

f430 rAct d 8

Act d 8 from kiwi (*Actinidia deliciosa*)



Clinical Utility

ImmunoCAP® Allergen component f430, rAct d 8 in combination with ImmunoCAP® f84, Kiwi, adds clinical value in the diagnostic work-up of kiwi-allergic patients.

Sensitization to Act d 8, a Bet v 1 homologue aids in:

- Assessment whether symptoms originate from birch-pollen allergy.
- Identifying patients at risk of symptoms due to cross-reactivity with other food and plants containing Bet v 1 homologous proteins.

Allergen Description

Act d 8 is a 17 kDa protein from green kiwi (*Actinidia deliciosa*) (1). Act d 8 belongs to the PR-10 family and shares 50% homology with Bet v 1, the most thoroughly characterized PR-10 allergen (1). Act d 8, like other Bet v 1 homologous proteins, is heat labile and expected to be prone to gastric digestion (2).

Cross-Reactivity

Act d 8 shows 97% amino acid sequence similarity with the related Act c 8 from gold kiwi (*Actinidia chinensis*) (1). Sequence homology has also been demonstrated between Act d 8 and other Bet v 1 homologues in food and pollens, ranging from 50% for Aln g 1 from alder pollen to 61% for Pru ar 1 from apricot (3). See **Table 1** for more information.

Bet v 1 homologous proteins are major cross-reactive allergens and the most relevant sensitizing proteins in patients with a combined birch/plant food allergy (4-6). About 70% of birch allergic patients experience allergic symptoms when consuming fruits, nuts and/or vegetables such as hazelnut, apple, other stone fruits, celery and carrot (5).

Clinical Experience

Allergy to kiwi fruit is being increasingly reported, and some regard kiwi as being one of the major inducers of plant food allergy (7). However, prevalence data as well as characterization of the clinical features of allergy to kiwi are currently limited (8). Patients affected by intake of kiwi present a wide range of symptoms, from mild local so-called oral allergy syndrome (OAS) to more generalized symptoms and even life-threatening anaphylaxis (8-13).

Kiwi-allergic people are expected to be sensitized to several kiwi fruit proteins, and Act d 8 represents the link to birch-pollen associated kiwi allergy. Although sensitization to Bet v 1 homologous proteins is usually associated with OAS, severe oral symptoms and anaphylactic reactions have been reported and attributed to a Bet v 1 homologue in soybean (14).

Kiwi allergy seems to be mostly associated with latex, birch- and grass-pollen allergy. However, isolated allergy to kiwi has nevertheless also been reported (8).

Table 1. Sequence homology between Act d 8 and other Bet v 1 homologues from food and pollen (3).

PR-10 homologue and Allergen source	Sequence homology with Act d 8
Pru ar 1 Apricot	61%
Mal d 1 Apple	57%
Fag s 1 Beech pollen	57%
Pru av 1 Cherry	56%
Cor a 1 Hazelnut	55%
Pru p 1 Peach	54%
Bet v 1 Birch pollen	53%
Aln g 1 Alder pollen	50%

References

1. OBERHUBER C, BULLEY S, BALLMAR-WEBER B, BUBLIN M, GAIER S, MARKNELL DEWITT Å, BRIZA P, HOFSTETTER G, LIDHOLM J, VIETHS S, HOFFMAN-SOMMERGRUBER K.
Characterization of Bet v 1-related allergens from kiwi fruit relevant for patients with combined kiwi fruit and birch allergy.
Mol Nutr Food Res 2008 Nov;52 Suppl 2:S230-40.
2. BREITENER H AND MILLS C.
Molecular properties of food allergens.
J Allergy Clin Immunol 2005;115:14-23
3. INTERNATIONAL UNION OF IMMUNOLOGICAL SOCIETIES ALLERGEN NOMENCLATURE:
IUIS official list <http://www.allergen.org/List.htm> 2009.
4. WENSING M, AKKERDAAS JH, VAN LEEUWEN WA, STAPEL SO, BRUIJNZEEL-KOOMEN CA, AALBERSE RC, BAST BJ, KNULST AC, VAN REE R.
IgE to Bet v 1 and profilin: Cross-reactivity patterns and clinical relevance.
J Allergy Clin Immunol 2002;110(3):435-42.
5. VIETHS S, SICHERER S, BALLMER-WEBER B.
Current understanding of Cross-reactivity of Food Allergens and Pollen.
Annals of the New York Academy of Science 2002;964:47-68
6. BOHLE B.
The impact of pollen-related food allergens on pollen allergy.
Allergy 2007;62(1):3-10.
7. BUBLIN M, MARI A, EBNER C, KNULST A, SCHEINER O, HOFFMANN-SOMMERGRUBER K, BREITENEDER H, RADAUER C.
IgE sensitization profiles toward green and gold kiwifruits differ among patients allergic to kiwifruit from 3 European countries.
J Allergy Clin Immunol 2004;114(5):1169-75.
8. LUCAS JS, LEWIS SA, HOURIHANE JO.
Kiwi fruit allergy: A review.
Pediatr Allergy Immunol 2003;14(6):420-8.
9. LUCAS JS, GRIMSHAW KE, COLLINS K, WARNER JO, HOURIHANE JO.
Kiwi fruit is a significant allergen and is associated with differing patterns of reactivity in children and adults.
Clin Exp Allergy 2004;34(7):1115-21.
10. DUTAU G, RITTIE JL, RANCE F, JUCHET A, BREMONT F.
New food allergies.
[French] Presse Med 1999;28(28):1553-9.
11. YAMAMOTO T, ASAKURA K, SHIRASAKI H, HIMI T.
Clustering of food causing oral allergy syndrome in patients with birch pollen allergy.
[Japanese] Nippon Jibiinkoka Gakkai Kaiho 2008;111(8):588-93.
12. FALLIERS CJ.
Anaphylaxis to Kiwi fruit and related "exoti" items.
J Asthma 1983;20(3):193-6.
13. SHIMITSU T, MORIKAWA A.
Anaphylaxis to kiwi fruit in a 12-year-old boy.
J Asthma 1995;32(2):159-60.
14. KLEINE-TEBBE J, VOGEL L, CROWELL DN, HAUSTEIN UF, VIETHS S.
Severe oral allergy syndrome and anaphylactic reactions caused by a Bet v 1-related PR-10 protein in soybean, SAM22.
J Allergy Clin Immunol 2002;110(5):797-804.

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