

**Franki Kai-Hei TSE**  
**Assistant Professor**



**BIOSKETCH**

I am a trained and registered medical laboratory scientist, specialized in glial biology and neuropathology. My research experiences are broad, ranging from the study of nerve injury, to neuroinflammation and to age-related dementia. The primary research focus of my lab is myelinating glial cells. Our ultimate goal is to reveal the causative role of glial cells in the pathogenesis of neurological disorders, and evaluate their values for clinical diagnostics. My team is investigating whether myelin degradation as one of the earliest pathology in the aging and dementia brains as well as to understand cellular mechanisms underlying MRI findings. Specifically, we aim to address whether age-associated DNA damage in oligodendrocytes causes such myelin degradation. (More news in IG @hti\_tselab & www.tse-lab.org; **Always looking for research students and assistants, please contact by email or IG DM**)

**QUALIFICATIONS**

Ph.D. in Biomedical Science <i>The Chinese University of Hong Kong, Hong Kong</i>	2014
Lic. Med. (Medicine Licentiatexamen) in Anatomy <i>Umeå University, Sweden</i>	2011
M.Res (Dist.) in Tissue Engineering for Regenerative Medicine <i>The University of Manchester, UK</i>	2008
B.Sc (Hons.) in Medical Laboratory Sciences <i>The Hong Kong Polytechnic University, Hong Kong</i>	2007

**BRIEF OUTLINE OF EXPERIENCE AND POSTS HELD:**

Assistant Professor, <i>Department of Health Technology &amp; Informatics, Faculty of Health &amp; Social Sciences, The Hong Kong Polytechnic University</i>	Jul, 2019 – present
Research Assistant Professor, <i>Division of Life Science, The Hong Kong University of Science and Technology</i>	Aug, 2018 – Jul, 2019
Endeavour Australia Cheung Kong Research Fellow <i>Department of Neuropathology &amp; Royal Prince Alfred Hospital University of Sydney, Australia</i>	Apr, 2018 – Aug, 2018
Postdoctoral Fellow, <i>Division of Life Science, The Hong Kong University of Science and Technology</i>	Aug, 2014 – Aug 2018
Visiting Lecturer <i>Department of Health Technology and Informatics Faculty of Health &amp; Social Sciences, The Hong Kong Polytechnic University</i>	2014 – 2018 (Invited/ Part- time)

**RESEARCH INTERESTS:**

Neuropathology; Radio-pathological correlation of the aging brain;  
 Oligodendrocytes, Age-related myelin degradation;  
 DNA damage and repair in myelinating cells;  
 Biological mechanisms underlying genetic risk factors of age-related dementia.

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**SERVICE TO PROFESSIONAL & SCIENTIFIC BODIES, CONSULTANCY, MEMBERSHIP OF PROFESSIONAL & LEARNED SOCIETIES:**Journal Reviewer

<i>Journal (publisher)</i>	<i>Role</i>	<i>Period</i>
Alzheimer's & Dementia (Elsevier)	Reviewer (ad-hoc)	2017
Experimental Cell Research (Elsevier)	Reviewer (ad-hoc)	2016
Cell Death & Differentiation (NPG)	Reviewer (ad-hoc)	2019

Professional Qualifications

Medical Laboratory Technologist (Pt II), Medical Laboratory Technologists Board, The Supplementary Medical Professions Council, Hong Kong Gov't	2007 -
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Society Memberships

Fellow, Institute of Biomedical Science, UK	2020 -
Member, Society for Neuroscience	2010 -
Member, Hong Kong Pharmacology Society	2011 -
Associate Member, The Hong Kong Society of Molecular Diagnostic Sciences	2013 -

**AWARDS**

Endeavour Australia Cheung Kong Research Fellowship <i>Australia Government and Cheung Kong Group</i>	2017-2018
AAIC Varna Satellite Symposium – Travel Fellowship <i>Alzheimer's Association and University of Pittsburgh</i>	Oct, 2017
Young investigator Award <i>Poster session, Annual Scientific Meeting of Hong Kong Society of Immunology</i>	Sep, 2013
Madam Woo Li Shiu Charm Memorial Scholarship <i>The Chinese University of Hong Kong</i>	2012-2013
Trainee Travel Award - The 14th World Congress on Pain, Milan, Italy <i>International Association for the Study of Pain</i>	Aug, 2012

