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**The mechanism of the stimulation of the mitotic process**

The article describes a new mechanism of stimulation of cell division. This hypothesis is based on the geometric (stereometrically) changes in cell volume tensile fabrics. The volume change due to a change in cell shape, it is, in our opinion, leads to stimulation of cell division.

**Keywords:** stretching, mitosis, geometry.

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**Митоз процессінің ынталануының механизмі**

Мақалада митоз процессінің ынталануының жаңа механизмі ұсынылады. Ол гипотезаның негізі жасушаның көлемінің созылу кезіндегі геометриялық (стереометриялық) өзгеруіне сүйенеді. Көлемнің өзгеруі жасуша пішінінің өзгеруімен байланысты, бұл, біздің ойымызша, жасушаның бөлінуінің ынталануына алып келеді.

**Түйін сөздер:** созылу, митоз, стереометрия

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**Механизм стимуляции митотического деления**

В статье рассказывается о новом механизме стимуляции деления клетки. Данная гипотеза основана на геометрическом (стереометрическом) изменении клеточного объема при растяжении тканей. Изменение объема связано с изменением формы клеток, это, по нашему мнению, приводит к стимуляции деления клетки.

**Ключевые слова:** растяжение, митоз, стереометрия.

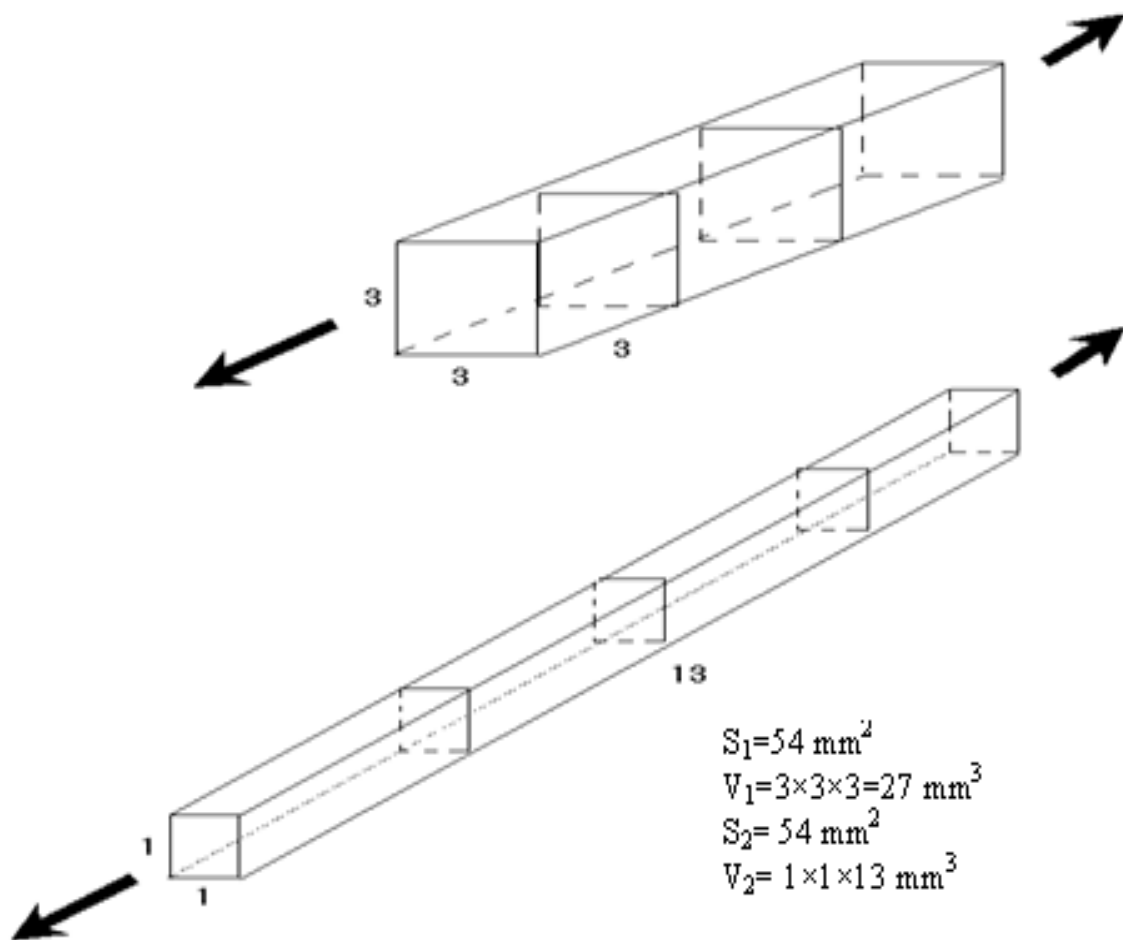
For last decade the well known manifestation of the connective tissue's high plasticity is used in the traumatology, which concludes in its ability to increase the mass at the stretching, that can be for example at the increasing of a skin mass at adiposity, stretching abdomen skin of gravid uterus etc.

