THE ROLE OF GLYCATION ON TRANSPLANTOLOGY METHODS IN CANCER TREATMENT

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Background. Advanced glication end products (AGEs) are formed in result of Millard reaction in hiperglycemic conditions caused by Warburg`s effect. Many studies have shown the presence of AGEs in neoplastic tissues through which are: pyrraline, imidazolone A and B, argpyrimidine, fructosyl-lysine, methylglyoxal-lysine dimer, Nε(carboxyethyl)-lysine (CEL), Nε(carboxymethyl)-lysine (CML), N2-(1-carboxyethyl)-2′-dezoxyguanosine) (CEdG). It proves corellation between AGEs and cancer. Actually chimeric antigen receptor (CAR)-T cell therapy has been revolutionary in cancer treatment and therefore AGEs may be potential target for it.
Objective of the study. To elucidate the mechanisms through which AGEs influence cancer development in order to find different approaches in diagnostic, treatment and preventing of cancer.
Materials and methods. A review of the literature from 2014-2024 was performed, using 11 articles, including data from ScienceDirect, PubMed Central, Biomed Central, MedScape, and others.
Results. Can be noticed some mechanisms how AGEs influence cancer. Firstly, direct glycation of proteins as histones and nucleic acids as DNA causes epigenetic changes, mutations genomic instability and formation of neoantigens, that complicates targeted treatment with (CAR)-T, producing tumor antigen heterogeneity. Secondly, AGEs cause a significant decrease in proliferation and an increase in apoptosis of primary stem cells. It may be explained by interaction of AGEs - the receptor for advanced glycation end products (RAGE). Therefore, direct blocking of proteins involved in the apoptotic or RAGE pathway can improve viability of stem cells and efficiency of regenerative therapies with stem cells. Finally, accumulation of AGEs leads to irreversible bond of AGEs with proteins, especially with conjunctive tissue proteins. Obviously glycation of extracellular matrix increases tumor invasion and metastasis. Moreover it alters migration of immune cells and efficiency of (CAR)-T cell therapy.
Conclusions. In conclusion, glycation is pathognomonic process in cancer and therefore its studying is a key to the pathogenetic therapy with actual methods in tissue and cell transplantology, like (CAR)-T cell therapy. On the one side AGEs, as markers of cancer, may be used in targeting of therapy. On the other side antiglycation agents may potentiate transplantology methods of cancer treatment.
Keywords: AGEs, RAGE, (CAR)-T cell therapy, regenerative therapy with stem cells, glycation, cancer.