T
he next time you think you might be more intelligent than the plants in your backyard, consider these recent research findings—plants can differentiate between the pull of gravity and a similar type of force produced by mechanical stimulation, and they can respond accordingly.

The study, “The Fast and Transient Transcriptional Network of Gravity and Mechanical Stimulation in the Arabidopsis Root Apex,” which was funded by NASA and published in the September 2005 issue of Plant Physiology, also revealed that when a plant is disturbed—meaning contact with wind, rain, rocks, animals, humans, or natural forces such as gravity have exerted a stress on the plant—the specific genes responsible for keeping the plant stable and its roots and shoots growing respond very quickly, often within 1 minute of the stimulus.

Genetic instructions in living cells—whether plant or animal—are transferred from the DNA to molecules of messenger RNA that subsequently direct the manufacture of protein within an organism, which then creates change of some sort, as directed by the information. This transfer of instructions is called transcription and it is this mechanism that the study addressed. To learn more about the transcriptional response mechanisms in plants, the authors (all from North Carolina State University) conducted a whole-genome microarray analysis of Arabidopsis root apices after both gravity stimulation and mechanical stimulation and then monitored transcript levels of 22,744 genes. Their research revealed that 65 of the Arabidopsis root’s genes responded specifically to gravitational stimulation and that 26 genes responded specifically to mechanical stimulation. The team also discovered that approximately 7% of the plant’s genes responded to both mechanical and gravitational stimulation.

Although the researchers had anticipated that plants did have the ability to differentiate stimuli, “the rapidity of the response was a surprise,” says Heike Winter Sederoff, PhD, assistant professor in the Department of Botany at North Carolina State University in Raleigh, North Carolina, and one of the authors. According to Sederoff, it was from a lucky coincidence that they were able to catch the fast responses. However, since publication of the study, the research team—which includes Jeffery M. Kimbrough; Heike Winter Sederoff, PhD; Christopher
completed. "We know that electrical signal-
shoots toward a source of light, they do not understand how this is accom-
stand that plants can sense the direction
wards light."

"Gravitropism is a key mechanism because all land plants orient their roots into the soil and their shoots to-
around a rock in the soil or follow the path of the sun during the
day," says Sederoff. "Gravitropism is a key mechanism because all land plants orient their roots into the soil and their shoots to-

However, although scientists under-
and force of gravity or can point their
shoots toward a source of light, they do not fully understand how this is accom-
plished. "We know that electrical signal-
ning, calcium, phytohormones, and spe-
cific structures in some cells are involved in
this process, but we do not know how they are connected and how different cells coordinate the response," says Sederoff. Of course, as with any scientific discipline, understanding this process in plants may lead to new understandings about our-
selves and the world we live in.

Can Medicine Learn From Biology?

Indigenous healers speak regularly of how the care and preparation of herbs makes a difference in their potency and the quality of their medicinal properties. Herbalists tell us that growing an herb out of its natural environment may affect its chemical com-
position, altering the active ingredient for
which the herb is sought, yet these perspec-
tives are often dismissed by the medical community as being "unproven." However, perhaps they have been dismissed too
quickly. As shown through the study dis-
cussed above, other fields of science such as
plant physiology and functional plant bio-
yology are accumulating a growing body of ev-
eidence that plants can communicate with
other life forms and that plants do change
based on changes in their environment.

"There are studies about plants respond-
ing to the proximity of other plants and sev-
eral such 'communications' between plants
have been shown, and a few mechanisms
have been found," says Sederoff. "Volatile
chemicals like the plant hormone ethylene
play an important role in plant to plant com-
munication and certain plants release chem-
icals into the soil to 'mark their territory' and
prevent other plants from growing."

More is known about the internal com-
munication systems of plants than external
ones, however. "We know about cell to cell
communication by electrical signaling and
metabolic signaling. Cells in plant organs
are usually directly connected via 'lasmodes-
mata,' so they can exchange metabolites and
nutrients, but it has also shown that small
proteins and even RNA can be transported
between cells through these channels. Plants
also use specific small molecules to 'com-
municate' between cells that are the same as
those used by animal cells. And just like an-
imals, plants use hormones (so called phyto-
hormones) to coordinate the response and
development of entire organs and between
organs."

