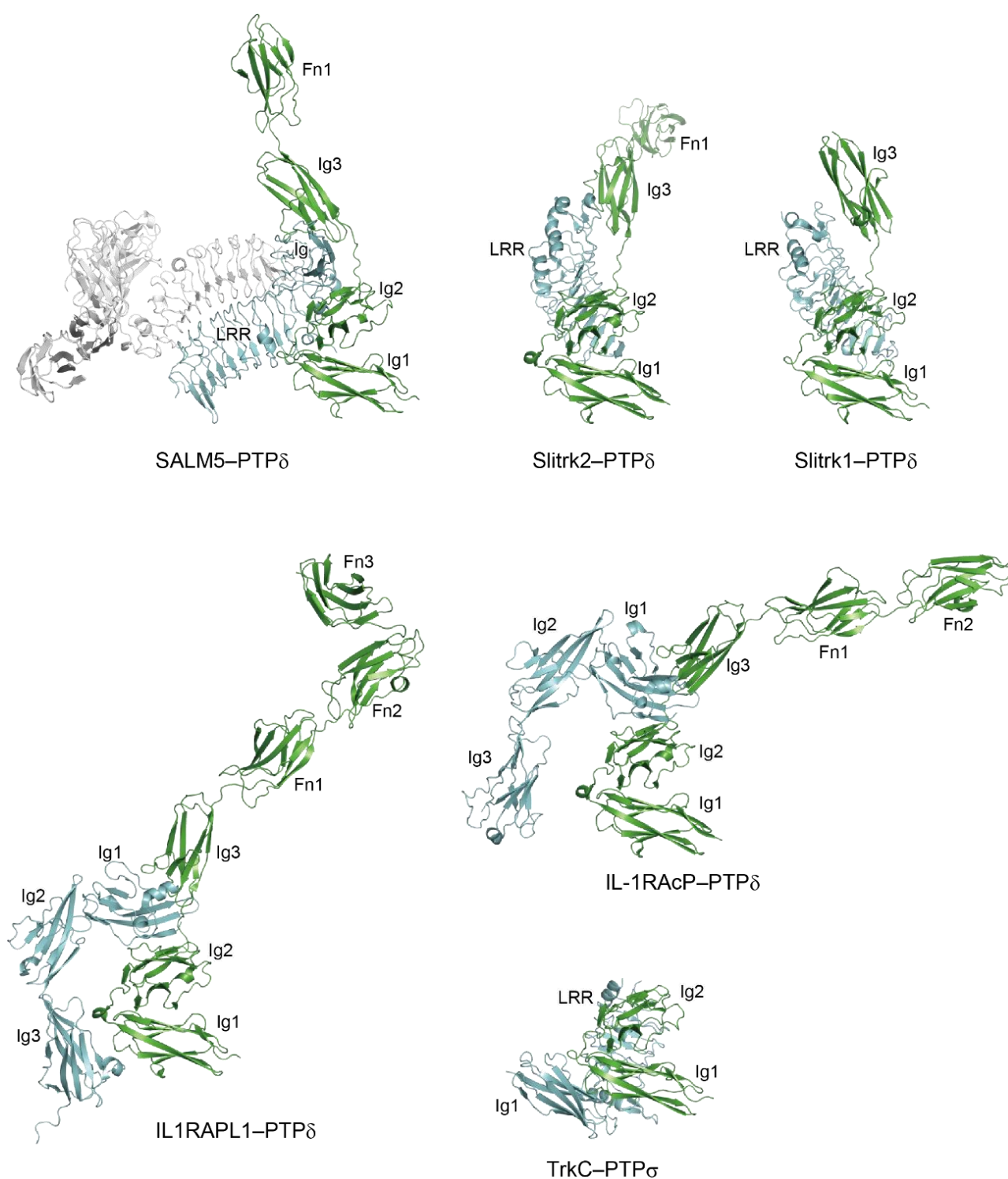
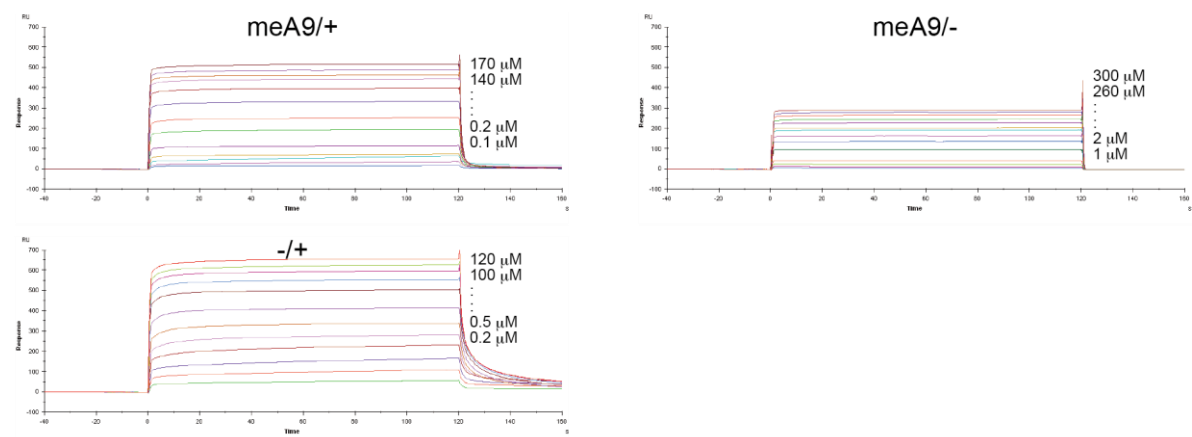




