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HIV-patients discrimination according to phenotype and functional assay of T-cells subsets

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Background

To distinguish HIV-1 patients with clinical diversity by using a simplified model of T-cell interactions

Methods

During 28 months, 1074 blood samples from 200 HIV-1 patients and 418 blood samples from healthy blood donors were prospectively collected. T lymphocyte subsets and activation markers expression (CD4, CD69, CD25, CD8, CD28, HLA-DR) were determined initially and after PHA stimulation in whole blood cultures.

Results

Two step Cluster Analysis followed by a discriminant function analysis of the lymphocyte activation assay from the first blood sample, allowed the separation of HIV-1 patients in two groups: Cluster1 (67%) and Cluster2 (33%). Clusters definition relied on the level of three T-cells subsets: a) stimulated $CD4^+CD69^+CD25^{high}$, b) unstimulated $CD4^+CD69^+CD25^+$ and c) unstimulated $CD4^+CD25^{high}$. PHA stimulated $CD4^+CD69^+$ $CD25^{high}$ subset level alone allowed to classify correctly patients with 92% sensitivity and 87% specificity. Cluster-2 expressed more CD69 and HLA-DR activation markers on CD4 and CD8 lymphocytes, less $CD8^+CD28^+$ and responded less to mitogen even if viral load undetectable. Cluster-2 presented poorly clinical profile in terms of previous AIDS events, current $CD4^+$ count, viral load, length of treatment. Over the time most patients (64%) were keeping their cluster category.

Discussion

We propose an algorithm to identify a subset of HIV patients with an over-determined immunodeficiency status characterized by a lower ability to reverse inappropriate activation of CD4 and CD8 T-lymphocytes leading probably to earlier exhaustion of their immunological resources. This subgroup of patients could display a worst clinical evolution, lower control capacity of viral load, even under antiretroviral therapy-mediated viral suppression.

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