HerbalGram 79 • August – October 2008

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HERBALGRAM

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Number 79 | August – October 2008

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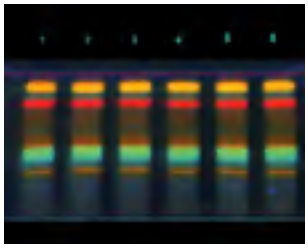

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Valerian

Valeriana officinalis

Family: Valerianaceae

Introduction

Valerian is a perennial that produces clusters of pink or white flowers in the summer and grows up to 5 feet tall.[1] It is native to Asia and Europe, has naturalized in northeastern America, and is extensively cultivated in Belgium, The Netherlands, France, Germany, Eastern Europe, Japan, and the United States.[2,3] There are over 250 species of the genus *Valeriana*.[4] In the United States and Europe, *V. officinalis* is the most commonly used and studied species.

The derivation of the genus name, *Valeriana*, is unclear. It may have been named for the German physician and botanist Valerius Cordus (1515-1544).[5] Others believe that the name is derived from the Latin word *valere* meaning "to be in health." Prior to the 9th or 10th century CE, the plant known as valerian was variously called *phu, fu, amantilla*, *setwall* (or *setewale*), *thericaria*, *marinella*, *genicularis*, and *terdina*.[5]

Some modern popular writers have confused the anti-anxiety drug Valium® (diazepam) as being derived from valerian, but it is not. There is no connection between the two, except for the phonetic similarity.

History and Cultural Significance

Valerian has a long history of medicinal use dating back to the era of the Greek physicians Hippocrates (circa 460-377 BCE) and Dioscorides (1st century CE) who prescribed it as a sleep aid.[6] Galen (circa 130-200 CE), physician to Roman emperor Marcus Aurelius, prescribed it for insomnia.[6] Among the ancient classical authors it was also recorded as a diuretic and a menstrual flow stimulator.[7] Valerian was used to treat nervousness, trembling, headaches, and heart palpitations in the 16th century.[5] In England during World War II, valerian was used to relieve the stress caused by air raids.[5]

Some folklorists attribute valerian as being the agent used by the fabled Pied Piper of Hamelin in ridding the German town of Hamelin of its rats. Animal studies testing valerian on rats have shown anxiolytic (reduction of anxiety, agitation, and tension) effects.[8,9]

In the United States, valerian is used extensively as a dietary supplement in the form of alcoholic tinctures, infusions (teas), and as a crude-root, powdered and dried extract in capsules and tablets. Often, valerian is combined with other herbs traditionally known to promote sleep such as hops (*Humulus lupulus*, Cannabaceae), passion flower (*Passiflora incarnata*, Passifloraceae), and lemon balm (*Melissa officinalis*, Lamiaceae).[10]

The United States Pharmacopeia provides dietary supplement quality standards monographs for valerian root, powdered valerian root extract, and valerian tablets that contain powdered valerian root extract.[11] Valerian standards were published in the national pharmacopeias of Austria, France, Great Britain, Hungary, and Russia, among others.[10] Most of these have been

Continues on page 2

Valerian *Valeriana officinalis* ©2008 Stevenfoster.com

superseded by the *European Pharmacopoeia*, which provides pharmaceutical product quality standards monographs for valerian tincture, dry hydroalcoholic extract, and dry root.[12]

In 1985 the German Commission E approved the internal use of valerian for restlessness and sleeping disorders based on nervous conditions.[6] The European Scientific Cooperative on Phytotherapy (ESCOP), a non-official group of scientists in Europe, notes that valerian is used for "tenseness, restlessness, and irritability, with difficulty in falling asleep."[13] For the purposes of drug licensing, the European Medicines Evaluation Agency (EMEA) permits indications for "relief of mild nervous tension and sleep disorders."[14] Further, Canada's Natural Health Products Directorate (NHPD) also recognizes valerian's sedative actions.[15]

Modern Research

A growing number of clinical trials have shown various types of valerian preparations to be useful in reducing anxiety,[16-20] as well as for improving sleep quality and decreasing the amount of time it takes to fall asleep.[21-42] In 2 clinical trials, valerian (taken the evening before) did not significantly influence alertness, reaction time, concentration, driving, or operating of heavy machinery,[43,44] despite such cautions by EMEA. Additional clinical trials have been conducted on a fixed combination of a valerian extract (500 mg; extract strength not specified) with an extract of another popular traditional sedative herb, hops (120 mg; extract strength not specified), demonstrating improved quality and length of sleep and ease of falling asleep.[45-47]

Future Outlook

Mass-market sales of valerian equaled $2,947,351 in the United States in 2007; this statistic represents only about 15% of the total herbal dietary supplement market in the United States.[48] Most of the valerian marketed in the United States is from cultivated sources.[49] Currently, there is a strong demand for certified organic material. HG

—Gayle Engels

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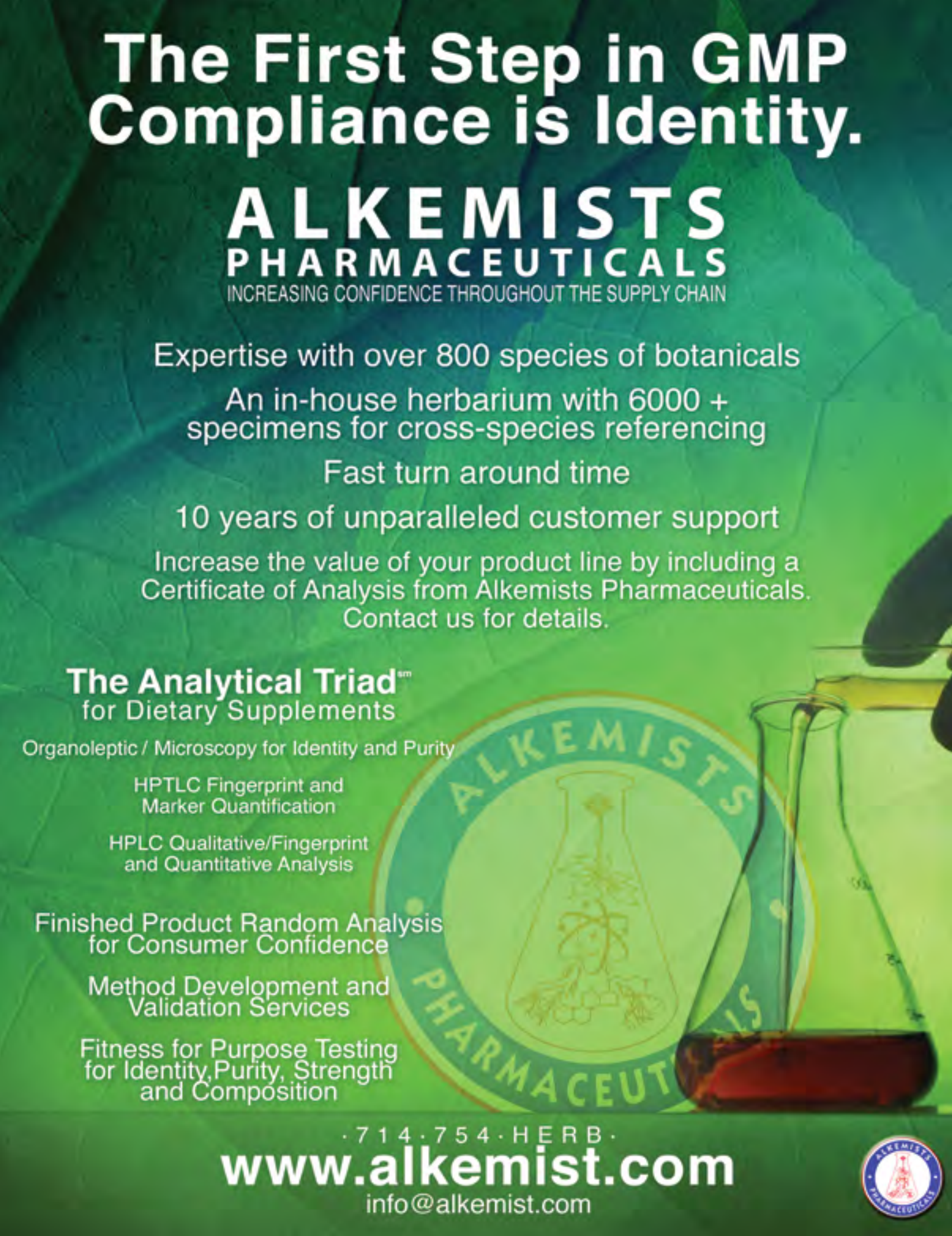

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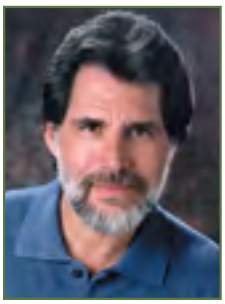
dear *reader*



HerbalGram and ABC Celebrate Important Milestones

As we go to press, we mark the 25th anniversary of *HerbalGram*. It was in July 1983 that Rob McCaleb and I wrote the first issue, which at that time was an 8-page newsletter we produced on behalf of the recently-created American Herbal Products Association (AHPA) and Herb Research Foundation (HRF).

Rob and I were both founding board members of AHPA as well as co-founders and president and vice-president, respectively, of HRF. At the time Rob was director of research at Celestial Seasonings, the iconic herb tea pioneer, and I was running my now-defunct wholesale herb company, Sweethardt Herbs. Previously, I had been president of the also now-defunct Herb Trade Association, an industry trade group and predecessor of AHPA, for which I published a magazine called *Herb News*. *HerbalGram* followed as part of our intention to communicate news of interest to the herb community. Back then there was no Internet access, e-mail or blogging, and most publications in the natural products arena seldom covered topics related to herbs.

In 1988, after 5 years of publishing *HerbalGram* as a newsletter, I co-founded the American Botanical Council (with the aid of Dr. Jim Duke and Prof. Norman Farnsworth), initially to create a vehicle for refining *HerbalGram* (then 24-pages) into a full-color, *Scientific American*-like magazine/journal on herbs. In the subsequent years, ABC has obviously grown into an organization with a robust array of publications (e.g., HerbalEGram, HerbClip, monographs, books, etc.), and many unique educational projects.

During its history, *HerbalGram* has been ably produced by 3 managing editors—Barbara "BJ" Johnston (17 years), Karen Robin (3 years), and now, Michael Finney (5 years)—and by 5 art directors—Ira Kennedy, Ginger Hudson, Natalie Reitinger, Sean Barnes, and now Matt Magruder.

We also mark ABC's 10th anniversary of our occupation at the historic Case Mill Homestead, our 2.5 acre headquarters in the home built in 1853. The original 451-acre homestead was initially granted to Sherman Case by the Republic of Texas in the early 1840s so he could build one of the first grist mills in the Austin-Travis County area. After a year of repairs and improvements, ABC moved into its new headquarters in July 1998.

This past July marked another milestone for ABC. In July 1998 ABC published *The Complete German Commission E Monographs: Therapeutic Guide to Herbal Medicines*, a landmark publication for its time (now out of print after 3 printings), still available electronically as one of the many benefits available to ABC members on the ABC Web site (www.herbalgram.org).

Moving from history to the present, this issue of *HerbalGram* continues our emphasis on ethnobotany (the traditional intersections between plants and people) as well as our focus on the emerging science that evaluates and, in many cases, validates historical therapeutic uses of plants.

This issue profiles some plants sacred to Native Americans of the Southwest's "Painted Desert" area of Arizona and the ethnobotanical conservation work of the Arizona Ethnobotanical Research Society. We also profile the marula tree (*Sclerocarya birrea*) and its oil, a revered and economically useful product in southern Africa.

Part of ABC's evolution has included our highly successful internships for pharmacy and dietitian students from local and even distant universities. In 2006 Katie Welch interned at ABC while working on her doctorate in pharmacy from Oregon State University in Portland. She studied herbal medicine before attending pharmacy school, and her interest in herbs and natural medicine was readily apparent during her internship. For her intern project she studied herbs and their potential effects on various thyroid conditions, the results published herein as an extensive, peer-reviewed article reviewing the clinical evidence, or lack of it in some cases, for the use of herbs to treat various thyroid conditions and diseases.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features

Marula kernels
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departments

On the Cover
Traditional marula festival in southern Africa (see page 32)
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Meet Peggy Brevoort, President of ABC Board of Trustees

Peggy Brevoort is legendary in the natural products industry and the community beyond. She's well-known as the person who, along with her husband Bill, was the first to manufacture Chinese herbal formulations in the United States at their company East Earth Herb, Inc., which is now A.M. Todd Botanicals.

The Brevoorts started East Earth Herb in Oregon in the early 1970s, initially importing Chinese herbal preparations to sell to health food stores, food co-ops, and almost anyone who might be interested. In those days it was not unusual to sell herbs from a table at a crafts fair or outdoor concert. In the mid-1970s the Brevoorts lived in a rural setting near the Oregon coast, where they conducted their business in a somewhat isolated, natural environment.

"I remember having to call Peggy and Bill on what seemed like a ship-to-shore radio phone line," said Mark Blumenthal, founder and executive director of the American Botanical Council. "Back in those days, when many early herb business were just beginning (and many of today's large herb companies had not started yet), the Brevoort's company, East Earth, was a major source of some key ingredients and products. They are true pioneers."

Brevoort. Photo ©2008 Steven Foster

"Really it was Bill who had the burning interest in Chinese herbs," said Peggy (e-mail, June 16, 2008). "I found my passion to be with the trade organizations that were growing along with the industry at that time."

Brevoort has extensive experience with trade and other natural product organizations. Besides serving as president of East Earth Herb, and then continuing as president when it became A.M. Todd Botanicals in 1999, she has served as the president of the American Botanical Council's (ABC) Board of Trustees since 2003.

"I believe at the last [ABC Board] meeting she turned down a motion that we make her president for life," said John Weeks, editor and publisher of the *Integrator Blog News* and a fellow ABC Board of Trustees member (e-mail, June 16, 2008). "Hers will be tough shoes for the incoming president to fill when she steps down later this year."

Brevoort has also served as the president of the American Herbal Products Association (AHPA) from 1990–1994, and she describes her time as AHPA president as a "great and satisfying highlight" of her life.

Bill Brevoort, whom Peggy met in high school and married soon after, agreed that "Peggy makes an ideal board president," (e-mail, June 16, 2008). "She always takes a neutral position and makes sure every viewpoint is presented. She makes sure the party represented by the board has a strategic plan and begins to fulfill it. She runs a no-nonsense meeting and gets the agenda done in a respectful way."

Brevoort has also served on the board of several progressive organizations dealing with natural products including Biomed Comm Inc., United Plant Savers, the Corporate Alliance for Integrative Medicine Inc., Citizens for Health, and AHPA. Recently, she accepted a position on the Board of Trustees of Bastyr University in Seattle. "This is a huge honor for me—in the same way as being part of ABC," said Brevoort. "These are 2 organizations we have known and supported for many, *many* years when we were in the herbal industry, and it is a pleasure to be able to 'give back' in some way to each of them."

Lyn Ciocca, president of the marketing research firm Wellness Resources and close friend of Brevoort's, describes Peggy's friendship and intelligence: "She's just an unusual combination of kindness, spirituality, curiosity, and brilliance," said Ciocca (oral communication, June 16, 2008). "They have both been extraordinary friends to me. Bill is the artist/alchemist and Peggy is the pragmatist."

Perhaps it's Peggy Brevoort's pragmatic mind that explains her math skills, which lead her to construct complicated labyrinths as a hobby. In fact, Brevoort currently has a 41-foot replica of the Chartres labyrinth in her backyard, a picture of which can be located by visiting www.veriditas.org. "If you knew how many stones I've moved for Peggy…" said Ciocca with a laugh, adding that Brevoort's last labyrinth consisted of 860 stones that weighed about 17 pounds each.

Peggy Brevoort has also done a great deal of market research on the US Market for Botanicals and has lectured about this topic around the world. She was named Woman of the Year by the Association of Women in Natural Foods in 1990, and she received the Natural Business Communication's Leadership in Business Award in 1999. After her retirement from A.M. Todd Botanicals in 2000, Peggy founded Brevoort LLC, a holding company for mostly non-herbal projects such as projects involving things like astronomy, real estate holdings, and medicinal plant research. Peggy Brevoort currently lives on 10 acres in Hawaii where she continues her labyrinth-building hobby. HG

—Kelly E. Saxton

ABC Announces New Development Director

The American Botanical Council (ABC) is pleased to announce a significant new addition to its staff. Denise Meikel joined ABC in May of 2008 as the director of development. She brings with her 20 years of extensive development and nonprofit experience, which includes collaborating with individuals, foundations, government agencies, and nonprofit partners.

Meikel

Denise came to ABC from her position at the American Youthworks (AYW), a highly effective nonprofit organization serving at-risk youth in Austin, Texas. For 15 years she served AYW in multiple capacities, for the first 12 acting as the organization's development director and the last 3 years as its deputy CEO. In the latter capacity, she supervised the AYW development director, finance director, chief operating officer, program director, and director of human resources. Denise has also served as the director of development, marketing and communications for Bat Conservation International (BCI) where she became an accomplished "bat wrangler." BCI is an Austin-based international organization devoted to conservation, education, and research initiatives involving bats and the ecosystems they serve.

Denise has some passionate outside interests. She has served on the Board of Directors for Balcones Council Camp Fire USA for 7 years, and she currently serves as its vice-president. This Camp Fire group serves the youth and families in 5 Central Texas counties.

A native Texan, Denise is a graduate of the University of Texas at Austin, with a degree in English (minor Biology). She is also an alumnus of the 2005-2006 Leadership Austin (LA) class, which she proclaims the "best LA class ever." Since 1979, individuals selected to participate in LA's 8-month program get the rare opportunity to collectively explore and discuss critical community issues while developing and honing the leadership skills necessary to serve the Austin community. She was also part of the Bank of America's 2007 Emerging Leaders training, a key benefit of the bank's national Neighborhood Builders Excellence Awards. The training spanned one year and took Denise to Boston, San Francisco, and Charlotte. Denise said that her training and collaborating on key issues facing nonprofits with individuals from 82 other organizations from across the nation was one of the most enriching experiences of her professional career.

In her new role as ABC's director of development, Denise will be responsible for leading and expanding ABC's development efforts, helping members and others find mutually beneficial ways to successfully engage in ABC's vital educational mission. Denise says she's looking forward to working with the passionate people involved at ABC, from trustees and advisory members who give selflessly of their knowledge, talents and time, to the amazing staff committed to quality, integrity, and effective communication of ABC's herbal knowledge with its members and the public.

"ABC is a unique organization," said Denise, "one that is committed to the overall health of its employees and the planet. It is set in a serene environment surrounded by organic gardens and the workplace is casual and relaxed. So, even though we're working a 'mile a minute,' stress levels stay low. That is a balance most organizations want and very few achieve." HG

Employee Profile: Perry Sauls

Sauls

Almost every business and nonprofit organization needs a hands-on person who is responsible for much of the organization's physical activity. This is particularly true when it comes to the shipping and receiving of various materials and supplies, keeping them organized, and maintaining customer satisfaction, as well as the nuts-and-bolts of maintaining office equipment and keeping property systems running smoothly. At the American Botanical Council (ABC), that person is Perry Sauls.

Perry joined ABC in May 2007. He almost immediately impresses people as positive, organized, and very friendly. His primary responsibilities include customer service, purchasing, sales, and inventory control. He excels in fulfilling orders for ABC members and other customers who order books, monographs, and other educational items from the ABC online bookstore. Perry is also responsible for shipping issues of *HerbalGram* and other printed ABC educational materials to scientific conferences and trade shows for the organization.

With his extensive past military experience, Perry is well organized and approaches tasks methodically with his pleasing and positive attitude. Consequently, he is the perfect person to take on the role of ensuring that the various areas of ABC's physical operations are properly maintained, including the air conditioning and heating systems, plus the electrical, plumbing, and rainwater-harvesting systems.

Perry's previous experience includes warehouse manager at a local plumbing supply wholesaler, service manager for a local heating and air conditioning contractor, and before that he served for 6 years in the US Marine Corps as a military policeman. For 3 of those years he was the disc jockey at the non-commissioned officers' club at Camp Pendleton, California.

Perry's office is located in the "Carriage House," the oldest building on the ABC grounds, which was built around 1860 for the Case family's horse and buggy. This structure was expanded by the Cook family when they purchased the historic Case Mill Homestead in 1950.

Perry's positive, polite, and energetic personality is contagious at ABC, and he keeps customers and staff happy with a pleasant smile on his face.

—Mark Blumenthal

Plans for HerbDay 2008 in Full Swing

Any opportunity to celebrate plants and the role they have played and continue to play in human experience is a worthwhile endeavor. To that end, and building on two successful annual HerbDays, the HerbDay Coalition has announced that HerbDay 2008 will be celebrated on Saturday, October 11, and the weeks surrounding that date. Health food stores, herb societies, botanical gardens, schools and garden stores are encouraged to host events such as herb walks, plant lectures, herb demonstrations, and book signings. The HerbDay Web site (www.herbday.org) includes ideas for possible events.

HerbDay is a grassroots event, and anyone with an interest in promoting the use of plants in everyday life is invited to become involved. Corporate sponsors are needed to support the efforts of the coalition; media sponsors are needed to help promote the mission; and partnering organizations are needed to ensure that there are numerous events around the country. Information on how an organization or company can participate is available from Gayle Engels at 503-746-5867 or Gayle@herbalgram.org.

The American Botanical Council will be hosting an HerbDay event at its headquarters in Austin, Texas. The schedule includes lectures on current issues and methodologies in herbal medicine, demonstrations on making herbal medicines, and interesting and tasty foods. Local herbalists will lead plant walks through ABC's themed medicinal gardens. There will be a variety of local vendors and practitioners providing herbal products, herb crafts, massage therapy, and more. Food and refreshments will be provided by local sponsors. More information on this event and opportunities for participation are available from Jessica Guffey at 512-926-4900 ext. 112 or Jessica@herbalgram.org.

The HerbDay Coalition consists of 5 nonprofit organizations: American Botanical Council (ABC), American Herbalists Guild (AHG), American Herbal Pharmacopoeia (AHP), American Herbal Products Association (AHPA), and United Plant Savers (UpS). HG

—Gayle Engels and Jessica Guffey

ACT Receives Million Dollar Award from Skoll Foundation to Protect Rainforests

The Amazon Conservation Team (ACT) received an award of $1,015,000 in March 2008, which will be awarded over a period of 3 years.[1] One of 11 Social Entrepreneurship awards presented by the Skoll Foundation in 2008, this particular award is intended to help protect 100 million acres of the rainforest by expanding the biocultural conservation efforts in this area through mapping and management.

Founded in 1996, ACT is a nonprofit organization that works with indigenous people to conserve the biodiversity, traditional culture, and health in Amazonia. Currently, ACT has joined forces with 28 tribes of indigenous people to create an area of environmental and cultural conservation that spans more than 40 million acres of the rainforest.[2] ACT's goal is to double that to 80 million by 2011.[3] In the past, ACT partnered with the Brazilian government to help 14 tribes of the Xingu reserve to map their land of over 7.5 million acres of rainforest. The partnership with the Brazilian government validates the mapping project as a legal document and gives the indigenous people leverage to protect their lands against illegal activity. An article published in *HerbalGram* 62[4] explained that the indigenous people made sketches of their ancestral lands, and then they were supplied with satellite photographs and portable global positioning systems (GPS) to map their territories accurately.

The ethnographic mapping process enables the participating indigenous groups to exert greater influence over the future of their lands. The indigenous people are confirmed experts on key conservation areas and areas at risk, and they can be enlisted by protection agencies to serve as the eyes and ears of the lands, reporting back to those agencies when incursions occur, particularly with regard to border protection. Working in concert with indigenous people, representative associations like ACT become the obvious choice to develop and implement effective forest management policies and to keep national environmental enforcement agencies well informed on illegal incursions and ecologically destructive activities.

"Indigenous peoples know, manage, and protect the rainforest far better than we do," said Mark Plotkin, PhD, co-founder and president of ACT.[1] "If you want to protect the rainforest, why not enlist the assistance of the people who actually live there?"

"[ACT] is a tremendous addition to the community of Skoll entrepreneurs who have demonstrated, through their inspiration and creativity, courage, and fortitude, that solutions do exist for some of the world's intractable problems," said Skoll President and CEO Sally Osberg.[1] "We believe their work has the potential for transformational benefit to indigenous cultures and forests of the Amazon and we're honored to support their continued commitment to systemic change at the grassroots level."

The Skoll Foundation was created by Jeff Skoll (ebay's first president) in 1999.[5] Its mission is to advance systemic change that benefit communities around the world by providing investment, connection, and celebration for social entrepreneurs. HG

—Kelly E. Saxton

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AHPA Presents 2008 Awards

The American Herbal Products Association (AHPA), the only national trade association in the United States focusing primarily on herbal products, presented its 2008 AHPA Awards on March 13, 2008, during its annual member meeting in Anaheim, California, held in conjunction with Natural Products Expo West.[1]

Anthony Young, AHPA's general counsel and partner with the law firm Kleinfeld, Kaplan and Becker, LLP, was selected as the 2008 AHPA Herbal Hero. This award recognizes an individual who has made outstanding contributions to the association's committees and initiatives. According to an AHPA press release, the organization chose Young for the award due to his exemplary dedication and support of the herbal community and AHPA during his decade-long tenure with the association.

"I was honored to receive the AHPA Herbal Hero Award," said Young (e-mail, March 28, 2008). "I love to practice law, and representing AHPA and AHPA members in the good work they do makes my practice even more rewarding. The ceremony was humbling because the others who received AHPA awards that morning were such giants of the botanical field."

Botanical author and photographer Steven Foster was given the 2008 AHPA Herbal Insight Award. This award honors those individuals or non-commercial organizations that AHPA considers as having significantly impacted or furthered knowledge and understanding of botanicals and their uses. According to AHPA, Foster's many images, books, and articles have enhanced public knowledge and acceptance of herbs by skillfully depicting what Foster calls the "human-plant relationship."

"I was delighted to learn that I would receive the AHPA Herbal Insight Award in 2008," said Foster, who is also a member of the American Botanical Council's (ABC) Board of Trustees (e-mail, February 25, 2008). "It is always gratifying to be recognized by your peers for your work." Foster added that the work he creates as an author and photographer is often presented to an "unseen audience," meaning that he has no way of knowing who views his photography or reads his publications. The award from AHPA is therefore particularly significant in that it shows "that my work has not only been seen, but also appreciated," Foster said.

A second 2008 AHPA Herbal Insight Award was posthumously bestowed upon the late Stephen Straus, MD, who served as the first director of the National Institutes of Health's (NIH) National Center for Complementary and Alternative Medicine (NCCAM). During Straus' leadership of NCCAM, from 1999-2006, research at NIH into CAM modalities increased threefold.[2] AHPA noted that Dr. Straus' contributions as the first NCCAM director revolutionized the study of herbs at NIH and helped lay the groundwork for current herb research.[1] Dr. Straus died in May of 2007 at age 60, and a tribute article to his life and work was published in *HerbalGram* issue 75.[2]

"Stephen Straus of NCCAM had made a profound contribution to bringing NIH funding to herbal clinical research," said Foster. "He moved the bar up for the recognition of herbs in the research community. To receive the award in the same year is, of course, an honor."

The company Herb Pharm was recognized with the 2008 AHPA Industry Leader Award, which is presented to a company that has set an example of outstanding business practices.[1] According to an AHPA press release, Herb Pharm co-founders Sara Katz and Ed Smith have built a company renowned for its positive reputation for quality, rigorous standards, and authenticity.

"While it's always great to get positive recognition for our years of hard work, it's especially rewarding to receive that recognition from our many friends and colleagues in the herbal products industry," said Smith, who is a member of the ABC Advisory Board (e-mail, March 3, 2008). "Our corporate practices are definitely not 'corporate'—at least not in the usual MBA sense of that phrase. From Herb Pharm's idealistic hippy beginnings in our kitchen 29 years ago to its present position as the nation's top-selling provider of liquid herbal extracts, our business skills have evolved but our ideals have never changed—always do the right thing and never sacrifice your integrity for profit."

"For the third year, we have been honored to recognize top-notch representatives of the herbal industry with AHPA Awards," said AHPA President Michael McGuffin in an AHPA press release.[1] "This is a very impressive slate of winners, and AHPA is pleased to know we will have an impressive slate of award recipients next year as well. Our awards thus far have only begun to honor the outstanding members of the herbal world." HG

—Courtney Cavaliere

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Ethnobotanist Nancy Turner Receives Two Prestigious Awards

Nancy Turner, PhD, an ethnobotanist and distinguished professor in the school of Environmental Studies at the University of Victoria in British Columbia, Canada, recently received two prestigious awards.[1] The first, the William L. Brown Award for Excellence in Genetic Resource Conservation, is only bestowed once every 2 years to an individual who contributes to the field. The second honor that Dr. Turner received, the Killam Research Fellowship, is awarded by the Canadian Council, a Canadian government funding agency, to a small group of people every year.

Nancy Turner. Photo ©2008 Valerie Shore

Dr. Turner was chosen for the William L. Brown award based on her lifetime's work studying the traditional ecological knowledge systems and traditional land and resource management systems of indigenous peoples, particularly in western Canada, said Bruce Ponman, information coordinator for the William L. Brown Center (e-mail, April 3, 2008). According to Ponman, the recipient of this award receives a bronze medal and a check for $10,000 with "no strings attached."

The Killam Research Fellowship is a $70,000-a-year grant (Canadian dollars), given for two years, covering the cost of teaching and administrative duties at a recipient's university so that the winner may take a paid leave of absence to pursue research goals.[2] It is expected that by the end of this time a certain pre-established research project is to be completed.

"I was very surprised because it is very competitive," said Dr. Turner of the Killam Fellowship, adding that only 9 other people were selected that year as co-winners (oral communication, April 3, 2008).

Dr. Turner was actually notified that she received the Killam Fellowship in Spring 2007; however, she deferred for a year because of certain teaching responsibilities she did not find appropriate putting on hold at that time. She began her use of the fellowship in January 2008 and will return to regular teaching in January 2010. Besides serving as a professor, Dr. Turner is also a research associate with the Royal British Columbia Museum and is affiliated with the Natural Resources Institute at the University of Manitoba in Winnipeg.

"A lot of people have noted that the value of my work is in giving a voice to indigenous elders and plant experts and demonstrating just how sophisticated and complex indigenous peoples' knowledge and use of plants and the environments is," said Dr. Turner. She explained that some believe that these indigenous people, called "hunter-gatherers," just took whatever they could find. Through her work, Dr. Turner has been able to show that they actually developed very complex systems for managing and enhancing the plant and animal populations they relied on and continue to do so. "It is far from random," Dr. Turner said. "As some of these approaches become better understood and more widely known, they could be applied in a contemporary context, to increase the quality and diversity of native species."

It is through this understanding that Dr. Turner believes the original richness of British Columbia could be restored, and she has high hopes for the future: "I think the loss and deterioration of habitats and native species is turning around," said Dr. Turner. "I think indigenous people are revitalizing their knowledge through increased control of their lands and resources, and there is coming to be a greater recognition of their contributions to environmental stewardship."

