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Research Interests (<200 words)

Development of the central nervous system. In particular the development of the cerebral cortex and the critical role of cerebrospinal fluid and cerebral folate metabolism in development and how this goes wrong in conditions including hydrocephalus. Our studies of the H-Tx rat have led to an understanding of a unique supply system for folate to the developing and adult which has led to the proposition of a novel folate treatment that can significantly reduce the risk of hydrocephalus in the rat model and that may therefore be beneficial in reducing human hydrocephalus. We found that hydrocephalus was associated with a change in CSF composition that arrested development and prevented access to available folate in the CSF. We have now expanded our studies to other conditions where cerebrospinal fluid flow and/or drainage are affected in order to test our hypothesis that cerebral folate is sensitive to CSF drainage abnormalities.

Research Focus

Development, cerebral cortex, cerebrospinal fluid, cerebral folate metabolism, hydrocephalus

Research Technologies/Facilities

Publications

- 10 key papers (preferably pdf's)
 - Requena-Jimenez, Nabiuni, and Miyan. (2021) "Profound changes in cerebrospinal fluid proteome and metabolic profile are associated with congenital hydrocephalus." *Journal of Cerebral Blood Flow & Metabolism*: 41(12):3400-3414. doi: 10.1177/0271678X211039612
 - Miyan et al. (2022) Folate Related Pathway Gene Analysis Reveals a Novel Metabolic Variant Associated with Alzheimer's disease with a Change in Metabolic Profile. *Metabolites* 12, 475. <https://doi.org/10.3390/metabo12060475>
 - Cousins et al. (2021) The Blood-CSF-Brain Route of Neurological Disease: The Indirect Pathway into the Brain. *Neuropathology & Applied Neurobiology*.

- Bueno, D, et al. "Embryonic cerebrospinal fluid formation and regulation." *Seminars in cell & developmental biology*. Vol. 102. Academic Press, 2020.
 - Miyan, J., et al. (2020), June. Subarachnoid cerebrospinal fluid is essential for normal development of the cerebral cortex. In *Seminars in cell & developmental biology* (Vol. 102, pp. 28-39). Academic Press.
 - Gato, A., Alonso, M. I., Lamus, F., & Miyan, J. (2020, June). Neurogenesis: a process ontogenically linked to brain cavities and their content, CSF. In *Seminars in cell & developmental biology* (Vol. 102, pp. 21-27). Academic Press.
 - Jimenez AR, Naz N, Miyan JA (2018) Altered folate binding protein expression and folate delivery are associated with congenital hydrocephalus in the hydrocephalic Texas rat. *J.Cerebral blood flow and metabolism*. <https://doi.org/10.1177/0271678X18776226>
 - Naz N, Jimenez AR, Sanjuan-Vilaplana A, Gurney M, Miyan J. (2016) Neonatal hydrocephalus is a result of a block in folate handling and metabolism involving 10-formyltetrahydrofolate dehydrogenase. *J Neurochem*. 2016 Aug;138(4):610-23. doi: 10.1111/jnc.13686
 - Cains,s., et al. (2009) Addressing a folate imbalance in fetal CSF can decrease the incidence of congenital hydrocephalus. *J.Neurpathol.Exp.Neurol*. 68(4): 404-416
- Link to full publication list
https://scholar.google.com/citations?hl=en&user=lj0TWNAAAAAJ&view_op=list_works&sortby=pubdate
 - ORCID number <https://orcid.org/0000-0002-1835-0143>

Collaborators

Dr Ian Pople, Sidra Medicine, Qatar

Dr Imran Bhatti, Shifa International, Pakistan

Prof Masood Sadiq, University of Child Health, Lahore Pakistan

Prof Conor Mallucci, Liverpool Alder Hey, UK

Student/Fellowship Opportunities

Scholarships through Manchester Doctoral Academy

Self-funded always welcome

Fellowship applications supported