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Neurovascular unit: An integrated endocrine organ

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he concept of 'Neurovascular unit' [NVU] introduced in 2001 ,by stroke progress review group under the National Institutes of L Neurological Disorders and Stroke, emphasize that brain function and dysfunction arises from integrated interaction between a network of neurons, Glia and cerebral endothelium i.e. a functioning NVU. This phenomenon is partly mediated by the ability of cerebral endothelium, astrocytes, pericytes and oligodentrocytes to secrete a rich repertoire of trophic factors. More data are available now regarding endothelial -neuron /endothelial-astrocyte /endothelial -oligo dentrocyte trophic coupling. Brain derived neurotrophic factors, fibroblast growth factor-2, transforming growth factor - beta, adreno-medullin, vascular endothelial growth factor, matrix metalloproteinases etc. play multiple, specific roles in neurovascular unit to accomplish its functions of homeostasis and damage repair. Neurovascular unit participates in the establishment and function of the blood brain barrier [BBB]. Astrocytes contribute support to the BBB via the release of factors including Glial cell line-derived neurotrophic factor, angiopoetin-1 and angiotensin -11. Through releasing trophic factors cerebral endothelial cells guide developing axons and protect neurons against stress. It also provides a niche for supporting neural stem /progenitor cells [NSPCs]. NSPCs are shown to have direct coupling with cerebral endothelial cells .In neurovascular unit cell-cell signaling between cerebral endothelial cells and neuronal precursor cells help mediate and sustain pockets of ongoing neurogenesis and angiogenesis in adult brain. Under the remodeling phase after brain injury these close relationships are maintained and both neurogenesis and angiogenesis occur in the neurovascular niche to promote repairing the brain .Thus rather performing as a passive conduit for blood stream, cerebro-vascular system with its actively interacting cellular network and trophic mediators plays more active role in maintaining CNS homeostasis. As more and more acute ischemic stroke patients are undergoing endovascular re-canalization after the successful Mr. Clean [2014] & Escape [2015] trials, more clinical and radiological evidences are surfacing supporting the existence of this integrated endocrine CNS homeostasis.

Biography

Joy Varghese is a Sr. Consultant Neurosurgeon & Head of the department, Dept. of Neuro-intervention, Global Health City, Chennai. He completed MCH in Neurosurgery from Mumbai University, India and Fellowship in Interventional Neuro-radiology [FINR] from Zurich University, Switzerland. Endovascular and micro vascular neurosurgery always fascinated him and has been working in this field for last ten years. He is the Neuro interventional Surgeon in-charge of Global Hospital India stroke program. He has published several papers in reputed journals.

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