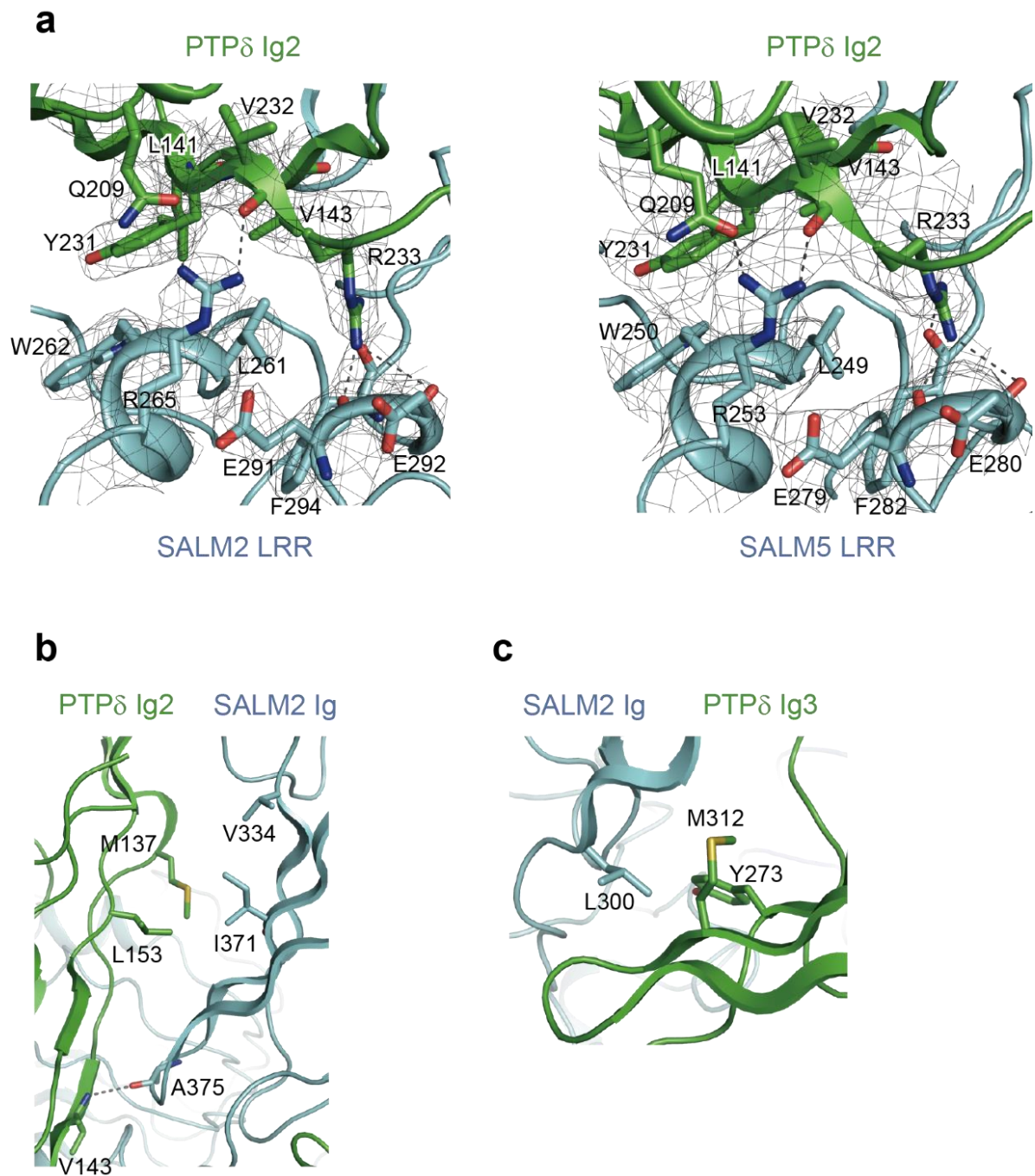
Supplementary Figure 1 Structures of complexes between type-IIa RPTPs and postsynaptic organizers.

Type-IIa RPTPs and postsynaptic organizers are colored in green and cyan, respectively.

Ligand : SALM5 Analyte : PTP δ splicing variant



Supplementary Figure 2 SPR sensorgrams for interaction analyses between SALM5 and PTP δ splicing variants.



Supplementary Figure 3 Interface between PTPδ and SALM2.

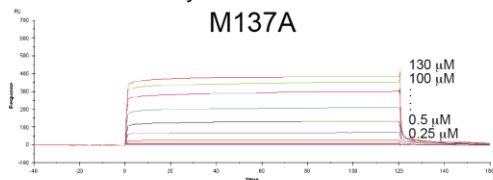
Hydrogen bonds are indicated as dotted lines.

(a) Interface between PTPδ Ig2 and SALM2 LRR. The electron density of the area around this interface is shown as a $2F_o - F_c$ map contoured at 1.3σ level. For comparison, the electron density of the area around the interface between PTPδ Ig2 and SALM5 LRR is also shown ($2F_o - F_c$ map contoured at 1.3σ level).

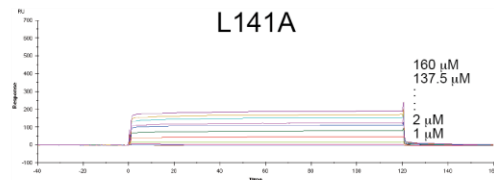
(b) Interface between PTPδ Ig2 and SALM2 Ig.

(c) Interface between PTPδ Ig3 and SALM2 Ig.

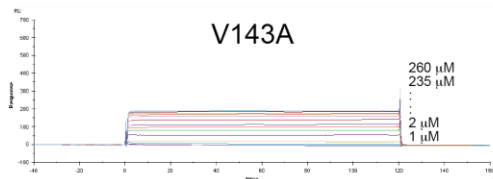
Ligand : SALM5 Analyte : PTP δ mutant
M137A



