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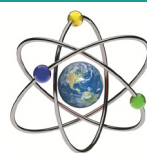


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- 13.00.00 Pedagogika fanlari
- 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
- 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
- 13.00.03 Maxsus pedagogika
- 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
- 13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
- 13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohaları va bosqichlari bo'yicha)
- 13.00.07 Ta'limda menejment
- 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
- 13.00.09 Ijtimoiy pedagogika
- 07.00.00 Tarix fanlari
- 19.00.00 Psixologiya fanlari
- 01.00.00 Fizika-matematika fanlari
- 02.00.00 Kimyo fanlari
- 03.00.00 Biologiya fanlari
- 09.00.00 Falsafa fanlari
- 10.00.00 Filologiya fanlari
- 11.00.00 Geografiya fanlari

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Pedagogika, psixologiya fanlariga ixtisoslashgan ilmiy jurnal



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INNOVATIVE METHOD FOR THE TREATMENT OF CHRONIC PERIODONTITIS USING THE “GEISTLICH BIO-OSS” PREPARATION

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Abstract: This article analyzes the clinical effectiveness of an innovative method for the treatment of chronic periodontitis using the “Geistlich Bio-Oss” preparation. The study evaluated indicators of alveolar bone regeneration, reduction of periodontal pocket depth, and improvement of clinical attachment level. “Geistlich Bio-Oss” is structurally similar to natural bone mineral and is characterized by pronounced osteoconductive properties that support bone tissue regeneration. Clinical observations demonstrated positive dynamics at 3- and 6-month follow-up periods. The obtained results confirm the feasibility and effectiveness of this biomaterial in the comprehensive treatment of chronic periodontitis.

Key words: chronic periodontitis, bone regeneration, osteoconductive biomaterial, “Geistlich Bio-Oss”, alveolar bone, periodontal therapy.

Annotatsiya: Ushbu maqolada surunkali parodontitni davolashda “Geistlich Bio-Oss” preparatidan foydalanishga asoslangan innovatsion yondashuvning klinik samaradorligi tahlil qilinadi. Tadqiqotda alveolyar suyak to'qimasining regeneratsiyasini rag'batlantirish, parodontal cho'ntak chuqurligini kamaytirish va klinik birikma darajasini yaxshilash ko'rsatkichlari baholandi. “Geistlich Bio-Oss” preparati tabiiy suyak mineraliga yaqin tuzilishga ega bo'lib, osteokondktiv xususiyatlari bilan ajralib turadi hamda suyak to'qimasining qayta tiklanish jarayonini qo'llab-quvvatlaydi. Klinik kuzatuvlar natijasida 3- va 6-oylarda ijobiy dinamik o'zgarishlar qayd etildi. Olingan natijalar mazkur biomaterialning surunkali parodontitni kompleks davolashda samarali va istiqbolli vosita ekanligini ko'rsatadi.

Kalit so'zlar: surunkali parodontit, suyak regeneratsiyasi, osteokondktiv biomaterial, “Geistlich Bio-Oss”, alveolyar suyak, parodontal terapiya.

Аннотация: В статье представлен анализ клинической эффективности инновационного метода лечения хронического пародонтита с применением препарата “Geistlich Bio-Oss”. В ходе исследования оценивались показатели регенерации альвеолярной костной ткани, уменьшение глубины пародонтальных карманов и улучшение уровня клинического прикреплении. Препарат “Geistlich Bio-Oss” по своей структуре близок к природному костному минералу, обладает выраженными остеокондуктивными свойствами и способствует восстановлению костной ткани. Результаты клинического наблюдения продемонстрировали положительную динамику через 3- и 6-месяцев после проведения лечения. Полученные данные подтверждают целесообразность применения данного биоматериала в комплексной терапии хронического пародонтита.

Ключевые слова: хронический пародонтит, регенерация костной ткани, остеокондуктивный биоматериал, “Geistlich Bio-Oss”, альвеолярная кость, пародонтальная терапия.

INTRODUCTION

In vitro-grown cells are currently being used clinically to advance the science of transplantology and regenerative medicine. The rapid development of cell technologies has opened new prospects for tissue engineering and the restoration of damaged biological structures. Cultured cells, particularly fibroblasts, play a crucial role in reparative processes due to their ability to synthesize extracellular matrix components, including collagen and glycoproteins, which are essential for tissue regeneration.

One of the significant advantages of in vitro cell cultivation is the possibility of reducing immunogenicity through prolonged culture, thereby minimizing the risk of immunological conflict after transplantation. Furthermore, cultured cells can be expanded under controlled laboratory conditions, ensuring adequate cell quantity, viability, and functional activity for therapeutic application.



In dentistry and periodontology, regenerative approaches are of particular importance, as periodontal diseases remain among the most prevalent inflammatory conditions affecting oral tissues. The application of cultured allogeneic fibroblasts represents a promising strategy aimed at enhancing tissue repair, reducing inflammation, and promoting structural regeneration of the periodontium.

LITERATURE REVIEW

This method circumvents a number of issues that are frequently associated with allotransplantation. Cellular antigenic determinants are reduced after prolonged in vitro culture, which results in minimal or no immunological conflict. Moreover, fibroblasts grown in vitro are not carcinogenic [6]. Since periodontal disease is one of the most common dental illnesses, increasing the effectiveness of therapeutic interventions and searching for alternative treatment methods remain highly relevant. Therefore, the use of cell cultures, particularly fibroblasts, for the regeneration of damaged tissues is of considerable interest [1, 4].

