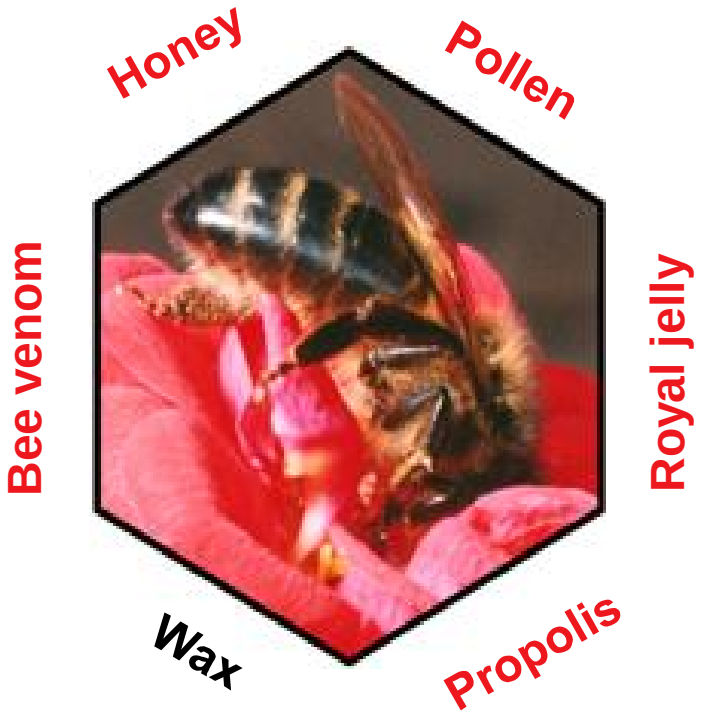
Bee Products for Health:

Functional Properties



Stefan Bogdanov
Bee Product Science, Switzerland

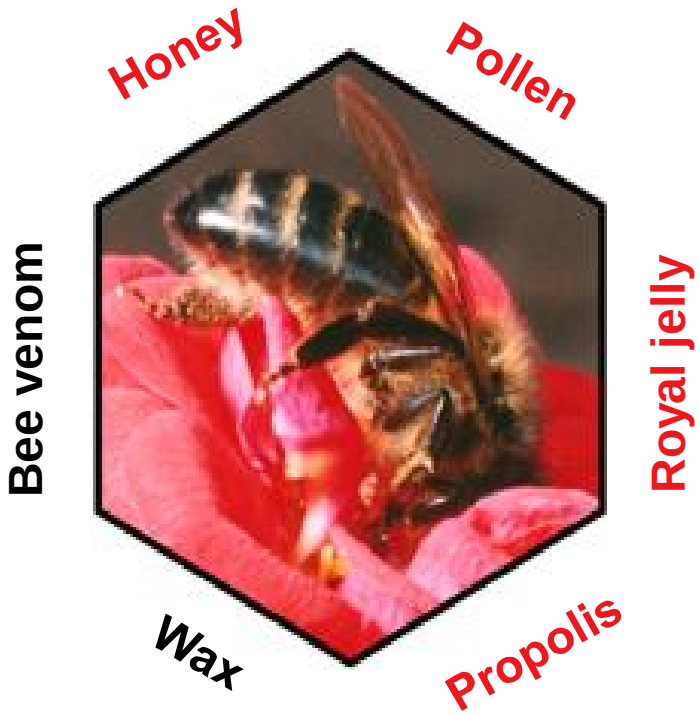
Functional and biological properties of
1. the food bee products
2. bee venom

According to the reviews published online on Bee Product Science

www.bee-hexagon.net , see there specific references

The food bee products: common functional properties

Food Bee Products: food or medicine ??



- Honey, pollen, royal jelly and propolis (mostly) are regarded as food or food supplement. According to EU food law legislation no healing claims are allowed for food
- Specific health claims as functional food are allowed, which should be scientifically proven

Antimicrobial properties

illustration: Don Smith

- ✓Antibacterial
- ✓Fungicide
- ✓Antiviral

propolis>>honey>royal jelly>pollen

Antibacterial properties of propolis

- ✓Most powerful antibacterial bee products
- ✓Many different substances are responsible for action: polyphenols, flavonoids, caffeic acid phenethyl ester, terpenes, essential oils and furfuran lignans
- ✓development of bacteria resistence improbable

- ✓Bactericidal action against many pathogenic strains
- ✓In spite of differences in composition, depending on the botancal geographical origin all propolis types are equally antibacterial

