wwPDB EM Validation Summary Report

Jul 15, 2025 – 11:40 AM JST

PDB ID	:	8YGP / pdb_00008ygp
EMDB ID	:	EMD-39259
Title	:	The tetramer Structure of DSR2-SPR with NAD
Authors	:	Gao, X.; Zhu, H.; Cui, S.
Deposited on	:	2024-02-26
Resolution	:	4.40 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

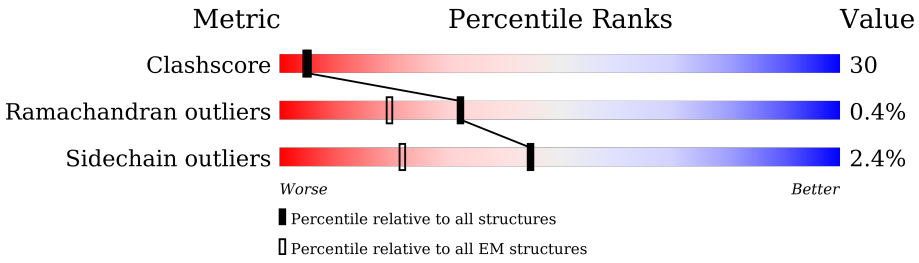
EMDB validation analysis	:	FAILED
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 4.40 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5%

Mol	Chain	Length	Quality of chain
1	A	1005	51% 43%
1	B	1005	54% 41%
1	E	1005	47% 49%
1	F	1005	45% 48%
2	C	264	36% 19% 43%
2	D	264	31% 26% 43%
2	G	264	29% 25% 43%
2	H	264	28% 26% 43%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 37524 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called SIR2-like domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	983	Total	C	N	O	S	0	0
			8183	5292	1322	1538	31		
1	B	983	Total	C	N	O	S	0	0
			8183	5292	1322	1538	31		
1	E	983	Total	C	N	O	S	0	0
			8183	5292	1322	1538	31		
1	F	983	Total	C	N	O	S	0	0
			8183	5292	1322	1538	31		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	171	ALA	HIS	engineered mutation	UNP D4G637
B	171	ALA	HIS	engineered mutation	UNP D4G637
E	171	ALA	HIS	engineered mutation	UNP D4G637
F	171	ALA	HIS	engineered mutation	UNP D4G637

- Molecule 2 is a protein called SPR.

