

## Minee L. Choi, MMSc. PhD.

### Assistant Professor

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### EDUCATION

- PhD. in Clinical Neurosciences, University of Cambridge, UK (2013)  
*Thesis title "Adult neurogenesis and dopamine in neurodegenerative diseases" supervised by Prof. Roger Barker*
- B.A/MMSc. Hanyang University, Seoul, Republic of Korea (2005)

### RESEARCH EXPERIENCES

- 2023 – Present    Assistant Professor at the Department of Brain and Cognitive Sciences, KAIST, Republic of Korea
- 2017 – 2022    Research Fellow at the Francis Crick Institute, UK (laboratory secondment)
- 2014 – 2022    Post-Doctoral Research Fellow at the UCL Queen Square Institute of Neurology, University of London, UK
- 2012 – 2013    Research Associate at the UCL Wolfson Institute for Biomedical Research, University of London, UK
- 2007 – 2008    Research Assistant at the University of Cambridge, UK

### PUBLICATIONS

1.     D'Sa K, Evans JR, Viridi GS, Vecchi G, Adam A, Bertolli O, Fleming J, Chang H, Leighton C, Horrocks M, Athauda D<sup>†</sup>, **Choi ML<sup>†</sup>**, Gandhi G<sup>†</sup> "Prediction of mechanistic subtypes of Parkinson's using patient-derived stem cell models" *Nature Machine Intelligence*, 11 Aug (2023) (**†Equally contributed**)
2.     Viridi GS, **Choi ML**, Evans JR, Yao Z, Athauda D, Strohbuecker S, Raja S, Nirujogi, Wernick AI, Pelegrina-Hidalgo N, Leighton C, Saleeb RS, Kopach O, Alrashidi H, Melandri D, Perez-Lloret J, Angelova PR, Sylantyev S, Eaton S, Heales S, Rusakov DA, Alessi DR, Kunath T, Horrocks MH, Abramov AY, Patani R, Gandhi S "Protein aggregation and calcium dysregulation are hallmarks of familial Parkinson's

disease in midbrain dopaminergic neurons” *npj Parkinson's disease* 8(1):162 (2022).  
<https://doi.org/10.1038/s41531-022-00423-7>

3. **Choi ML**, Chappard A, Singh BP, Maclachlan C, Rodrigues M, Fedotova E, Berezhnov AV, De S, Peddie C, Athauda D, Viridi GS, Zhang W, Evans JR, Angelova PR, Esteras N, Morris K, Tosatto L, Little D, Gissen P, Collinson L, Klenerman D, Abramov AY, Horrocks MH, Gandhi S “Pathological structural conversion of  $\alpha$ -synuclein at the mitochondria induces neuronal toxicity” *Nature Neuroscience* 25, 1134–1148 (2022). <https://doi.org/10.1038/s41593-022-01140-3>

4. Athauda D, Evans JR, Wernick A, Viridi GS, **Choi ML**, Morris H, Grosset D, Foltynie T, Gandhi S “The Impact of Type 2 Diabetes in Parkinson's Disease” *Movement Disorders* 37(8):1612-1623. (2022).  
<https://doi.org/10.1002/mds.29122>

5. Angelova PR\*, **Choi ML\***, Berezhnov AV, Horrocks MH, Hughes CD, De S, Rodrigues M, Yapom R, Little D, Dolt KS, Kunath T, Devine MJ, Gissen P, Shchepinov MS, Sylantsev S, Pavlov EV, Klenerman D, Abramov AY, Gandhi S “Alpha synuclein aggregation drives ferroptosis in Parkinson's disease: an interplay of iron, calcium and lipid peroxidation” *Cell death & Differentiation*. 27, 2781-2796 (2020).  
<https://doi.org/10.1038/s41418-020-0542-z> (**\*Equally contributed**)

6. Hughes CD\*, **Choi ML\***, Yi JH\*, Kim SC, Drews A., St.George-Hyslop P, Bryant B, Gandhi S, Cho K, Klenerman D “A $\beta$  aggregates induce sensitised TLR4 signalling in glial cells causing LTP deficit and neuronal cell death” *Communications Biology*. 3(1): 79 (2020). DOI: 10.1038/s42003-020-0792-9 (**\*Equally contributed**)

