health and the mechanisms of propolis in human health

Two principle studies show different results for the probiotic effect of propolis on *bifidobacterium in vitro* and *in vivo*

Further research is needed to establish the nature and reality of these differences

Table 1: Effect of different concentrations (mg/100 ml of growth medium) of propolis on the growth of Bif. infantis and L.acidophilus over a period of 16 h; all figures as million cfu/ml and means of duplicate samples from two bottles of milk.

Weight of propolis mg (mg/100 ml)	Bif. infantis million cfu/ml	L. acidophilus million cfu/ml
100	369	9.48
200	295	13.9
400	214	71.3
600	180	86.3
800	110	96.8

From Haddadin et al., Effect of Propolis on Two Bacterial Species with Probiotic Potential, Pakistan Journal of Nutrition, vol 7, no 2, 2008

## Coliform and Bifido Count (million CFU/g gecal homogenate) in samples obtained from Secum

Group	Bifidobacterium Million CFU/g	Coliform Group Million CFU/g
Base Diet (Control)	0.500	0.039
Cake Diet (Control)	0.770	0.010
Cake + Crude Propolis	10.000	0.010
Cake + WEP	10.000	0.390
Cake + EEP	30.000	0.001
Cake + Aflotoxn	0.001	0.620
Cake +Aflotoxin+Crude Propolis	20.000	0.400
Cake +Aflotoxin+WEP	10.000	0.480
Cake +Aflotoxin+EEP	30.000	0.330

WEP = Water Extract of Propolis    EEP= Ethanol Extract of Propolis

From El-Shobaki et al., The Effect of Consuming a Cake Containing Propolis on Gut Microflora and Toxicity, Journal of American Science, 2011;7(7)

# Biofilms, Quorum Sensing, and Propolis

Bacteria and some other organisms chemically communicate cell to cell

When signals are received, communication increases and aggregation of cells moves toward a “quorum”

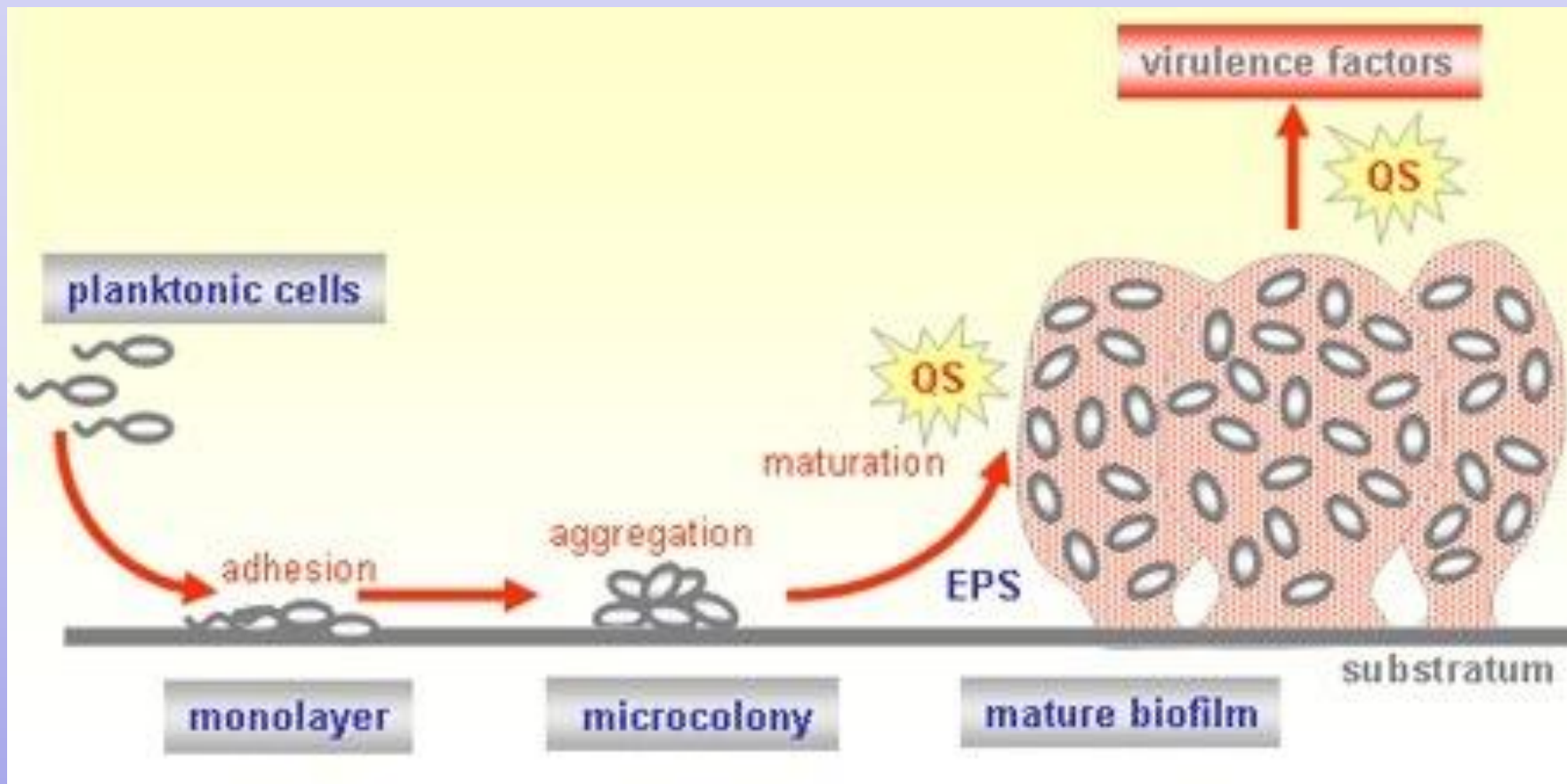
One-cell organisms in effect become multi-cellular organisms and can act together forming biofilms or Extracellular Polymeric Substances for proliferation and protection

