

## Diabetes-associated structural and molecular alterations in capillaries supplying the myenteric plexus in rats

N Bódi<sup>1</sup>, N Linke<sup>1</sup>, F Izbéki<sup>2</sup>, M Bagyánszki<sup>1</sup>, É Fekete<sup>1</sup>

<sup>1</sup>Department of Physiology, Anatomy and Neuroscience, University of Szeged, Szeged, Hungary, <sup>2</sup>First Department of Internal Medicine, University of Szeged, Szeged, Hungary

We have recently demonstrated different susceptibilities of nitrergic neurones located in different intestinal segments to diabetic damage. Their different levels of responsiveness to insulin treatment have also been revealed indicating the importance of the neuronal microenvironment in the pathogenesis of diabetic nitrergic neuropathy. Although the myenteric ganglia are not vascularized, blood vessels closely related to the ganglia play a key role in creating the proper microenvironment for the ganglia.

Recent data confirm that the loss of the modulatory role of the endothelium may be a critical initiating factor in the development of diabetic vascular diseases. The reduction of the endothelium-dependent vasodilatation is mainly induced by a decreased bioavailability of the endothelium-dependent vasodilator nitric oxide and an increase in the activity of toxic oxygen free radical.

To understand the cellular and molecular background of the diabetes related myenteric neuropathy we investigated the capillaries close to the myenteric plexus and raised two main questions; 1. Is there any difference between controls and streptozotocin-induced diabetic rats in the thickness of the basal lamina surrounding these blood vessels? 2. Is there a direct linkage between the quantitative features of Caveolin-1, which is the major negative regulatory protein for endothelial nitric oxide synthase (eNOS), caveolae and eNOS in the endothelium of these vessels.

In this study a streptozotocin-induced chronic diabetic rat model was used. The rats were divided into three groups: controls, streptozotocin-induced diabetics and insulin-treated diabetic rats. Ten weeks after the onset of diabetes the rats were killed by cervical dislocation, and samples of different gut segments were processed for electronmicroscopical investigations. We measured the thickness of basal lamina by the help of electronmicroscopic morphometry. Postembedding immunohistochemistry was used to study the eNOS and Caveolin-1 expression and interaction in capillary endothels in the vicinity of the myenteric plexus. To evaluate the effects of streptozotocin-treatment and insulin replacement statistical analysis was performed, the probability of  $P < 0.05$  was set as the level of significance.

In diabetic rats, the endothelial basal lamina what plays a key role in permeability and transendothelial transport was significantly thicker than in the controls. The amount of eNOS and its negative regulator protein, Caveolin-1 was increased in diabetic rats. Immediate insulin replacement significantly prevented the thickening of the basal lamina, and overexpression of eNOS and Caveolin-1.

These results indicate a close relationship between vascular dysfunction and diabetic nitrergic neuropathy, suggesting that endothelial dysfunction in the intestine can be a good prognostic factor for developing enteric neuropathy.

## Antioxidant properties of home-made fruit concentrate

I Engler, E Kosaras, Zs Varga

Ist. Department of Medicine Health and Medical Science Center, University of Debrecen, Debrecen, Hungary

Enhanced oxidative stress develops when production and elimination of reactive oxygen derived compounds (ROS) does not balanced. Enhanced ROS production plays role in development of several diseases. In physiological circumstances elevated ROS production can be decreased by enzymes such as superoxide dismutase, catalase, glutathione reductase, and non-enzymatic ways. One part of the non-enzymatic antioxidants are formed in our body – like serum albumin, coruloplasmine, bilirubin, biliverdin etc. – and other part came from the diet.

During the last decades, several clinical and experimental studies were performed to determine the effects of antioxidant supplementation on health and diseases. However, contradiction in the results considering health prevention were found. Moreover, more and more evidences suggest the pro-oxidant or other disadvantageous properties of mega dose antioxidant supplementation. On these basis, one can assume that the most effective sources of antioxidant are natural origin e.g. the diet itself, and consumption of fresh fruit and vegetables to ensure optimal antioxidant, trace element state mostly advised.