Supplemental Figure Legends

Supplemental Figure 1. Acetyl-α-tubulin overlapped with ARL13B in the cilia of mouse IMCD3 cells with (*upper panel*) or without *(lower panel*) nicotinamide treatment shown by co-staining with anti-acetyl-α-tubulin antibody (*red*) and anti-α-ARL13B antibody (*green*) and counterstained with DAPI (*blue*). Scale bar, 10 μm.

Supplemental Figure 2. Mouse IMCD3 cells with nicotinamide treatment were stained with anti-SIRT2 antibody (*red*) and anti-acetyl-α-tubulin antibody (*green*) and counterstained with DAPI (*blue*). Arrows point basal body. Scale bar, 10 μm.

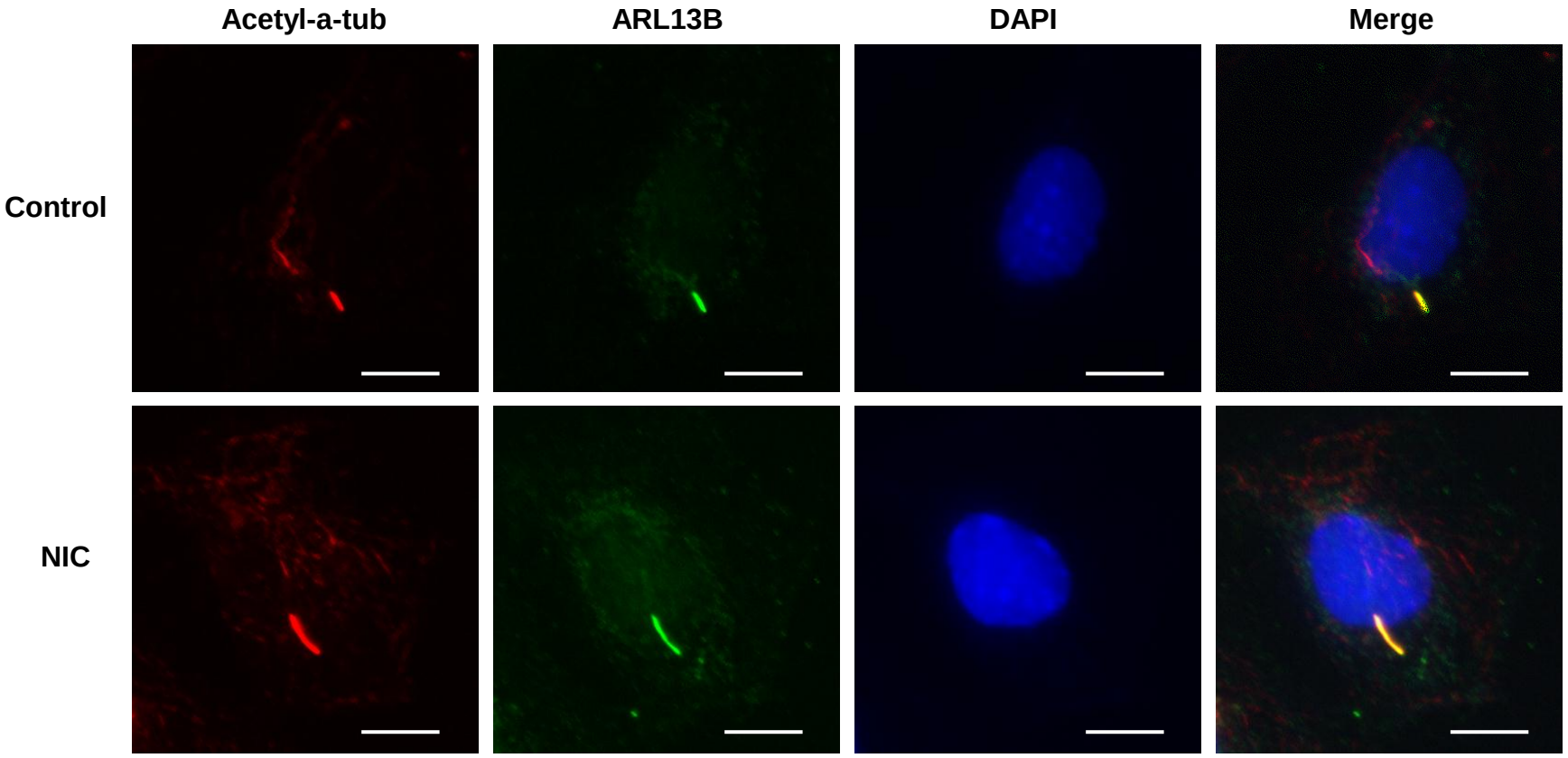
Supplemental Figure 3. (**A**) Quantification of BrdU staining in mouse IMCD3 cells with nicotinamide treatment at the indicated time points following serum refeeding. (**B**) Quantification of BrdU staining in mouse IMCD3 cells transduced with pGIPZ-NS or pGIPZ-shPkd1 at the indicated time points following serum refeeding.

Supplemental Figure 4. Knockdown of SIRT2 increases cilia length in Kupffer's vesicle of zebrafish embryos. (**A**) The knockdown efficiency of SIRT2 morpholino (SIRT2-Mor-2) targeting intron 1 - exon 2 site was analyzed by reverse transcription PCR. (**D**) Whole-mount immunofluorescence microscopy of cilia at the Kupffer's vesicle in embryos at the 10 SS, injected with control or SIRT2 morpholino (SIRT2-Mor-2). Scale bar, 5 μm. (**E**) Cilia lengths in Kupffer's vesicle (KV) were measured at the 10 SS embryos injected with control or SIRT2 morpholino (SIRT2-Mor-2) respectively. n represents total cilia numbers that were measured for cilia length from 7 embryos per group. ** $p < 0.01$. (**F**) Cilia numbers in Kupffer's vesicle (KV) (n = 10) at the 10 SS embryos injected with control or SIRT2 morpholino (SIRT2-Mor-2) respectively.

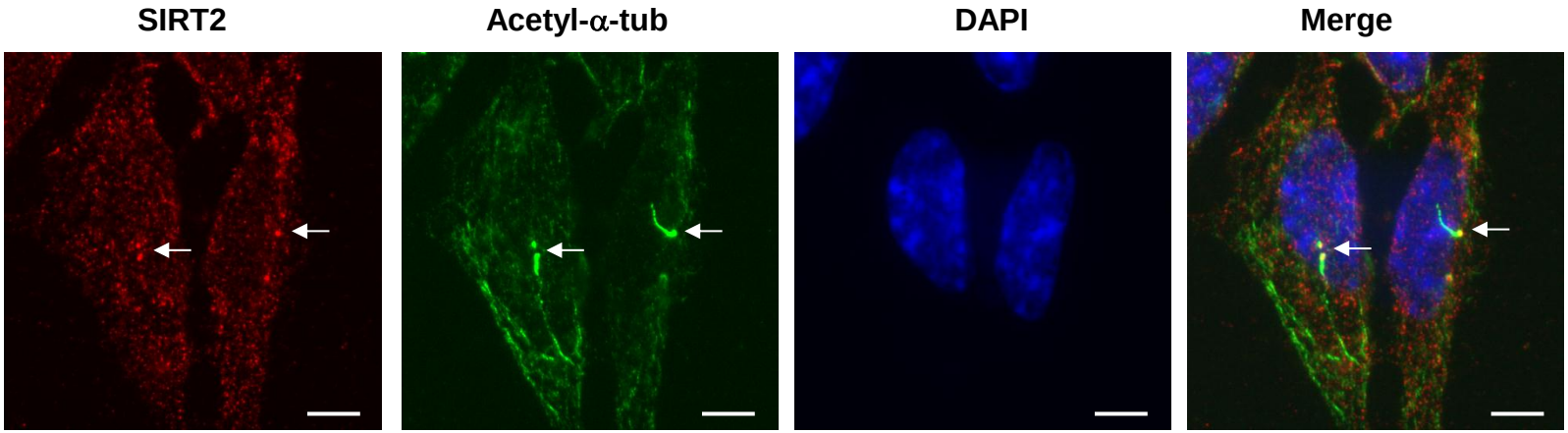
Supplemental Figure 5. Knockdown or loss of *Pkd1* leads to aberrant centrosome amplification and atypical mitoses. (**A**) Cells with *Pkd1* knockdown show abnormal centrosome numbers. Mouse IMCD3 cells transduced with lentivirus carrying pGIPZ-NS (control) or pGIPZ-shPkd1 vectors were immunostained for pericentrin (*red*) to visualize the centrosomes and were counterstained with DAPI (*blue*). Scale bar, 10 μm. (**B**) Cells with *Pkd1* knockdown show atypical mitoses with multipolar spindles. Mouse IMCD3 cells transduced with pGIPZ-NS or pGIPZ-shPkd1 were immunostained for acetyl-α-tubulin (*red*) to visualize the spindle and were counterstained with DAPI (*blue*). Scale bar, 10 μm. (**C** and **D**) Abnormal centrosome amplification was detected in kidneys from *Pkd1*$^{flox/flox}$*:Ksp-Cre* mice (**C**, right) and ADPKD patients (**D**, right) but not in age-matched wild type kidneys (**C**, left) and normal human kidneys (**D**, left). Pericentrin (*red*), DAPI (*blue*).

