

Good Dental News for Expectant Mothers

In 2006 expectant mothers received some good news—treatment for periodontal disease is safe during pregnancy.

UK's John Novak and James Ferguson took part in the largest clinical trial ever to try to determine the connection between maternal periodontal disease and increased risk of pre-term birth and low birthweight. The results were published in November 2006 in the *New England Journal of Medicine*.

"Dental treatment is not usually recommended during the first trimester because this is such an important time in fetal development," says Novak, associate director of the College of Dentistry's Center for Oral Health Research. Ferguson is chair of the College of Medicine's Department of Obstetrics and Gynecology. This project was backed by a five-year NIH grant.

The study enrolled 823 women with periodontal disease, which is caused by bacterial plaque and toxins that accumulate under the gums. The volunteers, between 13 and 17 weeks pregnant, were divided into two groups: those who received periodontal treatment (cleaning the root to remove bacteria and toxins from below the gums) before the 21st week of pregnancy and a control group that received the same treatment after delivery.

The study also concluded that treatment for periodontal disease did not reduce the risk for pre-term delivery, low birthweight, smaller fetal growth, or serious levels of hypertension, but may increase the risk for spontaneous abortions and stillbirths.



Other Key Research

New Treatments for Parkinson's

Parkinson's disease affects more than one million people in North America, progressively impairing control of body movement and often leading to immobility. In 1999, UK joined the fight against Parkinson's by establishing a Morris K. Udall Parkinson's Disease Research Center of Excellence (one of 12 in the United States) to develop new treatments and therapies.

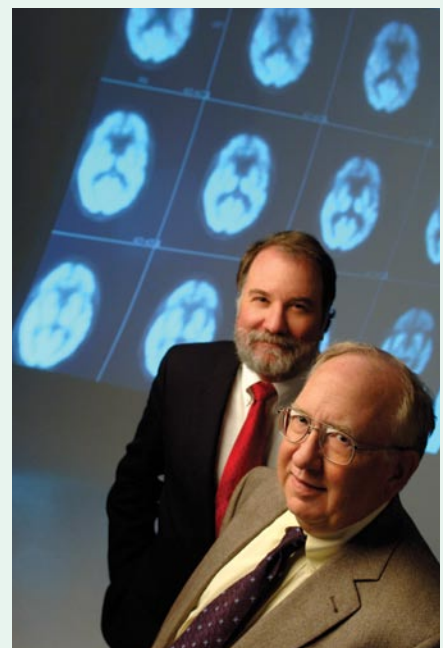
Researchers at the center, directed by Greg Gerhardt (anatomy and neurobiology, left below), focused their work from the outset on a protein called glial cell-line derived neurotrophic factor (GDNF), which is produced by cells in the brain and required for the normal development and differentiation of dopamine cells.

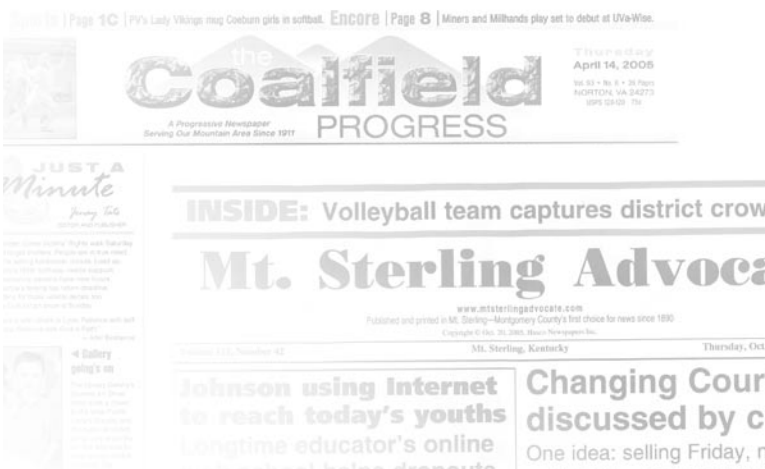
In 2002 Gerhardt, Don Gash (anatomy and neurobiology, right below), and John Slevin (neurology and molecular and biomedical pharmacology) launched the first U.S. clinical trial of GDNF, sponsored by Amgen, a large biotech company that holds a patent on GDNF. The 10 patients in the UK trial had programmable pumps implanted in their abdomen, a system that delivered GDNF directly to a second implant—a small, multi-port catheter in the brain. The catheter dispersed the drug over a broad area in the brain involved in Parkinson's.

