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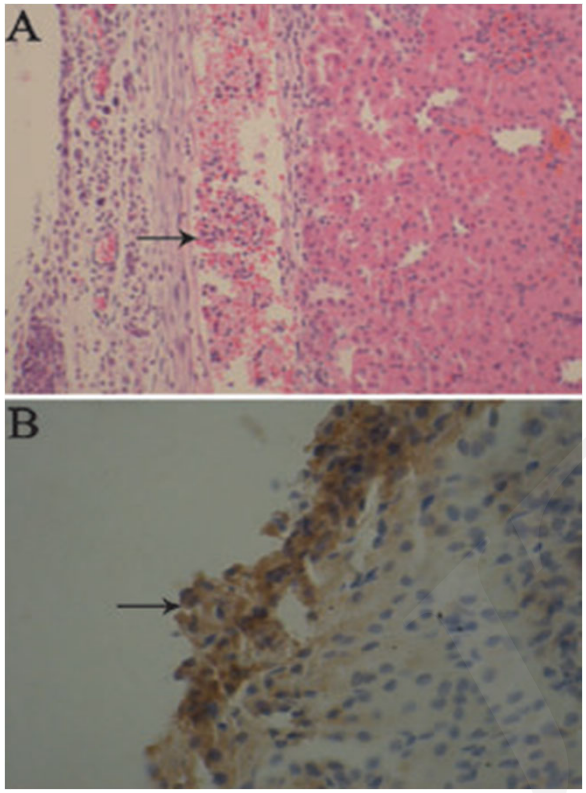
Treatment of diabetes with encapsulated pig islets: an update on current developments

Key words: **Encapsulation, Pig, Islet, Xenotransplantation, Diabetes mellitus**

Research Summary

This article provides a comprehensive review of xenotransplantation of encapsulated pig islets for the treatment of T1DM, including current research findings and suggestions for future studies



The arrows intact islet cells.
A.HE stain; B.pig-insulin expression

- **Sources of pig islets**
- **Encapsulation approaches:**
  - **1) intravascular devices**
  - **2) extravascular macrocapsules**
  - **3) extravascular microcapsules**
  - **4) conformal coating**
- **Implantation sites**

Pictures adapted from: Chao, Z., Liang, Y., Haitao, Z., Min, T., Xiaogang Z., Bo, W., 2011. Porcine CTLA4-Ig prolong islet xenografts in rats by downregulating the direct pathway of T-cell activation. *xenotransplantation*, 18(1):40-45. [doi: 10.1111/j.1399-3089.2011.00627.x]

Research Summary

- **Xenotransplantation of encapsulated pig islets may overcome the two major hurdles of conventional islet transplantation: limited human donor supply and the extensive use of immunesuppressants.**

- **Conformal coating of micron and submicron scale on individual islets or cell aggregates represents a promising direction.**

- **Comprehensive tables are created to summarize the current knowledge about pig islet encapsulation**

Table 1 | **Preclinical and clinical studies of xenotransplantation of encapsulated pig islets**

Table 2 | **Device configuration for encapsulation of pig islets**