Over 700 references

Antibacterial Properties of Honey

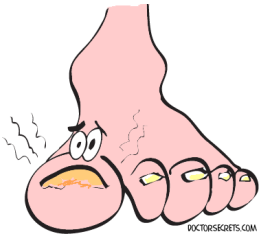
- ✓Osmotic effect of sugars
- ✓pH and honey acids
- ✓Hydrogen peroxide
- ✓Others: phenolics, carbohydrates, proteins etc.
- ✓ different factors responsible for action: development of bacteria resistence improbable

- ✓Against many pathogenic strains
- ✓Depend on the botanical origin of honey
- ✓Both bacteriostatic and bactericidal mechanism of action
- ✓Stop of bacterial growth after a certain time of honey action
- ✓Complete inhibition of growth is important for controlling infections
- ✓Store honey in a dark cool place for optimum antibacterial action,
- ✓Do not heat

Molan, 1992, 1997, Bogdanov, 1997

Antiviral and antifungal properties of honey

- ✓**Against Rubella virus**
  Zeina et al., 1996
- ✓**Against Herpes virus**
  Al-Waili, 2004

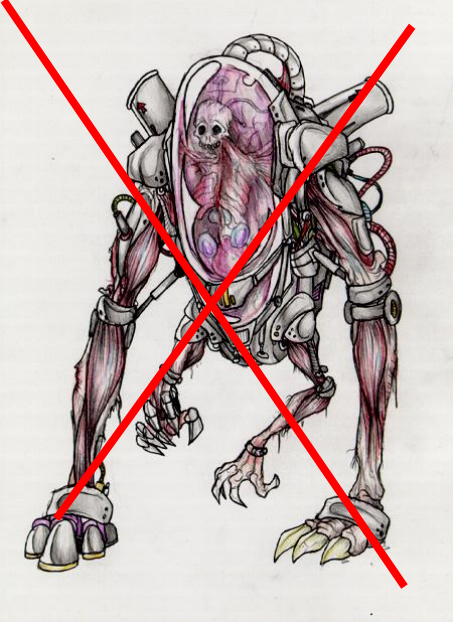


- ✓**Against different dermtophite funghi**
  Molan, 1997

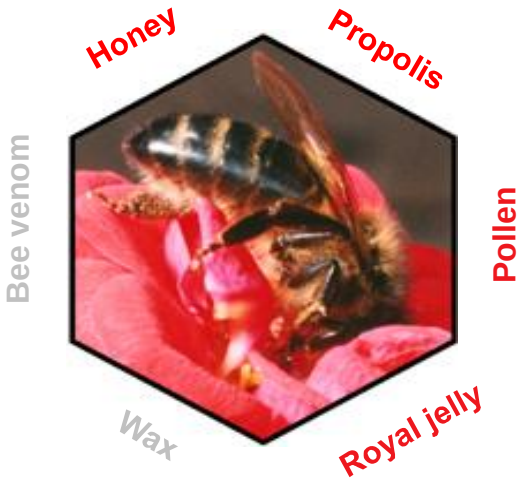
Anti-inflammary properties of honey and propolis

Explains anti-inflammatory action of these products in wound healing

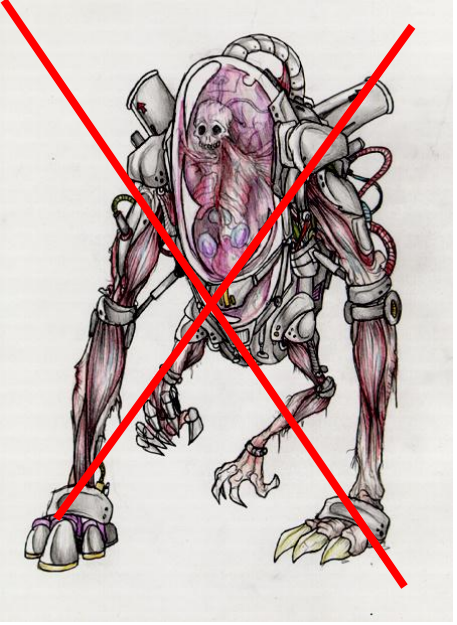
Shkenderov and Ivanov, 1983; Son et al., 2007



