

**Short-Time Ozone Treatment Promotes Protease-Mediated Destruction of B Cell  
Allergen Epitopes by Altering the Structural Characteristics of Whey Protein**

Ziyi Xiong<sup>1,2,4</sup>, Hongkai Tan<sup>1,2,4</sup>, Yu Qiu<sup>1,2,4</sup>, Yong Wu<sup>2,3,4</sup>, Xuanyi Meng<sup>2,3,4</sup>,

Hongbing Chen<sup>2,3,4</sup>, Linsheng Wei<sup>5</sup>, Xin Li<sup>1,2,4\*</sup>

<sup>1</sup>State Key Laboratory of Food Science and Resources, Nanchang University,  
Nanchang, Jiangxi 330047, P.R. China

<sup>2</sup>School of Food Science and Technology, Nanchang University, Nanchang, Jiangxi  
330047, P.R. China

<sup>3</sup>Sino-German Joint Research Institute, Nanchang University, Nanchang, Jiangxi  
330047, P.R. China

<sup>4</sup>Jiangxi Province Key Laboratory of Food Allergy, Nanchang University, Nanchang,  
Jiangxi 330047, China

<sup>5</sup>School of Resources and Environment, Nanchang University, Nanchang, Jiangxi  
330031, China

\* Corresponding authors.

**Correspondence:**

Dr. Xin Li

State Key Laboratory of Food Science and Resources, Nanchang University,  
Nanchang 330047, P.R. China

Address: No. 235 Nanjing Donglu, Nanchang 330047, China

\* E-mail: zhizilixin@ncu.edu.cn

## **Content**

**Figure S1** Schematic diagram of ozone treatment. ①: Oxygen cylinder; ②: O<sub>3</sub> generator; ③: Gas flowmeter; ④: Gas disperser; ⑤: Whey protein solution.

**Table S1** Information about CMA patients.

**Table S2** Enzymatic hydrolysis conditions of whey protein.

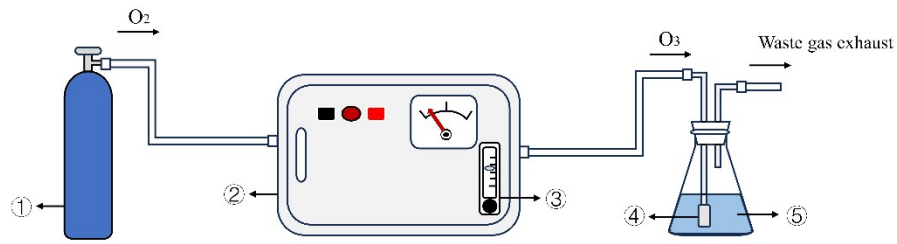
**Table S3** Peptide mapping information of whey protein hydrolysate.

**Table S4** Peptide mapping information of hydrolysate of ozonated whey protein.

**Table S5** B-cell linear epitope database of ALA and BLG.

**Table S6** Epitope peptides contained in whey protein hydrolysate.

**Table S7** Epitope peptides contained in the hydrolysate of ozonated whey protein.



**Figure S1** Schematic diagram of ozone treatment. ①: Oxygen cylinder; ②:  $O_3$  generator; ③: Gas flowmeter; ④: Gas disperser; ⑤: Whey protein solution.

**Table S1 Information about CMA patients.**

<b>Patient No.</b>	<b>Gender</b>	<b>Age (months)</b>	<b>Symptoms</b>	<b>Specific IgE Level (IU/mL)</b>
1	F	48	Allergic rhinitis	3.2
2	M	9	Serum urticaria	56.8
3	M	1	Asthmatic bronchitis	2.9
4	M	36	Allergic rhinitis	3.7
5	M	12	Leukocytosis	43.7
6	F	10	Asthmatic bronchopneumonia	3.5
7	M	4	Urticaria	5.9
8	F	13	pneumonia	1.0
9	M	4	ND*	2.7
10	M	11	ND*	1.8

M means male.

F means female.

ND\* means Not Done.

**Table S2** Enzymatic hydrolysis conditions of whey protein.

Condition parameter	Level				
pH	8	9	10	11	12
t (h)	0.5	1	1.5	2	2.5
E/S (%)	1.5	2	2.5	3	3.5
T (°C)	40	45	50	55	60

**Table S3:** Peptide mapping information of whey protein hydrolysate.

Sequence	Length	Mass	Leading razor protein	Start position	End position	Score	Intensity
NNDSTEY	7	841.309	sp P00711 LALBA_BOVINAAlpha-lactalbumin	63	69	197.16	3616900000
DTDYKKY	7	931.4287	sp P02754 LACB_BOVINBeta-lactoglobulin	112	118	171.08	2117800000
LIVTQ	5	572.3534	sp P02754 LACB_BOVINBeta-lactoglobulin	17	21	161.77	4068700000
EVFREL	6	791.4178	sp P00711 LALBA_BOVINAAlpha-lactalbumin	26	31	155.73	4764200000
GYDTQ	5	582.2286	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	58	154.44	1418000000
LKDLKGY	7	835.4804	sp P00711 LALBA_BOVINAAlpha-lactalbumin	31	37	154.01	861480000
TWYSL	5	668.317	sp P02754 LACB_BOVINBeta-lactoglobulin	34	38	153.57	605900000
LSFNPT	6	677.3384	sp P02754 LACB_BOVINBeta-lactoglobulin	165	170	150.06	10292000
KIDAL	5	558.3377	sp P02754 LACB_BOVINBeta-lactoglobulin	99	103	150	6403100000
KFDKALK	7	848.512	sp P02754 LACB_BOVINBeta-lactoglobulin	151	157	149.4	4774800000
LIVTQT	6	673.401	sp P02754 LACB_BOVINBeta-lactoglobulin	17	22	144.29	105140000
KDLKGY	6	722.3963	sp P00711 LALBA_BOVINAAlpha-lactalbumin	32	37	143.97	27253000000
DTDYK	5	640.2704	sp P02754 LACB_BOVINBeta-lactoglobulin	112	116	143.88	556520000
KIIAEKT	7	801.496	sp P02754 LACB_BOVINBeta-lactoglobulin	86	92	143.61	76384000
EYGLF	5	627.2904	sp P00711 LALBA_BOVINAAlpha-lactalbumin	68	72	143.11	840650000
DKVGIN	6	644.3493	sp P00711 LALBA_BOVINAAlpha-lactalbumin	116	121	137.59	12518000000
DKVGINY	7	807.4127	sp P00711 LALBA_BOVINAAlpha-lactalbumin	116	122	135.87	3804900000
KILDK	5	615.3956	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	117	135.25	168900000
KTKIPAV	7	755.4905	sp P02754 LACB_BOVINBeta-lactoglobulin	91	97	132.53	36645000
KKIIAE	6	700.4483	sp P02754 LACB_BOVINBeta-lactoglobulin	85	90	130.84	1089600000
TDYKKY	6	816.4018	sp P02754 LACB_BOVINBeta-lactoglobulin	113	118	130.84	428200000

KILDKV	6	714.464	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	113	118	130.05	1856500000
FDKALK	6	720.417	sp P02754 LACB_BOVIN	Beta-lactoglobulin	152	157	129.96	463030000
VAGTWY	6	695.3279	sp P02754 LACB_BOVIN	Beta-lactoglobulin	31	36	128.65	1193300000
VLDTD	5	561.2646	sp P02754 LACB_BOVIN	Beta-lactoglobulin	110	114	127.53	67008000
INNKIW	6	786.4388	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	74	79	126.38	293740000
VFREL	5	662.3752	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	27	31	123.53	4010500000
VDDEAL	6	660.2966	sp P02754 LACB_BOVIN	Beta-lactoglobulin	144	149	123.4	348680000
QAIVQ	5	557.3173	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	58	62	123.06	572290000
IVTQ	4	459.2693	sp P02754 LACB_BOVIN	Beta-lactoglobulin	18	21	121.92	6775700000
NENKVL	6	715.3865	sp P02754 LACB_BOVIN	Beta-lactoglobulin	104	109	120.9	17731000000
VAGTW	5	532.2646	sp P02754 LACB_BOVIN	Beta-lactoglobulin	31	35	120	2859800000
VGINY	5	564.2908	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	118	122	120	492780000
FQIN	4	520.2646	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	72	75	119.89	254210000
EQLTK	5	617.3384	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	20	24	119.22	3688300000
DIQKVA	6	672.3806	sp P02754 LACB_BOVIN	Beta-lactoglobulin	27	32	117.56	14842000000
AIVQN	5	543.3017	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	59	63	115.97	6976100000
PLRVY	5	646.3803	sp P02754 LACB_BOVIN	Beta-lactoglobulin	54	58	115.03	372750000
DSTEY	5	613.2231	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	65	69	114.73	117580000
QTMKGL	6	676.3578	sp P02754 LACB_BOVIN	Beta-lactoglobulin	21	26	114.02	2141700000
KIPAVF	6	673.4163	sp P02754 LACB_BOVIN	Beta-lactoglobulin	93	98	113.63	33554000000
KTKIPA	6	656.4221	sp P02754 LACB_BOVIN	Beta-lactoglobulin	91	96	113.08	1603100000
PEQSL	5	572.2806	sp P02754 LACB_BOVIN	Beta-lactoglobulin	129	133	113.07	38776000
KPTPE	5	570.3013	sp P02754 LACB_BOVIN	Beta-lactoglobulin	63	67	112.88	14180000
YWLAH	5	688.3333	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	122	126	111.84	35404000000
KALPMH	6	695.3789	sp P02754 LACB_BOVIN	Beta-lactoglobulin	157	162	110.43	48095000

AMAAS	5	449.1944	sp P02754 LACB_BOVINBeta-lactoglobulin	39	43	110.2	134740000
DISLL	5	559.3217	sp P02754 LACB_BOVINBeta-lactoglobulin	44	48	110.2	158150000
YGLFQ	5	626.3064	sp P00711 LALBA_BOVINAAlpha-lactalbumin	69	73	110.2	3510800000
VYVE	4	508.2533	sp P02754 LACB_BOVINBeta-lactoglobulin	57	60	109.97	209260000
SFNPT	5	564.2544	sp P02754 LACB_BOVINBeta-lactoglobulin	166	170	109.94	15899000000
QKVAGT	6	602.3388	sp P02754 LACB_BOVINBeta-lactoglobulin	29	34	109.8	160260000
GLFQIN	6	690.3701	sp P00711 LALBA_BOVINAAlpha-lactalbumin	70	75	109.6	3886400000
QLTK	4	488.2959	sp P00711 LALBA_BOVINAAlpha-lactalbumin	21	24	109.53	34257000
GDLEIL	6	658.3538	sp P02754 LACB_BOVINBeta-lactoglobulin	68	73	109.15	8218900000
KIIAE	5	572.3534	sp P02754 LACB_BOVINBeta-lactoglobulin	86	90	108.69	2762800000
AEPEQSL	7	772.3603	sp P02754 LACB_BOVINBeta-lactoglobulin	127	133	107.74	333230000
IIAEKT	6	673.401	sp P02754 LACB_BOVINBeta-lactoglobulin	87	92	107.65	2472400000
GTWYSL	6	725.3384	sp P02754 LACB_BOVINBeta-lactoglobulin	33	38	107.15	6338500000
HIRLS	5	624.3707	sp P02754 LACB_BOVINBeta-lactoglobulin	162	166	107.15	19695000000
LQKWE	5	702.3701	sp P02754 LACB_BOVINBeta-lactoglobulin	74	78	107.15	9149800000
GDLE	4	432.1856	sp P02754 LACB_BOVINBeta-lactoglobulin	68	71	105.36	267310000
TKIPAVF	7	774.464	sp P02754 LACB_BOVINBeta-lactoglobulin	92	98	105.2	14700000000
LSFN	4	479.238	sp P02754 LACB_BOVINBeta-lactoglobulin	165	168	104.62	32719000
LQKW	4	573.3275	sp P02754 LACB_BOVINBeta-lactoglobulin	74	77	104.58	1261300000
IPAVF	5	545.3213	sp P02754 LACB_BOVINBeta-lactoglobulin	94	98	104.08	144810000
VTQ	3	346.1852	sp P02754 LACB_BOVINBeta-lactoglobulin	19	21	104.08	84683000
DYKKYL	6	828.4382	sp P02754 LACB_BOVINBeta-lactoglobulin	114	119	103.28	135520000
DAQSAPL	7	700.3392	sp P02754 LACB_BOVINBeta-lactoglobulin	49	55	102.8	14770000000
AIVQ	4	429.2587	sp P00711 LALBA_BOVINAAlpha-lactalbumin	59	62	102.45	28490000000
ISLL	4	444.2948	sp P02754 LACB_BOVINBeta-lactoglobulin	45	48	102.45	7724800000



LIVT	4	444.2948	sp P02754 LACB_BOVINBeta-lactoglobulin	17	20	102.45	19099000000
LEEQ	4	517.2384	sp P02754 LACB_BOVINBeta-lactoglobulin	172	175	102.4	108970000
TFHTS	5	591.2653	sp P00711 LALBA_BOVINAAlpha-lactalbumin	49	53	102.29	3268100000
DISLLD	6	674.3487	sp P02754 LACB_BOVINBeta-lactoglobulin	44	49	102.12	233660000
KFDKAL	6	720.417	sp P02754 LACB_BOVINBeta-lactoglobulin	151	156	101.72	4613400000
KGLDIQ	6	672.3806	sp P02754 LACB_BOVINBeta-lactoglobulin	24	29	101.69	400070000
LDKVGIN	7	757.4334	sp P00711 LALBA_BOVINAAlpha-lactalbumin	115	121	101.41	151770000
LNENKVL	7	828.4705	sp P02754 LACB_BOVINBeta-lactoglobulin	103	109	101.28	1067800000
DISL	4	446.2377	sp P02754 LACB_BOVINBeta-lactoglobulin	44	47	100.21	973500000
FNPT	4	477.2224	sp P02754 LACB_BOVINBeta-lactoglobulin	167	170	100.09	7415300000
QSAPL	5	514.2751	sp P02754 LACB_BOVINBeta-lactoglobulin	51	55	100.04	73926000
LVRTPE	6	713.4072	sp P02754 LACB_BOVINBeta-lactoglobulin	138	143	99.919	3373800000
EQLT	4	489.2435	sp P00711 LALBA_BOVINAAlpha-lactalbumin	20	23	99.626	179760000
EVFRE	5	678.3337	sp P00711 LALBA_BOVINAAlpha-lactalbumin	26	30	99.511	1905600000
DYKKY	5	715.3541	sp P02754 LACB_BOVINBeta-lactoglobulin	114	118	99.228	139920000
RELKDL	6	772.4443	sp P00711 LALBA_BOVINAAlpha-lactalbumin	29	34	98.415	2864200000
DKALKAL	7	757.4698	sp P02754 LACB_BOVINBeta-lactoglobulin	153	159	97.033	75131000
KKYLLF	6	810.5004	sp P02754 LACB_BOVINBeta-lactoglobulin	116	121	96.839	26636000
DEALE	5	575.2439	sp P02754 LACB_BOVINBeta-lactoglobulin	146	150	96.372	72077000
YWLAHK	6	816.4283	sp P00711 LALBA_BOVINAAlpha-lactalbumin	122	127	96.337	7033400000
ALNE	4	445.2173	sp P02754 LACB_BOVINBeta-lactoglobulin	102	105	95.117	994930000
FHTS	4	490.2176	sp P00711 LALBA_BOVINAAlpha-lactalbumin	50	53	94.737	893860000
ILLQ	4	485.3213	sp P02754 LACB_BOVINBeta-lactoglobulin	72	75	94.737	8224400000
EALE	4	460.2169	sp P02754 LACB_BOVINBeta-lactoglobulin	147	150	94.533	78021000
IRLS	4	487.3118	sp P02754 LACB_BOVINBeta-lactoglobulin	163	166	94.268	150480000

HIRL	4	537.3387	sp P02754 LACB_BOVINBeta-lactoglobulin	162	165	94.118	988510000
WYSL	4	567.2693	sp P02754 LACB_BOVINBeta-lactoglobulin	35	38	94.118	2573700000
FNPTQLE	7	847.4076	sp P02754 LACB_BOVINBeta-lactoglobulin	167	173	94.006	42222000
GLDIQ	5	544.2857	sp P02754 LACB_BOVINBeta-lactoglobulin	25	29	93.763	908980000
LTDDIM	6	706.3207	sp P00711 LALBA_BOVINAAlpha-lactalbumin	104	109	93.595	104460000
PMHIRL	6	765.432	sp P02754 LACB_BOVINBeta-lactoglobulin	160	165	93.595	14909000
QLEE	4	517.2384	sp P02754 LACB_BOVINBeta-lactoglobulin	171	174	93.045	1914500000
QINNKIW	7	914.4974	sp P00711 LALBA_BOVINAAlpha-lactalbumin	73	79	92.785	1076000000
WLAHKAL	7	837.4861	sp P00711 LALBA_BOVINAAlpha-lactalbumin	123	129	92.785	123810000
PMHIR	5	652.3479	sp P02754 LACB_BOVINBeta-lactoglobulin	160	164	92.151	393990000
VEELKPT	7	814.4436	sp P02754 LACB_BOVINBeta-lactoglobulin	59	65	91.906	29399000
LAHKAL	6	651.4068	sp P00711 LALBA_BOVINAAlpha-lactalbumin	124	129	90.631	1675600000
KVGIN	5	529.3224	sp P00711 LALBA_BOVINAAlpha-lactalbumin	117	121	89.847	176800000
LKALPM	6	671.404	sp P02754 LACB_BOVINBeta-lactoglobulin	156	161	89.775	9649500000
TMKGL	5	548.2992	sp P02754 LACB_BOVINBeta-lactoglobulin	22	26	89.775	3291000000
ALKALPM	7	742.4411	sp P02754 LACB_BOVINBeta-lactoglobulin	155	161	88.627	4954900000
DLKGY	5	594.3013	sp P00711 LALBA_BOVINAAlpha-lactalbumin	33	37	88.626	1627800000
LRVY	4	549.3275	sp P02754 LACB_BOVINBeta-lactoglobulin	55	58	88.444	2659400000
DQWL	4	560.2595	sp P00711 LALBA_BOVINAAlpha-lactalbumin	135	138	87.945	1303700000
GLDIQK	6	672.3806	sp P02754 LACB_BOVINBeta-lactoglobulin	25	30	87.582	539450000
FREL	4	563.3068	sp P00711 LALBA_BOVINAAlpha-lactalbumin	28	31	87.265	2430700000
LDIQ	4	487.2642	sp P02754 LACB_BOVINBeta-lactoglobulin	26	29	87.265	154900000
VLDTDYK	7	852.4229	sp P02754 LACB_BOVINBeta-lactoglobulin	110	116	86.866	2271600000
DYKKYLL	7	941.5222	sp P02754 LACB_BOVINBeta-lactoglobulin	114	120	86.838	26135000
LIVTQTM	7	804.4415	sp P02754 LACB_BOVINBeta-lactoglobulin	17	23	86.838	77702000