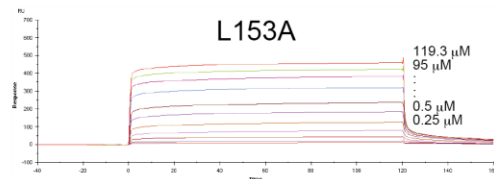
L141A



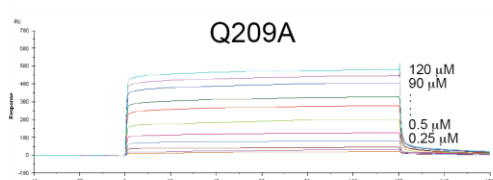
V143A



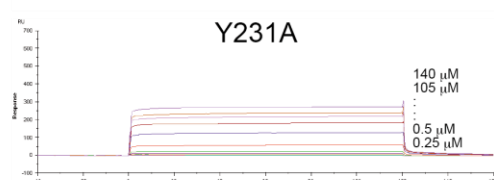
L153A



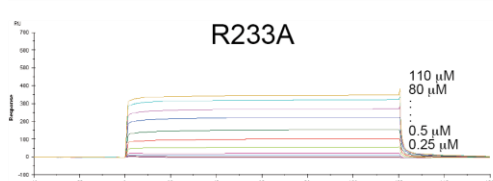
Q209A



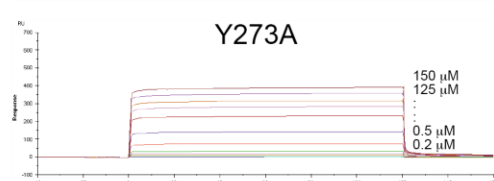
Y231A



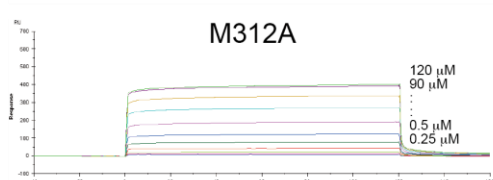
R233A



Y273A

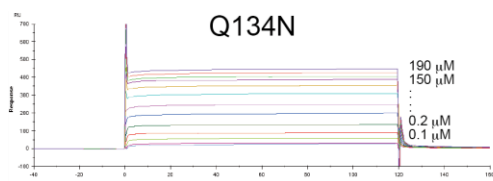


M312A

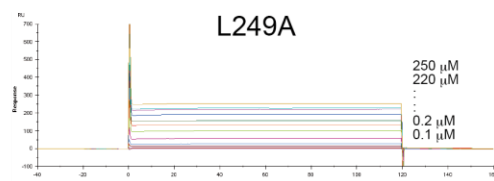


