

Supplementary Materials

sTable 1. The cell densities of nine abundant odorant receptors in the septal organ are summarized at different time points.

| OR Gene | P0 | | 4 wks | | 12 wks | |
|-----------|----------------------|--------------|------------------------|--------------|------------------------|--------------|
| | Density | Contribution | Density | Contribution | Density | Contribution |
| MOR256-3 | 507 ± 55 (n = 12) | 28.6% | 3550 ± 230 (n = 14) | 49.9% | 3832 ± 258 (n = 14) | 50.7% |
| MOR244-3 | 134 ± 29 (n = 13) | 7.5% | 983 ± 82 (n = 20) | 13.8% | 1044 ± 66 (n = 20) | 13.8% |
| MOR235-1 | 105 ± 20 (n = 17) | 5.9% | 447 ± 60 (n = 24) | 6.3% | 500 ± 54 (n = 20) | 6.6% |
| MOR0-2 | 137 ± 34 (n = 13) | 7.7% | 440 ± 57 (n = 22) | 6.2% | 454 ± 52 (n = 20) | 6.0% |
| MOR236-1 | 250 ± 38 (n = 15) | 14.1% | 424 ± 55 (n = 24) | 5.0% | 442 ± 49 (n = 20) | 5.8% |
| MOR256-17 | 278 ± 31 (n = 13) | 15.7% | 344 ± 82 (n = 10) | 4.8% | 332 ± 56 (n = 20) | 4.4% |
| MOR122-1 | 78 ± 24 (n = 9) | 4.4% | 319 ± 45 (n = 18) | 4.5% | 331 ± 37 (n = 18) | 4.4% |
| MOR160-5 | 198 ± 30 (n = 12) | 11.2% | 310 ± 48 (n = 28) | 4.4% | 327 ± 40 (n = 20) | 4.3% |
| MOR267-16 | 88 ± 28 (n = 7) | 5.0% | 292 ± 44 (n = 19) | 4.1% | 297 ± 33 (n = 20) | 3.9% |

The averaged cell density per cross-sectional area of the septal organ is denoted as cell number ± standard error/mm², with *n* = the number of septal organ sections (thickness = 20 μm). The relative contribution (%) for each OR is obtained by normalizing the averaged cell density to the sum of the cell densities from all nine ORs. The cell densities at 12 weeks are not significantly different than those at 4 weeks. Detailed temporal onsets and growth rates for different receptor cells are reported elsewhere (Tian and Ma, 2008).

sTable 2. The primer and probe sequences of the nine odorant receptors are listed below.

1. MOR256-3 (accession number: AY073026, coding region = 948 bp)

Forward primer: CCATTATCCTAGTTTCCCGCC

Reverse primer: GTACCCAGGATGAGGCTGAGA

Probe sequence (520 bp):

CCATTATCCTAGTTTCCCGCCTAGACCCCCAGCTTGACAGCCCCATGTACTTTTTTGTCTCCAACCTTTCTCTT
CTGGACCTCTGCTATACTACGAGCACTGTCCCTCAGATGTTGGTCAACCTTAGAGGGCCTGAAAAGACCATC
AGCTATGGTGGCTGTGTGGCCAGCTCTATATTTCTTGGCTTTGGGCTCAACTGAATGTATCCTTCTGGCCA
TCATGGCCTTTGACCGTTTTGCTGCCATTTGCAGGCCCTTCACTATCCTATCATCGTGAACCAGAAACGATG
CATTATATGGCCACAGGAACCTGGATTAGCGGATTTGCAAACCTCTTGTGCAGTCCACCCTCACTGTGGT
AGCCCCAGGTGTGGACAGAGGGTAATAGACCATTTCTTCTGTGAAGTCCCAGCCCTTTTGAACCTAGCTTG
CACTGACACAAGTGTGAATGAAGCTGAGCTTAATGTTCTTGGAGCTTTGCTGCTCTTGGTGCCTCTCAGCCTC
ATCCTGGGTAC

2. MOR244-3 (accession number: AY073295, coding region = 927 bp)

Forward primer: GGGAAGTTCCTCATTGTTGTT
Reverse primer: AGGCTAGAAAACATACGAGGG
Probe sequence (519 bp):

