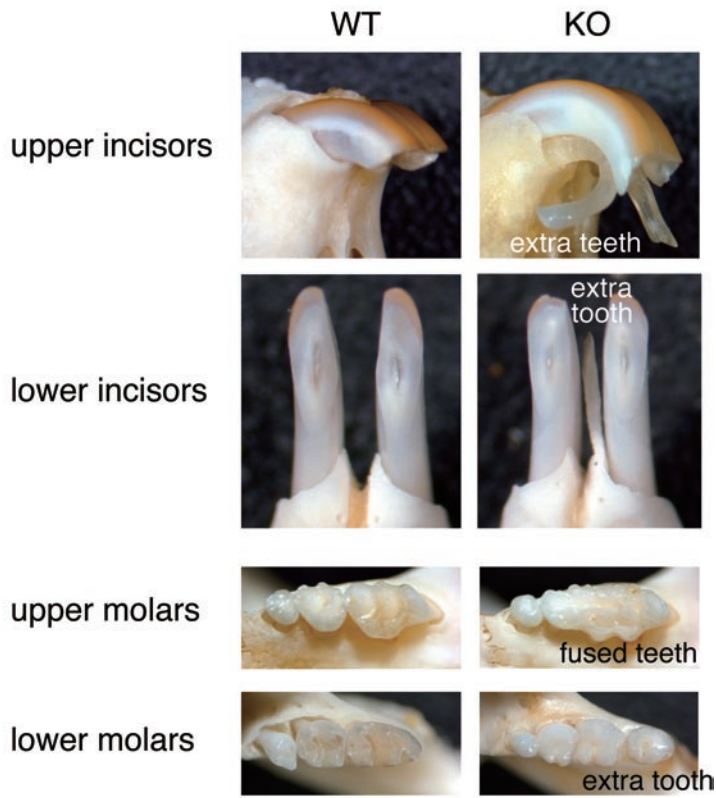
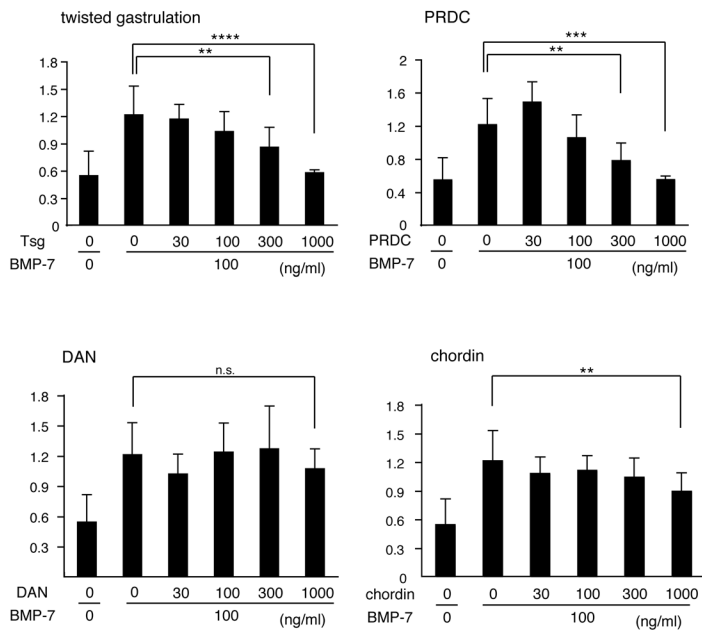


