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Isolated pancreatic islets of the rat: an immunohistochemical and morphometric study.

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Abstract

Although there is a recent increase in the use of the isolated pancreatic islets of the rat in the transplantation and functional studies, there has been no detailed quantitative assessment on the size and cellular constituents of islets after the isolation procedure. The present work was undertaken to study the size classes of the isolated islets and the morphometry of their cellular populations. Islets of the rat pancreas were isolated by using the intraductal collagenase digestion technique, the most commonly used procedure for the isolation of pancreatic islets. Different endocrine cells of the isolated islets were stained by immunoperoxidase staining techniques. The distribution of the cellular constituents of the isolated islets was similar to that of the intact islets of the normal pancreas; A, D, and PP cells were peripherally arranged around the centrally located B cells. However, morphometric quantitative study showed that the percent volume and percent number of A, D, and PP cells of the isolated islets were lower than those of the corresponding intact ones. Further, the mean true diameter of the isolated islets was lower than that of the intact ones. These data indicate loss of islet cells during the process of isolation. Most of the lost cells were from the periphery of islets. This may provide an explanation for the incomplete metabolic control and recurrence of hyperglycemia encountered after isolated islet transplantation in the treatment of diabetes mellitus. It seems that further refinements of the isolation techniques are necessary to obtain islet tissue with total cellular integrity, before a complete success in transplantation could be achieved.