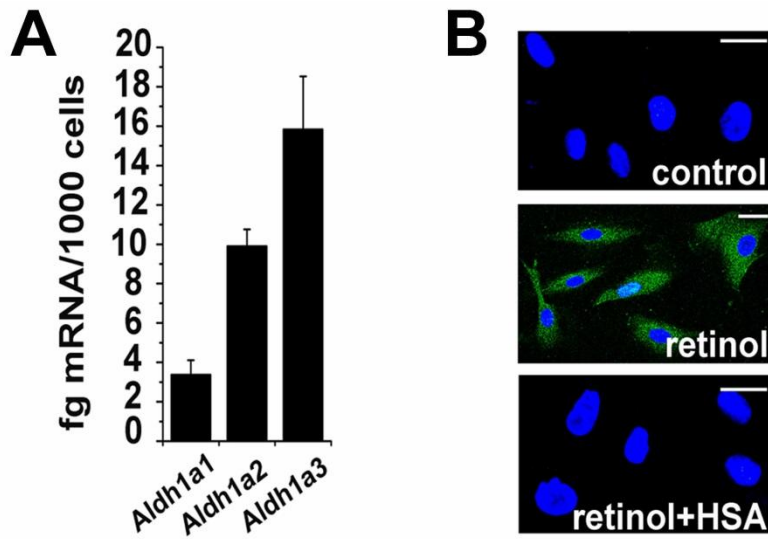
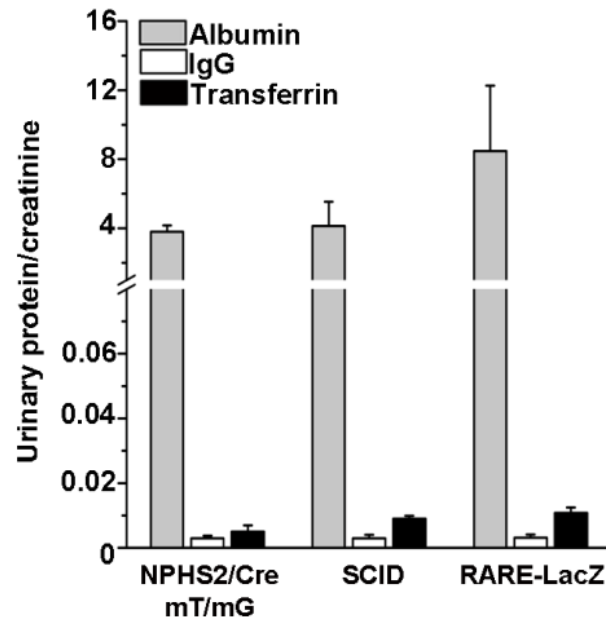


