

SUPPLEMENTARY MATERIAL

Table S1. Fish species used for parvalbumin purification and the parvalbumin sequences identified by LC-MS/MS.

English name of species	Latin name of species	Fish family	Main parvalbumin sequences identified by MS (UniProt or GenBank ID)	Molecular weight (Da)	Coverage (%)	Number of identified peptides	Number of unique peptides
Brook trout	<i>Salvelinus fontinalis</i>	Salmonidae	D3GME6 D3GME5	11364 11945	93 99	24 44	24 44
Brown trout	<i>Salmo trutta fario</i>	Salmonidae	A0A673WFS7 A0A673W6J5	11902 11383	93 87	22 14	22 12
Danube salmon	<i>Hucho hucho</i>	Salmonidae	A0A4W5MDQ5	11902	93	28	28
Rainbow trout	<i>Oncorhynchus mykiss</i>	Salmonidae	A0A060WYV9 A0A8C7QUQ5	11380 11872	82 93	13 21	1 21
European perch	<i>Perca fluviatilis</i>	Percidae	A0A6A5E777	11611	95	54	51
Pikeperch	<i>Sander lucioperca</i>	Percidae	A0A8C9YPR2 A0A8D0DAE7	11554 11648	95 87	19 17	15 8
Northern pike	<i>Esox lucius</i>	Esocidae	P02619	11390	82	13	13
Wels catfish	<i>Silurus glanis</i>	Siluridae	KAF7705229.1 (*) KAI5103184.1 (*)	11512 10579	77 72	11 10	7 1
Common carp	<i>Cyprinus carpio</i>	Cyprinidae	P02618 Q8UUS2	11436 11569	94 82	16 16	1 2
Tench	<i>Tinca tinca</i>	Cyprinidae	XP_016106649.1 (#) XP_048027610.1 (¥) ACI01049.1 (Δ)	11549 13433 11567	55 50 46	13 9 11	2 5 1
European eel	<i>Anguilla anguilla</i>	Anguillidae	KAG5832188.1 KAG5832187.1	11714 11521	83 79	14 8	13 7
Sterlet	<i>Acipenser ruthenus</i>	Acipenseridae	A0A444UY07	12187	90	14	14

Sequences without symbols belong to the exact species used for the parvalbumin purification. Following sequences were identified from related but not exact species: (*) Sequence hits from *Silurus meridionalis* (Siluridae family); (#) Sequence hit from *Sinocyclocheilus graham* (Cyprinidae); (¥) Sequence hit from *Megalobrama amblycephala* (Cyprinidae); (Δ) Sequence hit from *Hypophthalmichthys nobilis* (Cypinidae).

Table S2. A list of Taxonomy IDs used to create fish databases for the identification and sequence analyses of the fish parvalbumins included in this study.

Species	Database of proteins from:	Taxonomy ID
Brook trout	<i>Salvelinus fontinalis</i>	8038
Brown trout	<i>Salmo trutta</i>	8032
Danube salmon	<i>Hucho hucho</i>	62062
Rainbow trout	<i>Oncorhynchus mykiss</i>	8022
European perch	<i>Perca fluviatilis</i>	8168
Pikeperch	Perciformes	8111
Northern pike	<i>Esox Lucius</i>	8010
Wels catfish	Silurus glanis	94993
	Silurus	94992
Common carp	<i>Cyprinus carpio</i>	7962
Tench	<i>Tinca tinca</i>	27717
	Cyprinoidei	30727
European eel	<i>Anguilla anguilla</i>	7936
Sterlet	<i>Acipenser ruthenus</i>	7906

Table S3. Clinical and demographic characteristics of the recruited fish-allergic individuals.

Patient code	Sex	Age	Symptoms of fish allergy	Causative fish	Tolerated fish	Other food allergies	SPT cod (mm)	Total IgE (ImmunoCAP, kU/L)	Cod (ImmunoCAP, kUA/L)	Gad c 1 (ImmunoCAP, kUA/L)	Cyp c 1 (ImmunoCAP, kUA/L)	Fish-MIX (ImmunoCAP, kUA/L)	Salmon (ImmunoCAP, kUA/L)
P1	m	25	OAS	NA	NA	None	++	1840.0	4.2	NA	NA	NA	NA
P2	f	25	U	NA	NA	Apple, nuts	+++	1331.0	2.4	NA	NA	NA	NA
P3	f	22	A, U	Pangasius	NA	None	++++	102.0	2.8	NA	NA	3.9	NA
P4	f	33	E	Trout	Tuna	None	NA	868.0	NA	NA	NA	2.3	NA
P5	f	12	AE	Carp	NA	None	++++	261.0	7.5	7.4	7.9	NA	NA
P6	f	21	AE	NA	NA	None	NA	276.0	3.9	3.7	6.9	NA	
P7	f	20	Severe OAS, heat sensation	Carp	NA	None	++++	771.0	4.6	9.6	25.5	NA	NA
P8	m	21	GIS	NA	NA	Nuts	++	545.0	1.3	1.4	1.4	1.1	NA
P9	f	14	OAS, GIS, heat sensation	NA	NA	Apple, nuts	++++	948.0	NA	2.1	NA	NA	NA
P10	m	17	U	NA	NA	None	+++	589.0	NA	7.6	NA	NA	NA
P11	f	19	OAS	NA	Tuna	Apple, peach, kiwi	+++	273.0	5.4	6.1	NA	NA	NA
P12	m	23	AE, OAS	NA	NA	None	++++	97.0	NA	0.4	NA	NA	NA

P13	f	24	AE, OAS	NA	NA	None	+++	167.0	0.5	NA	NA	NA	NA
P14	f	9	NA	NA	NA	Shrimp, nuts, apple, peach	++++	890.0	3.0	NA	NA	NA	NA
P15	m	4	E, GIS	NA	NA	Milk	++++	400.0	NA	2.9	NA	NA	NA
P16	m	9	NA	NA	NA	Nuts	+	346.0	NA	NA	NA	2.8	NA
P17	m	2	AE	NA	NA	None	(+)	49.0	2.2	NA	NA	NA	NA
P18	f	23	AE, U	NA	NA	Peanut	++++	1093.0	4.3	NA	NA	NA	NA
P19	m	2	U	NA	NA	None	++	32.0	NA	1.2	1.5	NA	NA
P20	f	5	AE, E	NA	NA	None	+++	74.0	3.0	3.0	NA	NA	4.9
P21	f	4	E	NA	NA	Egg, soy, nuts	+++	1477.0	30.6	NA	NA	NA	NA
P22	f	12	OAS	NA	NA	Shrimp	+++	909.0	NA	3.4	NA	NA	NA
P23	m	6	DB, U	NA	NA	None	+	201.0	1.0	NA	NA	NA	NA
P24	m	6	C, E	NA	NA	Egg	++++	141.0	1.0	0.8	NA	NA	NA
P25	m	5	OAS, cough	Sardines	NA	None	+++	486.0	2.8	NA	NA	NA	NA
P26	m	6	OAS	Pangasius	NA	Sunflower seeds	+++	895.0	14.9	17.7	NA	NA	NA
P27	f	35	DB, OAS, U	Cod, catfish, herring, trout, salmon	NA	Shellfish	++	1290.0	0.7	0.8	NA	NA	NA
P28	m	29	DB, GIS, OAS,	Carp, cod, sole	Mackerel, tuna, salmon	Peanut	+++	151.0	0.4	0.3	0.4	NA	NA
P29	m	5	AE	NA	NA	Milk	++	35.0	0.8	0.1	NA	NA	NA
P30	m	17	NA	NA	NA	Tree nuts	++	2660.0	NA	5.6	6.9	NA	NA
P31	m	4	E	NA	NA	Legumes, egg	++	2576.0	22.7	NA	NA	NA	NA
P32	m	10	AE, GIS, E, U,	NA	NA	None	++	1198.0	NA	31.0	NA	NA	NA

			somnolence										
P33	m	38	NA	NA	NA	Shellfish	++	193.0	4.8	NA	NA	NA	NA
P34	m	13	U	NA	NA	None	++	292.0	2.2	NA	NA	NA	NA
P35	m	10	AE, U	NA	NA	None	8	202.0	9.2	NA	NA	NA	NA
P36	m	4	GIS	NA	NA	None	++++	86.0	4.0	2.4	NA	NA	NA
P37	m	6	AE	NA	NA	None	++	2207.0	18.9	26.3	NA	NA	NA
P38	m	9	AE	NA	NA	None	++	175.0	NA	12.1	15.9	NA	NA
P39	f	13	AE, GIS, E, U	Anchovy, gold bream	NA	None	+	717.0	NA	NA	NA	NA	NA
P40	m	10	AE, Rn	NA	NA	None	+++	229.0	NA	NA	NA	1.8	NA
P41	m	11	NA	NA	NA	Shellfish	++	1359.0	11.2	10.5	12.8	NA	NA
P42	m	3	AE, heat sensation	Cod, sole	NA	None	(+)	19.0	NA	4.0	NA	NA	NA
P43	m	15	E	NA	NA	None	+++	216.0	NA	3.3	NA	NA	NA
P44	m	1	E	NA	NA	Egg	++	173.0	8.3	NA	NA	NA	NA
P45	m	23	A, Hypercrinia, U	Carp, Northern pike, pikeperch, Wels catfish	NA	NA	NA	NA	1.4	NA	NA	NA	NA
P46	m	27	DB, Hypercrinia	Cod	NA	NA	NA	NA	NA	8.4	NA	NA	NA
P47	m	23	DB, GIS, OAS	Salmon, tuna	NA	NA	NA	NA	1.4	NA	NA	NA	NA
P48	f	46	AE, DB, OAS, U	NA	NA	NA	NA	NA	5.6	NA	NA	NA	NA
P49	f	34	AE, DB, U	Cod, salmon	Tuna	Egg	NA	NA	NA	12.4	NA	NA	NA
P50	f	25	AE, C, DB, GIS,	Brown trout, cod, pikeperch	NA	NA	NA	108	NA	NA	0.6	0.6	NA

			OAS, U, Rn	, rainbow trout, salmon, Wels catfish									
P51	f	30	OAS, U	Salmon	Canned tuna	None	NA	NA	NA	NA	0.5	NA	NA
P52	m	9	U, difficulty swallowin g	Pikeperch	NA	NA	+++	28.0	NA	NA	1.4	1.2	NA
P53	m	70	AE, U	NA	NA	NA	+++	1239.0	NA	NA	15.8	18.2	NA
P54	f	20	Anaphyla xis	NA	Tuna	Tree nuts	++	667	2.1	9.0	NA	NA	NA
P55	f	12	GIS	NA	NA	Hazelnut	++	2650	5.0	4.6	NA	NA	NA
P56	m	33	NA	Salmon, trout	NA	None	++	549	1.3	1.0	NA	NA	NA
P57	m	10	NA	Salmon	NA	Walnut	++	1371	NA	NA	NA	NA	1.4
P58	m	43	Generaliz ed pruritus	NA	NA	Egg	+++	2150	NA	29.8	NA	NA	NA
P59	m	3	AE	Salmon	NA	Hazelnut	++	317	12.2	NA	NA	NA	NA
P60	f	4	NA	NA	NA	Egg, walnut	++	486	1.6	NA	NA	NA	NA
P61	f	40	AE, DB, OAS, U	Pikeperch	Salmon	None	+++	261	2.4	1.8	NA	NA	NA
P62	m	3	NA	NA	NA	Tree nuts	NA	2364	0.5	0.6	9.4	NA	7.3
P63	m	9	AE, OAS	NA	NA	Peanut	++	215	1.7	2.0	NA	NA	NA
P64	m	4	NA	NA	NA	Cashew	+++	458	NA	9.5	NA	NA	NA
P65	m	28	U	NA	NA	None	+	2364	NA	1.0	1.6	NA	NA
P66	f	47	NA	Pangasiu s	NA	Egg	+	4202	2.9	3.3	NA	NA	1.8

A, asthma; AE, angioedema; C, conjunctivitis; DB, difficulty breathing; E, eczema; GIS, gastrointestinal symptoms; OAS, oral allergy syndrome; U, urticaria; Rn, rhinitis. All symptoms experienced upon exposure to any fish are listed.
NA: information not available.

Table S4. Mass spectrometry data showing features of all identified proteins for each excised parvalbumin band. For parvalbumins which were separated by 2D gel electrophoresis before the excision from the gel, proteins identified in each excised spot are shown. The rest of the proteins were excised from 1D gels.

Brook trout (<i>Salvelinus fontinalis</i>), spot 1							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
D3GME6	416.11	93	24	24	83	11364	Parvalbumin OS=Salvelinus fontinalis OX=8038 GN=pvalb1
A0A076UAB0	38.52	3	1	1	2	31660	Glucose-6-phosphate 1-dehydrogenase (Fragment) OS=Salvelinus fontinalis OX=8038 GN=G6PD
A0A076U5B8	37.83	8	1	1	2	12290	40S ribosomal protein S20 (Fragment) OS=Salvelinus fontinalis OX=8038 GN=RPS20
V9H0A1	32.28	15	1	1	1	8155	Reverse transcriptase (Fragment) OS=Salvelinus fontinalis OX=8038 GN=pol
Brook trout (<i>Salvelinus fontinalis</i>), spot 2							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
D3GME5	376.22	93	28	28	321	11945	Parvalbumin OS=Salvelinus fontinalis OX=8038 GN=pvalb1

D3GME6	89.56	23	1	1	1	11364	Parvalbumin OS=Salvelinus fontinalis OX=8038 GN=pvalb1
Brook trout (<i>Salvelinus fontinalis</i>), spot 3							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
D3GME5	670.75	99	44	44	662	11945	Parvalbumin OS=Salvelinus fontinalis OX=8038 GN=pvalb1
Brown trout (<i>Salmo trutta fario</i>), spot 1							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
A0A673WFS7	243.46	93	22	22	436	11902	Parvalbumin OS=Salmo trutta OX=8032 GN=LOC115205657
Brown trout (<i>Salmo trutta fario</i>), spot 2							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
A0A673W6J5	215.62	87	14	12	99	11383	Parvalbumin OS=Salmo trutta OX=8032 GN=LOC115201382
A0A673WEM1	215.62	64	14	12	99	15730	Parvalbumin OS=Salmo trutta OX=8032 GN=LOC115152924

A0A673VUG2	109.51	34	3	1	21	14891	Parvalbumin OS=Salmo trutta OX=8032 GN=LOC115201382
A0A673WFS7	78.78	29	2	2	6	11902	Parvalbumin OS=Salmo trutta OX=8032 GN=LOC115205657
Brown trout (<i>Salmo trutta fario</i>), spot 3							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
A0A673WFS7	247.58	93	22	22	227	11902	Parvalbumin OS=Salmo trutta OX=8032 GN=LOC115205657
A0A673W6J5	54.38	23	1	1	1	11383	Parvalbumin OS=Salmo trutta OX=8032 GN=LOC115201382
A0A673WEM1	54.38	17	1	1	1	15730	Parvalbumin OS=Salmo trutta OX=8032 GN=LOC115152924
A0A673WFF3	54.38	23	1	1	1	11822	Parvalbumin OS=Salmo trutta OX=8032 GN=LOC115152924
Danube salmon (<i>Hucho hucho</i>)							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
A0A4W5MDQ5	219.38	93	28	28	700	11902	Parvalbumin OS=Hucho hucho OX=62062

A0A4W5RM21	42.31	20	2	2	4	12944	D-dopachrome tautomerase OS=Hucho hucho OX=62062
A0A4W5NKS4	42.31	10	1	1	3	11878	Uncharacterized protein OS=Hucho hucho OX=62062
A0A4W5NN94	42.31	9	1	1	3	12937	Uncharacterized protein OS=Hucho hucho OX=62062
A0A4W5LVY5	33.67	7	1	1	3	11838	Parvalbumin OS=Hucho hucho OX=62062
A0A4W5LWG0	33.67	8	1	1	3	11026	Parvalbumin OS=Hucho hucho OX=62062
A0A4W5Q604	33.67	7	1	1	3	11410	Parvalbumin OS=Hucho hucho OX=62062
A0A4W5LZ22	33.67	7	1	1	3	12445	Parvalbumin OS=Hucho hucho OX=62062
A0A4W5Q4K2	33.67	6	1	1	3	14015	Parvalbumin OS=Hucho hucho OX=62062
Rainbow trout (<i>Oncorhynchus mykiss</i>), spot 1							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
E0WDA3	203.23	82	13	1	49	11364	Parvalbumin OS=Oncorhynchus mykiss OX=8022 GN=pvalb2

A0A8C7QUQ5	170.35	59	8	2	41	11872	Parvalbumin beta 1 OS=Oncorhynchus mykiss OX=8022 GN=LOC110486850
A0A060XWA9	170.35	38	8	2	41	18962	Parvalbumin OS=Oncorhynchus mykiss OX=8022 GN=GSONMT00043152001
E0WDA4	139.74	39	6	1	24	11975	Parvalbumin OS=Oncorhynchus mykiss OX=8022 GN=pvalb1
Rainbow trout (<i>Oncorhynchus mykiss</i>), spot 2							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
A0A8C7QUQ5	213.5	93	21	21	268	11872	Parvalbumin beta 1 OS=Oncorhynchus mykiss OX=8022 GN=LOC110486850
A0A060XWA9	213.5	59	21	21	268	18962	Parvalbumin OS=Oncorhynchus mykiss OX=8022 GN=GSONMT00043152001
A0A060WYV9	45.8	23	1	1	2	11380	Parvalbumin OS=Oncorhynchus mykiss OX=8022 GN=GSONMT00063579001
E0WDA3	45.8	23	1	1	2	11364	Parvalbumin OS=Oncorhynchus mykiss OX=8022 GN=pvalb2
A0A060X840	45.8	23	1	1	2	11380	Parvalbumin OS=Oncorhynchus mykiss OX=8022 GN=GSONMT00043621001
A0A8C7T6P3	45.8	19	1	1	2	14134	Parvalbumin thymic-like OS=Oncorhynchus mykiss OX=8022 GN=LOC110499196

A0A8C7R9K4	45.8	14	1	1	2	19382	Parvalbumin 2 OS=Oncorhynchus mykiss OX=8022
Rainbow trout (<i>Oncorhynchus mykiss</i>), spot 3							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
A0A8C7QUQ5	288.62	93	30	30	437	11872	Parvalbumin beta 1 OS=Oncorhynchus mykiss OX=8022 GN=LOC110486850
A0A060XWA9	288.62	59	30	30	437	18962	Parvalbumin OS=Oncorhynchus mykiss OX=8022 GN=GSONMT00043152001
European perch (<i>Perca fluviatilis</i>), spot 1							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
A0A6A5E777	308.35	95	54	51	731	11611	Parvalbumin OS=Perca fluviatilis OX=8168 GN=PFLUV_G00245730
A0A6A5E9V6	171.87	35	10	7	60	26076	Parvalbumin OS=Perca fluviatilis OX=8168 GN=PFLUV_G00175940
European perch (<i>Perca fluviatilis</i>), spot 2							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description

A0A6A5E9V6	198.8	39	15	15	118	26076	Parvalbumin OS=Perca fluviatilis OX=8168 GN=PFLUV_G00175940
A0A6A5E777	111.31	65	4	4	7	11611	Parvalbumin OS=Perca fluviatilis OX=8168 GN=PFLUV_G00245730
Pikeperch (<i>Sander lucioperca</i>)							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
A0A8C9YPR2	250.05	95	19	15	397	11554	Parvalbumin beta-like OS=Sander lucioperca OX=283035 GN=LOC116044318
A0A8D0DAE7	213.12	87	17	8	337	11648	Parvalbumin beta-like OS=Sander lucioperca OX=283035 GN=LOC116059559
C0LEK7	92.18	39	5	1	65	11553	Parvalbumin OS=Pseudochaenichthys georgianus OX=52239
A0A8C9ZV13	78.63	38	2	1	13	11460	Parvalbumin beta-like OS=Sander lucioperca OX=283035 GN=LOC116059560
C0LEK8	73.71	50	4	1	17	11435	Parvalbumin OS=Champscephalus gunnari OX=52237
Northern pike (<i>Esox Lucius</i>), spot 1							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description

P02619	182.87	82	13	13	50	11390	Parvalbumin beta OS=Esox lucius OX=8010
B5DH15	74.39	29	2	2	5	11916	Parvalbumin OS=Salmo salar OX=8030 GN=LOC106601787
A0A1S2WYZ0	74.39	29	2	2	5	11889	Parvalbumin OS=Salmo salar OX=8030 GN=LOC100137051
Northern pike (<i>Esox Lucius</i>), spot 2							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
P02619	120.36	76	7	7	31	11390	Parvalbumin beta OS=Esox lucius OX=8010
A0A1S2WYZ0	54.65	29	2	2	6	11889	Parvalbumin OS=Salmo salar OX=8030 GN=LOC100137051
B5DH15	54.65	29	2	2	6	11916	Parvalbumin OS=Salmo salar OX=8030 GN=LOC106601787
A0A3P9AMT2	24.34	5	1	1	1	17291	Uncharacterized protein OS=Esox lucius OX=8010
Northern pike (<i>Esox Lucius</i>), spot 3							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description

A0A6Q2Y0Q5	130.76	68	10	10	45	11911	Parvalbumin OS=Esox lucius OX=8010
P02628	130.76	69	10	10	45	11707	Parvalbumin alpha OS=Esox lucius OX=8010
B5DH15	50.92	29	2	2	2	11916	Parvalbumin OS=Salmo salar OX=8030 GN=LOC106601787
A0A1S2WYZ0	50.92	29	2	2	2	11889	Parvalbumin OS=Salmo salar OX=8030 GN=LOC100137051
A0A6Q2Y240	50.29	4	2	1	5	55148	Keratin 5 OS=Esox lucius OX=8010
A0A6Q2YIG0	50.29	3	2	1	5	59325	Keratin 5 OS=Esox lucius OX=8010
A0A6Q2XC09	50.29	3	2	1	5	60322	Keratin 5 OS=Esox lucius OX=8010
A0A6Q2YKA3	32.45	10	1	1	1	9684	Fatty acid-binding protein heart OS=Esox lucius OX=8010
B9EQ03	32.45	9	1	1	1	11479	Fatty acid-binding protein Brain OS=Salmo salar OX=8030 GN=FABP7
B9ENA1	32.45	8	1	1	1	12164	Fatty acid-binding protein brain OS=Salmo salar OX=8030 GN=FABP7
B5X9J0	32.45	8	1	1	1	12739	Fatty acid-binding protein heart OS=Salmo salar OX=8030 GN=FABPH

B9ELS2	32.45	7	1	1	1	14752	Fatty acid-binding protein brain OS=Salmo salar OX=8030 GN=FABP7
B9EMT2	32.45	7	1	1	1	14811	Fatty acid-binding protein brain OS=Salmo salar OX=8030 GN=FABP7
B9EQI0	32.45	7	1	1	1	14752	Fatty acid-binding protein brain OS=Salmo salar OX=8030 GN=FABP7
B5XFW4	32.45	7	1	1	1	14764	Fatty acid-binding protein brain OS=Salmo salar OX=8030 GN=FABP7
B5X7L3	32.45	7	1	1	1	14794	Fatty acid-binding protein OS=Salmo salar OX=8030 GN=FABP7
B9ELZ6	32.45	7	1	1	1	14810	Fatty acid-binding protein 7 OS=Salmo salar OX=8030 GN=FABP7
B5XEE1	32.45	7	1	1	1	14703	Fatty acid-binding protein heart OS=Salmo salar OX=8030 GN=FABPH
B5X633	32.45	7	1	1	1	14719	Fatty acid-binding protein heart OS=Salmo salar OX=8030 GN=FABPH
A0A3P8X8R1	32.45	7	1	1	1	14820	Fatty acid-binding protein heart OS=Esox lucius OX=8010
B5XC76	32.45	7	1	1	1	15220	Fatty acid-binding protein adipocyte OS=Salmo salar OX=8030 GN=FABP4
B5XC84	32.45	7	1	1	1	15291	Fatty acid-binding protein heart OS=Salmo salar OX=8030 GN=FABPH

B5X5M2	32.45	7	1	1	1	15203	Fatty acid-binding protein heart OS=Salmo salar OX=8030 GN=FABPH
C1BW31	32.45	7	1	1	1	15183	Fatty acid-binding protein heart OS=Esox lucius OX=8010 GN=FABPH
B5X7J2	32.45	7	1	1	1	15263	Fatty acid-binding protein heart OS=Salmo salar OX=8030 GN=FABPH
B5XBM4	32.45	7	1	1	1	15258	Fatty acid-binding protein heart OS=Salmo salar OX=8030 GN=FABPH
B5XCV0	32.45	7	1	1	1	15181	Fatty acid-binding protein heart OS=Salmo salar OX=8030 GN=FABPH
B5X623	32.45	7	1	1	1	15290	Fatty acid-binding protein heart OS=Salmo salar OX=8030 GN=FABPH
P02619	26.54	7	1	1	1	11390	Parvalbumin beta OS=Esox lucius OX=8010
A0A3P8YPV5	26.54	7	1	1	1	11521	Parvalbumin OS=Esox lucius OX=8010
B5DH16	26.54	7	1	1	1	11383	Parvalbumin OS=Salmo salar OX=8030 GN=PRVB2
A0A3P8YPZ6	26.54	7	1	1	1	11835	Parvalbumin OS=Esox lucius OX=8010
Wels catfish (<i>Silurus glanis</i>)							

Accession (NCBI)	Score Sequest HT	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
KAF7705228.1	414.27	45	13	4	155	19573	Hypothetical protein HF521_020514 [Silurus meridionalis]
KAI5103184.1	244.77	72	10	1	101	10579	Parvalbumin isoform 1b, partial [Silurus meridionalis]
KAF7705229.1	220.55	77	11	7	88	11512	Hypothetical protein HF521_020515 [Silurus meridionalis]
KAF7698042.1	190.92	42	12	9	71	16901	Hypothetical protein HF521_004552 [Silurus meridionalis]
KAF7698043.1	53.06	17	5	3	20	27154	Hypothetical protein HF521_004553 [Silurus meridionalis]
KAF7708191.1	24.71	23	4	4	9	27554	Hypothetical protein HF521_017248 [Silurus meridionalis]
KAF7711981.1	16.03	5	4	1	6	64093	Hypothetical protein HF521_000992 [Silurus meridionalis]
XP_046689431.1	12.78	46	3	3	5	9800	Acyl-CoA-binding domain-containing protein 7 [Silurus meridionalis]
XP_046696882.1	12.64	43	4	4	5	12563	Parvalbumin-7 isoform X1 [Silurus meridionalis]
KAI5616098.1	7.66	8	3	2	3	57135	Actin, cytoplasmic 1 [Silurus asotus]

XP_046713087.1	5.38	10	2	2	2	24358	Histone H3-like [Silurus meridionalis]
KAI5105466.1	5.24	8	2	1	2	41962	Actin, alpha cardiac muscle 1 [Silurus meridionalis]
KAI5090970.1	4.55	3	2	1	2	89998	Keratin 92, partial [Silurus meridionalis]
Common carp (<i>Cyprinus carpio</i>)							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
P02618	206.03	94	16	1	110	11436	Parvalbumin beta OS=Cyprinus carpio OX=7962
Q8UUS2	202.5	82	16	2	116	11569	Parvalbumin OS=Cyprinus carpio OX=7962 GN=cyp c 1.02
A0A8C1XDB1	202.5	82	16	2	116	11422	Parvalbumin beta-like OS=Cyprinus carpio OX=7962 GN=LOC109096998
Q8UUS3	156.33	70	7	6	24	11504	Parvalbumin OS=Cyprinus carpio OX=7962 GN=cyp c 1.01
A0A8C1C0A5	156.33	70	7	6	24	11561	Parvalbumin-2 OS=Cyprinus carpio OX=7962 GN=LOC109049716
A0A8C2JVQ7	156.33	70	7	6	24	11532	Parvalbumin alpha OS=Cyprinus carpio OX=7962 GN=LOC109049715

E0WD92	156.33	70	7	6	24	11504	Parvalbumin OS=Cyprinus carpio OX=7962 GN=pvalb1
P09227	156.33	70	7	6	24	11466	Parvalbumin alpha OS=Cyprinus carpio OX=7962
A0A8C2JDB0	156.33	70	7	6	24	11535	Parvalbumin-2-like OS=Cyprinus carpio OX=7962 GN=LOC109100277
A0A8C1N3X0	154.36	47	8	1	39	12704	Parvalbumin 4 OS=Cyprinus carpio OX=7962
A0A8C1UR34	154.36	38	8	1	39	16151	Parvalbumin beta-like OS=Cyprinus carpio OX=7962 GN=LOC109097013
A0A8C2L2F5	154.36	51	8	1	39	11375	Parvalbumin beta-like OS=Cyprinus carpio OX=7962 GN=LOC109096998
A0A8C1A9C6	87.74	47	2	1	5	11567	Parvalbumin-2-like OS=Cyprinus carpio OX=7962 GN=LOC109100277
Tench (<i>Tinca tinca</i>)							
Accession (NCBI)	Score Sequest HT	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
XP_048027610.1	282.19	50	9	5	101	13.4	Parvalbumin alpha isoform X1 [Megalobrama amblycephala]
XP_016106649.1	153.49	55	13	2	60	11.5	PREDICTED: parvalbumin beta-like [Sinocyclocheilus grahami]

TRY68170.1	144.62	13	10	1	55	40.6	Hypothetical protein DNTS_010201 [Danionella translucida]
ACI01049.1	142.97	46	11	1	55	11.6	Parvalbumin [Hypophthalmichthys nobilis]
XP_056310372.1	69.68	36	6	1	31	11.6	Parvalbumin 4 [Danio aesculapii]
TRZ04482.1	61.47	18	5	1	29	38	Hypothetical protein DNTS_027550 [Danionella translucida]
XP_016126230.1	50.68	46	5	2	23	11.6	PREDICTED: parvalbumin alpha-like [Sinocyclocheilus grahami]
ACI95744.1	41.94	28	4	1	20	11.6	Parvalbumin [Hypophthalmichthys molitrix]
XP_048027614.1	35.15	17	2	1	17	11.6	Parvalbumin-2 [Megalobrama amblycephala]
XP_016121794.1	17.76	40	6	4	7	9.8	PREDICTED: parvalbumin beta-like, partial [Sinocyclocheilus grahami]
KAI2649894.1	10.19	5	3	1	5	73.7	Intermediate filament protein ON3 [Labeo rohita]
XP_039513417.1	3.98	13	2	2	2	16.7	Myosin, light polypeptide 3, skeletal muscle [Pimephales promelas]
European eel (<i>Anguilla Anguilla</i>)							

Accession (NCBI)	Score Sequest HT	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
KAG5854363.1	352.45	66	15	13	133	13	Hypothetical protein ANANG_G00037050 [Anguilla anguilla]
KAG5832188.1	337.91	83	14	13	117	11.7	Hypothetical protein ANANG_G00288450 [Anguilla anguilla]
KAG5832187.1	35.85	79	8	7	14	11.5	Hypothetical protein ANANG_G00288440 [Anguilla anguilla]
KAG5839115.1	27.48	33	6	5	12	20.3	Hypothetical protein ANANG_G00201510 [Anguilla anguilla]
KAG5849233.1	14.7	17	3	2	6	20.8	Hypothetical protein ANANG_G00107780 [Anguilla anguilla]
XP_035259144.1	7.03	21	3	3	3	19	Myosin regulatory light chain 2, skeletal muscle isoform type 2 [Anguilla anguilla]
XP_035263507.1	4.35	8	2	2	2	34	Four and a half LIM domains protein 1a isoform X1 [Anguilla anguilla]
KAG5831868.1	4	7	2	2	2	43.5	Hypothetical protein ANANG_G00284640 [Anguilla anguilla]
Sterlet (<i>Acipenser ruthenus</i>), spot 1							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description

A0A444UY07	224.13	90	14	14	154	12187	Parvalbumin OS=Acipenser ruthenus OX=7906 GN=EOD39_19466
A0A444TZU4	115.06	27	4	4	4	11840	Cytochrome c OS=Acipenser ruthenus OX=7906 GN=EOD39_9794
A0A444ULZ1	32.77	2	1	1	1	56910	Catenin alpha-3 OS=Acipenser ruthenus OX=7906 GN=EOD39_12209
Sterlet (<i>Acipenser ruthenus</i>), spot 2							
Accession (UniProtKB)	-10lgP	Coverage (%)	#Peptides	#Unique peptides	#PSM	Mass (Da)	Description
A0A444UY07	165.51	57	6	6	14	12187	Parvalbumin OS=Acipenser ruthenus OX=7906 GN=EOD39_19466
A0A662Z0K8	45.05	4	1	1	1	32891	Troponin I fast skeletal muscle OS=Acipenser ruthenus OX=7906 GN=EOD39_3731
A0A444U9D0	45.05	4	1	1	1	34783	Troponin I fast skeletal muscle OS=Acipenser ruthenus OX=7906 GN=EOD39_6696
A0A444V486	36.85	1	1	1	1	61108	Inositol 1 4 5-trisphosphate receptor type 1 OS=Acipenser ruthenus OX=7906 GN=EOD39_17122
A0A444ULZ1	35.36	2	1	1	1	56910	Catenin alpha-3 OS=Acipenser ruthenus OX=7906 GN=EOD39_12209
A0A444U1V8	35.36	1	1	1	1	60002	Catenin alpha-3 OS=Acipenser ruthenus OX=7906 GN=EOD39_9111

PSM- identified peptide spectrum matches that support the given protein.

Table S5. Comparison (Friedman test with Dunn's post-test) of IgE levels to different fish parvalbumins. Please refer to Figure 1A and Table S6 for the IgE quantification data.

	Brook trout	Brown trout	Danube salmon	Rainbow trout	European perch	Pikeperch	Northern pike	Wels catfish	Common carp	Tench	European eel
Brown trout	ns										
Danube salmon	ns	ns									
Rainbow trout	**	ns	ns								
European perch	***	ns	**	ns							
Pikeperch	***	ns	**	ns	ns						
Northern pike	****	****	****	****	****	****					
Wels catfish	****	****	****	****	****	****	ns				
Common carp	****	****	****	****	****	****	ns	**			
Tench	****	****	****	****	****	****	ns	ns	ns		
European eel	****	****	****	****	****	****	ns	ns	ns	ns	
Sterlet	****	****	****	**	*	ns	ns	****	ns	*	ns

*p<0.05, ** p<0.01, ***p<0.001, ****p<0.0001, ns: non-significant.

Table S6. Multiplex IgE quantification readouts (kUA/L) for all patients and all parvalbumins.

Patient code	Brook trout PV	Brown trout PV	Danube salmon PV	Rainbow trout PV	European perch PV	Pikeperch PV	Northern pike PV	Wels catfish PV	Common carp PV	Tench PV	European eel PV	Sterlet PV	Number of PVs the patient is positive to
P1	44.68	44.50	39.52	39.83	25.97	32.06	12.66	6.72	9.43	7.23	9.55	10.88	12
P2	11.34	12.37	8.70	9.49	7.86	8.33	4.10	1.17	5.15	4.21	3.78	7.13	12
P3	11.70	10.27	9.25	8.72	2.91	3.04	1.45	0.59	0.93	0.57	0.93	1.65	12
P4	10.64	8.74	9.12	7.76	2.39	2.25	0.00	0.00	0.00	0.02	0.18	1.47	7
P5	19.61	9.39	8.52	9.99	4.78	4.52	1.37	2.51	4.61	2.70	4.18	2.28	12
P6	7.13	5.01	5.81	3.47	5.45	5.13	0.74	0.00	1.81	1.26	0.00	2.62	10
P7	13.40	8.67	10.69	7.73	6.63	6.58	2.17	0.68	4.72	2.89	1.40	4.07	12
P8	4.56	4.48	3.07	3.35	2.21	2.07	1.78	0.47	1.26	0.77	2.14	1.64	12
P9	4.12	3.42	3.75	2.53	2.21	1.99	0.40	0.00	0.66	0.40	0.07	1.06	10
P10	15.17	15.70	17.81	9.34	7.40	8.41	3.86	0.70	3.84	2.92	2.90	4.96	12
P11	23.83	21.17	12.58	17.91	14.06	17.10	8.02	6.43	10.12	8.88	15.93	8.86	12
P12	0.26	0.02	0.00	0.09	1.73	1.61	0.05	0.41	1.16	0.69	1.81	1.11	7
P13	1.47	1.03	0.61	0.87	0.66	0.82	0.40	0.00	0.20	0.00	0.19	0.13	7
P14	14.06	11.77	10.13	10.70	9.16	9.67	6.93	3.10	7.70	6.76	6.22	7.19	12
P15	1.11	0.62	1.32	0.55	0.11	0.15	0.04	0.00	0.00	0.00	0.00	0.00	4
P16	1.25	0.47	0.60	0.62	0.04	0.11	0.00	0.00	0.06	0.00	0.09	0.00	4
P17	0.79	0.45	0.15	0.26	0.85	0.86	0.06	0.00	0.10	0.04	0.00	0.50	5
P18	10.50	9.82	16.86	7.16	4.31	3.74	0.16	0.00	1.36	1.19	0.53	4.36	10

