

Tissue engineering is a part of regenerative medicine and sets itself the goal of autologous tissue grafts that combine three components: cells of different tissues, biopolymers, and biologically active molecules. 3D scaffolds play an important role in tissue engineering, allowing you to control the architecture of the entire transplant, as well as the interaction between its individual components. Obtaining 3D scaffolds is possible with the help of various technologies, including various types of bioprinting, decellulization of organs, etc. Decellulization of biological technologies does not require the creation of complex engineering structures, due to which, it is widely used in translational medicine. For decellularization a large range of biological tissues, both animal and vegetable, is used. Among the animal tissues, we should separately highlight the lungs, as one of the most promising organs for creating 3D scaffolds. The lung parenchyma has a well-developed network structure, which facilitates the process of decellularization, and subsequently, as the scaffold improves the adhesion and proliferation of newly colonized cells.

The aim of our work is to develop a method of chemical decellulization of lung tissues to obtain 3D scaffolds suitable for the subsequent cultivation of cells and create autologous transplants to solve the problems facing regenerative medicine.

Materials and methods. The development of methods of chemical decellulization was carried out on a lungs of rats. In contrast to the widely used for the removal of cells of dodecylsulfate, the main cell detergent used is polysorbate-20 (Reachim). Decellularization was carried out as follows. After the seizure complex of organs consisting of left and right lungs, trachea, and the main vessels belonging to them, catheterization of blood vessels was performed, followed by stepwise washing of 3% polysorbate-20, 1x phosphate buffer with antibiotics and deionized water. To introduce solutions, a peristaltic pump was used to control the rate of delivery of solutions. In addition to decellularization of the lung as an organ in general, we evaluated the effectiveness of this method in decellularizing individual fragments of the lung parenchyma, by step-by-step immersion in these solutions. To assess the degree of decellularization, we used both a macro- and microscopic evaluation of the 3D scaffolds obtained. The macroscopic evaluation was carried out with the help of a magnifying glass, with entrainment x10, the integrity of the lungs and tissue fragments was assessed after the procedure of decellularization. Microscopic evaluation included histological examination of tissue with hematoxylin-eosin staining and scanning electron microscopy of the samples to evaluate the ultrastructure of the resulting 3D scaffolds.

Results. The analysis of the data obtained by us was carried out on the basis of the existing requirements in the scientific community for 3D scaffolds obtained by decellularization of the lungs. Namely, the degree of preservation of the ordering of the extracellular matrix (ECM) and the degree of removal of cells from the organ or tissue. In addition, we made a comparative analysis of the effectiveness of our methodology, in comparison with other methods, based on the use of sodium dodecyl sulfate as the main detergent. As a result of this work, we have received mixed results. The use of polysorbate-20 as the main detergent showed better efficiency in decellularization of individual pieces of lung parenchyma, and a low efficiency in decellularization by introducing detergent through the main vessels, in comparison with sodium

dodecylsulfate.

Conclusions. The preparation of scaffolds consisting of ECM requires the decellularization of a tissues of a organ. Since the original tissues for scaffolds are usually allogenic or xenogenic in origin, the maximum degree of cell removal is desirable. Based on the results of our work, the use of polysorbate-20 as the main detergent is possible to prepare scaffolds of small size used for subsequent cultivation of cells, due to the greatest efficiency, relative availability and smaller damaging action on the ECM during decellularization of individual fragments of the lung parenchyma.

DOI 10.22448/AMJ.2019.2.95-96

UDC 355.337.8:577.161.2

VITAMIN D INSUFFICIENCY IN CADETS OF THE AMUR REGION

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Abstract Nowadays, the lack of sunshine vitamin D is associated with rickets in children and osteoporosis in adults. Recently, however, new data on the physiological role of cholecalciferol and the relationship of its deficit with numerous diseases (immune system, cardiovascular, oncological, neurological, etc.) were received. This paper presents the analysis of the results of the study of vitamin D metabolites in serum of healthy adolescents, training on the basis of the Amur Cadet Corps, residing in the territory of the Amur region. Risk factors for development of vitamin D deficiency were identified and the adequacy of preventive measures was assessed. A study to identify D-deficient states of conditionally healthy adolescents in the Amur region began with the December 2014 and March, 2015. The article presents the first results of studies indicating a high frequency of deficits of varying severity of vitamin D in healthy adolescent boys in the Amur region. Currently the principles of prevention and optimal methods of correction of low vitamin D status in adolescents are not developed. These results allow to speak about necessity of revision of existing methodological recommendations taking into account modern approaches to the prevention and treatment of deficiency with different degrees of severity of vitamin D in children and adolescents. **Key words.** Vitamin D, cholecalciferol, hypovitaminosis, deficiency, vitamin D insufficiency, adolescent boys, cadets, risk factors. **Introduction.** In the scientific literature has dramatically increased the interest in solar vitamin D. Over the past half century was published more than 60 thousand articles on the subject. Not more than 30% of physiological needs vitamin D enters the human body. To prevent the effects of D-deficiency condition is a necessary and timely prevention and treatment of vitamin D deficiency, so additional applications of farmpreparatov vitamin D throughout life is necessary. Up to the present time vitamin D was associated within the meaning of the doctor effect on bone-joint system and for the prevention/treatment of rickets in children the first year Amur Medical Journal №3 - 4 (15 - 16) 21 of life[3]. In the present study, D - deficient States in children has become the most urgent problem. In recent years, were discovered and collected convincing data on the role of vitamin D in many other biological processes. Hormonally active form of vitamin D, namely calcitriol receptors, detected in at least 36 different tissues of the body, where they carry out the regulation of processes of growth and differentiation of cells and prevents their excessive proliferation and controls the synthesis of hormones.[5] So, for example, it is proved that the deficiency of this vitamin increases the risk of autoimmune and inflammatory disorders, cancer (mammary, pancreatic, prostate gland, intestine and colon), heart failure, hypertension, myocardial infarction, diabetes, obesity. It is proved that the contents 25(OH)D above 30 ng/ml is sufficient to ensure normal uncouthly effects of this vitamin on the human body. We know that about 30-50% of the population of Europe and the United States revealed low levels of vitamin D. According to Beghin et al, 2012 study of 1,006 Teens 12 to 17 years showed that 81% had insufficient levels of vitamin D in adolescents living in the EU. In the course of research in the Department of Pediatrics GBOU SPE Russian medical Academy of health Ministry under the leadership of Professor Zakharaova I. N. in 2013-14 the examined

