EFFECTS OF ROYAL JELLY ON SYSTEMIC INFLAMMATION: A CLINICAL STUDY

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ROYAL JELLY

Royal jelly is secreted from the hypopharynx glands of young (5 – 12 days old) nurse bees. It is a milky white creamy substance, with sour bitterish taste and characteristic odour.

It is used to feed the bee larvae in the first three days of their life, but only the bee queen is fed with royal jelly through her whole life, enabling her to become the only fertile female in the hive and to live 2 – 7 years, while worker bees usually live just few months.

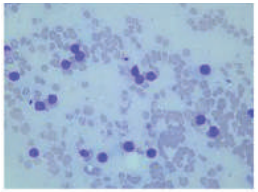
Royal jelly contains approx. 67 % water, 12 % protein, 15 % sugars, 6 % fat, vitamins and minerals.

10-hydroxy decenoic acid (10-HDA) is the main bioactive ingredient and a measure of quality, contains also bioactive peptides and glycoproteins (MRJP, apisimin, jeleins, rojalactin), AMP N1 oxide, acetilcholine, poliphenols, hormones, etc.

BENEFITS OF ROYAL JELLY

ROYAL JELLY HAS PLENTY OF BENEFICIAL EFFECTS ON HEALTH:

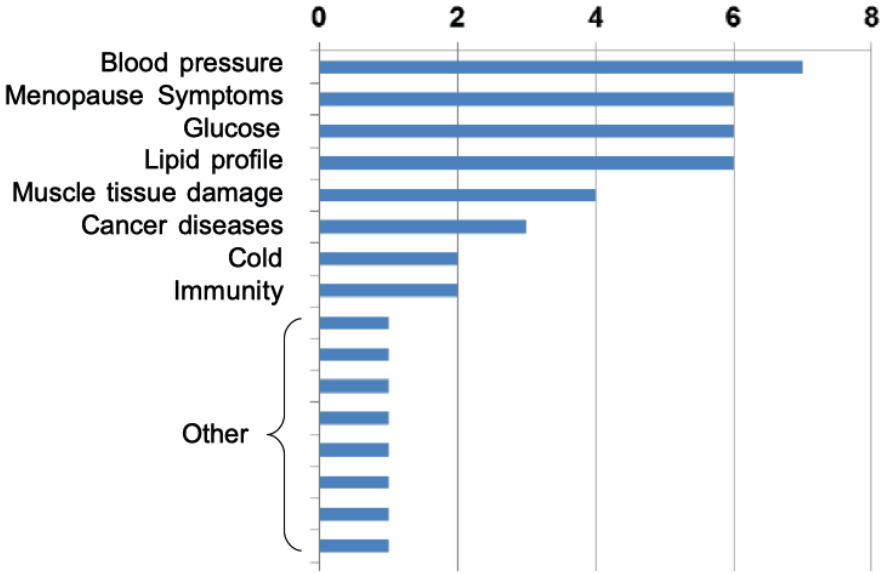
- Vasodilatation (Takaki.Do et al. 2009)
- Lowering of blood pressure (Matsui et al. 2002)
- Antioxidative potential (Jamnike et al., 2007)
- Antitumor activity (Guo et al., 2008)
- Anti-inflammatory activity (Kohno et al., 2004)
- Inhibition of pro-inflammatory cytokines (Aslan et al., 2015)



Most of the beneficial effects of royal jelly have been proven on *in vitro* and *in vivo* models.

