**Table S1.** A list of the structures of benchmark proteins selected for this study with the respective numbers of residues in the sequence (#res), the numbers of residues after truncation (#res.<sub>t</sub>), and the ranges of residues after truncation (range<sub>t</sub>). The entries are grouped according to secondary-structure class. PDB codes in boldface font correspond to NMR structures, those in regular font correspond to X-ray structures.

	lpha proteins				<i>β</i> p	roteins		$\alpha + \beta$ proteins			
PDB ID <sup>a</sup>	# res.	#res.t	ranget	PDB ID <sup>a</sup>	# res.	#res.t	ranget	PDB ID <sup>a</sup>	# res.	#res.t	ranget
1A6S	87	87	1-87	1AH9	71	63	5-67	1A80	277	276	2-277
1ACP	77	71	3-73	1BK2	57	55	2-56	1ADG	374	373	2-374
1ALA	316	316	1-316	1CSP	67	67	1-67	1AKY	218	216	2-217
1AUM	70	70	1-70	1ED7	45	45	1-45	1CFJ	532	530	1-530
1BAL	51	33	16-48	1HRF	67	45	7-51	1CLB	75	72	2-73
1ENH	54	48	4-51	1IYV	79	71	3-73	1CTF	68	68	1-68
1EO0	77	73	2-73	1MJC	69	69	1-69	1E0G	48	46	2-47
1FEX	59	54	5-58	1NOA	113	113	1-113	1EM7	56	56	1-56
1GAB	53	44	9-52	1RUW	69	69	1-69	1G6E	87	86	2-87

1HNS	47	39	6-44	1TEN	89	89	1-89	1GHH	81	80	1-79
1HYP	75	73	1-73	1TPN	50	43	5-47	1HYW	58	52	3-52
1IYR	83	72	4-75	1WIU	93	93	1-93	1IG5	75	75	1-75
1J70	76	71	5-75	1WKT	88	85	4-88	1IQO	88	87	2-88
1K40	126	124	3-126	1XCD	305	305	1-305	1K8B	52	51	1-51
1L2Y	20	18	2-19	2K9G	73	62	9-70	1LEB	72	66	4-69
1LQ7	67	65	3-67	2KYW	87	78	2-79	10GQ	313	310	3-312
1P68	102	98	4-101	2LGN	66	65	2-66	10IX	168	168	1-168
1POU	71	66	5-70	2LVC	90	87	4-90	10PD	85	81	1-81
1PRV	56	36	5-40	3PUC	98	97	1-97	1PGA	56	56	1-56
1RIJ	23	17	5-21	4F98	62	60	3-62	1PHT	83	83	1-83
1ROP	56	56	1-56	4M9O	97	95	1-95	1PTF	87	86	1-86

1YRF	35	34	1-34			1QRE	210	208	3-210
2BF9	36	34	1-34			1STU	68	66	1-66
2CRB	97	69	11-79			1THX	108	104	3-106
2E7N	117	108	10-117			1TIG	88	87	1-87
2HEP	42	23	8-30			1UBQ	76	71	1-71
2HI3	73	47	9-55			1VIG	71	67	4-70
2YGS	92	91	1-91			2ACY	98	93	5-97
3ICB	75	74	1-75			2BBY	69	62	5-66
3WFW	138	134	1-134			2FMR	65	64	2-65
						2L09	62	48	3-50
						2LZM	164	162	1-162
						2M6Q	91	82	2-83

				2MQ8	112	97	1-97
				2N2U	77	63	3-65
				2PTL	78	59	19-77
				2RGF	97	97	1-97
				3CI2	64	63	2-64
				3E8Y	30	29	1-29
				3KYW	54	53	1-53
				ЗКҮҮ	54	53	1-53
				3NCM	92	92	1-92
				4N6T	79	79	1-79
				40ZU	390	389	2-390
				4QRL	110	110	1-110

				4R7E	69	69	1-69
				4RTE	124	123	2-124
				5D14	70	68	1-68
				6DNB	411	409	1-410

**Table S2.** The Pearson  $(r_p)$  and Spearman  $(r_s)$  correlation coefficients of the RMSF profiles over the truncated structures calculated from B-factors (X-ray structures) or NMR ensembles (NMR structures) and those predicted with UNRES-flex, UNRES-DSSP-flex, CABS-flex, and NOLB, respectively.

#	# PDB ID	UNRE	ES-flex	UNRES-I	DSSP-flex	CAB	S-flex	NC	LB
		rs	$r_p$	<i>r</i> <sub>s</sub>	$r_p$	rs	$r_p$	rs	$r_p$
1	1A6S	0.52	0.34	0.59	0.56	0.75	0.81	0.17	-0.08
2	1A80	0.42	0.40	0.49	0.44	0.59	0.50	0.67	0.66
3	1ACP	0.22	0.20	0.46	0.35	0.42	0.38	0.22	0.22
4	1ADG	0.31	0.30	0.36	0.31	0.45	0.41	0.45	0.40
5	1AH9	0.71	0.65	0.74	0.72	0.79	0.68	0.21	0.21
6	1AKY	0.40	0.38	0.44	0.58	0.52	0.73	0.71	0.73
7	1ALA	0.47	0.43	0.58	0.54	0.52	0.49	0.55	0.48
8	1AUM	0.40	0.24	0.52	0.43	0.28	0.11	0.44	0.46

