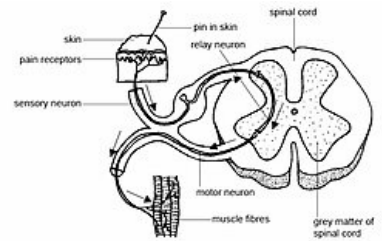


# Motor Neurons

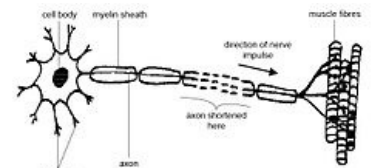
**Motor neurons** are cells, which are able to coordinate a motoric function of our body by their influence on contraction and relaxation of the muscles. They are also sometimes called efferent neurons, because they lead information from central nervous system to muscles and tell them what to do.

We can divide motoneurons according to the target systems:

- **Somatic motoneurons** are connected to the skeletal muscles and their main role is in locomotion. If this type of motoneurons is activated, the muscle contraction occur, but also their relaxation is important, because it leads to the muscle relaxation. The contraction is not the most important thing, because without the relaxation there is no chance to move. All our voluntary movements are coordinated alternating of contraction and relaxation.
- The second type is the **visceral motoneurons**. They control viscera, which we can not affect on our own (e.g.: heart, vascular muscles and others).



Motor neuron in a spinal cord



Motor neuron

## Lower motoneuron

- includes many parts of a motor tract: *anterior corners of the spinal cord, anterior spinal roots, spinal nerves, plexuses, peripheral nerves, neuromuscular plates and muscles*
- diseases of lower motoneuron: progressive bulbar palsy, progressive muscular atrophy, ALS

## Upper motoneuron

- includes less parts than the lower one: *tractus corticospinalis*
- diseases of upper motoneuron: primary lateral sclerosis, ALS

## Lesions of the motoneurons

A lesion of the motoneuron can be on the upper or on the lower part of a system, but the result is similar in both cases - **movement disorders**. There are few types of a classification and one of them is a division on the positive and the negative symptoms. Another classification is based on on the degree of disability.

1. **positive symptoms** – a function is increased: convulsions, muscle spasms;
2. **negative symptoms** – a function is decreased: *paresis* (partial damage of movement ability), *plegia* (complete lost of movement ability).

1. **monoplegia** (monoparesis) – disability of one limb;
2. **hemiplegia** (hemiparesis) – disability of right or left part of a body;
3. **paraplegia** (paraparesis) – disability of lower limbs;
4. **quadraplegia** (quadraparesis) – involvement of all limbs.

## Comparison between central and periferal lesion of motoneurons

Function	Upper motoneuron lesion	Lower motoneuron lesion
<b>Movement ability</b>	more affected groups of muscles (diffuse damage)	affected is just one innervated region
<b>Reflexes</b>	increased (the influence of central inhibition is nonfunctional)	decreased or disappeared
<b>Muscle tone</b>	increased ( <i>hypertonia</i> : spasticity or rigidity)	decreased ( <i>hypotonia</i> )
<b>Trophic</b>	muscle atrophy occurs later as a result of an inactivity	early muscle atrophy
<b>Patological movements</b>	irritative phenomena	fasciculations (spontaneous contractions of muscles); fibrillations (spontaneous contractions of a single muscle fiber)

# Links

## Related articles

- Pyramidal Tract
- Motorneuron Diseases
- Hypertonia
- Irritative Phenomena
- Amyotrophic Lateral Sclerosis
- Progressive Bulbar Palsy
- Progressive Muscular Atrophy
- Primary Lateral Sclerosis

## External links

- wiseGEEK (<http://www.wisegeek.com/what-is-a-motor-neuron.htm>)
- National Institute of Neurological Disorders and Stroke ([http://www.ninds.nih.gov/disorders/motor\\_neuron\\_diseases/detail\\_motor\\_neuron\\_diseases.htm](http://www.ninds.nih.gov/disorders/motor_neuron_diseases/detail_motor_neuron_diseases.htm))

## Bibliography

- AMBLER, Zdeněk. *Základy neurologie*. 7th edition. 2011. ISBN 978-80-7262-707-3.