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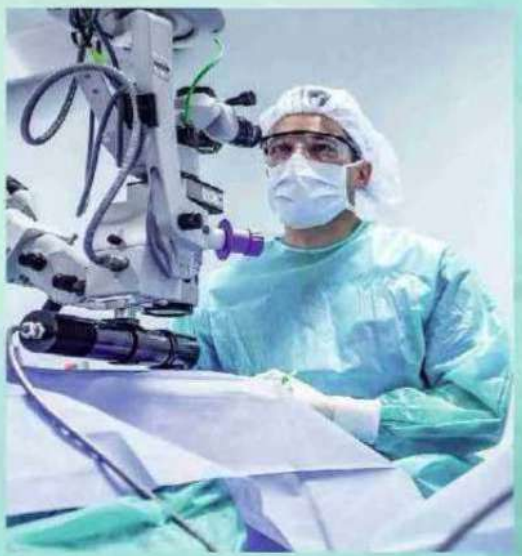

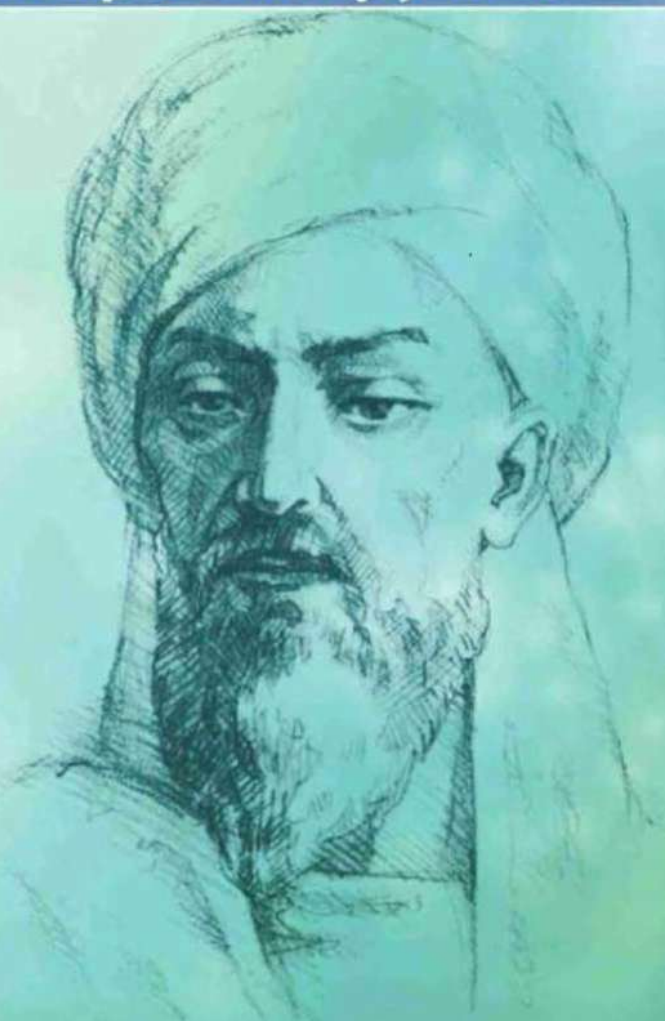

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НОВЫЙ ДЕНЬ В МЕДИЦИНЕ
NEW DAY IN MEDICINE

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PHARMACOLOGICAL CORRECTION OF SKIN LESIONS IN CONDITIONS OF EXPERIMENTAL DIABETES, DEPENDING ON THE TYPOLOGICAL REACTIONS OF THE BODY

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✓ ***Resume***

The impact of pharmacological correction on skin damage in experimental diabetes mellitus is examined in this article. A meta-analysis was conducted taking into account typical characteristics of the disease, such as hyperglycemia, oxidative stress, and inflammation. The authors discuss the effectiveness of various pharmacological correction methods, including antioxidants, anti-hyperglycemic agents, anti-inflammatory drugs, and others. The study results suggest the possibility of using specific methods for preventing and treating skin damage in diabetes mellitus. Modern treatment methods for wounds using pharmacological agents in the context of diabetes mellitus are discussed.

