Based on these data, we made a suggestion that in regulatory mechanisms of the brain the biorhythms of different ranges are generated and interacted. Besides, the high-frequency rhythms ensure the intrasystemic information analysis in separate nuclei and centers of nervous system. Low-frequency biorhythms, including decasecond range, fulfil the intersystem coordination, particularly the coordination of nervous and visceral processes. The decasecond range biorhythm with the fluctuation period of 20 s, which reflects the successful organism adaption, we named "the adaptogenous rhythm".

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CHANGE OF NEURONAL SPECIALIZATION AS AN INDEX OR REORGANIZATION OF THE MEMORY STORE AFTER LOCAL BRAIN DAMAGES

Yu.I.Alexandrov
Inst. of Psychology, USSR Acad. of Sci., Moscow, USSR

The conclusions concerning the state of memory in patients with local brain damages are drawn from the comparison of testing results with the normal data. An existence or absence of the given memory material and its state are evaluated by analysing the realization of behavior, report behavior included. With respect to that an attention is drawn to a problem what memory material becomes actualized during the realization of the same (according to the criterion of the result being achieved) behavior before and after a local brain damage.

Memory store of an organism is represented by the systems formed during phylo- and ontogenesis (Shvyrkov, 1985). A behavioral act may then be considered as a hierarchy of systems, the levels of this hierarchy reflecting the successive stages of the formation of behavior (Alexandrov, 1987). Neurons are specialized in relation to the given functional systems (Shvyrkov, 1985); thus the activity of central and peripheral neurons in behavior may serve as an index to evaluate the differences in the sets of systems forming the hierarchies of the compared behavioral acts (Alexandrov, 1986).

The present study was designed to compare, on the basis of the analysis of the systemic specificity of neurons in the anterolateral part of the motor cortex, the memory material that becomes actualized during the realization of the complex food-acquisition behavior in normal rabbits and in rabbits after bilateral lesion of the striate cortex (VI) . It is these two structures that may be clearly distinguished in the rabbit brain; with the high degree of certainty they may be correlated with fields 4 and 17 respectively.

The unit activity was recorded in 5 rabbits. Two of them served as controls, while in other 3 striate cortex was lesioned. The initial sequence of behavioral acts composing the complex food-acquisition behavior (pedal approaching, pedal-pressing automatic feeder approaching, food-seizure) had been restored in all rabbits by postoperative day 2, and by day 4–5 the timing of the behavior returned to the control level. The activity of 301 units in the operated rabbits and of 274 in the control ones was recorded during the performance of that behavior. The detailed description of methods is given elsewhere (Alexandrov et al., 1984).

Two operated rabbits out of 3 showed a twofold decrease in the number of units activated during food-seizure that form the greatest cell group in the studied cortical area of normal animals. The number of units activated during the approach to and/or pressing of a pedal and during the approach to feeder that belonged to the new systems formed in the process of acquiring the complex food-acquisition behavior increased proportionally. Thus after lesion the motor cortex lost some of its specificity and became more like (but not identical with) visual and limbic cortexes that normally contain noticeably more neurons belonging to new systems than the motor cortex.

Markedly changing ratio of the types of specialization resulted in the abrupt change of the "overall picture" of motor cortex unit activity in behavior (percentage of activations at each of the successive stages of behavior from the total number of activations) as compared with normal animals:the number of activations not related to the act of food seizure (at the stages of the acquired food-acquisition behavior) increased significantly.

Modifications of the specialization pattern in the operated rabbit N 3 were limited to a decrease in the number of units that were activated during the chewing. Less pronounced reorganization of the activity on operated rabbit N 3 may be attributed to the premorbid specificity of the specialization of its neurons.

The vertical distribution of activated neurons changed also. The number of activated neurons decreased in the upper and increased in the lower layers of the cortex. This finding probably reflects the recruitment of new neurons from the lower cortical layers into providing for behavior.

The data obtained point to the similarity of the processes underlying recovery and the normal learning of a new habit – in both cases, the original behavioral specialization of motor cortex neurons undergoes a change (the number of neurons activated in relation to the act of food-seizure decreases), and new neurons are recruited to provide for behavior.

Thus the state of the subject of a behavior during the achievement of the same behavioral result by normal organism and by the one after a local brain lesion may be different because of the difference of the sets of functional systems that become realized in these situations. Bearing in mind the goal of this report we think important to stress the following consequence of this statement. The performance of the same (according to the criterion of a result being achieved) behavioral acts during memory tests in normal subjects and in patients after brain damages may be based on the actualization of different memory material. The relative amount of newer components of this material is probably increased in the patients.

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SCALP DISTRIBUTION OF THE MISMATCH NEGATIVITY IN THE AUDITORY EVENT-RELATED BRAIN POTENTIAL TO AN INFREQUENT STIMULUS CHANGE

K. Alho, P. Paavilainen, K. Reinikainen, M. Sams and R. Näätänen

Department of Psychology, University of Helsinki, Helsinki, Finland

Physically deviant stimuli in a sequence of repetitive auditory standard stimuli elicit an event-related brain potential (ERP) component called the mismatch negativity (MMN; for reviews see Näätänen, 1985; Näätänen and Picton, 1987). The MMN begins at the time-zone of the N1 deflection (a negative ERP deflection peaking at or near the vertex around 100 msec from stimulus onset). At the MMN latencies, the ERP to deviant stimuli is negatively displaced in relation to the standard-stimulus ERP. Furthermore, the MMN is elicited by deviant stimuli in an auditory stimulus sequence even when the subject ignores that sequence and attends to a concurrent auditory sequence presented to the opposite ear (Näätänen et al., 1978), or concentrates on reading (e.g., Näätänen et al., 1982; Sams et al., 1984, 1985b) or visual discrimination task (Sams et al., 1985b). The MMN has been suggested to reflect a mismatch between the sensory inflow caused by a deviant stimulus and a neuronal sensory-memory trace storing the physical features of frequent standard stimuli (see, e.g., Näätänen, 1985). This automatic mismatch process might explain why we occasionally become aware of, and orient to, infrequent changes in unattended stimulus sequences.

In the present study, we examined the scalp distribution of MMN to infrequent changes in the pitch, intensity, or duration of an auditory stimulus. Stimulus