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The impact of persistent hepatitis C virus infection on cellular immune subsets

Essa S, Al-Attiyah R, Siddique I, Al-Ali J and Al-Nakib W
Kuwait University, Kuwait

Background & Aim: Hepatitis C virus (HCV) infection is a major public health problem with an estimated 3-4 million people infected each year worldwide. 20-30% of individuals acutely infected with HCV will spontaneously clear the virus, with the remaining 70-80% developing persistent HCV infection. The interplay between the virus and host innate and adaptive immune responses determines the outcome of HCV infection. The present study aims to determine the level of cellular immune subsets in HCV-infected patients and to compare it to healthy controls.

Methods: This was carried out by investigating the immunophenotypes of immune cells in the peripheral blood of 33 HCV-infected patients and 30 healthy controls before treatments. The immunophenotyping of mononuclear cells in the peripheral blood were evaluated by flow cytometry using antibodies specific to $CD3^+$ (mature T cells), CD3+$CD8^+$ (T cytotoxic cells), CD4+$CD25^+$ (regulatory T cells), CD3+$CD4^+$ (T helper cells), CD8+$CD26^+$ (activated T cells), CD3-$CD56^+CD16^+$ (natural killer cells), CD3+$CD56^+CD16^+$ (NKT cells), $CD19^+$ (pan B cells), and $CD4^+CD25^+$ (regulatory T cells).

Results: There were significantly lower mean values for absolute count and percentage of T lymphocytes (CD3+, $P<0.007$ and $P<0.5$ respectively), absolute count of T cytotoxic cells ($CD3^+CD8^+$, $P<0.005$), percentages of regulatory T cells ($CD4^+CD25^+$, $P<0.001$), absolute count of NK cells ($CD3^-CD56^+CD16^+$, $P<0.05$), absolute count and percentage of NKT cells ($CD3^+CD56^+CD16^+$, $P<0.001$ and $P<0.002$, respectively) and activated T cells (CD8+$CD26^+$, $P<0.5$) between HCV-infected patients and healthy donors. On the other hand, insignificantly lower mean values for absolute count and percentage of T helper cells (CD3+$CD4^+$) and B cells ($CD19^+$), were identified among HCV-infected patients and healthy donors.

Conclusion: Cellular subsets of the immune system play an important role in the pathogenesis, progression and clearance of HCV. The screening for multiple cellular markers in the present study may help us to understand the immunopathogenesis of the disease. These findings could lead to new possibilities for immune-based interventions and/or vaccine development with the aim of restoring functional antiviral T cell responses combined with improved viral clearance.

Biography

Sahar Essa is a clinical virologist in the Department of Microbiology, Faculty of Medicine, Kuwait University. She received her PhD from Warwick University, United Kingdom. In addition to teaching, Dr. Essa is professionally involved in medical research. She is mainly interested in the viral immunopathology. She collaborated on a number of research grant and together with colleague wrote manuscripts on respiratory tract viral infections, parvovirus B19 infection during pregnancy, cell mediated immune responses and humoral immune responses during activation of cytomegalovirus infection in kidney transplant recipients. She recently collaborated with her colleges and submitted two grants to investigate the cell mediated immune responses in HCV-infected patients.

sahar@hsc.edu.kw