



Models of glomerulopathy

Models of adriamycin-induced nephropathy and anti-GBM glomerulonephritis

Gubra models glomerulopathy

The Adriamycin-induced nephropathy and anti-glomerular basement membrane (GBM) glomerulonephritis models are two mouse models displaying translatability to human kidney diseases.

Key model traits

- Altered lipid profiles
- Advanced albuminuria
- Focal glomerulosclerosis
- Tubulointerstitial fibrosis

AI-assisted glomerulosclerosis scoring using GHOST

Automated AI-assisted image analysis strategy

Automatic AI-assisted scoring of glomeruli is performed as a two step process. Firstly, all glomeruli are detected and delineated using a neural network. Next, each glomerulus is assigned a glomerulosclerosis score by a second neural network. Approximately 100 glomeruli are scored per mouse kidney section.

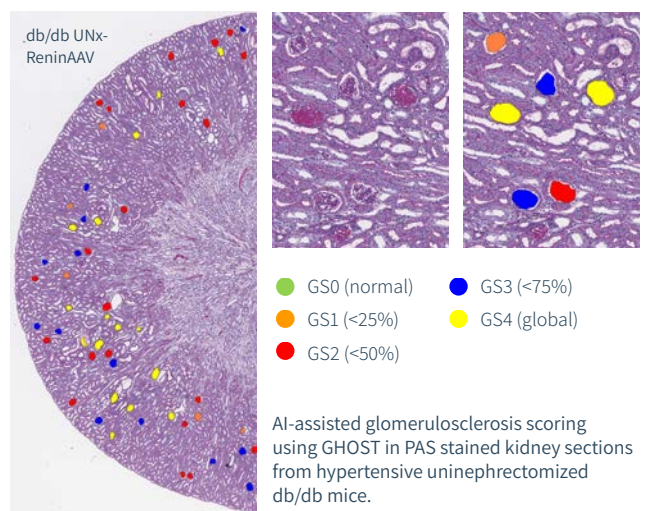
Glomerulosclerosis scoring system

Glomerulosclerosis is classified using a five-point scale according to the fraction of the capillary tuft affected:

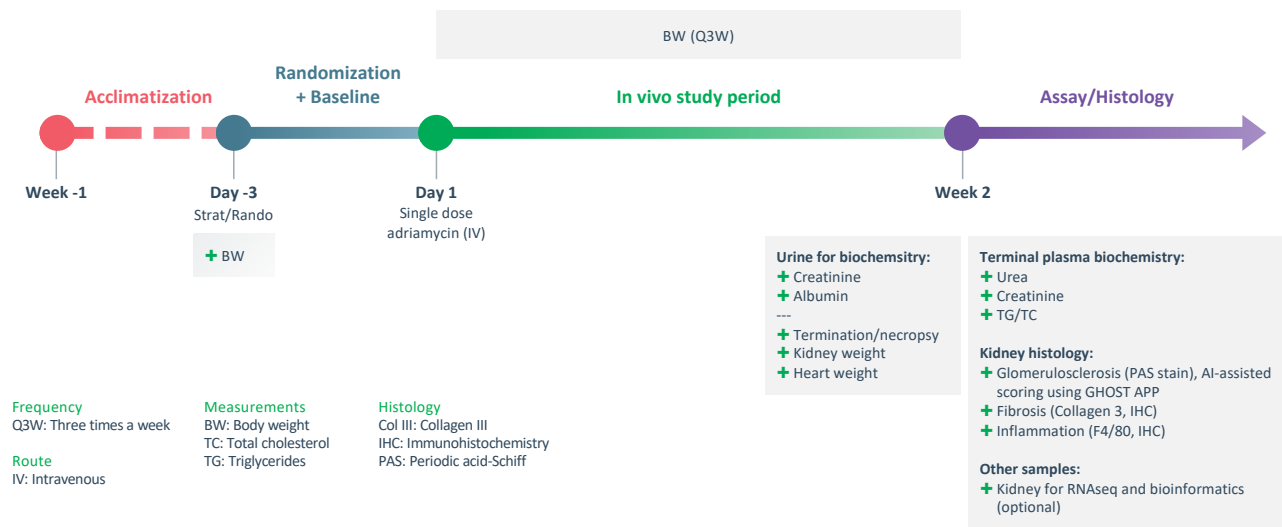
Cohen's Kappa: 0.78

0	175	23	3	1	0
1	46	70	30	8	1
2	5	27	69	31	2
3	0	3	20	63	17
4	1	0	1	9	114
	0	1	2	3	4

GHOST confusion matrix demonstrates strong performance



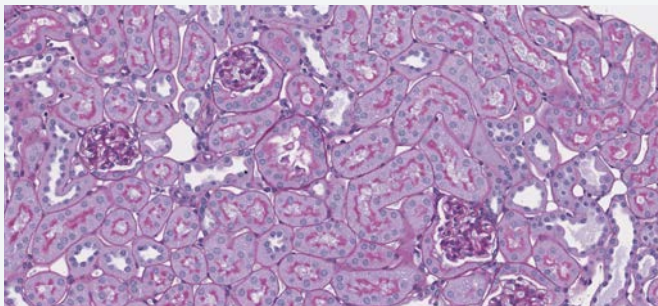
Adriamycin-induced nephropathy



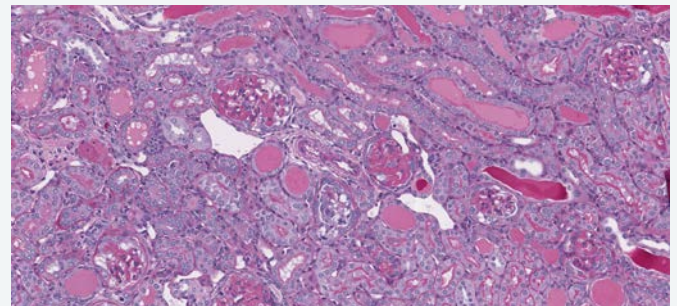
A single adriamycin (ADR) injection induces albuminuria, increased plasma triglycerides and total cholesterol, and glomerulosclerosis

