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Microglia modulates neural stem/progenitor cell characteristics and potentiates differentiation in co-culture system

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To evaluate better the contributions of microglia to modulate the neural stem/progenitor cells (NSPCs) characteristics, we employed a neural stem/progenitor neurosphere culture system that models the continuing proliferation and differentiation. NSPCs were cultured under different conditions: 1) NSPCs cultured in stem cell supporting medium. 2) NSPCs cultured in LPS treated stem cell supporting medium. 3) NSPCs cultured in microglia conditioned medium. 4) NSPCs cultured in microglia conditioned medium treated with LPS. 5) NSPCs co-cultured with microglia. The differentiation potential of NSPCs with microglia co-culture was determined by checking the cell fate markers MAP2, GFAP and olig-2 expressions. Doublecortin (DCX) immunostaining was performed to check the migrating neuroblasts within the NSPCs. Fluorescent staining and western blotting were employed to determine the effect of microglia on NSPCs differentiation. Our results showed that, microglia modulated the effects on NSPCs cell characteristics and directed the NSPCs differentiation. The proliferation rate of NSPCs was checked in all the experimental groups. The neuron specific marker MAP2, the astrocyte specific marker GFAP and oligodendrocyte specific marker olig-2 expressions were modulated in all the experimental groups directing the cell fate. DCX immunostaining showed increase in the migrating neuroblasts within the NSPCs. Neurogenesis in NSPCs is activated by co-culture with microglia or microglia-conditioned medium, indicating that microglia activates and secretes cytokines essential for neurogenesis evident through our microarray analysis. Neurogenesis in highly expanded NSPCs can be rescued by co-culture with microglial cells or microglia-conditioned medium, indicating that microglia provide secreted factors essential for neurogenesis, NSPCs maintenance, selfrenewal, or propagation

Biography

Jong Eun Lee, Department of Anatomy, Yonsei University College of Medicine, Seoul, South Korea attained her Ph.D from Yonsei University and perused her post doctoral research from Stanford University. Her research interests include the development of new transgenic functional stem cells and evaluation of their therapeutic potentials in various neuronal disease animal models in vivo, development of CMOS-based DNA/Neuron Biosensor Chips and development of modified biomaterials for use in medical implants. She is an active and regular member to some of the important conferences and served in different capacities to Neuroscience, International association for the study of pain, American Heart Association &American stroke congress, International Stroke Conference, Asian Pacific International Congress of Anatomists, Korean Association of Anatomists, Korean Society for Neurobiology, Korean Stem Cell Society. She is an editorial board member as well as reviewer for many international journals. She has delivered several invited talks at various National and International Conferences. Prof Lee has published about 90 research articles in various National and International peer reviewed journals. Her research was been supported by various funding agencies and some of them are: KOSEF, Korea Institute of Industrial Technology Evaluation and Planning, Korea Research Foundation, MOST, Korean Health 21 R&D Project, Ministry of Health & Welfare, Korean Ministry of Science & Technology 'The Neurobiology Research Program

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