

## Investigating the Science Behind Plants as Treatments

**F**or thousands of years, people around the world have used plants and plant products in the hope of treating or preventing disease. In many countries and cultures, medicinal plants are still a key component of medical care. Plants are also the basis for many modern prescription drugs, such as digitalis (from the foxglove plant), which is used to treat heart problems, and paclitaxel (from the yew tree), used to treat cancer.

Plants and their products, which together are called botanicals, make up an important research area for NCCAM. Examples of botanicals are flowers, leaves, bark, fruits, seeds, stems, and roots; exudates (that is, substances emitted by plants); and algae. About 25 percent of the economic market for dietary supplements in America consists of botanicals.

For the most part, botanicals have not been rigorously studied. Even though many of them have been used for centuries, there are many reasons to study them now. For example, some botanicals may be toxic. Some have been found to interact with other botanicals or with medications (whether prescription or over-the-counter). Often the ingredient(s) that are active medicinally in a botanical are unknown or not well understood.

“Our research portfolio in botanicals covers a wide range—from laboratory-based research studying their effects on the body to large clinical trials testing their safety and effectiveness in people,” says NCCAM Director Stephen E. Straus, M.D. “Exploring how and why botanicals act in the body is a key step in evaluating their safety and effectiveness.”

Recent NCCAM-sponsored research has led to important insights about botanicals on:

► **Interactions.** For example, NCCAM-funded studies have found that both St. John’s wort and PC SPES (a botanical mixture marketed for prostate health until the U.S. Food and Drug Administration warned consumers to stop its use because it contained an unlabeled prescription drug) affect the activity of a key enzyme in the liver. This, in turn, affects

the processing of some drugs by the body, causing some of them to be less effective and others potentially more toxic.

► **Benefits.** A 2003 study found that an extract from the root of a botanical called Chinese skullcap (Huang Qin) strongly inhibits cancer cell growth in the laboratory setting, especially cells present in head and neck cancers (forms of cancer typically resistant to multi-drug chemotherapy). Future NCCAM-sponsored studies will investigate this botanical’s effects on cell replication and whether it can be translated into a safe and effective treatment for cancer patients.

► **Lack of benefit.** Some NCCAM-funded studies have found that botanicals do not deliver on claims made for them. For example, in December 2003, NCCAM-funded researchers reported that an echinacea preparation did not lessen the symptoms or duration of colds in children. The study included 500 children, aged 2 to 11 years, who were given echinacea when they started to have symptoms of a cold.

In fiscal year 2003, NCCAM spent \$24.8 million on research related to botanicals. This fiscal year, 2004, research on botanicals continues to be a very active area. Some highlights are described below.

NCCAM sponsors a **Botanical Research Centers (BRCs) Program** in partnership with the National Institutes of Health

**NCCAM Invites You to  
Help Plan Its Future**

See pg. 3 for details



Preparing dried St. John’s wort (Hypericum perforatum) for extraction and analysis

Photo by Peggy Greb

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## Science Behind Plants as Treatments, continued from pg. 1

(NIH) Office of Dietary Supplements (ODS) and the National Institute of Environmental Health Sciences (NIEHS). Currently, there are five BRCs cofunded by NCCAM (to find out more, go to [nccam.nih.gov/training/centers](http://nccam.nih.gov/training/centers) and scroll down to “Centers for Dietary Supplements Research: Botanicals”). Investigators at these centers are working to “characterize” botanicals, or define their chemical and biological characteristics as completely as possible. This is important to achieve before a botanical product is tested in a clinical trial (a research study in people). The botanical products tested in clinical trials need to be as stable and consistent as possible in their composition and actions in the body in order for trial results to be most meaningful. Among the challenges in studying botanicals is that it is difficult to make botanical products so that every batch is fairly similar. Active ingredients in the same species of plant can vary widely depending on such factors as where the plant is grown, when it is harvested, how it is prepared, and how it is stored.

In December 2003, NCCAM (with ODS and NIEHS) issued a request for applications to form new centers, following the recommendations of an expert panel that reviewed the BRCs Program in 2003 (more at [nccam.nih.gov/training/centers/bot-research-index](http://nccam.nih.gov/training/centers/bot-research-index)).

NCCAM is supporting a research initiative to study **cranberry** for the prevention and treatment of urinary tract infections, other infections, and other conditions for which there has been promising early evidence. In February 2002, NCCAM released a solicitation for research-grade cranberry products to be developed for use in NIH-sponsored studies. The selected contractor is developing a cranberry powder in capsules, a cranberry juice cocktail, and a matching placebo for each. While these materials were being developed, in February 2003 NCCAM requested cranberry research project applications. As of February 15, 2004, nine grants had been awarded—two to find out more about how cranberry behaves in the body and interacts with drugs,

two on its basic science, four on its use to prevent urinary tract infections, and one on its use against dental plaque. The cranberry initiative is being cosponsored by NCCAM, ODS, the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), and the National Institute of Dental and Craniofacial Research.

