



MICHAEL SMERDON LAB

▲ Researchers have linked DNA repair problems with Huntington's disease.

Overworked Gene Repair Kit Tied to Huntington's

Huntington's disease, or HD, is a neurological disorder that causes uncontrolled movements, clumsiness, and balance problems. As the disease worsens, HD can take away the ability to walk, talk, and swallow. There is no cure.

Although HD is an inherited disease involving a defective gene, symptoms usually don't appear until middle age. Researchers have been puzzled about why.

It's known that the disease gene contains an extra piece of DNA that gets copied over and over. For a while, the body's DNA repair machinery can trim the excess. But over time, the gene repair kit becomes overwhelmed, says pharmacologist **Cynthia McMurray** of the Mayo Clinic in Rochester, Minnesota.

McMurray did experiments with genetically altered mice that have the human version of the HD gene. Her results showed that in "middle-aged" mice, the DNA segments continued to grow in length and the mice's brain cells died.

When that happened, McMurray explains, faulty repair was worse than no repair at all. She is now looking for ways to either fix or eliminate the broken repair kit, which could ultimately prevent the onset of symptoms.

— *Alison Davis*



VIJAY PANDE

▲ Home computers all over the world contribute to science through Folding@Home.

Gamers for Science

Finally, you can tell your parents you're doing something worthwhile by racing virtual cars or fighting intergalactic battles on your video game console.

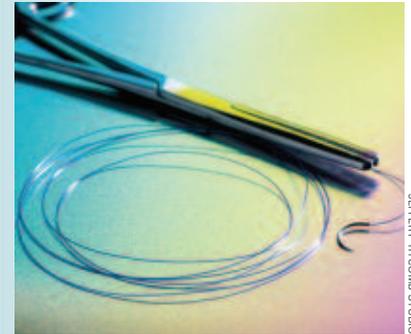
Scientists teamed with the Sony Corporation to install a program on every PlayStation®3 (PS3) that donates machine downtime to a research project called Folding@Home. The project harnesses the processing power of game consoles and computers to study proteins.

Proteins are chains of amino acids that fold into special shapes that allow them to do their jobs. Badly folded proteins can trigger diseases like Alzheimer's or cystic fibrosis.

Vijay Pande, a computational biologist at Stanford University in California, created Folding@Home to let idle home computers connected to the Internet help researchers solve huge scientific problems—like how proteins fold. Studying these processes requires enormous amounts of computing power.

Twenty times faster than the average computer, the PS3 also simulates protein folding twice as fast. When gamers connect their consoles to the Internet to play opponents, their machines get regular work assignments.

As of March 2007, more than 100,000 PS3 owners, including Pande himself, were playing for science. — *E.C.*



JEFFERY TITCOMB STUDIO

▲ Cutting-edge DNA technology has created super-strong sutures.

Bacteria Make Strong Stitches

Doctors use sutures to seal a wound caused by a serious cut or surgery. Stitches need to be strong enough to close a wound, but flexible enough to be tied easily. Absorbable sutures dissolve on their own, usually in a few weeks. These are ideal for many types of wounds.

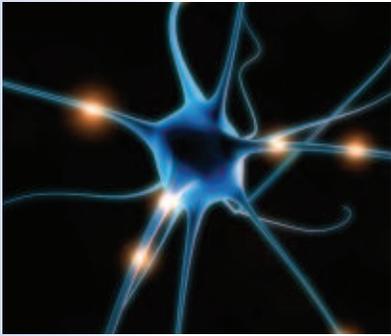
Typically, self-dissolving stitches are made of a synthetic fiber produced with standard chemical manufacturing methods. Unfortunately, these methods can be time-consuming and costly.

Now, scientists have discovered a new, relatively cheap way to manufacture sutures that are tougher and more flexible than current ones. Using recombinant DNA technology, or genetic engineering, chemist **David P. Martin** of the biotechnology company Tephra, Inc., in Cambridge, Massachusetts, created bacteria that produce a substance that can be converted to a self-dissolving, super-strong suture.

The U.S. Food and Drug Administration recently cleared the natural sutures, meaning they have passed safety tests and doctors can begin using them.

Tephra is looking for more ways to use genetic engineering to make new materials for use in medical devices such as surgical meshes. — *A.D.*





▲ In epilepsy, nerve cells fire uncontrollably.

Dandruff-Shampoo Ingredient May Calm Seizures

In a surprise discovery, scientists have found that zinc pyrithione, the active ingredient in dandruff shampoos, appears to do something else: quiet jumpy nerve cells that cause seizures in epilepsy and other neurological disorders.

Healthy nerve cells give off electrical pulses in response to two carefully timed chemical signals that start and stop the pulses. With seizures, potassium, the chemical “stop” signal, cannot flow into cells fast enough to shut off the pulse. The cells then “fire” uncontrollably.

Neuroscientist **Min Li** of the Johns Hopkins School of Medicine in Baltimore, Maryland, wasn’t looking for new cures for dandruff, the itchy, skin-flaking disorder of the scalp.

Rather, his research focuses on finding new treatments for epilepsy, a disorder caused by nerve cells that become overexcited.

Li’s team performed an exhaustive chemical search for substances that could let potassium into nerve cells.

After screening thousands of substances, one at a time, he discovered that zinc pyrithione allowed potassium to gush in and calm the nerve cells. — *A.D.*



▲ Scientists have found a new suspect in childhood asthma: bacteria.

Asthma Linked to Disappearing Stomach Bug

Trillions of bacteria live in our gastrointestinal tracts. They’re part of our health, helping to digest food, make vitamins, and run metabolism. Sometimes they even make us burp!

New research suggests they do something else really important: protect kids against getting asthma.

One of the most common stomach microbes, *Helicobacter pylori*, has lived in the stomachs of humans for millions of years. It’s best known for causing stomach cancer and ulcers. But due to better sanitation and more frequent use of antibiotics, fewer people in developed countries like the United States have this bacterium.

With *H. pylori* on the decline and other illnesses like asthma on the rise, microbiologist **Martin Blaser** of the New York University School of Medicine in New York City suspected a connection.

Blaser and his team compared the medical history and *H. pylori* status of more than 7,000 people. They found that people with the bacterium were less likely than those without it to develop asthma before their mid-teens.

The research raises questions about potential consequences of evicting this long-time microbial resident. — *E.C.*

These stories describe NIGMS-funded medical research projects. Although only the lead researchers are named, scientists work together in teams to carry out these studies.