Ligand : SALM5 mutant Analyte : PTP δ

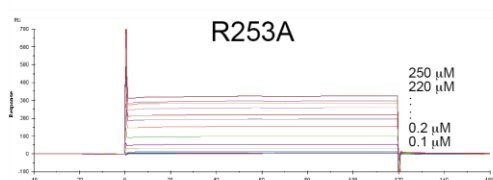
Q134N



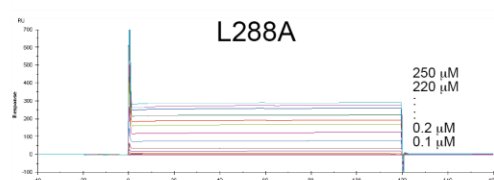
L249A



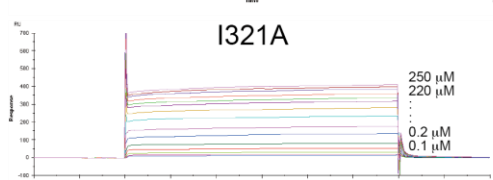
R253A



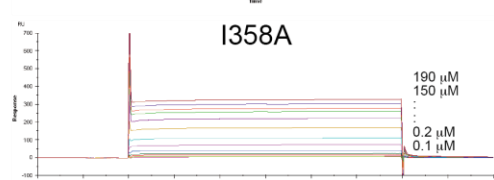
L288A



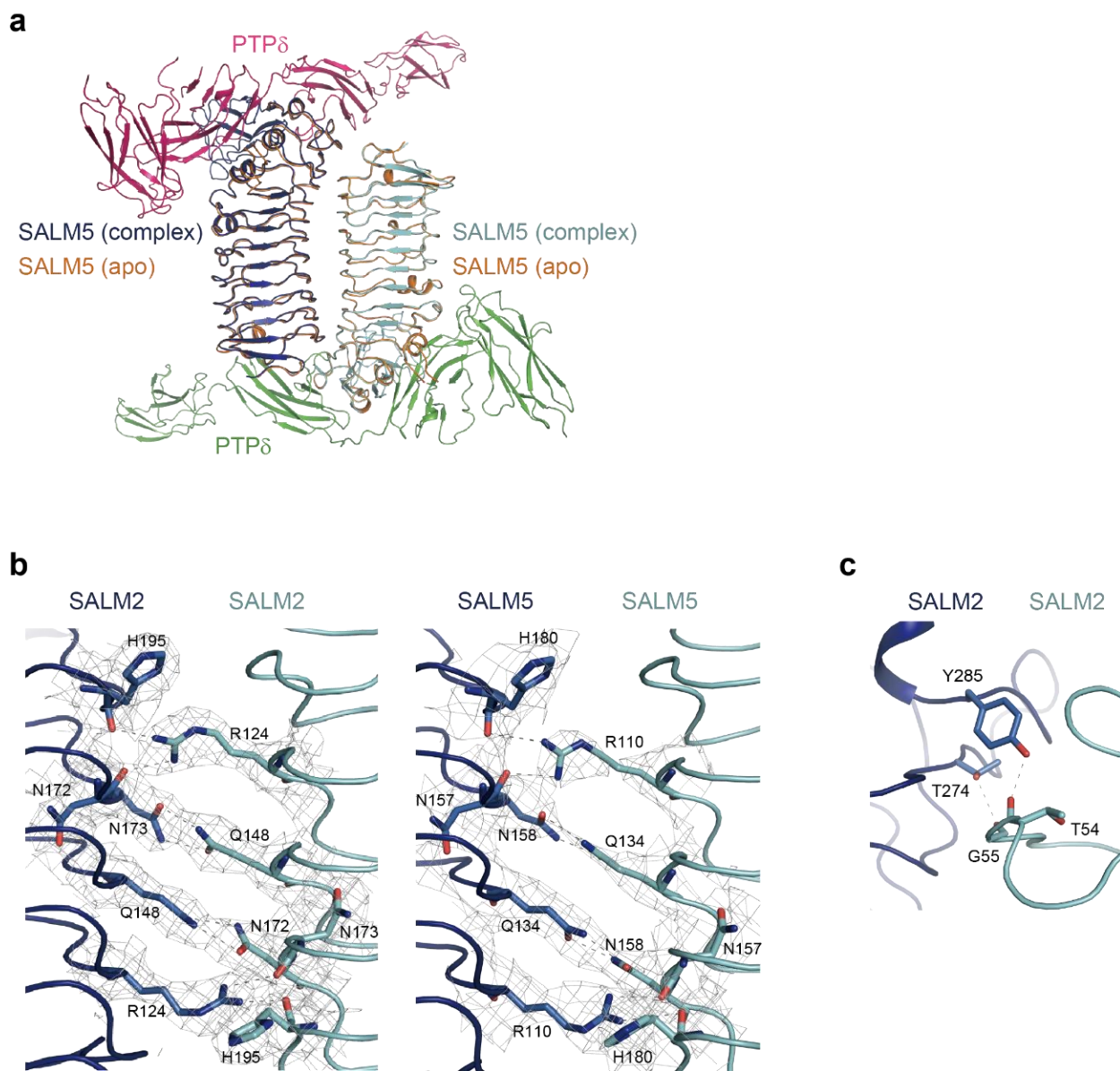
I321A



I358A



Supplementary Figure 4 SPR sensorgrams for interaction analyses between mutant PTP δ and SALM5 or between PTP δ and mutant SALM5.

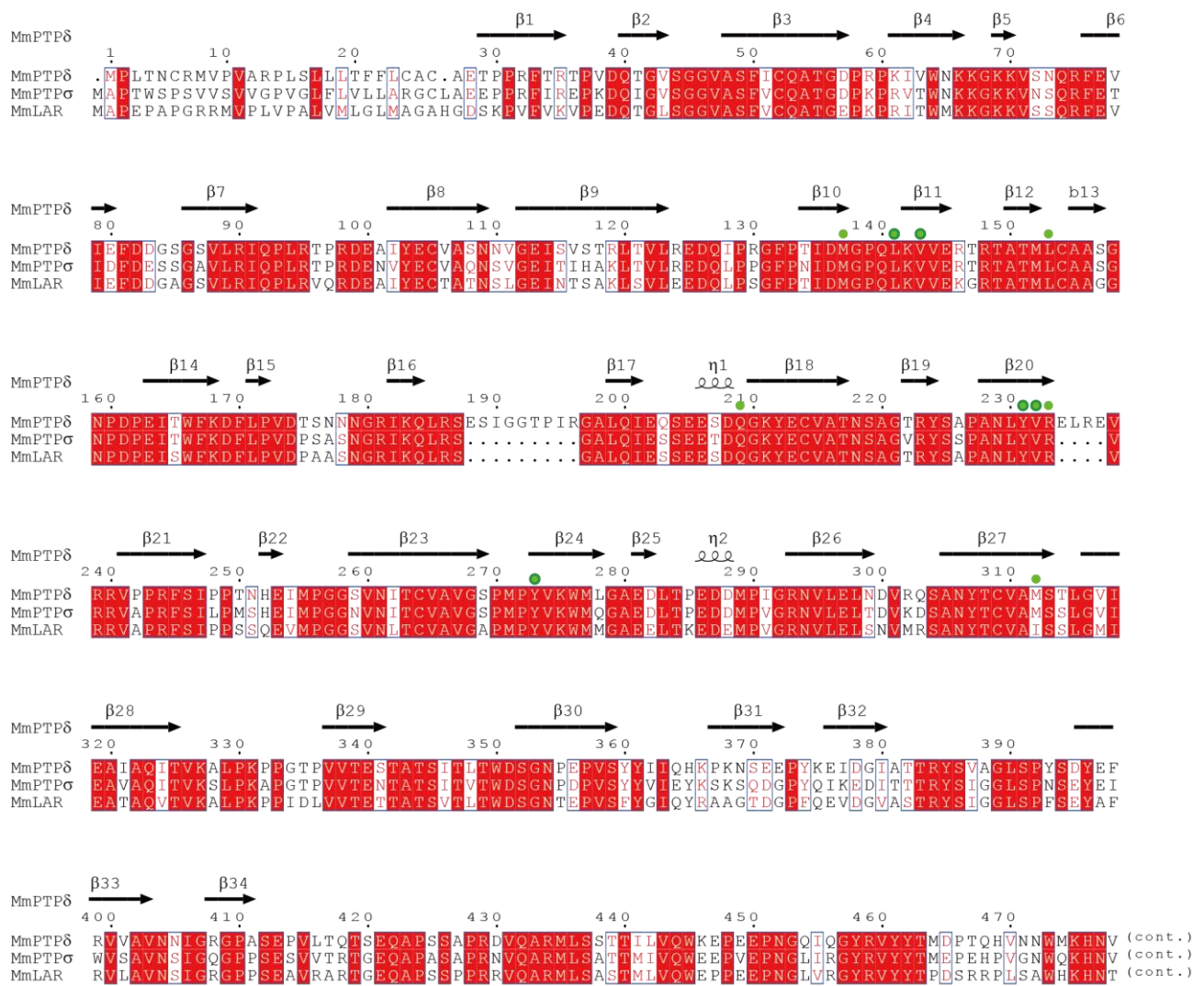


Supplementary Figure 5 LRR-mediated dimer of SALM2 and SALM5.

(a) Superposition of SALM5 dimers from PTPδ–SALM5 complex and apo-SALM5.

