

Of Guts and Gluten In Celiac Disease, the Two Don't Mix

What if you couldn't eat bread? Or pasta? Or *cookies*? What if you couldn't eat anything containing wheat, rye and barley because of gluten, a protein found in these grains? You would be among the millions of American who get gas, diarrhea and other symptoms whenever they eat foods with gluten. The condition is called celiac disease, and many people who have it don't even realize it.

called villi that line the small intestine. Without healthy villi, which normally allow nutrients from food to be absorbed into your bloodstream, your body can't get enough nutrients no matter how much food you eat. The resulting malnutrition can be a serious problem—particularly for children, who need adequate nutrition to grow and develop properly.

The symptoms of celiac disease can vary. Dr. Stephen P. James of NIH's

National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) explains, "One of the challenges with celiac disease is the vast array of symptoms associated with the disease." Symptoms range from gas, diarrhea and belly pain to delayed growth, certain skin rashes, infertility and osteoporosis.

The symptoms can be similar to those of several other diseases, so diagnosing

celiac disease is sometimes difficult. Some people with the disease don't even have any symptoms. With or without symptoms, people with celiac disease are at risk for the complications of the disease. The longer a person with celiac disease goes undiagnosed and untreated, the greater their chance of developing malnutrition and other serious problems.

Celiac disease shouldn't be ignored, though. It can lead to **malnutrition**, **osteoporosis** and other serious problems. The only treatment is to eliminate gluten from your diet.

When people with celiac disease eat things with gluten, their **immune system** attacks their small intestine. This attack damages and can even destroy the tiny finger-like structures



Definitions

Immune System

The system that protects your body from invading viruses, bacteria and other microscopic threats.

Malnutrition

When your body doesn't get the right balance of nutrients it needs.

Osteoporosis

A disease in which your bone becomes thin and fragile and can break easily.

"We now know that celiac disease is more prevalent than previously thought—affecting nearly 1 percent of the U.S. population—and remains under-diagnosed," said Dr. Griffin Rodgers, acting director of NIDDK.

To heighten awareness of celiac disease among both health professionals and the public, NIDDK, along with other organizations, recently launched a campaign offering a variety of resources about celiac disease.

James said, "We are hoping to educate health professionals and the public that celiac disease is not only a gastrointestinal disease."

If you suspect you have celiac disease, see your doctor for a diagnosis as soon as you can. They can

continued on page 2

Inside News

- 1 Of Guts and Gluten
- 3 Discoveries Behind Future Cures
- 4 Health Capsules

- Drug for Postpartum Hemorrhage
- Preventing Falls
- Web Site: Stories from the Heart

www.celiac.nih.govdigestive.niddk.nih.gov/ddiseases/pubs/celiac/index.htmwww.niams.nih.gov/bone/hi/bowel/celiac.htm*continued from page 1*

draw blood and measure the levels of molecules made by your immune system that attack your small intestine. Before being tested, continue to eat a regular diet that includes foods with gluten. If you stop eating these foods before being tested, the results may be negative for celiac disease even if you have it.

If your tests and symptoms suggest celiac disease, your doctor will likely

perform a small-bowel biopsy, during which a tiny piece of tissue from the small intestine is removed to check for damage to the villi.

The good news if you're diagnosed with celiac disease is that following a gluten-free diet will stop symptoms, heal existing intestinal damage and prevent further damage for most people with the illness. Improvements usually begin within days of eliminating gluten. The small intes-



Definitions

Dietitian

A health care professional who specializes in food and nutrition.

tine usually heals completely within months in children and young adults, and within two years for older adults.

A gluten-free lifestyle can be challenging. To start, you'll need to adopt a completely new approach to eating. If you're diagnosed with celiac disease, your doctor will probably ask you to work with a **dietitian** on a gluten-free diet plan. People with celiac disease have to be very careful about what they buy for lunch at school or work, what they buy at the grocery store, what they eat at restaurants or parties and what they grab for a snack. The dietitian can teach you how to read ingredient lists and identify foods that contain gluten.

