

Title: Genetic insights into the connection between pulmonary TB and non-communicable diseases: An integrated analysis of shared genes and potential treatment targets

Author: Amira Mahjabeen, Md. Zahid Hasan, Md. Tanvir Rahman , Md. Aminul Islam, Risala Tasin Khan, M. Shamim Kaiser

Abstract: Pulmonary Tuberculosis (PTB) is a significant global health issue due to its high incidence, drug resistance, contagious nature, and impact on people with compromised immune systems. As mentioned by the World Health Organization (WHO), TB is responsible for more global fatalities than any other infectious illness. On the other side, WHO also claims that noncommunicable diseases (NCDs) kill 41 million people yearly worldwide. In this regard, several studies suggest that PTB and NCDs are linked in various ways and that people with PTB are more likely to acquire NCDs. At the same time, NCDs can increase susceptibility to active TB infection. Furthermore, because of potential drug interactions and therapeutic challenges, treating individuals with both PTB and NCDs can be difficult. This study focuses on seven NCDs (lung cancer (LC), diabetes mellitus (DM), Parkinson's disease (PD), silicosis (SI), chronic kidney disease (CKD), cardiovascular disease (CVD), and rheumatoid arthritis (RA)) and rigorously presents the genetic relationship with PTB regarding shared genes and outlines possible treatment plans. BlueThis study aims to identify the drug components that can regulate abnormal gene expression in NCDs. The study will reveal hub genes, potential biomarkers, and drug components associated with hub genes through statistical measures. This will contribute to targeted therapeutic interventions. Numerous investigations, including protein-protein interaction (PPI), gene regulatory network (GRN), enrichment analysis, physical interaction, and protein-chemical interaction, have been carried out to demonstrate the genetic correlation between PTB and NCDs. During the study, nine shared genes such as TNF, IL10, NLRP3, IL18, IFNG, HMGB1, CXCL8, IL17A, and NFkB1 were discovered between TB and the above-mentioned NCDs, and five hub genes (NFkB1, TNF, CXCL8, NLRP3, and IL10) were selected based on degree values. In this study, we found that all of the hub genes are linked with the 10 drug components, and it was observed that aspirin CTD 00005447 was mostly associated with all the other hub genes. This bio-informatics study may help researchers better understand the cause of PTB and its relationship with NCDs, and eventually, this can lead to exploring effective treatment plans.

Keywords: Pulmonary tuberculosis (PTB), Noncommunicable diseases, (NCDs) Genetic association, Protein-protein interaction (PPI), Gene regulatory network (GRN)

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