

U α TN	Consensus	Alternate amino acids	Mutation	Modification	Interaction
α 1	M	P, K, S, G	✓		✓
α 2	R	K, G, E	✓		✓
α 3	E	Q	✓		✓
α 4	C	I, V, A	✓	✓	✓
α 5	I	V, L	✓		✓
α 6	S	T, N, Q	✓	✓	
α 7	I	V, M, L	✓		
α 8	H	N, C, Q, F	✓	✓	
α 9	I	V, L, C	✓		✓
α 10	G	∅	✓		✓
α 11	Q	∅	✓		✓
α 12	A	C, Y, S, G	✓	✓	✓
α 13	G	∅	✓		✓
α 14	V	A, T, C, I, L	✓	✓	
α 15	Q	R	✓		✓
α 16	I	M, V, L, S	✓		✓
α 17	G	A	✓		
α 18	N	D, F, Q	✓		
α 19	A	S, T, Q, E	✓		
α 20	C	V, F, Y	✓	✓	
α 21	W	∅	✓		
α 22	E	K	✓		
α 23	L	Q	✓		
α 24	Y	F, L, I	✓	✓	
α 25	C	L	✓		
α 26	L	E, A, I	✓		
α 27	E	∅	✓		
α 28	H	∅	✓		
α 29	G	K, N, Q	✓		
α 30	I	L			
α 31	Q	E, K, G, D, T, L, N, H	✓		
α 32	P	A, E, Q, L, Y, S	✓		
α 33	D	A, N, S, E, Y, G	✓		✓
α 34	G	C	✓		✓
α 35	Q	R, H, T, L, S, K, I, M, V, F	✓		✓
α 36	M	K, Q, I, L, R, T, V, P, H, S, F	✓		
α 37	P	A, K, V, T, I, L, G, E, N, M, D	✓		✓
α 38	S	G, T, D, Q, K, E, P, A	✓	✓	✓
α 39	D	R, K, Q, S, N, H, T, G, E, P, V	✓		✓
α 40	K	Q, S, T, D, E, V, P, N, A, L, –	✓	✓	✓
α 41	T	S, Q, E, A, K, N, –	✓	✓	✓
α 42	I	C, V, D, K, S, Y, L, N, A, T, P, G	✓		✓
α 43	G	E, K, S, Q, N, D, I, A, –	✓		✓
α 44	G	N, V, E, K, Y, H, L, G, S, T, A, –	✓		✓
α 45	G	A, T, L, S, K, E, N, D, H, C, M,	✓		✓

α46	D	H, N, E, Q, T, S, G, A, R, K	✓		✓
α47	D	A, E, G, Q, N, S	✓		✓
α48	S	T, G, A, D, L, N	✓	✓	✓
α49	F	I, L, Y, V, K, A	✓		
α50	N	S, T, D, G, Q, L, R	✓		
α51	T	A, N, C, S	✓	✓	✓
α52	F	∅	✓		✓
α53	F	∅	✓		
α54	S	C, M, H, A, T, E, Y, Q	✓	✓	✓
α55	E	F, D	✓	✓	✓
α56	T	S, A	✓	✓	✓
α57	G	R, M, A, P, V, H, E, Q, S	✓		✓
α58	A	S, Y, Q, N, G, T, K, H	✓		✓
α59	G	E, K, Q	✓		✓
α60	K	R, Q, C	✓	✓	✓
α61	H	Y, F, I, S, V, Q	✓	✓	
α62	V	Q, T	✓		✓
α63	P	∅	✓		
α64	R	I	✓	✓	
α65	A	V, S, C, L, A	✓		
α66	V	I, L, A	✓		
α67	F	Y, M, S	✓		
α68	V	I, L	✓		
α69	D	∅	✓	✓	✓
α70	L	T	✓		✓
α71	E	D	✓	✓	✓
α72	P	T, N, A, S	✓		
α73	T	N, E, S	✓	✓	
α74	V	P, Q, A, S	✓	✓	
α75	I	V, L, E	✓		
α76	D	S	✓		
α77	E	G, Q, L, D	✓	✓	
α78	V	I, T	✓		
α79	R	K, G	✓		✓
α80	T	N, S, A, W, K, V	✓	✓	
α81	G	S, K	✓		
α82	T	I, S, P, Q, C, D, A, R, V	✓	✓	
α83	Y	M, Q, I, C, F, –	✓	✓	✓
α84	R	G, K, S	✓		✓
α85	Q	H, E, K, N, S, R, T, D	✓		✓
α86	L	F	✓		✓
α87	F	Y	✓		✓
α88	H	N, R, D, K	✓		✓
α89	P	D, K, H	✓		✓
α90	E	D	✓	✓	✓
α91	Q	Y, T, F, C	✓		✓