EFFECTS OF ROYAL JELLY

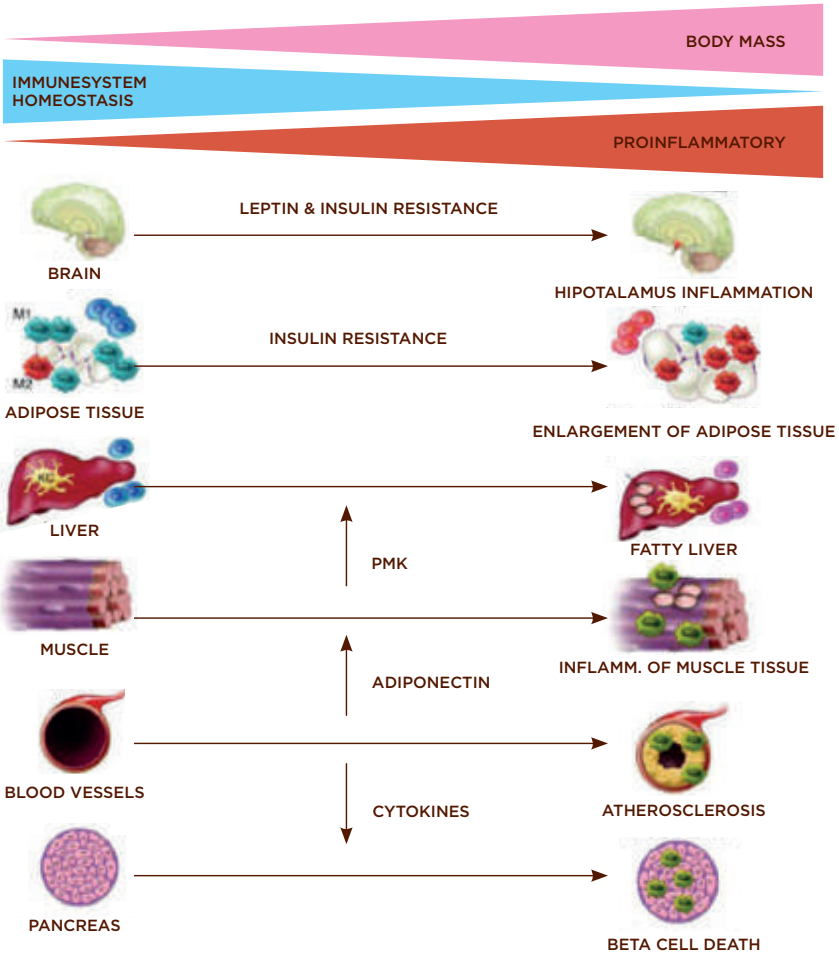
Few relevant clinical studies:



THE EFFECTS OF ROYAL JELLY ON LOW CHRONIC INFLAMMATION ARE STILL UNEXPLORED!

OBESITY

- **One of the most serious health problems of the 21st century**
- **Epidemic disease**
- **Associated with several serious illnesses**
  - Diabetes type 2
  - Cardiovascular diseases
  - Fatty liver disease
  - Cancer
- **Low level of chronic inflammation as a consequence of obesity:**
  - Key association between obesity and development of metabolic syndrome
  - Role of adipose tissue inflamation: inflammation due to obesity can affect also other organs



CLINICAL STUDY

DOUBLE BLIND, PLACEBO CONTROLLED, RANDOMIZED

PURPOSE OF THE STUDY:

- **To find out if consumption of royal jelly has an effect on pro- and anti-inflammatory factors**
- **Confirm or deny previously reported effects of royal jelly from *in vitro* studies on human individuals**

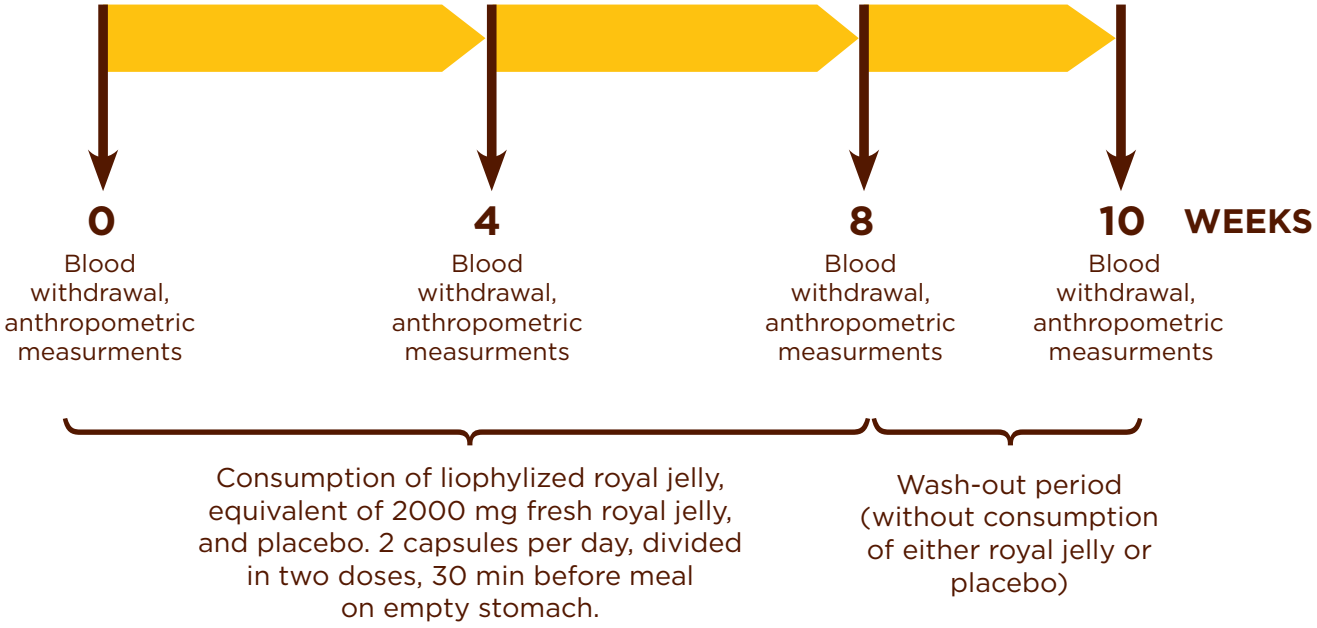
CRITERIA:

1. BMI > 23
2. Age 25 – 60 yrs
3. Without metabolic disorders, diabetes, cardiovascular diseases, endocrine organ dissfunction
4. Not using medicines for lowering blood lipids
5. Not using food supplements
6. With stable body mass in the last 3 months

HEALTHY ASIMPTOMATIC INDIVIDUALS!

PLACEBO, N = 30, GROUP ROYAL JELLY, N = 30

METHODOLOGY: TIMELINE

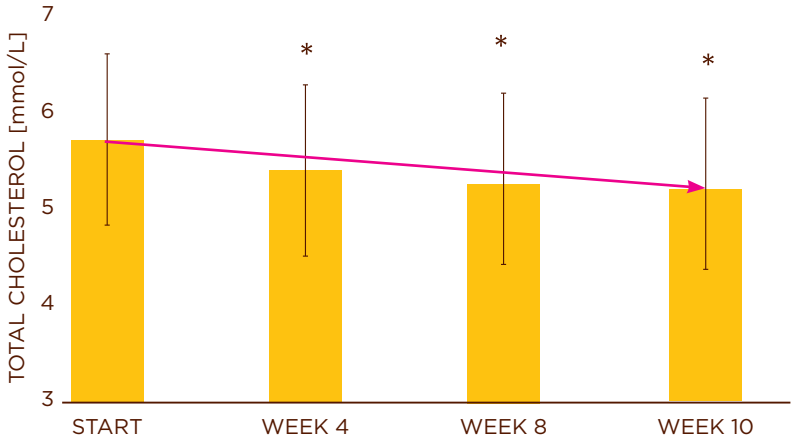


RESULTS

CHOLESTEROL

SIGNIFICANT DECREASE OF BODY FAT AND INCREASE OF PHASE ANGLE ONLY ROYAL JELLY GROUP

DECREASED BY 8 %



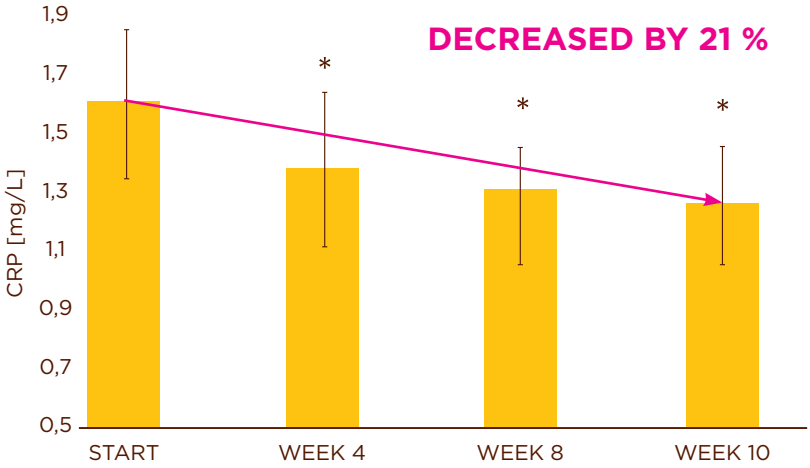
* Statistically significant differences within group in comparison to baseline values (p<0,05).

CRP

SIGNIFICANT DECREASE OF C-REACTIVE PROTEIN ONLY ROYAL JELLY GROUP

CRP – systemic inflammation marker

Decrease of CRP of great importance!