GGGAAGTTCCTCATTGTTGTTACCATAGTCTTCACGCCACGTCTCCACAATCCCATGTACTTCTTTCTGAGCA
ATCTGTCCTTCATTGACATCTGCCACTCATCTGTCACCGTGCCCAAGATGCTTGAGGGTTTGCTTTTAGAGAG
GAAGACCATTTCCTTTGACAATTGCATTGCACAGCTCTTCTTCTACATCTCTTTGCTTGTCTGAGATCTTTC
TGCTGACGATTATGGCGTATGATCGTTATGTGGCTATCTGCATCCCATTGCATTACTCCAATGTGATGAACAT
GAAGGTCTGTGTACAGCTTGTCTTTGCACTCTGGCTGGGGGGCACTATTCACTTGTGCAGACCTTCTT
GACTATTCTGCTACCTACTGTGGCCCAAACATTATCGATAGCTACTTCTGTGACGTACCTCCTGTCATCAAG
CTGGCCTGCACAGATACATACCTTACAGGGATTCTGATCGTGTCCAATAGTGAACCATCTCCCTCGTATGTT
TTCTAGCC

3. MOR0-2 (accession number: AY635588, coding region = 1055 bp)

Forward primer: TTCCTTTGCCAGTTGTCAGC

Reverse primer: TCCGTGTACAGGCCAAGTG

Probe sequence (403 bp):

TTCCTTTGCCAGTTGTCAGCCATTGAACTCTGCTACACGCTAGTGGTGGTGCCCCGTTCTCTAGCTGACCTG
AGCATGCCTGGCCATGGCAGGGGCAGTCCCATCTCATTCTTGGGCTGTGCTGTCCAAATGCAGATGTTTGTG
GCACTGGGTGGGGCTGAGTGCTTTTTGCTGGCAGCCATGGCCTATGACCGCTACGTGGCCATCTGCCACCC
CCTGCGATATGCATCTATAGTGACCCAGGTCTATGTGCACGCCTGGCCCTGGCCTGCTGCCTTGGAGGAC
TAGCTGTATCCGTGGGGCTAACGGTGGCAGTGTCCACCTGCCTTTCTGTGGCTCCCGCCTGCTGGTGCATT
TCTTCTGCGACATCACCGCACTGCTGCACTTGGCCTGTACACGGA

4. MOR235-1 (accession number: AY073623, coding region = 909 bp)

Degenerate forward primer: ATGGCIT(T/A)(T/C)GA(T/C)(C/A)GIT(T/A)(T/C) (T/C/G)TIGC

Degenerate reverse primer: ATIA(A/T/G)IGG(G/A)TTIA(A/G)CAT

Probe sequence (485 bp):

GTGGCCATCTGCAAGCCCCTACACTATAACCACCACCATGACCAGGCATGTCTGTATTGTGCTGGTGGCAGTG
GCTTGGCTGGGTGGCATCCTGCATTCAACAGCTCAGCTCTTTCTGGTCCCTTCAGTTGCCCTTCTGTGGTCCC
AATGTGATAAACCCTTTGTGTGTGACTTGTATCCTTTACTGGAGCTGGCCTGCACTGACACATATGTCATTG
GCCTGCTGGTGGTGGCCAACAGTGGTGTGATTTGCCTGTTGAACTTCCTCATGCTGGCTGCCTCGTACATTG
TCATCCTGCGCACTTTGAGGTCCCACAGTGCAGAGGGAAGACGGAAAGCTCTGTCTACCTGTGGAGCCCAC
TTCACTGTTGTTGCTTTGTTCTTTGTGCCCTGTATATTTATTTACATGAGACCATCATCTACTCTGTCCATAGAC
AAAATAGTAGCTGTGTTTTATTGTATTTTGTACACCCATGCTCAACCCCCT

5. MOR122-1 (accession number: AY073588, coding region = 933 bp)

Same degenerate primers for MOR235-1

Probe sequence (512 bp):

TATGATCGGTACCTGGCCATTTGCCACCCCCTTACCTACCCGGTCCCTCATGAGCACCTGGTGTGTGCCG
CTAGCCACGGGGGCTGTTTTCAGTGGCTTCTTCTTCTGCTTCACTCTGGCCTTGGCAGCCCCTCTGTCC
CTCTGTCCCGCCGCGAGGGTGATTGATCACTACTTCTGTGACTTCGCTCCGGTGGTAGGGCTGTTCTGTGGA
GAGGTGTGGGTCATGTGGGGGCTGGCGTGAGCATCTCGGGCTGCCTCACACTCGCCCCCTTCTGTTGAT
CGTCGCGTCCCTACGTCTTTCATCCTGCGGGCTGTGCTGAGAATCCCTTCCAGCCACGGGAGGCAGAAAGCCT
TCTCCACCTGCTCCTCCACCTCAGTGTGGTTCGCGGTATTCTACGGCACTCTCATCGTGGTCTATGTGGCCC
CGACAGAGCACATGCCCGCCTTGCTCCGGAAGGCCTTCTCTGTCTTCTACACAGTGCTTACCCCATGCTCA
ATCCCCTCAT