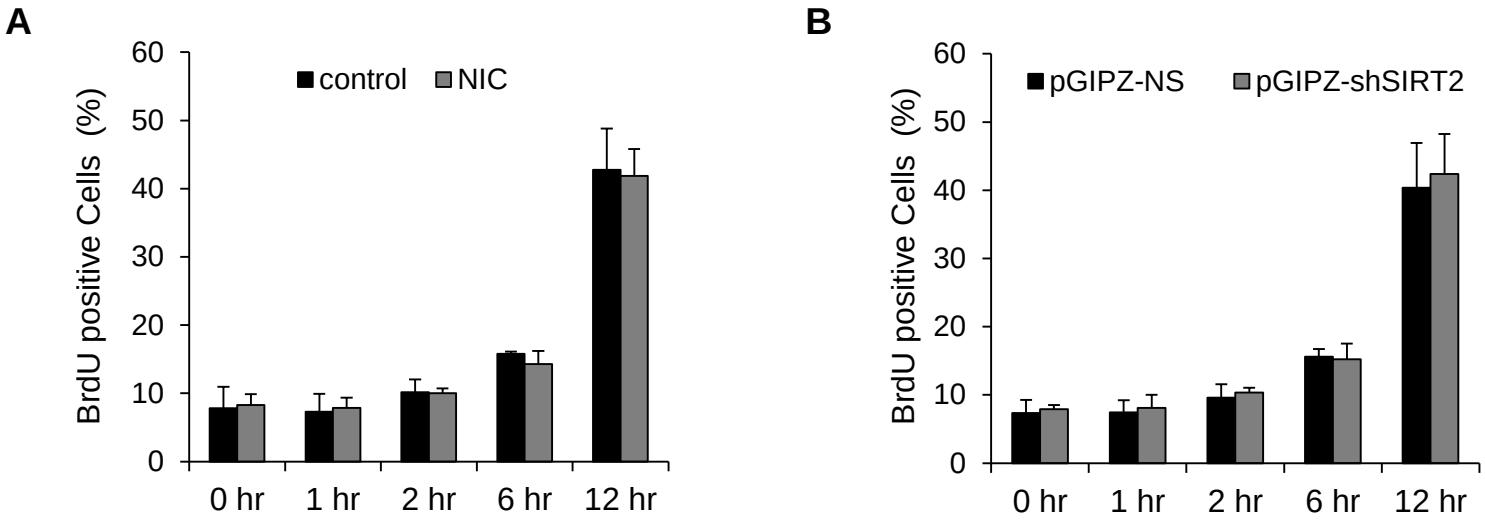
Supplemental Figure 6. SIRT2 colocalized with centrosomes in *Pkd1* null MEK cells. *Pkd1* null MEK cells were immunostained with anti-SIRT2 (*green*) antibody and anti-γ-tubulin (*red*) antibody, a centrosome marker, and counterstained with DAPI (*blue*). Scale bar, 10 μm.

