



Apitherapy finds a role in caring for animals

A growing number of veterinarians in the United States are adopting holistic veterinary medicine, in which they consider all aspects of an animal's environment and employ gentle, minimally invasive techniques. Holistic veterinary medicine (also referred to as alternative or complementary veterinary medicine) encompasses such practices as herbal medicine, acupuncture, chiropractic, homeopathy, therapeutic nutrition, and even certain components of apitherapy.

One veterinarian who enthusiastically opts for a product of the hive—honey—is Richard Palmquist, DVM, who for more than 20 years has practiced integrative medicine, which makes use of both mainstream and complementary and alternative therapies. He is past president of the American Holistic Veterinary Medical Association and current president of the American Holistic Veterinary Medical Foundation, which promotes research to determine the effectiveness of various complementary and alternative veterinary therapies.

Honey's anti-inflammatory and antibacterial properties make it ideal for handling wound infections. In his practice at Centinela Animal Hospital in Inglewood, California, Dr. Palmquist treated a dog with a damaged paw by applying a "medical honey wrap" directly on the wound. He notes that honey can remain in an animal's fur, but removing it is easy: warm water or a saline solution will do the job. It is important, he says, for animal owners to notify their veterinarian if they decide to give honey to a pet.

He also used honey to help a dog with chronic severe skin and ear infections. He advised against surgery and instead recommended feeding the dog a



Richard Palmquist, DVM

teaspoon of local honey daily. A few weeks after the owner depleted his supply of that honey, the symptoms returned, so it was evident that the dog would need to take honey indefinitely. Once this treatment resumed, Dr. Palmquist recalls, the dog's "skin and ears were perfect."

Honey may be helpful in addressing allergic components in cases like the one above by treating pollen allergies and balancing immune regulation. When certain animals eat honey, says Dr. Palmquist, it decreases

inflammation in the intestinal tract and may affect dendritic cells (specialized cells that monitor the proteins going into the body through the gut) to inform the body that pollen is being ingested and not to overreact. When pollen enters the nose or lungs or skin, the signals from those cells reduce the allergy symptoms.

For dogs with allergies, Dr. Palmquist commonly provides a kale shake, consisting of a third to a half leaf of organic kale blended with water or broth, plus honey, given daily. His advice to dog owners: identify the trees or flowers that are in bloom when the allergies flare, and then look for honey that contains these pollens.

The American Holistic Veterinary Medical Foundation is raising money for research into holistic therapies for animals. Because many issues cross species, supporting the foundation helps both people and animals. Website: www.ahvmf.org

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Journal of the American Apitherapy Society

The American Apitherapy Society, Inc.
15 Heights Road, Northport, NY 11768
Phone: (631) 470-9446
Email: aasoffice@apitherapy.org
Website: www.apitherapy.org

EDITOR Patsy McCook

MEDICAL ADVISORS Andrew Kochan, M.D., Theo Cherbuliez, M.D.

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- Assembles information on apitherapy and collects data on the administration of and reactions to hive products
- Advises the medical and scientific communities and the general public, both national and international, about apitherapy through this *Journal*, a website, and courses, conferences, and workshops
- Maintains a network of people involved with apitherapy as apitherapists, beekeepers, and patients
- Establishes guidelines for the professional conduct of apitherapists
- Trains apitherapists.

The efficacy of honeybee products for medical conditions has not been adequately evaluated in the United States, and bee venom therapy has been approved in the U.S. only for the desensitization of persons allergic to bee stings. Thus, the AAS makes no claims about the safety or efficacy of honeybee products, nor does it endorse any form of apitherapy.

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From the Editor

Contact:

BeeEditor@gmail.com



It has been estimated that in some areas of the United States, honeybee losses this past winter exceeded 50%—the worst in several decades. Recent studies suggest a possible interaction between two of the many factors thought to play a role in colony collapse disorder: pesticides and honeybees' diet.

Neonicotinoids, a category of pesticides introduced in the 1990s and now used widely, have a highly efficient delivery system. They can persist in soils for as long as two years, and they are water-soluble, meaning that they may travel far from their original applications. Ultimately they are taken up by plants' roots and circulated throughout, so the entire plant—leaves, nectar, pollen, fruit—is infected. The toxin-contaminated nectar and pollen accumulate in the hive.

