The changes of hepatocyte ploidy in cholestatic liver of rats

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Introduction. Numerous studies have shown that the liver regenerates under strictly regulated processes such as proliferation, hypertrophy and polyploidy. At the same time, recent studies have provided that liver regeneration does not always occur simultaneously with all three mechanisms. For example, it has been established that: In alimentary dyslipidemia, the mechanism of regeneration depends on duration hepatogenic ration and extent of damage of liver. In particular, it has been shown that tissue renewal at an early stage is mainly due to the growth of ploidy of liver cells (5); The increase in cell ploidy in response to trauma has also been described in the tissues of various mammalian organs (heart, liver, cornea). It follows that in some pathologies the liver is regenerated by quantitative changes of high-ploidy cells or by regulation of polyploidy.

The aim of this work was to study the changes of hepatocyte ploidy on various terms after common bile duct ligation.

Materials and methods. Experiments were carried out on adult white rats (130-150g). Model of cholestatic liver with common bile duct ligation was used. Animals of the first task were divided into three group: I control intact animals, II – sham operated animals, III-cholestatic animals. Nuclear DNA content was detected by using of computer software ImageJ 1.36 b. Student's t test was used for comparison among the different groups. $P<0.05$ was considered statistically significant.

Results. It has been detected that on the 24^{th} hours after common bile duct ligation (CBDL) number of diploid cells (2C) is increased by 20%. At the same time number of tetraploid cells (4c and 2c×2) is significantly decreased. Presumably, binuclear hepatocytes are divided into simple divisions and form two mononuclear hepatocytes. At 48^{th} hours of cholestasis, the number of high-ploidy cells is dramatically increased. In particular, the number of 4C cells increases and at this same time, mono- and binuclear octaploid (8C, 4C× 2) cells appear. At 72^{nd} hours of cholestasis the number of high ploidy cells (4C, 2C×2, 8C) is not changed. On the 96^{th} hours tetra (4C) and octaploid (8c, 4c×2) cells number is increased.

Conclusions. To destructive processes initiated by common bile duct ligation at the early stage liver responds by quantitative change of high-ploidy parenchymal cells, i.e by regulation of polyploidization.