Dr. Turner is currently working on a book that will be a culmination of 40 years of work in ethnobotany with indigenous elders and cultural specialists in British Columbia. The topic is the examination of "how botanical and environmental knowledge is transmitted through time and space." Chapter topics will include: ethnoecology and ethnobotany, history and archaeoecology, language and classification systems, narrative and ceremony in knowledge transmission, food systems, medicine and healing, belief systems, and cultural and environmental renewal and restoration, among others. Dr. Turner described the process of creating and compiling this complicated and thorough book as "fun work."

Dr. Turner, who received her doctorate in botany from the University of British Columbia, has authored or co-authored over 20 books and received many awards.[1] One of her books, *Plants of Haida Gwaii* (Sono Nis Press 2005), was awarded the Lieutenant Governor's medal for the best work of historical non-fiction concerning British Columbia. Among various other professional associations, she is a long-time member of the American Botanical Council's Advisory Board. She also co-authored the cover article for *HerbalGram* 62 regarding devil's club (*Oplopanax horridus*, Araliaceae).[3] HG

—Kelly E. Saxton

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Southwest School of Botanical Medicine Offers Distance Learning Program

Since 1979, the Southwest School of Botanical Medicine (SWSBM) in Bisbee, Arizona, has offered a 500-hour residency program where students have received training to become Certified Clinical Herbalists. In 2006, after 28 continuous years of educational training in medical herbalism, SWSBM held the last of its acclaimed full residency programs. Now, instead of a residency-based curriculum, SWSBM Founder and Director Michael Moore has produced 2 distance learning programs, each with 2 optional residency components. The majority of the educational material consists of filmed lectures by Moore, a widely respected herbalist, author, and teacher. Each program contains about 150 hours of lecture on easy-to-use DVDs. The program material also includes additional DVDs and CDs with supplemental information, research, and resources. The cost is $1200 for Program I, and $1000 for Program II.

Program I, "Herbal Therapeutics and Constitutional Evaluation," addresses the physiology, energetics, and constitutional aspects of each organ system. Moore also explains various treatment methods and denotes tonic herbs for each organ system or stress type. Additional material includes the Constitutional Workbook, Herbal Materia Medica, patient record forms, work sheets, and intake forms.

Program II, "Herbal Materia Medica," covers medicinal plants from "Acacia to Zingiber" (i.e., from *Acacia* spp., Fabaceae to ginger, *Zingiber officinale*, Zingiberaceae). Each plant is described in terms of botany, identification, preferred growing conditions and locations, growing and/or gathering guidelines, parts used, notable chemical constituents, preparation methods, guidelines for use, and any additional pertinent information. The discussion of each genus includes photographs of various species, distribution maps, and film clips.

Moore's command of the subject matter is immediately evident upon watching his lectures. They are fully and intensely saturated with herb-related information without being dry or boring; Moore has a very animated style, replete with connections to his own extensive experiences, personal and clinical. These programs provide the opportunity to review the lectures repeatedly, which helps to fully digest the plethora of information. The SWSBM distance learning programs serve as a unique and invaluable resource for herbalists and natural medicine practitioners.

American Botanical Council Founder and Executive Director Mark Blumenthal said, "I consider Michael Moore one of my greatest teachers on herbs and medicinal plants, i.e., based on the lectures of his I have attended over the past 35 or more years that I have known him. While I don't have many regrets in my life, if I were to have to make a list, I would definitely include the fact that I never made the time to spend the full 5 months learning with Michael when his school was still residence-based. Now, I, and the herbalists of my generation, as well as new generations of students, will have the immense benefit of learning from Michael via the convenience of this DVD-based program."

More information on the program is available from the SWSBM Web site at www.swsbm.com, by calling (520) 432-5855, or by e-mailing hrbmoore@mindspring.com. HG

—Jessica Guffey

NPA Develops Standard and Seal to Identify Natural Personal Care Products

The Natural Products Association (NPA) announced in May of 2008 that it has developed a new certification program to identify and distinguish truly "natural" personal care products.[1] As part of this program, NPA has created a standard to define "natural" in terms of personal care products, and products that meet this standard will be eligible to bear NPA's Natural Seal.

According to NPA, the natural personal care industry has grown substantially over the past several years—5 times faster than non-natural personal care products.[2] Sales of natural personal care products reportedly rose 17% in 2007 to reach $7 billion in the United States. However, there has been no standard definition for the term "natural," and the use of the term is not regulated by any government or inspecting body. Therefore, products may claim to be natural even if they are mostly or entirely synthetic or petroleum-based.

"As the natural personal care industry has grown, we've seen some abuses of the term," said Daniel Fabricant, PhD, NPA's vice president of scientific and regulatory affairs (oral communication, May 28, 2008). "That's why consumers are confused."

Dr. Fabricant explained that NPA developed its certification program primarily to provide consumers with a tool for distinguishing those products that have been verified as "natural" according to a high and recognizable standard. He noted that many consumers are interested in the health and environmental benefits of natural products, which is why the term "natural" should not be misused as a marketing ploy. Further, the new NPA program should assist the natural personal care industry by clearly delineating those brands that are natural from those that are not.

To qualify as "natural" under the NPA's new standard, a personal care product must consist of at least 95% natural ingredients or ingredients derived from renewable sources found in nature.[3] Such ingredients must not be suspected of any human health risks, and the product's manufacturing must not have included any processes that could significantly or adversely alter the purity or effect of the natural ingredients. Any unnatural ingredients should be used only when viable natural alternatives are unavailable and only when there are absolutely no suspected potential human health risks. Certain ingredients are strictly prohibited under the NPA standard, including parabens, sodium lauryl sulfate, petrolatum and paraffin, chemical sunscreens, and phthalates, among other chemical ingredients and preservatives. The full standard is accessible from the NPA Web site, www.naturalproductsassoc.org.

Products certified under the NPA's standard may carry the organization's Natural Seal.[1] Certification is obtained through an auditing process conducted by one of NPA's third party auditors. This process costs a fee, for which NPA members will receive a discount. According to Dr. Fabricant, NPA anticipates that the auditing process should take approximately 2 to 4 weeks to complete, although this may vary depending on the number of ingredients in the product and other factors.

According to Dr. Fabricant, NPA has already received positive feedback on the certification program from product manufacturers and retailers, as well as from consumers. "The natural personal care industry very much wants to move forward with certification," said Dr. Fabricant. "Across the board, people have been very positive about this."

"I think any sincere effort to strengthen the movement toward greener ingredients that are healthier for users and for the environment is commendable," said Cindy Angerhofer, PhD, director of botanical research for Aveda Corporation (e-mail, June 5, 2008). "I have to say that many of the prominent companies that have been in the business of selling natural personal care products for years have done a pretty good job of defining and upholding their own standards. Their reputations really depend on integrity, and the 'natural' consumer tends to be pretty savvy. Of course, there is also abuse of the term 'natural' on product labels and advertising that is sometimes well-intended and other times blatantly misleading. Occasionally, good ingredients are denigrated more for competitive advantage than any real shortcomings in naturalness or safety, so a broader trade perspective in determining approved ingredients could represent a more balanced and realistic standard. To this end, Aveda has been proactively participating in the creation of environmentally responsible industry standards for more than a decade."

Morris Shriftman, CEO of the marketing communication firm Mozart, Inc., and former senior vice president of marketing for Avalon Natural Products, a manufacturer of natural cosmetics, remarked that NPA has done a good job of defining "natural" and that the work NPA has done to assist the natural personal care products industry should be honored (oral communication, June 9, 2008).

Shriftman added, however, that more work still needs to be done to address the larger issue of safety within the personal care industry. "Chemicals of all kinds are pervasive in our lives today, and we need significantly better safety studies and data," said Shriftman. This concern regarding safety led Shriftman to help develop Avalon's "Consciousness in Cosmetics" philosophy, which defines safety as a top priority in the development of the company's natural and organic products. "You need to be aware that your skin is the largest organ of your body, and it absorbs a lot of what you put on it," said Shriftman. "We really have to establish a greater awareness of long-term safety."

Dr. Fabricant mentioned that NPA may eventually develop a similar certification program for other sectors of the natural products industry, such as natural food products or natural cleaning products. Industry and consumer confusion has been particularly outspoken in regards to the labeling of "natural" food products in recent years.[4] The US Food and Drug Administration (FDA) has received 2 petitions to define the term "natural" in regards to food products, to which the organization has not formally responded and may not address in the near future, reportedly due to limited resources. An FDA spokesperson recently publicly commented that high fructose corn syrup should not be considered a "natural" ingredient, although it has been included on the labels of food products claiming to be "all natural." Like natural personal care products, natural food products and natural household cleaning products have both been growing considerably in US sales. HG

—Courtney Cavaliere

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Wisdom Natural Brands Begins Marketing SweetLeaf® Stevia as a Sweetener

Other Companies Announcing Plans to Launch Stevia Sweeteners

After many years of regulatory hurdles and setbacks, stevia (*Stevia rebaudiana*, Asteraceae) has finally begun to enter the mainstream sweetener market. The company Wisdom Natural Brands (Phoenix, Arizona) announced in June 2008 that its stevia product SweetLeaf® has been self-affirmed as being generally recognized as safe (GRAS), allowing the company to immediately begin marketing SweetLeaf as a sweetener rather than as a dietary supplement.[1] Several other companies, including Cargill (Minneapolis, Minnesota) and Corn Products International (Westchester, Illinois), have also recently announced plans for marketing their own stevia-based sweeteners and products in the near future.[2,3]

The leaves of the South American plant stevia have an extremely sweet taste that is far more potent than sucrose (table sugar).[4] In addition to being a naturally-derived sweetening agent, stevia is non-caloric, making it particularly appealing to food and beverage companies catering to health-conscious consumers. Stevia was declared an "unapproved food additive" by the US Food and Drug Administration (FDA) in 1991. Since 1995 it has only been marketed in the United States as a dietary supplement, an exception allowed under the provisions of the Dietary Supplement Health and Education Act of 1994 (DSHEA), which specifically exempts dietary supplements from the type of regulation—including pre-market approval—required for food additives. There has been speculation by some people in the natural products industry and beyond that producers of synthetic sweeteners may have initially pressured the FDA into designating stevia as an illegal food additive in order to keep stevia off the market as a competitor.[5]

Although Wisdom Natural Brands first introduced stevia into the US market in the form of ground or whole leaves in 1982, SweetLeaf has been sold as a dietary supplement for over a decade due to the marketing restrictions placed on stevia by the FDA. "My dream and my vision has always been to have SweetLeaf as a sweetener," said James May, president and CEO of Wisdom (oral communication to C. Cavaliere, June 12, 2008).

Wisdom decided to utilize the GRAS self-affirmation process, which the FDA made available to companies in 1997 and involves having an independent group of qualified scientists review the available data on an ingredient's safety and determine whether that ingredient is considered safe for its intended use and meets strict FDA requirements. The company ultimately hired 2 groups of independent scientists to review the available worldwide data on stevia, both groups containing former FDA officials familiar with the GRAS process. Both groups determined that SweetLeaf stevia meets safety and production requirements necessary for GRAS status, and this status was officially given to Wisdom on March 5, 2008.

SweetLeaf is 98% pure stevia glycosides (the sweet components of the stevia leaf). In its efforts to ensure that SweetLeaf would obtain GRAS status, Wisdom developed a new method for extracting glycosides from stevia leaves that involves a water-membrane filtration system. "We've really met heightened or superior standards for the manufacturing of the product," May stressed.

"We're on absolutely solid ground in this self-affirmation of GRAS," he said. May explained that the FDA is not required to review or approve the decision made by the independent scientists who provided the GRAS status. However, the only way for the FDA to reverse the scientists' GRAS determination would be to take the company to court and prove that stevia is harmful to the human body. According to May, over 1200 studies have now been published verifying the safety of stevia for human consumption.

Although Wisdom has become the first company to market a stevia-based sweetener, several other companies have announced plans for introducing their own stevia sweeteners in the near future. Cargill announced in May that it plans to release its stevia-based sweetener Truvia™ by the end of 2008.[6] Cargill funded studies exploring the safety of rebiana (the common name for the stevia constituent rebaudioside A, from which Truvia is composed), which were published electronically in the journal *Food and Chemical Toxicology* in May 2008.[2] According to Ann Tucker, a spokesperson for Cargill, Cargill has notified the FDA that research data concerning the safety of rebiana have been completed and are available, which is one step of a multistage process in obtaining US regulatory approval (A. Tucker, oral communication to C. Cavaliere, June 10, 2008).

Tucker claimed that Truvia is distinguished from other stevia products in that it is a fully-characterized product that promises consistency and high-quality. She added that such consistency is what food companies typically look for in a sweetener, since these companies also want their finished products to be consistent. "All stevia isn't the same," said Tucker. "Unlocking the taste and getting it to be consistent was the hard part."

Cargill has been collaborating with Coca-Cola Co. (Atlanta, Georgia) in developing its stevia-based sweetener, which Coca-Cola intends to use in beverages and Cargill plans to use in various food products, in addition to marketing the table-top sweetener Truvia.[7] Coca-Cola filed 24 patent applications in May of 2007 to give the company exclusive rights to develop and sell beverages containing the stevia-based sweetener it has developed with Cargill.

Another company, Corn Products International (CPI), has also indicated that it plans to add a stevia-based ingredient to its list of sweeteners.[3] CPI announced in April 2008 that it has entered into an agreement with the Japanese company Morita Kagaku Kogyo Company Ltd., which has been producing stevia sweeteners since 1971, to market that company's patented stevia strain. CPI has announced that it will also make a $20 million investment to build a stevia extraction factory in Brazil. CPI plans to initially market the stevia-based ingredient, called Enliten™, in select Latin American and Asian countries, where the sweetener is already approved for use in foods. The company reportedly will

also file for regulatory approval of Enliten in the United States and Europe.

Oscar Rodes of Stevita Co. Inc. (Arlington, Texas), a distributor of stevia products manufactured by Steviafarma of Brazil, is also developing, in conjunction with the Brazilian manufacturer, a table-top sweetener to be released in 2009. Rodes expects that Steviafarma will have had its steviosides reviewed and affirmed as GRAS by that time. Rodes has intended to market stevia as a sweetener and food additive for the last 20 years, but when he met with the FDA in 1989, he learned that there were concerns about the product's widespread use as a table-top sweetener without having first undergone some rigorous safety studies. Conducting such studies would have totaled an estimated $10 million; Rodes decided this was too high a cost for his small company at that time. However, now Stevita and Steviafarma are working with a large US-based food manufacturer (name undisclosed), which has reportedly spent over $6 million testing the safety of the product and will spend an additional $40 million in a project to launch its own stevia-based table-top sweetener.

"Ten million doesn't seem like so much now," said Rodes (oral communication to K. Saxton, June 16, 2008). According to Rodes, this product is going to be at least 95% pure glycosides extracted from special stevia cultivars with a particularly high concentration of rebaudioside A. The company's extraction process uses water filtration and natural resins instead of solvents or chemicals.

Although various stevia sweeteners may therefore enter US stores in the near future, Wisdom's May argued that not all of these sweeteners are prepared in the same fashion and can promise the same health benefits. May explained that a blending agent must be used (to bulk up the product to enable packaging in sachets for single servings) when manufacturing stevia products, and many companies utilize a carbohydrate-based compound such as maltodextrin, sorbitol, dextrose, erithrytol, lactose, etc. Some of these blending agents could prevent the stevia products from providing zero carbohydrates or a zero score on the glycemic index. Wisdom's SweetLeaf stevia is blended with inulin, a prebiotic carbohydrate that is beneficial for gastrointestinal flora and can help improve immune system function. "We've blended our stevia with something that also is extraordinarily good for the human body," said May. He stated that consumers should be careful to read labels and learn the facts about various stevia products.

Consumer interest in stevia sweeteners is expected to be rather high. Tucker stated that Cargill has received very few questions from industry members or the public concerning the science behind stevia. "The majority of questions have been 'Where can I get it?' 'When can I taste it?'—which has been very interesting!" she said.

May stated that the new designation of "sweetener" could possibly raise SweetLeaf's sales substantially, particularly since the product can now be sold in the baking aisle rather than the herbal dietary supplements aisle. HG

—Courtney Cavaliere and Kelly E. Saxton

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Efficacy of Danish Rosehip as a Pain-Reducing Agent in Persons with Osteoarthritis

Reviewed: Christensen R, Bartels EM, Altman RD, Astrup A, Bliddal H. Does the hip powder of *Rosa canina* (rosehip) reduce pain in osteoarthritis patients?—a meta-analysis of randomized controlled trials. *Osteoarthritis Cartilage.* 2008;doi:10.1016/j.joca.2008.03.001.

Osteoarthritis (OA) is a common disorder of the synovial joints in the body, particularly of the hands, knees, hips, and spine. The symptoms of OA include pain, stiffness, restricted movement, and cracking of joints. OA has traditionally been thought of as a non-inflammatory condition; however, improvements in detection methods have shown that inflammatory pathways are up-regulated in this disorder.

The oral analgesic paracetamol (aka, acetaminophen) is the first line of therapy for OA and the preferred choice for long-term use. If paracetamol is not efficacious, non-steroidal anti-inflammatory drugs (NSAIDs) must be considered. However, an alternative therapy is a special standardized rosehip (*Rosa canina,* Rosaceae) powder from Langeland Island, Denmark, which has been evaluated in short-term randomized controlled trials (RCTs) for its efficacy in ameliorating the symptoms of OA. The results of these trials appear to be consistent.

Evidence from early experiments indicated that rosehip exerted anti-inflammatory activity via a reduction in the chemotaxis (i.e., the movement of cells [or unicellular organisms] with reference to a chemical agent) of peripheral blood neutrophils and monocytes in healthy subjects and decreased C-reactive protein concentrations in patients with OA. To review and evaluate the most up-to-date clinical data on the efficacy of rosehip compounds in treating symptoms associated with OA, these authors conducted a meta-analysis of published trials.

A systematic literature search of several databases (e.g., EMBASE, Medline, and Cochrane Library) was conducted to identify RCTs of OA treatment with this rosehip powder that included a placebo group. Only studies that included patients with clinical or radiographic evidence of OA were selected for review. Two reviewers performed the data extraction independently, and disagreements were resolved through discussion. The following data were recorded: authors, year of publication, design, duration of study, number of patients randomized (i.e., intention-to-treat population), patient age and sex, and site of OA (e.g., knee, hip, neck, etc.). The primary outcome measure was the level of pain reduction. Secondary outcome measures included the change in the amount of pain-reducing agents used, the number of responders to therapy, and adverse outcomes.

Three RCTs met the inclusion criteria for analysis: one was conducted in an outpatient clinic in Norway and two were conducted in outpatient clinics in Denmark.[1-3] All three trials were supported by the manufacturer of the supplement (Hyben-Vital® [also known as Litozin® Hyben-vital®] is made by Hyben-Vital International, Tullebølle, Langeland, Denmark; in North America and many countries outside of Europe, this rosehip material is distributed by DSM [Basel, Switzerland] under the trade name i-flex™).

Combined, the 3 trials included a total of 306 OA patients who were allocated in equal numbers to receive rosehip powder or placebo for 3 to 4 months at a dose of 5g per day. Most of the patients were women (62%), most had OA of the knee (61%), and the median age of the subjects was 66 years.

The change in pain scores was significantly greater in the rosehip group than in the placebo group (P = 0.0019), and the efficacy was consistent across all 3 trials. The pain-reducing ability of rosehip appeared to be greater in patients awaiting hip or knee surgery. In one of the studies, the use of analgesics was reduced significantly in the rosehip group compared with the placebo group. The total number of responders was 94 of 153 patients (61.4%) in the rosehip group and 65 of 153 patients (42.5%) in the placebo group.

A traditional and widely consumed food, the rosehip showed considerable safety. Adverse effects were minimal, with approximately the same number of cases of mild gastrointestinal discomfort (e.g., acid regurgitation, diarrhea, and constipation) being reported in both study groups.

Overall, the analysis showed a "small to moderate short-term efficacy of preparations with *R. canina* hip powder with a small but clinically relevant reduction of pain in OA patients." The lack of heterogeneity among the 3 trials supports the findings of rosehip's efficacy. However, the authors note that their conclusion was based on the results of only 3 clinical trials, all of which were short term (3-4 months in duration). Furthermore, the same product was tested in all 3 studies. Ideally, similar products from different manufacturers should be tested, which the authors suggest "would increase the external validity of any proposed herbal therapy." However, insofar as the Langeland rosehip powder is derived from a particular chemotype that grows in this area, and since the company holds a patent on the use of rosehip (and any member of the genus *Rosa*) for use in OA, it is problematic whether other rosehip products will be able to be tested or marketed for this use. HG

—Brenda Milot, ESL

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Coccinia Extract Safely Reduces Blood Glucose in Subjects with Mild Type 2 Diabetes

Reviewed: Kuriyan R, Rajendran R, Bantwal G, Kurpad AV. Effect of supplementation of *Coccinia cordifolia* extract on newly detected diabetic patients. *Diabetes Care*. 2008 Feb;31(2):216-220.

The prevalence of diabetes in India is increasing at an alarming rate as lifestyle and eating habits change rapidly. There is renewed interest in the use of traditional herbs to help manage blood sugar levels. Coccinia (*Coccinia cordifolia* syn. *C. indica*, Cucurbitaceae) is an herb that has been used widely since ancient times in traditional Ayurvedic medicine (where it is known as *tindora* or *tindori*) in the treatment of diabetes-like conditions. Aqueous alcoholic extracts of coccinia leaves and fruit have been shown to reduce blood sugar levels in diabetic animals, but few clinical trials have been conducted in humans. The purpose of this trial was to evaluate the effects of a similar coccinia extract on blood glucose levels in people newly diagnosed with diabetes.

This randomized, double-blind, placebo-controlled trial was conducted at St. John's Medical College Hospital in Bangalore, India. The subjects were adults recently diagnosed with type 2 diabetes who would normally be treated with dietary and lifestyle modifications only. They were randomly assigned to receive capsules containing coccinia extract or placebo. The coccinia extract was prepared by extracting the leaves and fruit with 50% alcohol, purifying by fractionation, and spray-drying the filtered liquid. Fifteen kg of the herb provided 1 kg of the final extract. (Both coccina and placebo capsules were prepared by Green Chem, Bangalore, India.) Subjects took 2 capsules daily, providing a total of 1 g coccinia extract or 1 g maltodextrin placebo, for 90 days. This amount was chosen as equivalent to the traditional Ayurvedic dose of approximately 15 grams of dried herb ("a handful") daily.

All subjects were prescribed regular exercise and a low fat, high-fiber diet to control their blood sugar. The subjects underwent a physical examination, laboratory testing, and assessment of dietary and exercise habits on days 0, 45, and 90 of the study. They returned to the clinic every week to be weighed, report any adverse effects, obtain the week's supply of study capsules, and rate their compliance with the dietary advice, the physical activity recommendations, and the study capsules.

Sixty subjects ranging in age from 35 to 60 years were enrolled in the study, and 59 subjects completed the study. At the end of the trial, the coccinia group had a significant decrease in fasting blood glucose ($P < 0.05$), with a mean reduction of 15.6% (20.6 mg/dl) compared to baseline. The placebo group had a non-significant increase in fasting blood glucose of 6% (8 mg/dl). The coccinia group also had a significant ($P < 0.05$) decrease in postprandial (2 hours after breakfast) blood glucose levels of 18.5% (34 mg/dl), while the placebo group had a non-significant increase of 7% (12 mg/dl) after breakfast. Glycosylated hemoglobin, a measure of long-term glucose control, dropped significantly ($P < 0.05$) in the coccinia group after 90 days but remained unchanged in the placebo group. The low density lipoprotein (LDL) cholesterol in the coccinia groups was also reduced significantly ($P < 0.05$) by 14.6% after 90 days compared to the baseline value.

No significant differences were found between the two groups for weight loss, percent body fat, body mass index, waist and hip circumferences, blood values, daily calorie intake, or compliance with diet and physical activity recommendations. No serious adverse events were reported. More than half of subjects (59%) in the coccinia group reported mild hypoglycemic symptoms such as sweating, excessive hunger, and slight dizziness once or twice during the study, usually during mid-morning, that were controlled by a snack at that time. Other minor complaints were similar for the 2 groups of subjects.

These results suggest that coccinia has a hypoglycemic action that is independent of food intake or weight loss. The authors conclude that coccinia may represent a beneficial adjunct for the treatment of people with mild type 2 diabetes. The mechanism of action of the herb is not well understood, but it appears to mimic the effects of insulin. Insulin levels were not measured in this study, so it is not known if coccinia enhances insulin production or function. Future trials of coccinia should measure insulin concentrations, include larger numbers of subjects with varying degrees of disease severity, assess dosage variations, and evaluate the mechanisms of action to determine if its effects are applicable to patients with type 1 diabetes. HG

—Heather S. Oliff, PhD

Review of the Efficacy of South African Geranium (Pelargonium) in the Treatment of Acute Bronchitis

Reviewed: Agbabiaka TB, Guo R, Ernst E. *Pelargonium sidoides* for acute bronchitis: a systematic review and meta-analysis. *Phytomed*. 2008; In press [epub ahead of print].

Acute bronchitis, an inflammation of the bronchiole tubes characterized by a productive cough, is one of the most common diagnoses in primary care. Viral infection is the primary cause of this condition; however, bacteria and allergens also play a role. Because antibiotics are ineffective at treating viral infections and are associated with adverse side effects and with resistance development because of misuse and overuse, alternative therapies for the treatment of acute bronchitis have gained increased focus. South African geranium (*Pelargonium sidoides*, Geraniaceae) is an herbaceous perennial popularly used in South African traditional medicine for the treatment of respiratory diseases. The objective of this study was to evaluate the evidence from clinical trials on the efficacy of a proprietary extract of South African geranium roots for treating acute bronchitis.

A systemic literature search was conducted to identify clinical trials of the efficacy of South African geranium published between 1950 and 2007 in 5 electronic databases: Medline, Amed, Embase, The Cochrane Library, and CINAHL. The following search terms were used: "acute bronchitis," "Pelargonium," "sidoides," "Umckaloabo," and "EPs®7630." The reference lists of the retrieved articles were also reviewed. Only randomized clinical trials that evaluated single preparations of South African geranium as sole or adjunctive oral treatments for acute bronchitis were included in the meta-analysis. Two reviewers independently assessed the retrieved articles to determine their eligibility for inclusion in the review.

Six randomized controlled trials met the inclusion criteria, of which four were suitable for statistical pooling; four of the studies were published. The meta-analysis was conducted using a fixed-effect model for continuous data, and each trial was evaluated for methodological quality and assigned a Jadad score (maximum possible score: 5). The 6 trials were categorized into one of 2 groups on the basis of the control intervention used: one trial evaluated South African geranium relative to conventional therapy (acetylcysteine), and the remaining 5 trials evaluated South African geranium relative to placebo. In all 6 trials, the South African geranium preparation used was EPs 7630 (Dr. Willmar Schwabe Pharmaceuticals, Karlsruhe, Germany). The methodological quality of the trials was "generally good." Three of the trials had the maximum Jadad score of 5; one trial had a low score of 2. The results of all 6 trials suggested that EPs 7630 was effective at treating acute bronchitis. Four of the 5 placebo-controlled trials suggested that EPs 7630 significantly decreased bronchitis symptom scores after 7 days of treatment. No serious adverse effects were reported in any of the trials, but mild to moderate adverse effects were reported in all 6 trials. Reported adverse effects included gastrointestinal disorders, nervous system disorders, and ear and labyrinth disorders. Also reported were infections and infestations in trials involving children.

The authors of this study conclude that the meta-analysis yielded "encouraging evidence from currently available data that *P. sidoides* is effective compared to placebo for patients with acute bronchitis." The mechanism of action thought to be responsible for the beneficial effects is the ability of EPs 7630 to antagonize bacterial adhesion and/or invasion of intact epithelia, thus protecting the upper respiratory tract from bacteria colonization and infection. The authors note that the study was limited by the relatively small number of studies reviewed. HG

—Brenda Milot, ELS

Survey of Potential Interactions between Dietary Supplements and Prescription Medications Indicates Limited Risks

Reviewed: Sood A, Sood R, Brinker FJ, Mann R, Loehrer LL, Wahner-Roedler DL. Potential for interactions between dietary supplements and prescription medications. *Am J Med*. March 2008;121:207-211.

More than two-thirds of Americans use complementary and alternative medicine (CAM) treatments, and dietary supplements are some of the most popular treatments used.[1] Some treatments can produce adverse events, including interactions with prescription medications. These authors designed a study to assess which are the most common clinically significant interactions among patients who concurrently use dietary supplements and prescription medications.

The study involved a cross-section, point-of-care survey of patients treated in six different specialty clinics (Departments of General Internal Medicine, Oncology, and Physical Medicine; the Fibromyalgia Clinic; the Preoperative Clinic; and the Spine Center) at the Mayo Clinic in Rochester, Minnesota. The authors designed an 85-question survey to determine the use of CAM therapies during the six months before the survey date. The questions asked about the use of 52 listed dietary supplements and included an opportunity for patients to document the use of supplements not included in the list. The survey was completed by 1,818 patients from September 2002 through July 2003.

Dietary supplements were defined as products containing herbs or other botanical components, amino acids, enzymes, organ tissues, glandular extract, or metabolites. (Vitamins and minerals were not included.) Prescription medications were defined as pharmacologic agents that were available in the United States only by prescription from a physician (though aspirin was also included).

The authors obtained information regarding the concurrent use of prescription medications from the patients' electronic medical records. They acquired information on potential interactions by searching the MEDLINE database (using PubMed), the Natural Medicines Comprehensive Database, and the textbook *Herb Contraindications and Drug Interactions: With Extensive Appendices Addressing Specific Conditions, Herb Effects, Critical Medications, and Nutritional Supplements*. Clinical significance of individual interactions was assessed using the Lexi-Interact online medication and dietary supplement interaction analysis program.

The authors used the chi-squared and log-rank tests to compare the differences in baseline characteristics between patients who did and did not report use of dietary supplements. P values <0.05 were considered statistically significant. Statistical analysis was performed by using the SAS software package, version 9.1.3 (SAS Institute, Cary, NC).

The authors report an overall survey response rate of 98.7% (1,795 of the 1,818). Of the respondents, 710 patients (39.6%) reported use of dietary supplements. After excluding 11 patients because of a lack of information about the use of prescription medications in their medical records, 699 patients made up the final sample of dietary supplement users. Of these, the medical records of only 185 (26.5%) showed use of dietary supplements.

There were similar mean ages for those patients using dietary supplements (55.7 ± 14.9 years) and those not using supplements (58.1 ± 16.8 years). Women were more likely to use supplements than men. Patients using supplements reported more symptoms than patients not taking the products (on average 10.6 ± 8.6 symptoms vs. 9.1 ± 7.7 symptoms, respectively). The mean self-perceived stress level ranked from 1 to 5 was statistically different between the two groups (P=0.008), but the actual difference of 0.1 was not clinically meaningful. The mean number of prescription medications per patient (3.6 ± 3.1 for supplement users vs. 3.7 ± 3.3 for nonusers) was not significantly different between the two groups (P=0.71).

