



HUMAN HEMATOPOIETIC STEM CELL

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ABSTRACT OF THE DISCLOSURE

Human hematopoietic stem cells are provided by separation of the stem cells from dedicated cells. The stem cells may then be maintained by regeneration in an appropriate growth medium. Means are provided for assaying for the stem cells as to their capability for producing members of each of the hematopoietic lineages.

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PATENT

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10 The field of this invention is the isolation,
regeneration and use of hematopoietic stem cells.

15 Mammalian blood cells provide for an
extraordinarily diverse range of activities. The
blood cells are divided into several lineages,
including lymphoid, myeloid and erythroid. The
lymphoid lineage, comprising B-cells and T-cells,
provides for the production of antibodies,
regulation of the cellular immune system, detection
20 of foreign agents in the blood, detection of cells

differentiated cells are also present on the stem cell. One marker which is reported to provide for some enrichment of progenitor activity is Class II HLA (particularly a conserved DR epitope recognized by a monoclonal antibody designated J1-43).
However, these markers are found on numerous lineage committed hematopoietic cells. One marker which has been indicated as present on stem cells, CD34, is also found on a significant number of lineage committed progenitors. In particular, B-cells (CD19+) and myeloid cells (CD33+) make up 80-90% of the CD34+ population. Moreover, a combination of CD3, 8, 10, 15, 19, 20, and 33 will mark >90% of all CD34+ cells. Therefore, in view of the small proportion of the total number of cells in the bone marrow which are stem cells, the uncertainty of the markers associated with the stem cell as distinct from more differentiated cells, and the general inability to biologically assay for human stem cells, the identification and purification of stem cells has been elusive. Recently, the mouse stem cell has been obtained in at least highly concentrated, if not a purified form, where fewer than

the selection of hematopoietic stem cells.

There is a strong interest in identifying the human hematopoietic stem cell. Having possession of the stem cell will allow for identification of growth factors associated with its self regeneration. In addition, there may be as yet undiscovered growth factors associated (1) with the early steps of dedication of the stem cell to a particular lineage; (2) the prevention of such dedication; and (3) the negative control of stem cell proliferation. The availability of stem cells would be extremely useful in bone marrow transplantation, as well as transplantation of other organs in association with the transplantation of bone marrow. Stem cells are important targets for gene therapy, where the inserted genes promote the health of the individual into whom the stem cells are transplanted. In addition, the ability to isolate the stem cell may serve in the treatment of lymphomas and leukemias, as well as other neoplastic conditions, e.g., breast cancer. Thus, there have been world-wide efforts toward isolating the human hematopoietic stem cell in substantially pure or pure form.