At the two-year point, all 10 patients had completed the Phase I leg of the trial, and all of those who had gotten GDNF reported that their lives had improved dramatically. No one reported any significant side effects.

But citing safety concerns and potential side effects of this drug, Amgen stopped the trial in 2004.

"This was a severe setback for the patients in our study, of course," says Gerhardt, "but the trial showed us that GDNF was definitely something to be further investigated." The UK research group then began working with a "brother" of GDNF, a molecule called Neurturin, which hits the same targets as GDNF. A California company, called Ceregene, has since sponsored a clinical trial, currently in Phase II, using this new molecule.





Telling the Stories That Need to Be Told

Al Cross says UK's Institute for Rural Journalism and Community Issues has a simple goal: Help rural journalists report on the stories that matter, and report them accurately and well—no matter how controversial or complex the issues may be. Cross (journalism and telecommunications), the director and only full-time employee of the institute, came to UK after a 26-year career at the Louisville *Courier-Journal*, 15 of it as the chief political writer.

Creation of the institute was partly driven, Cross explains, by the widespread buyout by large newspaper chains of rural daily and weekly papers in the 1980s and 1990s. "Many of them cut staffs and lost their focus on local issues. Stories on issues central to the sustainability of rural communities—on education, the environment, economic development, and healthcare—were simply going untold."

The idea for the institute began in late 2000, when Kentuckian Al Smith, longtime newspaper editor and host of Kentucky Educational Television's political show *Comment on Kentucky*, and other leading journalists shared their mutual concern about what they saw as the declining quality of rural newspapers. They agreed something needed to be done to combat the ill effects of what Smith calls "the Wal-Marting of Main Street in America"—the loss of small-town ownership of local news media, banks and retail establishments to large conglomerates.

The institute's focus on rurality led Cross to begin the online Rural Blog, which is now regular reading for hundreds of journalists who cover rural issues. "The defining characteristic of rurality is isolation. And I know from personal experience that there are thousands of good rural journalists in America. Or those that could be good. But they don't get a chance to rub shoulders or share ideas with people like themselves. And that's what the institute is here to do."

Going Smoke-Free

A decade ago, almost anybody you might have asked in Central Kentucky—the heart of tobacco country—about a policy requiring restaurants and bars to go smoke-free would have likely shrugged with a dismissive, "No way."

But Ellen Hahn in UK's College of Nursing decided to take on this Mission Impossible, and in April of 2004 was pleased—and more than a little surprised—that Lexington-Fayette Urban County Council enacted a smoke-free ordinance in all establishments open to the public. The EPA has classified secondhand smoke as a cause of cancer in humans, leading to around 3,000 lung cancer deaths and 42,000 heart disease deaths in adult nonsmokers in the United States each year.

Hahn and colleagues have conducted a series of health and economic impact studies of Lexington's smoke-free law. A study published last February on the effects of Lexington's smoke-free law showed that employment at Lexington restaurants grew by 3 percent after the smoke-free law went into effect, while employment in bars remained basically the same. And a study by the UK College of Nursing has reported a 31.9 decrease in adult smoking since Lexington's smoke-free ordinance passed.

"Over 2,000 municipalities in the United States have some sort of smoke-free laws," Hahn says, "and now 13 other Kentucky communities have followed Lexington's lead."



