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Supplemental Information

Spatial Representation of Feeding and Oviposition Odors in the Brain of a Hawkmoth

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	Aromatic	Terpene	Acid	Alcohol	Aldehyde	Ester	Ketone
Terpene	**0.000**						
Acid	0.005	**0.000**					
Alcohol	0.240	**0.000**	**0.002**				
Aldehyde	0.260	**0.001**	0.021	0.390			
Ester	0.003	**0.002**	**0.000**	**0.002**	**0.002**		
Ketone	0.081	**0.000**	0.008	0.921	0.334	**0.001**	
Nitrogenous	0.357	**0.000**	**0.001**	0.301	0.092	**0.000**	0.048

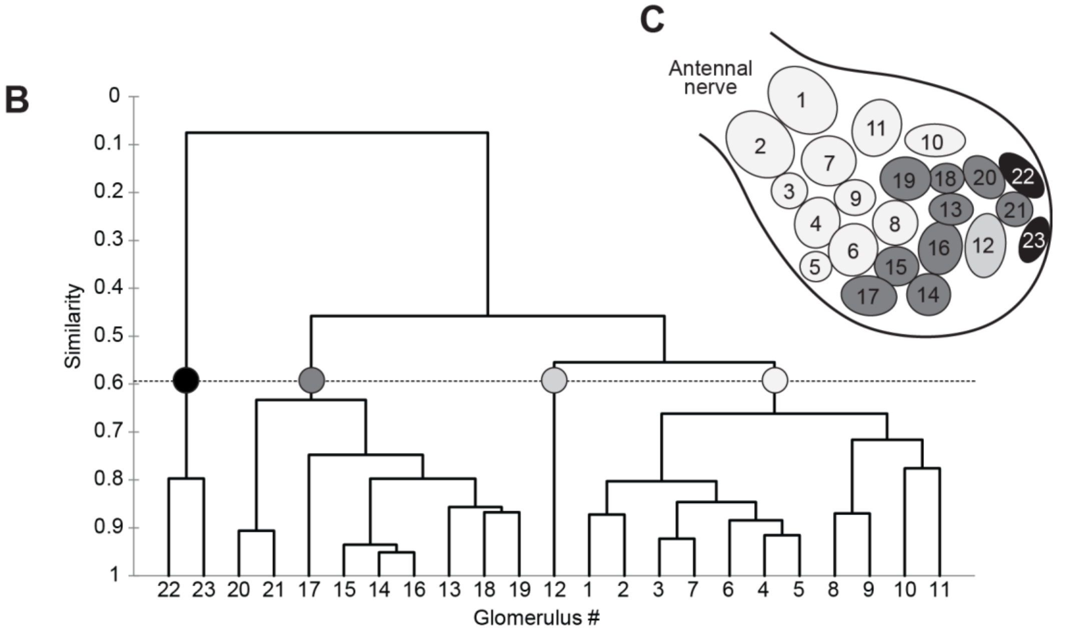

Figure S1. Odor-evoked activity patterns in the antennal lobe of *M. sexta*. Related to Figure 1.
A) The odor-evoked activation patterns across 23 glomeruli after stimulation with 80 odorants belonging to eight chemical classes were analyzed with an analysis of similarity (ANOSIM based on correlations, 10^5 permutations). Values depict p values; significant differences between chemical classes after correcting significance levels for multiple comparisons (Bonferroni-Holm) are marked in bold. **B**) Hierarchical cluster analysis (Unweighted pair-group average) based on the similarity between 23 glomerular response patterns upon stimulation with 80 odorants. The dotted line shows the result of an automatic truncation process, and reveals 4 functional classes of glomeruli. **C**) Schematic of the antennal lobe glomeruli identified in our study. Glomeruli with the same shade of grey belong to the same functional class.

