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A Compilation of Amino Acid Analyses of Proteins

XVIII. Residues Per Thousand Residues—5

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Abstract

The amino acid analyses of 213 proteins, as residues per 1000 residues, are given. In addition, the carbohydrate content, the content of any noncommon amino acids, the sources of all proteins, and the necessary literature citations are given.

Index Entries: Proteins, amino acid analyses of; analyses, amino acid, of proteins; amino acids, analyses, of proteins.

Introduction

In Table 1, the Protein Index, are alphabetically listed 213 proteins and the sources from which they were obtained. In Table 2 are the amino acid analyses compiled from the published literature and given as residues per 1000 residues regardless of how the numerical data were originally given in the literature, e.g., mol%, % of total moles, or moles per 100 moles of recovered amino acids. All values have been rounded to the nearest ten value except for values below 10, where rounding to the nearest tenth has been done. The values for aspartic acid and glutamic acids include any asparagine and glutamine that may have been present in the protein prior to acid hydrolysis. Except for a few analyses that were done by gas–liquid chromatography of amino acid derivatives, e.g., Nos. 144 and 152, all analyses were done by ion exchange chromatography. The values for half-cystine have, in many instances, been obtained from the quantitative determination of

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S-carboxymethylcysteine or cysteic acid. For two of the amino acids, serine and threonine, the values have been corrected for hydrolytic losses. All proteins have a citation to the source of the numerical data.

In the footnotes to Table 2 are given carbohydrate analyses, references to additional analyses of the protein prepared by a different method, references to protein from a source at different ages, and references to the same protein prepared by a different research group. For some proteins, analytical results for uncommon amino acids, e.g., hydroxyproline and hydroxylysine, are also given. For half-cystine and tryptophan, frequently no results were given and this is indicated by a dash.

The method used to compile these data has been described (*1*). This paper is part of a continuing compilation of amino acid analyses of proteins (*2*).

Acknowledgments

The Library of the Downstate Medical Center College of Medicine has been the major source of all publications examined. What was not available in the library was obtained for me from other libraries by its excellent interlibrary loan service. I should like to thank all the librarians for their most useful and continuing assistance. During the summers of 1971–75, and 1977–81 I was a Library Reader at the Library of the Marine Biological Laboratory, Woods Hole, Massachusetts. From February, 1976 to July, 1976 I used the Library of the University of Sussex, Falmer, Brighton, England. I thank the Librarians of each of these institutions for their kind assistance. I thank Ms. Marvo Lowe for typing the reference list.

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References

1. Kirschenbaum, D. M. (1980), *J. Chem. Info. Comput. Sci.* **20,** 152.
2. Kirschenbaum, D. M. (1982), *Appl. Biochem. Biotech.* **7,** 343.

TABLE 1
Protein Index

No.		
1	Name:	Elastase 1
	Source:	Human pancreatic tissue
2	Name:	Elastase 2
	Source:	Human pancreatic tissue
3	Name:	Elastic fibrils
	Source:	Trout (*Salmo gairdneri*) bulbus arteriosus
4	Name:	Elastic fibrils
	Source:	Salmon (*Salmo salar*) bulbus arteriosus
5	Name:	Elastic fibrils
	Source:	Beef ligamentum nuchae
6	Name:	Elastic protein
	Source:	Rabbit psoas muscle myofibrils
7	Name:	Elastin
	Source:	African elephant (*Loxodonta africana*)
8	Name:	Elastin
	Source:	Sheep carotid artery
9	Name:	Elastin
	Source:	Sheep jugular vein
10	Name:	Elastin
	Source:	Broad-breasted white turkey aorta tissue
11	Name:	Elastin
	Source:	Broad-breasted white turkey aorta tissue
12	Name:	Elastin
	Source:	Domestic turkey (*Meleagris sp.*) aorta tissue
13	Name:	Elastin
	Source:	Vole (*Microtus montanus*) aorta
14	Name:	Elastin
	Source:	Red kangaroo (*Macropus rufus*) aorta
15	Name:	Elastin
	Source:	Bottle nose dolphin (*Tursiops truncatus*) aorta
16	Name:	Elastin
	Source:	Domestic goose (*Anser* sp)
17	Name:	Elastin
	Source:	Whistling swan (*Cygnus columbianus*) aorta
18	Name:	Elastin
	Source:	Green sea turtle (*Chelonia mydas*) aorta
19	Name:	Elastin
	Source:	Bullfrog (*Rana catesbiana*) aorta
20	Name:	Elastin
	Source:	Salamander (*Amphiuma means*) aorta

(continued)

TABLE 1 (*continued*)

21	Name:	Elastin
	Source:	Black grouper (*Mycteroperca bonaci*) bulbus arteriosus
22	Name:	Elastin
	Source:	Black cod (*Anoplopoma fimbria*) bulbus arteriosus
23	Name:	Elastin
	Source:	Ling cod (*Ophiodon elongatus*) bulbus arteriosus
24	Name:	Elastin
	Source:	Pacific yellow tail (*Sebastodes flavidus*) bulbus arteriosus
25	Name:	Elastin
	Source:	Porcupine fish (*Chilomycterus schoepfi*) aorta
26	Name:	Elastin
	Source:	Walleyed pike (*Stizostedion vitreum*) bulbus arteriosus
27	Name:	Elastin
	Source:	Yellowfin tuna (*Thunnus albacares*) aorta
28	Name:	Elastin
	Source:	Toadfish (*Opsanus beta*) aorta
29	Name:	Elastin
	Source:	Starry flounder (*Platichthys stellatus*) aorta
30	Name:	Elastin
	Source:	Carp (*Cyprinus carpio*) bulbus arteriosus
31	Name:	Elastin
	Source:	Steelhead (*Salmo gairdnerii*) aorta
32	Name:	Elastin
	Source:	King salmon (*Onchorhynchus tshawytscha*) bulbus arteriosus
33	Name:	Elastin
	Source:	Tarpon (*Tarpon atlanticus*) bulbus arteriosus
34	Name:	Elastin
	Source:	Longnose gar (*Lepisosteus osseus*) aorta
35	Name:	Elastin
	Source:	Paddlefish (*Polyodon spathula*) aorta
36	Name:	Elastin
	Source:	White sturgeon (*Acipenser transmontanus*) aorta
37	Name:	Elastin
	Source:	African lungfish (*Protopterus* sp.) aorta
38	Name:	Elastin
	Source:	Coelacanth (*Latimeria chalumnae*) aorta
39	Name:	Elastin
	Source:	Reedfish (*Polypterus senegalus*) aorta
40	Name:	Elastin
	Source:	Hornshark (*Heterodontus francisci*) aorta
41	Name:	Elastin
	Source:	Hammerhead shark (*Sphyrna zygaena*) aorta

(*continued*)

TABLE 1 (*continued*)

42	Name:	Elastin
	Source:	Dog (*Canis familiaris*) aorta
43	Name:	Elastin
	Source:	Dog lung
44	Name:	Elastin
	Source:	Dog uterus
45	Name:	Elastin
	Source:	Monkey aorta
46	Name:	Elastin
	Source:	Monkey lung
47	Name:	Elastin
	Source:	Guinea pig aorta
48	Name:	Elastin
	Source:	Guinea pig lung
49	Name:	Elastin
	Source:	Hamster aorta
50	Name:	Elastin
	Source:	Hamster lung
51	Name:	Elastin
	Source:	Rabbit aorta
52	Name:	Elastin
	Source:	Rabbit lung
53	Name:	Elastin
	Source:	Rabbit ear
54	Name:	Elastin
	Source:	Rat aorta
55	Name:	Elastin
	Source:	Rat lung
56	Name:	Elastin
	Source:	Rat uterus
57	Name:	Elastin
	Source:	Rat smooth-muscle cells (R22)
58	Name:	α-Elastin
	Source:	Pig aorta
59	Name:	β Elastin
	Source:	Pig aorta
60	Name:	Elastin
	Source:	Pig aorta
61	Name:	Elastin
	Source:	Pig lung
62	Name:	Elastin
	Source:	Pig uterus

(*continued*)

TABLE 1 (*continued*)

63	Name:	Elastin
	Source:	Chick aorta
64	Name:	Elastin
	Source:	Chick lung
65	Name:	α-Elastin
	Source:	Beef ligamentum nuchae
66	Name:	β-Elastin
	Source:	Beef ligamentum nuchae
67	Name:	κ-Elastin
	Source:	Beef ligamentum nuchae
68	Name:	Elastin
	Source:	Beef ear tissue
69	Name:	Elastin
	Source:	Beef aorta tissue
70	Name:	Elastin
	Source:	Beef lung tissue
71	Name:	Elastin
	Source:	Beef parenchymal tissue
72	Name:	Elastin
	Source:	Beef ligamentum nuchae
73	Name:	Elastin
	Source:	Beef pericardium tissue
74	Name:	Elastin
	Source:	Human aorta
75	Name:	Elastin
	Source:	Human lung
76	Name:	Elastin
	Source:	Human uterus
77	Name:	Elastin
	Source:	Human cerebral artery (4.3 ± 6.5 yr)
78	Name:	Elastin
	Source:	Human coronary artery (10.2 ± 8.0 yr)
79	Name:	Elastin
	Source:	Human skin
80	Name:	Elastin
	Source:	Human breast cancer
81	Name:	Elastoidin
	Source:	Great blue shark (*Prionace glauca*) pectoral fins
82	Name:	Elastolytic Enzyme I
	Source:	Human blood granulocytes
83	Name:	Elastolytic Enzyme II
	Source:	Human blood granulocytes

(*continued*)

TABLE 1 (*continued*)

