Hepatic "stem" cells: state of the art

Maria Grazia Mancino[2], Guido Carpino[1], Paolo Onori[4], Antonio Franchitto[1], Domenico Alvaro[2,3] and Eugenio Gaudio[1]

[1] Department of Human Anatomy, [2] Department of Clinical Medicine, Division of Gastroenterology and [3] Polo Pontino, Latina, Italy *State University "La Sapienza" of Rome*; [4] Department of Experimental Medicine, *State University of L'Aquila*

Key words: Hepatic stem cells, cholangiocytes, hepatic progenitor cells, liver regeneration

SUMMARY

As previously showed for the classical self renewing tissues (i.e. bone marrow, gut and skin), rapidly changing concepts about tissue stem cell biology identify the liver as a maturational lineage system capable to generate mature cells (hepatocytes and cholangiocytes) from a resident stem cells compartment localized near the so called Canals of Hering. At present liver transplantation is the only available therapy for end stage liver diseases and there is an ever increasing shortage of donor livers. Thus in the last decades, HPC has becoming the object of many researchers since HPC might offer a new therapeutic approach for controlling the evolution of chronic liver diseases. The aim of the present review is to update readers with the evolving concepts about hepatic stem cells biology, their characterization and isolation methods and finally their therapeutic potential.

DEFINITION/CLASSIFICATION

A stem cell is an undifferentiated cell capable of renewing itself as well as of generating one or more type of differentiated cells endlessly. Thus, stem cells have the potential to regenerate tissues and organs and can be classified according to their plasticity, i.e. the capacity to overcome genic repression, into:

– totipotent stem cells, are capable of generating germ cells and cells of all the three germ layers (mesoderm, endoderm and ectoderm layers) but they are also able to give raise to extraembryonic tissues (such as the supporting trophoblast) indispensable for the survival of the developing embryo.