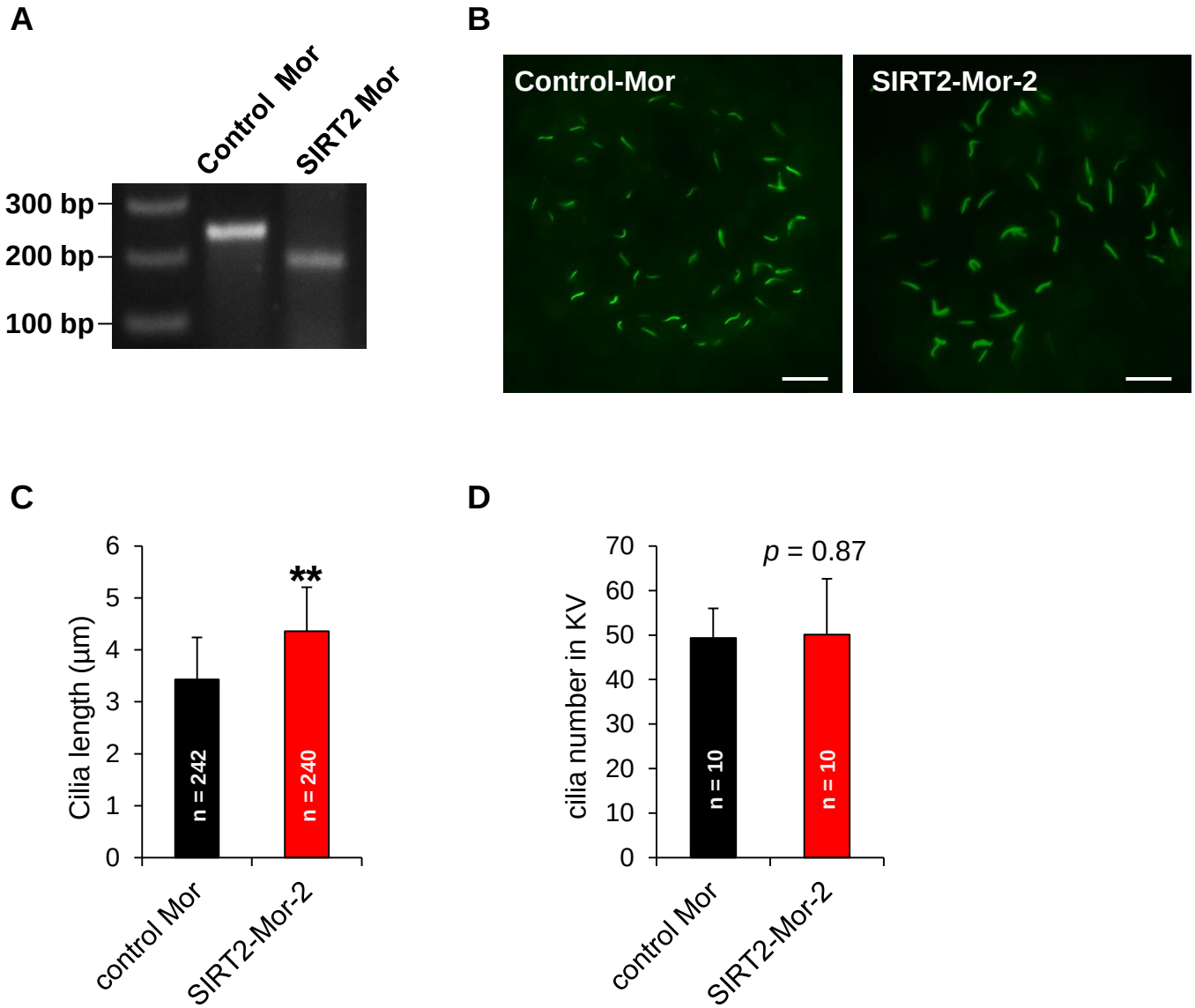
Supplemental Figure 1

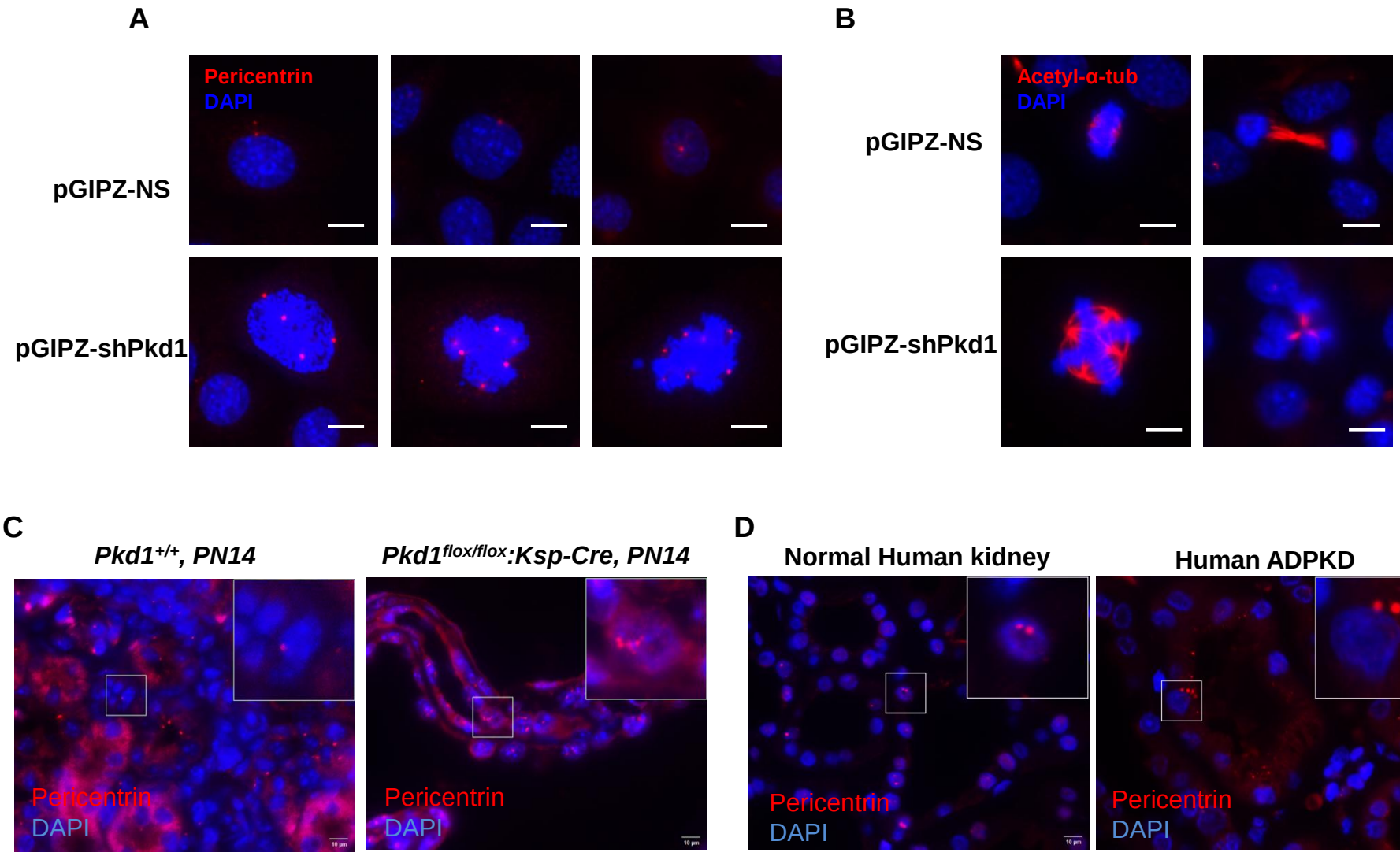


Supplemental Figure 2




A
BrdU positive Cells (%)
60
50
40
30
20
10
0
control
NIC
0 hr
1 hr
2 hr
6 hr
12 hr
B
BrdU positive Cells (%)
60
50
40
30
20
10
0
pGIPZ-NS
pGIPZ-shSIRT2
0 hr
1 hr
2 hr
6 hr
12 hr


A
Control Mor
SIRT2 Mor
300 bp
200 bp
100 bp
B
Control-Mor
SIRT2-Mor-2
C
Cilia length (µm)
0
1
2
3
4
5
6
**
n = 242
n = 240
control Mor
SIRT2-Mor-2
D
cilia number in KV
0
10
20
30
40
50
60
70
p = 0.87
n = 10
n = 10
control Mor
SIRT2-Mor-2


A
Pericentrin
DAPI
pGIPZ-NS
pGIPZ-shPkd1
B
Acetyl-α-tub
DAPI
pGIPZ-NS
pGIPZ-shPkd1
C
Pkd1+/+, PN14
Pkd1flox/flox:Ksp-Cre, PN14
Pericentrin
DAPI
Pericentrin
DAPI
D
Normal Human kidney
Human ADPKD
Pericentrin
DAPI
Pericentrin
DAPI

Supplemental Figure 6