LLDAQ	5	558.3013	sp P02754 LACB_BOVINBeta-lactoglobulin	47	51	86.344	49575000
LKPTPE	6	683.3854	sp P02754 LACB_BOVINBeta-lactoglobulin	62	67	86.121	929360000
YKKYLL	6	826.4953	sp P02754 LACB_BOVINBeta-lactoglobulin	115	120	85.909	126610000
LKPTPEG	7	740.4069	sp P02754 LACB_BOVINBeta-lactoglobulin	62	68	85.89	18015000
LDQW	4	560.2595	sp P00711 LALBA_BOVINAAlpha-lactalbumin	134	137	85.518	36179000
ELKPTPE	7	812.428	sp P02754 LACB_BOVINBeta-lactoglobulin	61	67	85.359	554000000
KVAGTWY	7	823.4228	sp P02754 LACB_BOVINBeta-lactoglobulin	30	36	85.357	90914000
STEY	4	498.1962	sp P00711 LALBA_BOVINAAlpha-lactalbumin	66	69	84.485	44817000
ALE	3	331.1743	sp P02754 LACB_BOVINBeta-lactoglobulin	148	150	83.876	2394000000
ALPM	4	430.225	sp P02754 LACB_BOVINBeta-lactoglobulin	158	161	83.876	17760000000
IVQ	3	358.2216	sp P00711 LALBA_BOVINAAlpha-lactalbumin	60	62	83.876	399980000
LLAL	4	428.2999	sp P02754 LACB_BOVINBeta-lactoglobulin	5	8	83.876	352970000
PAVF	4	432.2373	sp P02754 LACB_BOVINBeta-lactoglobulin	95	98	83.876	153840000
VLVL	4	442.3155	sp P02754 LACB_BOVINBeta-lactoglobulin	108	111	83.876	969600000
GYGGV	5	451.2067	sp P00711 LALBA_BOVINAAlpha-lactalbumin	36	40	83.661	27183000
RVYVEE	6	793.397	sp P02754 LACB_BOVINBeta-lactoglobulin	56	61	83.229	223600000
VGIN	4	401.2274	sp P00711 LALBA_BOVINAAlpha-lactalbumin	118	121	82.602	280710000
YSLA	4	452.2271	sp P02754 LACB_BOVINBeta-lactoglobulin	36	39	82.602	7338500000
KVAGT	5	474.2802	sp P02754 LACB_BOVINBeta-lactoglobulin	30	34	82.141	42730000
SDISLL	6	646.3538	sp P02754 LACB_BOVINBeta-lactoglobulin	43	48	80.498	19997000
IVTQT	5	560.317	sp P02754 LACB_BOVINBeta-lactoglobulin	18	22	80.317	94714000
EKFDKA	6	736.3756	sp P02754 LACB_BOVINBeta-lactoglobulin	150	155	79.469	19562000
TTFHTS	6	692.313	sp P00711 LALBA_BOVINAAlpha-lactalbumin	48	53	78.166	380010000
AHKAL	5	538.3227	sp P00711 LALBA_BOVINAAlpha-lactalbumin	125	129	77.925	122440000
LDTDYK	6	753.3545	sp P02754 LACB_BOVINBeta-lactoglobulin	111	116	77.748	62388000

KFDKA	5	607.333	sp P02754 LACB_BOVINBeta-lactoglobulin	151	155	77.72	469010000
ALIVT	5	515.3319	sp P02754 LACB_BOVINBeta-lactoglobulin	16	20	77.448	179410000
KALPM	5	558.32	sp P02754 LACB_BOVINBeta-lactoglobulin	157	161	77.448	16057000000
LLQKW	5	686.4116	sp P02754 LACB_BOVINBeta-lactoglobulin	73	77	77.448	526150000
QSLA	4	417.2224	sp P02754 LACB_BOVINBeta-lactoglobulin	131	134	77.448	259660000
EEQCHI	6	757.3065	sp P02754 LACB_BOVINBeta-lactoglobulin	173	178	76.553	17742000
LPMHIR	6	765.432	sp P02754 LACB_BOVINBeta-lactoglobulin	159	164	76.553	68524000
QAIVQN	6	671.3602	sp P00711 LALBA_BOVINAAlpha-lactalbumin	58	63	76.347	17011000
GYDT	4	454.17	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	57	75.898	78139000
DIQKV	5	601.3435	sp P02754 LACB_BOVINBeta-lactoglobulin	27	31	75.682	123830000
IIAEK	5	572.3534	sp P02754 LACB_BOVINBeta-lactoglobulin	87	91	74.849	981270000
NYWLAH	6	802.3762	sp P00711 LALBA_BOVINAAlpha-lactalbumin	121	126	73.289	49082000
EVFRELK	7	919.5127	sp P00711 LALBA_BOVINAAlpha-lactalbumin	26	32	72.875	20027000
KGYGCV	6	579.3017	sp P00711 LALBA_BOVINAAlpha-lactalbumin	35	40	72.338	165350000
LQKWEN	6	816.413	sp P02754 LACB_BOVINBeta-lactoglobulin	74	79	72.021	64048000
ALEKF	5	606.3377	sp P02754 LACB_BOVINBeta-lactoglobulin	148	152	71.995	8186300
TQTMKGL	7	777.4055	sp P02754 LACB_BOVINBeta-lactoglobulin	20	26	71.949	15312000
IVTQTMK	7	819.4524	sp P02754 LACB_BOVINBeta-lactoglobulin	18	24	71.852	37728000
WLAHK	5	653.3649	sp P00711 LALBA_BOVINAAlpha-lactalbumin	123	127	71.753	50388000
RVYVE	5	664.3544	sp P02754 LACB_BOVINBeta-lactoglobulin	56	60	71.475	309060000
YKKYL	5	713.4112	sp P02754 LACB_BOVINBeta-lactoglobulin	115	119	71.475	34287000
KVLVL	5	570.4105	sp P02754 LACB_BOVINBeta-lactoglobulin	107	111	69.776	44520000
KWENGE	6	761.3344	sp P02754 LACB_BOVINBeta-lactoglobulin	76	81	69.432	766470000
QKKIIAE	7	828.5069	sp P02754 LACB_BOVINBeta-lactoglobulin	84	90	69.383	303900000
EKFDKAL	7	849.4596	sp P02754 LACB_BOVINBeta-lactoglobulin	150	156	69.176	126650000

AQSAPL	6	585.3122	sp P02754 LACB_BOVINBeta-lactoglobulin	50	55	69.093	118480000
KLDQW	5	688.3544	sp P00711 LALBA_BOVINAAlpha-lactalbumin	133	137	69.093	1325800000
VDDEALE	7	789.3392	sp P02754 LACB_BOVINBeta-lactoglobulin	144	150	68.485	2683100000
YWLAHKA	7	887.4654	sp P00711 LALBA_BOVINAAlpha-lactalbumin	122	128	68.033	793860000
ASDISLL	7	717.3909	sp P02754 LACB_BOVINBeta-lactoglobulin	42	48	67.76	80333000
KVAGTW	6	660.3595	sp P02754 LACB_BOVINBeta-lactoglobulin	30	35	67.76	2666200000
KLDQWL	6	801.4385	sp P00711 LALBA_BOVINAAlpha-lactalbumin	133	138	67.285	242480000
LLQKWE	6	815.4541	sp P02754 LACB_BOVINBeta-lactoglobulin	73	78	66.994	68285000
MHIRLS	6	755.4112	sp P02754 LACB_BOVINBeta-lactoglobulin	161	166	66.994	504490000
MHIRL	5	668.3792	sp P02754 LACB_BOVINBeta-lactoglobulin	161	165	66.538	206640000
DIQKVAG	7	729.4021	sp P02754 LACB_BOVINBeta-lactoglobulin	27	33	65.263	106050000
DDEALEK	7	818.3658	sp P02754 LACB_BOVINBeta-lactoglobulin	145	151	65.246	5077200
ALKAL	5	514.3479	sp P02754 LACB_BOVINBeta-lactoglobulin	155	159	63.055	20733000
ALPMHIR	7	836.4691	sp P02754 LACB_BOVINBeta-lactoglobulin	158	164	62.978	873850000
DTQAIVQ	7	773.3919	sp P00711 LALBA_BOVINAAlpha-lactalbumin	56	62	62.715	20531000
GTWYS	5	612.2544	sp P02754 LACB_BOVINBeta-lactoglobulin	33	37	58.256	424580000
IIAEKTk	7	801.496	sp P02754 LACB_BOVINBeta-lactoglobulin	87	93	54.205	20008000
KILDKVGINYWLAH	14	1668.935	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	126	277.28	1458100000
NSAEPEQSL	9	973.4353	sp P02754 LACB_BOVINBeta-lactoglobulin	125	133	256.48	5850900000
QAIVQNNDSTEYGLF	15	1697.79	sp P00711 LALBA_BOVINAAlpha-lactalbumin	58	72	222	56403000
AIVQNNDSTEYGLF	14	1569.731	sp P00711 LALBA_BOVINAAlpha-lactalbumin	59	72	218.48	10746000000
VEELKPTPEGDLE	13	1454.714	sp P02754 LACB_BOVINBeta-lactoglobulin	59	71	214.26	23163000000
AIVQNNDSTE	10	1089.494	sp P00711 LALBA_BOVINAAlpha-lactalbumin	59	68	213.53	6175800000
EVFRELKDLKGY	12	1495.804	sp P00711 LALBA_BOVINAAlpha-lactalbumin	26	37	210.93	2092000000
ASDISLLDAQSAPLRVY	17	1817.952	sp P02754 LACB_BOVINBeta-lactoglobulin	42	58	202.44	25451000

LVRTPEVDDE	10	1171.572	sp P02754 LACB_BOVINBeta-lactoglobulin	138	147	199.89	2335800000
AIVQNNDSTEY	11	1252.557	sp P00711 LALBA_BOVINAAlpha-lactalbumin	59	69	195.57	6101300000
AIVQNNDSTEYGLFQ	15	1697.79	sp P00711 LALBA_BOVINAAlpha-lactalbumin	59	73	195.51	313370000
KILDKVGIN	9	998.6124	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	121	191.85	5842000000
KILDKVGINY	10	1161.676	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	122	191.67	964500000
ELKPTPEGDLE	11	1226.603	sp P02754 LACB_BOVINBeta-lactoglobulin	61	71	190.88	2092200000
KIIAEKTKIPAVF	13	1456.902	sp P02754 LACB_BOVINBeta-lactoglobulin	86	98	190.53	3957700000
VEELKPTPEGDLEIL	15	1680.882	sp P02754 LACB_BOVINBeta-lactoglobulin	59	73	184.24	3964000000
HIRLSFNPTQLEEQ	14	1710.869	sp P02754 LACB_BOVINBeta-lactoglobulin	162	175	182.23	215930000
ELKPTPEGDLEIL	13	1452.771	sp P02754 LACB_BOVINBeta-lactoglobulin	61	73	179.42	4469000000
VEELKPTPEGDLEI	14	1567.798	sp P02754 LACB_BOVINBeta-lactoglobulin	59	72	174.42	353690000
DAQSAPLRVY	10	1118.572	sp P02754 LACB_BOVINBeta-lactoglobulin	49	58	172.21	906680000
KIDALNENKVLVL	13	1467.866	sp P02754 LACB_BOVINBeta-lactoglobulin	99	111	172	315190000
LKPTPEGDLE	10	1097.561	sp P02754 LACB_BOVINBeta-lactoglobulin	62	71	171.46	2637500000
VRTPEVDDE	9	1058.488	sp P02754 LACB_BOVINBeta-lactoglobulin	139	147	170.3	4400600000
DTDYKKYL	8	1044.513	sp P02754 LACB_BOVINBeta-lactoglobulin	112	119	166.05	1499300000
LDTDYKKYL	9	1157.597	sp P02754 LACB_BOVINBeta-lactoglobulin	111	119	165.72	211320000
LVRTPEVDDEALEK	14	1612.831	sp P02754 LACB_BOVINBeta-lactoglobulin	138	151	164.81	2058000000
HIRLSFNPT	9	1083.583	sp P02754 LACB_BOVINBeta-lactoglobulin	162	170	163.9	623970000
RTPEVDDE	8	959.4196	sp P02754 LACB_BOVINBeta-lactoglobulin	140	147	162.5	1457100000
LDKVGINYWLAH	12	1427.756	sp P00711 LALBA_BOVINAAlpha-lactalbumin	115	126	161.63	24129000
SAEPEQSL	8	859.3923	sp P02754 LACB_BOVINBeta-lactoglobulin	126	133	160.54	351910000
NDSTEYGLF	9	1044.44	sp P00711 LALBA_BOVINAAlpha-lactalbumin	64	72	159.04	3914400000
ALNENKVL	8	899.5076	sp P02754 LACB_BOVINBeta-lactoglobulin	102	109	157.33	1861400000
DIQKVAGTW	9	1016.529	sp P02754 LACB_BOVINBeta-lactoglobulin	27	35	157.2	5194900000

LDTDYKKY	8	1044.513	sp P02754 LACB_BOVINBeta-lactoglobulin	111	118	156.4	524570000
MENSAEPEQSL	11	1233.518	sp P02754 LACB_BOVINBeta-lactoglobulin	123	133	156.35	218670000
EVFRELKDL	9	1147.624	sp P00711 LALBA_BOVINAAlpha-lactalbumin	26	34	155.42	138800000
IAEKTKIPAVF	11	1215.723	sp P02754 LACB_BOVINBeta-lactoglobulin	88	98	154.85	758910000
LSFNPTQLEE	10	1176.566	sp P02754 LACB_BOVINBeta-lactoglobulin	165	174	154.12	40151000
EELKPTPEGDLEIL	14	1581.814	sp P02754 LACB_BOVINBeta-lactoglobulin	60	73	153.12	550240000
KFLDDDLTDDIM	12	1439.649	sp P00711 LALBA_BOVINAAlpha-lactalbumin	98	109	153.05	122490000
ALEKFDKALKALPM	14	1573.89	sp P02754 LACB_BOVINBeta-lactoglobulin	148	161	151.79	44925000
DTDYKKYLLF	10	1304.665	sp P02754 LACB_BOVINBeta-lactoglobulin	112	121	150.4	11588000000
VFRELKDLKGY	11	1366.761	sp P00711 LALBA_BOVINAAlpha-lactalbumin	27	37	150.08	1014700000
DTDYKKYLL	9	1157.597	sp P02754 LACB_BOVINBeta-lactoglobulin	112	120	150.05	8688600000
ELKPTPEGDLEI	12	1339.687	sp P02754 LACB_BOVINBeta-lactoglobulin	61	72	148.91	176590000
KTKIPAVF	8	902.5589	sp P02754 LACB_BOVINBeta-lactoglobulin	91	98	147.52	56785000000
FNPTQLEEQ	9	1104.509	sp P02754 LACB_BOVINBeta-lactoglobulin	167	175	147.36	458980000
VLDTDYKKY	9	1143.581	sp P02754 LACB_BOVINBeta-lactoglobulin	110	118	147.19	10576000000
LSFNPTQL	8	918.4811	sp P02754 LACB_BOVINBeta-lactoglobulin	165	172	147.16	349150000
GYDTQAIQV	9	993.4767	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	62	144.83	2665200000
VAGTWYSL	8	895.444	sp P02754 LACB_BOVINBeta-lactoglobulin	31	38	144.58	74496000
GYDTQAIQVQNNNDSTEY	16	1816.775	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	69	143	46927000
KILDKVGINYW	11	1347.755	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	123	141.95	4062600000
ENSAEPEQSL	10	1102.478	sp P02754 LACB_BOVINBeta-lactoglobulin	124	133	140.84	781300000
NNDSTEYGLFQ	11	1286.542	sp P00711 LALBA_BOVINAAlpha-lactalbumin	63	73	140.35	53123000
AIVQNNNDSTEYGL	13	1422.663	sp P00711 LALBA_BOVINAAlpha-lactalbumin	59	71	140.14	96874000
VEELKPTPE	9	1040.539	sp P02754 LACB_BOVINBeta-lactoglobulin	59	67	140.14	9711300000
EKFDKALKALPM	12	1389.769	sp P02754 LACB_BOVINBeta-lactoglobulin	150	161	139.86	78434000

VEELKPTPEGD	11	1212.587	sp P02754 LACB_BOVINBeta-lactoglobulin	59	69	139.38	424300000
SDISLLDAQSAPLRVY	16	1746.915	sp P02754 LACB_BOVINBeta-lactoglobulin	43	58	138.89	30570000
IIAEKTKIPAVF	12	1328.807	sp P02754 LACB_BOVINBeta-lactoglobulin	87	98	138.22	38298000000
LVRTPEVDDEALE	13	1484.736	sp P02754 LACB_BOVINBeta-lactoglobulin	138	150	138.22	29387000000
ILDKVGIN	8	870.5175	sp P00711 LALBA_BOVINAAlpha-lactalbumin	114	121	137.62	2010200000
EKTKIPAVF	9	1031.602	sp P02754 LACB_BOVINBeta-lactoglobulin	90	98	134.48	13746000000
KPTPEGDLE	9	984.4764	sp P02754 LACB_BOVINBeta-lactoglobulin	63	71	133.55	177450000
NNDSTEYGLF	10	1158.483	sp P00711 LALBA_BOVINAAlpha-lactalbumin	63	72	133.12	5213500000
VRTPEVDDEALE	12	1371.652	sp P02754 LACB_BOVINBeta-lactoglobulin	139	150	132.88	6837700000
KDLKGYGGV	9	935.5076	sp P00711 LALBA_BOVINAAlpha-lactalbumin	32	40	132.76	460080000
LQKWENGE	8	1002.477	sp P02754 LACB_BOVINBeta-lactoglobulin	74	81	132.57	552120000
KILDKVGINYWLA	13	1531.876	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	125	131.43	3862400000
ILDKVGINY	9	1033.581	sp P00711 LALBA_BOVINAAlpha-lactalbumin	114	122	131.41	1447000000
LVRTPEVDDEAL	12	1355.693	sp P02754 LACB_BOVINBeta-lactoglobulin	138	149	130.66	8577400000
LIVTQTMKGL	10	1102.642	sp P02754 LACB_BOVINBeta-lactoglobulin	17	26	128.69	1846500000
ELKPTPEGD	9	984.4764	sp P02754 LACB_BOVINBeta-lactoglobulin	61	69	128.61	182340000
NENKVLVL	8	927.5389	sp P02754 LACB_BOVINBeta-lactoglobulin	104	111	128.57	678800000
DIQKVAGTWY	10	1179.592	sp P02754 LACB_BOVINBeta-lactoglobulin	27	36	128.38	519290000
VRTPEVDDEALEK	13	1499.747	sp P02754 LACB_BOVINBeta-lactoglobulin	139	151	128.31	172450000
AEKTKIPAVF	10	1102.639	sp P02754 LACB_BOVINBeta-lactoglobulin	89	98	126.31	757960000
LDTDYKKYLL	10	1270.681	sp P02754 LACB_BOVINBeta-lactoglobulin	111	120	126.24	64465000
MAASDISLL	9	919.4685	sp P02754 LACB_BOVINBeta-lactoglobulin	40	48	126.24	1513200000
DKALKALPM	9	985.563	sp P02754 LACB_BOVINBeta-lactoglobulin	153	161	125.31	12991000000
FNPTQLEE	8	976.4502	sp P02754 LACB_BOVINBeta-lactoglobulin	167	174	124.59	132160000
AMAASDISLL	10	990.5056	sp P02754 LACB_BOVINBeta-lactoglobulin	39	48	124.37	711290000



