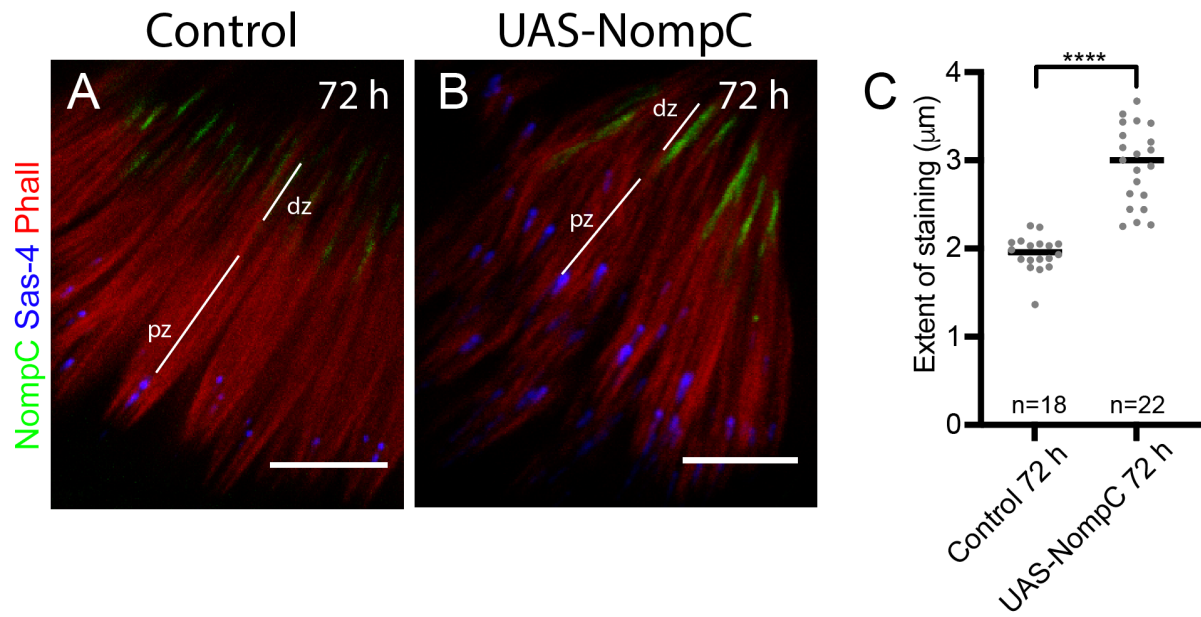
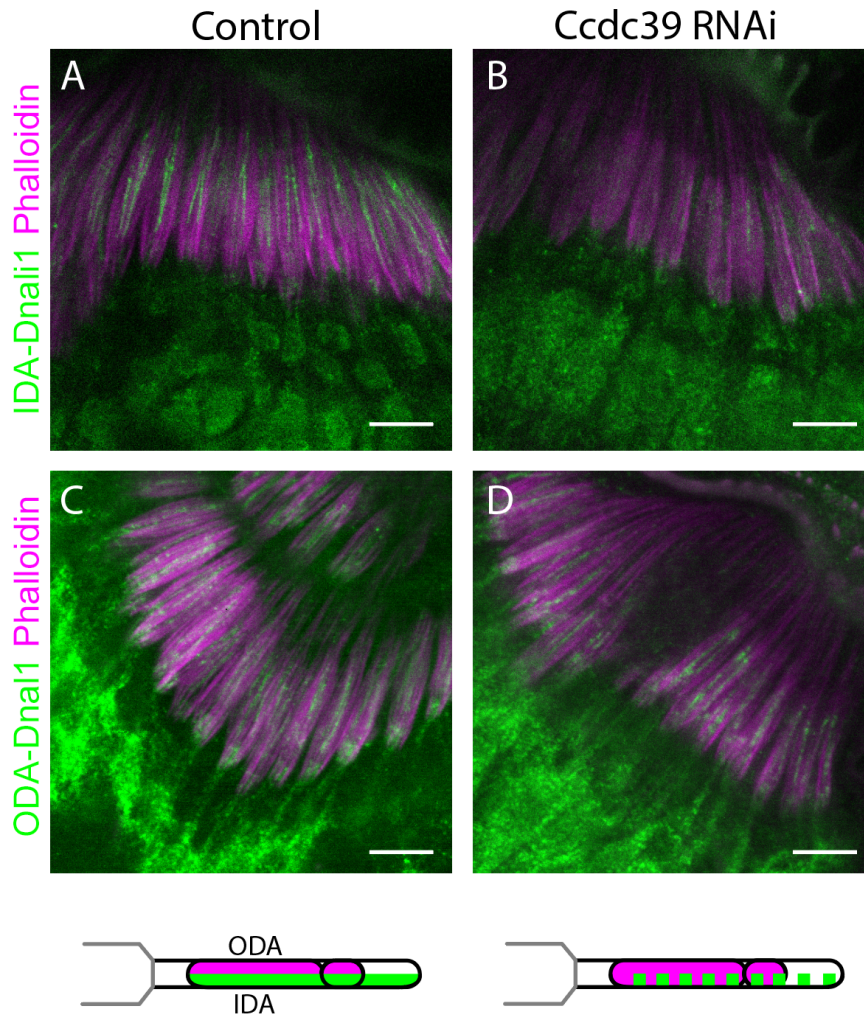