7. Hughes CD\*, **Choi ML\***, Ryten M, Hopkins L, Drews A, Botía JA, Iljina M, Rodrigues M, Gagliano SA, Gandhi S, Bryant C, Klenerman D “Picomolar concentrations of oligomeric alpha-synuclein sensitizes TLR4 to play an initiating role in Parkinson's disease pathogenesis” *Acta Neuropathologica* 137(1), 103-120 (2019). DOI: 10.1007/s00401-018-1907-y (**\*Equally contributed**)

8. Whiten DR, Zuo Y, Calo L, **Choi ML**, De S, Flagmeier P, Wirthensohn DC, Kundel F, Ranasinghe RT, Sanchez SE, Athauda D, Lee SF, Dobson CM, Gandhi S, Spillantini MG, Klenerman D, Horrocks MH “Nanoscope characterization of individual endogenous protein aggregates in human neuronal cells” *ChemBiochem* 19(19):2033-2038 (2018). DOI: 10.1002/cbic.201800209

9. **Choi ML**, & Gandhi S “Crucial role of protein oligomerization in the pathogenesis of Alzheimer's and Parkinson's diseases” *The FEBS journal* 285(19):3631-3644 (2018). DOI: 10.1111/febs.14587

10. Ludtmann MHR, Angelova PR, Horrocks MH, **Choi ML**, Rodrigues M, Baev AY, Berezhnov AV, Yao Z, Little D, Banushi B, Al-Menhali AS, Ranasinghe RT, Whiten DR, Yapom R, Dolt KS, Devine MJ, Gissen P, Kunath T, Jaganjac M, Pavlov EV, Klenerman D, Abramov AY, Gandhi S “ $\alpha$ -synuclein oligomers interact with ATP synthase and open the permeability transition pore in Parkinson's disease” *Nature*

*Communications* 9(1), 1–16 (2018). doi.org/10.1038/s41467-018-04422-2

11. Iljina M, Hong L, Horrocks MH, Ludtmann MH, **Choi ML**, Hughes CD, Ruggeri FS, Williams T, Buell AK, Lee JE, Gandhi S, Lee SF, Bryant CE, Vendruscolo M, Knowles TPJ, Dobson CM, Genst ED, Klenerman D “Nanobodies raised against monomeric alpha-synuclein inhibit fibril formation and destabilize toxic oligomeric species” *BMC Biology* 15, 57 (2017). <https://doi.org/10.1186/s12915-017-0390-6>
12. Hall CE\*, Yao Z\*, **Choi M\***, Tyzack GE\*, Serio A, Luisier R, Harley J, Preza E, Arber C, Crisp SJ, Watson PMD, Kullmann DM, Abramov AY, Wray S, Burley R, Loh SHY, Martins LM, Stevens MM, Luscombe NM, Sibley CR, Lakatos A, Ule J, Gandhi S, Patani R “Progressive Motor Neuron Pathology and the Role of Astrocytes in a Human Stem Cell Model of VCP-Related ALS” *Cell Reports* 19(9), 1739-1749 (2017). DOI: 10.1016/j.celrep.2017.05.024 (**\*Equally contributed**)
13. Iljina M, Tosatto L, **Choi ML**, Sang SC, Ye Y, Hughes CD, Bryant CE, Gandhi S, Klenerman D “Arachidonic acid mediates the formation of abundant alpha-helical multimers of alpha-synuclein” *Scientific Reports* 6, 33928 (2016). 10.1038/srep33928
14. **Choi, ML**, Begeti F, Barker, RA, Kim N “A simple assessment model to quantifying the dynamic hippocampal neurogenic process in the adult mammalian brain” *Hippocampus* 26(4), 517-529 (2016). doi: 10.1002/hipo.22541
15. Iljina M, Garcia GA, Horrocks MH, Tosatto L, **Choi ML**, Ganzinger KA, Abramov AY, Gandhi S, Wood NW, Cremades N, Dobson CM, Knowles TP, Klenerman D “Kinetic model of the aggregation of alpha-synuclein provides insights into prion-like spreading” *PNAS* 113(9), E1206-E1215 (2016). <https://doi.org/10.1073/pnas.1524128113>
16. **Choi L\***, Vernon J\*, Kopach O\*, Minett MS., Mills K, Clayton PT, Meert T, **Wood JN** “The Fabry disease-associated lipid lyso-Gb3 enhances voltage-gated calcium currents in sensory neurons and causes pain” *Neuroscience Letters* 594, 163-168 (2015). DOI: 10.1016/j.neulet.2015.01.084 (**\*Equally contributed**)
17. **Choi ML\***, Begeti F\*, Oh JH, Lee SY, O’Keeffe GC, Clelland CD, Tyers P, Tyers ZH, Kim YB, **Barker RA** “Dopaminergic manipulations and its effects on neurogenesis and motor function in a transgenic mouse model of Huntington’s disease” *Neurobiology of Disease* 66, 19-27 (2014). doi: 10.1016/j.nbd.2014.02.004 (**\*Equally contributed**)
18. Clelland CD, **Choi M**, Romberg CCGJ, Clemenson GD, Fragniere A, Tyers P, Jessberger S, Saksida LM, Barker RA, Gage FH, Bussey TJ “A Functional Role for Adult Hippocampal Neurogenesis in Spatial Pattern Separation” *Science* 325(5937), 210-213 (2009). doi: 10.1126/science.1173215
19. Kim BW, **Choi M**, Kim YS, Park H, Lee HR, Yun CO, Kim EJ, Choi JS, Kim S, Rhim H, Kaang BK, Son H “Vascular endothelial growth factor (VEGF) signaling regulates hippocampal neurons by elevation of

