

# Early Introduction of Foods and its Role in Tolerance Induction

Prof. Gideon Lack



MRC & Asthma UK Centre in Allergic Mechanisms of Asthma

Guy's and St Thomas'



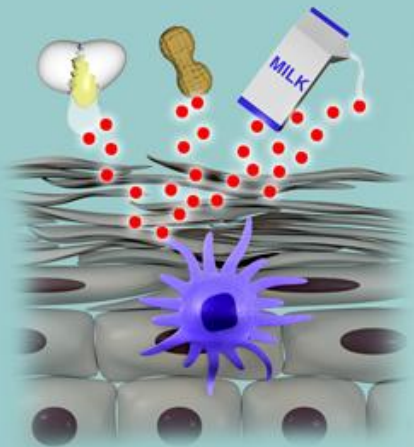
NHS Foundation Trust



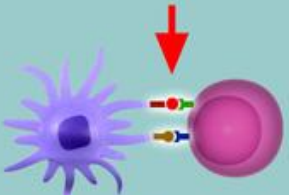
# Principles of prevention of food allergy

- Avoidance
- Avoidance
- Avoidance

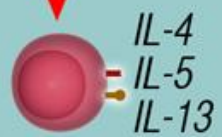
# CUTANEOUS EXPOSURE



Skin



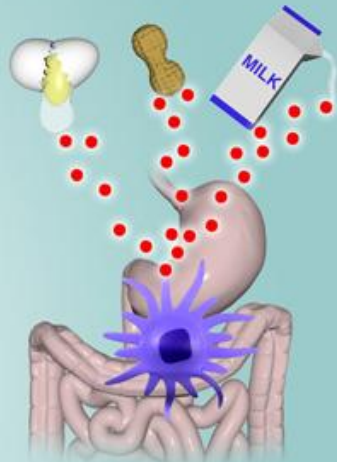
Skin-draining lymph nodes



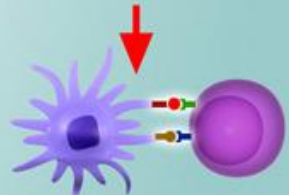
Th2 memory