**PUBLICATIONS**Journal Papers (\*corresponding author)

1. **TSE KH\***, Cheng A, Yeung HS, Cheng WYG, Zhu B, Wang Q, Cui Y, Jiang L, Kofler J, Herrup K. Myelin pathology in ataxia-telangiectasia is the cell-intrinsic consequence of ATM deficiency in the oligodendrocytes **medRxiv** 2021.01.22.20245217; doi: <https://doi.org/10.1101/2021.01.22.20245217> (*Preprint, under review*)
2. Takase H, Hamanaka G, Ohtomo R, Ishikawa H, Chung K, Mandeville ET, Lok J, Fornage M, Herrup K, **TSE KH**, Lo E, Arai K. Transcriptome profiling of mouse corpus callosum after cerebral hypoperfusion 2021 **Front. Cell Dev. Biol.** doi.org/10.3389/fcell.2021.685261
3. Cheng A, **TSE KH**, Chow HM, Gan Y, Song X, Ma, Qian YX, She W, Karl Herrup ATM loss disrupts the autophagy-lysosomal pathway **Autophagy** 2020 Aug 14;1-13. doi: 10.1080/15548627.2020.1805860 PMID: 32757690
4. Huang H, van Zijl P, Han X, Don CM, Cheng GWY, **Tse KH**, Knutsson L, Chen L, Lai J, Wu E, Xu J, Chan KWY. Altered D-glucose in brain parenchyma and cerebrospinal fluid of early Alzheimer's disease detected by dynamic glucose enhanced MRI. **Sci. Adv.** 2020 May 13;6(20):eaba3884
5. Sorond FA, Whitehead S, Arai K, Arnold D, Carmichael ST, De Carli C, Duering M, Fornage M, Flores-Obando RE, Graff-Radford J, Hamel E, Hess DC, Ihara M, Jensen MK, Markus HS, Montagne A, Rosenberg G, Shih AY, Smith EE, Thiel A, **Tse KH**, Wilcock D, Barone F. Proceedings from the Albert Charitable Trust Inaugural Workshop on white matter and cognition in aging. **Geroscience.** 2020 Feb;42(1):81-96. PMID: 31811528
6. **Tse KH\***, Cheng A, Ma F, Herrup K DNA damage-associated oligodendrocyte degeneration precedes amyloid pathology and contributes to Alzheimer's disease and dementia **Alzheimer Dement** 2018 **14**(5):664-679 PMID: 29328926
7. Cheng A, Zhao T, **Tse KH**, Chow HM, Cui Y, Jiang L, Du S, Herrup K. ATM and ATR play complementary roles in synaptic vesicle trafficking. **Proc. Natl. Acad. Sci. U. S. A.** 2018 **115**(2):E292-E301 PMID: 29279380
8. Herrup K, **Tse KH\***, Chow HW, Loopholes in the DNA contract kill neurons. **Nat Neurosci** 2017 **20**(9):1192-1194. PMID: 28849789 (co-corresponding author, commentary)
9. **Tse KH\***, Herrup K Re-imagining Alzheimer's disease – the diminishing importance of amyloid and a glimpse of what lies ahead. **J Neurochem** 2017 **143**:432-444 PMID: 28547865 (*Feature on Journal Cover*)
10. **Tse KH\***, Herrup K. DNA damage in the oligodendrocyte lineage and its role in brain aging **Mech Ageing Dev** 2016 161(Pt A):37-50 PMID:27235538
11. **Tse KH\***, Chow KBS, Wise H. The role of prostaglandin E2 (EP4) receptors in modulating Toll-like receptor-4-dependent signaling in dorsal root ganglion cells **J Neuroimmunol** 2016. **293**: 8-16. PMID:27049555
12. **Tse KH**, Chow KBS, WK Leung, Wong YH, Wise H. Primary sensory neurons regulate Toll-like receptor-4-dependent activity of glial cells in dorsal root ganglia. **Neuroscience** 2014. **279**: 10-22. PMID: 25171787
13. **Tse KH**, Chow KBS, WK Leung, Wong YH, Wise H. Lipopolysaccharide differentially modulates expression of cytokines and cyclooxygenases in dorsal root ganglion cells via Toll-like receptor-4 dependent pathways. **Neuroscience** 2014. **267**: 241-251. PMID: 24607321
14. **Tse KH**, Kingham PJ, Novikov LN, Wiberg M. Adipose tissue and bone marrow-derived stem cells react similarly in an ischaemia-like microenvironment. **J Tissue Eng Regen Med.** 2012. **6**(6):473-85. PMID: 21751425.
15. **Tse KH**, Sun M, Mantovani C, Terenghi G, Downes S, Kingham PJ. In vitro evaluation of polyester-based scaffolds seeded with adipose derived stem cells for peripheral nerve regeneration. **J Biomed Mater Res A.** 2010. **95**(3):701-8. PMID: 20725987

