Martin W. Nicholson, Ph.D.

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Personal Summary

I am a highly motivated, results-driven Ph.D. level Research Scientist with Postdoctoral experience. I have more than 15 years bench-side experience in cell biology and human iPSCs with expertise in advanced techniques in imaging, molecular biology, high-throughput screening, and cell line development.

Professional Experience

Lead Scientist, NeuCyte, USA 2022 - Present

- Lead the cell production of iPSC-derived neurons (glutamatergic and GABAergic), neural stem cells, and astrocytes used for internal work and revenue generation.
- Develop iPSC disease models in 2D and 3D assembloids for phenotype extraction.
- Develop phenotypic assays for drug screening including MEA and high-content imaging.
- Data presentation to clients and collaborators.

Postdoctoral Scholar, Academia Sinica, Taiwan 2019 - 2022

Project title: An Asian population-based high-throughput drug toxicity screen of human iPSC-derived cardiomyocytes and neurons

- Scientific lead on a collaborative project employing human iPSC derivatives to develop a population-based high-throughput pre-clinical drug screening platform.
- *In vitro* differentiation of iPSCs (neurons, glial cells, cardiomyocytes, endothelial cells) and establish complex functional assays in both 2D and 3D organoid models.
- Responsible for experimental design across multiple sub-projects within a multi-disciplinary team assessing *in vitro* and *in vivo* drug toxicity.
- Written successful grant applications and published lab manuscripts.

Freelance Specialist Editor, Cactus Communications 2018 - 2019

- Specialist Editor for the Life Sciences and Medicine division.
- Edit and format manuscripts to meet publication standards for scientists and medical doctors.
- I maintained an above-average Quality Index rating during my tenure.

Doctoral Student, University College London, United Kingdom 2010 - 2018

Thesis title: Diazepam-dependent modulation of GABAergic inhibitory synapses

- Used biochemical approaches to elucidate a novel signaling pathway.
- Generate stable cell lines expressing $GABA_A$ receptors.
- Supervised M.Sc. students providing guidance throughout their projects.
- Managed the lab organization, procurement of consumables, and maintained equipment.
- Ph.D. student representative on the Research Degrees Committee.

Departmental Technician, University College London, United Kingdom 2009 - 2018

- Taught in a new master's program where I developed and delivered the practical component of the course.
- Set-up and managed a flow cytometry facility and provided support to researchers in confocal microscopy.
- Radiation Protection Supervisor and conducted health and safety audits for the department.

Education

Ph.D. Neuroscience, University College London, United Kingdom 2018

B.Sc. Biology & Spanish, Dalhousie University, Canada 2008

Awards

Academia Sinica Postdoctoral Scholar 2021

Academia Sinica Postdoctoral Fellow 2019

Practical Experience

CELL CULTURE

Human iPSCs and derivatives (neurons, endothelial cells, cardiomyocytes), COS-9, HEK-293, primary neurons, stable cell line development.

MOLECULAR BIOLOGY

DNA/RNA purification, plasmid design and generation, cloning, cell transfection, CRISPR-Cas9, PCR, *in vitro* transcription/translation.

PROTEIN CHARACTERIZATION

Co-immunoprecipitation, protein purification, SDS-Page, Western blot, SPR, fusion protein generation.

CELL-BASED ASSAYS

Florescence assays (FRET, reporter assays, calcium, IP3, DAG, chloride), luminescence assays, ELISA, high-throughput screening, high-content imaging, confocal microscopy (live and fixed cell), flow cytometry, microelectrode array.

SOFTWARE

Microsoft suite, GraphPad PRISM, OriginPro, Affinity Designer, Photoshop, R (programming language).