**ALLERGY**

# ORAL EXPOSURE



GI Track

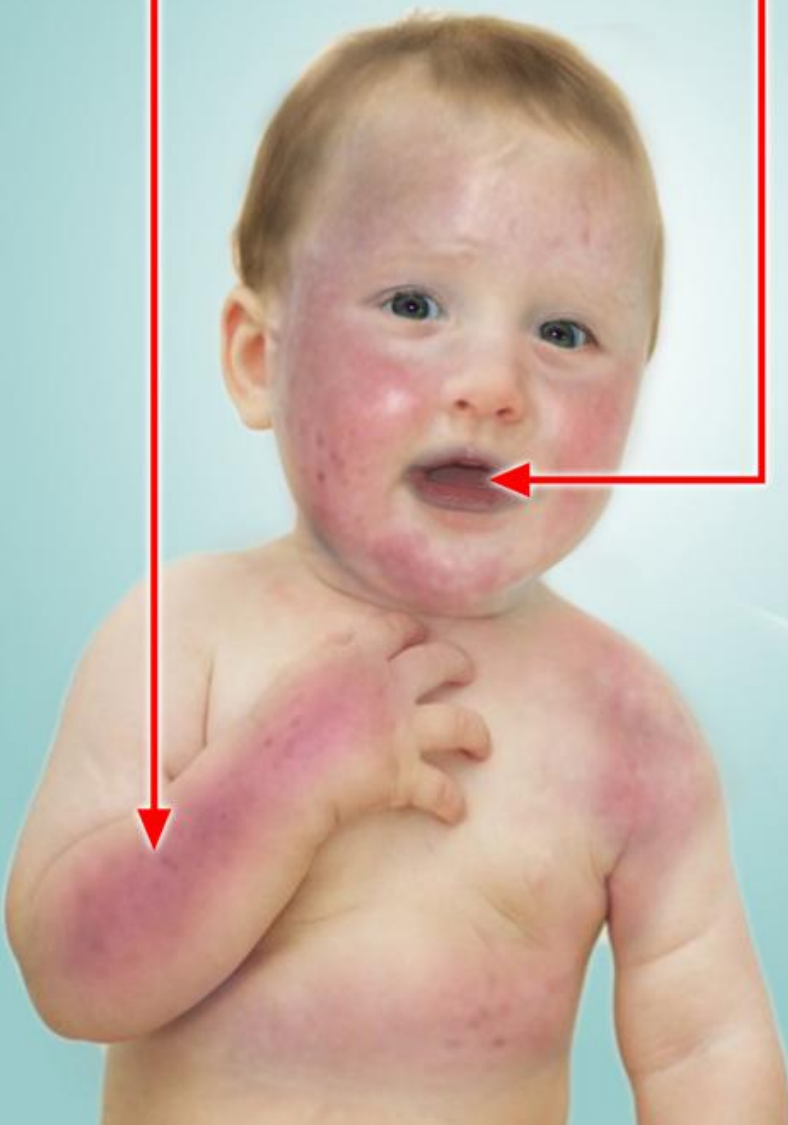


Mesenteric lymph nodes



Th1 memory Treg memory

**TOLERANCE**



# Evidence for Cutaneous Sensitisation

- **Severe eczema is associated with food allergy.**

D. J. Hill et al. Clin Exp Allergy. 2008 Jan;38(1):161-8.

- **Topical exposure to peanut oil is associated with peanut allergy.**

G. Lack et al., NEJM 2003; 348: 977-985

- **High household peanut consumption is associated with peanut allergy.**

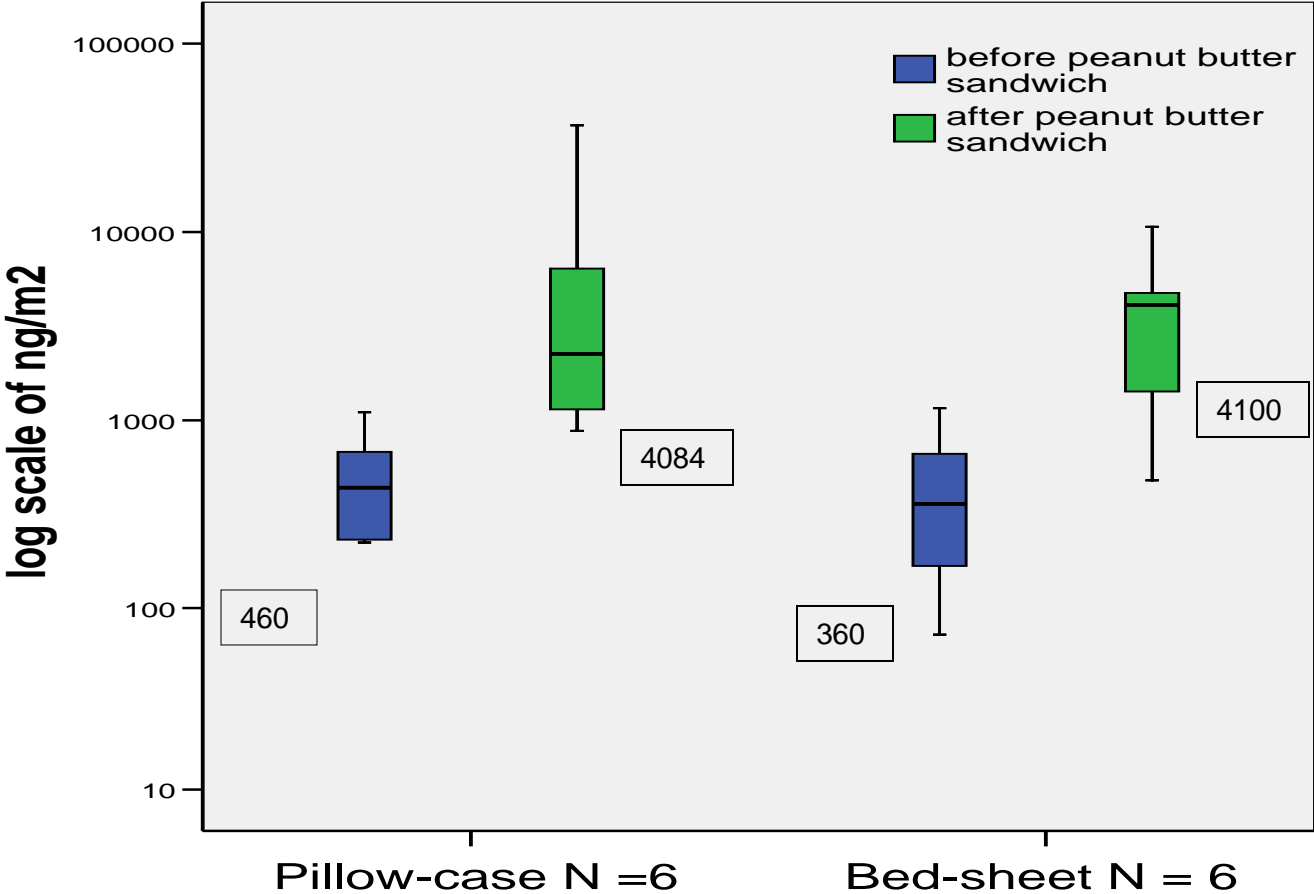
Fox AT et al. JACI 2009 Feb;123(2):417-23