84	Name:	Elastolytic Enzyme III
	Source:	Human blood granulocytes
85	Name:	Elongation Factor 1 Component 52K
	Source:	*Artemia salina* embryos
86	Name:	Elongation Factor 1 Component 47K
	Source:	*Artemia salina* embryos
87	Name:	Elongation Factor TsI
	Source:	*Artemia salina* embryos
88	Name:	Elongation Factor TsII
	Source:	*Artemia salina* embryos
89	Name:	Elongation Factor TsIII
	Source:	*Artemia salina* embryos
90	Name:	Elongation Factor 1α
	Source:	Pig liver
91	Name:	Elongation Factor 1
	Source:	Rabbit reticulocyte
92	Name:	Elongation Factor 1b
	Source:	Silk gland
93	Name:	Elongation Factor 2
	Source:	Pig liver
94	Name:	Endonuclease
	Source:	*Escherichia coli* B41
95	Name:	Endocellulase (EC 3.2.1.4)
	Source:	*Irpex lacteus* (*Polyporus tulipiferae*)
96	Name:	Endopeptidase
	Source:	Rat liver mitochondria
97	Name:	Endotoxin-binding protein
	Source:	*Limulus polyphemus* amoebocyte membranes
98	Name:	Enolase (EC 4.2.1.11)
	Source:	Human brain
99	Name:	Enolase I (EC 4.2.1.11)
	Source:	Rat brain
100	Name:	Enolase II (EC 4.2.1.11)
	Source:	Rat brain
101	Name:	Enolase III (EC 4.2.1.11)
	Source:	Rat brain
102	Name:	Entactin
	Source:	Endodermal cell M1536-B3 membrane sacs
103	Name:	Erythrocruorin
	Source:	Marine worm (*Amphitrite ornata*)
104	Name:	Estramustine-binding protein
	Source:	Rat ventral prostate cytosol

(*continued*)

TABLE 1 (*continued*)

105	Name:	Factor D
	Source:	Human plasma
106	Name:	Factor D
	Source:	Guinea pig serum
107	Name:	Factor G
	Source:	*Escherichia coli*
108	Name:	F II C
	Source:	Rat epidermis
109	Name:	F IIIb
	Source:	Rat epidermis
110	Name:	Factor 4
	Source:	Human platelets
111	Name:	Factor XI
	Source:	Human plasma
112	Name:	Factor XIIIa subunit
	Source:	Human plasma
113	Name:	Factor XIIIb subunit
	Source:	Human plasma
114	Name:	Factor XIIIa subunit
	Source:	Human platelets
115	Name:	Fatty acid synthetase
	Source:	Human breast cell line (SKBr3)
116	Name:	Fatty acid synthetase
	Source:	Mouse mammary gland
117	Name:	Fatty acid synthetase
	Source:	Rat liver
118	Name:	Fertilization envelope
	Source:	Sea urchin (*Strongylocentrotus purpuratus*) embryos
119	Name:	α-Fetoprotein A
	Source:	Rat amniotic fluid
120	Name:	α-Fetoprotein B
	Source:	Rat amniotic fluid
121	Name:	Fibrinogen
	Source:	Rabbit plasma
122	Name:	Fibrin stabilizing factor
	Source:	Human placenta
123	Name:	Fibrin stabilizing factor
	Source:	Human platelets
124	Name:	Fibroin
	Source:	Silkworm (*Bombyx mori*)
125	Name:	Fibronectin
	Source:	Human plasma

(*continued*)

TABLE 1 *(continued)*

126	Name:	Fibronectin
	Source:	Human amniotic fluid
127	Name:	Fibronectin
	Source:	Human amniotic fluid
128	Name:	Fibronectin
	Source:	Fibroblast culture medium
129	Name:	Fibronectin
	Source:	Pig plasma
130	Name:	Filaggrin
	Source:	Newborn mouse epidermis (stratus corneum)
131	Name:	Filamin
	Source:	Chicken gizzard
132	Name:	Filamin
	Source:	Guinea pig vas deferens
133	Name:	Flagellin
	Source:	*Escherichia coli*
134	Name:	Follitropin (follicle stimulating hormone)
	Source:	Beef pituitary glands
135	Name:	Follitropin α subunit
	Source:	Beef follitropin
136	Name:	Follitropin β subunit
	Source:	Beef follitropin
137	Name:	Follitropin (follicle stimulating hormone)
	Source:	Pig pituitary glands
138	Name:	Follitropin α subunit
	Source:	Pig follitropin
139	Name:	Follitropin β subunit
	Source:	Pig follitropin
140	Name:	α-Fucosidase I
	Source:	Human spleen
141	Name:	α-Fucosidase II
	Source:	Human spleen
142	Name:	Galactoprotein a
	Source:	Hamster NIL cells
143	Name:	Galactoprotein b
	Source:	Hamster NIL cells
144	Name:	Galactoprotein a
	Source:	Hamster NIL cells
145	Name:	Galactoprotein a (released form)
	Source:	Hamster NIL cells
146	Name:	Galactose-binding protein
	Source:	*Escherichia coli*

(continued)

TABLE 1 (*continued*)

147	Name:	α-D-Galactosidase (EC 3.2.1.22)
	Source:	Soybean meal
148	Name:	β-D-Galactosidase A_2
	Source:	Human liver
149	Name:	Galactosylhydroxylysyl glucosyltransferase
	Source:	Chick embryos (White Leghorn eggs)
150	Name:	Galactosyl transferase I
	Source:	Human effusions (cancer)
151	Name:	Galactosyltransferase II
	Source:	Human effusions (cancer)
152	Name:	Galactosyltransferase
	Source:	Rabbit erythrocyte
153	Name:	Gelatin
	Source:	Snail (*Helix aspersa*) body walls
154	Name:	Gelatin
	Source:	Human skin, newborn
155	Name:	Gelatin
	Source:	Human skin, 93 yrs. old
156	Name:	Gelsolin
	Source:	Rabbit lung macrophages
157	Name:	dna B Gene Product
	Source:	*Escherichia coli* str. MV 12/28
158	Name:	ω-Gliadin
	Source:	Wheat (*Triticum monococcum*)
159	Name:	ω-Gliadin
	Source:	Capelle wheat
160	Name:	Gliadin-like proteins
	Source:	Wheat (*Triticum aestivum*) endosperm
161	Name:	α-Globulin (aggregate)
	Source:	Sesame (*Sesamum indicum L.*) seeds
162	Name:	α-Globulin, 4S
	Source:	Sesame (*Sesamum indicum L.*) seeds
163	Name:	Globulin (Legumin)
	Source:	*Vicia faba L.*
164	Name:	Globulin (vicilin)
	Source:	*Vicia faba L.*
165	Name:	Globulin, 7S
	Source:	Cotton seeds, variety 108-F
166	Name:	Globulin, 2S
	Source:	No. 165 Globulin
167	Name:	α-2 Globulin
	Source:	Human plasma

(*continued*)

TABLE 1 (*continued*)

168	Name:	α_f-Globulin
	Source:	Human hepatoma
169	Name:	α_f-Globulin
	Source:	Human fetuses, 5–7 months
170	Name:	γ-Globulin, post
	Source:	Human urine
171	Name:	γ-Globulin, slow post
	Source:	Human urine
172	Name:	γ-Globulin, intermediate post
	Source:	Human urine
173	Name:	γ-Globulin, fast post
	Source:	Human urine
174	Name:	*exo*-1,3-β-Glucanase (EC 3.2.1-)
	Source:	Culture fluid of yeast (*Candida utilis*)
175	Name:	*exo*-β-D-Glucanase
	Source:	Extracts of yeast (*Candida utilis*)
176	Name:	1,4-β-Glucan cellobiohydrolase I
	Source:	*Trichoderma reesei* QM 9414
177	Name:	1,4-β-Glucan cellobiohydrolase II
	Source:	*Trichoderma reesei*, QM 9414
178	Name:	Glucose-binding protein
	Source:	Periplasm of *Pseudomonas aeruginosa*
179	Name:	β-Glucuronidase I
	Source:	Mollusc (*Littorina littorea L.*) hepatopancreas
180	Name:	β-Glucuronidase II
	Source:	Mollusc (*Littorina littorea L.*) hepatopancreas
181	Name:	β-Glucuronidase (L form)
	Source:	Mouse liver
182	Name:	β-Glucuronidase (form A)
	Source:	Female Wistar rats preputial glands
183	Name:	β-Glucuronidase (form B)
	Source:	Female Wistar rats preputial glands
184	Name:	β-Glucuronidase (form C)
	Source:	Female Wistar rats preputial glands
185	Name:	β-Glucuronidase (EC 3.2.1.31)
	Source:	Rat liver microsomes
186	Name:	β-Glucuronidase (EC 3.2. 131)
	Source:	Rat liver lysosomes
187	Name:	L-Glutaminase
	Source:	*Pseudomonas* p-210 (ATCC 21025)
188	Name:	Glutaminase (Asparaginase) (EC 3.5.1.38)
	Source:	*Pseudomonas aurantiaca* BKMB-548

(*continued*)

TABLE 1 (*continued*)

189	Name:	γ-Glutamyl transpeptidase I
	Source:	Rat kidney
190	Name:	γ-Glutamyl transpeptidase II
	Source:	Rat kidney
191	Name:	γ-Glutamyl transpeptidase III
	Source:	Rat kidney
192	Name:	γ-Glutamyl transpeptidase
	Source:	Human kidney
193	Name:	Glutelin
	Source:	Corn seed
194	Name:	Glutenin
	Source:	Ponca wheat
195	Name:	Glyceraldehyde 3-phosphate dehydrogenase (EC 1.2.1.12)
	Source:	Pea (*Pisum sativum*) seeds
196	Name:	Glyceraldehyde 3-phosphate dehydrogenase (EC 1.2.1.13)
	Source:	Beet leaves
197	Name:	Glyceraldehyde 3-phosphate dehydrogenase (EC 1.2.1.13)
	Source:	Beet chloroplasts
198	Name:	Glyceraldehyde 3-phosphate dehydrogenase (EC 1.2.1.12)
	Source:	White mustard (*Sinapis alba*) seedling cytoplasm
199	Name:	Glyceraldehyde 3-phosphate dehydrogenase (EC 1.2.1.13)
	Source:	White mustard (*Sinapis alba*) seedlings
200	Name:	Glyceraldehyde 3-phosphate dehydrogenase (EC 1.2.1.13)
	Source:	White mustard (*Sinapis alba*) seedlings
201	Name:	Glyceraldehyde 3-phosphate dehydrogenase (EC 1.2.1.13)
	Source:	Barley (*Hordeum vulgare*) seedlings
202	Name:	Glyceraldehyde 3-phosphate dehydrogenase
	Source:	Yeast (*Sacharomyces cerevisiae*)
203	Name:	Glycocalicin
	Source:	Human platelets
204	Name:	Gonadotropin (α-subunit)
	Source:	Pregnant mare serum
205	Name:	Gonadotropin (β-subunit)
	Source:	Pregnant mare serum
206	Name:	Gonadotropin
	Source:	Human chorion
207	Name:	Gonadotropin I
	Source:	Bullfrog (*Rana catesbeiana*) pituitary glands
208	Name:	Gonadotropin
	Source:	Pike eel (*Muraenesox cinereus*) pituitary glands
209	Name:	Gonadotropin (subunit I)
	Source:	No. 208