The big contribution to development of the metered stretch for replacement tissues is the method of the compressive-distraction osteosynthesis developed by Iliazarov G.A. He formulated the influence of stretch on the growth of tissue. Last years on the basis of this conception the distraction methods of treatment in patients with defects of the long bones, shortening of limb and with different consequences of the musculoskeletal system's

trauma got wide spreading in the clinical practice [1,2].

If there is the opportunity of different tissues' stretching of the body, especially connective tissue, now it is the established fact and it used in the clinical practice generally enough, but the question is about the process is provided structurally, but to present day it is not clear. It didn't give rise to doubts that the morphological changes happen in the process of tissues' stretching. Due to which the integrity is kept and the mass is grown gradually [2,3].

However concerning that, what cellular elements take part in the tissues' stretching and what changes they are undergone, there are different points of views. Some authors suppose that the source of



**Figure 1** – Changing the ratio of the volume and surface of the object under tension.  
The figures are taken empirically.

the cells' duplication at the tissues' stretching is the cambial mesenchymal cells, which differentiate into that cells type of connective tissue, which is undergone to stretching [1, 4, 5, 6].

Another group of authors hold the opinion about the metaplastic transformation of single mesenchymal cambial cell into one or another connective cell- into osteoblast, fibroblast, fatty, smoothmuscular etc. There is the point of view allowing the synthesis of specific and metaplastic cambial theories. Essentially important that almost all authors shows the important role in the reactivation-hyperplastic processes of the vascular system, especially so cells of small vessels' wall as pericyte which is covered the vessel out of side.

Morphological changes at the reactivation processes in the bone tissue, especially at the distraction osteosynthesis, studied better than at the skin stretching, but in that and in another cases

they demand the further investigations, especially regarding of more exact identification of the cellular elements, which play the definite role in these processes.

Stretching stimulates the tissues growth, amount of vessels, cells and intracellular substance increase in it.

From our point of view, the essence of process of the surface skin's increasing at tension of stretching includes exactly the stretching. The point is that at the stretching of the soft tissues as at the Iliazarov's apparatus as at another apparatus, including the apparatus method, the form of epidermis, dermis, subcutaneous etc. are changed. Out of changing form the cell's volume can change.

At first glance this paradoxical statement seems absurdity.

Schematically the volume's correlation and surface of cytoplasm's cell and their changing

after stretching is showed on the scheme (see Figure 1). As scheme shows, the volume of the cytoplasm has decreased, though the nucleus's volume didn't decreased. The force of stretching acts on the cytoplasm's biological membrane, whereas the impact of stretching on the membrane is absent.

Decreasing of the cytoplasm's volume concerning the nucleus's volume leads to the changing of the nuclear - cytoplasmic correlation. The changing of the nuclear - cytoplasmic correlation to the side of decreasing is observed in the stage G1

of the mitotic cycle. That is these cells' alterations are the stimulus including the processes preceding to the cell division.

In the treatment process by the apparatus method of the surgical wound [7,8,9,10] both as outside and as inside ligature arch, there are elements soft tissues' stretching. It can be used for the dosed stretching of the soft tissues in skin defects (after tumor's dissection, burning etc).

So using this apparatus the mitotic processes in cells are stimulating and leading to acceleration of healing wounds.

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