

論文 / 著書情報  
Article / Book Information

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| 種別(和文)            | 要約   |
| Type(English)     | Outline  |

(博士課程)  
Doctoral Program

# 論文要約

THESIS OUTLINE

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| 系・コース：<br>Department of Graduate major in | 生命理工学<br>生命理工学 | 系<br>コース | 申請学位（専攻分野）：<br>Academic Degree Requested | 博士<br>Doctor of | （工学） |
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## 要約

Thesis Outline

### Chapter 1: Literature research

Chapter 1 summaries and compares the relative research with this research. The research aim was also described in this chapter.

### Chapter 2: Atelocollagen sponge is a promising device for subcutaneous Transplantation

Chapter 2 describes the experimental protocol used to tailor and optimize the shape of atelocollagen sponges for subcutaneous islet cell transplantation. Here, I discuss the various methods tested to introduce islet cells into the sponge, the selection process for the most effective technique, and compare the cell viability of islet cells in the sponge to naked islet cells using a Live/Dead assay.

### Chapter 3: Angiogenesis stimulation paved the way for subcutaneous transplantation

Chapter 3 discusses the critical role of angiogenesis in improving the engraftment and function of transplanted islet cells. The conditions for inducing angiogenesis using bFGF and gelatin sponges are discussed, the results are evaluated, and the methodology is determined.

### Chapter 4: Reversal of hyperglycemia by subcutaneous islet transplantation in BALB/c mice

Chapter 4 reports the results of angiogenesis stimulation experiments performed on BALB/c mice and the generation of a diabetes model by STZ induction. It provides an in-depth analysis of the effects of enhanced angiogenesis on the efficacy of islet transplantation, supported by non-fasting glucose levels, non-fasting body weights, glucose tolerance tests, and immunohistochemical analysis.

Chapter 5: Reversal of hyperglycemia by islet transplantation in Rag-2/Jak3 Double-Deficient BALB/c (BRJ) mice

Chapter 5 focuses on *Rag-2/Jak3* double-deficient BALB/c (BRJ) mice and investigates the use of the developed subcutaneous transplantation platform in immunodeficient models. It evaluates the effectiveness of this approach in models that are less susceptible to immune rejection and highlights the potential for broader application in future cell therapy with stem cell-derived  $\beta$  cells.

Chapter 6: Conclusion, Discussion, and Future Directions

The final chapter summarizes the results across all experiments and concludes that the new method of subcutaneous transplantation not only alleviates the challenges associated with traditional transplantation methods but also opens new avenues for future research. It recommends further experiments to optimize the protocol and explore its applicability in other settings and suggests possible improvements and future research needed to advance the field of diabetes treatment.