**Supplementary File 2a. Primary antibodies used in this study**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Antigen group** | **Antigen** | **Host** | **Clonality** | **Application** | **Dilution** | **Source** |
| Nups | Tpr | Rabbit | Polyclonal | Western blot | 1:1000 | Abcam (ab84516) |
| Immunofluorescence | 1:300 |
| Mouse | Monoclonal | Immunofluorescence | 1:200 | Santa Cruz (sc-271565) |
| Nup358  Nup214  Nup153  Nup62 | Mouse | Monoclonal | Western blot | 1:4000 | Covance (MMS-120R) |
| Immunofluorescence | 1:500 |
| Nup153 | Mouse | Monoclonal | Immunofluorescence | 1:3 | In-house (SA1) |
| Rat | Monoclonal | Immunofluorescence | 1:300 | Abcam (ab81463) |
| Nup96 | Rabbit | Monoclonal | Western blot | 1:1000 | Abcam (ab124980) |
| Nup93 | Mouse | Monoclonal | Western blot | 1:200 | Santa Cruz (sc-81343) |
| Nup50 | Rabbit | Monoclonal | Western blot | 1:1000 | Abcam (ab151567) |
| ELYS | Rabbit | Polyclonal | Western blot | 1:1000 | In-house |
| Nup205 | Rabbit | Polyclonal | Western blot | 1:500 | In-house |
| Nup188 | Rabbit | Polyclonal | Western blot | 1:1000 | Bethyl Laboratories (A302-323A) |
| Nup160 | Rabbit | Polyclonal | Western blot | 1:500 | In-house |
| Nup155 | Guinea Pig | Polyclonal | Western blot | 1:1000 | In-house |
| Nup85 | Rabbit | Polyclonal | Western blot | 1:500 | In-house |
| Sec13 | Rabbit | Polyclonal | Western blot | 1:500 | In-house |
| Nup37 | Rabbit | Polyclonal | Western blot | 1:500 | In-house |
| Pom121 | Rabbit | Polyclonal | Western blot | 1:1000 | Invitrogen (PA5-36498) |
| Immunofluorescence | 1:300 |
| Caspases | Caspase-3 | Rabbit | Polyclonal | Western blot | 1:1000 | Cell Signaling Technology (9661) |
| Caspase-9 | Rabbit | Polyclonal | Western blot | 1:1000 | Cell Signaling Technology (9504) |
| Caspase-12 | Rat | Monoclonal | Western blot | 1:200 | Santa Cruz (sc-21747) |
| IAPs | XIAP | Rabbit | Polyclonal | Western blot | 1:1000 | Cell Signaling Technology (2042) |
| Survivin | Rabbit | Monoclonal | Western blot | 1:1000 | Cell Signaling Technology (2808) |
| Differentiation-  related | Cleaved Notch1 | Rabbit | Monoclonal | Western blot | 1:1000 | Cell Signaling Technology (4147) |
| Myogenin | Mouse | Monoclonal | Western blot | 1:1000 | BD Biosciences (556358) |
| Immunofluorescence | 1:200 |
| Myosin heavy chain | Mouse | Monoclonal | Western blot | 1:100 | In-house (MF20) |
| Sox2 | Rabbit | Polyclonal | Western blot | 1:1000 | Cell Signaling Technology (2748) |
| III-Tubulin | Rabbit | Polyclonal | Western blot | 1:5000 | Biolegend (802001) |
| ER stress | Bip | Rabbit | Monoclonal | Western blot | 1:1000 | Cell Signaling Technology (3177) |
| Caspase  substrates | PARP | Rabbit | Monoclonal | Western blot | 1:1000 | Cell Signaling Technology (9532) |
| II-Spectrin | Mouse | Monoclonal | Western blot | 1:100 | Santa Cruz (sc-48382) |
| Cytoplasm &  nucleoplasm  markers | -Tubulin | Mouse | Monoclonal | Western blot | 1:5000 | Sigma (T5168) |
| Lamin B1 | Mouse | Monoclonal | Western blot | 1:200 | Santa Cruz (sc-374015) |
| Fibrillarin | Chicken | Polyclonal | Western blot | 1:2000 | Novus Biologicals (NBP2-46881) |
| Focal adhesion  proteins | Hic-5 | Rabbit | Polyclonal | Western blot | 1:1000 | Proteintech (10565-1-AP) |
| Zyxin | Mouse | Monoclonal | Western blot | 1:1000 | R&D Systems (MAB6977) |
| Paxillin | Mouse | Monoclonal | Western blot | 1:1000 | Invitrogen (AHO0492) |
| FAK | Mouse | Monoclonal | Western blot | 1:1000 | BD Biosciences (610087) |
| Rabbit | Polyclonal | Western blot | 1:1000 | Cell Signaling Technology (3285) |
| Karyopherins | Crm1 | Mouse | Monoclonal | Immunofluorescence | 1:200 | BD Biosciences (611833) |
| Importin-a | Mouse | Monoclonal | Immunofluorescence | 1:1000 | Abcam (ab2811) |
| Importin-b | Rabbit | Polycloncal | Immunofluorescence | 1:200 | Novus Biologicals (NBP2-38482) |
| RNA polymerase | Phospho-Rbp1 (Ser5) | Rabbit | Monoclonal | Western blot | 1:1000 | Cell Signaling Technology (13523) |

