

3<sup>rd</sup> Global Summit on **BRAIN DISORDERS AND THERAPEUTICS**

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**Does Cardiac Function Affect Cerebral Blood Flow Regulation?****Shigehiko Ogoh***Toyo University, Japan*

**Statement of the problem:** Some previous studies indicated that heart failure (HF) increases the risk of cognitive dysfunction and stroke, showing the logic that several physiological factors associated with cardiac dysfunctions affect homeostasis in cerebral circulation. However, the mechanism underlying HF-induced brain disease remains unclear. While several physiological factors associated with cardiac dysfunctions in patients with HF directly affect homeostasis in the cerebral circulation, therefore, it should be considered the influence of systemic circulatory dysfunction (physiological factors regarding HF) on cerebral circulatory homeostasis in preventing brain disorder. The purpose of this presentation is to describe the possible systemic circulatory mechanism that influenced cerebral dysfunction.

**Methodology & theoretical orientation:** The previous studies regarding patients with HF support the logic that several physiological factors associated with cardiac dysfunctions affect homeostasis in cerebral circulation. HF, one of the leading causes of morbidity and mortality, is a systemic disease that affects the other organ system, especially the brain, e.g. cognitive function. To understand the effect of systemic dysfunction of circulation and cerebral dysfunction, I focused on systemic and cerebral circulation in patients with HF.

**Findings:** Based on the anatomy, cardiac function should directly affect CBF regulation because of the cerebral artery connected to the aortic arch. Indeed, changes in arterial blood pressure and cardiac output are directly associated with CBF regulation. However, cardiac dysfunction in patients with HF directly does not cause impairment in CBF regulation. In addition to baroreflexes, and external carotid artery vascular bed, our previous study demonstrated that arterial stiffening modified dynamic pulsatile hemodynamic transmission from the aorta to the brain. These compensatory mechanisms of CBF regulation are also modified in patients with HF.

**Conclusion:** Cardiac dysfunction and cerebral unfavorable circulatory homeostasis may be linked by a common factor, central arterial stiffening rather than direct cardiac dysfunction.

**Biography**

Prof. Shigehiko Ogoh is a full professor at the Department of Biomedical Engineering, Toyo University since 2009. He is also a member of Research Institute of Industrial Technology, Biomedical Engineering Research Center, and an Editorial Board member of the journal of Physiological Sciences (JPN), Experimental Physiology (UK), Exercise and Sports Science Reviews (US), Frontier in Physiology (NLD), Journal of Clinical Medicine (CHE), PLOS ONE etc. He has experiment in the field of cardiovascular/respiratory regulation, especially arterial baroreflex, peripheral vasculature, cerebral blood flow etc. He is also expert in muscle sympathetic nerve activity or baroreflex recording in humans. He published 183 original peer-reviewed papers since 1999.