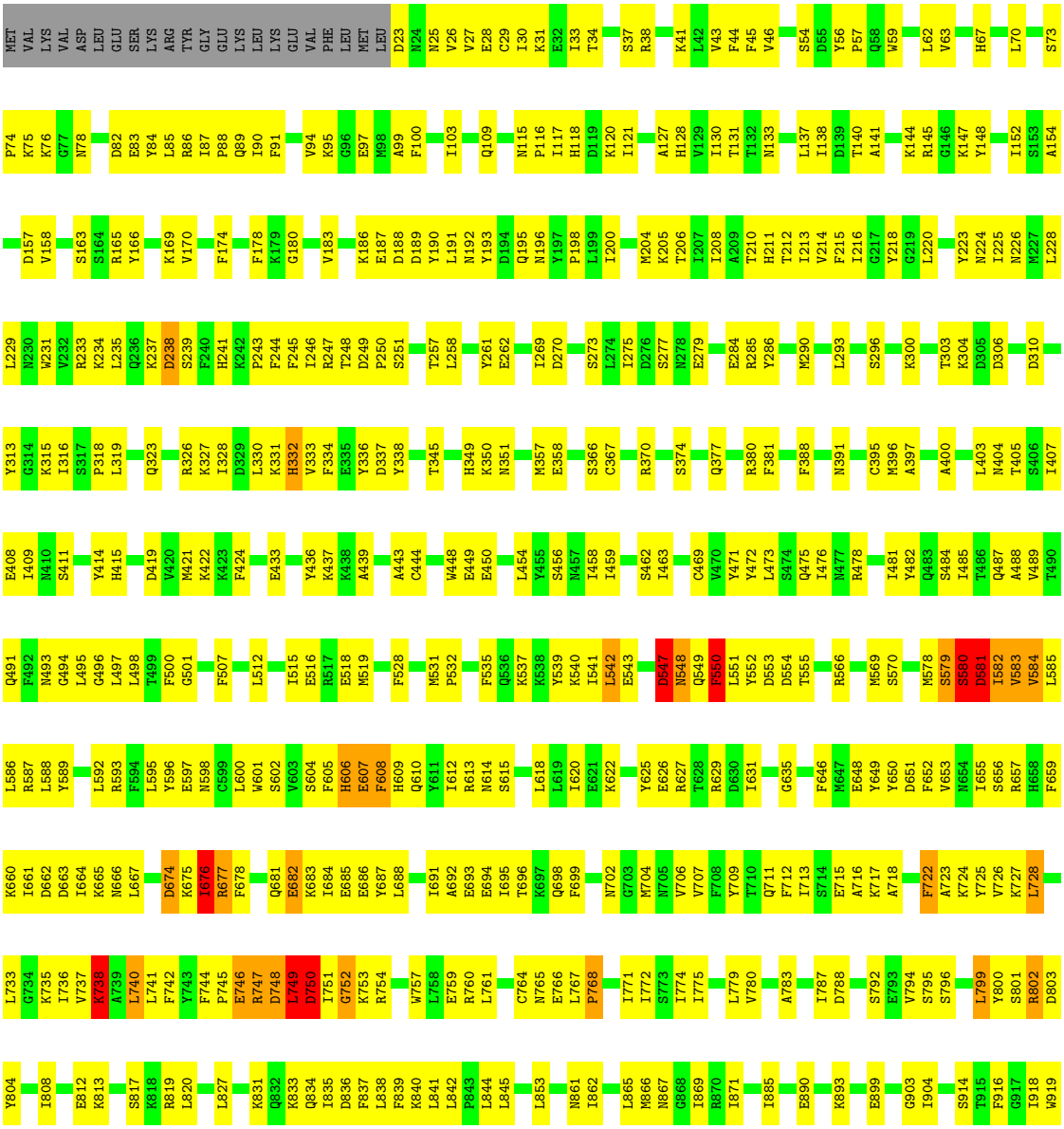
Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	151	Total	C	N	O	S	0	0
			1198	758	189	247	4		
2	D	151	Total	C	N	O	S	0	0
			1198	758	189	247	4		
2	G	151	Total	C	N	O	S	0	0
			1198	758	189	247	4		
2	H	151	Total	C	N	O	S	0	0
			1198	758	189	247	4		

