

## Supplementary video legends

**Supplementary video 1.** Changes in fluorescence over time (30 min) after addition of 10  $\mu\text{M}$  ruthenium red in distal tubules of a Fluo-4-loaded kidney slice from a 3-month-old rFGF23-treated mouse, 8 hours after injection.

**Supplementary video 2.** Changes in fluorescence over time (30 min) after addition of 10  $\mu\text{M}$  ruthenium red in distal tubules of a Fluo-4-loaded kidney slice from a vehicle-treated mouse, 8 hours after injection.

**Supplementary video 3.** Time-dependent increase in intracellular fluorescence in distal tubules in a Fluo-4-loaded, 300- $\mu\text{m}$ -thick kidney slice from of a 3-month-old wild-type mouse treated at time 0 with rFGF23 (100 ng/ml) *in vitro*.

**Supplementary video 4.** Decrease in intracellular fluorescence in distal tubules in a 300- $\mu\text{m}$ -thick kidney slice from of 3-month-old wild-type mouse treated at time 0 with rFGF23 (100 ng/ml) *in vitro*. After 120, 135, and 150 min, 1, 10, and 50  $\mu\text{M}$  of the TRPV inhibitor ruthenium red (RR) was added, respectively.