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Nitric oxide and L-arginine metabolism intermediates in coronary heart disease

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Abstract

Nitric oxide (NO) is an important signalling molecule in a variety of physiological processes. It is synthesized from L-arginine by different isoforms of the nitric oxide synthase (neuronal - nNOS, inducible - iNOS and endothelial - eNOS). Blood vessel cells and cardiomiocytes express all three isoforms. NO produced by vascular endothelium regulates a number of healthy endothelium functions. NO produced in cardiac smooth cells regulates cardiac contractility. Due to its importance for vascular function, an abnormal production of NO can adversely affect blood flow and other vascular functions. The free radical activity of NO can cause cellular damage by the induction of nitrosative stress leading to protein modification by nitrosylation and nitro-tyrosination. It has been suggested that alterations in NO generation are a critical cause of injury in coronary heart disease. A biological link between the endothelial damage and atherosclerotic coronary arterial disease has been presumably related to an decreased arterial bioavailability of NO. However, there is a considerable controversy regarding whether myocardial ischemia results in increased or decreased NO formation. Beside NO synthesis, L-arginine may be transformed by the methylation in monomethylarginine and two forms of dimethylarginine: symmetrical dimethylarginine (SDMA) and asymmetric dimethylarginine (ADMA). ADMA is a natural, competitive inhibitor controlling NOS activity. ADMA has been found to be elevated in different conditions associated with the endothelial dysfunction, but it is also suggested as a predictor of future coronary events in patients with the elevated cardiovascular risk, and in acute coronary events as an independent cardiovascular risk factor.

Biography

Vidosava B. Djordjević has completed her Clinical Biochemistry specialization at the age of 30, and Ph.D at the age of 36 at the Faculty of Medicine, Niš University. She is the director of the Centre for Medical Biochemistry, Clinical Centre Niš, and the chief of the Institute of Biochemistry, Faculty of Medicine, Niš University. She has published more than 40 papers in reputable journals and four chapters in international books. She is a reviewer for a few respectable journals, and a member of the editorial board of *The Journal of Medical Biochemistry*.