6. MOR236-1 (accession number: AY073890, coding region = 930 bp)

Same degenerate primers for MOR235-1

Probe sequence (484 bp):

TGACCGGTACGTGGCCACTCTGCAAACCCCTGCACTATAACCACCACCATGACCAGGCACCTTTGTGTCGTGCT
GGTGGCGGTGGCTTGGCTGGGTGGTTTCTGCACTCGTTGGTTCAGATCCTTCTGATTTTTTTCAGTTGCCTTTC
TGTGGACCCAATGTAATAAACCCTTTGTGTGTGACTTGTATCCTTTACTGGAGCTGGCCTGCACCAACACAT
ACGTCATCGGCCTGCTGGTGGTGGCCAACAGTGGTGTGATTTGCCTGCTGAACTTCTCATGTTGGCTGCCT
CGTACATTGTCATCTTGCCTCTTTGCGGTCCCACAGTGCAGAGGGGAGACGGAAAGCTCTGTCTACCTGTG

GGGCTCACTTCACTGTGGTACTATGTTCTTTGTGCCCTGTATATTTAGTTATATGCGTCCATCGACTACTTTA
CCTATAGATAAAAACATGGCAGTGTCTTATGGTATTCTCACACCCATG

7. MOR160-5 (accession number: AY073813, coding region = 936 bp)

Forward primer: AACCTGACGATGCTGCTGGT

Reverse primer: GATTGGGAGAAAGGTCCCC

Probe sequence (522 bp):

GGGAACCTGACGATGCTGCTGGTGTATCACGGCTGACTCCCACCTCCACACGCCCATGTACTTCTTCCTAAGT
AACCTGTCTTCCTGGATCTCTGCTTCTCATCCGTACGGTACCGAAGCTGCTGAAGGACCTGCTGTCTGCT
AAGAAAACCATCTCTGTAGAGGGCTGCCTGGCTCAGGTCTTCTTCGTGTTTCATCACTGCGGGAACCGAAGCC
TTTCTTCTGTCAATGATGGCGTACGACCGCTACGCGGCTGTCTGCCACCCGCTACTCTATGGGCAGATGATG
AGCAACGAACCTCTGTCTGAAGTTGGTTTTGCTCTCATGGGGCCTGGCCTCTCTCAGTTCAGTAGTCATTGTG
CTCTTGGCGGTGAACCTGGACTTCTGCGAGGCCTACACCATAACCCTACACGTGTGAGTTACCCTCTCTC
TTTCTTTGTCTTGCTCAGATATCTCCATCAACGTGGACATCTTGATCTGCTCTACCCTGCTGCACGGGCTGG
GGACCTTTCTCCCAATC

8. MOR256-17 (accession number: AY073576, coding region = 939 bp)

Forward primer: ATGGAGGTGGACAGCAACA

Reverse primer: TTCCTTTCCCAGCAATCTT

Probe sequence (907 bp):

