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An Alignment Database

release 2a

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NOTICE

Some of the datasets here are not yet in the public domain. These are clearly identified by the prefix `X` in the following tables. If you receive these coordinate sets with this database, the coordinates (and probably the derived data) should not be further distributed without the relevant authors permission.

REFERENCES

The work in this database was performed mainly by John Overington, with assistance from Andrej Šali, Mark Johnson, and Tom Blundell; many of the ideas contained in this database and the support program *JOY* arose while the authors were at Birkbeck College, but the database has been actively maintained and developed since. The source code for *JOY* and the formatted alignments (as PostScript files) can be obtained by contacting the author at the email address given on the first page.

For an introduction to the utility of this database in protein modelling applications, the following references should be consulted:

- J.P. Overington, M.S. Johnson, A. Šali, and T.L. Blundell, (1990), ‘‘Tertiary structural constraints on protein evolutionary diversity; Templates, key residues and structure prediction,’’ *Proc. Roy. Soc. Lond.*,**B 241**, pp. 132-145.
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- A. Šali, and T.L. Blundell, (1993), ‘‘Comparative protein modelling by satisfaction of spatial restraints,’’ *J. Mol. Biol.*, **234**, pp. 779-815.

- A. Šali, and J.P. Overington (1994), "Comparative modelling with the aid of a database of aligned protein families," *Prot. Sci.*, *submitted*.

The current reference that should be cited when using this version of the database is J.P. Overington and A. Šali (1994) unpublished results.

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TABLE 1. Families as a function of secondary structural class.

	family	$N_{str.}$	$N_{ave.}$	$\%ID_{ave.}$
	• small			
111	zinc finger — CCHC-type	2	17	47.06
112	zinc finger — CCHH-type	8	28	36.60
113	metallothionein — β-domain	3	30	83.33
114	metallothionein — α-domain	3	31	93.55
115	E3-binding domain	2	35	33.33
116	pancreatic hormone	2	36	41.67
117	rubredoxin	5	51	62.11
118	serine proteinase inhibitor — potato I-type	2	64	35.48
119	SH3 domain	4	68	30.78
120	ferredoxin (4Fe-4S)	3	72	29.91
121	high potential iron protein	4	72	26.65
122	ferredoxin (2Fe-2S)	3	97	72.04
	• small — disulphide			
123	serine proteinase inhibitor — squash-type	2	28	71.43
124	sea anemone toxin	2	45	27.03
125	EGF-like domain	4	46	36.26
126	insulin	4	55	47.40
127	serine proteinase inhibitor — Bowman-Birk-type	3	56	74.89
128	serine proteinase inhibitor — Kazal-type	6	56	40.77
129	serine proteinase inhibitor — Kunitz-type	4	56	39.70
130	C-module domain	2	60	37.93
131	snake toxin	10	63	42.92
132	kringle domain	4	86	39.98
	• all-α			
133	DNA-binding homeodomain	3	67	28.97
134	DNA-binding repressor	3	71	32.59
135	steroid-binding protein	2	73	55.71
136	cytochrome-c5	3	82	39.36
137	cytochrome-b	2	88	30.95
138	calcium-binding protein — parvalbumin-like	4	107	52.10
139	cytochrome-c	9	110	45.70
140	cytochrome-c3	2	112	35.42
141	hemerythrin	2	116	46.02
142	phospholipase A2	6	122	46.75
143	cytochrome-c’	2	129	21.60
144	globin	18	146	28.62
145	cytokine — granulocyte colony stimulating factor	3	153	81.85
146	calcium-binding protein — calmodulin-like	5	162	33.44
147	Fe/Mn superoxide dismutase	2	192	36.41
148	glutathione S-transferase	4	213	37.73
149	annexin	2	317	77.85
150	peroxidase	3	324	24.87
151	cytochrome p450	3	424	17.95
	• membrane bound all-α			
152	photosynthetic reaction center	2	826	48.49
	• α+β			

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153	protein G domain	2	63	87.50
154	interleukin 8-like protein	2	70	18.46
155	histidine carrier protein	2	87	59.30
156	ribonuclease — bacterial	3	104	61.44
157	SH2 domain	2	106	35.42
158	FK506-binding protein	2	110	57.01
159	ribonuclease — mammalian	2	124	81.45
160	lysozyme	6	128	63.90
161	ribonuclease H	3	141	34.01
162	histocompatibility antigen-binding domain	5	178	76.46
163	cysteine proteinase	3	215	55.35
164	carbonic anhydrase	2	256	61.57
165	thymidylate synthase	3	288	51.89
166	zinc metalloproteinase	3	310	44.73
167	serine proteinase inhibitor — serpin-type	4	378	31.41
168	amylase	3	485	37.52
	• α/β			
169	thioredoxin	4	96	14.50
170	nucleotide diphosphate kinase	2	151	60.67
171	flavodoxin	5	159	33.39
172	GTP-binding protein	2	171	14.19
173	dihydrofolate reductase	4	172	35.96
174	nucleotide kinase	4	202	24.95
175	β-lactamase	2	256	43.14
176	ricin-like protein	2	264	28.85
177	subtilase	7	274	51.88
178	periplasmic binding protein — sugar	3	295	21.33
179	phosphofructokinase	2	319	55.35
180	lactate/malate dehydrogenase	9	321	36.86
181	glyceraldehyde phosphate dehydrogenase	4	339	56.64
182	periplasmic binding protein — amino acid	2	345	79.07
183	alcohol dehydrogenase	2	374	87.17
184	actin/heat-shock cognate	2	377	14.10
185	isocitrate dehydrogenase	2	379	28.23
186	aspartate aminotransferase	2	398	39.90
187	disulphide oxidoreductase	5	466	29.96
188	α/β-hydrolase	2	534	27.14
189	cholesterol oxidase	2	541	16.40
190	haemocyanin	2	617	34.19
	• α/β-barrel			
191	tryptophan biosynthesis enzyme	2	226	10.22
192	triose phosphate isomerase	4	249	45.48
193	aldose reductase	2	311	47.67
194	fructose-1,6-biphosphatase aldolase	2	361	70.56
195	flavin-binding β-barrel	2	376	41.37
196	xylose isomerase	3	390	67.21
197	ribulose-1,5-biphosphate carboxylase/oxygenase	3	537	49.57
	• all-β			
198	immunoglobulin domain — C2 set	2	75	15.94
199	immunoglobulin domain — C1 set - non constant immunoglobulin	5	96	43.54
200	immunoglobulin domain — C1 set - constant immunoglobulin	11	98	34.28
201	retroviral proteinase	3	104	32.65
202	immunoglobulin domain — V set - non variable immunoglobulin	4	105	11.07
203	azurin/plastocyanin	8	109	35.10
204	antibacterial protein	3	111	43.07

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205	immunoglobulin domain — V set - immunoglobulin light chain	23	112	55.95
206	avidin	2	120	32.46
207	immunoglobulin domain — V set - immunoglobulin heavy chain	20	123	52.13
208	interleukin 1-β-like growth factor	4	141	29.50
209	lipocalin	8	144	18.07
210	Cu/Zn superoxide dismutase	3	152	56.19
211	glucose permease	2	154	42.28
212	crystallin	4	175	57.96
213	plant virus coat protein	2	185	23.31
214	serine proteinase — bacterial	3	188	45.36
215	plant lectin	5	234	45.22
216	serine proteinase — mammalian	12	238	37.56
217	aspartic proteinase	10	331	35.68
218	neuraminidase	3	389	35.68
219	picornavirus coat proteins	6	780	33.12
	• membrane bound all-β			
220	porin	2	335	64.53

TABLE 2. Small

1) zinc finger — CCHC-type

1ncp	1	N	17	N	Nucleocapsid protein P2 (N-terminal domain)	*HIV-1*		
1ncp	22	C	39	C	Nucleocapsid protein P2 (C-terminal domain)	*HIV-1*		

2) zinc finger — CCHH-type

5znf	1		30		zinc-finger (ZFY-6T)	*Homo sapiens*		
3znf	1		30		zinc-finger (enhancer binding protein)	*Homo sapiens*		
1ard	102		130		zinc-finger (transcription factor ADR1)	*Saccharomyces cerevisiae*		
1bbo	1		27		zinc-finger (enhancer binding protein)	*Homo sapiens*	2.20	15.20
1znf	1		25		zinc-finger (XFIN, 31st domain)	*Xenopus laevis*		
1zaa	34	C	61	C	zinc-finger (ZIF268, domain 2)	*Mus musculus*	2.10	18.20
1zaa	62	C	87	C	zinc-finger (ZIF268, domain 3)	*Mus musculus*	2.10	18.20
1zaa	3	C	33	C	zinc-finger (ZIF268, domain 1)	*Mus musculus*	2.10	18.20

3) metallothionein — β-domain

2mhu	1		30		metallothionein (β domain)	*Homo sapiens*		
2mrb	1		30		metallothionein (β domain)	*Oryctolagus cuniculus*		
2mrt	1		30		metallothionein (β domain)	*Rattus rattus*		

4) metallothionein — α-domain

1mrb	31		61		metallothionein (α domain)	*Oryctolagus cuniculus*		
1mrt	31		61		metallothionein (α domain)	*Rattus rattus*		
1mhu	31		61		metallothionein (α domain)	*Homo sapiens*		

5) E3-binding domain

1bbl	12		48		E3-binding domain	*Escherichia coli*		
1pde	7		39		E3-binding domain	*Bacillus stearothermophilus*		

6) pancreatic hormone

1bba	1		36		pancreatic polypeptide	*Bos taurus*		
1ppt	1		36		avian pancreatic polypeptide	*Meleagris gallopavo*	1.40	17.80

7) rubredoxin

6rxn	1		52		rubredoxin	*Desulfovibrio desulfuricans*	1.50	9.30
1rdg	1		52		rubredoxin	*Desulfovibrio gigas*	1.40	13.60
7rxn	1		52		rubredoxin	*Desulfovibrio vulgaris*	1.50	9.80
4rxn	1		54		rubredoxin	*Clostridium pasteurianum*	1.20	12.80
1zrp	1		53		rubredoxin	*Pyrococcus furiosus*		

8) serine proteinase inhibitor — potato I-type

2ci2	19	I	83	I	barley seed chymotrypsin inhibitor	*Hordeum vulgare*	2.00	19.80
1cse	8	I	70	I	eglin	*Hirudo medicinalis*	1.20	17.80

9) SH3 domain

1hsp	1		71		Phospholipase CγSH3 domain	*Homo sapiens*		
1shf	84	A	142	A	FYN SH3 domain	*Homo sapiens*	1.90	18.0
1shg	6		62		α spectrin	*Gallus gallus*	1.80	19.5
1pnj	1A		84		p85-α subunit SH3 domain	*Bos taurus*		

10) ferredoxin (4Fe-4S)

4fd1	1		106		ferredoxin	*Azotobacter vinelandii*	1.90	21.20
1fdx	1		54		ferredoxin	*Peptococcus aerogenes*	2.00	20.60
1fxd	1		58		ferredoxin II	*Desulfovibrio gigas*	1.70	15.70

11) high potential iron protein

1isu	1		62		high potential iron protein	*Rhodocyclus tenius*	1.50	17.30
2hip	1	A	71	A	high potential iron protein	*Oryctolagus cuniculus*	2.50	18.40
1hpi	1		71		high potential iron protein	*Ectothiorhodospira vacuolata*	1.80	16.30
1hip	1		85		high potential iron protein	*Chromatium vinosum*	2.00	24.00

12) ferredoxin (2Fe-2S)

1fxi	1	A	96	A	ferredoxin	*Aphanothece sacrum*	2.20	23.00
3fxc	1		98		ferredoxin	*Spirulina platensis*	2.50	31.00
1fxa	1	A	98	A	ferredoxin	*Anabaena 7120*	2.50	18.70

TABLE 3. Small — disulphide

13) serine proteinase inhibitor — squash-type

2eti	1		28		trypsin inhibitor	*Ecballium elaterium*		
1cti	1		29		trypsin inhibitor	*Cucurbita maxima*		

14) sea anemone toxin

1bds	1		43		anti-hypertensive protein BDS-1	*Anemonia sulcata*		
1sh1	1		48		neurotoxin 1	*Stichodactyla helianthus*		

15) EGF-like domain

1ixa	46		84		EGF-like module factor IX	*Homo sapiens*		
1apo	45		86		EGF-like module factor X	*Bos taurus*		
1epi	1		53		epidermal growth factor	*Mus musculus*		
4tgf	1		50		transforming growth factor α	*Homo sapiens*		

16) insulin

4ins	1	A	30	B	insulin	*Sus scrofa*	1.50	15.30
2ins	1	A	30	B	insulin	*Bos taurus*	2.50	18.00
6rlx	−2	A	24	B	relaxin	*Homo sapiens*	1.50	18.70
2gf1	1		70		insulin-like growth factor 1	*Homo sapiens*	0.00	0.00

17) serine proteinase inhibitor — Bowman-Birk-type

1tab	12	I	73	I	Bowman-Birk inhibitor AB-I	*Phaseolus angularis*	2.30	20.00
1bbi	1		71		chymotrypsin Bowman-Birk inhibitor	*Glycine max*		
1pi2	3		63		Bowman-Birk inhibitor PI-II	*Glycine max*	2.50	23.60

18) serine proteinase inhibitor — Kazal-type

1ovo	1	A	56	A	third domain ovomucoid inhibitor	*Coturnix coturnix Japonica*	1.90	20.00
2ovo	1		56		third domain ovomucoid inhibitor	*Lophura nycthemera*	1.50	19.90
2bus	2		57		seminal plasma proteinase inhibitor IIA	*Bos taurus*		
1tgs	1	I	56	I	pancreatic secretory trypsin inhibitor	*Sus scrofa*	1.80	18.60
1cgi	1	I	56	I	pancreatic secretory trypsin inhibitor	*Homo sapiens*	2.30	19.50
1pce	1		60		PEC-60	*Sus scrofa*		

19) serine proteinase inhibitor — Kunitz-type

5pti	1		58		pancreatic polypeptide inhibitor	*Bos taurus*	1.00	20.00
1aap	1	A	56	A	Alzheimer's amyloid B-protein precursor	*Homo sapiens*	1.50	17.70
1shp	1		55		trypsin inhibitor	*Stichodactyla helianthus*		
1dtx	2		59		α-dendrotoxin	*Dendroaspis angusticeps*	2.20	16.90

20) C-module domain

1hfh	1		62		factor H 15th C-module domain	*Homo sapiens*		
1hfh	63		120		factor H 16th C-module domain	*Homo sapiens*		

21) snake toxin

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2ctx	1		71		α-cobratoxin	*Naja naja Siamensis*	2.40	19.50
2abx	1	A	74	A	α-bungarotoxin	*Bungarus multicinctus*	2.50	24.00
1nbt	1	A	66	A	neuronal bungarotoxin	*Bungarus multicinctus*		
1fas		1		61	fasciculin 1	*Dendroaspis angusticeps*	1.80	14.90
1nea	1		61		α-toxin	*Naja nigricollis*		
1nor	1		61		neurotoxin II	*Naja naja oxiana*		
1ntx	1		62		α-neurotoxin	*Dendroapsis polylepsis polylepsis*		
1nxb	1		62		erabutoxin	*Laticauda semifasciata*	1.38	24.00
1tgx	1	A	60	A	γtoxin	*Naja nigricolis*	1.55	17.20
1cdt	1	A	60	A	cardiotoxin V4	*Naja mossambica mossambica*	2.50	19.70

22) kringle domain

1pk4	0		80		plasminogen kringle 4	*Homo sapiens*	1.90	14.20
1tpk	−3	A	82	A	tissue-type plasminogen activator kringle	*Homo sapiens*	2.40	18.40
1kdu	−1		82		urinary plasminogen activator kringle	*Homo sapiens*		
2pf1	64		156		thrombin kringle 1	*Bos taurus*	2.20	17.50

TABLE 4. All α

23) DNA-binding homeodomain

1hdd	3	C	59	C	engrailed homeodomain	*Drosophila melanogaster*	2.80	22.50
1hom	1		68		antennapedia homeodomain	*Drosophila melanogaster*		
1lfb	13		89		transcription factor LFB homeodomain	*Rattus rattus*	2.80	21.20

24) DNA-binding repressor

2cro	−1		63		cro repressor	*phage 434*	2.30	19.50
1r69	1		63		repressor	*phage 434*	2.00	19.30
1lrd	6	3	92	3	lambda repressor	*bacteriophage l*	2.50	24.20

25) steroid-binding protein

2utg	1	A	70	A	uteroglobin	*Oryctolagus cuniculus*	1.60	19.00
1ccd	−2		75		Clara cell 17kDa protein	*Rattus rattus*	3.00	22.50

26) cytochrome-c5

1cor	2		82		cytochrome-c551	*Pseudomonas stutzeri*		
351c	1		82		cytochrome-c551	*Pseudomonas aeruginosa*	1.60	19.50
1cc5	5		87		cytochrome-c5	*Azotobacter vinelandii*	2.50	29.00

27) cytochrome-b

3b5c	3		87		cytochrome b5	*Escherichia coli*	1.40	16.40
1fcb	1	A	92	A	flavocytochrome b2	*Saccharomyces cerevisiae*	2.40	18.80

28) calcium-binding protein — parvalbumin-like

5pal	1		109		parvalbumin	*Triakis semifasciata*	1.50	17.30
5cpv	1		108		parvalbumin	*Cyprinus carpio*	1.60	18.70
1omd	2		108		oncomodulin	*Rattus norvegicus*	1.90	16.60
1pal	1		108		parvalbumin	*Esox lucius*	1.70	19.70

29) cytochrome-c

1cry	1		107		cytochrome-c2	*Rhodopseudomonas viridis*	3.00	21.90
2pcbB	1		104		cytochrome-c	*Equus caballus*	2.80	22.20
1yea	−9		103		cytochrome-c isozyme 2	*Saccharomyces cerevisiae*	1.90	19.00
1ycc	−5		103		cytochrome-c isozyme 1	*Saccharomyces cerevisiae*	1.20	19.20
1ccr	1		111		cytochrome-c	*Oryza sativa*	1.50	19.00
5cyt	1	R	103	R	cytochrome-c	*Thunnus alalunga*	1.50	15.90
2c2c	1		112		cytochrome-c2	*Rhodospirillum rubrum*	2.00	17.20
1c2r	1	A	116	A	cytochrome-c2	*Rhodobacter capsulatus*	2.50	16.80
155c	1		121		cytochrome-c550	*Paracoccus denitrificans*	2.50	

30) cytochrome-c3

1cy3	1		118		cytochrome c3	*Desulfovibrio desulfuricans Norway*	2.50	34.00
2cdv	1		107		cytochrome c3	*Desulfovibrio vulgaris Miyazaki*	1.80	17.60

31) hemerythrin

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2mhr	1		118		myohemerythrin	*Themiste zostericola*	1.70	15.80
2hmq	1	A	113	A	hemerythrin	*Themiste dyscritum*	2.00	17.30

32) phospholipase A2

1bp2	1		123		phospholipase A2	*Bos taurus*	1.70	17.10
1p2p	1		124		phospholipase A2	*Sus scrofa*	2.60	24.10
1bbc	1		132		phospholipase A2	*Homo sapiens*	2.20	17.80
1pp2	1	R	133	R	phospholipase A2	*Crotalus atrox*	2.50	17.80
1ppa	1		133		phospholipase A2	*Agkistridon piscivorus*	2.00	15.70
1pob	1	A	118	A	phospholipase A2	*Naja naja atra*	2.00	17.90

33) cytochrome-c'

2ccy	2	A	128	A	cytochrome c'	*Rhodospirilium molischianum*	1.70	18.80
1bbh	1	A	131	A	cytochrome c'	*Chromatium vinosum*	1.80	18.50

