NF-KB A KEY TRANSCRIPTION FACTOR IN DISEASE PROGRESSION OF PATIENTS WITH COVID-19

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ABSTRACT

Covid19 is a current pandemic caused by SARS COVID2 virus. It is a RNA virus consists of outer spike glycoproteins. These PAMP's such as surface glycoproteins were recognized by PRR (pattern recognition receptors) belongs to TLR's especially TLR7 and TLR8 on immune cells activate NF-KB a key transcription factor involved in development of immunity. Dysregulated NF-KB a key transcription factor activates inflammatory mediators involved in disease progression in COVID patients. Targeting NF-KB, a key transcription factor and suppressing it, helps in suppressing the progression of disease for better prognosis. This article highlights about the NF-KB, a key transcription factor activity in progression of diseases in COVID19 patients, which is helpful for future therapeutic target and prognostic marker.

Keywords: PAMP's (Pathogen associated molecular patterns), TLR's (Toll like receptors), PRR (Pattern recognition receptors), Glycoprotein's.

INTRODUCTION

The emergence and global spread of SARS-COV-2 causes COVID-19 is a major threat to the world. Because, of which WHO declared it as a pandemic on march 2020. SARS-COV-2 virus originated in the city of wuhan of china, many viral pneumonia cases were reported. Corona virus is a largest single stranded RNA virus consists of nucleocapsid includes genomic RNA and phosphorylated nucleocapsid (N) protein located inside phospholipid bilayer and consists of different spike proteins such as spike glycoprotein trimmer (S) present in all coronaviruses, HE (Haemagglutinin esterase) present in some coronaviruses, the M (Membrane) protein and E (Envelop) protein are present along with S protein in the virus. SARS-COV-2 virus enters the cell by binding to ACE2 (Angiotensin converting enzyme 2) receptor and the clinical presentations ranging from asymptomatic, fever, cough, dyspnea, pneumonia, respiratory failure , and death. SARS-COV-2 is related to SARS (SARS-COV-1) and MERS-COVs, caused zoonotic epidemic. SARS-COV-2 is not threat as SARS-COV-1 and MERS-COV. Spike protein of SARS-COV-2 trigger immune reaction leading to activation of NF-KB a key transcription factor involved in activation of antiviral cytokine such as IFN-γ. Dysregulated NF-KB transcription factor results in release of various inflammatory mediators such as cytokines, growth factors, and enzymes involved in tissue damage, viral pneumonia, respiratory failure and death.

Current pandemic COVID-19 is caused by SARS-COV-2 virus. This virus consists of S1 and S2 glycoprotein's has an affinity to bind with ACE receptors situated on respiratory tract[1,2]. Pathogen associated molecular pattern's recognized by pattern recognition receptors belongs to toll-like receptors (TLRs) present on immune cells especially TRL7 and TLR8 recognizes the surface glycoprotein's of SARS-COV-2 virus. Abberated TLR's activate NF-KB, a desregulated NF-KB a key transcription factor involved in production of inflammatory mediators [1,3,4,10,11].

Mechanism of actions of NF-KB transcription factor

NF-KB a key transcription factor ubiquitous in cytoplasm of each cell in an inactive state by IkB (inhibitory kappa beta transcription factor), when it is activated degradation of inhibitory kappa beta transcription factor (IKB) by IKK kinases results in shifting of deregulated NF-KB from cytoplasm to nucleus binds with DNA leads to transcription of various inflammatory mediators such as proinflammatory cytokines (IL-1,TNF-α,IL-6), growth factors (EGF,FGF,VEGF), proteolytic enzymes UPA (Urokinase plasminogen activator), COX-2, MMP's (Matrix metallo proteinases), Free radicals (ROS,RNS), from inflammatory cells such as macrophages ,neutrophils, mast cells involved in chronic inflammation, immune modulation, lung alveoli tissue

damage leads to cough, fever, breathlessness later results in severe acute respiratory distress syndrome[5-11] (Figure 1).

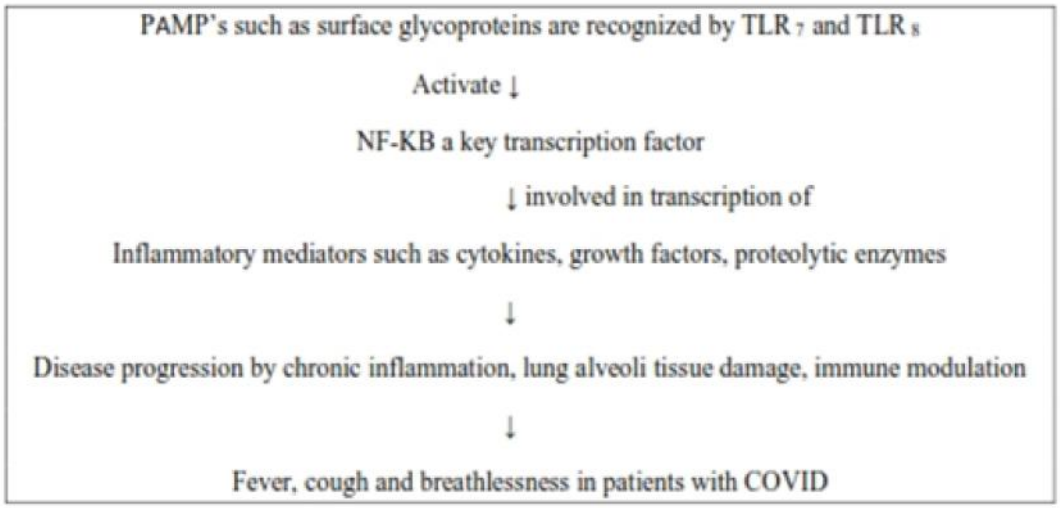

Figure 1: Shows the NF-KB a key transcription factor activated by PAMP's recognized by TLR involved in transcription of inflammatory mediators leads to disease progression in patients with COVID.

CONCLUSION AND FUTURE PERSPECTIVE

NF-KB a key transcription factor activated by PAMP's recognized by TLR7 and TLR8 involved in transcription of inflammatory mediators such as cytokines, growth factors, proteolytic enzymes involved in disease progression in patients with COVID19

Understanding of NF-KB a key transcription factor activity, activating factors, control of inflammatory mediators, which is helpful for future therapeutic target and prognostic marker.

Abbreviations:

NF-KB ; Nuclear factor kappa Beta, PAMPs; Pathogen associated molecular patterns, iKB; Inhibitory kappa beta, SARS; Severe acute respiratory syndrome, MERS; Middle east respiratory syndrome, TLR; Toll Like Receptors, PRR: Pattern recognition receptors, MMP's; Matrix metallo proteinases, UPAs; Urokinase plasminogen activator, EGF; Epidermal growth factor, FGF; Fibroblast growth factor, VEGF; Vascular endothelial growth factor, COVID19; Coronavirus infectious diseases 19, IFN-γ; Interferon Gamma, ACE2; Angiotensin converting enzyme 2.

Conflict of interest: None

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