

**Bioinformatics analysis using an allergen database of CP4EPSPS
L214P protein produced by Roundup Ready ® Corn Event NK603**

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Study Title

**Bioinformatic analysis using an allergen database of the CP4 EPSPS L214P protein
produced by Roundup Ready® corn event NK603**

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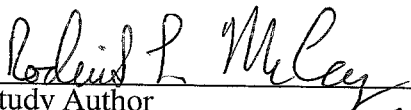
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Study Start Date: March 19, 2002

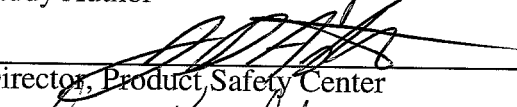
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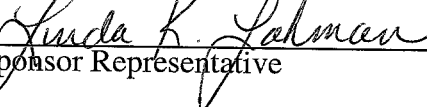
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Date



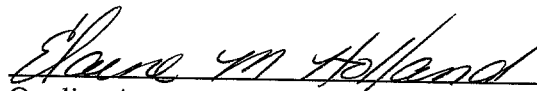
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Summary of Quality Control Review

This report was reviewed to ensure that it accurately reflects the raw data. The raw data was audited for compliance to the Monsanto Company Guidelines for Keeping Research Records (GRR 10/1/99), and where applicable, to Monsanto SOPs.



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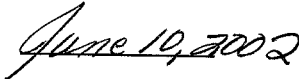
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Abbreviations and Definitions

aa	Amino acid
AD3.1	Allergen protein sequence database, compiled by Monsanto Company
<i>ArabTP</i>	<i>Arabidopsis thaliana</i> EPSPS chloroplast transit peptide
CD4+	T lymphocyte cells bearing CD4 (CD4+) membrane glycoproteins on their surfaces.
CP4 EPSPS	5-enolpyruvylshikimate-3-phosphate synthase protein produced from the <i>cp4 epsps</i> gene
EMBL	A public genetic database maintained by the European Molecular Biology Laboratory at the European Bioinformatics Institute, Hinxton, England
FASTA	Algorithm used to find local high scoring alignments between a pair of protein or nucleotide sequences
GCG	Genetics Computer Group
GenBank	A public genetic database maintained by the National Center for Biotechnology Information at the National Institutes of Health, Bethesda, MD
IDENTITYSEARCH	Algorithm used to find immunologically relevant amino acid identities between a pair of protein sequences, also referred to as ALLERGENSEARCH
MHC II	Major histocompatibility complex molecules. MHC molecules are polymorphic glycoproteins found on cell membranes. Class II MHC molecules consist of a α and a β glycoprotein chain and are expressed only by antigen-presenting cells.
NRL3D	National Research Laboratory's protein 3-dimensional protein database founded at Brookhaven National Laboratory and maintained by the RCSB
PDB	Protein Database
PIR	Protein Information Database
RCSB	Research Collaboratory for Structural Bioinformatics
SwissProt	Translated sequences from EMBL database

1.0 Summary

Monsanto Company has developed Roundup Ready[®] corn event NK603 that is tolerant to glyphosate, the active ingredient in Roundup[®] agricultural herbicides through insertion of a gene that encodes the 5-enolpyruvylshikimate-3-phosphate synthase protein from *Agrobacterium* sp. strain CP4 (CP4 EPSPS). The safety assessment of genetically enhanced crops evaluates potential health effects through a comprehensive approach that includes bioinformatic analysis of the amino acid sequence of the introduced protein to ensure that the protein is not similar to allergenic proteins. The protein sequence database assembled and used for this purpose includes known and/or suspected allergens (AD3.1). A comprehensive safety assessment of the CP4 EPSPS protein has previously been described in the literature (Harrison *et al.*, 1996).

This study evaluated the CP4 EPSPS L214P protein, a single amino acid variant of the CP4 EPSPS protein, produced by Roundup Ready corn event NK603. The amino acid sequence of the CP4 EPSPS L214P protein was compared to sequences in the allergen (AD3.1) protein sequence database using the FASTA sequence alignment algorithm.

The FASTA sequence alignment tool was used to assess structural similarity between the CP4 EPSPS L214P protein and each protein sequence of AD3.1 allergen database. Although the FASTA program directly compares amino acid sequences (*i.e.*, primary protein structure), the alignment data may be used to infer higher order structural similarities (*i.e.*, secondary and tertiary protein structures). Structural similarities between the CP4 EPSPS L214P protein sequence and the aligned database sequences were examined. The extent of each similarity was evaluated by visual inspection of the alignment, the calculated percent identity and the *E* score value for that alignment.

The CP4 EPSPS L214P protein sequence was also screened against the AD3.1 sequence database for immunologically relevant similarity using a pair-wise comparison algorithm. In these analyses, any sequence of eight or more linearly contiguous and identical amino acids were defined as immunologically relevant. The presence of such identities may indicate the presence of potentially cross-reactive allergenic epitopes.

No biologically relevant structural similarities were observed between any known allergen and the CP4 EPSPS L214P protein. Furthermore, no immunologically relevant sequence similarities were observed between the CP4 EPSPS L214P protein and proteins in the allergen database. The results of these bioinformatics analyses indicate that the CP4 EPSPS L214P protein produced by Roundup Ready corn event NK603 is not similar to known allergenic proteins.

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2.0 Introduction

Monsanto Company has developed Roundup Ready corn event NK603 that is tolerant to glyphosate, the active ingredient in Roundup agricultural herbicides, at the whole plant level. Corn event NK603 produces the 5-enolpyruvylshikimate-3-phosphate synthase protein from *Agrobacterium* sp. strain CP4 (CP4 EPSPS). The *cp4 epsps* coding sequence from *Agrobacterium* sp. strain CP4 has been completely sequenced and encodes a ~47 kDa protein consisting of a single 455 amino acid polypeptide (Padgett *et al.*, 1996). The CP4 EPSPS protein is functionally similar to plant EPSPS enzymes but has a much reduced affinity for glyphosate (Padgett *et al.*, 1993). In nontransgenic plants, glyphosate binds to the plant EPSPS enzyme and blocks the biosynthesis of aromatic amino acids, thereby depriving plants of these essential nutrients. In Roundup Ready plants, nutritional requirements for growth and development are met by the continued action of the glyphosate-tolerant CP4 EPSPS enzyme in the presence of glyphosate. A comprehensive safety assessment of the CP4 EPSPS protein has been described in the literature (Harrison *et al.*, 1996).

Corn event NK603 was produced by transformation of corn tissue with a 6.7-kb linear DNA fragment PV-ZMGT32L, derived from the plasmid vector PV-ZMGT32, using a particle acceleration method. NK603 contains a single DNA insert consisting of two expression cassettes: the first CP4 EPSPS gene cassette, containing the CP4 EPSPS coding sequence under regulation of the rice actin promoter and intron (P-ract1/ract intron), a chloroplast transit peptide (CTP2) sequence, and a nopaline synthase (chloroplast transit peptide) 3' polyadenylation sequence; and the second CP4 EPSPS gene cassette, containing the CP4 EPSPS L214P coding sequence under the regulation of the cauliflower mosaic virus (CaMV) enhanced 35S plant promoter (e35S), a maize heat-shock protein 70 (*Zmhsp70*) intron, CTP2 and the NOS 3' polyadenylation sequence.

As part of a safety assessment, a bioinformatic analysis is performed for each protein introduced into a crop produced by the techniques of biotechnology. The bioinformatic analysis is performed to ensure that the introduced protein is not an allergen and is not likely to act as a cross-reactive allergen. Exposure to specific allergens in foods may pose a risk to sensitized, allergic individuals. Type I (immediate hypersensitivity) reactions occur when a sufficient number of individual allergenic proteins are each bound by two separate IgE antibodies, which are attached to IgE receptors on the surface of mast cells, stimulating the cells to release histamine and other allergenic mediators. The two binding sites (epitopes) are generally different structures or sequences, unless two identical proteins are covalently linked. Sensitization to produce the IgE antibodies requires a third allergen-specific recognition sequence within a protein, a CD4+ T-cell epitope, to provide appropriate stimulation to the IgE-producing B cells (Plaut and Zimmerman, 1993). Cross-reactivity may be induced in sensitized individuals by a different protein if it contains IgE-binding epitopes that are identical or nearly identical to those of the sensitizing protein. However, cross-reactive ligands usually bind to the antibody with

lower affinity than the immunogen and are therefore typically less effective at inducing an immune response (Berzofsky *et al.*, 1993).

Screening the amino acid sequences of proteins introduced into plants for similarity to sequences of known allergens is one of many assessments performed to evaluate product safety (Metcalf *et al.*, 1996). The bioinformatic allergen assessment of the CP4 EPSPS protein has been done previously (Hileman and Astwood, 1999). The extent of sequence similarities between the CP4 EPSPS L214P protein and database sequences of allergens can be assessed using the FASTA sequence alignment tool. Although the FASTA program directly compares amino acid sequences (*i.e.*, primary protein structure), the alignment data may be used to infer higher order structure (*i.e.*, secondary and tertiary protein structures). Proteins that share a high degree of similarity throughout the entire length are often homologous. Homologous proteins share secondary structure and common three-dimensional folds (Pearson, 1996). Homologous proteins are more likely to share allergenic cross-reactive conformational and linear epitopes than unrelated proteins; however, the degree of similarity between homologues varies widely. The minimum structural or sequence similarity required for allergenic cross-reactivity of conformational epitopes is at least 50% identity across the full length of the protein sequences (Aalberse, 2000).

