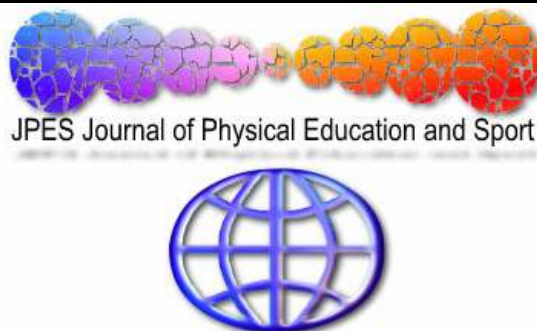




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ORIGINAL RESEARCH

ANTICIPATING AND REGULATING BIOSYSTEM

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Abstract:

Regulating biosystems closely related to human beings are structures still difficult to understand. Numerous intimate processes taking place in these systems, even their actual constitution, are insufficiently decoded, and that they have populated the world long before man invented the first regulator, appears not to have contributed much to their knowledge. This work is intended to highlight what regulating biosystems are. There is no secret that somatic muscles perform control operations which no act of moving would be possible without. All actions are the result of dynamic controlled processes adjusted to strict control laws. By treating them very seriously may lead to knowledge of processes occurring in complex systems.

Keywords: biosystems, control systems

Introduction:

We often ask ourselves: is risk anticipation a science? To be an exact science, we should be able to determine the exact future. As everyone knows, the future is unknowable in detail, especially since it is a more distant perspective full of complex events. Thus, risk anticipation is a scientific component (the collection of statistics and facts, statistical analysis of data), but also an intuitive component (interpretation of data, to some degree). Biological systems highlight the advantages of introducing anticipation in control systems. The system is warned by action that follows. It will be able to respond to control conditions more complex than when the differential component would be absent. Here is an example in which anticipation advantages the control system, namely anticipation of ski turn.

Anticipation of ski turn, as we know it today, was introduced internationally, by Ingemar Stenmark in the early '80s, and in Romania, by Professor Bogdan from the ski school near CSS Sinaia, after a period of training in Austria. In summary, it's the 'hanging' on the outer edge of the inside ski before completing the turn. The process is useful and applicable only in short turns. Dynamic prediction is only mentioned in the world of amateur or recreational skiing, since ski schools tend to make as much of the opportunities offered by pure carving. And cut skis, although revolutionary, are still limited in terms of turning radius, pure carving forcing the curve near the huge slalom, ie large or moderate turns. Dynamic anticipation substantially shortens turns somewhat detrimental to carving. What it is and when is it useful?

It is useful primarily on slopes inclined enough to impose a strict control of speed, on narrow passages or untended traverse. We refer only to fast slopes. Carving practice and theory teach us to stand relaxed and as long as we can on the outside ski, launching the turn and leave the ski to conclude it in its own rhythm. But when we talk about steep slopes that any delay with skis on the 'fall line' leads to rapid acceleration beyond the comfort level, which excludes long turns. Most skiers know this instinctively, from the moment of evaluating all sides and then try to curtail the powers of the turns. Dynamic prediction is described in the following sequences:

Exiting the turn, the skis are almost perpendicular to the slope.

Outside ski is loaded.

Before completing the turn the mass is transferred on the inside ski. The shoulder line is perpendicular to the slope wire. The trunk bends to the valley while performing. The ski on the outside edge „runs” on the inner edge by the easy lifting of the inner schi. Once the turn occurred press against the outside leg knee vigorously

This action tends to conclude the turn very quickly, with a slight slippage of the tails. It is very important not to change the position of the trunk. The shoulder line will be perpendicular to slope. This will create a voltage kick in the abdomen and back muscles which will make changing direction almost automatically and effortless. From the outside, sliding skiers will be seen as a straight line, the trunk will remain almost stationary, just the feet swinging left and right in a fast pace. There is a beneficial side effect: when the slope is very fast or there is very bad snow, "landing" in the final turn produces a new kick, this time vertically, which makes the next turn more easier. The discussion above highlights the advantage of introducing anticipation in control systems; the system is somehow warned by the action that follows. It's no secret that the striated muscle achieves adjustment operations, without which none of the habitat acts would be possible because they are the result of controlled dynamic processes which obey very strict regulating laws. We naturally ask ourselves whether muscle fiber is simply an effector. Even at a first approach of the question, the answer is negative because it is hard to believe that a system so demanding will make use of directly executed elements, that is effector in open circuit.

