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Novel roles of miR-199b in regulating fat and bone metabolism

Aldona Karaczyn
Maine Medical Center

Victoria DeMambro
Maine Medical Center

Jennifer Daruszka
Maine Medical Center

Patrizia Roy
Maine Medical Center

Clifford Rosen
Maine Medical Center

See next page for additional authors

Authors
Aldona Karaczyn, Victoria DeMambro, Jennifer Daruszka, Patrizia Roy, Clifford Rosen, and Calvin Vary

Novel roles of miR-199b in regulating fat and bone metabolism

Aldona Karaczyn[1], Victoria DeMambro[1], Jennifer Daruszka[1], J. Patrizia Roy[1], Pradeep Sathyanarayana[2], Clifford Rosen[1], Calvin Vary[1]

[1] Maine Medical Center Research Institute, Scarborough ME
[2] IDEXX, Westbrook, ME

i. Public Health Problem:

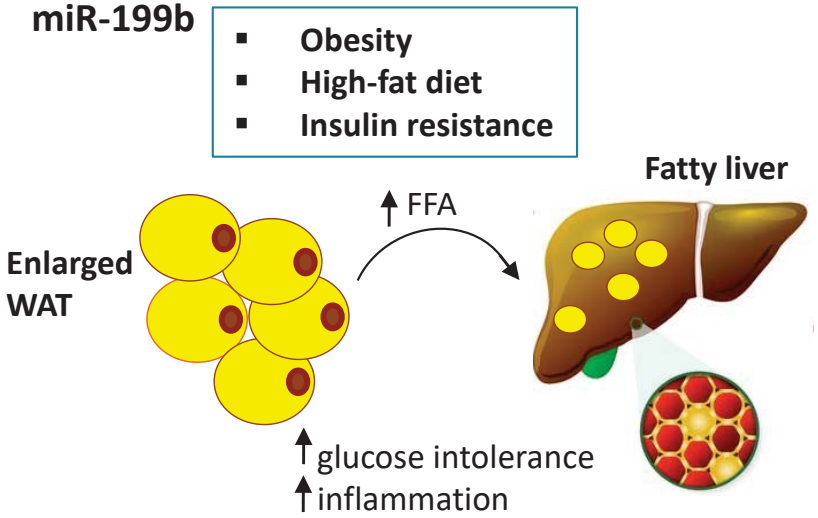
- The incidence of obesity has reached epidemic proportions worldwide and has contributed to an increase in the risk of numerous chronic disorders → type 2 diabetes, liver pathologies, dyslipidemia, and cardiovascular diseases.
- Obesity can have negative effects on bone remodeling → reduced mineral density → osteoporosis.
- Imbalance between food intake and energy expenditure → obesity → accumulation of fat mass and energy storage in white adipose tissue (WAT).

ii. Objectives:

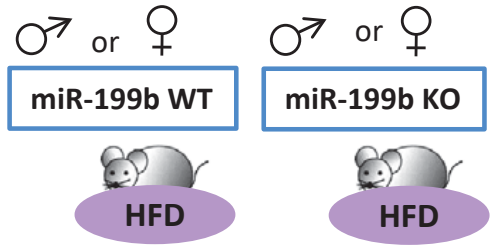
- During obesity overworked fat cells reach their storage capacity; this leads to the deleterious accumulation of lipids in the liver, skeletal muscle, pancreas, and heart.
- MicroRNA 199b is strongly elevated in low calorie diet-responders in obese individuals, which correlated with weight loss → gap in our understanding whether miR-199b regulates the components of metabolic homeostasis.

iii. Hypothesis:

- MicroRNA 199b controls susceptibility of abdominal adipose tissue accumulation and development of obesity