Previous studies have demonstrated the potential application of allogeneic fibroblasts in combination with various carriers and cellular preparations [2, 3, 5, 12] for the treatment of periodontitis. These cells have been transplanted onto osteoplastic materials, dura mater, and biopolymer films [7–11, 13]. However, insufficient research has been conducted to comparatively evaluate histological regeneration processes following fibroblast application in comparison with other cellular preparations.

The objective of this study was to isolate allogeneic fibroblasts from gingival biopsy specimens and to use cultured fibroblasts in an experimental setting to conduct a comparative histological assessment of periodontal tissue regeneration.

RESEARCH METHODOLOGY

A method was developed for isolating allogeneic fibroblasts from gingival biopsy samples. A 2 × 2 mm fragment of mucous membrane was obtained from the oral vestibule, hard palate, or retromolar region under aseptic conditions and local infiltration anesthesia. The biopsy specimen was stored in a sterile tube containing Hank's balanced salt solution supplemented with antibiotics and maintained at a chilled temperature. The material was transported to the laboratory within 3-days.

Tissue deaggregation was performed in the cell technology laboratory using a 0.15% trypsin solution. Trypsinization was carried out in several cycles using a magnetic stirrer until complete tissue exhaustion. After centrifugation, filtration, and resuspension in a nutrient medium, the cell suspension was counted and seeded into Medium-199 at a density of 500,000–600,000 cells/ml, supplemented with 10% fetal bovine serum. Cultivation was performed at 37 °C, and the culture medium was replaced every 48-hours. Daily monitoring was conducted using phase-contrast microscopy.

Cells exhibiting the morphology of typical fibroblasts were selected. The formed monolayer was used for further subculturing. To count the cells, the monolayer was treated with a 0.25% trypsin–Versene solution and incubated at 37 °C for 10–15-minutes. Cell viability was assessed using 0.1% trypan blue staining in a Goryaev chamber. Subsequently, the cellular suspension was aspirated into an insulin syringe and injected to a depth of 1 mm into the gingiva near the cervical region of the tooth.

ANALYSIS AND RESULTS

The volume of the suspension ranged between 0.3–0.4 ml. Perifocal blanching of the mucosa and tissue tension confirmed successful administration.

A total of 50 white Wistar rats were included in the study. They were divided into three experimental groups and two control groups and received the following treatments:

- Group I – Metrogyl-Denta
- Group II – Regenerin (Allogeneic Culture)
- Group III – Fibroblasts

Mechanical damage to the periodontal tissues was used to simulate periodontitis. On the 7th-day of the experiment, histological examinations were performed in all groups, including the intact control group.

Findings and Discussion

Primary fibroblast culture growth occurred in three phases: attachment and spreading (Phase-1), exponential proliferation (Phase-2), and monolayer formation (Phase-3).

Control Group-1 (Intact): The periodontium consisted of stratified squamous epithelium and dense fibrous connective tissue containing thick collagen bundles.



Control Group-2 (Untreated Periodontitis): By the 7th-day, deep pathological changes were observed in the mucosa and underlying connective tissue. Diffuse purulent periodontitis developed, characterized by neutrophil-dominated infiltration with the presence of macrophages and lymphocytes.

Experimental Group-I (Metrogyl-Denta): On the 7th-day, vascular disturbances (congestion and stasis) and generalized mild edema were identified. Partial epithelial necrosis was observed. Although the medication reduced the inflammatory process to a more localized pattern compared to the untreated group, deep tissue damage persisted.

Experimental Group-II (Regenerin): Morphological changes corresponded to serous periodontitis. Small inflammatory infiltrates were detected in the connective tissue, predominantly composed of lymphocytes.

Experimental Group-III (Cultured Fibroblasts): A pronounced anti-inflammatory effect was observed, along with increased mitotic activity and basal cell proliferation at the margins of the defect. Focal proliferation of fibroblasts around blood vessels in the stroma was noted, with active collagen synthesis. This resulted in enhanced fibrillogenesis and the formation of new connective tissue.

Conclusions and suggestions

A method for cultivating and morphologically assessing monolayer cultures of allogeneic fibroblasts was developed in conjunction with an experimental model of periodontitis. Comparative data confirmed the following:

- Untreated injury leads to diffuse purulent periodontitis with marked tissue destruction.
- Metrogyl-Denta results in superficial defects and focal purulent inflammation.
- Regenerin demonstrates greater anti-inflammatory activity than Metrogyl-Denta and promotes a transition to serous periodontitis.
- Cultured fibroblasts exhibit the most pronounced reparative effects, characterized by enhanced fibrillogenesis and rapid formation of new connective tissue.

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- 13.00.00 Pedagogika fanlari
 - 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
 - 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
 - 13.00.03 Maxsus pedagogika
 - 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
 - 13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
 - 13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohaları va bosqichlari bo'yicha)
 - 13.00.07 Ta'limda menejment
 - 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
 - 13.00.09 Ijtimoiy pedagogika
 - 07.00.00 Tarix fanlari
 - 19.00.00 Psixologiya fanlari
 - 01.00.00 Fizika-matematika fanlari
 - 02.00.00 Kimyo fanlari
 - 03.00.00 Biologiya fanlari
 - 09.00.00 Falsafa fanlari
 - 10.00.00 Filologiya fanlari
 - 11.00.00 Geografiya fanlari



AKTABGACHA VA AKTAB TA'LIMI

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