DEVELOPMENTAL CHANGES IN THE MODULATION OF CYCLIC AMP ACCUMULATION BY ACTIVATION OF METABOTROPIC GLUTAMATE RECEPTORS

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Physiological functions of glutamic acid, the major neurotransmitter in the central nervous system, are mediated by the two receptor families: ionotropic glutamate receptors (iGluRs), and metabotropic glutamate receptors (mGluRs). Eight mGluR subtypes (mGluR1-mGluR8), together with splice variants, have been identified and classified into three groups. One of the features of mGluRs is their profile of functional expression throughout postnatal development. Several lines of evidence suggest age-dependent differences in the pattern or amount of mGluR-mediated phosphatidylinositol (PI) turnover as well as in the expression of mGluRs. The aim of the present study was to investigate how the different effects of mGluR agonists on cAMP accumulation change during rat postnatal life.

We have found that the stimulatory effect of glutamate and/or 1S,3R-ACPD on cAMP accumulation predominates in young animals and decreases in the adults. We have also shown that the enhancement of the effect of noradrenaline on cAMP accumulation by 1S,3R-ACPD in rats is an age-dependent phenomenon which reaches its maximum in 14–30-day-old rats and gradually decreases during their maturation. On the basis of our studies, we conclude that the activation of mGluRs resulting in cAMP accumulation depends on the age of an animal.

Key words: metabotropic glutamate receptors, development, cAMP accumulation

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