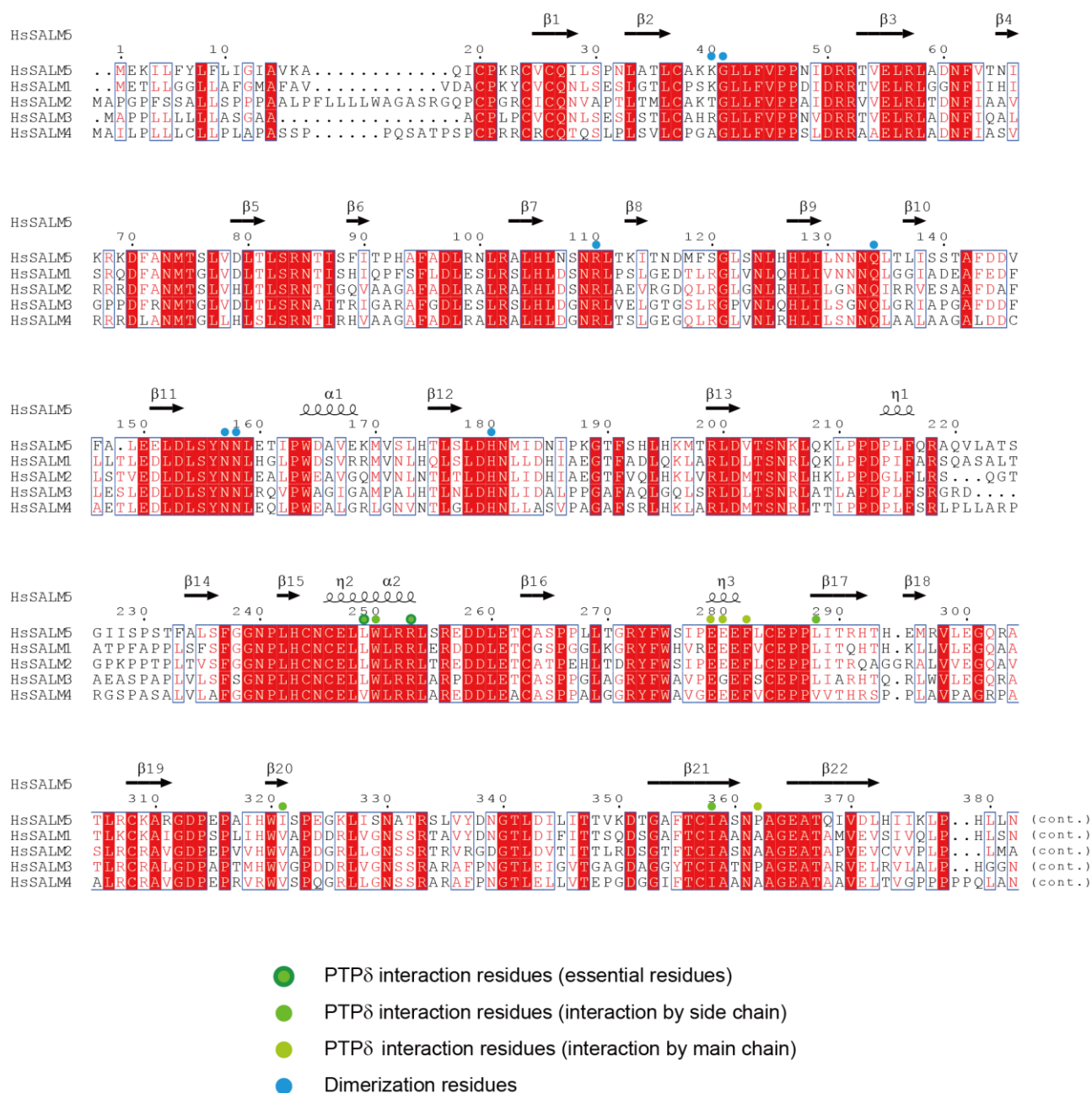
(b) Interactions in the central region of the SALM2 dimer interface. Hydrogen bonds are indicated as dotted lines. The electron density of the area around this interface is shown as a $2F_o - F_c$ map contoured at 1.1σ level. For comparison, the electron density of the area around the central region of the SALM5 dimer interface is also shown ($2F_o - F_c$ map contoured at 1.1σ level).

(c) Interactions in the peripheral region of the SALM2 dimer interface. Hydrogen bonds are indicated as dotted lines.

