**Supplemental figure legends**

**Supplemental figure 1** Expression of c-Fos in the GG of CNGA3-heterozygous animals upon stimulation with 2,3-DMP.

**A**-**B** In the absence of 2,3-DMP, in the GG of wild-type ($CNGA3^{+/+}$) or CNGA3-heteozygous ($CNGA3^{+/-}$) pups which were kept in sealed plastic boxes, no expression of c-Fos was visualized by in situ-hybridization with an antisense probe for c-Fos. **C**-**D** Upon exposure to 2,3-DMP for 1 h, c-Fos expression was clearly detectable in both $CNGA3^{+/+}$ (C) and $CNGA3^{+/-}$ (D) individuals albeit the signals appeared to be somewhat weaker in heterozygous pups. All figures depicted are representative of 6 independent experiments. For each of these experiments, a "novel" litter was used. Scale bars: 50 µm. **E** Quantification of the c-Fos-positive GG cells in $CNGA3^{+/+}$ and $CNGA3^{+/-}$ pups after exposure to 2,3-DMP for 1 h. The results shown are derived from 6 experiments. In each of these experiments, the number of c-Fos-positive cells in the GG of a $CNGA3^{+/-}$ mouse was determined relative to that in a concomitantly processed $CNGA3^{+/+}$ pup; the latter was set as 100 %. A mean of values, the standard deviation and the P value were calculated. The P value is 0.0823, indicating that there are no statistically significant differences between $CNGA3^{+/+}$ and $CNGA3^{+/-}$ pups.

**Supplemental figure 2** The guanylyl cyclase domain of GC-G is absent from the GG of $GC\text{-}G^{-/-}$ individuals.

**A**–**B** Immunohistochemical staining on coronal sections through the GG of a wild-type (A) and a $GC\text{-}G^{-/-}$ pup (B) with an antibody specific for the C-terminal region of GC-G which comprises the guanylyl cyclase domain. Performing immunostaining with this GC-G antibody on sections through the GG of a $GC\text{-}G^{-/-}$individual, no

labeled cells were detectable (B). In wild-type conspecifics, staining was detectable in GG cells - in particular in filiform subcellular structures (A). Sections were counterstained with propidium iodide. Scale bars: 20 µm.

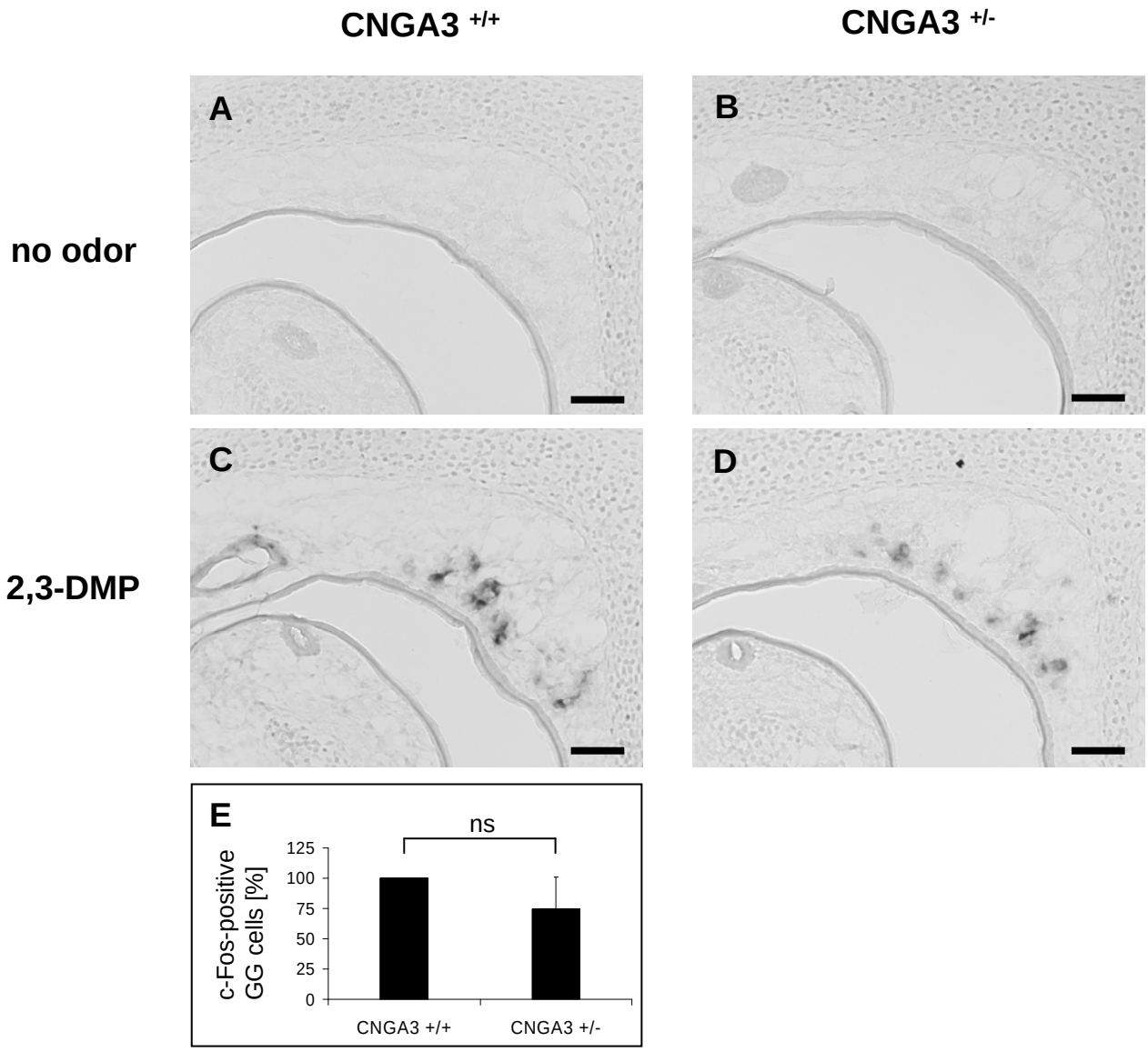
**Supplemental figure 3** Expression of OMP, V2r83, and CNGA3 is similar in the GG of GC-$G^{+/+}$ and GC-$G^{-/-}$ pups.