children aged 10 to 17 years in Moscow. Results seasonal changes of vitamin D in the blood serum demonstrates the relationship of this vitamin from the month of the year. The lowest concentration of vitamin D was observed in may, and a more favorable pattern in summer and autumn than in winter-spring. The result of another study in girls aged 10-17 in different months of the year showed that the average content of vitamin D in October and November was significantly higher than in February and March, tells about the depletion of the body 25(OH)D in winter in conditions of low insolation. A recent study of adolescents living in the Amur region revealed that 26.2 percent of the surveyed low in vitamin D, higher levels were noted in adolescents living in rural areas (Evseeva et al., 2014). According to the findings of many scientific studies it was found that average content of 25(OH)D in blood serum, according to most experts, agree on the following criteria[7]: • normal 25(OH)D >30 ng/ml. • insufficiency of 25(OH)D 21-29 ng/ml; • deficiency of 25(OH)D 0.05). From the bone-joint system, there are differences in the levels of vitamin D at 5% level of significance, with low levels of vitamin D observed in the cadets with the chest deformity and flat feet. Thus, there is a contribution to an insufficient level of vitamin D are contributing factors such as the combination of in the body available virus - bacterial infection on the background of chronic pathology of gastrointestinal tract and disorders KSS-71,4%. It has the value of summer holiday of teenagers in areas of high solar insolation resulting in increased and even in winter was significantly higher than in adolescents, the vacation of which took place in the zone of low insolation (p < 0.001). Influenced by and taking multivitamins which include prophylactic dose of cholecalciferol (400-500ME) Alphabet, and Vitrum Duovit in contrast to the group with low vitamin D and adolescents did not take multivitamins (p < 0.001).

The analysed results indicate a high frequency of failure and deficiency of cholecalciferol in the Amur region in children 15-17 years of 86.6% with a mean level of vitamin 25(OH)D = 26,74 ± 0,81 ng/ml.

Conclusion. To prevent low vitamin D level of adolescents is necessary to study 25(OH)D, its correction and control, taking into account risk factors for developing deficiency of vitamin D. Prophylactic administration of vitamin D should continue, and adolescent children year-round, given the low solar insolation, with the use of vitamin D compounds.

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- DOI 10.22448/AMJ.2019.2.96-97

NATIVE FIBRIN MEDICATION USAGE FOR CURING DURABLY NONHEALING CUTANEOUS WOUNDS AND ULCERS.

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Summary: The curing of 9 patients' durably nonhealing cutaneous wounds (thermal injury) was analysed medication (pulvis and cream) made of porcine blood was used for local treatment.

Key words: wound, fibrinous pulvis, fibrinous cream.

Curing durably nonhealing cutaneous wounds and ulcers is a one of important and largely unresolved problems. We set a goal to use native fibrin medication made of porcine blood in curing durably nonhealing cutaneous wounds, caused by thermal injury.

9 patients 3 women and 6 men at the age of 45-65 were under medical supervision. Seven of them had degree burns; two of them had second and third-degree frostbite. The duration of the wound process was from one three months. The average injured body area was equal to 132,4-1,3 square centimeters. Indications for native fibrin medication usage was ineffectiveness of standard local treatment therapy achievement of self epithelialization, donors resource shortage in connection with previous derma scrapping. F medications were used during the period of spreading only after the wounds had been completely cleared from necrotic tissue. For this purpose all the patients were cured locally and nonoperatively in combination with debridement and autoplasty in some cases. Fibrin medication was used in the form of pulvis and cream for local treatment. Fibrin pulvis or cream was spread along the wounded area treated with antiseptic and covered with a gauze wad. Redressments were made every day or two. The results of native fibrin medication usage were estimated at the patients of the index group and the group of clinic comparison, who were treated traditionally (with "Levomekol" cream). As a criteria of wounded process curing we used a clinical, planimetric, bacteriologic and cytodetection technique. Results and discussion Native fibrin medication was used for self epithelialization durably cutaneous wounds to prepare for autoplasty: rudimentary wounds curing after autoplasty. After taking fibrin medication all the patients felt satisfactorily. After 2-3 days wounds algesis fell substantially at patients of the index group, but for patients of the group of clinic comparison algesis remained for 10-12 days. No sense of discomfort, connected with native fibrin medication taking, was felt by the patients of the index group. Their body temperature remained normal. No inflammation connected with curing process was marked at clinical blood analysis, f At the moment of examination bacterial content of nonhealing cutaneous wounds in the index group and the group of clinic comparison was almost equal and did not exceed 103 - 104 colony-forming unit (CFU) per 1 gram of damaged area. In both groups the axenic culture was equal to 45-48% preferentially in the form of Saureus, Streptococcus pyogenes, Proteus Vulgaris, P.Aeruginosa. 32-34% of the patients had associations of two stocks, other patients had three or four stocks of microgerms. The microscopic flora was poliresistant to the most exhibited germicides. In spite of related bacteriologic presentation of wounds the patients of the index group had more