Neonicotinoids, which include the potent neurotoxins imidacloprid, clothianidin, and thiamethoxam, are under suspicion for impairing bees' ability to find their way back to the hive. These pesticides are available for home use on roses, flowers, shrubs, trees, and lawns, so it is crucial to read the ingredient list for all garden products. The labels of products used by landscaping services and arborists should be checked as well; many of these businesses have access to even stronger forms of pesticides.

Also under investigation is the role of honeybees' diet. Certain chemicals that make up the outer wall of pollen grains are incorporated in honey by adhering to the legs of bees as they visit flowers. When bees are exposed to one of these—an enzyme that switches on “detoxification genes”—their immune systems are strengthened. Ultimately the consumption of honey, which is a natural source of carbohydrates and a diet that bees have evolved to eat, helps them fight off toxins.

However, commercially raised bees do not always have access to honey. Instead, honey, which commands high prices, may be taken away from them and they are fed high-fructose corn syrup. The problem is not that high-fructose corn syrup is toxic, but rather that it is an inadequate substitute for honey. (See Notes from the Field, page 10 of this issue.) It is possible that the absence of honey—and the absence of the enzyme that activates detoxification genes—from their diet compromises bees' immune systems. This in turn may make them more vulnerable to insecticides like neonicotinoids.

With my good wishes,
Patsy McCook



From the President

Contact:
frederiquekeller25@gmail.com

Dear AAS members,

Our first Flower Power Fund Raiser, held earlier this year, was a rousing success, producing \$453 for the AAS. A hefty thanks to everyone who participated!

We're planning a second round of this effort in the fall.

Also in the fund-raising arena, the AAS has developed a new-member gift package, which in addition serves as a promotional technique. Board member Craig Byer has produced "Bee-come a member" stickers (see samples on this page), which he is attaching to a beehive tool: a pry bar with a blade on one end to facilitate work in the hive. These will be sent to all new AAS members. Another creation of Craig's is an AAS bumper sticker, designed to encourage beekeepers to join the organization. We'll be taking a supply of the bumper stickers to the Eastern Apicultural Society meeting, in West Chester, Pennsylvania, this summer.

On Thursday, August 8, during the EAS meeting, the AAS is holding an Apitherapy Day, which will enable us to share ideas about promoting apitherapy-grade standards for honeybee products. Craig and I will be giving presentations, and we hope to see board members Kristine Jacobsen and Vetaley Stashenko there as well. Additional details are on page 11 of this issue.

On the activism front, the AAS lent support on Saturday, May 25, to thousands of participants around the world in what was termed "The March Against Monsanto." We've noted that close to 90% of the conventional corn, soy, and sugar beet crops in the United States are now genetically modified, and Monsanto is a leading manufacturer of genetically modified organisms. Among the many concerns about Monsanto are that the company's genetically engineered foods can lead to health problems like tumors, infertility, and birth defects and—especially alarming to beekeepers and apitherapists—that pollen from plants grown from its genetically modified seeds may be toxic to honeybees.

Meanwhile, a loophole added to recently passed U.S. Congressional legislation protects genetically modified seed manufacturers—including Monsanto—from litigation regarding health risks. As a result, organic and small farmers suffer losses while a corporation like Monsanto forges a monopoly in food supplies, including exclusive patenting rights over seeds and genetic makeup. The May 25 demonstrators urged consumers to boycott Monsanto-owned companies that use

genetically modified organisms in their products and instead to opt for organic products. Support was also expressed for labeling GMOs and for increased funding of research on their health effects.

Back home, an exciting offer came my way in April. At a farmers' market here in Huntington, New York, a customer offered his ten acres of pristine land—it borders a nature preserve on Long Island Sound, just down the street from my house—to install some beehives. What a spectacular location! Craig Byer, who is a neighbor, needed to move some of his hives, so I had a brainstorm: creating the first Apitherapy Hive Project.

The idea is to set up ten hives and to cultivate raw honey, pollen, and propolis and collect bee venom for apitherapy use. I would have these products tested by a lab in New Jersey to monitor the exact specifications. Although the project is still in its infancy, I hope it will serve as an inspiration for others around the country to do the same. The next issue of this *Journal* will give more details—and photographs!

Also in the works are new features on the AAS website. The opening page will feature larger, more user-friendly thumbnails for accessing membership information and for viewing video clips, along with a sample issue of the *Journal*. Executive director Marilyn Graham and I are working on the titles, and our webmaster will be adding photos to spruce up the video of apitherapy products.

