

TRACE ELEMENTS IN HEALTHY BONES

*Pogorelov M. V. *, Gusak E. V., Deyneka V. N. **, Gordienko E. N.*

*Sumy State University, department of hygiene and ecology with course of microbiology, virology and immunology,
*Institute of applied physics, Sumy, **human anatomy department*

Osteogenesis stimulation is one of the underinvestigated issues nowadays, as well as the topical problem of traumatology. One of the most important functions of the osseous tissue is depositing of macro- and microelements, due to this research on the skeleton ion profile is highly important to explain the osteogenesis physiological and reparative processes. As some microelements are involved into enzyme catalysis reactions, which are held in the osteogenic cells, so in case of their deficit or imbalance some processes are interrupted such as osteoblastic and osteoclastic differentiation, apatite crystallization process, cell-cell collaboration. These all cause physiological and reparative remodeling changes of bone.

Unfortunately, science literature has no data about the comparative compound of skeleton long bones under different mechanical load and hardly present information about correlational interaction among different biogenic elements of bone matrix. Nevertheless, it is well known that microelements have wide variety of synergetic and antagonistic interactions. Additionally, 15 vital elements have 105 bileral and 455 trilateral interactions. These correlations are natural basis to research the microelement homeostasis imbalance evidences and evaluation, which occurs with absence of hardly one essential element. That's why not only the level of microelement concentration is important, but its balance too, because some elements have incomplete or hypernormal routes of exposures.

These factors determined the goal of research, which deals with the microelement compounds of tibia, femoral bone and II lumbar vertebra. We make analysis of the correlation ration among identified elements levels. The paper dealt with analysis of osseous tissue samples of 20 5-month old white rates. During the research the femoral bone, tibia, II lumbar vertebra was investigated for microelement composition.

The osseous tissue chemical compound analysis proved the storage of such elements as Fe, Mg, Zn, Mn, Cu, Co, Cd, Ni, Pb in it. During the investigation process the followed ranges of certain bioelements general level were derived, which are in agreement with literature published data. The contrastive analysis among microelements concentration measures gave an opportunity to identify the next tendency $Zn > Mg > Fe > Ni > Cu > Mn > Co > Pb > Cd$. These trends approve the essentiality of some microelements for the osseous tissue.

Therefore analysis of the elementary compound of different bone types shows diversities between tubular and mix bones microelement compound. The lumbar vertebrae contain great deal of essential elements; it clarifies its remodeling activity and enzymes availability, which allow the process. Mostly the long bone store toxic elements, like Ni and Pb, it points out the less remodeling speed process of compact substance. Thus, elementary bone compound directly depend on osseous tissue structure. Correlation analysis of derived data figured that osseous tissue had weak positive microelement correlation interactions, while negative interactions partly identified. The low correlation coefficient values are determined by the fact that normal osseous tissue is enough stable system. That's why these values can be used as standard measurements for the further microelement interaction researches of various pathology osseous tissue being.