	Control	ADR
Urine ACR ($\mu\text{g}/\text{mg}$)	207 \pm 108	163000 \pm 30900
Plasma TG (mmol/L)	1.36 \pm 0.38	2.58 \pm 0.33
Plasma TC (mmol/L)	2.77 \pm 0.21	13.9 \pm 1.51

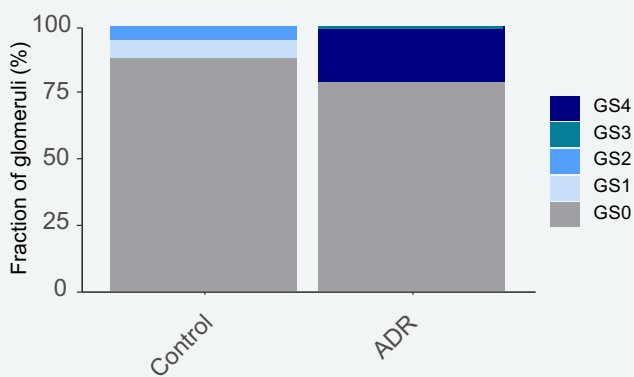
Control



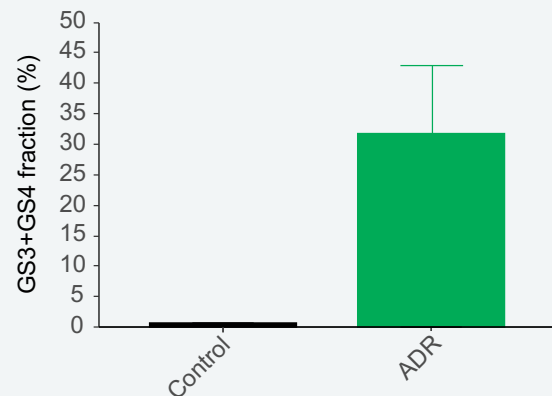
ADR



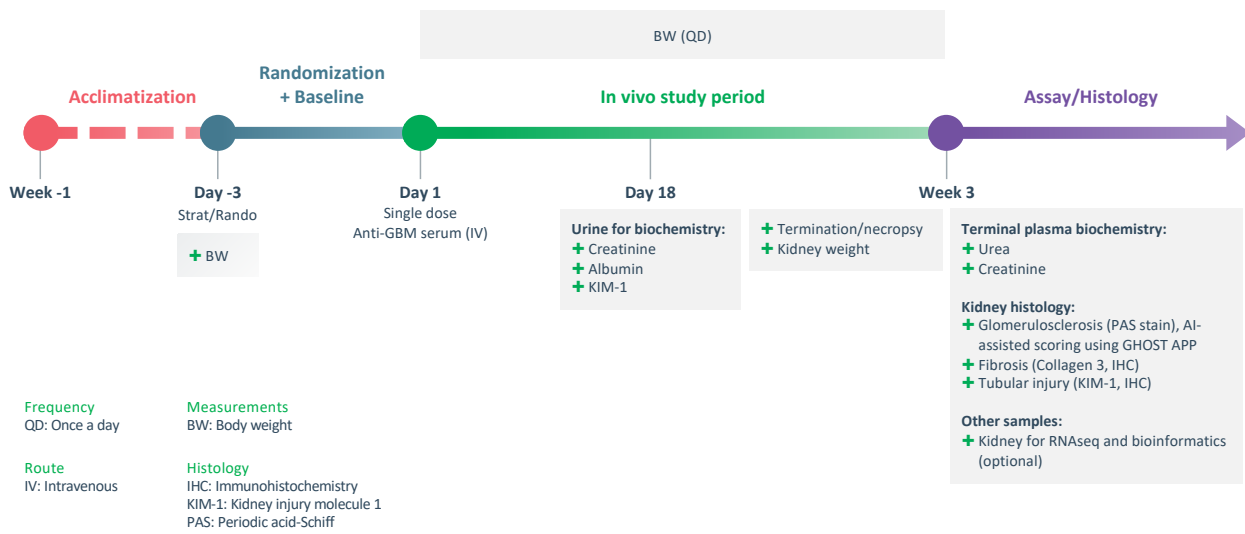
Glomerulosclerosis score



Glomeruli with severe glomerulosclerosis



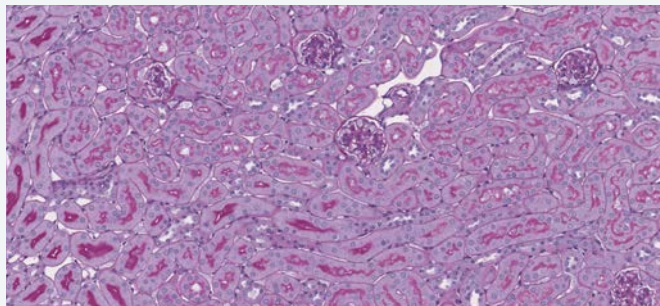
Anti-GBM glomerulonephritis



Anti-GBM serum causes albuminuria and urine kidney injury molecule-1 (KIM-1) excretion, and induces glomerulosclerosis

	Control	Anti-GBM
Urine ACR ($\mu\text{g}/\text{mg}$)	117 \pm 35.2	22300 \pm 2910
Urine KIM-1-to-creatinine (ng/mg)	7.45 \pm 1.28	119 \pm 6.76

Control



Anti-GBM

