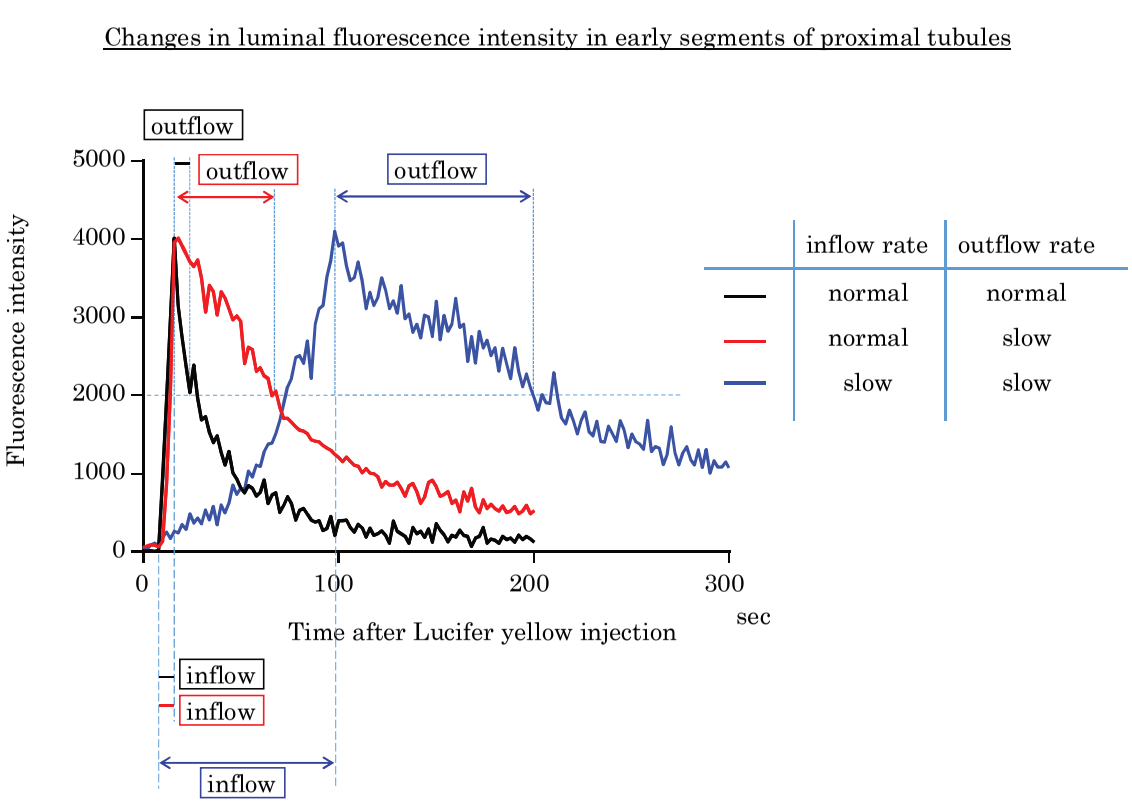
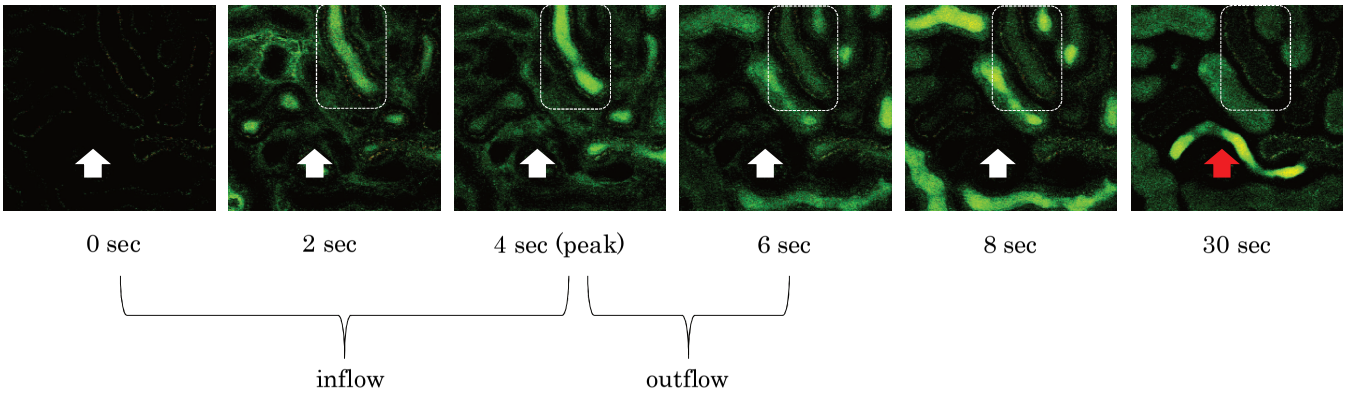
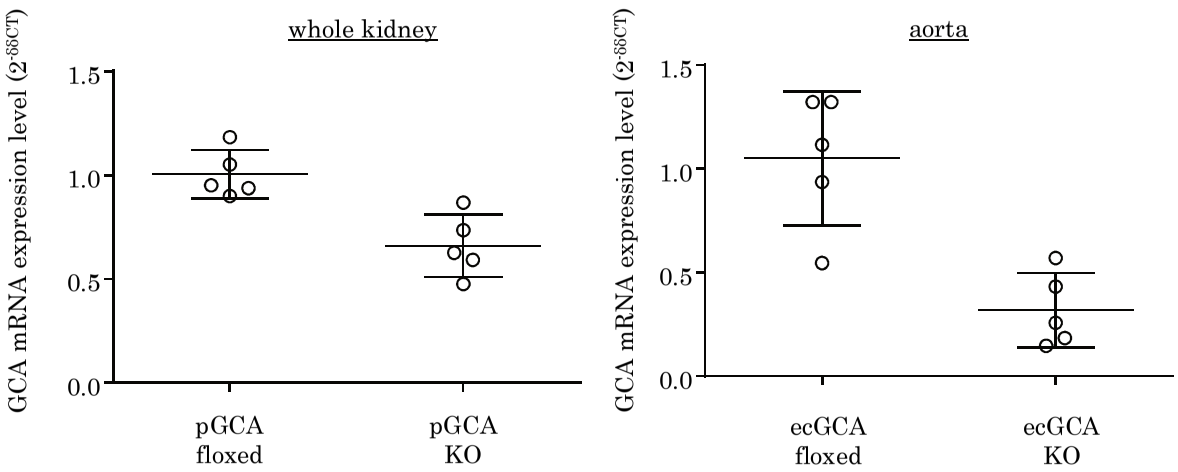
A



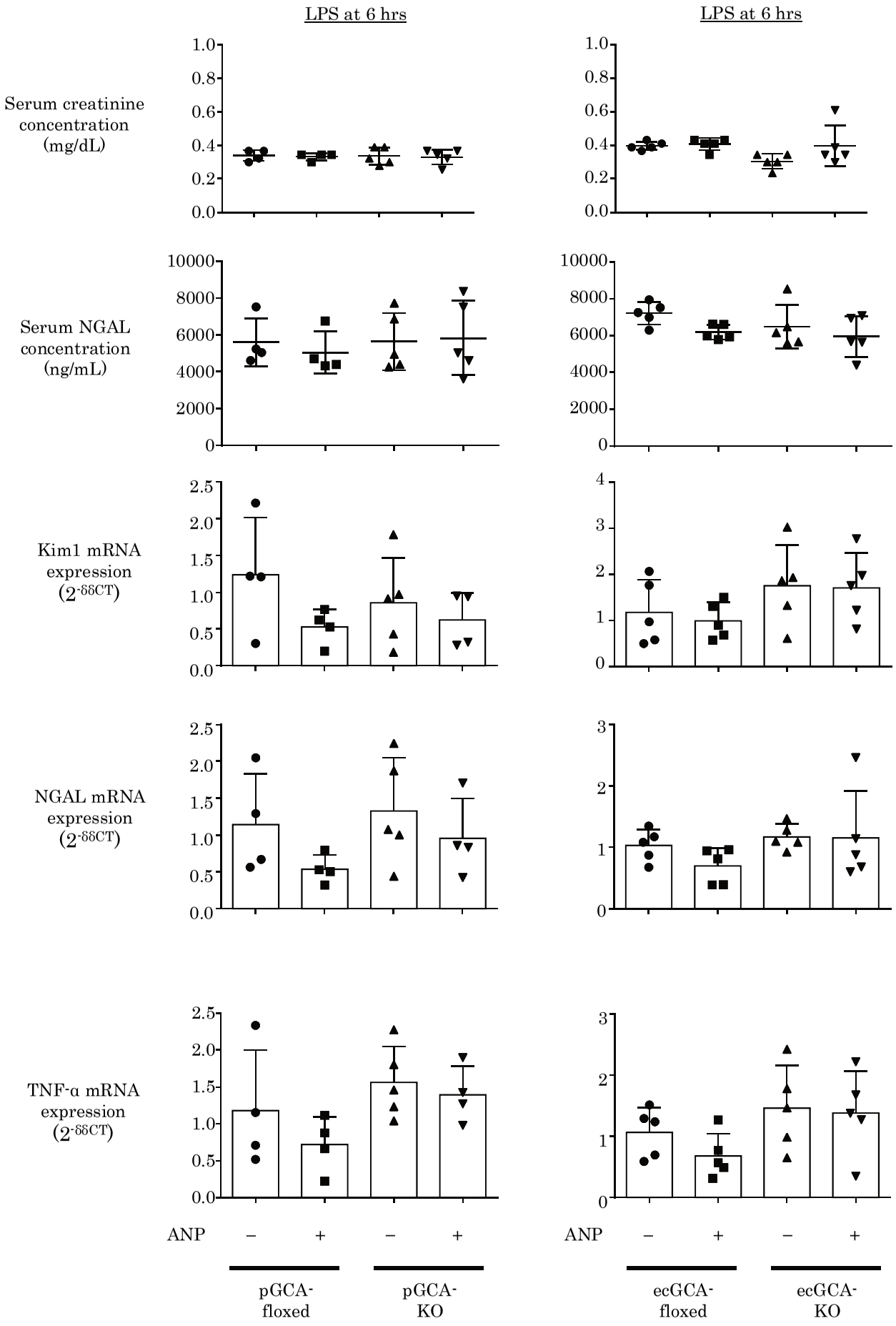
B



Supplementary Fig. S1. (A) Representative curve for the time-course changes in fluorescence intensity (in the “green” channel, 12-bit images) in the lumen of early segments of proximal tubules. Inflow time is measured from the appearance of Lucifer yellow fluorescence in the imaging window to the time of the peak fluorescence intensity. Outflow indicates the duration required to halve the fluorescence intensity from the peak reading. The black line represents the changes in fluorescence intensity in a normal animal. The red line represents the changes in fluorescence intensity in an animal that shows normal inflow rate and slower outflow rate than normal animals. The blue line represents the changes in fluorescence intensity in an animal that