

ROYAL JELLY

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Humans have known about Royal Jelly for several thousand years. Aristotle (384-322, BC) spoke of it. It has only been available in the last 50-60 years in quantities large enough for human consumption on a wide scale.

Where Does Royal Jelly Come From?

- Honey and pollen is processed into Royal Jelly in the hypopharyngeal and mandibular endocrine glands of nurse bees that are typically between the age of 5 and 15 days old.
- All bee larva are fed Royal Jelly for the first three days after their egg hatches. Thereafter, only those larva destined to become queen bees get Royal Jelly. With Royal Jelly a bee larva turns into a queen bee which can live for up to 5-7 years and can lay up to about 2,000 eggs a day. Queens are fed Royal Jelly throughout their entire lives. Deprived of Royal Jelly and fed a mixture of honey and pollen, a larva turns into a worker bee with a life expectancy of 5-6 weeks during the warm summer months and 3-4 months during the winter.
- Queens and workers have the same DNA. An unknown component in RJ silences a specific methyltransferase gene which adds methyl tags to DNA in larvae destined to be workers. *Nutritional Control of Reproductive Status in Honeybees via DNA Methylation*, Kucharski, R., Science, March 28, 2008; 319(5871):1827-33

Royal Jelly – Production

- China is the largest producer (over 2,000 tons) and consumer (about 1,000 tons). Why are the Chinese so interested in RJ and why should we care? There are legends of Chinese rulers who enjoyed remarkably long lives and great sexual prowess as a result of a diet high in RJ.
- In honey trace and mineral element concentrations varied substantially depending on botanical and geological origin. In the associated royal jelly samples the concentrations of trace and mineral elements were consistent from sample to sample. Like human milk, all royal jelly appears to be very similar and indicates that bees are able to make homeostatic adjustments of trace mineral and element concentrations in Royal Jelly – Trace and Mineral Elements in Royal Jelly and Homeostatic Effects, Stocker, A., et al., J Trace Lem Med Biol, 2005; 19(2-3):183-9, Epub Oct 24, 2005

Royal Jelly - Composition

Water	67%
Sugars	11% (Fructose 6%, Glucose 4%, Sucrose .7%, Others .5%)
Fatty Acids	5%
Minerals	1% (Ca, Cu, Fe, Mg, Mn, Na, K, Zn, Si)
Vitamins	B1 Thiamine 1.5-7.4 mcg/gm
	B2 Riboflavin 5.3-10 mcg/gm
	B3 Niacin 60-150 mcg/gm
	B5 Pantothenic Acid 65-200 mcg/gm (Richest natural source known for Vit. B5)
	B6 Pyridoxine 2.2-10.2 mcg/gm
	B7 Biotin 0.5-1.5 mcg/gm
	B9 Folic Acid 0.2-0.16 mcg/gm
	B12 Cobalamin 0.015 mcg/gm

Trace and insignificant amounts of Vit B12, Vit C, A, D, E, and K.

Royal Jelly – Composition: Continued

Proteins 13% - 52 RJ Proteins identified including 42 novel proteins which are about 3% of the protein in RJ but most of their functions are still unknown- *Comprehensive Royal Jelly (RJ) Proteomics Using One- and Two-Dimensional Proteomics Platforms Reveals Novel RJ Proteins and Potential Phospho/Glycoproteins*, J Proteome Res, June 26, 2008

Other Components:

- Gamma Globulin- mostly immunoglobulins which powerfully strengthen the immune system
- 10-HydroxyDecanoic Acid- 20-60 mcg/gm: Powerful anti-bacterial and anti-fungal that keeps Royal Jelly sterile.
- Gelatin- Precursor of collagen for skin, tendon, ligaments, etc.
- Acetylcholine- up to 1 mg/gm of RJ- the richest natural source. Important in nerve transmission and production and release of glandular secretions. “A tonic for the nervous system”.
- Nucleic acids- DNA and RNA - building blocks of genetic material available for repair projects.
- 7-9 different sterols- (e.g. sitosterol, cortisol, cholesterol, testosterone)
- 4 phospholipids from which cell walls are made
- 5 glycolipids which provide energy

Royal Jelly – Forms

- Lyophilized – (flash frozen, dehydrated, and Capsulized) – Keeps indefinitely at room temp.
- Fresh from the Hive – Limited quantity
- Fresh Frozen – 1 gram fresh frozen=200-300 mg lyophilized
- Combined with Honey – Fresh RJ combined with honey will last 3 weeks in the refrigerator
- Tablets, granules, coated pills
- Lotions, creams, ointments, shampoos
- Emulsions, slaves, mixtures with other natural products