Propolis has been shown to interrupt this communication in *Pseudomonas Aeruginosa*, *E. Coli*, and *Streptococcus Aureus* in new research



There are five stages of biofilm formation

Propolis interrupts intra cell communication by blocking cell receptors at each stage



# Anti Bacterial

Propolis is best known as an antibiotic & sometimes known as “Russian Penicillin”

Active against a wide range of bacteria including drug resistant strains

Most effective against bacteria with permeable membranes

Works synergistically with many pharmaceutical antibiotics

# Anti Bacterial

Propolis is very effective against gingivitis and periodontal infections through direct application

Propolis in honey is very effective for ear, eye, and sinus infections applied directly to site of infection

Propolis has a good success rate with urinary tract infections with moderate internal dosing 3x day

Propolis has been effective as a part of several protocols for Lyme disease

# Anti Parasitic

Propolis has been used traditionally as anti parasitic in tropical area

It is regarded as wide spectrum against microbial and larger parasites.

A moderate dose generally recommended at least two times per day

Has been used with other therapies for Lyme disease

# Anti Viral

Propolis, topically applied, can shorten duration of viral cold sores or interrupt onset

Colds and flus can be shortened with small oral doses every one to two hours

Duration of shingles outbreaks have reportedly been shortened with topical propolis

# Radioprotective

Animals fed propolis before irradiation had less gene mutation than control subjects

Propolis taken before extreme UV exposure lessened the effect and accelerated skin repair

Oral propolis before and during radiation therapy lessens the undesired side effects

Topical propolis during radiation therapy can minimize or eliminate non cancerous tissue damage

# Multiplicity of Medical Actions

Propolis may promote health by several simultaneous actions

Example: propolis for cancer may

- Improve the immune response

- Directly attack cancer cells

- Diminish growth rate of cancer cells

- Improve liver function and general health

# Biological Response Modifier

A substance that helps the body respond to imbalance more effectively or helps the body use it's agencies more effectively

Examples:

Hypo/hyper glycemia and thyroid conditions respond equally well to propolis

Animals given propolis and vaccines produced more antibodies than with vaccines only



# Biological Response Modifier

BRM activity shown In a study of the effect of propolis' on the H1N1 virus:

“..anti-influenza effects of propolis might trigger or enhance the self defense machineries of the host. ...it would be more difficult for viruses to become resistant to antiviral agents whose targets molecules are host molecules or machinery.”

Tomoaki Takemura, et al., “3,4-Dicaffeoylquinic Acid, a Major Constituent of Brazilian Propolis, Increases TRAIL Expression and Extends the Lifetimes of Mice Infected with the Influenza A Virus”, Evidence-Based Complementary and Alternative Medicine, Vol 2012, Published on the internet August 2011.

# Biological Response Modifier

BRM activity evidenced in study demonstrating probiotic and antibiotic activity:

Rats with beneficial bifidobacterium and pathogenic coliform bacteria in gut were fed propolis and showed an increase in bifidobacterium and decrease in coliform in feces

Rats with bifidobacterium in gut were infected with aflatoxin and showed decrease in bifidobacterium and elevated liver enzymes. After treating with propolis, bifidobacterium were increased and liver enzymes returned to near normal.

*F.A. El-Shobaki, et al., The Effect of Consuming a Cake Containing Propolis on Gut Micro flora and Toxicity. Journal of American Science, 2011;7(7)*

# Organs Influenced by Propolis

Traditional use of propolis has often focused on certain organs of the body

Those treatments sometimes continue to be successful

The causative effects are not always known

In others, science has caught up to folk medicine

# Hepatoprotective

The liver is a signature organ for propolis

Positive results have been achieved with

- Cirrhosis of the liver

- Hepatitis B & C

- Liver Atrophy

- Toxic exposure of liver

It would be advisable to take high doses several times per day for these conditions

# Skin & Tissue

## **Propolis is effective as a treatment for wounds/burns**

Especially effective for chronically infected and unhealing wounds

Helps during the inflammatory, proliferative, and remodeling phases of healing by stimulating growth of granulation tissue, collagen and blood vessels

Generally applied topically mixed with honey at 2-5% propolis to 95 - 98% honey

# Skin & Tissue

Eczema, psoriasis, & chronic acne often respond to propolis applied with a cream or honey

Propolis reduces effect of exposure to oxidative stress such as radiation exposure