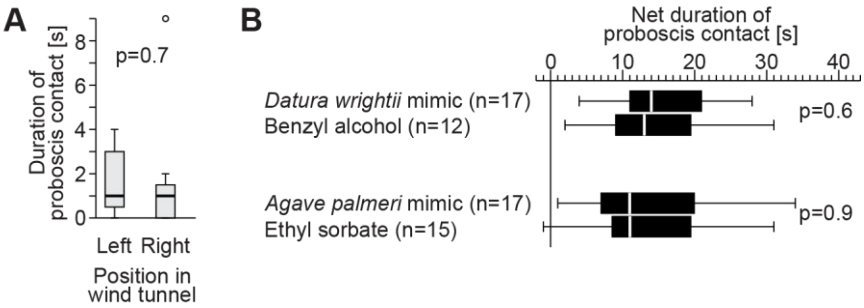

Figure S2. Control experiments in the wind tunnel. Related to Figure 2.
A) Duration of proboscis contacts moths made at two unscented, white, circular filter papers during 3 min after take-off (Wilcoxon-matched pairs test). Thirteen out of 20 tested moths contacted at least one of the filter papers with their proboscis. Boxplots depict the median proboscis contact duration (horizontal line in the box), 25th and 75th percentiles (lower and upper margins of the box) together with minimum and maximum values (whiskers), and outliers (circles). **B**) Two-choice tests (odor *versus* solvent) with behaviorally active mixtures of floral volatiles emitted by *Datura wrightii* (90% benzyl alcohol, 7% (±)-linalool, 3% benzaldehyde), and *Agave palmeri* (91% ethyl sorbate, 5% propyl valerate, 1% b-myrcene, 1% butyl butyrate, 1% ethyl tiglate, 1% benzaldehyde (Riffell et al., 2009b) were compared with experiments using only the major constituents of the *Datura* mimic (benzyl alcohol), and the *Agave* mimic (ethyl sorbate), respectively (Mann-Whitney U test). Numbers in brackets depict the number of moths out of 20 tested that contacted at least one of the filter papers with their proboscis. Boxplots depict the median net proboscis contact duration (vertical line in the box), 25th and 75th percentiles (left and right margins of the box) together with minimum and maximum values (whiskers), outliers not shown.

Table S1. List of 80 tested stimuli. Related to Experimental Procedures.
Odorants were diluted in mineral oil, except for benzoic acid, which was diluted in acetone. Odorants that did not evoke a clear response at $1{:}10^3$ were tested at $1{:}10^2$ (marked with §); 19 diagnostic odorants were tested in each animal (marked with *).

Odorant name	**CAS Number**	**Odorant name**	**CAS Number**
Acetic acid§	64-19-7	*z-3-Hexenyl benzoate§	25152-85-6
Acetophenone	98-86-2	z-3-Hexenyl propionate	33467-74-2
*2-Acetylpyridine	1122-62-9	Indole	120-72-9
Benzaldehyde	100-52-7	*z-Jasmone§	488-10-8
Benzoic acid§	65-85-0	(+)-Limonene§	5989-27-5
Benzyl acetate	140-11-4	(+)-Linalool	126-90-9
Benzyl acetone	2550-26-7	(-)-Linalool	126-91-0
Benzyl alcohol	100-51-6	*(±)-Linalool	78-70-6
*Benzyl salicylate§	118-58-1	(-)-Menthone§	14073-97-3
2,3-Butanedione	431-03-8	Methionol	505-10-2
Butyl butyrate	109-21-7	*Methyl anthranilate	134-20-3
*Butyric acid	107-92-6	Methyl benzoate	93-58-3
Cadaverine§	462-94-2	2-Methylbutylaldoxime (e/z)	49805-55-2 / 49805-56-3
Carvacrol	499-75-2	3-Methylbutylaldoxime (e/z)	5775-74-6 / 5780-40-5
*b-Caryophyllene§	87-44-5	Methyl heptenone	110-93-0
*Cinnamaldehyde	104-55-2	Methyl hexanoate	106-70-7
p-Cresol	106-44-5	*Methyl salicylate	119-36-8
Decanal	112-31-2	b-Myrcene	123-35-3
*DEET§	134-62-3	Nerol	106-25-2
Ethyl anthranilate	87-25-2	*e-Nerolidol	40716-66-3
*4-Ethyl guaiacol	2785-89-9	Nicotine§	54-11-5
Ethyl hexanoate	123-66-0	Nonanal	124-19-6
Ethyl sorbate	2396-84-1	1-Nonanol§	143-08-8
Ethyl tiglate	5837-78-5	2-Nonanone	821-55-6
Eucalyptol	470-82-6	b-Ocimene	13877-91-3
*Eugenol	97-53-0	Octanal	124-13-0
*a-Farnesene	502-61-4	Octanoic acid	124-07-2
Geraniol	106-24-1	Octanol	111-87-5
Geranyl acetate	105-87-3	2-Octanone	111-13-7
Heptanoic acid	111-14-8	Octen-3-ol	3391-86-4
2-Heptanone	110-43-0	2-Oxopentanoic acid	1821-02-9
g-Hexalactone	695-06-7	Phenyl acetaldehyde	122-78-1
Hexanal	66-25-1	2-Phenylethanol	60-12-8
Hexanoic acid	142-62-1	*Propionic acid	79-09-4
*Hexanol	111-27-3	Propyl valerate	141-06-0
2-Hexanone	591-78-6	Pyrrolidine§	123-75-1
e-2-Hexenal	6728-26-3	p-Toluquinone	553-97-9
z-3-Hexenol	928-96-1	*Valencene§	4630-07-3
e-2-Hexenyl acetate	2497-18-9	*Veratrole	91-16-7
z-3-Hexenyl acetate	3681-71-8	z-Verbenol	18881-04-4