Analysis of CSF-1R Involved in Hemin, HMBA and TPA Induced K562 Cell Differentiation

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ABSTRACT

Stem cells are a type of cells that has the ability to either divide for indefinite periods in culture to produce more stem cells, or to differentiate into give rise to specialized cells. Differentiation is a maturing process which a determined cell becomes a recognizable, specialized cell. External stimuli, such as growth factors and chemicals trigger cells to differentiate. Once differentiated, these specialized cells are usually terminal and nondividing, though some may be induced to divide following injury. Human cell line K562, derived from a patient who had chronic myeloid leukemia in terminal blast cell crisis, has certain erythroid characteristics. In this study, we use K562 cell as the test cell line and explore the effects that tyrosine kinase and serine/threonine kinase participate in K562 cell erythroid differentiation. Those as differentiating agent, hemin, HMBA (hexamethylene bisacetamide) and TPA (12-O-tetraphorbol 13-acetate) were shown to induce erythroid or macrophage-like differentiation of K562 cells. When K562 cell differentiate to the erythroid cell line by hemin and HMBA induced, also accompany the accumulation of alpha globin and gamma globin synthesis. It become the silk-extension of cell formed when TPA-induced the K562 cell. The 32P-ATP labeled tyrosine or serine/threonine kinase degenerate primer were used to PCR kinases of drug treated cells, and cloned the differential cDNA by enzyme digestion. We found that protein kinase C- (PKC-) and macrophage colony-stimulating factor receptor (MCSF-1R) play a part in the K562 cell erythroid differentiation pathway. The promoter and enhancer of MCSF-1R were put into pGL-3 vector, and the vector was transfer into K562 cell. After TPA treatment, most cells died with apoptosis phenotype. This phenotype deserves a further investigation.

Keywords : Stem cell, Differentiation, hemin, HMBA, TPA

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