Royal Jelly – Longevity

- A 3-fold difference in the peroxidation resistance of their phospholipid membranes (antioxidant activity prevents breakdown of cell walls) accounts for the order of magnitude difference in the longevity of queen honey bees compared to worker bees- Haddad, LS, et al., *Exp Gerontol*, July, 2007; 42(7):601-9
- Royal Jelly stimulates metabolic activity of proteins, glucose, and lipids in part due to its high vitamin B5 content. Vit B5 (Pantothenic acid) catalyzes the synthesis of coenzyme A which helps synthesize and oxidize fatty acids and helps other enzymes work. White mice have significantly increased life spans when a “sufficient” amount of Vit B5 is added to their food.
- Hypothalamic-pituitary functioning generally declines with aging. Reportedly RJ has favorable effects on the hypothalamic-pituitary axis. RJ can compensate for age-associated declines in pituitary functions in rats – Effects of Long Term Administration of Royal Jelly on Pituitary Weight and Gene Expression in Middle-Aged Female Rats, Yulio Narita, Shozo Ahta, et al., *Biosci. Biotechnol. Biochem.*, 73, 80556-1-3, 2009
- Components of RJ decrease intra-cellular oxidation by acting as a scavenger of reactive oxygen species. Some components also affect protein expression
 - Jamnik, P., et al., Antioxidative Action of Royal Jelly in the Yeast Cell, University of Ljubljana, Food and Science Technology Dept., Slovenia.
 - Inoue, S., et al., Royal Jelly Prolongs the Life Span of C3H/HeJ Mice: Correlation with Reduced DNA Damage, *Exp. Gerontol*, September 2003; 38(9):965-9

Royal Jelly – Cosmetic Use

- Skin shows a marked reduction of wrinkles and better skin tone when Royal Jelly is applied topically. Skin with radiation damage heals rapidly. - Royal Jelly in Dermatologic Cosmetics, Hans Weitgasser, MD., *Medizinische Kosmetick*

Royal Jelly – Hormonal Activity / Estrogenic Effects

- It is said that fatty acids found in RJ are effective towards autonomic imbalance, perimenopausal symptoms, osteoporosis, and other conditions. These effects may be due to the interaction of the fatty acids of RJ with an estrogen receptor inside the human body. - A Theoretical Insight into the Interaction of Fatty Acids Involved in Royal Jelly with the Human Estrogen Receptor β Toshiaki Matsubara, et al., Center for Quantum Life Sciences and Graduate School of Science, Hiroshima University, Yamada Apiculture Center.
- Royal Jelly competes with 17 beta-estradiol for binding to the human estrogen receptors alpha and beta and RJ evidently has estrogenic activity through interaction with estrogen receptors followed by endogenous gene expressions. - Royal jelly has estrogenic effects in vitro and in vivo. Mishima, S., Suzuki, K.M., et al., *J Ethnopharmacol*, October 3, 2005; 101(1-3):215-20
- Henry Hale fed lab rats royal jelly and documented increased ovarian activity within a few days and an increase in fertility.
- Menopausal Symptoms – Royal Jelly Treatment Regimen
- 300 mg a day orally. It may take 1 to 2 weeks to notice a significant response in terms of lessening of symptoms like night sweats and hot flashes.

Royal Jelly – Healing Collagen

- With aging one loses the ability to renew collagen. RJ contains the basic components of collagen and stimulates the production of TGF-beta 1 (transforming growth factor-beta 1) which is an important factor for collagen production. - Identification of a Collagen Production-Promoting Factor from an Extract of Royal Jelly and its Possible Mechanism, *Biosci Biotechnol Biochem*, April 2004; 68(4):767-73

Royal Jelly – Anti-Cancer / Immunologic Activity

- Bisphenol A (BPA) is an estrogen mimicking compound produced by certain plastics and stimulate proliferation of human breast cancer MCF-7 cells. RJ inhibited the growth-promoting effect of BPA on MCF-7 cells. - Effect of Royal Jelly on Bisphenol A-Induced Proliferation of Human Breast Cancer Cells, Nakaya, M., et al., *Biosci Biotechnol Biochem*, Jan 7, 2007
 - Fraction RJP30, obtained by precipitation of RJ with ammonium sulfate, decreased by 2.5 fold the initial cell density of HeLa human cervicouterine carcinoma cells, after 7 days of treatment. -Screening of Biological Activities Present in Honeybee (*Apis mellifera*) Royal Jelly, Salazar-Olivo, L.A., Paz-Gonzalez, V., *Toxicol In Vitro*, August 2005; 19(5):645-51
 - In children with leukemia, Royal Jelly was effective in improving general condition of patients with increased appetite and weight gain.
 - Royal Jelly offers protection against side effects of chemotherapy and radiation therapy
 - Mixture containing:
 - 25 grams pollen
 - +2 grams royal jelly
 - +223 grams honey
- Take 1-3 teaspoons / day

