



Stem Cell Research: An Overview

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Abstract

A primary cell can reproduce itself or give rise to more specialized cell type is known as stem cell. The stem cell is the primogenitor at the top of the family tree among all type of cell [1-7]. One blood stem cell gives birth to red blood cells (RBC), white cells (WBC) and platelets stem cells that vary in their developmental capacity. A multi-potent stem cell can give birth to several types of mature cell. A pluripotent stem cell can give birth to all types of adult tissue cells and extra embryonic tissue cells which support embryonic development inside fetus[8-14]. A totipotent stem cell can give birth to a new individual given appropriate maternal support. The current growth of stem cell research is quiet good from last few decades. Stem cell therapy has capabilities of regenerating any human tissue damaged by injury, disease or ageing could be available within a few years. In this review there are few discussion related to current stem cell research and development [15-21].

Keywords: Stem cell; Regenerative medicine; Cell biology

Introduction

Stem cells have the remarkable potential in the development of several different type of cell in the body during early life and growth [22-28]. When a stem cell divides, each new cell has the potential either to remain a stem cell or become a specific type of cell with a specialized function, such as a muscle cell, a blood cell, or a brain cell. Unlike muscle cells, blood cells, or nerve cells which do not replicate themselves normally, stem cells may replicate many times, or proliferate [29-34]. Stem cells are special from other cell types by two important characteristics. First, they are unspecialized cells that are capable of renewing themselves through cell division, few times after long periods of inactivity. Second, under certain experimental or physiologic conditions which they can be induced to become tissue or organ-specific cells along with special functions [35-40].

Current findings on stem cell research

Stem cell research is growing twice as fast as the world average update in research, there are many potential sources for stem cells [41-44]. Inner cell mass of a blastocyst derive embryonic stem cell. Somewhat later stage of development embryonic germ cells are collected from fetal tissue and the cell types that they can develop into

may be limited. From mature tissue adult stem cells are derived and even after maturation of an organism, cells need to be replaced like blood, but this is true for muscle and other connective tissue as well, and may be true for nervous system cells, because these give rise to a limited number of cell types, they are accurately referred to as multi potent stem cells [45-47]. Knowledge about stem cell science & potential applications has been accumulating for more than 30 years. In the 1960s, it was revealed that mouse cells had the capacity to form multiple tissue types, and the original stem cells from mice found in 1971. Limited variety of stem cell therapies are already in use and among them the most well-known therapy is the stem cell transplant for cancer patients where stem cells give rise to blood cells that are given to patients to restore tissue spoiled by high dose of radiation therapy or chemotherapy [48-53]. But recently scientists have discovered that stem cells are well enough to grow them outside the body for long periods of time. With that advance, rigorous experiments can be conducted, and the possibility of steering these cells in such a way that specific tissues can be grown is real [54-59].

Novel Technologies in Stem Cell

Stem cells are a special kind of cells which is unspecialized and capable of developing into a variety of specialized cells and tissues. Researchers are investigating how to culture them and control their differentiation, in the hope that they can be used to generate tissues or organs to treat a variety of diseases. Stem cells can be derived from a variety of tissues. Adult, fetal, placental, umbilical, and embryonic stem cells properties varies one another. Adult stem cells are isolated from the blood, bone marrow, brain, pancreas, and fat of adult bodies [60-63]. Embryonic stem cells area unit found in ancient embryos, and may be obtained from "supernumerary" or "leftover" embryos given by couples undergoing in vitro fertilization treatment. Scientists have additionally derived embryonic stem cells from clonal human embryos.

Embryonic stem cells are preferred by researchers in research because they are totipotent, which are capable of developing into all tissue types [64-71]. Other stem cells, such as adult stem cells, are generally thought to be multi-potent, which is particular types of adult stem cell that are capable of developing into a limited number of tissue types. The potency of adult stem cell both of individual types, and of adult stem cells taken as a group which is still an issue of debate for research scientists. Recent studies suggest that adult stem cells are as flexible as embryonic stem cells.

There are many societies all around the world which helps to develop current technologies, growth in the field of stem cell research [72-79]. International society for stem cell research (ISSCR), Formed in 2002, and it promotes global collaboration among the world's most talented and committed stem cell physicians and scientists, and plays a catalyzing role in the development of effective new medical treatments. The society has 4,100 members from more than 60 countries, the International society for stem cell research is the preeminent transnational, cross-disciplinary science-based organization dedicated to stem cell research.

Many Journals and Conferences are there presents the current status and future plans for the growth of Stem cell1 worldwide. Cell Biology: Research & Therapy (CBRT) is a peer-reviewed scholarly journal which is a rich source of information on the discoveries and current developments in the field of cell biology. An article was published named The Role of MicroRNA in Adipose-derived Stem Cells for Skin Wound Healing which reports on the significant role of MicroRNA within ASCs and how these are interlinked to the pathogenesis of wound healing. Archives on Medical Biotechnology is a multidisciplinary, open access, peer-reviewed, scientific journal that focusses on the publication of scientific manuscripts pertaining to avant-

garde medical biotechnological research studies[80-84]. 3rd International Conference on Tissue Science and Regenerative Medicine was held on September 24-26, 2014 Valencia, Spain where Dr. Jan O. Gordeladze professor of University of Oslo presented a lecture on the topic of modern research development of stem cell [85-89].

Relative safety of different kinds of stem cells is also the matter of discussion medical researchers. Few researchers claim that embryonic stem cells are difficult to control, due to their flexibility and tendency to increasing rapidly. Embryonic stem cells sometime behave similarly to cancer cells and have turned into tumors in some animal experiments. It has been debated that adult stem cells are relatively easier to control and less likely to behave in a tumor-like and are thus more suitable for research.

Stem cells derived from adult tissues that are used in research, almost universally supported. Research using stem cells derived from embryos created in the course of in vitro fertilization procedures which are widely supported except by those who object to the demolition of human embryos[90-93].

The creation of embryos of human by cloning is far more problematic. Numerous researchers view it as unsatisfactory, and a developing number of liberals and progressives are concerned that unregulated research cloning will open the way to regenerative cloning and inheritable genetic change [94-96]. Women's health advocates point out the number of human eggs that would be needed for the medical use of research cloning may put at risk the health of the many women who would be as egg donors.

Conclusion

The era of learning and its enthusiasm through coherent scientific research is an undertaking that offers enormous intellectual rewards for research people while also performing a major social role. The movement cum achievement of science has altered our way of living that would have been Unpredictable just two or three decades earlier. Public conversations about research and use of human stem cells are in progress [97-99]. We recognize that science does not exist in isolation from the larger community which feels its results as good or bad. The work of scientists is, and should be, conditioned and directed carefully by consideration of more human values [100]. The development of public policy, especially where highly controversial matters are included, must take all interested sectors of the public into account. It is only through broad-based participation that the values of all stakeholders in the research centers that can be considered carefully and weighed. Researchers trust that this report has offered an approach that adjusts the guarantee of human stem cell research with the public's genuine concerns about such research in a manner that will lead to a consensus on how best to proceed.

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