Introduction

Stem cells are special cells that have the ability to divide for an indefinite period and can give rise to a wide variety of specialized cell types. This ability, known as developmental plasticity, is a common feature of fertilized eggs and early embryonic cells (known as blastomeres). A fertilized egg, being able to give rise to all of the body's cells, has the highest degree of developmental plasticity and, thus, is said to be totipotent***(Notarianni,et al.,2006)***

All stem cells, whether isolated from adults or embryos, have the ability to proliferate in culture and can differentiate into many different kinds of cells. Differentiation of these cells occurs spontaneously or through directed differentiation. Researchers choose the initial culturing conditions that prevent spontaneous differentiation.***(Downing,et al.,2004)***

Stem cells can be obtained from various sources, including embryos, fetal tissues, uumbilical cord blood, and also terminally differentiated organs. Once isolated, these cells may be forced to expand and to differentiate into functional progenies suitable for cell replacement and tissue engineering.***(Piscaglia, et al.,2007)***

Embryonic stem cells obtained from a stock culture can be engineered to carry cell-surface antigens that would be acceptable to the patient's immune system, thus reducing the risk of tissue rejection.***(Petros,et al.,2005)***

Adult stem cells can be easily obtained from any patient by a routine bone-marrow tap. After the cells are grown in culture to increase their numbers, they could be directed to differentiate into the tissue needed. This approach removes the ethical problems associated with harvesting human embryos and it solves the problem of tissue rejection**.**Stem cells isolated from umbilical cord blood not only demonstrate a high degree of developmental plasticity but also do not stimulate graft-versus-host disease. A great advantage of the cord blood stem cells is that umbilical cord blood banks could be established to provide a convenient source of stem cells***.(Moorman et al. ,2003)***

Stem cell-based therapy could be used to cure inherited or genetic degenerative alterations associated with loss of adult stem cell functions, such as cancers, immune system and hematopoietic disorders, cardiovascular, muscular and neurological diseases, diabetes, chronic hepatopathies and gastrointestinal pathologies as inflammatory bowel disease.***(Mimeault, et al.,2008)***

the feasibility of using stem cells to produce organs, and if successful, its results will go a long way toward relieving the chronic shortness of organ supplies for transplant surgery. Of equal importance is the effect it will have on relieving the ethical and social problems associated with the current practice of obtaining organ donations from family members, who must be subjected to severe surgery even though they may be perfectly healthy themselves from which they may not recover.***(Notarianni,et al.,2006)***