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FORMATION OF BIOMIMETIC CALCIUM PHOSPHATES IN THE PRESENCE OF OPTICALLY ACTIVE ORGANIC MOLECULES

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In this paper, aspects of the effect of nutrients and vitamins on bone formation were considered. A model system for the formation of calcium phosphates in an organic matrix was created. The calcium phosphate rings have been shown to be biocompatible with the C2C12 cell line.

Introduction. In a human body, bone formation occurs in the presence of various alpha-amino acids and substances involved in metabolic processes. It is known that a lack of nutrients and vitamins can cause joint and cartilage disease. Despite the huge amount of information, the influence of hormones, alpha-amino acids, and substances involved in metabolic processes on the processes of proliferation, differentiation of bone tissue cells, mineralization of the basic substance is an urgent and poorly studied problem.

In this regard, the aim of our research is to study the fundamental processes of calcium phosphate formation in the presence of alpha-amino acids and metabolically active substances to understand the nature of bone formation in living systems.

Main part. In this work, we create the model system of calcium phosphate formation in an organic matrix loaded with optically active organic molecules. For visualization of the process of calcium phosphate formation and its interaction with cells, we adopted our methodology for thin layers. Cover glass with a layer of agar and sodium hydrogen phosphate was placed into a well of 6-well-plate. After the agar layer solidification, the calcium chloride solution containing optically active organic molecules was dropped into the center of the glass. The L-glutamic and L-ascorbic acids were used as optically active organic molecules. The rings of calcium phosphates formed without any additives were used as a control. After the formation of the Liesegang rings, C2C12 cells were seeded onto the samples at a density of $5 \cdot 10^5$ cells/cm³.

Conclusions. Thus, calcium phosphate rings are found to be biocompatible for C2C12 cells. It has been shown that L-glutamic acid causes intense cell growth and changes in their shape to more elongated ones. The formed calcium phosphate rings loaded with L-glutamic and L-ascorbic acids are destroyed after 3 days of C2C12 cell cultivation, while the control remains stable. At the same time, in the place of destroyed rings, there is a cell tissue formation.

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