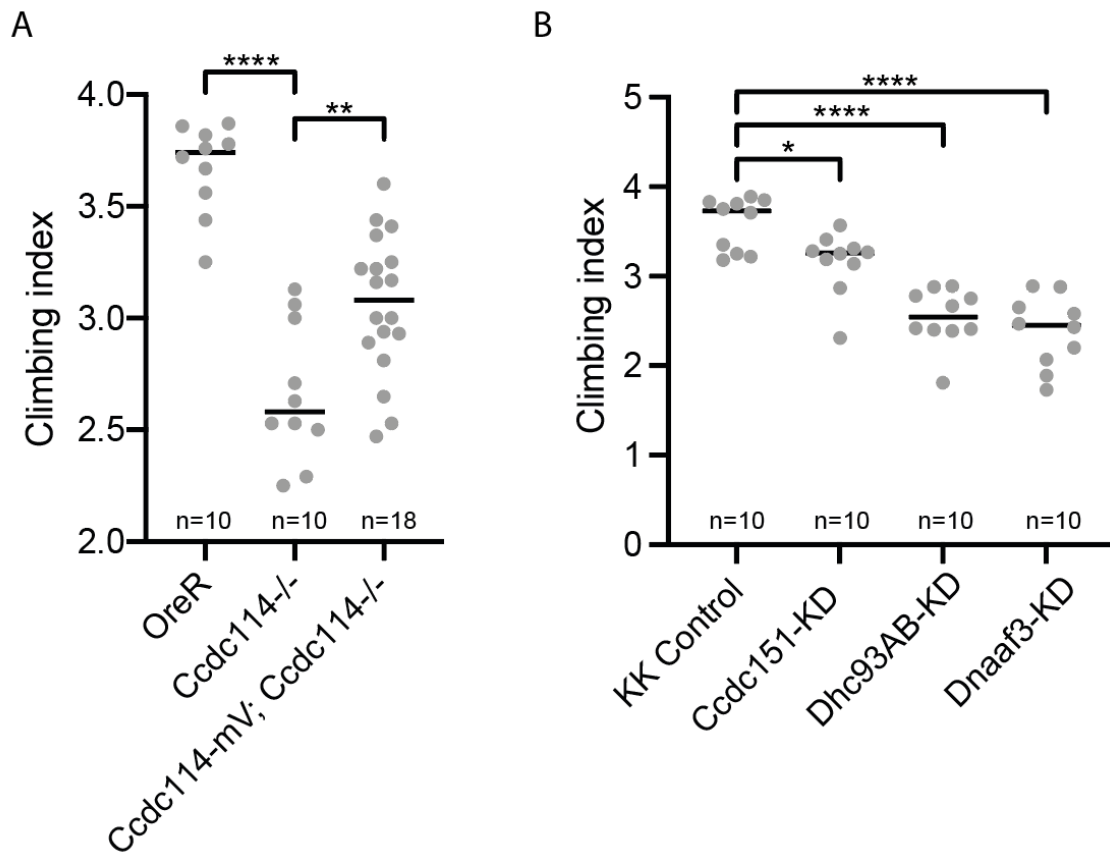
Supplementary Fig. S1. NompC overexpression does not strongly alter its localisation to the distal zone

(A,B) 72-h pupal antenna showing NompC (green), Sas-4 (blue), phalloidin (red). (A) Control (*scaGal4/+*). (B) NompC overexpression (*scaGal4, UAS-NompC*), showing longer extent of NompC labelling. (C) Graph comparing length of NompC labelling. Significance determined by two-tailed Mann-Whitney U test (****: $P < 0.0001$). All scale bars are 5 µm.



Supplementary Fig. S2. Knockdown of *Ccdc39* reduces localisation in the cilium IDA-Dnal1 but not ODA-Dnal1.

