The stability of peanut allergens in AR101, an oral immunotherapeutic for the treatment of peanut allergy, in two representative food matrices

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**Aims:** Peanut allergy is an increasingly common health problem. While there are currently no approved treatments specifically for peanut allergy, oral immunotherapy (OIT) has shown promising results. In OIT, peanut allergens (often in the form of peanut flour) are typically delivered by mixing into vehicle foods and then consuming. Also, in OIT clinical trials, patients undergo food challenges, where the peanut allergens are mixed into vehicle food. To insure consistent dosing during OIT and during food challenges, it is important to show that the food matrices do not compromise the integrity of the allergens.

Aimmune Therapeutics is currently enrolling patients in a Phase 3 OIT study (PALISADE) to demonstrate the efficacy and safety of AR101, a formulated drug product containing peanut protein at different dosage strengths. It is taken orally following mixing with food. The aim of this study was to determine the stability of peanut allergens over a 24 hour period following mixing with foods used in the PALISADE food challenge, applesauce and chocolate pudding, foods also commonly used as vehicles for OIT dosing.

**Methods:** Peanut flour (PF), Peanut-Food Challenge Material (PFCM; peanut flour mixed with food-grade flavorings and bulking agents), and AR101 (100 mg) were each mixed with food and sampled at 0, 4, and 24 hours. Proteins were extracted from the food mixtures and analyzed by peanut specific ELISA and LCMSMS. Total peanut allergen was quantitatively measured in an ELISA (R-Biopharm Ridascreen Fast-Peanut). LCMSMS identified two marker peptides each for Ara h 1, h 2, and h 6 following protein extraction, digestion, and alkylation. These were compared over the course of 24 hours to a no-food-matrix control.

**Results:** ELISA: Ranges of peanut protein (ppm peanut) recovered with AR101 extraction from applesauce (2 samples analyzed in duplicate) were: 3.3-4.2 (t=0h), 3.9-4.3 (4h), 3.3-3.8 (24h). Ranges for AR101 extracted from chocolate pudding were: 3.2-3.6 (0h), 4.0-5.7 (4h), 3.6-4.5 (24h). Data were similar for PF and PFCM. LCMSMS: For all marker peptides, peak areas were within 30% of t=0h for all food matrices (single samples, triplicate measurement).

**Conclusion:** When mixed into applesauce or chocolate pudding, there was no observable degradation of the samples over 24 hours, insuring sufficient stability to accommodate any reasonable variability in time taken to consume a dose.