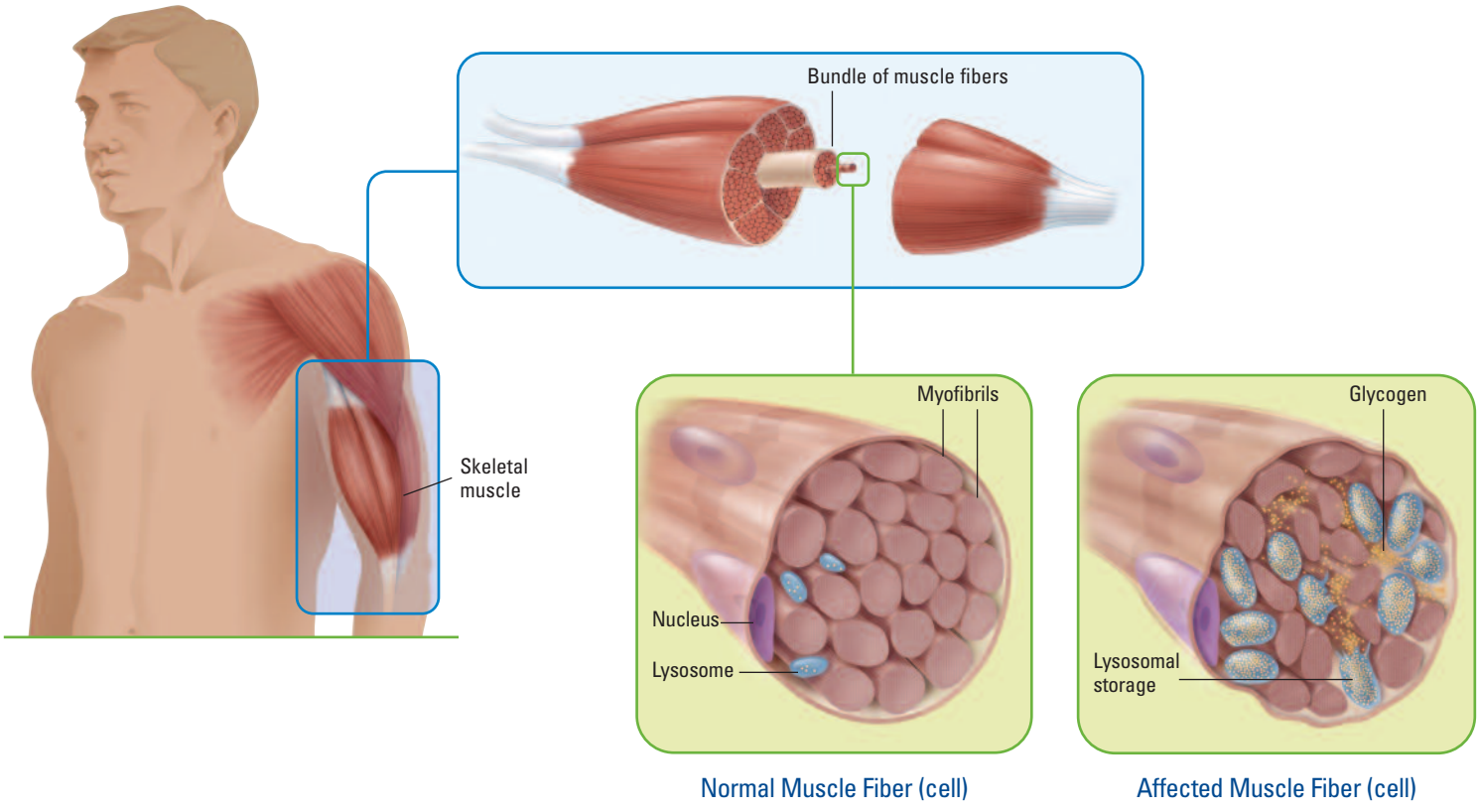
POMPE Connections

The signs and symptoms of Pompe disease

Pompe disease is a rare progressive disorder that is genetically inherited, or passed on to children when both parents have a defective gene. It causes muscle weakness that gets worse over time and often leads to breathing problems. People with this disease do not have enough of an enzyme called ***acid alpha-glucosidase,*** *or* ***acid maltase.*** *This enzyme is needed to break down* ***glycogen,*** *a form of sugar stored in muscle cells. When too much glycogen builds up in the muscle cells, the cells become damaged and the muscles cannot function properly. Because the enzyme is found in a part of the cell called the* ***lysosome,*** *Pompe disease is often referred to as a* ***lysosomal storage disorder.*** *And because it affects the muscles, it is also called a* ***neuromuscular disorder.*** *Though symptoms of Pompe disease may appear at any time from infancy through adulthood, patients tend to receive diagnoses of either infantile-onset or late-onset Pompe disease.*



Muscle cells (or fibers) are grouped in bundles. Each cell is made up of bands of **myofibrils**. Glycogen starts to build up in a part of the muscle cell called the **lysosome**. This causes the lysosomes to expand until they take up so much space that the muscle cell is damaged. Glycogen may also leak out of the cells and cause more damage to the muscle cells.

