G-proteins Play Concerted Roles in Chemical Induced K562 Cell Differentiation

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ABSTRACT

The human chronic myelogenous leukaemia (CML) cell line K562 can be triggered in culture to differentiate along the erythrocytic pathway in response to a variety of stimulatory agents. Heterotrimeric guanine nucleotide binding proteins (G-proteins) are peripheral proteins. They have crucial roles in transmembrane signal transduction by coupling agonist-activated G-protein-coupled receptor to specific effectors in the plasma membrane. The levels of G-protein in cell have been shown to vary in response to hormones, cell growth, differentiation and development. G-proteins compose of three subunits, which are α, β and γ subunits. The α subunit, which has GTPase activity, can hydrolyze GTP to GDP. The Gα subunits have been divided into four families, Gs, Gi / o, Gq / 11 and G12 / 13, based on homology at the amino acid level and function. In the presence of Hemin, HMBA and Huangqi, K562 cells differentiate to erythroblasts and acquire the capability to synthesize β-globin or γ-globin. We used this cell system to study alterations in the levels of several G-protein α subunits during chemicals induced cell differentiation by semi-quantitative RT-PCR. These are GNAS isoform (GNAS and GNASS), Gαi2, Gα11 and Gα11 pseudo gene. The result of differential chemicals induced K562 cells indicate: (1) The expression of Gαi2 mRNA in HMBA treated K562 cells was significant higher than those in other inducers (P

Keywords : G-protein ; Huangqi ; GNAS form ; β-globin

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