(*continued*)

TABLE 1 (*continued*)

210	Name:	Gonadotropin (subunit II)
	Source:	No. 208
211	Name:	Granulin
	Source:	Granulosis virus of *Trichoplusia ni*
212	Name:	Growth hormone
	Source:	Snapping turtle (*Chelhydra serpentina*) pituitary glands
213	Name:	Growth hormone
	Source:	Mullard duck (*Anas phatyrhynchos*) pituitary glands

TABLE 2
Amino Acid Analyses of Proteins/Residues per 1000 Residues

Amino acid	Residues per 1000 residues					
Protein Index No.:	**1**	**2**	**3**	**4**	**5**	**6**
Glycine	117	115	445	420	336	89
Alanine	71	71	142	157	224	82
Valine	89	91	48	49	130	62
Leucine	75	82	35	35	59	73
Isoleucine	52	48	9.3	10	24	53
Proline	70	56	91	86	114	63
Serine	85	116	32	33	8.6	61
Threonine	54	48	32	31	9.2	61
Aspartic acid	102	119	23	28	5.7	95
Glutamic acid	87	60	39	40	15	130
Half-cystine	34	38	0	0	0	2
Methionine	4	5	4.6	6.0	0	24
Lysine	32	31	7.8	11	3.2	66
Arginine	42	42	23	26	5.7	57
Histidine	22	23	6.3	8.0	0.4	16
Phenylalanine	31	10	11	12	29	29
Tyrosine	34	45	43	35	5.8	30
Tryptophan	—	—	—	—	—	—
Amide-ammonia	—	—	—[1]	—[2]	—[3]	—[4]
Ref. no.:	*1*	*1*	*2*	*2*	*2*	*3*

(continued)

TABLE 2 (*continued*)

Residues per 1000 residues							
7	**8**	**9**	**10**	**11**	**12**	**13**	**14**
270	309	305	366	353	358	358	301
250	218	215	172	197	187	228	235
107	112	118	153	153	154	102	108
61	59	59	52	53	56	53	63
26	21	23	24	22	24	32	25
150	103	103	123	135	128	93	115
9	16	18	6.0	4.3	6.8	18	14
14	17	17	10	10	13	18	16
12	15	15	6.3	3.0	6.1	6.5	12
24	28	26	18	14	15	19	19
—	0	0	—	—	—[11]	—[12]	—[13]
1	0	1.7	—	—	2.0	1.7	3.2
8	9.2	7.9	3.9	1.7	3.3	3.9	6.3
7	13	11	8.5	6.5	6.7	10	13
2	3.3	3.0	1.4	0.8	0.6	1.0	1.0
29	31	30	21	20	22	18	26
14	13	14	14	13	14	27	31
—[5]	—	—	—	—	—[10]	—[10]	—[10]
36	—[6]	—[7]	—[8]	—[9]	—[11]	—[12]	—[13]
4	*5*	*5*	*6*	*6*	*7*	*7*	*7*

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**15**	**16**	**17**	**18**	**19**	**20**
Glycine	311	338	336	319	402	373
Alanine	232	190	191	184	154	121
Valine	114	154	154	151	83	118
Leucine	62	53	53	58	60	60
Isoleucine	23	21	21	17	33	28
Proline	124	136	142	130	104	121
Serine	12	5.5	8.6	11	15	14
Threonine	11	11	13	18	23	23
Aspartic acid	13	3.7	4.0	3.4	12	11
Glutamic acid	25	17	16	24	29	40
Half-cystine	—[14]	2.3	—[16]	—[17]	3.0	3.9
Methionine	1.5	0.9	1.0	2.0	3.6	2.4
Lysine	7.0	4.8	4.0	6.8	7.4	4.8
Arginine	—	6.9	5.6	7.6	8.6	9.3
Histidine	2.0	1.6	0.7	3.6	2.0	2.6
Phenylalanine	38	24	24	13	15	14
Tyrosine	20	15	15	34	42	44
Tryptophan	—[10]	—[10]	—[10]	—[10]	—[10]	—[10]
Amide-ammonia	—[14]	—[15]	—[16]	—[17]	—[18]	—[19]
Ref. no.:	*7*	*7*	*7*	*7*	*7*	*7*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues							
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**
439	449	428	400	423	413	391	407
120	136	131	130	110	139	103	97
57	47	48	57	54	61	64	66
36	29	34	37	38	33	45	41
10	7.7	11	12	37	7.9	19	17
101	98	89	99	92	98	101	103
25	29	31	32	27	34	34	51
67	60	65	63	62	64	63	50
11	12	17	18	16	12	26	19
27	27	32	33	27	27	43	36
—[20]	1.2	—[22]	—[23]	—[24]	—[25]	—[26]	—[27]
3.2	3.5	6.2	6.4	3.5	4.5	7.1	5.4
7.9	5.4	8.1	11	10	7.7	15	9.2
18	17	17	21	17	20	16	23
2.3	2.2	3.4	3.5	4.2	3.7	2.6	3.6
34	33	29	31	39	32	28	24
34	36	42	38	25	38	37	39
—[10]	—[10]	—[10]	—[10]	—[10]	—[10]	—[10]	—[10]
—[20]	—[21]	—[22]	—[23]	—[24]	—	—	—
7	7	7	7	7	7	7	7

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**29**	**30**	**31**	**32**	**33**	**34**
Glycine	432	437	360	421	421	297
Alanine	113	81	133	151	99	104
Valine	56	77	55	46	158	98
Leucine	32	61	52	63	47	62
Isoleucine	11	34	16	9.9	21	29
Proline	103	109	86	86	127	117
Serine	31	29	39	30	10	23
Threonine	66	46	38	29	21	48
Aspartic acid	13	9.9	32	17	11	25
Glutamic acid	33	26	54	36	20	67
Half-cystine	—[28]	2.9	—[30]	—[31]	—[32]	—[33]
Methionine	4.2	1.8	9.4	5.6	2.3	5.9
Lysine	5.2	5.9	16	8.1	6.1	18
Arginine	22	20	30	26	15	21
Histidine	2.2	1.9	8.1	6.1	1.4	4.5
Phenylalanine	19	18	19	11	15	22
Tyrosine	52	31	50	49	20	49
Tryptophan	—[10]	—[10]	—[10]	—[10]	—[10]	—[10]
Amide-ammonia	—	—[29]	—[30]	—[31]	—[32]	—[33]
Ref. no.:	*7*	*7*	*7*	*7*	*7*	*7*

(continued)

TABLE 2 (*continued*)

Residues per 1000 residues							
35	**36**	**37**	**38**	**39**	**40**	**41**	**42**
300	312	351	308	262	266	310	314
133	152	105	131	86	128	176	249
103	97	110	106	90	123	98	99
57	59	80	73	64	45	72	46
23	19	43	39	52	36	31	28
133	128	112	117	90	109	99	107
17	12	23	17	28	29	22	16
30	31	33	24	57	33	20	24
20	17	14	14	30	26	11	7.6
70	61	35	59	76	70	62	22
4.6	—[35]	—[36]	3.7	4.9	1.6	—[40]	2.3
4.4	4.6	3.5	1.9	10	8.5	5.1	2.1
14	11	12	8.8	31	14	6.8	5.2
18	15	15	27	27	27	20	9.1
2.8	2.4	5.3	3.0	9.9	6.1	3.2	1.9
9.9	9.9	18	13	26	21	14	25
57	64	27	46	40	49	44	29
—[10]	—[10]	—[10]	—[10]	—[10]	—[10]	—[10]	—[10]
—[34]	—[35]	—[36]	—[37]	—[38]	—[39]	—[40]	—[41]
7	*7*	*7*	*7*	*7*	*7*	*7*	*7*

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**43**	**44**	**45**	**46**	**47**	**48**
Glycine	349	350	331	336	330	323
Alanine	224	235	227	228	236	232
Valine	107	102	141	134	124	122
Leucine	50	58	58	60	58	59
Isoleucine	28	26	22	23	25	25
Proline	110	105	105	107	118	117
Serine	13	16	12	15	14	14
Threonine	21	12	15	14	14	14
Aspartic acid	8	10	5	6	6	8
Glutamic acid	21	19	14	16	15	17
Half-cystine	—	—	—	—	—	—
Methionine	—	—	—	—	—	—
Lysine	3	3	2	2	3	10
Arginine	6	6	6	6	6	9
Histidine	0.2	2	0.4	1	0.2	1
Phenylalanine	21	20	19	20	11	11
Tyrosine	27	26	21	21	24	23
Tryptophan	—	—	—	—	—	—
Amide-ammonia	—[42]	—[43]	—[44]	—[45]	—[46]	—[47]
Ref. no.:	*9*	*9*	*9*	*9*	*9*	*9*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues

49	**50**	**51**	**52**	**53**	**54**	**55**	**56**
383	376	334	331	334	377	383	377
226	225	232	227	223	196	197	192
97	94	109	109	105	96	95	91
53	55	57	61	60	66	66	65
31	35	20	22	20	29	25	29
91	95	113	112	123	104	103	103
12	12	13	15	15	14	14	20
17	17	12	15	15	21	21	22
7	7	5	9	10	8	7	11
14	15	14	18	21	15	14	18
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
3	2	2	4	4	2	4	5
8	9	7	9	9	9	8	8
0.4	0.6	0.3	1	2	0.8	0.1	2
16	16	19	21	19	13	15	15
28	26	27	28	29	30	28	26
—	—	—	—	—	—	—	—
—[48]	—[49]	—[50]	—[51]	—[52]	—[53]	—[54]	—[55]
9	9	9	9	9	9	9	9

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**57**	**58**	**59**	**60**	**61**	**62**
Glycine	329	305	341	326	323	324
Alanine	203	261	231	233	244	235
Valine	90	116	133	132	132	125
Leucine	62	54	53	59	58	60
Isoleucine	25	17	18	19	19	21
Proline	115	117	112	110	109	106
Serine	25	11	9.2	11	11	12
Threonine	33	15	13	14	13	13
Aspartic acid	26	4.3	4.6	7	7	10
Glutamic acid	27	22	18	18	18	21
Half-cystine	—	0	0	—	—	—
Methionine	—	0	0	—	—	—
Lysine	—	5.3	5.7	6	4	7
Arginine	—	5.2	5.2	6	6	1
Histidine	—	0	0	0.7	0.5	1
Phenylalanine	15	29	30	30	29	33
Tyrosine	22	20	15	15	14	18
Tryptophan	—	—	—	—	—	—
Amide-ammonia	—[56]	—[57]	—[58]	—[59]	—[60]	—[61]
Ref. no.:	*13*	*14*	*14*	*9*	*9*	*9*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues							
63	**64**	**65**	**66**	**67**	**68**	**69**	**70**
338	336	320	341	217	309	322	321
179	185	246	188	379	152	229	221
173	164	149	187	111	72	139	134
56	58	60	57	35	79	61	61
20	19	23	27	14	11	28	25
131	120	104	104	111	132	112	117
6	11	9.8	7.3	3.9	18	9	11
9	11	7.4	7.2	3.0	13	10	10
7	11	4.8	7.9	7.1	41	8	12
13	18	18	18	30	60	17	20
—	—	—	—	—	—	—	—
—	—	—	—	—	—[67]	—	—
2	6	3.4	3.6	7.6	11	5	6
5	6	5.5	2.7	5.0	20	6	7
0.7	1	—	—	—	1	0.5	1
19	21	28	26	32	35	30	29
13	13	6.1	6.0	12	26	7	8
—	—	—	—	—	—	—	—
—[62]	—[63]	—[64]	—[65]	—[66]	—[67]	—[68]	—[69]
9	*9*	*26*	*27*	*29*	*30*	*9*	*9*

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**71**	**72**	**73**	**74**	**75**	**76**
Glycine	322	333	321	295	291	294
Alanine	221	225	220	233	225	231
Valine	130	129	136	143	136	139
Leucine	61	64	61	58	60	59
Isoleucine	28	25	28	23	24	25
Proline	111	115	113	131	127	126
Serine	13	10	10	8	9	9
Threonine	12	11	11	12	13	13
Aspartic acid	11	7	19	6	9	9
Glutamic acid	23	17	20	18	23	21
Half-cystine	—	—	—	—	—	—
Methionine	—	—	—	—	—	—
Lysine	7	3	6	4	7	4
Arginine	8	5	7	9	13	7
Histidine	0.5	—	—	0.5	0.3	0.4
Phenylalanine	30	31	30	22	22	21
Tyrosine	9	10	9	23	24	23
Tryptophan	—	—	—	—	—	—
Amide-ammonia	—[70]	—[71]	—[72]	—[73]	—[74]	—[75]
Ref. no.:	*9*	*9*	*9*	*9*	*9*	*9*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues							
77	**78**	**79**	**80**	**81**	**82**	**83**	**84**
308	271	305	246	280	112	116	115
218	234	231	158	109	111	113	95
130	140	130	90	25	114	105	100
63	64	59	112	16	97	104	88
26	27	25	30	20	42	47	39
133	139	117	102	100	74	85	85
6.6	6.6	12	13	36	52	56	50
9.6	9.3	14	20	20	28	30	29
4.9	4.3	7.0	27	50	96	101	99
21	19	22	80	77	70	78	68
—	—	—[78]	—	3.2	—[81]	—[81]	—[81]
1.0	1.2	—[78]	1.0	10	7	11	8
3.4	5.2	8.0	30	25	5	5	7
7.6	6.7	10.4	15	47	117	73	139
0.9	0.6	1.3	10	10	28	16	30
24	25	24	43	12	39	45	34
23	24	20	9.0	42	11	8	7
—	—	—	—	0.2	—	—	—
—[76]	—[77]	—[78]	—[79]	48[80]	—	—	—
53	*53*	*59*	*48*	*60*	*61*	*61*	*61*

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**85**	**86**	**87**	**88**	**89**	**90**
Glycine	131	63	60	63	74	99
Alanine	88	102	90	92	85	84
Valine	79	47	65	55	48	92
Leucine	54	65	91	83	70	61
Isoleucine	68	51	59	55	53	62
Proline	61	47	44	41	33	57
Serine	43	46	64	57	65	49
Threonine	56	52	52	48	44	58
Aspartic acid	81	98	117	125	132	96
Glutamic acid	94	148	135	153	152	92
Half-cystine	7	—	—	—	—	12
Methionine	14	13	20	21	30	20
Lysine	92	112	89	97	100	84
Arginine	43	34	34	27	28	36
Histidine	24	10	29	16	21	25
Phenylalanine	40	67	48	54	54	32
Tyrosine	25	45	12	14	15	25
Tryptophan	—	—	—	—	—	8
Amide-ammonia	—	—	—	—	—	—[82]
Ref. no.:	*62*	*62*	*63*	*63*	*63*	*64*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues							
91	**92**	**93**	**94**	**95**	**96**	**97**	**98**
78	61	89	169	118	73	69	84
94	99	73	76	78	64	56	105
80	74	89	44	52	58	51	64
77	83	91	54	57	82	86	110
45	41	61	28	36	39	47	56
55	53	48	35	71	57	50	35
59	62	53	130	95	53	60	55
50	48	47	46	84	55	51	39
105	135	105	113	126	86	122	125
124	154	114	151	93	95	112	109
3	—[81]	15	—	23	23	—	—
17	11	30	—	—	21	22	14
83	88	67	56	28	53	60	67
46	33	39	35	22	48	50	46
15	6	13	18	13	35	60	15
35	23	40	39	61	36	50	33
21	31	20	9	43	24	40	29
14	—	4.7	—	—	—[84]	10	—
—	—	—	—	—[83]	100	—[85]	—[86]
65	*66*	*67*	*68*	*69*	*70*	*71*	*72*

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**99**	**100**	**101**	**102**	**103**	**104**
Glycine	88	93	101	111	—	45
Alanine	113	115	121	67	81	47
Valine	66	63	53	44	55	86
Leucine	80	87	93	69	83	89
Isoleucine	57	52	38	27	47	52
Proline	27	28	25	76	33	36
Serine	68	64	62	84	62	63
Threonine	42	38	35	64	43	59
Aspartic acid	117	120	130	113	141	98
Glutamic acid	103	111	119	123	108	160
Half-cystine	—	—	—	24	20	36
Methionine	20	20	22	10	20	25
Lysine	80	68	58	34	52	68
Arginine	40	40	42	51	55	25
Histidine	27	30	29	28	42	12
Phenylalanine	42	43	47	34	54	43
Tyrosine	27	26	26	34	33	29
Tryptophan	—	—	—	7	—	6
Amide-ammonia	—	—	—	—[87]	—	—[88]
Ref. no.:	*73*	*73*	*73*	*74*	*75*	*76*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues							
105	**106**	**107**	**108**	**109**	**110**	**111**	**112**
104	61	82	93	296	52	79	78
88	79	101	55	75	77	52	54
80	38	80	61	16	42	58	92
103	51	65	61	16	139	72	69
26	27	65	31	15	73	56	48
81	34	44	52	33	59	41	47
50	61	52	69	138	49	86	68[91]
35	34	57	44	39	72	82	65[91]
94	55	106	114	44	61	83	116
94	99	124	212	184	139	101	111
40	10	7.9	0	0	53	47	3
12	—	27	16	—[81]	0	6.4	20
39	55	55	88	36	105	67	54
71	24	47	43	58	41	46	62
52	21	20	11	7	27	32	23
13	24	35	29	7	0	40	44
18	14	25	23	37	14	30	40
—	—[89]	9.1	—	—	—	22	7
—	27	—	—	—	—[90]	—	—[92]
77	*78*	*79*	*80*	*80*	*81*	*82*	*83*

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**113**	**114**	**115**	**116**	**117**	**118**
Glycine	116	69	93	86	84	104
Alanine	33	72	105	98	90	52
Valine	52	76	73	66	77	63
Leucine	54	70	122	116	136	47
Isoleucine	35	49	34	37	38	41
Proline	74	50	56	49	57	67
Serine	104[91]	64[91]	75	77	69	71
Threonine	92[91]	56[91]	46	49	50	54
Aspartic acid	86	91	76	76	79	138
Glutamic acid	112	98	122	122	101	107
Half-cystine	14	5	11	17	16	84
Methionine	14	34	15	17	20	4.9
Lysine	62	60	35	42	40	37
Arginine	53	73	55	49	46	58
Histidine	31	30	27	26	26	15
Phenylalanine	35	44	31	33	32	32
Tyrosine	36	35	11	19	21	26
Tryptophan	5	22	16	21	19	—
Amide-ammonia	—[92]	—[92]	—	—	—	—[93]
Ref. no.:	*83*	*83*	*85*	*85*	*86*	*87*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues							
119	**120**	**121**	**122**	**123**	**124**	**125**	**126**
64	79	76	70	71	435	82	92
82	85	37	53	53	301	44	44
42	42	30	97	99	24	73	76
93	89	49	67	68	4.9	50	56
45	40	56	50	52	5.8	44	43
42	43	48	49	46	3.9	87	76
86	80	69	61	58	121	85	82
50	52	40	62	59	9.1	118	119
87	86	154	122	122	17	101	98
155	153	158	110	108	13	105	112
39	40	17	11	12	—	23	26
20	17	33	26	26	1.0	11	10
69	70	124	51	57	3.0	32	34
34	34	36	62	62	4.6	57	52
29	28	16	19	20	2.0	20	21
43	43	25	46	45	6.7	24	21
24	24	25	44	42	48	46	42
—	—	—	—	—	—	—	—
—[94]	—[95]	—[96]	—	—	—[97]	—[98]	—[99]
88	*88*	*89*	*90*	*90*	*91*	*94*	*94*