The most common dietary supplements with a potential for interaction were preparations of garlic (*Allium sativum*, Alliaceae), valerian (*Valeriana officinalis*, Valerianaceae), kava (*Piper methysticum*, Piperaceae), ginkgo (*Ginkgo biloba*, Ginkgoaceae), St. John's wort (*Hypericum perforatum*, Clusiaceae), glucosamine, ginger (*Zingiber officinale*, Zingiberaceae), and ginseng (*Panax quinquefolius*, Araliaceae). The most common prescription medication classes with a potential for interaction were antithrombotic medications, sedatives, antidepressant agents, and antidiabetic agents. The authors report that 369 potential interactions were identified among 236 patients. Of those, 107 interactions were considered to have potential clinical significance. The authors state, however, that no potential interactions resulted in serious harm (hospitalization, new medical problem, or serious bleeding) to any patient during the study.

Study strengths include the large sample size, excellent response rate, inclusion of patients from different specialty groups, and availability of complete data for most patients. Study weaknesses include the possibility of recall bias, possible incomplete or inaccurate medical record information about prescription medications, incomplete information about potential interactions between dietary supplements and prescription medications, and a limited generalizability of the study findings to the community.

The authors compared their study with other studies reported in the medical literature. Among all prescription medications, antithrombotic agents are the best-described class of medications with a potential for interaction with herbal products.[2,3] Findings from the study reported here confirmed this finding.

In summary, the present study showed that a small number of prescription medications and dietary supplements accounted for most potential interactions. HG

—Shari Henson

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Pilot Study Suggests that Pharmaceutical Ads Influence Publication of Dietary Supplement Articles in Medical Journals

Reviewed: Kemper KJ, Hood KL. Does pharmaceutical advertising affect journal publication about dietary supplements? *BMC Complement Altern Med*. 2008;8:11.

The US Food and Drug Administration defines dietary supplements (DS) as "vitamins, minerals, herbs or other botanicals, amino acids, and substances such as enzymes, organ tissues, glandulars, and metabolites." Because of Americans' increasing interest in supplements, the National Institutes of Health has funded research to evaluate the safety and effectiveness of DS, resulting in an increasing number of published research papers.

Articles in general medical journals are often cited in professional practice guidelines for clinicians and by the media for dissemination of information to the public. Many medical journals are supported by advertising revenue. Seeking to evaluate the relationship between pharmaceutical advertising and publication about natural health products (which may be viewed as competing with pharmaceutical products), the authors conducted a pilot study to explore this relationship and to compare this to publication about DS in three journals devoted to complementary and alternative medicine (CAM).

The authors hypothesized that journals with more pharmaceutical advertisements (pharmads) would publish fewer articles about DS and more articles suggesting that DS were unsafe or ineffective than would journals with fewer pharmads. Also, they expected that CAM journals would have fewer pharmads and more DS articles and that fewer of the articles in CAM journals would be unfavorable about DS than articles in the general medical journals.

The authors selected 10 major medical journals published in English and devoted to general medicine, internal medicine, or pediatrics: *American Family Physician*, *British Medical Journal*, *Canadian Medical Association Journal*, *Journal of the American Medical Association*, *New England Journal of Medicine*, *Annals of Internal Medicine*, *Archives of Internal Medicine*, *Pediatrics*, *Archives of Pediatrics and Adolescent Medicine*, and *Pediatric Research*. All issues of each journal for the time period between June 30, 2006, and June 30, 2007, were reviewed.

The review also included three CAM journals published during the same period: *Journal of Alternative and Complementary Therapies*, *Alternative Therapies in Health and Medicine*, and *Explore*.

Between May 21 and July 17, 2007, two premedical students reviewed the journals by using standard rating forms created for this study. They examined each page of every journal reviewed, selecting pages that included any kind of advertising or any report regarding a dietary supplement.

For analytical purposes, the ads were collapsed into two categories: pharmaceutical versus other.

Articles about DS were divided into major articles (original research, editorials, reviews) and other types of articles (basic scientific mechanisms, case reports, letters, fillers, news, abstracts, meeting notes, and similar).

For each DS article, reviewers examined the conclusions regarding safety and coded them as unsafe, safe, unclear or mixed, or not discussed. Conclusions about effectiveness were coded as follows: (1) ineffective; (2) effective; (3) neutral, mixed, or insufficient evidence; and (4) not discussed. Because the authors were interested in negative publications, articles were categorized for analysis as "unsafe" versus "other" and as "ineffective" versus "other."

Data were entered into a Microsoft (MS) Access Database and transferred to MS EXCEL for descriptive analysis; Stata 8.1 software was used for statistical analysis.

The authors report that, on average, 30 issues were reviewed for each of the 11 primary journals (range, 12 to 52). The average number of pages per issue ranged from 56 to 217, and the average number of all advertising pages ranged from 3.9 to 87.8 per issue. The average number of pharmads varied from 0.15 to 66.3 pages per issue and from 0.001 to 0.441 pharmads per average number of journal pages per issue.

Two journals had fewer than 10 pharmad pages in an average issue and were labeled as the "fewest pharmads" group. The seven journals with between 10 and 39 pages per issue were named the "middle pharmads" group, and the two with more than 40 pages per issue, the "most pharmads" group.

The journals with the most pharmads published fewer major articles (0.08 per issue) about DS than the middle pharmads journals (0.21) ($P<0.05$); the middle pharmads journals published fewer major DS articles per issue (0.21) than those with the fewest pharmads (0.43), ($P<0.05$). The difference in major DS articles between journals with the most pharmads and fewest pharmads was most significant ($P<0.01$).

The DS written about most often in the medical journals were folate and other B vitamins, caffeinated beverages (it is questionable whether such beverages actually qualify as DS), calcium and vitamin D, iron, and essential fatty acids such as omega-3 fatty acids.

Safety concerns were raised less often in clinical trials or cohort studies than in other articles. Concerns about unsafe DS were cited in 1/44 (2%) clinical trials or cohort studies versus 3/34 (8.8%, though the article states 10%) of editorials or reviews and 20/177 (11%) of other types of articles. More journals with the most pharmads (67%) were significantly likely to publish major articles concluding that DS were unsafe than journals with middle (7%) or fewest (4%) pharmads ($P<0.005$).

In the 10 primary journals, 68 of 254 (26%) articles about DS concluded they were ineffective; only 10 of these articles were clinical trials or cohort studies. Conclusions about ineffective DS were less common in journals with fewest pharmads (27%) than

The authors hypothesized that journals with more pharmaceutical advertisements (pharmads) would publish fewer articles about DS and more articles suggesting that DS were unsafe or ineffective than would journals with fewer pharmads.

in journals with more pharmads (34%); the differences were not significant.

In the three CAM journals, the number of total ads ranged from 5.7 to 24 pages per issue, with no ads for prescription pharmaceuticals found in those journals. The number of pages of DS ads ranged from 0 to 12.3, with an overall average of 5.5 per issue. Not surprisingly, the CAM journals had significantly more articles about DS than any group of the primary journals ($P<0.01$). The CAM journals published more than twice as many clinical trials or cohort studies as the general medical journals with the fewest pharmads (0.5 vs. 0.22 per issue); the number of major articles per issue was significantly higher among CAM journals (0.86) than among the regular journals with the fewest ads (0.43) ($P<0.05$). The authors report that although CAM journals published more original science about DS, the proportion of major articles concluding that DS were unsafe or ineffective was not significantly different from general journals with middle or fewest pharmads.

These results support the authors' hypothesis that pharmaceutical advertising biases journals against publishing articles on DS and in publishing more articles that DS are unsafe. The results are consistent with substantial research suggesting that advertising influences behavior.

According to the authors, this study was limited by the fact that it included the American library version of only a few clinical medical journals. The secondary analysis of CAM journals could have been strengthened by a larger sample of more diverse CAM publications. In addition, this study did not survey journal editors about the number of submissions of different types of articles they receive or how they decide which ones to include. Also, according to the authors, this study used the number of issues per journal as the study denominator rather than the total number of articles per issue; future studies could use the number of articles per issue as the denominator to address the related question of whether journals with more advertising per issue also have fewer articles of all types and therefore fewer articles about DS.

An *HerbalGram* peer reviewer, who has extensive experience contributing to medical journals, has added that other potential confounders are that DS manufacturers might not be able to afford the cost of advertising in journals supported primarily by more lucrative pharmads. Further, they may have preferentially chosen to advertise in journals that are likely to be more receptive to the use of DS and perhaps provided more affordable advertising space as well, presuming that the audience of such journals are more open to the professional use of DS. Clearly, the reviewer writes, editors seem to preferentially publish about products (whether they be DS or pharma) that help support their publication and distribution costs. HG

—Shari Henson

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Study Shows Ginkgo Extract and Aspirin Use Does Not Impact Coagulation Indices

Reviewed: Gardner CD, Zehnder JL, Rigby AJ, et al. Effect of *Ginkgo biloba* (EGb 761) and aspirin on platelet aggregation and platelet function analysis among older adults at risk of cardiovascular disease: a randomized clinical trial. *Blood Coagul Fibrinolysis*. Dec 2007;18(8):787-793.

Ginkgo (*Ginkgo biloba*, Ginkgoaceae) is most commonly used to treat dementia and peripheral claudication. Many reviews have reported that it is generally "safe under conditions of usual intake." There is a growing concern that ginkgo may be contraindicated under conditions that may predispose individuals to bleeding disorders. This would occur, for example, in patients taking anticoagulants or thrombolytic agents. The purpose of this study was to determine whether a high dose of ginkgo would affect platelet function in patients taking a daily dose of 325 mg aspirin (platelet aggregation inhibitor).

Adults with established peripheral artery disease (PAD) or a risk for PAD due to either family history of cardiovascular disease (CVD) or elevated CVD risk factors such as diabetes, hypercholesterolemia, or hypertension were recruited from the local community (Stanford University Medical School, Stanford, CA) to participate in this randomized, double-blind, placebo-controlled study. Participants (n = 67) received either placebo or 300 mg/day of the ginkgo extract EGb 761 (Dr. Willmar Schwabe, Karlsruhe, Germany; Ginkgold®, Nature's Way, Springville, Utah) for 4 weeks. EGb 761 contains 24% ginkgo flavone glycosides and 6% terpene lactones. All participants also took 325 mg/day aspirin. Aspirin treatment was initiated 2 weeks prior to EGb 761 administration. Patients recorded daily bleeding or bruising in a log. Blood samples were collected to analyze platelet function.

Treatment adherence was excellent, with participants consuming more than 90% of the tablets. Twenty-six participants reported attendant symptoms, 11 in the EGb 761 group and 15 in the placebo group (P = 0.4). Unusual bleeding and/or nosebleeds were reported by 5 in the EGb 761 group and 4 in the placebo group. Upset stomach was reported by 6 in the EGb 761 group and 5 in the placebo group. The pre-study to end-study change in time for clotting was not significantly different between groups. Platelet aggregation was assessed via 4 classical tests. With all 4 tests, there was no significant difference from pre-study to end-study in platelet aggregation between the EGb 761 and placebo groups.

The authors conclude that adding 300 mg/day of EGb 761 to daily aspirin therapy in this patient population did not have a detectable effect on platelet function as assessed by 2 standard methods. The authors state that a limitation of the study was that additional measures of platelet function and coagulation were not assessed in this study. Also, a participation of larger number of participants would have permitted greater sensitivity to detect small inter-group differences. It should also be noted that this study used a sample size that was larger than many other published studies.

This study shows that a relatively high dose of EGb 761 combined with daily aspirin did not have clinically or statistically detectable impact on indices of coagulation examined over 4 weeks. Considering that this study had exemplary design, execution, and synopsis, and employed tests commonly used in clinical practices, the conclusion is convincing. HG

—Heather S. Oliff, PhD

Ginkgo *Ginkgo biloba*

The Elusive Source of Feverfew's Anti-migraine Activity

Introduction

The development, as well as the relief, of the symptoms of migraine headache is an extremely complex process that has eluded understanding for over a century despite more than 60 years of intensive research. Attention has been mainly focused on three theoretical causes: chemical (prominently concerned with serotonin), vascular, and neural. Blau has pointedly observed, "Migraine, like gravity, becomes evident only by its effects,"[1] and research has therefore depended largely upon observations made about or by migraineurs. No satisfactory animal model of migraine is currently available, for as Blau further noted: "Animals may get headaches, but they cannot tell us about it."[1]

Feverfew (*Tanacetum parthenium*, Asteraceae) has been used since antiquity for a variety of medicinal purposes but prominently to alleviate fever, headache, and women's genito-urinary ailments.[2] Claims of efficacy for these traditional uses are almost invariably anecdotal. However, over the past 2 decades, randomized controlled trials have been conducted in the prophylaxis of migraine. While the quality of these trials vary, there is good evidence of feverfew's potential in migraine: statistically significant reduction in frequency and severity of attacks as well as decrease of nausea and vomiting has been observed following the administration of feverfew leaf. Neither the constituent(s) of feverfew responsible for the migraine-preventing activity nor the mechanism(s) of action are yet known. Parthenolide, the dominant sesquiterpene lactone (STL) constituent of the clinically tested sesquiterpene chemotype and long considered the active antimigraine principle, is no longer considered by many to be a significant contributor in that respect. Also, the latest trial, using a supercritical carbon dioxide extract of feverfew leaf, lends promise to the development of a reliably consistent and effective standardized preparation. No serious adverse reactions have been recorded, although the development of mouth ulcers has caused a small percentage of consumers to discontinue treatment. No interactions with conventional medications have been observed so far.

Parthenolide

The decades-long flush of adherents to the theory of inhibition of the release of serotonin (5-hydroxytryptamine) from blood platelets by parthenolide—as the basis for feverfew's anti-migraine activity[3]—has apparently only slightly paled as a belief, despite the shock of a 1996 Dutch study,[4] in which an extract of feverfew leaf, with ample (more than 4%) charged parthenolide content, was found ineffective in mitigating the symptoms of migraine. I find it frankly baffling that, despite the lack of any evidence of a contribution by parthenolide to feverfew's anti-migraine activity, a number of scientists still believe that the cytotoxic allergenic STL could somehow contribute to the plant's prophylactic potential. Also, generally, manufacturers, unfazed by or unaware of the negative Dutch trial, continue to strive for ever-increasing parthenolide content in their feverfew leaf products.

Subsequently, studies conducted by researchers of the reputable German company Schaper & Bruemmer Gmbh Co. KG of Salzgitter, Germany, demonstrated the effectiveness in migraine prophylaxis of a supercritical carbon dioxide extract of feverfew leaf, but only in a small subset of patients with a minimum of 4 migraine headache attacks per month.[5,6] From 45 samples of feverfew leaf, these researchers selected the 6 highest in parthenolide content and touted their proprietary extract for its stable parthenolide content, exceeding 1%. The 0.2% content criterion established in 1992 by the Canadian regulatory authority was an *identity* criterion, seeking to ensure approval of the same STL chemotype that had been used in the two positive British trials upon which recognition of the therapeutic claim was based.[7,8] This criterion was established upon a recommendation by this author and Heptinstall[2] based on a measured average of 0.42% parthenolide content found in feverfew leaf material used in the two British clinical trials.[7,8]*

These two trials were of very different qualities: the earlier[6] was widely criticized because of its small subject population (n=17) as well as the basis of self-selection, and did not persuade the UK health authorities to recognize a therapeutic claim, while in the United States feverfew is regarded as simply a "dietary supplement" for which no therapeutic claims can be made. The German Commission E did not provide a product monograph (since fever-

Feverfew *Tanacetum parthenium* ©2008 Steven Foster

few was not widely used in German pharmacies during the time that the Commission was reviewing herbs for its widely-touted monographs), but the European Scientific Cooperative for Phytotherapy (ESCOP) produced, in 2003, a therapeutic monograph for dried aerial parts, with a limit for parthenolide (0.1%) acknowledging value of feverfew in the prophylaxis of migraine.[9]

On the feverfew front, the first few years of the 21st century have witnessed a curious and interesting development, namely, the registration of patents for the preparation and application of "substantially parthenolide-free feverfew extracts" for both oral and topical treatment of migraine, arthritis, bronchial complaints, inflammatory disorders, and related conditions. This last application is particularly interesting in view of the loudly trumpeted anti-inflammatory potential of parthenolide: the authors of US Patent 7,229,650,B2, June 12, 2007, from the Netherlands, France, and the US, claim that their innovation provides "a method for treating and preventing inflammatory disorders and related conditions by applying a topical composition containing an effective amount of an extract of feverfew to a patient where said extract is substantially free of α-unsaturated γ-lactone." The other patent (US 7,192,614,B2, March 20, 2007) proclaimed: "Methods of treating migrainous headaches and their associated symptoms are provided by administering a composition comprising parthenolide or feverfew sublingually to a patient in need thereof. Treatments are surprisingly effective with low total administered amounts of parthenolide or feverfew." (It should be noted that a use for an herb can be patented even without ample proof of the herb's and/or an herbal preparation's actual activity for the patented claim.) An earlier patent (US 6,224,875,B1) acquired in 2001 by Bombardelli and Morazzoni of the botanical extractor Indena S.P.A., Milan, Italy, claimed to generate "Extracts of *Tanacetum parthenium* with a reduced content of α-unsaturated γ-lactones, particularly of parthenolide, obtainable by elution on basic resins... The extracts of the invention have favourable pharmacological properties together with reduced risks of allergic reactions." However, while STLs have long been associated with allergic reactions and cross-reactivity with other plants of the Asteraceae / Compositae family, such as ragweed (*Ambrosia* spp.), chamomile (*Matricaria recutita*), echinacea (*Echinacea* spp.), and yarrow (*Achillea millefolium*), no allergic reactions from oral ingestion have been documented.

The Active Principle(s)

It appears eminently reasonable to infer from the Dutch and German clinical trials that protracted (19 days) 90% ethanol extraction used for the product employed in the former, resulted in loss / degradation of the actual anti-migraine principle(s). Prominent candidates considered for the active principle mantle include the volatile *trans*-chrysanthenyl acetate and the isomeric *cis/trans*-spiroketal enolether diynes. Clearly, talented organic chemists, allied with competent pharmacologists, are needed to advance the current understanding of the agent(s) and mechanism(s) involved in feverfew migraine prophylaxis.

Of possible interest is that UK's Medicines and Healthcare products Regulatory Agency (MHRA) granted a Traditional Herbal Registration Certificate for the traditional herbal remedy "Migra-Herb hard capsules" to MH Pharma Ltd on April 3, 2007. This product has been granted a general sales license (GSL), presumably with no therapeutic claim allowed. This application was submitted as a complex process according to Article 16.c of Directive 2001/83 EC, as amended, as part of the Traditional Herbal Medicines Registration Scheme. The data supplied by the applicant demonstrated 30 or more years of traditional use of feverfew in the European Community. A satisfactory review of the available safety data on feverfew has also been provided, together with an Expert Safety Report supporting the proposed product. Of interest is that the approved product is a capsule containing 100mg of dried feverfew leaf—with no reference to parthenolide content—and is not an extract. HG

—Dennis V.C. Awang, PhD

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* As far as the 0.42% v. 0.2% calculation, the former was the average level of the parthenolide found in feverfew leaf grown in the Chelsea Physic Garden which provided the material used in the two successful UK clinical trials. After consultation with Prof. Stan Heptinstall of the University of Nottingham who was involved with the vastly superior 1988 study, we thought it reasonable to propose a level of 0.2% parthenolide simply to ensure that the sesquiterpene lactone chemotype approved was the same as that used in the two positive trials. (Recall that the positive Israeli trials used whole leaf containing 0.2% parthenolide while the extract that did not produce any clinically positive results in the trial conducted at a Dutch university contained more than 0.4%. Note also that no one has yet demonstrated any role whatsoever for parthenolide in feverfew for anti-migraine activity. I believe that the deWeerdt study, though singular, is definitive—and rather than the onus being on the anti-parthenolide group to demonstate the lack of parthenolide participation one more time, it ought to be up to the pro-parthenolide group to demonstrate its relevance.

Tree of Life

The Use of Marula Oil in Southern Africa

By Lucy Welford, PhD; Maria E. Abad Jara; and Nigel Gericke, MD

Marula kernels
Photo ©2008 PhytoTrade Africa

Introduction

For generations, marula oil has been of great social and cultural importance for rural people living throughout southern Africa. With numerous local traditional uses, it is venerated throughout the region for its nutritional, medicinal, social, and spiritual significance.[1,2] As the archetypal African "Tree of Life," the marula tree (*Sclerocarya birrea*, Anacardiaceae) is protected throughout its distribution as one of the most important wild indigenous African fruit trees. Also of great importance is the oil from marula kernels, which forms an important part of the rich cultural fabric of life among the rural African people. Marula oil has great value in local economies, not only for subsistence, but also increasingly for commercial trade, providing a much-needed livelihood alternative for impoverished rural communities. Research has established that marula oil has significant antioxidant,[3] skin healing, and hydrating properties.[4] A number of international cosmetics and personal care companies have started to use it in their formulations.[5] The juice from the pulp surrounding the seed is used in making traditional beers and wine and a commercial cream liquor Amarula.

The Marula Tree and Its Distribution

The marula is a medium to large deciduous tree, 15 to 20 meters tall, with a wide crown and characteristic silvery, mottled bark, which peels in disc-shaped flakes.[6,7,8] The small dark-red flowers are unisexual; although widely described as a dioecious species, female flowers occasionally occur among the male flowers of a few otherwise male trees[9] and are found in fragrant clusters at the end of the branches. The compound leaves are grey-green in color throughout the growing season, after which the tree is denuded of leaves; the end-branches are characteristically thick and erect, like upturned fingers (digitaliform).

The marula tree is in the same family (Anacardiaceae) as the mango (*Mangifera indica*), cashew (*Anacardium occidentale*), and pistachio nut (*Pistacia vera*). The plum-sized marula fruits are covered in a soft, leathery, pale green-yellow exocarp, which encloses the juicy translucent white flesh.[10] The fruit has an exotic flavor reminiscent of grapefruit and a distinctive scent similar to pineapple.[11] The fruits usually fall to the ground in large numbers while still green, where they ripen to a yellow color. They develop a pleasing resinous fragrance when on the tree and even more so when ripened.[12] Over-ripe fruits begin to ferment spontaneously. The smooth skin is tough and leathery, protecting an edible white fibrous flesh that is tart and juicy. Within the fruit is a large very hard seed, which contains one to three edible kernels, rich in edible oil.

The genus name (*Sclerocarya*) is derived from the Greek for hard (*skleros*) and nut (*karyon*). Marula or *morula* (Afrikaans) is the local name for this tree. Marula has many names in local languages, including *toa* (San), *iganu* (Ndebele), *onganga* (Ovambo), *morula, merula* (Pedi), *mapura* (Bechuana), *umGanu* (Swazi), *tsua* (Tonga), *ol-mangwai* (Maasai), *umganu* (Zulu), and *omuongo* (Herero). Marula trees are distinctive for their exceptional fruit and nut yields. In heavy fruiting seasons, a single tree can provide between 21,000 and 91,000 fruits,[13] making them very easy to harvest. The prolific nature of the marula tree has not only been noted by humans, but also by elephants that travel considerable distances to gorge themselves on the fruits.[14] Importantly, the marula fruit harvest season occurs between January and March at the beginning of the school year, making the cash income from their sale in informal markets or through more formalized market channels important for the payment of school fees and clothing.[15]

Marula trees are widely distributed throughout the tropical and subtropical zones of the African continent, with the subspecies *caffra* (Sonder) restricted to southern Africa. The tree usually grows at medium to low altitudes in frost-free areas, on sandy soils, or on sandy loams. Marula's drought resistance makes it ideally suited to Namibia, Botswana, Zambia, and Zimbabwe, where it is found in abundance. In these places, it is one of the few trees left standing after wild bushveld and savan-

A traditional marula festival in northern Namibia. Photo ©2008 PhytoTrade Africa

nah are burned and cleared for subsistence agriculture. The marula is of great economic importance to rural communities and every part of the tree, from the leaves to the roots, is utilized for a wide variety of domestic needs (See Table 1). In southern Africa, the edible fruits are consumed locally and are also used to make beer, wine, and jam.[6,16] The bark, roots, and leaves are used in traditional medicine to treat diarrhea, diabetes, fever, and malaria.[6,17] The leaves are used to make a relish and the hard wood makes excellent mortars for pounding corn, as well as spoons and other kitchen utensils.[6]

The tree has vital subsistence value in times of drought and famine.[18] Wherever marula grows, it is venerated and conserved by Africans for the abundance and reliable harvest of its fruit; for generations it has been customary to parcel out rights over these trees among local inhabitants.[4,16,19]

Local Production of Marula Oil

The extremely hard seeds of the marula tree are difficult to crack without crushing the kernel, and specially designed small implements are used to open the opercula or "eyelets" in the seeds to pry the kernels out. Archaeological evidence confirms that the marula tree and the production of oil from its kernels has been a central part of the way of life in southern Africa for thousands of years.[1,21,22] There has been speculation that endocarp material recovered from archaeological deposits aged at 150,000 years in Zimbabwe shows significant resource usage around the time that *Homo sapiens* was emerging as a species. There is wider acceptance that much younger material (9,000–11,000 years old), from the same area near Bulawayo in Zimbabwe, reflects the earliest organized exploitation.[10,22] Archaeologists have also found marula seeds at Mapungubwe, where Boskopoid people lived over 1,000 years ago. Specially shaped pieces of bone, typical of Iron Age sites in the Transvaal, were possibly used to crack marula seeds.[6,23] Similar tools are used to this day to crack the seeds and extract the kernels, and it is likely that the modern uses for the tree have been passed down the generations from Stone Age *Homo sapiens*.

The nutritious oil and protein-rich kernels (See Tables 2 and 3) are processed by women for both domestic use and sale.[24-27] They are extracted manually from the seeds using a range of techniques specific to different parts of the trees' distribution range (See Table 3). On the sandy coastal plain of the Ingwavuma district in KwaZulu-Natal Province in South Africa, decortication is achieved by cracking the seeds against a stone slab and removing the kernels individually with a sharp needle-like tool.[28] In parts of Namibia, the marula seeds are cracked against an axe blade or other large piece of iron using a block of hard wood. In Bushbuckridge in Mpumalanga Province, and some other areas of South Africa, the seeds are boiled or heated in a fire prior to decortication. This is said to make extraction simpler as the "eyelets" in the seeds are removed more easily.[23] The kernels are so full of oil that

Processing marula kernel. Photo ©2008 PhytoTrade Africa

a squeeze with the hand can release a rich yield. The oil is traditionally prepared by squeezing it from the kernel in a mortar and pestle or by crushing the marula seeds and kernels in boiling water so that the released oil floats to the top of the water and can be skimmed off. Oil and cake prepared in this way can be stored and used for at least a year.

The fact that many rural households in southern Africa are in need of extra income to improve living conditions, contributes to peoples' positive perception of the commercialization of marula. They use the money for basic needs such as food, school fees, and hospital expenses.[29]

Traditional Use of Marula Kernels and Oil

Marula kernels and oil make an important contribution to the diet of many rural African people in Mozambique, Namibia, South Africa, and Zimbabwe.[30,31] It also plays an important role in the diet of the San (the indigenous people of the Kalahari desert in Botswana and northern South Africa).[32] The kernels have also been reported to provide sustenance on long journeys. Men walking from Tzaneen in Limpopo Province to the diamond mines at Kimberley in Northern Cape Province take marula kernels mixed with millet meal in a large horn, slung over their shoulder, as the only sustenance for the long journey.[6]

The oily kernels are eaten as nuts, fresh or roasted, or stamped to form a cake which can be eaten on its own. The cake is occasionally used to feed animals.[1,6,9,14,26,33-36] The kernels are also pounded or ground into powder that is added to sauces, soups, and other foods, such as biscuits and porridge.[6,10,37,38,39] The kernels have a delicious flavor and are regarded by many indigenous people as the "Food of Kings" because of the hard work required to obtain even a small quantity from the hard seeds.[40]

Due to their high fat, protein, and mineral content, the seeds provide a valuable emergency food during seasons of food shortage.[16,28] Krige reported that marula seeds were once an important staple food in drier regions of the Limpopo Province of South Africa and that in Mpumalanga Province of South Africa, the Phalaborwa ethnic group (which is locally regarded as a "Marula culture") subsisted largely on the stored nuts during the winter dry season.[1] Similarly, Cunningham showed that on the Maputaland coastal plain in KwaZulu-Natal Province, the nuts are still stored and provide a major source of protein during drought periods.[28] Marula kernels have also been used as a famine food in Zambia and Tanzania.

Marula oil is considered a luxury food and is added to a wide variety of traditional and modern recipes. It is a key ingredient in a number of indigenous dishes to add a nutritious, rich nutty flavor and a smooth, buttery texture to foods. It is also used as cooking oil for garnish and salad dressing.

