Tree Nut Allergens

Allergies to tree nuts (TNs) are becoming more and more prevalent with reactions to hazelnut (*Corylus avellana*) being the most common one in Europe (Geiselhart *et al.* 2018).

TN components can cause mild oral to severe systemic allergic reactions with even life threating symptoms including anaphylactic shock (Weinberger and Sicherer 2018). Oral allergy syndrome (OAS) is often caused by secondary reactions due to cross-reactivity, while the more severe systemic reactions occur with the manifestation of a primary TN allergy (Dodig and Cepelak 2018). Therefore, component-resolved diagnostics (CRDs) can help to better categorize the severity of a patient's allergy in order to provide a more individualized therapeutic approach (Sastre 2010; Weinberger and Sicherer 2018).

In patients suffering from a hazelnut allergy, IgE antibodies against the hazelnut components Cor a1, Cor a 8 Cor a 9 or Cor a 14 are most likely to be found.

Cor a 1 (PR10) is a homolog of Bet v 1 (major birch pollen allergen) and is mainly involved in cross-reactive allergy (Hofmann *et al.* 2013; Flinterman *et al.* 2006; De Knop *et al.* 2011). Cor a 1 has been identified as the major hazelnut allergen in patients in Europe (Schocker *et al.* 2004). Patients only sensitized to Cor a 1 often tolerate roasted or heated hazelnuts as Cor a 1 is heat- and digestion-labile (Hansen *et al.* 2003).

Cor a 8 is a lipid transfer protein (LTP) that is structurally similar to LTPs found in fruits (Egger *et al.* 2010). It is often involved in cross-reactivity, for example in peach-allergic patients (Weinberger and Sicherer 2018). Since Cor a 8 is heat-stable it is known to be a risk factor for systemic reactions (Schocker *et al.* 2004).

Cor a 9 belongs to the family of seed storage proteins and antibodies to this allergen are detected in 86% of patients with a hazelnut allergy. As a heat-stable protein, it has a history of systemic reactions (Weinberger and Sicherer 2018). Cor a 9 has been shown to be a pollen-independent hazelnut allergen in the US and major pollen-unrelated TN allergen in Europe (Schocker *et al.* 2004).

Sensitization to the hazelnut storage protein Cor a 14 usually indicates a primary nut allergy and involves systemic reactions (Masthoff *et al.* 2013).
It is suggested that patients reacting to Cor a 9 and Cor a 14 should also be investigated for allergy to peanuts and other tree nuts, such as walnuts and Brazil nuts, as cross-reactivity can occur (Asero et al. 2004; Flintermann et al. 2008; Beyer et al. 2015).

DIARECT's recombinant TN allergens are produced in the baculovirus/insect cell expression system. Non-recombinant Cor a 9 is purified from hazelnut by protein-chemical methods.

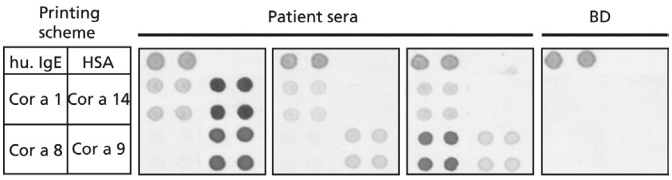

Figure: Immunodot analyses of a blood donor (BD) and sera from patients allergic to hazelnut. The presence of IgE antibodies was determined by spotting quadruplicates of DIARECTS's recombinant allergens Cor a 1.0401, Cor a 14.0101, Cor a 8.0101, as well as DIARECT's non-recombinant allergen Cor a 9 on nitrocellulose membrane. Positive (human IgE) and negative controls (human serum albumin; HSA) are displayed in duplicates in the top line.

Ordering Information		
51800	Cor a 1.0401	0.1 mg
51801		1.0 mg
54200	Cor a 8.0101	0.1 mg
54201		1.0 mg
54300	Cor a 9 (non recombinant)	0.1 mg
54301		1.0 mg
54400	Cor a 14.0101	0.1 mg
54401		1.0 mg

References:
De Knop *et al.* (2011) Pediatr Allergy Immunol. 22 (1 Pt 2): e139-149
Dodig and Cepelak (2018) Biochem Med (Zagreb). 28 (2): 020501
Egger *et al.* (2010) Curr Allergy Asthma Rep. 10 (5): 326-335
Flinterman *et al.* (2006) J Allergy Clin Immunol. 118 (5): 1186-1189
Geiselhart *et al.* (2018) Mol Immunol. 100: 71-81
Hansen *et al.* (2003) Allergy. 58 (2): 132-138
Hofmann *et al.* (2013) J Allergy Clin Immunol. 131 (5): 1384-1392.e6
Masthoff *et al.* (2013) J Allergy Clin Immunol. 132 (2): 393-399
Sastre (2010) Clin Exp Allergy. 40 (10): 1442-1460
Schocker *et al.* (2004) J Allergy Clin Immunol. 113 (1): 141-147
Weinberger and Sicherer (2018) J Asthma Allergy. 11: 41-51

DIARECT GmbH · Bötzinger Str. 29 B · 79111 Freiburg · Germany
Tel. +49 (0) 761 47979-0 · Fax +49 (0) 761 47979-29 · orders-dia@bbisolutions.com · www.bbisolutions.com