

**Table S4: Differences phenomenological transverse relaxation rate constant  $\Delta R_{ex} = R_{ex}(20ms) - R_{ex}(1ms)$  and  $\Delta\Delta R_{ex}$  the differences between the  $\Delta R_{ex}$  in R62A and Wild type. Residues with large  $\Delta\Delta R_{ex}$  are likely to be involved in motions in the microsecond-to-millisecond time scale (bold).**

Residues	$\Delta R_{ex}$ ( $s^{-1}$ )		$\Delta\Delta R_{ex}$ ( $s^{-1}$ )
	Wild type	R62A	$\Delta R_{ex}(R62A) - \Delta R_{ex}(WT)$
Thr23		2.83	2.83
Asp26	1.9	2.19	0.29
Glu27		1.44	1.44
Tyr29	2.59	2.92	0.33
Ile31		3.32	3.32
Glu38	1.56	4.41	2.85
Ile39	1.57	5.78	4.21
Arg40		4.3	4.3
Gly41		4.91	4.91
Tyr42	2.12	3.03	0.91
Val45	12.87	11.75	-1.12
Ile48	2.68	2.9	0.22
Ala49	6.27		-6.27
Asn50	6.19		-6.19
Ile55	6.09		-6.09
Thr59	9.56		-9.56
Gly63	8.15		-8.15
<b>Ile65</b>	<b>2.66</b>	<b>11.09</b>	<b>8.43</b>
Val66	9.09	16.91	7.82
Arg72	3.79	6.45	2.66
Ile73	3.21	4.44	1.23
<b>Phe75</b>	<b>8.51</b>	<b>13.67</b>	<b>5.16</b>
<b>Ser76</b>	<b>3.26</b>	<b>12.08</b>	<b>8.82</b>
<b>Gln77</b>	<b>2.57</b>	<b>8.95</b>	<b>6.38</b>
Val78	7.09	8.84	1.75

Asp79	2.32	3.09	0.77
Asp81	8.83		-8.83
Asn83	1.83	4.69	2.86
Asn85	1.19	2.08	0.89
Thr86	5.33	16.87	11.54
Val88	5.89		-5.89
Gly94	6.08		-6.08
Gln95	5.75	7.74	1.99
Val97	4.55	6.01	1.46
Val98	2.78	3.91	1.13
Gly99	2.78	7.84	5.06
Ile100	9.31		-9.31
Ser106	1.53	2.55	1.02
Asp107	1.54	0.7	-0.84
Val108	0.67	0.56	-0.11
Leu111	4.23	3.55	-0.68
Glu114	1.31	1.39	0.08
Ala119	1.74		-1.74
Glu121	5.14	5.47	0.33
Phe122	3.38	4.4	1.02
Ala123	3.83	3.58	-0.25
Thr125	6.68		-6.68
Glu129	4.59	5.04	0.45
Tyr130	10.35		-10.35
Ala136	6.09	6.68	0.59
Ala136		4.92	4.92
Arg140	1.7	1.73	0.03
Met141		0.59	0.59
Leu142	2.13		-2.13

Val145	4.94		-4.94
Asn146	5.34	6.34	1
Lys149	10.54	14.8	4.26
Leu150	8.1	6.96	-1.14
Leu151		3.51	3.51
Glu155	9.65	6.82	-2.83
Ala157	9.21		-9.21
<b>Leu159</b>	<b>5.35</b>	<b>13.13</b>	<b>7.78</b>
Asp160	7.65	12.46	4.81
Ser161	9.02	11.08	2.06
Ala162	2.89	5.62	2.73
<b>Ser164</b>	<b>6.8</b>	<b>15.94</b>	<b>9.14</b>
Glu165	1.07	3.29	2.22
Val166	6.17	13.27	7.1