A second bioinformatic tool, IDENTITYSEARCH, was used to specifically search for immunologically relevant sequences in the CP4 EPSPS L214P protein. It is possible that proteins that are structurally unrelated to allergens may still contain smaller, immunologically significant epitopes. A sequence length of eight contiguous amino acids was chosen as a target to identify potentially cross-reactive allergenic epitopes (Metcalf *et al.*, 1996). In the absence of a complete description of IgE epitopes for all known allergens, a theoretical database of all potential epitopes for these allergens can effectively be screened by scanning all overlapping peptides (in this case eight or more amino acids in length) of all the allergens of the database and comparing them in pairwise fashion to all same-size potential peptides of the test protein using computer software or scanning manually. This can be viewed as a highly conservative approach, as virtually all of the theoretical peptides compared with the query sequence do not represent *bona fide* epitopes. The use of an eight amino acid window represents a compromise to identify potentially cross-reactive epitopes, while reducing the probability of identifying a large number of irrelevant similarities that would be identified using a window smaller than eight amino acids and are unlikely to present a risk of cross-reactivity.

This report describes the bioinformatic assessment of the CP4 EPSPS L214P protein and demonstrates the absence of sequence similarity to allergenic proteins.

3.0 Purpose

The purpose of this study was to evaluate the amino acid sequence similarity between the CP4 EPSPS L214P protein produced by Roundup Ready corn event NK603 and proteins relevant to allergy that have been assembled into a sub-database of publicly available sequences. Structural similarities to allergens were assessed using the sequence alignment tool, FASTA. Immunologically relevant similarities were also assessed using the pair-wise comparison algorithm IDENTITYSEARCH.

4.0 Methods

- 4.1 *Sequence database preparation.* The allergen sequence database (Appendix 1) was assembled from public domain databases GenBank and EMBL version 108 (Benson *et al.*, 1997; Stoesser *et al.*, 1997), PIR version 56 (George *et al.*, 1997), the NRL3D (version 56) of RCSB PDB (Berman *et al.*, 2000; Bernstein *et al.*, 1977) and SwissProt version 36 (Bairoch and Apweiler, 1997), as previously described (Hileman and Astwood, 1999; Hileman and Astwood, 1999a).
- 4.2 *Sequence database searches.* The structural similarity of the CP4 EPSPS L214P protein sequence (Figure 1) with sequences in the AD3.1 database was assessed using the FASTA algorithm (Pearson and Lipman, 1988). In addition to the FASTA comparisons of the CP4 EPSPS L214P protein towards allergens (to assess overall structural similarity), an 8-mer search was performed. The algorithm (IDENTITYSEARCH, also called ALLERGENSEARCH) was developed to identify whether or not a linearly contiguous match of eight amino acids existed between the query sequences and sequences within the allergen database (AD3.1). The algorithm was run from a UNIX terminal window in Genetics Computing Group (GCG) software. This program compares the query sequences to each protein sequence in the allergen database using a sliding window of eight amino acids. An epitope of eight amino acids was chosen to represent the smallest typical immunologically significant IgE-binding epitope (Metcalf *et al.*, 1996). The IDENTITYSEARCH algorithm produces no output data if 8-mer identities are not found.

Structural similarity between the query sequence and proteins from the database was evaluated by visual inspection of the alignment, the calculated percent identity and *E* score. The *E* score (expectation score) reflects the degree of similarity and the value depends on the overall length of joined (gapped) local sequence alignments, the quality (percent identity, similarity) of the overlap and the size of the database. A larger *E* score value indicates a lower degree of similarity between the query sequence and the sequence from the database.

5.0 Results and Discussion

Bioinformatic analyses were performed on the CP4 EPSPS L214P protein produced by Roundup Ready corn event NK603 to assess the potential similarity to allergens. A summary of the best similarity is shown in Table 1. The supporting dataset output file is provided in Appendix 2.

Table 1. Best CP4 EPSPS L214P protein sequence alignment against AD3.1 database.

Database	Hit #	Accession #	Description	E-score	% Identity	aa Overlap
AD3.1 ^a	1	AAB30829	Der f 2 ^b	0.63	30.6	72

^a AD3.1 database corresponds to the allergen protein database (Appendix 1).

^b Der f 2 is a group 2 house dust mite allergen from *Dermatophagoides farinae*.

Potential structural similarities shared between the CP4 EPSPS L214P protein and proteins in the AD3.1 database were evaluated using the FASTA sequence alignment tool. Identified proteins were ranked according to their degree of similarity (Appendix 2). The best similarity observed (Table 1) was to the *Dermatophagoides farinae* (mite) allergen, Der f 2 (Accession No. AAB30829). In the alignment with the Der f 2 protein, the overlap of 72 aa contained six gaps and was relatively short compared to the length (455 aa) of the CP4 EPSPS L214P protein. Consequently, homology between the CP4 EPSPS L214P protein and the Der f II allergen can not be inferred. Frequently, alignments comprised of $\geq 50\%$ identities in short overlaps (20-40 aa) occur by chance and do not indicate homology (Pearson, 1996). Furthermore, recognition of the Der f 2 protein by IgE antibodies depends strongly on the conformation of the protein. Truncation of N- or C-terminal short sequences, destruction of the disulfide bonds or mutation of amino acid residues severely reduces binding of the Der f 2 protein by IgE antibodies (Ichikawa *et al.*, 1998). Also, the minimum similarity likely required for allergenic cross-reactivity is $\geq 50\%$ identity across the entire length of the protein (Aalberse, 2000). Together, these facts suggest that cross-reactivity between CP4 EPSPS L214P protein and Der f 2 allergen is not expected to occur. Inspection of the remaining alignments also yielded poor *E* score values and did not suggest homologous structure or function (Pearson, 1996).

No immunologically relevant sequences (eight contiguous amino acid identities) were detected when the CP4 EPSPS L214P protein sequence was compared to the AD3.1 sequence database using the IDENTITYSEARCH algorithm (Appendix 3). Together, these data demonstrate that the CP4 EPSPS L214P protein does not share structurally relevant or immunologically relevant sequence similarities with allergens.

6.0 Conclusions

Bioinformatic analyses were performed on the CP4 EPSPS L214P protein produced by Roundup Ready corn event NK603. These analyses were used to assess the similarity between this protein and proteins described as or known to be allergens. No structurally relevant sequence similarities with known allergens were observed. No immunologically relevant sequence similarities of eight linearly contiguous amino acid identities were found, suggesting that it is highly unlikely that this protein may contain immunologically cross-reactive allergenic epitopes.

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Figure 1. The amino acid sequence of the CP4 EPSPS L214P protein.

1 MLHGASSRPA TARKSSGLSG TVRIPGDKSI SHRSFMFGGL ASGETRITGL
51 LEGEDVINTG KAMQAMGARI RKEGDTWIID GVGNGLLAP EAPLDFGNAA
101 TGCRLTMGLV GYDFDSTFI GDASLTKRPM GRVLNPLREM GVQVKSEDGD
151 RLPVTLRGP K TPTPITYRVP MASAQVKS AV LLAGLNTPGI TTVIEPIMTR
201 DHTEKMLQGF GANPTVETDA DGVRTIRLEG RGKLTGQVID VPGDPSSTAF
251 PLVAALLVPG SDVTILNVLM NPTRTGLILT LQEMGADIEV INPRLAGGED
301 VADLRVRSST LKGVTVPEDR APSMIDEYPI LAVAAFAEG ATVMNGLEEL
351 RVKESDRLSA VANGLKLNGV DCDEGETSLV VRGRPDGKGL GNASGAAVAT
401 HLDHRIAMSF LVMGLVSENP VTVDDATMIA TSFPEFMDLM AGLGAKIELS
451 DTKAA

Appendix 1. The AD3.1 (allergen) database entries

Food Allergens - Plants

Species	Common Name	Allergen	Comment/Synonym/Function	Accession No.
Apium graveolens	Celery	Api g 1	Similar to 17 kDa tree allergens	S63984
Apium graveolens	Celery	Api g 1.0201		CAA99992
Apium graveolens	Celery	Api g 3	chlorophyll a/b binding protein	CAA99993
Apium graveolens	Celery	Api g 4	Profilin	AAD29409
Apium graveolens	Celery	Api g 5	Fragment	P81943
Arachis hypogaeae	Peanut	Ara h 1	Vicilin, clone P17	P43237
Arachis hypogaeae	Peanut	Ara h 1	Vicilin, clone P41b	P43238
Arachis hypogaeae	Peanut	Ara h 2	Conglutin	AAK96887
Arachis hypogaeae	Peanut	Ara h 3	Glycinin	AAC63045
Arachis hypogaeae	Peanut	Ara h 4	Glycinin	AAD47382
Actinidia chinensis	Kiwi	Act c 1	Cysteine protease	P00785
Arachis hypogaeae	Peanut	Ara h 5	Profilin	AAD55587
Arachis hypogaeae	Peanut	Ara h 6	similar to conglutin	AAD56337
Arachis hypogaeae	Peanut	Ara h 7	Conglutin homolog	AAD56719
Arachis hypogaeae	Peanut		Lectin, phytohemagglutinin	S14765
Bertholletia excelsa	Brazil nut	Ber e 1	2S albumin	CAA38363
Brassica juncea	Leaf mustard	Bra j 1-e	2S albumin	P80207
Capsicum annuum	Bell pepper	Cap a 2	profilin	CAD10376
Carica papaya	Papaya		Papain	AAB02650
Corylus avellana	European hazel	Cor a 1.0401	Bet v 1 homolog	AAD48405
Daucus carota	Carrot	Dau c 1/1		CAB06416
Daucus carota	Carrot	Dau c 1.2		CAB03715
Daucus carota	Carrot	Dau c 1.3		CAB03716
Glycine max	Soybean	Cim1 protein		S48032
Glycine max	Soybean	Gly m 1.0101	Soybean hull allergen, HPS	Gly_M_1a
Glycine max	Soybean	Gly m 1.0102	Soybean hull allergen, HPS	Gly_M_1b
Glycine max	Soybean	Gly m 2	Hull allergen	A57106
Glycine max	Soybean	Gly m 3	Profilin	O65809
Glycine max	Soybean		Lipoxygenase 1	DASYL2
Glycine max	Soybean		Lipoxygenase 2	DASYL1
Glycine max	Soybean		Alpha of beta-conglycinin	CAA35691
Arabidopsis thaliana	Mouse-ear cress	BAC F5I14	Similar to Holcus major allergen	AAB60916
Anglostoma duodenale	Hookworm	-	ancylostoma secreted protein 1	AAD13339
Glycine max	Soybean		A1aBx subunit of glycinin	CAA26723
Glycine max	Soybean		A5A4B3 subunit of glycinin	CAA26478
Glycine max	Soybean		G1 subunit of glycinin	CAA33215