Response to Stimuli

Responses of plants to a "directional" stim-
ulus such as light or gravity are called "tro-
pisms": gravitropism is the response to grav-
ity; phototropism is the response to light;
and thigmotropism describes the response
of a plant to a mechanical stimulus such as
rain or wind or rocks in the soil. "Plants
cannot just get up and move, so they respond to
these stimuli with a change in their direction of
growth, ie, they grow around a rock in the
soil or follow the path of the sun during the
day," says Sederoff. "Gravitropism is a key
mechanism because all land plants orient their roots into the soil and their shoots to-

However, although scientists under-
stand that plants can sense the direction
and force of gravity or can point their
shoots toward a source of light, they do not fully understand how this is accom-
plished. "We know that electrical signal-

Brown, PhD; Wendy Boss, PhD; and Raul
Salinas-Mondragon, PhD—has worked to
refine its measurement techniques. "Our
new measurements show that it takes a root
tip only about 45 seconds after gravity stim-
ulation until it has activated its genetic ma-
achinery," says Sederoff. "Obviously, we now
want to know how the plants can do it and if
all plants can do it this fast or if a tree or a
corn plant have a different kinetic."

The study used Arabidopsis seedlings such as
this one to monitor the effect of gravity on plants

Plants have also been shown to produce
volatile molecules that allow communica-
tion between different plant species and
between plants and insects. "Communica-
tion of plants with soil bacteria is very spe-
cies specific and allows the plants to at-
tract beneficial bacteria or repel those that
could be harmful," says Sederoff. The bot-
tom line? Plant science now acknowledges
that plant cells communicate with each
other, their organs communicate with
each other, and plants communicate with
other plants and their living environment.

However, as Sederoff is quick to point
out, plants do not have central nervous
systems. What they do have is a mecha-

"While animals rely mainly on electrical
signal transduction through their nervous
system and a central processing unit (the
brain) for the integration of environmental
stimuli, the ability of plants to sense and
respond to the environment is based on
chemistry and decentralized integration and
coordination. Plants have, for example, in-
vented 'antifreeze' substances to protect
themselves against the cold, cytotoxins to
protect against predators, light absorbing
and reflecting chemicals to protect against
too much light (burning), pigments of all
kind, and volatile chemicals to attract or re-
pel insects," says Sederoff.

More to Know

People currently use many of these plant-
produced chemicals as pharmaceuticals,
The American Holistic Medical Association (AHMA) welcomed its new President, Lawrence B. Palevsky, MD, at the AHMA Annual Conference in May 2005 in Philadelphia, PA. Dr. Palevsky, a pediatrician from New York who has served as a Trustee on the AHMA Board and was the Conference Chair for the 2005 AHMA conference, “Holism & Family Health,” will serve until May 2007. Karen Lawson continues on the AHMA Board as past president for 1 year.

During his term of office, Dr. Palevsky is intent on helping to increase visibility of the AHMA and bringing its message to more healthcare practitioners promote health, prevent illness, and help raise awareness of disease in our lives rather than merely managing symptoms.

- **Innate healing power.** All people have innate powers of healing in their bodies, minds, and spirits. Holistic healthcare practitioners evoke and help patients utilize these powers to affect the healing process.
- **Integration of healing systems.** Holistic healthcare practitioners embrace a lifetime of learning about all safe and effective options in diagnosis and treatment.
- **Relationship-centered care.** The ideal practitioner-patient relationship is a partnership that encourages patient autonomy and values the needs and insights of both parties. The quality of this relationship is an essential contributor to the healing process.
- **Individuality.** Holistic healthcare practitioners focus patient care on the unique needs and nature of the person who has an illness rather than the illness that has the person.
- **Teaching by example.** Holistic healthcare practitioners continually work toward the personal incorporation of the principles of holistic health, which then profoundly influence the quality of the healing relationship.
- **Learning opportunities.** All life experiences including birth, joy, suffering, and the dying process are profound learning opportunities for both patients and healthcare practitioners.

More information about the AHMA is available at [www.holisticmedicine.org](http://www.holisticmedicine.org). Dr. Palevsky may be contacted at lpalevsky@holisticmedicine.org.

