## Impaired M-current in KCNQ2 Encephalopathy Evokes Dyshomeostatic Modulation of

## 2 Excitability

1

3

4

9

10

11

- 5 Dina Simkin<sup>1,2</sup>, Timothy J. Searl<sup>2</sup>, Brandon N. Piyevsky<sup>1</sup>, Marc Forrest<sup>3,4</sup>, Luis A. Williams<sup>5</sup>,
- 6 Vaibhav Joshi<sup>5</sup>, Hongkang Zhang<sup>5</sup>, Steven J. Ryan<sup>5</sup>, Michael Schwake<sup>1</sup>, Gabriella L.
- 7 Robertson<sup>1</sup>, Peter Penzes<sup>3,4</sup>, Linda C. Laux<sup>6</sup>, Owen B. McManus<sup>5</sup>, Graham T. Dempsey<sup>5</sup>, John
- 8 J. Millichap<sup>6</sup>, Alfred. L. George, Jr.<sup>2,\*</sup> and Evangelos Kiskinis<sup>1,3,\*</sup>
- <sup>1</sup>The Ken & Ruth Davee Department of Neurology, Feinberg School of Medicine, Northwestern
- 13 University, Chicago, IL, USA
- <sup>2</sup>Department of Pharmacology, Feinberg School of Medicine, Northwestern University, Chicago,
- 15 IL, USA
- 16 <sup>3</sup>Department of Physiology, Feinberg School of Medicine, Northwestern University, Chicago, IL,
- 17 USA

24

25

27

28

29

30

- <sup>4</sup>Center for Autism and Neurodevelopment, Feinberg School of Medicine, Northwestern
- 19 University, Chicago, IL, USA
- <sup>5</sup>Q-State Biosciences, Cambridge, MA, USA
- <sup>6</sup>Epilepsy Center and Division of Neurology, Departments of Pediatrics and Neurology, Ann &
- 22 Robert H. Lurie Children's Hospital of Chicago, Feinberg School of Medicine, Northwestern
- 23 University, Chicago, IL, USA
- \*Correspondence: <u>al.george@northwestern.edu</u> and <u>evangelos.kiskinis@northwestern.edu</u>

- 31 "The authors have withdrawn their manuscript whilst they perform additional 32 experiments to test some of their conclusions further. Therefore, the authors do not
- 33 wish this work to be cited as reference for the project. If you have any questions, please
- 34 contact the corresponding authors."