Royal Jelly – Physical Exhaustion

- Mice could swim longer before drowning after being fed Royal Jelly. - Antifatigue Effect of Fresh Royal Jelly in Mice, *J of Nutr Sci Vitamin (Tokyo)*, Dec 2001; 47(6):394-401

Royal Jelly – Brain Injury and Healing

- The effects of AMP N1-oxide (a compound unique to RJ) on the proliferation and/or differentiation of cultured neural stem/progenitor cells (NSCs) were examined. The results suggest that AMP N1-oxide may be a good tool for protection against and therapy for certain brain injuries. - AMP N1-oxide Potentiates Astrogenesis by Cultured Neural Stem/Progenitor Cells Through STAT3 Activation, *Biomedical Research*, Vol. 28, pp.295-299 (2007)
- RJ Treatment to Improve Memory
 - Mix Royal Jelly and 40% vodka 1:2 by weight
 - Take 5-10 drops 3-4 times per day ½ hour before meals
 - Moderate amounts of alcohol were found to decrease incidence of dementia including Alzheimer's Disease in people over age 60 – Alcohol Consumption as a Risk Factor for Dementia and Cognitive Decline: Meta-Analysis of Prospective Studies, Anstey, K.J., Mack, H.A., *AM J Geriatr Psychiatry*, 2009; 17:542-555

Royal Jelly – Cholesterol Management

- Rats with experimentally induced hyperlipidemia were fed lyophilized RJ at about 100mcg/kg for 6 weeks. Investigators found decreased serum cholesterol and increased HDL with a $p \leq 0.01$
- The addition of RJ to the daily diet increases the HDL cholesterol, especially in older patients – Royal Jelly Increases High Density Lipoprotein Levels But in Older Patients Only, *The Journal of Alternative and Complementary Medicine*, April 2009, 15(4):329-330
- In humans 50 to 100 milligrams dry weight of royal jelly per day decreased total serum cholesterol by 14% and lipids by 10%. The patients were given royal jelly by mouth and by injection but the results were very similar for both delivery techniques – Effect of Royal Jelly on Serum Lipids in Experimental Animals and Humans with Atherosclerosis, Vittek, J., *Eperientia*, Vol 51, Sept. 29, 1995, pp 927-935

Royal Jelly – Aids Bone Formation

- RJ as a whole or some of its individual components stimulate production of type I collagen and other activities for bone formation through action on osteoblasts through up-regulation of procollagen I alpha1 gene expression – Royal Jelly Stimulates Bone Formation: Physiologic and Nutrigenomic Studies with Mice and Cell Lines, Narita, Y., et al., *Biosci Biotechnol Biochem*, October 7, 2006

Royal Jelly – Adverse Effects / Cautions

- Symptoms of asthma and anaphylaxis seen in subjects following ingestion of royal jelly were true IgE-mediated hypersensitivity reactions – Asthma and Anaphylaxis Induced by Royal Jelly, Thien, F.C., et al., *Clin Exp Allergy*, February 1996; 26(2):216-222

Royal Jelly – Administrations / Treatments

- Daily Maintenance Dose 100-500 mg/day
- Anti-viral 5,000 mg/day – Careful not to cause hormonal disorder due to estrogenic effect
- According to Chinese texts, to get optimal results with bee venom therapy it is necessary to pre-treat a patient for three weeks with Royal Jelly in order to support immune system functions.
- High and Low Blood Pressure:
 - Mix 5 gms fresh Royal Jelly with 100 gms of raw unprocessed honey
 - Mix well for 20-30 minutes
 - Keep container tightly closed and refrigerate
 - Take 1 teaspoon 3-4 times per day under the tongue until it dissolves
 - Take mixture for 3-10 weeks depending on your condition
- Chronic Fatigue and Immune Dysfunction:
 - Use rectal candles made by compounding pharmacist in dosage of 2-50 grams of royal jelly depending on the age and size of the person.
- Blood Vessels:
 - After heart attack, stroke, and for cardiovascular problems take 15-20 mg fresh Royal Jelly 2-4 times per day 30-60 minutes before meals for 5-6 weeks. Keep RJ under the tongue until it dissolves

As if all that was not enough...the studies on Royal Jelly seem to indicate that there are more to the following reports of the benefits of Royal Jelly than simply old wive's tales:

- Stimulate better memory and mental function
- Increase sexual vitality and rejuvenation
- Increase vigor and physical strength
- Regulate and balance hormonal activity and increase fertility
- Normalize blood pressure
- Improve skin smoothness and elasticity
- Regenerate bone tissue
- Promote building of soft tissues and muscles
- Enhance wound healing
- Decrease arthritic symptoms
- Protect the liver
- Decrease depression and calm anxiety
- Stimulate the immune system to fight infections and tumors
- Lower cholesterol and blood lipid levels
- Stimulate production of red blood cells
- Prevent hair loss
- Help in some Central Nervous System disorders including Parkinson's Disease