Keywords: pharmacological correction, skin injuries, experimental diabetes, typical characteristics, diabetes, skin, injuries, experimental

ФАРМАКОЛОГИЧЕСКАЯ КОРРЕКЦИЯ ПОРАЖЕНИИ КОЖИ В УСЛОВИЯХ ЭКСПЕРИМЕНТАЛЬНОГО ДИАБЕТА В ЗАВИСИМОСТИ ОТ ТИПОЛОГИЧЕСКИХ РЕАКЦИЙ ОРГАНИЗМА

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✓ ***Резюме***

В статье рассмотрено влияние фармакологической коррекции на поражение кожи при экспериментальном сахарном диабете. Метаанализ проводился с учетом типичных характеристик заболевания, таких как гипергликемия, окислительный стресс и воспаление. Авторы обсуждают эффективность различных методов фармакологической коррекции, в том числе антиоксидантов, сахароснижающих средств, противовоспалительных препаратов и других. Результаты исследования позволяют предположить возможность использования специфических методов профилактики и лечения повреждений кожи при сахарном диабете. Обсуждаются современные методы лечения ран с использованием фармакологических средств при сахарном диабете.

Ключевые слова: фармакологическая коррекция, повреждения кожи, экспериментальный диабет, типичные характеристики, диабет, кожа, травмы, экспериментальный

ТИПОЛОГИК ХУСУСИЯТЛАРГА БОҒЛИҚ ҲОЛАТДАГИ ЭКСПЕРИМЕНТАЛ ДИАБЕТДА ТЕРИ ЖАРОХАТЛАРИНИНГ ФАРМАКОЛОГИК КОРРЕКЦИЯСИ.

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✓ ***Rezyume***

Maqolada eksperimental diabeteda teri jarohatlariga farmakologik dovolashning ta'siri ko'rib chiqiladi. Meta-tahlil giperglikemiya, oksidlovchi stress va yallig'lanish kabi kasallikning tipik xususiyatlarini hisobga olgan holda o'tkazildi. Mualliflar antioksidantlar, gipoglikemik vositalar, yallig'lanishga qarshi dorilar va boshqalarni o'z ichiga olgan farmakologik davolashning turli usullarining samaradorligini muhokama qiladilar. Tadqiqot natijalari diabetesda terining jarohatlarining oldini olish va davolash uchun maxsus usullarni qo'llash imkoniyatini taklif qiladi. Qandli diabet uchun farmakologik vositalar yordamida yaralarni davolashning zamonaviy usullari muhokama qilinadi.

Kalit so'zlar: farmakologik davolash, terining jarohatlari, eksperimental diabet, tipik xususiyatlar, diabet, teri, shikastlanish, eksperimental

Relevance

In recent years, diabetes has become a prevalent disease worldwide. Experts in the field of public health consider this to be a major issue for all populations and individuals of all ages. The reasons for this include geographical factors, the rapid spread of the disease, and the emergence of various pathological processes that can develop at different rates [1].

In the world of high-risk groups related to diabetes, patients suffering from diabetic complications are exploring the individual typological approach to the disease, especially focusing on the pathophysiology, pathochemical, and pharmacokinetic aspects of diabetes. Studies are being conducted to develop new treatment methods and attention is being paid to scientific research. Retrospective analyzes show that in recent years, the effectiveness of stress protection mechanisms against physical and sensory stressors, which define the individual response to stress, has been confirmed [2]. Creating a system that identifies the terrifying effects of this disease related to microcirculation disruption, often leading to disability and death, and developing a comprehensive set of preventive measures and implementing a treatment system are of paramount importance.

Key factors in the pathogenesis and treatment of blood diabetes: the severity of pathology, homeostatic system, activity of phospholipases, hypoxic events, and microcirculation disturbances. In blood diabetes, the trend of slow healing of wounds is observed, with a tendency towards chronic wounds. Special features of wound healing include severe microcirculatory disturbances, formation of microthrombi, necrotic and dystrophic processes, and the reparative superiority of the healing component. Pharmacological agents and physiotherapeutic methods are used postoperatively to correct cellular and biochemical disturbances and enhance the regenerative and reparative processes of wounds [3, 4].

Materials and methods

The treatment of complex medical conditions involves optimizing the functions of vital organs, restoring acid-base balance, detoxification, monitoring metabolic, glycemic, and lipid profiles, improving the hematological characteristics of blood, enhancing the body's natural defenses, and preventing necrosis. In all stages of treatment and rehabilitation, patients with endocrine or diabetic disorders should be referred to specialists such as endocrinologists, orthopedists, surgeons, and psychologists. Currently, one of the complications of diabetic foot syndrome, following surgery on diabetic wounds, is being treated. This involves the development of heavy purulent-necrotic manifestations, frequent complications of high-level amputations, and the persistence of hospitalization for 15-35 days due to various causes [5].