DIQKVAGTWYSL	12	1379.709	sp P02754 LACB_BOVINBeta-lactoglobulin	27	38	123.79	391880000
AMAASDISLLDAQ	13	1304.628	sp P02754 LACB_BOVINBeta-lactoglobulin	39	51	122.94	443580000
LVRTPEVDDEA	11	1242.609	sp P02754 LACB_BOVINBeta-lactoglobulin	138	148	120.45	163050000
KILDKVGINYWL	12	1460.839	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	124	119.53	114520000
VLDTDYKKYLL	11	1369.749	sp P02754 LACB_BOVINBeta-lactoglobulin	110	120	118.71	3469300000
NSAEPEQSLA	10	1044.472	sp P02754 LACB_BOVINBeta-lactoglobulin	125	134	118.5	246430000
KVAGTWYSL	9	1023.539	sp P02754 LACB_BOVINBeta-lactoglobulin	30	38	118.32	2274700000
VEELKPTPEG	10	1097.561	sp P02754 LACB_BOVINBeta-lactoglobulin	59	68	117.89	56716000
KILDKVGINYWLAHKAL	17	1981.151	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	129	115.87	1041700000
LKPTPEGDLEIL	12	1323.729	sp P02754 LACB_BOVINBeta-lactoglobulin	62	73	115.82	13890000000
VFRELKDLKGYGGV	14	1579.872	sp P00711 LALBA_BOVINAAlpha-lactalbumin	27	40	115.82	97571000
KKIIAEKTKIPAVF	14	1584.997	sp P02754 LACB_BOVINBeta-lactoglobulin	85	98	113.69	221610000
LVLDTDYKKY	10	1256.665	sp P02754 LACB_BOVINBeta-lactoglobulin	109	118	113.22	871910000
LDDDLTDDIM	10	1164.486	sp P00711 LALBA_BOVINAAlpha-lactalbumin	100	109	112.17	45178000
VEELKPTPEGDL	12	1325.672	sp P02754 LACB_BOVINBeta-lactoglobulin	59	70	111.86	378400000
KKILDKVGIN	10	1126.707	sp P00711 LALBA_BOVINAAlpha-lactalbumin	112	121	111.61	297370000
MENSAEPEQSLA	12	1304.555	sp P02754 LACB_BOVINBeta-lactoglobulin	123	134	110.47	53895000
DDLTDIM	8	936.3746	sp P00711 LALBA_BOVINAAlpha-lactalbumin	102	109	110.36	224240000
DIQKVAGT	8	830.4498	sp P02754 LACB_BOVINBeta-lactoglobulin	27	34	110.12	6234100000
RELKDLKGY	9	1120.624	sp P00711 LALBA_BOVINAAlpha-lactalbumin	29	37	108.74	805370000
LSFNPTQLEEQ	11	1304.625	sp P02754 LACB_BOVINBeta-lactoglobulin	165	175	108.57	402370000
YWLAHKAL	8	1000.549	sp P00711 LALBA_BOVINAAlpha-lactalbumin	122	129	107.74	4816100000
GYDTQAIQVN	10	1107.52	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	63	107.29	280710000
HIRLSFNPTQLE	12	1453.768	sp P02754 LACB_BOVINBeta-lactoglobulin	162	173	105.98	33064000
LDKVGINY	8	920.4967	sp P00711 LALBA_BOVINAAlpha-lactalbumin	115	122	105.81	27415000

IVQNNDSTEYGLF	13	1498.694	sp P00711 LALBA_BOVINAAlpha-lactalbumin	60	72	104.2	59958000
MAASDISLLDAQ	12	1233.591	sp P02754 LACB_BOVINBeta-lactoglobulin	40	51	103.87	180830000
KFDKALKAL	9	1032.633	sp P02754 LACB_BOVINBeta-lactoglobulin	151	159	103.82	166580000
VKKILDKVGIN	11	1225.776	sp P00711 LALBA_BOVINAAlpha-lactalbumin	111	121	103.46	144790000
ALNENKVLVL	10	1111.66	sp P02754 LACB_BOVINBeta-lactoglobulin	102	111	102.62	3404800000
VRTPEVDDEAL	11	1242.609	sp P02754 LACB_BOVINBeta-lactoglobulin	139	149	102.61	2737600000
KFDKALKALPM	11	1260.726	sp P02754 LACB_BOVINBeta-lactoglobulin	151	161	101.3	21253000000
YVEELKPTPEGDL	14	1617.777	sp P02754 LACB_BOVINBeta-lactoglobulin	58	71	100.69	33961000
DYKKYLLF	8	1088.591	sp P02754 LACB_BOVINBeta-lactoglobulin	114	121	100.39	79477000
GGVSLPEW	8	843.4127	sp P00711 LALBA_BOVINAAlpha-lactalbumin	38	45	99.279	292630000
DKVGINYWLA	10	1177.613	sp P00711 LALBA_BOVINAAlpha-lactalbumin	116	125	98.033	194560000
KFDKALKALPMHIR	14	1666.971	sp P02754 LACB_BOVINBeta-lactoglobulin	151	164	97.551	577520000
IIAEKTKIPAVFK	13	1456.902	sp P02754 LACB_BOVINBeta-lactoglobulin	87	99	96.591	124600000
KTKIPAVFK	9	1030.654	sp P02754 LACB_BOVINBeta-lactoglobulin	91	99	96.331	431210000
KFDKALKALPMHIRL	15	1780.055	sp P02754 LACB_BOVINBeta-lactoglobulin	151	165	96.247	80161000
KTKIPAVFKI	10	1143.738	sp P02754 LACB_BOVINBeta-lactoglobulin	91	100	96.171	109520000
TDYKKYLL	8	1042.57	sp P02754 LACB_BOVINBeta-lactoglobulin	113	120	95.909	24069000
FDKALKALPM	10	1132.632	sp P02754 LACB_BOVINBeta-lactoglobulin	152	161	95.608	1224200000
LVRTPEVDDEALEKF	15	1759.899	sp P02754 LACB_BOVINBeta-lactoglobulin	138	152	95.428	90878000
KILDKVGINYWLAHKA	16	1868.067	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	128	95.197	1481800000
KFLDDDLTD	9	1080.498	sp P00711 LALBA_BOVINAAlpha-lactalbumin	98	106	92.439	130450000
DKVGINYW	8	993.492	sp P00711 LALBA_BOVINAAlpha-lactalbumin	116	123	92.187	23198000
VDDEALEKF	9	1064.503	sp P02754 LACB_BOVINBeta-lactoglobulin	144	152	91.069	37907000
KIDALNENKVL	11	1255.714	sp P02754 LACB_BOVINBeta-lactoglobulin	99	109	90.964	150070000
IIAEKTKIPA	10	1082.67	sp P02754 LACB_BOVINBeta-lactoglobulin	87	96	89.886	233020000

QNNDSTEYGLF	11	1286.542	sp P00711 LALBA_BOVINAAlpha-lactalbumin	62	72	89.355	37755000
MENSAEPEQS	10	1120.434	sp P02754 LACB_BOVINBeta-lactoglobulin	123	132	88.921	41613000
TDYKKYLLF	9	1189.638	sp P02754 LACB_BOVINBeta-lactoglobulin	113	121	88.819	49015000
LVLDTDYKKYL	11	1369.749	sp P02754 LACB_BOVINBeta-lactoglobulin	109	119	87.789	119720000
RVYVEELKPTPEGDLEIL	18	2099.115	sp P02754 LACB_BOVINBeta-lactoglobulin	56	73	87.287	31074000
KALPMHIRL	9	1077.648	sp P02754 LACB_BOVINBeta-lactoglobulin	157	165	85.67	159250000
AASDISLL	8	788.428	sp P02754 LACB_BOVINBeta-lactoglobulin	41	48	85.061	79669000
RTPEVDDEALEK	12	1400.678	sp P02754 LACB_BOVINBeta-lactoglobulin	140	151	79.886	75071000
LVLDTDYKKYLL	12	1482.833	sp P02754 LACB_BOVINBeta-lactoglobulin	109	120	79.82	33639000
TMKGLDIQ	8	904.4688	sp P02754 LACB_BOVINBeta-lactoglobulin	22	29	79.596	1026700000
KALPMHIR	8	964.564	sp P02754 LACB_BOVINBeta-lactoglobulin	157	164	79.451	66324000
KILDKVGI	8	884.5695	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	120	78.377	21687000
RTPEVDDEALE	11	1272.583	sp P02754 LACB_BOVINBeta-lactoglobulin	140	150	78.098	1926400000
KILDKVGINYWLAHK	15	1797.03	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	127	76.82	7115900000
VLDTDYKKYL	10	1256.665	sp P02754 LACB_BOVINBeta-lactoglobulin	110	119	76.465	4686500000
ILDKVGINYW	10	1219.66	sp P00711 LALBA_BOVINAAlpha-lactalbumin	114	123	76.17	23809000
MENSAEPE	8	905.3437	sp P02754 LACB_BOVINBeta-lactoglobulin	123	130	76.035	26446000
LVRTPEVDDEALEKFDKALK	20	2315.237	sp P02754 LACB_BOVINBeta-lactoglobulin	138	157	76.027	94104000
IRLSFNPT	8	946.5236	sp P02754 LACB_BOVINBeta-lactoglobulin	163	170	74.929	186390000
TMKGLDIQKVA	11	1202.669	sp P02754 LACB_BOVINBeta-lactoglobulin	22	32	74.611	34802000
VRTPEVDDEALEKF	14	1646.815	sp P02754 LACB_BOVINBeta-lactoglobulin	139	152	74.257	49563000
KGYGGVSLPEW	11	1191.592	sp P00711 LALBA_BOVINAAlpha-lactalbumin	35	45	73.985	11754000
KALKALPM	8	870.5361	sp P02754 LACB_BOVINBeta-lactoglobulin	154	161	73.637	74897000
LVRTPEVD	8	927.5026	sp P02754 LACB_BOVINBeta-lactoglobulin	138	145	73.26	223810000
HIRLSFNPTQL	11	1324.725	sp P02754 LACB_BOVINBeta-lactoglobulin	162	172	73.067	31179000

HTSGYDTQ	8	907.3672	sp P00711 LALBA_BOVINAAlpha-lactalbumin	51	58	73.039	30349000
KDLKGYGG	8	836.4392	sp P00711 LALBA_BOVINAAlpha-lactalbumin	32	39	72.789	11271000
IVQNDSTE	9	1018.457	sp P00711 LALBA_BOVINAAlpha-lactalbumin	60	68	72.138	80358000
AEPEQSLA	8	843.3974	sp P02754 LACB_BOVINBeta-lactoglobulin	127	134	69.628	39624000
VFRELKDL	8	1018.581	sp P00711 LALBA_BOVINAAlpha-lactalbumin	27	34	68.224	217910000
SFNPTQLEEQ	10	1191.541	sp P02754 LACB_BOVINBeta-lactoglobulin	166	175	67.414	49853000
GINYWLAH	8	972.4818	sp P00711 LALBA_BOVINAAlpha-lactalbumin	119	126	67.285	18284000
LKPTPEGDLEI	11	1210.645	sp P02754 LACB_BOVINBeta-lactoglobulin	62	72	66.568	698440000
NSAEPEQS	8	860.3512	sp P02754 LACB_BOVINBeta-lactoglobulin	125	132	66.457	123010000
LVLDTDYK	8	965.507	sp P02754 LACB_BOVINBeta-lactoglobulin	109	116	66.073	37498000
LIVTQTMK	8	932.5365	sp P02754 LACB_BOVINBeta-lactoglobulin	17	24	65.313	258570000
VDDEALEK	8	917.4342	sp P02754 LACB_BOVINBeta-lactoglobulin	144	151	63.673	272050000
DAQSAPLR	8	856.4403	sp P02754 LACB_BOVINBeta-lactoglobulin	49	56	63.21	223560000
ASDISLLDAQ	10	1031.514	sp P02754 LACB_BOVINBeta-lactoglobulin	42	51	62.969	22576000
SDISLLDAQ	9	960.4764	sp P02754 LACB_BOVINBeta-lactoglobulin	43	51	60.682	23336000
EKFDKALK	8	977.5546	sp P02754 LACB_BOVINBeta-lactoglobulin	150	157	59.35	62355000
KVAGTWYSLA	10	1094.576	sp P02754 LACB_BOVINBeta-lactoglobulin	30	39	59.245	711060000
VLVLDTDYK	9	1064.575	sp P02754 LACB_BOVINBeta-lactoglobulin	108	116	59.245	34399000
ALPMHIRL	8	949.5531	sp P02754 LACB_BOVINBeta-lactoglobulin	158	165	57.281	63109000
LKPTPEGDL	9	968.5179	sp P02754 LACB_BOVINBeta-lactoglobulin	62	70	56.258	62347000
KIDALNENK	9	1043.561	sp P02754 LACB_BOVINBeta-lactoglobulin	99	107	55.064	102400000
FHTSGYDTQ	9	1054.436	sp P00711 LALBA_BOVINAAlpha-lactalbumin	50	58	54.205	322980000
VRTPEVDD	8	929.4454	sp P02754 LACB_BOVINBeta-lactoglobulin	139	146	54.157	18918000
KTKIPAVFKID	11	1258.765	sp P02754 LACB_BOVINBeta-lactoglobulin	91	101	54.005	608590000
TPEVDDEALE	10	1116.482	sp P02754 LACB_BOVINBeta-lactoglobulin	141	150	53.878	82474000

YGLFQINNK	9	1095.571	sp P00711 LALBA_BOVINAAlpha-lactalbumin	69	77	52.403	26228000
DSTEYGLF	8	930.3971	sp P00711 LALBA_BOVINAAlpha-lactalbumin	65	72	52.299	776590000
ENSAEPEQS	9	989.3938	sp P02754 LACB_BOVINBeta-lactoglobulin	124	132	51.193	75671000
DKALKALPMH	10	1122.622	sp P02754 LACB_BOVINBeta-lactoglobulin	153	162	49.715	7340900
KALCSEKL	8	890.4895	sp P00711 LALBA_BOVINAAlpha-lactalbumin	127	134	49.536	6592100
DIMCVKKILDKVGIN	15	1687.937	sp P00711 LALBA_BOVINAAlpha-lactalbumin	107	121	48.284	84456000
KPTPEGDLEIL	11	1210.645	sp P02754 LACB_BOVINBeta-lactoglobulin	63	73	48.091	83590000
KGYGGVSLPE	10	1005.513	sp P00711 LALBA_BOVINAAlpha-lactalbumin	35	44	47.869	238320000
KIDALNEN	8	915.4662	sp P02754 LACB_BOVINBeta-lactoglobulin	99	106	47.657	204150000
EELKPTPEGDLE	12	1355.646	sp P02754 LACB_BOVINBeta-lactoglobulin	60	71	46.462	41656000
TKIPAVFK	8	902.5589	sp P02754 LACB_BOVINBeta-lactoglobulin	92	99	45.335	39026000

**Table S4:** Peptide mapping information of hydrolysate of ozonated whey protein.

Sequence	Length	Mass	Leading razor protein	Start position	End position	Score	Intensity
NNDSTEY	7	841.309	sp P00711 LALBA_BOVINAAlpha-lactalbumin	63	69	197.16	1909100000
DTDYKKY	7	931.4287	sp P02754 LACB_BOVINBeta-lactoglobulin	112	118	171.08	1234200000
LIVTQ	5	572.3534	sp P02754 LACB_BOVINBeta-lactoglobulin	17	21	161.77	2455100000
ALCSE	5	521.2156	sp P00711 LALBA_BOVINAAlpha-lactalbumin	128	132	158.84	16122000
EVFREL	6	791.4178	sp P00711 LALBA_BOVINAAlpha-lactalbumin	26	31	155.73	39871000000
GYDTQ	5	582.2286	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	58	154.44	3424000000
LKDLKGY	7	835.4804	sp P00711 LALBA_BOVINAAlpha-lactalbumin	31	37	154.01	856270000
TWYSL	5	668.317	sp P02754 LACB_BOVINBeta-lactoglobulin	34	38	153.57	491980000
KIDAL	5	558.3377	sp P02754 LACB_BOVINBeta-lactoglobulin	99	103	150	7722800000
KFDKALK	7	848.512	sp P02754 LACB_BOVINBeta-lactoglobulin	151	157	149.4	3312700000
LIVTQT	6	673.401	sp P02754 LACB_BOVINBeta-lactoglobulin	17	22	144.29	31976000
KDLKGY	6	722.3963	sp P00711 LALBA_BOVINAAlpha-lactalbumin	32	37	143.97	19831000000
DTDYK	5	640.2704	sp P02754 LACB_BOVINBeta-lactoglobulin	112	116	143.88	64027000
KIIAEKT	7	801.496	sp P02754 LACB_BOVINBeta-lactoglobulin	86	92	143.61	9643600
EYGLF	5	627.2904	sp P00711 LALBA_BOVINAAlpha-lactalbumin	68	72	143.11	617730000
DKVGIN	6	644.3493	sp P00711 LALBA_BOVINAAlpha-lactalbumin	116	121	137.59	4864200000
KILDK	5	615.3956	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	117	135.25	118630000
KTKIPAV	7	755.4905	sp P02754 LACB_BOVINBeta-lactoglobulin	91	97	132.53	22247000
KKIIAE	6	700.4483	sp P02754 LACB_BOVINBeta-lactoglobulin	85	90	130.84	654770000
TDYKKY	6	816.4018	sp P02754 LACB_BOVINBeta-lactoglobulin	113	118	130.84	265480000
KILDKV	6	714.464	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	118	130.05	1847600000