α92	L	S, M, I	✓		
α93	I	V, L, M	✓		
α94	S	T, N	✓	✓	
α95	G	H, Y, K, S	✓		
α96	K	N, R	✓	✓	✓
α97	E	D	✓		✓
α98	D	E	✓		✓
α99	A	S, K, C, T	✓		✓
α100	A	V, G, S	✓		✓
α101	N	S, G	✓		✓
α102	N	T, L, C	✓		✓
α103	Y	F, C	✓	✓	✓
α104	A	V, S	✓		✓
α105	R	∅	✓	✓	✓
α106	G	∅	✓		✓
α107	H	R, Y, N, K	✓		✓
α108	Y	I, N	✓	✓	✓
α109	T	S, L, Q	✓	✓	✓
α110	I	V, M, L, A	✓		✓
α111	G	S, A	✓		✓
α112	K	R, S, P,	✓	✓	✓
α113	E	S	✓		✓
α114	I	V, F, M, L, S	✓		✓
α115	V	I, A, L, C	✓		✓
α116	D	E, S, G	✓		✓
α117	L	T, P, V, R, F, I, A, H, E, S, L	✓		✓
α118	x	V, C, S, A, T	✓		✓
α119	L	M, T, N, I, E	✓		✓
α120	D	E, S, N	✓		✓
α121	R	K, Q, V, A, C	✓		✓
α122	I	T, V, L	✓		
α123	R	Q	✓		✓
α124	K	R, L	✓	✓	✓
α125	L	Q, I, M, E, V	✓		✓
α126	A	S, T, V,	✓		✓
α127	D	E, N	✓		✓
α128	N	Q, R, A, S, M, K	✓		✓
α129	C	∅	✓		✓
α130	T	S, R, E, Q, N, D, G	✓		✓
α131	G	S, Y, N, G, A	✓		✓
α132	L	∅	✓		✓
α133	Q	H, R	✓		✓
α134	G	∅	✓		✓
α135	F	∅	✓		✓
α136	L	V, F, I	✓		✓
α137	V	I, F, G, M	✓		

α138	F	T, Y, C, H	✓		
α139	H	R, N, S	✓		✓
α140	S	T, A	✓		✓
α141	x	F, L, V, A, I, S			✓
α142	G	S, N	✓		✓
α143	G	∅	✓		✓
α144	G	∅	✓		✓
α145	T	A, S	✓	✓	✓
α146	G	S	✓		✓
α147	S	N	✓	✓	✓
α148	G	∅	✓		
α149	x	L, V, F	✓		✓
α150	G	T, A, S, L	✓		
α151	S	A, N, T, C	✓		
α152	L	M, R, H	✓		✓
α153	L	V, I	✓		✓
α154	M	L, C, T, V	✓		
α155	E	Q, D, K	✓		✓
α156	R	N, E, G, K, T	✓	✓	✓
α157	L	I	✓		
α158	S	E, N, R, A, K, V	✓	✓	✓
α159	V	G, A, Y, M, T, I, L, E, R, Q	✓		✓
α160	D	E, Q, N	✓		✓
α161	Y	F	✓	✓	✓
α162	G	S, T, A, N	✓		✓
α163	K	R, Q	✓	✓	✓
α164	K	E	✓	✓	✓
α165	S	T, P, A, I, Y, V, M, P	✓	✓	✓
α166	K	N, I, V	✓	✓	✓
α167	L	I, V	✓		✓
α168	x	E, Q, G, F, D, N, A, T	✓		
α169	F	S	✓		✓
α170	T	S, A, C, Q, F, L, T	✓	✓	
α171	I	V, Q, L, S	✓	✓	✓
α172	Y	I, W, F	✓		✓
α173	P	∅	✓		✓
α174	S	A, C, F	✓		✓
α175	P	N, D	✓		✓
α176	Q	R, S, L, N, K	✓		✓
α177	V	I, L, N, Q, T	✓		✓
α178	S	Q, T, A	✓	✓	✓
α179	T	N, P, S	✓	✓	✓
α180	A	S, E, N, V	✓		✓
α181	V	M, E, I	✓		✓
α182	V	F	✓		✓
α183	E	S	✓		✓

