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АКТУАЛЬНІ ПИТАННЯ ТЕРЕТИЧНОЇ ТА ПРАКТИЧНОЇ МЕДИЦИНИ

Topical Issues of Clinical and Theoretical Medicine

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silvered. The scanograms of the deposits' surfaces were obtained by the means of raster scanning microscopy.

Research results. The results showed that the calcifications are built with well-crystallized apatite. Received scanograms clearly show general dependencies in structure of deposits: surface facing walls of blood vessels is smooth and the one that is facing vascular lumen is rough. Therefore smooth, convex surface has a dense nature and less cracks while rough surface has a high amplitude terrain with a clear focus of crystallization. The inner surface of deposits has a crystalline layer of small aggregates. After sonication the layer of small crystals became less sinewy, more pores appeared on rough surface. The presence of pores in the structure of deposits may indicate the participation of organic compounds in the process of formation of pathological biominerals.

Conclusions. Raster scanning microscopy made it possible to explore the structure of calcificates. Deposits have a layered structure. Calcificates have two walls: the inner one has no signs of ordered structure while the outer one is smooth and convex. The presence of pores in the structure proves its heterogenic structure mainly caused by organic components involved into the formation of calcificate.

HOMOCYSTENE AND HUMAN ASTROCYTES

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Astrocytes are multipotent and serve surprisingly large and diverse variety of functions, providing for the overall brain homeostasis, assisting in neurogenesis, determining the microarchitecture of the grey matter, and defending the brain through evolutionary conserved astrogliosis programs. Astrocytes are specifically involved in various neurodegenerative diseases, including Alzheimer's and Parkinson's diseases, and various forms of dementia. Homocysteine is a nonessential sulphur-containing amino acid that had been linked with neurodegenerative diseases and aging. It has been shown, that an increased plasma homocysteine level is an independent risk factor for the development of dementia, Alzheimer's and Parkinson's diseases. Homocysteine behaves as an excitatory molecule which markedly enhanced the vulnerability of neuronal cells to exitotoxic, apoptotic, and oxidative injury *in vivo* and *in vitro*. However, data about the neurotoxic effect of homocysteine on human astrocytes are lacking. Therefore, we decided to investigate the effect of homocysteine on cultured human astrocytes. We tested cell viability by various tests (MTT and Annexin tests). Homocysteine negatively affected the cell viability in dose-dependent manner, which was evaluated by decreased cell density and lowered ability of cells to metabolize MTT. However, the molecular mechanisms by which HCY induced neurotoxicity are still unknown. Targeting of astroglia may provide a new principle for treatment of neurodegenerative diseases, especially at early stages of AD.

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CHARACTERIZATION OF DENTAL TISSUE DERIVED STEM CELLS

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Stem cells (SCs) are undifferentiated cells that are capable to differentiate into more specialized cells with specific functions. Oral tissues, which are easily accessible for dentists are a rich source of stem cells. The isolation of stem cells from these location may still not be convenient, because most of them requires surgical procedures, tooth or pulp extraction. Furthermore, these SCs

are present in small quantities and can therefore be difficult to isolate, purify and homogenously expand them. On the other hand, many of dental tissues have been discarded after extraction, and should be cryopreserved for use as an autologous stem cell source. There are eight major populations of dental tissue-derived MSCs (DMSCs): dental pulp stem cells (DPSCs), stem cells from human exfoliated deciduous teeth (SHEDs), periodontal ligament stem cells (PDLSCs, dental follicle progenitor cells (DFPCs), alveolar bone-derived mesenchymal stem cells (ABSMCs), stem cells from apical papilla (SCAPs), tooth germ progenitor cells (TGPCs) and gingival mesenchymal stem cells (GMSCs). There are several differences in properties, available sources and obtaining possibilities of DMSCs, and any of this differences can have influence on decision which populations of MSCs to choose. The recent finding of SCs in periodontal tissues has suggested the use of dental stem cells as a potential cell sources for tissue engineering.

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