# L-Arginine attenuates cardiovascular impairment in DOCA-salt hypertensive rats

**Andrew Fenning,[1] Glenn Harrison,[2] Roselyn Rose'meyer,[2] Andrew Hoey,[3] and Lindsay Brown[1]**

*[1]Department of Physiology and Pharmacology, School of Biomedical Sciences, The University of Queensland, Brisbane; [2]School of Health Science, Griffith University Gold Coast Campus; and [3]Centre for Biomedical Research, University of Southern Queensland, Brisbane, Queensland, Australia*



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## ABSTRACT

Nitric oxide (NO) is essential for normal function of the cardiovascular system. This study has determined whether chronic administration of L-arginine, the biological precursor of NO, attenuates the development of structural and functional changes in hearts and blood vessels of deoxycorticosterone acetate (DOCA)-salt hypertensive rats. Uninephrectomized rats treated with DOCA (25 mg every 4th day sc) and 1% NaCl in the drinking water for 4 wk were treated with L-arginine (5% in food, 3.4 ± 0.3 g·kg body $wt^{-1}$·$day^{-1}$). Changes in cardiovascular structure and function were determined by echocardiography, microelectrode studies, histology, and studies in isolated hearts and thoracic aortic rings. DOCA-salt hypertensive rats developed hypertension, left ventricular hypertrophy with increased left ventricular wall thickness and decreased ventricular internal diameter, increased inflammatory cell infiltration, increased ventricular interstitial and perivascular collagen deposition, increased passive diastolic stiffness, prolonged action potential duration, increased oxidative stress, and inability to increase purine efflux in response to an increased workload. L-Arginine markedly attenuated or prevented these changes and also normalized the reduced efficacy of norepinephrine and acetylcholine in isolated thoracic aortic rings of DOCA-salt hypertensive rats. This study suggests that a functional NO deficit in blood vessels and

heart due to decreased NO synthase activity or increased release of reactive oxygen species such as superoxide may be a key change initiating many aspects of the cardiovascular impairment observed in DOCA-salt hypertensive rats. These changes can be prevented or attenuated by administration of L-arginine.

deoxycorticosterone acetate; oxidative stress; remodeling; collagen

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