was a control group. Animals were removed from the experiment 3,7,14, days, 2 months after the operation. During investigation we determined indexes of marked nucleuses, indices of epithelium proliferation and fibroblasts. Quantitative volume of different types of cells was established by osteometry methods.

Results showed authentic difference of proliferation indexes in the 1-st group as regards control group. Epithelium proliferation and fibroblasts indices were different from coefficient of significance $p<0,001$ for the 3-rd day. For the 7,14-th days they were different from $p<0,01$ and $p<0,001$ correspondingly. Reparative regeneration of the skin wound 3 days postoperatively (FIG.1 and FIG.2)

Conclusion

Acupuncture treatment has positive influence to the processes of connective tissue and epidermis regeneration, scar formation and reorganization as well.

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STUDY OF THE REPARETIVE OSTEOINTEGRATION PROPERTIES OF CALCIUM PHOSPHATE CERAMICS "KAFAM"

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Over the past decades the bone-plastic surgery has a tendency to replace bone implants by synthetic implantation materials, whose structure and composition are close to the mineral component of human bone. This tendency opens a new stage in bone-replacing surgery. Abroad and in the CIS countries comprehensive and widespread studies are being made in the fields of synthesis and medical-biological tests of material able to stimulate the processes of reparative osteogenesis [1,2].
The co-workers of the Academy of Sciences of Belarus together with the Belarusian State Medical University have developed and studied a porous bone-replacing material based on calcium phosphate - Kafam [3]. The present paper deals with the "Kafam" osteointegration properties investigated on laboratory animals by the angio-osteoscintigraphy.
Calcium phosphate ceramics was prepared from cheap natural biological materials. During this process organic and inorganic reagents of high purity were used to clean raw material. During in vivo experiments, the calcium phosphate ceramics samples with different heat treatment temperatures: 900 (type B) and 14000 C (type D) were used and had different physical-chemical properties. The type B material had larger porosity and smaller strength, as compared to the type D one. The crystalline structure of ceramics "Kafam" of the both-type materials corresponded to hydroxyapatite with a small amount of calcium phosphate admixture.
For the biological activity of calcium phosphate material to be specified, the angio-osteoscintigraphy procedure is adopted. Usually this method finds use for evaluation of the intensity of the metabolic processes that occur during healing of animal bone defects. With the angio-osteoscintigraphy applied, experiments were made on 54 rats, on whose anterior surface of the proximal end of the tibia of the back paw a number of the defects 7-8 mm long and 2-2.5 mm wide were performed. In this case, the medullar canal was not destructed.
All operated animals were divided into three groups: 18 individuals in each group (2 tentative and 1 control). In the first group of animals the performed bone defects were filled with ceramics "Kafam" (type B). In the second group the defects were filled with ceramics "Kafam" (type D). In the third group the bone defects were reparated under a blood clot. During operation the wounds of all animals being under general anaesthesia were treated with antibiotic and were sutured. The angio-osteoscintigraphycal assessments were done after 7, 14, 21, 28, 42, 56 days since surgery. For this purpose, a computerized gamma carema LEM (Firm "Siemens") and an osteotropic radio pharmacological preparation "Medronat" labeled with technetium-99 were used. In 120-150 min after preparation injection, the content of the latter in the zone of the bone defect and also in the symmetric zone of the intact bone was investigated.

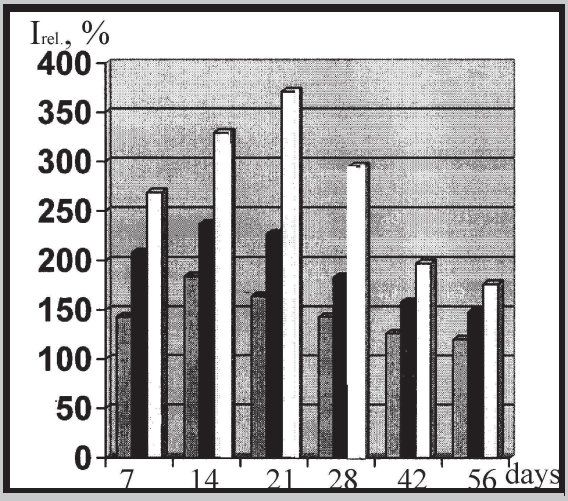

FIG. 1. Variations of the accumulated osteotropic radio pharmacological preparation content in the bony regenerative tissue during healing of the bone defect using material "Kafam".