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**127**	**128**	**129**	**130**	**131**	**132**
Glycine	89	88	84	170	125	120
Alanine	49	48	44	86	93	77
Valine	62	79	84	30	100	98
Leucine	55	61	56	7	33	60
Isoleucine	36	42	46	2	60	41
Proline	85	83	77	31	80	87
Serine	83	78	80	204	68	68
Threonine	84	112	104	4	53	64
Aspartic acid	95	96	91	52	76	92
Glutamic acid	116	134	114	206	95	108
Half-cystine	28	—	16	1	20	—
Methionine	9	11	11	1	8	11
Lysine	51	39	38	1	48	64
Arginine	45	56	51	115	55	35
Histidine	20	26	21	84	23	21
Phenylalanine	25	24	22	6	29	22
Tyrosine	42	43	40	6	26	27
Tryptophan	26	—	21	0	10	—
Amide-ammonia	—[100]	—	—[101]	—	—	—
Ref. no.:	*96*	*98*	*99*	*100*	*101*	*102*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues							
133	**134**	**135**	**136**	**137**	**138**	**139**	**140**
95	68	70	61	54	58	55	148
121	74	85	61	82	90	57	66
58	67	71	63	45	50	72	39
76	44	36	56	49	45	50	53
42	35	23	46	35	25	42	28
14	66	68	71	49	64	47	37
86	72	72	68	62	65	55	128
99	95	85	111	101	96	107	46
170	72	62	93	77	55	89	82
85	98	93	103	87	84	89	122
—	84	82	82	93	85	97	—
10	16	30	0	19	30	3	3
72	65	76	44	77	87	72	37
33	33	32	36	31	36	28	13
4	51	29	21	30	42	37	20
14	35	39	31	37	39	37	32
23	50	42	55	67	51	68	22
—	—	—	—	8	0	7	—
—	—[102]	—[103]	—[104]	—[105]	—[106]	—[107]	—[108]
103	*104*	*104*	*104*	*104*	*104*	*104*	*106*

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**141**	**142**	**143**	**144**	**145**	**146**
Glycine	110	139	85	102	105	71
Alanine	73	78	71	71	52	138
Valine	50	54	59	70	77	96
Leucine	72	54	83	58	67	78
Isoleucine	30	37	43	47	55	49
Proline	46	51	52	75	100	29
Serine	104	177	77	96[96]	73[96]	40
Threonine	48	73	60	104[96]	100[96]	45
Aspartic acid	91	78	111	95[111]	103[111]	159
Glutamic acid	125	77	111	124[111]	116[111]	92
Half-cystine	—	32	35	—	—	—
Methionine	3	12	19	—	—	19
Lysine	44	33	45	31	32	100
Arginine	25	32	53	46	45	21
Histidine	21	30	23	22	16	11
Phenylalanine	55	21	44	24	21	21
Tyrosine	23	23	30	38	37	18
Tryptophan	—	—	—	—	—	13
Amide-ammonia	—[109]	—	—[110]	—[112]	—[113]	—
Ref. no.:	*106*	*107*	*107*	*108*	*108*	*110*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues							
147	**148**	**149**	**150**	**151**	**152**	**153**	**154**
88	95	139	331	370	91	321	332
81	64	103	86	65	81	72	110
61	50	60	64	54	90	22	24
93	110	67	66	56	107	24	24
50	40	34	13	21	38	12	12
46	72	56	19	19	66	104	121
61	66	71	48	64	83	61	36
50	59	50	32	35	66	28	18
129	107	115	49	83	133	67	48
68	96	133	94	109	101	99	81
33	10	—	11	15	—	0	1.0
31	11	—	—	—	—	1.2	6.4
62	50	63	105	73	57	8.3	26
39	36	50	—	—	—	51	44
19	20	18	8.9	16	—	2.6	3.5
27	58	31	48	57	35	9.9	13
38	59	10	13	13	0.2	8.8	4.4
24	—	—	12	14	—	—	—[119]
—	—[114]	—	—[115]	—[116]	—[117]	—[118]	—[120]
111	*112*	*113*	*114*	*114*	*115*	*116*	*117*

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**155**	**156**	**157**	**158**	**159**	**160**
Glycine	327	86	70	8.9	16	81
Alanine	109	91	96	16	5.7	74
Valine	26	72	43	8.0	5.3	57
Leucine	25	90	90	47	34	49
Isoleucine	12	37	63	22	38	51
Proline	122	60	45	262	229	63
Serine	36	62	82	49	34	82
Threonine	18	52	41	11	12	75
Aspartic acid	47	106	127	12	4.8	31
Glutamic acid	81	130	122	452	501	213
Half-cystine	1.1	—	1.8	—[81]	3.6	85
Methionine	6.5	21	32	1.3	1.1	34
Lysine	26	63	43	1.3	4.1	10
Arginine	44	51	82	10	6.5	41
Histidine	3.9	21	20	5.6	9.5	8
Phenylalanine	13	42	25	81	91	19
Tyrosine	3.9	30	19	12	11	29
Tryptophan	—[119]	—	—	—	—	—
Amide-ammonia	—[121]	—[122]	—	—	—[123]	—
Ref. no.:	*117*	*118*	*119*	*120*	*121*	*122*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues							
161	**162**	**163**	**164**	**165**	**166**	**167**	**168**
—	—	77	65	49	73	86	48
53	43	63	60	43	81	89	87
51	38	51	56	48	49	73	51
72	66	85	89	66	65	—[125]	96
40	32	43	51	35	30	—[125]	46
—	—	54	46	43	47	49	39
—	—	74	75	53	75	64	64
—	—	37	38	32	38	47	63
—	—	123	122	110	110	—[125]	88
—	—	199	174	227	188	—[125]	186
—	—	0	4	—	—	—	24
—	—	3	7	17	4.3	—[81]	10
—	—	42	65	36	41	—[125]	63
—	—	80	64	132	83	—[125]	30
—	—	24	18	32	34	35	21
51	44	32	40	69	63	49	52
41	40	21	27	28	24	35	29
2.3	0.8	—	—	13	—	—	3
—	—	—	—	—[124]	—	—	—
123	*123*	*123*	*124*	*125*	*125*	*126*	*127*

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**169**	**170**	**171**	**172**	**173**	**174**
Glycine	47	73	69	67	67	96
Alanine	90	86	83	101	88	72
Valine	48	82	69	77	82	—
Leucine	94	68	70	70	73	51
Isoleucine	44	15	19	16	17	36
Proline	38	65	69	50	46	72
Serine	66	65	57	49	49	91
Threonine	65	58	61	59	68	61
Aspartic acid	87[126]	102	108	111	133	113
Glutamic acid	197[125]	101	99	101	108	111
Half-cystine	20	26	26	25	20	10
Methionine	8	22	18	25	23	4.3
Lysine	64	58	78	58	44	66
Arginine	31	66	68	75	55	25
Histidine	22	24	25	25	24	30
Phenylalanine	48	41	41	44	49	21
Tyrosine	28	26	26	34	36	22
Tryptophan	3	13[127]	9	10	11	—
Amide-ammonia	—	105	—[128]	—[128]	—[128]	—[129]
Ref. no.:	*127*	*128*	*130*	*130*	*130*	*131*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues								
175	**176**	**177**	**178**	**179**	**180**	**181**	**182**	**183**
137	126	95	101	82	87	61	70	70
120	64	128	147	82	82	39	50	50
66	47	59	66	75	74	76	70	70
59	54	74	73	79	86	78	89	93
36	24	35	29	42	47	43	33	36
51	55	72	52	59	56	50	61	61
140	111	109	54	58	59	61	60	58
55	115	80	41	70	72	62	70	68
93	116	121	112	127	119	94	113	116
102	90	66	130	96	96	144	104	106
3	47	28	8	9	7	—[81]	33	—
11	14	8	3	21	22	12	17	15
89	25	21	71	60	57	48	46	43
12	17	25	21	16	14	117	61	61
7	10	10	9	24	23	31	33	30
9	31	23	45	54	55	39	43	43
2	53	46	14	45	44	46	53	50
—	—	—	32	—	—	—	—	—
—[130]	—	—	—[131]	—[132]	—[133]	—[134]	—[135]	—[136]
132	*133*	*133*	*134*	*135*	*135*	*136*	*137*	*137*

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**184**	**185**	**186**	**187**	**188**	**189**
Glycine	71	99	105	83	98	98
Alanine	50	80	79	112	116	88
Valine	67	65	71	106	83	73
Leucine	91	83	85	82	80	82
Isoleucine	35	40	41	53	49	49
Proline	61	57	61	28	29	52
Serine	61	81	57	63	73	82
Threonine	74	65	65	54	56	60
Aspartic acid	118	112	114	123	99	92
Glutamic acid	107	149	146	96	110	104
Half-cystine	—	—[81]	—[81]	0	0	12
Methionine	15	10	12	25	23	14
Lysine	43	60	59	71	70	53
Arginine	61	46	56	38	38	31
Histidine	30	26	30	15	15	20
Phenylalanine	43	38	41	19	20	47
Tyrosine	48	39	41	20	24	35
Tryptophan	—	—	—	11	10	8
Amide-ammonia	—[137]	—[138]	—[139]	—[96]	—	—[140]
Ref. no.:	*137*	*138*	*138*	*139*	*140*	*141*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues								
190	**191**	**192**	**193**	**194**	**195**	**196**	**197**	**198**
94	91	67	68	84	85	94	97	96
100	100	75	99	34	93	101	77	88
75	75	51	55	40	95	86	101	72
77	78	104	117	65	67	73	88	65
52	54	44	29	30	59	56	70	46
55	58	58	135	130	35	34	51	36
79	77	70[91]	59	74	68	59	69	74
67	65	77[91]	4	32	70	55	48	61
91	89	95	42	27	120	119	122	128
93	96	89	177	333	69	63	65	74
16	16	9.8	—	18	7	4	16	19
11	13	2.5	28	14	14	8	2	21
46	48	58	18	15	97	111	69	89
45	41	40	30	24	39	40	40	33
22	24	77[91]	35	16	16	28	47	16
40	37	52	31	36	42	47	32	40
32	33	33	31	30	24	28	8	26
5	5	—	—	5	—	—	—	17
—[141]	—[142]	—	—[143]	—[144]	—[145]	—[145]	—[146]	—[145]
141	*141*	*142*	*143*	*145*	*146*	*147*	*147*	*148*

(*continued*)

TABLE 2 (*continued*)

Amino acid	Residues per 1000 residues					
Protein Index No.:	**199**[147]	**200**[148]	**201**[147]	**202**	**203**	**204**
Glycine	92	91	102	84	51	45
Alanine	94	90	96	111	44	44
Valine	92	80	101	94	46	50
Leucine	85	83	75	63	129	43
Isoleucine	50	51	56	55	23	46
Proline	44	44	47	37	126	64
Serine	72	73	69	70	89	50
Threonine	55	54	52	69	140	99
Aspartic acid	136	137	154	116	88	65
Glutamic acid	60	63	61	66	105	87
Half-cystine	24	30	26	6	—	101
Methionine	13	10	12	21	14	20
Lysine	68	72	64	84	63	94
Arginine	40	42	31	30	23	49
Histidine	10	17	17	22	21	30
Phenylalanine	27	31	21	24	30	60
Tyrosine	17	17	18	29	21	51
Tryptophan	17	17	—	19	—	—
Amide ammonia	—[146]	—[146]	—[146]	—[149]	—[150]	—[151]
Ref. no.:	*148*	*148*	*148*	*149*	*150*	*151*

(*continued*)

TABLE 2 (*continued*)

Residues per 1000 residues								
205	**206**	**207**	**208**	**209**	**210**	**211**	**212**	**213**
60	40	42	31	39	26	42	96	62
91	54	50	30	47	27	44	74	67
47	69	61	55	50	86	63	47	11
73	90	64	61	58	67	83	81	105
47	26	58	34	38	41	58	38	35
159	126	68	107	79	111	65	57	72
100	107	70	90	65	94	34	87	70
77	85	94	78	69	73	58	56	50
48	83	108	94	96	96	124	100	112
72	89	72	84	105	91	128	137	163
69	89	19	97	112	91	17	26	12
19	23	36	17	17	16	27	—	11
31	41	77	54	63	38	54	72	82
64	—	58	63	47	58	63	51	67
16	—	31	26	30	18	25	21	26
30	30	35	40	51	28	58	31	37
16	47	59	39	36	42	43	16	21
—	—	—	—	—	—	14	—	—
—[152]	—[153]	—[154]	—[155]	—	—	—[96]	—	—
151	*153*	*154*	*155*	*155*	*155*	*157*	*158*	*158*

[1]All results have been corrected for hydrolytic losses. The following are reported as residues per 1000 total amino acid residues: hydroxyproline, 6.7; hydroxylysine, 0; ϵ-hydroxynorleucine, 1.1. The following are all expressed as lysine equivalents: aldol condensation product, 1.2; dehydrolysinonorleucine, 0.3; lysinonorleucine, 0.1; dehydromerodesmosine, 0; merodesmosine, 0; isodesmosine, 1.7; desmosine, 1.0. In Ref. *2* may also be found an analysis for this material after collagenase digestion.

[2]All results have been corrected for hydrolytic losses. The following are reported as residues per 1000 total amino acid residues: hydroxyproline, 5.6; hydroxylysine, 0; ϵ-hydroxynorleucine, 1.2. The following are all expressed as lysine equivalents: aldol condensation product, 2,1; dehydrolysinonorleucine, 0.1; lysinonorleucine, 0.9; dehydromerodesmosine, 0.6; merodesmosine, 0; isodesmosine, 0.8; desmosine, 0.6.

[3]All results have been corrected for hydrolytic losses. The following are reported as residues per 1000 total amino acid residues: hydroxyproline, 8.5; hydroxylysine, 0; ϵ-hydroxynorleucine, 0.6. The following are all expressed as lysine equivalents: aldol condensation product, 3.7; dehydrolysinonorleucine, 0; lysinonorleucine, 2.1; dehydromerodesmosine, 0.1; merodesmosine, 0.5; isodesmosine, 5.4; desmosine, 10.1

[4]The amino acid composition of elastic protein from fiber fragments is in Ref. *3*.

[5]This is the analysis of the thoracic aorta. There are also present as residues per 1000 residues: hydroxyproline, 12; isodesmodine, 1.3; desmosine, 3.5. The analysis of elastin from the abdominal aorta can be found in Ref. *4*.

[6]Also present as residues per 1000 residues: 4-hydroxyproline, 23.4; hydroxylysine, 0; and (as leucine equivalents) isodesmosine, 4.5; desmosine, 6.4; merodesmosine, 0; lysinonorleucine, 1.5. An analysis for elastin prepared differently can be found in Ref. *5*.

[7]Also present as residues per 1000 residues: 4-hydroxyproline, 22.4; hydroxylysine, 0; and (as leucine equivalents) isodesmosine, 4.4; desmosine, 6.2; merodesmosine, 0.3; lysinonorleucine, 1.3.

[8]This is the analysis of elastin from the abdominal aorta of a 10-week-old female. Also present as residues per 1000 residues: hydroxyproline, 15.6; isodesmosine, 1.05; desmosine, 1.25; lysinonorleucine, 0.52. The analysis of elastin from the thoracic aorta of a 10-week-old female broad-breasted turkey can be found in Table 1 of Ref. *6*.

[9]This is the analysis of elastin from the abdominal aorta of an 8-month-old female. Also present as residues per 1000 residues: hydroxyproline, 15.2; isodesmosine, 0.87; desmosine, 0.89; lysinonorleucine, 0.54. The analysis of elastin from the thoracic aorta of an 8-month-old female broad-breasted turkey can be found in Ref. *6*.

[10]These analyses are not corrected for hydrolytic losses. Hydroxylysine and tryptophan less than 0.1% of total amino acid content.

[11]Present as residues per 1000 residues: hydroxyproline, 6.8; isodesmosine, 1.2; desmosine, 0.9; cysteine, less than 0.9.

[12]Present as residues per 1000 residues: hydroxyproline, 11; isodesmosine, 0.9; desmosine, 0.7; cysteine, less than 0.9.

[13]Present as residues per 1000 residues: hydroxyproline, 10; isodesmosine, 2.0; desmosine, 1.4; cysteine, less than 1.

[14]Present as residues per 1000 residues: hydroxyproline, 2.5; isodesmosine, 1.7; desmosine, 1.2; cysteine, less than 1.

[15]Present as residues per 1000 residues: hydroxyproline, 11; isodesmosine, 1.4; desmosine, 1.0.

[16]Present as residues per 1000 residues: hydroxyproline, 8.8; isodesmosine, 1.8; desmosine, 1.3; cysteine, less than 1.

[17]Present as residues per 1000 residues: hydroxyproline, 16; isodesmosine, 1.5; desmosine, 1.2; cysteine, less than 0.9.

[18]Present as residues per 1000 residues: hydroxyproline, 5.1; isodesmosine, 1.0; desmosine, 1.0.

[19]Present as residues per 1000 residues: hydroxyproline, 7.5; isodesmosine, 0.9; desmosine, 0.8.

[20]Present as residues per 1000 residues: hydroxyproline, 5.9; isodesmosine, 0.6; desmosine, 0.7; cysteine, less than 0.8.

[21]Present as residues per 1000 residues: hydroxyproline, 7.3; isodesmosine, 0.3; desmosine, 0.3.

[22]Present as residues per 1000 residues: hydroxyproline, 8.8; isodesmosine, 0.2; desmosine, 0.3; cysteine, less than 1.2.

[23]Present as residues per 1000 residues: hydroxyproline, 8.5; isodesmosine, 0.4; desmosine, 0.4; cysteine, less than 0.6.
[24]Present as residues per 1000 residues: hydroxyproline, 15; isodesmosine, 0.5; desmosine, 0.5; cysteine, less than 1.
[25]Present as residues per 1000 residues: hydroxyproline, 4.5; isodesmosine, 0.7; desmosine, 0.7; cysteine, less than 1.
[26]Present as residues per 1000 residues: hydroxyproline, 5.5; isodesmosine, 0.3; desmosine, 0.3; cysteine, less than 1.
[27]Present as residues per 1000 residues: hydroxyproline, 7.3; isodesmosine, 0.8; desmosine, 0.5; cysteine, less than 0.6.
[28]Present as residues per 1000 residues: hydroxyproline, 2.7; isodesmosine, 0.2; desmosine, 0.3; cysteine, less than 0.1.
[29]Present as residues per 1000 residues: hydroxyproline, 8.3; isodesmosine, 0.5; desmosine, 0.8.
[30]Present as residues per 1000 residues: hydroxyproline, 2.8; isodesmosine, 0.3; desmosine, 0.3; cysteine, less than 0.1.
[31]Present as residues per 1000 residues: hydroxyproline, 6.3; isodesmosine, 0.3; desmosine, 0.3; cysteine, less than 1.1.
[32]Present as residues per 1000 residues: hydroxyproline, 3.6; isodesmosine, 0.7; desmosine, 0.7; cysteine, less than 1.
[33]Present as residues per 1000 residues: hydroxyproline, 7.8; isodesmosine, 1.0; desmosine, 1.0; cysteine, less than 0.5.
[34]Present as residues per 1000 residues: hydroxyproline, 1.6; isodesmosine, 1.1; desmosine, 1.0.
[35]Present as residues per 1000 residues: hydroxyproline, 3.6; isodesmosine, 0.9; desmosine, 0.9; cysteine, less than 0.6.
[36]Present as residues per 1000 residues: hydroxyproline, 12; isodesmosine, 0.7; desmosine, 0.5; cysteine, less than 0.8.
[37]Present as residues per 1000 residues: hydroxyproline, 4.5; isodesmosine, 1.3; desmosine, 1.1.
[38]Present as residues per 1000 residues: hydroxyproline, 13; isodesmosine, 0.8; desmosine, 0.8.
[39]Present as residues per 1000 residues: hydroxyproline, 5.4; isodesmosine, 1.5; desmosine, 1.3.
[40]Present as residues per 1000 residues: hydroxyproline, 6.5; isodesmosine, 1.8; desmosine, 1.5; cysteine, less than 1.1.
[41]Present as residues per 1000 residues: hydroxyproline, 11; isodesmosine, 1.8; desmosine, 1.3. Additional analyses of elastin from dog aorta may be found in Refs. *8* and *9*.
[42]Present as residues per 1000 residues: hydroxyproline, 9; isodesmosine, 1.5; desmosine, 2.0.
[43]Present as residues per 1000 residues: hydroxyproline, 8; isodesmosine, 1.1; desmosine, 1.1.
[44]Present as residues per 1000 residues: hydroxyproline, 10; isodesmosine, 1.1; desmosine, 1.5.
[45]Present as residues per 1000 residues: hydroxyproline, 12; isodesmosine, 1.1; desmosine, 1.3.
[46]Present as residues per 1000 residues: hydroxyproline, 14; isodesmosine, 1.0; desmosine, 1.3.
[47]Present as residues per 1000 residues: hydroxyproline, 14; isodesmosine, 0.5; desmosine, 0.5. An additional analysis may be found in Ref. *11*.
[48]Present as residues per 1000 residues: hydroxyproline, 12; isodesmosine, 1.0; desmosine, 0.9.
[49]Present as residues per 1000 residues: hydroxyproline, 13; isodesmosine, 1.0; desmosine, 0.9. An additional analysis may be found in Ref. *10*.
[50]Present as residues per 1000 residues: hydroxyproline, 16; isodesmosine, 1.0; desmosine, 1.2. Additional analysis found in Refs. *12* and *47*.
[51]Present as residues per 1000 residues: hydroxyproline, 15; isodesmosine, 1.0; desmosine, 1.1. Additional analyses can be found in Ref. *47*.
[52]Present as residues per 1000 residues: hydroxyproline, 9; isodesmosine, 1.1; desmosine, 1.1.
[53]Present as residues per 1000 residues: hydroxyproline, 18; isodesmosine, 1.0; desmosine, 1.0.
[54]Present as residues per 1000 residues: hydroxyproline, 18; isodesmosine, 1.0; desmosine, 1.2.
[55]Present as residues per 1000 residues: hydroxyproline, 14; isodesmosine, 1.1; desmosine, 1.4.
[56]There are 26 residues of hydroxyproline present. Elastin obtained from muscle cells grown in the absence of ascorbate contained no hydroxyproline (*13*). An amino acid analysis of this elastin can be found in Ref. *13*.
[57]8.1 quarter residues of isodesmosine and 10.7 quarter residues desmosine expressed as lysine equivalents. An analysis for the coacervate from α-elastin is in Ref. *14*.

[58]6.3 quarter residues of isodesmosine and 7.3 quarter residues desmosine expressed as lysine equivalents.

[59]Present as residues per 1000 residues: hydroxyproline, 9; isodesmosine, 1.7; desmosine, 2.3. Additional analyses of elastin from porcine aorta may be found in Refs. *7, 14,* and *15*. The analyses of a high molecular weight component and a low molecular weight component from a coacervate of elastin isolated from copper-deficient pig aorta may be found in Ref. *16*.

[60]Present as residues per 1000 residues: hydroxyproline, 10; isodesmosine, 1.9; desmosine, 2.4.

[61]Present as residues per 1000 residues: hydroxyproline, 6; isodesmosine, 1.3; desmosine, 1.4.

[62]Present as residues per 1000 residues: hydroxyproline, 26; isodesmosine, 1.2; desmosine, 1.4. Another analysis of chick aortic elastin may be found in Ref. *17*. The amino acid analyses of soluble and insoluble elastins obtained from lathyritic chick aortas, using various procedures can be found in Refs. *18–23*. The amino acid analyses of soluble and insoluble elastin of copper-deficient and copper-supplemented chick aortas may be found in Refs. *24* and *25*.

[63]Present as residues per 1000 residues: hydroxyproline, 18; isodesmosine, 1.4; desmosine, 1.6. Analyses of lathyritic chick lung elastin isolated by different procedures can be found in Ref. *21*.

[64]Present as residues per 1000 residues: hydroxyproline, 11.2; isodesmosine, 2.7; desmosine, 4.2. Other analysis for beef α-elastins can be found in Refs. *27* and *28*.

[65]Present as residues per 1000 residues: hydroxyproline, 12.0; isodesmosine, 2.9; desmosine, 3.8. (these last two as lysine equivalents).

[66]Present as residues per 1000 residues: hydroxyproline, 12.1; isodesmosine, 6.9; desmosine, 10.7; lysinonorleucine, 3.6. (these last three expressed as lysine equivalents). See Ref. *40* for κ-elastin of beef aorta.

[67]Present as residues per 1000 residues: hydroxyproline, 14; isodesmosine, 1.8; desmosine, 2.0; lysinonorleucine, 0.7; and a trace of methionine. Analyses of beef ear elastins prepared by various methods can be found in Ref. *31*.

[68]Present as residues per 1000 residues: hydroxyproline, 11; isodesmosine, 1.5; desmosine, 2.4; additional analyses may be found in Refs. *15, 40,* and *47*.

[69]Present as residues per 1000 residues: hydroxyproline, 15; isodesmosine, 1.8; desmosine, 2.3. Additional analyses can be found in Refs. *8* and *32*.

[70]Present as residues per 1000 residues: hydroxyproline, 14; isodesmosine, 1.5; desmosine, 2.3. Additional analyses can be found in Ref. *8*.

[71]Present as residues per 1000 residues: hydroxyproline, 11; isodesmosine, 1.8; desmosine, 2.4. Additional analyses may be found in Refs. *8, 15, 26, 27,* and *32–47*. Analyses for elastins from copper-deficient animal in Ref. *46* and from a lathyritic animal in Ref. *33*.

[72]Present as residues per 1000 residues: hydroxyproline, 13; isodesmosine, 1.7; desmosine, 2.4.

[73]Present as residues per 1000 residues: hydroxyproline, 10; isodesmosine, 2.2; desmosine, 2.8. Additional analyses for soluble and insoluble human aortic elastins can be found in Refs. *47–52*.

[74]Present as residues per 1000 residues: hydroxyproline, 12; isodesmosine, 2.5; desmosine, 2.7. Additional analyses of lung elastins of humans of different ages and sex may be found in Ref. *51*, in normal newborns and newborns with different pulmonary disease (*54*), in lung parenchymal tissue of infants of different ages (*55*) and also in Refs. *10* and *56–58*.

[75]Present as residues per 1000 residues: hydroxyproline, 13; isodesmosine, 2.7; desmosine, 3.0.

[76]Present as residues per 1000 residues: hydroxyproline, 10.0; ornithine, 1.0; ¼ isodesmosine, 4.2; ¼ desmosine, 5.1; ½ lysinonorleucine, 1.2. Analysis of cerebral artery elastin of older patients (49.3 ± 4.9 yr) can be found in Table II of Ref. *53*.

[77]Present as residues per 1000 residues: hydroxyproline, 11.4; ornithine, 0.8; ¼ isodesmosine, 5.1; ¼ desmosine, 6.4; ½ lysinonorleucine, 1.2. Analysis of coronary artery elastin of older patients (53.9 ± 6.1 yr) can be found in Table II of Ref. *53*.

[78]Present as residues per 1000 residues: hydroxyproline, 10; isodesmosine, 1.2; desmosine, 1.9; lysinonorleucine, 0.8; half-cystine, trace; methionine, trace. The analysis of elastin isolated from the skin of patients with scleroderma can be found in Ref. *59*.

[79]Present as residues per 1000 residues: hydroxyproline, 10; isodesmosine, 1.5 lysine equivalents; desmosine, 2.5 lysine equivalents. This elastin was prepared by an autoclaving procedure. The analyses of elastins prepared by other procedures from breast cancer can be found in Ref. *48*.

[80]Present as residues per 1000 residues: hydroxyproline, 64.2; hydroxylysine, 6.1. Analyses for pepsin solubilized elastoidin and an acid soluble protein from elastoidin can be found in Ref. *60*.

[81]Trace.

[82]These are the averages of the values of the three EF-1α peaks in Table II of Ref. *64*.

[83]Carbohydrate (12.2%) as glucose.

[84]The 1000 residues on which these values are based include 100 residues of NH_3.

[85]This is the analysis of material purified by affinity chromatography. An analysis of protein purified by butanol-water procedure can be found in Table 1 of Ref. *9*.

[86]This is also known as Protein 14-3-2.

[87]Carbohydrate is present as *N*-acetylneuraminic acid, *N*-acetylgalactosamine, galactose, *N*-acetylglucosamine, and mannose.

[88]Assumed to be 19.6 residues/1000 residues. The data is reported as residues per 1000 residues, although table 2 of Ref. *76* is labeled "nmol/100 n/mol protein."

[89]Unidentified are 44 residues per 1000 residues.

[90]Glucosamine and galactosamine not present.

[91]Extrapolated to zero hydrolysis time.

[92]Another analysis may be found in Ref. *84*.

[93]Analysis of urea-mercaptoethanol extracted material can be found in Ref. *87*.

[94]Carbohydrate content as percent of 74,000 molecular weight: hexose, 2.5; *N*-acetylglucosamine, 2.07; *N*-acetylneuraminic acid, 2.44; total carbohydrate, 7.05. Carbohydrate content as mol per mol protein AFPAI: L-fucose, 0; D-galactose, 6.2; D-mannose, 6.0; *N*-acetylglucosamine, 7.6; *N*-acetylneuraminic acid, 6.2. Carbohydrate content as mol per mol protein $AFPA_2$: L-fucose, 0; D-galactose, 6.6; D-mannose, 6.0; *N*-acetylglucosamine, 7.8; *N*-acetylneuraminic acid, 4.0.

[95]Carbohydrate content as percent of 72,000 molecular weight: hexose, 2.67; *N*-acetylglucosamine, 2.19; *N*-acetylneuraminic acid, 2.33; total carbohydrate, 7.1. Carbohydrate content as mol per mol protein: L-fucose, 0; D-galactose, 5.8; D-mannose, 6.0; *N*-acetylglucosamine, 7.8; *N*-acetylneuraminic acid, 5.8.

[96]Values corrected for hydrolytic loss.

[97]Additional analyses of fractions of silk protein can be found in Tables I and II of Ref. *91* and of silk fibroin in Refs. *92* and *93*.

[98]Carbohydrate composition as mol per 230,000 molecular weight: mannose, 15; galactose, 12; fucose, 1; glucosamine, 22; galactosamine, 2; sialic acid, 14. Additional analyses can be found in Refs. *95* and *96*.

[99]Carbohydrate composition as mol per 230,000 molecular weight: mannose, 14; galactose, 38; fucose, 7; glucosamine, 36; galactosamine, 8; sialic acid, 13. An analysis for fibronectin from second trimester amniotic fluid can be found in Table 1 of Ref. *94*.

