

# Diabetic nephropathy in STZ rats

## AN *IN VIVO* MODEL FOR NEPHROPATHY INDUCED BY TYPE 1 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 and by glomerular hypertrophy, mesangial matrix expansion, proteinuria, renal fibrosis, decreased GFR and renal failure in the end-stage. DN is accounting for millions of deaths worldwide.

Streptozotocin (STZ) is an anticancer drug derived from *Streptomyces achromogenes* that is clinically used in the treatment of pancreatic  $\beta$ -cell carcinoma.

In this model, STZ is injected in rat to induce Type 1 diabetes leading to development of renal injury with similarities to human DN.

### Specie

Rat

### Interest

In this model there is a rapid hyperglycemia and albuminuria but a slow development of kidney tissue injury. Its is a good model of early changes in human DN.

### Model Description

- Diabetes is induced by a single i.v. injection of STZ
- Standard protocol duration: up to 12 weeks
- Pathophysiological features: type 1 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:
  - Plasma and urinary creatinine and urea
  - Estimated and transdermal Glomerular Filtration Rate (GFR).
  - Albuminuria and proteinuria
- Glomerular sclerosis: histological analysis of glomerular matrix expansion by Periodic Acid Schiff (PAS) staining.

