Novel Variations in Native Ethiopian Goat breeds Prnp Gene and Their Potential Effect on Prion Protein Stability

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Table 1   Haplotype

	HAPLOTYPE 1						
	67NOV	68NOV	69NOV	127	138	143	146
AfCap01	G	W	G	G	S	H	N
AfCap02	G	R	G	G	S	H	S
AfCap03	G	W	G	G	S	H	S
AfCap04	G	W	G	G	S	H	S
AfCap05	G	W	G	G	S	H	S
AfCap06	G	W	G	G	S	H	N
AfCap07	G	R	G	G	S	H	N
AfCap08	G	R	G	G	S	H	S
AfCap09	G	W	G	G	S	H	N
AfCap10	G	W	G	G	S	H	N
AfCap11	G	R	G	G	S	H	N
AfCap12	G	W	G	G	S	H	S
AfCap13	G	W	G	G	S	H	N
AfCap14	G	W	G	G	S	H	S
AfCap15	G	W	G	G	S	H	N
AfCap16	G	W	G	G	S	H	S
AfCap17	G	W	G	G	S	H	S
AfCap18	G	W	G	G	S	H	N
AfCap19	G	W	G	G	S	H	N
AfCap20	G	R	G	A	S	H	N
AfCap23	G	W	G	G	S	H	S
AfCap24	G	W	G	G	S	H	S
AfCap25	S	R	G	G	S	H	N
AfCap26	S	R	G	G	S	H	S
AfCap27	G	W	G	G	S	H	S
AfCap28	G	W	G	G	S	H	S
AfCap29	G	W	G	G	S	H	N
AfCap30	G	W	G	G	S	H	S
AfCap31	G	W	G	G	S	H	S
AfCap35	G	W	G	G	S	H	N
AfCap36	G	W	G	G	S	H	S
AfCap37	G	W	G	G	S	H	N
AfCap38	G	R	G	G	S	H	N
AfCap39	G	W	G	G	S	H	S
AfCap40	G	W	G	G	S	H	N
ArCap01	S	R	D	G	S	H	N
ArCap02	S	R	D	G	S	H	N
ArCap03	G	W	G	G	S	H	S
ArCap05	S	R	D	A	S	H	N
ArCap06	G	W	G	G	S	H	N

ArCap07	G	W	G	G	S	H	S
ArCap08	G	W	G	G	S	H	S
ArCap09	G	W	G	G	S	H	S
ArCap10	G	W	G	G	S	H	N
ArCap11	G	W	G	G	S	H	N
ArCap12	G	W	G	G	S	H	N
ArCap13	G	W	G	G	S	H	N
ArCap14	G	W	G	G	S	H	S
ArCap15	G	W	G	G	S	H	S
ArCap16	G	W	G	G	S	H	S
ArCap17	G	W	G	G	S	H	S
ArCap18	G	W	G	G	S	H	S
ArCap19	G	W	G	G	S	H	S
ArCap20	G	W	G	G	S	H	N
ArCap21	G	W	G	G	S	H	S
ArCap22	G	W	G	G	S	H	N
ArCap23	G	W	G	G	S	H	S
ArCap24	G	W	G	G	S	H	N
ArCap25	G	W	G	G	S	H	N
ArCap26	G	W	G	G	S	H	N
ArCap27	G	W	G	G	S	H	N
ArCap28	G	W	G	G	S	H	N
ArCap29	G	W	G	G	S	H	S
ArCap30	G	W	G	G	S	H	S
ArCap31	G	W	G	G	S	H	N
ArCap32	G	W	G	G	S	H	N
ArCap33	G	W	G	G	S	H	N
ArCap34	G	W	G	G	S	H	N
ArCap35	G	W	G	G	S	H	N
ArCap36	G	W	G	G	S	H	N
ArCap37	G	W	G	G	S	H	S
ArCap38	G	W	G	G	S	H	N
ArCap39	G	W	G	G	S	H	S
ArCap40	G	W	G	G	S	H	N

AfCap-Afar Caprine, ArCap-Arsi Caprine

*Haplotype Blockf from the Each partent (HAPLOTYPE 1 ve 2)

* *Colured columns are MONOMORPHIC lucus

***Last column best prediction

154	159NOV	193	240		67NOV	68NOV	69NOV	127
R	R	T	P		G	R	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	W	G	G
R	R	T	S		G	W	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	W	G	G
R	R	I	P		G	R	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	R	G	G
H	R	T	P		G	W	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	R	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	W	G	G
R	R	T	P		G	W	G	G

R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	S	G	W	G	G
R	R	T	P	G	W	G	A
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	R	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	S	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	I	P	G	W	G	G
R	R	T	P	G	W	G	G
R	R	T	P	G	W	G	A

138	143	146	154	159NOV	193	240
S	H	S	R	H	T	P
S	H	N	R	R	T	S
S	H	S	R	R	T	S
S	H	N	R	R	I	P
S	H	N	R	R	T	P
S	H	N	R	R	T	P
S	H	N	R	R	T	S
S	H	N	H	R	T	S
S	H	N	H	R	T	S
S	H	N	R	R	T	S
S	H	N	R	R	T	S
S	H	N	R	R	T	P
S	H	N	R	R	T	P
S	H	N	H	R	T	P
S	H	N	R	R	I	P
S	H	N	R	R	T	P
S	H	S	R	R	T	P
S	H	N	R	R	T	P
S	H	N	R	R	T	P
S	H	S	R	R	T	P
S	H	N	R	R	T	P
S	H	N	R	R	T	P
S	H	N	R	R	T	P
S	H	S	R	R	T	P
S	H	N	R	R	T	P
S	H	N	R	R	T	P
S	H	S	R	H	T	P
S	H	N	R	R	T	P
S	H	N	R	R	T	P
S	H	N	H	R	T	P
S	H	N	R	R	T	P
S	R	N	R	R	T	P
S	H	N	R	R	T	S
S	H	N	R	R	T	P
S	H	N	R	R	T	S
S	H	N	R	R	T	P
S	H	S	R	R	T	P
S	H	S	R	R	T	P
S	H	N	R	R	T	P
S	H	S	R	R	T	P

S	H	S	R	R	T	P
S	H	N	R	R	T	S
S	H	N	R	R	I	P
S	H	N	R	R	T	S
S	H	N	R	R	T	S
S	H	N	R	R	T	P
S	H	S	R	R	T	P
S	H	S	R	R	T	P
S	H	S	R	R	T	P
S	H	N	R	R	I	P
S	H	N	R	R	T	S
S	H	S	R	R	T	P
S	H	N	R	R	T	S
S	H	N	R	R	T	P
S	H	N	R	R	T	S
S	H	S	R	R	T	P
S	H	N	R	R	T	S
S	H	S	R	R	T	P
S	H	N	R	R	T	S
S	H	N	R	R	T	P
S	H	N	R	R	T	P
S	R	N	R	R	T	P
S	H	N	R	R	T	P
S	H	S	R	R	T	P
S	H	S	R	R	T	P
S	H	N	R	R	T	S
S	H	N	R	R	T	S
S	H	N	R	R	T	P
S	H	N	R	R	T	P
S	H	N	R	R	I	P
S	H	N	R	R	I	P
S	H	N	R	R	T	S
S	H	S	R	R	T	P
S	H	N	R	R	T	P

,

HAPLOTYPE 1	HAPLOTYPE 2	POSTPROBABILITY
GWGGSHNRRTP	GRGGSHSRHTP	1
GRGGSHSRRTP	GWGGSHNRRTS	1
GWGGSHSRRTP	GRGGSHSRRTS	1
GWGGSHSRRTP	GRGGSHNRRIP	0.5914
GWGGSHSRRTP	GRGGSHNRRTP	0.6887
GWGGSHNRRTP	GRGGSHNRRTP	1
GRGGSHNRRTP	GWGGSHNRRTS	1
GRGGSHSRRTP	GWGGSHNHRTS	0.9237
GWGGSHNRRTS	GWGGSHNHRTS	0.5
GWGGSHNRRTP	GWGGSHNRRTS	1
GRGGSHNRRTP	GWGGSHNRRTS	1
GWGGSHSRRTP	GRGGSHNRRTP	0.6887
GWGGSHNRRTP	GRGGSHNRRTP	1
GWGGSHSRRTP	GWGGSHNHRTP	0.5
GWGGSHNRRIP	GRGGSHNRRIP	1
GWGGSHSRRTP	GRGGSHNRRTP	0.6887
GWGGSHSRRTP	GRGGSHSRRTP	1
GWGGSHNRRTP	GRGGSHNRRTP	1
GWGGSHNRRTP	GRGGSHNRRTP	1
GRGASHNRRTP	GWGGSHSRRTP	0.5848
GWGGSHSRRTP	GRGGSHNRRTP	0.6887
GWGGSHSRRTP	GRGGSHNRRTP	0.6887
SRGGSHNHRTP	GWGGSHNRRTP	1
SRGGSHSRRTP	GWGGSHSRRTP	1
GWGGSHSRRTP	GRGGSHNRRTP	0.6887
GWGGSHSRRTP	GRGGSHNRRTP	0.6887
GWGGSHNRRTP	GRGGSHSRHTP	1
GWGGSHSRRTP	GRGGSHNRRTP	0.6887
GWGGSHSRRTP	GRGGSHNRRTP	0.6887
GWGGSHNRRTP	GWGGSHNHRTP	0.9742
GWGGSHSRRTP	GRGGSHNRRTP	0.6887
GWGGSHNRRTP	GWGGSRNRRTP	1
GRGGSHNRRTP	GWGGSHNRRTS	1
GWGGSHSRRTP	GWGGSHNRRTP	1
GWGGSHNRRTP	GWGGSHNRRTS	1
SRDGSHNRRTP	GWGGSHNRRTP	1
SRDGSHNRRTP	GWGGSHSRRTP	1
GWGGSHSRRTP	GWGGSHSRRTP	1
SRDASHNRRTP	GWGGSHNRRTP	1
GWGGSHNRRTP	GWGGSHSRRTP	0.5

GWGGSHSRRTP	GWGGSHSRRTP	1
GWGGSHSRRTP	GWGGSHNRRTS	1
GWGGSHSRRTP	GWGGSHNRRIP	0.5
GWGGSHNRRTP	GWGGSHNRRTS	1
GWGGSHNRRTS	GWGGSHNRRTS	1
GWGGSHNRRTP	GWGASHNRRTP	1
GWGGSHNRRTP	GWGGSHSRRTP	0.5
GWGGSHSRRTP	GWGGSHSRRTP	1
GWGGSHSRRTP	GWGGSHSRRTP	1
GWGGSHSRRTP	GWGGSHNRRIP	0.5
GWGGSHSRRTP	GWGGSHNRRTS	1
GWGGSHSRRTP	GWGGSHSRRTP	1
GWGGSHSRRTP	GWGGSHNRRTS	1
GWGGSHNRRTP	GWGGSHNRRTP	1
GWGGSHSRRTP	GWGGSHNRRTS	1
GWGGSHNRRTP	GWGGSHSRRTP	0.5
GWGGSHSRRTP	GWGGSHNRRTS	1
GWGGSHNRRTP	GWGGSHSRRTP	0.5
GWGGSHNRRTP	GWGGSHNRRTS	1
GWGGSHNRRTP	GWGGSHNRRTP	1
GWGGSHNRRTP	GWGGSHNRRTP	1
GWGGSHNRRTP	GWGGSRNRRTP	1
GWGGSHSRRTP	GRGGSHNRRTP	0.6887
GWGGSHSRRTP	GWGGSHSRRTP	1
GWGGSHNRRTP	GWGGSHSRRTP	0.5
GWGGSHNRRTP	GWGGSHNRRTS	1
GWGGSHNRRTS	GWGGSHNRRTS	1
GWGGSHNRRTP	GWGGSHNRRTP	1
GWGGSHNRRTP	GWGGSHNRRTP	1
GWGGSHNRRTP	GWGGSHNRRIP	0.5
GWGGSHSRRTP	GWGGSHNRRIP	0.5
GWGGSHNRRIP	GWGGSHNRRTS	1
GWGGSHSRRTP	GWGGSHSRRTP	1
GWGGSHNRRTP	GWGASHNRRTP	1

Table 2   Hotspot identification Pr

Mutation score ([-1,0) for decreased amyloidogenicity and (0,1] for increased amyloidogenicity):

Sr#	Startposition	sequence	score
1	10	ILVLFVA	0.941
2	9	WILVLFV	0.934
3	12	VLFVAMW	0.925
4	11	LVLFVAM	0.923
5	250	LIFLIVG	0.919
6	13	LFVAMWS	0.918
7	251	IFLIVG	0.898
8	182	CVNITVK	0.898
9	120	AAGAVVG	0.896
10	14	FVAMWSD	0.893
11	249	FLIFLIV	0.886
12	8	SWILVLF	0.881
13	174	NQNNFVH	0.876
14	233	ASVILFS	0.867
15	243	VILLISF	0.856
16	247	ISFLIFL	0.853
17	121	AGAVVGG	0.852
18	7	GSWILVL	0.851
19	123	AVVGGLG	0.832
20	115	VAGAAAA	0.826
21	119	AAAGAVV	0.826
22	252	FLIVG	0.814
23	235	VILFSSP	0.808
24	234	SVILFSS	0.808
25	6	IGSWILV	0.805
26	246	LISFLIF	0.801
27	244	ILLISFL	0.801
28	122	GAVVGGL	0.793
29	175	QNNFVHD	0.792
30	248	SFLIFLI	0.792
31	232	GASVILF	0.777
32	124	VVGGLGG	0.768
33	212	VVEQMCI	0.729

Sr#	Startposition	sequence	score
1	10	ILVLFVA	0.941
2	9	WILVLFV	0.934
3	12	VLFVAMW	0.925
4	11	LVLFVAM	0.923
5	250	LIFLIVG	0.919
6	13	LFVAMWS	0.918
7	251	IFLIVG*	0.898
8	182	CVNITVK	0.898
9	120	AAGAVVG	0.896
10	14	FVAMWSD	0.893
11	249	FLIFLIV	0.886
12	8	SWILVLF	0.881
13	174	NQNNFVH	0.876
14	233	ASVILFS	0.867
15	243	VILLISF	0.856
16	247	ISFLIFL	0.853
17	121	AGAVVGG	0.852
18	7	GSWILVL	0.851
19	123	AVVGGLG	0.832
20	115	VAGAAAA	0.826
21	119	AAAGAVV	0.826
22	252	FLIVG*	0.814
23	235	VILFSSP	0.808
24	234	SVILFSS	0.808
25	6	IGSWILV	0.805
26	246	LISFLIF	0.801
27	244	ILLISFL	0.801
28	122	GAVVGGL	0.793
29	175	QNNFVHD	0.792
30	248	SFLIFLI	0.792
31	232	GASVILF	0.777
32	124	VVGGLGG	0.768

