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THE PATTERNS OF DNA AND HISTONE H3 METHYLATION IN THE RAT BRAIN IN RESPONSE TO SEVERE HYPOBARIC HYPOXIA AND HYPOXIC POSTCONDITIONING

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Using the original paradigm of severe hypobaric hypoxia (SH) and hypoxic postconditioning (PostC), the levels of H3 methylated at Lys4 (meH3K4), or at Lys9 (meH3K9), and methylated DNA (meDNA) were studied in the cells of rat hippocampus and neocortex. It has been shown that in hippocampal CA1 field in 1 day after SH the level of meH3K4 increased but the level of meDNA decreased, whereas in the delayed period the level of meH3K9 decreased but the level of meDNA increased. PostC induced the increase of meH3K4, normalized the level of meH3K4 and decreased the level of meDNA in the CA1 field of hippocampus in the delayed period following SH. In the neocortex, significant changes have been detected only in 1-2 days after SH and appeared as stimulation of histone H3 methylation and decrease of meDNA content. Thus, in response to SH, the complex pattern of changes in methylation of H3 and DNA was observed both in the hippocampus and neocortex but the protective effect of PostC was accompanied by only hippocampal reactions whereas the methylation levels in the neocortex returned to baseline independently of PostC session.

Keywords: severe hypobaric hypoxia, hypoxic postconditioning, brain, DNA methylation, methylation of H3 histone