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OMICS analyses identify genes, proteins and peptides of *Mycobacterium tuberculosis* useful for diagnosis and new vaccine

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Abstract

Tuberculosis (TB) is a major infectious disease of global importance and the World Health has declared TB a "global emergency". The comparative analyses of *Mycobacterium tuberculosis* genome with the genome of other mycobacteria have identified several regions of differences (RDs), which are specific for *M. tuberculosis*. Hence, the proteins and peptides encoded by the genes present in these RDs may be useful in the diagnosis of TB and the development of new vaccines. In this study RD genes, proteins and peptides were characterized using the methods of OMICS, to identify the proteins and peptides of diagnostic and vaccine potential. The testing of RD proteins and peptides sera of TB patients and healthy subjects identified two proteins and three peptides of diagnostic relevance. The bioinformatics analysis showed each peptide had several antibody-binding epitopes. In cellular immune responses, five proteins were recognized as the major antigens. The bioinformatics analysis for binding to HLA-DR molecules showed that all of these proteins were promiscuous HLA binders. However, an immunodominant peptide of PPE68 was recognized equally well by TB patients as well as healthy subjects. The bioinformatics analysis of the peptide sequence for identity in the bacterial data base and HLA-DR binding showed that the immunodominant peptide was shared between various mycobacterial species and was highly promiscuous for binding to HLA molecules. In conclusion, the OMICS analyses has identified immunodominant RD proteins and peptides useful for TB diagnosis and vaccine applications. The study was supported by Kuwait University Research Sector grants MI02/12 and GM01/01.

Biography

Prof. Abu Salim Mustafa has completed PhD in 1979 from the All India Institute of Medical Sciences and postdoctoral studies from the National Institute of Cancer Research, Oslo, and Whitehead Institute for Biomedical Research, Cambridge. He is the Director of Research Core Facility at the Health Sciences Centre, Kuwait University. He has published >150 papers in reputed journals with>6500 citations and h-index 39. He has served as an editorial board member for 8 journals, invited speaker in 63 conferences and chairman of 18 scientific sessions, member of 15 academic and professional societies, and successfully completed 51 funded research projects.