

## ZAP-70 Positive Cells in Treated and Untreated HIV-1 Infected Patients

Srisurapanon S<sup>1</sup>, Sukwit S<sup>2</sup>, Chuenchitra T<sup>2</sup> and Santiwattanakul S<sup>1</sup>

<sup>1</sup>Department of Pathology, Faculty of Medicine, Srinakharinwirot University, Bangkok, Thailand <sup>2</sup>Armed Forces Research Institute of Medical Sciences, Bangkok, Thailand

### Abstract

**Background:** ZAP-70 is a critical protein tyrosine kinase in T-cell activation and proliferation processes. Defective recruitment of ZAP-70 molecules results in termination of the T-cell receptor (TCR) signal transduction pathway. Impairment of this pathway is one of the early markers of disease progression in HIV-1 infected individuals. T-cell dysfunction in HIV infected patients may be connected to a defect in the proximal TCR signaling cascade.

**Objectives:** To evaluate the numbers and mean fluorescence intensity (MFI) of ZAP-70 positive cells in patients with treated and untreated HIV-1 infection and healthy controls.

**Methods:** The numbers and mean fluorescence intensity (MFI) of ZAP-70 positive cells in patients with treated and untreated HIV-1 infection and healthy controls were analyzed by flow cytometry. A correlation between the MFI in ZAP 70 molecules and the viral load was evaluated. A total of 41 HIV-1 infected patients, 30 patients on HAART and 11 untreated patients, and 11 healthy controls were enrolled.

**Results:** The data show ZAP-70+/CD4+ cells in treated and untreated HIV-1 infected individuals had a greater MFI of ZAP-70 molecules than those from healthy controls ( $p < 0.001$ ). The inverse correlation between the percentage of CD4+ cells and the MFI of ZAP-70+/CD4+ T-cells was significant ( $r = -0.5$ ;  $p < 0.01$ ). A stronger correlation between the percentage of CD4+/CD25+ cells and the MFI of ZAP-70+/CD4+ cells was observed ( $r = -0.6$ ;  $p < 0.01$ ). However, no significant correlation was seen between the MFI of the ZAP-70+/CD4+ cells and the viral load in patients with untreated HIV-1 infection ( $r = -0.4$ ,  $p = 0.16$ ). For HIV-1 treated patients, the viral loads were too low to detect so it was not possible to calculate the correlation.

**Conclusions:** Elevated MFI levels of ZAP-70 molecules in CD4+ cells in HIV infected patients may be associated with an inability to further activate T-cells.

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