Meanwhile, in the past ten days alone, the AAS has increased its "Likes" on Facebook from 2,616 to 2,733. Also on the upswing was the number of Friends—from 510 to 600. These figures most likely resulted from increased postings and activity on the AAS page. I encourage everyone to visit the AAS page and support us—and then go to our website and become a member!

Peace, bees, and great health,
Frederique Keller L.Ac.



6.8145x1.24"



BEE VENOM

Nanoparticles can kill HIV

Bee venom's primary toxin is a small protein known as melittin. In laboratory studies it has been used for its anti-tumor properties and distributed by means of microscopic spheres, known as nanoparticles. Now a group of researchers has found that nanoparticles containing melittin can kill viruses including HIV—the virus that causes AIDS—without harming the body's normal cells. Melittin does this by attacking an inherent physical property of the virus: ripping holes in, essentially rupturing, its protective double-layered membrane.

The researchers, based at the Washington University School of Medicine in St. Louis, Missouri, designed the nanoparticles to be delivered as a vaginal gel to prevent the transmission of HIV. The idea was that women using the gel would not need to have their partner wear a condom. It also could help HIV-positive women to conceive a child without spreading the virus to the fetus.

Melittin's ability to kill HIV outright, before it has a chance to infect a person, contrasts with current HIV treatments, which focus on inhibiting the virus from reproducing. But those treatments do not prevent the infection in the first place, because the virus remains alive.

In developing the gel, the researchers first designed the nanoparticles to prevent the toxin from coming into contact with other cells in the body. To do this they added to the surface of the nanoparticles protective molecular “bumpers” of the exact size that allows the passage of HIV (which is smaller than the nanoparticle) between the bumpers. It then makes contact with the surface of the nanoparticle, where it is destroyed by the melittin. In contrast, healthy human cells are much larger in size, so the particles simply bounce off.

Another benefit of the bumpers is that because they prevent the melittin from reaching normal cells, they do not harm sperm cells. As a result, a vaginal gel could be used by couples who want to have children and where only one of the partners is HIV-infected and wants HIV protection but not, therefore, contraception. A gel could also help prevent the spread of other infectious diseases, like hepatitis B and C, whose viruses have a protective membrane similar to that of HIV and as a result are vulnerable to melittin. Also contemplated

is the use of nanoparticles against existing HIV infections, especially those that are resistant to drugs.

The researchers refer to their work as a “proof of concept study,” a laboratory experiment that demonstrates the feasibility of the technology. A next step is to test the vaginal gel in clinical trials.

Source: Hood JL et al. (2013) Cytolytic nanoparticles attenuate HIV-1 infectivity. *Antiviral Therapy* 19 (March), 95-103.

Effective in treating lupus

An estimated 500,000 people in Europe and 250,000 people in the United States have systemic lupus erythematosus. Most patients are women in their childbearing years. Lupus, which is characterized by flares and remissions, is a complex disease with varying manifestations and prognoses. Because it is systemic, many medical specialties are involved in the care of these patients.

The Bee Venom Therapy Research Center in Cairo, Egypt, saw a 29-year-old woman who had been diagnosed with lupus nine years earlier. She reported many flat lesions on her face, ulcers in her mouth, significant hair loss with areas of alopecia, and arthritis in the form of swelling and tenderness of the small joints in both hands and both ankles. She complained of shortness of breath after moderate exertion. She had no palpitations, difficulty swallowing, muscle weakness, painful urination, or diarrhea. There was no evidence of any type of skin rash.

Laboratory results showed reduced blood cells, elevated erythrocyte sedimentation rate with normal C-reactive protein and average liver granulation. Certain antibodies were positive, suggesting lupus. No erosions or cysts on either hand or ankle were shown on plain X-rays.

The patient was started on a six-month regimen of bee stings, five days a week. In the first week she received one sting on the lower back daily. She subsequently received one sting on the base of her spine daily and several stings a week on her kidneys, both shoulders, and both wrists and elbows. She reported marked improvement of her joint symptoms, with gradual improvement of the skin lesions.

Source: El-Bassiony Mohammed N et al. (2012) Effects of bee venom on systemic lupus erythematosus: Case study. *Egyptian Rheumatology & Rehabilitation* 39:3 & 4 (July & October), 569-571.

Use with propolis may help treat psoriasis

Psoriasis is a common chronic skin disease manifested by plaques covered by silvery white scales. Its origin is unclear, although T-cells (white blood cells that are part of the immune system) are thought to be a factor. Interleukin-1 beta, a chemical involved in the regulation of immune responses and inflammatory reactions, plays a role. Current treatments help suppress psoriasis but do not cure it. Now investigators have reported finding changes in the level of interleukin-1 beta in psoriasis patients treated with bee venom and propolis. The changes were particularly pronounced with bee venom.

The study group consisted of 26 males and 22 females, ages 8 to 60, with localized plaque psoriasis affecting less than 30% of the skin, in the active stage of the disease. The duration of lesions ranged from four months to seven years. Patients with systemic conditions like diabetes and heart disease were excluded from the study, as were pregnant and lactating women.

The investigators, affiliated with the National Research Center and Tanta University, both in Egypt, randomly divided the 48 patients into four groups, which respectively received (1) intradermal bee venom, (2) topical propolis ointment in a petroleum jelly base, (3) oral propolis capsules, and (4) intradermal bee venom and oral and topical propolis. The response to treatment was determined by calculating Psoriasis Area and Severity Index (PASI) score and measuring serum interleukin-1 beta before treatment and three months afterwards.

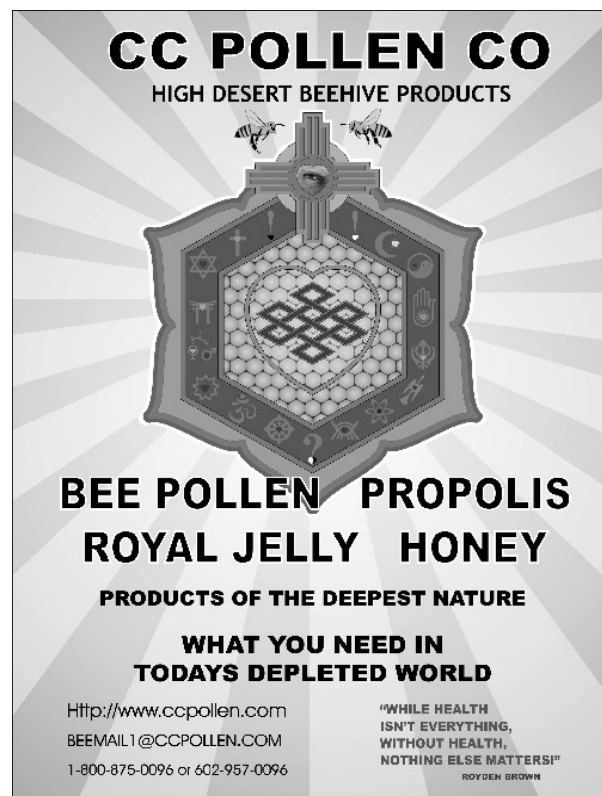
All treatments were tolerated and, in contrast to most treatments used for psoriasis, produced only minor adverse effects, like generalized itching. Although all four groups demonstrated a substantial reduction in PASI score and serum interleukin-1 beta, changes in PASI score and interleukin were significantly higher in groups 1 and 4. When used alone or in combination with propolis, intradermal bee venom showed results superior to those with oral or topical propolis.

The precise means of action by bee venom and propolis is unclear. However, the researchers suggest that bee venom exerts its action through melittin, which blocks the expression of inflammatory genes. Other mechanisms may be involved with propolis, including its extracts like flavonoids and caffeic acid phenyl ester, which play a role in human immune cell functions.

In the absence of side effects, say the investigators, it is likely that treatment with both products of the hive is safe and could be used in patients with impaired liver or kidney functions. They recommend further studies with a

larger sample size and a longer follow-up period to confirm these results.

Source: Hegazi AG et al. (2013) Bee venom and propolis as new treatment modality in patients with localized plaque psoriasis. *International Research Journal of Medicine and Medical Science* 1:2 (February), 27-33.



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HONEY

Review of its healthy properties

Numerous studies are focusing on the therapeutic effects of honey, in particular its ability to protect against cardiovascular diseases, cancer, and microbial infections. These properties depend on the presence of chemical compounds known as phytochemicals—chemicals from plants that may have a biological significance—which have been shown to have antimicrobial, antioxidant, anti-inflammatory, and anti-mutagenic activities. Researchers affiliated with the Università Politecnica delle Marche in Ancona, Italy, have conducted a comprehensive review of the studies contributing to this knowledge.