α184	P	F	✓		
α185	Y	F	✓	✓	✓
α186	N	∅			
α187	S	A, F, T	✓		
α188	V	I, L, T	✓		
α189	L	∅	✓		
α190	T	M, S, N, A, G, Y		✓	
α191	T	L, M, A	✓	✓	✓
α192	H	G, P, Y, Q	✓		✓
α193	T	A, S, D, N, F, K	✓		
α194	x	L, T, S, I			
α195	L	T, C, I, M	✓		✓
α196	E	A, D	✓		✓
α197	H	N, L, E, C, Y	✓		✓
α198	T	S, A, Q, G, I	✓		✓
α199	D	S, E	✓		✓
α200	x	C, V, M, A, L	✓		✓
α201	A	S, T, N, V	✓		
α202	x	F, V, I, L	✓		✓
α203	M	I, L, S, V	✓		
α204	V	L, M, F	✓		
α205	D	Q	✓		
α206	N	∅			✓
α207	E	A	✓		✓
α208	A	S, Q	✓		
α209	I	C, V, L	✓		
α210	Y	F	✓	✓	✓
α211	D	E, K, N	✓		
α212	I	L, M, F			
α213	C	T, Y, S, A	✓		
α214	R	H, K, E, D, N, A	✓	✓	
α215	R	Q, V, N, M, C	✓	✓	
α216	N	K, S, Q, L, Y, T	✓		
α217	L	F, P	✓		✓
α218	D	S, R, G, H, N, Y, C	✓		✓
α219	I	V, L, F	✓		✓
α220	E	D, A, S, R, P, Q	✓	✓	
α221	R	S, C, Y, Q, N, A, I	✓		✓
α222	P	V, L, I	✓		
α223	T	S, F, D, A, T, S	✓	✓	✓
α224	Y	F, H		✓	✓
α225	T	A, S, E, N, Q, M, C, R	✓	✓	✓
α226	N	D, S	✓		
α227	L	I, V	✓		✓
α228	N	∅	✓		✓
α229	R	N, G, H, Q	✓		

α230	L	I, V	✓		
α231	I	V, L, M, T	✓		✓
α232	S	A, V, G	✓	✓	
α233	Q	I	✓		
α234	V	I, A, T			
α235	I	V, A, L, N	✓		
α236	S	∅	✓	✓	
α237	S	Q, A	✓	✓	✓
α238	L	I, V, T	✓		✓
α239	T	I	✓		✓
α240	A	T, S, L, H, C			✓
α241	S	G		✓	✓
α242	L	I, T, M, Q	✓		✓
α243	R	∅	✓		✓
α244	F	∅	✓		✓
α245	D	E, A, K, G, S	✓		✓
α246	G	D	✓		✓
α247	A	P, S, D, T, E, G	✓		✓
α248	L	I, Q, S, M		✓	✓
α249	N	Q, T	✓	✓	✓
α250	V	F, S, Y, N	✓	✓	✓
α251	D	T, N, H, S	✓		✓
α252	L	I, M, F, V	✓		✓
α253	T	N, I, A, E, S, Q	✓		✓
α254	E	Q, H, N, D	✓		✓
α255	F	L, T, Y	✓	✓	✓
α256	Q	I, L, V, E	✓		✓
α257	T	M, V, K, A	✓	✓	✓
α258	N	∅	✓		✓
α259	L	T	✓		✓
α260	V	I	✓		✓
α261	P	C	✓		✓
α262	Y	F		✓	✓
α263	P	R	✓		✓
α264	R	K, E	✓		✓
α265	I	L, F	✓		✓
α266	H	N, K, C	✓		✓
α267	F	L, N, Y	✓		
α268	x	P, M, V, L, T, E	✓		
α269	L	M, I, T	✓		
α270	S	A, V, T, P, I	✓		
α271	S	N, A, T	✓	✓	
α272	Y	L, F	✓	✓	
α273	A	S, C, T, N	✓	✓	
α274	P	S	✓		
α275	V	I, L, S, F	✓	✓	

