

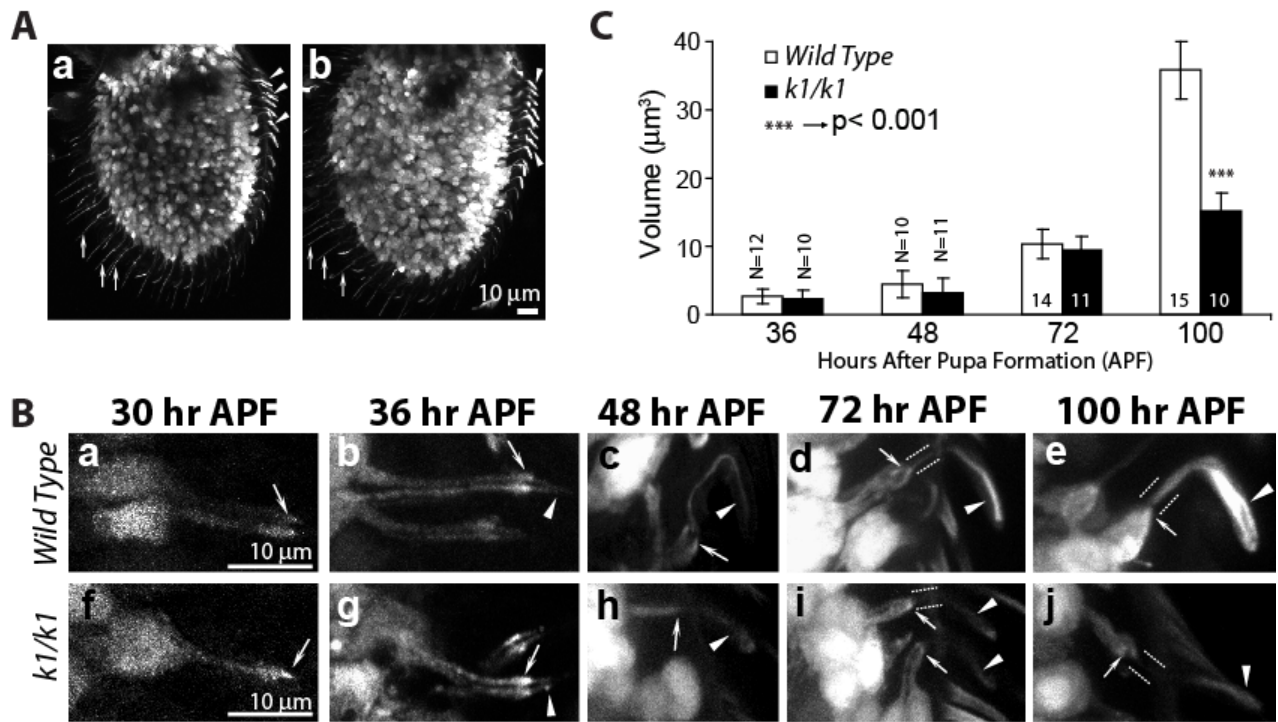
Supplemental Table 1: List of Fly Stocks used in this study.

Fly Stocks Used	Nature	Reference
<i>Cha19b-Gal4</i>	Transgene, recombinant Gal4 under <i>Cha</i> promoter, expresses in cholinergic neurons	Salvaterra and Kitamoto, 2001, Brain Res. Gene Expression Patterns 1(1): 73--82
<i>SG18.1-Gal4</i>	Transgene, recombinant Gal4, enhancer trap, expresses in sensory cilia	Shyamala and Chopra, 1999, J. Genet. 78(2): 87--97
<i>daG32-Gal4</i>	Transgene, recombinant Gal4, enhancer trap, expresses in all cells during development	Woderz et al, 1995, Cell 82, 67--76.
<i>UAS-eGFP</i>	Transgene	Spana, 1999.9.27, P{UAS-EGFP} constructs and insertions from Eric Spana.
<i>UAS-GFP:α1tub84B</i>	Transgene	Avidor-Reiss et al., 2004, Cell 117(4): 527--539.
<i>UAS-Actin5C:GFP</i>	Transgene	Ritzenthaler et al., 2000, Nature Neurosci. 3(10): 1012--1017
<i>UAS-Klp64D</i>	Transgene	Ray et al, 1999, J. Cell Biol. 147(3): 507--518
<i>UAS-DmKap</i>	Transgene	Sarpal et al, 2003, Curr. Biol. 13(19): 1687--1696
<i>Klp64D^{k1}</i>	Amorphic allele, contains a stop codon at the thirteenth amino acid position in the ORF	Ray et al, 1999, J. Cell Biol. 147(3): 507--518
<i>Klp64D^{k5}</i>	Amorphic allele, contains a missense mutation converting the 551 Glu to Lys	-do-
<i>Klp64D^{l4}</i>	Hypomorphic allele, contains a Gly102Asp change in the KLP64D protein sequence.	Sarpal et al, 2003, Curr. Biol. 13(19): 1687--1696.