34) globin

2mm1	1		153		myoglobin	*Homo sapiens*	2.80	15.80
1ymb	1		153		myoglobin	*Equus caballus*	1.90	15.50
1pmb	1	A	153	A	myoglobin	*Sus scrofa*	2.50	18.50
1mbs	1		153		myoglobin	*Phoca vitulina*	2.50	
4mbn	1		153		myoglobin	*Physeter catodon*	2.00	17.20
1myt	5		153		myoglobin	*Thunnus albacares*	1.74	17.70
2hhb	1	A	141	A	haemoglobin α-chain	*Homo sapiens*	1.70	16.00
2mhb	1	A	141	A	haemoglobin α-chain	*Equus caballus*	1.70	23.00
1pbx	1	A	142	A	haemoglobin	*Pagothenia bernacchii*	2.50	17.80
2hhb	1	B	146	B	haemoglobin β-chain	*Homo sapiens*	1.70	16.00
2mhb	1	B	146	B	haemoglobin β-chain	*Equus caballus*	1.70	23.00
2lhb	1		149		haemoglobin	*Petromyzon marinus*	2.00	14.20
1mba	1		146		myoglobin	*Aplysia liminacia*	1.60	19.30
1sdh	1	A	146	A	haemoglobin	*Scapharca inaequivalvis*	2.40	15.60
1lh1	1		153		leghaemoglobin	*Lupinus luteum*	2.00	
1ith	1	A	141	A	haemoglobin	*Urechis caupo*	2.50	14.70
1ecd	1		136		erythrocruorin	*Chironomous thummi thummi*	1.40	19.00
2hbg	1		147		haemoglobin	*Glycera dibranchiata*	1.50	12.70

35) cytokine — granulocyte colony stimulating factor

1bgc	9		173		Granulocyte colony stimulating factor	*Bos taurus*	1.70	21.30
1bgd	10		173		Granulocyte colony stimulating factor	*Canis familiaris*	2.30	20.7
1rhg	9	A	172	A	Granulocyte colony stimulating factor	*Homo sapiens*	2.20	21.50

36) calcium-binding protein — calmodulin-like

3cln	5		147		calmodulin	*Rattus rattus*	2.20	17.50
4cln	1		148		calmodulin	*Drosophila melanogaster*	2.20	19.70
5tnc	2		162		troponin C	*Meleagris gallopavo*	2.00	15.50
2scp	1	A	174	A	sarcoplasmic calcium-binding protein	*Nereis diversicolor*	2.00	18.00
1sas	1		185		sarcoplasmic calcium binding protein	*Branchiostoma lanceolatum*	2.40	19.00

37) Fe/Mn superoxide dismutase

1abm	1	A	198	A	manganese superoxide dismutase	*Homo sapiens*	2.20	17.10
3sdp	5	A	190	A	iron superoxide dismutase	*Pseudomonas ovalis*	2.10	23.20

38) glutathione S-transferase

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1gss	1	A	207	A	glutathione S-transferase	*Homo sapiens*	2.80	19.60
1gsr	1	A	207	A	glutathione S-transferase	*Sus scrofa*	2.30	24.10
5gst	1	A	217	A	glutathione S-transferase	*Rattus rattus*	2.0	19.2
1guh	2	A	222	A	glutathione S-transferase A1-1	*Homo sapiens*	2.60	22.90

39) annexin

1ala	3		318		annexin V	*Homo sapiens*	2.30	18.40
1avh	3	A	320	A	annexin V	*Gallus gallus*	2.30	19.20

40) peroxidase

1arp	9		344		peroxidase	*Arthromyces ramosus*	1.90	17.40
1lga	1	A	343	A	lignin peroxidase	*Phanerochaete chryosporium*	2.03	15.00
2cyp	2		294		cytochrome c' peroxidase	*Saccharomyces cerevisiae*	1.70	20.20

41) cytochrome p450

2cpp	10		414		cytochrome p450CAM	*Pseudomonas putida*	1.63	19.00
1cpt					cytochrome p450TERP	*Pseudomonas sp.*	2.30	18.90
2hpd	1	A	457	A	cytochrome p450BM3	*Bacillus megaterium*	2.0	16.70

TABLE 5. Membrane-bound all-α

42) photosynthetic reaction center

1prc	1	L	258	H	photosynthetic reaction center	*Rhodopseudomonas viridis*	2.30	19.30
4rcr	5	L	248	H	photosynthetic reaction center	*Rhodobacter sphaeroides R-26*	2.80	22.70

TABLE 6. α+β

43) protein G domain

1pgx	8		77		protein G domain B2	*Streptococcus sp.*	1.70	19.10
2gb1	1		56		protein G domain B1	*Streptomyces griseus*		

44) interleukin 8-like protein

1hum	1	A	69	A	macrophage inflammatory protein 1 β	*Homo sapiens*		
1il8	2	A	72	A	interleukin 8	*Homo sapiens*		

45) histidine carrier protein

1hid	2		88		histidine containing carrier protein	*Bacillus subtilis*		
1ptf	1		87		histidine containing carrier protein	*Streptomyces faecalis*	1.60	15.6

46) ribonuclease — bacterial

1fus	2		107		ribonucelase F1	*Fusarium moniliforme*	1.30	18.70
1rds	1		105		ribonuclease MS	*Aspergillus saitoi*	1.80	20.4
1rnt	1		104		ribonuclease T1	*Aspergillus oryzae*	2.90	18.00

47) SH2 domain

1ab2	1		109		proto-oncogene Abelson SH2 domain	*Homo sapiens*		
1shb	2	A	104	A	V-src tyrosin kinase SH2 domain	*Rous sarcoma virus*	2.00	19.00

48) FK506-binding protein

1fkb	1		107		FK506-binding protein	*Homo sapiens*	1.70	16.50
1yat	−5		107		12KDa FK506-binding protein	*Saccharomyces cerevisiae*	2.50	17.70

49) ribonuclease — mammalian

1rbb	1	A	124	A	ribonuclease B	*Bos taurus*	2.50	21.8
1bsr	1	A	124	A	seminal ribonuclease	*Bos taurus*	1.90	17.7

50) lysozyme

1ghl	0	A	129	A	lysozyme	*Phasianus colchicus*	2.10	17.80
1hhl	1		129		lyszoyme	*Numida meleagris*	1.90	17.0
1lzt	1		129		lysozyme	*Gallus gallus*	2.00	25.40
1lz3	1		129		lysozyme	*Meleagris gallopavo*	1.50	18.40
1lz1	1		130		lysozyme	*Homo sapiens*	1.50	18.70
1alc	1		122		α-lactalbumin	*Papio cynocephalus*	1.70	22.00

51) ribonuclease H

1rnh	2		152		ribonuclease H	*Escherichia coli*	2.00	19.80
1ril	2		147		ribonuclease H	*Thermus thermophilus*	2.80	20.50
1hrh	427	A	556	A	ribonuclease H	*HIV-1*	2.40	20.00

52) histocompatibility antigen-binding domain

2hla	1	A	178	A	histocompatibility antigen AW68.1	*Homo sapiens*	2.60	17.30
3hla	1	A	178	A	histocompatibility antigen AW2.1	*Homo sapiens*	2.60	16.90
1hsa	1	A	178	A	histocompatibility antigen HLA-B*2705	*Homo sapiens*	2.10	20.30
1vab	1	A	178	A	histocompatibility antigen H-2KB	*Mus musculus*	2.50	15.90
1hoc	1	A	178	A	histocompatibility antigen H-2DB	*Mus musculus*	2.40	19.80

