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Mycobacterial Diseases

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Commentary

A Part of Intracellular Life of Mycobacterium

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DESCRIPTION

Tuberculosis pathogenesis is the major cause of high morbidity and mortality in the current scenario. Major aspects supports this prevalence, the most significant is the mycobacterium's ability to modulate host immune system. Also the resistivity it shows towards many anti-tuberculosis drugs which support its infectivity leading the world towards prevalence of more harmful forms of tuberculosis like XDR and MDR. According to WHO reports 2015, approximately 4000 people are killed each day due to this disease which clearly demonstrates us the need to work towards eradicating it. During its interaction with the host cell mycobacteria adopts many strategies to circumvent host immune system which it initialises with the adhesion molecules which interacts with their specified receptors and with this they help mycobacteria to interact with their host cell. Recent studies have shown with these extracellular receptors there are many signalling molecules which are enhanced intracellular during adhesion and pathogenesis. Hence, we can elaborate their mechanism in host pathogenesis so that we can be more evident about Mycobacterium's strategy to circumvent host cell. Adhesion molecule expression forms a backbone of cell to cell communication in granuloma formation. Leukocyte adhesion molecules like ICAM and other stimulatory and costimulatory molecules show increased or decreased level of expressions in host pathogenesis. In a study of tuberculous pleuritus patients soluble vascular cell adhesion molecules sVCAM, sICAM were evaluated which can be helpful in diagnosis of the disease. Being much conclusive about them can further help us to be brief about these significant molecules and target them to open new avenues to invent more significant and reasonable anti-tuberculosis drugs to eradicate the pandemic.

VCAM and ICAM 1

Vascular cell adhesion molecule and Intracellular adhesion molecules play vital role in stimulating immune response inside the host cell. Among this ICAM 1 is a cell surface glycoprotein that serves as a counter receptor for β2 integrin. It belongs to leukocyte adhesion molecule subfamily of "immunoglobulin" superfamily. Previous studies, also demonstrates the involvement of ICAM 1 in host cell invasion and pathogenesis. It is also evidenced that mycobacteria form association with the host macrophage through complement receptors like CR3 which is in turn is associated with the ICAM. Monocyte derived macrophages when treated with live mycobacteria also demonstrates increased level in expression of ICAM 1 and also LFA 1 which suggests its vitality during host pathogenesis.

LFA 1

LFA is found in most of the immune cells like T cells and macrophages which is involved in their dissemination to the infected site. Reports have demonstrated its involvement in the adhesion as it binds to its counter receptors ICAM. β2 integrin lymphocyte function associated antigen 1, which is not a phagocytic receptor plays a vital role in cellular adhesion and is a part of integrin family. Studies demonstrate that it is involved in promigration of leukocyte cell and requires cytoskeleton.

Chemokines and chemoattractants

Chemokines are basically cell signalling peptides play crucial role in regulation of cellular trDekLnJ and equip tissue specLfic homing. Previous studies demonstrate that during mycobacterial pathogenesis several chemokines like TNFα and chemoattractants are stimulated which further activates immune response. Also it also further facilitates granuloma formation. He pattern recognition molecules like TLRs recognize Mycobacteria and so its pathogenesis which further elucidate a sLJnLficDnt immune response. Production of chemokines and chemoattractants like TNF by macrophages is said to be initiated by adhesion molecules. It have been also evidenced thst chemokines activates leukocytes during pathogenesis.

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