

The attack of the brain-eating amoeba

By Scientific American, adapted by Newsela staff 09.05.14



Naegleria fowleri is a type of amoeba, a tiny living being made of just one cell. This particular amoeba lives in freshwater lakes and rivers. Scientists call it *N. fowleri*. It can cause a very rare, deadly illness. *N. fowleri* is a brain-eating amoeba.

Nine-year-old Hally Yust died from the illness recently. The amoeba got into her body while she was swimming.

N. fowleri makes the brain swell. The infection kills almost everybody it attacks. More than 97 percent of its victims die within days.

Found In Northern Waters

Not many people get the infection. Only 34 were reported in the United States during the past 10 years. That number may be increasing. Before 2010, more than half of the cases came from Southern states. Since then, infections have turned up as far north as Minnesota.

“We’re seeing it in states where we hadn’t seen cases before,” said Jennifer Cope. She is an expert in amoeba infections at the U.S. Centers for Disease Control and Prevention (CDC). The CDC is in charge of protecting America from health and safety threats. The infections could be moving to other places because of climate change, Cope said. Naegleria thrives in warmer temperatures. “It’s something we’re definitely keeping an eye on,” she said.

The Amoeba Chooses A Victim And Attacks

“When it comes to Naegleria, there’s a lot we don’t know,” Cope said. One of those things is why it chooses its victims. It has ways to slip past the body's disease defenses, or immune system. There are not many ways to treat the infections. One reason is that the disease moves very quickly.

But research suggests that the infection can be stopped if it is caught soon enough. So what happens during an *N. fowleri* infection?

The amoeba enters the body when water goes up the nose. It sticks to the mucous membranes. Those membranes are the slimy stuff inside your nasal cavity. Then *N. fowleri* digs into the olfactory nerve. That nerve is what lets us smell things. It also leads directly to the brain.

People who get infections usually have been doing some sort of sport or other activity that forces water up the nose. Some of those activities include diving and waterskiing. One case happened after a baptism dunking.

There Is No Stopping The Amoeba

"Brain eating" is actually a pretty accurate description for what the amoeba does. The amoeba moves to the front of the brain, where *N. fowleri* feasts on tissue. The destruction of that tissue causes the first symptoms — loss of smell and taste. Those symptoms, or signs of disease, show up about five days after the infection sets in.

From there, the amoeba moves to the rest of the brain. First, it gobbles up the protective covering that surrounds the central nervous system. When the body notices that something is wrong, it sends cells to combat the infection. This causes the surrounding area to become swollen. The swelling contributes most to the early symptoms of headache, nausea, vomiting and stiff neck.

N. fowleri consumes more tissue and digs deeper into the brain. Then the next symptoms set in. They include confusion, seeing things that are not there, and uncontrollable muscle movements.

Ultimately what causes death is the extreme pressure in the skull swelling related to the body's fight against the infection. Increasing pressure forces the brain down into where the brain stem meets the spinal cord, eventually breaking the connection between the two. Then people stop breathing. Most patients die from this respiratory failure less than two weeks after symptoms begin.

There Are Ways To Better Avoid Infection

The threat of contracting an N. fowleri infection is small. In fact, many more people die every year from drowning. Still, you can take some measures to lower your risk even further. Cope recommends using nose plugs and not putting your head fully under water when swimming. She also says not to kick up mud in the water, which can shake the amoeba loose.

More effective treatments may be on the horizon. Last year, the U.S. Food and Drug Administration approved Miltefosine, a drug originally intended as an anti-cancer treatment. In 2013, two people in the United States survived N. fowleri when they took the drug (and others) soon after being infected.

In June, scientists figured out the order of the amoeba's DNA for the first time. Doing that is a step that may help us understand what makes it so deadly and point the way to better treatments.

Until then, hold your nose.

My Haiku Poem on Brain-Eating Amoeba

Haiku= 3 line Japanese poem

Line 1= 5 syllables

Line 2= 7 syllables

Line 3= 5 syllables

Ms. Thornton's Example

Gravy

My one goal this week

Eat gravy this Thanksgiving

One time, FOREVER!