Immuno modulating and anti-cancer effects



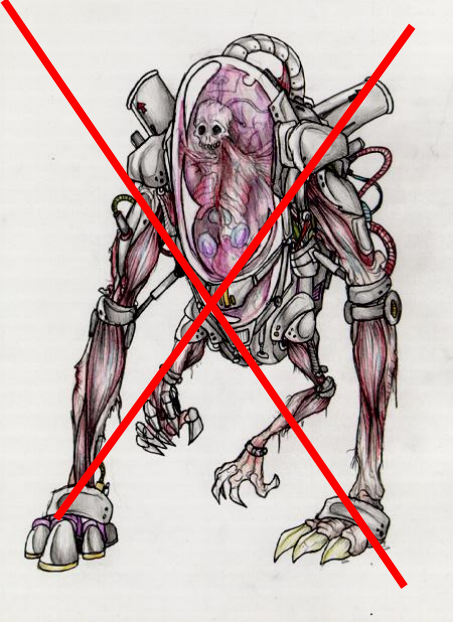
propolis>>royal jelly>honey>pollen



Immuno-modulating and anti-cancer effects of propolis

- ✓ **Increases microbicidal action of macrophages**
- ✓ **Stimulates lytic activity against cancer cells**
- ✓ **Stimulates antibody production against cancer celles**
- ✓ **Many different compounds have immuno-modulating and anti-cancer activity**

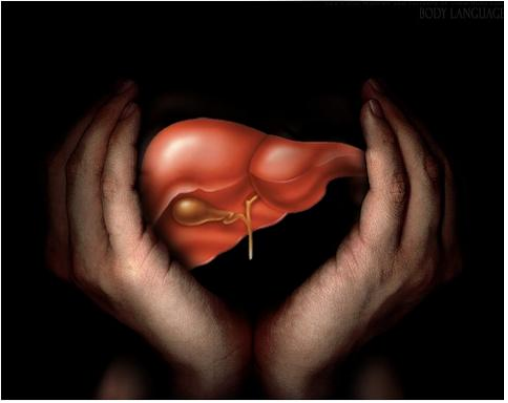
Sforcin, 2007, Orsolic 2009



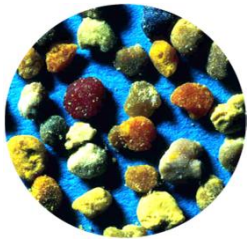
Immuno-modulating and anti-cancer effects of honey

- ✓Increases T-lymphocytes, monocytes and eosinophils
- ✓ Activates neutrophils
- ✓Antimetastatic effects in tissue and animal experiments
- ✓ Anti-cancer effects in bladder, breast, prostate and endometrial cancer cells

Orslolic, 2009, Tsapiara et al. 2009



Hepatoprotective and anti-radiation effects



- ✓ **Propolis, pollen and royal jelly**
- ✓**These effects correlate roughly with the anti-oxidant activity**

Specific functional properties of honey and royal jelly

Specific biological effects of honey

Prebiotic Activity

- ✓ stimulation the growth of Biphidus and Lactobacillus bacteria in the intestines
- ✓ action due to specific oligosaccharides
- ✓ some unifloral honeys (e.g. honeydew, chestnut) have higher activity

„Good bacteria“ in the intestines cause decrease of growth of the „bad bacteria“ -

Improvement of intestine health, immune reaction, anti-cancer etc.

Bogdanov, 2010

Specific biological effects of royal jelly

Bio-stimulalting effects

- ✓ Improves oxygen utilisation
- ✓ Anti-fatigue
- ✓ Increase of growth and weight in animal experiments

explains its stimulating effects in children and elderly

Specific biological effects of royal jelly:

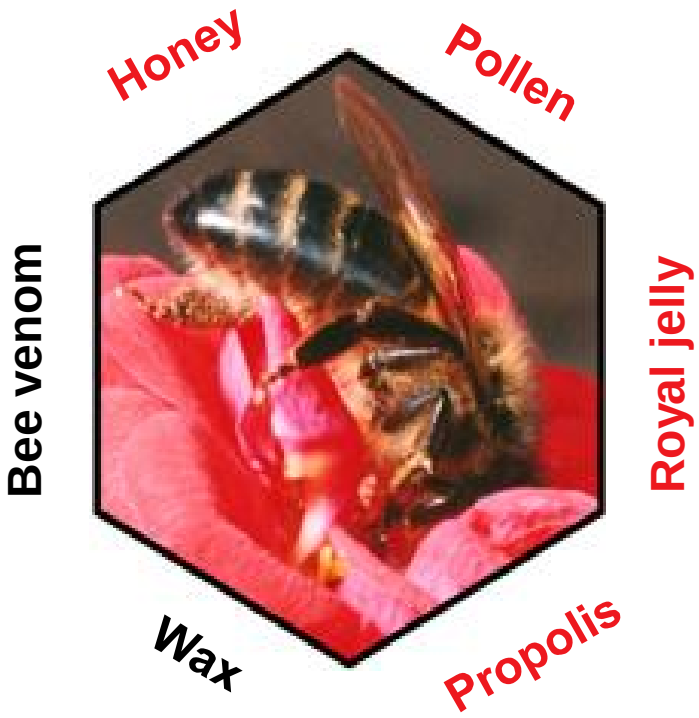
Effects on central and peripheric nervous systen