intracellular calcium and activation of calcium/calmodulin protein kinase II and mammalian target of rapamycin" *Cellular Signalling* 20(4), 714-725 (2008). doi: 10.1016/j.cellsig.2007.12.009

### **GRANTS (PI/Co-applicant/Key researcher)**

1. NRF Neuroscience Leading Convergence Technology grant; Therapeutic target on the neural circuit and synapses for Parkinson's disease. 3,000,000,000 Won (2023 – 2028); Co-applicant
2. Google ASAP (Aging Science Across Parkinson's disease); Mapping the PD brain: Oligomer-driven functional genomics. \$6.4m (Sep 2020 – 2023); Key researcher
3. The Michael J. Fox Foundation, Astrocyte Biology in Parkinson's disease, Fall 2019: Reacting to  $\alpha$ -synuclein: how astrocytes cause neuronal loss. \$103,445 (Nov 2019 – Oct 2021); Co-applicant
4. Parkinson's UK grant; Novel gene therapeutic approach for Parkinson's disease. £49,823 (Sep 2019 – Sep 2020); Co-applicant
5. The Francis Crick Internal Grant (i2i Grant); Testing gene editing strategies for Parkinson's disease in a novel iPSC derived human neuronal platform £60,000 (2019 – 2020); Co-applicant

### **HONORS AND AWARDS**

1. KAIST Q-DAY Special Prize (2023)
2. Cambridge Parry Dutton Student Fund Award (2010)
3. Imogen Rose Prize; Best first-year report award of the Department of Clinical Neurosciences, University of Cambridge (2010)
4. Cambridge Overseas Trust; PhD scholarship (2008 – 2012)
5. Mogam Foundation Overseas Student Fund Award (2008)

### **ACADEMIC ACTIVITIES**

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|----------------|----------------------------------------------------------------------------------------------|
| 2023 – Present | Honorary fellow of the Francis Crick Institute & UCL Queen Square Institute of neurology, UK |
| 2019 – Present | Member of the Royal Society of Biology                                                       |
| 2016 – Present | Editorial board member of the Journal of Alzheimers Parkinsonism and Dementia                |
| 2020           | Committee member for BNA2021 conference, British Neuroscience Association                    |
| 2019 – 2022    | Athena Swan Committee Member at The Francis Crick Institute                                  |