Future Treatments for Spinal Cord and Brain Injury

After traumatic injury to a person's brain or spinal cord, time is the major factor in the ultimate severity of that injury. Much of the damage to the injured nervous tissue occurs during the first several hours and days following the incident, which suggests that "secondary injury" might be prevented by early treatment with neuroprotective drugs.

Edward Hall, director of the UK Spinal Cord & Brain Injury Research Center (SCoBIRC), is leading a team of scientists who are testing various drugs that might inhibit secondary injury to the brain or spinal cord. This team includes Jim Geddes, Patrick Sullivan, Kathryn Saatman, and Alexander Rabchevsky (SCoBIRC), Stephen Scheff (Sanders-Brown Center on Aging) and Joe Springer (physical medicine and rehabilitation).

Three different types of drugs are currently being tested. These drugs block the damaging effects of oxygen free radicals, prevent the loss of energy production in cells' mitochondria, and inhibit the degradation of nerve cell proteins by an enzyme known as calpain. One of those treatments, using the drug cyclosporine A, is currently being tested in severely brain-injured patients by SCoBIRC Clinical Director Byron Young.

Hall was a pioneer in the discovery and development of the steroid drug methylprednisolone, the only approved drug that has been shown to be effective for the treatment of spinal cord injury. But he is hopeful that the protective effects of the

newer types of drugs now being tested by his group will far surpass the benefits of methylprednisolone in treating the estimated 11,000 Americans who suffer a spinal cord injury each year and the 1.5 million who sustain traumatic brain injuries.



(from left) Edward Hall, George Smith, Alexander Rabchevsky, and Patrick Sullivan



Targeting Children's Mental Health

Understanding childhood violence is the focus of the new UK Center for the Study of Violence Against Children (CSVAC). The culmination of eight years of multidisciplinary work by faculty from the College of Social Work and the College of Medicine, this center of excellence began in 1999 with the creation of the Comprehensive Assessment and Training Services (CATS) Clinic.

CATS is funded by the Kentucky Cabinet for Health & Families to serve maltreated children and their caregivers, and assist the cabinet in planning for children's safety and long-term welfare. The clinic will serve as the living laboratory for CSVAC's research, education and training activities.

In addition to current state and federal funding, CSVAC will be supported by the H. Otto Kaak Chair in Early Childhood Mental Health in the College of Social Work. The creation of the Kaak Endowed Chair was made possible through a pledge of \$3 million from R. Bruce Bacon of Michigan. Bacon, a native of Cadillac, Michigan, and his wife, Barbara, have a strong commitment to improving the lives of impoverished children and families. Bacon created and endowed the chair after attending a lecture given by Kaak, who is an expert on childhood attachment disorders and a CSVAC co-founder.

Kaak is professor of psychiatry and pediatrics at the UK College of Medicine. Other CSVAC co-founders include Virginia Sprang and James Clark, associate professors of social work, and Allen Brenzel, associate professor of psychiatry.

Functional Independence

What does it mean to be independent? For people who suffer spinal cord injuries or simply face the normal decline of aging, muscle activity makes all the difference.

In 2006 the UK College of Health Sciences hired Charlotte Peterson and Esther Dupont, who previously worked together at the University of Arkansas, to jump-start the Functional Independence Research Center. With more than \$1 million in NIH grants, Peterson and Dupont are working closely with communication specialists, physical therapists and athletic trainers in the college to build a research program focusing on maintaining both communication and mobility.

Peterson, who has spent more than 20 years in the field and now serves as the associate dean for research in the college, is focusing on adult stem cell activity during muscle regeneration, with an emphasis on the effects of aging and obesity. She is also studying the basis for differences in muscle response to exercise.

Dupont, who has more than 15 years' experience in muscle loss research, is focusing on the mechanisms of muscle wasting. She is studying the role of muscle stem cells and cell death during disuse, spinal cord injury and aging, as well as bone changes resulting from muscle loss. Peterson's and Dupont's goal is to develop targeted interventions to maintain muscle mass, thereby preventing frailty and loss of functional independence. ■