- **Peanut allergen can be measured in household dust.**



Disposable, single use, **40 micron nylon filters**

# Peanut in fresh bed-linen before eating peanut butter and day after N = 6



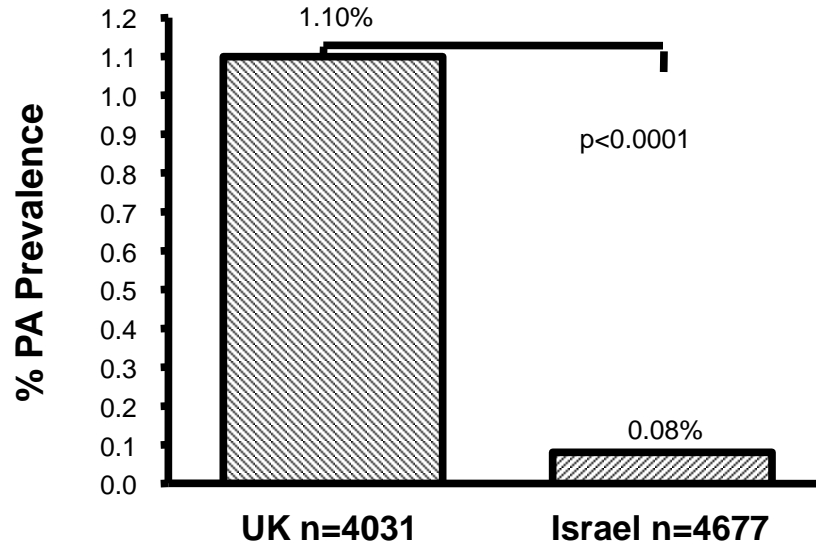
# Evidence for Oral Tolerance

Oral

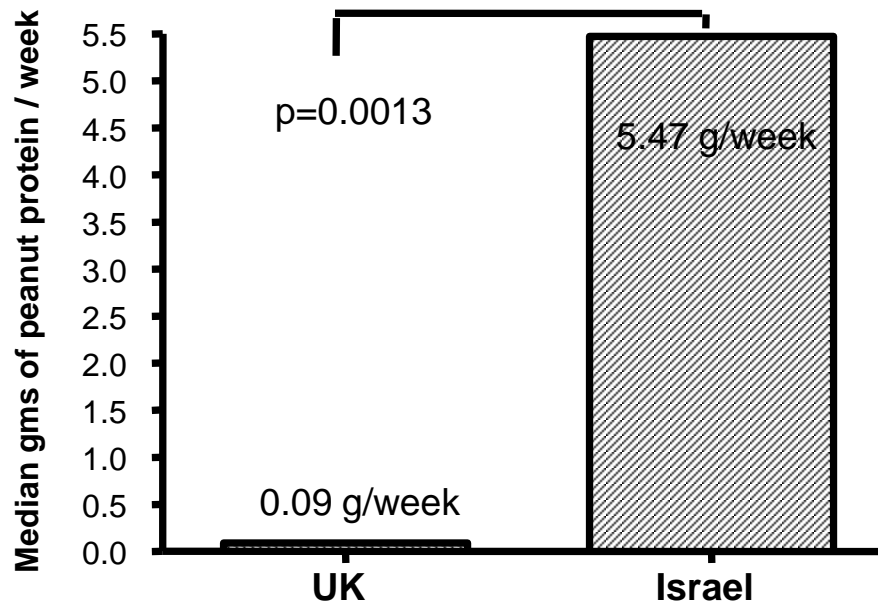


Tolerance

## Prevalence of Peanut Allergy in Children 4-11yrs



## Peanut Protein Consumption 8-14 month



# Strategies to Prevent Sensitisation

- Complete environmental avoidance?
- Early high dose oral tolerance induction?