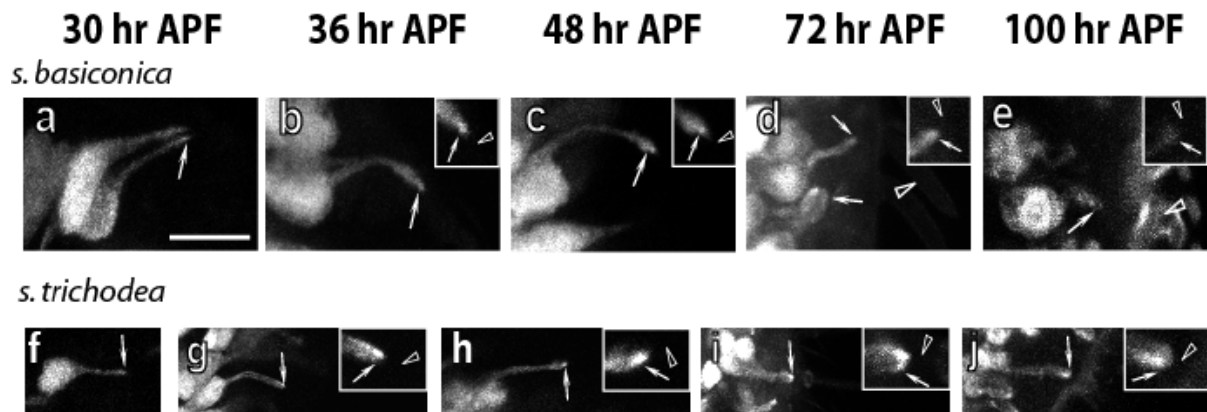
<i>Klp68D</i> ^{KG03849}	P-element insertion	Berkeley Drosophila Genome Project. Bellen et al., 2004, Genetics 167(2): 761–781.
<i>Klp68D</i> ^{EY00199}	P-element insertion	-do-
<i>DmKap</i> ^{v6}	EMS alleles	Sarpal et al, 2003, Curr. Biol. 13(19): 1687--1696.
<i>DmKap</i> ^{v5}	EMS alleles	-do-

Supplementary Figure 1: Olfactory cilia growth in the adult antennae in wild type and *Klp64D* mutant.

A) Comparison of *UAS-eGFP* expression in the ORNs due to *Gal4^{SG18.1}* (a) and *Gal4^{Cha19B}* (b): both marked the entire cell including the cilia inside *s. basiconica* (arrow heads) and *s. trichodea* (arrows) shafts at 100 hrs after pupa formation (APF). B) Cilia growth inside *s. basiconica* shafts during development highlighted by the *UAS-eGFP* expression due to *Gal4^{cha19b}* in the wild type (a-e), homozygous *Klp64D^{k1}* (f-g) backgrounds. Labels on the left margin of each row indicate the genotypic backgrounds and the top of the column indicates the pupa stage in hours. Arrow indicate the cilia base in the IS, paired dotted lines indicate the CC and the arrowhead indicate the OS in each panel. C) Histograms depict the growth of the cilia volumes inside the *s. basiconica* shafts in developing wild-type (open bars) and homozygous *Klp64D^{k1}* (solid filled bars) antennae. Error bars indicate \pm S. D. and sample numbers (N) are indicated on the bars. Scale bar 10 μ m for all the panels. The results are identical to the one presented in Figures 2 and 5, respectively.

