

BIOGRAPHICAL SKETCH

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NAME: Sweelin Chew

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE: Postdoctoral Researcher

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Manchester	BSc	06/2009	Neuroscience
University of Glasgow	MRes	09/2011	Biomedical Science
National University of Singapore	PhD	11/2017	<i>Biochemistry</i>
University of Eastern Finland	Postdoc	On-going	Neuroscience

A. Personal Statement

My research interests involve mechanistic understanding of pathways and transcriptomic alterations in the nose-brain axis in Alzheimer's disease and in response to environmental exposures including air pollution and viral infections. My training and research experience have provided me with a strong expertise in *in vitro* human disease models (3D and microfluidic), sequencing, genome-editing and molecular biology. As an undergraduate, I conducted an *in silico* study on striatal interneuron electrophysiology with Dr Enrico Bracci, then senior lecturer at the Faculty of Life Sciences, University of Manchester. As a postgraduate, I conducted two studies on astrocyte reactivity in 3D cultures and MECP2 gene function in Rett Syndrome with Professor Susan Barnett and Dr Stuart Cobb (then senior lecturer at University of Glasgow). As a predoctoral student, my research focused on understanding human neural and epidermal stem cell mechanobiology in cell-fate specification with Professor Birgit Lane and Dr Sohail Ahmed (then Associate Professor at School of Medicine, National University of Singapore) The research collaboration with Dr Keng-Hwee Chiam at the Bioinformatic Institute, A*STAR, Singapore resulted in my first peer-reviewed article describing a novel 3D analytical method for stem cell fate specification. During my PhD, I received an international scholarship. For this postdoctoral fellowship, I will continue to build on my previous training in neuroscience by moving onto clinical models of Alzheimer's disease, which will allow me to address additional questions regarding the targeted mechanisms governing brain health in disease and in response to environmental exposures. My mentor, Associate Professor Katja Kanninen, is a leading expert on Neurobiology of Disease in Finland and is the first EU-based PI to establish *in vitro* AD models using patient-derived olfactory cells. The proposed research will provide me with new conceptual and technical training in microfluidics, single cell analysis and multi-omic data integration. In addition, the proposed training plan in the mentor's letter outlines a set of career development training for research independence, including grant-writing, pedagogy, project management and leadership. Since joining Professor Kanninen's group, I have led and contributed to multiple projects, some of which have been published (Chew et al, 2020a) and presented at international conferences. In addition, I have assisted in writing three successful national and EU grant applications, one of which was recently awarded by the EU Joint Program on Neurodegenerative Diseases for 1.5 million euros.

On-going research

Lampinen R, Fazaludeen MF, Avesani S, Örd T, Penttilä E, Lehtola J, Saari T, Hannonen S, Saveleva L, Kaartinen E, Acosta FF, Cruz-Haces M, Löppönen H, Mackay-Sim A, Malm T, Kaikkonen-Määttä M, Koivisto AM, White AR, Giugno R, **Chew S**, Kanninen KM: *Disease specific alterations in the olfactory mucosa of patients with Alzheimer's disease*. Manuscript under preparation.

Lampinen R, **Chew S**, Saveleva L, Malm T, White AR, Kanninen KM: *Mitochondrial function impairment in human olfactory mucosa of Alzheimer's disease patients*. Manuscript under preparation.

Lampinen R, Belaya I, **Chew S**, Rait D, Giniatullina R, Sorvari A, Konovalova J, Domanskyi A, Martikainen R, Goldsteins G, Koistinaho J, Malm T, Rilla K, Marsh-Armstrong N, Kanninen KM: *Astrocyte-mediated degradation of neuronal mitochondria is altered in aging and neurodegeneration*. Manuscript under review.

Relevant and recent publications

Chew S, Lampinen R, Saveleva L, Korhonen P, Mikhailov N, Setälä R, Mackay-Sim A, Malm T, White AR, Jalava P, Kanninen KM: Urban air particulate matter induces mitochondrial dysfunction in human olfactory mucosa. *Part Fibre Toxicol*. 2020 Jun 1;17(1):18. doi: 10.1186/s12989-020-00352-4. PMID: 32487172; PMCID: PMC7268298.

Chew S, Kolosowska N, Saveleva L, Malm T, Kanninen KM. Impairment of mitochondrial function by particulate matter: Implications for the brain [published online ahead of print, 2020 Feb 10]. *Neurochem Int*. 2020;135:104694. doi:10.1016/j.neuint.2020.104694

Kanninen KM, Lampinen R, Rantanen LM, Odendaal L, Jalava P, **Chew S**, White AR. Olfactory cell cultures to investigate health effects of air pollution exposure: Implications for neurodegeneration. *Neurochem Int*. 2020 Jun;136:104729. doi: 10.1016/j.neuint.2020.104729. Epub 2020 Mar 19. PMID: 32201281.