The pharmaceutical industry is one of the most complex sectors of the chemical industry, consisting of numerous small-scale operations, high levels of scientific research, and substantial capital expenditures. The products of modern pharmaceutical industry play a crucial role in safeguarding the health of our growing population. Manufacturing and benefitting from these products require efficient, high-speed processes that meet the increasing demand for pharmaceutical goods in the global market, contributing to the economic development and growth in various countries [6-8]. The pharmaceutical industry is currently one of the key pillars of the global economy, exerting a significant impact on the status of operations in related sectors such as healthcare, insurance business, finance, and others. Moreover, the industry's increasing knowledge intensity is driving closer connections with many sectors

through numerous avenues of collaboration, ensuring the rapid development of interconnected relationships [9, 10].

The globalization of the world economy is leading to significant changes in the pharmaceutical industry, driven by a wide range of geopolitical factors. These changes impact the market dynamics of pharmaceutical products, influencing countries and regions that are part of the global patent system. The merger of clinical and pre-clinical research methods in the process of creating drug vehicles becomes crucial. Understanding the economic aspects of pharmaceutical industry operations requires considering the complex nature of public health regulations that determine the population's healthcare system and linking them with various levels of drug vehicles. Therefore, besides the physical and mental effects of a drug, its social impact is also of great importance. Improving a patient's interactions with others as well as returning them to an active lifestyle and work routine can be achieved. It is essential to consider the unique influence of each country's public health preservation programs [11].

Results and discussions

Studying the phenomenon of disease evolution in creating new drugs requires an understanding of the concept known as the "disease evolution theory". This theory arises from natural factors and influences human behavior and the evolution of pharmaceutical products. Therefore, various fields of knowledge such as chemistry, biology, medicine, sociology, politics, statistics, psychology, and the possibilities of management should be considered. The operations of major pharmaceutical companies involved in the search, discovery, creation, production, marketing, and sale of drugs, as well as dealing with sales issues, confirm this thesis.

Even the development, production, storage, and sale of medications contribute to the enhancement of the national security through comprehensive learning of the economic aspects. This is also indicated by the significance of pharmaceutical industry in improving national security, as well as safeguarding public health [12].

Skin damage is a common occurrence in individuals with diabetes, and proper pharmacological intervention is necessary for effective healing. This article will discuss the typology and features of pharmacological correction of skin damage in experimental diabetes. Understanding these aspects is crucial for developing targeted treatment strategies for patients with diabetes.

The importance of pharmacological intervention in skin injuries. Individuals with diabetes often experience slow healing and are prone to infections in skin injuries such as ulcers and wounds. Pharmacological interventions play a crucial role in accelerating wound healing, reducing inflammation, and preventing complications in these patients:

Provide the necessary nutrients and growth factors required for skin repair. Enhance the migration and proliferation of skin cells. Reduce inflammation and promote tissue regeneration.

Description of pharmacological agents for skin damage correction. Various pharmacological agents are used in the treatment of skin lesions in patients with diabetes. These agents have specific characteristics that make them effective in promoting wound healing and preventing infections. Local antiseptics: Acts against bacteria and prevents infection Provides a clean wound environment for healing Examples include iodine, chlorhexidine, and silver. Various ointments are available to treat and prevent diabetic wounds. However, the most effective means of healing are therapeutic gels and gel dressings, as they do not adhere to the wound, allowing for better airflow and promoting faster healing. Creams and ointments inhibit bacterial growth and prevent infection. The innovative development of the Russian company NPC "LitA-Tsvet" has enabled diabetic wound treatment to achieve superior results with the introduction of their product "LitA-Color - 2", a therapeutic gel formulated to combat microbes and stimulate biostimulation. The two main components of the product are "Echoline" - a peptide bioregulator containing minerals, uronic acid, and amino acids, regulating tissue repair processes, and providing reliable protection against microbes.

Banecin® (ointment, cream) is used in the complex treatment of lower limb ulcers and necrotic lesions in patients suffering from diabetic foot syndrome. Banecin is effective in clearing and treating bacterial skin infections, such as impetigo, infected trophic ulcers, infected eczema, bacterial dermatitis, and others. It is also used to prevent infantile infections on newborns. The ointment form of the antibacterial drug Banecin facilitates the treatment of wounds in children, making it possible to apply it to open wounds [14].

Povidone-iodine is an antiseptic that even surpasses alcohol-based antiseptics. When in contact with skin, its active ingredient iodine released from povidone effectively targets and eliminates bacterial microorganisms, causing their coagulation and ultimately leading to their demise. Povidone-iodine (Betadine®) works against several bacterial targets, hence the absence of microbial resistance or cross-resistance. It exhibits effective activity against bacteria, single-celled microorganisms, herpes virus, and pathogens responsible for skin infections. This antiseptic agent is not to be ingested for treatment purposes. It may be used for wound care in diabetic foot syndrome when properly diluted. To treat wounds by cleansing, disinfecting, mechanically removing debris, and using in drainage systems, apply the solution 10-100 times, without direct application to necrotic or viable tissues.

