Myasthenia gravis
Myasthenia gravis
Myasthenia gravis is an autoimmune disease that causes muscle weakness. The symptoms are caused by the immune system interfering with the transmission of messages from the nervous system to the muscles. There is no cure, but the symptoms can be managed. Treatment options include drugs to suppress the activity of the immune system, plasmapheresis to clear the antibodies from the blood and surgical removal of the thymus gland.

The term 'myasthenia gravis' (MG) comes from the Greek word ‘myasthenia’ meaning muscle weakness and the Latin word ‘gravis’ meaning severe. It is an autoimmune condition that causes problems with the transmission of signals from the nerves to the muscles. This results in weak muscles that get tired quickly and which improve after rest.

In the early stages, myasthenia gravis mostly affects the muscles that control eye movement, facial expression, chewing and swallowing. As the condition progresses, neck and limb muscles may also be affected, causing difficulty with holding the head up, walking upstairs and raising the arms. If untreated, breathing may be affected. Fortunately, treatment – which may include medication or surgery – is usually successful in managing the symptoms of the condition.

Myasthenia gravis affects all races and can develop at any age from childhood to old age. Women are affected nearly three times more often than men during early adulthood (under 40 years of age). After 50 years of age, more men are affected than women. It is fairly unusual for children under the age of 15 to have myasthenia gravis, except in some Asian countries where up to half of people with myasthenia gravis have symptoms beginning in childhood.

Although the condition doesn’t generally run in families, people who inherit a tendency to develop autoimmune conditions are at increased risk of developing myasthenia gravis, so a person with myasthenia gravis may have another autoimmune disease, such as diabetes, or have a relative with an autoimmune disease.

A 2009 survey found that 2,574 people in Australia were currently being treated for myasthenia gravis. This equals approximately 1.2 out of every 10,000 people.

### Symptoms of myasthenia gravis

Some of the symptoms of myasthenia gravis include:

- weak muscles
- weakness that improves after resting and gets worse after physical activity
- visual disturbances such as double vision, inability to hold a steady gaze and droopy eyelids
- fatigue
- swallowing difficulties
- breathing difficulties
- shortness of breath.

### Cause of myasthenia gravis

Myasthenia gravis is just one of many autoimmune diseases, which include arthritis and type 1 diabetes. Normally, the immune system produces antibodies that recognise foreign things that enter the body, such as bacteria and viruses. This leads to them being destroyed and cleared from the body. In the case of an autoimmune condition, the body’s immune system produces antibodies against things in the body that aren’t foreign. In myasthenia gravis it is the structure at the junction of the nerves and the muscles (the neuromuscular junction) that is attacked.

About 85 percent of patients with myasthenia gravis produce antibodies against a protein called the ‘acetylcholine receptor’ (AChR). This is found at the neuromuscular junction and acts as a receiver for the chemical signal ‘acetylcholine’ (ACh) that is released from the nerve to tell a muscle to contract.

The antibodies bind to the acetylcholine receptors on the surface of the muscle and greatly reduce their ability to receive the chemical signal. As a result, the person experiences muscle weakness, which becomes worse as they repeatedly try to use the same muscle.

Many people with myasthenia gravis who don’t have antibodies to the AChR, have antibodies to a protein called ‘muscle-specific kinase’ (MuSK). This protein helps organise ACh receptors on the muscle cell surface. Research is ongoing to find out what antibody is responsible in the approximately 10 percent of people who don’t have antibodies to AChR or MuSK. Recently, antibodies to a protein called ‘LRP4’ were found to be the cause for some of these people.

Scientists don’t know what triggers most autoimmune conditions, but they have a few theories. One possibility is that certain viral or bacterial proteins mimic ‘self-
Myasthenia gravis is an autoimmune disease that causes muscle weakness. Symptoms include muscle fatigue, weakness, and difficulty swallowing. The disease is caused by an overactive immune system that attacks the nerve-muscle junction, leading to muscle weakness. Treatment options include immunosuppressive drugs, corticosteroids, and plasmapheresis. Surgery, such as thymectomy, may be recommended for some people. The benefits of thymectomy develop gradually and most improvement occurs years after the procedure is performed, but it is believed to be the only treatment capable of producing long-term, drug-free remission.

**References**

More information here.

Myasthenia gravis, MDA. More information here.