shows slower inflow and outflow rate than normal animals. (B) Representative images of the analyzed tubules. In the provided images, the fluorescence level of Lucifer yellow reached the peak level within 4 s, and was then reduced to the level less than half within 2 s in the proximal tubular lumen enclosed by dashed box. Thus, the inflow and outflow time of this tubule were 4 and 2 s, respectively. The distal nephrons that have not had Lucifer yellow in the lumen are indicated by white arrows, and the distal nephrons that have already had Lucifer yellow in the lumen are indicated by red arrows.



Supplementary Fig. S2. Level of guanylyl cyclase-A mRNA either in whole kidney samples of NDRG1^{CreERT2}:GCA floxed mice (pGCA-KO mice) or in aorta of Tie2^{Cre}:GCA floxed mice (ecGCA-KO mice). (Left graph) The mRNA level in pGCA-KO mice was measured after the *in vivo* imaging experiments, which were conducted at least 6 weeks after Cre recombinase induction by tamoxifen. The pGCA-KO mice showed significantly reduced levels of GCA mRNA ($p < 0.05$) in the whole kidney samples. (Right graph) The mRNA level in ecGCA-KO mice was measured after the *in vivo* imaging experiment. The ecGCA-KO mice showed significantly reduced levels of GCA mRNA ($p < 0.05$) in the aorta samples.



Supplementary Fig. S3. Plasma concentration of creatinine and neutrophil gelatinase-associated lipocalin (NGAL), and mRNA levels of renal tissue markers for damage (kidney injury molecule 1 (Kim1), and NGAL) and inflammation (tumor necrosis factor-α; TNF-α) at 6 hours after LPS injection (n = 4–5). One-hour infusion of human recombinant arterial natriuretic peptide (hANP) did not significantly affect these parameters in either floxed control mice or guanylyl cyclase-A conditional knock out mice for proximal tubules (pGCA-KO) or endothelial cells (ecGCA-KO).