Overview

Approximately 26 sugars have been identified in honey. Fructose and glucose are the most abundant. In addition, honey contains proteins, mainly enzymes and free amino acids. Also present are mineral and trace elements (their amount depends on geographic region, soil type, and floral origin), which play a major role in biomedical activities associated with food. The vitamin content in honey is small.

One feature of honey setting it apart from other sweetening agents is the presence of enzymes, which may originate from the bee, pollen, or nectar, and even from yeasts or micro-organisms present in honey. Among the functions of the three main enzymes—invertase, diastase, and glucose oxidase—are to increase the metabolism of sugars, especially related to carbohydrate digestive orders, and to play an antibacterial role. Honey enzymes can be destroyed or weakened by heat caused by improper handling during processing or storage.

The phytochemicals in honey are chiefly represented by phenolic compounds, which are incorporated in honey through the presence of nectar or pollen. The most common classes of phenolic compounds are flavonoids (flavanols, flavonols, and flavones) and phenolic acids (benzoic, phenylacetic, and hydroxycinnamic acids).

Recent reports support the notion that some of these organic compounds, and their micronutrient function, are absorbed by humans. Flavonoids, for example, can be incorporated in lipoprotein areas and plasma membranes, which serve as targets for lipid peroxidation—the process in which free radicals take electrons from the lipids in cell membranes, resulting in cell damage—suggesting a protective interaction of flavonoids with cell membranes.

Flavonoids also can accumulate in the nucleus and mitochondria, where they affect cell metabolic functions.

The antioxidant capacity in honey varies greatly according to the floral source. Some researchers have found that at least in vitro, honey's antioxidant capacity is similar to that of many fruits and vegetables. In addition, it contains radical scavenging properties. These characteristics may contribute its ability to prevent or reduce certain inflammatory diseases in which oxidative stress (an imbalance between the production of reactive oxygen and the system's ability to repair resulting damage) is a factor.

Antioxidant capacity is also correlated with honey's color, suggesting that the color intensity is related to pigments. Dark honeys have been shown to contain the highest antioxidant capacity, while light-colored ones have the lowest values.

Cardiovascular disease

In vitro, animal model, and human epidemiologic and interventional studies have looked at the biological activities of honey. In vitro and in vivo studies have found that honey can positively affect risk factors for cardiovascular disease by inhibiting inflammation, improving the function of the inner lining of blood vessels, enhancing the plasma lipid profile, and increasing low-density lipoprotein resistance to oxidation.

Changes in blood, which is functionally related to the cardiovascular system, may be a predisposing factor for cardiovascular disease. One area of study is the protective effect of food polyphenols in red blood cells against oxidative damage.

As research finds a close relationship between oxidative stress and hypertension, studies are examining nutritional interventions aimed at reducing oxidative stress and even treating hypertension itself. One animal study has found that honey supplementation produced significantly reduced elevated systolic blood pressure and oxidative stress in the kidney. From other animal studies it has been hypothesized that honey may produce cardio-protective effects against certain cardiac disorders and blood vessel dysfunction directly, by means of its antioxidant capacity and its wealth of antioxidants involved in cardiovascular defense mechanisms. It is also possible that substantial quantities of such mineral elements as magnesium, sodium, and chlorine play a role.

A few interventional studies have investigated the use of honey among humans who are at risk of developing cardiovascular disease. One study found a mild reduction in body weight and body fat, a more consistent reduction of total cholesterol, LDL cholesterol, triglycerides, and C-reactive protein, and an increase in HDL cholesterol.

Overall, the results support the hypothesis that honey reduces cardiovascular risk factors, particularly in patients at high risk, and that it does not increase body weight in overweight or obese patients.

Of the possible mechanisms through which the consumption of honey could affect pathways related to cardiovascular health, the principal one appears to concern the actions of polyphenols. Animal studies have shown that chronic treatment with the dietary form of one of the flavonols, quercetin, lowers blood pressure and restores the functioning of the lining of the blood vessels in the case of hypertension. Animals receiving the supplement also showed less abdominal fat and lower systolic blood pressure as well as reduced changes in structure and function of the heart and liver. In sum, quercetin treatment reduced most of the symptoms of metabolic syndrome—a combination of disorders that together increase the risk of cardiovascular disease and diabetes—including abdominal obesity and abnormalities in the size, shape, structure, and physiology of the heart. The most likely mechanisms are thought to be the decrease in oxidative stress and inflammation.