9	1BAL	0.27	0.26	0.32	0.27	0.05	-0.08	0.08	-0.05
10	1BK2	0.36	0.22	0.14	0.05	0.37	0.22	0.47	0.54
11	1CFJ	0.53	0.53	0.56	0.59	0.37	0.40	0.68	0.67
12	1CLB	0.33	0.30	0.56	0.58	0.81	0.88	0.09	-0.08
13	1CSP	0.41	0.49	0.50	0.51	0.50	0.45	0.28	0.28
14	1CTF	0.29	0.27	0.38	0.36	0.10	0.05	0.41	0.40
15	1E0G	0.42	0.62	0.58	0.66	0.61	0.73	0.28	0.14
16	1ED7	0.49	0.45	0.59	0.53	0.33	0.22	0.00	-0.02
17	1EM7	0.31	0.28	0.46	0.42	0.52	0.53	0.69	0.61
18	1ENH	0.52	0.62	0.39	0.51	0.48	0.51	0.35	0.34
19	1EO0	0.29	0.36	0.33	0.41	0.31	0.37	0.30	0.34
20	1FEX	0.50	0.39	0.64	0.46	0.54	0.40	-0.13	-0.21
21	1G6E	0.59	0.43	0.69	0.53	0.46	0.41	0.48	0.33
22	1GAB	0.20	0.16	0.22	0.18	0.39	0.38	0.57	0.46
23	1GHH	0.28	0.35	0.40	0.52	0.21	0.36	0.07	0.09
24	1HNS	0.53	0.49	0.67	0.66	0.81	0.81	0.16	0.16
25	1HRF	-0.18	-0.12	-0.18	-0.12	0.25	0.43	0.45	0.45
26	1HYP	0.72	0.62	0.62	0.54	0.69	0.54	0.60	0.57
27	1HYW	0.60	0.57	0.58	0.56	0.64	0.60	-0.03	-0.02
28	1IG5	0.77	0.62	0.78	0.75	0.75	0.61	0.76	0.74
29	1IQO	0.41	0.32	0.56	0.44	0.62	0.50	0.18	0.06

30	1IYR	0.21	0.53	0.52	0.61	0.69	0.74	0.44	0.07
31	1IYV	0.47	0.42	0.47	0.42	0.63	0.67	0.12	0.33
32	1J7O	0.17	0.11	0.09	0.05	-0.37	-0.29	0.23	0.04
33	1K40	0.78	0.78	0.82	0.85	0.68	0.64	0.55	0.55
34	1K8B	0.34	0.31	0.46	0.43	0.16	0.14	0.17	-0.01
35	1L2Y	0.56	0.57	0.72	0.62	0.70	0.54	-0.23	-0.14
36	1LEB	0.22	0.23	0.35	0.32	0.86	0.82	-0.05	-0.12
37	1LQ7	0.66	0.66	0.67	0.60	0.69	0.81	0.67	0.49
38	1MJC	0.76	0.80	0.63	0.69	0.58	0.67	0.60	0.65
39	1NOA	0.45	0.43	0.36	0.38	0.42	0.40	0.65	0.66
40	10GQ	0.08	0.06	0.20	0.17	0.62	0.59	0.45	0.50
41	10IX	0.25	0.25	0.49	0.49	0.21	0.32	0.51	0.54
42	10PD	0.55	0.52	0.57	0.62	0.35	0.40	0.43	0.40
43	1P68	0.61	0.51	0.58	0.56	0.69	0.56	0.47	0.34
44	1PGA	0.21	0.18	0.16	0.13	0.31	0.14	0.30	0.20
45	1PHT	0.79	0.77	0.83	0.70	0.72	0.67	0.82	0.78
46	1POU	0.32	0.24	0.54	0.47	0.49	0.65	-0.22	-0.15
47	1PRV	0.63	0.53	0.69	0.54	0.49	0.60	0.52	0.60
48	1PTF	0.29	0.29	0.41	0.42	0.51	0.39	0.52	0.60
49	1QRE	0.77	0.71	0.74	0.71	0.71	0.76	0.80	0.83
50	1RIJ	0.46	0.48	0.74	0.78	0.71	0.68	-0.28	-0.19

51	1ROP	0.53	0.52	0.50	0.59	0.43	0.54	0.49	0.55
52	1RUW	0.39	0.49	0.35	0.47	0.36	0.62	0.29	0.48
53	1STU	0.46	0.48	0.40	0.48	0.55	0.88	0.38	0.17
54	1TEN	0.48	0.48	0.44	0.46	0.56	0.61	0.29	0.35
55	1THX	0.37	0.32	0.36	0.38	0.58	0.46	0.48	0.45
56	1TIG	0.40	0.42	0.47	0.48	0.64	0.49	0.72	0.61
57	1TPN	0.57	0.70	0.76	0.87	0.49	0.58	0.14	0.02
58	1UBQ	0.49	0.49	0.47	0.40	0.52	0.50	0.65	0.67
59	1VIG	0.79	0.66	0.27	0.33	0.85	0.86	0.53	0.48
60	1WIU	0.70	0.48	0.77	0.66	0.67	0.47	0.59	0.45
61	1WKT	0.66	0.47	0.80	0.59	0.72	0.55	0.48	0.37
62	1XCD	0.71	0.64	0.74	0.70	0.58	0.49	0.31	0.41
63	1YRF	0.58	0.69	0.35	0.60	0.58	0.62	0.32	0.45
64	2ACY	0.33	0.27	0.27	0.29	0.26	0.33	0.44	0.47
65	2BBY	0.55	0.62	0.75	0.82	0.51	0.76	0.38	0.48
66	2BF9	0.29	0.21	-0.06	0.02	0.27	0.06	0.34	0.33
67	2CRB	0.56	0.44	0.52	0.47	0.50	0.66	0.49	0.39
68	2E7N	0.61	0.57	0.69	0.67	0.72	0.83	0.09	0.06
69	2FMR	0.63	0.58	0.83	0.78	0.77	0.60	0.42	0.33
70	2HEP	0.71	0.61	0.51	0.43	0.58	0.73	0.14	0.38
71	2HI3	0.63	0.45	0.34	0.19	0.64	0.75	-0.14	-0.14

