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Association between vitamin D receptor gene polymorphisms and iron indices in HIV-negative patients with malnutrition-inflammation-cachexia syndrome

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Malnutrition-inflammation-cachexia syndrome (MICS) is a frequent complication of end-stage AIDS. Malnutrition, with its associated adverse effects on immunocompetence contributes to the progression of AIDS independently of HIV. Iron indices are considered reliable prognostic factors because of their association with inflammation and malnutrition. Since the active form of vitamin D has immunomodulatory effects, and considering that allelic variants of the vitamin D receptor (VDR) are associated with the rates of progression to AIDS in HIV-positive patients (J Steroid Biochem Mol Biol. 2004 89-90:199-207), here we evaluated the association between VDR polymorphisms and iron indices in HIV-negative patients with MICS.

38 HIV-negative patients treated at the Unit of Clinical and Artificial Nutrition, Misericordia e Dolce Hospital, Prato (Italy) for at least 12 months were studied. The mean age of the patients (22 men and 16 women) included in this study was 65 ± 10 years. Genomic DNA was extracted from peripheral blood leucocytes and amplified by polymerase chain reaction (PCR). PCR products were digested with the respective restriction enzymes in order to identify VDR polymorphisms. Absence or presence of the *Bsm*I, *Apa*I, *Taq*I, and *Fok*I restriction sites were denominated B and b, A and a, T and t, F and f respectively.

Serum transferrin levels showed significant association with *Bsm*I, *Apa*I and *Taq*I polymorphisms, *i.e.* those polymorphisms that are located in a regulatory site at the 3′ end of the VDR gene and are in linkage disequilibrium. Patients harbouring the BB, AA and tt genotypes showed significantly higher levels of serum transferrin compared with bb, Aa, aa, TT and Tt respectively.

These results are consistent with those previously obtained in HIV-positive patients (J Steroid Biochem Mol Biol. 2004 89-90:199-207; J Infect Dis. 2008 197:405-10) and highlight an inverse correlation between vitamin D signalling and AIDS progression to MISC. These results also provide a link between VDR alleles and nutritional markers which are highly predictive variables of MICS. Since MICS is one of the leading causes of mortality in AIDS patients, the determination of VDR polymorphisms could help identifying those AIDS patients with a greater risk of developing MICS, a syndrome that appears to be independent of HIV serostatus or viral load.

Key words
HIV, AIDS, Vitamin D, polymorphisms, cachexia, malnutrition