Enzyme Selection for Islet Isolation: Experiences in Three Different Species

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Effect of Neutral Protease Concentration on Human Islet Yield

![Bar graph showing the effect of neutral protease concentration on human islet yield.]

- **Pre Ficoll (n=10):**
  - 0.6 DMC-U/g NP: [Value]
  - 1.0 DMC-U/g NP: [Value]

- **Post Ficoll (n=10):**
  - 0.6 DMC-U/g NP: [Value]
  - 1.0 DMC-U/g NP: [Value]
Effect of Neutral Protease Concentration on Human Islet Purity

![Diagram showing the effect of neutral protease concentration on human islet purity. The diagram compares purity and trapped islets at two different protease concentrations: 0.6 DMC-U/g NP and 1.0 DMC-U/g NP. The purity and trapped islets are represented with bars, and the purity is shown on a percentage scale, while the trapped islets are shown on a count scale. The diagram includes error bars indicating the variability in the data. A star (*) indicates a significant difference between the two concentrations.](image-url)
Influence of Neutral Protease Concentration on Human Islet Viability

![Graph showing the influence of neutral protease concentration on islet viability. The x-axis represents neutral protease activity (DMC-U/g) with two levels: 0.6 (n=10) and 1.0 (n=10). The y-axis represents islet viability (%). The graph indicates a significant difference (*) between the two levels.]
Effect of Neutral Protease Concentration on Human Islet In Vitro Function

![Graph showing the effect of neutral protease concentration on human islet function. The x-axis represents neutral protease activity (DMC-U/g), and the y-axis represents stimulation index. There are two bars: one for 0.6 (n=10) with a stimulation index of approximately 5.0 and another for 1.0 (n=10) with a stimulation index of approximately 2.0. The bars are accompanied by error bars indicating variability. A significant difference is indicated by asterisks (**).]
Influence of Neutral Protease Activity on Islet Recovery after 3 day-Culture

- 0.6 DMC-U/g NP (n=5)
- 1.0 DMC-U/g NP (n=5)

* indicates statistical significance.
Influence of Collagenase Activity on Rat Islet Yield

![Graph showing the influence of collagenase activity on rat islet yield.](image)

- **20 PZ-U (1.5)**: 2200 islet yield with n=7
- **40 PZ-U (1.5)**: 1800 islet yield with n=4

**Collagenase Activity (Class II/I Ratio)**

- **Islet Yield (IEQ/Pancreas)**
- **Y-axis range**: 0 to 2200
Influence of Collagenase Activity on Viability of Rat Islets

![Graph showing influence of collagenase activity on islet viability. The graph compares islet viability between 20 and 40 PZ-U (1.5) of collagenase activity. The data shows a similar islet viability percentage for both conditions, indicating minimal effect of collagenase activity on islet viability.](image-url)
Influence of Collagenase Activity on Rat Islet In Vitro Function
Influence of Collagenase Activity on Pig Islet Yield

[Bar graph showing islet yield (IEQ/g pancreas) pre and post Ficoll with two conditions: 4 PZ-U/g (n=6) and 8 PZ-U/g (n=6). The graph indicates a higher yield post Ficoll for both conditions.]
Influence of Collagenase Activity on Mitochondrial Viability of Pig Islets

![Graph showing the influence of collagenase activity on mitochondrial viability of pig islets. The x-axis represents collagenase activity (4 PZ-U/g, 8 PZ-U/g) and the y-axis represents formazan production/mg absorbance (490 nm). The graph indicates a significant difference in mitochondrial viability between the two conditions.]
Influence of Collagenase Activity on Pig Islet In Vitro Function

[Graph showing the influence of collagenase activity on insulin release in pig islets under different glucose concentrations (2.8 mM and 20 mM) and collagenase activity levels (4 PZ-U and 8 PZ-U)].
Influence of Neutral Protease Activity on Efficiency of Different Collagenase Class II over I Ratios (I)
Influence of Neutral Protease Activity on Efficiency of Different Collagenase Class II over I Ratios (II)
Summary and Conclusion

Increasing NP activity:
- enhances enzymatic dissociation of human pancreatic tissue
- improves release of human islets from acinar tissue
- reduces postficoll purity reflecting acinar tissue damage
- deteriorates islet in vitro function and islet viability
- reduces islet survival and viability after culture
- the full efficiency of a certain class II/I ratio is reached only by minimizing neutral protease activity
- In contrast, overdosing purified collagenase has no detrimental effect on islet functional and morphological integrity.

NP activity has to be carefully adjusted within a small range.