# Strategies to Prevent Sensitisation

- Complete environmental avoidance?
- **Early high dose oral tolerance induction?**



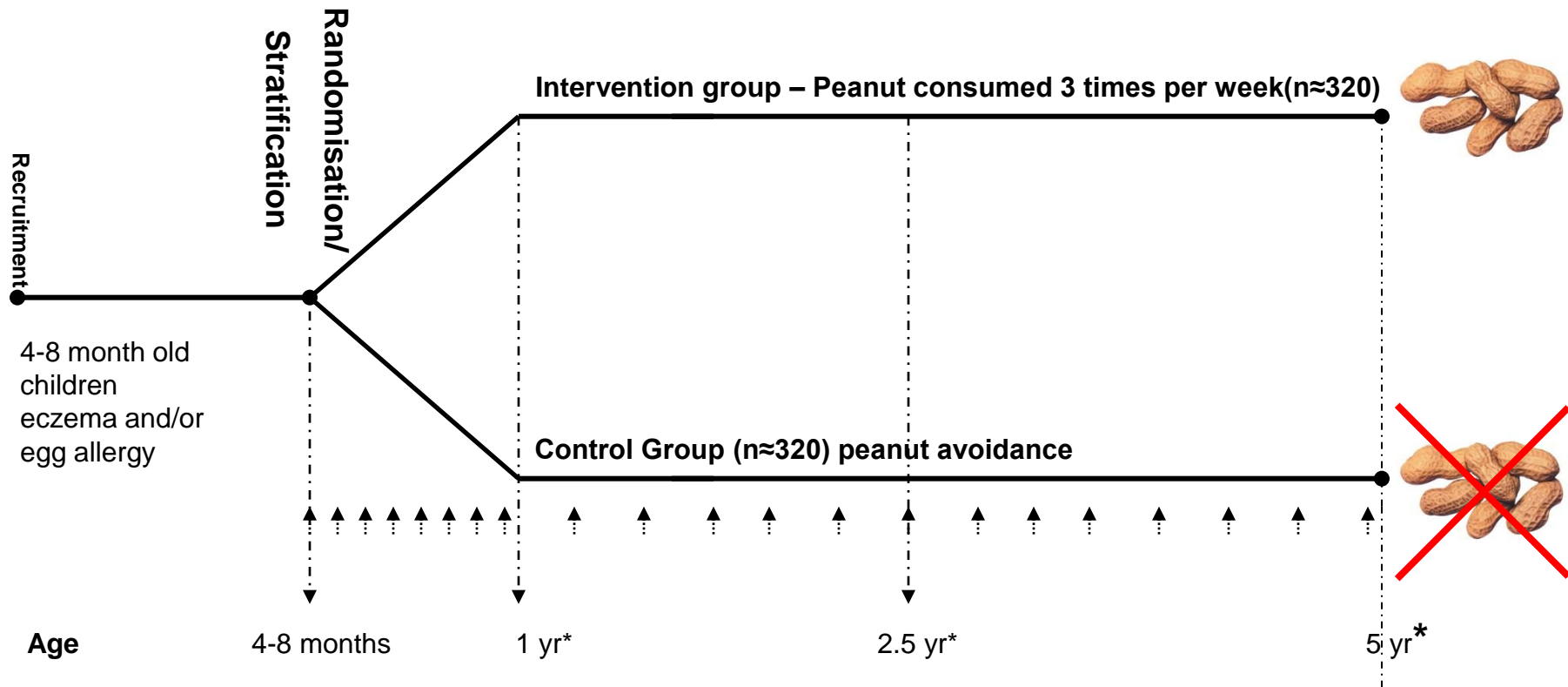


NORMAL  
PEANUT  
BUTTER



**To eat  
or not to eat...**

# LEAP Study – Immune Tolerance Network

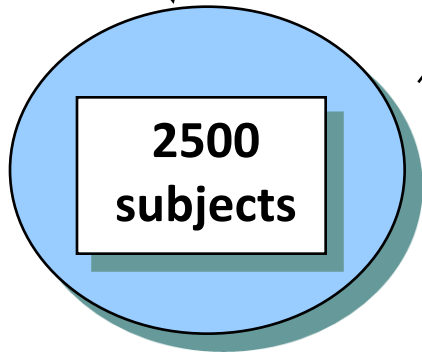


# LEAP Study – primary endpoint

- Peanut allergy at 5 years of age by DBPCFC
- Power: 90% power to detect 66% reduction in peanut allergy (p<0.05)