72	2K9G	0.78	0.80	0.61	0.61	0.71	0.52	0.39	0.31
73	2KYW	0.75	0.63	0.78	0.69	0.72	0.67	0.19	-0.02
74	2L09	0.43	0.36	0.29	0.20	0.44	0.68	0.00	-0.18
75	2LGN	0.72	0.53	0.56	0.57	0.77	0.61	0.37	0.36
76	2LVC	0.79	0.73	0.85	0.77	0.71	0.49	0.36	0.16
77	2LZM	0.37	0.46	0.23	0.33	0.46	0.49	0.49	0.55
78	2M6Q	0.45	0.45	0.43	0.50	0.58	0.55	0.25	0.03
79	2MQ8	0.59	0.49	0.73	0.62	0.76	0.58	0.28	0.22
80	2N2U	0.14	0.17	0.43	0.41	0.55	0.48	0.39	0.37
81	2PTL	0.56	0.43	0.52	0.41	0.72	0.72	0.53	0.68
82	2RGF	0.55	0.37	0.51	0.32	0.40	0.19	0.29	0.18
83	2YGS	0.16	0.15	0.07	0.05	0.11	0.01	0.33	0.27
84	3CI2	0.32	0.23	0.52	0.40	0.65	0.62	-0.16	-0.24
85	3E8Y	0.54	0.30	0.48	0.43	0.18	0.12	0.55	0.52
86	3ICB	0.15	0.13	0.31	0.30	0.33	0.19	0.68	0.56
87	3KYW	0.51	0.51	0.49	0.45	0.49	0.44	0.47	0.56
88	ЗКҮҮ	0.49	0.41	0.44	0.41	0.52	0.36	0.53	0.63
89	3NCM	0.71	0.44	0.57	0.39	0.68	0.34	0.39	0.24
90	3PUC	0.57	0.47	0.67	0.53	0.60	0.46	0.57	0.47
91	3WFW	0.55	0.62	0.55	0.64	0.38	0.50	0.43	0.54
92	4F98	0.75	0.66	0.73	0.68	0.71	0.64	0.58	0.62

93	4M9O	0.64	0.60	0.55	0.51	0.52	0.43	0.64	0.55
94	4N6T	0.41	0.34	0.53	0.52	0.84	0.73	0.76	0.79
95	4OZU	0.49	0.48	0.31	0.36	0.44	0.48	0.61	0.63
96	4QRL	0.69	0.61	0.47	0.46	0.81	0.81	0.79	0.78
97	4R7E	0.46	0.47	0.44	0.46	0.59	0.55	0.37	0.34
98	4RTE	0.49	0.52	0.38	0.30	0.74	0.81	0.71	0.74
99	5D14	0.56	0.56	0.46	0.44	0.35	0.40	0.52	0.53
100	6DNB	0.46	0.34	0.58	0.41	0.51	0.37	0.58	0.36
Ave	rage:	0.48	0.44	0.44	0.48	0.53	0.51	0.38	0.35

**Table S3.** The Pearson  $(r_p)$  and Spearman  $(r_s)$  correlation coefficients of the RMSF profiles over the full structures calculated from B-factors (X-ray structures) or NMR ensembles (NMR structures) and those predicted with UNRES-DSSP-flex, CABS-flex, and NOLB, respectively.

# PDB II	PDB ID	UNRE	ES-flex	UNRES-I	OSSP-flex	CABS-flex		NOLB	
"		rs	rp	rs	r <sub>p</sub>	rs	r <sub>p</sub>	rs	r <sub>p</sub>
1	1A6S	0.52	0.34	0.59	0.56	0.75	0.81	0.17	-0.08
2	1A80	0.42	0.39	0.49	0.42	0.59	0.51	0.67	0.64
3	1ACP	0.38	0.59	0.55	0.67	0.36	0.30	0.25	0.18
4	1ADG	0.32	0.33	0.37	0.34	0.45	0.41	0.46	0.41
5	1AH9	0.77	0.84	0.79	0.82	0.83	0.79	0.19	0.31
6	1AKY	0.42	0.42	0.45	0.62	0.53	0.76	0.71	0.72
7	1ALA	0.47	0.43	0.58	0.54	0.52	0.49	0.55	0.48