**Phase III clinical trials** sponsored by NCCAM are progressing on three botanicals: *Ginkgo biloba* for preventing Alzheimer’s disease, St. John’s wort for treating minor depression (cosponsored with the National Institute of Mental Health and ODS), and saw palmetto for relieving symptoms of prostate enlargement (cosponsored with NIDDK).

Another key area is **international collaborations**. In September 2003, NCCAM launched a new program by awarding 10 Planning Grants for International Research Centers on Complementary and Alternative Medicine (CAM). These grants are establishing global collaborations and cross-cultural exchange among international and U.S. institutions to design and implement research on CAM approaches—including botanicals—from traditional medical systems, such as those of China, India, and Korea.

NCCAM’s portfolio includes **additional projects** on botanicals—such as garlic (a CAM therapy commonly used by patients with HIV/AIDS) and how it interacts with antiretroviral medications; plants traditionally used by Native Americans to treat tuberculosis; feverfew, for its potential usefulness against migraines; and borage oil, for its potential benefits in rheumatoid arthritis.

“NCCAM recognizes the potential of botanicals and is committed to their rigorous research,” says Dr. Straus. “Ultimately, the public will benefit as we discover which botanicals are safe and effective—and which are not.” ■

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For more information on botanical supplements, go to [nccam.nih.gov/health/supplements](http://nccam.nih.gov/health/supplements) or contact the NCCAM Clearinghouse (see box at left).

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**Our mission:** NCCAM is dedicated to exploring complementary and alternative healing practices in the context of rigorous science, training complementary and alternative medicine researchers, and disseminating authoritative information to the public and professionals.

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# Celebrating 5 Years, NCCAM Invites Your Input on Strategic Planning

In 1999, the U.S. Congress established NCCAM at the National Institutes of Health. NCCAM celebrates its fifth anniversary in 2004. As part of that celebration, the Center has launched a strategic planning initiative to establish its vision and goals for the years 2005 to 2009. All stakeholders (the public, health care professionals, researchers, and others) are invited to be part of this planning process. Here are the ways you can participate:

- ▶ **Submit your written views and recommendations** about NCCAM's future direction at [nccam.nih.gov/about/plans/2005](http://nccam.nih.gov/about/plans/2005).
- ▶ **Comment on the draft strategic plan** when it is posted in Fall 2004 on the NCCAM Web site.

NCCAM's first strategic plan set out a vision and plans for the years 2001 to 2005 (see [nccam.nih.gov/about/plans/fiveyear](http://nccam.nih.gov/about/plans/fiveyear)). The Center now seeks to build on its achievements, refine its goals, and prioritize its investments to realize the greatest success and impact in the upcoming years. The first public events in the strategic planning process were NCCAM's two Stakeholder Forums. The first was held on March 22, 2004, in Bethesda, Maryland; at press time, the second is scheduled for April 19, 2004, in Seattle ([nccam.nih.gov/about/plans/2005](http://nccam.nih.gov/about/plans/2005)).

## Five Years...and Counting

Stephen E. Straus, M.D., Director of NCCAM, announced the new strategic planning effort during his annual State of the Center Address on January 30, 2004. He also recounted the Center's accomplishments from 1999 to the present. Among those accomplishments:

- ▶ NCCAM has become fully integrated into NIH's science and leadership. It has engaged in many productive collaborations with fellow Institutes and Centers.
- ▶ The research arena in complementary and alternative medicine has expanded—through an intramural program, a refined Research Centers Program, and a rise in the number of project grants (to more than 300 currently). More than 700 scientific articles have been published on NCCAM-supported findings. Powerful new technologies, such as brain imaging (e.g., to study the effects of acupuncture), are being harnessed to gain insight into what CAM therapies work and why. Productive international collaborations have been established.
- ▶ NCCAM's first clinical trials have been carried out, and more are under way—such as the largest-ever placebo-controlled trials on certain dietary supplements (such as glucosamine for degenerative arthritis).
- ▶ Innovative plans are in place to ensure the quality of botanicals for use in NCCAM-sponsored clinical trials.

- ▶ Grants for training and career development have expanded the number of investigators and the depth of expertise.
- ▶ NCCAM's information has been reaching an ever-widening audience—for example, through more publications, an expanded Web site, and an array of events for the public.



