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P5: REGIONAL VARIATIONS IN THE MICROMECHANICAL AND BIOCHEMICAL PROPERTIES OF THE OVINE AORTA

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used as culturing substrates, which restrict cell migration although enabling biochemical communication. All the established culture systems presented viable and proliferative cell populations over time. Interestingly, the tri-culture system presented protein synthesis values much higher than the co-cultures, mostly of collagen. On the immunofluorescence micrographs were observed the maintenance of cell type-specific proteins expression, even in the presence of another cell type. Quantification of Growth Factors (GFs) on conditioned media of the co- and tri-culture systems demonstrated a synergistic interplay between Vascular Endothelial GF (VEGF) and basic Fibroblast GF (Bfgf). The VEGF was mainly expressed by smooth muscle cells, which leads to increasing levels in the co- and tri-culture systems. A similar trend is observed for Bfgf, expectedly produced by the fibroblastic cells. By its side, the platelet derived GF levels remain unaltered among conditions. This study demonstrated the fundamental importance of the intercellular crosstalk between endothelial, smooth muscle and fibroblastic cells. It reinforces the potential of a tri-culture system in the development of tissue engineered blood vessel substitutes.

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P4

MECHANISM OF PROANGIOGENIC ACTIVITY OF MITOCORRECTIN ON ENDOTHELIAL CELLS IN VITRO

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Background: Investigations of different effective treatment modalities of infectious and inflammatory complications of stroke remain relevant. Normalization of vascularization, impaired due to hypoxia, is an important component of ischemic disease treating. The aim of our work was to study the mechanism of action of mitocorrectin on endothelial cells in vitro.

Methods: Active ingredient of mitocorrectin is a set of oligopeptides and amino acids isolated from cell mitochondria of the liver, brain and the pancreas (10:10:1) of pigs. As an experimental model was used endothelial cell line (PAEC), which was incubated at the standard conditions. Cytotoxic/proliferative effect on cultured cells was determined using cytofluorimetric analysis and MTT-test.

Results: Our studies have shown that mitocorrectin increased of endothelial cell by 25% and decreased apoptotic cells almost 2 times compared with the control. Cytofluorimetric analysis revealed an increase 1.8-fold in the population of proliferative cells pool under the influence of mitocorrectin. The most pronounced mitogenic and antiapoptotic effect of mitocorrectin on the endothelial cells was at concentrations of 0.1 – 1/ml. Thus, these doses may be the most therapeutically effective in restoring vascularization in post-stroke period. In addition, long-term cultivation of cells in the 2D-culture when exposed to mitocorrectin, more intensive formation of the capillary-like structures compared with controls, which may indicate vascular morphogenesis.

Conclusions: Thus, a study suggests that mitocorrectin shows a positive proangiogenic effect on endothelial cell line and this drug can be quite effective to restore vascularization, which is important in post-stroke period at ischemic complications.

P5

REGIONAL VARIATIONS IN THE MICROMECHANICAL AND BIOCHEMICAL PROPERTIES OF THE OVINE AORTA

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Background: It is important to understand regional variations in the mechanical and biochemical properties of the aorta to better predict and treat

diseases. Although previous studies have been explored regional differences in the structure and biomechanical properties of the aorta, little is known about how these properties vary across its entire length [1, 2].

Objectives: To map the micromechanical and biochemical properties of the ovine aorta from the aortic root to the celiac artery region.

Methods: Fresh ovine aortas (n = 3) were split into nine sections, separated by 2 cm intervals between the aortic root and the celiac artery region. For each section, three biopsies were cut out using a 5 mm biopsy punch (a total of 81 biopsies). An oscillatory nanoindentation method was used to determine the micromechanical properties of the tissue [3]. 16 indents were made per biopsy. The shear storage (G'), the shear loss modulus (G'') were determined [3]. Subsequently, the same samples were used to determine elastin, collagen and glycosaminoglycan (GAG) levels using established biochemical assays.

Results: Overall, there was a significant correlation between an increase in G' and collagen (P = 0.01) with distance from the aortic root whilst elastin (P = 0.05) and GAG (P = 0.05) levels were significantly decreased.

Conclusions: Our study is the first to comprehensively map the mechanical and biochemical properties across the entire aorta. There was a progressive increase in mechanical properties from the proximal to the distal region, along with an increase in collagen and a decrease in elastin content.

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P6

ARTERIAL STRUCTURE AND COAGULATION IN AGEING NAKED MOLE RATS

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Vascular stiffening and a prothrombotic state consistently increase with age. Naked mole rats (NMRs) among rodent species have a maximum lifespan exceeding 30 years. Arterial stiffness assessed by pulse wave velocity and arterial pressure have been shown not to increase with age in NMRs (Grimes et al. *AJP*). The objective of this work was to study the relation between functional and structural arterial changes and plasma thrombin generation changes in young (2-year-old) and adult (9-year-old) NMRs. Collagen and elastin contents, vascular smooth muscle cell density and intimal thickening have been analyzed in the thoracic aorta, whereas plasma thrombin generation was assessed by calibrated automated thrombography associated with dosage of coagulation factors and endothelial markers. Our results showed no difference in collagen, elastin and vascular smooth muscle cell (VSMC) content between 2 (n = 5) and 9-year-old (n = 5) NMRs. There was no elastin degradation nor intimal thickening in NMRs at 9-years-old compared to 2-years-old. We showed no increase in plasma thrombin generation up to 9 years of age and no change in coagulant fibrinogen and factor VIII both known to increase normally with age. The expression of Endothelial Protein C Receptor (EPCR) and Thrombomodulin were similar at both ages.

In conclusion, young and adult NMRs do not show structural changes of the vascular wall in accordance with the absence of arterial stiffening. The conservation of an intact structure of the vascular wall and no change in endothelial markers during the first third of lifetime is compatible with the lack of a prothrombotic state.

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TELOMERE LENGTH AND AORTIC VALVE CALCIFICATION

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Background: Short telomere length (TL) is associated with atherosclerosis development. Aortic valve stenosis, an age-related disease characterized by narrowing of the aortic opening, is mainly caused by aortic valve