Why the flu makes you feel so miserable

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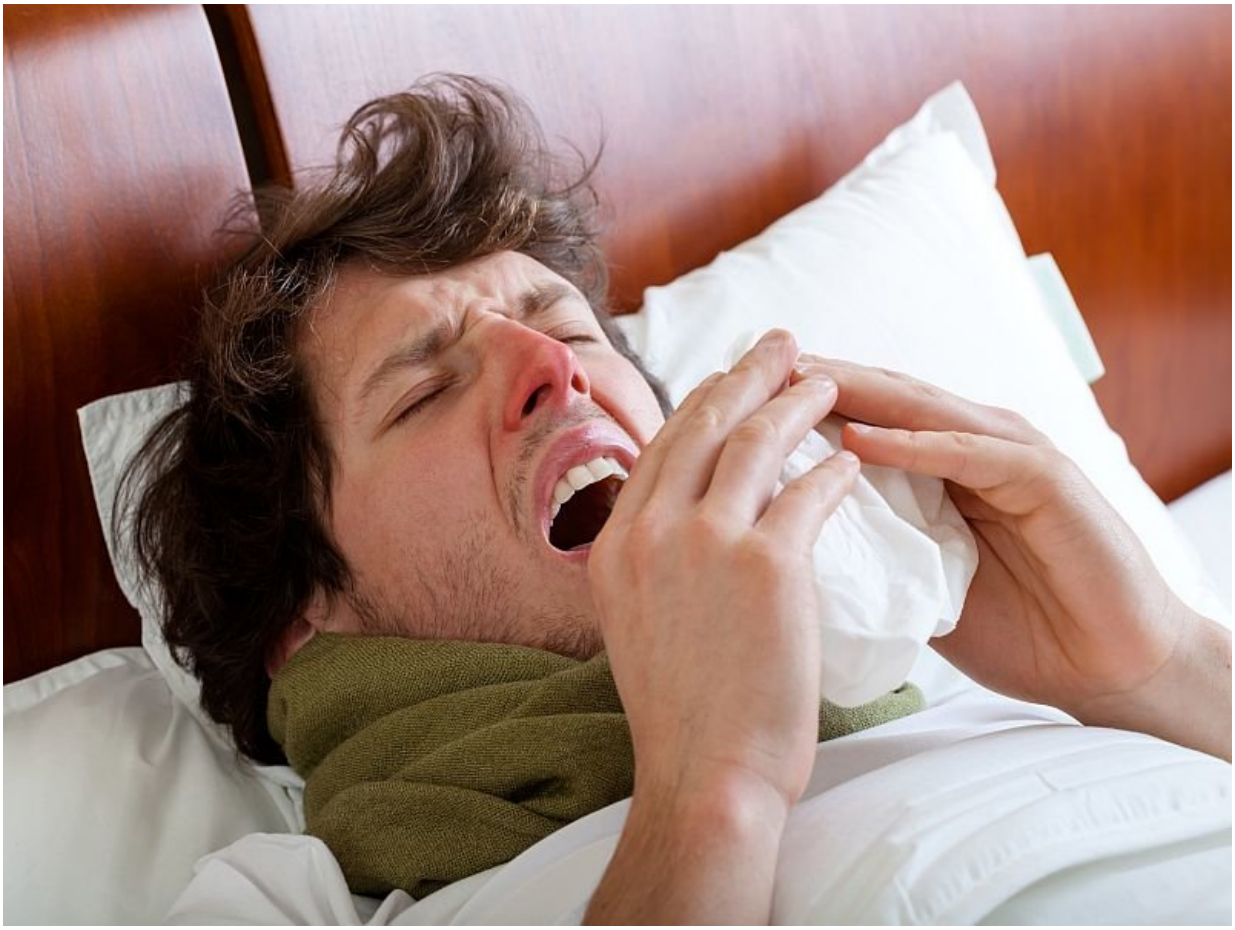

(HealthDay)—If you're unlucky enough to come down with the flu, you can blame your own body for your fever, cough, muscle aches and head-to-toe distress, experts say.

