



RACP Foundation Research Awards

FINAL REPORT

Project / Program Title	Effect of Iron Supplements and Multiple Micronutrient Powders on intestinal microbiota and health in young children: A sub-study of an RCT in Bangladesh (BRISC-Microbiome)	
Name	Dr Sant-Rayn Pasricha	
Award Received	2018 Cottrell Research Establishment Fellowship	
Report Date	14 May 2019	
Chief Investigator / Supervisor	Dr Sant-Rayn Pasricha	
Administering Institution	Walter and Eliza Hall Institute of Medical Research	
Funding Period	Start Date:	5 March 2018
	Finish Date:	5 March 2019

PROJECT SUMMARY

Anaemia affects almost 300 million pre-school children worldwide. Universal distribution of iron to young children is recommended by the World Health Organization (WHO). However, in low-income settings the high burden of anaemia is often accompanied by a concomitant burden of diarrhoea, which causes up to 10% of all child deaths in Asia and Africa. Iron-containing interventions change children's intestinal microbiota from commensals toward pathogenic organisms and increase luminal inflammation. Leveraging a large NHMRC funded randomised controlled trial set in young children in Bangladesh, this project will establish whether changes in the intestinal microbiota induced by iron have clinical consequences for child health: specifically, on intestinal inflammation, intestinal absorption, diarrhoea, and impairment of growth. It will also establish whether effects are similar between iron drops and micronutrient powders, and whether effects are sustained.

PROJECT AIMS / OBJECTIVES

The aims of this project were to collect stool samples in our field trial in Bangladesh, and to then assess whether iron interventions influenced the carriage of intestinal pathogens, the microbiota, and gut inflammation, in a sample size of 180 children (n=60 per arm) at two timepoints (i.e. 360 samples).

During the planning of the study, we made a decision to invest the RACP Cottrell Fellowship funding into markedly increasing the sample size of the study. This was because the trial was running well (entire trial completed recruitment of N=3300 children in Feb 2019) and we felt that collecting a much larger sample size would increase the possible opportunities for analysing both the effects of iron on the microbiome, and also to understand associations between the

microbiome and broader aspects of child health including growth and cognitive development. Our view was that investing the RACP Grant into the larger sample size would fully leverage the field activities and data being collected by the large trial, and mean we would always have the resource of the samples to call on in the future, whereas a smaller sample size could potentially limit our discoveries in the future.

SIGNIFICANCE AND OUTCOMES

We have used the RACP Cottrell Fellowship to perform one of the world's largest longitudinal field microbiome studies, collecting and preserving samples from over 1000 infants in rural Bangladesh. Extensive data from the field trial will be able to be leveraged against the extensive neurocognitive, developmental, growth, haematologic, socioeconomic and clinical data already being collected as part of the study. Showing that the effect from iron on the microbiome has functional implications for intestinal inflammation, function and episodes of diarrhoea, is sustained beyond the intervention period, and/or is more likely attributable to MNPs or iron drops, would cause reconsideration of decisions to deploy iron interventions in settings where prevalence of diarrhoea or carriage of intestinal pathogens is high. Correlating associations between the microbiome and functional child outcomes will be a world first and make this the defining study of effects of the microbiome on child health.

PUBLICATIONS / PRESENTATIONS

N/A