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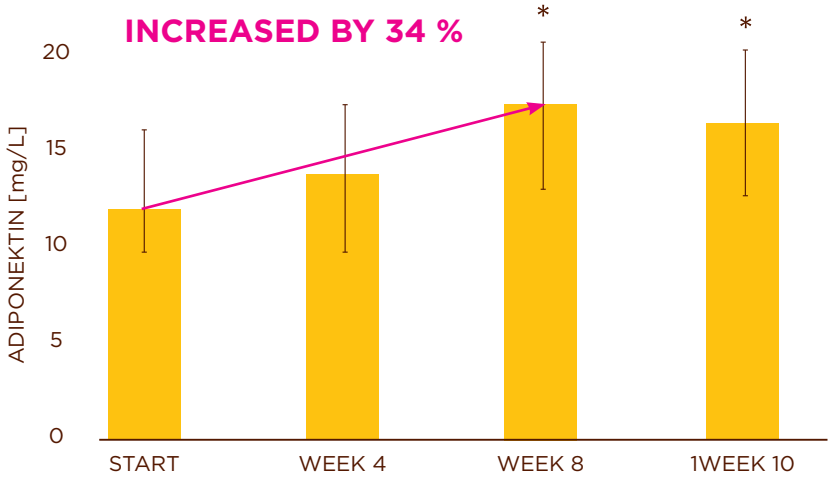
ADIPONECTIN

SIGNIFICANT INCREASE OF ADIPONECTIN LEVELS ONLY ROYAL JELLY GROUP

Adiponectin – anti-inflammatory cytokine, released from adipose tissue, concentration is decreased in obese people.

Adiponectin has anti-inflammatory role and is involved in metabolic regulation – it stimulates β-oxidation in skeletal muscles, uptake of glucose,...



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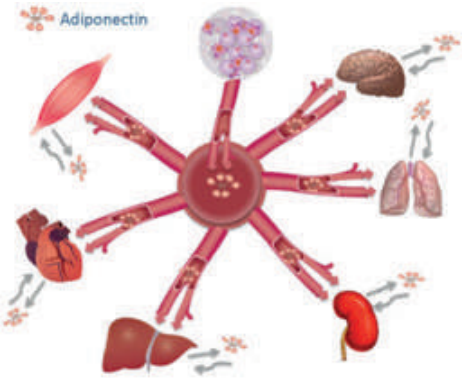
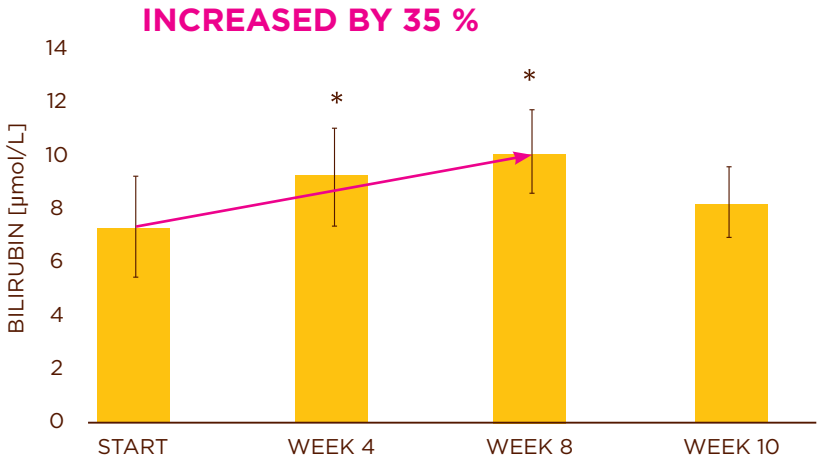


BILIRUBIN

SIGNIFICANT INCREASE OF BILIRUBIN LEVELS ONLY ROYAL JELLY GROUP

Bilirubin – product of heme, endogenuous antioxidant, which has anti-inflammatory activity.