Propolis in ointment has reduced hemorrhoids, in some cases quite quickly

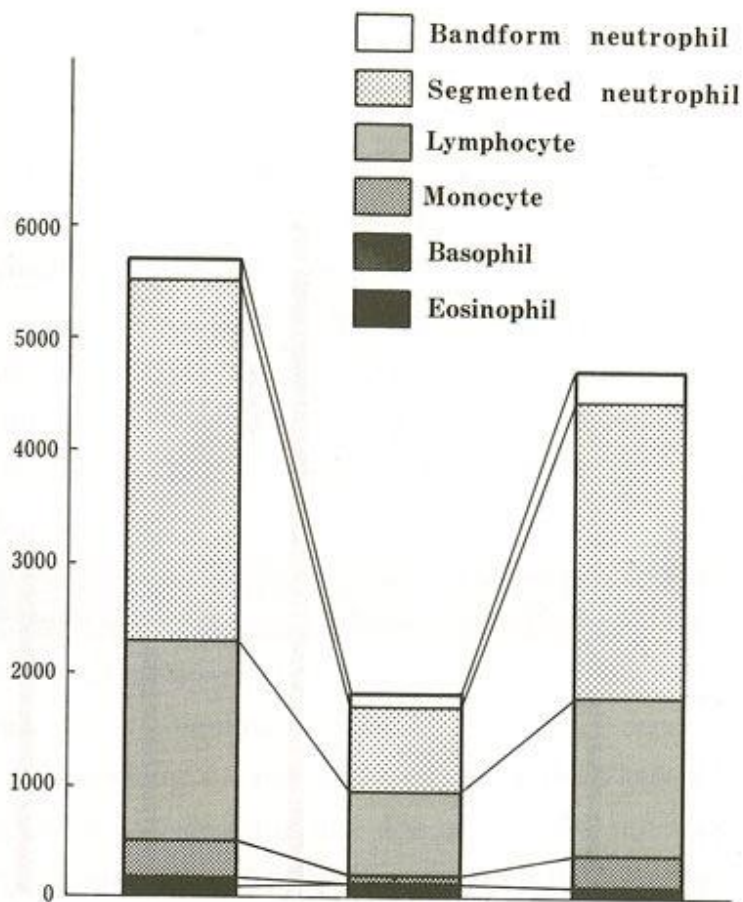


Fig. 3-13. Differential WBC count

See the footnote to Fig. 1-6 for the subpopulations of leukocytes. This patient showed a decrease in the absolute total WBC count due to impaired bone marrow function. This decrease was reversed after 10 days of oral intake of propolis.

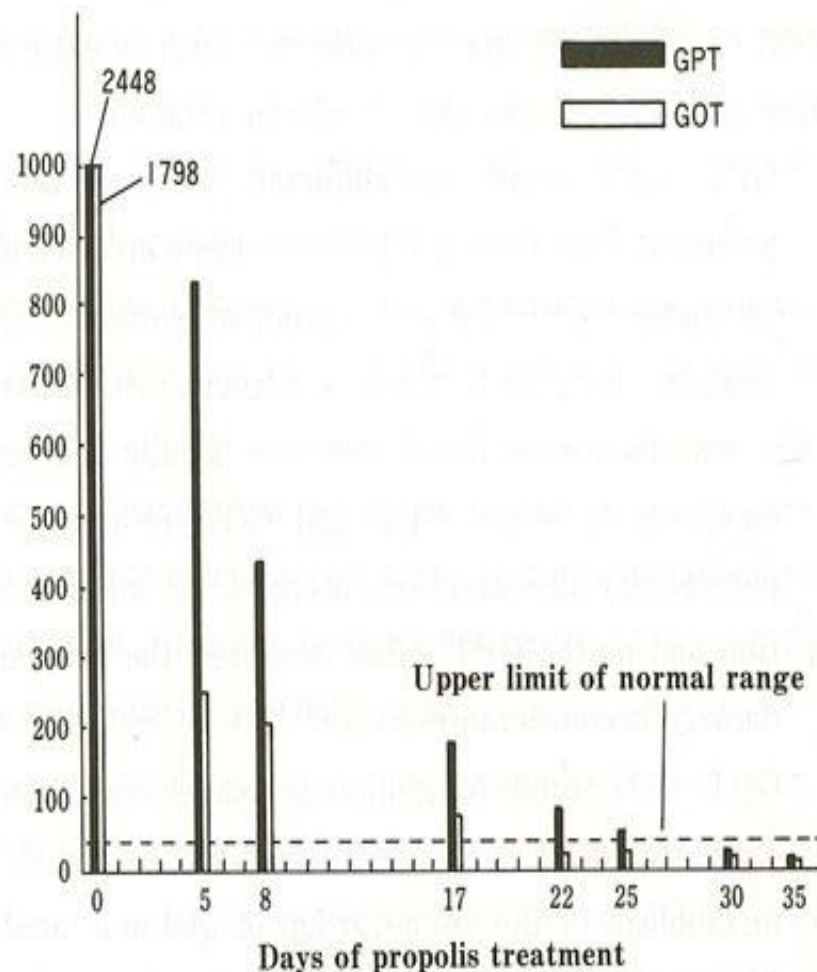


Fig. 1-13. A case of acute hepatitis B in which liver function was normalized rapidly by propolis

# Gastro/Intestinal Organs

Propolis is a hallmark remedy for gastric ulcers, colitis, and diverticulosis

Dosing should occur a half hour or more before meals

Use of raw propolis chunks has been reported successful with diverticulosis