B. Positions and Honors

Positions and employment

Feb-Aug 2012 Lab Analyst, Robert Wiseman Dairies
2018- Postdoctoral Researcher, University of Eastern Finland

Other Experience and Profession Memberships

2009-2010 Volunteer, UK Dementia Society
2012-2017 Member, Singapore Stem Cell Society
2018- Member, Brain Research Society of Finland
2020- Member, Alzheimer's Association

Honors

2019 Agilent Cell Analysis Travel Award
2018 Finnish Stem Cell Network Best Poster Award
2012-2016 International Graduate Award, Agency for Science, Technology and Research

C. Contributions to Science

1. **Graduate Career:** My PhD research contributions focused on 3D mechanobiology of neural stem cell fate specification. Results from my research provided an understanding of how extracellular cues in multi-cellular tissues influences stem cell biology. I proposed a novel analytical method of live cells in 3D. My role in the project was to generate neural stem cells via cellular reprogramming, develop 3D cultures and perform live cell microscopy.
 - a. **Chew S**, Zeng Y, Khoo D, Hong Yu MY, Ahmed S, Chiam KH. Enrichment and Identification of Neural Stem Cells in Neurospheres Using Rigidity-Tunable Gels. *Tissue Eng Part A*. 2019;25(5-6):427–436. doi:10.1089/ten.TEA.2018.0221
2. **Postdoctoral Career:** As a postdoctoral researcher, my research has provided a mechanistic insight into air pollutant exposure effect on primary human olfactory cells, potentiating the link of air pollution effect in brain via the olfactory route. Post-mortem studies by others reported translocation of air pollutants to the olfactory bulb but mechanistic information is lacking. My research is focused elucidating early cellular responses to adverse environmental exposures. During this time, I also lent my expertise to other projects on neurodevelopmental disorders.

- a. **Chew S**, Lampinen R, Saveleva L, Korhonen P, Mikhailov N, Setälä R, Mackay-Sim A, Malm T, White AR, Jalava P, Kanninen KM: Urban air particulate matter induces mitochondrial dysfunction in human olfactory mucosa. *Part Fibre Toxicol.* 2020 Jun 1;17(1):18. doi: 10.1186/s12989-020-00352-4. PMID: 32487172; PMCID: PMC7268298.
- b. **Chew S**, Kolosowska N, Saveleva L, Malm T, Kanninen KM. Impairment of mitochondrial function by particulate matter: Implications for the brain [published online ahead of print, 2020 Feb 10]. *Neurochem Int.* 2020;135:104694. doi:10.1016/j.neuint.2020.104694
- c. Singh Y, Leinonen H, Fazaludeen F, Jaronen M, Guest D, Buckley N, Byts N, Oksa P, Jalkanen K, Iqbal I, Huuskonen M, Savchenko E, Keksa-Goldsteine V, **Chew S**, Myllyharju J, Tanila H, Ooi L, Koistinaho J, Kanninen KM, Malm T. Loss of Cln5 leads to altered Gad1 expression and deficits in interneuron development in mice. *Hum Mol Genet.* 2019;28(19):3309–3322. doi:10.1093/hmg/ddz165

Complete List of Published Work: <https://pubmed.ncbi.nlm.nih.gov/?term=Chew+Sweelin&sort=date&size=100>

Professional activities

Invited speaker in conferences/meetings

Posgraduate course on Air pollution and the brain (**Jun 2019**): *Mitochondrial effects of air pollutants*

Finnish Society of Toxicology (**May 2019**): *Pinpointing air pollutant effects in human olfactory mucosa*

Keystone Symposium: Mitochondria in Aging and Diseases (**Jan 2019**) short talk: *Exposure to particulate matter perturbs mitochondrial function in a novel cellular model*

Merits in teaching

Involvement in planning and teaching *Disease-modelling in Neurobiological Research*, UEF

Other Academic merits

Referee in Scientific journals: Tissue Engineering, Particle and Fibre toxicology, Neurochemistry International

Memberships in scientific societies: Alzheimer's Association ISTAART, Finnish Brain Research Society,

Completed Supervision: 2 ERASMUS students to completion

Current supervision

Co-supervisor Liudmila Saveleva (PhD student)

Laura Mussalo (PhD student)

Supervisor Janna Umme (MSc student)

Ilona Juvonen (MSc student)

D. Additional Information: Research Support and/or Scholastic Performance

Research support

Research costs are supported by the Finnish Cultural Foundation, Academy of Finland, European Commission and Finnish Brain Foundation. Research resources, instrument and personnel necessary for the proposed work in the project are housed in the A. I. Virtanen Institute at the University of Eastern Finland, unless stated otherwise.

Scholastic Performance

FELASA-certified animal license, passed (2019)

Linguistic skills (According to Europass evaluation)

English: Native speaker; Chinese: Mother Tongue