[100]See Ref. *97* for analysis of fibronectin from spent culture medium.

[101]Carbohydrate composition as mol per 230,000 molecular weight: fucose, 3.3; mannose, 11.9; galactose, 9.6; glucose, 5.7; glucosamine, 15.9; galactosamine, 0; sialic acid, 7.2.

[102]Sialic acid, 0.057 μmol/mg.

[103]Sialic acid, 0.024 μmol/mg.

[104]Sialic acid, 0.095 μmol/mg.

[105]Carbohydrate composition as μmol/mg: fucose, 0.100; mannose, 0.343; galactose, 0.267; glucosamine, 0.411; galactosamine, 0.042; sialic acid, 0.550.

[106]Carbohydrate composition as μmol/mg: fucose, 0.026; mannose, 0.177; galactose, 0.081; *N*-acetylglucosamine, 0.140; *N*-acetylgalactosamine, 0.23; sialic acid, 0.480.

[107]Carbohydrate composition as μmol/mg: fucose, 0.087; mannose, 0.232; galactose, 0.224; *N*-acetylglucosamine, 0.353; *N*-acetylgalactosamine, 0.030; sialic acid, 0.500.

[108]Carbohydrate composition as molar ratios: mannose: galactose: *N*-acetylglucosamine: sialic acid: 3.0:3.0: 4.0:2.5.

[109]Carbohydrate composition as molar ratios: mannose: galactose: *N*-acetylglucosamine: sialic acid: 6.0: less than 0.5: 2.0: less than 0.5.

[110]Carbohydrate composition as percent of dry weight: fucose, 0.51; mannose, 2.36; galactose, 0.95; glucose, 0.25, *N*-acetylglucosamine, 2.54; *N*-acetylgalactosamine, 0.33. This is found in Ref. *108*.

[111]In Ref. *108* "asparagine" and "glutamine" are listed in Table 2. The numerical results are actually for "aspartic acid" and "glutamic acid" as 6*N* HCl hydrolysis was used. See also Table I of Ref. *109*.

[112]Carbohydrate composition as mols per 230,000 molecular weight: fucose 5.9; mannose, 16.8, galactose, 11.5; *N*-acetylgalactosamine, 5.2; sialic acid, 2.0 (*109*).

[113]Carbohydrate composition as mols per 220,000 molecular weight: fucose, 4.3; mannose, 14.5; galactose, 10.6; *N*-acetylglucosamine, 20.2; *N*-acetylgalactosamine, 1.9; sialic acid, 1.9 (*109*).

[114]Carbohydrate composition as mol per 100 mol: D-mannose, 40.9; D-glucosamine, 25.7; D-galactose, 15.5; sialic acid, 16.3; L-fucose, 0.01.

[115]Amino acid analyses done by gas–liquid chromatography of amino acid derivatives. Carbohydrate composition as mols per 54,000 molecular weight: neutral hexose, 8.5; hexosamine, 6.9; sialic acid, less than 0.1; fucose, 0.5; galactose, 2.2; *N*-acetyl-D-glucosamine, 7.2; *N*-acetyl-D-galactosamine, 0.1; mannose, 7.6.

[116]Amino acid analyses done by gas–liquid chromatography of amino acid derivatives. Carbohydrate composition as mol per 76,000 mol wt: neutral hexose, 11.2; hexosamine, 17.2; sialic acid, 0.1; fucose, 0.8; galactose, 3.1; *N*-acetyl-D-glucosamine, 16.4; *N*-acetyl-D-galactosamine, 0.2; mannose, 9.2.

[117]Amino acid analyses done by gas–liquid chromatography on amino acid derivatives. Although "asparagine" is listed in Table 2 of Ref. *115* I have listed the results under aspartic acid as 6*N* HCl hydrolysis was used. Carbohydrate composition as μg per mg protein: L-fucose, 1.6; *N*-acetylneuraminic acid, 22.3; D-galactose, 71.0; *N*-acetyl-D-glucosamine, 42.5; *N*-acetyl-D-galactosamine, 0; D-mannose, 66.0, neutral hexose, 137.0; hexosamine, 51.0, sialic acid, 20.0.

[118]Reported as residues per 1000 residues: hydroxyproline, 100; hydroxylysine, 8.2. Reported as g per 100 g dry, ash-free sample: glucosamine, 0.17; galactosamine, 0.48, hexose, 12.10.

[119]The amino acid analyses of skin from 6 yr, 24 yr, 36 yr, 54 yr, 61 yr, and 75-yr old humans can be found in Ref. *117*, Table 2.

[120]Reported as residues per 1000 residues: aldehyde, 0.87; hydroxyproline, 93; hydroxylysine, 3.9; glucosamine, 0.59.

[121]Reported as residues per 1000 residues: aldehyde, 0.81; hydroxyproline, 95; hydroxylysine, 4.0; glucosamine, 0.60.

[122]Average value from two analyses of two different preparations.

[123]The amino acid analyses of different fractions of ω-gliadin can be found in Table 1 of Ref. *121*.

[124]The amino acid analysis of Fraction 4, the α subunit of the 7S globulin, is given in Table 1 of Ref. *125*.

[125]Lysine + arginine, 145; aspartic acid + glutamic acid, 232; isoleucine + leucine, 123. The amino acid analysis of an α-2 globulin from a patient can be found in Table 1 of Ref. *126*.

[126]Although reported as asparagine and glutamine the results are given for aspartic acid and glutamic acid.

[127]Present as residues per 1000 residues: hydroxylysine, 4; hydroxyproline, 7.5. Another analysis of this same kind of protein (*129*) is given as Table II of Ref. *128*.

[128]No hydroxyproline or hydroxylysine present. The values for serine, threonine, and isoleucine corrected for hydrolysis loss.

[129]Carbohydrate present, 20%.

[130]Carbohydrate present, 68%.

[131]Present as residues per 1000 residues: glucosamine, 31; galactosamine, 6; fucose, 20; galactose, 28; glucose, 23; mannose, 13.

[132]Carbohydrate composition in percent: glucose, 2; galactose, 0.6; mannose, traces; hexosamines, 1.7; sialic acid, 0. These values obtained by gas–liquid chromatography. Hexosamines by Elsen-Morgan method, 1.8%.

[133]Hexosamines by Elsen-Morgan method, 11.9%; sialic acid, 0.

[134]Carbohydrate composition as mg/100 mg protein: glucosamine, 2.10; mannose, 4.52; galactose, 0.23; glucose, 0.44; fucose, 0; sialic acid, 0.

[135]Carbohydrate composition as mg/100 mg protein: total sugars, 4.75; glucosamine, 1.94, sialic acid, 0; mannose, 2.87; fucose, 0.21; galactose, 0.18; glucose, 0.18.

[136]Carbohydrate composition as mg/100 mg protein: total sugars, 4.71; glucosamine, 1.95, sialic acid, 0; mannose, 0.76; fucose 0.19; galactose, 0.16; glucose, 0.17.

[137]Carbohydrate composition as mg/100 mg protein: total sugars, 9.24; glucosamine, 2.14; sialic acid, 0; mannose, 3.64; fucose, 0.61; galactose, 1.14; glucose, 1.46.

[138]This is the 70 h hydrolysis result. An analysis after 20 h hydrolysis can be found in Table 3 of Ref. *138*. Carbohydrate composition as mg/100 mg protein: total sugars, 6.45; mannose, 4.89; glucose, trace; fucose, 0.14; galactose, 0.17; glucosamine, 2.51; *N*-acetylneuraminic acid, 0.24.

[139]This is the 70 h hydrolysis result. An analysis after 20 h hydrolysis can be found in Table 3 of Ref. *138*. Carbohydrate composition as mg/100 mg protein; total sugars, 5.25; mannose, 2.94; glucose, 0.42; fucose, 0.30; galactose, 0.20; glucosamine, 2.07; *N*-acetylneuraminic acid, 0.

[140]Carbohydrate composition as nmol/mg protein: hexose as galactose, 567; hexosamine as galactosamine, 893; sialic acid, 58.

[141]Carbohydrate composition as nmol/mg protein: hexose as galactose, 723; hexosamine as galactosamine, 481; sialic acid, 71.

[142]Carbohydrate composition as nmol/mg protein: hexose as galactose, 695; hexosamine as galactosamine, 503; sialic acid, 55.

[143]This is an analysis of a mixture of $0.35G_1 + 0.4G_2 + 0.25G_3$ where G_1, G_2, and G_3 are different fractions of the corn protein. Analyses of glutenin from developing and mature rice grain can be found in Ref. *144*.

[144]The protein analyzed was S-pyridylethyl-glutenin.

[145]This is the analysis of the NAD^+ specific enzyme.

[146]This is the analysis of the NAD(P)-dependent enzyme.

[147]This is the analysis for isoenzyme 1.

[148]This is the analysis for isoenzyme 2.

[149]This protein has nucleic acid helix-destabilizing activity.

[150]Carbohydrate composition as mol % of total amino acids and carbohydrates: sialic acid, 12.5; mannose, 1.2; fucose, 1.9; galactose, 15.1; glucose, 2.3; *N*-acetylglucosamine, 7.2; *N*-acetylgalactosamine, 5.9.

[151]An earlier analysis can be found in Ref. *152*. Carbohydrate composition as g/100 g glycoprotein: mannose, 3.9; galactose, 3.7; fucose, 0.8; glucosamine, 3.7; galactosamine, 2.0; sialic acid, 4.5.

[152]An earlier analysis can be found in Ref. *152*. Carbohydrate composition as g/100 g glycoprotein: mannose, 2.7; galactose, 12.5; fucose, 0.6; glucosamine, 14.6; galactosamine, 3.6; sialic acid, 21.3.

[153]Carbohydrate composition as g/100 g glycoprotein: galactose, 4.0; mannose, 4.0; fucose, 0.6; glucosamine and/or *N*-acetylglucosamine, 7.5; galactosamine and/or *N*-acetylgalactosamine, 1.5; sialic acid, 9.3. The amino acid and carbohydrate analyses of five isoelectric focused fractions can be found in Ref. *153*.

[154]The amino acid analyses of three more gonadotropins isolated from bullfrog pituitaries can be found in Table IV of Ref. *154*. the results are all very similar to gonadotropin I.

[155]Another amino acid analysis and a carbohydrate analysis can be found in Ref. *156*.

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