

**S1 Table. Key Reagents/Resources used in this study.**

REAGENT or RESOURCE	SOURCE	IDENTIFIER
Antibodies		
GFP Tag Monoclonal Antibody (3E6)	Molecular Probes	Cat#: A-11120 RRID:AB_221568
Donkey anti-Mouse IgG (H+L) Highly Cross-Adsorbed Secondary Antibody, Alexa Fluor 488	Molecular Probes	Cat#: A-21202 RRID:AB_141607
Chemicals, Peptides, and Recombinant Proteins		
Roscovitine	Sigma-Aldrich	Cat#: R7772
VX-680 (Tozasertib)	Selleckchem.com	Cat#: S1048
AMG-900	Selleckchem.com	Cat#:S2719
DMSO	Sigma-Aldrich	Cat#:D2650
CLIP-Cell TMR-Star	New England Biolabs	Cat#: S9219S
Brefeldin A	Sigma-Aldrich	Cat#: B7651
AlexaFluor Phalloidin 633	Molecular Probes	Cat#: A22284
DRAQ5	Cell Signaling Technologies	Cat#: 4084
Experimental Models: Organisms/Strains		
<i>C. robusta</i>	M-Rep	N/A
Oligonucleotides		
Rab11_BamHI_F: 5'- ATTGGGATCCAATGGGAACCAAAGATGACG-3'	Sigma-Aldrich	N/A
Rab11_BlpI_R: 5'- GAAGCTCAGCTAGATATTTTTACAACATTG-3'	Sigma-Aldrich	N/A
Rab7_BamHI_F: 5'- AAAGGATCCAATGGCGTCAAGGAA-3'	Sigma-Aldrich	N/A
Rab7_BlpI_R: 5'- TTTGGATCCAGCATGAGCAATCTC-3'	Sigma-Aldrich	N/A
Rab7noBlp_F: 5'- TATCCCATACTTTGAATGTTTCAGCGAAGGACAACAT C-3'	Integrated DNA Technologies, Inc.	N/A
Rab7noBlp_R: 5'- GATGTTGTCCTTCGCTGAACATTCAAAGTATGGGAT A-3'	Integrated DNA Technologies, Inc.	N/A
Rab4_BamHI_F: 5'- AAAGGATCCTATGAGTGAAAGATACGA-3'	Sigma-Aldrich	N/A
F ClipSnapNot: 5'- AAAGCGGCCGCCCAAACCATGGACAAAGACTGCGA AATG-3'	Integrated DNA Technologies, Inc.	N/A
R HaloCLIP Bam: 5'- AAAGGATCCAGGATAACTCGAGATCTGAGTCCG-3'	Integrated DNA Technologies, Inc.	N/A
Rab4_BlpI_R: 5'- TTTGCTCAGCTCAAGCACATTTACATT-3'	Sigma-Aldrich	N/A
Rab4ST_AA_F:5'- GCATTAAGACAATTACGCGCCGCAAATCGACAAAG GAACGTC-3'	Integrated DNA Technologies, Inc.	N/A
Rab4ST_AA_R: 5'- AAAGCTCAGCAAAGATTGACCAATCAGGAGTGTCG- 3'	Integrated DNA Technologies, Inc.	N/A

Rab4S_A_F: 5'- GCATTAAGACAATTACGCGCCACAAATCGACAAAG GAAC-3'	Integrated DNA Technologies, Inc.	N/A
Rab4S_A_R: 5'- GTTCCCTTTGTCGATTTGTGGCGCGTAATTGTCTTAAT GC-3'	Integrated DNA Technologies, Inc.	N/A
Rab4ST_DD_F: 5'- GCATTAAGACAATTACGCGACGACAATCGACAAAG GAACGTC-3'	Integrated DNA Technologies, Inc.	N/A
Rab4ST_DD_R: 5'- GACGTTCCCTTTGTCGATTGTCGTCGCGTAATTGTCTT AATGC-3'	Integrated DNA Technologies, Inc.	N/A
VAM2_Forward: 5'- AAAGGATCCGAATAATATGAACCACTGGGAGG-3'	Integrated DNA Technologies, Inc.	N/A
VAM2_Reverse: 5'- AAAGCTCAGCAAAGATTGACCAATCAGGAGTGTCG- 3'	Integrated DNA Technologies, Inc.	N/A
CKI_NotI_F: 5'- AAAGCGGCCGCAATGGTTCCCCCACCTTCGTACAAT GC-3'	Integrated DNA Technologies, Inc.	N/A
CKI_Blp_R: 5'- AAAGCTCAGCTTCAATGAGTTGGAAGCGACCATGG- 3'	Integrated DNA Technologies, Inc.	N/A
CyBDN Not1F: 5'- AAAGCGGCCGCAAAGATGCAACTCCAGAAACCAAC AACCACC-3'	Integrated DNA Technologies, Inc.	N/A
CyBDN EcoR1R: 5'- AAAGAATTCATAACTTGTGACTTGCTGCCTGCTCTG C-3'	Integrated DNA Technologies, Inc.	N/A
Recombinant DNA		
Unigene collection clone (Rab4)	Cogenics	VES67_I21
Unigene collection clone (Rab7)	Cogenics	VES63_C01
Unigene collection clone (Rab11)	Cogenics	VES68_O04
Unigene collection clone (Vam2)	Cogenics	VES88_L15
CLIP-rGBD Rho	W. M. Bement	N/A
HALO-rGBD	W. M. Bement	N/A
<i>Mesp&gt;LacZ</i>	(Davidson et al., 2005)	N/A
<i>Mesp&gt;FGFR::Venus</i>	(Cota and Davidson, 2015)	N/A
<i>Mesp&gt;CLIP::Rab4</i>	This study	N/A
<i>Mesp&gt;HALO::Rab4</i>	This study	N/A
<i>Mesp&gt;HALO::Rab4<sup>S199A/T200A</sup></i>	This study	N/A
<i>Mesp&gt;HALO::Rab4<sup>S199A</sup></i>	This study	N/A
<i>Mesp&gt;HALO::Rab4<sup>S199D/T200D</sup></i>	This study	N/A
<i>Mesp&gt;E-Cadherin::GFP</i>	(Norton et al., 2013)	N/A
<i>Mesp&gt;CLIP::Rab7</i>	This study	N/A
<i>Mesp&gt;CLIP::Rab11</i>	This study	N/A
<i>Mesp&gt;HALO::Vam2<sup>421-841</sup></i>	This study	N/A
<i>Mesp&gt;Cdk1(p27)</i>	This study	N/A
<i>Mesp&gt;CyclinB<sup>300</sup></i>	This study	N/A
Software and Algorithms		

FIJI(ImageJ)	NIH	RRID:SCR_002285
Matlab	Mathworks	RRID:SCR_001622
Other		
35mm glass-bottom culture dish	MatTek	Cat#: P35G-0-10-C