ATGGAGGTGGACAGCAACAGCTCCTCTGGGAGCTTCATTTCGATGGGTGTCTCTGACCATCCCCATCTGGAG
ATCATCTTTTTTGTGTCTCCTGGCCTCTTACTTGTGACGCTGGTTGGGAACCTTGACCATCATCCTCTTTTCG
GCCTTGATGCTCGGCTCCACACACCCATGTACTTCTTCTCACAACCTCTCCTCTCTAGACCTTGCCTTTACT
ACCAGTTCAGTCCCTCAGTGTGAAAAATTTATGGGGGCCAGACAAGACAATCAGCTATGGTGGGTGGTAAC
TCAACTCTATGTTTTCTTTGGCTGGGGGCTACTGAGTGCATACGCTCGTGGTGTATGGCATTGATCGGTAT
GTGGCAGTTTGTGCGCCCTGACTACATGACCGTCATGAATCCTCGCCTCTGCTGGGGGCTGGCTGCTATA
GCTGGTTGGGTGGCTTAGGCAACTCCGTGATTCAGTCAACATTCCTCCAGCTCCCATTTTTGCGGACACCG
AAAAGTGGACAACCTTCTGTGTGAGTACCCGCCATGATTAATTTGGCCTGTGGAGACACAAGTCTCAATGAG
GCGTGTCAATGGTGTGTGACCTTCTTCACTGTGGTCCCAGTAAGCGTCACCTGGTCTCTTACTGCTTCATT
GCTCAGGCAGTGATGAAGATCCGCTCTTGGAGGGACGTCGAAAGGCTTCAATACGTGTGTCTCCCACTTGG
TGGTGTGTTTTCTTCTATGGCTCTGCGATCTATGGGTATCTGCTTCCAGCTAGAGCAGTAATCAAAGCCAAG
GAAAATTCATTTCTCTTCTACTCTGTGTCACACCCATGGTGAATCCGCTCATCTATACTCTAAGAAACAAAG
AAGTAAGGGGGCCCTGGGAAGATTGCTGGGGAAAGGAA

9. MOR267-16 (accession number: AY073823, coding region = 945 bp)

Forward primer: TCTTCCTTTCTGTCCTGTCCT

Reverse primer: TGGAAAACGCTTTGTACCTG

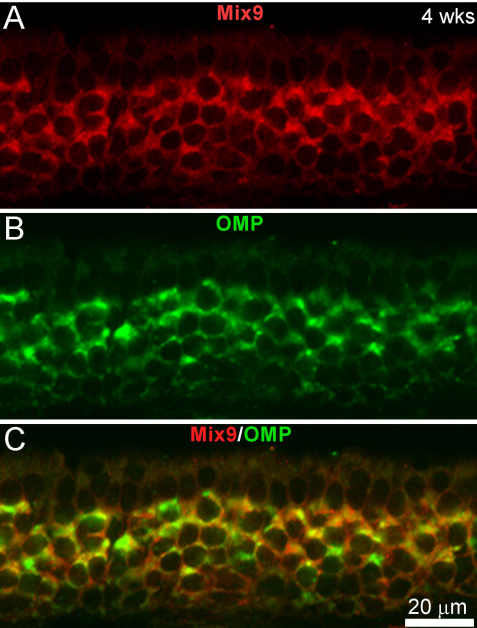
Probe sequence (537 bp):

TCTTCCTTTCTGTCCTGTCCTGTTCTGAGACCTGCTACACCTTCGTCATTGTGCCCAAGATGCTGGTTGACTT
GCTGGCGCGGAAGAAGAGCATCTTTTCTCGGCTGCGCCATCAAATGTTACCTTCTTCTCCTCGGCTG
TTCTCATTCTTCTGCTGGCAGCCATGGGTTATGATCGATACGTGGCCATTTGCCACCCTCTGCGCTACAC
GGTGCTCATGGGGCACAGGGTATGCGTGGGGCTAGTAGCTGCTGCGTGTGTCTGTGGCTTCACTGTGGCAC
AGGTAATCACATCCCAGGTGTTTCGTCTACCCTTCCGCTCTTCCAATCAACTCCACCCTTTTTCTGTGACAT
CTCCCCTGTTCTCCAGTTGGCATCTCACCACCCTCACTCCACTCAGATCACCATCTTCTGCTTTGCGCGCTG
GTCTTGGTTATCCCTCTTGTGATCCTGGTATCATATTCACATCATTTCTGCCATCCTCCAATTCCCTTC
CACGCTGGGCAGGTACAAAGCGTTTTCCA

