15. METABOLIC PECULIARITIES OF IMMUNOTHERAPEUTIC MEDICINES (CHIMERIC ANTIGEN RECEPTOR T CELLS) USED IN CANCER TREATMENT (B-CELL ACUTE LYMPHOBLASTIC LEUKEMIA)

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Introduction. In the dynamic realm of cancer therapeutics, many studies explore the metabolic nuances of Chimeric Antigen Receptor (CAR) T-cell therapy in treating B-cell acute lymphoblastic leukemia (B-ALL). Understanding these metabolic intricacies is pivotal for refining therapeutic strategies and improving patient outcomes. Advanced techniques and protocols guide this investigation-based review.

Aim of study. to explore the most recent dates about the metabolic intricacies in Chimeric Antigen Receptor (CAR) T-cell therapy for B-cell acute lymphoblastic leukemia (B-ALL), which are guiding treatment optimization and enhancing patient outcomes.

Methods and materials. This involved conducting an analytical literature review based on scientific articles using specific keywords: Chimeric Antigen Receptor (CAR) T-cell therapy and B-cell acute lymphoblastic leukemia (B-ALL). Through a comprehensive search on PubMed with the filters: clinical-trial, meta-analysis, in the last 5 years; 34 scientific articles were selected for the research topic.

Results. Scientific articles based on information unveiled significant metabolic alterations in Chimeric Antigen Receptor (CAR) T-cell therapy for B-cell acute lymphoblastic leukemia (B-ALL). CAR-T cells targeting CD-19, a key antigen expressed in B-cell malignancies- are the most commonly used combination to achieve the optimal therapeutic effect. There are distinct metabolic alterations induced by CAR-T cell therapy, revealing a pronounced shift towards glycolysis with concurrent suppression of oxidative phosphorylation. Notably, CD-28 and CD-3 coreceptor engagement played a crucial role in shaping the metabolic profile, influencing the magnitude of glycolytic flux and subsequent effector functions. Results of many studies highlight the intricate interplay between CD-19 targeting and coreceptor signaling in modulating CAR-T cell metabolism. Additionally, dynamic changes in amino acid metabolism and lipid biosynthesis took place, underscoring the multifaceted impact of immunotherapeutic interventions on cellular metabolic pathways. These findings provide valuable insights for optimizing CAR-T cell therapy efficacy and managing potential adverse effects.

Conclusion. The action of Chimeric antigen receptor (CAR) T-cell therapy for B-cell acute lymphoblastic leukemia (B-ALL) is based on complex mechanisms, including at the metabolic level. Deep knowledge of these modifications will allow optimization of therapeutic management and patient outcomes.