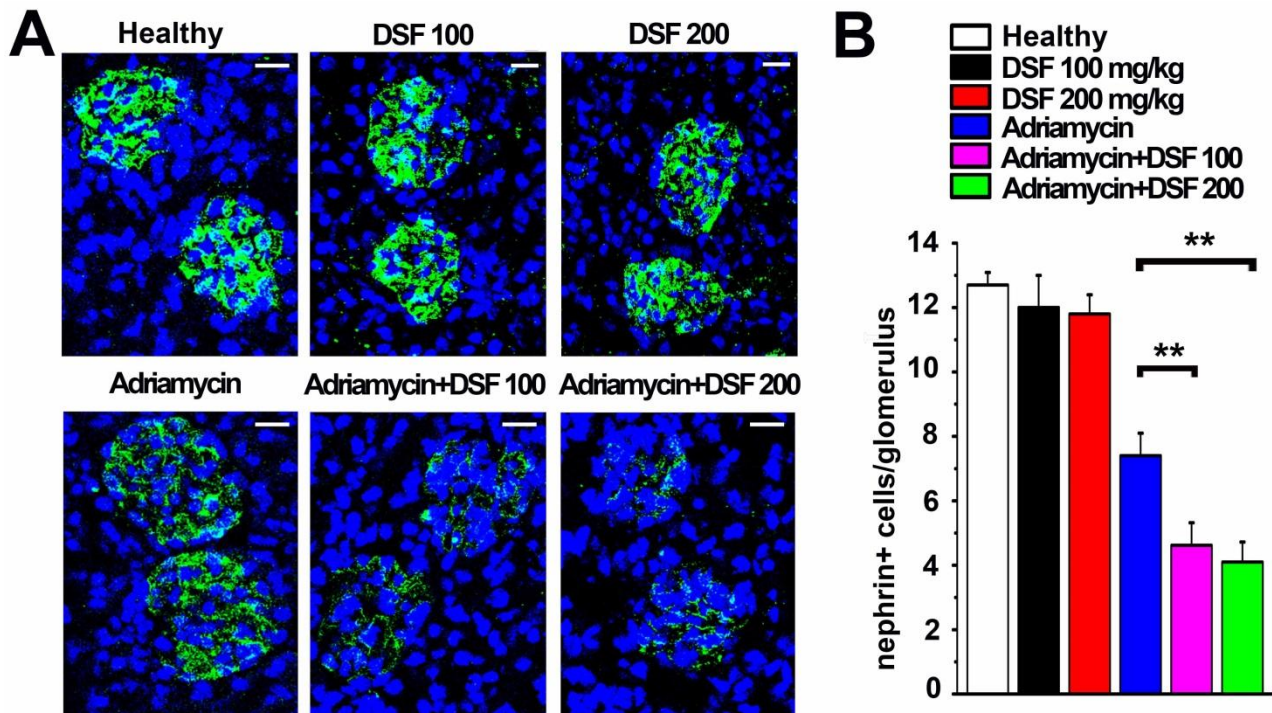
Supplementary Figure 1. Albumin overload impairs RPC differentiation into podocyte. (A) Assessment of mRNA levels of KLF15 (left panel, $n=6$) and PODXL (central panel, $n=4$) and protein expression of podocin (right panel, one representative of four experiments is shown) on human RPC cultured in control medium, VRAD medium alone or supplemented with 10 mg/ml HSA. (B) mRNA levels of CCNI, p21 and p27 ($n=4$) in human RPC cultured in control medium, VRAD medium alone or supplemented with 10 mg/ml HSA. Topro-3 counterstains nuclei (blue). Bars 20 μm . All data are means \pm s.e.m., * $P < 0.05$ and *** $P < 0.001$ by Mann-Whitney test for (A) and (B).



Supplementary Figure 2. Albumin overload impairs RPC differentiation induced by retinol. (A) Expression of Aldh1a1, 2 and 3 mRNA in human RPC ($n=15$). (B) Effect of HSA (10 mg/ml) on nephrin (green nephrin, blue Topro-3 nuclear staining) expression increase induced by retinol treatment in human RPC ($n=6$). Bars 20 μ m.

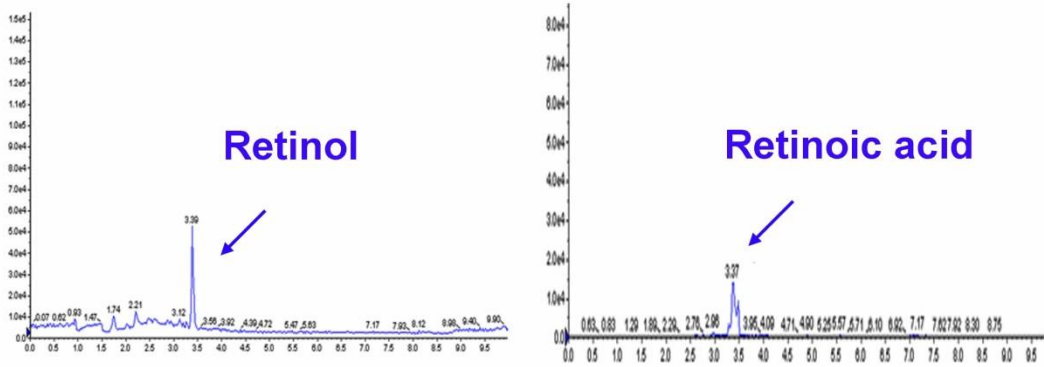


Supplementary Figure 3. Evaluation of albumin, transferrin and IgG normalized on creatinine in the urine of three different mice strains after induction of AN. Albumin, transferrin, IgG and creatinine levels were measured in 15 mice/group at day 11 following AN induction. Data are means \pm s.e.m.; not significant by Mann-Whitney test.

