

Frontiers in Immunology, 2015, vol.6, NAUG

Multiplex analysis of serum cytokines in humans with hantavirus pulmonary syndrome

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Abstract

© 2015 Morzunov, Khaiboullina, St. Jeor, Rizvanov and Lombardi. Hantavirus pulmonary syndrome (HPS) is an acute zoonotic disease transmitted primarily through inhalation of virus-contaminated aerosols. Hantavirus infection of endothelial cells leads to increased vascular permeability without a visible cytopathic effect. For this reason, it has been suggested that the pathogenesis of HPS is indirect with immune responses, such as cytokine production, playing a dominant role. In order to investigate their potential contribution to HPS pathogenesis, we analyzed the serum of hantavirus-infected subjects and healthy controls for 68 different cytokines, chemokines, angiogenic, and growth factors. Our analysis identified differential expression of cytokines that promote tissue migration of mononuclear cells including T lymphocytes, natural killer cells, and dendritic cells. Additionally, we observed a significant upregulation of cytokines known to regulate leukocyte migration and subsequent repair of lung tissue, as well as cytokines known to increase endothelial monolayer permeability and facilitate leukocyte transendothelial migration. Conversely, we observed a downregulation of cytokines associated with platelet numbers and function, consistent with the thrombocytopenia observed in subjects with HPS. This study corroborates clinical findings and extends our current knowledge regarding immunological and laboratory findings in subjects with HPS.

<http://dx.doi.org/10.3389/fimmu.2015.00432>

Keywords

Chemokines, Cytokines, Growth factors, Hantavirus pulmonary syndrome, Hantaviruses, Immune response, Serum