Conference Paper (Selected, \*corresponding author)

1. Mok KS, Cheng GWY, Yeung HS, **TSE KH\*** Failure of APOE-mediated interactions between astrocytes and oligodendrocytes – A putative cellular mechanism of myelin loss in APOE4 carriers. 2021 The 44th Annual Meeting of the Japan Neuroscience Society, Kobe, Japan AP-080
2. Huang H, Lai JHC, **TSE KH**, Cheng GWY, Liu Y, Chen Z, Han X, Chen L, Xu J, Chan KWY. CEST and AREX data analysis based on deep neural network: application to image Alzheimer's disease at 3T ISMRM 2021 D-56 3707
3. Zhang H, Zhang H, **TSE KHF**, Hui E, Cao P, Chan KWY, Chan Q, Herrup K, Mak HKF A DTI Comparative study – Is demyelination in AD resembling primary demyelinating disease (MS) or secondary demyelinating disease (NPSLE)? ISMRM 2020 #4551
4. Yeung HS, Fornage M, Herrup K, Arai K, **TSE KH\*** Characterization of TRIM47 in the mouse brain: a GWAS-identified tripartite motif family member associated with white matter hyperintensity. 2020 The 43rd Annual Meeting of the Japan Neuroscience Society, Kobe, Japan B-18 1P-055
5. Cheng GWY, Herrup K, **Tse KH\***. Apolipoprotein  $\epsilon$ 4 contributes to oligodendrocyte vulnerability and decreased myelination in Alzheimer's disease. 2019, Alzheimer's Association International Conference (AAIC) Los Angeles P4-488
6. **Tse KH**, Kofler J, Harding A, Buckland M, Herrup K. Double-strand breaks DNA damage in oligodendrocytes - the unifying step prior to myelin degeneration in Alzheimer's dementia and Multiple Sclerosis 2018, The 19<sup>th</sup> International Congress of Neuropathology, Tokyo, Japan
7. **Tse KH**, Herrup K. DNA damage-induced oligodendrocyte degeneration underlies the cortical myelin loss in Alzheimer's and dementia. 2017, Alzheimer's Association International Conference - Satellite Symposium, Varna, Bulgaria
8. **Tse KH**, Cheng A, Chow HM, Herrup K White matter degeneration and aberrant oligodendrocyte differentiation during the progress of Alzheimer's disease. 2015, Society for Neuroscience Meeting, Chicago, IL, US
9. Herrup K, **Tse KH**, Chan K, Hung SC, Chow HM, Herculano-Houzel S The clonal organization of the mammalian CNS: numerical quanta of cerebellar cells define highly specified developmental lineage relationships 2015, Society for Neuroscience Meeting, Chicago, IL, US

Book Chapters

1. Herrup K, **Tse KH**, Trapp B. Neurons and Neuroglia. Chapter 6, Vol 1; 8th edition of Youmans and Winn Neurological Surgery. Elsevier, Philadelphia. (Scheduled in print by early 2022)

Invited Talks

1. **TSE KH**. TRIM47 in White Matter Hyperintensity: From population to the cell – Albert Research Institute for White Matter and Cognition – The Second Albert White Matter Research Symposium (United States of America, Virtual Meeting 3<sup>rd</sup> & 4<sup>th</sup> March 2021) [www.albertwhitematterresearchinstitute.org](http://www.albertwhitematterresearchinstitute.org)
2. **TSE KH** Myelinated axons begin and end in gray matter (and that's where the action is in Alzheimer's disease) – Leo and Anne Albert Charitable Trust Inaugural Workshop: White Matter and Cognition (Carlsbad, CA, 8-11<sup>th</sup> Feb, 2019) invited by Prof. Frank C Barone (SUNY Downstate Medical Center, U.S.)
3. **TSE KH** DNA damage connects myelin pathology with brain aging – Neuroscience Seminar Series, Perron Institute & University Western Australia (Perth, 24<sup>th</sup> May, 2018) invited by Prof. Lindy Fitzgerald (Perron Institute, Perth, Australia)

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