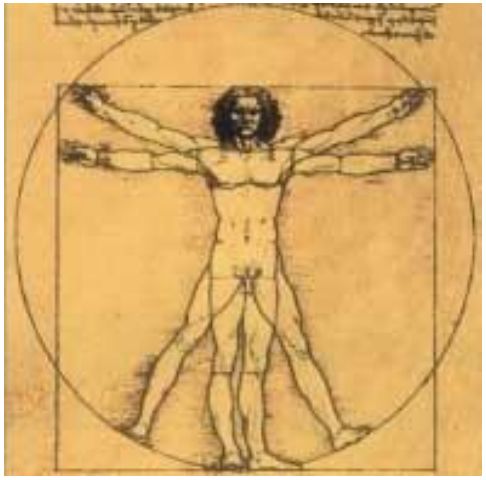
- ✓ **Stimulates the central and the peripheric nervous system**
- ✓ **Facilitates the differentiation of brain cells**
- ✓ **Acetyl cholin-like effects on smooth muscles**

explains its stimulating effects of brain activity

Krylov, 2000

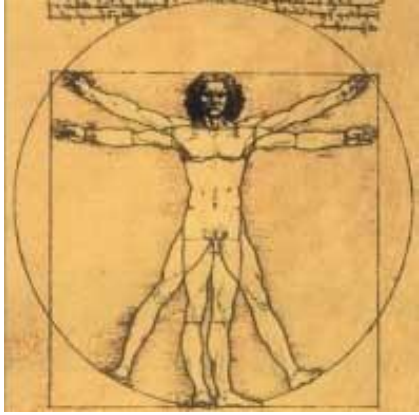
Food Bee Products: Functional Food





- **Specific health claims of food bee products as functional food could be allowed, as health enhancing propertes are scientifically proven**

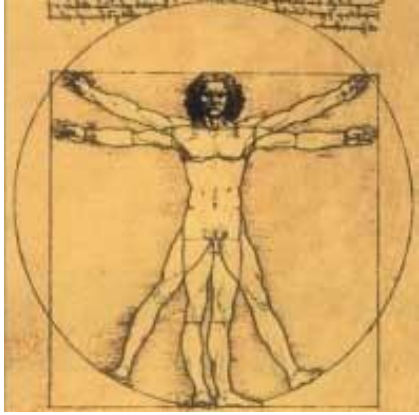
Honey: Functional Food



- **Antimicrobial activity**
- **Physical performance**
- **Immunity**
- **Gut Health and digestion**
- **Infant Nutrition**
- **Nutrition of Diabetes Patients**

- ***Carbohydrates***
- *Polyphenols*
- *Antimicrobrial substances*

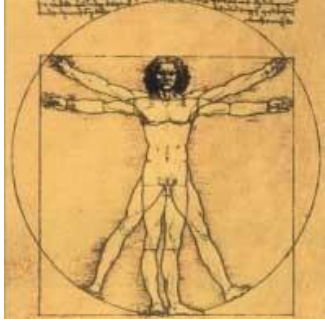
Pollen: Functional Food



- **physical performance**
- **gut and liver health, digestion**

- *Vitamins*
- *Polyphenols*
- *Phytosterols*

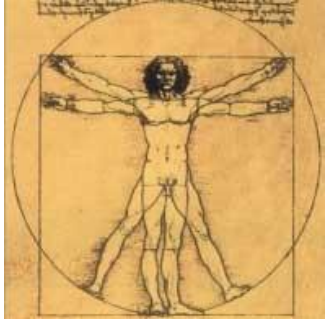
Propolis: Functional Food



- **Antimicrobial agent**
- **Gut health, digestion and immunity**
- **Diet related cancer**

- *Polyphenols (poplar)*
- *Prenlylated coumaric acids and diterpenes (Baccharis)*

