

Poster presentation

Changes in expression of cGMP selective phosphodiesterases 2,5 and 9 in the rat brain during aging

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Nitric oxide (NO)-stimulated cGMP synthesis is present in the adult rat brain in close proximity to the NO-synthase containing structures [1]. Intracellular cGMP concentration is under very precise control and depends on parameters of its synthesis by guanylyl cyclase and degradation by phosphodiesterases (PDE). It is known that in the senescent brain the concentration of cGMP decreased [2]. When brain slices were incubated in the presence of isobutylmethylxanthine (IBMX), a nonselective phosphodiesterase inhibitor, sildenafil as a selective PDE5 inhibitor and BAY 60-7550 as a selective PDE2 inhibitor and DEANOONOate as an NO donor, we have previously found that old brains are unresponsive to sildenafil treatment. Therefore in this study we wanted to investigate how the expression of cGMP selective phosphodiesterases changes in the brain during aging by using mRNA in situ hybridization.

Our results indicate differences in the expression of PDE 5 and 9 in the cerebral cortex, forebrain and caudate putamen during aging. Expression of PDE 5 is significantly decreased in old brains in comparison to adult once, which explains our previous findings with sildenafil. Expression of PDE 9 is higher in old brains comparing to adult and PDE 2 expression remains unchanged. Our findings show that cGMP metabolism is altered during brain aging.

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