

Recombinant Food Allergens

Food and pollen from a species usually comprise more than one allergenic component that may share various degrees of identity and might induce cross-sensitivity due to cross-specific IgE antibodies (Turnbull *et al.* 2015; Werfel *et al.* 2015). Molecular identification of individual allergens and subsequent establishment of Component Resolved Diagnostics (CRD) allow the detection of specific IgE antibodies (Canonica *et al.* 2013; Werfel *et al.* 2015).

Due to similarities between gluten proteins, wheat allergic patients can also react to various other kinds of cereals. Tri a 14, the non-specific lipid transfer protein (nsLTP) of wheat has been shown to not exhibit cross-reactivities to other grass pollen allergens and is therefore used as a specific marker for wheat allergic subjects (Palacin *et al.* 2010).

Print scheme

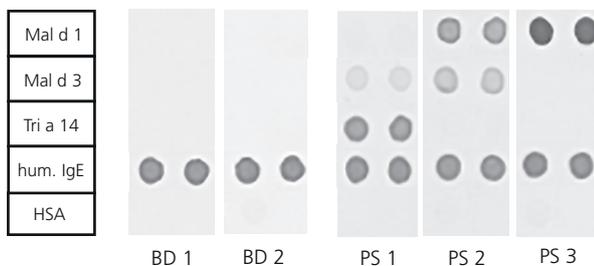


Figure: Immunodot analyses of blood donors (BD 1-2) and sera from patients (PS 1-3) allergic to wheat or apple. The presence of IgE antibodies was determined by spotting duplicates of DIARECT's recombinant allergens Mal d 1.0108, Mal d 3.0101 and Tri a 14.0101 on nitrocellulose membrane. Positive (human IgE) and negative controls (HSA) were spotted in the two bottom lines.

Apple (*Malus domestica*) allergen Mal d 1 belongs to a class of proteins called pathogenesis-related (PR) proteins. Apple is a prime example of pollen-fruit syndrome in which patients with hay fever develop oral allergic symptoms to food allergens (Fritsch *et al.* 1998). In contrast, lipid transfer proteins (LTPs) are often associated with severe allergic reactions (Palacin *et al.* 2012). Sensitization to Mal d 3 is a risk factor for systemic reactions (Fernández-Rivas *et al.* 2006). The 13-kDa protein is heat-stable and retains its allergenicity even after cooking (Asero *et al.* 2003). Apple-allergic patients sensitized to Mal d 3 may react to other LTP-containing foods, such as peach, nuts, or grapes.

A high percentage of patients allergic to birch pollen have been reported to also be allergic to soybean. Bet v 1, a major birch allergen, and Gly m 4, a major soybean allergen, were detected in the sera of these patients (Berkner *et al.* 2009; Mittag *et al.* 2004; Werfel *et al.* 2015). In 2009, Holzhauser *et al.* described another soybean allergen, Gly m 5. IgE

antibodies against Gly m 5 were mainly found in sera of patients that suffer from anaphylaxis upon exposure to soybean. IgE antibodies against Gly m 4, however, appeared to be present preferentially in sera of patients that only have mild symptoms.

Tropomyosin of *Penaeus aztecus* (34-38 kDa), designated Pen a 1 (Daul *et al.* 1991), is representative of shrimp tropomyosin, used in the investigation of allergies to foods in which tropomyosin is a major determinant (Castillo *et al.* 1994). Of the thirteen different allergens identified in brown shrimp, it is the best characterized, has been detected in sera of more than 80% of shrimp allergic subjects and binds to 75% of the shrimp-specific IgE (Daul *et al.* 1994; Jeoung *et al.* 1997).

DIARECT's recombinant food allergens are produced in either *E. coli* or the baculovirus/insect cell expression system.

Ordering Information		
50500	Gly m 4.0101	0.1 mg
50501		1.0 mg
50600	Gly m 5.0101	0.1 mg
50601		1.0 mg
52800	Mal d 1.0108	0.1 mg
52801		1.0 mg
53100	Mal d 3.0101	0.1 mg
53101		1.0 mg
54100	Pen a 1.0101	0.1 mg
54101		1.0 mg
54500	Tri a 14.0101	0.1 mg
54501		1.0 mg

References:

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- Berkner *et al.* (2009) *Bioscience Rep.* 29 (3): 183-192
- Canonica *et al.* (2013) *World Allergy Organi J.* 6: 1-17
- Castillo *et al.* (1994) *Allergol Immunopathol.* 22: 83-87
- Daul *et al.* (1991) *J Allergy Clin Immunol.* 87 (1): 192
- Daul *et al.* (1994) *Int Arch Allergy Immunol.* 105 (1): 49-55
- Fernández-Rivas *et al.* (2006) *J Allergy Clin Immunol.* 118 (2): 481-488
- Fritsch *et al.* (1998) *J Allergy Clin Immunol.* 102 (4): 679-686
- Holzhauser *et al.* (2009) *J Allergy Clin Immunol.* 123 (2): 452-458
- Jeoung *et al.* (1997) *J Allergy Clin Immunol.* 100 (2): 229-234
- Mittag *et al.* (2004) *J Allergy Clin Immunol.* 113 (1): 148-154
- Palacin *et al.* (2010) *Int Arch Allergy Immunol.* 152 (2): 178-183
- Palacin *et al.* (2012) *PLoS One* 7 (12): e50799
- Turnbull *et al.* (2015) *Aliment Pharmacol Ther.* 41 (1): 3-25
- Werfel *et al.* (2015) *Allergy.* 70 (9): 1079-1090

In some countries the use of certain allergens in diagnostic tests may be protected by patents. DIARECT is not responsible for the determination of these issues and suggests clarification prior to use.

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