The oil has also been reported to have food-preservative properties, and it has been used by Venda and Shangaan people in the

Preparing traditional marula oil in northern Namibia. Photo ©2008 PhytoTrade Africa

Table 1. Range of marula products used by households in Bushbuckridge, South Africa[20]

Fruit	Eaten Fresh
	Beer
	Juice
	Jam
	Whole
	Oil (cooking and cosmetics)
	Food additive
	Other (fodder, manure)
Wood	Carving
	Utensils
	Firewood
	Other (cattle yoke, fencing, furniture)
Bark, Roots, and Leaves	Medicine to treat diarrhea, diabetes, fever, and malaria

Table 2: Nutritional Content of Marula Kernels[27]	
Moisture %	4.0
Ash (g/100g)	3.8
Protein (g/100g)	28.3
Fat (g/100g)	57.3
Fiber (g/100g)	2.9
Carbohydrates (g/100g)	3.7
Energy Values (KJ/100g)	2703
Ca (mg/100g)	118
Mg (mg/100g)	462
Fe (mg/100g)	4.87
Na (mg/100g)	3.81
K (mg/100g)	601
Cu (mg/100g)	2.81
Zn (mg/100g)	5.19
P (mg/100g)	808
Thiamine (mg/100g)	0.42
Riboflavin (mg/100g)	0.12
Nicotinic Acid (mg/100g)	0.72

northern part of South Africa to drip onto meat before it is air-dried for storage as *biltong* (South African dried meat) or jerky.[6] The meat is steamed over boiling water, moistened gradually with marula oil, and stored in a cool place. Meat preserved in this way is stored up to a year. The Pedi ethnic group who inhabit the Limpopo Province of South Africa use the seeds in porridge and also as a condiment.[13] For years, Tonga women in Zambia and Zimbabwe have used the roasted nuts as food and used marula oil as a skin softener and meat preservative.[5]

There are 2 basic types of marula oil: heated and raw. Raw marula oil is less commonly used as local people say it only stays fresh for a short while before becoming rancid. Raw oil is preferred when used as a topical application and to prevent minor ailments; therefore, it is produced in small quantities. Heat-treated oil, usually with salt added, is the most commonly used marula oil and is preferred because of the improved taste and its ability to be stored for use throughout the year without becoming rancid.[4]

Medicinal Uses of Marula Oil

Marula oil is also reputed to have medicinal properties. It is used as a balm to treat ear, eye, and nose problems, especially in children.[8] It can also be used to treat coughs, diarrhea, and wounds when applied topically. Burning the seeds and inhaling the smoke is a traditional cure for treating headaches.[29] The oil is believed to prevent colds and flu and to soothe colic in babies. A few drops of pure marula oil should be administered before the infant has eaten anything else.[4] Shangaan traditional healers from southern Mozambique regard the seeds as a symbol of medicine in the set of divining "bones" used during divination ceremonies.[7,16,23]

Marula oil has great cultural significance in traditional rituals and is given as a gift as a token of respect. Marula oil is also given as a gift to mothers who have just given birth so that it can be used

Marula fruits on the tree.
Photo ©2008 PhytoTrade Africa

topically and orally by both the mother and her newborn.[4] Among the Zulu people, the marula tree symbolizes women's fertility, softness, and tenderness, and newborn girls are welcomed into the world with traditional marula ceremonies.[6]

The soothing oil from the marula tree is used by rural people all over southern Africa as an emollient when massaged onto the face, feet, and hands. It is used across the region to treat cracked, dry, or damaged skin (F. Taylor, e-mail, July 14, 2007). Zulu women used marula oil as a beauty treatment for cracked skin on the hands, feet, and lips.[7,41] It is still widely used by the Tsonga people of South Africa and Mozambique as a baby oil and moisturizer for women's skin.[4,42] Anecdotal evidence suggests that rural pregnant women apply it to prevent stretch marks. In north central Namibia, Owambo women use it as a moisturizing lotion, which is applied to the whole body, especially for the bride during wedding ceremonies. It is also mixed with millet grains for use as a traditional body scrub and skin exfoliator.[4] Marula oil has been mixed with red ochre and smeared on women's hair and bodies for ornamentation. It's also used to repel insects and moisturize the skin during the dry season.[4]

Marula Oil Properties

Marula oil has a clear, pale, yellowish-pink color and a pleasant nutty aroma. The oil is prized for its nutritional, antioxidant, free radical scavenging and moisturizing properties. Marula oil contains a large proportion of mono-unsaturated fatty acids and natural antioxidants. It can be classified as a high-oleic acid (70-80%) with relatively low tocopherol content.[3,43,44,45] The stability of the oil is therefore attributed to its particular fatty acid composition. Recent studies have suggested that some of the minor components in the oil, such as sterols, may contribute to this important anti-oxidant property (See Table 4).[37] Marula oil contains a similar

Table 3. Chemical Composition of Marula Seeds from different locations in Africa [24-27]

	Angola	South Africa	South Africa	South Africa	Mozambique	Nigeria
	Note: Quantities below are g/100g.					
Ash	4.1	4.2		3.8	3.7	11.7
Protein	27.6	30.9	25.9	28.3	27.6	36.7
Oil	56.2	57.0	57.6		54.3	11.0
Fiber	4.5	2.4	3.5	2.9	2.8	3.4
Carbohydrate		1.5	3.5	3.7	5.3	17.2
Caloric Volume			645.4			
Fat				57.3		
Unsaponifiable Fraction						0.9
Saponins						0.9
Moisture	3.9	4.0	3.9	4.0	9.0	2.5
Energy Value (KJ/100g)				2703		
	Note: Quantities below are mg/100 g.					
Ca	161.0	106.0	130.4	118	93.0	
Mg		467.0	456.6	462	329.0	
Na		3.4	4.2	3.81	81.0	
K		677.0	525.3	601	675.0	
Cu		1.99	3.62	1.81	7.1	
Fe		0.42	9.32	4.87	4.4	
Zn		4.89	4.89	5.19	2.9	
P		836.0	779.1	808	774.0	
Thiamine	1907.0	0.4	0.43	0.42		
Riboflavin		0.12	0.12	0.12	0.20	

Table 4: Sterol and Tocopherol content of marula oil[43]	
Sterol Content (mg/kg oil)	
Campesterol	181
Stigmasterol	51
B-Sitosterol	1494
Δ5 – Avenasterol	246
Topherol Content (mg/kg oil)	
A-Tocopherol	0.28
Γ-Tocopherol	22.2
B-Tocotrienol	0.06
Γ-Tocotrienol	0.04
Δ-Tocopherol	0.59
4-Monomethyl sterols and 4,4'-dimethyl sterols (mg/kg oil)	
Obtusifoliol	10.8
Cycloartenol	17.5
24-Methulenecycloartenol	32.7
Citrostadienol	42.8
X RTT 1,89	76.6
Y RTT 1,67	34.6

Table 5: Oxidative stability of Marula Kernel Oil compared with different oils[43]	
Oil Sample	**Induction period (h) ****
Marula oil *	34.2
Olive oil	4.6
Sunflower oil	1.9
Cottonseed oil	3.1
Palmolein oil	8.5

* Average taken from different marula oil samples
** Measured by Rancimat at 120 C and 20 l/h airflow

Table 6: Technical characteristics of a purified commercial marula oil used in personal care products in Europe[49]	
Parameter	**Specification**
Color	Light yellow
Odor	Sweet
Appearance	Clear oily liquid
Microbiology	<100 cfu/g
Acid value	< 8
Peroxide value	< 20
Rancimat (120ºC , 20 L/h)	20-45
Specific gravity (15ºC)	0.915-0.92
Refractive index	20°C
Iodine value	70-76
Saponifation value	188-196
Saturated fatty acids	
Myristic	<0.2%
Palmitic	9.0-13%
Stearic	4.0-8.0
Arachidic	<1.0
Unsaturated fatty acids	
Palmitoleic	<0.2
Oleic	70-80
Linoleic	4.0-9.0
Linolenic	<0.7
Eicosenoic	0.5

fatty acid composition to olive oil and may be as stable to oxidation (See Table 5).[43,44,46,47] The oxidative stability exhibited by this oil could explain its use as a traditional food preservative, and its equally exceptional resistance to oxidative rancidity. Flavonoids may also contribute to the antioxidant activity.[47] However, like all fixed oils, it is also subject to hydrolytic rancidity, whereby triglycerides are attacked by moisture and enzymes to create free fatty acids and glycerol.[5] Owing to its high oxidative stability, marula oil is highly suitable for use as a frying oil or as a coating on dried fruit. It may also be useful for replacing the high-oleic safflower oil used in baby food formulas.[43]

Depending on the extraction process used, marula oil has been shown to have good free radical scavenging properties attributed to a non triglyceride fraction (which varies from 3,800 to 4,300 mg/kg). Research into the identification of this fraction is ongoing.

Containing high proportions of oleic acid as well as 4% to 7% linoleic fatty acid, marula oil is easily absorbed, making the oil potentially useful for topical application. Marula oil has also been shown to improve skin hydration and smoothness, and it also reduces redness.[48]

Preliminary tests to investigate the commercial potential of marula oil as an ingredient in cosmetic formulations have been successfully carried out (See Table 6). *In vitro* tests included skin hydration, transepidermal water loss, and "increase in skin smoothness with marula oil performing significantly well."[3, 4, 49] HG

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A traditional marula festival in northern Namibia. Photo ©2008 PhytoTrade Africa

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Conflict of Interest Disclosure

The authors work for a nonprofit organization and have declared that none of them stand to benefit financially from interest that may be generated from this article.

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Local people in northern Namibia collecting marula. Photo ©2008 PhytoTrade Africa

Environmentally Sustainable, Ethically Traded Marula Oil

PhytoTrade Africa, the Southern African Natural Products Trade Association, is a nonprofit entity dedicated to the development of a viable and enduring natural products industry in southern Africa, based on resources accessible to poor rural communities. With over 50 member organizations in 8 countries, its objective is to deliver large volumes of sustainably-harvested natural products, thus providing many small-scale rural producers with access to markets and an equitable livelihood alternative.

Since 2003, PhytoTrade Africa has been working in partnership with Aldivia, a specialist French lipids company based near Lyon that produces innovative natural and organic cosmetic ingredients and derivatives. Both partners share the belief that together they can make a difference in the lives of people in Africa and their environment.

After extensive research and development, the partners have developed the Ubuntu line of African natural lipid oils. Seven virgin African oils, including marula, have been subjected to a unique process that has been developed to maintain oxidative stability and antioxidant properties while at the same time complying with the stringent microbiological and toxicological quality specifications required for international skin care formulations. PhytoTrade and Aldivia are both signatory to a charter that expresses their commitment to Fair Trade, organic, environmental sustainability, good governance, and best practices. Aldivia and some PhytoTrade Africa members are organically certified through Ecocert and both partners are working towards Ethical BioTrade biodiversity verification. Aldivia has developed Ubuntu oils under ISO guidelines. No Fair Trade standards as yet exist for these oils, but PhytoTrade Africa is in ongoing negotiations with Fairtrade Labeling Organizations International (FLO) to develop standards.

Regulatory Note: In South Africa, there are no specific regulations other than food and cosmetic safety. PhytoTrade Africa is currently preparing a dossier to submit for obtaining Novel Foods/GRAS status for importation of marula oil as a food oil into the European Union and United States. In addition, the oils have registration with the US Cosmetics, Toiletries and Fragrance Association and with the names in the EU's International Nomenclature of Cosmetic Ingredients list. Most of the traditional and modern uses of the fruit in the food and beverage market are derived from the marula fruit pulp, not the marula oil.

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The Painted Desert

A SOUTHWESTERN ETHNOBOTANICAL PERSPECTIVE

The Arizona Ethnobotanical Research Association Celebrates 25 Years of Plant Documentation in the Little Colorado River Basin

By Jessa Faith Fisher and Phyllis Hogan

Two integral threads in the web of life on this planet are increasingly threatened: (1) native plants and (2) the ancient indigenous wisdom and ritual surrounding their use. One place in the United States where native plant traditions are still alive is in northern Arizona, where many indigenous tribes still use plants that their elders have used for generations before them. An organization supporting this continued tradition and movement back to the land is the Arizona Ethnobotanical Research Association (AERA).

The AERA is a nonprofit, tax-exempt under code 501(c)(3), bioregional organization established in 1983 to promote environmental education and ethnobotanical awareness in the southwestern United States. The AERA mission is to investigate, document, and promote the use of traditionally utilized plants of the Southwest and to aid in preserving this knowledge for future generations.

Phyllis Hogan, a Southwestern herbalist, co-founded the AERA in 1983 with Navajo traditional herbalist Hastiin Sam B. Boone Sr. Other charter members include noted southwestern herbalist, author, and educator Michael Moore and rare plant botanist Jill Dedera. Hogan initiated the founding of the AERA in response to requests by indigenous herbalists and healers to assist them in preserving the beneficial plants of the region, their habitats, and their uses.

The AERA was and still is completely respectful of the wishes of these tribal elders, documenting only what they care to disclose. AERA representatives never go into a community uninvited and always with deference and an aim to assist in whatever way possible. They place their emphasis simply on helping indigenous elders pass on their oral traditions to their youth, without focus on developing natural products from these herbs for the wider consumer. Working with this oral history is what makes the AERA dynamic and so necessary in this time of global transition. Forging the wisdom of traditional native knowledge with contemporary scientific methods ensures a strong interdisciplinary palate with which to face the unknown future.

The AERA is based in Flagstaff, Arizona, a small mountain city surrounded by National Park and National Forest areas. To the north and extending into the two adjoining states of Utah and New Mexico is the Navajo Reservation, the largest in the country.[1] Other reservations in the area include the Hopi, Havasupai, Hualapai, Kaibab-Paiute, and Yavapai-Apache—tribes whose territory formerly covered all of northern Arizona and beyond. Flagstaff and the surrounding area is a hotspot for tribal activism and environmental justice, with many groups campaigning currently against coal mining, ground water drilling, salt mining, and desecration of sacred sites on and around their reservations.

One such group is Just Transition Coalition, a partnership of indigenous groups and nonprofit organizations

The Painted Desert region of Arizona. Photo © 2008 Michael R. Swigart.

Desert Rue, *Thamnosma texana*, blooming in the Verde Valley during March. Photo © 2008 Max Licher.

A sun dial, one of the many petroglyph carved in sandstone at Wupatki National monument. Photo ©2008 Billy Gobus.

working together to transition from non-renewable resource extraction, which is harmful to both humans and the land, to renewable energy sources such as solar and wind energy. Another influential group active with tribes all over the Southwest is the Tucson-based Native Seeds/SEARCH (Southwestern Endangered Aridland Resources Clearing House). Hogan served on the board of directors for this nonprofit organization for 12 years. Ethnobotanist and prolific author Gary Paul Nabhan, PhD, plant ecologist Karen Reichhardt, archaeologist Barney Burns, PhD, and community gardener Mahina Drees founded Native Seeds/SEARCH in 1983, the same year as the founding of the AERA. Their mission is to protect and promote the agricultural diversity of the Southwest, and they do so by maintaining a seed bank, educating the community about the importance of crop diversity, and distributing seeds to native tribes.

There are 21 federally recognized tribes in Arizona, and the AERA has worked with different communities and their attendant plants from all over the state. Their main area of interest is the dynamic ecosystem centered on and around the Little Colorado River (LCR) basin, where people have lived for millennia and many of the AERA focal plant species grow.

Landscape of the Colorado Plateau

The LCR watershed is one of the most sacred and revered watersheds in the country. Within the LCR basin lies the majestic Painted Desert. The Painted Desert is a brilliantly colored plateau and badland region extending 200 miles along the LCR in north-central Arizona. The desert received its name from early Spanish explorers, who called it *El Desierto Pintado,* because of the brilliant colors of the clays and soils.[2] It is an extraordinary land of mesas, buttes, and valleys formed by ages of wind and water erosion. The pastel colors seem to change from blue, amethyst, and yellow to russet, lilac, and red. The Painted Desert is particularly beautiful at sunrise and sunset, when the colors are most brilliant and the shadows are deepest. The bright reds and yellows of the desert come from iron oxides in the soils, whereas hematite is responsible for reds and limonite for yellows.[3]

The LCR begins its course on Mt. Baldy near the town of Greer, in the White Mountains of Arizona. It flows 350 miles through six vegetative zones. The LCR watershed is the second largest watershed in Arizona, encompassing 27,000 square miles in Arizona and New Mexico. Almost half (48%) of the LCR basin belongs to Native American Nations.[4]

The LCR is a major tributary to the Colorado River. Near the confluence of these mighty watercourses is the *Sipapu*—the emergence place of the ancestral Hopi and home of their mysterious deity, creator of humans, *Grandmother Spider Woman,* Kóokyang' wuuti.[5] A cultural crossroads of immense importance to both Hopi and Navajo, the confluence of the LCR and the Colorado

River in the heart of the Grand Canyon is one of the most revered places of which the elders speak. It is a homeland where myths and legends were born.

Along the LCR corridor, there are more than 4,000 archaeological sites and a network of Pre-Columbian trails that link the modern-day town of Zuni in New Mexico with the 12 Hopi villages of Black Mesa in Arizona.[4] Upon entering this sacred region, one finds a world that embodies all the mystery and grandeur of the distant past. Like images from a dream, petroglyphs emerge out of the desert pavement, connecting modern people to the ancestors whose wisdom is still echoed in the ancient healing songs and poetic prayers that remind us of our place in the universe.

Modern-Day Research with the AERA

The unique plants growing in the Painted Desert region, along with the rich cultural traditions of tribes in northern Arizona, attracted many researchers, archaeologists, and botanists to the area around the turn of the 20th century. Several botanical and ethnobotanical studies were carried out between 1880 and 1950, when Europeans first established large settlements in the area. Many studies of the Navajo and Hopi were published, including works by Washington Matthews,[6,7] Berard Haile,[8,9] Jesse Walter Fewkes,[10] Francis H. Elmore,[11] and Alfred Frank Whiting.[12]

The AERA today continues this rich tradition of researching and documenting the ethnobotanical uses of plants in the southwest. In the 21st century, the AERA has turned this into an integrated endeavor by having native students carry out the cultural and botanical research that was started by European settlers. In this way, the traditions are kept alive and accessible for the youth to take their applied knowledge back to the tribes and to continue teaching others the wisdom of their elders.

This is done through mentorships offered to indigenous students interested in applied ethnoecology. The attention is focused on the youth, for the AERA believes if a positive planetary transformation can occur, it will happen by sharing traditional values with future generations. The most recent activity for furthering this aspect of the AERA was the Little Colorado River Basin Field Institute. Hogan, Dedera, other consultants, and many native elders including traditional healers and herbalists, co-taught the Institute.[13] Six indigenous youth were handpicked for this project because of their outstanding interest in sustainable environments, as well as their desire to preserve traditional plant knowledge in their own communities. The yearlong learning experience interspersed 12 field trips to local culturally significant sites with nighttime classroom sessions.

The AERA's main repository for indigenous plant knowledge is its herbarium, which is the only ethnobotanical collection of its kind in the Southwest. This compilation of pressed, specially preserved plants contains voucher specimens with ethnobotanical knowledge that will be usable for centuries. The over 2,000 specimens databased by the AERA represent the rare and common plants of the LCR basin region. Many plant uses have been recorded in several special ethnobotanical sub-collections. Sam B. Boone Sr. and Hogan made many collections from around the Southwest in the 1980s. John Yazzie, a Navajo healer from Sand Springs, made a collection of plants growing around his high-desert homestead, focusing on the wild native plants that accompany cultivated plants as important food sources. William Waddell, a current practicing ethnobotanist and teacher, donated his Northern Arizona University (NAU) thesis collection on ethnobotanical plants of the Northeastern Yavapai, a tribe from north-central Arizona.[14] Janneli Miller, PhD, midwife and medical anthropologist, a professor in the Anthropology Department at NAU, Flagstaff, Arizona, contributed her collection of plants used by the Tarahumara in the Sierra Madre of northern Mexico.[15]

All over the world, native elders who retain plant knowledge handed down from generation to generation are slowly passing on, taking their wisdom with them.

Navajo medicine man Hostiin Sam Boone Sr. shown in 1982, the year the Arizona Ethnobotanical Research Association (AERA) was founded. Photo ©2008 John Aber.

The turquoise-blue waters of the Little Colorado River (LCR) at the sacred confluence of the Colorado River and the LCR. Photo ©2008 Billy Gobus.

It only makes sense to return to a more simple way of living as oil, land, and mineral resources dwindle.

The AERA is currently compiling an annotated guide to the herbarium. Once the historic collection is in good working condition, it will serve as a teaching herbarium, playing a vital role in educating indigenous youth about the importance of native plant uses for food, medicine, crafts, ceremonies, and all aspects of rapidly disappearing traditional living.

The Rare and Special Plants of the Little Colorado River Basin

Probably the most important plant to Puebloan tribes like the Hopi is corn (*Zea mays,* Poaceae). This food staple factors highly in artwork, ceremony, prayer, and legend. Next in importance to cultivated crops like corn, beans, and squashes are wild plants, some of which grow in conjunction with food crops as weeds, and some of which are harvested in the wild. Desert plants of the Southwest have extensive uses by many tribes and have been incorporated into the modern *materia medica* of the whole continent. Plants such as osha (*Ligusticum porteri,* Apiaceae), jojoba (*Simmondsia chinensis,* Simmondsiaceae), and chaparral (*Larrea tridentata,* Zygophyllaceae) are southwestern plants so useful that they are now popularized to some extent in the commercial herbal trade. As well, the Southwest has regional species locally substituted for more popular species in the trade, such as Oregon grape root (*Mahonia aquifolium,* Berberidaceae; the local species being *M. fremontii*), valerian (*Valeriana officinalis,* Valerianaceae; the local species being *V. arizonica*), and St. Johns wort (*Hypericum perforatum,* Clusiaceae; the local species being *H. scouleri*). Many of the common plant uses for regional southwestern plants are well documented in books such as *Nanise: A Navajo Herbal,*[16] *The Ethnobotany of the Hopi,*[13] *Medicinal Plants of the Desert West,*[17] *Medicinal Plants of the Mountain West,*[18] and more recently *Herbal Medicine of the American Southwest.*[19] These common plants are the heart of the AERA herbarium collection, because they represent the daily medicinal, edible, and utilitarian uses of plants by so many tribes and settlers to the area.

If the common plants are the heart of the AERA collection, the rare plants are the soul. The AERA is particularly fond of some special plants, many of which are endemic to the southwest or even certain regions. These plants were never used or known by all members of a tribe, but were specialty plants for ceremonial and specific medicinal needs, utilized only by medicine men and women. Because of their rarity and limited distributions, most practitioners no longer use these esoteric plants. Many of these plants are often found today growing in association with archaeological sites. The AERA has made it a point to search out some of these rarities and document any known information about them. This documentation is especially important in the 21st century. Human caused impacts, such as development, wildfire suppression, ranching, and burning of fossil fuels, make the study of these threatened plants imperative.

The yellow, apetalous flowers of **roundleaf dunebroom**, *Errazurizia rotundata*, appearing after spring rains. Photo ©2008 Billy Gobus.

Roundleaf Dunebroom, *Errazurizia rotundata*

Roundleaf dunebroom (*Errazurizia rotundata*, Fabaceae) is a rare plant known from only a handful of populations, all occurring in either Navajo or Coconino counties in northern Arizona. Some Navajo medicine men call this plant "prairie dog smoke." A prostrate shrub, it can be up to 30 cm tall, forming clonal rings that grow preferentially on raised hummocks where its roots help hold in the bare soil. It is found in areas where red sandstone and gypsum soils are covered with desert pavement, which is a scattering of rough and rounded pebbles on the soil floor.[20]

The plant is very inconspicuous, appearing dead until the spring rains, when the pinnately compound leaves unfurl in a fern-like manner, diminishing in size towards the rachis tip. The stems and lower surface of the leaves are covered with fragrant, colorful glands producing a strong lemon scent. The apetalous flowers also feature scent glands on their bracts.[21,22]

Roundleaf dunebroom is a distinct member of its genus because its flowers are apetalous (no petals) or only a banner is present, and this has lead to a lot of confusion about its classification. The other 3 species of the genus all have 5 petals. *Errazurizia* is discontinuously distributed

The pink and yellow blooms of **spiny milkwort**, *Polygala subspinosa,* at Crack-in-Rock Ruin, Wupatki National Monument. Photo ©2008 AERA.

If the common plants are the heart of the AERA collection, the rare plants are the soul.

over deserts of North and South America. Two species, *E. megacarpa* and *E. benthami*, occur in the Sonoran Desert between the Gulf of California and Pacific Baja California;[23] *E. multifoliolata* occurs in the Atacama Desert of Chile.[23]

A distribution mapping study of the local species, in conjunction with the AERA and NAU, was completed in 2004. Various land management agencies list the plant as sensitive, salvage-restricted and/or endangered, and it is only found in a few areas featuring the specific soil combination the plant prefers. Unfortunately, cattle graze many of these sites, which are found in drought areas affected by off-road vehicle use, and threatened by potential water well drilling.

There is no known literature about the ethnobotanical uses of roundleaf dunebroom. This may be due to the rarity of the plant and the antiquity of its uses. An elderly Navajo herbalist brought the enigmatic plant to the attention of Hogan in the early 1980s because he wanted to pass on the plant use to other herbalists. He mentioned that the plant was very rare, and only a few people knew about its uses or even existence. The AERA was the first entity to document a use for this plant when they were told that Navajo herbalists include the fragrant leaves in a rare ceremonial smoking mix.

Encouraged by this information, Hogan wondered if there were Hopi uses for the plant. Two elderly Hopis who both knew of roundleaf dunebroom said no one had found it in a while and the plant had gone out of use. It was traditionally burned as a fumigant for purification and taken internally in a now extinct ceremony, but the informants never knew where it grew and only recognized the plant because of its distinct fragrance.

Researching uses of roundleaf dunebroom remains an ongoing investigation for AERA. In another partnership with NAU, AERA will look to see if a lost population remains to be rediscovered at the Petrified Forest National Park, Wupatki National Monument, or Homolovi Ruins State Park near Winslow, Arizona. Homol'ovi is an ancestral Puebloan ruin prominent in Hopi mythology.[24] Several studies there have revealed an extensive history of lithics, ceramics, and plant uses dating back 2000 years.[25,26] Hopi elders have mentioned the plant growing in the area in the past, but no modern populations of this elusive plant have been found as yet.

Another unanswered question is if indigenous tribes have utilized other species in the *Errazurizia* genera. Hogan has been in contact with Teodora Cuero, the traditional chief and midwife of the Kumeyaay tribe in Baja California. As of yet, no Kumeyaay or Paipai uses of *Errazurizia* have been revealed, though more investigation is warranted.

Spiny Milkwort, *Polygala subspinosa*

The Polygalaceae, or Milkwort Family, is only represented by a few genera in Arizona. One genera, where the family gets its namesake, is *Polygala*. In Greek this means "much milk," in reference to it being a galactagogue, an agent that stimulates mother's milk production.[27] This genera contains herbs or small shrubs with entire leaves

and flowers with 3 petals, the lower one clawed, which are situated in narrow, terminal racemes. The local Colorado Plateau species is spiny milkwort (*Polygala subspinosa*, Polygalaceae). The common name comes from its branches that end in a spiny tip. It blooms in June and July and in Arizona is found only in northern Navajo and Mohave counties at 5000 to 6500 feet in elevation. It lives under other shrubs and is rather unnoticeable unless flowering.[22]

One mission of the Little Colorado River Basin (LCRB) Field Institute was to teach students how to search for rare and sensitive species. One of the many sites of interest to the field school was Wupatki National Monument, located in the cinder volcanic hills 40 miles north of Flagstaff towards the Hopi and Navajo Reservations. The AERA had first found spiny milkwort at Wupatki in 1999, noting a new Coconino county and National Park Service Monument record for the shy little plant. In April of 2005, the LCRB Field Institute went to Crack-In-Rock Ruin at Wupatki, just one of many well preserved pueblos at the site, and surprisingly found the rare plant growing in a new area of the monument. The field team recorded data on the plant's habitat and size of the population. The 2005 sighting confirmed that spiny milkwort is hanging on to its specialized niche.

The uses of *P. subspinosa* might have been lost through time, due to its small distribution and 20th century cultural shifts. Navajo uses are not documented. Alfred Whiting, the eminent Hopi ethnobotanist, found the plant growing on Third Mesa on the Hopi Reservation in 1967, only noting that the plant was "an extremely rare species that seems to be very important to the Hopi, but just why and how it's important, I just don't know."[28] Theodora Homewytewa, a Hopi medicine woman, noted the roots of the plant were used as a blood purifier, but that it was an old Hopi medicinal which few people know about now.

Other species of *Polygala* throughout the United States and the world are used medicinally for a broad range of ailments including snakebites, coughs, and insufficient milk production. The most well known species in indigenous and western herbal use is Seneca snake root (*P. senega*), native to the eastern United States and Canada.[29]

Peebles' bluestar, *Amsonia peeblesii*

Another rare plant of ethnobotanical note in the Painted Desert region is Peebles' bluestar (*Amsonia peeblesii*, Apocynaceae), an Arizona endemic. This herbaceous perennial has branched stems 40 to 90 cm long. Numerous oblong-linear to linear leaves grow alternately along the stems. Panicles of small white to light blue trumpet-shaped flowers appear in spring at the ends of the branches.[22,30] The plant grows primarily in shrublands and grasslands in the LCR basin. The stunning plant makes an appearance every year for those who visit Wukoki ruin at Wupatki National Monument in the cinder volcanic hills 40 miles south of Flagstaff. It was first documented at Crack-In-Rock ruin at Wupatki in 1999.[31]

A closely related species, Jones' bluestar (*A. jonesii*), has a more extensive range, reaching to Arizona, Utah, Colorado, and New Mexico, the four corner states.[32] In the early 1980s, several Navajo herbalists visited Hogan at her herb store, Winter Sun Trading Company, asking for *azedo-clish*, "blue root medicine," which Hogan later learned was Jones' bluestar. In 1981, Sam B. Boone Sr. brought Hogan a specimen of Peebles' bluestar and explained that the plant is known to some of the Western Dine as "turkey corn." It became clear that both Peebles' bluestar and Jones' bluestar were important medicinal plants to the Navajo and were sometimes used interchangeably. Boone Sr. said the leaves and roots of the plants are used in the Lifeway Medicine ceremony, one of the many Navajo healing ceremonies involving herbs, chanting, and ritual objects. Peebles' bluestar has also been used for skin irritations caused by chicken pox or measles. Jones' bluestar, the true "blue root medicine," is used as an eyewash.[13]

In 2003, Sharlot Hart, an undergraduate student at the University of Arizona, worked with the AERA interviewing herbalists and traditional elders of the Navajo Nation about their knowledge of Peebles' bluestar. She found many conflicting reports on its uses, both herbal and ceremonial. This could be for several reasons, which expose the difficulty in translating traditional plant uses from indigenous languages to English. Some of the subjects in the study mentioned they weren't familiar with the plant because only certain medicine men are allowed to know uses for herbs, only obtained after years of training and learning the specific songs dedicated to individual plant species. Although not all of the information was consistent, all of the informants in the study had some knowledge of Peebles' bluestar.[33]

Close up of the white, tubular flowers of **Peebles' bluestar**, *Amsonia peeblesii*. Photo ©2008 Billy Gobus.

The brilliant blue flowers extending from purple bracts of a **blue sage,** *Salvia pachyphylla.* Photo ©2008 Jessa Fisher.

Blue Sage, *Salvia pachyphylla*

Blue sage (*Salvia pachyphylla,* Lamiaceae) is also called thick leafed sage, rose sage, or purple sage. True to the characteristics of this famous family, purple sage is covered with glands, which exude a pleasantly pungent scent. This shrubby plant has gray obovate leaves, smaller than but similar to white sage leaves (*S. apiana*), which are commonly used in smudge sticks. The typically bilabiate mint family flowers on this plant are a brilliant blue, extending from purple to rose bracts, as seen flowering from July to October.[22]

Most populations of blue sage are found on the mountain ranges in the Mojave Desert of southern California and Nevada, and in northern Baja California, Mexico. A smaller disjunct group occurs in eastern Arizona near the southern edge of Navajo and Hopi reservation lands near Winslow, and also in the Petrified Forest National Park, as well as Apache, Navajo, and Coconino counties. The plant prefers dry rocky slopes in open pinyon-juniper forests.[34]

Blue sage has been used in the past and is presently used by the Hopi, Navajo, Northern Pauite, and Kawaiisu tribes as a ceremonial tobacco and medicine. Theodora Homewytewa, a Hopi medicine woman, says that Hopis make a tea from the leaf, which they drink for menstrual depression and hysteria.

The dried foliage and roots with tufted root hairs of **buffalo fir,** *Acourtia wrightii.* Photo ©2008 John Aber.

Buffalo Fir, *Acourtia wrightii*

Acourtia wrightii (Asteraceae) has the descriptive Navajo common name of buffalo fir, referring to the color and soft feel of the tufted hairs at the base of the stems. This shrubby perennial is a true southwest beauty, ranging from Nevada and Utah southeast to Texas. It has several stems with alternate, toothed leaves. The bright pink flowers on buffalo fir are clustered into paniculate heads at the end of the branches.[22,35]

While this flower is not federally or state listed, it is not considered common. It grows in the Verde Valley of northern Arizona at elevations of 6000 feet or less, preferring to live in canyons or on foothills, where it can gather up any extra water. The tuft of wool might be a water saving adaptation.