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**More information**

**Immune system**

The following content is displayed as Tabs. Once you have activated a link navigate to the end of the list to view its associated content. The activated link is defined as Active Tab.

- Immune system explained
- Lymphatic system
- Spleen
- Lupus
- Autoimmune disorders

**Immune system explained**

- Immune system explained
  - The immune system remembers every germ it has ever overcome...
- Vaccines
  - Vaccines trick the body into building immunity against infectious diseases without causing the actual disease...

**Lymphatic system**

- Fluid retention (oedema)
  - Fluid retention (oedema) occurs when fluid isn't removed from the body tissues, including the skin. Causes include the body's reaction to hot weather, a high salt intake, and the hormones associated...
- Lymphatic system
  - The lymphatic manages fluid levels in the body, filters out bacteria and houses types of white blood cells...
- Lymphoedema
  - Women who have undergone treatment of breast cancer are particularly susceptible to lymphoedema of the arm...
- Lymphoma
  - Lymphoma is a general term for a cancer that begins in the lymphatic system...

**Spleen**

- Spleen
  - Surgically removing a diseased or damaged spleen is possible without causing any serious harm to the person...
- Splenomegaly
  - Any conditions that cause a rapid breakdown of blood cells can place great strain on the spleen and make it enlarge...

**Lupus**

- Lupus
  - Lupus can be mild or life-threatening, depending on which tissues are affected...
- Lupus and infections
  - The most common infections for people with lupus include those of the respiratory tract, skin and urinary system...
- Lupus and medication
  - Lupus most commonly appears in women of childbearing age...
- Lupus and pregnancy
  - Lupus can be controlled with medications, so the majority of affected women are able to have children...

**Autoimmune disorders**

- Addison's disease
Most cases of Addison’s disease are caused by an autoimmune response that attacks and damages the adrenal glands over time.

- **Autoimmune disorders**
  - There is generally no cure for an autoimmune disorder, but the symptoms can be managed.
- **Chronic fatigue syndrome (CFS)**
  - Myalgic encephalomyelitis, commonly known as chronic fatigue syndrome, can affect people of any age, including children.
- **Diabetes type 1**
  - Type 1 diabetes can affect anyone of any age, but is more common in people under 30 years.
- **Guillain-Barré syndrome**
  - Most people with Guillain-Barré syndrome experienced some form of viral or bacterial infection before the onset of symptoms.
- **Henoch-Schönlein purpura**
  - Henoch-Schönlein purpura causes a purple spotted skin rash which lasts around one to four weeks, and is often marked by relapses.
- **HIV**
  - In Australia, HIV is most commonly spread when having sex without a condom and when sharing needles and other injecting equipment.
- **Hughes syndrome**
  - Hughes syndrome is thickening of the blood caused by abnormal immune system cells.
- **Idiopathic thrombocytopenic purpura (ITP)**
  - Idiopathic thrombocytopenic purpura (ITP) is a rare autoimmune disorder in which a person’s immune system destroys the platelets that help their blood to clot.
- **Myasthenia gravis**
  - Myasthenia gravis is an autoimmune disease that causes muscle weakness.
- **Polymyositis**
  - Polymyositis is hard to diagnose and may be mistaken for muscular dystrophy.
- **Rheumatoid arthritis**
  - Early treatment of rheumatoid arthritis is important in helping you manage the condition more effectively.
- **Scleroderma**
  - Scleroderma is an autoimmune disease that causes muscle weakness.
- **Spinal muscular atrophy (SMA)**
  - Spinal muscular atrophy is one form of muscular dystrophy.

**Related Information**
- **Myasthenia gravis**
- **Polymyositis**
- **Rheumatoid arthritis**
- **Scleroderma**
A child with spinal muscular atrophy type 1 rarely lives beyond three years of age...

- **Muscular dystrophy**
  People affected by muscular dystrophy have different degrees of independence, mobility and carer needs...

- **Multiple sclerosis (MS)**
  Multiple sclerosis is not contagious, but it is progressive and unpredictable...

- **Raynaud’s phenomenon**
  Raynaud's phenomenon can be a sign of a more serious underlying condition, so see your doctor if you experience it...

**Related information on other websites**

- Macalester College - Management of MG
- Neuromuscular junction: Myasthenia gravis, MDA

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