FDKALK	6	720.417	sp P02754 LACB_BOVINBeta-lactoglobulin	152	157	129.96	255490000
VAGTWY	6	695.3279	sp P02754 LACB_BOVINBeta-lactoglobulin	31	36	128.65	687830000
VLDTD	5	561.2646	sp P02754 LACB_BOVINBeta-lactoglobulin	110	114	127.53	57755000
INNKIW	6	786.4388	sp P00711 LALBA_BOVINAlpha-lactalbumin	74	79	126.38	57589000
VFREL	5	662.3752	sp P00711 LALBA_BOVINAlpha-lactalbumin	27	31	123.53	5248200000
VDDEAL	6	660.2966	sp P02754 LACB_BOVINBeta-lactoglobulin	144	149	123.4	155050000
QAIVQ	5	557.3173	sp P00711 LALBA_BOVINAlpha-lactalbumin	58	62	123.06	425220000
IVTQ	4	459.2693	sp P02754 LACB_BOVINBeta-lactoglobulin	18	21	121.92	1137100000
NENKVL	6	715.3865	sp P02754 LACB_BOVINBeta-lactoglobulin	104	109	120.9	1555800000
VAGTW	5	532.2646	sp P02754 LACB_BOVINBeta-lactoglobulin	31	35	120	896610000
VGINY	5	564.2908	sp P00711 LALBA_BOVINAlpha-lactalbumin	118	122	120	416470000
FQIN	4	520.2646	sp P00711 LALBA_BOVINAlpha-lactalbumin	72	75	119.89	1056300000
EQLTK	5	617.3384	sp P00711 LALBA_BOVINAlpha-lactalbumin	20	24	119.22	829400000
DIQKVA	6	672.3806	sp P02754 LACB_BOVINBeta-lactoglobulin	27	32	117.56	4141000000
AIVQN	5	543.3017	sp P00711 LALBA_BOVINAlpha-lactalbumin	59	63	115.97	3086400000
DSTEY	5	613.2231	sp P00711 LALBA_BOVINAlpha-lactalbumin	65	69	114.73	37458000
QTMKGL	6	676.3578	sp P02754 LACB_BOVINBeta-lactoglobulin	21	26	114.02	527040000
KIPAVF	6	673.4163	sp P02754 LACB_BOVINBeta-lactoglobulin	93	98	113.63	1437700000
KTKIPA	6	656.4221	sp P02754 LACB_BOVINBeta-lactoglobulin	91	96	113.08	893060000
PEQSL	5	572.2806	sp P02754 LACB_BOVINBeta-lactoglobulin	129	133	113.07	30723000
KPTPE	5	570.3013	sp P02754 LACB_BOVINBeta-lactoglobulin	63	67	112.88	6295500
YWLAH	5	688.3333	sp P00711 LALBA_BOVINAlpha-lactalbumin	122	126	111.84	1629900000
KALPMH	6	695.3789	sp P02754 LACB_BOVINBeta-lactoglobulin	157	162	110.43	17497000
DISLL	5	559.3217	sp P02754 LACB_BOVINBeta-lactoglobulin	44	48	110.2	4513900000
YGLFQ	5	626.3064	sp P00711 LALBA_BOVINAlpha-lactalbumin	69	73	110.2	4418400000

VYVE	4	508.2533	sp P02754 LACB_BOVINBeta-lactoglobulin	57	60	109.97	85337000
SFNPT	5	564.2544	sp P02754 LACB_BOVINBeta-lactoglobulin	166	170	109.94	1362200000
QKVAGT	6	602.3388	sp P02754 LACB_BOVINBeta-lactoglobulin	29	34	109.8	83918000
GLFQIN	6	690.3701	sp P00711 LALBA_BOVINAAlpha-lactalbumin	70	75	109.6	3045500000
QLTK	4	488.2959	sp P00711 LALBA_BOVINAAlpha-lactalbumin	21	24	109.53	6704800
GDLEIL	6	658.3538	sp P02754 LACB_BOVINBeta-lactoglobulin	68	73	109.15	7160400000
KIIAE	5	572.3534	sp P02754 LACB_BOVINBeta-lactoglobulin	86	90	108.69	484860000
AEPEQSL	7	772.3603	sp P02754 LACB_BOVINBeta-lactoglobulin	127	133	107.74	81564000
IIAEKT	6	673.401	sp P02754 LACB_BOVINBeta-lactoglobulin	87	92	107.65	1191600000
GTWYSL	6	725.3384	sp P02754 LACB_BOVINBeta-lactoglobulin	33	38	107.15	12162000000
HIRLS	5	624.3707	sp P02754 LACB_BOVINBeta-lactoglobulin	162	166	107.15	8732300000
LQKWE	5	702.3701	sp P02754 LACB_BOVINBeta-lactoglobulin	74	78	107.15	3371900000
GDLE	4	432.1856	sp P02754 LACB_BOVINBeta-lactoglobulin	68	71	105.36	37734000
TKIPAVF	7	774.464	sp P02754 LACB_BOVINBeta-lactoglobulin	92	98	105.2	15391000000
LQKW	4	573.3275	sp P02754 LACB_BOVINBeta-lactoglobulin	74	77	104.58	214960000
DLEIL	5	601.3323	sp P02754 LACB_BOVINBeta-lactoglobulin	69	73	104.48	63597000
IPAVF	5	545.3213	sp P02754 LACB_BOVINBeta-lactoglobulin	94	98	104.08	55195000
DYKKYL	6	828.4382	sp P02754 LACB_BOVINBeta-lactoglobulin	114	119	103.28	119800000
DAQSAPL	7	700.3392	sp P02754 LACB_BOVINBeta-lactoglobulin	49	55	102.8	9584800000
AIVQ	4	429.2587	sp P00711 LALBA_BOVINAAlpha-lactalbumin	59	62	102.45	26034000000
ISLL	4	444.2948	sp P02754 LACB_BOVINBeta-lactoglobulin	45	48	102.45	813840000
LIVT	4	444.2948	sp P02754 LACB_BOVINBeta-lactoglobulin	17	20	102.45	11057000000
LEEQ	4	517.2384	sp P02754 LACB_BOVINBeta-lactoglobulin	172	175	102.4	10446000
TFHTS	5	591.2653	sp P00711 LALBA_BOVINAAlpha-lactalbumin	49	53	102.29	617880000
DISLLD	6	674.3487	sp P02754 LACB_BOVINBeta-lactoglobulin	44	49	102.12	162900000



KFDKAL	6	720.417	sp P02754 LACB_BOVINBeta-lactoglobulin	151	156	101.72	5316200000
KGLDIQ	6	672.3806	sp P02754 LACB_BOVINBeta-lactoglobulin	24	29	101.69	1183600000
LDKVGIN	7	757.4334	sp P00711 LALBA_BOVINAAlpha-lactalbumin	115	121	101.41	134860000
LNENKVL	7	828.4705	sp P02754 LACB_BOVINBeta-lactoglobulin	103	109	101.28	631630000
DISL	4	446.2377	sp P02754 LACB_BOVINBeta-lactoglobulin	44	47	100.21	351810000
FNPT	4	477.2224	sp P02754 LACB_BOVINBeta-lactoglobulin	167	170	100.09	7401700000
QSAPL	5	514.2751	sp P02754 LACB_BOVINBeta-lactoglobulin	51	55	100.04	36423000
LVRTPE	6	713.4072	sp P02754 LACB_BOVINBeta-lactoglobulin	138	143	99.919	1163500000
EQLT	4	489.2435	sp P00711 LALBA_BOVINAAlpha-lactalbumin	20	23	99.626	68701000
EVFRE	5	678.3337	sp P00711 LALBA_BOVINAAlpha-lactalbumin	26	30	99.511	1339600000
DYKKY	5	715.3541	sp P02754 LACB_BOVINBeta-lactoglobulin	114	118	99.228	50673000
NPTQL	5	571.2966	sp P02754 LACB_BOVINBeta-lactoglobulin	168	172	98.513	36139000
RELKDL	6	772.4443	sp P00711 LALBA_BOVINAAlpha-lactalbumin	29	34	98.415	2149000000
DKALKAL	7	757.4698	sp P02754 LACB_BOVINBeta-lactoglobulin	153	159	97.033	63177000
KKYLLF	6	810.5004	sp P02754 LACB_BOVINBeta-lactoglobulin	116	121	96.839	174650000
DEALE	5	575.2439	sp P02754 LACB_BOVINBeta-lactoglobulin	146	150	96.372	54833000
YWLAHK	6	816.4283	sp P00711 LALBA_BOVINAAlpha-lactalbumin	122	127	96.337	3778200000
QLEEQ	5	645.297	sp P02754 LACB_BOVINBeta-lactoglobulin	171	175	96.041	2054900
ALNE	4	445.2173	sp P02754 LACB_BOVINBeta-lactoglobulin	102	105	95.117	125220000
FHTS	4	490.2176	sp P00711 LALBA_BOVINAAlpha-lactalbumin	50	53	94.737	611560000
ILLQ	4	485.3213	sp P02754 LACB_BOVINBeta-lactoglobulin	72	75	94.737	28179000
EALE	4	460.2169	sp P02754 LACB_BOVINBeta-lactoglobulin	147	150	94.533	56166000
IRLS	4	487.3118	sp P02754 LACB_BOVINBeta-lactoglobulin	163	166	94.268	289980000
HIRL	4	537.3387	sp P02754 LACB_BOVINBeta-lactoglobulin	162	165	94.118	693310000
WYSL	4	567.2693	sp P02754 LACB_BOVINBeta-lactoglobulin	35	38	94.118	9006400000

FNPTQLE	7	847.4076	sp P02754 LACB_BOVINBeta-lactoglobulin	167	173	94.006	129620000
GLDIQ	5	544.2857	sp P02754 LACB_BOVINBeta-lactoglobulin	25	29	93.763	212860000
QLEE	4	517.2384	sp P02754 LACB_BOVINBeta-lactoglobulin	171	174	93.045	691990000
QINNKIW	7	914.4974	sp P00711 LALBA_BOVINAlpha-lactalbumin	73	79	92.785	308470000
WLAHKAL	7	837.4861	sp P00711 LALBA_BOVINAlpha-lactalbumin	123	129	92.785	379860000
TPEGDLE	7	759.3287	sp P02754 LACB_BOVINBeta-lactoglobulin	65	71	92.692	16238000
PMHIR	5	652.3479	sp P02754 LACB_BOVINBeta-lactoglobulin	160	164	92.151	242240000
VEELKPT	7	814.4436	sp P02754 LACB_BOVINBeta-lactoglobulin	59	65	91.906	57581000
LAHKAL	6	651.4068	sp P00711 LALBA_BOVINAlpha-lactalbumin	124	129	90.631	395940000
KVGIN	5	529.3224	sp P00711 LALBA_BOVINAlpha-lactalbumin	117	121	89.847	60041000
LKALPM	6	671.404	sp P02754 LACB_BOVINBeta-lactoglobulin	156	161	89.775	4738900000
TMKGL	5	548.2992	sp P02754 LACB_BOVINBeta-lactoglobulin	22	26	89.775	1461900000
ALKALPM	7	742.4411	sp P02754 LACB_BOVINBeta-lactoglobulin	155	161	88.627	2964800000
DLKGY	5	594.3013	sp P00711 LALBA_BOVINAlpha-lactalbumin	33	37	88.626	953150000
LRVY	4	549.3275	sp P02754 LACB_BOVINBeta-lactoglobulin	55	58	88.444	1789000000
DQWL	4	560.2595	sp P00711 LALBA_BOVINAlpha-lactalbumin	135	138	87.945	230250000
GLDIQK	6	672.3806	sp P02754 LACB_BOVINBeta-lactoglobulin	25	30	87.582	12591000
FREL	4	563.3068	sp P00711 LALBA_BOVINAlpha-lactalbumin	28	31	87.265	6250800000
LDIQ	4	487.2642	sp P02754 LACB_BOVINBeta-lactoglobulin	26	29	87.265	76385000
VLDTDYK	7	852.4229	sp P02754 LACB_BOVINBeta-lactoglobulin	110	116	86.866	891170000
DYKKYLL	7	941.5222	sp P02754 LACB_BOVINBeta-lactoglobulin	114	120	86.838	99348000
LIVTQTM	7	804.4415	sp P02754 LACB_BOVINBeta-lactoglobulin	17	23	86.838	8568200
LLDAQ	5	558.3013	sp P02754 LACB_BOVINBeta-lactoglobulin	47	51	86.344	6601600
LKPTPE	6	683.3854	sp P02754 LACB_BOVINBeta-lactoglobulin	62	67	86.121	397950000
YKKYLL	6	826.4953	sp P02754 LACB_BOVINBeta-lactoglobulin	115	120	85.909	237070000

LKPTPEG	7	740.4069	sp P02754 LACB_BOVINBeta-lactoglobulin	62	68	85.89	15359000
ELKPTPE	7	812.428	sp P02754 LACB_BOVINBeta-lactoglobulin	61	67	85.359	533860000
KVAGTWY	7	823.4228	sp P02754 LACB_BOVINBeta-lactoglobulin	30	36	85.357	92903000
ENKVL	5	601.3435	sp P02754 LACB_BOVINBeta-lactoglobulin	105	109	84.609	107040000
STEY	4	498.1962	sp P00711 LALBA_BOVINAlpha-lactalbumin	66	69	84.485	25949000
VEEL	4	488.2482	sp P02754 LACB_BOVINBeta-lactoglobulin	59	62	84.485	41445000
ALE	3	331.1743	sp P02754 LACB_BOVINBeta-lactoglobulin	148	150	83.876	637440000
ALPM	4	430.225	sp P02754 LACB_BOVINBeta-lactoglobulin	158	161	83.876	8277900000
IVQ	3	358.2216	sp P00711 LALBA_BOVINAlpha-lactalbumin	60	62	83.876	107680000
LLAL	4	428.2999	sp P02754 LACB_BOVINBeta-lactoglobulin	5	8	83.876	175950000
PAVF	4	432.2373	sp P02754 LACB_BOVINBeta-lactoglobulin	95	98	83.876	346560000
VLVL	4	442.3155	sp P02754 LACB_BOVINBeta-lactoglobulin	108	111	83.876	952130000
GYGGV	5	451.2067	sp P00711 LALBA_BOVINAlpha-lactalbumin	36	40	83.661	22009000
RVYVEE	6	793.397	sp P02754 LACB_BOVINBeta-lactoglobulin	56	61	83.229	353680000
VGIN	4	401.2274	sp P00711 LALBA_BOVINAlpha-lactalbumin	118	121	82.602	150830000
YSLA	4	452.2271	sp P02754 LACB_BOVINBeta-lactoglobulin	36	39	82.602	4319900000
KVAGT	5	474.2802	sp P02754 LACB_BOVINBeta-lactoglobulin	30	34	82.141	25355000
SDISLL	6	646.3538	sp P02754 LACB_BOVINBeta-lactoglobulin	43	48	80.498	25584000
IVTQT	5	560.317	sp P02754 LACB_BOVINBeta-lactoglobulin	18	22	80.317	59686000
EKFDKA	6	736.3756	sp P02754 LACB_BOVINBeta-lactoglobulin	150	155	79.469	6587900
TTFHTS	6	692.313	sp P00711 LALBA_BOVINAlpha-lactalbumin	48	53	78.166	200650000
AHKAL	5	538.3227	sp P00711 LALBA_BOVINAlpha-lactalbumin	125	129	77.925	44319000
VEELK	5	616.3432	sp P02754 LACB_BOVINBeta-lactoglobulin	59	63	77.906	18939000
LDTDYK	6	753.3545	sp P02754 LACB_BOVINBeta-lactoglobulin	111	116	77.748	14123000
ALIVT	5	515.3319	sp P02754 LACB_BOVINBeta-lactoglobulin	16	20	77.448	210180000

KALPM	5	558.32	sp P02754 LACB_BOVINBeta-lactoglobulin	157	161	77.448	6653700000
LLQKW	5	686.4116	sp P02754 LACB_BOVINBeta-lactoglobulin	73	77	77.448	197850000
QSLA	4	417.2224	sp P02754 LACB_BOVINBeta-lactoglobulin	131	134	77.448	34639000
EEQCHI	6	757.3065	sp P02754 LACB_BOVINBeta-lactoglobulin	173	178	76.553	41747000
LPMHIR	6	765.432	sp P02754 LACB_BOVINBeta-lactoglobulin	159	164	76.553	64419000
QAIVQN	6	671.3602	sp P00711 LALBA_BOVINAlpha-lactalbumin	58	63	76.347	11570000
GYDT	4	454.17	sp P00711 LALBA_BOVINAlpha-lactalbumin	54	57	75.898	8494200
DIQKV	5	601.3435	sp P02754 LACB_BOVINBeta-lactoglobulin	27	31	75.682	13074000
IIAEK	5	572.3534	sp P02754 LACB_BOVINBeta-lactoglobulin	87	91	74.849	235870000
TDYKKYL	7	929.4858	sp P02754 LACB_BOVINBeta-lactoglobulin	113	119	74.423	120620000
YGLF	4	498.2478	sp P00711 LALBA_BOVINAlpha-lactalbumin	69	72	73.311	1420500000
NYWLAH	6	802.3762	sp P00711 LALBA_BOVINAlpha-lactalbumin	121	126	73.289	10165000
EVFRELK	7	919.5127	sp P00711 LALBA_BOVINAlpha-lactalbumin	26	32	72.875	12652000
KGYGGV	6	579.3017	sp P00711 LALBA_BOVINAlpha-lactalbumin	35	40	72.338	48716000
LQKWEN	6	816.413	sp P02754 LACB_BOVINBeta-lactoglobulin	74	79	72.021	18280000
ALEKF	5	606.3377	sp P02754 LACB_BOVINBeta-lactoglobulin	148	152	71.995	18438000
TQTMKGL	7	777.4055	sp P02754 LACB_BOVINBeta-lactoglobulin	20	26	71.949	11215000
WLAHK	5	653.3649	sp P00711 LALBA_BOVINAlpha-lactalbumin	123	127	71.753	32031000
RVYVE	5	664.3544	sp P02754 LACB_BOVINBeta-lactoglobulin	56	60	71.475	372990000
YKKYL	5	713.4112	sp P02754 LACB_BOVINBeta-lactoglobulin	115	119	71.475	23784000
IDAL	4	430.2428	sp P02754 LACB_BOVINBeta-lactoglobulin	100	103	70.435	270470000
KVLVL	5	570.4105	sp P02754 LACB_BOVINBeta-lactoglobulin	107	111	69.776	1164700000
KWENGE	6	761.3344	sp P02754 LACB_BOVINBeta-lactoglobulin	76	81	69.432	108150000
QKKHAE	7	828.5069	sp P02754 LACB_BOVINBeta-lactoglobulin	84	90	69.383	54289000
VFRELK	6	790.4701	sp P00711 LALBA_BOVINAlpha-lactalbumin	27	32	69.383	5333500

EKFDKAL	7	849.4596	sp P02754 LACB_BOVINBeta-lactoglobulin	150	156	69.176	92156000
AQSAPL	6	585.3122	sp P02754 LACB_BOVINBeta-lactoglobulin	50	55	69.093	74409000
KLDQW	5	688.3544	sp P00711 LALBA_BOVINAlpha-lactalbumin	133	137	69.093	188900000
VDDEALE	7	789.3392	sp P02754 LACB_BOVINBeta-lactoglobulin	144	150	68.485	38298000
YWLAHKA	7	887.4654	sp P00711 LALBA_BOVINAlpha-lactalbumin	122	128	68.033	194850000
ASDISLL	7	717.3909	sp P02754 LACB_BOVINBeta-lactoglobulin	42	48	67.76	36692000
KVAGTW	6	660.3595	sp P02754 LACB_BOVINBeta-lactoglobulin	30	35	67.76	5367000000
NKVLVL	6	684.4534	sp P02754 LACB_BOVINBeta-lactoglobulin	106	111	67.327	83264000
KLDQWL	6	801.4385	sp P00711 LALBA_BOVINAlpha-lactalbumin	133	138	67.285	61925000
HKALCSE	7	786.3694	sp P00711 LALBA_BOVINAlpha-lactalbumin	126	132	67.035	12226000
LLQKWE	6	815.4541	sp P02754 LACB_BOVINBeta-lactoglobulin	73	78	66.994	36934000
MHIRLS	6	755.4112	sp P02754 LACB_BOVINBeta-lactoglobulin	161	166	66.994	77573000
LVLDT	5	559.3217	sp P02754 LACB_BOVINBeta-lactoglobulin	109	113	66.663	280100000
MHIRL	5	668.3792	sp P02754 LACB_BOVINBeta-lactoglobulin	161	165	66.538	1821800000
ALKAL	5	514.3479	sp P02754 LACB_BOVINBeta-lactoglobulin	155	159	63.055	19605000
ALPMHIR	7	836.4691	sp P02754 LACB_BOVINBeta-lactoglobulin	158	164	62.978	644380000
DTQAIVQ	7	773.3919	sp P00711 LALBA_BOVINAlpha-lactalbumin	56	62	62.715	165440000
GTWYS	5	612.2544	sp P02754 LACB_BOVINBeta-lactoglobulin	33	37	58.256	144180000
EQLTKC	6	720.3476	sp P00711 LALBA_BOVINAlpha-lactalbumin	20	25	58.246	38869000
IIAEKTK	7	801.496	sp P02754 LACB_BOVINBeta-lactoglobulin	87	93	54.205	8492900
KILDKVGINYWLAH	14	1668.935	sp P00711 LALBA_BOVINAlpha-lactalbumin	113	126	277.28	2211000000
NSAEPEQSL	9	973.4353	sp P02754 LACB_BOVINBeta-lactoglobulin	125	133	256.48	3604800000
QAIVQNNDSTEYGLF	15	1697.79	sp P00711 LALBA_BOVINAlpha-lactalbumin	58	72	222	77122000
AIVQNNDSTEYGLF	14	1569.731	sp P00711 LALBA_BOVINAlpha-lactalbumin	59	72	218.48	5934600000
VEELKPTPEGDLE	13	1454.714	sp P02754 LACB_BOVINBeta-lactoglobulin	59	71	214.26	28992000000

AIVQNNDSTE	10	1089.494	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	59	68	213.53	3954600000
EVFRELKDLKGY	12	1495.804	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	26	37	210.93	718070000
LVRTPEVDDE	10	1171.572	sp P02754 LACB_BOVIN	Beta-lactoglobulin	138	147	199.89	9336600000
AIVQNNDSTEY	11	1252.557	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	59	69	195.57	3722000000
AIVQNNDSTEYGLFQ	15	1697.79	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	59	73	195.51	242390000
KILDKVGIN	9	998.6124	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	113	121	191.85	37194000000
KILDKVGINY	10	1161.676	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	113	122	191.67	673380000
ELKPTPEGDLE	11	1226.603	sp P02754 LACB_BOVIN	Beta-lactoglobulin	61	71	190.88	18158000000
KIIAEKTKIPAVF	13	1456.902	sp P02754 LACB_BOVIN	Beta-lactoglobulin	86	98	190.53	1279000000
VEELKPTPEGDLEIL	15	1680.882	sp P02754 LACB_BOVIN	Beta-lactoglobulin	59	73	184.24	39632000000
HIRLSFNPTQLEEQ	14	1710.869	sp P02754 LACB_BOVIN	Beta-lactoglobulin	162	175	182.23	70590000
ELKPTPEGDLEIL	13	1452.771	sp P02754 LACB_BOVIN	Beta-lactoglobulin	61	73	179.42	35195000000
VEELKPTPEGDLEI	14	1567.798	sp P02754 LACB_BOVIN	Beta-lactoglobulin	59	72	174.42	204970000
DAQSAPLRVY	10	1118.572	sp P02754 LACB_BOVIN	Beta-lactoglobulin	49	58	172.21	1084100000
KIDALNENKVLVL	13	1467.866	sp P02754 LACB_BOVIN	Beta-lactoglobulin	99	111	172	441680000
LKPTPEGDLE	10	1097.561	sp P02754 LACB_BOVIN	Beta-lactoglobulin	62	71	171.46	20258000000
VRTPEVDDE	9	1058.488	sp P02754 LACB_BOVIN	Beta-lactoglobulin	139	147	170.3	1064900000
LIVTQTMKGLDIQ	13	1458.812	sp P02754 LACB_BOVIN	Beta-lactoglobulin	17	29	168.22	605850000
DTDYKKYL	8	1044.513	sp P02754 LACB_BOVIN	Beta-lactoglobulin	112	119	166.05	9390600000
LDTDYKKYL	9	1157.597	sp P02754 LACB_BOVIN	Beta-lactoglobulin	111	119	165.72	131360000
LVRTPEVDDEALEK	14	1612.831	sp P02754 LACB_BOVIN	Beta-lactoglobulin	138	151	164.81	928670000
HIRLSFNPT	9	1083.583	sp P02754 LACB_BOVIN	Beta-lactoglobulin	162	170	163.9	1677200000
RTPEVDDE	8	959.4196	sp P02754 LACB_BOVIN	Beta-lactoglobulin	140	147	162.5	392240000
SAEPEQSL	8	859.3923	sp P02754 LACB_BOVIN	Beta-lactoglobulin	126	133	160.54	198460000
NDSTEYGLF	9	1044.44	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	64	72	159.04	457130000

ALNENKVL	8	899.5076	sp P02754 LACB_BOVINBeta-lactoglobulin	102	109	157.33	1623800000
DIQKVAGTW	9	1016.529	sp P02754 LACB_BOVINBeta-lactoglobulin	27	35	157.2	4960800000
LDTDYKKY	8	1044.513	sp P02754 LACB_BOVINBeta-lactoglobulin	111	118	156.4	599820000
MENSAEPEQSL	11	1233.518	sp P02754 LACB_BOVINBeta-lactoglobulin	123	133	156.35	80972000
EVFRELKDL	9	1147.624	sp P00711 LALBA_BOVINAlpha-lactalbumin	26	34	155.42	186370000
IAEKTIPAVF	11	1215.723	sp P02754 LACB_BOVINBeta-lactoglobulin	88	98	154.85	611420000
LSFNPTQLEE	10	1176.566	sp P02754 LACB_BOVINBeta-lactoglobulin	165	174	154.12	62575000
EELKPTPEGDLEIL	14	1581.814	sp P02754 LACB_BOVINBeta-lactoglobulin	60	73	153.12	612050000
ALEKFDKALKALPM	14	1573.89	sp P02754 LACB_BOVINBeta-lactoglobulin	148	161	151.79	147500000
DTDYKKYLLF	10	1304.665	sp P02754 LACB_BOVINBeta-lactoglobulin	112	121	150.4	1062500000
VFRELKDLKGY	11	1366.761	sp P00711 LALBA_BOVINAlpha-lactalbumin	27	37	150.08	2170500000
DTDYKKYLL	9	1157.597	sp P02754 LACB_BOVINBeta-lactoglobulin	112	120	150.05	1213500000
ELKPTPEGDLEI	12	1339.687	sp P02754 LACB_BOVINBeta-lactoglobulin	61	72	148.91	42689000
GYDTQAIQNNNDSTE	15	1653.712	sp P00711 LALBA_BOVINAlpha-lactalbumin	54	68	147.62	90402000
KTKIPAVF	8	902.5589	sp P02754 LACB_BOVINBeta-lactoglobulin	91	98	147.52	2052600000
FNPTQLEEQ	9	1104.509	sp P02754 LACB_BOVINBeta-lactoglobulin	167	175	147.36	849890000
VLDTDYKKY	9	1143.581	sp P02754 LACB_BOVINBeta-lactoglobulin	110	118	147.19	1258400000
LSFNPTQL	8	918.4811	sp P02754 LACB_BOVINBeta-lactoglobulin	165	172	147.16	247790000
GYDTQAIQVQ	9	993.4767	sp P00711 LALBA_BOVINAlpha-lactalbumin	54	62	144.83	4139200000
GYDTQAIQNNNDSTEY	16	1816.775	sp P00711 LALBA_BOVINAlpha-lactalbumin	54	69	143	81572000
ENSAEPEQSL	10	1102.478	sp P02754 LACB_BOVINBeta-lactoglobulin	124	133	140.84	502450000
VEELKPTPE	9	1040.539	sp P02754 LACB_BOVINBeta-lactoglobulin	59	67	140.14	5877700000
EKFDKALKALPM	12	1389.769	sp P02754 LACB_BOVINBeta-lactoglobulin	150	161	139.86	37830000
VEELKPTPEGD	11	1212.587	sp P02754 LACB_BOVINBeta-lactoglobulin	59	69	139.38	523720000
IIAEKTKIPAVF	12	1328.807	sp P02754 LACB_BOVINBeta-lactoglobulin	87	98	138.22	2765100000

LVRTPEVDDEALE	13	1484.736	sp P02754 LACB_BOVINBeta-lactoglobulin	138	150	138.22	2152600000
ILDKVGIN	8	870.5175	sp P00711 LALBA_BOVINAlpha-lactalbumin	114	121	137.62	142800000
EKTKIPAVF	9	1031.602	sp P02754 LACB_BOVINBeta-lactoglobulin	90	98	134.48	1466100000
KPTPEGDLE	9	984.4764	sp P02754 LACB_BOVINBeta-lactoglobulin	63	71	133.55	84138000
NNDSTEYGLF	10	1158.483	sp P00711 LALBA_BOVINAlpha-lactalbumin	63	72	133.12	4678800000
VRTPEVDDEALE	12	1371.652	sp P02754 LACB_BOVINBeta-lactoglobulin	139	150	132.88	2307900000
KDLKGYGGV	9	935.5076	sp P00711 LALBA_BOVINAlpha-lactalbumin	32	40	132.76	121220000
LQKWENGE	8	1002.477	sp P02754 LACB_BOVINBeta-lactoglobulin	74	81	132.57	119950000
FRELKDLKGY	10	1267.693	sp P00711 LALBA_BOVINAlpha-lactalbumin	28	37	131.83	25359000
KILDKVGINYWLA	13	1531.876	sp P00711 LALBA_BOVINAlpha-lactalbumin	113	125	131.43	32003000
ILDKVGINY	9	1033.581	sp P00711 LALBA_BOVINAlpha-lactalbumin	114	122	131.41	1674300000
LVRTPEVDDEAL	12	1355.693	sp P02754 LACB_BOVINBeta-lactoglobulin	138	149	130.66	3340000000
LIVTQTMKGL	10	1102.642	sp P02754 LACB_BOVINBeta-lactoglobulin	17	26	128.69	1550900000
ELKPTPEGD	9	984.4764	sp P02754 LACB_BOVINBeta-lactoglobulin	61	69	128.61	197410000
NENKVLVL	8	927.5389	sp P02754 LACB_BOVINBeta-lactoglobulin	104	111	128.57	841600000
DIQKVAGTWY	10	1179.592	sp P02754 LACB_BOVINBeta-lactoglobulin	27	36	128.38	972760000
AEKTKIPAVF	10	1102.639	sp P02754 LACB_BOVINBeta-lactoglobulin	89	98	126.31	620890000
MAASDISLL	9	919.4685	sp P02754 LACB_BOVINBeta-lactoglobulin	40	48	126.24	2964000000
DKALKALPM	9	985.563	sp P02754 LACB_BOVINBeta-lactoglobulin	153	161	125.31	9500000000
FNPTQLEE	8	976.4502	sp P02754 LACB_BOVINBeta-lactoglobulin	167	174	124.59	259860000
AMAASDISLL	10	990.5056	sp P02754 LACB_BOVINBeta-lactoglobulin	39	48	124.37	308820000
DIQKVAGTWYSL	12	1379.709	sp P02754 LACB_BOVINBeta-lactoglobulin	27	38	123.79	112050000
AMAASDISLLDAQ	13	1304.628	sp P02754 LACB_BOVINBeta-lactoglobulin	39	51	122.94	334370000
LVRTPEVDDEA	11	1242.609	sp P02754 LACB_BOVINBeta-lactoglobulin	138	148	120.45	111560000
NSAEPEQSLA	10	1044.472	sp P02754 LACB_BOVINBeta-lactoglobulin	125	134	118.5	304160000



KVAGTWYSL	9	1023.539	sp P02754 LACB_BOVINBeta-lactoglobulin	30	38	118.32	3396300000
VEELKPTPEG	10	1097.561	sp P02754 LACB_BOVINBeta-lactoglobulin	59	68	117.89	50049000
LKPTPEGDLEIL	12	1323.729	sp P02754 LACB_BOVINBeta-lactoglobulin	62	73	115.82	153650000
VFRELKDLKGYGGV	14	1579.872	sp P00711 LALBA_BOVINAlpha-lactalbumin	27	40	115.82	28165000
KKIIAEKTKIPAVF	14	1584.997	sp P02754 LACB_BOVINBeta-lactoglobulin	85	98	113.69	280880000
LVLDTDYKKY	10	1256.665	sp P02754 LACB_BOVINBeta-lactoglobulin	109	118	113.22	527300000
VEELKPTPEGDL	12	1325.672	sp P02754 LACB_BOVINBeta-lactoglobulin	59	70	111.86	310780000
KKILDKVGIN	10	1126.707	sp P00711 LALBA_BOVINAlpha-lactalbumin	112	121	111.61	329390000
DAQSAPLRVYVE	12	1346.683	sp P02754 LACB_BOVINBeta-lactoglobulin	49	60	110.93	84459000
DDLTDIM	8	936.3746	sp P00711 LALBA_BOVINAlpha-lactalbumin	102	109	110.36	31779000
DIQKVAGT	8	830.4498	sp P02754 LACB_BOVINBeta-lactoglobulin	27	34	110.12	4026300000
ALEKFDKAL	9	1033.581	sp P02754 LACB_BOVINBeta-lactoglobulin	148	156	109.44	37870000
RELKDLKGY	9	1120.624	sp P00711 LALBA_BOVINAlpha-lactalbumin	29	37	108.74	352960000
LSFNPTQLEEQ	11	1304.625	sp P02754 LACB_BOVINBeta-lactoglobulin	165	175	108.57	494780000
YWLAHKAL	8	1000.549	sp P00711 LALBA_BOVINAlpha-lactalbumin	122	129	107.74	2127500000
GYDTQAIQVN	10	1107.52	sp P00711 LALBA_BOVINAlpha-lactalbumin	54	63	107.29	167620000
FHTSGYDTQAIQVQ	13	1465.684	sp P00711 LALBA_BOVINAlpha-lactalbumin	50	62	107.08	75543000
LDKVGINY	8	920.4967	sp P00711 LALBA_BOVINAlpha-lactalbumin	115	122	105.81	81335000
MAASDISLLDAQ	12	1233.591	sp P02754 LACB_BOVINBeta-lactoglobulin	40	51	103.87	306620000
KFDKALKAL	9	1032.633	sp P02754 LACB_BOVINBeta-lactoglobulin	151	159	103.82	213990000
VKKILDKVGIN	11	1225.776	sp P00711 LALBA_BOVINAlpha-lactalbumin	111	121	103.46	1115400000
ALNENKVLVL	10	1111.66	sp P02754 LACB_BOVINBeta-lactoglobulin	102	111	102.62	4471300000
VRTPEVDDEAL	11	1242.609	sp P02754 LACB_BOVINBeta-lactoglobulin	139	149	102.61	515180000
KFDKALKALPM	11	1260.726	sp P02754 LACB_BOVINBeta-lactoglobulin	151	161	101.3	23072000000
YVEELKPTPEGDLE	14	1617.777	sp P02754 LACB_BOVINBeta-lactoglobulin	58	71	100.69	23389000

DYKKYLLF	8	1088.591	sp P02754 LACB_BOVINBeta-lactoglobulin	114	121	100.39	154540000
GGVSLPEW	8	843.4127	sp P00711 LALBA_BOVINAAlpha-lactalbumin	38	45	99.279	29309000
DKVGINYWLA	10	1177.613	sp P00711 LALBA_BOVINAAlpha-lactalbumin	116	125	98.033	42314000
KFDKALKALPMHIR	14	1666.971	sp P02754 LACB_BOVINBeta-lactoglobulin	151	164	97.551	630060000
IIAEKTKIPAVFK	13	1456.902	sp P02754 LACB_BOVINBeta-lactoglobulin	87	99	96.591	105530000
KTKIPAVFK	9	1030.654	sp P02754 LACB_BOVINBeta-lactoglobulin	91	99	96.331	220830000
KTKIPAVFKI	10	1143.738	sp P02754 LACB_BOVINBeta-lactoglobulin	91	100	96.171	74007000
TDYKKYLL	8	1042.57	sp P02754 LACB_BOVINBeta-lactoglobulin	113	120	95.909	131300000
FDKALKALPM	10	1132.632	sp P02754 LACB_BOVINBeta-lactoglobulin	152	161	95.608	703590000
LVRTPEVDDEALEKF	15	1759.899	sp P02754 LACB_BOVINBeta-lactoglobulin	138	152	95.428	165590000
KILDKVGINYWLAHKA	16	1868.067	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	128	95.197	273720000
GYDTQAIVQNNDSTEYGLF	19	2133.949	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	72	94.767	11232000
KFLDDDLTD	9	1080.498	sp P00711 LALBA_BOVINAAlpha-lactalbumin	98	106	92.439	131410000
DKVGINYW	8	993.492	sp P00711 LALBA_BOVINAAlpha-lactalbumin	116	123	92.187	303720000
VDDEALEKF	9	1064.503	sp P02754 LACB_BOVINBeta-lactoglobulin	144	152	91.069	60384000
KIDALNENKVL	11	1255.714	sp P02754 LACB_BOVINBeta-lactoglobulin	99	109	90.964	46155000
IIAEKTKIPA	10	1082.67	sp P02754 LACB_BOVINBeta-lactoglobulin	87	96	89.886	245130000
QNNDSTEYGLF	11	1286.542	sp P00711 LALBA_BOVINAAlpha-lactalbumin	62	72	89.355	13465000
MENSAEPEQS	10	1120.434	sp P02754 LACB_BOVINBeta-lactoglobulin	123	132	88.921	6073700
TDYKKYLLF	9	1189.638	sp P02754 LACB_BOVINBeta-lactoglobulin	113	121	88.819	98920000
LVLDTDYKKYL	11	1369.749	sp P02754 LACB_BOVINBeta-lactoglobulin	109	119	87.789	94096000
RVYVEELKPTPEGDLEIL	18	2099.115	sp P02754 LACB_BOVINBeta-lactoglobulin	56	73	87.287	44283000
KALPMHIRL	9	1077.648	sp P02754 LACB_BOVINBeta-lactoglobulin	157	165	85.67	68847000
AASDISLL	8	788.428	sp P02754 LACB_BOVINBeta-lactoglobulin	41	48	85.061	41411000
RTPEVDDEALEK	12	1400.678	sp P02754 LACB_BOVINBeta-lactoglobulin	140	151	79.886	20558000

LVLDTDYKKYLL	12	1482.833	sp P02754 LACB_BOVINBeta-lactoglobulin	109	120	79.82	45685000
TMKGLDIQ	8	904.4688	sp P02754 LACB_BOVINBeta-lactoglobulin	22	29	79.596	808580000
KALPMHIR	8	964.564	sp P02754 LACB_BOVINBeta-lactoglobulin	157	164	79.451	41785000
KILDKVGI	8	884.5695	sp P00711 LALBA_BOVINAlpha-lactalbumin	113	120	78.377	48000000
LVRTPEVDD	9	1042.53	sp P02754 LACB_BOVINBeta-lactoglobulin	138	146	78.334	46552000
RTPEVDDEALE	11	1272.583	sp P02754 LACB_BOVINBeta-lactoglobulin	140	150	78.098	1708500000
KILDKVGINYWLAHK	15	1797.03	sp P00711 LALBA_BOVINAlpha-lactalbumin	113	127	76.82	1311500000
VLDTDYKKYL	10	1256.665	sp P02754 LACB_BOVINBeta-lactoglobulin	110	119	76.465	2751100000
ILDKVGINYW	10	1219.66	sp P00711 LALBA_BOVINAlpha-lactalbumin	114	123	76.17	8616600
MENSAEPE	8	905.3437	sp P02754 LACB_BOVINBeta-lactoglobulin	123	130	76.035	4868200
IRLSFNPT	8	946.5236	sp P02754 LACB_BOVINBeta-lactoglobulin	163	170	74.929	1181800000
TMKGLDIQKVA	11	1202.669	sp P02754 LACB_BOVINBeta-lactoglobulin	22	32	74.611	24180000
LVRTPEVD	8	927.5026	sp P02754 LACB_BOVINBeta-lactoglobulin	138	145	73.26	60231000
HIRLSFNPTQL	11	1324.725	sp P02754 LACB_BOVINBeta-lactoglobulin	162	172	73.067	53148000
HTSGYDTQ	8	907.3672	sp P00711 LALBA_BOVINAlpha-lactalbumin	51	58	73.039	6399200
KDLKGYGG	8	836.4392	sp P00711 LALBA_BOVINAlpha-lactalbumin	32	39	72.789	5161000
IVQNNDSTE	9	1018.457	sp P00711 LALBA_BOVINAlpha-lactalbumin	60	68	72.138	55968000
AEPEQSLA	8	843.3974	sp P02754 LACB_BOVINBeta-lactoglobulin	127	134	69.628	10206000
IQKVAGTW	8	901.5022	sp P02754 LACB_BOVINBeta-lactoglobulin	28	35	68.787	39736000
VFRELKDL	8	1018.581	sp P00711 LALBA_BOVINAlpha-lactalbumin	27	34	68.224	542970000
SFNPTQLEEQ	10	1191.541	sp P02754 LACB_BOVINBeta-lactoglobulin	166	175	67.414	53742000
GINYWLAH	8	972.4818	sp P00711 LALBA_BOVINAlpha-lactalbumin	119	126	67.285	7934000
LKPTPEGDLEI	11	1210.645	sp P02754 LACB_BOVINBeta-lactoglobulin	62	72	66.568	421770000
NSAEPEQS	8	860.3512	sp P02754 LACB_BOVINBeta-lactoglobulin	125	132	66.457	28267000
VEELKPTPEGDLEILLQKWENGECA	25	2839.395	sp P02754 LACB_BOVINBeta-lactoglobulin	59	83	66.387	53169000

LIVTQTMK	8	932.5365	sp P02754 LACB_BOVINBeta-lactoglobulin	17	24	65.313	43958000
VDDEALEK	8	917.4342	sp P02754 LACB_BOVINBeta-lactoglobulin	144	151	63.673	237020000
DAQSAPLR	8	856.4403	sp P02754 LACB_BOVINBeta-lactoglobulin	49	56	63.21	19121000
ASDISLLDAQ	10	1031.514	sp P02754 LACB_BOVINBeta-lactoglobulin	42	51	62.969	16062000
EKFDKALK	8	977.5546	sp P02754 LACB_BOVINBeta-lactoglobulin	150	157	59.35	67393000
KVAGTWYSLA	10	1094.576	sp P02754 LACB_BOVINBeta-lactoglobulin	30	39	59.245	595890000
ALPMHIRL	8	949.5531	sp P02754 LACB_BOVINBeta-lactoglobulin	158	165	57.281	123790000
LKPTPEGDL	9	968.5179	sp P02754 LACB_BOVINBeta-lactoglobulin	62	70	56.258	30653000
KIDALNENK	9	1043.561	sp P02754 LACB_BOVINBeta-lactoglobulin	99	107	55.064	4888600
FHTSGYDTQ	9	1054.436	sp P00711 LALBA_BOVINAlpha-lactalbumin	50	58	54.205	223640000
VRTPEVDD	8	929.4454	sp P02754 LACB_BOVINBeta-lactoglobulin	139	146	54.157	4015000
EVDDEALE	8	918.3818	sp P02754 LACB_BOVINBeta-lactoglobulin	143	150	54.056	17499000
KTKIPAVFKID	11	1258.765	sp P02754 LACB_BOVINBeta-lactoglobulin	91	101	54.005	1131300000
TPEVDDEALE	10	1116.482	sp P02754 LACB_BOVINBeta-lactoglobulin	141	150	53.878	63329000
YGLFQINNK	9	1095.571	sp P00711 LALBA_BOVINAlpha-lactalbumin	69	77	52.403	636780000
DSTEYGLF	8	930.3971	sp P00711 LALBA_BOVINAlpha-lactalbumin	65	72	52.299	339840000
ENSAEPEQS	9	989.3938	sp P02754 LACB_BOVINBeta-lactoglobulin	124	132	51.193	16462000
KALCSEKL	8	890.4895	sp P00711 LALBA_BOVINAlpha-lactalbumin	127	134	49.536	10983000
DIMCVKKILDKVGIN	15	1687.937	sp P00711 LALBA_BOVINAlpha-lactalbumin	107	121	48.284	52221000
KPTPEGDLEIL	11	1210.645	sp P02754 LACB_BOVINBeta-lactoglobulin	63	73	48.091	116020000
KGYGVSLEPE	10	1005.513	sp P00711 LALBA_BOVINAlpha-lactalbumin	35	44	47.869	171700000
KIDALNEN	8	915.4662	sp P02754 LACB_BOVINBeta-lactoglobulin	99	106	47.657	64359000
EELKPTPEGDLE	12	1355.646	sp P02754 LACB_BOVINBeta-lactoglobulin	60	71	46.462	51591000
TKIPAVFK	8	902.5589	sp P02754 LACB_BOVINBeta-lactoglobulin	92	99	45.335	38149000
KPTPEGDLEILL	12	1323.729	sp P02754 LACB_BOVINBeta-lactoglobulin	63	74	45.137	42727000

ALTCGAQALI	10	959.511	sp P02754 LACB_BOVINBeta-lactoglobulin	9	18	44.447	460370000
KDLKGYGGVSLPE	13	1361.719	sp P00711 LALBA_BOVINAlpha-lactalbumin	32	44	42.19	15468000
IMCVKKILDKVGIN	14	1572.91	sp P00711 LALBA_BOVINAlpha-lactalbumin	108	121	41.704	43392000
EQLTKCEVFREL	12	1493.755	sp P00711 LALBA_BOVINAlpha-lactalbumin	20	31	37.144	12815000
LALTCGAQAL	10	959.511	sp P02754 LACB_BOVINBeta-lactoglobulin	8	17	36.395	132170000
KKILDKVGINY	11	1289.771	sp P00711 LALBA_BOVINAlpha-lactalbumin	112	122	33.87	51044000

**Table S5: B-cell linear epitope database of ALA and BLG.**

Object Type	Name	Source Molecule	Molecule Parent
Linear peptide	KCEVFRELKDLKGY	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	KDLKGYGGVS	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	ALCSEKLDQWLCEKL + MCM (C3, C12)	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	GYGGVSLPEWVCTTFHTSGYDTQAIVQNNDSTEYGLFQINNK + MCM (C12)	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	IWCKDDQNPSSNICNISCDKFLDDDLTDDIMCVK + MCM (C3, C15, C19, C33)	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	IWCKDDQNPSSNICNISCDKFLDDDLTDDIMCVKK + MCM (C3, C15, C19, C33)	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	VGINYWLAHK	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	CDKFLDDDLT	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	CNISCDFLD	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	CVKKILDKVG	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	DDIMCVKKIL	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4

Linear peptide	DDLTDDIMCV	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	DKVGINYWLA	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	DTQAIVQNND	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	ELKDLKGYGG	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	EQLTKCEVFR	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	EVFRELKDLK	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	EYGLFQINNK	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	FQINNKIWCK	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	FRELKDLKGY	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	GLFQINNKIW	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	GYDTQAIVQN	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	GYGGVSLPEW	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	ILDKVGINYW	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4

Linear peptide	IMCVKKILDK	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	INYWLAHKAL	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	ISCDKFLDDD	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	KCEVFRELKD	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	KFLDDDLTDD	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	KKILDKVGIN	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	LDDDLTDDIM	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	LKGYGGVSLP	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	LTDDIMCVKK	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	LTKCEVFREL	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	NDSTEYGLFQ	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	NICNISCDKF	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	PHSSNICNIS	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4



Linear peptide	SSNICNISCD	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	STEYGLFQIN	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	VSLPEWVCTT	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	YWLAHKALCS	Chain A, Anomalous Substructure of Alpha-Lactalbumin	Bos d 4
Linear peptide	LKGYGGVSLPEW	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	MCVKKILDKVGI	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	STEYGLFQINNK	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	TKCEVFRELKDL	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	AHKALCSEKLDQWLC	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	CEVFRELKDLKGYGG	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	CKDDQNPSSNICNI	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	CSEKLDQWLCEKL	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	CVKKILDKVGINYWL	alpha-lactalbumin precursor protein	Bos d 4

Linear peptide	DSTEYGLFQINNKIW	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	ELKDLKGYGGVSLPE	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	EQLTKCEVFRELKDL	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	FHTSGYDTQAIVQNN	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	GLFQINNKIWCKDDQ	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	INYWLAHKALCSEKL	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	IVQNNDSTEYGLFQI	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	KGYGGVSLPEWVCTT	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	LDDDLTDDIMCVKKI	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	LDKVGINYWLAHKAL	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	NICNISCDKFLDDDL	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	NNKIWCKDDQNPHSS	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	NPHSSNICNISCDKF	alpha-lactalbumin precursor protein	Bos d 4

Linear peptide	SCDKFLDDDLTDDIM	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	TDDIMCVKKILDKVG	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	VSLPEWVCTTFHTSG	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	WVCTTFHTSGYDTQA	Alpha-lactalbumin precursor	Bos d 4
Linear peptide	YDTQAIVQNNDSTEY	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	DDQNPHSSNICNISC DK	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	FLDDDLTDDIMCVK	alpha-lactalbumin precursor protein	Bos d 4
Linear peptide	AASDISLLDAQSAPLR	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	AQKKIIAEKT	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	AQKKIIAEKTKI	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	EVDDEALEKF	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	EVDDEALEKFDKAL	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	GLDIQK	Beta-lactoglobulin precursor	Bos d 5

Linear peptide	IDALNENK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KALKALPMHI	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KALPMHIRLSFN	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KPTPEGDLEI	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KPTPEGDLEILLQK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KTKIPAVFKI	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KTKIPAVFKIDA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LIVTQTMK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LIVTQTMKGLDIQK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LSFNPTQLEEQCHI	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	PAVFK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	RTPEVDDEALE	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	RTPEVDDEALEKFDKALKAL	Beta-lactoglobulin precursor	Bos d 5

Linear peptide	TPEVDDEALEK	beta-lactoglobulin [Bos taurus]	Bos d 5
Linear peptide	TPEVDDEALEKFDK	beta-lactoglobulin [Bos taurus]	Bos d 5
Linear peptide	VLVLDTDYK	beta-lactoglobulin [Bos taurus]	Bos d 5
Linear peptide	VYVEELKPTP	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	VYVEELKPTPEGDLEILLQK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	YLLFCMENSAPPEQSLVCQCLVR	beta-lactoglobulin	Bos d 5
Linear peptide	CLVRTPEVDDEALEKFDKAL	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	LQKWENDECAQKKIIAEKTK	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	TKIPAVFKIDALNENKVLVL	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	AEPEQS	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	AQKKII	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	DALNEN	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	DALNENKVLVLD	major allergen beta-lactoglobulin	Bos d 5

Linear peptide	DDEALE	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	EALEKF	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	EILLQK	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	ENKVLV	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	EVDDEA	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	FCMENS	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	FNPTQLEEQCHI	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	IIAEKT	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	IRLSFN	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	KIPAVF	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	LACQCLVRTPEV	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LDTDYK	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	LEKFDK	major allergen beta-lactoglobulin	Bos d 5

Linear peptide	LLFCME	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	LPMHIR	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	LSFNPT	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	LVLDTD	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	MENSAE	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	MHIRLS	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	NDECAQ	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	NSAEPE	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	PEQSLA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	QSAPLRVYVEEL	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	QSLACQ	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	TDYKKY	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	TDYKKYLLFCME	major allergen beta-lactoglobulin	Bos d 5

Linear peptide	TPEVDD	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	VAGTWYSLAMAA	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	WENGECAQK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	AEPEQSLACQCLVRT	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	AGTWYSLAMAASDIS	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	ALNENKVLVLDTDYK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	ASDISLLDAQSAPLR	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	CAQKKIIAEKTKIPA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	CLVRTPEVDDEALEK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	CMENSAEPEQSLACQ	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	DIQKVAGTWYSLAMA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	DTDYKKYLLFCMENS	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	EALEKFDKALKALPM	Beta-lactoglobulin precursor	Bos d 5



Linear peptide	FDKALKALPMHIRLS	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	HIRLSFNPTQLEEQC	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	IIAEKTKIPAVFKID	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	ILLQKWENGECAQKK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KALPMHIRLSFNPTQ	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KVLVLDTDYKKYLLF	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LIVTQTMKGLDIQKV	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LKPTPEGDLEILLQK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LLDAQSAPLRVYVEE	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	PEVDDEALEKFDKAL	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	QKVAGTWYSLAMAAS	major allergen beta-lactoglobulin	Bos d 5
Linear peptide	SAPLRVYVEELKPTP	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	SLAMAASDISLLDAQ	Beta-lactoglobulin precursor	Bos d 5

Linear peptide	TKIPAVFKIDALNEN	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	TMKGLDIQKVAGTWY	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	VYVEELKPTPEGDLE	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	AASDISLLDA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	AEKTKIPAVF	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	AEPEQSLACQ	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	ALKALPMHIR	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	AMAASDISLL	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	APLRVYVEEL	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	CLVRTPEVDD	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	CQCLVRTPEV	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	DALNENKVLV	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	DAQSAPLRVY	Beta-lactoglobulin precursor	Bos d 5

Linear peptide	DDEALEKFDK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	DIQKVAGTWY	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	DKALKALPMH	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	DLEILLQKWE	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	EALEKFDKAL	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	EGDLEILLQK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	ELKPTPEGDL	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	ENKVLVLDTD	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	FCMENSAEPE	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	FNPTQLEEQC	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	GLDIQKVAGT	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	IIAEKTIPA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	IRLSFNPTQL	Beta-lactoglobulin precursor	Bos d 5

Linear peptide	ISLLDAQSAP	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KALPMHIRLS	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KFDKALKALP	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KIDALNENKV	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KIPAVFKIDA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KKIIAEKTKI	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LACQCLVRTP	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LEKFDKALKA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LLDAQSAPLR	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LNENKVLVLD	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LPMHIRLSFN	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LRVYVEELKP	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LSFNPTQLEE	Beta-lactoglobulin precursor	Bos d 5

Linear peptide	LVLDTDYKKY	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	MENSAEPEQS	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	MHIRLSFNPT	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	MKGLDIQKVA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	NSAEPEQSLA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	PAVFKIDALN	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	PEQSLACQCL	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	QSAPLRVYVE	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	QSLACQCLVR	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	QTMKGLDIQK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	SDISLLDAQS	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	SLAMAASDIS	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	TPEGDLEILL	Beta-lactoglobulin precursor	Bos d 5

Linear peptide	VEELKPTPEG	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	VFKIDALNEN	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	VLDTDYKKYLLFCMENSAEP	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	VRTPEVDDEA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	VTQTMKGLDI	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	WYSLAMAASD	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	ACQCLVRTPEVDDEALEKFD	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	AEKTKIPAVFKIDALNENKV	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	ALPMHIRLSFNPTQLEEQCH	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	APLRVYVEELKPTPEGDLEI	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	AQKKIIAEKTKIPAVFKIDA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	CMENSAEPEQSLACQCLVRT	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	DEALEKFDKALKALPMHIRL	Beta-lactoglobulin precursor	Bos d 5

Linear peptide	DISLLDAQSAPLRVYVEELK	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	EILLQKWENG	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	EVDDEALEKFDKALKALPMH	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	GDLEILLQKWENGECAQKKI	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	GTWYSLAMAA	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KIIAEKTKIPAVFKIDALNE	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KKYLLFCMENSAPPEQSLAC	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	KYLLFCMENS	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LAMAASDISLLDAQSAPLRV	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LDTDYKKYLL	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LEKFDKALKALPMHIRLSFN	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LIVTQTMKGL	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LKPTPEGDLEILLQKWENGE	Beta-lactoglobulin precursor	Bos d 5

Linear peptide	LLFCMENSAE	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LLFCMENSAEPEQSLACQCL	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	LLQKWENGEC	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	MHIRLSFNPTQLEEQCHI	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	PTQLEEQCHI	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	QKVAGTWYSL	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	QKWENGEC AQ	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	RVYVEELKPTPEGDLEILLQ	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	TPEGDLEILLQKWENGEC AQ	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	TPEVDDEALE	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	VAGTWYSLAM	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	VEELKPTPEGDLEILLQKWE	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	WYSLAMAASDISLLDAQSAP	Beta-lactoglobulin precursor	Bos d 5



Linear peptide	YKKYLLFCME	Beta-lactoglobulin precursor	Bos d 5
Linear peptide	ALPMHIR	beta-lactoglobulin	Bos d 5

**Table S6:** Epitope peptides contained in whey protein hydrolysate.

Sequence	Length	Mass	Leading razor protein	Start position	End position	Score	Intensity
KILDKVGINYWLAH	14	1668.935	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	126	277.28	1458100000
EVFRELKDLKGY	12	1495.804	sp P00711 LALBA_BOVINAAlpha-lactalbumin	26	37	210.93	2092000000
AIVQNNDSTEYGLFQ	15	1697.79	sp P00711 LALBA_BOVINAAlpha-lactalbumin	59	73	195.51	313370000
LDKVGINYWLAH	12	1427.756	sp P00711 LALBA_BOVINAAlpha-lactalbumin	115	126	161.63	24129000
KFLDDDLTDDIM	12	1439.649	sp P00711 LALBA_BOVINAAlpha-lactalbumin	98	109	153.05	122490000
VFRELKDLKGY	11	1366.761	sp P00711 LALBA_BOVINAAlpha-lactalbumin	27	37	150.08	1014700000
GYDTQAIVQNNDSTEY	16	1816.775	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	69	143	46927000
KILDKVGINYW	11	1347.755	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	123	141.95	4062600000
NNDSTEYGLFQ	11	1286.542	sp P00711 LALBA_BOVINAAlpha-lactalbumin	63	73	140.35	53123000
KILDKVGINYWLA	13	1531.876	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	125	131.43	3862400000
KILDKVGINYWL	12	1460.839	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	124	119.53	114520000
KILDKVGINYWLAHKAL	17	1981.151	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	129	115.87	1041700000
VFRELKDLKGYGGV	14	1579.872	sp P00711 LALBA_BOVINAAlpha-lactalbumin	27	40	115.82	97571000
LDDDLTDDIM	10	1164.486	sp P00711 LALBA_BOVINAAlpha-lactalbumin	100	109	112.17	45178000
KKILDKVGIN	10	1126.707	sp P00711 LALBA_BOVINAAlpha-lactalbumin	112	121	111.61	297370000
GYDTQAIVQN	10	1107.52	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	63	107.29	280710000
VKKILDKVGIN	11	1225.776	sp P00711 LALBA_BOVINAAlpha-lactalbumin	111	121	103.46	144790000
DKVGINYWLA	10	1177.613	sp P00711 LALBA_BOVINAAlpha-lactalbumin	116	125	98.033	194560000
KILDKVGINYWLAHKA	16	1868.067	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	128	95.197	1481800000
KILDKVGINYWLAHK	15	1797.03	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	127	76.82	7115900000
ILDKVGINYW	10	1219.66	sp P00711 LALBA_BOVINAAlpha-lactalbumin	114	123	76.17	23809000

KGYGGVSLPEW	11	1191.592	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	35	45	73.985	11754000
DIMCVKKILDKVGIN	15	1687.937	sp P00711 LALBA_BOVINA	Alpha-lactalbumin	107	121	48.284	84456000
DTDYKKY	7	931.4287	sp P02754 LACB_BOVIN	Beta-lactoglobulin	112	118	171.08	21178000000
LSFNPT	6	677.3384	sp P02754 LACB_BOVIN	Beta-lactoglobulin	165	170	150.06	10292000
KIIAEKT	7	801.496	sp P02754 LACB_BOVIN	Beta-lactoglobulin	86	92	143.61	76384000
TDYKKY	6	816.4018	sp P02754 LACB_BOVIN	Beta-lactoglobulin	113	118	130.84	428200000
KIPAVF	6	673.4163	sp P02754 LACB_BOVIN	Beta-lactoglobulin	93	98	113.63	33554000000
AEPEQSL	7	772.3603	sp P02754 LACB_BOVIN	Beta-lactoglobulin	127	133	107.74	333230000
IIAEKT	6	673.401	sp P02754 LACB_BOVIN	Beta-lactoglobulin	87	92	107.65	2472400000
TKIPAVF	7	774.464	sp P02754 LACB_BOVIN	Beta-lactoglobulin	92	98	105.2	14700000000
GLDIQK	6	672.3806	sp P02754 LACB_BOVIN	Beta-lactoglobulin	25	30	87.582	539450000
VLDTDYK	7	852.4229	sp P02754 LACB_BOVIN	Beta-lactoglobulin	110	116	86.866	2271600000
LDTDYK	6	753.3545	sp P02754 LACB_BOVIN	Beta-lactoglobulin	111	116	77.748	62388000
LPMHIR	6	765.432	sp P02754 LACB_BOVIN	Beta-lactoglobulin	159	164	76.553	68524000
VDDEALE	7	789.3392	sp P02754 LACB_BOVIN	Beta-lactoglobulin	144	150	68.485	2683100000
MHIRLS	6	755.4112	sp P02754 LACB_BOVIN	Beta-lactoglobulin	161	166	66.994	504490000
DDEALEK	7	818.3658	sp P02754 LACB_BOVIN	Beta-lactoglobulin	145	151	65.246	5077200
ALPMHIR	7	836.4691	sp P02754 LACB_BOVIN	Beta-lactoglobulin	158	164	62.978	873850000
IIAEKTK	7	801.496	sp P02754 LACB_BOVIN	Beta-lactoglobulin	87	93	54.205	20008000
NSAEPEQSL	9	973.4353	sp P02754 LACB_BOVIN	Beta-lactoglobulin	125	133	256.48	5850900000
VEELKPTPEGDLE	13	1454.714	sp P02754 LACB_BOVIN	Beta-lactoglobulin	59	71	214.26	23163000000
ASDISLLDAQSAPLRVY	17	1817.952	sp P02754 LACB_BOVIN	Beta-lactoglobulin	42	58	202.44	25451000
LVRTPEVDDE	10	1171.572	sp P02754 LACB_BOVIN	Beta-lactoglobulin	138	147	199.89	23358000000
ELKPTPEGDLE	11	1226.603	sp P02754 LACB_BOVIN	Beta-lactoglobulin	61	71	190.88	20922000000
KIIAEKTKIPAVF	13	1456.902	sp P02754 LACB_BOVIN	Beta-lactoglobulin	86	98	190.53	3957700000

VEELKPTPEGDLEIL	15	1680.882	sp P02754 LACB_BOVINBeta-lactoglobulin	59	73	184.24	3964000000
HIRLSFNPTQLEEQ	14	1710.869	sp P02754 LACB_BOVINBeta-lactoglobulin	162	175	182.23	215930000
ELKPTPEGDLEIL	13	1452.771	sp P02754 LACB_BOVINBeta-lactoglobulin	61	73	179.42	4469000000
VEELKPTPEGDLEI	14	1567.798	sp P02754 LACB_BOVINBeta-lactoglobulin	59	72	174.42	353690000
DAQSAPLRVY	10	1118.572	sp P02754 LACB_BOVINBeta-lactoglobulin	49	58	172.21	906680000
KIDALNENKVLVL	13	1467.866	sp P02754 LACB_BOVINBeta-lactoglobulin	99	111	172	315190000
VRTPEVDDE	9	1058.488	sp P02754 LACB_BOVINBeta-lactoglobulin	139	147	170.3	440060000
DTDYKKYL	8	1044.513	sp P02754 LACB_BOVINBeta-lactoglobulin	112	119	166.05	1499300000
LDTDYKKYL	9	1157.597	sp P02754 LACB_BOVINBeta-lactoglobulin	111	119	165.72	211320000
LVRTPEVDDEALEK	14	1612.831	sp P02754 LACB_BOVINBeta-lactoglobulin	138	151	164.81	2058000000
HIRLSFNPT	9	1083.583	sp P02754 LACB_BOVINBeta-lactoglobulin	162	170	163.9	623970000
RTPEVDDE	8	959.4196	sp P02754 LACB_BOVINBeta-lactoglobulin	140	147	162.5	1457100000
SAEPEQSL	8	859.3923	sp P02754 LACB_BOVINBeta-lactoglobulin	126	133	160.54	351910000
LDTDYKKY	8	1044.513	sp P02754 LACB_BOVINBeta-lactoglobulin	111	118	156.4	524570000
MENSAEPEQSL	11	1233.518	sp P02754 LACB_BOVINBeta-lactoglobulin	123	133	156.35	218670000
IAEKTIPAVF	11	1215.723	sp P02754 LACB_BOVINBeta-lactoglobulin	88	98	154.85	758910000
LSFNPTQLEE	10	1176.566	sp P02754 LACB_BOVINBeta-lactoglobulin	165	174	154.12	40151000
EELKPTPEGDLEIL	14	1581.814	sp P02754 LACB_BOVINBeta-lactoglobulin	60	73	153.12	550240000
ALEKFDKALKALPM	14	1573.89	sp P02754 LACB_BOVINBeta-lactoglobulin	148	161	151.79	44925000
DTDYKKYLLF	10	1304.665	sp P02754 LACB_BOVINBeta-lactoglobulin	112	121	150.4	1158800000
DTDYKKYLL	9	1157.597	sp P02754 LACB_BOVINBeta-lactoglobulin	112	120	150.05	868860000
ELKPTPEGDLEI	12	1339.687	sp P02754 LACB_BOVINBeta-lactoglobulin	61	72	148.91	176590000
KTKIPAVF	8	902.5589	sp P02754 LACB_BOVINBeta-lactoglobulin	91	98	147.52	5678500000
VLDTDYKKY	9	1143.581	sp P02754 LACB_BOVINBeta-lactoglobulin	110	118	147.19	1057600000
LSFNPTQL	8	918.4811	sp P02754 LACB_BOVINBeta-lactoglobulin	165	172	147.16	349150000

ENSAEPEQSL	10	1102.478	sp P02754 LACB_BOVINBeta-lactoglobulin	124	133	140.84	781300000
EKFDKALKALPM	12	1389.769	sp P02754 LACB_BOVINBeta-lactoglobulin	150	161	139.86	78434000
VEELKPTPEGD	11	1212.587	sp P02754 LACB_BOVINBeta-lactoglobulin	59	69	139.38	424300000
SDISLLDAQSAPLRVY	16	1746.915	sp P02754 LACB_BOVINBeta-lactoglobulin	43	58	138.89	30570000
IIAEKTKIPAVF	12	1328.807	sp P02754 LACB_BOVINBeta-lactoglobulin	87	98	138.22	3829800000
LVRTPEVDDEALE	13	1484.736	sp P02754 LACB_BOVINBeta-lactoglobulin	138	150	138.22	2938700000
EKTKIPAVF	9	1031.602	sp P02754 LACB_BOVINBeta-lactoglobulin	90	98	134.48	1374600000
VRTPEVDDEALE	12	1371.652	sp P02754 LACB_BOVINBeta-lactoglobulin	139	150	132.88	6837700000
LVRTPEVDDEAL	12	1355.693	sp P02754 LACB_BOVINBeta-lactoglobulin	138	149	130.66	8577400000
LIVTQTMKGL	10	1102.642	sp P02754 LACB_BOVINBeta-lactoglobulin	17	26	128.69	1846500000
NENKVLVL	8	927.5389	sp P02754 LACB_BOVINBeta-lactoglobulin	104	111	128.57	678800000
DIQKVAGTWY	10	1179.592	sp P02754 LACB_BOVINBeta-lactoglobulin	27	36	128.38	519290000
VRTPEVDDEALEK	13	1499.747	sp P02754 LACB_BOVINBeta-lactoglobulin	139	151	128.31	172450000
AEKTKIPAVF	10	1102.639	sp P02754 LACB_BOVINBeta-lactoglobulin	89	98	126.31	757960000
LDTDYKKYLL	10	1270.681	sp P02754 LACB_BOVINBeta-lactoglobulin	111	120	126.24	64465000
AMAASDISLL	10	990.5056	sp P02754 LACB_BOVINBeta-lactoglobulin	39	48	124.37	711290000
DIQKVAGTWYSL	12	1379.709	sp P02754 LACB_BOVINBeta-lactoglobulin	27	38	123.79	391880000
AMAASDISLLDAQ	13	1304.628	sp P02754 LACB_BOVINBeta-lactoglobulin	39	51	122.94	443580000
LVRTPEVDDEA	11	1242.609	sp P02754 LACB_BOVINBeta-lactoglobulin	138	148	120.45	163050000
VLDTDYKKYLL	11	1369.749	sp P02754 LACB_BOVINBeta-lactoglobulin	110	120	118.71	3469300000
NSAEPEQSLA	10	1044.472	sp P02754 LACB_BOVINBeta-lactoglobulin	125	134	118.5	246430000
VEELKPTPEG	10	1097.561	sp P02754 LACB_BOVINBeta-lactoglobulin	59	68	117.89	56716000
LKPTPEGDLEIL	12	1323.729	sp P02754 LACB_BOVINBeta-lactoglobulin	62	73	115.82	1389000000
KKIIAEKTKIPAVF	14	1584.997	sp P02754 LACB_BOVINBeta-lactoglobulin	85	98	113.69	221610000
LVLDTDYKKY	10	1256.665	sp P02754 LACB_BOVINBeta-lactoglobulin	109	118	113.22	871910000

VEELKPTPEGDL	12	1325.672	sp P02754 LACB_BOVINBeta-lactoglobulin	59	70	111.86	37840000
MENSAEPEQSLA	12	1304.555	sp P02754 LACB_BOVINBeta-lactoglobulin	123	134	110.47	53895000
LSFNPTQLEEQ	11	1304.625	sp P02754 LACB_BOVINBeta-lactoglobulin	165	175	108.57	402370000
HIRLSFNPTQLE	12	1453.768	sp P02754 LACB_BOVINBeta-lactoglobulin	162	173	105.98	33064000
MAASDISLLDAQ	12	1233.591	sp P02754 LACB_BOVINBeta-lactoglobulin	40	51	103.87	180830000
ALNENKVLVL	10	1111.66	sp P02754 LACB_BOVINBeta-lactoglobulin	102	111	102.62	340480000
VRTPEVDDEAL	11	1242.609	sp P02754 LACB_BOVINBeta-lactoglobulin	139	149	102.61	2737600000
KFDKALKALPM	11	1260.726	sp P02754 LACB_BOVINBeta-lactoglobulin	151	161	101.3	21253000000
YVEELKPTPEGDLE	14	1617.777	sp P02754 LACB_BOVINBeta-lactoglobulin	58	71	100.69	33961000
KFDKALKALPMHIR	14	1666.971	sp P02754 LACB_BOVINBeta-lactoglobulin	151	164	97.551	577520000
IIAEKTKIPAVFK	13	1456.902	sp P02754 LACB_BOVINBeta-lactoglobulin	87	99	96.591	124600000
KTKIPAVFK	9	1030.654	sp P02754 LACB_BOVINBeta-lactoglobulin	91	99	96.331	431210000
KFDKALKALPMHIRL	15	1780.055	sp P02754 LACB_BOVINBeta-lactoglobulin	151	165	96.247	80161000
KTKIPAVFKI	10	1143.738	sp P02754 LACB_BOVINBeta-lactoglobulin	91	100	96.171	109520000
TDYKKYLL	8	1042.57	sp P02754 LACB_BOVINBeta-lactoglobulin	113	120	95.909	24069000
LVRTPEVDDEALEKF	15	1759.899	sp P02754 LACB_BOVINBeta-lactoglobulin	138	152	95.428	90878000
VDDEALEKF	9	1064.503	sp P02754 LACB_BOVINBeta-lactoglobulin	144	152	91.069	37907000
KIDALNENKVL	11	1255.714	sp P02754 LACB_BOVINBeta-lactoglobulin	99	109	90.964	150070000
IIAEKTKIPA	10	1082.67	sp P02754 LACB_BOVINBeta-lactoglobulin	87	96	89.886	233020000
MENSAEPEQS	10	1120.434	sp P02754 LACB_BOVINBeta-lactoglobulin	123	132	88.921	41613000
TDYKKYLLF	9	1189.638	sp P02754 LACB_BOVINBeta-lactoglobulin	113	121	88.819	49015000
LVLDTDYKKYL	11	1369.749	sp P02754 LACB_BOVINBeta-lactoglobulin	109	119	87.789	119720000
RVYVEELKPTPEGDLEIL	18	2099.115	sp P02754 LACB_BOVINBeta-lactoglobulin	56	73	87.287	31074000
KALPMHIRL	9	1077.648	sp P02754 LACB_BOVINBeta-lactoglobulin	157	165	85.67	159250000
RTPEVDDEALEK	12	1400.678	sp P02754 LACB_BOVINBeta-lactoglobulin	140	151	79.886	75071000

LVLDTDYKKYLL	12	1482.833	sp P02754 LACB_BOVINBeta-lactoglobulin	109	120	79.82	33639000
KALPMHIR	8	964.564	sp P02754 LACB_BOVINBeta-lactoglobulin	157	164	79.451	66324000
RTPEVDDEALE	11	1272.583	sp P02754 LACB_BOVINBeta-lactoglobulin	140	150	78.098	1926400000
VLDTDYKKYL	10	1256.665	sp P02754 LACB_BOVINBeta-lactoglobulin	110	119	76.465	4686500000
MENSAEPE	8	905.3437	sp P02754 LACB_BOVINBeta-lactoglobulin	123	130	76.035	26446000
LVRTPEVDDEALEKFDKALK	20	2315.237	sp P02754 LACB_BOVINBeta-lactoglobulin	138	157	76.027	94104000
IRLSFNPT	8	946.5236	sp P02754 LACB_BOVINBeta-lactoglobulin	163	170	74.929	186390000
TMKGLDIQKVA	11	1202.669	sp P02754 LACB_BOVINBeta-lactoglobulin	22	32	74.611	34802000
VRTPEVDDEALEKF	14	1646.815	sp P02754 LACB_BOVINBeta-lactoglobulin	139	152	74.257	49563000
HIRLSFNPTQL	11	1324.725	sp P02754 LACB_BOVINBeta-lactoglobulin	162	172	73.067	31179000
AEPEQSLA	8	843.3974	sp P02754 LACB_BOVINBeta-lactoglobulin	127	134	69.628	39624000
LKPTPEGDLEI	11	1210.645	sp P02754 LACB_BOVINBeta-lactoglobulin	62	72	66.568	698440000
NSAEPEQS	8	860.3512	sp P02754 LACB_BOVINBeta-lactoglobulin	125	132	66.457	123010000
LVLDTDYK	8	965.507	sp P02754 LACB_BOVINBeta-lactoglobulin	109	116	66.073	37498000
LIVTQTMK	8	932.5365	sp P02754 LACB_BOVINBeta-lactoglobulin	17	24	65.313	258570000
VDDEALEK	8	917.4342	sp P02754 LACB_BOVINBeta-lactoglobulin	144	151	63.673	272050000
VLVLDTDYK	9	1064.575	sp P02754 LACB_BOVINBeta-lactoglobulin	108	116	59.245	34399000
ALPMHIRL	8	949.5531	sp P02754 LACB_BOVINBeta-lactoglobulin	158	165	57.281	63109000
KIDALNENK	9	1043.561	sp P02754 LACB_BOVINBeta-lactoglobulin	99	107	55.064	102400000
VRTPEVDD	8	929.4454	sp P02754 LACB_BOVINBeta-lactoglobulin	139	146	54.157	18918000
KTKIPAVFKID	11	1258.765	sp P02754 LACB_BOVINBeta-lactoglobulin	91	101	54.005	608590000
TPEVDDEALE	10	1116.482	sp P02754 LACB_BOVINBeta-lactoglobulin	141	150	53.878	82474000
ENSAEPEQS	9	989.3938	sp P02754 LACB_BOVINBeta-lactoglobulin	124	132	51.193	75671000
DKALKALPMH	10	1122.622	sp P02754 LACB_BOVINBeta-lactoglobulin	153	162	49.715	7340900
KPTPEGDLEIL	11	1210.645	sp P02754 LACB_BOVINBeta-lactoglobulin	63	73	48.091	83590000

KIDALNEN	8	915.4662	sp P02754 LACB_BOVINBeta-lactoglobulin	99	106	47.657	20415000
EELKPTPEGDLE	12	1355.646	sp P02754 LACB_BOVINBeta-lactoglobulin	60	71	46.462	41656000
TKIPAVFK	8	902.5589	sp P02754 LACB_BOVINBeta-lactoglobulin	92	99	45.335	39026000



