



RACP Foundation Research Awards

PROGRESS REPORT

Project Title	Characterisation of eating behaviour and metabolism across neurodegenerative diseases: insights for survival and progression	
Name	Dr Rebekah Ahmed	
Award Received	2017 Vincent Fairfax Family Foundation Research Establishment Fellowship	
Report Date	1 March 2018	
Chief Investigator / Supervisor	Dr Rebekah Ahmed / Professor Matthew Kiernan	
Administering Institution	The University of Sydney	
Funding Period	Start Date:	1 January 2017
	Finish Date:	30 September 2018

PROJECT SUMMARY

It is recognized that metabolic changes (changes in weight, insulin and cholesterol levels) and eating behavior may modify the progression of neurodegeneration. This research aims using brain imaging and novel techniques from obesity research to examine if there are characteristic metabolic changes in patients with the neurodegenerative diseases frontotemporal dementia, motor neurone disease and Alzheimer's disease; how these changes relate to eating behavior, and how they may affect disease progression and survival. My research shows the application of science to address a critical medical and social concern and offers the potential to provide novel therapeutic targets to improve survival in these devastating neurodegenerative conditions.

PROJECT AIMS / OBJECTIVES

The aims of this project is to examine if there is a common pattern of metabolic and eating phenotypes between several neurodegenerative diseases, and whether this relates to degeneration of a specific brain network. Additionally, some forms of neurodegeneration may be characterised by specific metabolic abnormalities that result from their unique patterns of brain pathology

SIGNIFICANCE AND OUTCOMES

This project is expected to define the longitudinal metabolic phenotypes in several neurodegenerative conditions and their relationship to eating behaviour using methods adapted from genetic obesity research. Changes will also be correlated to brain structures through both

structural and functional imaging and pathological analyses. This comparative project is the first to determine commonalities and differences in metabolic abnormalities and eating behaviours in neurodegenerative conditions and relate these to disease progression and prognoses. The expectation is that these findings will identify potential early intervention targets and provide insights into how modifying eating behaviour and metabolism, which many patients enquire about, can affect disease progression and survival. This will then form the basis for treatment trials to modify these eating behaviours and metabolic changes to potentially change the course of these devastating neurodegenerative disorders.

PUBLICATIONS / PRESENTATIONS

1. **Ahmed RM**, Ke YD, Vucic S, Ittner LM, Seeley W, Hodges JR, Piguet O, Halliday G, Kiernan MC. Clinical phenotyping and tracking physiological alterations in neurodegenerative diseases. *Nature Reviews Neurol*. Accepted Jan 2018. Impact factor: 20.257
2. **Ahmed RM**, Highton-Williamson E, Caga J, Thornton N, Ramsey E, Zoing M, Kim WS, Halliday GM, Piguet O, Hodges JR, Farooqi IS, Kiernan MC. Lipid Metabolism and Survival Across the Frontotemporal Dementia-Amyotrophic Lateral Sclerosis Spectrum: Relationships to Eating Behavior and Cognition. *J Alzheimers Dis*. 2018;61:773-783. Impact Factor: 3.920
3. Caga J, Hsieh S, Highton-Williamson E, Zoing MC, Ramsey E, Devenney E, **Ahmed RM**, Kiernan MC. Apathy and its impact on patient outcome in amyotrophic lateral sclerosis. *J Neurol*. 2018;265:187-193. Impact factor: 3.578
4. **Ahmed RM**, Irish M, Piguet O, Halliday G, Piguet O, Kiernan M, Hodges J, Ittner LM. Mouse models in frontotemporal dementia: a comparison of phenotypes and clinical symptomology. *Neurosci Biobehav Rev*. 2017 Mar;74(Pt A):126-138. Impact Factor: 9.440
5. **Ahmed RM**, Landin-Romero R, Collet TH, van der Klaauw AA, Devenney E, Henning E, Kiernan MC, Piguet O, Farooqi IS, Hodges JR. Energy expenditure in frontotemporal dementia: a behavioural imaging study. *Brain* 2017;140:171-183. Impact Factor: 10.292. Citations: 8
6. Timmins HC, Saw W, Cheah BC, Lin CSY, Vucic S, **Ahmed RM**, Kiernan MC, Park SB. Cardiometabolic health and risk of amyotrophic lateral sclerosis. *Muscle Nerve* 2017;56:721-725. Impact Factor: 2.605. Citations: 1
7. **Ahmed RM**, Farooqi IS. Hypothalamic atrophy is related to body mass index and age at onset in amyotrophic lateral sclerosis. *J Neurol Neurosurg Psychiatry*. 2017 Dec;88(12):1006-1007. Impact Factor: 7.349. Citations: 4

Presentations

Ahmed RM, Highton-Williamson E, Caga J, Thornton N, Ramsey E, Zoing M, Kim WS, Halliday GM, Piguet O, Hodges JR, Farooqi IS, Kiernan MC. Lipid Metabolism and Survival Across the Frontotemporal Dementia-Amyotrophic Lateral Sclerosis Spectrum: Relationships to Eating Behavior and Cognition. ALS International symposium, Boston USA, Dec 2017

Ahmed RM, Caga J, Devenney E, Bartley L, Zoing M, Ramsey E, Piguet O, Hodges J, Kiernan M. Eating behaviour and cognition in amyotrophic lateral sclerosis: effect on survival. Australian and New Zealand Association of Neurology, Goldcoast 2017.