34	245	LLISFLI	0.725		33	212	VVEQMCI	0.729
35	116	AGAAAAG	0.721		34	245	LLISFLI	0.725
36	118	AAAAGAV	0.721		35	116	AGAAAAG	0.721
37	5	HIGSWIL	0.714		36	118	AAAAGAV	0.721
38	173	SNQNNFV	0.714		37	5	HIGSWIL	0.714
39	114	HVAGAAA	0.711		38	173	SNQNNFV	0.714
40	217	CITQYQR	0.678		39	114	HVAGAAA	0.711
41	216	MCITQYQ	0.676		40	253	LIVG*	0.698
42	178	FVHDCVN	0.665		41	217	CITQYQR	0.678
43	215	QMCITQY	0.661		42	216	MCITQYQ	0.676
44	213	VEQMCIT	0.660		43	178	FVHDCVN	0.665
45	172	YSNQNNF	0.658		44	215	QMCITQY	0.661
46	225	SQAYYQR	0.650		45	213	VEQMCIT	0.660
47	141	LIHFGND	0.647		46	172	YSNQNNF	0.658
48	117	GAAAAGA	0.633		47	225	SQAYYQR	0.650
49	15	VAMWSDV	0.613		48	141	LIHFGND	0.647
50	16	AMWSDVG	0.613		49	117	GAAAAGA	0.633
51	179	VHDCVNI	0.606		50	15	VAMWSDV	0.613
52	131	YMLGSAM	0.552		51	16	AMWSDVG	0.613
53	4	SHIGSWI	0.550		52	179	VHDCVNI	0.606
54	125	VGGLGGY	0.546		53	131	YMLGSAM	0.552
55	98	SHSQWNK	0.545		54	4	SHIGSWI	0.550
56	132	MLGSAMS	0.532		55	125	VGGLGGY	0.546
57	181	DCVNITV	0.531		56	98	SHSQWNK	0.545
58	55	QGGGGWG	0.530		57	132	MLGSAMS	0.532
59	92	GWGQGGS	0.530		58	181	DCVNITV	0.531
60	91	GGWGQGG	0.530		59	55	QGGGGWG	0.530
61	81	GGGWGQP	0.530		60	92	GWGQGGS	0.530
62	73	GGGWGQP	0.530		61	91	GGWGQGG	0.530
63	65	GGGWGQP	0.530		62	81	GGGWGQP	0.530
64	57	GGGWGQP	0.530		63	73	GGGWGQP	0.530
65	90	GGGWGQG	0.530		64	57	GGGWGQP	0.530
66	180	HDCVNIT	0.526		65	90	GGGWGQG	0.530
67	93	WGQGGSH	0.523		66	180	HDCVNIT	0.526
68	128	LGGYMLG	0.522		67	93	WGQGGSH	0.523
69	17	MWSDVGL	0.513		68	128	LGGYMLG	0.522
70	177	NFVHDCV	0.511		69	17	MWSDVGL	0.513

71	183	VNITVKQ	0.509
72	18	WSDVGLC	0.506
73	176	NNFVHDC	0.501
74	242	PVILLIS	0.497
75	33	GWNTGGS	0.491
76	32	GGWNTGG	0.491
77	31	GGGWNTG	0.491
78	34	WNTGGSR	0.484
79	127	GLGGYML	0.458
80	129	GGYMLGS	0.458
81	89	GGGGWGQ	0.456
82	56	GGGGWGQ	0.456
83	97	GSHSQWN	0.454
84	133	LGSAMSR	0.453
85	130	GYMLGSA	0.450
86	162	NQVYYRP	0.414
87	80	HGGGWGQ	0.396
88	72	HGGGWGQ	0.396
89	64	HGGGWGQ	0.396
90	88	HGGGGWG	0.396
91	126	GGLGGYM	0.387
92	19	SDVGLCK	0.384
93	160	YPNQVYY	0.378
94	161	PNQVYYR	0.378
95	214	EQMCITQ	0.360
96	224	ESQAYYQ	0.350
97	184	NITVKQH	0.337
98	231	RGASVIL	0.335
99	142	IHFGNDY	0.334
100	189	QHTVTTT	0.332
101	208	IMERVVE	0.330
102	187	VKQHTVT	0.276
103	111	NMKHVAG	0.273
104	143	HFGNDYE	0.267
105	226	QAYYQRG	0.265
106	94	GQGGSHS	0.257
107	230	QRGASVI	0.255

70	177	NFVHDCV	0.511
71	183	VNITVKQ	0.509
72	18	WSDVGLC	0.506
73	176	NNFVHDC	0.501
74	242	PVILLIS	0.497
75	33	GWNTGGS	0.491
76	32	GGWNTGG	0.491
77	31	GGGWNTG	0.491
78	34	WNTGGSR	0.484
79	127	GLGGYML	0.458
80	129	GGYMLGS	0.458
81	89	GGGGWGQ	0.456
82	56	GGGGWGQ	0.456
83	97	GSHSQWN	0.454
84	133	LGSAMSR	0.453
85	130	GYMLGSA	0.450
86	162	NQVYYRP	0.414
87	80	HGGGWGQ	0.396
88	72	HGGGWGQ	0.396
89	88	HGGGGWG	0.396
90	126	GGLGGYM	0.387
91	19	SDVGLCK	0.384
92	160	YPNQVYY	0.378
93	161	PNQVYYR	0.378
94	214	EQMCITQ	0.360
95	224	ESQAYYQ	0.350
96	184	NITVKQH	0.337
97	231	RGASVIL	0.335
98	142	IHFGNDY	0.334
99	189	QHTVTTT	0.332
100	208	IMERVVE	0.330
101	187	VKQHTVT	0.276
102	111	NMKHVAG	0.273
103	143	HFGNDYE	0.267
104	226	QAYYQRG	0.265
105	94	GQGGSHS	0.257
106	230	QRGASVI	0.255

108	95	QGGSHSQ	0.251		107	95	QGGSHSQ	0.251
109	96	GGSHSQW	0.251		108	96	GGSHSQW	0.251
110	211	RVVEQMC	0.251		109	211	RVVEQMC	0.251
111	1	MVKSHIG	0.249		110	1	MVKSHIG	0.249
112	191	TVTTTTK	0.231		111	191	TVTTTTK	0.231
113	190	HTVTTTT	0.227		112	190	HTVTTTT	0.227
114	113	KHVAGAA	0.226		113	113	KHVAGAA	0.226
115	185	ITVKQHT	0.216		114	185	ITVKQHT	0.216
116	228	YYQRGAS	0.211		115	228	YYQRGAS	0.211
117	227	AYYQRGA	0.211		116	227	AYYQRGA	0.211
118	218	ITQYQRE	0.208		117	218	ITQYQRE	0.208
119	112	MKHVAGA	0.206		118	112	MKHVAGA	0.206
120	171	RYSNQNN	0.200		119	171	RYSNQNN	0.200
121	2	VKSHIGS	0.199		120	2	VKSHIGS	0.199
122	236	ILFSSPP	0.198		121	236	ILFSSPP	0.198
123	99	HSQWNKP	0.180		122	99	HSQWNKP	0.180
124	140	PLIHFGN	0.170		123	140	PLIHFGN	0.170
125	110	TNMKHVA	0.166		124	110	TNMKHVA	0.166
126	30	PGGGWNT	0.164		125	30	PGGGWNT	0.164
127	82	GGWGQPH	0.154		126	82	GGWGQPH	0.154
128	74	GGWGQPH	0.154		127	74	GGWGQPH	0.154
129	**66**	**GGWGQPH**	**0.154**		128	58	GGWGQPH	0.154
130	58	GGWGQPH	0.154		129	144	FGNDYED	0.154
131	144	FGNDYED	0.154		130	229	YQRGASV	0.153
132	229	YQRGASV	0.153		131	164	VYYRPVD	0.139
133	164	VYYRPVD	0.139		132	84	WGQPHGG	0.125
134	84	WGQPHGG	0.125		133	76	WGQPHGG	0.125
135	76	WGQPHGG	0.125		134	60	WGQPHGG	0.125
136	**68**	**WGQPHGG**	**0.125**		135	83	GWGQPHG	0.125
137	**60**	**WGQPHGG**	**0.125**		136	75	GWGQPHG	0.125
138	83	GWGQPHG	0.125		137	59	GWGQPHG	0.125
139	75	GWGQPHG	0.125		138	169	VDRYSNQ	0.111
140	**67**	**GWGQPHG**	**0.125**		139	134	GSAMSRP	0.107
141	59	GWGQPHG	0.125		140	20	DVGLCKK	0.103
142	169	VDRYSNQ	0.111		141	186	TVKQHTV	0.100
143	134	GSAMSRP	0.107		142	188	KQHTVTT	0.100
144	20	DVGLCKK	0.103		143	198	GENFTET	0.099

