Myasthenia gravis (MG) is a chronic autoimmune disease — a disease that occurs when the immune system mistakenly attacks the body’s own tissues.

In MG, the immune system attacks and interrupts the connection between nerve and muscle, called the neuromuscular junction (NMJ). This causes weakness in the skeletal muscles, which are responsible for breathing and moving parts of the body.

In most cases of MG, the immune system targets the acetylcholine receptor — a protein on muscle cells that is required for muscle contraction.

About 85 percent of people with MG have antibodies against the acetylcholine receptor in their blood. The antibodies target and destroy many of the acetylcholine receptors on muscle. Consequently, the muscle’s response to repeated nerve signals declines with time, and the muscles become weak and tired.

About 15 percent of individuals with MG are seronegative for antibodies to the acetylcholine receptor, meaning the antibodies aren’t detectable in their blood (serum). It’s been discovered that a large fraction of these individuals have antibodies to muscle-specific kinase (MuSK), a protein that helps organize acetylcholine receptors on the muscle cell surface.

There’s also evidence that an immune system gland called the thymus plays a role in MG. About 10-15 percent of people with MG have a thymic tumor, called a thymoma, and another 65 percent have overactive thymic cells, a condition called thymic hyperplasia. When the thymus doesn’t work properly, the immune system may lose some of its ability to distinguish self from non-self, making it more likely to attack the body’s own cells.

MG affects both men and women and occurs across all racial and ethnic groups. It most commonly impacts young adult women (younger than 40) and older men (older than 60), but it can occur at any age, including during childhood.

MG is not inherited, and it is not contagious. Although MG is not hereditary, genetic susceptibility appears to play a role in it. Occasionally, the disease may occur in more than one member of the same family.

MG causes weakness in muscles that control the eyes, face, neck, and limbs. Symptoms include partial paralysis of eye movements, double vision, and droopy eyelids, as well as weakness and fatigue in neck and jaws with problems in chewing, swallowing, and holding up the head.

Muscle weakness in MG gets worse with exertion and improves with rest.

Approximately 10-20 percent of people with MG experience at least one myasthenic crisis, an emergency in which the muscles that control breathing weaken to the point where the individual requires a ventilator to help them breathe. This condition may be triggered by infection, stress, surgery, or an adverse reaction to medication, and usually requires immediate medical attention.

There is no known cure for MG, but there are treatments that can control symptoms and allow people with MG to have a relatively high quality of life. Most individuals with the condition have a normal life expectancy.

Most people with MG are able to manage their symptoms and lead active lives, and a few experience remission lasting many years.
What should I know about MG?

Myasthenia gravis weakens and fatigues the body’s voluntary muscles (those we can move at will). It doesn’t damage the musculature of the heart or the gastrointestinal tract.

What are the signs and symptoms of MG?

- Impaired speech
- Difficulty chewing or swallowing
- Partial paralysis of eye movements
- Double vision
- Muscle weakness
- Facial muscle weakness
- Weakness and fatigue in the neck
- Weakness and fatigue in the legs
- Weakness due to the muscles in the chest
- Weakness and fatigue in the face
- Weakened/uncoordinated grip

How is MG treated?

Medications

- Immunosuppressive drugs: Improve muscle strength by suppressing the production of abnormal antibodies. They include prednisone, azathioprine, mycophenolate mofetil, tacrolimus, and rituximab.

SURGERY

- Thymectomy: An operation to remove the thymus gland, is required in MG patients with a thymic tumor and, in other cases, may lessen the severity of MG symptoms. It may also reduce the patient’s need for the use of additional drugs to control MG symptoms.

Intravenous Therapy

- Plasmapheresis is a procedure in which a machine is used to remove harmful antibodies in plasma and replace them with good plasma or a plasma substitute.

- Intravenous immunoglobulin is a highly concentrated injection of antibodies pooled from many healthy donors that temporarily changes the way the immune system operates. It works by binding to the antibodies that cause MG and removing them from circulation.

Please talk to your medical provider to obtain more information about potential treatments for MG.
MDA Glossary

Autoimmune disease
A disease characterized by an inappropriate attack of the immune system on the body’s own tissues

Diplopia
Double vision

Dysarthria
Difficulty speaking or forming words

Dysphagia
Difficulty swallowing

Dyspnea
Difficulty breathing

Genetic susceptibility
An increased likelihood of developing a particular disease based on a person’s genetic makeup

Myasthenic crisis
A medical emergency that occurs when the muscles that control breathing weaken to the point where individuals require a ventilator to help them breathe

Neuromuscular junction
The place where nerve cells connect with the muscles they control

Neuromuscular junction disorder
A condition that is a result of the destruction, malfunction, or absence of one or more key proteins involved in the transmission of signals between muscles and nerves

Neurotransmitter
Chemicals that neurons, or brain cells, use to communicate information

Ophthalmoparesis
Partial paralysis of eye movements

Ptosis
Drooping of one or both eyelids

Thymus
A gland, located in the chest behind the breast bone, that controls immune function and may be associated with myasthenia gravis

To learn more about MG, visit mda.org or contact the MDA National Resource Center at 833-ASK-MDA1 (275-6321).