α276	I	V, L, T, N, M	✓	✓	
α277	S	D, N, F, P	✓	✓	✓
α278	A	K, S, L, F, T, I, V	✓		✓
α279	E	A, D, S, N, K, Q, I, –	✓		✓
α280	K	R, N, Q, H, –	✓	✓	
α281	A	S, Y, I, E, Q	✓	✓	✓
α282	Y	F, T, H, S, C, A, R, Q, N, K	✓	✓	✓
α283	H	F, S, C, N	✓		✓
α284	E	V, I, G, Q	✓		✓
α285	Q	S, P, F, A, N, R	✓		✓
α286	L	F, N, M, H, G, A, P	✓		✓
α287	S	T, A, N	✓	✓	
α288	V	T, I	✓		
α289	A	S, P, Q, D, N, T, R, Q, K	✓		✓
α290	E	D, S, M, Q, T	✓	✓	✓
α291	I	M, L	✓		
α292	T	C, S	✓		
α293	N	T, H, K, Q, S, V, G, I	✓		✓
α294	A	S, Q, M, V, E, F	✓		
α295	C	L, A, V	✓	✓	
α296	F	V	✓		
α297	E	K, L, N, Q, D	✓	✓	
α298	P	N, K, M, E, S, A	✓		
α299	A	S, G, Y, N, H, R, Q, D	✓		
α300	N	S, A, Y, R, F	✓		
α301	x	Q, M, V, F, C, S	✓	✓	
α302	M	F, L	✓		
α303	V	I, A	✓		
α304	K	R, D, S, N	✓	✓	✓
α305	C	I, V	✓		
α306	D	N, K	✓		
α307	P	I, Y	✓		✓
α308	R	T, S, K, L, Q, N	✓		✓
α309	H	R, L, D, K, T, A, N, Q, F	✓		✓
α310	G	N	✓		✓
α311	K	I, R	✓	✓	✓
α312	Y	S, F	✓	✓	
α313	M	L, I	✓		✓
α314	A	S	✓	✓	
α315	C	T, N, V, S	✓	✓	✓
α316	C	S, V, D, H	✓	✓	✓
α317	L	M, I, Y	✓	✓	✓
α318	M	L, T	✓	✓	✓
α319	Y	F, A, I	✓	✓	✓
α320	R	∅	✓		
α321	G	∅	✓		✓

α322	D	A	✓		✓
α323	V	I	✓		✓
α324	V	T, Y, A, Q, I	✓		✓
α325	P	T	✓		✓
α326	K	R, N	✓	✓	✓
α327	D	E, H, Q	✓		✓
α328	V	I, A	✓		✓
α329	N	G, S, Q, L	✓		✓
α330	A	E, Q, T, S, R, V	✓	✓	✓
α331	A	S, G	✓		✓
α332	V	I, M, L, F	✓		✓
α333	A	H, K, S, G, E, N, Y, T	✓		✓
α334	T	A, S, N, I, Q	✓	✓	✓
α335	I	W, V, L, T	✓	✓	✓
α336	K	M	✓	✓	✓
α337	T	A, S, G, R, E, K, N	✓	✓	✓
α338	K	H, N, R, Q	✓	✓	✓
α339	R	K, Q, G, H	✓		✓
α340	T	S, A, H, D, N, G	✓	✓	✓
α341	I	L, F, V	✓		✓
α342	Q	N, R, D, K	✓		✓
α343	F	M, L	✓		✓
α344	V	∅	✓		✓
α345	D	N, E			✓
α346	W	F	✓		✓
α347	C	S, I	✓	✓	✓
α348	P	S, Q	✓		✓
α349	T	S, N	✓		✓
α350	G	Y, S	✓		✓
α351	F	L, I	✓		✓
α352	K	L	✓	✓	✓
α353	x	L, C, V, I, T	✓		✓
α354	G	S, K	✓		✓
α355	I	V, M, A, L	✓		✓
α356	N	C, I, S	✓		✓
α357	Y	S, Q, P, D, N	✓	✓	✓
α358	Q	E, M, N, K, R, F	✓		✓
α359	P	K, L, Q, I, P, A	✓		✓
α360	P	M	✓		
α361	T	S, A, Y, C, K, Q	✓	✓	
α362	V	F, Y, I, N, P, T, H, A	✓		✓
α363	V	L, S, I, T, M	✓		✓
α364	P	I, L, E	✓		✓
α365	G	N, D, Q, H, I	✓		✓
α366	G	E, S, V, A	✓		✓
α367	D	H, S, Y, E, K, G, Q	✓		✓

