

**Synaptic plasticity in thalamic nuclei enhanced by motor skill training in rat with transient middle cerebral artery occlusion.**

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The goal of this study was to determine if synaptic plasticity in the thalamus of rats subjected to stroke could be altered by motor training. Transient occlusion of right middle cerebral artery in adult female Sprague-Dawley rats (n = 35) was induced with an intraluminal filament followed by three training conditions, 1. motor skill training on Rota-rod requiring balance and coordination skills, 2. simple exercise on treadmill, and 3. nontrained controls. Synaptic plasticity in brain was evaluated by synaptophysin immunocytochemistry at 14 or 28 days after training procedures. Infarct volume was determined in Nissl stained sections. Both at 14 and 28 days after Rota-rod training, intense synaptophysin immunoreactivity was present in the right but not the left mediodorsal and ventromedial nuclei of thalamus of ischemic rats. In treadmill-trained animals, however, similarly intense synaptic plasticity in these two thalamic nuclei was seen only at 28 days. Immunostaining was found also in other brain regions adjacent to or remote from infarct site. The data suggest that motor training, particularly motor skill training involving balance and coordination, facilitates a uniquely lateralized synaptogenesis in the thalamus.