

**Anti-HIV and anti-apoptotic activity of the whey protein concentrate:
IMMUNOCAL.**

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OBJECTIVES: The in vivo glutathione (GSH) promoting activity of undenaturated Whey protein concentrate (WPC) has already been demonstrated. Here we demonstrate the anti HIV and anti Apoptotic activity of a WPC product termed IMMUNOCAL and its relation with GSH synthesis. METHODS: IMMUNOCAL is produced in linear fashion in order to maintain proteins in a non denaturated form and to preserve their glutamyl cysteine residues. We tested the in vitro anti-HIV activity on cord blood mononuclear cells and MT 4 cells by studying each of reverse transcriptase (RT) activity, p24 antigen production, and syncytium formation. GSH was measured by spectrophotometric recycling assay. Apoptosis was evaluated by flow cytometry on PBMC from HIV infected individuals (cells were stained with acridine orange and ethidium bromide) (n = 6). RESULTS: An anti HIV activity was found at WPC concentrations between 100 micrograms/ml and 500 micrograms/ml. Inhibition of syncytium formation occurred with a IC50 of 150 micrograms/ml. PBMCs cultured with these WPC concentrations (n = 3) had a statistically significant increase in GSH synthesis when compared to untreated cells, 9.6 +/- 1.5 vs 5.4 +/- 0.4 nmoles/10(7) cells, p = 0.01. HIV infected PBMCs cultured in the presence of 100 micrograms/ml of WPC were less prone to die of apoptosis than untreated cells, 15% +/- 2.6 vs 37% +/- 2.4 p < 0.001. CONCLUSION: IMMUNOCAL (WPC) possesses antiviral and anti-apoptotic activities which may be related to its glutathione promoting activity. A clinical trial is currently going on with children with AIDS and wasting syndrome.

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