

**THE ULTIMATE QUESTION OF MUSCLES,
BIONICS AND EVERYTHING**

Gruzd N. A., student

Scientific supervisor – Lukashovich K. K., lecturer
Belarusian National Technical University
Minsk, Republic of Belarus

The part human, part machine era shown in fictional stories is rapidly coming. Soon placing man-made parts into a body will become as usual as tooth filling. Although artificial limb sometimes can even surpass the functionality of a lost tissue, it's still perceived as something unfamiliar. That is why the idea of synthesizing artificial muscles seems to be one of the most perspective branches of prosthetics. The example of nature has successfully been used for technical solutions over the last decades. Mentioned tasks is the sphere of the fresh baked science called bionics. Bionic prostheses work by reading the electric potential generated by the tension of the remaining muscle tissues of the arm with special myo-sensors [1]. They transmit the readout signal to the microprocessor, which generates commands and sends them to the motors. Servo motors are cheap and easy to work with however they are not able to imitate motions of human body clearly. Recently developed artificial muscles include nanocomposite actuators, twisted nanofiber yarns, oil-driven actuators, thermally activated shape-memory alloys, dielectric-elastomer actuators, conducting polymers, stimuli-responsive gels and even origami-inspired prototypes.

Vast problems make modern designs inappropriate to use in medicine, however progress doesn't stand still. The appearing of muscle-driven prostheses is only the question of time. But which technology would bring us to this point is the ultimate question of muscles, bionics and everything.

References:

1. Lake C. The Evolution of Upper Limb Prosthetic Socket Design. *J Prosthet Orthot*, 2008; 20 (3): 85–92

2. [1] Schlesinger G. Der mechanische Aufbau der künstlichen Glieder. In: Borchardt M, Hartmann K, Leymann, Radike R, Schlesinger G, Schwiening 2H (Hrsg.). *Ersatzglieder und Arbeitshilfen für Kriegsbeschädigte und Unfallverletzte*. Berlin, Heidelberg: Springer-Verlag, 1919: p. 321–661