**A**–**F** In situ-hybridization with antisense riboprobes specific for OMP (A-B), V2r83 (C-D) and CNGA3 (E-F) labeled numerous cells in the GG of neonatal GC-$G^{+/+}$ (left panel) and GC-$G^{-/-}$ (right panel) pups. Scale bars: 50 µm.

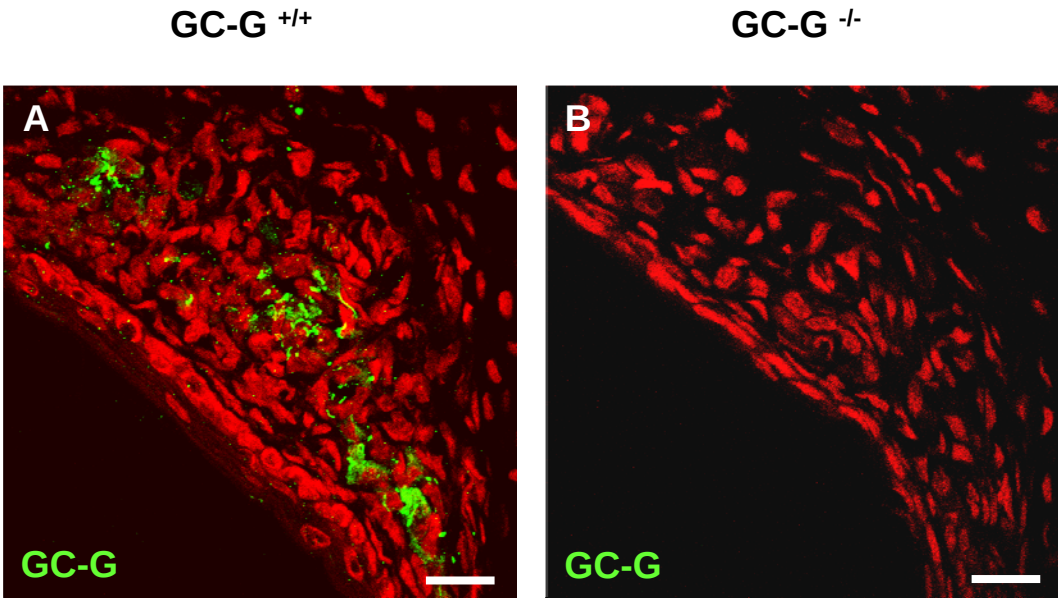
**Supplemental figure 4** 2,3-DMP-induced c-Fos expression in the GG of GC-G-heterozygous individuals.