**New AHMA Officers and Board Members**

The principles of holistic medicine, as endorsed by the AHMA, are as follows:

- **Optimal health** is the primary goal of holistic medical practice. It is the conscious pursuit of the highest level of functioning and balance of the physical, environmental, mental, emotional, social, and spiritual aspects of human experience, resulting in a dynamic state of being fully alive.
- **The healing power of love.** Holistic healthcare practitioners strive to meet the patient with grace, kindness, acceptance, and spirit without condition, as love is life’s most powerful healer.
- **Whole person.** Holistic healthcare practitioners view people as the unity of body, mind, and spirit and the systems in which they live.
- **Prevention and treatment.** Holistic healthcare practitioners promote health, fragrances, or spices. However, Sederoff points out that we only know a fraction of all the chemicals plants can produce or how or why, and we know very little about the different sensors and how plants integrate those signals. “This is one of the key questions many laboratories are working on: how do plants sense their environment and how do they integrate and coordinate their responses,” she says.

More information about the study is available from North Carolina State University at [www.ncsu.edu/news/press_releases/04_10/271.htm](http://www.ncsu.edu/news/press_releases/04_10/271.htm) or from the Plant Physiology Web site at [www.plantphysiol.org/cgi/content/abstract/136/1/2790](http://www.plantphysiol.org/cgi/content/abstract/136/1/2790). Dr. Sederoff may be contacted at [heike_winter@ncsu.edu](mailto:heike_winter@ncsu.edu).
Two Centers Added to Bravewell Clinical Network

The Bravewell Collaborative recently added two new centers to its clinical network. Joining the network are Don Novey, MD Medical Director, and Joan Marlow, Fellowship Director, from the Advocate Medical Group Center for Complementary Medicine in Park Ridge, IL; and Steven Amoils, MD Co-Medical Director, and Sandi Amoils, MD Co-Medical Director, from the Alliance Institute for Integrative Medicine in Cincinnati, OH.

Commissioned by the Bravewell Collaborative, a study of the emerging field of integrative medicine conducted by McKinsey & Company in 2002 recommended that a network be developed among leading integrative medicine centers through which they could share lessons learned and develop opportunities to build their capacity successfully to serve patients and survive in a rigorous competitive environment. “A critical mass of viable clinical centers is essential to making integrative care accessible to all those who need and want it,” said Penny George, president of The Bravewell Collaborative. “Simply infusing cash into these centers is not a strategic solution, so, instead, we work to understand the issues confronting these centers at a more fundamental level and help build strategic programs that will aid the centers in achieving viability.”

“We are honored and excited to be affiliated with these centers of excellence, all of who have shown their commitment to sharing a common goal. The integration of alternative therapies into mainstream medicine has moved beyond its fledgling stage. We are now able to apply these therapies with more understanding of their value and effectiveness. The Bravewell Collaborative allows us to further speed up this process by linking outcome data, setting clinical standards, and assuring the responsible use of integrative medicine,” explain Steve and Sandi Amoils.

Other members of the clinical network are:

- Center for Integrative Medicine, University of Maryland
- Osher Center for Integrative Medicine, University of California, San Francisco
- Duke Center for Integrative Medicine, Duke University
- Scripps Center for Integrative Medicine, Scripps Health Systems
- The Continuum Center for Health and Healing, New York Beth Israel Hospital
- Jefferson-Myrna Brind Center for Integrative Medicine, Thomas Jefferson University

“I look forward to working closely with such a great roster of integrative medicine centers. The Bravewell Collaborative has the potential to effect real change in the visibility and utilization of integrative medicine at the highest level of quality,” said Don Novey, MD.

The Bravewell Collaborative is a dynamic community of committed and informed philanthropists organized to study integrative medicine, identify and fund key initiatives that advance that field, and collaborate with other organizations pursuing similar missions. For more information, visit www.bravewell.org.

NCCAM and ODS Fund Five Botanical Research Centers

The National Center for Complementary and Alternative Medicine (NCCAM) and the Office of Dietary Supplements (ODS), both components of the National Institutes of Health (NIH), have recently funded five dietary supplement research centers focusing on studies of botanical products. Research conducted by these centers will advance the scientific base of knowledge about the safety, effectiveness, and mechanisms of action of botanicals.

