

AGING CHANGES IN ORGANS - TISSUE

<http://www.healthline.com/adamcontent/aging-changes-in-organs-tissue-cells>

Information

All vital organs begin to lose some function as you age. Aging changes have been found in all of the body's cells, tissues and organs, and these changes affect the functioning of all body systems.

Living tissue is made up of cells. There are many different types of cells, but all have the same basic structure. Tissues are layers of similar cells that perform a specific function. The various kinds of tissues group together to form organs.

There are four basic [types of tissue](#):

- **Connective tissue** supports other tissues and binds them together. This includes bone, blood, and lymph tissues in addition to the tissues that give support and structure to the skin and internal organs.
- **Epithelial tissue** provides a covering. The skin and the linings of the various passages inside the body are made of [epithelial](#) tissue.
- **Muscle tissue** includes three types of tissue:
 - Striated muscles, such as those that move the skeleton (also called voluntary muscle)
 - Smooth muscles, such as the muscles that surround the [stomach](#) (also called involuntary muscle)
 - Cardiac muscle, which makes up most of the heart wall (also involuntary muscle)
- **Nerve tissue** is made up of nerve cells (neurons) and is used to carry messages to and from various parts of the body. The brain is made of nerve tissue.

AGING CHANGES

Cells are the basic building blocks of tissues. All cells experience changes with aging. They become larger and are less able to divide and reproduce. Among other changes, there is an increase in pigments and fatty substances inside the cell (lipids). Many cells lose their ability to function, or they begin to function abnormally.

Waste products accumulate in tissue with aging. A fatty brown pigment called [lipofuscin](#) collects in many tissues, as do other fatty substances.

Connective tissue changes, becoming increasingly stiff. This makes the organs, [blood vessels](#), and airways more rigid. [Cell membranes](#) change, so many tissues have more trouble receiving oxygen and nutrients and getting rid of carbon dioxide and wastes.

Many tissues lose mass. This process is called atrophy. Some tissues become lumpy (nodular) or more rigid.

Because of cell and tissue changes, your organs also change as you age. Aging organs gradually but progressively lose function, and there is a decrease in the maximum functioning capacity. Most people do not notice this loss, because you seldom need to use your organs to their fullest capability.

Organs have a reserve ability to function beyond the usual needs. For example, the heart of a 20-year-old is capable of pumping about 10 times the amount that is actually needed to preserve life. After age 30, an average of 1% of this reserve is lost each year.

The most significant changes in organ reserve occur in the heart, [lungs](#), and [kidneys](#). The amount of reserve lost varies between people and between different organs in a single person.

These changes appear slowly and over a long period of time. Even so, when an organ is worked harder than usual it may not be able to increase function. Sudden [heart failure](#) or other problems can develop when the body is worked harder than usual. Things that produce an extra workload (body stressors) include the following:

- Certain medications
- Illness
- Significant life changes
- Suddenly increased physical demands on the body, for example:
 - A sudden change in activity
 - Exposure to a higher altitude

Loss of reserve also makes it harder to restore equilibrium in the body. Drugs are detoxified at a slower rate. Lower doses of medications may be needed, and side effects become more common.

Medication side effects can mimic the symptoms of many diseases, so it is easy to mistake a drug reaction for an illness. Some medications have entirely different side effects in the elderly than in younger people.

AGING THEORY

No one really knows how and why people change as they get older. Some theories claim that aging is caused by accumulated injuries from ultraviolet light, wear and tear on the body, by-products of [metabolism](#), and so on. Other theories view aging as a predetermined, genetically-controlled process.

However, no theory sufficiently explains all the changes of the aging process. Aging is a complex and varied process that varies in how it affects different people and even different organs. Most [gerontologists](#) (people who study aging) feel that aging is the cumulative effect of the interaction of many lifelong influences. These influences include heredity, environment, cultural influences, [diet](#), [exercise](#) and leisure, past illnesses, and many other factors.

Unlike the changes of adolescence, which are predictable to within a few years, each person ages at a unique rate. Some systems begin aging as early as age 30. Other aging processes are not common until much later.

Although some changes typically occur with aging, they occur at different rates and to different extents. There is no reliable way to predict specifically how you will age.

TERMS

- **ATROPHY**
 - Cells shrink. If enough cells decrease in size, the entire organ atrophies. This is often a normal aging change and can occur in any tissue. It is most common in skeletal muscle, the heart, the brain, and the secondary sex organs (such as the breasts).
 - The cause of atrophy is unknown, but may include reduced use, decreased workload, decreased blood supply or [nutrition](#) to the cells, and reduced stimulation by nerves or hormones.
- **HYPERTROPHY**
 - Cells enlarge. This size increase is caused by an increase in cellular proteins, such as the cell wall and internal cell structures, not an increase in the cell's fluid.
 - When some cells atrophy, others may hypertrophy in an attempt to compensate for loss of cell mass.
- **[HYPERPLASIA](#)**
 - The number of cells increases. There is an increased rate of [cell division](#).
 - Hyperplasia usually occurs in an attempt to compensate for loss of cells. It allows some organs and tissues to regenerate, including the skin, the lining of the intestines, the [liver](#) and the bone marrow. The liver is especially good at regeneration. It can replace up to 70% of its structure within 2 weeks after an injury.
 - Tissues that have limited ability to regenerate include bone, [cartilage](#), and smooth muscle (such as the muscles around the intestines). Tissues that seldom or never regenerate include nerves, skeletal muscle, heart muscle, and the lens of the eye. When injured, these tissues are replaced with scar tissue.
- **[DYSPLASIA](#)**
 - The size, shape, or organization of mature cells becomes abnormal. This is also called atypical hyperplasia.
 - Dysplasia is fairly common in the cells of the cervix and the lining of the [respiratory tract](#).
- **[NEOPLASIA](#)**

- The formation of [cancerous](#), malignant tumors. This may be an extension of the processes causing hyperplasia and hypertrophy.
- Neoplastic cells reproduce rapidly. They may have unusual shapes and abnormal function.