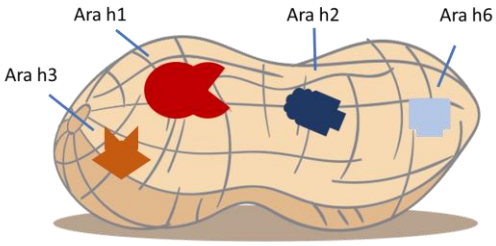
Food Allergy: Crude Peanut Extract

Immediate hypersensitivity reactions to peanuts, an IgE-mediated food allergy, has been a major public health concern for many years, particularly in westernized countries where peanut allergies can persist into adulthood. Among these allergens, peanut allergies account for most of the severe hypersensitivity acute reactions in patients. Several potentially important peanut allergens have been identified and designated the major peanut allergens: Ara h 1, Ara h 2, Ara h 3, and Ara h 6. For allergic patients, avoidance currently remains the only viable option (1).



Peanut Components

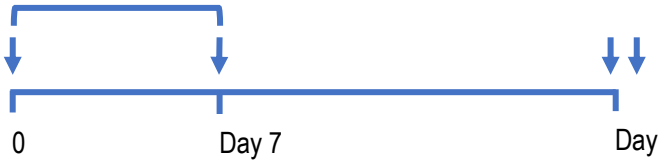
Peanut Allergy Model

Mouse peanut allergy models can be induced by several oral administrations of crude peanut extract (CPE) and evaluated for humoral immune responses such as serum anti-CPE IgE and IgG antibodies, T-cell mediated immune response associated cytokine levels, as well as body temperature and clinical signs of anaphylaxis (2).

A. CPE Oral Challenge Model

Oral Administration of 5 mg CPE with 0.01 mg Cholera toxin (CT)

Oral Challenge of 5 mg CPE two times, 30 minutes apart



Evaluation Methods:
- Serum anti-CPE IgE antibody levels
- Serum histamine levels

B. Anti-CPE IgE Antibody Induced Model

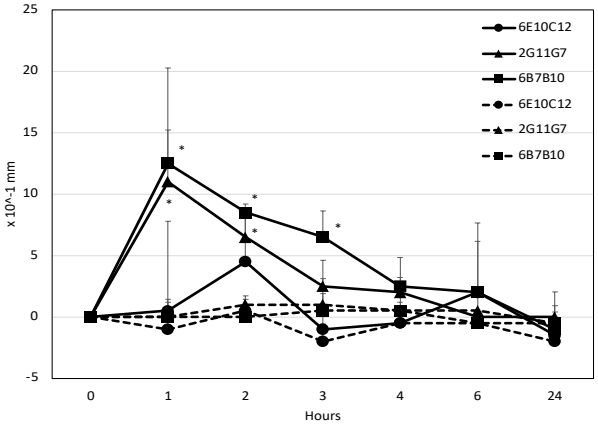
Intravascular (IV) injection of 0.3 mg Anti-CPE IgE antibody

1. **Anaphylaxis Model**: IV injection of 1 mg CPE

OR

2. **Footpad Type I Hypersensitivity Model**: Intradermal (ID) injection of 0.1 mg CPE

Evaluation Methods:
- Body Temperature
- Thickness of footpads



Footpad Type I Hypersensitivity by anti-CPE IgE monoclonal antibodies

The footpad thickness of mice after IV injections of 1 mg of mAbs: 6E10C12 (Circle) , 2G11G7 (Triangle), 6B7B10 (Square), followed by ID injections of 0.1 mg of CPE (Solid line) or PBS (Dashed line) at the footpad.

Products	Catalog #
Crude Peanut Extract (CPE)	3069
Mouse Anti-CPE IgE Antibody, Clone 2G11G7	3070

Food Allergy: Crude Peanut Extract

IgE antibodies against allergens play an important role to induce allergic reactions in patients. Mast cells are degranulated by multivalent allergens cross-linking two IgE antibodies bound to receptors on the mast cell's surface, resulting in histamine release which activates inflammatory cascades. Alternatively, anti-allergen IgG antibodies can form multivalent immune-complexes of allergens which can bridge IgE antibodies on mast cells (3, 4).

Products	Catalog # Anti-CPE	Catalog # Anti-Ara h 1	Catalog # Anti-Ara h 2	Catalog # Anti-Ara h 3	Catalog # Total Immunoglobulin
IgG Antibody Assay	3056	3084	3077	3082	3023
IgG1 Antibody Assay	3057	3085	Coming soon!	3083	3025
IgG2a Antibody Assay	3058	3088	Coming soon!	Coming soon!	3026
IgG2b Antibody Assay	3059	3086	3078	Coming soon!	3027
IgG3 Antibody Assay	3060	Coming soon!	Coming soon!	Coming soon!	3028
IgM Antibody Assay	3062	3087	3079	Coming soon!	3024
IgA Antibody Assay	3061	Coming soon!	3080	Coming soon!	3019
IgE Antibody Assay	3063	Coming soon!	3106	3071	3005

*Individual monoclonal antibodies against allergens are also available. Please visit www.chondrex.com for more information.

Protein-based assays, especially ELISA, are capable of identifying even the most abundant peanut proteins at low levels due to the ELISA's high precision, ease of handling, and significant potential for standardization (5) . The composition of peanut allergens, such as Ara h 1, h 2, and h 6, varies depending on individual food processing methods and peanut species (6). Allergens that have been treated or digested may transform into neoantigens, which possess higher allergenicity than their native counterparts. Therefore, monitoring peanut allergen levels in mixtures is crucial to prevent exposure to and consumption by allergic individuals.

Products	Catalog #
Ara h 1 Detection ELISA Kit	6045
Ara h 2 Detection ELISA Kit	6043
Ara h 3 Detection ELISA Kit	6047
Ara h 6 Detection ELISA Kit	6042
Mouse Mast Cell Protease-1 (MCPT-1) Detection ELISA Kit	6046

References

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2. X. M. Li, D. Serebrisky, S. Y. Lee, C. K. Huang, L. Bardina, B. H. Schofield, J. S. Stanley, A. W. Burks, G. A. Bannon, H. A. Sampson, A murine model of peanut anaphylaxis: T- and B-cell responses to a major peanut allergen mimic human responses. J. Allergy Clin. *Immunol*. **106**, 150–158 (2000).
3. S. J. Galli, M. Tsai, IgE and mast cells in allergic disease. *Nat. Med*. **18**, 693–704 (2012).
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6. S. Meng, J. Li, S. Chang, S. J. Maleki, Quantitative and kinetic analyses of peanut allergens as affected by food processing. *Food Chem X* **1**, 100004 (2019).