

Mechanical growth factor (from the English. *Mechano Growth Factor* or *MGF*) - isoform (variety) insulin-like growth factor, which is mainly formed after performing physical work as well as reception of anabolic steroids, hyperthermia and oxidation increase its secretion. Mechanical growth factor causes division of myoblast (muscle germ cells that are in a sleep state), and also accelerates muscle growth and recovery. The effect is much like the growth hormone, but it does not strengthen bones and cartilage. Mechanical growth factor is a variant of IGF-1 (insulin-like growth factor produced by the liver under the effect of growth hormone), which is formed by splicing (series connection of individual elements RNA encoding IGF-1) in response to damage to the muscle tissue as a result of physical load. The physiological role of MGF has been well studied in the in vitro cell models and in mice. In contrast to IGF-1, growth factor causes mechanical division of dormant muscle cells by activation of different receptors. Reduced synthesis of MGF - this is the main reason due to which there is a reduction of muscle mass in dystrophic patients and the elderly.

Application bodybuilding

Use of MGF as a therapeutic drug in the early stages was limited because the substance, when introduced into the body is destroyed in a few minutes. In the body, MGF is produced constantly, so concentration is maintained at a high level for a long time. At the same time, it is impossible to carry out the injection once every 30 minutes. Scientists have found a simple and ingenious solution - **pegylation**. Molecule mechanical growth factor has been combined with polyethylene glycol molecule, which protects it from degradation, and does not reduce biological activity and efficiency at the same time. Thus, all modern drugs are pegylated **Peg-MGF**, while the use of IFR is meaningless. Pegylated mechanical growth factor has a significantly higher bioavailability in the organism is introduced 2-3 times a week, and maintains a high concentration for a long time. However, pegylated peptides in a short time will be determined at a doping control, with the terms of their definitions will be very significant. For example, PEGylated erythropoietin variant - Mirsera - determined for months, in contrast to most of EPO, where the bill is literally for days. The drug is not used inside as quickly degraded in the digestive tract, usually the MPR is administered subcutaneously.

Effects

In studies on rats, a single intramuscular injection of MPR led to an increase in cross-sectional area of the muscle by 25% in three weeks. When using schemes similar administration, insulin-like growth factor led to an increase in cross-sectional area of muscles by only 15%.

Also, it was determined that mechanical growth factor is more effective for younger individuals. The higher the age, the lower the response of muscle tissue on injection of the drug.

The effects of bodybuilding (audit scientific sources for the year 2012)

Summary experience with mechanical growth factor showed that 5-week course of medication is:

- Muscle growth by *hyperplasia* (acceleration of cell division), *hypertrophy* (increase in cell volume), and extending their life **at any age**
- Reducing the percentage of body fat by an average of 5-6%
- Increasing endurance
- To increase the prominence of the muscles
- Improve venous pressure
- The growth of new blood vessels in the muscles and bones (shown Deng M, Wang Y. in 2012)

Additional effects:

- Enhancing the immune defense
- Improvement in skin properties
- Lowering cholesterol
- Accelerated recovery
- Neuroprotective effect (protects the nervous system)
- Stimulation of propagation of bone marrow cells
- It inhibits cell apoptosis and preserves cardiac function after myocardial infarction
- The regeneration of all tissues of the body,

Side effects

Side effects of mechanical growth factor (proven in studies):

- Bleeding from the nose (not shown at all)
- Swelling of subcutaneous injections
- Itching after injection
- Tingling fingertips, which is rare.
- Inhibition of differentiation and mineralization of osteoblasts
- Investigation Armakolas A, Philippou A. 2010 confirmed the participation of the mechanical growth factor in the biology of cancer of the prostate in humans.
- Increased heart rate. "Now with synthetic injections of MGF you can increase the pulse and so speed up recovery, and increase the muscle tissue cells by stimulating satellite cells into full maturity."