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

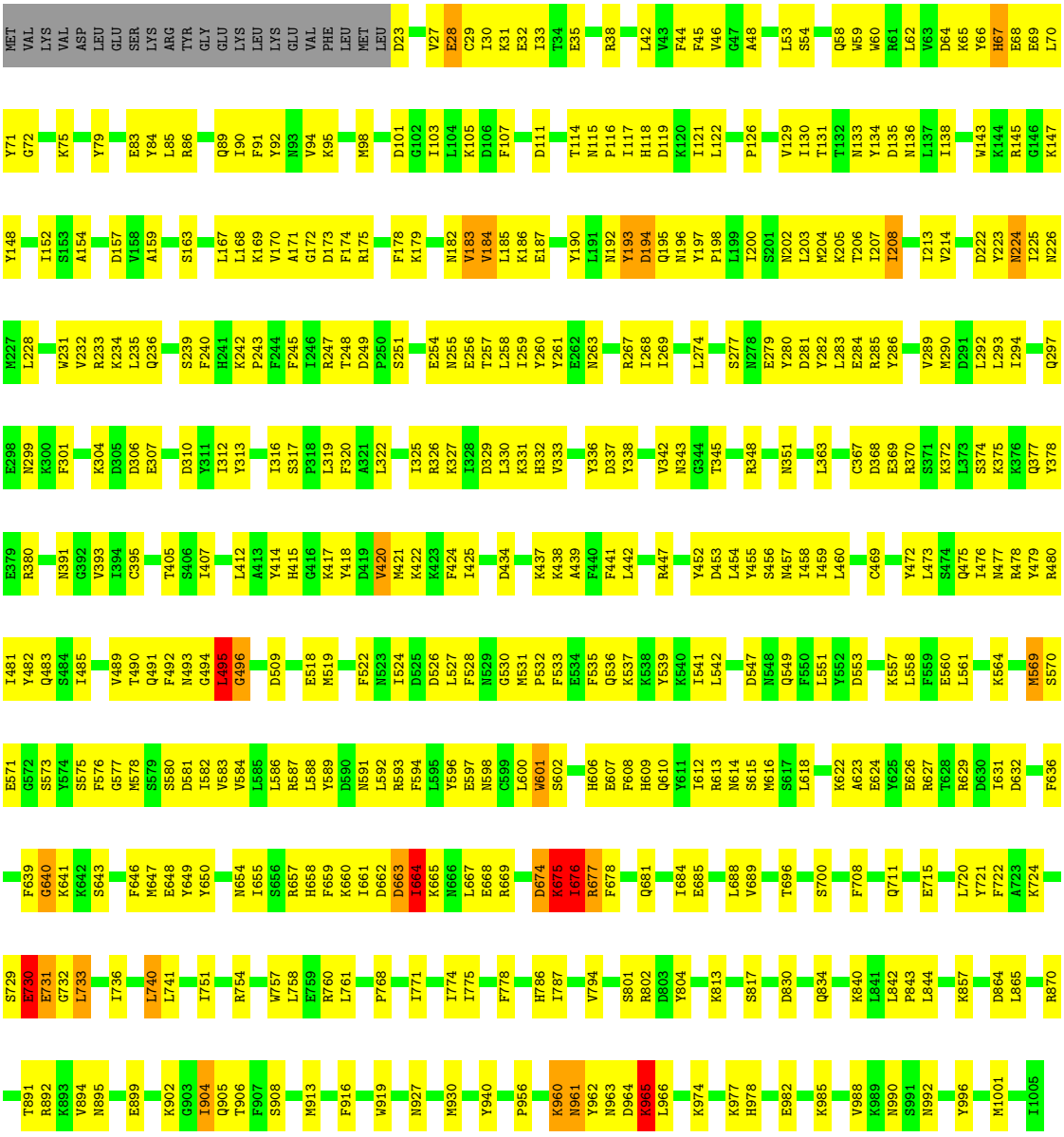
- Molecule 1: SIR2-like domain-containing protein

Chain A:



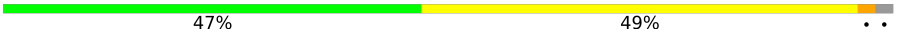
• Molecule 1: SIR2-like domain-containing protein