*Dr. Straus and Dr. Margaret Chesney, NCCAM Deputy Director, celebrate the Center's first 5 years on January 30, 2004.*

“Above all,” Dr. Straus said, “NCCAM research findings have begun to have an impact on public policy, on choices made by patients, and on clinical practice. As we move ahead, our primary goals will continue to be maintaining an open and objective approach to CAM research and communicating those research results to our stakeholders.” Elias A. Zerhouni, M.D., NIH Director, praised NCCAM at its fifth-year anniversary for “5 years of stellar work and aggressively mapping the future of the field through strategic planning.” ■

## Calendar of Events

This calendar lists events on complementary and alternative medicine (CAM) that are sponsored or organized by NCCAM or other components of NIH, and includes information available at press time.

### **Meeting of the National Advisory Council for Complementary and Alternative Medicine:** June 4.

Location: NIH Neuroscience Building, 6001 Executive Boulevard, Rockville, Maryland. For more information, go to [nccam.nih.gov/about/advisory/naccam](http://nccam.nih.gov/about/advisory/naccam).

### **Telephone Educational Workshop:** June 22, 1:30–2:30 p.m. ET.

“An Overview of Complementary and Alternative Medicine and Cancer.” Speaker: Stephen E. Straus, M.D., NCCAM Director. Designed for people with cancer and their family and friends, this workshop is a collaboration between NCCAM, Cancer Care, Inc., and the American Society for Clinical Oncology. Participants will listen by telephone, and both registration and the telephone call are free. To register, go to [www.cancercare.org](http://www.cancercare.org) or call 1-800-813-4673. The workshop will be archived at [www.cancercare.org](http://www.cancercare.org).



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## OTHER INFORMATION

NCCAM Director Stephen E. Straus, M.D., is senior author of "Ethical Issues Concerning Research in Complementary and Alternative Medicine" in the February 4, 2004, issue of the *Journal of the American Medical Association*. To view an abstract of the article, as well as other **items by and about Dr. Straus**, visit the new "Director's Corner" on NCCAM's Web site, at [nccam.nih.gov/about/dircorner](http://nccam.nih.gov/about/dircorner).



On February 6, 2004, the U.S. Food and Drug Administration (FDA) issued a "final rule" prohibiting the sale of dietary supplements containing **ephedra** (ephedrine alkaloids). This rule is to take effect on or about April 6, 2004. The FDA also advised consumers to stop using these supplements, finding them to carry an unreasonable risk of illness or injury (more at [www.fda.gov](http://www.fda.gov)). An NCCAM Consumer Advisory on ephedra is available at [nccam.nih.gov/health/alerts/ephedra/consumeradvisory](http://nccam.nih.gov/health/alerts/ephedra/consumeradvisory).



The *Congressional Justification 2005* is available on the NCCAM Web site at [nccam.nih.gov/about/congressional](http://nccam.nih.gov/about/congressional). This document, prepared each year for the consideration of the U.S. Congress, outlines NCCAM's plans and priorities for fiscal year 2005 (which begins October 1, 2004) and includes details of the proposed budget, a legislative history, and other items.



If you do not have access to the Web, please note that NCCAM-published documents mentioned in this issue are also available from the **NCCAM Clearinghouse** (see pg. 2).

**In advisory council news:** U.S. Health and Human Services Secretary Tommy G. Thompson has announced the appointment of **Robert E. Fullilove, Ed.D.**, to NCCAM's principal advisory body, the National Advisory Council for Complementary and Alternative Medicine. Dr. Fullilove is Associate Dean for Community and Minority Affairs at Columbia University's Joseph L. Mailman School of Public Health.

## NEWS FOR RESEARCHERS

Visit [nccam.nih.gov/research/announcements](http://nccam.nih.gov/research/announcements) for more information on these and other NCCAM funding opportunities.

- ▶ Program Announcement (PA-04-053): **Developmental Projects in Complementary Approaches to Cancer Care.** Sponsors: NCCAM, the National Cancer Institute, and two other NIH components. The major focus is research on complementary approaches (i.e., approaches that can be used with conventional medicine) as they relate to the prevention, diagnosis, and treatment of cancer, cancer-related symptoms, and side effects of conventional treatment.
- ▶ Program Announcement (PA-04-033): **Diet Composition and Energy Balance.** Sponsors: NCCAM and eight other components of NIH. These grants will support research in animals and people on how the elements of diets (and how various diets themselves) affect energy expenditure, weight gain or loss, and related processes. The knowledge gained is intended to help address overweight and obesity in the United States.
- ▶ Program Announcement (PA-04-046): **Clinical Cancer Therapy and Prevention Research.** Sponsors: NCCAM and the National Cancer Institute. These grants will support innovative clinical trials and related laboratory studies in order to develop insights into cancer biology and new approaches to preventing and treating cancer.