People with celiac disease need to eliminate gluten for the rest of their lives, not just until they're healed. Eating any gluten, no matter how little, can damage your small intestine again, whether or not you have noticeable symptoms. Newly diagnosed people and their families may find support groups helpful as they all learn to adjust to this new way of life. With practice, looking for gluten becomes second nature.

Unfortunately, some people's intestines are so severely damaged by the time they're diagnosed that, despite a strictly gluten-free diet, they can't heal. Because their intestines are not absorbing enough nutrients, they might need to receive nutrients directly into their bloodstream through a vein (intravenously). Researchers are now evaluating drug treatments for such "unresponsive" celiac disease.

If you suspect you have celiac disease (see the list in the side box for reasons to suspect celiac disease), don't hesitate to see your doctor. If you wait too long, you may find yourself dealing with much more serious complications than an altered diet. ■



Wise Choices How to Recognize Celiac Disease

Celiac disease affects people differently. One person might have diarrhea and belly pain, while another may be irritable or depressed. In fact, irritability is one of the most common symptoms in children. Symptoms of celiac disease may include one or more of the following:

- gas
- recurring bloating, belly pain
- chronic diarrhea
- pale, foul-smelling or fatty stool
- weight loss or weight gain
- fatigue
- unexplained anemia (lower red blood cell counts causing fatigue)
- bone or joint pain
- bone loss or weakening
- behavioral changes
- tingling numbness in the legs (from nerve damage)
- muscle cramps
- seizures
- missed menstrual periods (often because of excessive weight loss)
- infertility, recurrent miscarriage
- delayed growth
- failure to thrive (in infants)
- pale sores inside the mouth
- tooth discoloration or loss of enamel
- itchy skin rash called dermatitis herpetiformis

NIH News in Health (ISSN 1556-3898)

National Institutes of Health

Office of Communications
& Public Liaison
Building 31, Room 5B38
Bethesda, MD 20892-2090

newsinhealth.nih.gov

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The Discoveries Behind Future Cures

Nobel Prize Honors Basic Research Breakthroughs

The Nobel Prize, which is given every year, recognizes great achievements that have improved our lives. Two of this year's prizes honor advances in basic biology that have already opened up new avenues for diagnosing and treating a host of human diseases.

The prize winners get a medal and \$1.4 million. We all get a future of better health.

Both prizes involve a process central to life: how instructions encoded in our DNA are used to make proteins, molecules that perform critical tasks in the body. When a cell needs a protein, it first copies the genetic instructions for that protein from the DNA into a related molecule called RNA. This copying process is known as transcription. Like a courier, the RNA then delivers the instructions to the cell's protein-making factories.

Without transcription, all creatures would die because their cells no longer would make proteins. Many human illnesses, like heart disease and uncontrolled inflammation, have been linked to transcription errors.

Dr. Roger D. Kornberg won the Nobel Prize in chemistry this year for figuring out a key step in transcription. He follows in the footsteps of his father, who won a Nobel Prize in 1959.

To better understand how the process works and what can cause it to go awry, Kornberg used high-tech tools to capture the first image of the protein central to transcription in organisms ranging from yeast to humans. That snapshot is now helping researchers interested in tran-