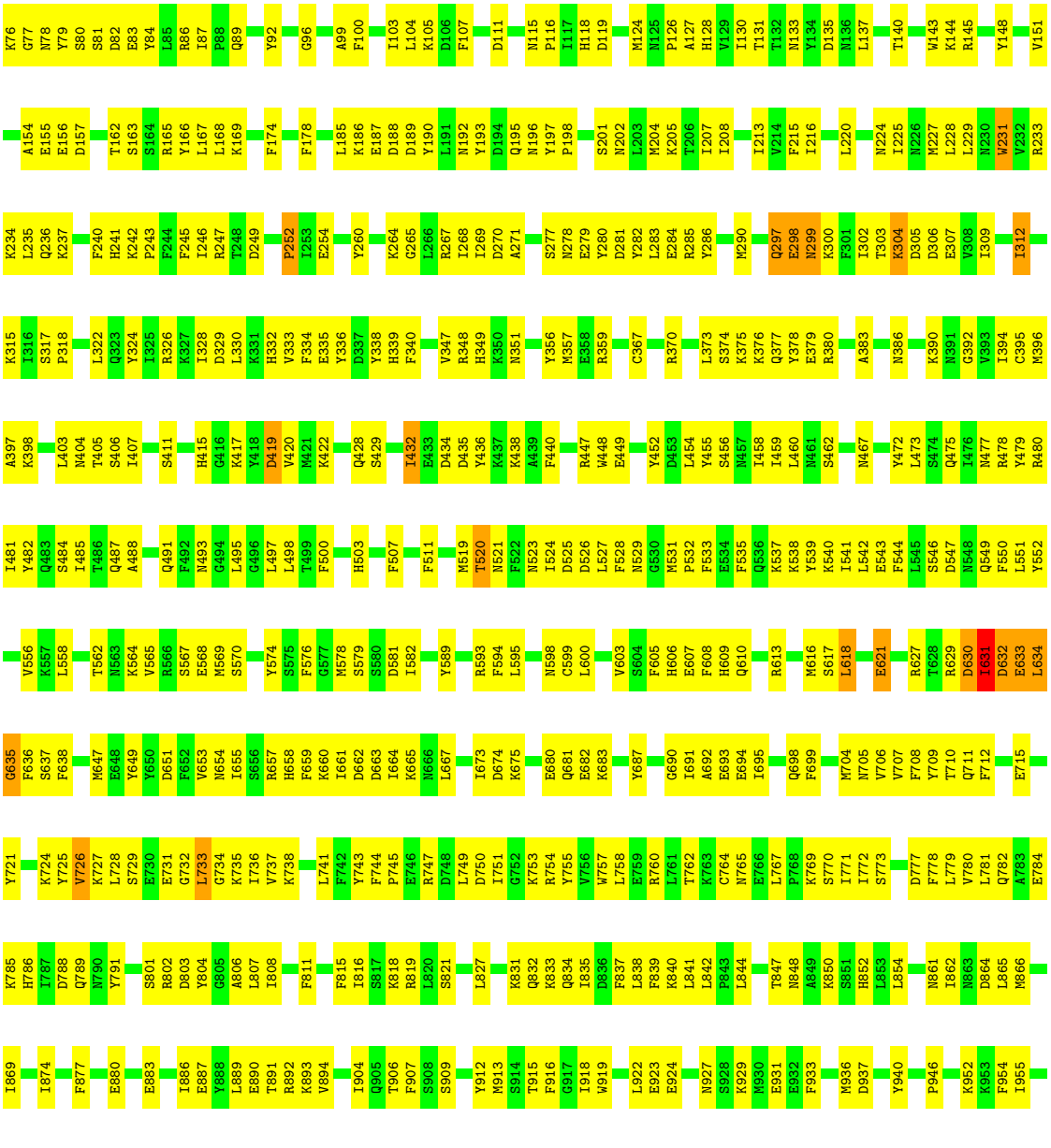
Chain B:



• Molecule 1: SIR2-like domain-containing protein

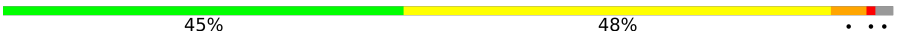
Chain E:

