GNAS, Gi and Gq Protein Play Concerted Roles in Huangqi, Hemin and HMBA Induced K562 Cell Differentiation

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ABSTRACT

Heterotrimeric G proteins have been demonstrated to play integral role in the transduction of extracellular signals from cell membrane receptor to intracellular effectors proteins. G proteins regulate critical processes such as cell growth, differentiation and development. G proteins compose of α、 β and γ subunits. To date, 27 different Gα, 5 Gβ and 14 Gγ subunits have been described. The α subunit have GTPase activities, hydrolyze GTP, return to the GDP-bound state, and reassociate with βγ-complex to form inactive heterotrimers. 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. K562 cells are human chronic myeloid leukemia cell line (CML). When K562 cells exposed to Huangqi, Hemin and HMBA, it markedly increase the β-globin or γ-globin expression and cell differentiation along the erythoid pathway. Studied expression of G proteins in differential drug induced erythoid differentiation of K562 cells by degenerate-primer PCR. The experiment clones are GNAS isoform (GNASL and GNASS), Gαi2 and Gα11 pseudo gene. The result of different drug induced of K562 cells has three conclusions: (1) It can increase the expression of GNASL and decrease the expression of GNASS by Huangqi-induced. (2) Gαi2 all has more obvious difference by durg. (3) G11 pseudo gene displays in Huangqi-indudced mainly. The above different that the mechanism of the signal transduction has not been clear yet, must enter a cloth discussion even more, especially the Huangqi treatment of the blood disease of traditional Chinese medicine is benefitted greatly, if can totally understand that Huangqi leads the mechanism of differentiation, perhaps the chance that the blood cancer patient can slow down the condition and cure.

Keywords : Heterotrimeric guanine nucleotide binding protein ; Huangqi

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