“Given that millions of Americans are using natural products, these research centers are critical to helping us determine whether and by what mechanisms botanicals may serve as effective treatments or preventive approaches,” said Stephen E. Straus, MD, NCCAM Director. “The five centers we are funding will investigate the use of a variety of widely consumed bo-
Botanical Lipids
Principal investigator: Norman Farnsworth, PhD
Institution: University of Illinois at Chicago, IL (UIC)
This center will focus on herbal supplements with implications for benefit in women's health. For example, UIC scientists are conducting a clinical trial to determine whether black cohosh and red clover provide relief of menopausal symptoms, including hot flashes. In addition to conducting basic and clinical research looking at standardization, metabolism, and toxicity of botanicals, the center will support research training in pharmacognosy.

Botanicals and Metabolic Syndrome
Principal investigator: William Cefalu, MD
Partner institutions: Pennington Biomedical Research Center, Louisiana State University System, Baton Rouge, LA; Center of Agriculture and the Environment of Rutgers University, New Brunswick, NJ
Researchers will study extracts of Russian tarragon, Shilajit (a Chinese herbal product), and grape seed and how they may influence molecular and cellular processes associated with the metabolic syndrome, which consists of obesity, insulin resistance, development of type 2 diabetes, and accelerated cardiovascular disease.

MSKCC Research Center for Botanical Immunomodulators
Co-investigators: Barrie Cassileth, PhD, and Philip Livingston, MD
Partner institutions: Memorial Sloan-Kettering Cancer Center, New York, NY; Weill Medical College of Cornell University, New York, NY; The Rockefeller University, New York, NY; the Institute of Chinese Medicine at the Chinese University of Hong Kong, China
This center will investigate botanicals with reported ability to modulate immune function—e.g., echinacea, astragalus, turmeric, maitake, and a traditional Chinese formula—and their relevance for the treatment of cancer and infectious disease.

Wake Forest and Harvard Center for Botanical Lipids
Principal investigator: Floyd Chilton, PhD
Partner institutions: Wake Forest University, Winston-Salem, NC; Harvard University, Cambridge, MA
This center will examine biological mechanisms and clinical applications of polyunsaturated fatty acids derived from botanicals, such as flaxseed, echium, and borage. The studies will focus on the anti-inflammatory actions of botanical oils and their potential to prevent and treat inflammatory diseases, such as atherosclerosis and asthma.

For additional information about NCCAM, please visit the NCCAM Web site at nccam.nih.gov. For additional information about the ODS, visit ods.od.nih.gov.

Global Ecosystem at Risk
The global ecosystem—which includes such things as the air we breathe, the earth in which we grow food and reap other resources, the rivers from which we drink and irrigate, the seas from which we harvest food and medicines, and the climate that affects all systems all the time—is in danger of being of being irrevocably altered. Human activity is changing these systems in ways that, left unchecked, may be irreparable. This is the official position of the Millennium Ecosystem Assessment (MA), which is a multiagency international initiative charged with providing governments, business, scientists, and the public relevant scientific information on the conditions of earth’s ecosystems, the consequences of any change thereof, and potential actions needed to enhance the sustainable use of ecosystems and their contribution to human well-being.

The Millennium Ecosystem Assessment Synthesis Report, which was issued in March 2005, is the first in a series of seven reports and four technical volumes that assess the state of global ecosystems and their impact on human well-being. The study started in 2001 in response to a call by UN Secretary General Kofi Annan. A hugely collaborative effort, more than 1,300 experts from 95 countries volunteered to conduct the study, and 900 more served as reviewers and editors.

"Ecosystems are the planet’s life-support system. They are fundamental to human health and indispensable to the well-being of all people everywhere in the world,” said Dr. Kerstin Leitner, World Health Organization (WHO) Assistant Director-General for Sustainable Development and Healthy Environments, and member of the MA Board.

“The work of the Millennium Ecosystem Assessment makes clear how ecosystems and human health are intertwined and further highlights how important it is that decisions related to economic development also protect the environment, in order to ultimately safeguard human health.”

Ecosystem disruption can impact on health in a variety of ways and through complex pathways. “One of the striking and over-arching conclusions of this assessment lies in the fundamental need to ensure ecological sustainability to safeguard ecosystems and therefore protect human health in the long-term,” said WHO scientist Dr. Carlos Corvalan.

In summary, the four main findings of the 219-page report are as follows:
During the past 50 years, humans have changed the earth’s ecosystems more rapidly and extensively than in any comparable period of time, which has led to a substantial loss in the diversity of life on earth.

