

312 EFFECT OF DIAZINON ON REVERSIBLE KINETIC PARAMETERS OF BOVINE RETINAL ACETYLCHOLINESTERASE

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This current study addresses the effect of diazinon on reversible kinetic parameters such as Michaelis-Menten constant (Ks) and Vmax of bovine retinal acetylcholinesterase (AChE). The Ks for the hydrolysis of acetylthiocholine iodide by AChE was increased while Vmax was decreased than the control value in the presence of the diazinon. A Lineweaver-Burk plot, Dixon plot and their secondary replots indicated that the nature of the inhibition was of the mixed type, i.e. a mixture of competitive and noncompetitive inhibition.

313 A NEW BEHAVIORAL MODEL TO STUDY ANIMAL COGNITION

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There are a great variety of behavioural models which are used in order to study different aspects of psychophysiology including such a complex brain functions as cognitive activity. However, simple animal models have become more and more popular in last decades. Undoubtedly, such models are extremely comfortable to identify electrophysiological and biochemical events that might mediate learning and memory. But it is far not evident that by using the models dealing with simple behaviours the cognitive processes can be estimated correctly. Drug-screening models have identified several compounds as being of potential use as treatments for cognitive dysfunction prominent in conditions such as Alzheimer's disease. Unfortunately, most of these compounds have not been successful in clinical studies. Possibly, that is why modern pharmacology guarantees only physiological safety of using various drugs including psychotropic ones.

A new original model to study cognitive aspects of animal behaviour has been worked out. This model allows to characterise basic cognitive processes such as perception, estimation and prognosis, dynamics of behavioural self-organisation and to identify animal individual learning abilities during 15-20 sessions. The experimental space is a complex multiple alternative labyrinth having 4 symmetry plans, divided into food and food-free areas without blinds. Animals have to solve a food-getting problem and to form a cyclic operant habit accordingly to a following logic: if after getting a food leave the food area into the food-free area and enter it again, there will be always a new portion of food available in the feeders. The model is based on Skinner's and Tolmen's principals of learning. Free-choice method is used for learning, so the absence of

any conditioned stimuli give the possibility to study the process of self-organisation. The experimenter does not influence animal learning by turning on/off conditioned stimuli. The structure of the experimental environment is organised so that there are a great route diversity (18^{10}) and numerous possible task solutions (7^4). The spatial and semantic complexity is resulted in the fact that the offered task can not be solved at once because the information capacity is over the animal simultaneous perception (7 ± 2) and basic cognitive processes display can be observed stage by stage.

The animals are supposed to solve two main problems in the experimental situation. First, to find out by themselves the logic of the task which is far not evident from the beginning and conflict for animal (leave the food area in order to get a new portion of food) and second, to realise the general biological principle: to provide maximum result (food) by minimum expense (motor activity). The original quantitative analysis of animal behaviour (15 conditioned and 24 unconditioned parameters) and cognitive activity has been worked out. The psycholinguistic approach and basic semiotic principles are used to analyse animal trajectories in the labyrinth while organising the goal-directed food behaviour. The integrative parameters of animal information processing have been worked out such as speed, intensity of cognitive processes, significance, value of animal actions accordingly to the task conditions and expediency and organisation of behaviour.

This model was successfully used for studying the influence of various factors on animal cognition such as pharmacological (piracetam and opioids), biochemical (ethanol, heparin), physical (magnetic field, ionising and non-ionising radiation, temperature). The model demonstrated the high sensitivity to detection of cognitive dysfunction.

314 SPATIAL LEARNING OF AMYGDALECTOMIZED RATS: EXPERIMENTAL MODEL "EMOTIONAL-COGNITIONAL INTERACTION"

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The spatial learning in rat in the complex maze when animal has to create 4-chains cycle to be food rewarded using the logic "if...then" was applied for cognitive function estimation. Corresponding learning curves (time course as a function of cycle's number of amygdalectomized rat's group were rather similar to those of the normal ones (N), including three types of efficacy increasing: characterized by exponential (I), logistic (II) and (III) no-trend/"no-capable"- low. Thus, the formal cognition wasn't disturbed by emotional structure removal (a defect may be revealed only by supplementary testing based on re-organisation of learned habit). However affective style (Davidson, R.1996) during forming this new behavioral programme was clearly changed: movement velocity was in-