Cancer

Published data on the effect of honey on cancer are limited. Although some work has been done on the effectiveness of honey or its components in inhibiting cell changes, the mechanisms underlying these effects at the cellular and molecular levels are unclear. One tentative conclusion is that honey's anti-mutagenic activity is not solely a function of polyphenols. Instead it is suggested that, because sugars are known to display mutagenic and anti-mutagenic effects, and because honey is a rich mixture of sugars, these sugars may also be a factor.

Although in vitro studies have shown honey's role in bringing about apoptosis (cell death), few studies have been done in vivo. Several mechanisms are suggested for the effects of flavonoids on the metabolism of cancer cells: cytoplasmic/nuclear hormone receptors, enzymes, growth regulation, and energy metabolism.

It is possible that the presence of quercetin, one of the flavonoids, might partly explain honey's ability to inhibit cell growth. Recent in vitro studies suggest that the main routes by which it is capable of regulating tumor cell growth are directed at its capacity to bring about cell death by affecting the cell growth cycle. Such an active compound might have a role in supplementing chemotherapy and preventive measures provided by diet.

Kaempferol, another flavonol, may also cause cell cycle alterations. Studies have found that it suppresses in vitro cell development in ovarian cancer.

Among honey phytochemicals, phenolic acids like caffeic acid (a hydroxycinnamic acid) and its organic compounds known as esters have been linked to the chemo-preventive effects of honey. In vitro and in vivo experiments show what seems to be their anti-carcinogenic function: against colon cancer and cervical cancer cells.

Diabetes

With a minimal incremental effect on blood glucose compared with other sweeteners or common sugars, honey consumption or its addition to dietary carbohydrates has been suggested as a benefit to patients with diabetes. Moreover, honey is more tolerable to all people—not only those who are healthy but also those with diabetes—than are common sugars or other sweeteners. Research is still needed to explore the mechanisms by which honey works to reduce the level of glucose in the blood.

Antimicrobial actions

Many studies have reported honey's inhibition of microorganisms, notably *Bacillus subtilis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Escherichia coli*. It also shows activity against *Bacillus anthracis* (anthrax), *Corynebacterium diphtheriae* (diphtheria), *Klebsiella pneumoniae* (pneumonia), *Mycobacterium tuberculosis* (tuberculosis), *Salmonella typhi* (typhoid fever), and *Vibrio cholera* (cholera).

Even so, the incomplete understanding of the compounds involved in this antibacterial activity is an obstacle for the wide clinical use of honey. Better knowledge of these compounds could pave the way for honey's greater use as an antibacterial agent, especially against antibiotic-resistant bacteria.

Conclusion

Although most of the health-promoting effects reported for honey were initially observed with in vitro studies, there are increasing animal and clinical investigations attempting to translate this early evidence into in vivo outcomes. Most crucial will be the development of knowledge of the mechanisms and factors influencing the bioavailability of honey phytochemicals.

Source: Alvarez-Suarez JM, Giampieri F, Battino M. (2013) Honey as a source of dietary antioxidants: Structures, bioavailability and evidence of protective effects against human chronic diseases. *Current Medicinal Chemistry* 20:5 (February), 621-638.

HONEY

May help treat type 1 diabetes

Researchers affiliated with two Cairo, Egypt, institutions conducted a case control cross-sectional study of 50 patients ages 1-18 who had been diagnosed with type 1 diabetes. The patients were compared with 30 healthy children and adolescents without diabetes who did not have the disease.

The investigators, based at the National Institute of Diabetes and the School of Medicine at Ain Shams University, administered two tests to all the subjects. The first was an oral sugar tolerance test using glucose, sucrose, and honey. The other was the measurement of levels of serum C-peptide (an amino acid that affects the processing of insulin) during a fasting period and after eating. The glycemic index and the peak incremental index were then calculated for each subject.

Honey, compared with sucrose, had a lower glycemic index and GI and peak incremental index among the patients and the controls. For both groups, the increase in the level of C-peptide after consumption of honey was significant when compared with the consumption of either glucose or sucrose.

From these results, the authors conclude that honey may have a stimulatory effect not only on healthy cells but also on the diseased beta cells of the pancreas, which affect the creation of insulin and the regulation of blood glucose levels. They hypothesize that the non-sugar part of honey might be the main factor responsible for this stimulation and recommend the inclusion of honey in therapeutic trials targeting the beta cells of the pancreas.

