

Cell Biological Characteristics of Adult Stem Cells

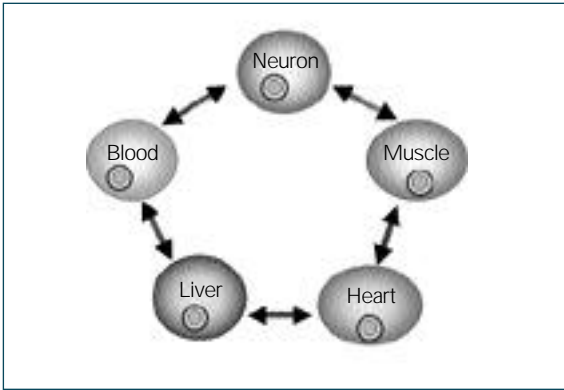
가 가
 505
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Abstract

Adult stem cells and embryonic stem cells are two counterparts of stem cells that can be used for the regeneration of organs and for cell therapy. While each stem cell has its own characteristics, recent findings on the plasticity of adult stem cells are expanding the horizons for cell therapy using these stem cells. In addition, adult stem cells are less prone to the transformation process or inappropriate ectopic differentiation. These characteristics of adult stem cells make them an attractive source of cell therapy and thus being actively exploited for their possible use in cell therapeutic treatment of many intractable diseases. However, many questions remain for the nature or mechanisms of plasticity in adult stem cells, and the task of inducing self - renewal for adult stem cell expansion and engineering has not been accomplished yet. Thus, for successful application of adult stem cells for cell therapy, further understanding on the nature of adult stem cells is necessary, which is critical for the development of high - performance cell therapy and to overcome current limitations in adult stem cell therapies.

Keywords : Adult stem cell; Cell therapy;
 Self - renewal; Stem Cell Plasticity
 : ; 가 ;

(adult stem cell)
 (embryonic stem
 cell)
 가 ,
 (multi-potentiality)
 (1).
 , (bone marrow),
 (umbilical cord blood), , , ,
 ,
 .
 ,
 .
 ,
 .



1. 가 (Heisenberg's law in stem cell)

가 (universal stem cell)
 가 (2).
 가 , 가

(3) ,

(microenvironment)
 ,
 commitment
 가

(Heisenberg's law in stem cell)

(circulating stem cell) (1)(4).

가
 가 develop
 mental process 가 ,

reconstructive function

가

가
 (stem cells as a function)
 (4).

(primary cell) 가

(inner cell mass)

(immortalization)

가

가
 (hematopoietic stem cell)

(bone marrow transplantation)

(CD34, CD38, CD133, c-kit, thy-1)

가

(5),

(1). (12).
(stem cell (neurosphere)
plasticity) , , ,
, nestin
(6). .
(non-adherent) 가
가
(stre 가 ,
ma) telomerase(TERT)c - myc
(7, 8). 가 ,
가 가
가 가 .
(neural stem cell)가 .
(postnatal period)
(13, 14). Ramiya Bonner-Weir
. 1992 Reynolds Weis
가 (islet progenitor cell, IPC)
가 (9, 10).
(ventricle) subependymal layer , (13, 15).
olfactory bulb sage 가 150pas
. 가
4 ,
scar 1 NOD (non-obese diabetic) renal capsule
(11). 가 가 .
subependymal layer ,
(dil.) , astrocyte ,
neuron oligodendrocyte ,
가 cadaveric donor

가 . 가 . 가 . (tumor
 , , purging)
 가 . 가
 , 가 cell engineering
 가 (16).

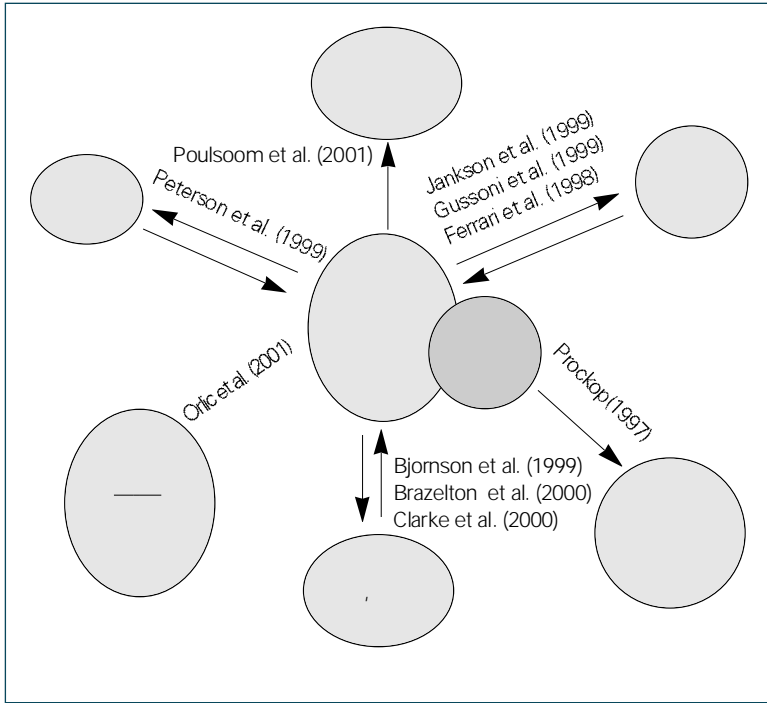
가 , 가
 (asymmetrical division)