**Supplementary File 2b. Secondary antibodies used in this study**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Antibody** | **Host** | **Clonality** | **Application** | **Dilution** | **Source** |
| HRP-conjugated anti-mouse IgG | Goat | Polyclonal | Western blot | 1:10,000 | Invitrogen (G-21040) |
| HRP-conjugated anti-rabbit IgG | Goat | 1:10,000 | Invitrogen (G-21234) |
| HRP-conjugated anti-rat IgG | Goat | 1:3,000 | Invitrogen (A10549) |
| HRP-conjugated anti-chicken IgY | Goat | 1:3000 | Invitrogen (A16054) |
| HRP-conjugated anti-guinea pig IgG | Goal | 1:3000 | Invitrogen (A18775) |
| IRDye800-conjugated  anti-mouse IgG | Donkey | 1:10,000 | Rockland Immunochemicals  (610-732-124) |
| Alexa Fluor 680-conjugated  Anti-rabbit IgG | Goat | 1:10,000 | Invitrogen (A-21109) |
| Alexa Fluor 647-conjugated  anti-mouse IgG | Donkey | Immunofluorescence | 1:1000 | Invitrogen (A-31571) |
| Alexa Fluor 568-conjugated  Anti-rabbit IgG | Goat | 1:1000 | Invitrogen (A-11036) |
| Alexa Fluor 488-conjugated  anti-rat IgG | Goat | 1:1000 | Invitrogen (A-11006) |

**Supplementary File 2c. Plasmids used in this study**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Plasmid** | **Backbone** | **Insert** | **Insert PCR template** | **Insert PCR Primers (5’ to 3’)** | **Cloning method** |
| 1 | Doxycycline-inducible  GFP-myogenin | LT3GEPIR  (Addgene  111177) | Myogenin | GE Healthcare  Dharmacon, Inc.  MMM1013-202805422 | Forward: atcgtgtacaagtcatcagagctgtatgagacatccccctatttc  Reverse: atcggaattctcagttgggcatggtttcgtc | Backbone and insert cut with BsrG1 and EcoR1 were ligated  by T7 DNA ligase. |
| 2 | Doxycycline-inducible  GFP-myogenin | GFP-myogenin | Plasmid No. 1 | Forward: aagtcgagcttgcgttggatc  Reverse: aaggcacagtgtacatcagttgggcatggtttcgtc | PCR products were cloned into the backbone cut with BamH1 and EcoR1  by In-fusion cloning. |
| Bovine growth hormone Poly-A | N/A | Forward: actgatgtacactgtgccttctagttgcc  Reverse: acaagataattgctcgaattcccatagagcccaccgcatc |
| 3 | EF1a promoter  NES-eGFP | pEF1a-Tet3G | NESRev-GFP  -IRES-Puror | Plasmid DNA and map available upon request | | |
| 4 | NESPKI-GFP  -IRES-Puror |

NESRev: LPPLERLTL

NESPKI: LALKLAGLDI

**Supplementary File 2d. RNA FISH probes used in the study**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **RNA target** | **Label** | **Source** | **Probe type** | **Sequence used to generate**  **Stellaris custom probe sets**  (NCBI reference sequence) |
| 18S rRNA | Quasar 570 | Stellaris | Deoxyribonucleic acid | NR\_003278.31 |
| *Gapdh* mRNA | Quasar 670 | NM\_008084.2 (ShipReady, SMF-3140-1) |
| Poly-A RNA | TYE563 | Qiagen | Locked nucleic acid (T25) |  |

**Supplementary File 2e. Chemicals used in this study**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Chemical** | **Function** | **Stock solution solvent** | **Stock solution concentration** | **Working concentration** | **Source** |
| Q-VD(OMe)-OPh | Pan-caspase inhibitor | DMSO | 30 mM | 30 M | APExBIO Technology (A8165) |
| Z-LL-CHO | Pan-calpain inhibitor | 50 mM | 50 M | Peptide Institute, Inc. (IZL-3178-v) |
| FK506 | Calcineurin inhibitor | 1 mg/ml | 0-100 ng/ml | Enzo Life Sciences (ALX-380-008) |
| DAPT | -Secretase inhibitor | 5 mM | 0-10 M | Enzo Life Sciences (ALX-270-416) |
| Tunicamycin | ER stress inducer | 10 mg/ml | 0-1 g/ml | Tocris (3516) |
| SCH772984 | ERK1/2 inhibitor | 10 mM | 1 M | BioVision (B1682-5) |
| Doxycycline | Tetracycline transactivator activator | H2O | 1 mg/ml | 0-1000 ng/ml | Alfa Aesar (J60422) |
| Leptomycin B | Exportin-1 inhibitor | ethanol | 250 M | 0-25 nM | BioVision (1814) |

**References**

1 Moor, A. E. *et al.* Global mRNA polarization regulates translation efficiency in the intestinal epithelium. *Science* **357**, 1299-1303 (2017).