



# Diabetic nephropathy in db/db mice

## AN *IN VIVO* MODEL FOR NEPHROPATHY INDUCED BY TYPE 2 DIABETES

### Model

Diabetic nephropathy (DN) is a major kidney-related complication of type 1 and type 2 diabetes. DN is an irreversible progressive chronic disease characterized by: microalbuminuria and hyperfiltration (increased glomerular filtration rate; GFR) in the early phase, glomerular hypertrophy and mesangial matrix expansion, proteinuria and renal fibrosis, and decreased GFR and renal failure in the end-stage. DN is accounting for millions of deaths worldwide. Db/db mice have a mutation deletion of the leptin receptor and an underlying genetic background that is susceptible to diabetic complications such as nephropathy.

### Species

Db/db mice (type 2 diabetes) and db/m mice (controls)

### Interest

Db/db mice represent a model of type 2 diabetes leading to the development of DN. It is a good model of early to moderately advanced changes in human DN.

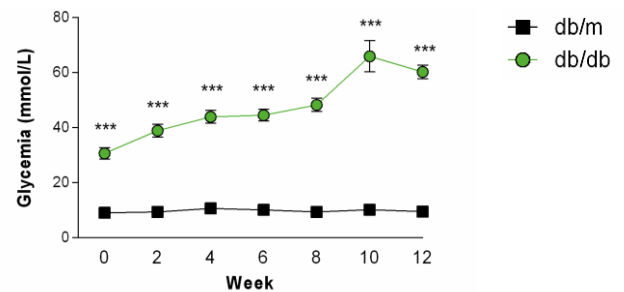
### Model Description

- Standard protocol duration: up to 12 weeks
- Every other week blood and urine collections
- Pathophysiological features: type 2 diabetes, impaired renal function and glomerular sclerosis

### Evaluated Parameters

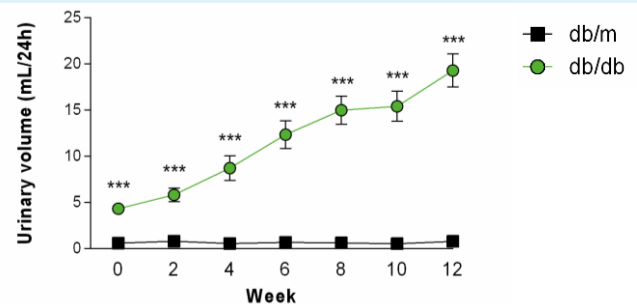
- Body and kidney weight
- Food and water intake
- Voided volume
- Metabolic changes: glycemia and plasma fructosamine
- Renal function:
  - Quantification of albuminuria and proteinuria
  - Biochemical dosage of plasma and urinary creatinine and urea
  - Estimated and transdermal Glomerular Filtration Rate (GFR).
- Glomerular sclerosis: histological analysis of glomerular matrix expansion by Periodic Acid Schiff (PAS) staining

#### Hyperglycemia in db/db mice



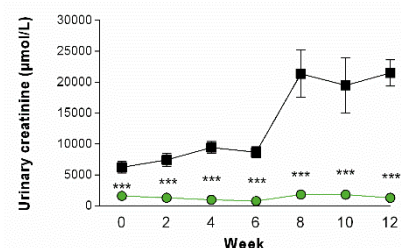
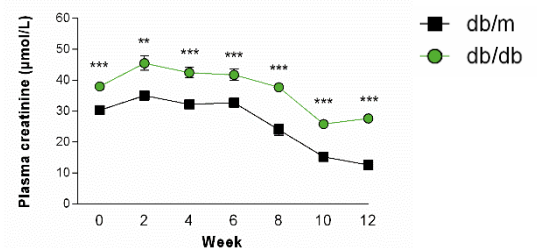
\*P<0.05 and \*\*\*P<0.001 (n=10/group)

#### Polyuria in db/db mice



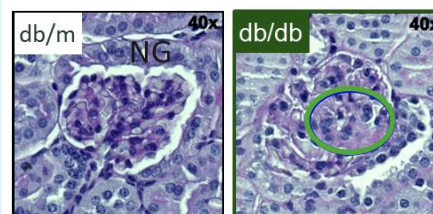
\*P<0.05, \*\*P<0.01 and \*\*\*P<0.001 (n=3-10/group)

#### Impaired renal function in db/db mice



\*\*P<0.01 and \*\*\*P<0.001 (n=9-10/group)

#### Glomerulosclerosis in db/db mice (week 12)



PAS staining (x40)

NG: Normal glomerulus,  
Circle: More extensive matrix expansion with presence of enlarged epithelial cells.