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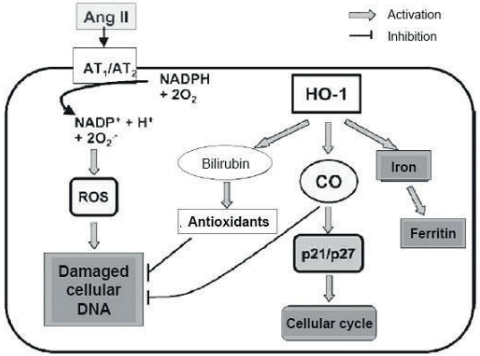
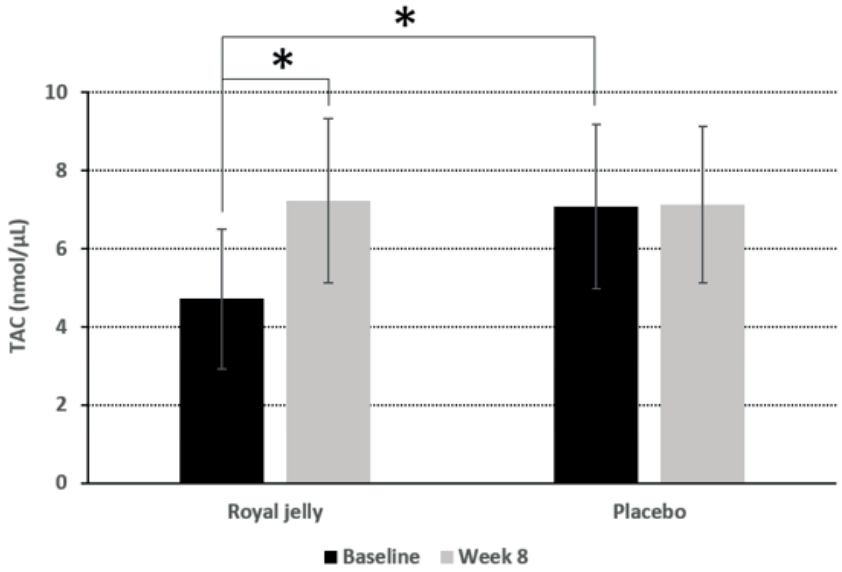


TOTAL ANTIOXIDANT CAPACITY (TAC)

INCREASE TAC ONLY IN ROYAL JELLY GROUP



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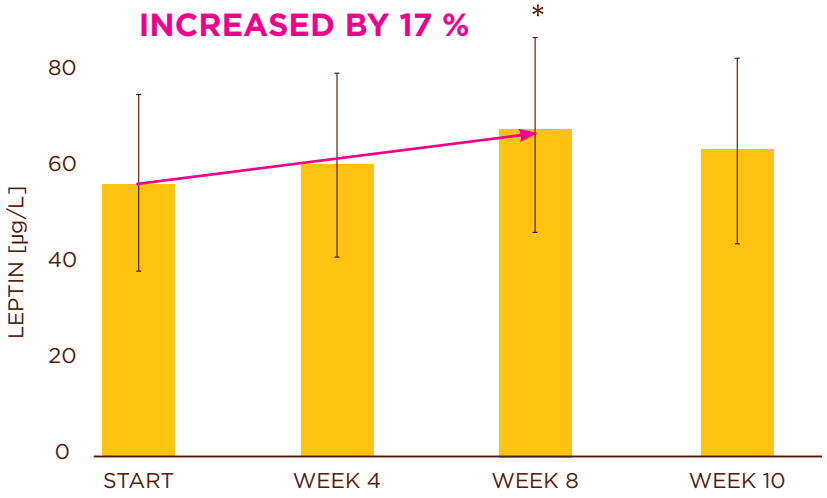
LEPTIN

SIGNIFICANT INCREASE OF LEPTIN CONCENTRATION ONLY ROYAL JELLY GROUP

Leptin is a hormone secreted by adipose tise tissue, that regulates food intake and energy metabolism. Leptin deficiency leads to weight gain, obesity, and insulin resistance, while higher leptin levels signal satiety and reduced appetite.

Higher feeling of satiety in royal jelly was significant also in subjective feeling questionnaires.



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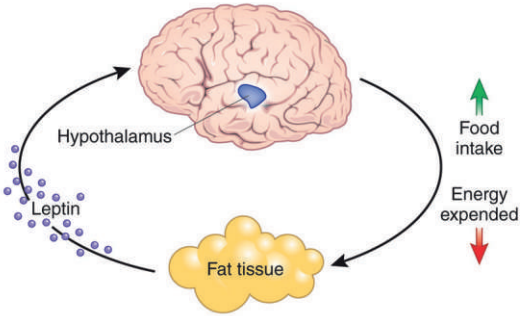

CONCLUSIONS

ROYAL JELLY (8 WEEKS CONSUMPTION, 2000 MG/DAY)**,**
HAS BENEFICIAL EFFECTS ON:

1. **LIPID PROFILE** (mostly by lowering total blood cholesterol)
2. **SYSTEMIC INFLAMMATION** (decreasing CRP, increasing adiponectin)
3. **INCREASE IN BLOOD ANTIOXIDANT POTENTIAL** (increasing bilirubin, endogenous antioxidant and TAC)
4. **APPETITE** (increase in leptin – satiety hormone, increase in subjective feeling of satiety)

Thank you!

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