CONTENT

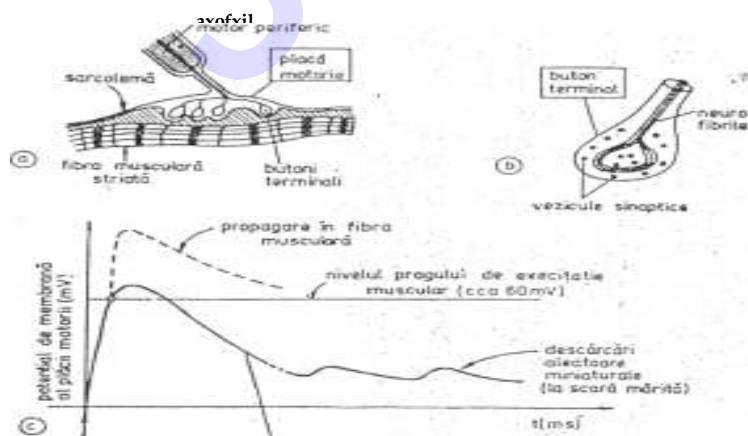
As we shall see below there is a whole system of sensors that transmit information at various levels to carry out orders received by the muscle fiber. Fig.1 (according to D Theodorescu 1978). The basic elements of the somatic muscles system are the muscle fibers which can be found in muscles in intrafusal fiber form, having the role of kinesthetic transmitters or extrafusal fibers, which are contractile elements of the muscle itself. Intrafusal muscle fibers are arranged in parallel with the rest of the fibers, and those close to tendon are "sequenced" with extrafusal fibers. In other words, extrafusal fibers are not directly related to tendon, but through transmitters (intrafusal fibers); the latter is the peripheral segment of kinesthetic analyzer.

Striated muscles in somatic muscle structure respond to voluntary and involuntary nervous commands, unlike the smooth muscles and glands of internal secretion, which respond only to unintentional and unconscious commands. However, muscle fiber control is synaptic and a typical example for these synapses established between nervous fiber and effector cell is the so-called motor plate. The peripheral motor neuron axon has many branches at the plate level, provided with terminal buttons.

The scheme of a terminal button is depicted in Figure 1.b. The terminal buttons are both provided with neurofibers leading the nervous influx from the axon and synaptic vesicles. They have a diameter of 300-600 Å and contain a specific chemical mediator (particularly acetylcholine) that is designed to transmit the nervous influx through the gap, from the terminal button to the plasma membrane of the muscle fiber.

The gap in question, called synaptic slit, is no more than 200 Å, so that when the nervous influx reaches the terminal button, synaptic vesicles burst and release acetylcholine, which acts on muscle fiber membrane by increasing its permeability for Na^+ ions. Thus, an electrical potential is achieved by depolarization (action potential). Depolarization then spreads out triggering the muscle fiber contraction. Depolarization potential varies with the characteristic shape in Figure 1.c. This is because of the muscles excitation level (60 mV) when propagation in muscle fiber (interrupted line) deforms potential depolarization. In fact, this feature can only be fully achieved at neuromuscular junctions where the fiber propagation was blocked by curarization [1.4].

At least two things deserve to be seen in relation to the control mechanism described above. The first one refers to the apparently complicated solution to achieve this command, solution including the sequence: frequency modulated impulses- chemical mediator - depolarization and contraction. Indeed, synaptic vesicles do not occur in the motor plate, but they are generated in the body of the neuron from where they migrate to the



• nervous system action potential (depolarization)

Fig. 1. Neuromuscular junction (a), terminal button (b) and junction response to a nervous stimulus (depolarization)

terminal buttons. Once "consumed" in the synaptic slit, vesicles are assumed to be replaced and that replacement is problematic, especially during long-term efforts. However, that solution can also be found at other levels than at the neuromuscular junction. It is widespread and at least for neuromuscular junction the explanation seems to lie in the fact that the processes of storing and releasing energy at muscle level are essentially biochemical. As a result, choosing a chemical signal at the end of the command chain, achieved through a mediator such as acetylcholine is most natural.

