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Population Dynamics of MafA-Positive Cells During Ontogeny of Human Pancreas

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Abstract

© 2016, Springer Science+Business Media New York.Diverse transcription factors influencing cell differentiation are often chosen as markers of β cell progenitors. One of these transcription factors is MafA, which according to data in literature activates the expression of insulin gene in β cells. Other data support the hypothesis that MafA is required solely for the regulation of insulin secretion by β cells of adult islets and is not involved in the development of islet cells. In this paper, we study the role of MafA through both examination of human pancreas ontogeny and comparison of these data with dynamic changes in the population of insulin-positive and glucagon-positive cells. The aim of this research was the immunohistochemical analysis of MafA, insulin, and glucagon expression during human pancreas ontogeny. The research was conducted on whole embryos and isolated human fetal organs, obtained as a result of either miscarriage or legal medical abortion with voluntary consent of patients, and also on autopsy material from infant and adult human pancreas. As a result of this study, it was found that, during the ontogeny of human pancreas, the first MafA-positive cells appear in the islets at 12.5 weeks of gestation, that is, later than both insulin-positive cells (11.5 weeks of gestation) and glucagon-positive cells (8.5 weeks of gestation). No MafA-positive cells were found in the epithelium of pancreatic ducts. The number of MafA-positive cells in the islets increases during pancreatic organogenesis. The results of our research do not allow us to regard MafA as a marker of undifferentiated progenitors of islet cells. Based on this, we believe that the results obtained in this study are a supplementary contribution to the hypothesis that relates MafA to the markers of adult β cells.

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Keywords

Differentiation of β cells, MafA, Pancreatic organogenesis

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