8	1AUM	0.40	0.24	0.52	0.43	0.28	0.11	0.44	0.46
9	1BAL	0.71	0.94	0.77	0.96	0.47	0.68	0.73	0.81
10	1BK2	0.42	0.39	0.21	0.20	0.39	0.21	0.52	0.60
11	1CFJ	0.54	0.56	0.56	0.61	0.38	0.41	0.69	0.69
12	1CLB	0.40	0.46	0.60	0.64	0.82	0.87	0.12	-0.07
13	1CSP	0.41	0.49	0.50	0.51	0.50	0.45	0.28	0.28
14	1CTF	0.29	0.27	0.38	0.36	0.10	0.05	0.41	0.40
15	1E0G	0.49	0.78	0.63	0.77	0.65	0.84	0.33	0.25
16	1ED7	0.49	0.45	0.59	0.53	0.33	0.22	0.00	-0.02
17	1EM7	0.31	0.28	0.46	0.42	0.52	0.53	0.69	0.61
18	1ENH	0.66	0.91	0.57	0.89	0.62	0.83	0.54	0.76
19	1EO0	0.40	0.59	0.43	0.66	0.36	0.31	0.38	0.39
20	1FEX	0.62	0.88	0.73	0.88	0.64	0.79	0.07	0.57
21	1G6E	0.60	0.49	0.70	0.57	0.47	0.44	0.49	0.40
22	1GAB	0.52	0.88	0.54	0.92	0.64	0.95	0.71	0.84
23	1GHH	0.30	0.52	0.42	0.67	0.24	0.57	0.10	0.16
24	1HNS	0.72	0.82	0.81	0.93	0.86	0.84	0.41	0.62
25	1HRF	0.55	0.87	0.55	0.87	0.69	0.79	0.39	0.05
26	1HYP	0.74	0.72	0.65	0.68	0.71	0.63	0.61	0.54
27	1HYW	0.71	0.76	0.70	0.82	0.73	0.81	0.19	0.46
28	1IG5	0.77	0.62	0.78	0.75	0.75	0.61	0.76	0.74

29	1IQO	0.43	0.41	0.57	0.50	0.63	0.53	0.21	0.29
30	1IYR	0.47	0.79	0.68	0.91	0.79	0.91	0.53	0.22
31	1IYV	0.55	0.80	0.55	0.80	0.65	0.86	0.24	0.07
32	1J7O	0.33	0.79	0.25	0.83	-0.15	0.52	0.37	0.67
33	1K40	0.79	0.82	0.82	0.85	0.68	0.59	0.57	0.55
34	1K8B	0.37	0.41	0.49	0.65	0.20	0.37	0.19	0.08
35	1L2Y	0.68	0.84	0.77	0.60	0.76	0.58	-0.12	-0.01
36	1LEB	0.51	0.85	0.62	0.88	0.89	0.86	0.07	0.48
37	1LQ7	0.69	0.77	0.70	0.78	0.72	0.72	0.69	0.92
38	1MJC	0.76	0.80	0.63	0.69	0.58	0.67	0.60	0.65
39	1NOA	0.45	0.43	0.36	0.38	0.42	0.40	0.65	0.66
40	10GQ	0.08	0.06	0.19	0.16	0.63	0.62	0.46	0.56
41	10IX	0.25	0.25	0.49	0.49	0.21	0.32	0.51	0.54
42	10PD	0.60	0.60	0.62	0.70	0.35	0.32	0.45	0.33
43	1P68	0.65	0.67	0.63	0.72	0.72	0.64	0.48	0.42
44	1PGA	0.21	0.18	0.16	0.13	0.31	0.14	0.30	0.20
45	1PHT	0.79	0.77	0.83	0.70	0.72	0.67	0.82	0.78
46	1POU	0.43	0.58	0.62	0.67	0.51	0.66	-0.07	0.02
47	1PRV	0.87	0.77	0.88	0.74	0.67	0.40	-0.24	-0.23
48	1PTF	0.31	0.34	0.43	0.47	0.53	0.45	0.50	0.54
49	1QRE	0.78	0.74	0.74	0.74	0.72	0.77	0.81	0.84

50	1RIJ	0.78	0.90	0.85	0.86	0.58	0.43	-0.02	0.03
51	1ROP	0.53	0.52	0.50	0.59	0.43	0.54	0.49	0.55
52	1RUW	0.39	0.49	0.35	0.47	0.36	0.62	0.29	0.48
53	1STU	0.48	0.49	0.44	0.49	0.58	0.88	0.40	0.18
54	1TEN	0.48	0.48	0.44	0.46	0.56	0.61	0.29	0.35
55	1THX	0.43	0.49	0.42	0.59	0.62	0.60	0.52	0.54
56	1TIG	0.42	0.53	0.48	0.59	0.65	0.60	0.73	0.66
57	1TPN	0.72	0.91	0.85	0.92	0.65	0.70	0.36	0.62
58	1UBQ	0.58	0.77	0.53	0.64	0.59	0.75	0.71	0.85
59	1VIG	0.82	0.88	0.38	0.82	0.87	0.88	0.58	0.78
60	1WIU	0.70	0.48	0.77	0.66	0.67	0.47	0.59	0.45
61	1WKT	0.69	0.63	0.82	0.75	0.73	0.54	0.50	0.52
62	1XCD	0.71	0.64	0.74	0.70	0.58	0.49	0.31	0.41
63	1YRF	0.61	0.78	0.40	0.73	0.62	0.77	0.35	0.41
64	2ACY	0.42	0.67	0.38	0.78	0.35	0.63	0.52	0.60
65	2BBY	0.67	0.72	0.82	0.77	0.56	0.54	0.45	0.60
66	2BF9	0.40	0.67	0.11	0.65	0.38	0.39	0.42	0.57
67	2CRB	0.84	0.91	0.82	0.95	0.81	0.94	0.76	0.67
68	2E7N	0.69	0.81	0.75	0.88	0.78	0.93	0.17	0.72
69	2FMR	0.64	0.61	0.84	0.80	0.78	0.63	0.44	0.40
70	2HEP	0.94	0.96	0.91	0.97	0.48	0.76	0.05	0.31

