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Liver Cells Can Dedifferentiate and Act as Progenitor Cells for Liver Growth

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Opinion

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Indeed, liver is the largest internal organ that performs major metabolic activities. Liver is a gland and performs both exocrine and endocrine functions. It also possesses the capacity to regenerate. The liver is the only organ that can grow back when part of it is damaged or removed surgically. That's why people are able to donate part of their liver to the patients suffering with serious disease like cirrhosis. Hepatocytes are the principal cell type in the liver and these along with biliary epithelial cells, are derived from the embryonic endoderm. Hepatocytes of injured liver act as stem cells that can proliferate and make up whole liver mass again was shown in a classical paper way back and defined "it is now defined as an orchestrated response induced by specific external stimuli and involving sequential changes in gene expression, growth factor production, and morphologic structure" Michalopoulos and De Frances [1]. Later, Michalopoulos [2] stressed that "Liver manages to restore any lost mass and adjust its size to that of the organism, while at the same time providing full support for body homeostasis during the entire regenerative process".

Since, liver being important organ, in the past many of the genes and molecular pathways that regulate liver functions were explored extensively [3]. In a series of papers we have analyzed various parameters of developing human liver. Hepatic diverticulum develops from ectodermal cells. From hepatic diverticulum to formation of adult liver many morphological and physiological changes takes place ontogeny of hepatocyte proliferation, glycogen storage capacity, and membrane function were studied [4-6]. During this development we also identified cell markers for example; epithelial cells are identified by keratin, embryonic liver cells by alpha feto protein, and adult liver cell by albumin [7]. Taking advantage of these specific cell markers, we performed in vitro experiments [8]. It was showed that adult rat hepatocyte seeded for cultures showed the presence of albumin, the marker protein for adult liver after 1 week of seeding. As the cultures aged, the cells start expressing alpha-foetoprotein and later keratin polypeptides 55 and 52 kD but ceased expressing albumin and alpha-foeto-protein. Enhanced expression of keratin polypeptides was confirmed by Western blot analysis in long term cultures [7]. This was shown for the first time that liver cells can dedifferentiate into its progenitor epithelial cell in culture media. Wang, et al. [9] concluded that hepatocytes are the liver cells that are responsible for the liver's ability to regenerate; they act as stem cells that can re-form liver tissue.

A possible mechanism for dedifferentiation of hepatocytes in culture is also worked out. Sen, et al. [10] that progenitor liver cells have receptors for proliferative hormone, the estrogen, and during differentiation of these cells these receptor protein is retain, in other words the adult liver cells also show the receptor protein. Therefore, they retain proliferative capacity from stem cell to fully developed and differentiated adult liver cell, the hepatocyte.

References

1. Michalopoulos GK, DeFrances MC (1997) Liver Regeneration Science 276(5309): 60-66.

2. Michalopoulos GK (2007) Liver regeneration. J Cell Physiol 213(2): 286-300.

3. Abdel Misih SRZ, Bloomston M (2010) Liver Anatomy. Surgical Clinics of North America 90(4): 643-653.

4. Devi BG, Habeebullah CM, Gupta PD (1993) Ontogeny of hepatocyte proliferation inhibitor activity during human liver development and its effect on cell proliferation in in vivo and in vitro studies Biochem. Cell Biol 71 (5-6): 241-247.

5. Devi BG, Habeebullah CM, Gupta PD (1992) Glycogen metabolism during human liver development. Biochem Int 28(2): 229-237.

6. Devi BG, Gupta PD, Habeebullah CM (1992) Changes in membrane fluidity during human liver development. Biochem int 28(1): 41-49.

7. Gupta PD, Bhonde RR (1992) Increased expression of keratin polypeptides in long term culture of adult rat hepatocytes. Cytobios 70(281): 123-130.

8. Tirnitz Parker JE, Tonkin JN, Knight B, Olynyk JK, Yeoh GC (2007) Isolation, culture and immortalisation of hepatic oval cells from adult mice fed a choline-deficient, ethionine-supplemented diet. Int J Biochem Cell Biol 39(12): 2226-2239.

9. Wang P, Liu T, Cong M, Wu X, Bai Y, et al. (2009) Expression of extracellular matrix genes in cultured hepatic oval cells: an origin of hepatic stellate cells through transforming growth factor beta? Liver Int 29(4): 575-584.

10. Sen KK, Gupta PD, Talwar GP (1975) Intracellular localization of estrogens in chick liver: Increase of the binding sites for the hormone on repeated treatment of the birds with the hormone. J Steroid Biochem 6(8): 1223-1227.