P19	3.10	2.25	1.79	1.86	1.66	1.83	0.40	0.00	0.00	0.00	0.00	0.64	8
P20	5.91	5.07	5.95	3.97	2.13	1.97	0.49	0.00	0.49	0.22	0.08	0.82	9
P21	31.44	29.49	27.84	19.02	27.00	23.53	7.40	2.00	8.78	6.16	5.97	9.37	12
P22	3.52	2.96	2.97	2.74	1.13	1.22	0.58	0.60	0.90	0.41	0.34	0.60	12
P23	1.86	1.92	2.95	1.41	0.16	0.29	0.00	0.00	0.00	0.00	0.06	0.09	4
P24	0.11	0.05	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1
P25	4.87	3.76	6.83	2.76	0.64	0.65	0.35	0.00	0.09	0.13	0.33	0.35	9
P26	33.87	29.79	32.90	25.52	9.27	10.75	13.71	5.54	9.06	7.56	10.92	10.66	12
P27	1.69	1.41	1.50	1.16	0.60	0.74	0.15	0.11	0.47	0.26	0.12	0.47	8
P28	0.97	0.63	0.46	0.43	0.69	0.49	0.00	0.00	0.00	0.00	0.00	0.28	6
P29	3.03	2.34	3.46	2.07	0.00	0.08	0.19	0.00	0.00	0.00	0.00	0.41	5
P30	21.87	20.06	23.24	15.91	6.91	7.03	5.99	2.23	5.07	5.28	3.71	7.90	12
P31	9.47	8.41	13.98	6.84	0.55	0.06	0.13	0.00	0.00	0.00	0.00	0.00	5
P32	38.55	34.90	41.87	32.29	6.82	4.50	1.74	0.72	2.36	1.81	1.65	5.09	12
P33	6.78	5.64	6.01	4.79	3.53	3.60	1.67	0.16	1.60	1.38	0.94	3.17	11
P34	1.39	0.55	0.72	0.69	0.10	0.22	0.04	0.00	0.04	0.00	0.07	0.00	4
P35	6.91	7.83	8.44	6.33	6.39	6.00	1.76	1.94	3.99	3.18	3.08	3.19	12
P36	0.73	0.77	0.99	0.40	0.19	0.17	0.09	0.00	0.06	0.00	0.15	0.02	4
P37	10.88	9.42	7.59	7.37	14.63	12.45	5.76	0.37	6.75	5.17	0.35	9.83	12
P38	6.76	7.63	15.23	4.37	6.52	6.93	1.17	0.19	1.55	1.23	0.91	3.14	11
P39	17.80	15.98	24.37	12.49	8.45	8.16	2.91	0.00	2.35	2.10	0.50	6.39	11
P40	2.82	2.35	2.77	1.74	1.51	1.43	0.41	0.00	0.36	0.22	0.09	0.84	9
P41	16.56	13.68	17.60	10.45	8.87	8.88	5.86	1.60	4.97	3.71	2.59	6.09	12
P42	1.63	1.07	1.18	0.82	0.46	0.53	0.00	0.00	0.00	0.00	0.00	0.27	6
P43	3.61	3.33	4.72	2.14	1.16	1.05	0.39	0.04	0.77	0.26	0.24	0.28	8
P44	8.52	7.42	10.03	5.52	2.11	1.91	0.00	0.00	0.00	0.00	0.28	0.16	6
P45	0.90	0.82	1.45	0.56	0.16	0.12	0.00	0.00	0.00	0.00	0.00	0.00	4
P46	18.96	10.62	22.32	10.53	4.44	3.61	2.13	0.73	1.92	1.24	1.45	1.63	12

P47	1.50	1.31	1.91	0.81	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	4
P48	1.83	1.84	3.52	1.49	0.78	0.84	0.19	0.00	0.22	0.08	0.20	0.49	7
P49	27.92	28.94	30.94	24.02	13.42	13.06	9.55	2.66	9.79	8.04	6.76	11.92	12
P50	1.33	1.05	1.53	0.53	0.21	0.17	0.00	0.00	0.00	0.00	0.00	0.00	4
P51	0.22	0.06	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1
P52	4.99	4.69	4.84	3.89	1.61	1.28	0.42	0.00	0.48	0.26	0.00	1.04	9
P53	17.55	11.52	9.72	10.19	9.39	8.56	7.03	1.08	5.38	4.58	2.04	7.24	12
P54	20.54	18.20	29.02	15.47	8.22	8.74	5.66	0.74	1.85	2.21	3.01	6.07	12
P55	2.47	1.20	1.84	0.74	1.16	1.23	0.59	1.56	1.94	1.65	2.11	0.72	12
P56	3.01	2.17	5.72	1.27	0.91	0.98	0.00	0.00	0.00	0.00	0.00	0.18	6
P57	2.17	1.30	2.36	0.70	0.42	0.53	0.11	0.00	0.05	0.00	0.02	0.06	6
P58	9.99	9.07	4.98	5.85	15.04	10.46	5.12	0.00	2.62	1.76	0.41	4.76	11
P59	0.23	0.09	0.02	0.00	4.94	1.83	0.34	0.00	0.15	0.09	0.00	0.69	4
P60	0.29	0.59	0.37	0.11	0.63	0.43	0.08	0.00	0.09	0.01	0.01	0.29	4
P61	5.77	5.44	3.55	3.67	5.56	6.48	3.14	0.00	2.69	2.19	0.19	4.65	10
P62	21.57	25.06	35.21	13.49	1.29	0.71	0.00	0.00	0.00	0.00	0.00	0.22	6
P63	1.63	1.21	2.03	0.55	0.58	0.66	0.12	0.00	0.18	0.16	0.15	0.26	6
P64	3.50	3.55	2.62	2.38	6.09	5.98	0.85	1.35	3.57	2.61	5.40	3.75	12
P65	0.17	0.59	0.90	0.31	0.48	0.39	0.00	0.00	0.11	0.13	0.11	0.25	5
P66	0	0	0	0	0	0	0	0.87	1.95	0.53	1.88	1.43	5
Percentage of positive patients	89	92	94	89	82	80	58	38	58	50	47	67	NA
Percentage of negative patients	11	8	6	11	18	20	42	62	42	50	53	33	NA

PV, parvalbumin.