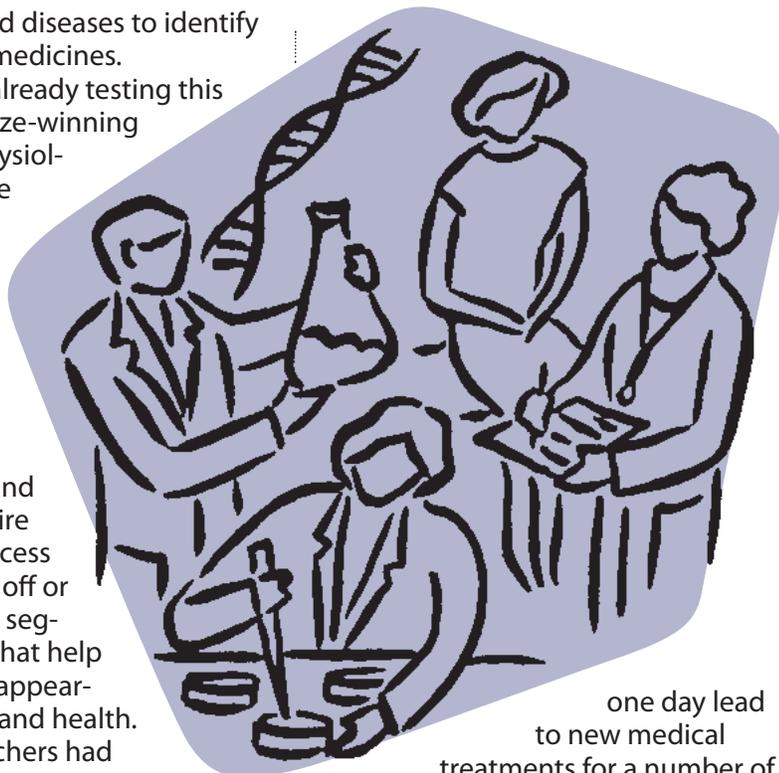
scription-related diseases to identify potential new medicines.

Doctors are already testing this year's Nobel Prize-winning discovery in physiology or medicine as a treatment for asthma, diabetes, brain diseases and age-related vision loss. In 1998, researchers Dr. Craig C. Mello and Dr. Andrew Z. Fire identified a process that could turn off or "silence" genes, segments of DNA that help determine our appearance, behavior and health.

Other researchers had previously noticed a puzzling phenomenon in petunias. When they gave the flowers an extra "purple" gene to brighten their color, the petals unexpectedly became stark white. It turns out that a special type of RNA prompts cells to destroy their own matching RNAs, effectively silencing genes.

Fire and Mello found that a similar thing happened in worms. By giving pieces of this RNA to the worms, the scientists could target and turn off specific genes. They called the process "RNA interference," or RNAi. Within a year, RNAi was documented in several other organisms.

RNAi has now become a powerful tool for scientists. Many researchers predict that gene silencing might



one day lead to new medical treatments for a number of human diseases, such as cancer and viral infections.

"These discoveries in basic science have changed our view of biology and they're already beginning to change how we treat disease," says Dr. Jeremy M. Berg, director of NIH's National Institute of General Medical Sciences, which has supported the research of Fire, Mello and Kornberg for many years.

Researchers around the world, many of them funded by NIH, continue to make new breakthroughs in basic science that will one day lead to the medical techniques of the future.

Berg asserts, "More breakthroughs that lay the foundation for improvements in health and medicine are on the way." ■



Information on RNAi: www.nigms.nih.gov/News/Extras/RNAi/factsheet.htm

List of NIH-Supported Nobel Prize Winners:
www.nih.gov/about/almanac/nobel/index.htm

NIH Research Matters, an eColumn about new discoveries:
www.nih.gov/news/research_matters/index.htm



Statistics

Number of Nobel Prize-winning discoveries by NIH and NIH-supported researchers: 120

Health Capsules

Drug Can Prevent Postpartum Hemorrhage

Deaths from postpartum hemorrhage, excessive bleeding by the mother after giving birth, are rare in developed countries like the U.S. However, the condition can be life-threatening in places where most births occur at home and emergency care may not be available. Researchers have now found a safe, convenient and inexpensive way to prevent this major killer of women in developing countries.

Postpartum hemorrhage is caused by the uterus failing to contract after the placenta detaches, or by ruptures or tears in the uterus and other tissues. In developed countries, oxytocin is the standard drug used to prevent postpartum hemorrhage. But oxytocin needs to be kept cold and to be given by trained medical personnel, so it's not ideal for use in

developing countries.

The drug misoprostol also stops uterine bleeding, but doesn't require refrigeration and doesn't have to be given by highly trained personnel. Researchers from the University of Missouri, India's Jawaharlal Nehru Medical College and NIH set out to test whether this inexpensive drug could effectively prevent postpartum hemorrhage in countries where hospital services are in limited supply.