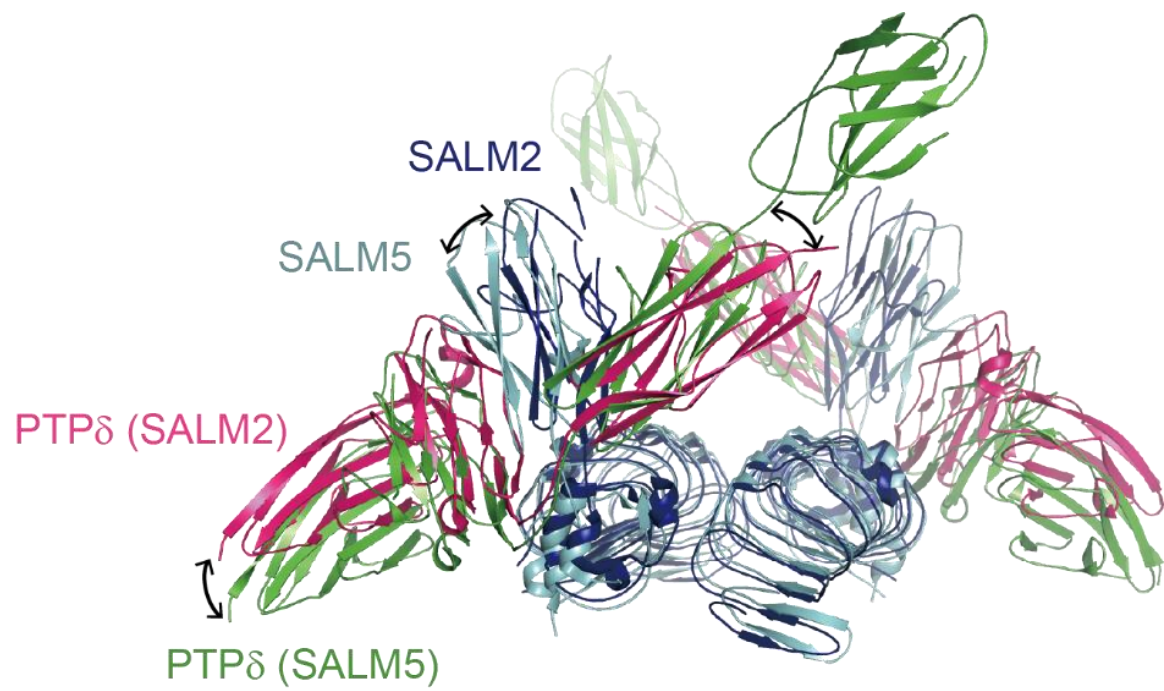


- SALM5 interaction residues (essential residues)
- SALM5 interaction residues

Supplementary Figure 6 Amino acid sequence alignment of type-IIa RPTPs.



Supplementary Figure 7 Amino acid sequence alignment of SALMs.



Supplementary Figure 8 Superposition of PTP δ –SALM5 and PTP δ –SALM2 complexes.

PTP δ –SALM5 and PTP δ –SALM2 complexes are superposed by the LRR domains of SALM dimers.

	SALM2	SALM5
PTP δ Ig2– SALM LRR	Leu261	Leu249
	Trp262	Trp250
	Arg265	Arg253
	Glu291	Glu279
	Glu292	Glu280
	Phe294	Phe282
PTP δ Ig2– SALM Ig	Val334	Ile321
	Ile371	Ile358
	Ala375	Pro362
PTP δ Ig3– SALM Ig	Leu300	Leu288
SALM LRR– SALM LRR (dimerization)	Thr54	Lys40
	Gly55	Gly41
	Arg124	Arg110
	Gln148	Gln134
	Asn172	Asn157
	Asn173	Asn158
	His195	His180
	Thr274	Thr262
	Tyr285	Tyr273

Supplementary Table 1 Conservation of the amino acid residues involved in the interaction with PTP δ or homodimerization of SALM s between SALM2 and SALM5.