From the experiment conducted it is found that in the group of the animals implanted with type B ceramics, the maximum accumulation of the radio pharmacological preparation was seen after 14 days and was statistically higher as against that in the control group (236.7±.8%). During sequential observations (after 56 days) the values of the relative level of the preparation accumulation decreased to 148.2±9.8%.
In the group of the animals implanted with type D ceramics, the maximum accumulation of the preparation (371.0±31.9%) was registered after 21 days since surgery. After 56 days since surgery, there was seen a gradual decrease in the measured value up to 175.7±15.4%.
In the control group, the maximum accumulation of the osteotropic radio pharmacological preparation was registered after 14 days since surgery and corresponded to (183.9±12.3%). In the subsequent periods of observation (after 56 days) the relative level of fixation of the preparation at the place of the defect gradually decreased up to 120±5.6%.
Analysis of the obtained results is evident of the fact that for the animals implanted with type B ceramics (1st group) or with D type ceramics (2nd group) the conditions for filling the defect with the primary bone callus were better than in the case when a blood clot (3rd group) was present in the defect cavity.
Thus, the from the investigations carried out it follows that the activity of metabolic processes during healing of the bone defect implanted with calcium phosphate ceramics "Kafam" was more intense as against the control group.

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COPOLYMERS OF L-LACTIDE AND TRIMETHYLENE CARBONATE EVALUATION OF SURFACE PROPERTIES AND DEGRADATION IN AQUEOUS MEDIUM

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Abstract

Two poly(L-lactide-co-trimethylene carbonates)s having the carbonate content of 15% and 50%, respectively were prepared by ring-opening copolymerization with the use of zirconium acetylacatonate as an initiator. The copolymers were characterized by NMR,GPC, DSC and AFM. Wettability and surface energy of the copolymers were also evaluated. The copolymers were submitted to degradation in phosphate buffered saline at 37°C for 10 weeks. It was shown that degradation mechanism and kinetics depend on chemical structure of the copolymers.

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Introduction

Polycarbonates and poly(a-hydroxy acids) have attracted much attention recently, because they degrade both in vitro and in vivo through hydrolysis reaction. Their big advantage is that their degradation products, namely carbonates and carboxylic acids might be metabolized by the living body [1]. Polymers derived from carbonic acid show, however less tendency towards hydrolysis than that with an ester linkage [2]. On the other hand, degradation of poly(a-hydroxy acids) often leads to local increase of acidity what may be harmful to the surrounding tissue, while polycarbonates do not cause pH decrease [3]. Therefore, copolymerization of both types of monomers may result in a wide variety of resorbable materials which might be attractive for medicine, pharmacy and tissue engineering.
In this paper we characterize two recently synthesized copolymers of L-lactide and trimethylene carbonate and study their degradation in aqueous medium in order to evaluate their usefulness in medical and tissue engineering applications.

Materials and methods

Copolymers synthesis and foils preparation

1,3-trimethylene carbonate (Boeringer Ingelheim, Germany) and L-lactide (Purac, The Nederland) were purified by recrystallization from dry ethyl acetate in a vacuum dryer at a room temperature. Copolymerization was performed in bulk with a $Zr(acac)_4$ initiator (Aldrich, Germany) at 110°C by a conventional method using a vacuum line for degassing and sealing of the ampoules. The copolymers were purified by dissolution in chloroform and precipitation in methanol. Subsequently, the copolymers were dried under reduced pressure at 25°C until constant weight was obtained.
Copolymer foils, having the thickness of 0.18±0.01 mm, were obtained by slip casting from 10 % (w/v) copolymer solution in methylene chloride (POCH S.A., Gliwice, Poland), followed by air and vacuum drying under reduced pressure at 25°C for at least 24h.

Characterization methods

The composition of the copolymers was determined by ^{1}H NMR measurements (Varian Unity Inowa spectrometer). Molecular masses Mn and Mw of the copolymers were determined by gel permeation chromatography with the Physics SP 8800 chromatograph.
Thermal properties, such as glass-transition temperature (T_g), melting temperature (T_m) and heat of melting (ΔH_m) were studied by differential scanning calorimetry with DuPont 1090B apparatus calibrated with gallium and indium.