Most of influenza's misery is caused by the human body itself, or more precisely the immune system's response to the virus.

"Many of the things that feel bad are the body's attempts to get rid of the pathogen that's causing the mischief," said Dr. Alan Taege, an infectious disease specialist with the Cleveland Clinic.

When your body has prior experience with a flu virus, it already knows how to send the right antibodies out to fight off the bug, Taege said. In those cases, folks might not even notice they've had a brush with influenza.

But when faced with a new invader, the immune system goes into overdrive. It floods the body with a host of immune system-stimulating biochemicals called cytokines.

And that helps to explain why this year's flu season has been so severe—many Americans haven't had enough prior exposure to the H3N2 flu strain that's causing such havoc, doctors say.

According to Dr. Gregory Poland, "As a result of fighting off the infection, our body releases an army of chemicals, and those are meant to stimulate the immune system. Think of them as chemicals released into the blood to flog the immune cells of the body to rev up, divide, and attack these viral infidels."

Poland is a vaccine expert with the Mayo Clinic in Rochester, Minn.

Cytokines also cause inflammation throughout the body, and that inflammation leads to many of flu's most wretched symptoms, Poland and Taege said.

For instance, muscle, joint and body aches occur due to cytokine

-prompted inflammation in the limbs.

Inflamed air passages produce mucous, causing a runny nose, coughing and sneezing.

Cytokines also cause the body to raise its temperature, resulting in fever.

What's more, the cytokine interferon has been linked to symptoms of headache. It's also possible that blood vessels in the brain dilate in response to fever, creating a headache by increasing pressure inside your head.

Taege likens this inflammation to your skin's response to a very hot object. You feel pain, and the place that's been seared will turn red and possibly blister. Over a few days, the burned spot starts to calm down and heal.

"The cytokines produce an inflammatory reaction that doesn't necessarily cause a blister like a thermal burn, but if you look at the throat it can look red. If you look at the airways they can look red," Taege said. "This is inflammation, and how it interacts with the cells and injures the cells goes on to produce symptoms."

Experiments have shown that people exposed to artificial cytokines will develop symptoms of flu infection, even though the virus isn't present, Taege said.

This is not to say the virus can't do damage on its own, Poland added.

"We recently had a young healthy boy die of influenza," Poland said. "Autopsy showed the virus had invaded his heart and he died as a result of that."

Flu virus infecting the lungs can directly cause shortness of breath, fever and pneumonia, Poland added.

But many deaths caused by flu occur due to a "cytokine storm"—an overwhelming flood of immune chemicals prompted by first exposure to a new and dangerous influenza virus, Poland said.

Many of the young and healthy people killed by the flu during the 1918 influenza pandemic are believed to have died due to cytokine storm.

"The body is so massively activated in an attempt to fight off this virus that it releases too many of these internal chemicals," Poland said.

That's why flu shots are recommended. They teach the body how to produce antibodies to fight off the flu without mounting a full-fledged cytokine defense, Taege and Poland explained.

With flu activity still elevated across much of the United States, Taege said the vaccine can help limit its damage.

"Should you encounter the flu virus, then it can control it much more quickly," Taege said.

People treating flu symptoms most often are treating the inflammation produced by cytokine release. That's why nonsteroidal anti-inflammatory drugs (NSAIDs) like aspirin and ibuprofen (Motrin, Advil) are recommended, Poland said.

You should also rest, drink plenty of fluids and continue to eat, Poland said.

Flu sufferers who remain active are adding to the body-wide inflammation caused by cytokines, Poland said. And those who stop

eating are robbing the body of energy it needs to recover.

"One of the effects of this cytokine release is it really revs up your metabolism," he said. "You actually need more caloric intake to sustain the body."

More information: Alan Taege, M.D., infectious disease specialist, Cleveland Clinic, Ohio; Greg Poland, M.D., vaccine expert, Mayo Clinic, Rochester, Minn.

The U.S. Centers for Disease Control and Prevention has more about flu symptoms and complications.