145	186	TVKQHTV	0.100	144	201	FTETDIK	0.099
146	188	KQHTVTT	0.100	145	79	PHGGGWG	0.096
147	198	GENFTET	0.099	146	71	PHGGGWG	0.096
148	201	FTETDIK	0.099	147	41	YPGQGSP	0.094
149	79	PHGGGWG	0.096	148	152	YYRENMY	0.090
150	71	PHGGGWG	0.096	149	153	YRENMYR	0.090
151	63	PHGGGWG	0.096	150	155	ENMYRYP	0.090
152	41	YPGQGSP	0.094	151	210	ERVVEQM	0.089
153	152	YYRENMY	0.090	152	209	MERVVEQ	0.088
154	153	YRENMYR	0.090	153	204	TDIKIME	0.082
155	155	ENMYRYP	0.090	154	199	ENFTETD	0.081
156	210	ERVVEQM	0.089	155	3	KSHIGSW	0.081
157	209	MERVVEQ	0.088	156	241	PPVILLI	0.075
158	204	TDIKIME	0.082	157	200	NFTETDI	0.074
159	199	ENFTETD	0.081	158	159	RYPNQVY	0.073
160	3	KSHIGSW	0.081	159	163	QVYYRPV	0.073
161	241	PPVILLI	0.075	160	45	GSPGGNR	0.071
162	200	NFTETDI	0.074	161	54	PQGGGGW	0.069
163	159	RYPNQVY	0.073	162	44	QGSPGGN	0.067
164	163	QVYYRPV	0.073	163	43	GQGSPGG	0.067
165	45	GSPGGNR	0.071	164	35	NTGGSRY	0.066
166	54	PQGGGGW	0.069	165	36	TGGSRYP	0.066
167	44	QGSPGGN	0.067	166	223	RESQAYY	0.065
168	43	GQGSPGG	0.067	167	192	VTTTTKG	0.063
169	35	NTGGSRY	0.066	168	222	QRESQAY	0.061
170	36	TGGSRYP	0.066	169	221	YQRESQA	0.059
171	223	RESQAYY	0.065	170	220	QYQRESQ	0.059
172	192	VTTTTKG	0.063	171	170	DRYSNQN	0.058
173	222	QRESQAY	0.061	172	240	SPPVILL	0.057
174	221	YQRESQA	0.059	173	78	QPHGGGW	0.055
175	220	QYQRESQ	0.059	174	70	QPHGGGW	0.055
176	170	DRYSNQN	0.058	175	86	QPHGGGG	0.055
177	240	SPPVILL	0.057	176	61	GQPHGGS	0.055
178	78	QPHGGGW	0.055	177	85	GQPHGGG	0.055
179	70	QPHGGGW	0.055	178	77	GQPHGGG	0.055
180	62	QPHGGGW	0.055	179	21	VGLCKKR	0.054
181	86	QPHGGGG	0.055	180	62	QPHGGSR	0.053

182	85	GQPHGGG	0.055
183	77	GQPHGGG	0.055
184	69	GQPHGGG	0.055
185	61	GQPHGGG	0.055
186	21	VGLCKKR	0.054
187	219	TQYQRES	0.049
188	196	TKGENFT	0.048
189	197	KGENFTE	0.048
190	100	SQWNKPR	0.044
191	239	SSPPVIL	0.044
192	205	DIKIMER	0.042
193	87	PHGGGGW	0.041
194	238	FSSPPVI	0.041
195	158	YRYPNQV	0.040
196	156	NMYRYPN	0.040
197	157	MYRYPNQ	0.040
198	139	RPLIHFG	0.037
199	145	GNDYEDR	0.033
200	137	MSRPLIH	0.033
201	207	KIMERVV	0.031
202	148	YEDRYYR	0.026
203	203	ETDIKIM	0.025
204	136	AMSRPLI	0.025
205	193	TTTTKGE	0.024
206	29	KPGGGWN	0.024
207	206	IKIMERV	0.023
208	195	TTKGENF	0.021
209	47	PGGNRYP	0.021
210	48	GGNRYPP	0.021
211	165	YYRPVDR	0.020
212	237	LFSSPPV	0.020
213	138	SRPLIHF	0.020
214	40	RYPGQGS	0.020
215	135	SAMSRPL	0.019
216	39	SRYPGQG	0.019
217	52	YPPQGGG	0.017
218	46	SPGGNRY	0.014

181	219	TQYQRES	0.049
182	196	TKGENFT	0.048
183	197	KGENFTE	0.048
184	100	SQWNKPR	0.044
185	239	SSPPVIL	0.044
186	205	DIKIMER	0.042
187	87	PHGGGGW	0.041
188	238	FSSPPVI	0.041
189	158	YRYPNQV	0.040
190	156	NMYRYPN	0.040
191	157	MYRYPNQ	0.040
192	139	RPLIHFG	0.037
193	145	GNDYEDR	0.033
194	137	MSRPLIH	0.033
195	207	KIMERVV	0.031
196	65	GGSRDQP	0.029
197	148	YEDRYYR	0.026
198	203	ETDIKIM	0.025
199	136	AMSRPLI	0.025
200	193	TTTTKGE	0.024
201	29	KPGGGWN	0.024
202	206	IKIMERV	0.023
203	195	TTKGENF	0.021
204	47	PGGNRYP	0.021
205	48	GGNRYPP	0.021
206	165	YYRPVDR	0.020
207	69	DQPHGGG	0.020
208	237	LFSSPPV	0.020
209	138	SRPLIHF	0.020
210	40	RYPGQGS	0.020
211	135	SAMSRPL	0.019
212	39	SRYPGQG	0.019
213	52	YPPQGGG	0.017
214	64	HGGSRDQ	0.017
215	46	SPGGNRY	0.014
216	38	GSRYPGQ	0.014
217	37	GGSRYPG	0.014

219 38 GSRYPGQ 0.014

220 37 GGSRYPG 0.014

221 168 PVDRYSN 0.014

222 151 RYYRENM 0.014

223 154 RENMYRY 0.013

224 109 KTNMKHV 0.013

225 53 PPQGGGG 0.012

226 194 TTTKGEN 0.012

227 42 PGQGSPG 0.011

228 202 TETDIKI 0.010

229 101 QWNKPRK 0.009

230 146 NDYEDRY 0.006

231 147 DYEDRYY 0.006

232 50 NRYPPQG 0.005

233 22 GLCKKRP 0.004

234 49 GNRYPPQ 0.003

235 149 EDRYYRE 0.003

236 150 DRYYREN 0.003

237 51 RYPPQGG 0.003

238 166 YRPVDRY 0.003

239 167 RPVDRYS 0.003

240 108 PKTNMKH 0.003

241 107 KPKTNMK 0.003

242 28 PKPGGGW 0.002

243 102 WNKPRKP 0.001

244 23 LCKKRPK 0.001

245 106 RKPKTNM 0.000

246 27 RPKPGGG 0.000

247 24 CKKRPKP 0.000

248 103 NKPRKPK 0.000

249 26 KRPKPGG 0.000

250 105 PRKPKTN 0.000

251 104 KPRKPKT 0.000

252 25 KKRPKPG 0.000

218 168 PVDRYSN 0.014

219 151 RYYRENM 0.014

220 154 RENMYRY 0.013

221 109 KTNMKHV 0.013

222 53 PPQGGGG 0.012

223 194 TTTKGEN 0.012

224 42 PGQGSPG 0.011

225 202 TETDIKI 0.010

226 101 QWNKPRK 0.009

227 63 PHGGSRD 0.008

228 146 NDYEDRY 0.006

229 147 DYEDRYY 0.006

230 66 GSRDQPH 0.005

231 50 NRYPPQG 0.005

232 22 GLCKKRP 0.004

233 68 RDQPHGG 0.004

234 67 SRDQPHG 0.004

235 49 GNRYPPQ 0.003

236 149 EDRYYRE 0.003

237 150 DRYYREN 0.003

238 51 RYPPQGG 0.003

239 166 YRPVDRY 0.003

240 167 RPVDRYS 0.003

241 108 PKTNMKH 0.003

242 107 KPKTNMK 0.003

243 28 PKPGGGW 0.002

244 102 WNKPRKP 0.001

245 23 LCKKRPK 0.001

246 106 RKPKTNM 0.000

247 27 RPKPGGG 0.000

248 24 CKKRPKP 0.000

249 103 NKPRKPK 0.000

250 26 KRPKPGG 0.000

251 105 PRKPKTN 0.000

252 104 KPRKPKT 0.000

1   10   ILVLFVA   0.941
2   9   WILVLFV   0.934
3   12   VLFVAMW   0.925
4   11   LVLFVAM   0.923
5   250 LIFLIVG   0.919
6   13   LFVAMWS   0.918
7   251 IFLIVG   0.898
8   182 CVNITVK   0.898
9   120 AAGAVVG   0.896
10 14   FVAMWSD   0.893
11 249 FLIFLIV   0.886
12 8   SWILVLF   0.881
13 174 NQNNFVH   0.876
14 233 ASVILFS   0.867
15 243 VILLISF   0.856
16 247 ISFLIFL   0.853
17 121 AGAVVGG   0.852
18 7   GSWILVL   0.851
19 123 AVVGGLG   0.832
20 115 VAGAAAA   0.826
21 119 AAAGAVV   0.826
22 252 FLIVG   0.814
23 235 VILFSSP   0.808
24 234 SVILFSS   0.808
25 6   IGSWILV   0.805
26 246 LISFLIF   0.801
27 244 ILLISFL   0.801
28 122 GAVVGGL   0.793
29 175 QNNFVHD   0.792
30 248 SFLIFLI   0.792
31 232 GASVILF   0.777
32 124 VVGGLGG   0.768