Languages

Publications

1. Lin C.J., Cheng Y.C., Chen H.C., Chao Y.K., **Nicholson M.W.,** Yen E.C.L., Kamp T.J., Hsieh P.C. 2022. Commensal gut microbiota-derived acetate and propionate enhance heart adaptation in response to cardiac pressure overload in mice. Theranostics; in press.
2. **Nicholson, M. W.**, Huang, C.Y., Wang, J.Y., Ting, C.Y., Cheng, Y.C., Chan, D., Lee, Y.C., Hsu, C.C., Hsu Y.H., Chang, C.M.C., Hsieh, M.L., Cheng, Y.Y., Hsu, Lin, Y.L., Chen, C.H., Hsu, Y.H., Wu, Y.T., Hacker, T.A., Wu, J.C., Kamp, T.J., Hsieh, P.C.H. 2022. Cardio and neurotoxicity of selected anti-COVID-19 drugs. Pharmaceuticals, 15(6), 765.
3. **Nicholson, M. W.**, Ting, C. Y., Chan, D. Z. H., Cheng, Y. C., Lee, Y. C., Hsu, C. C., Huang, C. Y., Hsieh, P. C. H. 2022. Utility of iPSC-derived cardiomyocytes and neurons for disease modeling, drug development, and cell therapy. Cells. 11, 1853.
4. Huang, C.Y., **Nicholson, M. W. (Co-first author)**, Wang, J.Y., Ting, C.Y., Tsai, M.H., Cheng, Y.C., Liu, Chan, D., Lee, Y.C., Hsu, C.C., Hsu Y.H., Yang, C.F., Chang, C.M.C., Ruan, S.C., Lin, P.J., Lin, J.H., Chen, L.L., Hsieh, M.L., Cheng, Y.Y., Hsu, W.T., Lin, Y.L., Chen, C.H., Hsu, Y.H., Wu, Y.T., Hacker, T.A., Wu, J.C., Kamp, T.J., Hsieh, P.C.H. 2022. Population-based high-throughput drug screen of human iPSC-derived cardiomyocytes and neurons. Cell Rep. 39, 1.
5. Chen, CY., Lee, D.S., Choong, O.K., Chang S.K., Hsu, T., **Nicholson, M. W.**, Liu, LW., Lin, PJ., Ruan, SC., Lin, SW., Hu, CY., Hsieh, P. C. et al. 2021. Cardiac-specific microRNA-125b deficiency induces perinatal death and cardiac hypertrophy. Sci Rep 11, 2377.
6. Petrache, A. L., Khan, A. A., **Nicholson, M. W.**, Monaco, A., Kuta-Siejkowska, M., Haider, S., Hilton, S., Jovanovic, J. N. & Ali, A. B. 2020. Selective modulation of alpha 5 GABAA receptors exacerbates aberrant inhibition at key hippocampal neuronal circuits in APP mouse model of Alzheimer's disease. Front. Cell. Neurosci., 14, 346.
7. Huang, C. Y., Li, L. H., Hsu, W. T., Cheng, Y. C., **Nicholson, M. W.**, Liu, C. L., Ting, C. Y., Ko, H. W., Hsu, S. H, Wen, C. H., Yan, Z., Huang, H. P., Su, H. L., Chiang, P. M., Shen, C. N., Chen, H. F., Yen, B. L., Lu, H. N., Hwang, S. M., Chiou, S. H., Ho, H. N., Wu, J. Y., Kamp, T. J., Wu, J. C., Hsieh, P. C. 2020. Copy Number Variant Hotspots in Han Taiwanese Population Induced Pluripotent Stem Cell Lines - Lessons from Establishing the Taiwan Human Disease iPSC Consortium Bank. J. Biomed. Sci., 27, 92.
8. Huang, C. Y., Liu, C. L., Ting, C. Y., Chiu, Y. T., Cheng, Y. C., **Nicholson, M. W.**, Hsieh, P. C. 2019. Human iPSC banking: Barriers and opportunities. J Biomed Sci. 26, 87.
9. **Nicholson, M. W.**, Sweeney A., Peckle, E., Alam, S., Ali, A. B., Duchen, M., Jovanovic, J. N. 2018. Diazepam-induced loss of inhibitory synapses mediated by PLC/Ca2+/calcineurin signalling downstream of GABAA receptors. Mol Psychiatry, 23,1851.
10. Brown, L. E., **Nicholson, M. W.**, Arama, J. E., Mercer, A., Thomson, A. M. & Jovanovic, J. N. 2016. gamma-Aminobutyric Acid Type A (GABAA) Receptor Subunits Play a Direct Structural Role in Synaptic Contact Formation via Their N-terminal Extracellular Domains. J Biol Chem, 291, 13926.
11. Brown, L. E., Fuchs, C., **Nicholson, M. W.**, Stephenson, F. A., Thomson, A. M. & Jovanovic, J. N. 2014. Inhibitory synapse formation in a co-culture model incorporating GABAergic medium spiny neurons and HEK293 cells stably expressing GABAA receptors. J Vis Exp, e52115.