## Supplemental figure 1

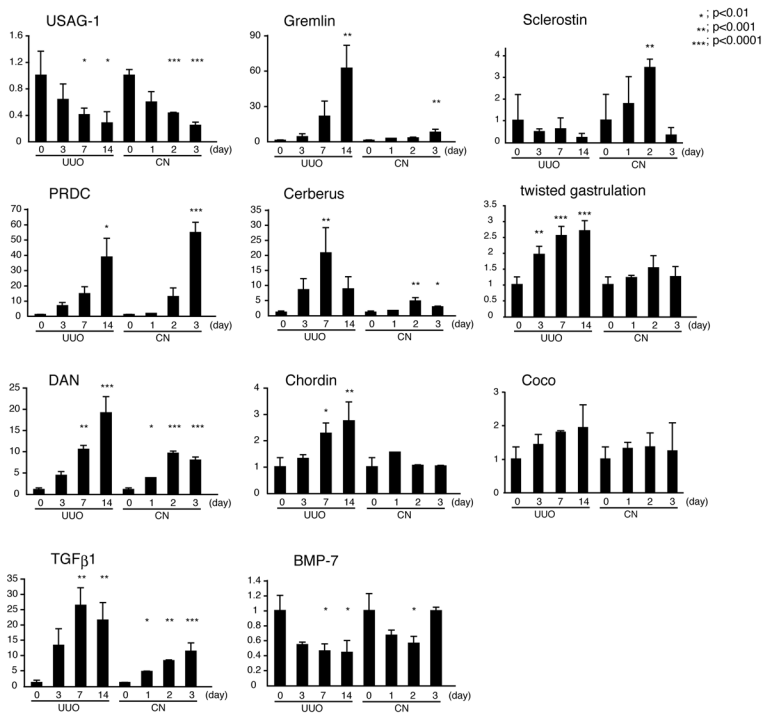


## Supplemental figure 2

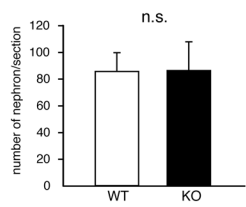
\*: p<0.1  
 \*\*: p<0.01  
 \*\*\*: p<0.001  
 \*\*\*\*: p<0.0001



### Supplemental figure 3

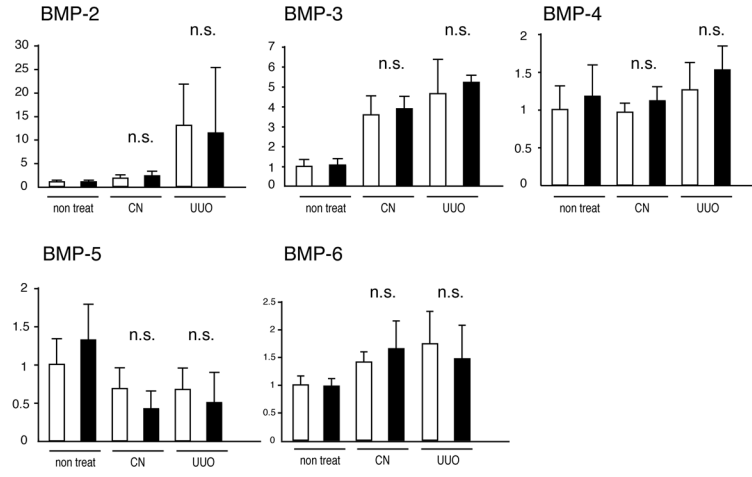


### Supplemental figure 4



### Supplemental figure 5

□ WT  
 ■ KO



## **Supplementary data**

### **Supplementary figure 1 *USAG-1*<sup>-/-</sup> mice exhibit supernumerary teeth and fused teeth.**

*USAG-1*<sup>-/-</sup> mice exhibit supernumerary teeth, both in the incisors and molars. *USAG-1*<sup>-/-</sup> mice also have fused teeth in the molar region. Although there was variation in the sites of extra teeth and fused teeth, this tooth phenotype was fully penetrant. Laurikkala *et al.* recently reported that USAG-1 is expressed in developing teeth, and a USAG-1-positive area surrounds the enamel knot signaling centers where BMPs are expressed (20). Because BMP-4 is known to be involved in the induction of the enamel knot signaling centers, loss of the inhibitory effect of USAG-1 might induce extra signaling centers, resulting in supernumerary teeth. Further investigation is required to evaluate the molecular mechanisms of action of USAG-1 in tooth development.

### **Supplementary figure 2 Other BMP antagonists also antagonize BMP-7.**

C2C12 cells were treated with BMP-7 (100 ng/ml) and indicated doses of various BMP antagonists, and cellular alkaline phosphatase activity was determined as previously described (21). Twisted gastrulation (Tsg), PRDC, and chordin antagonize BMP-7 activity. Tsg; twisted gastrulation. N=4 for each experiment. Representative data from three separate experiments are shown.

### **Supplementary figure 3 Expression of BMP antagonists during course of UUO and cisplatin nephrotoxicity.**

In both kidney disease models, C57BL/6J mice were sacrificed at the indicated time

points, RNA was isolated from the diseased kidney, and gene expression of BMP antagonists was determined by real-time RT-PCR. In each experiment, the expression levels were normalized to the expression of GAPDH, and expressed relative to expression in mice on day 0. N=4-5 for each experiment. Statistical significance was shown in comparison to the expression level on day 0.

**Supplementary figure 4 Numbers of nephrons in kidneys are not different between *USAG-1*<sup>-/-</sup> mice and WT mice.**

All the glomeruli within a transverse section at the renal pelvis were counted. N=10 for each experiment. n.s.; not significant.

**Supplementary figure 5 Expression of BMPs in kidney disease models is not different between *USAG-1*<sup>-/-</sup> mice and WT mice.**

Expression of BMP-2, 3, 4, 5, and 6 was determined in *USAG-1*<sup>-/-</sup> mice and WT mice in both kidney disease models, and were not significantly different.