Economic development and an increased need for food and other human comforts have been the motivating factors behind the changes, but the cost—the degradation of the world’s ecosystems—must be addressed, or the resultant problems will diminish the health and well-being for all humanity in future generations.

Unchecked, this trend could significantly worsen during the next 50 years.

Although solutions exist, to implement them, significant changes in government policy, institutional behavior, and human practices around the globe are needed.

According to the report, some 60% of the ecosystems examined are being degraded or used unsustainably, and evidence exists that some of these changes may be irreversible, with potentially dire consequences for human well-being. For instance, the MA investigators found that 20% of the world’s coral reefs have been lost in the past 50 years, and the incidence of disease found in marine species is on the rise. The amount of water impounded behind dams for agriculture and other human use has quadrupled since 1960, resulting in less water for other uses, which contributes to degraded water quality, reduced biodiversity, and decreased forest cover. Other examples of ecological change cited include shifts in regional climates, the emergence of disease because of flooding or warming temperatures, and an escalating extinction rate with 10% to 30% of the world’s current species currently in danger.

The MA contributors identified barriers needing to be overcome to create a sustainable planet. These include addressing those problems caused by the following:

- inappropriate institutional and government arrangements;
- misalignment of economic incentives;
- lack of empowerment of the people dependent on the ecosystem or affected by its degradation;
- underinvestment in technologies that could address correlated problems; and
- insufficient knowledge concerning the ecosystem and its management.

The report explores four potential scenarios for future management of the world’s ecosystems and human life within those systems, outlining what is plausible and possible in terms of reversing the damage and creating a sustainable future.

Other reports forthcoming include:

- Biodiversity and Human Well-being: A Synthesis Report for the Convention on Biological Diversity;
- Wetlands and Water: Ecosystem Services and Human Well-being;
- Global Assessment of Desertification: A Millennium Ecosystem Assessment Synthesis Report;
- Ecosystems and Human Health Synthesis Report; and
- Ecosystems and Human Well-being: Opportunities and Challenges for Business and Industry.

The Millennium Ecosystem Assessment Synthesis Report can be found on-line at http://www.who.int/globalchange/. For more information, please contact: N. Osseiran, Technical Officer, Communications and Advocacy, Protection of the Human Environment, WHO, Geneva, e-mail: osseirann@who.int or Dr. Carlos Corvalán, Coordinator and Scientific Expert, World Health Organization, Geneva, e-mail: corvalanc@who.int.

**Climate Change and Health: Is There a Risk?**

As scientists, researchers, and healthcare providers around the world grow increasingly aware of the interdependence of all life, we are beginning to understand more and more about the environmental hazards that pose a threat to human health and human life. Climate change, according to many, is one such potential hazard.

The World Health Organization (WHO), which is the United Nations agency for health established in 1948, has as its goal the “attainment by all peoples of the highest possible level of health.” Health is defined in WHO’s constitution as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.”

Because of climate’s potential negative impact on human health, WHO has dedicated significant resources to the study of the climate and the changes caused to it by human activity. Part of the efforts culminated in the 2003 publication of Climate Change and Human Health—Risks and Responses and an extensive Web site dedicated to “Global Environmental Change and Health.” Both of these resources encourage the need to recognize that, “the foundation of long-term good health in populations relies in great part on the continued stability and functioning of the biosphere’s life-supporting systems.”

Human presence and activity has always contributed to the altering of local ecosystems and thus local climates. Dams, agriculture, cities, roads, suburban sprawl, foresting, automobile emissions, and more—all of these things alter the environment, which eventually alters the climate. Although human impact is nothing new, in more recent times, because of an increasing population, growing energy consumption, and widespread land use, the WHO report notes that human influence has “attained a global scale” and is contributing to stratospheric ozone depletion, loss of biodiversity, changes in the freshwater system, and land degradation, all of which, in turn, affect the global climate.

Perhaps the biggest concern, the authors say, is global warming. According to the report, “During the 20th Century, world average surface temperature increased approximately 0.6°C, and approximately two thirds of that warming has occurred since 1975. Climatologists forecast further warming, along with changes in precipitation and climatic variability.”

