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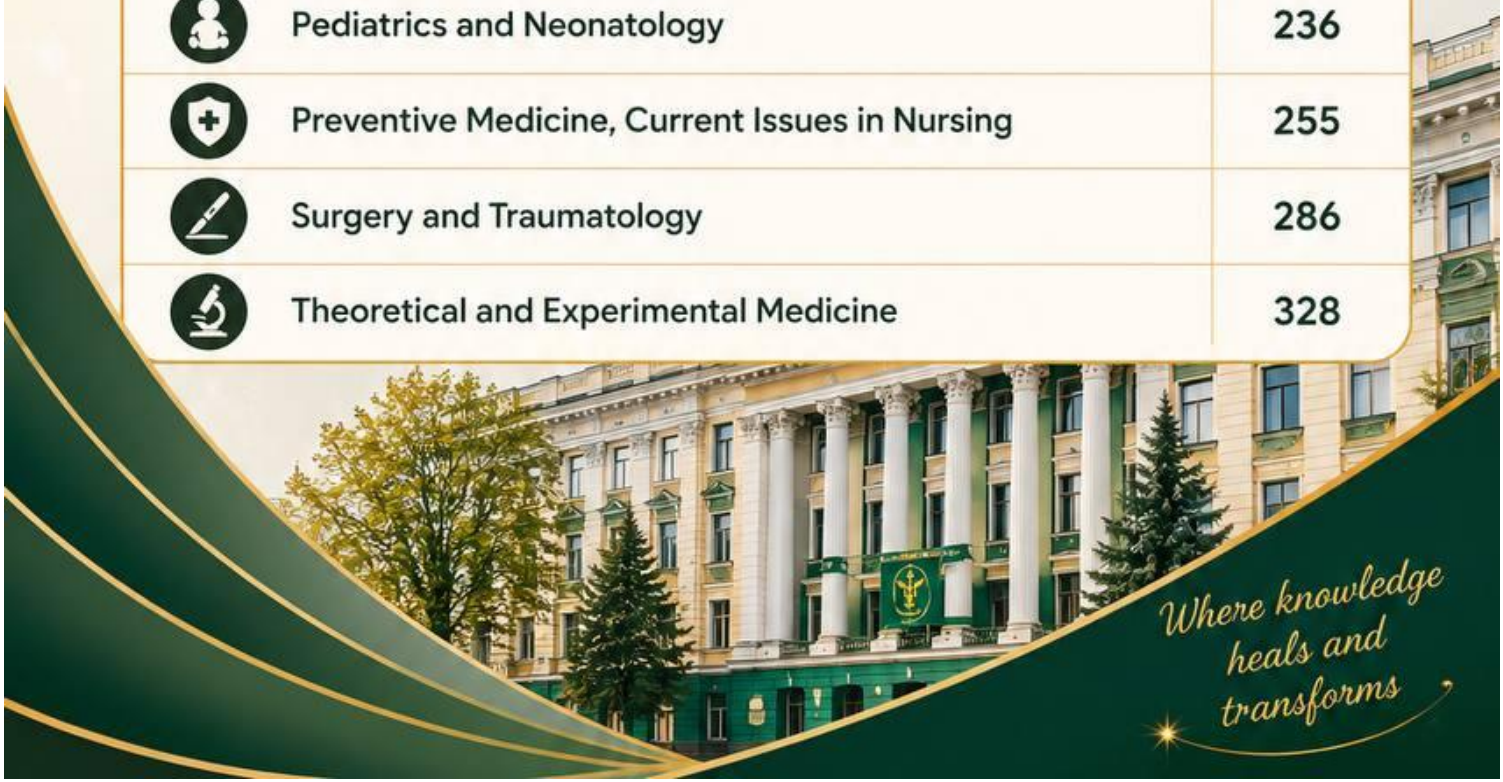

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Shcherbyna Yevheniia

MULTIFACTORIAL PHARMACOLOGICAL EVALUATION OF INCRETIN DRUGS IN THE TREATMENT OF TYPE 2 DIABETES: A STRUCTURED APPROACH TO THERAPY SELECTION (LIRAGLUTIDE, SEMAGLUTIDE, TIRZEPATIDE)

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Type 2 diabetes is spreading rapidly today and is increasingly common among younger patients. The disease is associated not only with impaired carbohydrate metabolism but also with an increased cardiometabolic risk, including obesity, hypertension, dyslipidemia, and cardiovascular complications. Treatment should be aimed not only at glycemic control but also at weight loss, correction of metabolic disorders, and reduction of cardiovascular risk. Therefore, selecting the optimal incretin-based medication remains a priority given its efficacy, safety, and ease of use. The aim of the study was to conduct a comparative pharmacological evaluation of liraglutide, semaglutide, and tirzepatide using a multi-criteria approach to determine their clinical advantages and justify the choice of therapy. A systematic analysis of current clinical studies and meta-analyses indexed in international scientometric databases, including PubMed/MEDLINE, Scopus, Web of Science, and the Cochrane Library, was conducted. To integrate the results, a multicriteria approach was applied, which involved standardization and quantitative assessment of key parameters of efficacy and safety, namely: reduction in HbA1c levels, body weight dynamics, safety profile, impact on cardiovascular events, and ease of use.

All of the drugs studied demonstrated effective reductions in glucose levels through glucose-dependent stimulation of insulin secretion, suppression of glucagon, delayed gastric emptying, and effects on appetite centers. Semaglutide showed superior efficacy among GLP-1 receptor agonists, providing a more pronounced reduction in HbA1c (~1.5–1.8%) and body weight ~10–15% compared to liraglutide (~1.0–1.5% and ~5–7%, respectively). Tirzepatide, due to its dual action on GIP/GLP-1 receptors, demonstrated the most significant metabolic effect, reducing HbA1c by ~2% and achieving a substantial reduction

in body weight of ~15–20% in clinical trials. Additionally, a positive effect of incretin-based medications on cardiovascular and renal outcomes has been established. The most common side effects remain gastrointestinal reactions. A comparative analysis indicates that long-acting formulations provide a more stable therapeutic effect. The results of the multicriteria analysis indicate that semaglutide and, in particular, tirzepatide demonstrate superior overall clinical efficacy, whereas liraglutide remains appropriate in certain clinical situations. Therefore, the choice of therapy should be individualized, taking into account the patient's characteristics and treatment goals