Unilateral nephrectomy and salt loading differentially alter glomerular filtration rate in the hypertensive, obese, type 2 diabetic SDT fatty rat model of diabetic nephropathy

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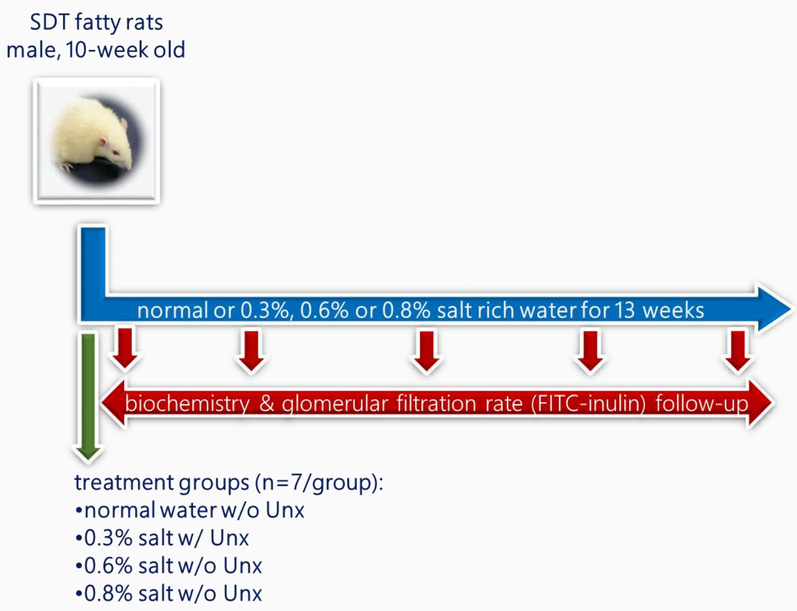
BACKGROUND:

Evaluation of drugs targeting diabetic nephropathy (DN) requires diabetic animal models developing renal complications and alteration of glomerular filtration rate (GFR) in a short period of time. These models should exhibit hyperfiltration followed by a >50% GFR decline. The hypertensive, obese, Spontaneously Diabetic Torii (SDT) fatty rat develops kidney lesions and may serve as a relevant model for DN. To promote alteration of GFR, we here evaluated the effects of unilateral nephrectomy (Unx) and salt loading in SDT fatty rats.

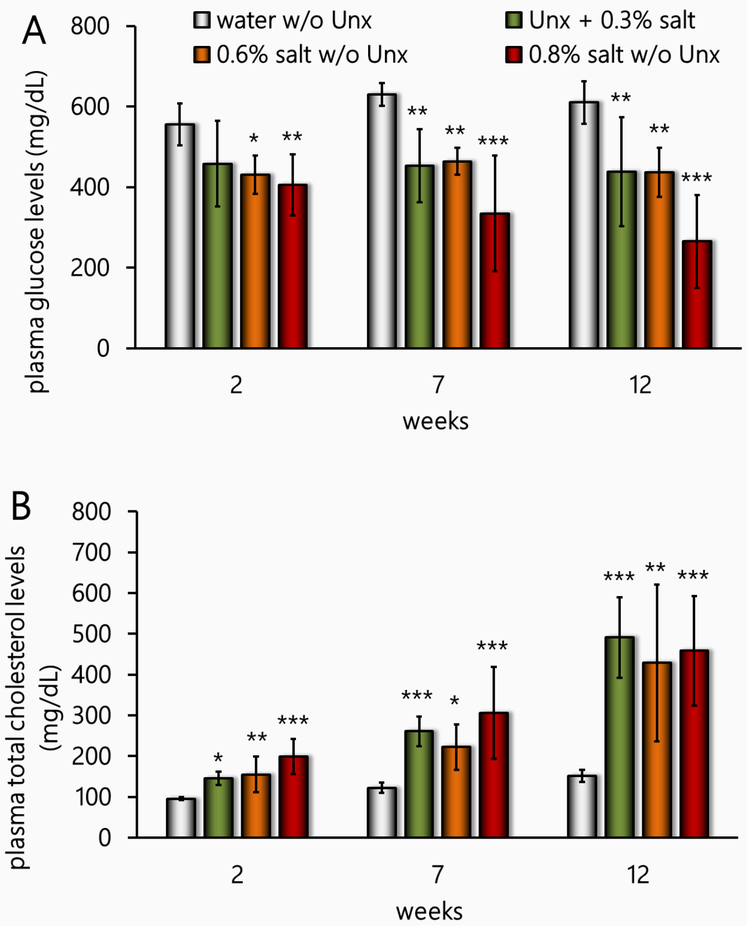
METHODS:

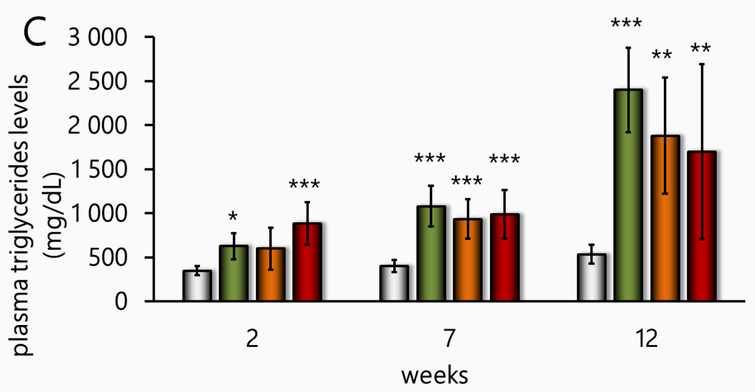
10-week old, male SDT fatty rats were included into 4 treatment groups (n=7/group): 1) normal water without Unx, 2) 0.3% salt water with Unx, 3) 0.6% salt water without Unx or 4) 0.8% salt water without Unx for 13 weeks. Plasma glucose, cholesterol, and triglycerides levels were measured using colorimetric assay kits. Glomerular Filtration rate was measured by i.v. injection of FITC-inulin. Data are shown as mean ± SD.



RESULTS:

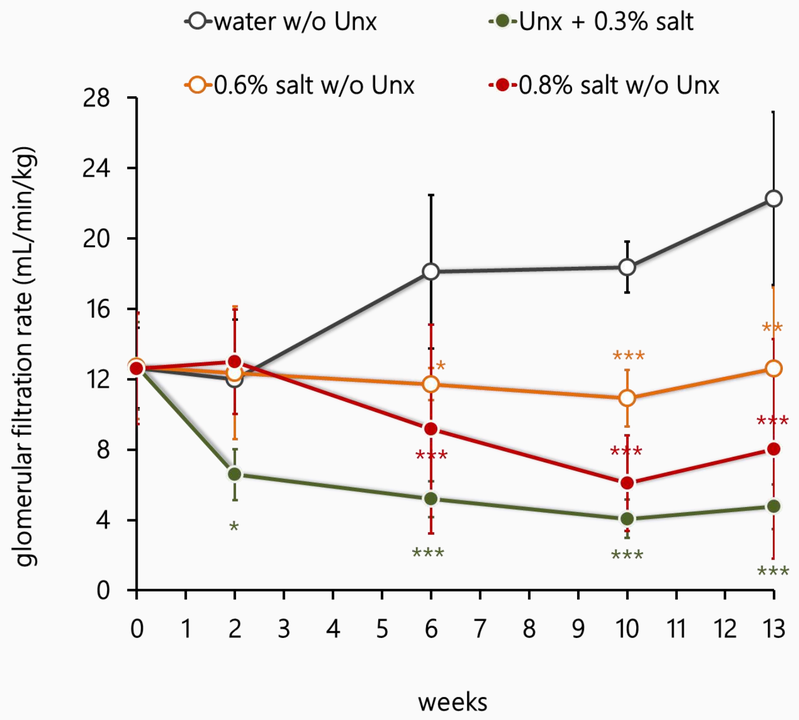
1 Salt supplementation slightly attenuates hyperglycemia, but favors dyslipidemia in SDT fatty rats





Non-fasting blood glucose levels (A), plasma total cholesterol (B) and triglycerides (C) levels during the experimental period.
**p<0.05, **p<0.01 and ***p<0.001 vs. vehicle*

2 Salt supplementation and unilateral nephrectomy differentially alter glomerular filtration rate in SDT fatty rats



Glomerular filtration rate measured by FITC-inulin injection during the experimental period.
**p<0.05, **p<0.01 and ***p<0.001 vs. vehicle*

CONCLUSION

- In the SDT fatty rat, Unx and salt loading have limited effect on diabetic state, while it favors induction of dyslipidemia and differentially alter GFR.
- Depending on the experimental setting, this rat model should be helpful to evaluate the effects of drugs on hyperfiltration and GFR decline for the treatment of DN.