



## RACP Foundation Research Awards

### FINAL REPORT

<b>Project / Program Title</b>	Immune mechanisms and clinical effects of oral immunotherapy on peanut allergic children	
<b>Name</b>	Dr Kuang-Chih Hsiao	
<b>Award Received</b>	2016 RACP Fellows Research Entry Scholarship	
<b>Report Date</b>	1 June 2017	
<b>Chief Investigator / Supervisor</b>	Professor Mimi Tang	
<b>Administering Institution</b>	The University of Melbourne	
<b>Funding Period</b>	Start Date:	1 January 2016
	Finish Date:	31 December 2016

#### PROJECT SUMMARY

The number of children affected by food allergy has increased exponentially in recent decades. Food allergen oral immunotherapy (OIT) is emerging as a potential treatment for food allergy. A combined Probiotic and Peanut Oral Immunotherapy (PPOIT) developed at The Murdoch Childrens Research Institute has shown substantial effectiveness for treatment of peanut allergy. My PhD research explores the immune mechanisms underlying the clinical benefits observed to date, investigates the long term clinical effectiveness of this treatment in peanut allergic children, and studies the tolerability and safety profile of a modified PPOIT buildup schedule designed to improve treatment delivery. My work provides insight into the mechanisms of action, demonstrates tolerability and long term beneficial effects of OIT and leads us steps closer towards finding a cure for food allergy.

#### PROJECT AIMS / OBJECTIVES

The overall aims and objectives of my PhD research are 1) to evaluate possible immune mechanisms underpinning the beneficial clinical effects of a combined probiotic and peanut oral immunotherapy (PPOIT) treatment, 2) to evaluate long-term posttreatment- cessation effects of PPOIT, and 3) to evaluate the tolerability of an enhanced PPOIT treatment regimen. In this report, I will focus on my work relating to the evaluation of long-term sustained effects of PPOIT.

#### SIGNIFICANCE AND OUTCOMES

The discovery of a food allergy treatment that can reverse a patient's allergy status and induce a sustained ability to tolerate a food allergen symptom-free years after treatment cessation will be

life changing for many food allergy sufferers and has the potential to improve quality of life and reduce health resource utilisation.

My research demonstrated that PPOIT provides long-lasting clinical benefit and persistent suppression of the allergic immune response to peanut in peanut allergic children. PPOIT-treated subjects were more likely to be eating peanut (66.7% vs. 4.2%, adjusted odds ratio (aOR) 49.7, 95%CI 5.4, 461.0, p=0.001) and tolerating a moderate/large amount of peanut (52.2% vs. 4.2%, aOR 29.6, 95%CI 3.1, 281.2, p=0.003) as compared to placebo-treated participants. 80% (16/20) of PPOIT-treated subjects who attained SU on completion of treatment were still eating peanut. 4 PPOIT treated and 6 placebo-treated subjects reported ever having a reaction on peanut intake (excluding with a food challenge) since treatment cessation. No anaphylaxis was reported. PPOIT-treated subjects had lower peanut SPT wheal size (PPOIT n=18, mean 8.1mm, s.d. 7.7; placebo n=18, 13.3mm, s.d. 7.6; p=0.05). 58.3% (7/12) of PPOIT subjects maintained 8-week SU compared to 0% (0/14) of placebo subjects.

Overall, these results suggest that PPOIT is effective at inducing long-term beneficial effects that persist for up to 4 years after completing treatment and is safe. I am involved in a three-arm, multicenter RCT (ACTRN12616000322437) comparing PPOIT vs. peanut OIT vs. placebo to address an important and as yet unanswered question of whether the addition of a probiotic confers greater benefit than OIT alone

#### **PUBLICATIONS / PRESENTATIONS**

Hsiao K-C, Ponsonby A-L, Axelrad C, Pitkin S, Tang MLK. Long Term Effects of a Probiotic and Peanut Oral Immunotherapy (PPOIT) Treatment on Peanut Allergic Children. *Journal of Allergy and Clinical Immunology* 2017;139:AB136.

Tang MLK, Hsiao K-C. An update on oral immunotherapy for the treatment of food allergy. *Paediatrics and Child Health* 2016;26:304-9.

Hsiao K-C, Tang MLK. Novel treatments for established food allergies. *Current Pediatrics Reports* 2016;4:178-85.