α368	L	F, E, S, I, M	✓		✓
α369	A	T, S, F, G	✓		✓
α370	K	A, P, Y, S, N, G	✓	✓	✓
α371	V	T, A, S, F, L, Q	✓		✓
α372	Q	R, M, S, P, N, F, H, D, T	✓		✓
α373	R	K, Q, V	✓		✓
α374	A	S, D	✓		✓
α375	V	C, A, G, I	✓	✓	✓
α376	C	V, F, I	✓	✓	✓
α377	M	A, L, I	✓	✓	✓
α378	L	I, V, M	✓		✓
α379	S	A	✓	✓	✓
α380	N	∅	✓		✓
α381	T	S, N	✓	✓	✓
α382	T	C	✓	✓	✓
α383	A	S, N, G	✓		✓
α384	I	V	✓		✓
α385	A	V, G, S, K, R, N, T, Q	✓		✓
α386	E	D, V, I, S	✓		✓
α387	A	L, I, V	✓		✓
α388	W	F, I, L			✓
α389	S	A, Q, C, E, D	✓		✓
α390	R	N, I, K, F	✓		✓
α391	L	I, M, T	✓		✓
α392	D	V, S, N, A, L, G	✓		✓
α393	H	I, R, Y, N, Q, A, T	✓		✓
α394	K	D, R	✓	✓	✓
α395	F	M			✓
α396	D	Y, N	✓		✓
α397	L	K, Q	✓		✓
α398	M	L	✓		✓
α399	Y	C, F	✓	✓	✓
α400	A	S, K, Q, T, D, N	✓		✓
α401	K	R	✓	✓	✓
α402	R	W	✓		✓
α403	A	Q	✓		✓
α404	F	∅			✓
α405	V	T, L	✓		✓
α406	H	Y	✓		✓
α407	W	R, H, L	✓		✓
α408	Y	F, H	✓		✓
α409	V	L, Q, Y	✓		✓
α410	G	R	✓		✓
α411	E	∅	✓		✓
α412	G	∅	✓		✓
α413	M	L, Q	✓		✓

α414	E	S	✓		✓
α415	E	S	✓		✓
α416	G	D, A	✓		✓
α417	E	Q, N, D	✓		✓
α418	F	L	✓		✓
α419	S	A, T, M, L, I, Q	✓	✓	✓
α420	E	C, Q	✓		✓
α421	A	∅	✓		✓
α422	R	S	✓		✓
α423	E	D	✓		✓
α424	D	N, R, I	✓		✓
α425	L	M, I	✓		✓
α426	A	C, L, Q	✓		✓
α427	A	V, Q, L, R, S	✓		✓
α428	L	T, I			✓
α429	E	I, V	✓		✓
α430	K	R, H, N, D	✓		✓
α431	D	∅	✓		✓
α432	Y	F, C	✓	✓	✓
α433	E	I, A, D, L, Q, H	✓		✓
α434	E	D	✓		✓
α435	V	I, A, S	✓		✓
α436	G	S, A, D, L	✓		✓
α437	A	V, I, M, T, Q, R, E, L, S, G,	✓	✓	✓
α438	D	E, T, S	✓		✓
α439	S	T, A, E, F, G, C, L, N, V	✓	✓	✓
α440	x	A, V, I, Y, G, T, L, D, M, F, N, E	✓	✓	✓