71	2HI3	0.89	0.93	0.81	0.92	0.84	0.90	0.14	0.06
72	2K9G	0.86	0.77	0.76	0.74	0.80	0.51	0.53	0.73
73	2KYW	0.82	0.85	0.84	0.96	0.79	0.70	0.30	0.01
74	2L09	0.73	0.95	0.67	0.86	0.66	0.91	0.25	0.02
75	2LGN	0.73	0.66	0.58	0.59	0.78	0.63	0.40	0.50
76	2LVC	0.81	0.84	0.86	0.88	0.71	0.40	0.42	0.69
77	2LZM	0.39	0.53	0.26	0.44	0.48	0.52	0.50	0.58
78	2M6Q	0.58	0.86	0.57	0.80	0.66	0.68	0.34	0.10
79	2MQ8	0.73	0.98	0.83	0.99	0.84	0.96	0.37	0.20
80	2N2U	0.51	0.96	0.65	0.98	0.67	0.90	0.41	0.03
81	2PTL	0.80	0.95	0.78	0.94	0.85	0.85	0.74	0.81
82	2RGF	0.55	0.37	0.51	0.32	0.40	0.19	0.29	0.18
83	2YGS	0.18	0.21	0.10	0.18	0.14	0.12	0.35	0.30
84	3CI2	0.35	0.45	0.54	0.56	0.67	0.71	-0.11	0.05
85	3E8Y	0.58	0.59	0.53	0.70	0.26	0.38	0.59	0.70
86	3ICB	0.18	0.18	0.34	0.38	0.35	0.25	0.69	0.61
87	3KYW	0.51	0.51	0.49	0.45	0.49	0.44	0.47	0.56
88	ЗКҮҮ	0.49	0.41	0.44	0.41	0.52	0.36	0.53	0.63
89	3NCM	0.71	0.44	0.57	0.39	0.68	0.34	0.39	0.24
90	3PUC	0.58	0.46	0.68	0.52	0.61	0.46	0.58	0.50
91	3WFW	0.59	0.61	0.59	0.70	0.35	0.39	0.44	0.45

92	4F98	0.77	0.67	0.76	0.73	0.73	0.76	0.61	0.63
93	4M9O	0.66	0.67	0.58	0.59	0.55	0.47	0.66	0.60
94	4N6T	0.41	0.34	0.53	0.52	0.84	0.73	0.76	0.79
95	40ZU	0.50	0.49	0.32	0.38	0.45	0.51	0.61	0.62
96	4QRL	0.69	0.61	0.47	0.46	0.81	0.81	0.79	0.78
97	4R7E	0.46	0.47	0.44	0.46	0.59	0.55	0.37	0.34
98	4RTE	0.51	0.56	0.39	0.38	0.74	0.82	0.71	0.73
99	5D14	0.60	0.78	0.51	0.70	0.38	0.45	0.56	0.59
100	6DNB	0.47	0.41	0.59	0.47	0.52	0.42	0.59	0.41
Aver	age:	0.56	0.62	0.58	0.65	0.58	0.59	0.43	0.45

**Table S4.** The average Pearson's  $(r_p)$  and Spearman's correlation coefficients  $(r_s)$  between fluctuation profiles calculated for truncated structures with UNRES-flex, UNRES-DSSP-flex, CABS-flex, and NOLB.

### A: NMR structures

			Seco	ndary-s	tructure	type		
	Ċ	x	β		α	+β	all	
	rp	rs	rp	rs	rp	rs	rp	rs
UNRES-flex	0.410	0.449	0.522	0.586	0.427	0.474	0.441	0.489
	0.153	0.172	0.236	0.264	0.138	0.163	0.176	0.200
UNRES-	0.466	0.516	0.574	0.613	0.488	0.525	0.498	0.541
DSSP-flex	0.181	0.174	0.248	0.275	0.154	0.151	0.194	0.197
CABS-flex	0.524	0.498	0.536	0.618	0.608	0.614	0.558	0.568
	0.300	0.279	0.129	0.173	0.191	0.163	0.235	0.226
NOLB	0.128	0.185	0.238	0.300	0.166	0.247	0.167	0.234
	0.249	0.277	0.172	0.171	0.237	0.202	0.233	0.234

B: X-ray st	tructures
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		Secondary-structure type										
	α		В		α +β		all					
	rp	rs	rp	rs	rp	rs	rp	rs				
UNRES-flex	0.465	0.501	0.527	0.553	0.396	0.417	0.447	0.474				
	0.195	0.169	0.149	0.145	0.159	0.168	0.178	0.173				
UNRES-	0.473	0.467	0.496	0.512	0.426	0.431	0.457	0.460				
DSSP-flex	0.198	0.202	0.181	0.182	0.148	0.157	0.176	0.182				
CABS-flex	0.392	0.439	0.497	0.519	0.499	0.524	0.460	0.492				
	0.209	0.165	0.131	0.104	0.189	0.190	0.194	0.171				
NOLB	0.512	0.512	0.502	0.468	0.573	0.578	0.537	0.532				
	0.130	0.129	0.120	0.150	0.158	0.150	0.145	0.149				

