FUNCTIONS OF ORIGIN OF STEM CELLS

BSL (HS) Paper III

Stem cells are generally totipotent/pluripotent (capable of differentiating into many types of cells) However, stem cells derived from specific tissue (ex- epithelium) can also be unipotent and will differentiate into the specific type required to replenish the cells of the tissue to which these stem cells belong. For instance, intestinal stem cells continuously regenerate the lining of the gut, stem cells (from bone marrow) give rise to a range of blood cells. Stem cells thus repair every day wear and tear in different organs of our body. However, there are organs in our body, which retain few or no stem cells in an adult, and therefore, the cells in these organs

can not renew the damaged tissues. Embryonic Stem cells (ESCs) are, however, extraordinary. Since they are totipotent and can give rise to essentially all types in the body. Therefore, they may prove particularly useful for treating ailments involving conditions that require renewal of cells/tissues in organs, which have few or no stem cells of their own.

It has also been shown that even the adult central nervous system (CNS), which are believed for long time not to contain any dividing cells, harbour stem cells, so that neurogenesis is now known to continue throughout the life of a human being, at least in certain parts of the brain ie- hippocampus, which important for memory and learning. Therefore, neural stem cells will be used in future for replacement of degenerating or lost neurons in neurological disorders like parkinson's and alzheimer diseases.

In constant to the stem cells which are generally pluripotent the "progenitor cells"

refer to partially committed cells with more restricted potential than the stem cells. Similarly, "precursor cells" are those cells which are further restricted in their potential and represent the penultimate stage in the developmental pathway of any specialized cell type.

Eg: