Study of MMSC homing in rats with livestock-burned

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Introduction

Nowadays the present time, it is necessary to know the fundamental concepts of the interaction of stem cells (SC, MMSC) with the self-sustaining, self-renewing animals' and humans' macroorganisms, and to have necessary knowledge about mobilization abilities of stem cells with their combined participation in a typical pathological process. The stem cells (MMSC) are pluripotency, that is the ability to organize an new pool of differentiated cells with heterogeneous properties.

Aim of the study

The aim of this research was to study the directed movement (homing) of multipotent mesenchymal stromal cells on mature laboratory animals making various ways of administration under physiological conditions and liver damage (resection). To achieve the goal it is necessary to solve the following tasks: 1. To study the homing of MMSC with intraperitoneal and hepatic artery's administration, the portal and tail veins in physiological conditions; 2. To study the homing of MMSC with intraperitoneal and hepatic artery's administration, portal and tail veins in laboratory animals with resected liver.

Materials and methods

White aging rats who are weighing 300-400 grams were used as laboratory animals. Keeping, nutrition, care of the animals and taking out them from the experiment was carried out in accordance with the requirements of the European convention for the protection of vertebrate animals using for experimental and other scientific purposes (Strasbourg, 1986). The general scientific (analysis, synthesis, comparison, generalization, experiment) and special methods were used during this research. Among the special methods were applied: 1. The ether anesthesia method wherein cotton wool soaked with a solution of 95% ether anesthesia and the rat were placed in a glass container. 2. The midline laparotomy method. 3. The technique of labThe cell culture of MMSC was obtained from the chorion of laboratory animals. 4. The introduction of MMSC labeled with acridine orange was administered intravenously, intraperitoneally, into the hepatic artery, into the portal vein at a dose of 4 million. kl. to kilogram of body weight. 5. The cell suspension was filtered through a 70 μm filter (Millipore, USA) for removing debris. The suspension was applied to a lympholite-M solution (StemCell Technologies, USA) in the ratio 1: 1 for isolation the mononuclear fraction, and centrifuged at 1000 g for 20 minutes. 6. The liver resection method in which surgical intervention consisted of applying a ligature under the left lobe of the liver, its bandaging and excision of the liver fraction distal to the site of application.

Results

The data was processed automatically using the Excel 2017 software. The ratio of labeled cells to the total number of cells was calculated in physiological conditions and in the conditions of the resected liver. The largest number of cells (31%) was detected by insertion into the tail vein (Figure 1). Further, the distribution tendency of cells along the organs (1, 3, 6 hours) injected into the tail vein (Fig. 2) under physiological conditions and with a resected liver.

Conclusion

1. With intravascular introduction of multipotent mesenchymal stromal cells, the difference in their detection is insignificant (27%, 28%, 31%); 2. Under physiological conditions, the concentration of cells in the peripheral blood and kidneys is decreasing (Figure 1). 3. After the determination of stem cells under the conditions of resection, the greatest concentration of cells in the liver was found, which makes it possible to talk about their directed movement (homing). 4. There was a tendency to decrease the concentration of stem cells in 1, 3 and 6 hours in peripheral blood.