33	212	VVEQMCI	0.729
34	245	LLISFLI	0.725
35	116	AGAAAAG	0.721
36	118	AAAAGAV	0.721
37	5	HIGSWIL	0.714
38	173	SNQNNFV	0.714
39	114	HVAGAAA	0.711
40	217	CITQYQR	0.678
41	216	MCITQYQ	0.676
42	178	FVHDCVN	0.665
43	215	QMCITQY	0.661
44	213	VEQMCIT	0.660
45	172	YSNQNNF	0.658
46	225	SQAYYQR	0.650
47	141	LIHFGND	0.647
48	117	GAAAAGA	0.633
49	15	VAMWSDV	0.613
50	16	AMWSDVG	0.613
51	179	VHDCVNI	0.606
52	131	YMLGSAM	0.552
53	4	SHIGSWI	0.550
54	125	VGGLGGY	0.546
55	98	SHSQWNK	0.545
56	132	MLGSAMS	0.532
57	181	DCVNITV	0.531
58	55	QGGGGWG	0.530
59	92	GWGQGGS	0.530
60	91	GGWGQGG	0.530
61	81	GGGWGQP	0.530
62	73	GGGWGQP	0.530
63	57	GGGWGQP	0.530
64	90	GGGWGQG	0.530
65	180	HDCVNIT	0.526
66	93	WGQGGSH	0.523
67	128	LGGYMLG	0.522
68	17	MWSDVGL	0.513
69	177	NFVHDCV	0.511

70	183	VNITVKQ	0.509
71	18	WSDVGLC	0.506
72	176	NNFVHDC	0.501
73	242	PVILLIS	0.497
74	33	GWNTGGS	0.491
75	32	GGWNTGG	0.491
76	31	GGGWNTG	0.491
77	34	WNTGGSR	0.484
78	127	GLGGYML	0.458
79	129	GGYMLGS	0.458
80	89	GGGGWGQ	0.456
81	56	GGGGWGQ	0.456
82	97	GSHSQWN	0.454
83	133	LGSAMSR	0.453
84	130	GYMLGSA	0.450
85	162	NQVYYRP	0.414
86	80	HGGGWGQ	0.396
87	72	HGGGWGQ	0.396
88	88	HGGGGWG	0.396
89	126	GGLGGYM	0.387
90	19	SDVGLCK	0.384
91	160	YPNQVYY	0.378
92	161	PNQVYYR	0.378
93	214	EQMCITQ	0.360
94	224	ESQAYYQ	0.350
95	184	NITVKQH	0.337
96	231	RGASVIL	0.335
97	142	IHFGNDY	0.334
98	189	QHTVTTT	0.332
99	208	IMERVVE	0.330
100	**155**	**ENMYHYP**	**0.292**
101	187	VKQHTVT	0.276
102	111	NMKHVAG	0.273
103	143	HFGNDYE	0.267
104	226	QAYYQRG	0.265
105	94	GQGGSHS	0.257
106	230	QRGASVI	0.255

107	95	QGGSHSQ	0.251
108	96	GGSHSQW	0.251
109	211	RVVEQMC	0.251
110	1	MVKSHIG	0.249
111	159	HYPNQVY	0.248
112	191	TVTTTTK	0.231
113	190	HTVTTTT	0.227
114	113	KHVAGAA	0.226
115	185	ITVKQHT	0.216
116	228	YYQRGAS	0.211
117	227	AYYQRGA	0.211
118	218	ITQYQRE	0.208
119	112	MKHVAGA	0.206
120	171	RYSNQNN	0.200
121	2	VKSHIGS	0.199
122	236	ILFSSPP	0.198
123	99	HSQWNKP	0.180
124	140	PLIHFGN	0.170
125	110	TNMKHVA	0.166
126	30	PGGGWNT	0.164
127	82	GGWGQPH	0.154
128	74	GGWGQPH	0.154
129	58	GGWGQPH	0.154
130	144	FGNDYED	0.154
131	229	YQRGASV	0.153
132	158	YHYPNQV	0.148
133	156	NMYHYPN	0.146
134	157	MYHYPNQ	0.146
135	164	VYYRPVD	0.139
136	84	WGQPHGG	0.125
137	76	WGQPHGG	0.125
138	60	WGQPHGG	0.125
139	83	GWGQPHG	0.125
140	75	GWGQPHG	0.125
141	59	GWGQPHG	0.125
142	169	VDRYSNQ	0.111
143	134	GSAMSRP	0.107

144	20	DVGLCKK	0.103
145	186	TVKQHTV	0.100
146	188	KQHTVTT	0.100
147	198	GENFTET	0.099
148	201	FTETDIK	0.099
149	79	PHGGGWG	0.096
150	71	PHGGGWG	0.096
151	41	YPGQGSP	0.094
152	152	YYRENMY	0.090
153	153	YRENMYH	0.090
154	210	ERVVEQM	0.089
155	209	MERVVEQ	0.088
156	204	TDIKIME	0.082
157	199	ENFTETD	0.081
158	3	KSHIGSW	0.081
159	241	PPVILLI	0.075
160	200	NFTETDI	0.074
161	163	QVYYRPV	0.073
162	45	GSPGGNR	0.071
163	54	PQGGGGW	0.069
164	44	QGSPGGN	0.067
165	43	GQGSPGG	0.067
166	35	NTGGSRY	0.066
167	36	TGGSRYP	0.066
168	223	RESQAYY	0.065
169	192	VTTTTKG	0.063
170	222	QRESQAY	0.061
171	221	YQRESQA	0.059
172	220	QYQRESQ	0.059
173	170	DRYSNQN	0.058
174	240	SPPVILL	0.057
175	78	QPHGGGW	0.055
176	70	QPHGGGW	0.055
177	86	QPHGGGG	0.055
178	61	GQPHGGS	0.055
179	85	GQPHGGG	0.055
180	77	GQPHGGG	0.055

181	21	VGLCKKR	0.054
182	62	QPHGGSR	0.053
183	154	RENMYHY	0.051
184	219	TQYQRES	0.049
185	196	TKGENFT	0.048
186	197	KGENFTE	0.048
187	100	SQWNKPR	0.044
188	239	SSPPVIL	0.044
189	205	DIKIMER	0.042
190	87	PHGGGGW	0.041
191	238	FSSPPVI	0.041
192	139	RPLIHFG	0.037
193	145	GNDYEDR	0.033
194	137	MSRPLIH	0.033
195	207	KIMERVV	0.031
196	65	GGSRDQP	0.029
197	148	YEDRYYR	0.026
198	203	ETDIKIM	0.025
199	136	AMSRPLI	0.025
200	193	TTTTKGE	0.024
201	29	KPGGGWN	0.024
202	206	IKIMERV	0.023
203	195	TTKGENF	0.021
204	47	PGGNRYP	0.021
205	48	GGNRYPP	0.021
206	165	YYRPVDR	0.020
207	69	DQPHGGG	0.020
208	237	LFSSPPV	0.020
209	138	SRPLIHF	0.020
210	40	RYPGQGS	0.020
211	135	SAMSRPL	0.019
212	39	SRYPGQG	0.019
213	52	YPPQGGG	0.017
214	64	HGGSRDQ	0.017
215	46	SPGGNRY	0.014
216	38	GSRYPGQ	0.014
217	37	GGSRYPG	0.014

