Lin28a expression protects against streptozotocin-induced β-cell destruction and prevents diabetes in mice

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Lin28a is a highly conserved RNA-binding protein that represses the miRNA let-7. Lin28a is highly expressed in embryonic stem cells (ESCs) and is involved in ESC differentiation. Lin28a also functions as a reprogramming factor for induced pluripotent stem (iPS) cells. A previous study showed that Lin28a modulates glucose metabolism, insulin sensitivity, and promotes cancer cell proliferation. Lin28a overexpression enhances cell proliferation and facilitates glucose transport in the mouse pancreatic β-cell line Min6. To investigate the effect of Lin28a expression on β-cells, cells were treated with the appropriate streptozotocin (STZ) concentrations. Pancreatic β-cells overexpressing Lin28a showed higher survival than mock cells. Furthermore, Lin28a was found to promote proliferation and inhibit apoptosis in STZ-treated cells. In addition, Lin28a-overexpressing cells show enhanced glucose transport. Lin28a inhibits let-7 expression and activates the PI3K/Akt signaling pathway. In addition, this study aimed to identify the relationship between Lin28a and type 1 diabetes *in vivo* using Lin28a-overexpressing transgenic (Tg) mice. Lin28a Tg mice showed enhanced glucose transport and increased insulin secretion. We performed STZ experiments to mimic diabetes *in vivo*. Lin28a-overexpressing mice were found to have lower blood glucose levels and higher survival following STZ treatment of pancreatic β-cells. The islet of Langerhans in Lin28a-overexpressing mice secretes more insulin than in WT mice when subjected to STZ treatment. In conclusion, Lin28a expression protects against STZ-induced pancreatic β-cell destruction and promotes cell proliferation in pancreatic β-cells. The results indicate that Lin28a improves the function of the islet of Langerhans in mice.

Speaker Biography

Jain Jeong is currently studying for PhD at Kyungpook National University in Korea. His current laboratory research work is focusing on elucidating gene function and their relation to diseases using various transgenic mice models.

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