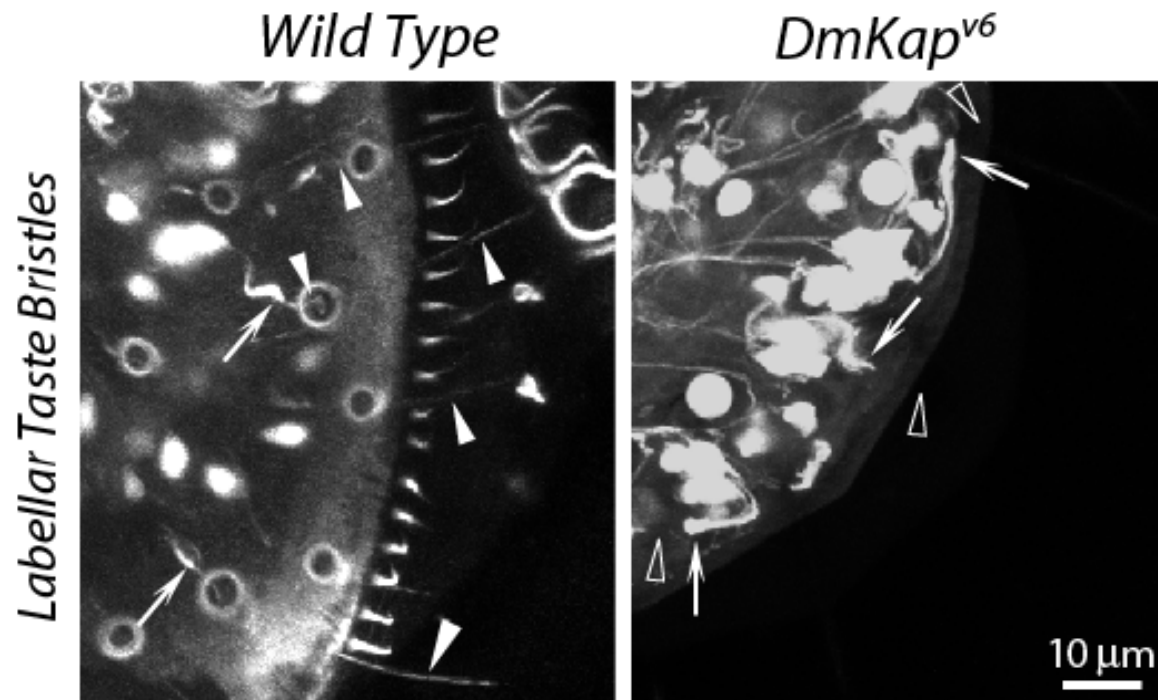


Supplemental Figure 2: Cilia growth monitored by UAS-eGFP expression in the ORNs due to the *Gal4^{SG18.1}* driver in the *DmKap^{v6}* homozygous background. Arrowheads indicate the ciliary base at the tip of the IS and the open arrowheads indicate the missing OS. Insets show the enlarge view of the IS tips highlighting the missing cilia.



Supplemental Figure 2:

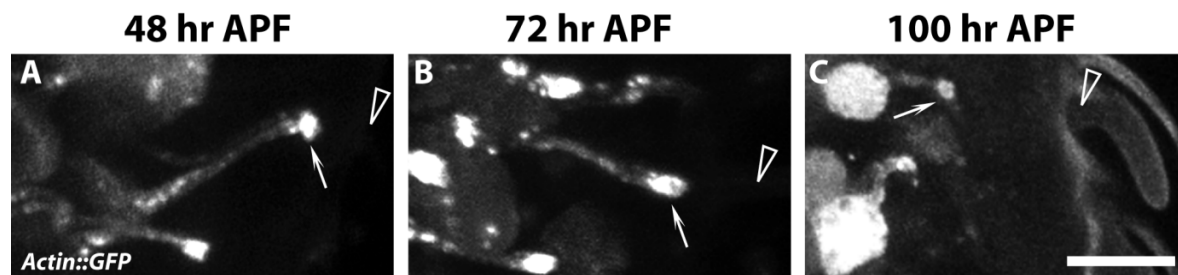
Supplemental Figure 3: Mutation in DmKap eliminates the cilia on gustatory neurons in the adult labellum. *UAS-eGFP* expression in the gustatory neurons due to *Gal4^{SG18.1}* marked the entire cell. In the wild type (A) background it highlighted long thin cilia (arrowheads) extended from the dendrites (arrows) of the neurons that were absent in the homozygous *DmKap* (B) background. Open arrowheads indicates the positions of the bristle shafts in B and the scale bar indicate 10 μm for both A and B.



