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Influence of food-derived opioid peptides on the level of defence motivation and learning ability of white rat pups.

As known, the opioid system is available to decrease level of defence motivation and to increase resistance of nervous system to stress. Influence of morphin, met-enkephalin, beta-endorphin decreases stress-induced release of noradrenaline in hypothalamus, amigdala, locus coeruleus.
The idea of our experiments was to investigate the behavioral effects of food-derived opioid peptides - beta-casomorphin-7 (from beta-casein of cow milk; YPFPGPI) and exorphin C (the fragment of gluten; YPISL).
Rat pups in different age had received peripheral injections of peptides as a model of consuming by newborns substitutions of maternal milk. As was shown the effects of beta-casomorphin-7 are anxiolytic that is typical for mu-agonists.
The peptide increases exploration and decreases defence motivation in various modifications of 'open field'test and in X-maze. Beta-casomorphin-7 also changes the learning process- it improves acquisition in food-reinforced task and impares acquisition in pain-reinforced task.
The peptide is effective when injected acute (from rats age 28 days) and chronically (long-lasting effects).
Now we investigate properties of gluten exorphin C. It was discovered that peptide influence is anxiogenic: the level of defence motivation increases exploration decreases.
In result exorphin C impaires acquisition in food-reinforced task increasing the number of errors in maze. Like beta-casomorphins exorphin C is effective when injected acute and chronically. In whole our results show that effects of beta-casomorphins and exorphin C on rats behavior are opposite.
Seems exorphin C when binding to opioid receptors works as compete antagonist to endorphins. The reason is the difference in primary structure of peptide molecules mainly the absense of Phe as 3 residue in molecule of exorphin C. The facts support the idea that consumption of food with high content of gluten may lead to unfavourable consequences.