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**Italian Conference**  
on **AIDS** and **Antiviral**  
**Research**

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**SITA**, Società italiana per la Terapia Antinfettiva

**SIV-ISV**, Società Italiana di Virologia - Italian Society for Virology

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A graphic of a stack of four books in yellow, blue, grey, and red, positioned behind the 'abbs' text.



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## Inflammation: a major pathogenetic process

### OC 15 ANTIRETROVIRAL THERAPY PARTIALLY RESTORES PHENOTYPIC AND METABOLIC IMMUNOSENESCENCE FEATURES OF T CELLS IN HIV INFECTED INDIVIDUALS

B. Dallan<sup>1</sup>, M. Campagnaro<sup>1</sup>, E. Gallerani<sup>1</sup>, D. Proietto<sup>1</sup>, R. Cultrera<sup>3</sup>, M. Libanore<sup>4</sup>, L. Sighinolfi<sup>4</sup>, F. Nicolì<sup>1</sup>, A. Caputo<sup>1</sup>, D. Segala<sup>2</sup>

<sup>1</sup>Laboratory of Biochemistry, Immunology and Microbiology (BIM), Department of Chemical, Pharmaceutical and Agricultural Sciences, University of Ferrara, Ferrara, Italy, <sup>2</sup>Department of Translational Medicine, University of Ferrara, Italy Infectious Diseases Unit, Azienda Ospedaliero-Universitaria di Ferrara, Italy, <sup>3</sup>Department of Translational Medicine, University of Ferrara, Italy Infectious Diseases-Primary and Community Health Care Dept, Azienda Unità Sanitaria Locale di Ferrara, Italy, <sup>4</sup>Infectious Diseases Unit, Azienda Ospedaliero-Universitaria di Ferrara, Italy

**Background:** HIV causes premature ageing in infected individuals, hampering their immune system and increasing the risk of cardiovascular diseases. T cell phenotypes associated with HIV disease progression are indeed also described during the ageing process and include the expression of immune exhaustion and activation markers as well as the loss of naïve and the accumulation of late differentiated T cells. Studies in elderly subjects suggest that T cell senescence correlates with metabolic alterations observed at both the systemic and T cell levels. Advances in availability and effectiveness of ART has certainly prolonged life of HIV-infected individuals but senescence-associated problems occur at younger age even in ART-treated subjects. Biomarkers to monitor disease control and immunosenescence despite viral suppression are urgently needed. We identified measures of T cell metabolism/senescence as putative biomarkers.

**Materials and Methods:** We assessed activation and senescence features as the expression of activation (CD38, HLA-DR) and senescence (CD57) markers that has been analysed on CD4+ and CD8+ T cells. Metabolic properties as T cells lipid metabolism and mitochondrial functionality was evaluated on CD4+ and CD8+ T cells by means of fluorescent probes. All analyses were conducted on three different groups enrolled: 1. ART-treated HIV-infected adults (30-50 years old) on therapy since <5 years (n=19); 2. ART-treated HIV-infected adults (30-50 years old) on therapy since >10 years (n= 23); 3. healthy adults (30-50 years old) matched for age and sex with #1 and #2, (n= 21).

**Results:** We observed a comparable activation profile (CD38, HLA-DR) among CD4+ and CD8+ T cells from HIV-infected and healthy adults. Immunological restoration in ART-treated HIV-infected adults was also observed in T cell lipid metabolism, measured as fatty acid uptake (FA) and storage (NL), as well as glucose uptake (2-NBDG). However, despite ART-treatment, CD4+ and CD8+ T cells from HIV-infected subjects presented with altered mitochondrial functions, characterized as mitochondrial membrane potential (TMRM), a pattern previously associated with ageing. Indeed, features of HIV premature immunosenescence were observed also in higher CD57 expression among T cells from HIV-infected patients.

**Conclusions:** ART treatment restores immunological balance in T cells lipid metabolism and down-regulates abnormal basal T cells activation, both typical features of chronic inflammation. No restoration was detected on T cells mitochondrial functionality and CD57 expression whose detection may be used to monitor disease status and immunosenescence progression in ART-treated infected adults.