

# Abstract

## Total anti-oxidant function (TAF) and specific anti-oxidant function in HIV-infected patients as assessed by a functional intracellular assay

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**BACKGROUND:** We investigated anti-oxidant function in HIV patients utilizing a functional intracellular assay.

**METHODS:** Blood was collected on patients without acute infections. Patients with a T4 count <200 cells were excluded from testing due to need for adequate lymphocytes. The lymphocytes were separated by gradient centrifugation, washed, counted and plated with 200  $\mu$ l medium plus 20  $\mu$ l of cell suspension. The cells were stimulated with PHA for 4 days then radio-labeled thymidine was added. After 24 hrs labeled DNA was counted. The number of counts was used as a measure of the capacity of the cells to grow under the various conditions tested. The capacity of a cell to grow is directly related to the nutrients available for DNA synthesis, either from the medium or from the patient's cells. 9 cultures per patient acted as controls where all of the micronutrients necessary for growth were present. Other cultures per patient in medium deficient in either glutathione, cysteine, CoQ10, selenium, vit E or alpha lipoic acid (ALA). TAF was assessed in medium deficient of antioxidants. Growth of these cultures compared to patient control produced a relative value. Reference ranges have been derived from a large population of apparently healthy individuals.

**RESULTS:** Of the 168 HIV patients, mean TAF was 43% (+/- 22.68) with 87% being below normal (ref >75%). Specific deficiencies were: glutathione 26%; cysteine 19%; CoQ10 24%; selenium 48%; vit E 32%; ALA 20%. Age/BMI matched control population (n= 16) revealed a mean TAF of 61% (+/- 21.30) with deficiencies: glutathione 7%; cysteine 13%; CoQ10 9%; selenium 27%, vit E 18%; ALA 18%. There was statistically significant difference between the mean TAF of the HIV patients vs the control population ( $p < 0.002$  two-tail t-Test)

**CONCLUSION:** Antioxidant function in HIV patients is significantly lower than this control population and well below the published reference range. This is the first assessment of TAF in an HIV-infected population by this methodology and suggests that the vast majority may be significantly deficient.