The use of Betadine, a povidone-iodine based antiseptic, allows for thorough monitoring of the healing process of wounds by controlling the color changes that indicate infection. Betadine has a high safety profile, as it does not get reabsorbed into the body when applied topically. It is recommended for use in children and adults, particularly in diabetic foot syndrome, to treat wound damage effectively. Healthcare providers often use Betadine as an antiseptic ointment to heal wounds in diabetic foot syndrome.

It is well-known that over 70 different enzymes participate in the process of healing in humans, with zinc being a crucial component of many of these enzymes. Experimental evidence suggests that the need for zinc increases sharply during the healing process. Therefore, the positive effects of using zinc have been observed in treating trophic ulcers of any etiology and diabetic foot syndrome. Some studies have shown that zinc can improve glucose levels (glycemic control) in patients with diabetes. The formation of a zinc-insulin complex in the pancreatic beta cells not only strengthens the binding of insulin to hepatocyte membranes but also slows down lipolysis, enhances lipogenesis, and is effective as the initial treatment for skin injuries (deep wounds, minor cuts, bedsores, and skin abrasions). Zinc ointment promotes wound healing, absorption, disinfection, reduces exudation, and promotes local regeneration and healing [15-17].

Chlorhexidine - chlorhexidine digluconate is effective against gram-positive and gram-negative bacteria, making contact with the skin for at least 10 minutes and impacting the microbial flora. It has a better effect on skin wounds, burns, and other superficial lesions after use, however, the resistance of some microorganisms to chlorhexidine has been noted. The product is primarily used by healthcare providers for hygienic cleaning of hands, disinfecting injection sites, and preventing infections in wound care.

Pharmacological Correction Typology in Experimental Diabetes. In experimental diabetes models, pharmacological correction of skin damage involves the administration of specific medications that promote wound healing and reduce complications. These models replicate the pathophysiological changes seen in humans with diabetes, allowing researchers to assess the effectiveness of pharmacological interventions.

Experiments conducted in vitro involve the use of cell culture systems to study the effects of pharmacological agents on skin cells. These experiments assess the potential toxicity and therapeutic benefits of these agents. They provide a controlled environment for studying the interaction of drugs and their mechanisms of action.

Bombyx mori silk fibroin is a widely used and engineered protein polymer biomaterial for various applications. When silk fibroin is processed into different forms, it exhibits unique mechanical properties, demonstrates biological compatibility, maintains degradation rate over years, and can be modified from its original properties for immobilization of chemical factors. Various methods, such as reprocessing with different aqueous or organic solvents, can be utilized for the fabrication of silk biomaterials for a range of applications. At present, Bombyx mori silkworms are widely utilized in the production of hydrogels, nanofibers, sponges, composites, scaffolds, microspheres, and thin films for various applications. These materials are directly employed as biomaterials for accurate implantation, tissue engineering, in vivo disease models, and fabrication of medical devices [18].

The silkworm (Bombyx mori) has been highly valued throughout history for its strength and softness as a raw material. Healthcare providers have utilized silk as a healing material for centuries and its unique properties have attracted attention as a biomaterial due to its biological compatibility, ease of chemical modification, rapid in vivo degradation, and ability to be processed into various material formats using aqueous or organic solvents. Silk production has been expanded for the textile industry, making it readily available for various applications, but medical purposes require the correct processing

and preparation of the natural polymer for use. Extracting the sericin component from silk cocoon fibers is essential for medical applications. Serisin - a group of glycoproteins found in the middle layer of the silk fibers produced by the Bombyx mori silkworm [19]. These proteins form the core of the silk filament in the silk glands. Once the secretory proteins are released, the fibroin chains are dissolved in a saline solution, and further processed into various materials.

Conclusion

The typology and characteristics of pharmacological correction of skin injuries in experimental diabetes play a crucial role in advancing our understanding of wound healing in people with diabetes. By studying the effects of pharmacological agents on experimental models, researchers can develop targeted treatment strategies that promote effective wound healing and prevent complications in diabetic patients.

In conclusion, it is important to note that a comprehensive understanding of the typology and characteristics of pharmacological correction in experimental diabetes is essential for improving outcomes of diabetic skin injuries and enhancing the quality of life for individuals living with diabetes.

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