## VI. On the Creation of a NanoneurO Interface

## connecting Brain and Computer. [1]

The psychoneurophysiology make use of various widely popular tomographs and electroencephalographs allowing in real-time to receive an amount of noninvasive information related to the nervous system functioning of a living organism. Unfortunately, these devices still do not have sufficient precision, selectivity and resolution to allow, according to the received information, reconstruct the structural and functional unit of the nervous system in functioning neural PC model.

Also well known and equally widely used are various types of invasive electrode systems that have sufficient precision and selectivity in resolution, but do not have sufficient capacity and completeness of the tomographic image, distort and injure the object with its invasiveness.

To solve the contradiction (according to the 10th «standard» of TRIZ between «the common incorrectness» of microtomography and «the narrow accuracy» of macro-electrodes we believe that it should be used widely invasive sensors with micro- and nano-scale in quantity corresponding to the quantity of studied objects (e.g. in the range of 50 billion neurons in the human brain) that will not traumatize and will not affect the normal operation of the object (excitatory formations), because of its small (micro and nano ) size, but will run around the clock monitoring throughout the life of the organism.

This kind of nanoneurosensors (in the earlier works from the years 1996 – 1998 the author named it «spy»-sensor) should have a «synergistic property» e.g., to organize themselves and to form a working system where they will be stationed after their passive delivery (for example in

the form of capsules) with blood flow. Or, in their active transport through the bloodstream and site assembly from micro-, nano- robots or biological cell-carriers (including viruses). These sensors will be an artificial membranes with graphene skeleton (tubular or spherical), which will further acts as a semiconductor chip.

The input of a large amount of information has to be structured in a hierarchical network with stepwise sequential compression of data so that the outside body to transmit a small amount of aggregated data (e.g. the changes in the coefficients of the approximating curves, the functions of an I/O of the «black box». The actual reception/transmission by means of radio or optical communication channel can be carried out through an embedded in the neural tissue chip-transmitter.

According to the information received from the sensors the superneurocomputer, which will be located outside the research organism, by set of special mathematical methods laid down in the relevant software, interactive and iterative shall rebuild the studied natural neuralnetwork in artificial model – its copy, as will further adjust the copy to the original, while the gap between them in structure and functions becomes negligible.

Working simultaneously, the original and the copy will exchange information between them and will form a parallel system, which is called «system with hot reserve» in the theory of reliability. When the natural neurocells fails, their functions shall be taken by the artificial model of that neurocell. At some point, instead of 100% natural defunct cells begin to work 100% artificial cells and the organism as a whole will not even notice this replacement.

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[1] ***Корчмарюк Я. И.*** **О создании нанонейроинтерфейса между мозгом и компьютером** //Региональная информатика-2008 (РИ-2008). XI Санкт-Петербургская международная конференция. Санкт-Петербург, 22-24 октября 2008 г. Материалы конференции. — СПб.: СПОИСУ, 2008. С. 243–244.