The Uni-Nephrectomized SD T fatty Rat, a novel Type 2 diabetic model of Diabetic Nephropathy, develops features of diabetic retinopathy over 10 weeks.

**PURPOSE:**

Animal models of spontaneous diabetes are still needed to mimic human diabetic retinopathy. We recently developed a novel model of diabetic nephropathy using the uni-nephrectomized Spontaneously Diabetic Torii (SDT) fatty rat. Fed a salt-rich diet, this hypertensive/obese/type 2 diabetic rat develops advanced renal glomerulosclerosis, inflammation and fibrosis, and a >50% glomerular filtration rate decline within 10 weeks. Here we investigated whether this rat model would also develop features of diabetic retinopathy.

**METHODS:**

Two groups of 6-week-old, male Sprague Dawley (SD) control rats and SDT fatty rats (n=10 per group) underwent unilateral nephrectomy. After a 1-week recovery period, rats were fed for 10 weeks a chow diet with 0.3% salt in drinking water (i.e. from 7 weeks to 17 weeks of age). Diabetic retinopathy was evaluated in terms of: i) retinal function by electroretinography and oscillatory potentials. ii) integrity of blood-retinal barrier by albumin-Evans blue complex leakage, iii) microscopy histopathologic studies by glial fibrillary acidic protein IHC.

**RESULTS:**

SDT fatty rats under 0.3% salt exhibit obese and diabetic phenotype after unilateral nephrectomy.

- **Electroretinography demonstrates retinal neurologic dysfunction in Uni SD T fatty rats from 12 weeks of age**

A-wave (panel A; photoreceptor response) and B-wave (panel B; inner retinal cells activity) during a standard scotopic ERG recording of a bright white flash (0 log cd/m2). Amplitude (panel C) and implicit times (panel D) of the oscillatory potentials (OP) reflect inner retinal function (extracted from scotopic responses). **p<0.05 and ***p<0.001 vs. Uni SD control**.

- **Unx SD T fatty rats show reactive gliosis in retina at 17 weeks of age**

**CONCLUSION**

- Uni-nephrectomized SD T fatty rats develop features of diabetic retinopathy in parallel with diabetic nephropathy.
- Our original data set suggests that this rat model is suitable to evaluate the effects of drugs on these type 2 diabetes co-morbidities.