Glycine max	Soybean		G2 subunit of glycinin	CAA33216
Glycine max	Soybean		G3 subunit of glycinin	CAA33217
Glycine max	Soybean		CG4 beta-conglycinin	AAB23463
Glycine max	Soybean		A3B4 subunit of glycinin	AAA33964
Glycine max	Soybean		Lectin Le1	AAA33983
Glycine max	Soybean		Kunitz trypsin inhibitor, Kti-S	CAA56343
Glycine max	Soybean		Trypsin inhibitor, Ti-a	CAA45777
Glycine max	Soybean		Trypsin inhibitor, Ti-b	CAA45778
Helianthus annuus	Sunflower	Hel a 2	Profilin	CAA75506
Hordeum vulgare	Barley	Hor v 15	trypsin/alpha amylase inhibitor BMAl-1	P16968
Hordeum vulgare	Barley	Hor v 15	trypsin/alpha amylase inhibitor CMB	P32936
Hordeum vulgare	Barley		dimeric protein BDP	S65605
Juglans regia	English walnut	Jug r 1	2S albumin	AAB41308
Juglans regia	English walnut	Jug r 2	Vicilin-like protein	AAF18269
Lycopersicon esculentum	tomato	LAT52	Ole e1 homolog	P13447
Malus domestica	Apple	Mal d 1		IC4276
Malus domestica	Apple	Mal d 1	Variant	AAC26136
Malus domestica	Apple	Mal d 1	Clone MDGC10	CAA96534
Malus domestica	Apple	Mal d 1	Clone MDGC32	CAA96535
Malus domestica	Apple	Mal d 1	-	AAD13683
Sinapis alba	White mustard	Sin a 1.0108	-	CAA62908
Malus domestica	Apple	Mal d 1	Clone MDGC36	CAA96536
Malus domestica	Apple	Mal d 1	Clone MDG38	CAA96537
Malus domestica	Apple	Mal d 1		CAA58646
Malus domestica	Apple	Mal d 2	Thaumatococcus homolog	AAC36740
Malus domestica	Apple	Mal d 3	Lipid transfer protein	AAF26450
Oryza sativa	Rice	Ory s 1	Similar to Lol P1	Q40638
Oryza sativa	Rice	RAG2	trypsin/alpha amylase inhibitor	Q01885
Oryza sativa	Rice	RA5	trypsin/alpha amylase inhibitor	S31078
Oryza sativa	Rice	RA5b	trypsin/alpha amylase inhibitor	BAA07713
Oryza sativa	Rice	RA14		Q01882
Oryza sativa	Rice	RA14B	trypsin/alpha amylase inhibitor	S59922
Oryza sativa	Rice	RA14d		BAA07772
Oryza sativa	Rice	RA14e		BAA07773
Oryza sativa	Rice	RA14f		BAA07774
Oryza sativa	Rice	RA16	trypsin/alpha amylase inhibitor	S59924
Oryza sativa	Rice	RA17	trypsin/alpha amylase inhibitor	S21157
Oryza sativa	Rice			AAB99797
Oryza sativa	Rice		beta-expansin	AAF72991
Oryza sativa	Rice		beta-expansin	AAF72990

Oryza sativa	Rice		beta-expansin	AAF72983
Persea americana	Avocado	Per a 1	Endochitinase	CAB01591
Triticum aestivum	Wheat	-	Alpha/beta gliadin	CAA26385
Chamaecyparis obtusa	Japanese cypress	Cha o 1	-	BAA08246
Arabidopsis thaliana	Mouse-ear cress	-	allergen-like protein	CAB10483
Pisum sativum	Garden pea	-	pollen allergen-like protein	CAA59470
Prunus armeniaca	Apricot	Pru ar 1	Bet v 1 homolog	AAB97141
Prunus armeniaca	Apricot	Pru ar 3	Nonspecific lipid transfer protein	P81651
Prunus avium	Cherry	Pru av 1	Bet v 1 homolog	AAC02632
Prunus avium	Cherry	Pru av 2	Thaumatococin homolog	AAB38064
Prunus avium	Cherry	Pru av 4	Profilin	AAD29411
Prunus domestica	Plum	Pru d 1	Lipid transfer protein 1	P82534
Prunus persica	Peach	Pru p 3	Lipid transfer protein 1	P81402
Ricinus communis	Castor bean	Ric c 1	2S albumin	P01089
Secale cereale	Rye	30K allergen	Fragment	S38292
Secale cereale	Rye	Sec c 1	Asthma allergen	S65604
Sinapis alba	Yellow mustard	Sin a 1	Seed storage protein	P15322
Sinapis alba	White mustard	Sin a 1		PC1246
Sinapis alba	White mustard	Sin a 1		AAB25214
Sinapis alba	White mustard	Sin a 1.0104		CAA62909
Sinapis alba	White mustard	Sin a 1.0105		CAA62910
Sinapis alba	White mustard	Sin a 1.0106		CAA62911
Sinapis alba	White mustard	Sin a 1.0107		CAA62912
Sinapis alba	White mustard	Sin a 1	alpha-amylase inhibitor	PC1247
Solanum tuberosum	Potato	Sol t 1	Patatin, storage protein	P15476
Taraxacum officinale	Dandelion	RAP	Root allergen protein	AAB92255
Piper nigrum	Pepper	14 kDa	-	14kdpepper
Piper nigrum	Pepper	28 kDa	-	28kdpepper
Brassica napus	Rapeseed	BnIII	2S albumin	Napin_Lrge
Triticum aestivum	Wheat	Tri a 3	Pollen allergen-like protein	CAA90746
Triticum aestivum	Wheat		pollen allergen-like protein	AAD10496
Zea mays	Maize	Zea m 1	Similar to Lol P1	Q07154
Zea mays	Maize	Clone c13	Ole e1 homolog	P33050
Zea mays	Maize		Pectate lyase, Clone Zm58.1	S43334
Zea mays	Maize		Pectate lyase	S43335
Zea mays	Maize	Zea m 14	Nonspecific lipid transfer protein	P19656
Brassica napus	Rapeseed	BnIII	2S albumin	Napin_Sml
Gliadins from Wheat				
Triticum aestivum	Wheat		Alpha/beta gliadin MM1	CAA35238
Triticum aestivum	Wheat		gliadin	CAA25261

Triticum aestivum	Wheat		Alpha/beta gliadin (pw1215)	CAA26383
Triticum aestivum	Wheat		Alpha/beta gliadin (pw8233)	CAA26384
Triticum aestivum	Wheat		Alpha gliadin	AAA17741
Triticum aestivum	Wheat		Gamma gliadin	AAA34272
Triticum aestivum	Wheat		Gamma gliadin B-precursor	AAA34274
Triticum aestivum	Wheat	pGliA-42	Alpha gliadin	AAA34275
Triticum aestivum	Wheat	Clone pA212	Alpha/beta gliadin class A-II	AAA34276
Phaseolus vulgaris	Kidney bean	PR-1	Pathogenesis-related protein 1	CAA43637
Lepidoglyphus destructor	Storage mite	Lep d 1.02	Precursor protein	S66499
Triticum aestivum	Wheat	Clone pA42	Alpha/beta class A-V	AAA34278
Triticum aestivum	Wheat	pW8142	Alpha/beta gliadin	AAA34279
Triticum aestivum	Wheat	pW8233	Alpha/beta gliadin, class I	AAA34280
Triticum aestivum	Wheat	Clone pA26	Alpha/beta gliadin, class A-I	AAA34281
Triticum aestivum	Wheat	Clone pA735	Alpha/beta gliadin, class A-IV	AAA34282
Triticum aestivum	Wheat	pA1235	Alpha/beta gliadin, class A-III	AAA34283
Triticum aestivum	Wheat	pB11-33	Gamma gliadin, class B-I	AAA34285
Triticum aestivum	Wheat	pB312	Gamma gliadin, class B-I	AAA34286
Triticum aestivum	Wheat		Gamma gliadin, class B-III	AAA34287
Triticum aestivum	Wheat		Gamma gliadin, variant	AAA34289
Triticum urartu	Wheat		Alpha/beta gliadin	AAA34290

Wheat lectins

Triticum aestivum	Wheat		Germ agglutinin isolectin A	AAA34256
Triticum aestivum	Wheat		Germ agglutinin isolectin D	AAA34258
Triticum durum	Wheat		Germ agglutinin (partial)	AAA34257

Wheat profilins

Triticum aestivum	Wheat	Clone TaPRO1	Profilin 1	CAA61943
Triticum aestivum	Wheat	Clone TaPRO2	Profilin 2	CAA61944
Triticum aestivum	Wheat	Clone TaPRO3	Profilin 3	CAA61945

Food Allergens - Animals

Bos taurus	Bovine	Bos d 4	Alpha-lactalbumin	AAA30367
Bos taurus	Bovine	Bos d 5	Beta-lactoglobulin	CAA32835
Bos taurus	Bovine	Bos d 6	BSA	AAA51411
Bos taurus	Bovine	Bos d 8	Alpha-s1 casein	AAA30428
Bos taurus	Bovine	Bos d 8	Alpha-s1 casein	AAA30429
Bos taurus	Bovine	Bos d 8	Alpha-s2 casein	AAA30479
Bos taurus	Bovine	Bos d 8	Beta casein	AAA30430
Bos taurus	Bovine	Bos d 8	Kappa casein, B2 variant	AAA30433

Charybdis feriatus	Crab	Cha f 1	Tropomyosin	AAF35431
Chlamys nobilis	Clam	Chl n ?	Tropomyosin	AAG08989
Crassostrea virginica	Eastern oyster		Tropomyosin	AAC61869
Gadus callarias	Baltic cod	Gad c 1	Parvalbumin beta, allergen M	P02622
Gallus gallus	Chicken	Gal d 1	ovomucoid	P01005
Gallus gallus	Chicken	Gal d 2	ovalbumin	P01012
Gallus gallus	Chicken	Gal d 3	ovotransferrin	P02789
Gallus gallus	Chicken	Gal d 4	Lysozyme C	P00698
Gallus gallus	Chicken	Gal d 5	albumin	P19121
Gallus gallus	Chicken	-	Ovalbumin Y gene	AAA68882
Gallus gallus	Chicken	-	vitellogenin II, Phosvitin	VJCH2
Haliotis diversicolor	Mollusk	Hal d 1	Tropomyosin	AAG08987
Metapenaeus ensis	Shrimp	Met e 1	Tropomyosin	AAA60330
Panulirus stimpsoni	Lobster	Pan s I	Tropomyosin	AAC38996
Penaeus aztecus	Shrimp	Pen a 1	Tropomyosin	Pen_A_1
Perna viridis	Mussel	Per v 1	Tropomyosin	AAG08988
Salmo salvar	Atlantic salmon	Sal s 1	Parvalbumin beta 1	Q91482
Salmo salvar	Atlantic salmon	Sal s 1	Parvalbumin beta 2	Q91483

Aero-Allergens - Pollen

Agrostis alba	Bent grass	Agr a 1	Form 1, fragment	F58493
Agrostis alba	Bent grass	Agr a 1	Form 1, fragment	E37396
Agrostis alba	Bent grass	Agr a 1	Form 2, fragment	G58493
Alnus glutinosa	Alder	Aln g 2		CAA76831
Alnus glutinosa	Alder	Aln g 1	-	AAB24432
Olea europea	Olive tree	Ole e 1.0102	-	CAA73038
Aspergillus oryzae	-	Asp o 21	TAKA-amylase A	JK0201
Penicillium chrysogenum	-	68kDa	-	AAB34785
Ambrosia artemisiifolia	Short ragweed	Amb a 1.1	Antigen E	P27759
Ambrosia artemisiifolia	Short ragweed	Amb a 1.2	Antigen E	P27760
Ambrosia artemisiifolia	Short ragweed	Amb a 1.2	Antigen E	B53240
Ambrosia artemisiifolia	Short ragweed	Amb a 1.3	Antigen E	P27761
Ambrosia artemisiifolia	Short ragweed	Amb a 1.3	Antigen E	C53240
Ambrosia artemisiifolia	Short ragweed	Amb a 1.4	Antigen E	P28744
Ambrosia artemisiifolia	Short ragweed	Amb a 2	Antigen K	P27762
Ambrosia artemisiifolia	Short ragweed	Amb a 2	Antigen K	E53240
Ambrosia artemisiifolia	Short ragweed	Amb a 3	Allergen RA3	P00304
Ambrosia artemisiifolia	Short ragweed	Amb a 5	Allergen RA5, fragment	P02878
Ambrosia artemisiifolia	Short ragweed	Amb a 6	Allergen RA6	O04004
Ambrosia trifida	Giant ragweed	Amb t 5	Allergen RA5G	P10414

Ambrosia psilostachya	Western ragweed	Amb p 5	Clone B1	AAA20064
Ambrosia psilostachya	Western ragweed	Amb p 5	Clone A2	AAA20065
Ambrosia psilostachya	Western ragweed	Amb p 5	Clone B2	AAA20066
Ambrosia psilostachya	Western ragweed	Amb p 5	Clone A3	AAA20067
Ambrosia psilostachya	Western ragweed	Amb p 5	Clone B3	AAA20068
Anthoxanthum odoratum	Sweet vernal grass	Ant o 1	Fragment	G37396
Anthoxanthum odoratum	Sweet vernal grass	Ant o 1	Fragment, form 1	ANT_O_1_1
Anthoxanthum odoratum	Sweet vernal grass	Ant o 1	Fragment, form 2	ANT_O_1_2
Lepidoglyphus destructor	Storage mite	Lep d 1.0102	-	CAA61419
Arabidopsis thaliana	Mouse-ear cress	-	minor allergen	CAB16805
Artemisia vulgaris	Mugwort	Art v 2	Fragments	A38624
Betula pendula	European White Birch	Bet v 1	isoform at2	CAA05186
Betula pendula	European White Birch	Bet v 1	isoform at12	CAA05187
Betula pendula	European White Birch	Bet v 1	isoform at15	CAA05188
Betula pendula	European White Birch	Bet v 1	isoform at76	CAA05190
Betula pendula	European White Birch	Bet v 1	-	CAA04823
Betula pendula	European White Birch	Bet v 1	-	CAA04826
Betula pendula	European White Birch	Bet v 1	-	CAA04827
Betula pendula	European White Birch	Bet v 1	-	CAA04828
Betula pendula	European White Birch	Bet v 1	-	CAA04829
Betula pendula	European White Birch	Bet v 1m/n		A57427
Betula pendula	European White Birch	Bet v 1.0103	Clone 2230	CAB02154
Betula pendula	European White Birch	Bet v 1.0201		A55699
Betula pendula	European White Birch	Bet v 1.0301		B55699
Betula pendula	European White Birch	Bet v 1.0401		C55699
Betula pendula	European White Birch	Bet v 1.0501		D55699
Betula pendula	European White Birch	Bet v 1.0601		E55699
Betula pendula	European White Birch	Bet v 1.0701		F55699
Betula pendula	European White Birch	Bet v 1.0801		G55699
Turbo cornutus	Gastropod	Tur c 1	Tropomyosin	JE0229
Betula pendula	European White Birch	Bet v 4	Calcium-binding allergen	Q39419
Betula pendula	European White Birch	Bet v 1.0901		H55699
Betula pendula	European White Birch	Bet v 1.1001		I55699
Betula pendula	European White Birch	Bet v 1.1502	Clone BVGC31	CAA96541
Betula pendula	European White Birch	Bet v 1.1601	Clone BVGC181	CAA96546
Betula pendula	European White Birch	Bet v 1.1701	Clone BVGC21	CAA96539
Betula pendula	European White Birch	Bet v 1.1801	Clone BVGC25	CAA96540
Betula pendula	European White Birch	Bet v 1.1901	Clone BVGC34	CAA96542
Betula pendula	European White Birch	Bet v 1.2001	Clone BVGC45	CAA96543
Betula pendula	European White Birch	Bet v 1.2101	Clone BVGC63	CAA96544

Betula pendula	European White Birch	Bet v 1.2301	Clone BVGC70	CAA96545
Betula pendula	European White Birch	Bet v 1.2401	Clone 167	CAB02155
Betula pendula	European White Birch	Bet v 1.2501	Clone 184	CAB02156
Betula pendula	European White Birch	Bet v 1.2601	Clone 2225	CAB02157
Betula pendula	European White Birch	Bet v 1.2701	Clone 2226	CAB02158
Betula pendula	European White Birch	Bet v 1.2801	Clone 2227	CAB02159
Betula pendula	European White Birch	Bet v 1.2901	Clone 2229	CAB02160
Betula pendula	European White Birch	Bet v 1.3001	Clone 2301	CAB02161
Betula pendula	White birch	Bet v 2	Profilin	P25816
Betula pendula	European White Birch	Bet v 2	Fragment	B45786
Betula pendula	European White Birch	Bet v 3	Calcium binding protein	S46233
Phaseolus vulgaris	Kidney bean	PR-2	Pathogenesis-related protein 2	CAA43636
Arabidopsis thaliana	Mouse-ear cress	-	Profilin I	3NUL
Betula pendula	European White Birch	Bet v 4	Calcium binding protein	CAA60628
Betula pendula	European White Birch	Bet v 6.0101	Isoflavone reductase homolog	AAC05116
Brassica napus	Rape	Bra n 1	Pollen allergen group I	S65149
Brassica napus	Rape	Bra n 2	Pollen allergen group II	S65150
Brassica napus	Rape	Clone 42	Pollen allergen group II	S65144
Brassica napus	Rape	Clone 44	Pollen allergen group II	S65145
Brassica rapa	Turnip	Bra r 1	Calcium binding protein	S65151
Brassica rapa	Turnip	Bra r 2	Pollen allergen group II	S65152
Brassica rapa	Turnip	Clone 4	Pollen allergen group II	S65143
Brassica rapa	Turnip		Chitin-binding allergen	P81729
Carpinus betulus	Hornbeam	Car b 1	Isoform 1, Bet v 1 homolog	P38949
Carpinus betulus	Hornbeam	Car b 1	Isoform 2, Bet v 1 homolog	P38950
Carpinus betulus	Hornbeam	Car b 1.0103	Clone 380	CAB02206
Carpinus betulus	Hornbeam	Car b 1.0104	Clone 383	CAB02207
Carpinus betulus	Hornbeam	Car b 1.0105	Clone 372	CAB02208
Carpinus betulus	Hornbeam	Car b 1.0106	Clone 541	CAB02209
Carpinus betulus	Hornbeam	Car b 1.0107	Clone 385	CAB02213
Carpinus betulus	Hornbeam	Car b 1.0108	Clone 295	CAB02215
Carpinus betulus	Hornbeam	Car b 1.0301	Clone 563	CAB02216
Carpinus betulus	Hornbeam	Car b 1.0302	Clone 2237	CAB02217
Betula pendula	European White Birch	Bet v 1.2201	Cline BVGC681	CAA96547
Castanea sativa	European chestnut	Cas s 1	Bet v 1 homolog, fragment	PC2001
Castanea sativa	European chestnut	Cas s 5	Chitinase 1b	CAA64868
Catharanthus roseus	Madagascar periwinkle		Bet v 1 homolog	T10059
Chamaecyparis obtusa	Japanese cypress	Cha o 2	polygalacturonidase	JC7100
Corylus avellana	European hazel	Cor a 1/11		S30055
Corylus avellana	European hazel	Cor a 1.0101		CAA50327

<i>Corylus avellana</i>	European hazel	Cor a 1.0102		CAA50328
<i>Corylus avellana</i>	European hazel	Cor a 1.0103		CAA50325
<i>Corylus avellana</i>	European hazel	Cor a 1.0104		CAA50326
<i>Corylus avellana</i>	European hazel	Cor a 1.0201	Clone CAGC10	CAA96548
<i>Corylus avellana</i>	European hazel	Cor a 1.0301	Clone CAGC11	CAA96549
<i>Cryptomeria japonica</i>	Japanese cedar	Cry j 1	Clone pCCI-15	JC2124
<i>Cryptomeria japonica</i>	Japanese cedar	Cry j 1	Clone pCCI-2-2	JC2123
<i>Cryptomeria japonica</i>	Japanese cedar	Cry j 2	Pectinase	P43212
<i>Cryptomeria japonica</i>	Japanese cedar	Cry j 2		JC2498
<i>Cucumis sativus</i>	Cucumber	Cs-EXP1	Expansin S1	AAB37746
<i>Cucumis sativus</i>	Cucumber	Cs-EXP2	Expansin S2	AAB37749
<i>Cupressus arizonica</i>	Conifer	Cup a 1	Clone LUZ99.ARI4.1	CAB62551
<i>Cupressus sempervirens</i>	Conifer	Cup s 1	Clone 23	AAF72629
<i>Cupressus sempervirens</i>	Conifer	Cup s 1	Clone 18	AAF72628
<i>Cupressus sempervirens</i>	Conifer	Cup s 1	Clone 16	AAF72627
<i>Cupressus sempervirens</i>	Conifer	Cup s 1	Clone 15	AAF72626
<i>Cupressus sempervirens</i>	Conifer	Cup s 1	Clone 13	AAF72625
<i>Cynodon dactylon</i>	Bermuda grass	B1	B1 clone	CAA01909
<i>Cynodon dactylon</i>	Bermuda grass	B2	B2 clone	CAA01911
<i>Cynodon dactylon</i>	Bermuda grass	B4	B4 clone	CAA01910
<i>Cynodon dactylon</i>	Bermuda grass	Cyn d 1	Fragment	A61226
<i>Cynodon dactylon</i>	Bermuda grass	Cyn d 1	Clone 14c1 and CD1	AAB50734
<i>Cynodon dactylon</i>	Bermuda grass	Cyn d 12	profilin 1	CAA69670
<i>Dactylis glomerata</i>	Orchard grass	Dac g 1	AgDg1, fragment	D58493
<i>Dactylis glomerata</i>	Orchard grass	Dac g 2	Similar to Lol p 1, fragment	Q41183
<i>Dactylis glomerata</i>	Orchard grass	Dac g 3	Fragment	A60359
<i>Dactylis glomerata</i>	Orchard grass	Dac g 5	mature isoform 2	CAD20405
<i>Dactylis glomerata</i>	Orchard grass	-	Group 5 allergen, precursor	AAK62278
<i>Festuca elatior</i>	Reed fescue	Fes e 1	fragment	A58493
<i>Festuca elatior</i>	Reed fescue	Fes e 1	Type A, fragment	C37396
<i>Festuca elatior</i>	Reed fescue	Fes e 1	Type B	D37396
<i>Holcus lanatus</i>	Velvet grass	Hol l 1.0101		CAA81610
<i>Holcus lanatus</i>	Velvet grass	Hol l 1.0102		CAA93121
<i>Holcus lanatus</i>	Velvet grass	Hol l 5	Group V allergen	CAB10765
<i>Holcus lanatus</i>	Velvet grass	Hol l 5.02	Group V allergen	CAB10766
<i>Holcus lanatus</i>	Velvet grass	30 kD	Fragment	S38291
<i>Cynodon dactylon</i>	Bermuda grass	Cyn d 7	Calcium binding protien	CAA62634
<i>Hordeum vulgare</i>	Barley	Hor v 9	pollen allergen	JC5475
<i>Juniperus ashei</i>	Mountain cedar	Jun a 1-1		AAD03608
<i>Juniperus ashei</i>	Mountain cedar	Jun a 2		CAC05582

Juniperus ashei	Mountain cedar	Jun a 3	Pathogenesis-related protein	AAF31759
Juniperus oxycedrus	Juniper	Jun o 2	EF-hand calcium binding	AAC15474
Juniperus virginiana	Red cedar	Jun v 1-1		AAF80166
Juniperus virginiana	Red cedar	Jun v 1-2		AAF80164
Juniperus virginiana	Red cedar	Jun v 3-2		AAF80165
Ligustrum vulgare	privet	L1		CAA54818
Ligustrum vulgare	privet	L10		CAA54819
Lolium perenne	Perennial ryegrass		Pollen allergen pIb	A38582
Lolium perenne	Perennial ryegrass		50k allergen	S38288
Lolium perenne	Perennial ryegrass	Lol p 1	Group I, allergen R7	P14946
Lolium perenne	Perennial ryegrass	Lol p 1	Group I	S13614
Lolium perenne	Perennial ryegrass	Lol p 1.0102	Group I, clone 1A	A37881
Lolium perenne	Perennial ryegrass	Lol p 1.0101	Group I, clone 5A	B37881
Lolium perenne	Perennial ryegrass	Lol p 2	Group II, fragment	A48595
Lolium perenne	Perennial ryegrass	Lol p 2-A	Group II	P14947
Lolium perenne	Perennial ryegrass	Lol p 3	Group III	P14948
Lolium perenne	Perennial ryegrass	Lol p 4	Fragment	A60737
Dactylis glomerata	Orchard grass	Dac g 3	Fragment	AAB42200
Oryza sativa	Rice	-	RA14c	BAA07711
Penicillium oxalicum	-	Pen o 18	Vacuolar serine protease	AAG44478
Lolium perenne	Perennial ryegrass	Lol p 5A	Similar to Poa P9/Phl P6	Q40240
Lolium perenne	Perennial ryegrass	Lol p 5B	Similar to Poa P9/Phl P6	Q40237
Lolium perenne	Perennial ryegrass	Lol p XI		A54002
Mercurialis annua		Mer a 1	Profilin	CAA73720
Olea europea	Olive tree	Ole e 1.0103		CAA73037
Olea europea	Olive tree	Ole e 1.05		CAA73036
Olea europea	Olive tree	Ole e 1		AAB32652
Olea europea	Olive tree	Ole e 1	Fragment	S36872
Olea europea	Olive tree	Ole e 2	profilin 1	O24169
Olea europea	Olive tree	Ole e 2	profilin 3	O24171
Olea europea	Olive tree	Ole3	Calcium-binding allergen	AAD05375
Olea europea	Olive tree	Ole16	Fragment	I53806
Olea europea	Olive tree	Ole17	Fragment	E53806
Olea europea	Olive tree	Ole19	Fragment	F53806
Olea europea	Olive tree	Ole1c	Fragment	C53806
Olea europea	Olive tree	Ole20	Fragment	A38968
Olea europea	Olive tree	Ole26	Fragment	G53806
Olea europea	Olive tree	Ole33/Ole37	Fragment	D53806
Olea europea	Olive tree	Ole3c	Fragment	A53806
Olea europea	Olive tree	Ole5c	Fragment	B53806

Olea europea	Olive tree	Ole6	Fragment	H53806
Olea europea	Olive tree	Ole e 4	Fragment	P80741
Olea europea	Olive tree	Ole e 5	Superoxide dismutase, fragment	P80740
Olea europea	Olive tree	Ole e 7	Fragment	P81430
Parietaria judaica		Par j 1.0101	Nonspecific lipid transfer protein	P43217
Parietaria judaica		Par j 1.0201	Nonspecific lipid transfer protein 1	Q40905
Parietaria judaica		Par j 2.0101	Nonspecific lipid transfer protein 2	P55958
Parthenium hysterophorus	Compositae weed	Par h 1	31 kDa hydroxyproline-rich glycoprotein Parh1	
Parietaria officinalis		Par o 1	Fragment	A53252
Phalaris Aquatica	Canary grass	Pha a 1	Similar to Lol P1	Q41260
Phalaris Aquatica	Canary grass	Pha a 5.1	Similar to Poa p 9/Phl p 6	P56164
Phalaris Aquatica	Canary grass	Pha a 5.2	Similar to Poa p 9/Phl p 7	P56165
Phalaris Aquatica	Canary grass	Pha a 5.3	Similar to Poa p 9/Phl p 8	P56166
Phalaris Aquatica	Canary grass	Pha a 5.4	Similar to Poa p 9/Phl p 9	P56167
Phleum pratense	Common timothy	Phl p 1.0101		CAA81613
Phleum pratense	Common timothy	Phl p 1.0102		CAA55390
Phleum pratense	Common timothy	Phl p 2		CAA53529
Phleum pratense	Common timothy	Phl p 5.0105	Clone 10022	AAC16525
Phleum pratense	Common timothy	Phl p 5.0106	Clone 10027	AAC16526
Phleum pratense	Common timothy	Phl p 5.0107	Clone 10029	AAC16527
Phleum pratense	Common timothy	Phl p 5.0108	Clone 10030	AAC16528
Phleum pratense	Common timothy	Phl p 5.0103	Group 5	AAC25994
Phleum pratense	Common timothy	Phl p 5.0203	Group 5	AAC25995
Phleum pratense	Common timothy	Phl p 5.0204	Group 5	AAC25996
Phleum pratense	Common timothy	Phl p 5.0206	Group 5	AAC25997
Phleum pratense	Common timothy	Phl p 5.0207	Group 5	AAC25998
Phleum pratense	Common timothy	Phl p 5.0202	Isovariant 711II3	CAB05371
Phleum pratense	Common timothy	Phl p 5.0104	Isovariant 618II8	CAB05372
Phleum pratense	Common timothy	Phl p 5A	Similar to Poa P9/Phl p 6	Q40962
Phleum pratense	Common timothy	Phl p 5A		S32101
Phleum pratense	Common timothy	Phl p 5B	Similar to Poa p 9/Phl p 6	Q40963
Phleum pratense	Common timothy	Phl p 5B	Similar to Poa p 9/Phl p 7	S38584
Phleum pratense	Common timothy	Phl p 6	Isolate c223	CAA76556
Phleum pratense	Common timothy	Phl p 6	Isolate c142	CAA76557
Phleum pratense	Common timothy	Phl p 11	Profilin	P35079
Phleum pratense	Common timothy	Phl p 13	Polygalacturonase	CAB42886
Pinus radiata	Pine	PRE29		AAC05149
Poa pratensis	Kentucky bluegrass	Poa p 9	Clone 31	C39098
Poa pratensis	Kentucky bluegrass	Poa p 9	Clone 41	A39098
Poa pratensis	Kentucky bluegrass	Poa p 9	KBG60	P22286

Poa pratensis	Kentucky bluegrass	Poa p 9	Clone 60	B39098
Poa pratensis	Kentucky bluegrass	Poa p 9	Clone 7.2	A60373
Pyrus communis	Pear	Pyr c 1	Bet v 1 homolog	AAC13315
Pyrus communis	Pear	Pyr c 4	Profilin	AAD29410
Pyrus communis	Pear	Pyr c 5	Isoflavone reductase	AAC24001
Quercus alba	Oak	Que a 1	Bet v 1 homolog, fragment	D53288
Syringa vulgaris	Lilac	Syr v 1	Isoform 1	S43242
Syringa vulgaris	Lilac	Syr v 1	Isoform 2	S43243
Syringa vulgaris	Lilac	Syr v 1	Isoform 3	S43244

Aero-Allergens - Fungi

Alternaria alternata	Mold	Alt a 1		AAB03877
Alternaria alternata	Mold	Alt a 1		AAB40400
Alternaria alternata	Mold	Alt a 3	hsp70	AAB48042
Alternaria alternata	Mold	Alt a 3	hsp70	AAB48043
Alternaria alternata	Mold	Alt a 4	Proteinsulfidisomerase	CAA58999
Alternaria alternata	Mold	Alt a 6	Ribosomal protein	CAA55066
Alternaria alternata	Mold	Alt a 7	YCP4 protein	CAA55069
Alternaria alternata	Mold	Alt a 10	Aldehyde dehydrogenase	P42041
Alternaria alternata	Mold	Alt a 11	Enolase	Q9HDT3
Alternaria alternata	Mold	Alt a 12	60S ribosomal protein P1	P49148
Aspergillus flavus	Mold	Asp fl 13	Alkaline serine protease, elastase	P35211
Aspergillus fumigatus	Mold	Asp f 1	Ribonuclease, mitogillin	P04389
Aspergillus fumigatus	Mold	Asp f 1	Ribonuclease, mitogillin	A46497
Aspergillus fumigatus	Mold	Asp f 1	Partial exon 2	CAA06305
Aspergillus fumigatus	Mold	Asp f 2		P79017
Aspergillus fumigatus	Mold	Asp f 3	Peroxisomal protein	AAB07620
Aspergillus fumigatus	Mold	Asp f 4	ABPA patient allergen	CAA04959
Aspergillus fumigatus	Mold	Asp f 5	Metalloprotease (MEP)	P46075
Aspergillus fumigatus	Mold	Asp f 6	Mn superoxide dismutase	AAB60779
Aspergillus fumigatus	Mold	Asp f 7		CAA11255
Aspergillus fumigatus	Mold	Asp f 8	Ribosomal protein P2	CAB64688
Aspergillus fumigatus	Mold	Asp f 9		CAA11266
Aspergillus fumigatus	Mold	Asp f 10	Aspartic protease	CAA59419
Aspergillus fumigatus	Mold	Asp f 12	Heat shock protein hsp1	P40292
Aspergillus fumigatus	Mold	Asp f 13	Alkaline serine protease	CAA05149
Aspergillus fumigatus	Mold	Asp f 17		CAA12162
Aspergillus niger	Fungus, baker's additive	Asp n 14	Beta-xylosidase	CAB06417
Aspergillus niger	Fungus, baker's additive	-	Beta-xylosidase	AAD13106
Aspergillus oryzae		Asp o 13	Alkaline serine protease	P12547

Candida albicans	Yeast	Can a 1	Alcohol dehydrogenase	P43067
Candida albicans	Yeast	Can a ?	Enolase 1	P30575
Candida boidinii	Yeast	Can b 2	peroxisomal membrane protein A	P14292
Candida boidinii	Yeast	Can b 2	peroxisomal membrane protein B	P14293
Cladisporium herbarum		Cla h 3	Aldehyde dehydrogenase	S43114
Cladisporium herbarum		Cla h 4	60S ribosomal protein P2	P42038
Cladisporium herbarum		Cla h 4	60S ribosomal protein P2	P42039
Cladisporium herbarum		Cla h IV	Heat shock 70 protein	P40918
Cladisporium herbarum		Cla h 5	YCP4 protein	P42059
Cladisporium herbarum		Cla h 6	Enolase	P42040
Cladisporium herbarum		Cla h 12	60S ribosomal protein P1	P50344
Coprinus comatus	Shaggy cap	Cop c 1	Leucine zipper protein	CAB39376
Coprinus comatus	Shaggy cap	Cop c 2	thioredoxin	CAB52130
Coprinus comatus	Shaggy cap	Cop c 3		CAB52131
Coprinus comatus	Shaggy cap	Cop c 5		CAB52132
Coprinus comatus	Shaggy cap	Cop c 7		CAB52133
Fusarium solani pisi		Fus s ?		P81010
Malassezia furfur	Mold	Mal f 1		CAA65341
Malassezia furfur	Mold	Mal f 2	MF1	BAA32435
Malassezia furfur	Mold	Mal f 3	MF2	JE0227
Malassezia furfur	Mold	Mal f 3	MF2	BAA32436
Malassezia furfur	Mold	Mal f 4	Malate dehydrogenase homolog	AAD25927
Malassezia furfur	Mold	Mal f 5		CAA09883
Malassezia furfur	Mold	Mal f 6	cyclophilin homolog	CAA09884
Malassezia furfur	Mold	Mal f 7		CAA09885
Malassezia furfur	Mold	Mal f 8		CAA09886
Malassezia furfur	Mold	Mal f 9		CAA09887
Penicillium chrysogenum		Pen n 18	Vacuolar serine protease	AAF71379
Penicillium citrinum		Pen c 1	Alkaline serine protease	AAD25926
Penicillium citrinum		Pen c 2	Alkaline serine protease	AAD25995
Trichophyton rubrum		Tri r 2	Serine protease	AAD52013
Trichophyton rubrum		Tri r 4	Serine protease	AAD52012

Aero-Allergens - Animals

Canis familiaris	Dog	Can f 1	Lipocalin	O18873
Canis familiaris	Dog	Can f 2	Lipocalin	O18874
Canis familiaris	Dog	Can f ?	Albumin, salivary gland allergen	AAB30434
Lolium Perenne	Perennial ryegrass	Lol p 2	Group II	CAA51775
Olea europea	Olive tree	Ole e 2	Profilin 2	O24170
Bos taurus	Bovine dander	BDA11	EF-hand calcium binding protein	Q28050

Bos taurus	Bovine dander	BDA20	Clones pPOT, pPOT10.2	AAB08720
Equus caballus	Horse dander	Equ c 2.0101	Lipocalin	P81216
Equus caballus	Horse dander	Equ c 2.0102	Lipocalin	P81217
Equus caballus	Horse	Equ c 1	Lipocalin	Q95182
Felis silvestris catus	Cat	Fel d 1-A		P30438
Felis silvestris catus	Cat	Fel d 1-A	Chain 1 precursor A	JC1136
Felis silvestris catus	Cat	Fel d 1-A	Chain 1 precursor B	JC1126
Felis silvestris catus	Cat	Fel d 1	Chain 1 short form	B56413
Felis silvestris catus	Cat	Fel d 1	Chain 1 long form	A56413
Felis silvestris catus	Cat	Fel d 1	Chain 2	AAC41616
Felis silvestris catus	Cat	Fel d 1	Chain 2 short form	JC1127
Felis silvestris catus	Cat	Fel d 1-A		P30439
Mus musculus	Mouse		Lacrimal gland protein	AAB67069
Mus musculus	Mouse	MUP	Major urinary protein	CAA26953
Mus musculus	Mouse	MUP 1	Major urinary protein I	AAA39767
Mus musculus	Mouse	MUP 2	Major urinary protein II	AAA39768
Mus musculus	Mouse	MUP 4	Major urinary protein IV	AAA39769
Mus musculus	Mouse	MUP 5	Major urinary protein V	AAA39770
Rattus norvegicus	Rat		Alpha 2u globulin	AAA41198

Aero-Allergens - Insects & Mites

Blattella germanica	German cockroach	Bla g 1.0101		AAD13530
Blattella germanica	German cockroach	Bla g 1.02		AAD13531
Blattella germanica	German cockroach	Bla g 2	Aspartyl protease	A57164
Blattella germanica	German cockroach	Bla g 4	Calycin	AAA87851
Blattella germanica	German cockroach	Bla g 5	Glutathione S-aryltransferase	AAB72147
Chironomus thummi thummi	Midge	Chi t 1.01	Globin component III	P02229
Chironomus thummi thummi	Midge	Chi t 1.02	Globin component IV	P02230
Chironomus thummi thummi	Midge	Chi t 2.0101	Globin component I	P02221
Chironomus thummi thummi	Midge	Chi t 3	Globin component II beta	P02222
Chironomus thummi thummi	Midge	Chi t 4	Globin component III-A	P02231
Chironomus thummi thummi	Midge	Chi t 5	Globin component VI	P02224
Chironomus thummi thummi	Midge	Chi t 6.01	Globin component VII-A	P02226
Chironomus thummi thummi	Midge	Chi t 6.02	Globin component IX	P02223
Chironomus thummi thummi	Midge	Chi t 8	Globin component VIII	P02227
Chironomus thummi thummi	Midge	Chi t 9	Globin component X	P02228
Periplaneta americana	American cockroach	Per a 1.0101		AAD13533
Olea europea	Olive tree	Ole e 6	-	O24172
Penicillium notatum	-	Pen n 20	68 kDa, N-acetyl glucosaminidase	AAB34785
Periplaneta americana	American cockroach	Per a 1.0102	Cr-P11	AAC34312

Periplaneta americana	American cockroach	Per a 1.0103	Cr-P11	AAB82404
Periplaneta americana	American cockroach	Per a 1.0104	Cr-P11	AAC34737
Periplaneta americana	American cockroach	Per a 1.02	Cr-P11	AAC34736
Periplaneta americana	American cockroach	Per a 3.01	Cr-P1, clone C12	AAB09629
Periplaneta americana	American cockroach	Per a 3.0201	Cr-P1, clone C20	AAB09632
Periplaneta americana	American cockroach	Per a 3.0202	Cr-P1	AAB62731
Periplaneta americana	American cockroach	Per a 3.0203	Cr-P1, clone C28	AAB63595
Periplaneta americana	American cockroach	Per a 7	Tropomyosin	CAB38086
Acarus siro	Mite	Aca s 13	Partial sequence	CAA07241
Blomia tropicalis	Mite	Blo t 5		AAD10850
Blomia tropicalis	Mite	Blo t 12	Bt11a	AAA78904
Blomia tropicalis	Mite		Partial sequence	AAB49396
Blomia tropicalis	Mite	Blo t 13	Fatty-acid binding protein, Bt6	AAC80579
Dermatoph. farinae	House dust mite	Der f 1	Thiol protease	P16311
Dermatoph. farinae	House dust mite	Der f 1		A61500
Dermatoph. farinae	House dust mite	Der f 1	Cysteine protease, Group I	CAA46316
Dermatoph. farinae	House dust mite	Der f 2	Complete sequence	BAA01240
Dermatoph. farinae	House dust mite	Der f 2	Partial sequence	BAA01241
Dermatoph. farinae	House dust mite	Der f 2	Group II allergen	AAB30829
Dermatoph. farinae	House dust mite	Der f 3	Trypsin family protease	P49275
Dermatoph. farinae	House dust mite	Der f 6	Trypsin family protease, fragment	P49276
Dermatoph. farinae	House dust mite	Der f 7		Q26456
Dermatoph. farinae	House dust mite	Der f 10	Tropomyosin, MAG 44	BAA04557
Dermatoph. farinae	House dust mite	Der f 14	Apolipophorin-like protein, MAG 3	BAA04558
Dermatoph. farinae	House dust mite	MAG		P39673
Dermatoph. farinae	House dust mite	MAG29	Heat shock protein 70	P39674
Dermatoph. farinae	House dust mite	Der f 3	Trypsin family protease	AAA99805
Dermatoph. microceras	House dust mite	Der m 1	Fragment	B27634
Dermatoph. pteronyssinus	House dust mite	Der p 10	Tropomyosin	CAA75141
Dermatoph. pteronyssinus	House dust mite	Der p 1	Cysteine protease, group I	CAA46317
Dermatoph. pteronyssinus	House dust mite	Der p 1	Preproenzyme, complete sequence	AAB60215
Dermatoph. pteronyssinus	House dust mite	Der p 1	Cysteine protease	A31657
Dermatoph. pteronyssinus	House dust mite	Der p 1	Cysteine protease, fragment	B31657
Dermatoph. pteronyssinus	House dust mite	Der p 1	Cysteine protease, fragment	S03380
Dermatoph. pteronyssinus	House dust mite	Der p 1	Cysteine protease	JQ0337
Dermatoph. pteronyssinus	House dust mite	Der p 2		P49278
Dermatoph. pteronyssinus	House dust mite	Der p 3	Prepro-zymogen, complete	AAA19973
Dermatoph. pteronyssinus	House dust mite	Der p 3	Group III allergen	A39997
Dermatoph. pteronyssinus	House dust mite	Der p 4	Alpha amylase	AAD38942
Dermatoph. pteronyssinus	House dust mite	Der p 5		P14004

Dermatoph. pteronyssinus	House dust mite	Der p 6	Trypsin family protease, chymotrypsin	P49277
Dermatoph. pteronyssinus	House dust mite	Der p 7	Complete sequence	AAA80264
Dermatoph. pteronyssinus	House dust mite	Der p 8	Glutathione S-transferase	AAB32224
Dermatoph. pteronyssinus	House dust mite	Der p 9	Collagenolytic serine protease	Der_P_9
Dermatoph. pteronyssinus	House dust mite	Der p 10	Tropomyosin	AAB69424
Euroglyphus maynei	House dust mite	Eur m 1	Group I, cysteine protease	CAA42677
Euroglyphus maynei	House dust mite	Eur m 3.0101	Trypsin family protease	AAD10712
Euroglyphus maynei	House dust mite	Eur m 4	Alpha amylase	AAD38943
Euroglyphus maynei	House dust mite	Eur m 14	Apolipoprotein-like protein	AAF14270
Glycyphagus domesticus	mite	Gly d 2		CAB59976
Glycyphagus domesticus	mite	Gly d 2.02	isoform	CAB76459
Chironomus thummi thummi	Midge	Chi t 7	Globin component VII-B	P12548
Tyrophagus putrescentiae	Dust mite		Group 2	CAA73221

Venoms & Salivary Allergens

Aedes aegypti	Yellowfever mosquito	Aed a 1	salivary gland allergen	AAC37218
Aedes aegypti	Yellowfever mosquito	Aed a 2	salivary gland allergen	AAA29348
Aedes aegypti	Yellowfever mosquito	Aed a 3	30 kDa salivary gland allergen	AAB58417
Anopheles gambiae	African malaria mosquito		gVAG protein, clone cF6	CAA76822
Apis mellifera	Honeybee	Api m 1	Phospholipase A2	P00630
Apis mellifera	Honeybee	Api m 2	Hyaluronoglucosaminidase	Q08169
Apis mellifera	Honeybee	Api m 3	Melittin	P01501
Ctenocephalides felis	Cat flea	Cte f 1	Salivary antigen 1	AAD17905
Ctenocephalides felis	Cat flea	Cte f 2		AAF65314
Dolichovespula arenaria	Yellow hornet	Dol a 5	Venom allergen 5	Q05108
Dolichovespula maculata	Whiteface hornet	Dol m 1.01	Phospholipase A1	Q06478
Dolichovespula maculata	Whiteface hornet	Dol m 1.02	Phospholipase A1 2	P53357
Dolichovespula maculata	Whiteface hornet	Dol m 2	Hyaluronoglucosaminidase	P49371
Dolichovespula maculata	Whiteface hornet	Dol m 5.01	Venom allergen 5.01	P10736
Dolichovespula maculata	Whiteface hornet	Dol m 5.02	Venom allergen 5.02	P10737
Myrmecia pilosula	Bulldog ant	Myr p 1		S28180
Myrmecia pilosula	Bulldog ant	Myr p 1		CAA49760
Myrmecia pilosula	Bulldog ant	Myr p 2		Q26464
Polistes annularis	Paper wasp	Pol a 5	Venom allergen 5	AAA29793
Polistes dominulus	Paper wasp	Pol d 5	Venom allergen 5	P81656
Polistes exclamans	Paper wasp	Pol e 5	Venom allergen 5	P35759
Polistes fuscatus	Paper wasp	Pol f 5	Venom allergen 5	F44583
Solenopsis geminata	???	Sol g 4.01		AAF65312
Solenopsis geminata	???	Sol g 4.02		AAF65313
Solenopsis invicta	Red fire ant	Sol i 2	Phospholipase, Venom allergen 2	A37330

