

ENDOCANNABINOIDS AS AUTOREGULATORY SIGNALING MOLECULES: ROLE OF SATURATED N-ACYLETHANOLAMINES

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N-acylethanolamines (NAE) – a new class of biologically active lipids. N-arachydonoil ethanolamine (anandamide) was the first compound of these lipids shown to be an endogenous ligand of cannabinoid receptors. Anandamide and some other saturated and unsaturated N-acylethanolamines were named endocannabinoids. They have a wide range of biological activity as autoregulatory signaling molecules. Stereoselective binding sites were found in the central nervous system and in peripheral tissues – CB1 and CB2 receptors respectively. Anandamide is the best studied compound among the endocannabinoids however it represents only 1–5% of all the quantity of endocannabinoids synthesized in the organism. The saturated N-acylethanolamines represent up to 80% of all NAE and they are less studied. Endocannabinoids were found in diverse tissues as minor lipid compounds and it was shown that they accumulated under different pathological processes.

These facts activated the investigation of biomedical properties of NAE. In this laboratory the role of the saturated NAEs was mainly studied. The membrane protective and antioxidant effects of NAE was found. The modulation of ion transport processes was also shown. We have shown the effect of NAE on adaptive and immune reactions of the organism. Saturated NAE affected myocardium contractility and inhibited the growth and dissemination of experimental cancer. NAE affected Ca^{2+} transport through Ca^{2+} pump.

We postulated that saturated NAE realized their effects through a direct nonreceptor influence on the membrane. We believe that membrane stabilizing, antioxidant and ion modulation effects are realized by the direct NAE influence on membranes. However we do not exclude the possibility of saturated NAE action through special receptors by the signal transduction mechanism. The question about the mechanisms of the NAE effects realization is still open.

Saturated N-acylethanolamines demonstrate many properties common with anandamide especially under pathology, besides they have some special properties. Saturated N-acylethanolamines were shown to have many pharmacological effects. This fact can be the base for the development of new medications.