218	168	PVDRYSN	0.014
219	151	RYYRENM	0.014
220	109	KTNMKHV	0.013
221	53	PPQGGGG	0.012
222	194	TTTKGEN	0.012
223	42	PGQGSPG	0.011
224	202	TETDIKI	0.010
225	101	QWNKPRK	0.009
226	63	PHGGSRD	0.008
227	146	NDYEDRY	0.006
228	147	DYEDRYY	0.006
229	66	GSRDQPH	0.005
230	50	NRYPPQG	0.005
231	22	GLCKKRP	0.004
232	68	RDQPHGG	0.004
233	67	SRDQPHG	0.004
234	49	GNRYPPQ	0.003
235	149	EDRYYRE	0.003
236	150	DRYYREN	0.003
237	51	RYPPQGG	0.003
238	166	YRPVDRY	0.003
239	167	RPVDRYS	0.003
240	108	PKTNMKH	0.003
241	107	KPKTNMK	0.003
242	28	PKPGGGW	0.002
243	102	WNKPRKP	0.001
244	23	LCKKRPK	0.001
245	106	RKPKTNM	0.000
246	27	RPKPGGG	0.000
247	24	CKKRPKP	0.000
248	103	NKPRKPK	0.000
249	26	KRPKPGG	0.000
250	105	PRKPKTN	0.000
251	104	KPRKPKT	0.000
252	25	KKRPKPG	0.000

Table 3 Ligand binding affinity probability

Wild Type	Variant
r=MET;n=1 :prob=0.026	r=MET;n=1 :prob=0.026
r=VAL;n=2 :prob=0.026	r=VAL;n=2 :prob=0.026
r=LYS;n=3 :prob=0.027	r=LYS;n=3 :prob=0.027
r=SER;n=4 :prob=0.026	r=SER;n=4 :prob=0.026
r=HIS;n=5 :prob=0.027	r=HIS;n=5 :prob=0.026
r=ILE;n=6 :prob=0.026	r=ILE;n=6 :prob=0.026
r=GLY;n=7 :prob=0.026	r=GLY;n=7 :prob=0.026
r=SER;n=8 :prob=0.027	r=SER;n=8 :prob=0.026
r=TRP;n=9 :prob=0.031	r=TRP;n=9 :prob=0.026
r=ILE;n=10 :prob=0.028	r=ILE;n=10 :prob=0.027
r=LEU;n=11 :prob=0.027	r=LEU;n=11 :prob=0.026
r=VAL;n=12 :prob=0.027	r=VAL;n=12 :prob=0.027
r=LEU;n=13 :prob=0.026	r=LEU;n=13 :prob=0.027
r=PHE;n=14 :prob=0.027	r=PHE;n=14 :prob=0.032
r=VAL;n=15 :prob=0.030	r=VAL;n=15 :prob=0.027
r=ALA;n=16 :prob=0.028	r=ALA;n=16 :prob=0.026
r=MET;n=17 :prob=0.027	r=MET;n=17 :prob=0.026
r=TRP;n=18 :prob=0.026	r=TRP;n=18 :prob=0.027
r=SER;n=19 :prob=0.026	r=SER;n=19 :prob=0.026
r=ASP;n=20 :prob=0.027	r=ASP;n=20 :prob=0.026
r=VAL;n=21 :prob=0.033	r=VAL;n=21 :prob=0.026
r=GLY;n=22 :prob=0.037	r=GLY;n=22 :prob=0.027
r=LEU;n=23 :prob=0.035	r=LEU;n=23 :prob=0.026
r=CYS;n=24 :prob=0.029	r=CYS;n=24 :prob=0.026
r=LYS;n=25 :prob=0.035	r=LYS;n=25 :prob=0.026
r=LYS;n=26 :prob=0.027	r=LYS;n=26 :prob=0.026
r=ARG;n=27 :prob=0.026	r=ARG;n=27 :prob=0.026
r=PRO;n=28 :prob=0.026	r=PRO;n=28 :prob=0.026
r=LYS;n=29 :prob=0.026	r=LYS;n=29 :prob=0.027
r=PRO;n=30 :prob=0.026	r=PRO;n=30 :prob=0.026
r=GLY;n=31 :prob=0.026	r=GLY;n=31 :prob=0.026
r=GLY;n=32 :prob=0.027	r=GLY;n=32 :prob=0.026
r=GLY;n=33 :prob=0.026	r=GLY;n=33 :prob=0.026
r=TRP;n=34 :prob=0.026	r=TRP;n=34 :prob=0.026
r=ASN;n=35 :prob=0.027	r=ASN;n=35 :prob=0.026
r=THR;n=36 :prob=0.026	r=THR;n=36 :prob=0.026
r=GLY;n=37 :prob=0.026	r=GLY;n=37 :prob=0.026
r=GLY;n=38 :prob=0.026	r=GLY;n=38 :prob=0.026
r=SER;n=39 :prob=0.027	r=SER;n=39 :prob=0.026
r=ARG;n=40 :prob=0.030	r=ARG;n=40 :prob=0.026
r=TYR;n=41 :prob=0.033	r=TYR;n=41 :prob=0.026

r=PRO;n=42 :prob=0.042	r=PRO;n=42 :prob=0.026
r=GLY;n=43 :prob=0.037	r=GLY;n=43 :prob=0.026
r=GLN;n=44 :prob=0.030	r=GLN;n=44 :prob=0.026
r=GLY;n=45 :prob=0.029	r=GLY;n=45 :prob=0.026
r=SER;n=46 :prob=0.027	r=SER;n=46 :prob=0.027
r=PRO;n=47 :prob=0.027	r=PRO;n=47 :prob=0.027
r=GLY;n=48 :prob=0.027	r=GLY;n=48 :prob=0.027
r=GLY;n=49 :prob=0.026	r=GLY;n=49 :prob=0.026
r=ASN;n=50 :prob=0.026	r=ASN;n=50 :prob=0.026
r=ARG;n=51 :prob=0.027	r=ARG;n=51 :prob=0.028
r=TYR;n=52 :prob=0.027	r=TYR;n=52 :prob=0.033
r=PRO;n=53 :prob=0.026	r=PRO;n=53 :prob=0.032
r=PRO;n=54 :prob=0.026	r=PRO;n=54 :prob=0.033
r=GLN;n=55 :prob=0.026	r=GLN;n=55 :prob=0.027
r=GLY;n=56 :prob=0.026	r=GLY;n=56 :prob=0.027
r=GLY;n=57 :prob=0.026	r=GLY;n=57 :prob=0.028
r=GLY;n=58 :prob=0.027	r=GLY;n=58 :prob=0.027
r=GLY;n=59 :prob=0.030	r=GLY;n=59 :prob=0.029
r=TRP;n=60 :prob=0.032	r=TRP;n=60 :prob=0.028
r=GLY;n=61 :prob=0.039	r=GLY;n=61 :prob=0.027
r=GLN;n=62 :prob=0.033	r=GLN;n=62 :prob=0.026
r=PRO;n=63 :prob=0.028	r=PRO;n=63 :prob=0.026
r=HIS;n=64 :prob=0.026	r=HIS;n=64 :prob=0.026
r=GLY;n=65 :prob=0.026	r=GLY;n=65 :prob=0.026
r=GLY;n=66 :prob=0.026	r=GLY;n=66 :prob=0.026
r=GLY;n=67 :prob=0.027	r=SER;n=67 :prob=0.026
r=TRP;n=68 :prob=0.038	r=ARG;n=68 :prob=0.026
r=GLY;n=69 :prob=0.026	r=ASP;n=69 :prob=0.026
r=GLN;n=70 :prob=0.026	r=GLN;n=70 :prob=0.026
r=PRO;n=71 :prob=0.026	r=PRO;n=71 :prob=0.026
r=HIS;n=72 :prob=0.026	r=HIS;n=72 :prob=0.026
r=GLY;n=73 :prob=0.026	r=GLY;n=73 :prob=0.026
r=GLY;n=74 :prob=0.026	r=GLY;n=74 :prob=0.026
r=GLY;n=75 :prob=0.026	r=GLY;n=75 :prob=0.026
r=TRP;n=76 :prob=0.026	r=TRP;n=76 :prob=0.026
r=GLY;n=77 :prob=0.026	r=GLY;n=77 :prob=0.029
r=GLN;n=78 :prob=0.026	r=GLN;n=78 :prob=0.027
r=PRO;n=79 :prob=0.026	r=PRO;n=79 :prob=0.030
r=HIS;n=80 :prob=0.028	r=HIS;n=80 :prob=0.030
r=GLY;n=81 :prob=0.028	r=GLY;n=81 :prob=0.034
r=GLY;n=82 :prob=0.029	r=GLY;n=82 :prob=0.035
r=GLY;n=83 :prob=0.028	r=GLY;n=83 :prob=0.033
r=TRP;n=84 :prob=0.028	r=TRP;n=84 :prob=0.030
r=GLY;n=85 :prob=0.026	r=GLY;n=85 :prob=0.031

r=GLN;n=86 :prob=0.027	r=GLN;n=86 :prob=0.034
r=PRO;n=87 :prob=0.026	r=PRO;n=87 :prob=0.027
r=HIS;n=88 :prob=0.026	r=HIS;n=88 :prob=0.030
r=GLY;n=89 :prob=0.026	r=GLY;n=89 :prob=0.026
r=GLY;n=90 :prob=0.026	r=GLY;n=90 :prob=0.026
r=GLY;n=91 :prob=0.026	r=GLY;n=91 :prob=0.026
r=GLY;n=92 :prob=0.026	r=GLY;n=92 :prob=0.026
r=TRP;n=93 :prob=0.026	r=TRP;n=93 :prob=0.026
r=GLY;n=94 :prob=0.026	r=GLY;n=94 :prob=0.026
r=GLN;n=95 :prob=0.026	r=GLN;n=95 :prob=0.026
r=GLY;n=96 :prob=0.026	r=GLY;n=96 :prob=0.026
r=GLY;n=97 :prob=0.026	r=GLY;n=97 :prob=0.026
r=SER;n=98 :prob=0.026	r=SER;n=98 :prob=0.026
r=HIS;n=99 :prob=0.026	r=HIS;n=99 :prob=0.026
r=SER;n=100 :prob=0.026	r=SER;n=100 :prob=0.027
r=GLN;n=101 :prob=0.026	r=GLN;n=101 :prob=0.028
r=TRP;n=102 :prob=0.026	r=TRP;n=102 :prob=0.030
r=ASN;n=103 :prob=0.027	r=ASN;n=103 :prob=0.032
r=LYS;n=104 :prob=0.027	r=LYS;n=104 :prob=0.033
r=PRO;n=105 :prob=0.029	r=PRO;n=105 :prob=0.034
r=SER;n=106 :prob=0.028	r=ARG;n=106 :prob=0.031
r=LYS;n=107 :prob=0.028	r=LYS;n=107 :prob=0.032
r=PRO;n=108 :prob=0.027	r=PRO;n=108 :prob=0.030
r=LYS;n=109 :prob=0.026	r=LYS;n=109 :prob=0.029
r=THR;n=110 :prob=0.026	r=THR;n=110 :prob=0.030
r=ASN;n=111 :prob=0.026	r=ASN;n=111 :prob=0.028
r=MET;n=112 :prob=0.026	r=MET;n=112 :prob=0.027
r=LYS;n=113 :prob=0.026	r=LYS;n=113 :prob=0.027
r=HIS;n=114 :prob=0.026	r=HIS;n=114 :prob=0.027
r=VAL;n=115 :prob=0.026	r=VAL;n=115 :prob=0.027
r=ALA;n=116 :prob=0.026	r=ALA;n=116 :prob=0.027
r=GLY;n=117 :prob=0.026	r=GLY;n=117 :prob=0.026
r=ALA;n=118 :prob=0.026	r=ALA;n=118 :prob=0.027
r=ALA;n=119 :prob=0.027	r=ALA;n=119 :prob=0.027
r=ALA;n=120 :prob=0.029	r=ALA;n=120 :prob=0.026
r=ALA;n=121 :prob=0.027	r=ALA;n=121 :prob=0.026
r=GLY;n=122 :prob=0.026	r=GLY;n=122 :prob=0.027
r=ALA;n=123 :prob=0.027	r=ALA;n=123 :prob=0.027
r=VAL;n=124 :prob=0.028	r=VAL;n=124 :prob=0.027
r=VAL;n=125 :prob=0.042	r=VAL;n=125 :prob=0.069
r=GLY;n=126 :prob=0.028	r=GLY;n=126 :prob=0.030
r=GLY;n=127 :prob=0.030	r=GLY;n=127 :prob=0.030
r=LEU;n=128 :prob=0.034	r=LEU;n=128 :prob=0.066
r=GLY;n=129 :prob=0.041	r=GLY;n=129 :prob=0.064

r=GLY;n=130 :prob=0.034	r=GLY;n=130 :prob=0.030
r=TYR;n=131 :prob=0.047	r=TYR;n=131 :prob=0.071
r=MET;n=132 :prob=0.037	r=MET;n=132 :prob=0.031
r=LEU;n=133 :prob=0.040	r=LEU;n=133 :prob=0.031
r=GLY;n=134 :prob=0.030	r=GLY;n=134 :prob=0.028
r=SER;n=135 :prob=0.027	r=SER;n=135 :prob=0.026
r=ALA;n=136 :prob=0.027	r=ALA;n=136 :prob=0.026
r=MET;n=137 :prob=0.026	r=MET;n=137 :prob=0.026
r=SER;n=138 :prob=0.026	r=SER;n=138 :prob=0.026
r=ARG;n=139 :prob=0.026	r=ARG;n=139 :prob=0.026
r=PRO;n=140 :prob=0.026	r=PRO;n=140 :prob=0.026
r=LEU;n=141 :prob=0.026	r=LEU;n=141 :prob=0.026
r=ILE;n=142 :prob=0.027	r=ILE;n=142 :prob=0.026
r=HIS;n=143 :prob=0.026	r=HIS;n=143 :prob=0.026
r=PHE;n=144 :prob=0.026	r=PHE;n=144 :prob=0.026
r=GLY;n=145 :prob=0.026	r=GLY;n=145 :prob=0.026
r=ASN;n=146 :prob=0.026	r=ASN;n=146 :prob=0.026
r=ASP;n=147 :prob=0.026	r=ASP;n=147 :prob=0.026
r=TYR;n=148 :prob=0.026	r=TYR;n=148 :prob=0.026
r=GLU;n=149 :prob=0.027	r=GLU;n=149 :prob=0.026
r=ASP;n=150 :prob=0.026	r=ASP;n=150 :prob=0.026
r=ARG;n=151 :prob=0.026	r=ARG;n=151 :prob=0.026
r=TYR;n=152 :prob=0.027	r=TYR;n=152 :prob=0.031
r=TYR;n=153 :prob=0.027	r=TYR;n=153 :prob=0.026
r=ARG;n=154 :prob=0.026	r=ARG;n=154 :prob=0.026
r=GLU;n=155 :prob=0.026	r=GLU;n=155 :prob=0.026
r=ASN;n=156 :prob=0.027	r=ASN;n=156 :prob=0.026
r=MET;n=157 :prob=0.026	r=MET;n=157 :prob=0.026
r=TYR;n=158 :prob=0.026	r=TYR;n=158 :prob=0.026
r=ARG;n=159 :prob=0.026	r=HIS;n=159 :prob=0.026
r=TYR;n=160 :prob=0.026	r=TYR;n=160 :prob=0.026
r=PRO;n=161 :prob=0.026	r=PRO;n=161 :prob=0.026
r=ASN;n=162 :prob=0.026	r=ASN;n=162 :prob=0.026
r=GLN;n=163 :prob=0.029	r=GLN;n=163 :prob=0.027
r=VAL;n=164 :prob=0.028	r=VAL;n=164 :prob=0.027
r=TYR;n=165 :prob=0.038	r=TYR;n=165 :prob=0.063
r=TYR;n=166 :prob=0.029	r=TYR;n=166 :prob=0.027
r=ARG;n=167 :prob=0.028	r=ARG;n=167 :prob=0.026
r=PRO;n=168 :prob=0.029	r=PRO;n=168 :prob=0.026
r=VAL;n=169 :prob=0.026	r=VAL;n=169 :prob=0.026
r=ASP;n=170 :prob=0.027	r=ASP;n=170 :prob=0.026
r=ARG;n=171 :prob=0.026	r=ARG;n=171 :prob=0.026
r=TYR;n=172 :prob=0.026	r=TYR;n=172 :prob=0.026
r=SER;n=173 :prob=0.026	r=SER;n=173 :prob=0.026