Source: Abdulrhman M et al. (2013) Effects of honey, sucrose and glucose on blood glucose and C-peptide in patients with type 1 diabetes mellitus. *Complementary Therapies in Clinical Practice* 19:1 (February), 15-19.

Possible benefit in easing mood disorders

Researchers affiliated with the School of Health Care Sciences at Universiti Kebangsaan Malaysia in Kuala Lumpur designed a three-week randomized clinical trial to determine the effect of Talbinah—a barley syrup cooked with milk and sweetened by honey—on mood and depression among institutionalized elderly people.

A sample of 21 men and 9 women at a long-term care facility were selected and evaluated for mood,

depression, stress, and anxiety. The nutritional value of Talbinah was determined using proximate food analysis, minerals content analysis, and differential amino acid analysis.

The researchers found that Talbinah has a high carbohydrate content and a high ratio of tryptophan to branch chain amino acids. A statistically significant decrease was found in depression, stress, and mood disturbances among the intervention group.

Source: Badrasawi MM et al. (2013) Effect of Talbinah food consumption on depressive symptoms among elderly individuals in long term care facilities, randomized clinical trial. *Clinical Interventions in Aging* 8 (March), 279-285.

Role in managing mucositis

A common side effect of head and neck radiotherapy is oral mucositis, the painful inflammation and ulceration of the mucous membranes lining the mouth. One potential source of relief is pure honey, which has analgesic, antibacterial and tissue nutritive factors to stimulate re-epithelization in the damaged oral mucosa. Researchers affiliated with the Tamilnadu Government Dental College and Hospital in Chennai, India, have found that honey can help manage the condition, with particular value in developing countries.

The investigators studied 60 men and women who had been diagnosed with oral malignancy and were planning to receive radiotherapy. They were assigned to three groups of 20 patients each. The groups rinsed with a different substance 15 minutes before radiotherapy: group 1, with 20 ml of natural honey; group 2, with 15 ml of 0.15% benzydamine hydrochloride without dilution; and group 3, with 20 ml of 0.9% normal saline. The onset and severity of mucositis (ranging from grade 1, with redness and soreness, to grade 4, with redness, soreness, and an inability to take solid food) were measured during the course of the radiotherapy and two weeks afterwards.

Only 30% of the patients in group 1 developed grade 4 mucositis, compared with 95% of the patients in group 2 and 100% in group 3. After two weeks on completing radiotherapy, 15% of the patients in group 1 had fully recovered without any signs or symptoms of mucositis, compared with none of the patients in groups 2 or 3.

Source: Jayachandran S, Balaji N. (2012) Evaluating the effectiveness of topical application of natural honey and benzydamine hydrochloride in the management of radiation mucositis. *Indian Journal of Palliative Care* 18:3, 190-5.

ROYAL JELLY

Valuable in healing diabetic foot ulcers

Diabetic foot ulcers are a common complication in patients with diabetes mellitus. To determine whether topical royal jelly might be effective in healing these ulcers, researchers at a clinic in Isfahan, Iran, studied eight diabetic patients (two of whom had two ulcers) three times a week.

All the patients were treated with standard measures: pressure reduction, infection control, vascular improvement, and debridement if necessary. In addition, the ulcers were measured, and topic sterile 5% royal jelly was applied to the total surface area of the wounds, which were then covered with sterile dressings. The patients were followed for three months or until the healing was complete. The major finding was that royal jelly is particularly valuable when used along with more standard treatments.

Of the total of ten ulcers, two were excluded, and seven of the remaining eight ulcers healed. The average duration required for full healing was 41 days. One ulcer did not fully heal but was reduced by 40% in length, 32% in width, and 28% in depth. The average length, width, and depth reduction rates were respectively 0.35 mm/day, 0.28 mm/day, and 0.11 mm/day.

Source: Siavash M et al. (2011) The efficacy of topical royal jelly on diabetic foot ulcers healing: A case series. *Journal of Research in Medical Sciences* 16:7 (July), 904-909.

PROPOLIS

Helps maintain oral health


Gingivitis and periodontitis, typically caused by bacteria in dental plaque, are common diseases of the mouth. Because propolis is thought to have regenerative, antibacterial, and anesthetic properties and to help stimulate the immune system, it is being recognized as a potentially valuable ingredient in toothpaste.

