Background and Purpose

- Previously, we demonstrated that miR-10b-5p-deficiency in cells expressing the receptor tyrosine kinase KIT leads to the degeneration of β cells in the pancreas and interstiti al cells of the Capil in the gastrointestinal tract. Injection of a synthesized miR-10b-5p mimic into mice with diabetes an d gastroparesis lowered and maintained healthy blood glucose levels, improved gastrointestinal functions, and reversed the gastroparesis phenotype.

- We also found that the KO effect of miR-10b in mice is sex-dependent. Male miR-10b KO mice show profound effects and develop diabetes but female KO mice have little change occur.

- Interestingly, there are more male patients with diabetes before age 45, with this pattern being reversed after age 45, with more female patients showing diabetic phenotypes.

- The female hormone estrogen protects rodent pancreatic β cells in vivo against multiple pro-apoptotic insults and this protection is conserved in human islets.

- This gender and age dependency on the formation of diabetes suggests that menopausal estrogen hormone therapy may reduce the incidence of T2D in women and protect β cell function in post-menopausal women.

- The purpose of this study is to investigate the expression pattern and the difference between male and female in the H/A ratio, glucose, C-peptide, insulin, miR-10a and miR-10b in Korean Diabetes Mellitus Patients and healthy controls.

Material and Method

- Biobank in Wonkwang University Hospital
- DM patients (M=62, F=38), Healthy (M=10, F=10)
- Recruiting Volunteer
- Healthy (M=9, F=11)
- ELISA: C-peptide and insulin
- qPCR: miR-10ab expression
- Glucose: Blood chemistry

Results

Summary

1) In the ovariectomy model, β-estradiol was significantly reduced concomitant with the lesser expression of miR-10a and 10b compared to control.

2) There were significant increases in the plasma concentration of HbA1c, glucose, C-peptide, and insulin from the plasma in both male and female Korean Diabetes Mellitus Patients compared to each healthy control.

3) There were significant decreases in the relative expression of miR-10a and miR-10b between male and female in the patients as well as in the healthy control.

4) Relative expression of miR-10a and miR-10b was significantly higher in the female healthy than male healthy control. Among the female healthy controls, over the age of 50 years old showed the higher expression of miR-10a and miR-10b than below the 50 years old.

Conclusion

From our data, we suggest that there are significant differences in the expression of miR-10a and miR-10b between female and male as well as between before menopause and postmenopause women. Therefore, diabetes might be protected by estrogen via miR-10a and miR-10b, and in situations which estrogen decreases, such as menopause, these protective effects are lowered with simultaneous decrease of miR-10a and miR-10b.