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Federation of American Societies for Experimental Biology

Harvard scientists identify compounds that stimulate stem cell growth in the brain

BETHESDA, Md.--Scientists at Harvard University have identified key compounds that stimulate stem cell growth in the brain, which may one day lead to restored function for people affected by Parkinson's disease, strokes, multiple sclerosis, and a wide range of neurological disorders. These findings, which appear in the September 2006 issue of The FASEB Journal, provide important clues as to which compounds may be responsible for causing key brain cells, neurons, to regenerate and ultimately restore brain function.

The research study focused on two compounds--LTB4 and LXA4. Both play a role in inflammation and are regulators of proliferation of several cell types. When stem cells isolated from the brains of mouse embryos were exposed to LTB4 they proliferated and differentiated, giving rise to additional stem cells and to differentiated neurons with limited or absent capacity to divide. When exposed to LXA4, these cells experienced decreased growth and apoptosis.

"This study opens doors to new therapeutic approaches for a wide range neurological disorders and injuries that were once considered incurable," said Gerald Weissmann, MD, Editor-in-Chief of The FASEB Journal.

The study also provided so insight into the cellular and molecular mechanisms involved when LTB4 stimulates neuronal stem cells. According to the study, cells generated as the result of LTB4 exposure had high levels of LTB4 receptors, whereas the level of LTB4 receptors was considerably lower in similar cells not generated by LTB4 stimulation. The investigators were further able to show that LTB4 up-regulated several molecules involved in cell cycling and growth, such as cyclins and epidermal growth factor receptor, and decreased those such as caspase 8 which play a role in apoptosis. LXA4 had the opposite effects.

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