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## Article

### Neuroepithelial Stem Cell Proliferation Requires LIS1 for Precise Spindle Orientation and Symmetric Division

Jessica Yingling,<sup>1,2,5</sup> Yong Ha Youn,<sup>1,4,5</sup> Dawn Darling,<sup>1</sup> Kazuhito Toyooka,<sup>1,3,4</sup>

Tiziano Pramparo,<sup>1,4</sup> Shinji Hirotsune,<sup>3</sup> and Anthony Wynshaw-Boris<sup>1,4,\*</sup>

<sup>1</sup> Departments of Pediatrics and Medicine, Center for Human Genetics and Genomics, UCSD School of Medicine, 9500 Gilman Drive, La Jolla, CA 92098-0627, USA

<sup>2</sup> Biomedical Science Graduate Program, UCSD School of Medicine, 9500 Gilman Drive, La Jolla, CA 92098-0627, USA

<sup>3</sup> Department of Genetic Disease Research, Osaka City University Graduate School of Medicine, Asahi-machi 1-4-3 Abeno, Osaka 545-8585, Japan

\*Corresponding author

Anthony Wynshaw-Boris

wynshawborist@peds.ucsf.edu

#### Summary

Mitotic spindle orientation and plane of cleavage in mammals is a determinant of whether division yields progenitor expansion and/or birth of new neurons during radial glial progenitor cell (RGPC) neurogenesis, but its role earlier in neuroepithelial stem cells is poorly understood. Here we report that *Lis1* is essential for precise control of mitotic spindle orientation in both neuroepithelial stem cells and radial glial progenitor cells. Controlled gene deletion of *Lis1* in vivo in neuroepithelial stem cells, where cleavage is uniformly vertical and symmetrical, provokes rapid apoptosis of those cells, while radial glial progenitors are less affected. Impaired cortical microtubule capture via loss of cortical dynein causes astral and cortical microtubules to be greatly reduced in *Lis1*-deficient cells. Increased expression of the LIS/dynein binding partner NDEL1 restores cortical microtubule and dynein localization in *Lis1*-deficient cells. Thus, control of symmetric division, essential for neuroepithelial stem cell proliferation, is mediated through spindle orientation determined via LIS1/NDEL1/dynein-mediated cortical microtubule capture.

#### Footnotes

<sup>4</sup> Present address: Department of Pediatrics, Institute for Human Genetics, UCSF School of Medicine, 513 Parnassus Avenue, HSE901F, San Francisco, CA 94143-0794, USA.

<sup>5</sup> These authors contributed equally to this work.

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