**Table S7:** Epitope peptides contained in the hydrolysate of ozonated whey protein.

Sequence	Length	Mass	Leading razor protein	Start position	End position	Score	Intensity
KILDKVGINYWLAH	14	1668.935	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	126	277.28	221100000
EVFRELKDLKGY	12	1495.804	sp P00711 LALBA_BOVINAAlpha-lactalbumin	26	37	210.93	718070000
AIVQNNDSTEYGLFQ	15	1697.79	sp P00711 LALBA_BOVINAAlpha-lactalbumin	59	73	195.51	242390000
VFRELKDLKGY	11	1366.761	sp P00711 LALBA_BOVINAAlpha-lactalbumin	27	37	150.08	2170500000
GYDTQAIVQNNDSTE	15	1653.712	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	68	147.62	90402000
GYDTQAIVQNNDSTEY	16	1816.775	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	69	143	81572000
FRELKDLKGY	10	1267.693	sp P00711 LALBA_BOVINAAlpha-lactalbumin	28	37	131.83	25359000
KILDKVGINYWLA	13	1531.876	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	125	131.43	32003000
VFRELKDLKGYGGV	14	1579.872	sp P00711 LALBA_BOVINAAlpha-lactalbumin	27	40	115.82	28165000
KKILDKVGIN	10	1126.707	sp P00711 LALBA_BOVINAAlpha-lactalbumin	112	121	111.61	329390000
GYDTQAIVQN	10	1107.52	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	63	107.29	167620000
VKILDKVGIN	11	1225.776	sp P00711 LALBA_BOVINAAlpha-lactalbumin	111	121	103.46	1115400000
DKVGINYWLA	10	1177.613	sp P00711 LALBA_BOVINAAlpha-lactalbumin	116	125	98.033	42314000
KILDKVGINYWLAHKA	16	1868.067	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	128	95.197	273720000
GYDTQAIVQNNDSTEYGLF	19	2133.949	sp P00711 LALBA_BOVINAAlpha-lactalbumin	54	72	94.767	11232000
KILDKVGINYWLAHK	15	1797.03	sp P00711 LALBA_BOVINAAlpha-lactalbumin	113	127	76.82	1311500000
ILDKVGINYW	10	1219.66	sp P00711 LALBA_BOVINAAlpha-lactalbumin	114	123	76.17	8616600
DIMCVKKILDKVGIN	15	1687.937	sp P00711 LALBA_BOVINAAlpha-lactalbumin	107	121	48.284	52221000
KDLKGYGGVSLPE	13	1361.719	sp P00711 LALBA_BOVINAAlpha-lactalbumin	32	44	42.19	15468000
IMCVKKILDKVGIN	14	1572.91	sp P00711 LALBA_BOVINAAlpha-lactalbumin	108	121	41.704	43392000
EQLTKCEVFREL	12	1493.755	sp P00711 LALBA_BOVINAAlpha-lactalbumin	20	31	37.144	12815000

KKILDKVGINY	11	1289.771	sp P00711 LALBA_BOVINAlpha-lactalbumin	112	122	33.87	51044000
DTDYKKY	7	931.4287	sp P02754 LACB_BOVINBeta-lactoglobulin	112	118	171.08	1234200000
KIIAEKT	7	801.496	sp P02754 LACB_BOVINBeta-lactoglobulin	86	92	143.61	9643600
TDYKKY	6	816.4018	sp P02754 LACB_BOVINBeta-lactoglobulin	113	118	130.84	265480000
KIPAVF	6	673.4163	sp P02754 LACB_BOVINBeta-lactoglobulin	93	98	113.63	1437700000
AEPEQSL	7	772.3603	sp P02754 LACB_BOVINBeta-lactoglobulin	127	133	107.74	81564000
IIAEKT	6	673.401	sp P02754 LACB_BOVINBeta-lactoglobulin	87	92	107.65	1191600000
TKIPAVF	7	774.464	sp P02754 LACB_BOVINBeta-lactoglobulin	92	98	105.2	1539100000
GLDIQK	6	672.3806	sp P02754 LACB_BOVINBeta-lactoglobulin	25	30	87.582	12591000
VLDTDYK	7	852.4229	sp P02754 LACB_BOVINBeta-lactoglobulin	110	116	86.866	891170000
LDTDYK	6	753.3545	sp P02754 LACB_BOVINBeta-lactoglobulin	111	116	77.748	14123000
LPMHIR	6	765.432	sp P02754 LACB_BOVINBeta-lactoglobulin	159	164	76.553	64419000
TDYKKYL	7	929.4858	sp P02754 LACB_BOVINBeta-lactoglobulin	113	119	74.423	120620000
VDDEALE	7	789.3392	sp P02754 LACB_BOVINBeta-lactoglobulin	144	150	68.485	38298000
MHIRLS	6	755.4112	sp P02754 LACB_BOVINBeta-lactoglobulin	161	166	66.994	77573000
ALPMHIR	7	836.4691	sp P02754 LACB_BOVINBeta-lactoglobulin	158	164	62.978	644380000
IIAEKTK	7	801.496	sp P02754 LACB_BOVINBeta-lactoglobulin	87	93	54.205	8492900
NSAEPEQSL	9	973.4353	sp P02754 LACB_BOVINBeta-lactoglobulin	125	133	256.48	3604800000
VEELKPTPEGDLE	13	1454.714	sp P02754 LACB_BOVINBeta-lactoglobulin	59	71	214.26	28992000000
LVRTPEVDDE	10	1171.572	sp P02754 LACB_BOVINBeta-lactoglobulin	138	147	199.89	9336600000
ELKPTPEGDLE	11	1226.603	sp P02754 LACB_BOVINBeta-lactoglobulin	61	71	190.88	18158000000
KIIAEKTKIPAVF	13	1456.902	sp P02754 LACB_BOVINBeta-lactoglobulin	86	98	190.53	1279000000
VEELKPTPEGDLEIL	15	1680.882	sp P02754 LACB_BOVINBeta-lactoglobulin	59	73	184.24	39632000000
HIRLSFNPTQLEEQ	14	1710.869	sp P02754 LACB_BOVINBeta-lactoglobulin	162	175	182.23	70590000
ELKPTPEGDLEIL	13	1452.771	sp P02754 LACB_BOVINBeta-lactoglobulin	61	73	179.42	35195000000

VEELKPTPEGDLEI	14	1567.798	sp P02754 LACB_BOVINBeta-lactoglobulin	59	72	174.42	204970000
DAQSAPLRVY	10	1118.572	sp P02754 LACB_BOVINBeta-lactoglobulin	49	58	172.21	1084100000
KIDALNENKVLVL	13	1467.866	sp P02754 LACB_BOVINBeta-lactoglobulin	99	111	172	441680000
VRTPEVDDE	9	1058.488	sp P02754 LACB_BOVINBeta-lactoglobulin	139	147	170.3	1064900000
LIVTQTMKGLDIQ	13	1458.812	sp P02754 LACB_BOVINBeta-lactoglobulin	17	29	168.22	605850000
DTDYKKYL	8	1044.513	sp P02754 LACB_BOVINBeta-lactoglobulin	112	119	166.05	9390600000
LDTDYKKYL	9	1157.597	sp P02754 LACB_BOVINBeta-lactoglobulin	111	119	165.72	131360000
LVRTPEVDDEALEK	14	1612.831	sp P02754 LACB_BOVINBeta-lactoglobulin	138	151	164.81	928670000
HIRLSFNPT	9	1083.583	sp P02754 LACB_BOVINBeta-lactoglobulin	162	170	163.9	1677200000
RTPEVDDE	8	959.4196	sp P02754 LACB_BOVINBeta-lactoglobulin	140	147	162.5	392240000
SAEPEQSL	8	859.3923	sp P02754 LACB_BOVINBeta-lactoglobulin	126	133	160.54	198460000
LDTDYKKY	8	1044.513	sp P02754 LACB_BOVINBeta-lactoglobulin	111	118	156.4	599820000
MENSAEPEQSL	11	1233.518	sp P02754 LACB_BOVINBeta-lactoglobulin	123	133	156.35	80972000
IAEKTIPAVF	11	1215.723	sp P02754 LACB_BOVINBeta-lactoglobulin	88	98	154.85	611420000
LSFNPTQLEE	10	1176.566	sp P02754 LACB_BOVINBeta-lactoglobulin	165	174	154.12	62575000
EELKPTPEGDLEIL	14	1581.814	sp P02754 LACB_BOVINBeta-lactoglobulin	60	73	153.12	612050000
ALEKFDKALKALPM	14	1573.89	sp P02754 LACB_BOVINBeta-lactoglobulin	148	161	151.79	147500000
DTDYKKYLLF	10	1304.665	sp P02754 LACB_BOVINBeta-lactoglobulin	112	121	150.4	10625000000
DTDYKKYLL	9	1157.597	sp P02754 LACB_BOVINBeta-lactoglobulin	112	120	150.05	12135000000
ELKPTPEGDLEI	12	1339.687	sp P02754 LACB_BOVINBeta-lactoglobulin	61	72	148.91	42689000
KTKIPAVF	8	902.5589	sp P02754 LACB_BOVINBeta-lactoglobulin	91	98	147.52	20526000000
VLDTDYKKY	9	1143.581	sp P02754 LACB_BOVINBeta-lactoglobulin	110	118	147.19	12584000000
LSFNPTQL	8	918.4811	sp P02754 LACB_BOVINBeta-lactoglobulin	165	172	147.16	247790000
ENSAEPEQSL	10	1102.478	sp P02754 LACB_BOVINBeta-lactoglobulin	124	133	140.84	502450000
EKFDKALKALPM	12	1389.769	sp P02754 LACB_BOVINBeta-lactoglobulin	150	161	139.86	37830000

VEELKPTPEGD	11	1212.587	sp P02754 LACB_BOVINBeta-lactoglobulin	59	69	139.38	523720000
IIAEKTKIPAVF	12	1328.807	sp P02754 LACB_BOVINBeta-lactoglobulin	87	98	138.22	27651000000
LVRTPEVDDEALE	13	1484.736	sp P02754 LACB_BOVINBeta-lactoglobulin	138	150	138.22	21526000000
EKTKIPAVF	9	1031.602	sp P02754 LACB_BOVINBeta-lactoglobulin	90	98	134.48	14661000000
VRTPEVDDEALE	12	1371.652	sp P02754 LACB_BOVINBeta-lactoglobulin	139	150	132.88	23079000000
LVRTPEVDDEAL	12	1355.693	sp P02754 LACB_BOVINBeta-lactoglobulin	138	149	130.66	33400000000
LIVTQTMKGL	10	1102.642	sp P02754 LACB_BOVINBeta-lactoglobulin	17	26	128.69	15509000000
NENKVLVL	8	927.5389	sp P02754 LACB_BOVINBeta-lactoglobulin	104	111	128.57	8416000000
DIQKVAGTWY	10	1179.592	sp P02754 LACB_BOVINBeta-lactoglobulin	27	36	128.38	9727600000
AEKTKIPAVF	10	1102.639	sp P02754 LACB_BOVINBeta-lactoglobulin	89	98	126.31	6208900000
AMAASDISLL	10	990.5056	sp P02754 LACB_BOVINBeta-lactoglobulin	39	48	124.37	3088200000
DIQKVAGTWYSL	12	1379.709	sp P02754 LACB_BOVINBeta-lactoglobulin	27	38	123.79	1120500000
AMAASDISLLDAQ	13	1304.628	sp P02754 LACB_BOVINBeta-lactoglobulin	39	51	122.94	3343700000
LVRTPEVDDEA	11	1242.609	sp P02754 LACB_BOVINBeta-lactoglobulin	138	148	120.45	1115600000
NSAEPEQSLA	10	1044.472	sp P02754 LACB_BOVINBeta-lactoglobulin	125	134	118.5	3041600000
VEELKPTPEG	10	1097.561	sp P02754 LACB_BOVINBeta-lactoglobulin	59	68	117.89	500490000
LKPTPEGDLEIL	12	1323.729	sp P02754 LACB_BOVINBeta-lactoglobulin	62	73	115.82	1536500000
KKIIAEKTKIPAVF	14	1584.997	sp P02754 LACB_BOVINBeta-lactoglobulin	85	98	113.69	2808800000
LVLDTDYKKY	10	1256.665	sp P02754 LACB_BOVINBeta-lactoglobulin	109	118	113.22	5273000000
VEELKPTPEGDL	12	1325.672	sp P02754 LACB_BOVINBeta-lactoglobulin	59	70	111.86	3107800000
DAQSAPLRVYVE	12	1346.683	sp P02754 LACB_BOVINBeta-lactoglobulin	49	60	110.93	844590000
ALEKFDKAL	9	1033.581	sp P02754 LACB_BOVINBeta-lactoglobulin	148	156	109.44	378700000
LSFNPTQLEEQ	11	1304.625	sp P02754 LACB_BOVINBeta-lactoglobulin	165	175	108.57	4947800000
MAASDISLLDAQ	12	1233.591	sp P02754 LACB_BOVINBeta-lactoglobulin	40	51	103.87	3066200000
ALNENKVLVL	10	1111.66	sp P02754 LACB_BOVINBeta-lactoglobulin	102	111	102.62	4471300000

VRTPEVDDEAL	11	1242.609	sp P02754 LACB_BOVINBeta-lactoglobulin	139	149	102.61	515180000
KFDKALKALPM	11	1260.726	sp P02754 LACB_BOVINBeta-lactoglobulin	151	161	101.3	23072000000
YVEELKPTPEGDLE	14	1617.777	sp P02754 LACB_BOVINBeta-lactoglobulin	58	71	100.69	23389000
KFDKALKALPMHIR	14	1666.971	sp P02754 LACB_BOVINBeta-lactoglobulin	151	164	97.551	630060000
IIAEKTKIPAVFK	13	1456.902	sp P02754 LACB_BOVINBeta-lactoglobulin	87	99	96.591	105530000
KTKIPAVFK	9	1030.654	sp P02754 LACB_BOVINBeta-lactoglobulin	91	99	96.331	220830000
KTKIPAVFKI	10	1143.738	sp P02754 LACB_BOVINBeta-lactoglobulin	91	100	96.171	74007000
TDYKKYLL	8	1042.57	sp P02754 LACB_BOVINBeta-lactoglobulin	113	120	95.909	131300000
LVRTPEVDDEALEKF	15	1759.899	sp P02754 LACB_BOVINBeta-lactoglobulin	138	152	95.428	165590000
VDDEALEKF	9	1064.503	sp P02754 LACB_BOVINBeta-lactoglobulin	144	152	91.069	60384000
KIDALNENKVL	11	1255.714	sp P02754 LACB_BOVINBeta-lactoglobulin	99	109	90.964	46155000
IIAEKTKIPA	10	1082.67	sp P02754 LACB_BOVINBeta-lactoglobulin	87	96	89.886	245130000
MENSAEPEQS	10	1120.434	sp P02754 LACB_BOVINBeta-lactoglobulin	123	132	88.921	6073700
TDYKKYLLF	9	1189.638	sp P02754 LACB_BOVINBeta-lactoglobulin	113	121	88.819	98920000
LVLDTDYKKYL	11	1369.749	sp P02754 LACB_BOVINBeta-lactoglobulin	109	119	87.789	94096000
RVYVEELKPTPEGDLEIL	18	2099.115	sp P02754 LACB_BOVINBeta-lactoglobulin	56	73	87.287	44283000
KALPMHIRL	9	1077.648	sp P02754 LACB_BOVINBeta-lactoglobulin	157	165	85.67	68847000
RTPEVDDEALEK	12	1400.678	sp P02754 LACB_BOVINBeta-lactoglobulin	140	151	79.886	20558000
LVLDTDYKKYLL	12	1482.833	sp P02754 LACB_BOVINBeta-lactoglobulin	109	120	79.82	45685000
KALPMHIR	8	964.564	sp P02754 LACB_BOVINBeta-lactoglobulin	157	164	79.451	41785000
LVRTPEVDD	9	1042.53	sp P02754 LACB_BOVINBeta-lactoglobulin	138	146	78.334	46552000
RTPEVDDEALE	11	1272.583	sp P02754 LACB_BOVINBeta-lactoglobulin	140	150	78.098	1708500000
VLDTDYKKYL	10	1256.665	sp P02754 LACB_BOVINBeta-lactoglobulin	110	119	76.465	2751100000
MENSAEPE	8	905.3437	sp P02754 LACB_BOVINBeta-lactoglobulin	123	130	76.035	4868200
IRLSFNPT	8	946.5236	sp P02754 LACB_BOVINBeta-lactoglobulin	163	170	74.929	1181800000

TMKGLDIQKVA	11	1202.669	sp P02754 LACB_BOVINBeta-lactoglobulin	22	32	74.611	24180000
HIRLSFNPTQL	11	1324.725	sp P02754 LACB_BOVINBeta-lactoglobulin	162	172	73.067	53148000
AEPEQSLA	8	843.3974	sp P02754 LACB_BOVINBeta-lactoglobulin	127	134	69.628	10206000
LKPTPEGDLEI	11	1210.645	sp P02754 LACB_BOVINBeta-lactoglobulin	62	72	66.568	421770000
NSAEPEQS	8	860.3512	sp P02754 LACB_BOVINBeta-lactoglobulin	125	132	66.457	28267000
VEELKPTPEGDLEILLQKWENGECA	25	2839.395	sp P02754 LACB_BOVINBeta-lactoglobulin	59	83	66.387	53169000
LIVTQTMK	8	932.5365	sp P02754 LACB_BOVINBeta-lactoglobulin	17	24	65.313	43958000
VDDEALEK	8	917.4342	sp P02754 LACB_BOVINBeta-lactoglobulin	144	151	63.673	237020000
ALPMHIRL	8	949.5531	sp P02754 LACB_BOVINBeta-lactoglobulin	158	165	57.281	123790000
KIDALNENK	9	1043.561	sp P02754 LACB_BOVINBeta-lactoglobulin	99	107	55.064	4888600
VRTPEVDD	8	929.4454	sp P02754 LACB_BOVINBeta-lactoglobulin	139	146	54.157	4015000
EVDDEALE	8	918.3818	sp P02754 LACB_BOVINBeta-lactoglobulin	143	150	54.056	17499000
KTKIPAVFKID	11	1258.765	sp P02754 LACB_BOVINBeta-lactoglobulin	91	101	54.005	1131300000
TPEVDDEALE	10	1116.482	sp P02754 LACB_BOVINBeta-lactoglobulin	141	150	53.878	63329000
ENSAEPEQS	9	989.3938	sp P02754 LACB_BOVINBeta-lactoglobulin	124	132	51.193	16462000
KPTPEGDLEIL	11	1210.645	sp P02754 LACB_BOVINBeta-lactoglobulin	63	73	48.091	116020000
KIDALNEN	8	915.4662	sp P02754 LACB_BOVINBeta-lactoglobulin	99	106	47.657	64359000
EELKPTPEGDLE	12	1355.646	sp P02754 LACB_BOVINBeta-lactoglobulin	60	71	46.462	51591000
TKIPAVFK	8	902.5589	sp P02754 LACB_BOVINBeta-lactoglobulin	92	99	45.335	38149000
KPTPEGDLEILL	12	1323.729	sp P02754 LACB_BOVINBeta-lactoglobulin	63	74	45.137	42727000