Researchers at the Medical University of Silesia, Poland, divided 80 adults into two groups: patients without pathological changes within tissues surrounding the teeth, and those at risk of periodontitis caused by

dental plaque and lack of proper oral hygiene. Four groups of 20 patients each were given the following preparations: toothpaste with propolis content, toothpaste without propolis content, gel with propolis content, and gel without propolis content. The patients were informed about the type of hygienic preparation they were to use.

The investigators found that hygienic preparations with 3% content of ethanol propolis extract were effective in both groups of patients: those without pathological changes in the tissues surrounding the teeth, and those at risk of gingivitis caused by dental plaque. They acknowledge that for patients in the second group (no periodontal disease but certain tendencies resulting from a lack of hygiene), participation in the research—and the necessity of using preparations and a toothbrush—could have played a role.

Source: Tanasiewicz M et al. (2012) Influence of hygienic preparations with a 3% content of ethanol extract of Brazilian propolis on the state of the oral cavity. *Advances in Clinical and Experimental Medicine* 21:1, 81-92.



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NOTES FROM THE FIELD

Honeybees may be weakened by diet of high-fructose corn syrup

Many insects use a particular group of enzymes to break down foreign substances like pesticides and compounds naturally found in plants. Compared with other insect species, however, honeybees have relatively few genes dedicated to this process, known as detoxification. Although it has been understood that eating honey activates detoxification genes that metabolize the chemicals in honey, it has been unclear which specific genes serve this purpose. Now researchers at the University of Illinois have identified the specific components responsible for this activity: an organic compound called p-coumaric acid.

The significance of the finding is that adding p-coumaric acid to a diet of sucrose substantially increases the metabolism of coumaphos, a widely used chemical compound that kills mites and ticks. As a major component of pollen grains—the natural diet of honeybees—p-coumaric acid may regulate immune and detoxification process.

The authors suggest that commercial beekeepers' widespread use of honey substitutes, including high-fructose corn syrup, may adversely affect honeybees' ability to cope with pesticides and pathogens, in turn contributing to colony losses.

Source: Wao M, Schuler MA, Berenbaum MR. (2013) Honey constituents up-regulate detoxification and immunity genes in the Western honey bee *Apis mellifera*. *Proceedings of the National Academy of Sciences*. Published online before print April 29. doi:10.1073/pnas.1303884110.

Beeswax possibly used as a dental filling during Neolithic Age

Beeswax has extreme chemical stability and was used as a binding agent in ancient times. Now researchers at the Natural History Museum of Trieste, Italy, studying a 6,500-year-old human jaw found in Slovenia, have found that it contained traces of a filling with beeswax. Electron microscopy and radiocarbon dating revealed that an exposed area of dentine and the upper part of a vertical crack were filled with beeswax shortly before or after the person died.

The investigators hypothesize that if the filling was done when the person was alive, the treatment might have been intended to reduce sensitivity resulting from exposed dentine or ease the pain resulting from

chewing on a cracked tooth. If so, this would represent the earliest known direct evidence of dental filling used for pain relief.

Source: Bernardini F et al. (2012) Beeswax as dental filling on a Neolithic human tooth. *PLoS ONE* 7(9): e44904. doi:10.1371/journal.pone.0044904.

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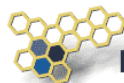
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EAS website: www.easternapiculture.org/conferences/eas-2013



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It may not be an exaggeration to suggest that bees, one of the world's great wonders, have the potential to help solve some of humanity's most pressing problems. Program planners for Apimondia 2013 are responding to a United Nations document outlining ways that nongovernmental organizations might work together to bring about solutions to environmental pollution and the depletion of natural resources, poverty and social inequality, cultural barriers, pandemics, and diseases of civilization. The scientific work of the Congress will culminate in official proposals of cooperation from the world beekeeping community. These will be produced as an open letter from Apimondia to the United Nations.

Apimondia 2013 features two renowned speakers. **Robert E. Page**, vice provost and dean of the College of Liberal Arts and Sciences at the Arizona State University, focuses on the evolution of complex social behavior. **Thomas D. Seeley**, professor in the Department of Neurology and Behavior at Cornell University, is the author of *The Wisdom of the Hive: The Social Psychology of Honeybee Colonies*, which received the Gold Medal Book Award by Apimondia. His most enduring award is the species of bee named after him: *Neocorynurella seeleyi*.