53) cysteine proteinase

9pap	1		212		papain	*Carica papaya*	1.60	16.10
2act	1		218		actinidin	*Actinida chinensis*	1.70	16.50
1ppo	1		216		papaya proteinase	*Carica papaya*	1.80	15.50

54) carbonic anhydrase

1ca2	4		260		carbonic anhydrase II	*Homo sapiens*	2.00	17.30
2cab	5		260		carbonic anhydrase B	*Homo sapiens*	2.00	19.30

55) thymidylate synthase

1tis	1		286		thymidylate synthase	*Bacteriophage T4*	3.10	19.90
3tms	1		264		thymidilate synthase	*Escherichia coli*	2.10	22.00
4tms	1		316		thymidilate synthase	*Lactobacillus casei*	2.40	19.30

56) zinc metalloproteinase

3tln	1		316		thermolysin	*Bacillus thermoproteolyticus*	1.60	21.30
1npc	1		317		neutral protease	*Bacillus cereus*	2.00	17.50
1ezm	1		298		elastase	*Pseudomonas aeruginosa*	1.50	18.00

57) serine proteinase inhibitor — serpin-type

Xpai	19		397		plasminogen activator inhibitor type-1	*Homo sapiens*	2.60	19.80
1hle	23	A	391	B	leukeocyte elastase inhibitor	*Equus caballus*	1.95	17.6
1ova	24	A	391	A	ovalbumin	*Gallus domesticus*	2.00	16.90
9api	20	A	395	C	α1-antitrypsin	*Homo sapiens*	3.00	20.90

58) amylase

1cdg	1		503		cyclodextrin glycosyltransferase	*Bacillus circulans*	2.00	16.40
2aaa	1		476		α-amylase	*Aspergillus niger*	2.10	16.90
6taa	1		476		α-amylase	*Aspergillus oryzae*	2.10	19.80

TABLE 7. α/β

59) thioredoxin

1aaz	1	A	87	A	glutaredoxin	*bacteriophage T4*	2.00	21.00
1ego	1		85		glutaredoxin	*Escherichia coli*		
3trx	1		105		thioredoxin	*Homo sapiens*		
2trx	1	A	108	A	thioredoxin	*Escherichia coli*	1.70	16.50

60) nucleotide diphosphate kinase

1ndp	2	A	153	A	nucleotide diphosphate kinase	*Dictyostelium discoideum*	2.20	19.30
1ndl	6	A	155	A	nucleotide diphosphate kinase	*Drosophila melanogaster*	2.40	16.70

61) flavodoxin

3fxn	1		138		flavodoxin	*Clostridium sp.*	1.90	21.40
1fx1	2		148		flavodoxin	*Desulfovibrio vulgaris*	2.00	
1flv	2		169		flavodoxin	*Anabaena 7120*	2.00	18.50
1ofv	1		169		flavodoxin	*Anacystis nidulans*	1.70	19.00
2fcr	1		173		flavodoxin	*Chondrus crispus*	1.80	16.80

62) GTP-binding protein

1etu	5		200		Elongation facture Tu	*Escherichia coli*	2.90	18.00
5p21	1		166		Harvey-ras p21	*Homo sapiens*	1.40	19.60

63) dihydrofolate reductase

3dfr	1		162		dihydrofolate reductase	*Lactobacillus casei*	1.70	15.20
4dfr	1	A	159	A	dihydrofolate reductase	*Escherichia coli*	1.70	15.50
8dfr	1		186		dihydrofolate reductase	*Gallus gallus*	1.70	18.80
1dhf	4	A	185	A	dihydrofolate reductase	*Homo sapiens*	2.30	17.60

64) nucleotide kinase

1ake	1	A	214	A	adenylate kinase	*Escherichia coli*	1.90	19.60
1ak3	5	A	218	A	adenylate kinase isozyme 3	*Bos taurus*	1.90	28.40
3adk	1		194		adenylate kinase	*Sus scrofa*	2.10	19.30
1gky	1		186		guanylate kinase	*Saccharomyces cerevisiae*	2.00	17.30

65) β-lactamase

3blm	31		290		β-lactamase	*Staphylococcus aureus*	2.00	16.30
4blm	31	A	291	A	β-lactamase	*Bacillus licheniformis*	2.00	16.00

66) ricin-like protein

1fmp	1		267		ricin A-chain	*Ricinus communis*	2.80	20.90
1paf	1	A	262	A	pokeweed antiviral protein	*Phytolacca americana*	2.50	17.00

67) subtilase

Xesp	2	A	275	A	esperase	*Bacillus lentus*	1.80	

1st3	1		269		subtilisin BL	*Bacillus lentus*	1.40	19.00
1sbt	1		275		subtilisin BPN	*Bacillus amyloliquefaciens*	2.50	44.00
1mee	1	A	275	A	mesentericopeptidase	*Bacillus mesentericus*	2.00	15.10
1sbc	1		275		subtilisin Carlsberg	*Bacillus subtilis*	2.50	20.60
1thm	1		279		thermitase	*Thermoactinomyces vulgaris*	1.40	16.60
2prk	1		279		proteinase K	*Tritirachium album*	1.50	16.70

68) periplasmic binding protein — sugar

1abp	1		306		L-arabinose-binding protein	*Escherichia coli*	2.40	
2gbp	1		309		D-galactose/D-glucose-bind	*Escherichia coli*	1.90	14.60
1dri	1		271		D-ribose binding protein	*Escherichia coli*	1.70	18.50

69) phosphofructokinase

1pfk	0	A	319	A	phosphofructokinase	*Escherichia coli*	2.40	16.50
4pfk	1		320		phosphofructokinase	*Bacillus stearothermophilus*	2.40	16.90

70) lactate/malate dehydrogenase

6ldh	1		329		lactate dehydrogenase	*Squalis acanthias*	2.80	20.20
1lld	7	A	319	A	lactate dehydrogenase	*Brevibacterium longum AM101-2*	1.50	17.90
9ldb	1	A	331	A	lactate dehydrogenase (A-type)	*Sus scrofa*	2.20	22.00
5ldh	1		331		lactate dehydrogenase (B-type)	*Sus scrofa*	2.70	16.60
1ldb	15		331		lactate dehydrogenase	*Bacillus stearothermophilus*	2.80	28.60
2ldx	1		331		lactate dehydrogenase	*Mus musculus*	3.00	25.60
1llc	13		334		lactate dehydrogenase	*Lactobacillus casei*	3.00	37.40
4mdh	1	A	333	A	malate dehydrogenase	*Sus scrofa*	2.50	16.70
2cmd	1		312		malate dehydrogenase	*Escherichia coli*	1.90	18.80

71) glyceraldehyde phosphate dehydrogenase

3gpd	1	R	334	R	D-glyceraldehyde-3-phosphate dehydrogenase	*Homo sapiens*	3.50	33.00
1gpd	1	G	334	G	D-glyceraldehyde-3-phosphate dehydrogenase	*Homarus americanus*	2.90	18.50
1gga	1	O	358	O	D-glyceraldehyde-3-phosphate dehydrogenase	*Trypanosoma brucei*	3.20	17.60
1gd1	0	O	333	O	D-glyceraldehyde-3-phosphate dehydrogenase	*Bacillus stearothermophilus*	1.80	17.70

