

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

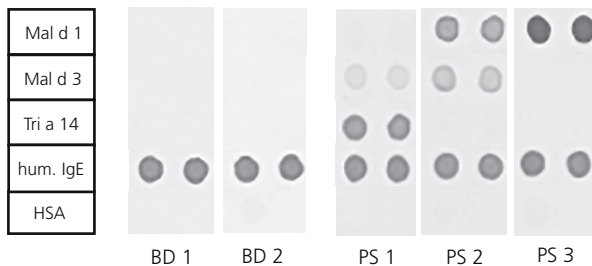


Figure: Immunodot analyses of blood donors (BD 1-2) and sera from patients (PS 1-3) allergic to wheat or apple. The presence of IgE antibodies was determined by spotting duplicates of DIARECT's recombinant allergens Mal d 1.0108, Mal d 3.0101 and Tri a 14.0101 on nitrocellulose membrane. Positive (human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

Asero *et al.* (2003) *J Allergy Clin Immunol.* 112 (5): 1009-1011
 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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