<i>Solenopsis invicta</i>	Red fire ant	Sol i 3	Venom allergen 3	P35778
<i>Solenopsis invicta</i>	Red fire ant	Sol i 3	Venom allergen 3	AAB65434
<i>Solenopsis invicta</i>	Red fire ant	Sol i 4	Venom allergen 4	P35777
<i>Solenopsis richteri</i>	Black fire ant	Sol r 2	Phospholipase, fragment	E60727
<i>Solenopsis richteri</i>	Black fire ant	Sol r 3	Venom allergen 3, fragment	P35779
<i>Vespa crabro</i>	European hornet	Vesp c 5.01	Antigen 5	G44583
<i>Vespa crabro</i>	European hornet	Vesp c 5.02	Antigen 5	H44583
<i>Vespa madarina</i>	Hornet	Vesp m 5	Venom allergen 5	P81657
<i>Vespula flavopilosa</i>	Wasp	Ves f 5	Venom allergen 5	A44583
<i>Vespula germanica</i>	Wasp	Ves g 5	Venom allergen 5	B44583
<i>Vespula maculifrons</i>	Wasp	Ves m 1	Phospholipase A1	A44564
<i>Vespula maculifrons</i>	Wasp	Ves m 5	Venom allergen 5	P35760
<i>Vespula pensylvanica</i>	Wasp	Ves p 5	Venom allergen 5	C44583
<i>Vespula squamosa</i>	Wasp	Ves s 5	Venom allergen 5	D44583
<i>Vespula vidua</i>	Wasp	Ves vi 5		E44583
<i>Vespula vulgaris</i>	Wasp	Ves v 1	Phospholipase A1	AAB48072
<i>Vespula vulgaris</i>	Wasp	Ves v 2	Hyaluronoglucosaminidase	P49370
<i>Vespula vulgaris</i>	Wasp	Ves v 5	Venom allergen 5	AAA30333

Others – Contact Allergens

<i>Hevea brasiliensis</i>	Para rubber tree		Latex allergen	CAA11041
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 1	Rubber elongation factor	P15252
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 2	beta 1,3-endoglucanase	S65077
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 3	Fragment	Hevb_3_11a
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 3	Fragment	Hevb_3_12
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 3	Fragment	Hevb_3_14
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 5	Latex allergen	AAC49447
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 6	Hevein	P02877
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 7	Latex patatin homolog	CAA11042
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 7	Latex patatin homolog	AAC27724
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 8	Profilin	CAA75312
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 9	Enolase (isoform 1)	CAC00532
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 9	Enolase (isoform 2)	CAC00533
<i>Hevea brasiliensis</i>	Para rubber tree	Hev b 10	Mn superoxide dismutase	CAB53458

Others – Nematodes & Worms

<i>Acanthamoeba castellanii</i>		profilin ia	actin-binding protein	1PRQ
<i>Ancylostoma caninum</i>	dog hookworm		aspartic proteinase	JC5077
<i>Anisakis simplex</i>	???	Ans1	excretory gland allergen	Ans1
<i>Ascaridia galli</i>		AG1	Fatty acid binding protein	AAC17174

<i>Ascaris lumbricoides</i>	Common roundworm	ABA-1	aba-1d1	AAB93837
<i>Ascaris lumbricoides</i>	Common roundworm	ABA-1	aba-1dr1	AAD13650
<i>Ascaris lumbricoides</i>	Common roundworm	ABA-1	aba-1dr2	AAD13651
<i>Ascaris lumbricoides</i>	Common roundworm	ABA-1	aba-1d3	AAB93839
<i>Ascaris lumbricoides</i>	Common roundworm	ABA-1	aba-1dr3	AAD13652
<i>Ascaris lumbricoides</i>	Common roundworm	ABA-1	aba-1r1	AAD13644
<i>Ascaris lumbricoides</i>	Common roundworm	ABA-1	aba-1r2	AAD13645
<i>Ascaris lumbricoides</i>	Common roundworm	ABA-1	aba-1r4	AAD13647
<i>Ascaris lumbricoides</i>	Common roundworm	ABA-1	aba-1r6	AAD13649
<i>Ascaris suum</i>	Pig roundworm	ABA-1	Fatty acid binding protein	AAC06015
<i>Ascaris suum</i>	Pig roundworm	ABA-1	Fatty acid binding protein	AAB41117
<i>Brugia malayi</i>	Nematode		vespid allergen antigen homolog	AAB97283
<i>Dictyocaulus vivipaurus</i>	Bovine lungworm	DVA-1	ABA-1	Q24702
<i>Toxocara canis</i>		TBA-1	ABA-1 homolog	B49139
<i>Dirofilaria immitis</i>			Venom allergen 5-like protein	AAB62535
<i>Loa loa</i>	Filarial worm	LL20	15kDa ladder antigen	AAB54037
<i>Meloidogyne incognita</i>	Southern root-knot nematode	MSP-1	secreted protein	AAD01511
<i>Necator americanus</i>	Hookworm	ASP1	Ancylostoma secreted protein 1	AAD13340
<i>Onchocerca volvulus</i>			Vespid allergen antigen homolog	AAB97282
<i>Strongyloides stercoralis</i>			Allergen polyprotein homolog	AAB97360

Appendix 2. FASTA alignments of the CP4 EPSPS L214P protein with AD3.1 database sequences.

(Peptide) FASTA of: L214pseq.txt from: 1 to: 455 June 4, 2002 15:04
 L214Pseq.txt

TO: AD3.1.* Sequences: 635 Symbols: 142,029 Word Size: 2

Databases searched:
 , Release 1.0, Released on 24Jan2002, Formatted on 24Jan2002

Scoring matrix: GenRunData:blosom50.cmp
 Variable pamfactor used
 Gap creation penalty: I2 Gap extension penalty: 2

Histogram Key:
 Each histogram symbol represents 2 search set sequences
 z-scores computed from opt scores

z-score	obs (=)	exp (*)
< 20	1	0.1=
20	0	0:
22	0	0:
24	0	0:
26	0	0:
28	0	0:
30	0	0:
32	1	3.1=
34	10	9.1=
36	16	19.1=
37	38	31.1=
40	31	43.1=
42	31	53.1=
44	74	58.1=
46	66	60.1=
48	60	57.1=
50	54	52.1=
52	49	46.1=
54	47	39.1=
56	21	33.1=
58	24	27.1=
60	30	22.1=
62	11	17.1=
64	9	14.1=
66	5	11.1=
68	15	9.1=
70	7	7.1=
72	11	5.1=
74	2	4.1=
76	2	3.1=
78	5	2.1=
80	0	2.1=
82	0	1.1=
84	0	1.1=
86	2	1.1=
88	1	1.1=
90	0	1.1=
92	0	0:

Joining threshold: 37, opt. threshold: 25, opt. width: 16, reg.-scaled

The best scores are: init1 initn opt z-sc E(634) ..

AD:AAB30829									
! S70378 Dermatophagoides farinae Der...	36	36	79	99.4	0.63				
AD:BA01240									
! D10448 Dermatophagoides farinae Der...	36	36	75	94.7	1.2				
AD:S63984									
! major allergen Api g 1 - Apium grav...	38	61	75	94.4	1.2				
AD:BA01241									
! D10449 Dermatophagoides farinae Der...	36	36	69	88.2	2.6				
AD:F04389									
! F04389 aspergillus restrictus, and ...	52	52	68	85.7	3.7				
AD:A46497									
! major allergen I - Aspergillus fumi...	52	52	68	85.7	3.7				
AD:P43237									
! P43237 arachis hypogaea (peanut). a...	44	44	68	78.6	9.1				
AD:P43238									
! P43238 arachis hypogaea (peanut). a...	44	44	68	78.5	9.2				
AD:CAB38086									
! Y14854 Periplaneta americana Periopl...	51	51	64	78.4	9.2				
AD:P22286									
! P22286 poa pratensis (kentucky blue...	58	58	64	78.0	9.7				
AD:E39098									
! allergen Poa p IX (clone 60) - Kent...	58	58	64	78.0	9.7				
\\End of List									

L214Pseq.txt
 AD:AAB30829

Description: S70378 Dermatophagoides farinae Der f II=group II major allergen [Dermatophagoid
 Accession/ID: AAB30829
 =====General comments=====

LOCUS S70378_1
 DEFINITION Der f II=group II major allergen [Dermatophagoides farinae=mites, .

SCORES Init1: 36 Initn: 36 Opt: 79 z-score: 99.4 E(): 0.63
 Smith-Waterman score: 79; 30.6% identity in 72 aa overlap

L214Pseq.txt GITTVIPIPIRDRHTRKMLQFGANPTVEDAD-GVRIIRLEGRKIKITGOVIDVPGDPSS
 190 200 210 220 230 240
 AAB30829 EIKKVVVDGCHGSDPCLIRHRKPFLEALFDANQVTKAKIHKASLDGLIHDVPG-IDP
 30 40 50 60 70 80

Appendix 3. Search for immunologically relevant sequences in the CP4 EPSPS L214P protein using IDENTITYSEARCH

```
allergensearch -infile1=L214Pseq.txt -INFILE2=AD3.1.* -  
OUTfile=L214Pseq.allergensearch -WINDOWsize=8
```

```
Query sequence(s): L214Pseq.txt  
Search sequence(s): AD3.1.*  
Window size: 8
```

L214Pseq.allergensearch Mon Mar 18 11:37:57 2000