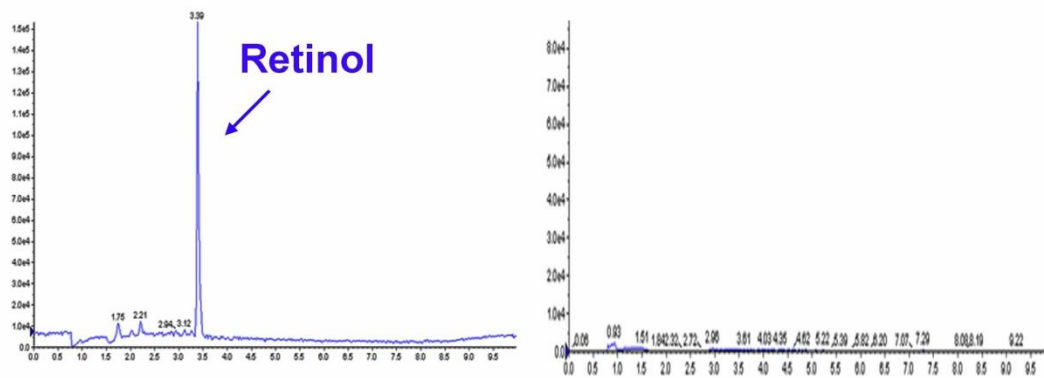


Supplementary Figure 4. Effect of blocking endogenous retinoic acid synthesis on podocyte number in SCID mice with FSGS. (A) Representative staining of nephrin (green) on kidney sections of healthy mice and of mice with adriamycin nephropathy untreated or treated with DSF 100 mg/kg and 200 mg/kg. (B) Quantitation of podocyte number (nephrin+ cells)/glomerulus in healthy mice and in mice with adriamycin nephropathy untreated or treated with DSF 100 mg/kg and 200 mg/kg ($n=6$ for each group of mice) Topro-3 counterstains nuclei (blue). Bars 20 μ m. All data are means \pm s.e.m., ** $P<0.01$ by Mann-Whitney test.

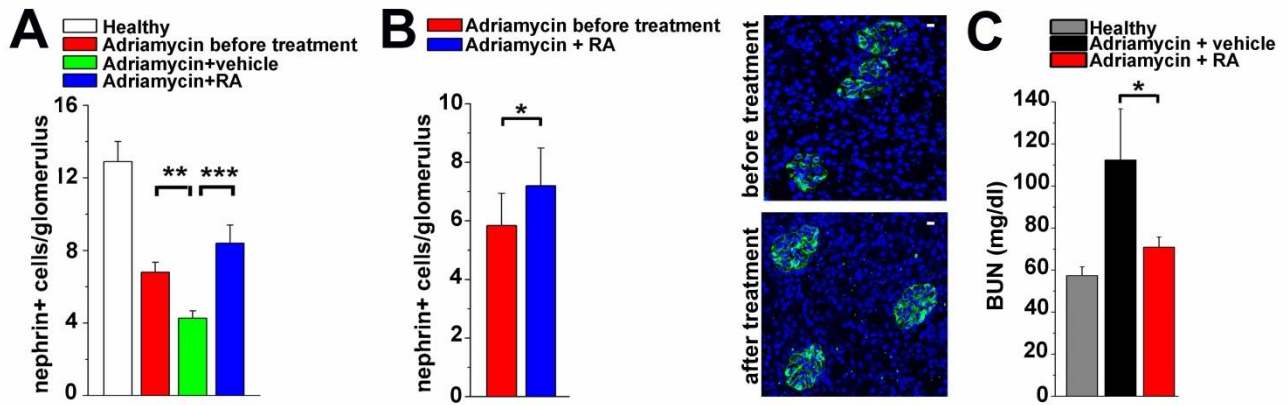
albuminuria 40 mg/dl



albuminuria 340 mg/dl



Supplementary Figure 5. LC-MS/MS analysis of RA and retinol in mice urine. Representative chromatograms of the presence of retinol and RA in urine of mice with low (top) or high (bottom) albuminuria.



Supplementary Figure 6. RA treatment increases podocyte number. (A) Quantitation of podocyte number (nephrin+ cells)/glomerulus in healthy ($n=10$), adriamycin before treatment ($n=10$), adriamycin + vehicle ($n=11$), adriamycin + RA ($n=11$). (B) Left: quantitation of podocyte number (nephrin+ cells/glomerulus) in renal biopsies ($n=12$) of mice with adriamycin nephropathy before and after RA treatment. Right: representative staining of nephrin (green) in renal biopsies of mice with adriamycin nephropathy before (top) and after (bottom) RA treatment. (C) BUN levels in healthy ($n=10$), adriamycin + vehicle ($n=11$), adriamycin + RA ($n=11$). Topro-3 counterstains nuclei (blue). Bars 20 μ m. All data are means \pm s.e.m. * $P<0.05$ ** $P<0.01$ *** $P<0.001$ by Mann-Whitney test for (A) and (C), and by Wilcoxon test for (B).