72) periplasmic binding protein — amino acid

2lbp	1		346		leucine binding protein	*Escherichia coli*	2.40	21.30
2liv	1		344		Leu/Ile/Val binding protein	*Escherichia coli*	2.40	17.90

73) alcohol dehydrogenase

3hud	1	A	374	A	alcohol dehydrogenase	*Homo sapiens*	3.00	25.30
8adh	1		374		alcohol dehydrogenase	*Equus caballus*	2.40	19.00

74) actin/heat-shock cognate

1atn	1	A	372	A	actin	*Oryctolagus cuniculus*	2.80	21.00
Xhsc	3		384		heat-shock cognate	*Bos taurus*	2.20	20.50

75) isocitrate dehydrogenase

1ipd	1		345		3-isopropylmalate dehydrogenase	*Thermus thermophilus*	2.20	18.50
3icd	3		416		isocitrate dehydrogenase	*Escherichia coli*	2.50	18.00

76) aspartate aminotransferase

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3aat	5		409		aspartate aminotransferase	*Escherichia coli*	2.80	21.50
1ama	3		410		aspartate aminotransferase	*Gallus gallus*	2.30	15.90

77) disulphide oxidoreductase

2tpr	1	A	482	A	trypanothione reductase	*Crithidia fasciculata*	2.40	18.00
3grs	18		478		glutathione reductase	*Homo sapiens*	1.50	18.60
3lad	1	A	472	A	lipoamide dehydrogenase	*Azotobacter vinelandii*	2.20	19.80
1lpf	1	A	472	A	lipoamide dehydrogenase	*Pseduomonas fluorescens*	2.80	19.60
1npx	1		447		NADH peroxidase	*Streptococcus faecalis*	2.20	17.70

78) α/β-hydrolase

1ace	4	534	acetylcholinesterase	*Torpedo californica*	2.80	18.60
1thg	2	544	triacylglycerol hydrolase	*Geotrichum candidum*	1.80	15.70

79) cholesterol oxidase

1cox	5	506	cholesterol oxidase	*Brevibacterium oxidase*	1.80	15.30
1gal	3	583	glucose oxidase	*Aspergillus niger*	2.30	18.10

80) haemocyanin

1hc1	5	653	haemocyanin	*Panularus interruptus*	3.20	20.10
1lla	2	628	haemocyanin	*Limulus polyphemus*	2.20	17.40

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TABLE 8. α/β-barrel

81) tryptophan biosynthesis enzyme

1pii	1		255		phosphoribosyl-anthranilate isomerase	*Escherichia coli*	2.00	17.30
1pii	256		452		indoleglycerol-phosphate synthase	*Escherichia coli*	2.00	17.30

82) triose phosphate isomerase

1tim	1	A	248	A	triose phosphate isomerase	*Gallus gallus*	2.50	21.00
5tim	2	A	250	A	triose phosphate isomerase	*Trypanosoma brucei brucei*	1.83	18.80
1ypi	2	A	248	A	triose phosphate isomerase	*Saccharomyces cerevisiae*	1.90	21.00
1tre	3	A	257	A	triose phosphate isomerase	*Escherichia coli*	2.60	11.90

83) aldose reductase

1ads	1		315		Aldose reductase	*Homo sapiens*	1.60	20.0
1ral	1		308		3-α-hydroxysteroid dehydrogenase	*Rattus norvegicus*	3.00	22.0

84) fructose-1,6-biphosphatase aldolase

1ald	1		363		aldolase A	*Homo sapiens*	2.00	22.00
1fba	2	A	364	A	fructose-1,6-biphosphatase aldolase	*Drosophila melanogaster*	1.90	17.90

85) flavin-binding β-barrel

1gox	1		359		glycolate oxidase	*Spinacia oleracea*	2.00	18.90
1fcb	93	A	511	A	flavocytochrome b2	*Saccharomyces cerevisiae*	2.40	18.80

86) xylose isomerase

4xia	2	A	394	A	xylose isomerase	*Arthrobacter, strain B3728*	2.30	15.60
6xia	1		387		xylose isomerase	*Streptomyces albus*	1.60	14.10
1xim	3	A	394	A	xylose isomerase	*Actinoplanes missouriensis*	2.20	15.20

87) ribulose-1,5-biphosphate carboxylase/oxygenase

4rub	1	S	472	B	ribulose-1,5-biphosphate carboxylase/oxygenase	*Nicotiana tabacum*	2.70	20.20
8rub	1	S	475	L	ribulose-1,5-biphosphate carboxylase/oxygenase	*Spinacia oleracea*	2.40	24.00
5rub	2	A	457	A	ribulose-1,5-biphosphate carboxylase/oxygenase	*Rhodospirillum rubrum*	1.70	18.00

TABLE 9. All β

88) immunoglobulin domain — C2 set

2cd4	99		176		CD4 domain 2	*Homo sapiens*	2.40	22.20
1cid	106		177		CD4 domain 4	*Rattus rattus*	2.80	23.30

89) immunoglobulin domain — C1 set - non constant immunoglobulin

3hla	1	B	99	B	β-2 microglobulin	*Homo sapiens*	2.60	16.90
1vab	1	B	99	B	β-2 microglobulin	*Mus musculus*	2.50	15.90
3hla	179	A	270	A	α-1 domain class I MHC	*Homo sapiens*	2.60	16.90
1hsa	179	A	276	A	α-1 domain class I MHC	*Homo sapiens*	2.10	20.30
1vab	179	A	274	A	α-1 domain class I MHC	*Mus musculus*	2.50	15.90

90) immunoglobulin domain — C1 set - constant immunoglobulin

2hfl	122	H	213	H	immunoglobulin FAB HyHEL-5 CH1	*Mus musculus*	2.50	24.50
4fab	124	H	216	H	immunoglobulin FAB 4-4-20	*Mus musculus*	2.70	21.50
1mam	125	H	217	H	immunoglobulin FAB YS-T9.1	*Mus musculus*	2.50	21.50
2fb4	124	H	221	H	immunoglobulin FAB KOL CH1	*Homo sapiens*	1.90	18.90
2fbj	124	H	220	H	immunoglobulin FAB J539 CH1	*Mus musculus*	2.00	19.40
2fbj	112	L	213	L	immunoglobulin FAB J539 CL1	*Mus musculus*	2.00	19.40
1dfb	111	L	212	L	immunoglobulin FAB 3D6 CL1	*Homo sapiens*	2.70	17.70
2fb4	115	L	214	L	immunoglobulin FAB KOL CL1	*Homo sapiens*	1.90	18.90
1fc1	238	A	341	A	immunoglobulin FC CH2	*Homo sapiens*	2.90	22.00
1fc1	346	A	443	A	immunoglobulin FC CH3	*Homo sapiens*	2.90	22.00
1pfc	346		446		immunoglobulin FC CH2	*Cavia porcellus*	3.10	30.30

