عنوان مقاله:

Identification Biomarkers and Molecular Mechanisms Involved in Lung Transplant Rejection, and Drug Repurposing : A Systems Biology Study

محل انتشار:

مجله علمی پژوهشی دانشگاه علوم پزشکی زنجان, دوره 31, شماره 149 (سال: 1402)

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خلاصه مقاله:

Background and Objective : Lung transplantation is a promising therapy for patients with end-stage lung disease. Pulmonary surfactant is a lipid and protein complex which has a key role in lung function. Molecular mechanisms mediating in rejection of lung transplantation related to surfactants are not still comprehensively understood. In this study, we applied bioinformatics approaches to identify genes and molecular mechanisms involved in surfactant function in rejection of lung transplantation. Materials and Methods : At first, transcriptomics data was extracted and analyzed to construct the protein-protein interaction network and gene regulatory network using Cytoscape. Then, networks analysis were performed to determine hubs, bottlenecks, clusters, and regulatory motifs to identify critical genes and molecular mechanisms involve in surfactant function in rejection of lung transplantation. Finally, critical genes selected for repuposing drugs. Results : Analyzing the constructed PPIN and GRN identified SCD, FN۱, ICAM۱, ITGB۸, FOXC۱, SIX۱, FHL۲, KRT۵, TFAP۲A, GAS۵, MALAT۱, and lnrCXCR۴ as critical genes. Enrichment analysis showed the genes are enriched for pulmonary surfactant metabolism dysfunction, defective CSF۲RB causes pulmonary surfactant metabolism dysfunction ۴ and ۵, Interleukin-۴ and Interleukin-۱۳ signaling may be the mechanisms for surfactant function in rejection of lung transplantation. We predicted some candidate drugs for preventing of lung transplantation rejection such as Sunitinib, Gemcitabine, Oxaliplatin, Hyaluronic acid, … . Conclusion : Following our model validation using the existing experimental data, our model suggested critical molecules and candidate medicines involve in surfactant function in rejection of lung transplantation for furtur investigations.

کلمات کلیدی:

Lung Disease, Transplantation, Systems Biology, Protein-protein Interaction Network, Gene Regulatory Network