[0012] A second embodiment of the present invention is a method of treating an individual having or at risk for developing allergies, the method comprising the administration to the individual an effective amount of β-hydroxy-β-methylbutyrate (HMB).

[0013] A third embodiment of the present invention is a method of treating individuals having or at risk for developing asthma, the method comprising the administration to the individual an effective amount of β-hydroxy-β-methylbutyrate (HMB).

[0014] A fourth embodiment of the present invention is a method of treating elderly individuals at risk for developing age-related infections, the method comprising the administration to such individuals an effective amount of β-hydroxy-β-methylbutyrate (HMB).

[0014a] In another embodiment, there is provided the use of β-hydroxy-β-methylbutyrate in the manufacture of a medicament to treat an individual having or at risk of developing an allergy characterized by an imbalance in type 1 and type 2 cytokine levels, wherein the β-hydroxy-β-methylbutyrate modulates the imbalance in type 1 and type 2 cytokine production.

[0015] The present invention is based upon the discovery that peripheral blood mononuclear cells (PBMC) stimulated with the T cell stimulus CD3/CD28 and simultaneously exposed to HMB exhibit a shift in type 1 and type 2 cytokine production, favoring type 1 cytokine production. The shift occurs as HMB exposure increases the production of type 1 cytokines such as interferon-γ (IFNγ), interleukin 12 (IL-12), and interleukin 2 (IL-2), without a corresponding increase in the production of type 2 cytokines such as interleukin 4 (IL-4), interleukin 5 (IL-5), interleukin 10 (IL-10), and interleukin 13 (IL-13).

Brief Description of the Drawings

[0016] Fig. 1 summarizes experimental data showing the effect of HMB on type 1 cytokine (IL-2, IL-12, IFNγ, TNFα, GM-CSF) production from peripheral blood mononuclear cells simultaneously stimulated with CD3/CD28 for 24 hours (*$p<0.05$, paired sample, 2 tailed t-test, comparison to no HMB).

[0017] Fig. 2 summarizes experimental data showing the effect of HMB on type 2 cytokine (IL-4, IL-5, IL-10, IL-13) production from peripheral blood mononuclear cells simultaneously stimulated with CD3/CD28 for 24 hours (*$p<0.05$, paired sample, 2 tailed t-test, comparison to no HMB).

[0018] Fig. 3 summarizes experimental data showing the effect of HMB on the ratio cytokine type 1 (IL-2) to type 2 cytokines (IL-4, IL-5, IL-13, IL-10) from peripheral