

*The role of oxidative stress in the pathogenesis of metabolic syndrome and its complications*

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**Abstract:**

Metabolic syndrome is a common disorder combining obesity, dyslipidemia, hypertension and insulin resistance and is primary risk factor for type 2 diabetes and cardiovascular disease. The pathogenetic mechanism is not fully clarified, but recent studies suggest that oxidative stress could play a key role in the pathogenesis of metabolic syndrome and could be common pathogenic factor underlying insulin resistance, diabetes type 2 and cardiovascular disease. The Thesis focus on oxidative stress in tissues and their metabolic consequences.

Clustering of cardiovascular risk factors – hypertriglyceridemia, elevated FFA, impaired glucose tolerance and hypertension in HHTg rats as a model of metabolic syndrome increased lipoperoxidation and aggravated antioxidant system in arterial wall and myocardium. Obesity and growing age further potentiated these disturbances. Oxidative stress potentiated with glutathione depletion impaired glucose tolerance and reduced adipose tissue insulin sensitivity. Fat accumulation in the liver with increasing oxidative stress in SREBP-1a transgenic rats may play a causal role in the pathophysiology of non-alcoholic steatosis and may participate on progression to steatohepatitis. The metabolic syndrome is characterized by increased oxidative stress in arterial wall, myocardium and liver, a relevant factor contributing to the development of metabolic and cardiovascular disorders.

Nutritional supplementation with conjugated linoleic acid, vitamin E, glutathione ethyl esters or lipoic acid improve oxidative stress and may have a positive effect on abnormalities associated with metabolic syndrome. On the other hand gemfibrozil administration indicate, that this fibrate has both hypolipidemic and antioxidant effect but improved oxidative stress do not have be effective for all components of antioxidant system.

Oxidative stress in tissues well correlates with relevance of metabolic abnormalities accompanying metabolic syndrome and could be a target for nutritional and pharmacologic intervention, that affect more components of antioxidant system.

**Keywords:** metabolic syndrome, oxidative stress, insulin resistance, antioxidants, cardiovascular disease