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Gallbladder Stem/progenitor cells are able to repopulate and rescue the damaged liver in a experimental mouse model of liver cirrhosis

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The human biliary tree contains stem cells within peribiliary glands (Cardinale et al., 2011). Human Gallbladder contains stem/progenitors (hGSCs) located in mucosal crypts (Carpino et al., 2012). Our aim was to evaluate the capability of hGSCs to repopulate and rescue the damaged liver in a model of liver cirrhosis.

hGSCs were selected for Epithelial Cell Adhesion Molecule. Cirrhosis was induced by intraperitoneal injection, twice a week, of carbon tetrachloride for 7 weeks. hGSCs were injected into the liver via the spleen of normal or cirrhotic SCID mice. As controls, cirrhotic SCID mice were injected only with the medium or with mature human hepatocytes.

2 months after the injection, the necrotic areas were lower in mice treated with hGSCs in comparison with controls. In hGSCs-injected cirrhotic mice, the expression of the human antigens indicated that ≈10% of the host hepatocyte mass was represented by in vivo differentiated human hepatocytes derived from injected hGSCs. This value was significantly higher with respect to mice injected with human adult hepatocytes. The presence of human cells in murine livers was confirmed by in situ hybridization for human chromosomes. hGSCs injection dictated an improvement of serum liver biochemistry with a significant reduction of transaminases and an improvement of synthetic functions.

In this model, hGSC engraftment and differentiation determinate the improvement of histological liver damage and serum liver biochemistry. These data could open future perspectives for a role of gallbladder as a source of stem cells for liver regenerative medicine.

References

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[2] Carpino et al. (2012) Biliary tree stem/progenitor cells in glands of extrahepatic and intraheptic bile ducts: an anatomical in situ study yielding evidence of maturational lineages. J Anat 220: 186-199.

Key words
Stem cell, gallbladder, liver, cirrhosis.