The health risks from climate change are three-fold:

1. Direct health impact caused by extreme weather conditions;
2. More long-term health consequences resulting from environmental change or disruption of normal environmental processes; and
3. Diverse health consequences resulting from demoralized and displaced populations, which include trauma, infection, and nutritional and psychological disorders.
“Climate factors are an important determinant of various vector-borne diseases, many enteric illnesses, and certain water-related diseases,” the report says. By way of example, the report explains that, during the 1990s, 2,073 extreme weather events around the globe resulted in 601,000 deaths. These weather events include such things as tornados, hurricanes, extreme heat or cold spells, and floods. However, in addition to the loss of life, more than 6 billion people were also affected, suffering from such adverse health problems as infection and malnutrition and the contraction of malaria, West Nile virus, and other infectious diseases because of changes in the ranges of disease vectors. Climate Change and Human Health—Risks and Responses recommends that societies worldwide use the principles of sustainable development. Sustainable development endorses the Precautionary Principle, which states that, when an activity raises threats of harm to human health or the environment, precautionary measures should be taken, even if some cause and effect relationships are not fully established scientifically. In this model, the proponent of an activity, rather than the public, bears the burden of proof. The report also encourages the use of the principle of “costs and responsibilities,” which dictates that the entity causing the environment damage should pay for the cost of repair.

Why should healthcare providers care about climate change? WHO says that, “Appreciation of this scale and type of influence on human health requires a new perspective, which focuses on ecosystems, and the recognition that the foundations of long-term good health in populations relies in great part on the continued stability and functioning of the biosphere’s life-sustaining systems.”

For those interested, the summary of the report can be read on-line or the full report can be ordered through the WHO Web site at http://www.who.int/globalchange/en.

New Career Center on the AHMA Web Site
In early April 2005, the American Holistic Medical Association launched a new job board for professionals and employers in a wide variety of medical fields. Job seekers in medical professions can create their own job-seeker accounts, post resumes, and search job postings for free; employers can post job opportunities, obtain resumes, and access a variety of recruitment tools for very reasonable rates. The site is powered by JobTarget, the leading provider of Internet job boards. To access the site, visit www.careers@holisticmedicine.org.

Call for Submissions
The American Holistic Medical Association (AHMA) is now accepting submissions for the 2006 Annual Scientific and Clinical Conference, “Holism in Action: Building Integrated Health Care,” which will be June 7-10, 2006, in Minneapolis, MN. The conference is being presented in parallel with the annual American Holistic Nurses Association conference. Along with general presentations concerning holistic healthcare, the AHMA will provide expert knowledge about forming progressive healthcare facilities and uniting healthcare providers in pursuit of mind-body-spirit medicine. All presentations should be submitted via the Web form provided on the AHMA Web site: www.holisticmedicine.org. Details regarding tracks and formats are available there. Submissions will be accepted through September 15, 2005.

Call for Abstracts
The Consortium of Academic Health Centers for Integrative Medicine (CAHCIM) is currently planning the 2006 North American Research Conference on Complementary and Integrative Medicine. The conference will be May 23–26, 2006, in Edmonton, Canada, at the Shaw Conference Centre.

Proposals for scientific sessions as well as abstracts are being accepted through September 30, 2005. Submission forms and instructions may be downloaded at www.imconsortium-conference2006.com. Members of the CAHCIM Conference Organizing Committee are:

- David Eisenberg, MD, Harvard Medical School
- Susan Folkman, PhD, University of California, San Francisco
- Aviad Haramati, PhD, Georgetown University Medical School
- Fredi Kronenberg, PhD, Columbia University
- Sunita Vohra, MD, University of Alberta

The conference is being supported by grants from the following organizations:

- Bernard Osher Foundation
- Lucie and André Chagnon Foundation
- The Bravewell Collaborative
- National Center for Complementary and Alternative Medicine, NIH

In addition to CAHCIM, participating organizations include:

- Advanced Food Materials Network (AFMnet)
- Canadian Interdisciplinary Network for Complementary/Alternative Medicine Research (IN-CAM)
- Canadian Pediatric Complementary and Alternative Medicine Research and Education Network (PedCAM)
- International Society for Complementary Medicine Research (ISCMR)
- National Center for Complementary and Alternative Medicine (NCCAM)
- National Health Products Research Society of Canada (NHPRS)
- Society for Integrative Oncology (SIO)

For more information, please visit www.imconsortium-conference2006.com.