LETTER TO THE EDITOR

CORTICAL-LIMBIC NEUROGENESIS ASYMMETRY AS POSSIBLE CEREBRAL BASIS OF BRAIN LATERALITY FOLLOWING EXPOSURE TO IONIZING RADIATION

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The public interest to radiovulnerability of the brain is now increasing dramatically due to the recent discoveries in neurosciences that satisfactory explain the sensitivity of the Central Nervous System (CNS) to exposure to ionizing radiation (Greene-Schloesser et al. 2012) even in low doses (Loganovsky 2009, Marazziti et al. 2012). There are several mechanisms of radiocerebral effects: disrupted neurogenesis in the adult hippocampus, changes in the gene expression profile, neuroinflammatory response, neurosignaling alterations, apoptotic cell death, cell death and injury mediated by secondary damage, "glial-vascular union", etc. At the same time, the cortical-limbic system is the target for radiation brain damage where hippocampal neurogenesis dysfunction is the crucial (Loganovsky 2009, Greene-Schloesser et al. 2012, Marazziti et al. 2012).

The human brain is anatomically, neurochemically, and functionally asymmetric. Disrupted lateralization of the brain is an important cause in the genesis of neuropsychiatric disorders. However, it is very little known about asymmetry of neurogenesis. There are data that the rate of cytogenesis is significantly higher in the *left* medial prefrontal cortex, than in the right (Czéh et al. 2007).

We found the cortical-limbic dysfunction in the left, dominating, hemisphere following exposure to ionizing radiation as a result of the Chernobyl accident at the different radiological scenario: acute radiation sickness, low dose chronic exposure, and irradiation *in utero*. Our data were independently supported by different groups of researchers in several countries.

We propose, that the increased neurogenesis in the left cortico-limbic system, mainly, in the left hippocampus, is the cerebral basis of lateralized radiation neuropsychiatric effects.

These findings have not only theoretical significance, but very pragmatic one also. The interventional cariologists, neurosurgeons and radiologists are exposing during the operations to X-rays to the left brain due to the location of X-ray machine at the left of operating table. This could be resulted in specific neurocognitive deficit and behavioural change.

Neurogenesis asymmetry and its disruption following exposure to low doses of ionizing radiation should be studied *in vivo* in humans by the modern neuroimaging technics.

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