Supporting Information

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a.							<i>b</i> . M	<i>b.</i> M1* ^{1R}								<i>с.</i> М1* ^{2R}							
	а	b	С	d	е	f	g		а	b	С	d	е	f	g		а	b	С	d	е	f	g
134					Е	Κ	Е	134	V	К	Е	L	Е	Е	Κ	134					Е	Κ	Е
137	L	Е	Е	К	к	Е	Α	141	V	Е	Α	L	E	L	А	137	V	Е	Е	L	к	Е	Α
144	L	Е				L	А	148	1	D	Q	A	s	R	D	144	V	E	L	L	1	D	Q
148	Т	D	Q	А	S	R	D	155	Y	н	R		т	Α		151	A	s	R	D	Y	н	R
155	Y					Н	R	160	v	k	_				- k	158	V	т	Δ		F	ĸ	F
158	А	т	А	L	Е	к	Е	102	v	N		L	E	E	ĸ	100	v		~	5	-		_
165	1	F	F	ĸ	ĸ	ĸ	Δ	169	V	K	Α	L	E	L	А	165	V	E	E	L	K	K	Α
100	1	2	-		IX.			176	1	D	0	A	S	Q	D	172	V	E	L	L	1	D	Q
172	L	E				L	A			-				-	_								_
176	1	D	Q	Α	S	Q	D	183	Y	Ν	R	L	Ν	V	L	179	A	S	Q	D	Y	Ν	R
183	Y					Ν	R	190	V	К	Е					186	V	Ν	V	L	Е	Κ	Е
186	А	Ν	V	L	Е	к	Е																

Fig. S1. Idealization of the B repeats. (A) Heptad positions of residues in the B repeats as predicted by Coils (12). Residues that correspond to register 1 are in red, and those that correspond to register 2 are in blue. (B) Sequence of $M1^{*1R}$, with idealizing mutations in black and depicted in register 1. Residues that contact Fg in register 2 are bolded and italicized. (C) Sequence of $M1^{*2R}$, with idealizing mutations in black and depicted in register 2. Residues that contact Fg in register 2 are bolded and italicized.



Fig. S2. Intradimer versus interdimer disulfide bond formation. Disulfide bond formation at 10-fold higher (0.5 mg/mL) or the same concentration (0.05 mg/mL) as in Fig. 4A, as assessed by nonreducing SDS/PAGE and visualized by Western blot using an anti-His antibody.



Fig. S3. Interaction with Fg. (A) Unbound proteins from Ni²⁺-NTA coprecipitation assay for interaction of His-tagged AB proteins with FgD, as shown in Fig. 4*B*. (*B*) Unbound proteins from Ni²⁺-NTA coprecipitation assay for interaction of His-tagged M1 proteins with FgD, as shown in Fig. 4*C*. (*C*) Ni²⁺-NTA agarose coprecipitation assay for interaction of His-tagged M1 proteins with FgD at 37 °C carried out in the presence of 2 M (*Left*) or 3 M (*Right*) urea. Bound FgD was assessed through Coomassie-stained SDS/PAGE. (*D*) Unbound proteins from Ni²⁺-NTA coprecipitation assay for interaction of His-tagged M1 proteins with FgD, as shown in Fig. 4*E*.



Fig. S4. AB*^{2R} is a structured protein. ¹H-¹⁵N HSQC spectra of (A) AB (B) and AB*^{2R} collected at 26 °C.



Fig. S5. Idealized M1 proteins on the GAS surface. (A) Surface expression of M1 protein by wild-type GAS 5448, GAS 5448 ($\Delta emm1$) carrying an empty plasmid or plasmids encoding wild-type M1, register 1-stabilized M1, or register 2-stabilized M1, as assayed by FACS, using a polyclonal anti-M1 protein antibody. The values are the means of three triplicates normalized to GAS 5448, with the SD shown. (*B*) Binding of FITC-labeled Fg to the same strains as in *A* as assayed by FACS. The values are normalized to the value for GAS 5448, with the SD shown.

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