

Stereological Evaluation of Liver of Rabbit Fetuses After Transplantation of Human Wharton's Jelly-Derived Mesenchymal Stromal/Stem Cells

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Abstract : Background: In-utero xenotransplantation of stem cells in abnormal fetuses effectively treats several genetic illnesses. Objective: The current research aimed to evaluate structural and morphological alterations in the liver of rabbit fetuses following xenotransplantation of human Wharton's jelly-derived mesenchymal stromal cells (hWJ-MSCs) using a stereological technique. Methods: hWJ-MSCs were isolated from the human umbilical cord, and their authenticity was established by flow cytometry and differentiation. At gestational day 14, the rabbits were anesthetized, and hWJ-MSCs were injected into the uteri of 24 fetuses. Twenty-two fetuses were born successfully. Ten rabbit liver specimens were prepared from injected fetuses, including eight rabbits on day three following birth and two rabbits on the 21st post-natal day. The non-injected fetuses were considered positive controls. The livers of the control and hWJ-MSCs-treated rabbits were fixed, processed, stained, and examined through stereological approaches. Results: In the hWJ-MSCs-treated group, the mean liver weight and volume increased by 42% and 78% compared to the control group. The total volume of the hepatocytes increased by 63% and that of sinusoids by threefold in the treated rabbits. The total volume of the central veins increased by 70%. The total number corresponding to hepatocytes in the experimental group increased by 112% compared to the rabbits in the control. The total volume of the hepatocyte nuclei in the experimental group increased by 117% compared to the rabbits in the control. Conclusion: After xenotransplantation of human MSCs, host tissue microenvironments (here, the rabbit liver) were altered, and these included quantitative factors corresponding to the liver tissue and hepatocyte morphometric indices.

Keywords : xenotransplantation, mesenchymal stromal, stem cell, Wharton 's jelly, liver

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