### C: All structures

			Seco	ndary-s	tructure	type		
	C	x	В		α +β		a	11
	rp	rs	rp	rs	rp	rs	rp	rs
UNRES-flex	0.436	0.474	0.525	0.570	0.410	0.444	0.444	0.482
	0.176	0.173	0.200	0.216	0.150	0.169	0.177	0.187
UNRES-	0.469	0.493	0.537	0.565	0.455	0.474	0.477	0.500
DSSP-flex	0.189	0.190	0.222	0.241	0.154	0.161	0.186	0.194
CABS-flex	0.461	0.470	0.517	0.571	0.550	0.566	0.509	0.530
	0.269	0.234	0.131	0.153	0.198	0.183	0.221	0.204
NOLB	0.310	0.340	0.364	0.380	0.384	0.425	0.352	0.383
	0.278	0.273	0.199	0.182	0.284	0.242	0.268	0.246

**Table S5.** The average Pearson's  $(r_p)$  and Spearman's correlation coefficients  $(r_s)$  between fluctuation profiles calculated for full structures with UNRES-flex, UNRES-DSSP-flex, CABS-flex, and NOLB.

## A: NMR structures

			Seco	ndary-s	tructure	type		
	α		β		α +β		all	
	rp	rs	rp	rs	rp	rs	rp	rs
<b>UNRES-flex</b>	0.759	0.625	0.735	0.698	0.681	0.580	0.724	0.624
	0.171	0.184	0.152	0.116	0.212	0.148	0.188	0.164
UNRES-	0.803	0.680	0.774	0.723	0.715	0.623	0.763	0.668
DSSP-flex	0.130	0.163	0.131	0.122	0.192	0.131	0.161	0.148
CABS-flex	0.672	0.590	0.600	0.695	0.706	0.666	0.669	0.642
	0.217	0.245	0.183	0.129	0.213	0.164	0.212	0.200
NOLB	0.361	0.282	0.358	0.356	0.292	0.318	0.334	0.312
	0.340	0.293	0.272	0.159	0.242	0.192	0.293	0.234

# B: X-ray structures

			Seco	ndary-s	tructure	type		
	(	X	β		α +β		all	
	rp	rs	rp	rs	rp	rs	rp	rs
<b>UNRES-flex</b>	0.560	0.529	0.552	0.563	0.453	0.434	0.512	0.494
	0.210	0.166	0.126	0.142	0.182	0.170	0.190	0.172
UNRES-	0.594	0.503	0.524	0.525	0.492	0.449	0.535	0.484
DSSP-flex	0.175	0.178	0.154	0.173	0.167	0.154	0.174	0.170
CABS-flex	0.464	0.464	0.513	0.528	0.541	0.537	0.508	0.509
	0.196	0.160	0.149	0.106	0.197	0.186	0.191	0.167
NOLB	0.562	0.537	0.518	0.478	0.589	0.590	0.565	0.548
	0.131	0.116	0.126	0.156	0.165	0.147	0.149	0.145

# C: All structures

		Seco	ndary-s	tructure	type			
(	x		8	α	+β	a	11	
rp	rs	rp rs rp rs rp rs						

UNRES-flex	0.665	0.580	0.648	0.634	0.559	0.502	0.618	0.559
	0.215	0.182	0.167	0.146	0.227	0.176	0.217	0.180
UNRES-	0.704	0.596	0.655	0.628	0.595	0.530	0.649	0.576
DSSP-flex	0.185	0.192	0.190	0.178	0.211	0.168	0.203	0.184
3CABS-flex	0.574	0.530	0.559	0.615	0.617	0.597	0.588	0.575
	0.232	0.218	0.173	0.145	0.220	0.188	0.217	0.196
NOLB	0.456	0.403	0.434	0.415	0.451	0.464	0.449	0.430
	0.281	0.260	0.230	0.169	0.252	0.217	0.259	0.228

**Table S6.** ANOVA results, shown as significance levels (expressed as p-values), of the Pearson's ( $r_p$ ) and Spearman's ( $r_s$ ) correlation coefficients between the fluctuation profiles calculated with UNRES-flex, UNRES-DSSP-flex, CABS-flex, and NOLB and the corresponding experimental profiles. The analysis has been carried out for truncated structures. The values in the 'Method' and 'Secondary structure' columns indicate the significance of the dependence of a correlation coefficient on fluctuation-profile-prediction method and on secondary-structure type ( $\alpha$ ,  $\beta$ , or  $\alpha+\beta$ , respectively). The values in the 'Interaction coefficient on the significance of the significance of a correlation coefficient on the prediction method and secondary-structure type. The p-values lower than 0.05 (indicating statistical significance) are in red font and higher values (corresponding to weak or no statistical significance) are in green font.

	$r_p/r_s$	Method	Secondary structure	Interaction
E		l	NMR structures	
eve	$r_p$	< 0.001	0.082	0.82
ce l	rs	< 0.001	0.016	0.94
an		2	X-ray structures	
ific	$r_p$	0.040	0.42	0.14
ign	rs	0.17	0.60	0.069
S			All structures	
	$r_p$	< 0.001	0.074	0.37
	rs	< 0.001	0.024	0.19

**Table S7.** Significance of differences, expressed as p-values, of the Pearson's ( $r_p$ ) and Spearman's ( $r_s$ ) correlation coefficients of fluctuation profiles, corresponding to truncated structures, calculated with UNRES-flex, UNRES-DSSP-flex, CABS-flex, and NOLB assessed by the two sample t-test depending on structure-determination method and secondary-structure class. The p-values with the "-" sign indicate that the respective correlation coefficients are greater for the method in the left column (Method 1), while the "+" sign means that the correlation coefficients are greater for the method in the right column (Method 1)

2). The p-values lower than 0.05 (indicating statistical significance) are in red font and higher values (corresponding to weak or no statistical significance) are in green font.