Royal Jelly: Functional Food

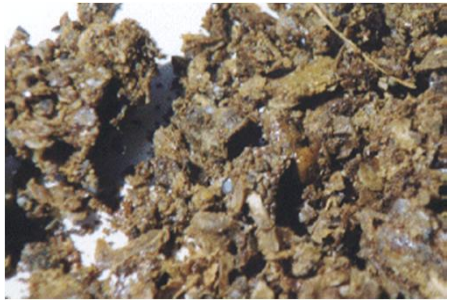


- **Mental state and performance (Anti-aging)**
- **diet related cardivascular diseases and cancer**

- *Specific fatty acids*
- *Proteins and peptides*
- *AMP-N-Oxide*

Natural Variation of Bee Products

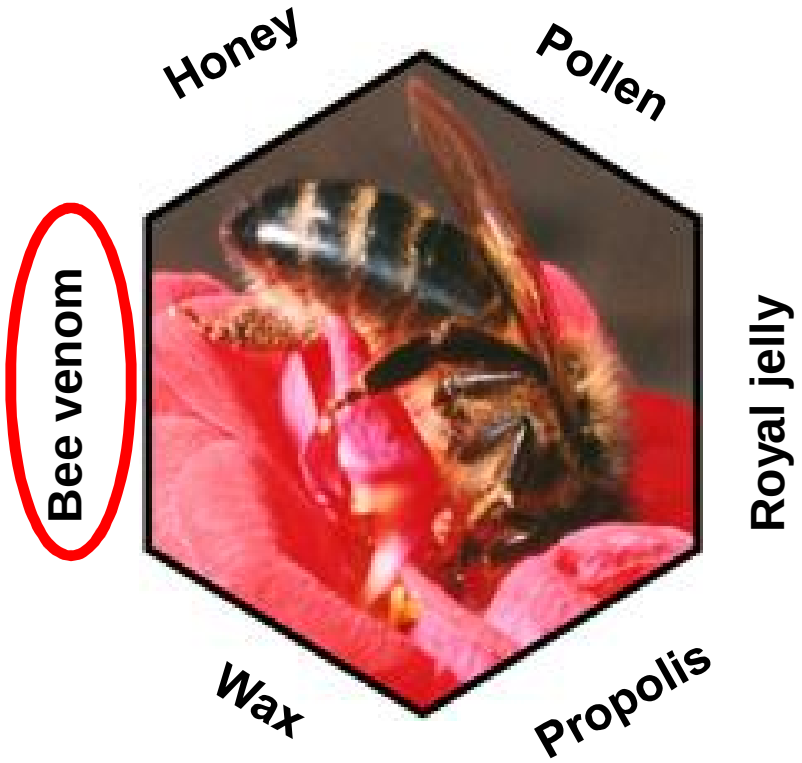
Poplar propolis | ***Baccharis "green Propolis" Brazil*** | **Red propolis (Latin America)**



Natural Variation of Bee Products

Standardisation necessary: use of standardised and specific honeys, pollen and propolis types for optimal biological action

Bee venom: the medical drug



Beneficial biological effects

- ✓ **anti-inflammatory (anti-rheumatic)**
- ✓ **specific effects on the central and peripheric NS**
- ✓ **antimicrobial**
- ✓ **immuno-activating and immunosuppressive**
- ✓ **anticancer**
- ✓ **radiation-protective**
- ✓ **Blood circulation: improves hemoglobin synthesis, anti-coagulant, accelarates heart beat, increases blood circulation, lowers blood pressure, lowers cholesterol levels,**
- ✓ **pain-soothing and analgetic**
- ✓ **Anti-addictive, metabolic**

Toxic biological effects

- ✓ induces inflammations, liberates biologican amines and induces pain
- ✓ cytotoxic et hemolytic
- ✓ blocks respiration
- ✓ inhibits body proteases
- ✓ allergenic

Bee venom
beneficial or toxic ?

Everything depends on the dose !

When using therapeutic doses the toxic effects are minimal

Health Enhancing Effects of the Bee Products: Conclusions

- ✓ All bee products have promising health enhancing effects
- ✓ <u>Specific health claims</u> of all food bee products as functional food are possible
- ✓ BV is medical drug with many biological effects
- ✓ There is a wide variaton of the composition and properties of honey, pollen and propolis, and also of their biological activity. Standardisation is necessary for specific therapeutic uses

Original reviews and references are available at

www.bee-hexagon.net