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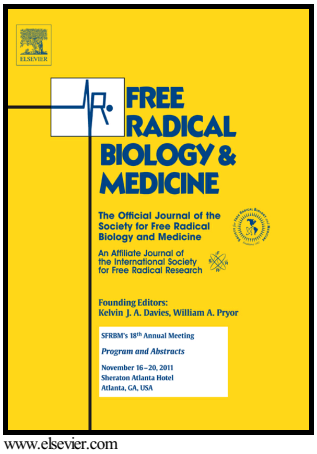

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Hypertension: focus on autoimmunity and oxidative stress

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Abstract:

Understanding the causal role of the immune and inflammatory responses in hypertension has led to questions regarding the links between hypertension and autoimmunity. Immune pathology in primary hypertension mimics several autoimmune mechanisms observed in the pathogenesis of systemic lupus erythematosus, psoriasis, systemic sclerosis, rheumatoid arthritis and periodontitis. More importantly, the prevalence of hypertension in patients with these autoimmune diseases is significantly increased, when compared to control populations. Clinical and epidemiological evidence is reviewed along with possible mechanisms linking hypertension and autoimmunity. Inflammation and oxidative stress are linked in a self-perpetuating cycle that significantly contributes to the vascular dysfunction and renal damage associated with hypertension. T cell, B cell, macrophage and NK cell infiltration into these organs is essential for this pathology. Effector cytokines such as IFN-γ, TNF-α and IL-17 affect Na^+/H^+ exchangers in the kidney. In blood vessels, they lead to endothelial dysfunction and loss of nitric oxide bioavailability and cause vasoconstriction. Both renal and vascular effects are, in part, mediated through induction of reactive oxygen species-producing enzymes such as superoxide anion generating NADPH oxidases and dysfunction of anti-oxidant systems. These mechanisms have recently become important therapeutic targets of novel therapies focused on scavenging oxidative (isolevuglandin) modification of neo-antigenic peptides. Effects of classical immune targeted therapies focused on immunosuppression and anti-cytokine treatments are also reviewed.