**A**-**B** On coronal sections through the GG of wild-type (GC-$G^{+/+}$) or GC-G-heteozygous (GC-$G^{+/-}$) pups which were kept in sealed plastic boxes without 2,3-DMP, no expression of c-Fos was observable by in situ-hybridization using an antisense probe for c-Fos. **C**-**D** Following exposure to 2,3-DMP for 1 h, c-Fos expression was detectable in both GC-$G^{+/+}$ (C) and GC-$G^{+/-}$ (D) individuals; however, the signals in heterozygous animals seemed to be weaker. All data shown are representative of 5 independent experiments. For each of these experiments, a "novel" litter was used. Scale bars: 50 µm. **E** Quantification of the c-Fos-positive GG cells in GC-$G^{+/+}$ and GC-$G^{+/-}$ pups upon exposure to 2,3-DMP for 1 h. The results are based on 4 experiments. In each experiment, the number of c-Fos-positive GG cells in a GC-$G^{+/-}$ pup was determined relative to that in a concomitantly processed GC-$G^{+/+}$ conspecific, which was set as 100 %. A mean of values, the standard deviation and the P value were calculated (P value: 0.0005).

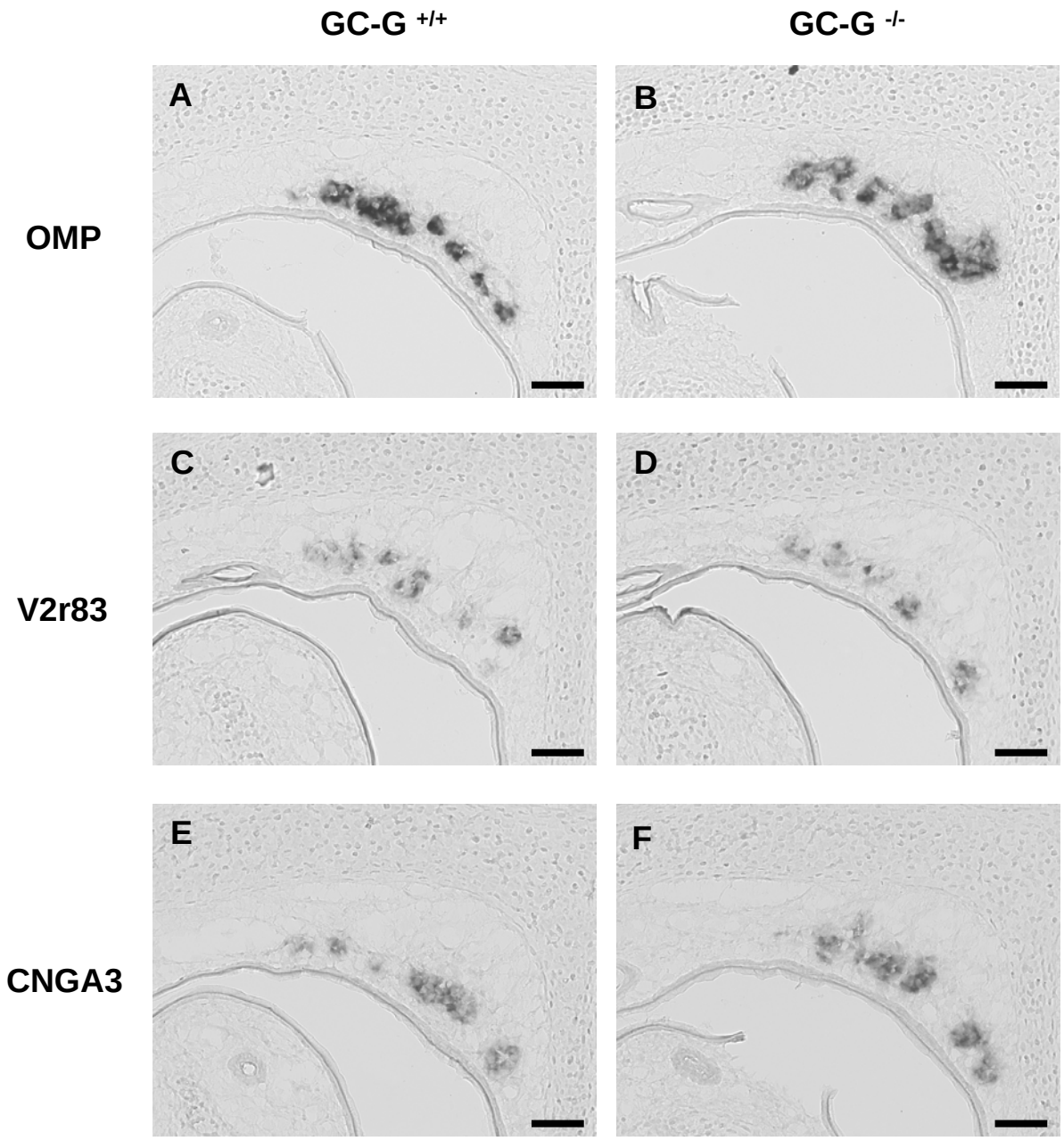
Supplemental figure 1



Supplemental figure 2



Supplemental figure 3



Supplemental figure 4