AGE-DEPENDENT EFFECTS OF 5,7-DIHYDROXYTRYPTAMINE ON SEROTONIN TRANSPORTER IN DIFFERENT BRAIN AREAS IN THE RAT

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In the present study, we investigated the [3H]citalopram binding using a quantitative autoradiography following intracerebroventricular injection of 5,7-dihydroxytryptamine (5,7-DHT) in neonatal and adult male Wistar rats. One group of animals was injected with 5,7-DHT at 3 days after birth while the second group received the neurotoxin at 3 months after birth. Control group was injected with saline. Afterwards, all rats were examined at 4th months after birth to determine the serotonin (5-HT) and catecholamines concentrations using the liquid chromatography with electrochemical detection HPLC system and distribution and density of [3H]citalopram binding sites in the brain using the quantitative autoradiography. A marked depletion of brain 5-HT was observed in rats lesioned either in postnatal or adult period of life. Rats lesioned in their adult period of life showed dramatic reduction of 5-HT transporter in all investigated brain areas (i.e. the frontal cortex, entorhinal cortex, hippocampus, caudate-putamen, nucleus accumbens and ventral tegmental area). On the other hand, administration of 5,7-DHT to newborn rats failed to reduce 5-HT transporter sites in the ventral tegmental area, and produced only slight or moderate reduction in the nucleus accumbens. Thus, it appears that the mesolimbic ventral tegmental area-nucleus accumbens systems are relatively more resistant to 5,7-DHT neurotoxicity in the early postnatal period.

Key words: serotonin, serotonin transporter, neonatal 5-HT depletion, 5,7- dihydroxytryptamine