1. 가 ,
 가 (self-renewal) 가 가 (symmetrical division)
 (17, 18).

가 가 가 가
 . 가가 가 ,
 가 HoxB4, Bmi - 1, Wnt(19~21)
 , self-renewal 가

가 가 가 가
 가 가 가 가 가 가 가 가
 가가 가 가 . 가

가가 가 . 2. (Stem Cell Plasticity)
 가가 가가 가가
 , 가가
 teratoma 가 .



2.

Krause 2001
(23).

PKH

(geographical plasticity)

(2).

가 (hepatocyte)

. 2000 Lagasse

(developmental plas-

FAH(fumaryl acetoacetate hydro-

ticity)

가 2000 Clarke

lase)

1

(22),

가

, NTBC

(neurosphere)

tyrosinemia

hepatotoxicity

(Sca- 1 + CD34 + CD45 +)

NTBC

50% 가

가

(notocord),

(meso-

nephron)

(24).

30 ~

50% (c-kit+ Sca-1+ Lin-) G-CSF (granulocyte-colony stimulating factor) (CD45+) (c-kit-, Lin+) hepatocyte (30). (spontaneous cell fusion) (25, 26) Jiang (neovascularization) 48 (Endothelial progenitor cell, EPC)가 (27). 2000 Alison (28) 가 , Y 가 가 Y 가 가 extra-hepatic tissue (hepatic tissue) 가 (5%) . Mezey Brazelton (31, 32) 가 2001 microglial cell hematopoietic origin Orlic (29). , EGFP (enhanced green fluorescent protein) NeuN, neurofilament protein astrocyte GFAP (c-kit+ Lin-) 9 68% 가 EGFP 가

가

가

가

action 가

potential

가

(mes-

enchymal stem cell)

(33).

가

가

Hofstetter (34)

1

debris

1. 가

GFAP

neurofilament

가

가

Li (35) cerebral stroke

가

BrdU

가

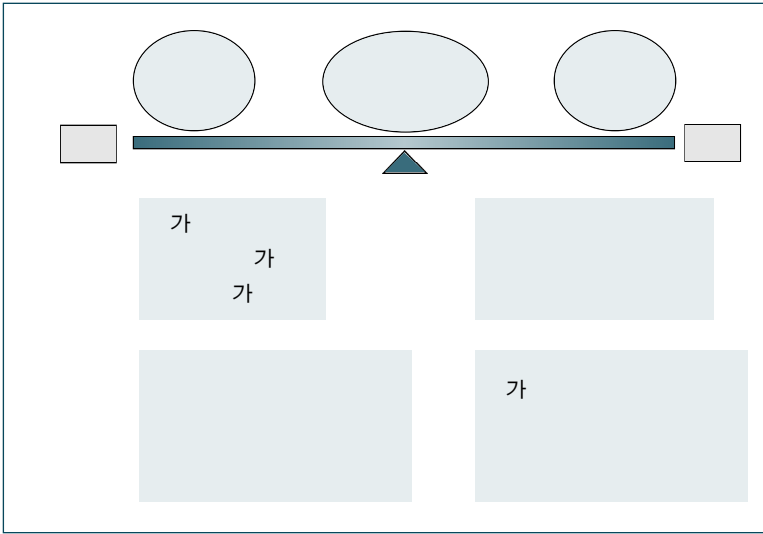
20% 가

가

5% 가

2.

가



3.

,

.

,

2~3

(4~6) spontaneous transformation

,

.

가

1)

가

가

가

2)

가

가

3)

가

가

가 (

3).

3.

가

가 ,
가
pilot study ,
가
가 가 가
가



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