Stress-Induced Hypertension and the Role of the Neuroimmune System

From 2012-07-02 to 2014-07-01, closed project

Objective

Hypertension is a major health concern because it markedly increases risk of death from stroke, atherosclerosis, and other diseases. An important environmental risk factor that contributes to the development and sustainment of hypertension is psychological stress. Given that the daily life in Western society has become increasingly stressful, a continued rise in stress-related diseases, including hypertension, is highly likely. It has become increasingly clear that inflammation and immune cell activation are fundamental to its development. In particular, T lymphocytes have been shown to play an important role in the pathophysiology of hypertension and more recently in psychological stress and depression related disabilities. Therefore, further understanding of the adaptive immune response and the underlying neuroimmune mechanism(s) in stress-related hypertension is warranted. In the proposed studies we plan to investigate the role of the adaptive immune response in stress-induced hypertension and to further characterize the underlying neurocircuitry in the brain. Using Cre-lox technology, we plan to use genetically modified mice that will allow us to specifically identify stress hormone producing cells in blood pressure control regions of the brain. In addition, we plan to delete genes such as the angiotensin II type 1a (AT1a) receptor in neurons that produce stress hormones, such as corticotropin releasing factor. These studies will provide new information for the central and peripheral mechanisms that mediate inflammatory diseases such as hypertension and may provide a better understanding for the link between the negative impact of stress on hypertension and cardiovascular disease development. The combined expertise from the host university in the pathophysiology of neurogenic hypertension and applicant’s expertise in hypertension, stress, and neuroimmunology afford us a unique opportunity to pursue this research.

Related information

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Subjects

Coordination and Cooperation - Social sciences and humanities

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