91) retroviral proteinase

3phv	1		99		HIV-1 proteinase	*HIV-1*	2.30	18.90
1ivp	1	A	99	A	HIV-2 proteinase	*HIV-2*	2.50	19.70
2rsp	1	A	124	A	Rous sarcoma proteinase	*Rous sarcoma virus*	2.00	19.00

92) immunoglobulin domain — V set - non variable immunoglobulin

1cd8	1		114		CD8	*Homo sapiens*	2.60	19.20
2cd4	1		98		CD4 domain 1	*Homo sapiens*	2.40	22.20
1cid	1		105		CD4 domain 3	*Rattus rattus*	2.80	23.30
1cdb	1		105		CD2 domain 1	*Homo sapiens*		

93) azurin/plastocyanin

2aza	1	A	129	A	azurin	*Alcaligenes denitrificans*	2.50	15.70
1azu	3		128		azurin	*Pseudomonas aeruginosa*	2.70	35.00
1pcy	1		99		plastocyanin	*Populus nigra Italica*	1.60	17.00
2plt	0		99		plastocyanin	*Chlamydomonas reinhardtii*	1.50	16.8
9pcy	1		99		plastocyanin	*Phaseolus vulgaris*		
7pcy	0		99		plastocyanin	*Enteromorpha prolifera*	1.80	11.70
1paz	1		120		pseudoazurin	*Alcaligenes faecalis*	1.50	15.90
1mda	3	E	105	E	amicyanin	*Paracoccus denitrificans*	2.50	35.60

94) antibacterial protein

2mcm	1		112		macromycin	*Streptomyces macromomyceticus*	1.50	16.20
1noa	1		113		neocarzostatin	*Streptomyces carzinostaticus*	1.50	17.20
1acx	1		107		actinoxanthin	*Actinomyces globisporus*	2.00	

95) immunoglobulin domain — V set - immunoglobulin light chain

1hil	1	A	112	A	immunoglobulin FAB 17/9	*Mus musculus*	2.00	19.00
1bbd	1	L	118	L	immunoglobulin FAB 8F5	*Mus musculus*	2.80	19.00
1mcp	1	L	118	L	immunoglobulin FAB McPC603	*Mus musculus*	2.70	22.50
1nca	1	L	112	L	immunoglobulin FAB NC41	*Mus musculus*	2.50	19.10
1igf	1	L	112	L	immunoglobulin FAB B13I2	*Mus musculus*	2.80	18.10
4fab	1	L	117	L	immunoglobulin FAB 4-4-20	*Mus musculus*	2.70	21.50
1mam	1	L	112	L	immunoglobulin FAB YS-T9.1	*Mus musculus*	2.50	21.50
1igm	1	L	112	L	immunoglobulin FAB POT	*Homo sapiens*	2.30	20.10
6fab	1	L	112	L	immunoglobulin FAB 36-71	*Mus musculus*	1.90	20.90
1rei	1	A	107	A	immunoglobulin Bence-Jones REI	*Homo sapiens*	2.00	23.00
1dfb	1	L	110	L	immunoglobulin FAB 3D6	*Homo sapiens*	2.70	17.70
1fdl	1	L	112	L	immunoglobulin FAB D1.3	*Mus musculus*	2.50	18.40
3hfm	1	L	112	L	immunoglobulin FAB HyHEL-10	*Homo sapiens*	3.00	24.60
1baf	1	L	112	L	immunoglobulin FAB AN02	*Mus musculus*	2.90	19.50
2hfl	1	L	110	L	immunoglobulin FAB HyHEL-5	*Mus musculus*	2.50	24.50
1jhl	1	L	108	L	immunoglobulin FAB D11.15	*Mus musculus*	2.40	21.40
2fbj	1	L	111	L	immunoglobulin FAB J539	*Mus musculus*	2.00	19.40
1bjl	2	1	117	1	immunoglobulin Bence-Jones loc	*Homo sapiens*	3.00	19.40
2fb4	1	L	114	L	immunoglobulin FAB KOL	*Homo sapiens*	1.90	18.90
2rhe	1		114		immunoglobulin Bence-Jones RHE	*Homo sapiens*	1.60	14.90
2mcg	2	1	116	1	immunoglobulin Bence-Jones MCG	*Homo sapiens*	2.00	18.70
7fab	1	L	108	L	immunoglobulin FAB NEW	*Homo sapiens*	2.00	16.90
8fab	3	A	112	A	immunoglobulin FAB HIL	*Homo sapiens*	1.80	17.30

96) avidin

1pts	13	A	133	A	streptavidin	*Streptomyces avidinii*	2.00	17.90
2avi	3	A	123	A	avidin	*Gallus gallus*	3.00	15.10

97) immunoglobulin domain — V set - immunoglobulin heavy chain

1igm	1	H	129	H	immunoglobulin FAB POT	*Homo sapiens*	2.30	20.10
1baf	1	H	120	H	immunoglobulin FAB AN02	*Mus musculus*	2.90	19.50
3hfm	1	H	118	H	immunoglobulin FAB HyHEL-10	*Homo sapiens*	3.00	24.60
7fab	1	H	122	H	immunoglobulin FAB NEW	*Homo sapiens*	2.00	16.90
1fai	1	H	129	H	immunoglobulin FAB R19.9	*Mus musculus*	2.70	18.90
1jhl	1	H	116	H	immunoglobulin DAB D11.15	*Mus musculus*	2.40	21.40
1fdl	1	H	121	H	immunoglobulin FAB D1.3	*Mus musculus*	2.50	18.40
1igf	1	H	118	H	immunoglobulin FAB B13I2	*Mus musculus*	2.80	18.10
1hil	1	B	118	B	immunoglobulin FAB 17/9	*Mus musculus*	2.00	19.00
2fbj	1	H	123	H	immunoglobulin FAB J539	*Mus musculus*	2.00	19.40
1mcp	1	H	127	H	immunoglobulin FAB McPC603	*Mus musculus*	2.70	22.50
1mam	1	H	124	H	immunoglobulin FAB YS-T9.1	*Mus musculus*	2.50	21.50
4fab	1	H	123	H	immunoglobulin FAB 4-4-20	*Mus musculus*	2.70	21.50
1dfb	1	H	131	H	immunoglobulin FAB 3D6	*Homo sapiens*	2.70	17.70
2fb4	1	H	118	H	immunoglobulin FAB KOL	*Homo sapiens*	1.90	18.90
8fab	1	B	126	B	immunoglobulin FAB HIL	*Homo sapiens*	1.80	17.30
1bbd	1	H	123	H	immunoglobulin FAB 8F5	*Mus musculus*	2.80	19.00
2hfl	2	H	116	H	immunoglobulin FAB HyHEL-5	*Mus musculus*	2.50	24.50
6fab	1	H	126	H	immunoglobulin FAB 36-71	*Mus musculus*	1.90	20.90
1nca	1	H	118	H	immunoglobulin FAB NC41	*Mus musculus*	2.50	19.10