The researchers recruited 25 nurse midwives who serve the rural Indian villages of the Belgaum District in Karnataka State. They showed the midwives how to use misoprostol and how to measure blood loss following birth using a plastic drape specifically designed for the study. Women who volunteered to participate received either misoprostol

or an identical-looking but inactive "placebo" immediately after they gave birth.

While 12% of the women in the placebo group had serious postpartum hemorrhage, only 6.4% receiving misoprostol did. Women receiving misoprostol also lost significantly less blood on average. Side effects included a slight increase in shivering and fever. The infants of nursing mothers who took misoprostol showed no apparent side effects.

Another benefit from the study was the development of the drape to estimate blood loss. Before this trial, the midwives had no way to accurately gauge blood loss. The drape provided an accurate, easy-to-use and inexpensive (about \$1 each) way to collect and measure blood. Wider use of it could lead to earlier detection of postpartum hemorrhage and earlier interventions to save lives. ■

Preventing Falls

You accidentally slip on a wet bathroom floor, trip on a loose throw rug, or lose your balance on the stairs. If you or an older person you know has fallen, you're not alone. Each year, more than 1.6 million older Americans go to the emergency room for fall-related injuries. Among older adults, falls are the number one cause of fractures, hospital admissions for trauma, loss of independence and injury-related deaths. But falls are not an inevitable part of life, even as you get older.

Information about the risks of falling and how to prevent falls has just been added to NIHSeniorHealth (www.NIHSeniorHealth.gov), a joint effort of NIH's National Institute on Aging (NIA) and National Library of Medicine (NLM).

"Falls can have devastating effects in older people," says Dr. Richard J.

Hodes, director of NIA.

In fact, a simple fall can cause a serious fracture of the arm, hand, ankle or hip. Only half of older adults hospitalized for a broken hip return home or live on their own after the injury. That's why prevention is so important. Information about taking care of your health, reducing hazards at home, exercising and making other lifestyle changes to reduce the risk of falling is now easily accessible on NIHSeniorHealth.

Older Americans increasingly are turning to the Internet for health information. For the 66% of "wired" seniors who now surf for health and medical information when they go online, NIHSeniorHealth features short, easy-to-read information in a variety of formats, including large-print type sizes, open-captioned videos and even an audio version.

Additional topics coming soon to NIHSeniorHealth include clinical trials, nutrition and skin cancer. The site also links to MedlinePlus, NLM's premier, more detailed site for consumer health information. ■



Featured Web Site Stories from the Heart

www.nhlbi.nih.gov/health/hearttruth/stories

Heart disease affects women in every community in the U.S. These "stories from the heart" tell how heart disease has changed the lives and outlooks of women like you. They explain why you should take steps now to protect your heart. *From NIH's National Heart, Lung, and Blood Institute.*

The screenshot shows the NIH Senior Health website interface. At the top, there's a navigation bar with links like "Home", "Contact Us", "Site Index", and "En Español". Below that, a banner for "National Heart Lung and Blood Institute" features a "heart truth" logo and the text "A NATIONAL AWARENESS CAMPAIGN FOR WOMEN ABOUT HEART DISEASE". The main content area is titled "STORIES FROM THE HEART" and includes a sub-header "Heart disease is not a stroke. It's a disease that affects women in every community in the United States—and may affect you. It can alter or damage your life, or even take it away." Below this, there's a "SELECT A STORY" section with three entries: "Claudette Age: 47", "Julie Age: 61", and "Marsha Age: 54". To the right, there's a sidebar with a "STORIES FROM THE HEART" section listing various resources like "LOWER BLOOD CHOLESTEROL", "HORMONE THERAPY", "CAMPAIGN MATERIALS", "HEALTH PROFESSIONAL MATERIALS", and "PRESS ROOM". At the bottom, there are links for "Heart Truth Home", "Contact Us", "Site Index", and "En Español", along with a "What is the Heart Truth?" section and a "Please send us your feedback, comments, and questions by using the appropriate link on the page. Contact the NIH!" note.



www.NIHSeniorHealth.gov