	Mathad 1	Mathad 2	Secondary-structure type				
vel	Method 1	Wiethou 2	α	β	$\alpha + \beta$	all	
e le		<b>UNRES-DSSP-flex</b>	+0.31	+0.64	+0.22	+ 0.42	
nce	<b>UNRES-flex</b>	CABS-flex	+0.15	+0.88	+0.0024	+ 0.35	
ïca		NOLB	- <0.001	- 0.0060	- <0.001	- <0.001	
ling	UNDES DSSD flow	CABS-flex	+0.47	- 0.67	+0.046	+ 0.36	
Sig	UNKES-DSSP-nex	NOLB	- <0.001	- 0.0022	- <0.001	- <0.001	
	CABS-flex	NOLB	- <0.001	- <0.001	- <0.001	- <0.001	

A: NMR struct	ures, Pearson	coefficient	$(r_p)$
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B: NMR structures, Spearman coefficient  $(r_s)$ 

	Method 1		Secondary-structure type				
vel		Nietnoa 2	α	В	$\alpha + \beta$	all	
e le		UNRES-DSSP-flex	+0.31	+0.64	+ 0.22	+ 0.42	
nco	UNRES-flex	CABS-flex	+0.15	+0.88	+0.0024	+ 0.35	
lica		NOLB	- <0.001	- 0.0060	- <0.001	- <0.001	
linț	UNDES DSSD flow	CABS-flex	+0.47	- 0.67	+0.046	+ 0.36	
Sig	UNKES-DSSF-Hex	NOLB	- <0.001	- 0.0022	- <0.001	- <0.001	
	CABS-flex	NOLB	- <0.001	- <0.001	- <0.001	- <0.001	

C: X-ray structures, Pearson coefficient  $(r_p)$ 

e n	Mathad 1	Mathad 2		Secondary-st	tructure type	
ca c	Method I	Wiethod 2	α	В	$\alpha + \beta$	all

		<b>UNRES-DSSP-flex</b>	+0.91	- 0.70	+0.52	+0.65
UNRES-flex	CABS-flex	- 0.30	- 0.66	+ 0.061	+0.24	
		NOLB	+0.41	- 0.70	+ < 0.001	+0.0073
	UNDER DRED flow	CABS-flex	- 0.25	- 0.99	+0.17	+0.35
	UNKES-DSSF-liex	NOLB	+0.50	- 0.94	+0.0035	+0.31
	CABS-flex	NOLB	+0.052	+0.94	+0.18	+0.30

D: X-ray structures, Spearman coefficient  $(r_s)$ 

	Mathad 1	Mothod 1 Mothod 2 Sec			econdary-structure type		
icance level	Ivietnou 1	Methou 2	α	В	$\alpha + \beta$	all	
e le		UNRES-DSSP-flex	- 0.60	- 0.61	+0.78	- 0.70	
nco	UNRES-flex	CABS-flex	- 0.28	- 0.58	+ 0.061	+ 0.22	
lica		NOLB	+ 0.84	- 0.24	+0.0021	+0.25	
ling	UNDES DSSD flow	CABS-flex	- 0.66	+ 0.92	+0.092	+ 0.39	
Sig	UNKES-DSSP-nex	NOLB	+0.45	- 0.58	+0.0033	+ 0.26	
	CABS-flex	NOLB	+0.16	- 0.41	+0.30	+0.29	

E: All structures, Pearson coefficient  $(r_p)$ 

	Method 1	Mathad 2	Secondary-structure type				
nificance level	Method 1	Method 2	α	β	$\alpha + \beta$	all	
e le		<b>UNRES-DSSP-flex</b>	+0.44	+0.86	+ 0.19	+0.41	
nce	UNRES-flex	CABS-flex	+0.63	- 0.90	+ < 0.001	+ 0.38	
ïca		NOLB	- 0.023	- 0.015	- 0.61	- 0.31	
ling	UNDER DEED flow	CABS-flex	- 0.89	- 0.74	+ 0.019	+ 0.43	
Sig	UNKES-DSSP-Hex	NOLB	- 0.0053	- 0.013	- 0.17	- 0.10	
	CABS-flex	NOLB	- 0.020	- 0.0063	- 0.0034	- 0.0090	

F: All structures, Spearman coefficient  $(r_s)$ 

e n	Mathad 1	Mathad 2		Secondary-st	tructure type	
c, C	Method I	Wiethod 2	α	β	$\alpha + \beta$	all

	UNRES-DSSP-flex	+0.66	- 0.94	+0.40	+ 0.59
<b>UNRES-flex</b>	CABS-flex	- 0.94	- 1.0	+0.0027	+ 0.49
	NOLB	- 0.014	- 0.0045	- 0.69	- 0.34
UNDER DEED flow	CABS-flex	- 0.65	+ 0.93	+ 0.021	+0.40
UNRES-DSSP-liex	NOLB	- 0.0067	- 0.0091	- 0.28	- 0.14
CABS-flex	NOLB	- 0.031	- <0.001	- 0.0043	- 0.012
CABS-flex	NOLB	- 0.031	- <0.001	- 0.0043	- 0.012

**Table S8.** PDB codes of NMR structures with low similarity of the fluctuation profiles estimated from NMR ensembles and those calculated with a given method.

method	structure with $r_p \leq 0.2$
LINRES_fley	1ACP, 1BAL, 1GAB, 1HRF, 1J7O, 1LEB, 1POU, 2N2U,
	3CI2
UNRES-DSSP-flex	1BAL, 1GAB, 1HRF, 1J7O, 2HI3, 2L09
CABS-flex	1BAL, 1ED7, 1J7O, 1K8B, 2RGF
	1A6S, 1ACP, 1AH9, 1BAL, 1CLB, 1E0G, 1ED7, 1FEX,
NOL D	1GHH, 1HNS, 1HYW, 1IQO, 1IYR, 1J7O, 1K8B, 1L2Y,
NULD	1LEB, 1POU, 1RIJ, 1STU, 1TPN, 2E7N, 2HI3, 2KYW,
	2L09, 2LVC, 2M6Q, 2MQ8, 2RGF, 3CI2, 3NCM

**Figure S1.** Normalized fluctuation profiles (RMSFN, dimensionless) calculated from NMR ensembles or X-ray B-factors (red line) and the corresponding profiled predicted by UNRES-flex (ligh-blue line), UNRES-DSSP-flex (green line), CABS-flex (yellow line), and NOLB (blue line). Except for NOLB, the fluctuation profiles are averaged over three simulations. The Pearson ( $r_p$ ) and Spearman ( $r_s$ ) coefficients for the correlation between the experimental and predicted profiles are shown in each panel. The solid orange and wave green lines below the abscissa of each panel indicate the  $\beta$ -sheet and  $\alpha$ -helical structure, respectively. The analyses were carried out for truncated structures.



1ADG truncated RMSFN profiles

1AH9 truncated RMSFN profiles

1AKY truncated RMSFN profiles



1BK2 truncated RMSFN profiles

1CFJ truncated RMSFN profiles

1CLB truncated RMSFN profiles





1EM7 truncated RMSFN profiles

1ENH truncated RMSFN profiles





1GHH truncated RMSFN profiles

1HNS truncated RMSFN profiles



1IG5 truncated RMSFN profiles

1IQO truncated RMSFN profiles

1IYR truncated RMSFN profiles





10GQ truncated RMSFN profiles

10IX truncated RMSFN profiles

10PD truncated RMSFN profiles



1POU truncated RMSFN profiles

1PRV truncated RMSFN profiles

1PTF truncated RMSFN profiles





1STU truncated RMSFN profiles

1TEN truncated RMSFN profiles



1UBQ truncated RMSFN profiles

1VIG truncated RMSFN profiles

1WIU truncated RMSFN profiles





2BBY truncated RMSFN profiles

2BF9 truncated RMSFN profiles







2LZM truncated RMSFN profiles

2M6Q truncated RMSFN profiles



2RGF truncated RMSFN profiles

2YGS truncated RMSFN profiles

3CI2 truncated RMSFN profiles



3KYY truncated RMSFN profiles

**3NCM truncated RMSFN profiles** 

3PUC truncated RMSFN profiles



4N6T truncated RMSFN profiles

40ZU truncated RMSFN profiles

4QRL truncated RMSFN profiles







**Figure S2.** Normalized fluctuation profiles (RMSFN, dimensionless) calculated from NMR ensembles or X-ray B-factors (red line) and the corresponding profiled predicted by UNRES-flex (ligh-blue line), UNRES-DSSP-flex (green line), CABS-flex (yellow line), and NOLB (blue line). Except for NOLB, the fluctuation profiles are averaged over three simulations. The Pearson ( $r_p$ ) and Spearman ( $r_s$ ) coefficients for the correlation between the experimental and predicted profiles are shown in each panel. The solid orange and wave green lines below the abscissa of each panel indicate the  $\beta$ -sheet and  $\alpha$ -helical structure, respectively. The analyses were carried out for full structures.





1BK2 whole RMSFN profiles

1CFJ whole RMSFN profiles

1CLB whole RMSFN profiles





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Residue index



Residue index

1ENH whole RMSFN profiles

1EM7 whole RMSFN profiles

1ED7 whole RMSFN profiles

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Residue index



1GHH whole RMSFN profiles

1HNS whole RMSFN profiles





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Residue index

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Residue index

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Residue index

1IQO whole RMSFN profiles

1IYR whole RMSFN profiles



10GQ whole RMSFN profiles

10IX whole RMSFN profiles

10PD whole RMSFN profiles







1STU whole RMSFN profiles

1TEN whole RMSFN profiles





1VIG whole RMSFN profiles

1WIU whole RMSFN profiles





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Residue index

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Residue index

2BF9 whole RMSFN profiles

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Residue index



2LVC whole RMSFN profiles

2LZM whole RMSFN profiles

2M6Q whole RMSFN profiles



2RGF whole RMSFN profiles

2YGS whole RMSFN profiles

3CI2 whole RMSFN profiles





4N6T whole RMSFN profiles

40ZU whole RMSFN profiles

4QRL whole RMSFN profiles





**Figure S3.** Scatter plots of the Pearson  $(r_p)$  and Spearman  $(r_s)$  coefficients between the experimental and predicted fluctuation profiles in chain length for the NMR (A-D) and X-ray (E-H) structures and the UNRES-flex (A, E), UNRES-DSSP-flex (B, F), CABS-flex (C,G), and NOLB (D, H) prediction methods.