r=ASN;n=174 :prob=0.026	r=ASN;n=174 :prob=0.026
r=GLN;n=175 :prob=0.026	r=GLN;n=175 :prob=0.026
r=ASN;n=176 :prob=0.026	r=ASN;n=176 :prob=0.026
r=ASN;n=177 :prob=0.026	r=ASN;n=177 :prob=0.026
r=PHE;n=178 :prob=0.026	r=PHE;n=178 :prob=0.026
r=VAL;n=179 :prob=0.026	r=VAL;n=179 :prob=0.026
r=HIS;n=180 :prob=0.026	r=HIS;n=180 :prob=0.026
r=ASP;n=181 :prob=0.026	r=ASP;n=181 :prob=0.026
r=CYS;n=182 :prob=0.026	r=CYS;n=182 :prob=0.026
r=VAL;n=183 :prob=0.026	r=VAL;n=183 :prob=0.026
r=ASN;n=184 :prob=0.026	r=ASN;n=184 :prob=0.026
r=ILE;n=185 :prob=0.039	r=ILE;n=185 :prob=0.116
r=THR;n=186 :prob=0.026	r=THR;n=186 :prob=0.026
r=VAL;n=187 :prob=0.026	r=VAL;n=187 :prob=0.026
r=LYS;n=188 :prob=0.031	r=LYS;n=188 :prob=0.058
r=GLN;n=189 :prob=0.041	r=GLN;n=189 :prob=0.510
r=HIS;n=190 :prob=0.026	r=HIS;n=190 :prob=0.027
r=THR;n=191 :prob=0.026	r=THR;n=191 :prob=0.026
r=VAL;n=192 :prob=0.031	r=VAL;n=192 :prob=0.058
r=THR;n=193 :prob=0.031	r=THR;n=193 :prob=0.058
r=THR;n=194 :prob=0.026	r=THR;n=194 :prob=0.026
r=THR;n=195 :prob=0.026	r=THR;n=195 :prob=0.026
r=THR;n=196 :prob=0.026	r=THR;n=196 :prob=0.026
r=LYS;n=197 :prob=0.026	r=LYS;n=197 :prob=0.026
r=GLY;n=198 :prob=0.026	r=GLY;n=198 :prob=0.026
r=GLU;n=199 :prob=0.026	r=GLU;n=199 :prob=0.026
r=ASN;n=200 :prob=0.026	r=ASN;n=200 :prob=0.026
r=PHE;n=201 :prob=0.026	r=PHE;n=201 :prob=0.026
r=THR;n=202 :prob=0.026	r=THR;n=202 :prob=0.026
r=GLU;n=203 :prob=0.026	r=GLU;n=203 :prob=0.026
r=THR;n=204 :prob=0.026	r=THR;n=204 :prob=0.026
r=ASP;n=205 :prob=0.026	r=ASP;n=205 :prob=0.026
r=ILE;n=206 :prob=0.045	r=ILE;n=206 :prob=0.026
r=LYS;n=207 :prob=0.510	r=LYS;n=207 :prob=0.026
r=ILE;n=208 :prob=0.046	r=ILE;n=208 :prob=0.036
r=MET;n=209 :prob=0.027	r=MET;n=209 :prob=0.026
r=GLU;n=210 :prob=0.118	r=GLU;n=210 :prob=0.026
r=ARG;n=211 :prob=0.045	r=ARG;n=211 :prob=0.031
r=VAL;n=212 :prob=0.026	r=VAL;n=212 :prob=0.036
r=VAL;n=213 :prob=0.026	r=VAL;n=213 :prob=0.026
r=GLU;n=214 :prob=0.026	r=GLU;n=214 :prob=0.026
r=GLN;n=215 :prob=0.026	r=GLN;n=215 :prob=0.026
r=MET;n=216 :prob=0.026	r=MET;n=216 :prob=0.026
r=CYS;n=217 :prob=0.026	r=CYS;n=217 :prob=0.026

r=ILE;n=218 :prob=0.026   r=ILE;n=218 :prob=0.026
r=THR;n=219 :prob=0.026   r=THR;n=219 :prob=0.026
r=GLN;n=220 :prob=0.026   r=GLN;n=220 :prob=0.026
r=TYR;n=221 :prob=0.026   r=TYR;n=221 :prob=0.027
r=GLN;n=222 :prob=0.026   r=GLN;n=222 :prob=0.026
r=ARG;n=223 :prob=0.026   r=ARG;n=223 :prob=0.026
r=GLU;n=224 :prob=0.026   r=GLU;n=224 :prob=0.026
r=SER;n=225 :prob=0.026   r=SER;n=225 :prob=0.027
r=GLN;n=226 :prob=0.026   r=GLN;n=226 :prob=0.026
r=ALA;n=227 :prob=0.026   r=ALA;n=227 :prob=0.026
r=TYR;n=228 :prob=0.026   r=TYR;n=228 :prob=0.026
r=TYR;n=229 :prob=0.026   r=TYR;n=229 :prob=0.026
r=GLN;n=230 :prob=0.026   r=GLN;n=230 :prob=0.026
r=ARG;n=231 :prob=0.026   r=ARG;n=231 :prob=0.026
r=GLY;n=232 :prob=0.026   r=GLY;n=232 :prob=0.026
r=ALA;n=233 :prob=0.026   r=ALA;n=233 :prob=0.026
r=SER;n=234 :prob=0.026   r=SER;n=234 :prob=0.026
r=VAL;n=235 :prob=0.026   r=VAL;n=235 :prob=0.026
r=ILE;n=236 :prob=0.026   r=ILE;n=236 :prob=0.026
r=LEU;n=237 :prob=0.026   r=LEU;n=237 :prob=0.026
r=PHE;n=238 :prob=0.026   r=PHE;n=238 :prob=0.026
r=SER;n=239 :prob=0.026   r=SER;n=239 :prob=0.026
r=SER;n=240 :prob=0.026   r=SER;n=240 :prob=0.026
r=PRO;n=241 :prob=0.026   r=PRO;n=241 :prob=0.026
r=PRO;n=242 :prob=0.026   r=PRO;n=242 :prob=0.026
r=VAL;n=243 :prob=0.026   r=VAL;n=243 :prob=0.026
r=ILE;n=244 :prob=0.026   r=ILE;n=244 :prob=0.026
r=LEU;n=245 :prob=0.026   r=LEU;n=245 :prob=0.026
r=LEU;n=246 :prob=0.026   r=LEU;n=246 :prob=0.026
r=ILE;n=247 :prob=0.026   r=ILE;n=247 :prob=0.026
r=SER;n=248 :prob=0.026   r=SER;n=248 :prob=0.026
r=PHE;n=249 :prob=0.026   r=PHE;n=249 :prob=0.026
r=LEU;n=250 :prob=0.026   r=LEU;n=250 :prob=0.026
r=ILE;n=251 :prob=0.026   r=ILE;n=251 :prob=0.026
r=PHE;n=252 :prob=0.026   r=PHE;n=252 :prob=0.026
r=LEU;n=253 :prob=0.026   r=LEU;n=253 :prob=0.026
r=ILE;n=254 :prob=0.026   r=ILE;n=254 :prob=0.027
r=VAL;n=255 :prob=0.026   r=VAL;n=255 :prob=0.026
r=GLY;n=256 :prob=0.026   r=GLY;n=256 :prob=0.026

Metal Binding sites UniProtKB - P52113

Position/codon
65
66
72
73
74
80
81
82
88
90
91