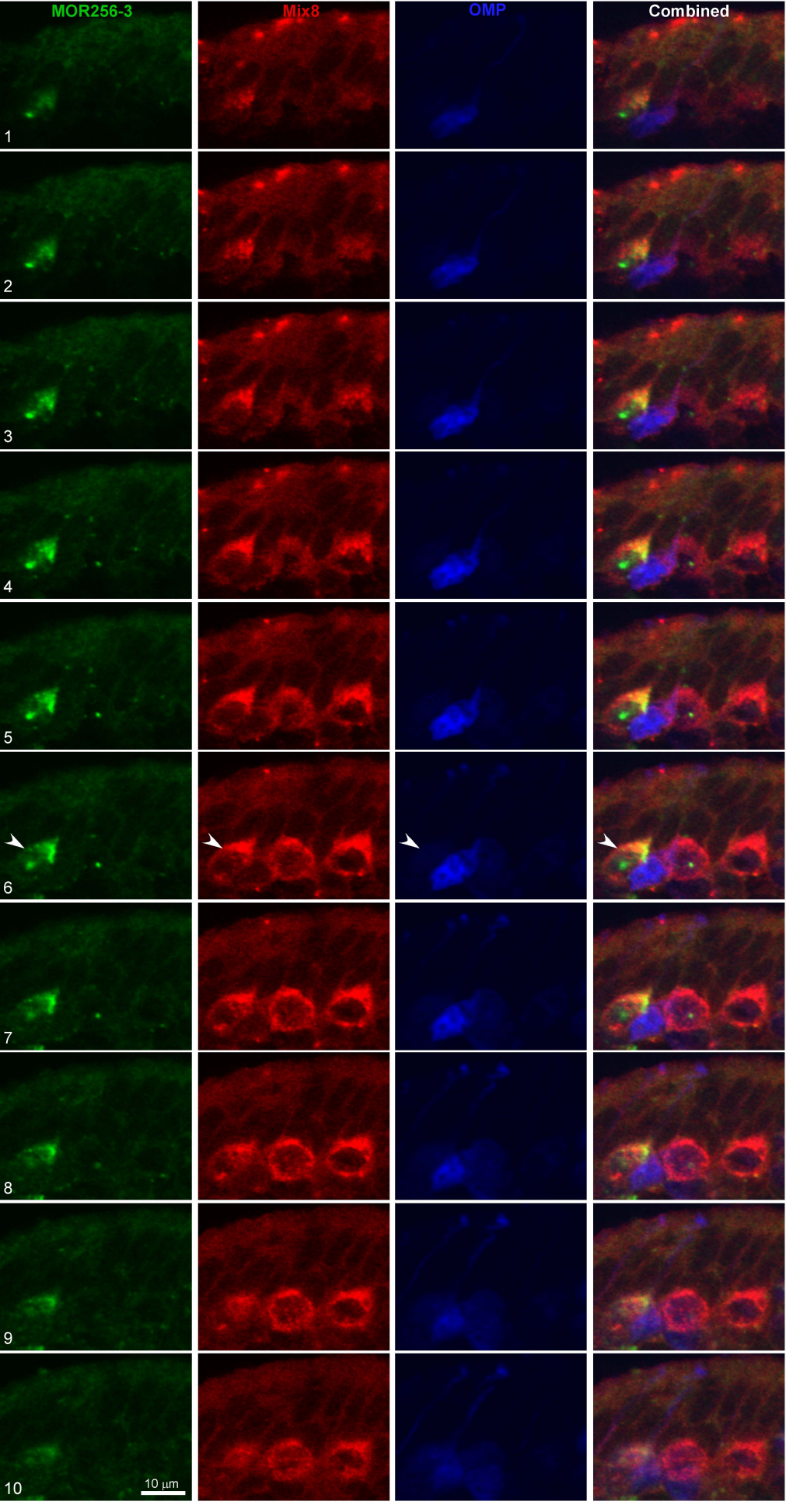
sFigure 1. The septal organ neurons predominantly express nine odorant receptors. Coronal sections from four week old animals were hybridized by a mixture of nine DIG-labeled OR probes (red) (A) and a FLU- labeled OMP probe (green) (B). The combined image of A and B is shown in (C). Mix9 included antisense RNA probes of the following receptors: MOR256-3, MOR244-3, MOR235-1, MOR0-2, MOR236-1, MOR256-17, MOR122-1, MOR160-5, and MOR267-16. The confocal images are shown at a single optical plane with a thickness of 1 μm .

sFigure 2. Coexpression of multiple odorant receptor genes in single neurons are confirmed in a stack of confocal images. Ten images taken at consecutive planes (z step = 0.5 μm , numbered from 1 to 10) from the example in Fig. 1B are shown. Arrowheads in plane 6 mark a single neuron coexpressing MOR256-3 and at least another odorant receptor in Mix8.

sFigure 3. More examples of colocalization under different conditions are shown in confocal images at a single optical plane with a thickness of 1 μm . Each row represents the staining from the same tissue section. Arrow heads mark colocalization. Mix3 contained MOR244-3, MOR236-1, and MOR0-2 probes. Mix5 contained MOR235-1, MOR160-5, MOR122-1, MOR256-17, and MOR267-16 probes.



Supplementary sFig. 1



Supplementary sFig. 2