Indigenous tribes all over Arizona have found uses for buffalo fir, also sometimes called brownfoot. The Hualapai name for the plant is Arizona cotton or *puchwam*. The Hualapai, their reservation now limited to land on the rim of the Grand Canyon, use the tufted fur of the plant to stop bleeding. The Navajo, who call the plant *lyani ghaa*, also use the plant as an astringent. In their case, they have found the plant helpful for post partum bleeding after a woman gives birth. The Pima in central Arizona and other tribes in northern Mexico find use for this astringent plant as well.[13]

Desert Rue, *Thamnosma texana*

Desert rue, or rue of the mountains (*Thamnosma texana,* Rutaceae), is in the same plant family as citrus plants like orange and lemon, and common rue (*Ruta graveolens*). Like these plants, desert rue is covered with aromatic, viscous glands with essential oils. It is herbaceous, or sometimes woody but only at the base of the plant. Desert rue has thin, alternate leaves on its many green stems. The flowers are yellow with a purplish hue, and the fruits are capsules with two lobes, like an hourglass.[22,35]

Desert rue can be found growing in Arizona, Colorado, New Mexico, and Texas. It grows from sea level to 4,500 feet, preferring mesa slopes and open areas.[22] A favorite spot for the AERA to find this plant is in the area around Montezuma Well National Monument, in the Verde Valley of Arizona. The LCR Basin Institute took a field trip here during springtime to observe and assist in a baseline study of the plant.

Theodora Homewytewa recalls collecting desert rue with her uncle in the 1970s. He and other Hopi healers used the aerial parts of the plant in a tea for infant diarrhea. Among the Navajo, Boone Sr. used the plant and a related species, turpentine broom (*T. montana*), for rheumatism, arthritis, and in cases of menopausal osteoporosis.[13]

This time in history is like no other, when ancient ways of life co-exist with modern technology.

A Southwestern Legacy Written by Plants and People

These are just some of the many special and unusual plants found only in this part of the world. They all have unique adaptations to surviving in the high desert of northern Arizona. These plants have a rich legacy of human use, which is threatened in many different ways. This time in history is like no other, when ancient ways of life co-exist with modern technology. It is a time of great flux with climate shifts, a rapidly increasing human population, and shrinking wilderness areas. All over the world, native elders who retain plant knowledge handed down from generation to generation are slowly passing on, taking their wisdom with them. Plant species with extremely narrow living requirements are fading from the planet as introduced exotics rapidly expand into disturbed areas. All of this can be disheartening when considering how one can make a difference in this rapidly changing world.

The AERA chooses to face these challenges head on with creative twists on old, trusted methodologies. The use of plants has been an instrumental and universal aspect of human survival on earth for countless centuries. It was only in the mid 1900s when petroleum-based products, laboratory-created medicines, and large scale farming were found to be economically viable substitutes for the many products that wild plants used to provide. It only makes sense to return to a more simple way of living as oil, land, and mineral resources dwindle. True to their belief that the only way to a sustainable future is by learning from the wisdom of the past, the AERA strives to keep alive the teachings of the plants and elders for the next seven generations. HG

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Phyllis Hogan has been a practicing herbalist for 31 years. She is the proprietor of the Winter Sun Trading Company, located in Flagstaff, Arizona, established in 1976. Winter Sun specializes in Southwest American Indian art and traditional herbs and has served as Hogan's ethnobotanical laboratory for 31 years. In 1983 she co-founded the Arizona Ethnobotanical Research Association and has continued to work with native plants and people ever since.

The AERA can be reached for its newsletter and activities at azethnobotany@hotmail.com.

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Herbs for Potential Adjunct Treatment of THYROID DISEASE

A Review of Botanical Preparations for Hypo- and Hyperthyroidism, Thyroid Nodules, and Thyroid Cancer

By Katie Welch, Pharm D

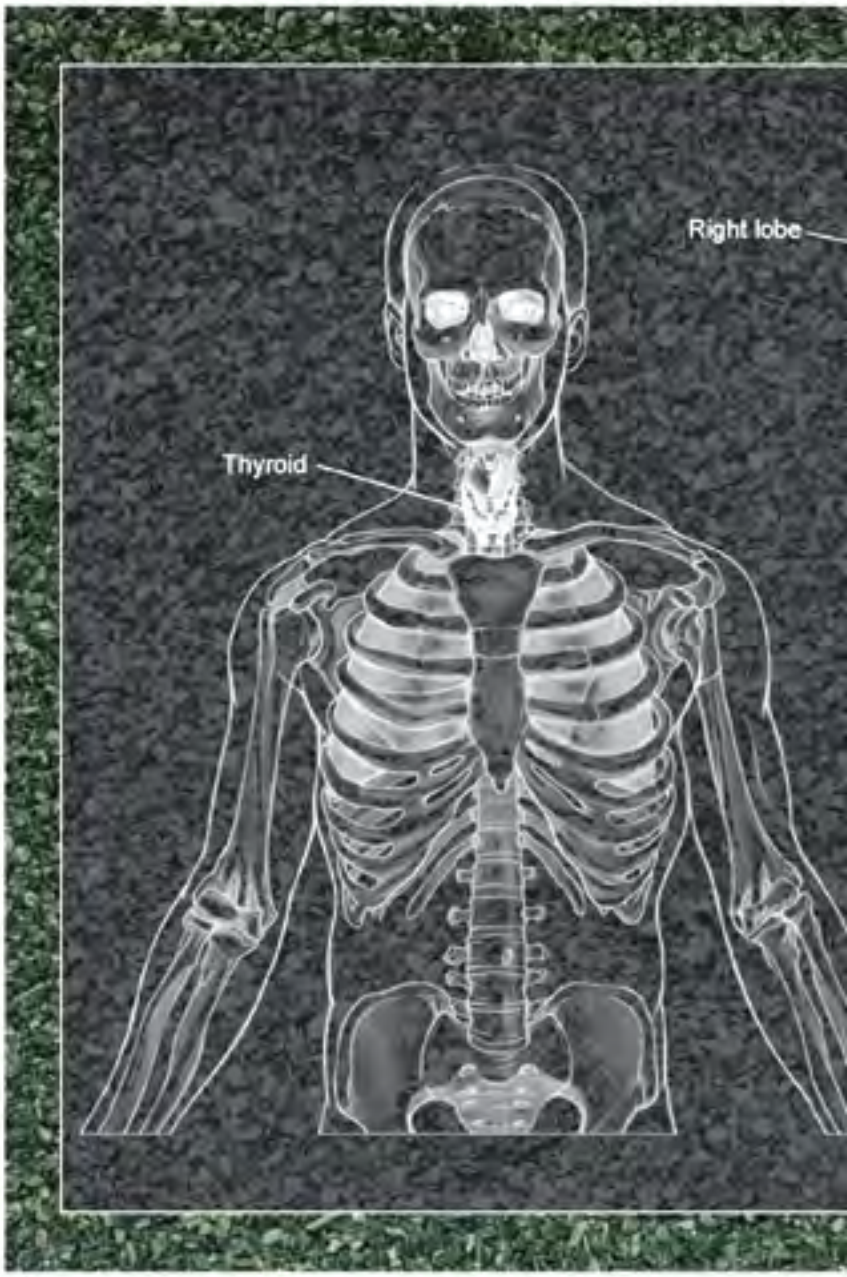
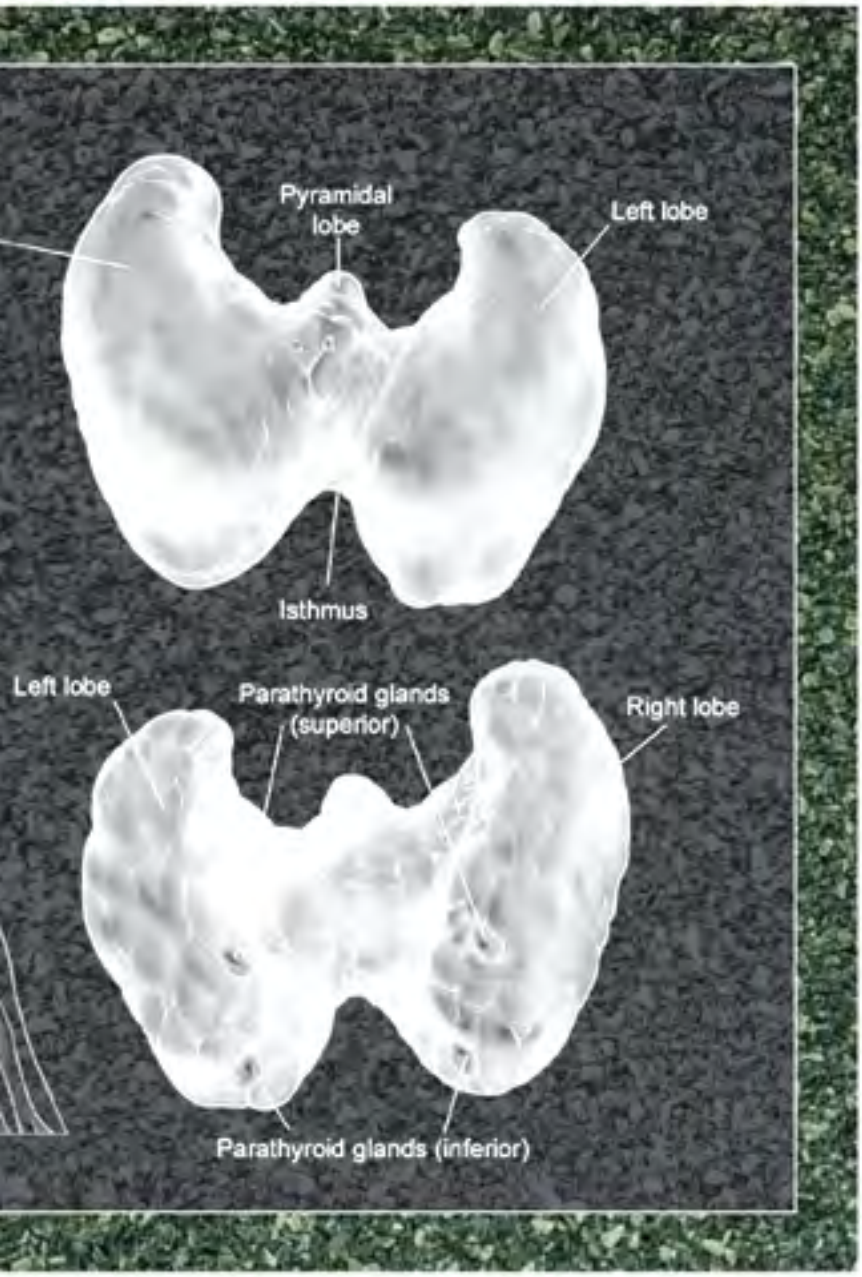


Illustration of the location and parts of the thyroid. Illustration by Robert Morreale/Visual Explanations, LLC. ©2008 American Society of Clinical Oncology
Background photo: **Kelp** *Laminaria* spp. ©2008 Steven Foster

Summary

Diseases of the thyroid are varied and can take many forms, which may or may not produce clinical symptoms that alert patients to their existence. The most common thyroid disorders are the under- or over-functioning of the gland—hypothyroidism and hyperthyroidism, respectively. Both of these most often result from autoimmune disorders. Physical irregularities, often termed nodules, occurring on the thyroid are a distinct condition of the gland and may arise simultaneously with these diseases, or emerge idiopathically with no symptoms. An important minority of thyroid nodules are malignant. Botanical medicines to treat thyroid disease are limited and have not been widely studied in humans. Traditional Western herbal medicine lacks a body of herbs earmarked for thyroid health, but modern research on a few of these herbs reveals potential clinical applications toward hyperthyroidism in humans. There are no herbs indicated in the Western tradition for resolving thyroid nodules *per se*, and herbs to treat thyroid cancer are not distinct from other herbs used in this tradition for cancer. Chinese medicine, on the other hand, has several herbs and herbal formulas earmarked for the resolution of thyroid disease and thyroid nodules, which may be interpreted (depending on symptoms) in the context of traditional Chinese medicine (TCM) as a disturbance of *qi*, a condition of excess or insufficient *yin*, or an accumulation of stagnant "phlegm" or "blood." These herbs have also largely been studied individually only *in vitro* and in animals, but some clinical trial data are available on TCM herbal formulas for treating hyperthyroidism. Much of this data has been the subject of a recent systematic review. Both the



TCM and Western modalities may employ the use of seaweed and sea products in thyroid formulas; these must be used with extreme caution due to the varying and often unpredictable effects of iodine supplementation on thyroid function.

Search Strategy

Secondary and tertiary sources of herbal medicine information in the American Botanical Council library and literature database were searched for basic information on herbs for thyroid disorders in the Western and Asian herbal medicine traditions. A list of plants with suspected thyroid activity was gathered, and their Latin binomials entered into the search engine of PubMed, a service of the US National Library of Medicine that includes over 16 million citations from MEDLINE and other life science journals for biomedical articles dating from the 1950s. Relevant articles were accessed and searched for information pertaining to thyroid. Latin binomials of plants with suspected thyroid activity were also entered into the search engine of NAPRALERT, a natural products database at the University of Illinois at Chicago encompassing over 200,000 scientific papers and reviews regarding organisms from all over the world, dating from 1975 through 2003. In addition, NAPRALERT was searched for plants with pharmacological activity using the search terms "antihypothyroid effect;" "antithyroid activity;" "thyroid agonist activity;" "thyroid hormone receptor antagonist;" "thyroid peroxidase inhibition;" and "thyroid type 1 deiodinase inhibition." Articles describing studies in humans were accessed and searched for information pertaining to thyroid.

Physiological Function of the Thyroid Gland

The thyroid is a two-lobed gland in the anterior neck composed of microscopic follicles that sits below the thyroid cartilage ("Adam's apple").[1] The surface-layer cells (epithelium) of the thyroid's follicles perform the processes of synthesis and release of thyroid hormones. The two main thyroid hormones are thyroxine (T4) and triiodothyronine (T3). Once released into the blood plasma, T4 and T3 bind reversibly to plasma proteins. Most circulating thyroid hormones are protein bound, yet only the free (unbound) fraction is available to tissues, whose cells actively take up the hormone molecules.[2]

Thyroid hormones bind to a specific receptor located in the nucleus of most cells. Activation of this receptor affects many cellular functions, primarily cell growth and metabolism by direct influence on gene transcription and subsequent protein synthesis, or by direct effects on the cell or on mitochondria through stimulation of cell growth and respiration. Thyroid hormone is regulated by the hypothalamic-pituitary-thyroid axis via a negative feedback mechanism. Thyrotropin-releasing hormone (TRH), synthesized in the hypothalamus, stimulates the pituitary gland, which manufactures thyrotropin, also known as thyroid-stimulating hormone (TSH). TSH travels to the thyroid gland to stimulate synthesis and release of T4 and T3. A decrease in plasma T4 or T3 triggers an increase in plasma TSH, and vice-versa.[1]

The thyroid also contains another type of cell: parafollicular cells, known as "C cells," which synthesize and release the hormone calcitonin. Calcitonin lowers plasma calcium levels.[3]

Thyroid Diseases: Classification and Diagnosis

The typical thyroid diseases discussed in this article are hypothyroidism, hyperthyroidism, thyroid nodular disease, and thyroid cancer. Classification and diagnosis of thyroid disease involves several steps. These include evaluating a patient for the following[3]: (1) presence of clinical symptoms (e.g., weakness, cold intolerance, headache, slow speech); (2) physical findings (e.g., thinning of hair and nails, tachycardia, bradycardia, peripheral edema, weight loss or gain); (3) blood chemistry (levels of circulating thyroid hormone, TSH, thyroid antibodies); and (4) presence of visible or

palpable irregularities upon the thyroid gland itself (which require evaluation with biopsy and/or ultrasound to rule out thyroid cancer).

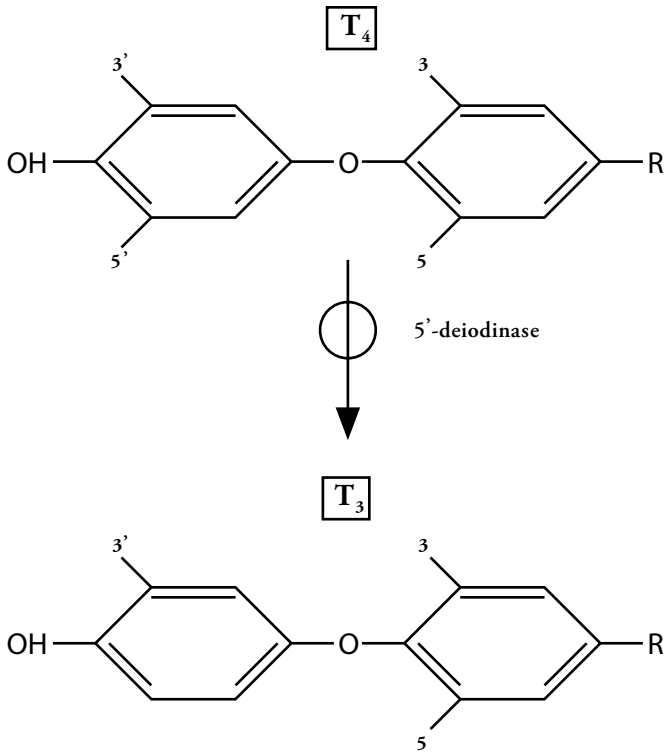
Hypothyroidism

This is defined as a clinical syndrome resulting from a deficiency of thyroid hormone. Clinical symptoms generally include cold intolerance, lethargy, weight gain, and muscle aches. Physical findings may include bradycardia; thinning of hair, skin, and nails; thickening of tongue; puffiness of face, eyelids, or peripheral edema; pallor. Hashimoto's disease is the most common cause of spontaneous hypothyroidism.

***Hashimoto's Disease*:** In this disease, antibodies attack thyroid tissue and impair production/release of thyroid hormone, leading to a hypothyroid condition, or sometimes a diffuse swelling or enlargement of the gland (goiter) with or without hormone deficiency. Physical irregularities of the thyroid gland that arise with Hashimoto's disease are usually multiple, presenting as a so-called "multinodular goiter"; minimal increased risk of thyroid cancer is linked to this disease, though thyroid cancer (including thyroid lymphoma) must be ruled out.[4]

Chemistry of thyroxine (T4) and triiodothyronine (T3) formation

Most hormone released from the thyroid gland is in the form of thyroxine (T4); however, enzymes remove an iodine atom from about half the thyroxine molecules released, to form additional triiodothyronine (T3), which is the most active form of the hormone utilized by cells.



Hyperthyroidism

This is defined as a clinical syndrome resulting from an excess of thyroid hormone. Clinical symptoms generally include heat intolerance, irritability, insomnia, and fatigue. Physical findings may include hair loss, palpitations, ophthalmopathy, tremor, and diarrhea.[1] Graves' disease is the most common cause of hyperthyroidism.

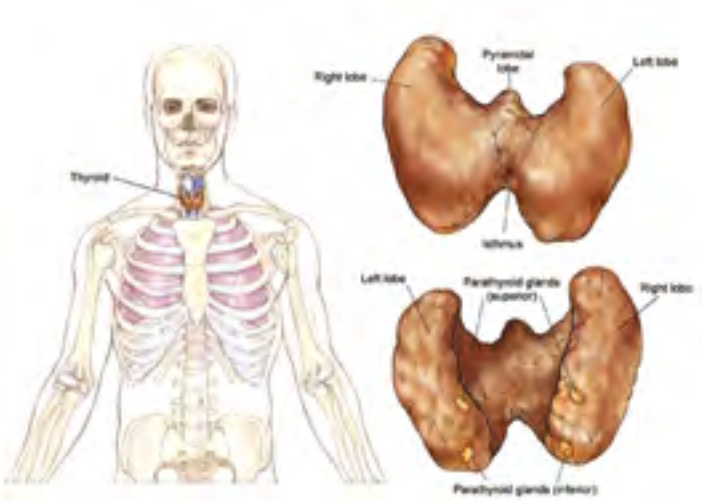
Graves' Disease: In this disease, antibodies stimulate thyroid tissue and cause it to overproduce/release too much thyroid hormone. Multinodular goiter is less common with Graves' disease than with Hashimoto's disease; in Graves' disease, a diffuse, nonnodular swelling of the entire gland usually occurs instead. There is an increased risk of thyroid cancer with Graves' disease.[4]

Subacute Thyroiditis: This refers to a diffuse swelling of the thyroid gland, which occurs as an acute inflammatory reaction typically following several types of viral infection. In most cases the thyroid is large and very tender. Some instances of subacute thyroiditis are marked by a transient hyperthyroidism. This disease is typically self-limited, and both thyroid inflammation and transient hyperthyroidism resolve within a few months without lasting clinical symptoms.[3] A hypothyroid phase may also follow the hyperthyroidism.

Thyroid Nodules

Physical irregularities of the thyroid gland not associated with abnormal antibody production may emerge as diffuse, singular, or multiple entities, and be either functional or non-functional parts of the gland. These physical irregularities are sometimes referred to as "nodular" or "multinodular," and they do not necessarily emerge because of one particular insult to the gland or disease; rather, they may manifest due to a variety of thyroid disorders

Illustration of the location and parts of the thyroid. Illustration by Robert Morreale/Visual Explanations, LLC. ©2008 American Society of Clinical Oncology



Bugleweed *Lycopus virginicus* ©2008 Steven Foster

and may or may not cause other clinically detectable symptoms. In countries where iodine deficiency has been corrected, physical irregularities of the thyroid gland are clinically detectable in about 4 to 7% of the population.[5]

Nontoxic Goiter: This refers to thyroid enlargement or physical irregularities of the thyroid that are not associated with hyperthyroidism. Antibody production, cancer, or hypothyroidism may or may not be present. The cause of nontoxic goiters is unknown but may reflect a condition where the thyroid tissue over responds to physiologic levels of TSH. Impaired utilization of iodine may also be a cause. In the absence of hypothyroidism, patients with nontoxic goiter are usually asymptomatic, save for the discomfort of having a mass in the neck that can interfere with normal breathing and swallowing.[1]

***Toxic Nodular Goiter*:** Also known as TNG or Plummer's disease, this is a more common cause of hyperthyroidism than Graves' disease in the elderly. Patients with nontoxic multinodular goiter may develop this disease over time when some of the physical irregularities within the thyroid gland develop into functionally autonomous, hormone-secreting nodules.[5] However, in TNG there is an absence of the thyroid autoantibodies characteristic of Graves'.[4] Patients with TNG usually have less severe hyperthyroid symptoms than those with Graves' (i.e., no ophthalmopathy) and serum T3 and T4 concentrations are not as elevated, though other subsequent secondary symptoms (tachycardia, palpitations) may be just as clinically significant.[3]

Thyroid Cancer

A thyroid nodule may be benign or malignant. Definitive evaluation of such nodules is done via fine needle aspiration biopsy (FNAB). Nodules may be imaged via ultrasound or radionuclide scan using iodine 123. While a hyperfunctioning or "hot" nodule on such a scan almost always indicates a benign lesion, a hypofunctioning or "cold" nodule may be either benign or malignant. Iodine scanning is usually reserved for determining the functional status of nodules coexisting with hyperthyroidism.[4,6]

The prevalence of thyroid cancer among thyroid nodules is approximately 5%. More than 75% of malignant nodules are well-differentiated cancers of the follicular epithelium: mostly papillary carcinomas carrying a relative low risk of death, and a smaller number of follicular carcinomas carrying a slightly higher risk. Rare cancers with a much higher mortality rate include: medullary cancer (originating in the calcitonin-producing cells of the thyroid, a familial form of cancer comprising 5-10% of the remaining thyroid carcinomas); thyroid lymphomas; and anaplastic carcinoma.[4,6]

Conventional Medical Treatment of Thyroid Diseases

The course of treatment of thyroid disease depends both on the underlying cause and the severity of secondary symptoms.

Hypothyroidism

For autoimmune (Hashimoto's disease) and non-autoimmune hypothyroid syndromes, treatment of choice is supplementation with some form of pharmaceutical thyroid hormone, such as levothyroxine (aka T4 or L-thyroxine, known by the brand names Synthroid® [Abbott Laboratories, Abbott Park, IL] and Levoxyl® [King Pharmaceuticals, Bristol, TN]), among others. The body converts this pharmaceutical L-thyroxine to the active form liothyronine (T3) as needed. Exogenous T3 (liothyronine, brand name Cytomel® [Forest Pharmaceuticals, New York, NY]) may also be given instead of T4 for symptoms of hypothyroidism, especially if blood tests suggest a particular patient has difficulty converting T4 to T3. Combination T4/T3 products also exist, such as a pharmaceutical preparation made of natural porcine thyroid glands (Armour® Thyroid [Forest Pharmaceuticals, New York, NY]); risk of drug-induced hyperthyroidism can be increased through administration of exogenous T3 and combination products.[4]

Hyperthyroidism

For autoimmune (Graves' disease) and non-autoimmune (TNG) hyperthyroid syndromes, conventional medical treatments include antithyroid drugs, radioactive iodine therapy, and surgery.

The two currently approved antihyperthyroid drugs in the United States are both classified as thioureylene compounds: methimazole (Tapazole®, King Pharmaceuticals, Bristol, TN) and propylthiouracil (PTU). Both of these drugs interfere with biosynthesis of thyroid hormone by interfering with the incorporation of iodine into thyroglobulin.[2] Long-term treatment with these drugs sometimes leads to remission of the disease.

Radioactive iodine therapy with iodine 131 is the most common treatment used in the United States for hyperthyroidism.[4] Radioactive iodine therapy usually renders the thyroid gland non-functional, requiring supplementation with exogenous thyroid hormone (levothyroxine, aka T4 or L-thyroxine) after treatment. Armour thyroid, the commercial pharmaceutical product derived from porcine thyroid glands, may be given as thyroid replacement instead.

Thyroidectomy is reserved for those patients with contraindications to antithyroid drugs and radioactive iodine therapy, coexisting suspicion for cancer, or with large, swollen thyroids that cause physical discomfort. Supplementation with some form of pharmaceutical thyroid hormone is required after surgery.

Drug treatment with antihyperthyroid drugs is not indicated for subacute thyroiditis with transient hyperthyroidism, since antihyperthyroid drugs will not affect the leaking of stored thyroid hormone. Other types of drugs may be offered to these patients to address the secondary symptoms of hyperthyroidism only (such as sedatives for insomnia and beta-blockers for palpitations or tachycardia).[1]

Thyroid Nodules

Patients with nodular irregularities of the thyroid in whom malignancy has been excluded or deemed unlikely should proceed with periodic clinical observation. Benign nodules may shrink with administration of levothyroxine (so-called "thyroid hormone suppression therapy"), which may be tried if the patient's serum TSH is high or normal. Large multinodular goiters, though benign, may exert compressive symptoms and sometimes respond to thyroid hormone suppression therapy, or they may require surgical removal. Radioactive iodine 131 to reduce gland size is also an option, especially if surgery is contraindicated; however, radioiodine is more effective in, and usually reserved for, hyperthyroid conditions.[4]

Thyroid Cancer

Full or partial thyroidectomy is the treatment of choice for differentiated thyroid cancers (papillary and follicular carcinomas). After such surgery, total body radioiodine scanning may be done to look for metastatic spread, and radioiodine treatment given to ablate remnant thyroid or metastatic tissue. Some form of pharmaceutical thyroid hormone product is given after surgery to replace thyroid hormone and suppress TSH, a thyroid tumor growth factor, to normal or low-normal levels. Follow up includes monitoring serum thyroglobulin levels, which should be low to undetectable after effective therapy.[4]

Medullary thyroid cancer usually requires full thyroidectomy and cervical lymph node dissection. Serum calcitonin levels should be monitored.[4]

Non-differentiated (anaplastic) thyroid cancers are rare but comprise aggressive forms of cancer with poor prognoses. Surgery, radiation and chemotherapy are palliative only.[4]

Herbal Treatment of Thyroid Disorders—Western Herbal Tradition

There are few herbs in the Western herbal tradition specifically indicated for thyroid disease. Of these, there are little to no data on their effectiveness in humans. There are no herbs specifically indicated for the treatment of physical irregularities of the thyroid or thyroid cancer *per se*; rather, herbs in Western alternative and complementary medicine believed to affect the thyroid specifically address symptoms of either hypothyroidism or hyperthyroidism only.

Hypothyroidism

Kelp (*Laminaria* spp., Laminariaceae) is recommended by many herbalists for the treatment of hypothyroidism or thyroid nodules.[7] Kelp is a rich source of iodine, which is necessary for the formation of thyroid hormone. Historically, iodine deficiency was the largest cause of thyroid swelling (commonly known as "goiter"); however, while iodine deficiency may precipitate hypothyroidism, goiter, or physical irregularities of the gland,[6] this deficiency is rare in developed countries. Autoimmune disease, rather than iodine deficiency, is the primary cause of hypothyroidism in the United States.[4]

While iodine is one of the oldest known remedies for thyroid diseases,[2] iodine supplements and seaweed products should be used with caution and under medical supervision in all patients with thyroid disorders, since the effects of iodine supplementation on thyroid function are unpredictable and vary over time. Excess iodine can trigger hyperthyroidism in some patients with seemingly normal thyroid function, yet the normal physiologic response to an acute increase in plasma iodine load is temporary hypothyroidism (an adaptive response to prevent dangerous fluctuations of thyroid levels, known as the "Wolff-Chaikoff effect").[8] In hyperthyroid patients, supplemental iodine may temporarily suppress, but then later increase,

Lemon Balm *Melissa officinalis* ©2008 Steven Foster

Rehmannia *Rehmannia glutinosa* ©2008 Steven Foster

synthesis of thyroid hormone.[9] A recent study of 3018 subjects in China demonstrated that excessive iodine intake may lead to hypothyroidism and autoimmune thyroiditis.[10] Improper use of a kelp-containing supplement has been linked to at least one case of iodine-induced hyperthyroidism.[11]

Hyperthyroidism

Four herbs are commonly suggested by Western herbalists, other practitioners of complementary and alternative medicine, and naturopathic medical textbooks for treating hyperthyroidism.[11,12,13] Three herbs appear to have effects on thyroid hormone—lemon balm (*Melissa officinalis*, Lamiaceae), bugleweed (*Lycopus virginicus*, Lamiaceae), and gromwell (*Lithospermum officinale*, Boraginaceae); and one appears to reduce secondary symptoms of hyperthyroidism (heart palpitations and tachycardia), motherwort (*Leonurus cardiaca*, Lamiaceae).

Lemon balm is approved by the German Commission E for use internally for nervous sleeping disorders and gastrointestinal complaints.[14] A systematic review of published articles conducted by the Natural Standard Research Collaboration in 2005 revealed that although no serious adverse effects have been reported with use of the herb, there is insufficient evidence for the use of lemon balm in treating Graves' disease or cancer.[15] However, freeze-dried extracts of lemon balm have been shown to have antithyroid activity *in vitro* by binding to TSH and preventing binding to its receptor, which prevents subsequent thyroid hormone manufacture and release. Likewise, lemon balm has been shown *in vitro* to interact with and prevent the binding of autoantibodies to the TSH receptor, suggesting the plant may have some use in Graves' disease.[16] The mechanism of action may be inhibition of TSH-stimulated cyclic adenosine monophosphate (cAMP, an enzyme activator) production.[17] Another *in vitro* study revealed that aqueous extract of lemon balm inhibited the peripheral conversion of T4 to T3.[18] No human trials have yet evaluated the efficacy of lemon balm for hyperthyroidism.

Bugleweed has also been shown *in vitro* to bind with TSH and TSH-like immunoglobulins, preventing binding to the receptor.[16,19] Likewise, an aqueous extract of bugleweed appeared *in vitro* to inhibit the enzymatic reaction that converts peripheral T4 to T3.[18,19] In rats, aqueous extracts of bugleweed appear to inhibit thyroid hormone production, possibly by inhibiting TSH.[20,21] Although no human trials have demonstrated the efficacy of bugleweed for hyperthyroidism, the German Commission E approves internal use of the fresh or dried above-ground parts for mild thyroid hyperfunction, noting that in rare cases, with extended therapy and high doses, sudden enlargement of the thyroid can occur. The Commission E also warns against abrupt discontinuation of bugleweed.[22]

Freeze-dried and aqueous extracts of gromwell, like those of lemon balm and bugleweed, have demonstrated TSH-binding and hormone conversion-preventing effects *in vitro*, respectively.[16,17,18] Another study revealed that injections of gromwell lowered TSH, T4 and T3 levels in animals.[23] In rats, aqueous gromwell extract has been shown to inhibit TSH[20,21] and decrease conversion of T4 to T3.[24] Again, no human trials have examined gromwell's efficacy for treating hyperthyroidism.

Motherwort is traditionally known as a heart tonic and uterine stimulant.[25] *In vitro* the plant has demonstrated negative chronotropic effects.[26,27] There are no complete studies in humans for motherwort. It is approved by the German Commission E for nervous cardiac disorders and as an adjuvant for thyroid hyperfunction.[14]

Some common plant foods contain substances that can prevent the utilization of iodine, and, subsequently, impact thyroid hormone function. They include, most prominently, members of the family Brassicaceae: cabbage (*Brassica oleracea*), turnips (*B. rapa*), and rutabagas (*B. napobrassica*); soybeans, peanuts, pine nuts, and millet have also been reported to interfere with thyroid iodine uptake.[28] While these foods must be consumed raw and in large quantities to have an antithyroid effect, this may be of clinical significance in some rare cases.[12]

Herbal Treatment of Thyroid Disorders: Eastern Herbal Traditions

Ayurvedic Medicine

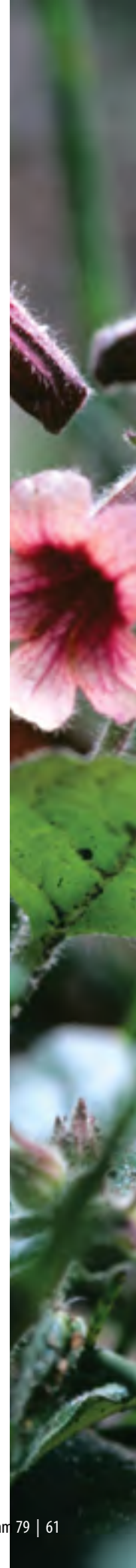
One herb in traditional Ayurvedic medicine has been studied in animals for its effects on the thyroid—the fruit of amla (*Emblica officinalis,* Phyllanthaceae, syn. *Phyllanthus emblica*). Administration of amla extract to hyperthyroid mice reduced T3 and T4 concentrations to a greater extent than the prescription antithyroid drug propylthiouracil (PTU).[29] There are no studies of the fruit's effect in humans.

Chinese Medicine

Thyroid disease is often treated by herbal medicine in China. As with Western herbal medicine, in traditional Chinese medicine (TCM) the greatest use for herbs lies in treatments for hyperthyroidism, the symptoms of which are characterized in this modality as a "*yin* deficiency" or syndrome of "excess fire." Hypothyroidism, in contrast, is characterized as "*yang* deficiency." TCM also employs herbs for treating thyroid masses and nodules, which are interpreted as "entangled *qi,*" "accumulated phlegm," and "static blood."[30,31,32]

Chinese herbal remedies are traditionally given as combinations rather than single herbs. Some traditional combinations are known for use in thyroid conditions and may be sold in supplements in this form: for example, *Jia Kang Wan* and *Pingyin Fufang*.[30] Both of these formulas contain herbs meant to target the thyroid, such as kelp, brown seaweed (*Sargassum* spp., Sargassaceae), Chinese yam (*Dioscorea oppositifolia,* Dioscoreaceae), fritillary (*Fritillaria* spp., Liliaceae), Prunella (*Prunella vulgaris*, Lamiaceae), scrophularia (*Scrophularia ningpoensis*, Scrophulariaceae), and rehmannia (*Rehmannia glutinosa*, Scrophulariaceae), in addition to other herbs. Both of the formulas also contain oyster shell, a common ingredient in TCM thyroid formulas, as sea materials with a high mineral content are considered in this modality to soften and remove masses.[32]

The Cochrane Collaboration recently published a systematic review, "Chinese Herbal Medicines for Hyperthyroidism."[33] Cochrane reviews (published quarterly and available by subscription) regularly collect and review all available evidence for and against the effectiveness of various treatments (medications, surgery, etc) for specific conditions, taking care to include evidence that is unpublished, published in languages other than English, or unlikely to appear in major databases. In order to assess the effects of Chinese herbal medicines for treating hyperthyroidism, the authors of the review searched several databases (both in English and Chinese) for random-



Chinese Yam *Dioscorea oppositifolia* ©2008 Steven Foster

ized controlled clinical trials of therapy for hyperthyroidism with Chinese herbs alone, or herbs in combination with antihyperthyroid drugs or radioactive iodine. Studies that met review inclusion criteria were obtained and the original authors contacted and interviewed to determine whether trial participants were correctly randomized. Only 13 trials met the Cochrane reviewers' criteria at the time of completion of the review, while the authors of 52 additional trials could not be contacted; those are still waiting assessment.

Reviewers assessed the quality of evidence and detailed the specific outcomes in each of the 13 trials. Trials could not be directly compared, since the herbal preparations used in the studies were all different from each other. The reviewers found that none of the trials used double blinding. Exact causes of hyperthyroidism were detailed in only 4 of the studies. Primary outcomes in the trials varied and included relapse rates, adverse effects, clinical symptoms, physical symptoms, and thyroid function tests (serum T3, T4, and TSH). Each of the 13 studies evaluated a specific formula containing at least 5 or more combined Chinese herbs (2 of these studies did not mention the specific contents of formulas). Formula types tested by the studies included capsules of dried herbs, tablets of dried herbs, ampoules of decocted herbs, and injections of decocted herbs. A total of 65 different Chinese herbs were identified throughout the 13 formulas.

While the Cochrane review authors conclude in their systematic review that Chinese herbal medicines, combined with conventional antihyperthyroid drugs, may be of some benefit to patients in relieving hyperthyroid symptoms, they also conclude that the current available studies of Chinese herbal medicine used to treat hyperthyroidism were too poorly controlled and subject to potential conflicts of interest to provide a reliable indication for any type of Chinese herbal formula for treating hyperthyroidism. Therefore, according to the criteria employed by this systematic review, there is currently no strong clinical trial-based evidence for the use of any Chinese herb or herbal formula for the treatment of hyperthyroidism. Randomized, double-blind, placebo-controlled trials of Chinese herbs and herbal formulas are still needed to provide evidence for the efficacy of Chinese herbs in treating one or more specific causes or symptoms of hyperthyroidism.

Data from some of the clinical studies in humans for TCM formulas containing the following herbs are summarized in English in the Cochrane review, and also in other secondary sources.[30,31,32] *In vitro* and animal data on these herbs published in English are also referenced below.

Kelp and Brown Seaweed: Kelp seaweed (*Kun Bu* in Mandarin) and brown seaweed (*Hai Zao* and *Lou Shu* in Mandarin and *Hoi Chou* in Cantonese) are common ingredients in TCM remedies for thyroid. Seaweeds are known traditionally as dissolvents that can soften chronic swellings, decongest lymphatic tissue, and reduce tumors.[34]

Modern research confirms seaweed as a rich source of trace minerals, including iodine; however, the iodine content varies with

species and preparation of the plant.[35] Bioavailability of iodine contained in seaweed is generally high (80-96%).[36] As a result, clinicians must carefully dose and observe patients treated with seaweed-containing products due to these variabilities and also the unpredictable effects that iodine can have on thyroid tissue, as enumerated previously. Another issue regarding use of seaweed in treatments is the potential for contamination by pollutants. Research shows that *Sargassum* biosorbs cationic metals, especially lead, in both low- and high-salt containing wastewater.[37]

Clinical studies in English evaluating the effects of *Laminaria* spp. or *Sargassum* spp. on thyroid disorders in humans are lacking.

***Chinese Yam*:** Traditional use of Chinese yam (*Huang Yao Zi* in Mandarin and *Wong San Ji* in Cantonese) root include to strengthen *yin*,[38] resolve thyroid tumors, and hypo- and hyperthyroidism (decoction or tincture).[34] Modern *in vitro* research reveals antibacterial[39] and antitumor[40] properties, but no studies or abstracts in English were found documenting the root's effect on thyroid disease in humans. Dioscorea rhizome or *shanyao* was identified as a component of a TCM herbal formula in one of the 13 trials evaluated by the Cochrane review.[33] This unblinded trial of 147 patients with Graves' disease evaluated 20 mL 3 times daily of the decocted herbal formula *Jiakangxin* plus radioiodine, versus the antithyroid pharmaceutical drug methimazole alone, versus radioiodine alone.[41] Outcomes evaluated included subjective symptoms, body weight, and thyroid hormone levels after 6 months of treatment. Statistical significance was found in improved hormone levels only in the radioiodine and radioiodine plus *Jiakangxin* groups, compared to the methimazole alone group, but the Cochrane review concluded the presence of potential conflicts of interest in the study.

Fritillary: The bulb of two species of fritillary (*Fritillaria cirrhosa* and *F. thunbergii*, *Bei Mu* in Chinese) is employed in TCM for "heat clearing" properties valuable in resolving cough, nodules, swellings, and thyroid cancer, among other things.[34,38] Modern research reveals the genus to be rich in a wide range of steroidal alkaloids.[42] Some may have acetylcholinesterase-inhibiting properties,[43] which raises the potential for toxicity similar to organophosphate insecticides (with hypersecretion, excitation, diarrhea, bronchospasm, slowed or rapid pulse, and even seizures). No studies or abstracts in English were found documenting the bulb's effect on thyroid disease in humans. Thunberg fritillary bulb or *zhebeimu* was identified as a component in formulas studied in two of the 13 trials evaluated by the Cochrane review.

The first, in 2003, was a parallel group, unblinded trial of 368 cases of hyperthyroidism defined by specific threshold levels of plasma thyroid function tests.[44] One ampoule per day of the herbal formula *Erdong Tang* with *Xiaoluwan Jiawei* was decocted with water and orally taken in the morning and evening and compared to the control group taking either propylthiouracil (PTU) or methimazole. Outcomes included symptom relief, plasma thyroid hormone levels for 1 year after discontinuing the herbal formula or drugs, and relapse rates. While the study found symptom relief improvement, plasma hormone improvement, and relapse rates to be better in the herbal treatment versus the control group, the Cochrane reviewers note potential conflicts of interest in the study.

The second trial including fritillary, published in 2005, was also of parallel design and unblinded.[45] It evaluated 62 cases of hyperthyroidism with symptoms of sweating, dysphoria, palpitations and emaciation. Interventions compared were the herbal formula *Jiakangxiao* (which included fritillary bulb) plus treatment with either methimazole or PTU, versus methimazole or PTU alone. Outcomes included symptom relief, measurement of plasma thyroid hormones after 50 days of treatment, and relapse rates after 1 year. The study found statistically significant improvement in the treatment versus control group in all outcomes, though the Cochrane reviewers note potential conflicts of interest in the study.

***Prunella*:** The flower spike of selfheal (aka Prunella, *Xia Ku Cao* in Mandarin; *Ha Gu Chou* in Cantonese) are used in TCM as an antipyretic, diuretic, astringent, and lymphatic decongestant.[34,38] Modern studies support selfheal's ability to reduce inflammation and modulate the immune system *in vitro*[46] and to suppress antibody production in mice.[47] No studies or abstracts in English were found documenting the flower's effect on thyroid disease in humans.

Xia Ku Cao was identified as a component in 4 of the 13 trials evaluated by the recent Cochrane review. *Xia Ku Cao* is included in the formula *Erdong Tang* with *Xiaoluwan Jiawei*, which was evaluated in the trial by Qiu et al (2003) enumerated above.[44] In 1999, an unblinded parallel group trial evaluated 105 hyperthyroid patients taking methimazole plus 1 ampoule per day of an herbal formula including *Xia Ku Cao,* versus a control group taking methimazole alone.[48] Outcomes included symptoms of palpitation, fatigue, emaciation and heat intolerance as well as plasma concentrations of thyroid hormones. The study found that while both groups improved with treatment, there was no statistically significant difference between the groups with regard to plasma hormone levels or symptom relief. The Cochrane review noted potential conflicts of interest in the study.

In 2001, another unblinded, parallel group trial evaluated 84 patients with hyperthyroidism identified through plasma thyroid hormone levels and clinical symptoms of palpitation, dizziness, tremor, fatigue, sweating, and emaciation.[49] Methimazole plus an herbal formula containing *Xia Ku Cao* given in an unidentified dosage form and frequency were compared to methimazole alone for 2 months with 1 year of follow-up. The study found greater improvement in the treatment group compared to control with regard to the outcomes of symptom relief and plasma thyroid hormone levels at 2 months and relapse rates after 1 year. The Cochrane review notes potential conflicts of interest in the study.

Finally, *Xia Ku Cao* was part of a formula called *Jiakang mianyi jiaonang* evaluated in 2005 on 44 subjects with hyperthyroidism in a study of 86 hyperthyroid patients with diffuse toxic goiter (aka Graves' disease) or subacute thyroiditis.[50] PTU was taken by both the treatment and control groups; the treatment group additionally took 4 capsules of *Jiakang mianyi jiaonang* formula 3 times daily for 90 days, while the control group took the formula *jiakangning pian* (the herbs in this formula were not specified in the Cochrane review) at 6 tablets 3 times per day. The study was of parallel group design and single-blinded. Outcomes included symptom relief, body weight increase, and plasma thyroid hormone levels. The study found no statistically significant improvement in treatment versus control groups for any outcome. The Cochrane review notes the herbal preparation was prepared by the authors' hospital and that this was a local government-supported project. In addition, the lack of distinction in this study between patients with Graves' disease and those with subacute thyroiditis may have impacted outcomes since, as enumerated above, neither antithyroid drugs

like PTU nor antithyroid botanicals can prevent the leaking of stored thyroid hormone from inflamed tissue that causes the transient hyperthyroidism characteristic of this condition. Furthermore, the lack of distinction between these two patient groups in this study would confound any potential immune-modulating benefit of the *Xia Ku Cao*-containing herbal formula.

***Scrophularia*:** Scrophularia (*Xuanshen* in Mandarin or *Hei Shen* in Cantonese) root is administered in TCM fresh or dried to "drain fire and disinhibit the throat."[38] *Scrofula* is an archaic term describing tubercular swelling of the lymph nodes; its inclusion in the Latin binomial of this plant is indicative of its traditional use to treat nodules and goiter.[32] Modern *in vitro* research reveals that plants in this genus contain antimicrobial,[51] anti-inflammatory,[52] and antitumor[53] properties. No studies or abstracts in English were found documenting the root's effect on thyroid disease in humans. Scrophularia root or *Xuanshen* is included in 2 formulas evaluated in the Cochrane review of included studies of Chinese herbal medicines for hyperthyroidism. *Xuanshen* is included in the Qiu et al (2003) study of the TCM herbal formula *Erdong Tang* with *Xiaoluwan Jiawei* described above in the sections on prunella and fritillary.[44] *Xuanshen* was also one of 10 herbs in the formula *Yikang wan*, given as 1 pill 3 times per day plus methimazole, versus methimazole alone in an unblinded parallel group study of 62 hyperthyroid patients.[54] Outcomes included clinical symptom relief and thyroid function tests at 2, 3, and 4 weeks after treatment. The study found improvement in all outcomes in more individuals in the treatment group vs. control, but statistical significance is unclear. The Cochrane review concluded there was potential conflict of interest in that the herbal formula was provided by the company sponsoring the magazine in which the study was published.

Kelp *Laminaria* spp. ©2008 Steven Foster

***Rehmannia*:** Rehmannia (*Shengdi* in Mandarin) prepared or cured root or rhizome is considered in TCM to be nourishing to the liver and blood and also to have heat-clearing properties. Its use in thyroid formulas stems from the idea in TCM that thyroid disorders are ultimately rooted in liver and kidney disorder.[34] Modern *in vitro* studies reveal that extracts of the plant may have antioxidant[55] and anticancer[56] activity. A study in mice suggested a hepatic protective effect.[57] No studies or abstracts in English were found documenting the root preparation's effect on thyroid disease in humans. Rehmannia rhizome or *Shengdi* is part of the herbal formula *Erdong Tang* with *Xiaoluwan Jiawei* evaluated by Qiu et al (2003) discussed previously.[44] It is also part of the formula *Yikang wan* evaluated by Huang (2003) as summarized above for the herb scrophularia.[54] A third study included *Shengdi* as one of 12 herbs, also including prunella flower.[49] A fourth study included in the Cochrane systematic review examined *Shengdi* as one of 4 herbs of a formula used in a parallel single-blind study of 93 patients with Graves' disease.[58] The herbs were made into granules, and 1 ampoule per day was given for 8 weeks to the treatment group along with PTU, while PTU alone was used by the control group. Outcomes included plasma thyroid function tests. Free T3 and free T4 of both treatment and control groups were improved at 8 weeks; statistical significance is unclear. The Cochrane reviewers concluded there was potential conflict of interest in the study.

Conclusion

Herbal medicines may be used as adjunct treatments for autoimmune thyroid diseases such as hypothyroidism and hyperthyroidism, the physical abnormalities (often referred to nonspecifically as "goiter," "nodules," or "thyroiditis") that can result from or precipitate the physical symptoms of these diseases, and for the malignant nodules that characterize thyroid cancers. However, large, randomized, double-blind, well-controlled studies in humans for their efficacy in any of these disorders are lacking. Most of the studies of botanical medicines for the treatment of thyroid disease have centered on hyperthyroid conditions. For herbs used to treat hyperthyroidism in TCM, a recent systematic review of 13 trials that met reviewers' inclusion criteria suggests that some herbal formulas used in conjunction with pharmaceutical antihyperthyroid drugs may provide marginal improvement over antihyperthyroid drugs alone with regard to symptom relief, thyroid hormone function tests, and relapse rates.[33] However, reviewers evaluated these studies as low quality due to small sample sizes, unblinding or single blinding,

and potential for conflicts of interest. The authors of the systematic review have 52 more studies to evaluate, which may yield more information. Currently there is scant published information supporting use of TCM herbal formulas alone for treating hyperthyroid conditions.

Therefore, initiation of treatment with any herbs for any type of thyroid disorder should be considered only under the supervision of a healthcare provider well trained in the use of herbs or TCM for thyroid disease. Such treatment is best done using information obtained with some tools of conventional medicine—blood chemistry analysis, FNAB, ultrasound, and radionuclide imaging—which can give the practitioner and patient an idea about the possible source, characteristics, and progress of thyroid disease. Because disorders of the thyroid are complex, idiosyncratic, and impact other body systems, courses of treatment with either alternative or conventional regimens (or both) must be carefully tailored to the individual, with assiduous attention to the individual's symptoms and plasma thyroid function analysis. HG

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Prunella *Prunella vulgaris* ©2008 Steven Foster

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GlaxoSmithKline Petitions FDA to Disallow Weight Loss Claims for Dietary Supplements

On April 17, 2008, GlaxoSmithKline (GSK), one of the world's leading pharmaceutical companies, filed a citizen petition to the Food and Drug Administration (FDA) to classify weight loss claims as disease claims.[1] This would require all weight loss claims for dietary supplements to be pre-approved by the FDA.

The petition was also filed on behalf of the American Dietetic Association (ADA), the Obesity Society, and Shaping America's Health, a sister organization of the ADA. It notes that these three organizations have received grants from GSK for their participation in the petition process. The petition was filed by Bruce S. Manheim, Jr., of the law firm Ropes & Gray LLP, Washington, DC, which represents GSK.

GSK is the manufacturer of alli™, an over-the-counter (OTC) non-prescription version (0.5 mg) of the drug orlistat (Xenical®, Roche) and the only FDA approved OTC drug for weight loss. Alli has become one of the highest-selling weight loss drugs in the world, with cumulative sales at approximately $315 million (USD) since its launch in June 2007 to March 2008, said Malesia Dunn, director of communications at GSK Consumer Healthcare (oral communication, June 20, 2008).

The primary objective of this 33-page petition is that dietary supplement claims about the ability to help a person lose weight should be treated as disease claims. The petition itself acknowledges that being overweight is not a disease: "Petitioners are not asking FDA to conclude that the state of being overweight is a disease…petitioners are requesting FDA to restrict weight loss claims because they purport to treat an unhealthy condition that is a risk factor for diseases—not the disease itself."[1] The petition cites the FDA ban on "cholesterol-lowering" claims for dietary supplements as a precedent. FDA policy states that a claim by a supplement to lower cholesterol implies that it could be used to treat hypercholesterolemia (high cholesterol levels), which is a disease.

The primary objective of this 33-page petition is that dietary supplement claims about the ability to help a person lose weight should be treated as disease claims.

The GSK petition claims that dietary supplements are ineffective in treating overweight conditions. It cites several review articles to support this contention, including a 2004 review by Harvard physicians Robert Saper and David Eisenberg,[2] as well as another 2004 review by Max Pittler and Edzard Ernst of the Universities of Exeter and Plymouth.[3]

Concern and disagreement regarding the petition has been raised by members of the dietary supplement and alternative medicine communities, including members of industry and natural product researchers. The criticisms include denying that being "overweight" is necessarily a prelude to obesity and other morbidity, noting that the desire to lose weight is not necessarily related to attempts to prevent diseases related to obesity, and also the acknowledgement that the FDA itself, in its own regulations on structure-function claims authorized by the Dietary Supplement Health and Education Act of 1994 (DSHEA), acknowledged the legitimacy of weight-loss claims for supplements.

Alexander G. Schauss, PhD, president and CEO of American Institute of Biomedical Research (AIBMR) in Puyallup, Washington, a contract research organization that conducts toxicological, pharmacological, and clinical research on dietary supplement ingredients, provided the following comments:

"GlaxoSmithKline is incorrect in attributing 'overweight' to being unhealthy. In fact, a paper that appeared in the *Journal of the American Medical Association* in mid-April 2005, authored by the American Centers for Disease Control and Prevention, based on a three-decade study of health and nutrition surveys carried out in the 1970s, 1980s and 1990s, reported that people who are overweight are likely to live longer than people who are underweight or obese.[4] People who had body mass indices that were higher than 25 but lower than 30 did *not* have a reduced life expectancy. Hence, to label this population as 'unhealthy' is unscientific and without competent and reliable substantiation." (e-mail, June 19, 2008).

Paul Dijkstra, CEO of Inter-Health, a producer and marketer of clinically-researched, patented dietary supplement ingredients such as Super CitriMax®, a proprietary form of hydroxycitric acid (HCA, derived from *Garcinia cambogia*), submitted comments on behalf of his company on June 3.[5] He emphasized that people are motivated to lose weight for reasons other than the treatment or prevention of obesity (e.g., to improve self-image, look better in a swim suit, etc.).

Dijkstra also noted that "the FDA has already ruled that dietary supplement labels can include information describing the supplement's effect on the body and its biological functions. These types of claims are referred to as structure/function claims, which should be substantiated, truthful, and not misleading. Many of the ingredients used in weight loss/management dietary supplements are backed by clinical research and sound scientific findings."

Daniel Fabricant, PhD, vice president of scientific affairs at the Natural Product Association (NPA), an industry trade group, noted that NPA's forthcoming comments on the petition will include mention that the FDA has previously approved the concept of weight loss claims for supplements in its publication of final regulations on dietary supplements claims (e-mail, June 16, 2008).[6]

The GSK petition lists the following dietary supplements as being ineffective in dealing with weight loss: bitter orange or zhi shi (*Citrus aurantium*, Rutaceae); chromium picolinate, a naturally occurring tryptophan derivative; guar gum, derived from the Indian cluster bean (*Cyamopsis tetragonolobus*, Fabaceae); hoodia

(*Hoodia gordonii*, Asclepiadaceae); hydroxycitric acid contained in the extract of *Garcina cambogia* (Clusiaceae); conjugated linoleic acid (CLA), a derivative of a bacteria in some animal guts; pyurate, a carbon ketoacid created in the body during glycolysis; and chitosan, a polysaccharide derived from crustacean shells.[1]

The petition classifies these supplements into 5 categories of weight loss supplements that are said to do the following: increase energy expenditure, modulate carbohydrate metabolism, increase satiety or suppress appetite, increase fat oxidation or reduce fat synthesis, and block dietary fat absorption.

The petition then relies on data, particularly from one meta-analysis, to attempt to demonstrate that there is insufficient evidence for weight loss claims for dietary supplements if they were held to the standard required for an FDA-approved health claim under the Nutrition Labeling and Education Act of 1990 (NLEA). One of the reviews that the petition quotes often is the Pittler and Ernst publication.[3] The petition quotes the Pittler-Ernst publication as concluding, "there is little convincing evidence that any specific dietary supplement is effective in reducing body weight."[1,3] However, the first part of this sentence in the cited meta-analysis, conveniently not quoted by the petition, states: "The data from published double-blind RCTs [randomized controlled trials], systematic reviews, and meta-analyses are encouraging in some cases…"[3]

Several supplements with encouraging evidence are not mentioned in this petition, though this petition never claims to have a complete list. Also, a number of clinical trials that support the effectiveness of the supplements are mentioned, but the petition claims that not enough evidence exists to support qualified health claims under NLEA and that there is insufficient evidence of safety.

An example of a supplement with encouraging evidence, unmentioned by this petition, is glucomannan, a derivative of konjac root (*Amorphophallus konjac,* Araceae) present in several dietary supplements used for weight management. A double-blind 8-week clinical trial on obese subjects indicated a "significant mean weight loss (5.5 lbs) using glucomannan."[7] Even the Pittler-Ernst meta-analysis, which the GSK petition points to continuously as proof that dietary supplements do not work, states that this double-blind study "suggests significantly greater weight loss in the treatment group than in the placebo group."[3] Another supplement the petition did not mention is the increasingly popular South American herb beverage yerba maté (*Ilex paraguariensis,* Aquifoliaceae), a natural source of caffeine. Again, the Pittler-Ernst meta-analysis acknowledges that a combination preparation of yerba maté, guarana (*Paullinia cupana*, Sapindaceae; also containing caffeine), and damiana (*Turnera diffusa,* Turneraceae) "might potentially be effective in lowering body weight."[3] It is also worth mentioning that both glucomannan and the yerba maté combination preparation, which are not mentioned in the petition, are not usually known to produce adverse effects.

Another ingredient omitted from the first category (supplements that increase energy expenditure) is green tea (*Camellia sinensis,* Theaceae). Green tea beverages and preparations have been shown in many clinical trials to be effective in aiding weight loss. For example, an RCT concluded that green tea can reduce body weight in obese subjects by increasing energy expenditure and fat oxidation,[8] and a safety study by the US Pharmacopeia found tea to be safe when used properly.[9] These are just a few examples of the many clinical trials suggesting evidence that weight loss supplements are effective (depending on the level of evidence required to confirm efficacy) and relatively safe. However, it remains to be seen whether enough evidence exists to support a qualified health claim and whether weight loss claims in principle should even be treated as disease claims.

"Many may be alarmed or even dismayed that the petition suggests that no dietary supplement meets even the lowest criteria to qualify for a level D FDA-approved qualified health claim under NLEA. This is probably a matter of interpretation and may become one of the focal points of intense debate on this entire issue," said Mark Blumenthal, founder and executive director of the American Botanical Council (ABC). "Considering the significant role that overweight conditions play in modern public health, it is clearly in the American consumers' interests for the door to stay open for truthfully-marketed and clinically-verified dietary supplements to continue to make weight loss structure-function claims under DSHEA, i.e., without requiring FDA pre-approval."

The FDA is normally required to respond to such a petition within 180 days of receiving it.[1] The public may comment about this issue at www.regulations.gov. HG

Note: An expanded version of this article was published in the June 2008 issue of HerbalEGram, the American Botanical Council's monthly e-journal (available at www.herbalgram.org).

—Kelly E. Saxton

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New Farm Bill Includes Provisions on Raw Ginseng Labeling and Eligibility of Herbal Crops under Grant Program

Following a lengthy and controversial legislative process, the US Congress enacted the Food, Conservation and Energy Act of 2008 ("the farm bill") on May 22, 2008.[1,2] The farm bill, which provides funding for a wide variety of agriculture-related projects and research, farm subsidies, and nutrition programs, includes 2 key provisions for the herbal industry. Under the new law, raw ginseng (*Panax* spp., Araliaceae) roots imported or sold in the United States must now include labeling indicating their country of origin, and herbal crops are now specifically acknowledged as eligible specialty crops under a government grant program.[3]

The new country of origin labeling requirement for raw, whole ginseng roots is intended to protect domestic ginseng farmers and American consumers against falsely marketed and mislabeled ginseng. Problems have been reported in the past of ginseng suppliers erroneously and/or fraudulently marketing ginseng grown in Asia or Canada as "Wisconsin grown."[4] According to the sellers and promoters of North American ginseng (*P. quinquefolius*) grown in Wisconsin, the region's ginseng is internationally reputed as being of high quality and commands a premium price in world markets. US Senators Russ Feingold (D-WI) and Herb Kohl (D-WI) and Congressman Dave Obey (D-WI) introduced the Ginseng Harvest Labeling Act of 2007 in August 2007, which was the precursor to this amendment in the farm bill.[5]

The American Herbal Products Association (AHPA) assisted in the drafting of the bill and helped ensure that its language would not cause regulatory inspectors to mistakenly believe that the provision might apply to ginseng as an ingredient in finished dietary supplement or herbal tea products.[3] After the passage of the farm bill, AHPA President Michael McGuffin announced that the new ginseng labeling provision will "ensure that buyers of whole ginseng root are given truthful information as to its source, without creating unnecessary labeling requirements for other herbal ingredients or for finished products."[3]

Senator Feingold provided the following statement about the new ginseng labeling requirement: "The ginseng labeling provision in the farm bill is crucial for Wisconsin ginseng farmers and consumers, who lose out when foreign farmers freeload off of Wisconsin ginseng's unparalleled reputation. I have worked on this issue for years with Senator Kohl and Representative Obey, and I am pleased we were able to help ensure consumers looking for Wisconsin ginseng are getting the premium product they expect" (e-mail, June 5, 2008).

Another provision of the farm bill acknowledges herbal crops as eligible specialty crops under the US Department of Agriculture's (USDA) Specialty Crop Block Grant Program, which provides funds to state departments of agriculture to enhance the competitiveness of US specialty crop growers in areas such as marketing, promotion, education, research, trade, and nutrition. There had been confusion in the past as to whether herbal crops were eligible under the grant program, since promotional literature disseminated to the states by the USDA's Agricultural Marketing Service often would not explicitly list herbal crops as eligible specialty crops. Under the new farm bill, the Agricultural Marketing Service must include a comprehensive list of specific categories of eligible specialty crops in all relevant promotional materials distributed in connection to the program. Senator Tom Harkin (D-IA) led the effort to add this language to the farm bill, at the suggestion of AHPA.[3]

The nearly $300 billion farm bill contains numerous funding initiatives, including increased assistance to organic farmers. The bill provides $22 million in mandatory funding for the National Organic Certification Cost-Share program, which helps producers and handlers of agricultural products in becoming certified for organic production and processing. The farm bill also includes a notable $10.3 billion increase in spending on nutrition programs, as well as increases for rural development and land conservation programs and extensions to various federal subsidies.[6]

The farm bill was passed by the US House of Representatives on May 14 and by the US Senate on May 15, 2008, both times with an overwhelming number of supporting votes. President George W. Bush vetoed the bill, claiming it to be too expensive and generous to prosperous farmers, even though the US Congress had amassed enough votes in its favor to override a veto.[2] After vetoing the bill, it was discovered that the copy of the bill sent to President Bush was missing 34 pages on international food aid and trade, sparking further controversy.[1,2] Both the US House of Representatives and the US Senate overruled President Bush's veto on May 22, enacting all sections of the bill except for the missing section. The House of Representatives passed the full version of the farm bill—including the missing pages that were not sent to President Bush—on May 22, and the Senate passed the full version on June 5. President Bush vetoed the full version of the farm bill on June 18, after which the US Congress immediately re-approved the bill, overturning the veto for a second time.[7] HG

—Courtney Cavaliere

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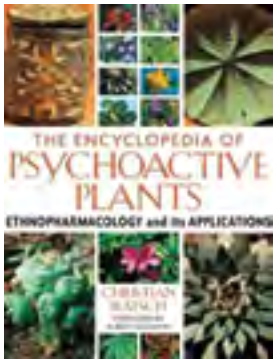
The Encyclopedia of Psychoactive Plants: Ethnopharmacology and Its Applications by Christian Rätsch, translated by John Baker, with a foreword by Albert Hofmann. Rochester, VT: Park Street Press; 2005. Hardcover, 942 pages. 978-0892819782. $125.

Christian Rätsch is a German anthropologist and author of several books related to the subject of psychoactive (psychedelic) plants. Other books by Rätsch cover topics like the sacred use of plants, marijuana, shamanism, and witchcraft. This encyclopedia is a large and somewhat intimidating book, but the format is friendly and embellished by many beautiful photographs and drawings. The full price is $125 but the street price is more reasonable (about $79 at Amazon.com). As the name implies, this is a mighty work, encyclopedic in its coverage of psychotropic plants.



The foreword by recently deceased chemist Albert Hofmann, father of LSD (see tribute article on page 76), is not related to chemistry but is more of a social commentary emphasizing the "spiritual" or metaphysical nature of these plants and their cultural uses. Considering his experience (he was 102 years old) and status within the psychedelic community, this is a nice addition.

While the book does briefly discuss some chemistry and pharmacology of each plant genus, the majority of space is occupied with a detailed sociologic setting for each plant and how it is/was cultivated, prepared, and used. A typical botanical description may be insufficient to allow actual identification of plants in many cases, but there are other sources for this information. First person accounts of the psychoactive effects of a plant are sometimes provided by the author when the published literature is incomplete or contradictory on the issue of a plant's psychedelic properties.

The first 543 pages are devoted to "major monographs" of psychoactive plants in alphabetical order by genus from *Acacia* to *Withania*. Each monograph generally contains sections on family, subspecies, synonyms, history, distribution, cultivation, appearance, psychoactive material, preparation and dosage, ritual use, medicinal use, constituents, effects, commercial forms and regulations, and literature references.

Pages 545–591 cover little-studied psychoactive plants, while pages 593–601 deal with reputed psychoactive plants. After a small section on psychoactive plants that haven't yet been identified (603–617), there is a 75-page A-Z section on psychoactive fungi with the same general categories as the first A-Z section. Psychoactive products with no apparent connection, including alcohol, ayahuasca, and snuff, as well as some legendary preparations such as mead and soma, are then discussed for another 100 pages. This is followed by another small A-Z section on active constituents of plants such as atropine, first isolated from nightshade (*Atropa belladonna*, Solanaceae); caffeine, first isolated from coffee beans (*Coffea arabica*, Rubiaceae); cocaine, first isolated from the Peruvian coca bush (*Erythroxylum coca*, Erythroxylaceae); nicotine, first discovered in tobacco (*Nicotiana tabacum*, Solanaceae); etc.

In all, this is a major work that will be an essential reference to those interested in cultural and historical aspects of psychedelics. It will certainly appeal to botanists and other biological scientists with a specific interest in this area, though they may need to supplement with other references for more in-depth coverage of a particular plant.

—Jerry Cott, PhD
Pharmacologist
Silver Spring, MD

Dictionary of Nutraceuticals and Functional Foods by N.A. Michael Eskin and Snait Tamir. Boca Raton, FL: Taylor & Francis Group/CRC Press; 2006. Hardcover; 507 pages. ISBN-13: 978-0849-3157-25. $89.95.

Except to take advantage of the current popularity of the term "nutraceuticals," I found no defensible reason why this text was allowed to go into print. Firstly, it is not a dictionary. As the authors admit, both of whom are biochemists with backgrounds in food sciences, it is more of a "mini-encyclopedia." If it were a dictionary, I would expect it to provide pronunciations of the terms it attempts to describe, as limited in number as they are (480 functional foods and nutraceuticals). Yet even a mini-encyclopedia would be expected to consistently provide Latin binomials for the plants it covers and to provide a basic description of the plant, which it does not, except in rare instances (e.g., blackberry). Instead, only some of the plant entries have binomials, some have both binomials and botanical authorities, and for some, the plant family is given. For whatever reason, items such as apples, caraway, coffee, milk thistle, saw palmetto berries, pears, pinto beans, and sweet potatoes, to name but a few, are not accorded their Latin names. Other common items, on the other hand, are provided such identification: apricot (*Prunus armeniaca,* Rosaceae), blackberry (*Rubus corchorifolius,* Rosaceae), carrot (*Daucus carota*, noted in this book as being in the "Umbelliferae family" instead of the commonly accepted Apiaceae), coriander (*Coriandrum sativum*, Apiaceae), oregano (*Origanum vulgare*, identified as being in the "Labiatae family," instead of Lamiaceae), and paprika (*Capsicum annuum,* Solanaceae). For angelica, as in many other entries, the Latin names do not follow the common name but are instead found later in the text; in this case only the species *Angelica furcijuga* (Apiaceae) and *Angelica japonica* are named, without authorities or families. The opposite is also found and with surprising frequency. For *Morinda citrifolia* (misspelled as *citrifola* in the text) (Rubiaceae), for example, the common names provided, "Indian mulberry" and "Mengkudu," fail to include noni, the more widely known common name. And whereas *Echinacea purpurea* (Asteraceae) is discussed, no other species of the genus are even mentioned.

The term "nutraceutical" is described in the preface as "bioactive components responsible for the health benefits of functional foods"; the latter being "similar in appearance to conventional foods, but in addition to providing basic nutritional components, have physiological benefits that can reduce the risk of chronic diseases." The subject of toxicity is largely avoided. Under ethanol and foxglove (*Digitalis purpurea*, Scrophulariaceae), however, associated harm is discussed, as one would hope. Still, I have to wonder why they were included at the obvious expense of other nutraceuticals or functional foods, particularly since foxglove—or any species in the genus *Digitalis*—is never sold as a func-

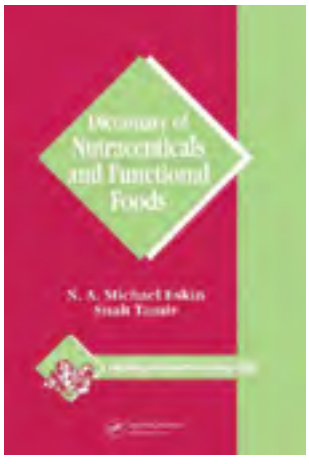
tional food or nutraceutical in any culture or country with which I am familiar! From the examples covered, nutraceuticals apparently include any natural product known to humankind, from the potentially or definitely poisonous to the benign. For example, among the diverse items listed, the authors include sweet flag (*Acorus calamus,* Acoraceae) and rosy periwinkle (*Catharanthus roseus*, Apocynaceae), but without any mention of their functions as foods (some types of calamus root, such as sweet flag, are edible, but periwinkle?) or their risk of producing toxicity.

Throughout the text, an inordinate amount of attention is given to the *in vitro* cytotoxic effects of natural products against tumor cells. The authors list highly cytotoxic compounds found in various marine sponges, and without naming the species, a "cytotoxic compound" ("thyrsiferyl 23-acetate") isolated from "marine red alga." Substances such as those are certainly of interest to chemists developing new anticancer drugs, but to classify them as functional foods or nutraceuticals is quite a stretch.

The profusion of illustrations, tables, and charts accompanying the text, usually taken from a single study, give little perspective of the subject being described and often occupy over half a page. These, too, are at the expense of entries that one would anticipate in a text with such an encompassing title. And if you thought that substances with attending human clinical trials would take precedence over obscure, scarcely studied ones, you would be sadly disappointed. Even in cases where such nutraceuticals are listed, clinical trials receive scant citation or are entirely ignored.

Although I do not mean to imply that most of the text is incorrect or uninteresting, it does have its share of bewildering, obviously unedited statements. For example, mangiferin from *Mangifera indica* (Anacardiaceae) is stated to be "a constituent of folk medicines," regardless of its occurrence in diverse plants, medicinal and otherwise. The text mentions esculetin but misspells the word as "esculentin" and refers to it as a coumarin derivative rather than correctly as a peptide, stating that it "has been used for centuries in China as folk medicine." Elsewhere in the text, one reads that, "In Latin America, the flowers, leaves, and vine tips of *Cucurbita* spp. are widely consumed, because they exhibit a wide range of biological activities in plants and animals." Further, the authors state that "Uva ursi (*Arctostaphylos uva-ursi*) is a compound extracted from the bearberry plant," incorrectly identifying uva ursi as a compound rather than the common name of a plant. It is also written that "Glucoraphanin, the natural precursor of sulforaphane found mostly in cruciferous vegetables, but also in radishes, is known for maintaining good heath." Apart from the obvious misspelling of "health," the text fails to disclose any of the circumstances under which glucoraphanin maintains health.

A handful of traditional Chinese herbal medicines are discussed: Job's tears (*Coix lacryma-jobi*, Poaceae), bitter tea (*Ligustrum pedunculare*, Apiaceae), Chinese bellflower (*Platycodon grandiflorum*, Campanulaceae), peony (*Paeoniae* spp., Paeoniaceae), Rehmannia (*Rehmannia glutinosa*, Scrophulariaceae), and dandelion (*Taraxacum officinale*, Asteraceae). Their Chinese common names are absent and the brief reviews are highly inadequate. As in most of the entries throughout the text, the authors focus on the details of a few activity studies to the exclusion of others of equal or greater importance. I can only suppose that for some it would be enough to know that Sho-saiko-to (the well-researched Japanese Kampo formulation known in Chinese traditional medicine as minor Bupleurum formula) is "a mixture drug of medicinal herbs prepared from the hot-water extraction of seven raw materials," even though what those materials are is not something the authors deemed worthy of inclusion.



It would also be useful to know that the carotenoids lutein and zeaxanthin are commercially obtained from marigold flowers (*Tagetes erecta*, Asteraceae). Instead, the authors list only some of their more common food sources, and *Tagetes* is nowhere to be found. Among other omissions, I could find oyster mushroom (*Pleurotus ostreatus,* Tricholomataceae) and ganoderma, but not the well-known shiitake (*Lentinula edodes*, Tricholomataceae) or Maitake (*Grifola frondosa,* Polyporaceae) mushrooms, which have been the subject of numerous activity studies. Under "Mushrooms," however, they make passing mention of *Phillenus linteus* (the correct spelling is *Phellinus*) (Hymenochaetaceae), which they refer to as the "orange color mushroom."

Given some of the more well-written, edited, and hence reliable titles that the Taylor & Francis group has published, particularly in the domain of botanicals, one might be inclined to expect a more reliable publication from this publisher. Given all the inconsistencies, scientific and taxonomic errors, etc., this book cannot be recommended.

—Kenneth Jones
Medical Writer
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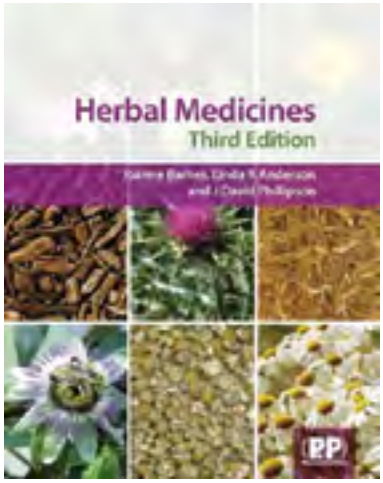
Herbal Medicines, 3rd edition by Linda Anderson, Joanne Barnes, and J. David Phillipson. London, England: Pharmaceutical Press, 2007; Hardcover, 710 pages. ISBN-13: 978-0853696230. $150. Available online from ABC.

Currently, there is a veritable legion of books pertaining to medicinal herbs and herbal products, but only a select few can be regarded as reliable and science-based sources of information for biomedical practitioners as well as informed laypersons.

This book is the third and much expanded edition of a textbook that has become a comprehensive single source of scientifically accurate information covering 152 of the most commonly used herbal medicinal products. Herbal medicinal products are increasing in popularity in the developed world and continue to be an important healthcare option in the traditional healing practices in developing countries. However, along with the widespread use of herbs and herbal medicines, there are many concerns about their quality, efficacy, and safety.

The third edition has been extensively revised and updated, and some of the outstanding new features include the following: an attractive full color layout with chemical structures of the main chemical compounds (bioactive ingredients) contained in medicinal plants, as well as color photographs of the plant and crude drug material—an asset to assist in the



correct identification of the diverse species covered in this text.

The book includes 152 plant monographs, comprehensively referenced, detailing the phytochemical, pharmacological, and clinical aspects of each plant (traditional and clinical applications, dose, evidence of efficacy, possible adverse effects, contraindications, use in pregnancy and lactation, as well as potential herb-drug interactions).

This updated edition contains new monographs on butterbur (*Petasites hybridus*, Asteraceae), greater celandine (*Chelidonium majus*, Papaveraceae), kava (*Piper methysticum*, Piperaceae), and rhodiola (*Rhodiola rosea*, Crassulaceae), plus a substantial revision of 20 major herbal medicines, including echinacea (*Echinacea* spp., Asteraceae), evening primrose (*Oenothera biennis,* Onagraceae), ginkgo (*Ginkgo biloba*, Ginkgoaceae), Asian ginseng (*Panax ginseng*, Araliaceae), St. John's wort (*Hypericum perforatum*, Clusiaceae), and valerian (*Valeriana officinalis*, Valerianaceae).

Although this book is a good source of information, some inadequacies and inconsistencies are present in some of the monographs. For example, the Rhodiola monograph could have cited the comprehensive review by Brown, Gerbarg and Ramazanov, which was published as a cover article in *HerbalGram* 56. Also, the willow bark (*Salix* spp., Salicaceae) monograph fails to mention several clinical trials published in the past decade, many of which were conducted well before the publication of this volume. (For example, the 2003 ESCOP monograph refers to 4 randomized and nonrandomized clinical trials of willow bark.) This book's willow bark monograph lists a total of only 8 references.

Nevertheless, despite some omissions, in general, the book acquits itself fairly well. Another highlight of this new edition is a section about herbal product information from over 30 countries, including Australia, Germany, the United Kingdom, and the United States. The book addresses issues regarding medicinal herbs sold in UK pharmacies, contains appendices that group herbs by specific actions and highlight potential interactions, and further provides an overview of UK legislation regarding herbs and herbal products.

The authors clearly state that this book is not intended as a guide for self-diagnosis or self-treatment, but rather as an updated reference work for biomedical professionals. The new and enhanced edition of *Herbal Medicines* makes it an invaluable reference text for pharmacists, phytotherapists, physicians, and nurses, as well as other healthcare professionals who require evidence-based information about herbal medicines used for treatment as well as prevention of health issues.

The book was written by experts in the fields of pharmacognosy, phytochemistry, phytopharmacy, clinical herbal medicines, phytopharmacovigilance (the research of the safety of herbal medicines from case reports and adverse event reports), and regulation of herbal medicinal products. Joanne Barnes, PhD, is associate professor in herbal medicines at the School of Pharmacy at the University of New Zealand; Linda Anderson, PhD, is the principal pharmaceutical assessor for the Medicines and Healthcare products Regulatory Agency in London; and J. David Phillipson, PhD, is emeritus professor at the School of Pharmacy, University of London.

—Armando González-Stuart, PhD
Herbal Research Coordinator
University of Texas at El Paso / UT Austin Cooperative Pharmacy Program,
El Paso, Texas

Pharmacodynamic Basis of Herbal Medicine, 2nd edition by Manuchair Ebadi. Boca Raton, FL: CRC Taylor & Francis, 2007; Hardcover, 699 pages. ISBN 0-8493-7050-7. $169.95.

With the proliferation of texts on alternative, complementary, herbal, integrative, natural and nutritional medicine, it is important to discern whether a book is published because it really has anything new to say or whether it is just a "me too" publication that is being added to the field's body of literature. Reaching a second edition is generally a sign that a book has found a purpose and an audience. However, in this case, there is no indication provided as to what the second edition purports to provide or accomplish that the first did not, other than to suggest that the "second edition separates fact from myth." We can only hope that this had been accomplished in the first edition as well.

In a book of this type, it is inevitable that traditional herbal remedies will be treated as sources of active ingredients for the pharmaceutical industry within the biomedical model. However, they should also be important in their own right, with synergistic effects and cultural meanings. While the author does bring forth ethnomedical perspectives to complement the pharmacodynamic perspective, he misses the social and cultural dimensions of herbal medicine as a major consumer health movement. For example, older Americans are correctly identified as more frequent users of complementary and alternative medicine (CAM), but paradoxically, the author explains this phenomenon with home-grown philosophical reasons rather than associating aging with an increased prevalence of health conditions that benefit from CAM.

The organization of the text presents no clear taxonomy for the contents by basic or applied principles, origins, actions, uses, or any other discernable rationale. Rather, in the tradition of CRC compendia, the property of alphabetization appears to be the central organizing principle. In the Introduction, there is a confusing, intrusive list of selected plants with their characteristics, in alphabetic order. No identification or explanation for the purpose of this list is provided.

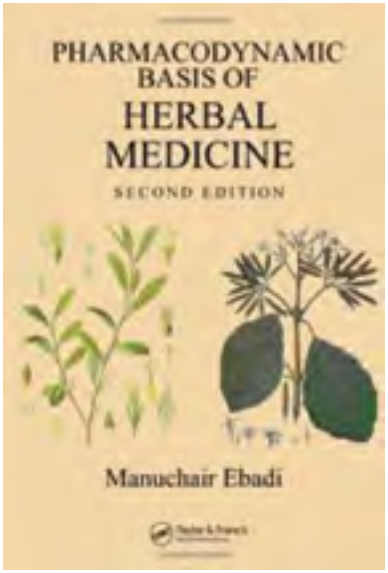
The first 5 chapters provide overviews of the basic science of pharmacokinetics and pharmacodynamics, drug interactions (herb-drug interactions would have been relevant and important here), and the drug development model. These are followed by a sketchy chapter on alternative therapies. The author touches on a random (alphabetic) list of what he considers "chief" modalities without explaining whether this "chieftancy" is based upon frequency of use by consumers, number of practitioners, antiquity and historical precedence, amount and quality of scientific research, comprehensiveness of the modality, or any

combination(s) of these criteria. Remarkably, there is a section on herbal remedies in the chapter on alternative therapies (in a book focusing on herbal remedies). However, there is no articulation of the principles of herb identification and selection, nor indigenous cultures from which they originated. The purpose of this section and of this chapter, in a 700-page book, is unclear.

Chapter 7 promises information on "historical use" of herbal remedies but provides only another alphabetic list with the occasional reference to a distinguished semi-mythical Greek ancient. Chapter 8, which from its title promises to discuss "dietary constituents," goes on to a disquisition on cancer therapy. Chapter 9, on "regulatory issues," provides more information on historic use than does the chapter on "historic use," as does the following Chapter 10. Chapter 10 treats us to another alphabetic list from algae to yogurt (not actually herbs), primarily organized by herb, but with the periodic physiologic function or disease condition thrown onto the list for good measure. There is no standard chapter format.

The author and the text provide a wealth of information, but it is an organizational hash.

Illustrations are crisp, but the purpose of some is marginal. References comprise only 8 pages for a text of 700 pages—a little more than one reference page per 100 pages of text. This is very sparse referencing for the amount of information provided. They are lumped together at the end of the book instead of being provided for each chapter, further compromising their utility.



This book is desperately in need of competent, disciplined, thoughtful and thorough developmental and copy editing from "A to Z." I have often wondered why CRC Press is even in the business of printing CAM texts, and this book did nothing to answer my question. The identification of CRC as a "Press" is appropriate insofar as it indicates the ability to print lines of text even in the absence of an editorial component. A book that is primarily a compendium should pay particular attention to issues of organization and taxonomy, which are notably absent from this effort. A great deal of useful information is available in this book, but there is no coherent approach to presenting it to the audience. While the sole reliance on alphabetization calls into question the publisher's editorial capabilities, it should settle the question that indeed the publisher had to have at least attended grade school.

—Marc S. Micozzi, MD, PhD
Policy Institute for Integrative Medicine, and Private Practice in Forensic Medicine
Bethesda, MD

The Fungal Pharmacy: Medicinal Mushrooms of Western Canada by Robert Rogers. Prairie Deva Press, Edmonton, Alberta, Canada; 2006. Paperback; 234 pages. ISBN: 978-1358-1-4. $39.95 (CDN).

In the last 15 years, a number of books have been published that cover the general topic of medicinal mushrooms.[1-7] *The Fungal Pharmacy* is fairly unique among these in that it focuses on medicinal mushroom species within a specific geographical area—Western Canada. I am aware of only one other book that has this kind of focus, *Icons of Medicinal Fungi from China*.[8] Actually, coverage of *The Fungal Pharmacy* is not limited to Western Canada because many of these species can also be found in the boreal forests of Europe, Asia, and other parts of North America.

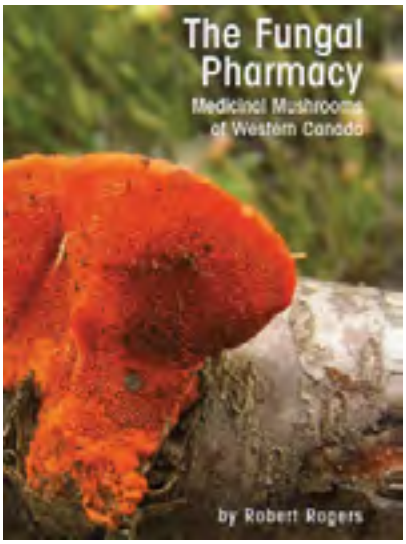
The Fungal Pharmacy begins with a short historical perspective on how mushrooms have been used throughout history and culture, from ancient Greece and Rome to the Far East and beyond. Rogers has researched the unique properties of various fungi used during ancient times in these parts of the world and incorporated their contributions into the text. The main section of the book is devoted to providing information on the medicinal properties of approximately 300 mushroom species.

The Fungal Pharmacy explores the diverse use of mushrooms, including their inspiration of some musical compositions, use in biological fuel cells, and medical research on fungi that exhibit *in vivo* and *in vitro* activity on bacteria, viruses, and pathogenic fungi. The range of topics covered in this book is extensive and includes a number of both edible and poisonous species with potential for present and future research. For example, mycoremediation helps to reduce toxic materials at disposal facilities, decontaminate and minimize road and farm runoff, create buffer zones, reduce agricultural waste, reduce pollution in watersheds, reduce forest fire potential, and clean up contaminated pathogenic bacteria such as *Escherichia coli*. The author pays special attention to cleaning the considerable amount of contamination produced by the Athabasca Tar Sands in northern Alberta, one of the largest petroleum deposits in the world.

The book delves into mythology as well as medicine. The chapter on *Amanita muscaria* (Pluteaceae), for example, is filled with Celtic, Egyptian, and First Nation mythology to evoke the imagination, and it is guaranteed to surprise the reader with medicinal uses for various neuro-muscular and psychosomatic conditions.

The author's main interest is the polypores, and this is evident throughout the book with extensive chapters on Amadou or German Tinder (*Fomes fomentarius,* Polyporaceae), Quinine Conk or Agarikon (*Fomitopsis officinalis,* Fomitopsidaceae), Red Belted Conk (*F. pinicola,* Fomitopsidaceae), Artist's Conk (*Ganoderma applanatum,* Ganodermataceae), Varnished Conk (*G. tsugae,* Ganodermataceae), Chaga (*Inonotus obliquus,* Hymenochaetaceae), White Gilled Polypore (*Lenzites betulina,* Polyporaceae), and Razor Strop or Birch Conk (*Piptoporus betulinus,* Fomitopsidaceae). The author, with over 35 years experience as a medicinal herbalist, lives on the edge of the boreal forest and mentions that millions of tons of these medicinal conks are available for harvest from public lands. He explains that the northern part of Canada has a number of economically marginalized communities that could benefit from cooperative collection and extraction of these medicinal mushrooms.

Rogers' appreciation of the people of the



First Nations' medicine also shows through his numerous descriptions of traditional use of fungi. For example, he mentions that chaga is the true tinder conk, as it needs no preparation as a fire starter. The author supplies two recipes for chaga, one from Russia and the other from a Cree healer from the Flying Dust First Nation. Both accounts include a slow decoction and fermentation to extract valuable sugars using water and heat. Currently, an 8:1 extract is produced commercially in the region for medicinal formulations.

False tinder conk (*Fomes fomentarius,* Polyporaceae) is prepared by cutting it into strips, soaking it in saltpeter, and then drying it. Rogers mentions the long-time use of this conk by the Cree of Alberta, who call the polypore *waskaskwitoy*. The hoof-shaped conk is dried and hollowed out, then packed with hot embers and repacked. This can be transported for several days, and upon reaching the destination, the *waskaskwitoy* can be fanned into flame. They also threw the conks onto nighttime fires. The glow and smolder kept wild animals at bay, and a morning fire could easily be started. The dry powder was also sprinkled on frostbite.

In the chapter on diamond willow fungus (*Haploporus odorus,* Polyporaceae), Rogers describes the work of Dr. R. Blanchette from the Glenbow Museum in Calgary. First Nations people carved the fungus into tennis ball shapes that were worn around the neck or on robes and blankets. The bracket polypore is closely related to *Trametes suaveolens* (Polyporaceae) and has an anise/coumarin odor when burned. This special incense of the Cree and other native tribes of Western Canada is smudged or smoldered to guard and protect against unseen forces, and it is used during blessings and during cleansing and empowerment ceremonies. The author shares his own personal experience and mentions the brightening effect of the smoke on dream states.

A number of user-friendly charts at the back of the book list medicinal properties of various mushrooms including antiviral, anti-cancer, anti-bacterial activity, and immune function. The charts also summarize species that show laboratory and clinical application for various diseases including diabetes, hypertension, hepatitis, and auto-immune conditions.

Several medicinal mushrooms given less attention in other publications are covered in *The Fungal Pharmacy*. For example, Rogers points out that smoky polypore (*Bjerkandera fumosa*, Hapalopilaceae) has been used in traditional Chinese medicine for uterine cancer. Concealed polypore (*Cryptoporus volvatus,* Polyporaceae) contains constituents with anti-cancer activity and inhibits leukotriene B4, which is related to the reduction of inflammation in asthma and related respiratory conditions. Yellow bird's nest (*Crucibulum leave,* Nidulariaceae) yields a range of compounds that possess aldose reductase, a compound that might aid eye health and the possible prevention of glaucoma and cataract formation. Under stinkhorn (*Phallus impudicus,* Phallaceae), Rogers devotes a small section to the related *Dictyophora* genus. He mentions one Hawaiian species that grows on hot lava flows for one to four hours. It emits a strong odor rich in sex pheromones that can be perceived by the human olfactory system 30 feet away. The compound is identical to or closely mimics a compound produced in females during the sexual arousal stage, but millions of times stronger, triggering a spontaneous, intense orgasm in women. As one can imagine, the market potential is huge, and research is ongoing.

The Fungal Pharmacy is a valuable resource to mycologists, researchers, oncologists, environmentalists, ecologists, wildcrafters, scientists, and anyone else interested in medicinal mushrooms. From folklore to modern scientific analysis, this book presents inspiration and hope for increasing the health and well-being of humans and other inhabitants of our planet.

—Solomon P. Wasser, PhD
Editor, *International Journal of Medicinal Mushrooms*
Haifa, Israel

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New Book Profiles

Arab/American: Landscape, Culture, and Cuisine in Two Great Deserts. Gary Paul Nabhan. Tucson, AZ: The University of Arizona Press; 2008. 141 pages, hardcover and softcover, b&w photos, references. $40.00 (hardcover); ISBN 978-0-81652-658-1. $17.95 (softcover); ISBN 978-0-81652-659-8.

The landscapes, cultures, and cuisines of deserts in the Middle East and North America have commonalities that have seldom been explored by scientists or celebrated by society at large. *Arab/American* is a revelation of the deep cultural linkages between the inhabitants of two of the world's great desert regions. With an extraordinary ear for language and a truly adventurous palate, Nabhan uncovers surprising convergences between the landscape ecology, ethnogeography, agriculture, and cuisines of the Middle East and the binational Desert Southwest.

Rare Plants of Texas. Jackie M. Poole, William R. Carr, Dana M. Price and Jason R. Singhurst. College Station, TX: Texas A&M University Press; 2007. 656 pages, softcover, color photos, b&w illustrations, maps, glossary, references, index. $35.00. ISBN 978-1-58544-557-8.

Complete with photographs, line drawings, and county maps, this book describes the officially listed, candidate, and species-of-concern plants in Texas. Individual accounts include information on distribution, habitat, physical description, flowering time, federal and state status, similar species, and published references. The authors also provide chapters on the state's vegetation regions, the history of plant conservation in Texas, ranking methods, threats to native plants, recovery methods, and reporting guidelines.

Ayurvedic Medicine: The Principles of Traditional Practice. Sebastian Pole. Philadelphia, PA: Elsevier Ltd; 2006. 399 pages, hardcover, color photos, tables, glossaries, resources, bibliography, appendices, index. $79.99. ISBN 978-0-44310-090-1.

Ayurvedic Medicine brings the unique theories and traditions of Ayurveda alive so that they are accessible to the complementary health practitioner of today. This book offers a clear, accessible, and detailed guide to Ayurvedic herbalism. It includes a brief history of the growth of Ayurveda, a discussion of its fundamental principles and treatment strategies, and a description of the energetic approach of traditional Ayurvedic herbal pharmacy and pharmacology. It also emphasizes the importance of using sustainably harvested herbs in clinical practice.

Herbal Therapy & Supplements: A Scientific and Traditional Approach. Merrily A. Kuhn and David Winston. Philadelphia, PA: Wolters Kluwer / Lippincott Williams & Wilkins; 2008. 560 pages, softcover, appendices, glossary, index. $39.95. ISBN 978-1-58255-462-4.

This pocket guide contains essentials of herbal and supplement therapy that combines the traditional and scientific worlds. The book covers 115 herbs that are commonly available in the United States and Canada and 15 nutritional supplements. Each monograph includes pharmacology, traditional and current uses, safety information, and a bibliography.

Plant Spirit Healing: A Guide to Working with Plant Consciousness. Pam Montgomery. Rochester, VT: Bear & Company; 2008. 248 pages, softcover, color photos, bibliography, index. $16.00. ISBN 978-1-59143-077-3.

Veteran herbalist Pam Montgomery offers an understanding of the origins of disease and the therapeutic use of plant spirits to bring balance and healing. She uses a process engaging heart, soul, and spirit that she calls the triple spirit path. According to Montgomery, plant spirits offer a guide to spiritual evolution—a stage of growth imperative not only for the healing of humans but also for the healing of the earth.

The Juicing Bible: Second Edition. Pat Crocker. Toronto, Canada: Robert Rose Inc; 2008. 400 pages, softcover, color photos, b&w illustrations, index. $24.95. ISBN 978-0-77880-181-8.

This new edition of a beloved best-seller provides 350 juicing recipes, including 100 new recipes. In addition to addressing more than 80 common health conditions, it offers new pages of health information, including a "healthy body systems" section that provides information on the critically important cardiovascular and immune systems. Any health-conscious person can now readily optimize the selections and combinations of prescriptive juices, which are extensively cross-referenced.

The Healing Bouquet: Exploring Bach Flower Remedies. Vinton McCabe. Laguna Beach, CA: Basic Health Publications, Inc; 2008. 464 pages, softcover, appendices, index. $19.95. ISBN 978-1-59120-072-7.

Vinton McCabe explores the history of the Bach flower remedies, as well as the philosophy behind their appropriate use. He also explains Bach's own philosophy of healing, one that stresses the need for emotional healing and the role it plays in physical health. McCabe provides in-depth portraits of the guiding symptoms for each of Bach's 38 remedies—portraits created with insight, humor, and an understanding of human emotions and behaviors that will allow readers to identify themselves and those who are part of their lives within these pages.

The Great Cacti: Ethnobotany & Biogeography. David Yetman. Tucson, AZ: The University of Arizona Press; 2007. 320 pages, hardcover, color photos, maps, glossary, references, indexes. $59.95. ISBN 978-0-81652-431-0.

Yetman has been fascinated by columnar cacti for most of his life and now brings years of study and reflection to a wide-ranging and handsomely illustrated book. Drawing on his close association with the Guarijíos, Mayos, and Seris of Mexico—peoples for whom such cacti have been indispensable to survival—he offers evidence of the importance of these plants in human cultures. Focusing particularly on northwestern Mexico and the southwestern United States, Yetman examines the role of each species in human society, describing how cacti have provided food, shelter, medicine, and even religiously significant hallucinogens.

Biology and Chemistry of Jerusalem Artichoke:* Helianthus tuberosus *L. Stanley J. Kays and Stephen F. Nottingham. Boca Raton, FL: Taylor and Francis Group; 2008. 496 pages, hardcover, tables, appendices, index. $139.95. ISBN 978-1-42004-495-9.

This book reviews the history, classification, morphology, and anatomy of the Jerusalem artichoke. It offers an in-depth explanation of Jerusalem artichoke's potential as a major source of inulin, a fructose polymer that provides dietary health benefits in relation to obesity and diabetes. It also examines the use of Jerusalem artichokes as a biofuel, as well as provides details in regards to breeding, propagation, developmental biology, and agronomic practices.

Frank Ayd Jr. 1920–2008

Frank Ayd Jr., MD, a psychiatrist who advanced psychopharmacology and arguably saved several patients from unnecessary lobotomies, died March 17, 2008, at the age of 87.[1]

"All ye who enter here abandon hope" was once a common phrase for the mentally ill in the 1950s, Dr. Ayd told the *Psychiatric Times*.[2] It was Dr. Ayd who helped make it a moot phrase for psychiatry through his use of antipsychotic and antidepressant drugs to treat the mentally ill.

In a time when lobotomies were performed for schizophrenia (and using drugs to treat mental disorders was not yet accepted practice), Dr. Ayd thought there was something in the brain that could be adjusted and suspected lobe removal wasn't the answer. He sought a biological approach to psychiatry, noticing that certain mental illnesses shared similar strange symptoms such as abnormal reactions to hot and cold and a reduced realization of pain.[3] In a clinical trial in 1957, researchers decided that no patients would be lobotomized without first undergoing a prolonged trial on reserpine.[4] Reserpine is a blood pressure-lowering alkaloid derived from the traditional Ayurvedic herb *sapagandha* or Indian snakeroot (*Rauvolfia* [or *Rauwolfia*] *serpentina*, Apocynaceae), also effective as an antipsychotic. Emil Schlittler of Ciba Pharmaceuticals in Switzerland originally discovered reserpine, but Dr. Ayd was among the first to test it for psychiatry, according to American Botanical Council Co-founder and Trustee Norman R. Farnsworth, PhD (e-mail, April 29, 2008). Though reserpine is no longer used for schizophrenia because of adverse side effects, it is still used to lower blood pressure, and it is arguable that its psychiatric use saved several patients from unnecessary lobotomies. Dr. Ayd also received the first permit from the US Food and Drug Administration in 1954 to use Thorazine®, another drug he tested in the field of psychiatry, to treat schizophrenia.[1]

"Dr. Ayd was one of the founding fathers of modern psychiatry," Philip Janicak, MD, a psychiatrist and editor of *Psychopharm Review* (which was founded by Dr. Ayd in the 1950s as a newsletter with the name "International Drug Therapy"[1]) told the *Los Angeles Times*.[3] "He changed the direction of psychiatry."

Dr. Ayd was born in Baltimore in 1920. He began medical school at the University of Maryland and completed his degree in 1945 during his time in the Navy, where he was first exposed to psychiatry.[1] He served as chief of psychiatry at Franklin Square Hospital in Baltimore from 1955–1962, then lectured at Pontifical Gregorian University in Rome from 1962–1965. He directed professional education and research at Taylor Manor Hospital in Ellicott City, Maryland, from 1969–1986, and retired from medicine in 2003.[3]

Dr. Ayd contributed to over 50 books and also wrote the *Lexicon of Psychiatry, Neurology, and the Neurosciences* (Lippincott-Raven Publishers, 1995), which became a standard reference for biological psychiatry.[1] He also contributed to the fourth edition of *Principals and Practice of Psychopharmacotherapy* (Lippincott Williams & Wilkins, 2006) and two other editions of that book.[3]

Dr. Ayd is survived by his wife Rita Anne Corasaniti; his sisters Jane Morales and Regina Brockmeyer; his brother Robert; his sons Frank III, Joseph, Thomas, Vincent, and John; his daughters Margaret Reid, Virginia Simpson, Teresa Knott, Martha Teitelbaum, Christina Lears, Rita O'Brennan, and Loretta Simpson; as well as 32 grandchildren and 38 great-grandchildren.[1] HG

—Kelly E. Saxton

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Kent Taylor 1944–2008

Kent Taylor, a major figure in the herb community in the 1970s and 1980s, died February 6, 2008. He was 63. His family owned an herb farm in California, of which he assumed management in the 1970s. At the time, Taylor's Herb Gardens was the largest supplier of live herb plants to nurseries and herb farmers across the United States and continued to be until the late 1980s.

"The simple fact of the matter is that if there is a live herb plant growing in someone's garden in the USA, it could probably trace its family history back to Taylor's Garden!" wrote Warren Raysor, Taylor's long-time friend (e-mail, April 29, 2008). "That's the primary gift that Kent brought to the herb industry."

Kent Allen Taylor was born in 1944 in Pasadena, California. He, his sister, and his older brother were raised on the family herb farm, which began on 2 acres in San Gabriel, California, a city later renamed Rosemead.[1] Kent and his wife Betty began a branch of the farm in Vista, California, just outside of San Diego in 1974. This became the main location of the farm in 1978.

"Kent was quite a gentle soul. He was two years older than me and he loved to tease me," said Taylor's sister, Jean Langely, president of Taylor's Herb Garden of Arizona, Inc. (e-mail, March 26, 2008). "Kent had a lot of charisma about him, and he was a caring and generous man." Langely's nursery in Phoenix was incorporated into the family business in 1976.

"Kent was encyclopedic in his knowledge of the growing and uses of hundreds of herbs," wrote long-time friend Anita Fieldman (freelance writer, editor, and publicist) in a eulogy e-mailed to Kent's friends and family (e-mail to M. Blumenthal, March 9, 2008). "But something he shared epitomizes him to me. 'I talk to herbs,' he said, almost shyly, not knowing what my reaction would

be. When I smiled in approval, he continued, 'and you know, they talk back to me.' I didn't doubt it for a second. Kent Taylor and the herbs of the world had a very special relationship."

Raysor agreed that plants became "inspired" in Kent's hands: "I know they talked to Kent, and he taught many people how to talk with them," wrote Raysor in a tribute to Taylor (written communication to M. Blumenthal, May 4, 2006). "Kent was a character, a Leo by nature, who would entertain busloads of visitors along his garden paths, smelling this and tasting that….Thousands of people discovered that legacy of herbs in Kent Taylor's garden."

"Kent was one of those rare individuals who make being in the herb community so interesting, and so rewarding," said Mark Blumenthal, founder and executive director of the American Botanical Council. "Kent's generosity and hospitality were legendary. Back in the late 1970s, in the heyday of the old Herb Trade Association (the initial trade organization for the herb industry), he'd invite many of his herbalist friends to spend a few days with him on his farm, showing us the herbs he and his crew were planting and tending, talking herb stories, acquainting all of us with the fragrance, flavor, and lore of many herbs that some of us had never experienced in person."

Taylor is survived by sister Jean Langely, his former wife Betty Green, his three daughters Toni, Tiffany, and Christi Taylor, and 3 grandchildren. HG

—Kelly E. Saxton

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Albert Hofmann 1906–2008

Albert Hofmann, PhD, most famous for accidentally discovering LSD and its psychoactive (referred to popularly as "psychedelic") effects, died at his home in Switzerland on April 29, 2008, at the age of 102.[1]

His research led to the discovery of important drugs like methergine, used to treat postpartum hemorrhaging, and Hydergine, which helps with circulation and cerebral function. Hofmann also developed dihydroergotamine mesylate (Dihydergot), which is still used in the treatment of migraines and orthostatic hypotension. He was also the first to isolate and name psilocybin and psilocin, the psychoactive compounds in the fabled Mexican mushrooms (*Psilocybin mexicana*, Strophariaceae) and the hallucinogenic properties of *Ololiuqui*, psychoactive morning glories (*Ipomoea* spp, *Rivea corymbosa* etc., Convolvulaceae).[2]

Dr. Hofmann was born in Baden, Switzerland, January 11, 1906. He received his PhD in chemistry from Zürick University in 1929. He headed the Sandoz Laboratories research department for natural medicine from 1929 to 1971, when he retired. He wrote over 100 scientific articles and authored and co-authored several books.[3]

While working as a chemist at Sandoz in the 1930s, Dr. Hofmann studied ergot (*Claviceps purpurea*, Clavicipitaceae) a fungus that grows on rye.[1] Though viewed as poisonous, the ergotine alkaloid derived from it has been used as a medicine to induce labor. According to Dennis McKenna, PhD, senior lecturer and research associate at the Center for Spirituality and Healing at the University of Minnesota, the poisonous constituents are collectively known as the ergot alkaloids, all of which are lysergic acid derivatives (e-mail, May 30, 2008). Many ergot alkaloids and semi-synthetics derived from them have important uses in medicine. Dr. Hofmann synthesized lysergic acid diethylamide-25 (LSD) in 1938 and accidentally found its psychoactive effects later in 1943. Hoffman's "accident" became famous. It was the first time a human had ingested LSD, which led to a very uncomfortable bicycle ride and the first "acid trip."

His original goal when synthesizing LSD was to find a substance to stimulate the circulatory and respiratory systems.[2] Though this wasn't accomplished, he was certainly successful in creating a compound that eventually inspired a movement of experimental and creative music, films, and other art forms.

LSD was banned in the United States in 1966 for a myriad of reasons.[1] "It was, basically, hysteria and fear that led to the blanket prohibition of LSD and other psychedelics," said McKenna. "It was really an overreaction to a class of drugs that, despite their dramatic effects, are non-addictive, non-toxic, and really quite safe if used appropriately."

Dr. Hofmann fought for LSD's reintroduction into research, arguing that it was likely to help patients with mental illnesses such as schizophrenia. He also proposed that it might also help treat alcoholism.[4] LSD has recently been approved for use in a psychotherapy research project in Switzerland, which is sponsored by the Multidisciplinary Association for Psychedelic Studies (MAPS), a California-based nonprofit that sponsors research aimed at developing psychedelic agents as prescription medicines. This research project will be conducted by Peter Gasser, PhD, a psychiatrist and psychotherapist in Switzerland, on patients with anxiety associated with end-of-life issues, according to Rick Doblin, founder and president of MAPS (e-mail to M Blumenthal, April 30, 2008). Doblin added that LSD has been studied for treatment of alcoholism, heroin addiction, end-of-life acceptance, anxiety, and depression.[5]

"Similar studies are going on in the US, one with psilocybin at

UCLA, another about to start with MDMA at Harvard's McLean Hospital. No currently approved studies with LSD are ongoing in the United States, but that may change soon," wrote McKenna (e-mail, May 21, 2008). "The psychedelics hold great promise for the treatment of mental disorders. Psilocybin has emerged as the medicine of choice in most of these studies because of its inherently low toxicity, relatively short duration of action, and more easily accommodated 'altered state' than LSD. LSD also has the cultural baggage and notoriety that makes it harder to get approved for studies, but it's also a perfectly good medication and I think will now be more aggressively investigated."

Doblin described Hofmann before his departure as "fully lucid and deeply satisfied that LSD psychotherapy research had been permitted to resume" (e-mail to M. Blumenthal, April 30, 2008). Doblin added that Dr. Hofmann called the renewal of LSD psychotherapy research the fulfillment of his heart's desire.

"He did make many other important contributions to pharmacology and medicine," said McKenna. "He is 'notorious' for LSD and I suppose some people will 'blame' him for that, as if it were his fault somehow. But he didn't start out to make a dangerous, illegal drug; he was a scientist who accidentally discovered something that changed history, changed society, and just maybe changed evolution."

Dr. Hoffman is survived by 3 children but outlived a son and his wife. The names of the surviving children have not been released to the public. "Albert died several months after his wife Anita died on December 20, 2007, demonstrating that their love affair of over 70 years was the primary motivation for both of them to stay alive so long," wrote Doblin.

More tribute articles about Albert Hofmann can be accessed at www.maps.org. HG

—Kelly E. Saxton

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Valerian *Continued from page 2*

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2008

August 3–8: 7th Joint Meeting of AFERP, ASP, GA, PSE & SIF: Natural Products with Pharmaceutical, Nutraceutical, Cosmetic, and Agrochemical Interest. Athens, Greece. This is the joint meeting of the *Association Francophone pour l'Enseignement et la Recherche en Pharmacognosie (*AFERP), or the French-speaking Association of Teaching and Research in Pharmacognosy; the American Society of Pharmacognosy (ASP); the *Gesellschaft für Arzneipflanzenforschung* (GA), or the Society for Medicinal Plant Research; the Phytochemical Society of Europe (PSE); and the *Società Italiana di Fitochimica* (SIF), or the Italian Society of Phytochemicals. Held at the Athenaeum Intercontinental Hotel, this meeting will include scientific topics such as drug discovery from natural sources, natural products with agrochemical and veterinary interest, and bioavailability and quality of herbal drugs. For more information or to register, please visit the Web site: www.jointmeeting.2008athens.gr.

August 11–15: 2008 International Training Program on Natural Products: Botanicals, Nutraceuticals, and Medicinal and Aromatic Plants, "From Sourcing and Production to Processing and Product Development, and from Quality Control to Health Applications." Rutgers University, New Brunswick, New Jersey, with part of the course held (transportation provided) at the New York Botanical Garden, Bronx, NY. This intensive training program is intended for those seeking in-depth knowledge and expertise in natural products. Topics will include the historical roles and modern uses of natural products, genetics and plant production, processing and extraction of plant products, basic plant chemistry and biochemistry and their relevance in the commercialization of final processed botanical products, essential oils, herbal teas, spices, and phytomedicinals and dietary supplements. More information, including a full course description and registration information, are available at the Web site: www.aesop.rutgers.edu/~newuseag/itp2008.htm.

August 24–28: 6th International Symposium on *In Vitro* Culture and Horticultural Breeding. Brisbane, Queensland, Australia. Held every four years, this symposium is an opportunity for sponsors and exhibitors to promote their products and services to an appropriate audience. The theme of this year's symposium is "2020 Vision for *in vitro* horticultural breeding" and topics include recent advances in the following: plant tissue culture, plant molecular breeding, *in vitro* breeding systems, and more. The symposium will take place at the Chifley at Lennons hotel, which is near such tourist attractions as the Brisbane River, the Queensland Art Gallery, and the Brisbane Botanical Gardens. For more information please visit the Web site: www.une.edu.au/campus/confco/ivchb2008/.

August 29–September 4: 68th International Congress of FIP. Basel, Switzerland. This year the International Pharmaceutical Federation (FIP) will co-host the World Congress of Pharmacy and Pharmaceutical Sciences with the Pharmaceutical Society of Switzerland. This event includes lectures, plenary sessions, poster exhibitions, section programs, council meetings, and the leadership conference. The annual congress also serves the Young Pharmacists Group with specially planned sessions and workshops focused on current issues facing the pharmacist profession. During the conference, the results of the Global Survey on Hospital Pharmacy Practice will be presented. Invited experts will introduce official representatives to discuss medicines procurement, prescribing, preparation and distribution, administration of medicines, outcome monitoring, and human resources. For more information visit the Web site at www.fip.org/CONGRESS/basel2008/ or call +31 (0) 70 3021982.

September 1–5: 2nd International Society for Horticultural Science (ISHS) International Humulus Symposium. Ghent, Belgium. The Symposium will be held at the Institute for Agricultural and Fisheries Research (ILVO) in Melle (near Ghent), Belgium; transportation between the Ghent city hotels and the conference site will be organized. The aim of this conference is to explore the progress being made on various aspects of hops research. Topics will include hops breeding and molecular genetics; hops cultivation and management; hops and health; and hops and beer. Features of this conference will include lectures by invited speakers, oral presentations, and poster sessions. The official language of the Symposium will be English and the proceedings of the Symposium will be published by ISHS. More information is available at the Web site: www.ishshumulus2008.ugent.be/meeting/invitation.htm.

September 4–7: 22nd Breitenbush Herbal Conference: An Herbal Infusion. Breitenbush, Oregon. Located at the Breitenbush Hot Springs Retreat and Conference Center, this event will include demonstrations, herb walks, and 30 workshops on topics such as the medicine of bees, the magic and medicine of chocolate, and seaweeds and health. A keynote address will be given by Christopher Hobbs, famous herbalist and author; other speakers include Herbalist Glen Nagel, ND, RH, and Cascade Anderson Geller, herbalist. The main conference begins on Friday at 4:30 pm with two special pre-conference intensive workshops taught by Herbalist Deborah Frances, RN, ND, and Brigitte Mars, a well-known herbalist and nutritionist. Registration for all events can be accomplished by visiting the Web site: www.breitenbushherbalconference.net/ or by calling 503-238-4513.

September 24–26: USP Annual Scientific Meeting 2008. Kansas City, MO. With the theme of "Quality of Manufactured Medicines, Quality of Food Ingredients and Dietary Supplements," this annual meeting is a chance to help establish the standard, priority, and the shape of USP quality requirements. Attendees have a chance to interact with USP scientific staff, members of expert committees, and peers in the scientific community. One may also learn about the new standards that are being implemented by USP. A block of rooms are reserved for conference attendees at the Westin Crown Center hotel. All attendees will receive a detailed program, CD ROM, and workbook upon arrival. More information is available at the Web site: www.usp.org.

September 26–28: Healthy Harvest Show. Long Beach, CA. The Official Tradeshow of the Natural Products Association West (NPA-West) is to be held at the Long Beach Convention Center. The aim of this tradeshow is to represent and protect retailer and suppliers in CA, AZ, NV, HI and Guam. The host hotel for this tradeshow, which has a special rate for attendees, is the Hilton Long Beach and Executive Meeting Center.

Last year's tradeshow, at the same location, doubled the overall attendance of the tradeshow as compared to the one the year before, located in Santa Clara, CA. A record number of exhibitors are expected at this year's show as well. For more information visit the Web site at www.healthyharvestshow.com or contact Ann Tisserand at (805) 646-4246 or AnnT@healthyharvestshow.com.

October 2–5: CRN's Annual Symposium on Dietary Supplements. Santa Ana Pueblo, New Mexico. With the aim of bringing together leaders in the dietary supplement industry, this annual symposium is an opportunity to market products and services to the heads of leading domestic and international companies in the industry. Extra activities include golf, horseback riding, wine tours, and a chance to view the Albuquerque International Balloon Fiesta. Flights should be booked well in advance because the timing of this event overlaps with this famous balloon event. Special rates are available for conference attendees at the Hyatt Regency Tamaya Resort & Spa. More information is available at the Web Site: www.crnusa.org/TheConference. For questions contact Designing Events at 410-654-5525 or e-mail CRN@designingevents.com.

October 12–17: Destination Health: Renewing Mind, Body & Soul. Kauai, Hawaii. The eighth annual meeting of this conference presents itself as a luxury vacation combined with lectures, workshops, and activities designed to heighten wellness, health education, and spirituality. Its location is Kauai, Hawaii, at the Marriott Resort & Beach Club located on the Kalapaki Bay. Recreation includes beach activities and golfing. More information can be obtained by calling 858-652-5400, e-mailing med.edu@scrippshealth.org, or visiting the Scripps Web site: www.scripps.org.

October 13–15: The 4th Annual Symposium of Integrative Medicine Professionals in the Land of Enchantment (SIMPLE IV). Santa Fe, New Mexico. Learn about the philosophy and advancement of integrative medicine from world-renowned experts such as Larry Dossey, MD, Tieraona Low Dog, MD, and other leaders in the field. Special guests from around the country, along with faculty from the University of New Mexico

and the University of Arizona, will share their integrative medicine knowledge and experiences in energy medicine, spirituality, progressive nutrition, botanical medicine, pain and chronic disease management, stress management in health and healing, and more. The 2 and a half day conference offers 8 plenary sessions and 40 different breakout sessions, as well as well yoga and meditation sessions. More information is available at the Web site: http://hsc.unm.edu/som/cfl/simpleConf.shtml.

More calendar listings at
www.HerbalGram.org

In this department of *HerbalGram*, we list resources such as publications, organizations, seminars, and networking for our readers. A listing in this section does not constitute any endorsement or approval by *HerbalGram*, ABC, or its Advisory Board.

The American Herbal Products Association (AHPA) has created a new job board powered by Consumer Packaged Goods jobs (CPGjobs). This enhanced feature is intended to help natural products companies find and hire quality applicants. Though CPGjobs is powering the new AHPA job board for free, there is a mutual benefit for both groups through the exposure to more high-quality candidates. All job candidate information is confidential with the level of disclosure solely decided by each candidate. Job posters also have control over the job posting, which allows the posted job to be modified after its initial submission to reflect changes. Positions posted by AHPA members—and those who sign up through AHPA—are also highlighted and placed at the top of the list, providing enhanced visibility. Position listing is free for AHPA members. Non-member companies must pay $200 for 60 days. More information about the job board is available at the AHPA Web site: www.ahpa.org.

The United States Pharmacopeia (USP) is offering "How to Develop a Monograph," an online course intended for anyone who desires to learn the skills necessary to structure a professional monograph. There are no prerequisites to take this course. The format is on-demand Web slides and audio. One may view a slide as many times as needed with a DVD-like play-back feature. At the end of each lesson are questions to test the knowledge gathered. The course concludes with something similar to a final exam, but it is open book and one may give any section a second glance while taking the test. The course takes about an hour and the purchaser has 30 days to finish the course after the initial log-on. Topics include the following: the value of a USP monograph, when to submit a monograph, contents of a USP monograph, the role of the USP Council of Experts and Expert Committees, the monograph development tools, the monograph submissions process, the USP revision process, the USP reference standards, and the USP standards for articles legally marketed outside the US (SALMOUS) monographs. Those interested in registering should contact USP customer service at 1–800–227–8772 or custsvc@usp.org. The cost is $99.

Aviva Romm: Integrative Medicine for Women and Children is a Web site intended to provide educational information about natural solutions for women's health, gynecology, obstetrics, and pediatrics. Aviva Romm is a practicing herbalist since 1985, a midwife, and a fourth-year medical student at Yale. The Web site provides information about her course titled "Herbal Medicine for Women," sample newsletter articles from *Botanica* (the newsletter for Herbal Medicine and Women), information about Romm's books, and access to several of Romm's articles. More information about Aviva Romm and her Web site can be accessed at www.avivaromm.com/homepage.

LycoRed has launched a new version of its previous Web site to heighten consumer lycopene awareness worldwide. What was previously LycoRed.org has been changed to www.lycopene.com. This change is designed to encourage more hits to the Web site since the keyword "lycopene" is more commonly entered in general search engines. The main objective of the new Web site is to highlight the differences between synthetic and natural lycopene. Natural lycopene has more evidence of bioavailability and potential health benefits related to a range of cancers as well as heart and skin health. Synthetic lycopene has an economic advantage in the United States due to its lower cost. More information about the Web site is available at www.lycopene.com. LycoRed's business partner, the Heinz company, also has a lycopene information site located at www.lycopene.org.

The Massachusetts College of Pharmacy and Health Sciences (MCPHS) is implementing a new 9-month Graduate Certificate Program in Applied Natural Products for Fall 2008. This program will consist of 3 courses: Applied Natural Products I, Principles of Functional Medicine, and Applied Natural Products II, each worth 3 credit hours. Most semesters will combine a hands-on 5-day intensive class and online coursework. This program has a rolling admission with the first class commencing August 6–10, 2008 and the second class following in March-April 2009, exact dates to be announced. Students who complete this program will be eligible to transfer their credits toward the Master of Applied Natural Products at MCPHS, which is a new degree program in natural products. For more information about admission requirements, curriculum, etc., visit the following Web sites: www.mcphs.edu/canp and www.mcphs.edu/manp. For questions e-mail manp@mcphs.edu.

Gaiam, Inc., a distributor of special interest programming, has released an Ayurveda line of Wellness DVD titles: Ayurveda for Weight Loss, Ayurveda for Stress Relief, and Ayurveda for Detox. Each 85-minute DVD has a listed retail price of $20 and is hosted by John Douillard, PhD, a renowned Ayurveda practitioner, teacher, and author. Each DVD features basic information about Ayurveda, Ayurveda information for a specific condition, and instruction on proper eating, meditation, self-massage, breathing exercises, and yoga. More information about Gaiam and these titles can be accessed by visiting www.gaiam.com or calling 800-869-3603.

Nutrition Business Journal (NBJ) launched a new Web site in early June. The first NBJ site was launched in 1998. The new site is designed to have a more intuitive interface, linking visitors to NBJ information more efficiently. New features of the improved site include an editorial blog, weekly news items, editorial calendar, enhanced search ability, and a new subscriber-only section. In addition, the new Web site gives subscribers access to 5 years of past articles, which are organized into "channels" such as supplements, raw materials and ingredient supply, natural and organic foods, and alternative medicine. The channels organize NBJ's data charts, issue articles, news, back issues, reports, and Web seminars into more user-friendly areas. The redesigned Web site intends to make more information available to subscribers and be more user-friendly for non-subscribers as well. The print version of the *Nutrition Business Journal* is also undergoing a redesign at this time. The new site can be viewed at http://nutritionbusinessjournal.com and the new blog can be accessed at http://blog.nutritionbusinessjournal.com/nbj/.

Publications

American Herb Association Quarterly Newsletter: $20/yr. AHA, P.O. Box 1673, Nevada City, CA 95959.

Australian Journal of Medical Herbalism: quarterly publication of the National Herbalists Association of Australia (founded in 1920). Deals with all aspects of Medical Herbalism, including latest medicinal plant research findings. Regular features include Australian medicinal plants, conferences, conference reports, book reviews, rare books, case studies, and medicinal plant reviews. AUD/$95 plus AUD/$15 if required by airmail. National Herbalists Association of Australia, 33 Reserve Street, Annandale, NSW 2038, Australia.

HerbalGram: Quarterly journal published by the American Botanical Council. A benefit at all levels of membership in ABC. See page 2 for membership information or join online at www.herbalgram.org. P.O. Box 144345, Austin, TX 78714. 800-373-7105 or fax 512-926-2345. E-mail abc@herbalgram.org.

Medical Herbalism: Subtitled "A Clinical Newsletter for the Herbal Practitioner." Edited by Paul Bergner. $36/yr, $60/2 yrs. Canada $39/yr. Overseas $45/yr. Sample/$6. Medical Herbalism, P. O. Box 20512, Boulder, CO 80308.

Other

Get Certified with ABC's Herbal Information Course. This self-paced online course is designed to help retail employees and multi-level distributors communicate knowledgeably with customers about herbs and dietary supplements. After successfully completing the course, you'll receive an Herbal Information Specialist Certificate and a window decal announcing "Herbal Information Specialist On Staff." Renewable annually. $69.95 Bulk pricing available. www.nutrilearn.com.

Interns, Get hands-on experience before you graduate! If you're a future pharmacist or dietitian, you can choose a rotation through ABC's internship program. You'll get a comprehensive introduction to phytomedicines, researching the medicinal, culinary and cosmetic uses of herbs, answering ABC members' questions, working with medicinal plants in ABC's 2.5 acres of herbal gardens, and preparing herbal salves, tinctures or meals. For more information, call 512-926-4900 or e-mail education@herbalgram.org.

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