98) interleukin 1-β-like growth factor

1i1b	3		153		interleukin 1β	*Homo sapiens*	2.00	18.90
1mib	3		152		interleukin 1β	*Mus musculus*	2.80	19.20
2fgf	19		144		basic fibroblast growth factor	*Homo sapiens*	1.80	18.60
1bar	1	B	138	B	acidic fibroblast growth factor	*Homo sapiens*	2.70	17.70

99) lipocalin

1mup	5		161		major urinary protein	*Mus musculus*	2.40	19.10
1rbp	1		174		retinol-binding protein	*Homo sapiens*	2.00	18.10
1bbp	2	A	178	A	bilin-binding protein	*Pieris brassicae*	2.00	20.00
1ifb	1		131		intestinal fatty acid-binding protein	*Rattus rattus*	2.00	18.80
1alb	1		131		adipocyte lipid-binding protein	*Mus musculus*	2.50	18.30
1mdc	1		131		fatty acid-binding protein	*Manduca sexta*	1.80	17.30
2hmb	1		131		muscle fatty acid binding protein	*Homo sapiens*	2.10	19.50
1opa	1	A	133	A	retinol binding protein II	*Rattus rattus*	1.90	20.00

100) Cu/Zn superoxide dismutase

1srd	1	A	154	A	superoxide dismutase	*Spinacea oleracea*	2.00	24.90
1sdy	2	A	151	A	superoxide dimutase	*Saccharomyces cerevisiae*	2.50	15.80
2sod	1	O	151	O	superoxide dismutase	*Bos taurus*	2.00	25.60

101) glucose permease

1f3g	19		169		phosphocarrier III glc	*Escherichia coli*	2.10	16.20
1gpr	4		161		glucose permease (domain IIA)	*Bacillus subtilis*	1.90	15.60

102) crystallin

4gcr	1		174		γ-II crystallin	*Bos taurus*	1.50	18.10
3gcr	1	A	173	A	γ-IIIB crystallin	*Bos taurus*	2.50	26.00
2gcr	1		174		γ-IV crystallin	*Bos taurus*	2.30	14.30
2bb2	−2		175		β-B2 crystallin	*Bos taurus*	2.10	18.60

103) plant virus coat protein

2tbv	102	A	273	A	coat protein	*Tomato bushy stunt virus*	2.90	
4sbv	62	A	260	A	coat protein	*Southern bean mosaic virus*	2.80	25.40

104) serine proteinase — bacterial

2alp	15A		245		α-lytic proteinase	*Lysobacter enzymogenes*	1.70	13.10
2sga	16		242		proteinase A	*Streptomyces griseus*	1.50	12.60
3sgb	16	E	242	E	proteinase B	*Streptomyces griseus*	1.80	12.50

105) plant lectin

2ltn	1	A	47	B	lectin	*Pisum sativum*	1.70	17.70
1loe	1	A	47	B	lectin	*Lathyrus achrus*	1.90	18.50
1lte	1		239		lectin	*Erythrina corallodendron*	2.00	19.00
1lec	2		243		lectin	*Griffonia simplifocolia*	2.00	18.20
4cna	119	A	118	B	concanavalin A	*Canavalia ensiformis*	2.90	19.00

106) serine proteinase — mammalian

1hne	16	E	243	E	neutrophil elastase	*Homo sapiens*	1.80	16.40
3est	16		245		pancreatic elastase	*Sus scrofa*	1.60	16.90
1tbs	16		243		trypsin	*Salmo salar*	1.80	16.40

2ptn	16		245		trypsin	*Bos taurus*	1.50	19.30
1trm	16	A	245	A	trypsin	*Rattus rattus*	2.30	16.00
2gch	1		245		γ-chymotrypsin	*Bos taurus*	1.70	18.10
2pka	16	A	246	B	kallikrein A	*Sus scrofa*	2.00	22.00
1ton	16		246		tonin	*Rattus rattus*	1.80	19.60
1ppb	1H	A	247	B	thrombin	*Homo sapiens*	1.90	15.60
1bbr	14	T	308	T	thrombin	*Bos taurus*	2.30	16.70
3rp2	16	A	243	A	mast-cell proteinase II	*Rattus rattus*	1.90	19.10
1sgt	16		245		trypsin	*Streptomyces griseus*	1.70	16.10

107) aspartic proteinase

Xypa	−1		326		proteinase A	*Saccharomyces cerevisiae*	2.50	21.00
Xren	−2	A	326	A	renin	*Mus musculus*	1.80	19.60
1bbs	−1	A	326	A	renin	*Homo sapiens*	2.80	19.60
1lya	1	A	346	B	cathepsin D	*Homo sapiens*	2.50	18.80
5pep	1		327		pepsin	*Sus scrofa*	2.30	18.00
4cms	−2		326		chymosin	*Bos taurus*	2.20	15.80
1mpp	−1		332		pepsin	*Mucor pusillus*	2.10	16.20
4ape	−2		326		endothiapepsin	*Endothia parasitica*	2.10	17.80
3app	1		323		penicillopepsin	*Penicillium janthinellum*	1.80	13.60
2apr	1		325		rhizopuspepsin	*Rhizopus chinensis*	1.80	14.30

108) neuraminidase

1nsb	76	A	465	A	neuraminidase	*Influenza virus B/Beijing*	2.20	14.80
1nca	81	N	468	N	neuraminidase	*Influenza virus A/Tern/G70C*	2.50	19.10
2bat	82		469		neuraminidase N2	*Influenza virus A/Tokyo*	2.00	21.00

109) picornavirus coat proteins

4rhv	17	1	68	4	Coat proteins VP1, VP2, VP3 and VP4	*rhinovirus serotype 14*	3.00	16.00
1r1a	5	1	44	4	Coat proteins VP1, VP2, VP3 and VP4	*rhinovirus serotype 1*	3.20	29.30
2plv	6	1	69	4	Coat proteins VP1, VP2, VP3 and VP4	*polio virus*	2.90	20.00
2mev	1	1	70	4	Coat proteins VP1, VP2, VP3 and VP4	*mengo virus*	3.00	22.10
1tme	1	1	39	4	Coat proteins VP1, VP2, VP3 and VP4	*murine encephalomyelitis virus*	2.80	30.00
1bbt	1	1	85	4	Coat proteins VP1, VP2, VP3 and VP4	*foot and mouth disease virus*	2.60	19.20

TABLE 10. Membrane-bound all-β

110) porin

1pho	1	340	phosphoporin (phoe)	*Escherichia coli*	3.00	22.2
1omf	1	340	matrix porin (ompf)	*Escherichia coli*	2.40	20.80

small

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small — disulphide

all-α

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membrane bound all-α

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$\alpha+\beta$

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α/β

α/β-barrel

all-β

membrane bound all-β