Supplemental Figure 3:

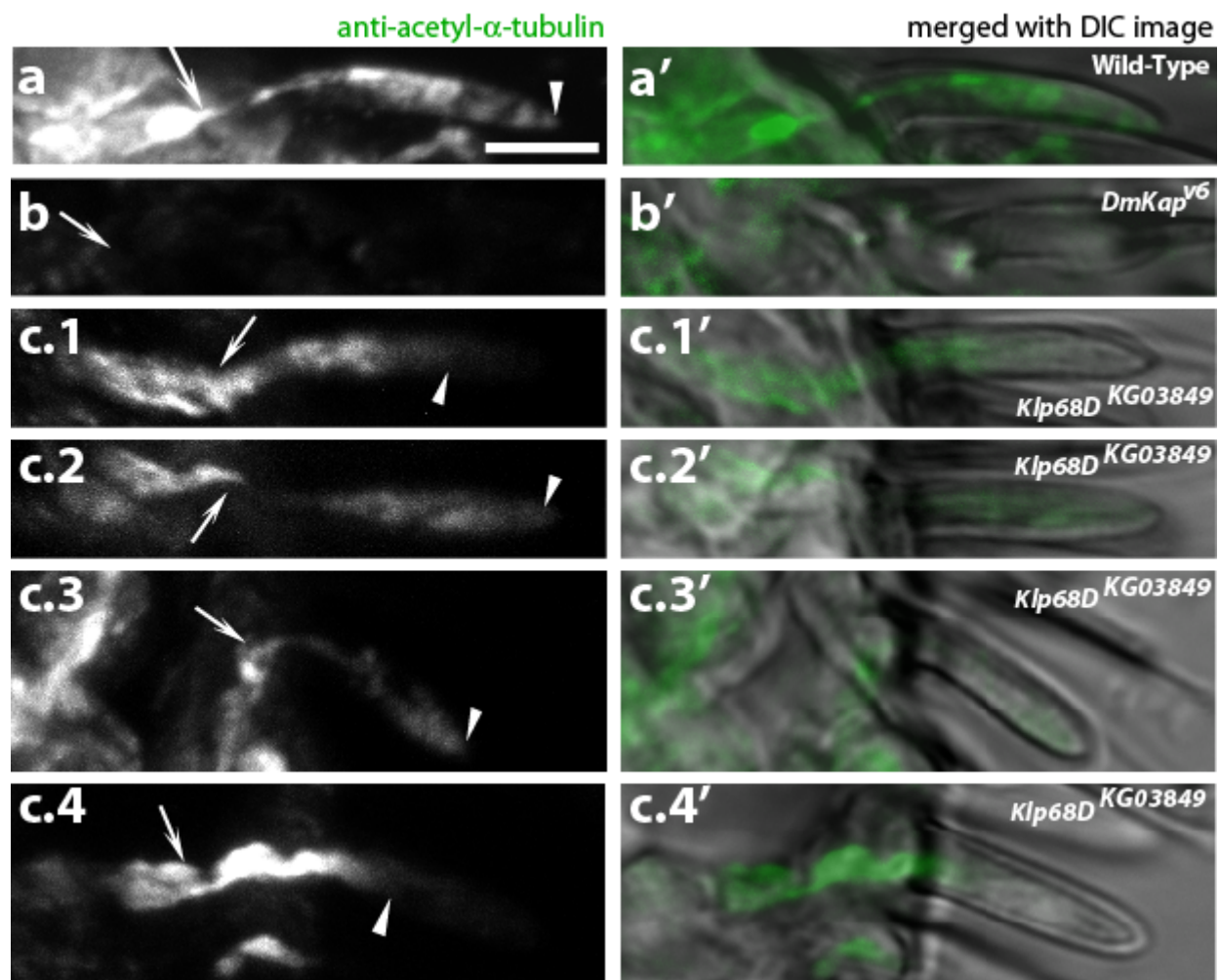
Supplemental Figure 4: Actin5C:GFP accumulated at the base but failed to enter the developing cilia.

The *UAS-Actin:GFP* expression in the developing ORNs due to *Gal4^{cha19B}* marked the entire cell including the IS at 48 hrs (A), 72 hrs (B) and 100 hrs (C) of pupal stage but not the cilia. Arrow indicates the cilia base in IS and open arrowheads indicate empty shaft. Scale bar indicates 10 μ m.



Supplemental figure 4:

Supplemental Figure 5: Mutations in *Klp68D* reduce tubulin acetylation in the ciliary outer segments, but tubulin acetylation is absent in *DmKap* mutant. Anti-acetylated-alpha-tubulin staining highlighted the IS (arrows) and the entire olfactory cilia (arrowheads) in the wild type (a, a'), homozygous *DmKap*^{v6} (b, b') and *Klp68D*^{KG03849} (c1.1-c1.4, c1.1'-c1.4') adults. Panels a-c show acetylated-alpha-tubulin staining in *s. basiconica*, and, a'-c' show DIC merged image of a-c. Arrowhead indicates the OS, and arrow indicate the IS in each panel. The pictures were taken from antennal sections at 100 hrs. a-c and a'-c' are shown in the same scale as indicated by the bar (10 μm) in a.



Supplemental Figure 5: