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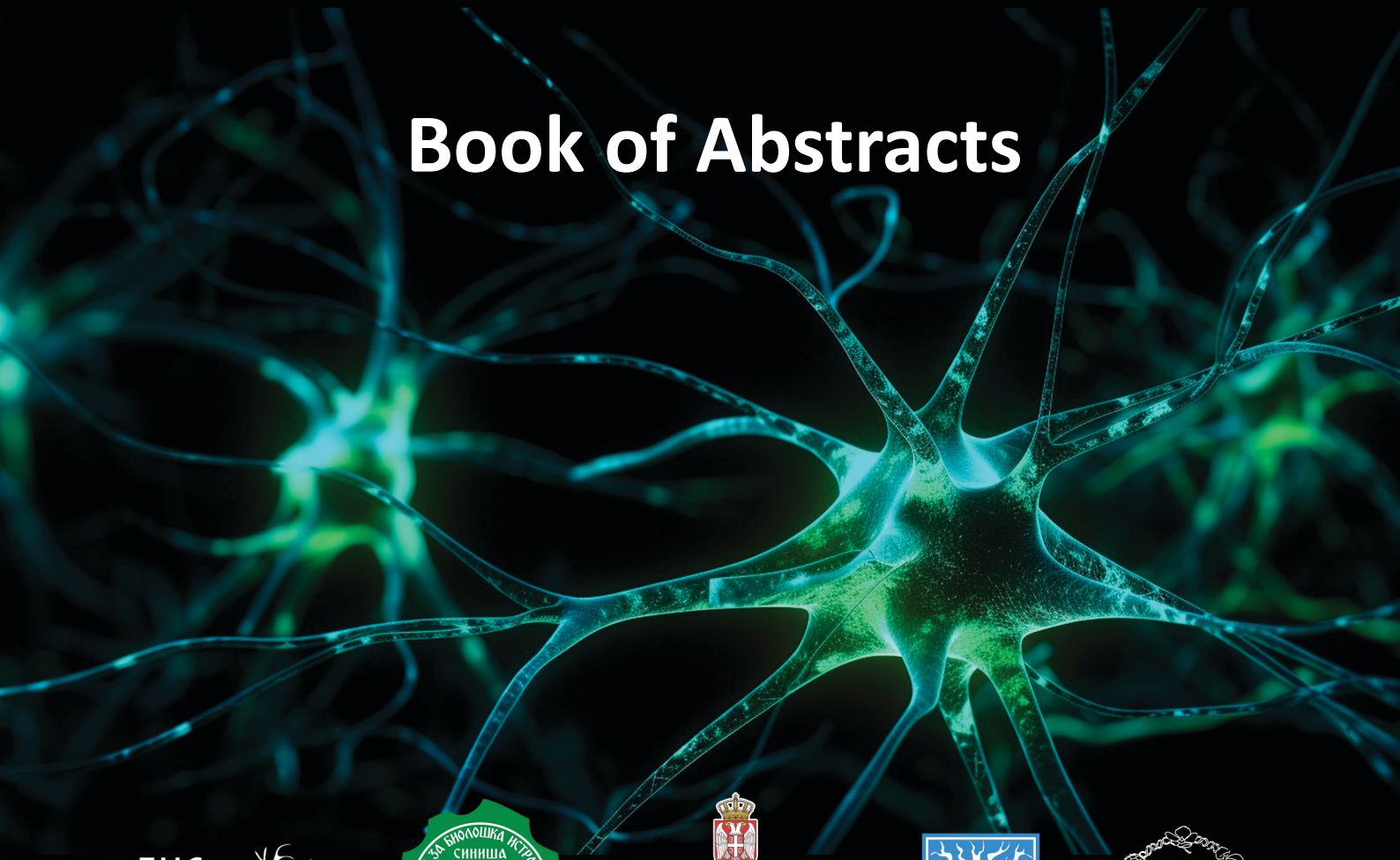

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# Hyperbaric oxygen prevents dendrite degeneration and loss of DCX-positive newborn immature neurons in the dentate gyrus after traumatic brain injury

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Introduction: There is growing evidence that hyperbaric oxygenation (HBO) can affect adult neural stem cells (NSCs) activity. Because the role of NSCs in recovery from brain injury is still unclear, this study examined how ablation of the sensorimotor cortex (SCA) and HBO treatment (HBOT) affect the process of neurogenesis in the adult dentate gyrus (DG), a region of the hippocampus considered to be the site of adult neurogenesis.

Material and methods: Ten-week-old Wistar rats were divided into groups: Control (C, intact animals), SCA (animals in which the right sensorimotor cortex was removed by suction ablation), and SCA+HBO (operated animals subjected to HBOT). HBOT protocol: pressure applied at 2.5 absolute atmospheres for 60 min, once daily for 10 days. The effects of HBOT were monitored by immunohistochemistry and double immunofluorescence labeling. In addition, the number of DCX+ cells was determined along the length of the SGZ in the inner and separately in the outer blade of the right dentate gyrus. Also, the total dendrite length was measured and the number of branching points, dendrite terminals, and segments were counted to quantify dendritic arborization in each neuron.

Results: HBOT decreases SCA-induced loss of immature neurons, prevents reduction of dendritic branching, and increases proliferation of progenitor cells.

Conclusion: Our results suggest a protective effect of HBOT by reducing the vulnerability of immature neurons in the adult DG to SCA injury.

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