

with anovulatory menstrual cycle. When planning a pregnancy, women of the main group had acupuncture. Women of the main and control groups received iodine and folate.

Criteria for inclusion in the study:

1. Women with LPI of menstrual cycle are included in the main group

2. Signing of informed consent for examination and treatment.

Exclusion criteria: obesity, early age of menarche (up to 11 years), endocrine gland disorders, confirmed by clinical and hormonal studies, severe somatic pathology, congenital anomalies and chromosomal disorders, inflammatory and non-inflammatory diseases of the female pelvic organs, taking combined oral contraceptives during the last 6 months before the study.

Echography of the ovaries was carried out in the preovulatory period (11-12 day of the menstrual cycle) and in the flowering stage of the corpus luteum (20-22 day of the menstrual cycle) before the pre-ovulatory preparation (initial) and one month after its implementation. The study was performed by ultrasonic device "Mindray DC-7" with dopplerometric console (Mindray, China).

Statistical data processing was carried out using the package of statistical programs in Microsoft Excel 2010, Statistica 10.0. Differences were estimated as statistically significant at  $p < 0.05$ .

**Results and discussion** The average age of women in the main and control groups was  $25.42 \pm 0.74$  and  $24.09 \pm 0.65$  years ( $p > 0.05$ ) and, respectively, was between 22 and 28 years. Menarche age in women of the main group was  $12.78 \pm 0.25$  years, the control group was  $12.75 \pm 0.18$  years ( $p > 0.05$ ). In 1 subgroup, 32 menstruations established the correct rhythm of women, 8 2 subgroups had oligomenorrhea. Female infertility was revealed in 32 (80.0%) women of the main group, in 1 subgroup in 24, in 2 - in 8 women. In the control group, the reproductive function is not impaired. In the initial echography, polycystic ovaries in women of the examined groups were not visualized. The initial size of the preovulatory follicle in women of the main group and subgroup 1 ( $13.15 \pm 1.22$  and  $14.49 \pm 0.67$  mm respectively) did not differ significantly from the control group ( $15.81 \pm 0.38$  mm). In women with anovulatory menstrual cycle (subgroup 2), the diameter of the preovulatory follicle ( $11.27 \pm 0.88$  mm) was significantly less than in the control group ( $p < 0.05$ ) and in 1 subgroup ( $p < 0.05$ ). After the acupuncture in women of the main group and 2 subgroups, a significant increase in the diameter of the preovulatory follicle was established ( $15.23 \pm 0.54$  and  $14.99 \pm 0.46$  mm respectively).

In the flowering stage of the corpus luteum in women of the main group and 1 subgroup the size of the corpus luteum ( $19.07 \pm 1.21$  and  $19.07 \pm 1.21$  mm respectively) was significantly less than in the control group ( $26.15 \pm 0.64$  mm;  $p < 0.01$ ), which was one of the signs of hypofunction of the corpus luteum. In women of subgroup 2, the corpus luteum was not visualized and the persistence of the preovulatory follicle was revealed, the average diameter of which was  $19.64 \pm 1.35$  mm. After the acupuncture all women in the main group and in the subgroups were visualized the corpus luteum. The size of which was  $25.35 \pm 0.46$

mm for main group,  $26.21 \pm 0.79$  mm for subgroup 1 and  $24.80 \pm 0.47$  mm for subgroup 2. This size did not differ significantly from the control group, which is a favorable condition for the onset and development of pregnancy.

**Conclusion.** After the acupuncture in women with ovulatory menstrual cycle and LPI of the menstrual cycle, a significant increase in the size of the corpus luteum was established. After the course of acupuncture in women with preovulatory follicle persistence in the ovary, a two-phase menstrual cycle was established, the size of the corpus luteum corresponds to normal values, which indicates the effectiveness of acupuncture in planning pregnancy in women with LPI of the menstrual cycle.

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## DECCELLULARIZATION OF RAT LUNG TISSUES FOR TISSUE ENGINEERING

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**Abstract** Regenerative medicine is a rapidly developing branch of translational medicine, aimed at the restoration of lost or damaged tissues and entire organs. We studied a method of chemical decellulization of lung tissues to obtain 3D scaffolds suitable for the subsequent cultivation of cells. Our results confirm that the preparation of scaffolds consisting of extracellular matrix requires the decellulization of a tissues of an organ.

**Key words:** tissue engineering, lung tissue, chemical decellulization.

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.

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#### 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