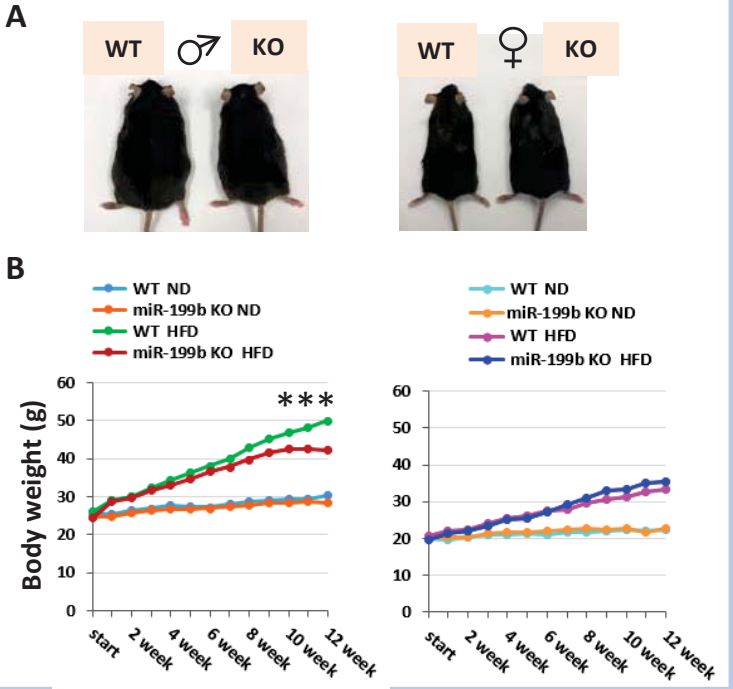


1. Study model and strategy

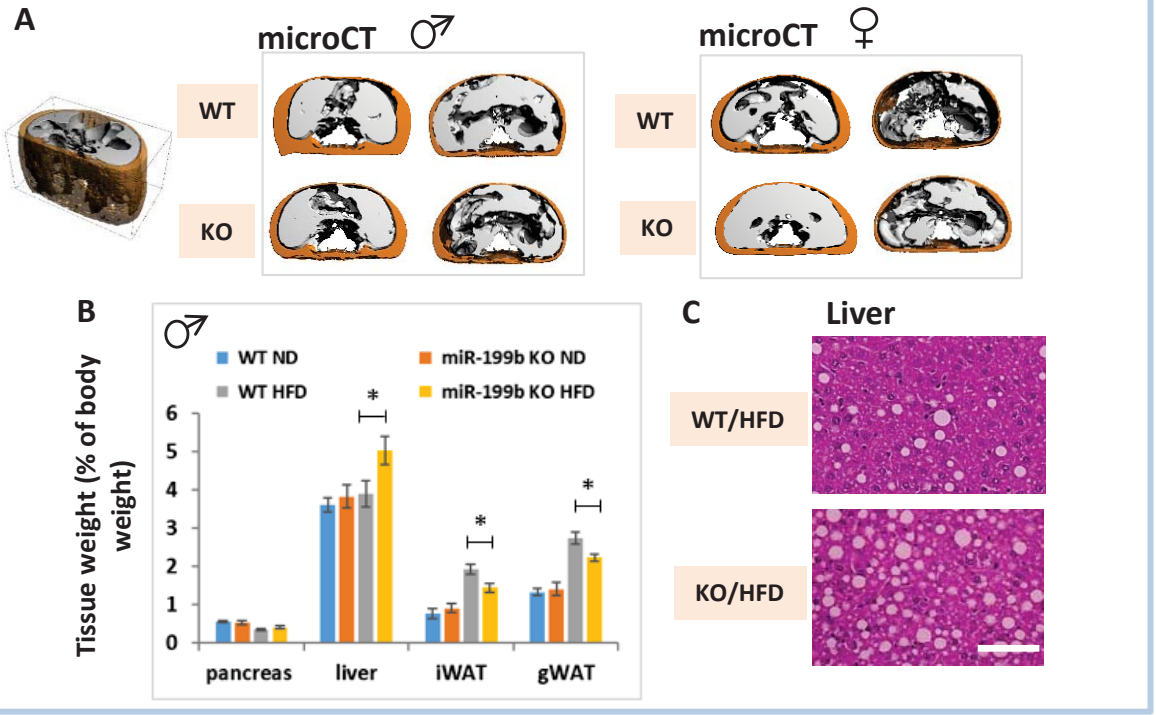


- body weight, tissue weight
- glucose and insulin tolerance tests
- abdominal adiposity in vivo imaging
- histology

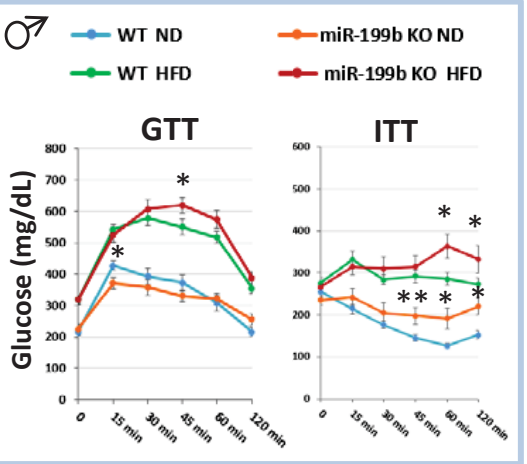
2. Results: Loss of miR-199 reduces body weight in HFD-induced obesity in male mice



3. Results: Loss of miR-199 differentially regulates WAT adipose tissue accumulation in HFD-induced obesity and leads to defects in liver



4. Results: Loss of miR-199 impairs glucose homeostasis



5. Conclusions

- Loss of miR-199b reduces WAT in HFD-induced obesity in male mice,
- Suppression of miR-199b impairs glucose tolerance and insulin sensitivity,
- Loss of miR-199b leads to liver steatosis,
- miR-199b differentially affects fat metabolism in males and females in response to HFD.