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Other names for Pompe disease

Acid alpha-glucosidase deficiency, acid maltase deficiency (AMD), glycogen storage disorder (GSD) type II, glycogenosis II, and lysosomal alpha-glucosidase deficiency. In different parts of the world, Pompe may be pronounced *"pom-PAY," "POM-puh,"* or *"pom-PEE."*

Q **How does the severity of Pompe disease relate to the age at which symptoms first appear?**

A In general, the later the symptoms appear, the less severe the disease will be. Pompe disease varies from one person to another. There are differences in the age at which symptoms first appear, the extent of muscle weakness, and how quickly the disease progresses. Babies will show symptoms in the first few months of life if there is no enzyme to break down glycogen. These infants develop major organ damage, such as an enlarged heart, and rarely live past their first birthdays. The late-onset form of the disease progresses more slowly, and some children and adults have much milder symptoms than others.

Q **What are the signs and symptoms of infantile-onset Pompe disease?**

A Infantile-onset Pompe disease, a more aggressive and life-threatening form of the disease, usually appears during the first 6 months of life. Extreme muscle weakness is the most noticeable sign. Babies with Pompe disease look "floppy" and cannot hold up their heads. They may not sit up, roll over, or crawl when other babies their age do. The muscle weakness progresses rapidly. Breathing, sucking, and swallowing become extremely difficult. The heart, liver, and tongue become enlarged. Increasing weakness of the heart muscle leads to heart failure and respiratory failure. Mental development does not seem to be affected.

Q **What are the signs and symptoms of late-onset Pompe disease?**

A Late-onset Pompe disease can appear in older babies, as well as in children or adults. Gradual muscle weakness and breathing problems are the major symptoms.

The first symptom is often a weakness of the legs or hips, which causes a swaying gait or waddle. People may have muscle aches and frequent falls. Babies may not learn to crawl, stand, walk, or meet other developmental milestones. Older children often have a curvature of the spine (lordosis, kyphosis, or scoliosis) that continues into adulthood.

Pompe disease affects one of the most important muscles that we use for breathing — the diaphragm. This muscle is just below the lungs and heart and separates the chest from the abdomen. As the diaphragm gets weaker, breathing becomes more difficult, especially while sleeping. Morning headaches and daytime sleepiness can result. Children with Pompe disease may have trouble keeping up with other children their age when they do physical activities. Adults may tire easily or get winded after exercising or climbing stairs. Some have low back pain. Enlargement of the heart or liver, a classic symptom of infantile-onset Pompe disease, is rarely seen in this form of the disease. It is important to remember that everyone progresses at a different rate and some children and adults have milder symptoms than others.

Q **Why does it sometimes take so long to get the right diagnosis?**

A Pompe disease is rare, affecting about 1 in 40,000 people. The infantile-onset form of the disease may be easier to recognize because the unique symptoms point toward a specific diagnosis. In older children and adults, the disease can be challenging to diagnose. Symptoms that come on gradually may be overlooked. Pompe disease may also be confused with other neuromuscular disorders that have similar symptoms. Infants with Pompe disease, for example, may receive a diagnosis of Werdnig-Hoffmann disease, while children and adults may receive a diagnosis of polymyositis or limb-girdle muscular dystrophy. As healthcare providers become more aware of the signs and symptoms of Pompe disease, it should become easier to avoid delays in diagnosis.

Q **What health problems may occur with Pompe disease?**

A The progressive muscle weakness and breathing problems caused by Pompe disease can increase the risk for respiratory infections, sleep apnea (pauses in breathing while asleep), and swallowing problems, as well as scoliosis (curvature of the spine), contractures (muscle tightness), and lower back pain. To learn more about the health problems caused by Pompe disease, see the handout *Common medical concerns*.

Q **Is there a cure for Pompe disease?**

A While we do not yet have a cure for Pompe disease, there is hope that effective treatment will soon be available. Enzyme replacement therapy is showing promising results in clinical trials. Researchers are also studying other ways to slow the progression of symptoms or cure the disease. (For more on these approaches, see the handout *Medical progress on Pompe disease*.) Until new treatments are approved, supportive therapies are available to help manage the symptoms of the disease. Such therapies may bring comfort and relief and help people live their lives as fully as possible.

Where to learn more

These sources can answer more of your questions about Pompe disease.

- The **International Pompe Association (IPA)** is a federation of Pompe disease patient groups around the world. To find the contact for your country, visit the IPA Web site at www.worldpompe.org
- **Understanding Pompe Disease** is a free booklet that gives a good introduction to Pompe disease. It is available on the Pompe Community Web site at www.pompe.com
- **The Physician's Guide to Pompe Disease** can be ordered from the National Organization for Rare Disorders (NORD) at www.rarediseases.org/programs/pompe_brochure.html