72-h pupal antennae. (A,B) Immunofluorescence for IDA-Dnal1-mVenus (green), phalloidin (magenta). (A) Control (*scaGal4/+*). (B) *Ccdc39* knockdown (*scaGal4, UAS-Ccdc39-RNAi*). (C,D) Immunofluorescence for ODA-Dnal1-mVenus (green), phalloidin (magenta). (C) Control (*scaGal4/+*). (D) *Ccdc39* knockdown (*scaGal4, UAS-Ccdc39-RNAi*). Below the panels is a schematic summary. All scale bars are 5 μ m.



Supplementary Fig. S3. Climbing assays to test proprioceptive behaviour of flies

(A) *Ccdc114* homozygote flies perform significantly worse than wild-type flies (OreR) in a climbing assay (****: $P < 0.0001$). Rescue of homozygotes by one copy of the *Ccdc114*-mVenus fusion gene improved their performance significantly compared to homozygotes (**: $P = 0.0027$). Significance was determined by one-way Anova followed by Dunnett's test for multiple comparisons. $n = 10$ batches of 15 flies (or 18 batches for rescue cross). (B) Knockdown of *Ccdc151* and *Dhc93AB* (*scaGal4*, UAS-RNAi) result in impaired performance in climbing assay compared to control (*scaGal4*, KK control line). For comparison, knockdown of *Dnaaf3* is also included, in which dynein arms are completely absent from the cilia (zur Lage et al., 2021). Significance was determined by one-way Anova followed by Dunnett's test for multiple comparisons: *CG14127*: $p = 0.0246$; *Dhc93AB*: $P < 0.0001$; *Dnaaf3*: $P < 0.0001$. $n = 10$ batches of 15 flies.

Supplementary Table S1. Oligonucleotides used in this study

Name of oligonucleotide	Sequence
mVenus constructs	
CG6971-L	GGGGACAAGTTTGTACAAAAAAGCAGGCTG AATTGGAAATGTGCAACGA
CG6971-R	GGGGACCACTTTGTACAAGAAAGCTGGGTC CTTCTTGGGTGCGGTTATGC
CG8800-attB Fw	GGGGACAAGTTTGTACAAAAAAGCAGGCTG GCAAGCGTGGAAATCGCAAG
CG8800-attB Rv	GGGGACCACTTTGTACAAGAAAGCTGGGTC AAGCTGCGGCTCCTCGTTGAGC
CG17387mVenus left	GGGGACAAGTTTGTACAAAAAAGCAGGCTT GACTACCGGCTTTGAGAAAT
CG17387mVenus right	GGGGACCACTTTGTACAAGAAAGCTGGGTC TTTTTTCTTCGGCAAGGGCAACTC
CG14905mVenus 5	GGGGACAAGTTTGTACAAAAAAGCAGGCTG TACAAATCGAGCGCTGCGTTGCTC
CG14905mVenus 3	GGGGACCACTTTGTACAAGAAAGCTGGGTC GTTTTTAGTTTTCGCCGATTCCCGT
pBID modification	
pBID UAS_del	TCGATCCGCTTGTCATGCCTGCAGGTATCGAGCGCAGCGGTATAAAAGGGC
Gibson cloning of pBID-GmCherry	
cassette-fwd	CGCAGATCTGCGGCCGCGGCTCGAGGGCCGGATCCGAA
cassette_rev	TGCTCACGCATGCGATATCAACCACTTTGTACAAGAAAGC
mCherry_fwd	TTGATATCGCATGCGTGAGCAAGGGCGAG
mCherry_rev	GGTTCCTTCACAAAGATCCTCTAGACTACTTGTACAGCTCGTCC
CG14905 CRISPR RNA guides	
RNA guide oligonucleotide 1 sense	CTTCGGTGGCAAGTTGCTTAGTAA
RNA guide oligonucleotide 1 antisense	AAACTTACTAAGCAACTTGCCACC
RNA guide oligonucleotide 2 sense	CTTCGTGTTCCCAAATTCAACATA
RNA guide oligonucleotide 2 antisense	AAACTATGTTGAATTTGGGAACAC
CG14905 CRISPR homology arms	
Left HA EcoRI 14905	GCCGAATTTCGCAACAACAACCACAACAGC
Left HA NotI 14905	GATGCGGCCGCGGTTTATCGAAGACTTTTACC
right HA PstI 14905	GCCCTGCAGTCGGCGAAAATAAAAACTA
Right HA XhoI 14905	GATCTCGAGGGCAGAAGGACCCAGTAAGT