# Early Weaning Trial

Pregnant women  
20/40 scan



Randomization (3 months)

Early weaning onto  
allergenic foods

Current weaning  
recommendations

3 year  
assessment

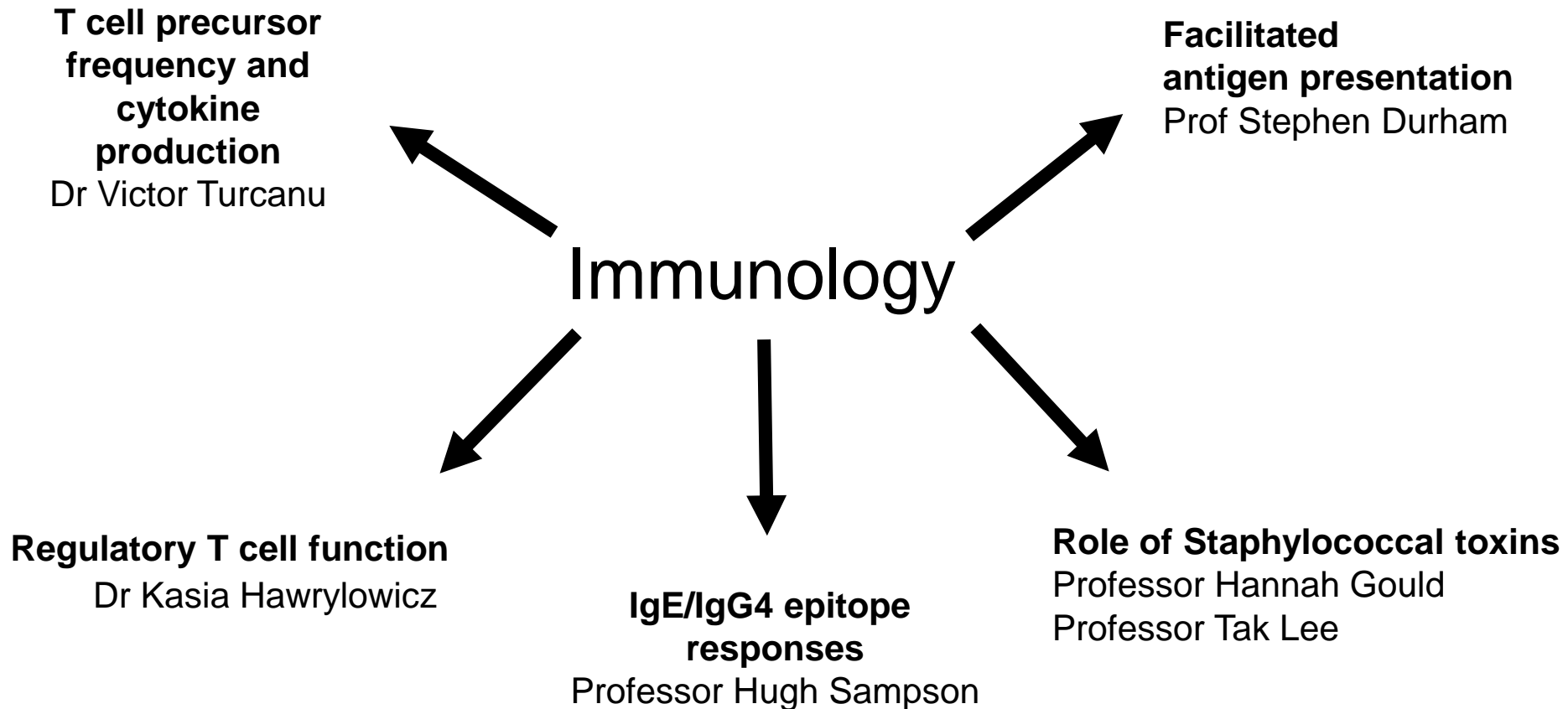
Food allergy

Eczema

Atopic wheeze

Cumulative  
allergy

# Oral Tolerance Induction



# Summary

- Allergic sensitisation to foods may occur through early exposure to allergens through eczematous skin: some circumstantial evidence.
- Oral tolerance induction to a food may result from early consumption – currently being tested in LEAP and EAT studies.
- The outcome of tolerance /allergy in an individual depends on presence of eczema (timing and severity) and the balance between cutaneous and oral exposure.

# Acknowledgements

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- Immune Tolerance Network/NIH
- Food Standards Agency
- Medical Research Council
- Food Allergy and Anaphylaxis Network