The second issue relates to the randomness of the processes at the neuromuscular junction level. The processes described above occurring in the motor plate are accompanied by random miniature discharges of chemical mediator producing corresponding variations of depolarization potential. Continuously noisy miniature discharges, make up the action potential (depolarization). Reaching the threshold value that expresses the character of nonlinear component of muscle fiber is produced by increasing the likelihood of overlap miniature discharges due to the appearance of a nervous stimulus.

Therefore, the motor plate is the place of random processes characterized by a low level of command, during the period preceding the incidence of nerve impulses and achieves a state of high command after the impulse emergence. In terms of quantum model, Rupert Sheldrake as postulated the existence of morphogenetic extraphysical fields justifying morphogenesis in biology.

What happens when material forms functions are not performed properly? Here comes the concept of vital body. The body has vital biological functions of the original plans, morphogenetic fields represented by the physical body organs. Once made representations, the organs implement the programs that fulfill biological functions.

Consciousness is what makes these representations, it is the programmer. It uses vital plans to make physical representations of its vital functions, whose archetypes are encoded in our supramental, body of laws and archetypes, Figure 2. (according to Goswami, A. 1999)

When consciousness collapses (it moves from possibility to actuality) quantum possibilities of a body in the field of actuality where it could fulfill a specific biological function also collapse. What we perceive as a meaning is exactly this movement.

If movements are possible, then we can say that mental movements are also possibilities of meanings. When you choose the possibilities of meanings, we get a concrete plan.

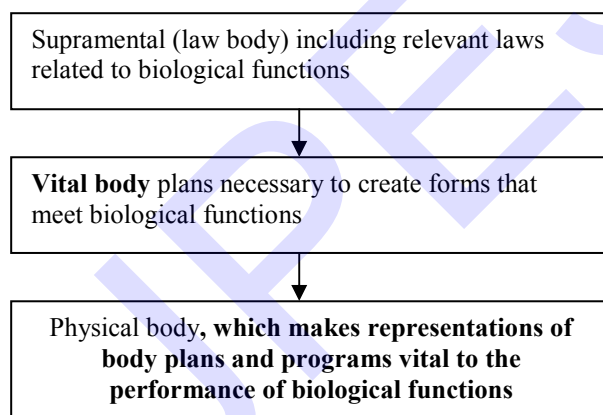


Fig 2. Stages of biological functions shift from supramental into material

In any experience, consciousness physically perceives the mental object, and mentally perceives its meaning. Consciousness is the foundation of our entire existence, the fundamental matter and mind. Matter and mind are both possibilities of consciousness. When consciousness turns - through collapse - these possibilities into a real event, some possibilities are represented physically and others mentally.

Physicist Fred Alan Wolf (1986) clarified the mechanism by which muscles record memory. Each muscle is a string of 30 cm long fibers, contains numerous cell nuclei and fine fibers called myofibrils. They are composed of several sarcomeres arranged along the longitudinal axis of the cylindrical muscle. Muscle bioenergy depends on the free movement of calcium ions. When a muscle is strained (as happens when we suppress an emotional trauma) sarcomeres are flooded by these calcium ions. Even after the traumatic incident, a part of the calcium may remain in sarcomeres. This leads to the continuation of muscle tension, becoming a memory of suppressed trauma. The muscle maintains a "body memory", of suppressed emotional trauma. We can say that the muscle retains a memory of when it is set in a certain position and cannot relax.

Conclusions

Regulating biosystems model provides a mixture of surprisingly varied and efficient solutions. The optimal nature of these solutions recommends statistical modeling of processes, possibly by using optimized statistical models. The discussion presented above is a preamble to the analysis of somatic muscles system through models. From the perspective of quantum mechanics, when we deal with the same stimulus, mind is not allowed to collapse certain mental states of emotional reaction awareness; the muscle memory does not collapse either. Therefore, that muscle will not be reactivated by subsequent emotional experiences, whether the existing defense mechanism always operates at the mental level.

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