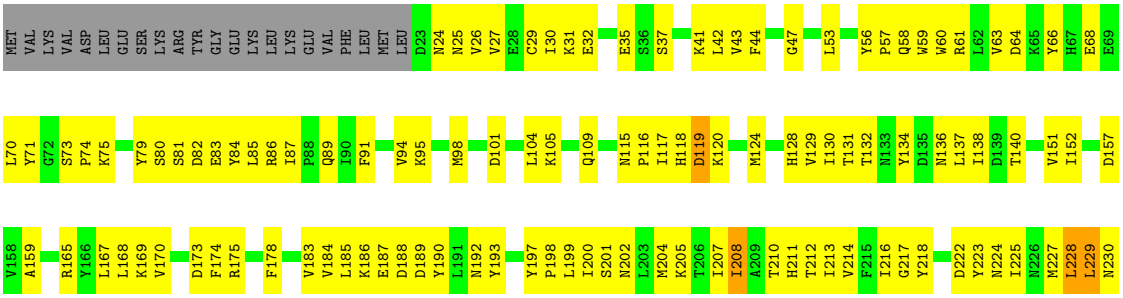


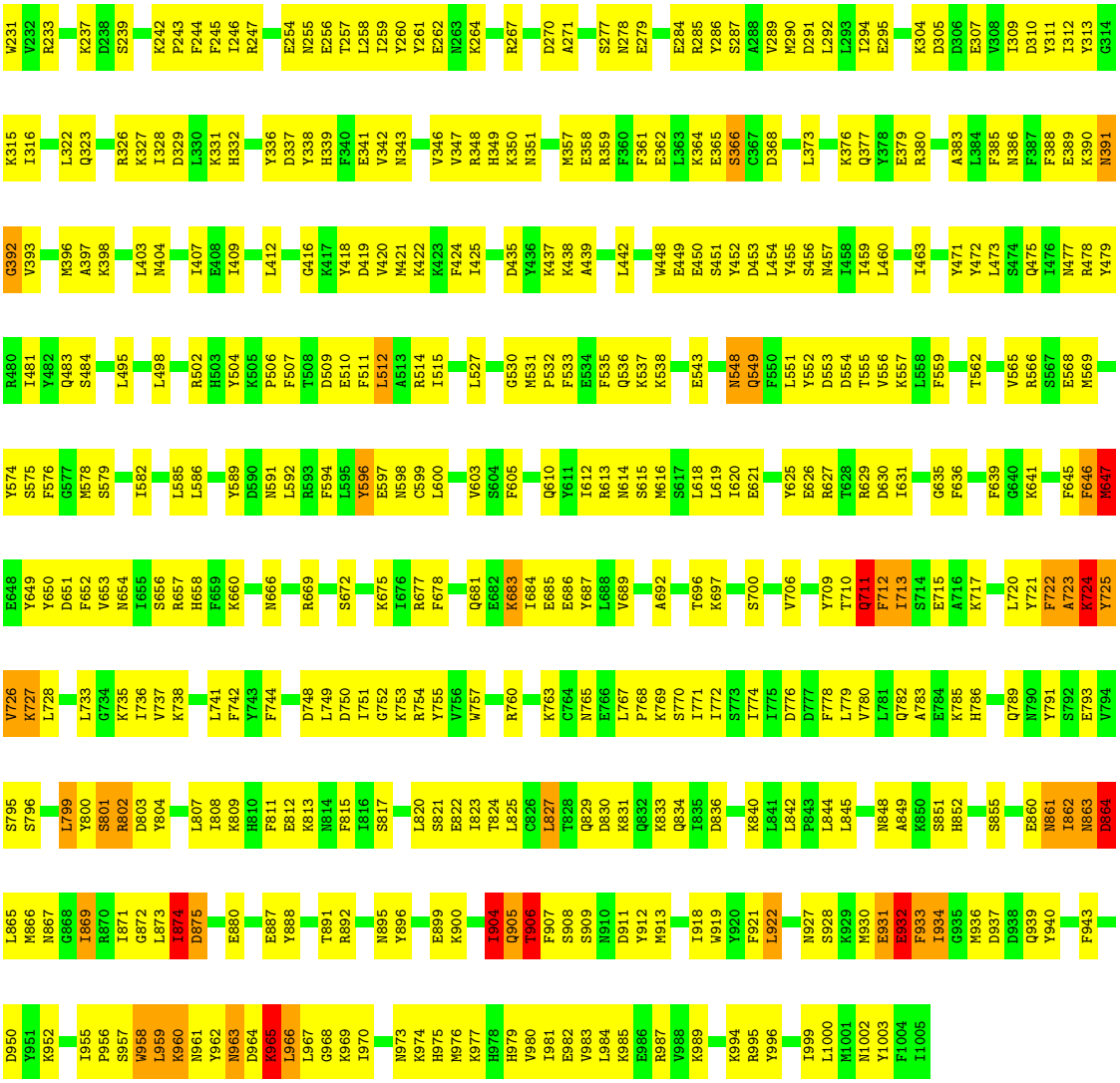


• Molecule 1: SIR2-like domain-containing protein

Chain F:

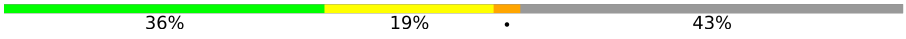


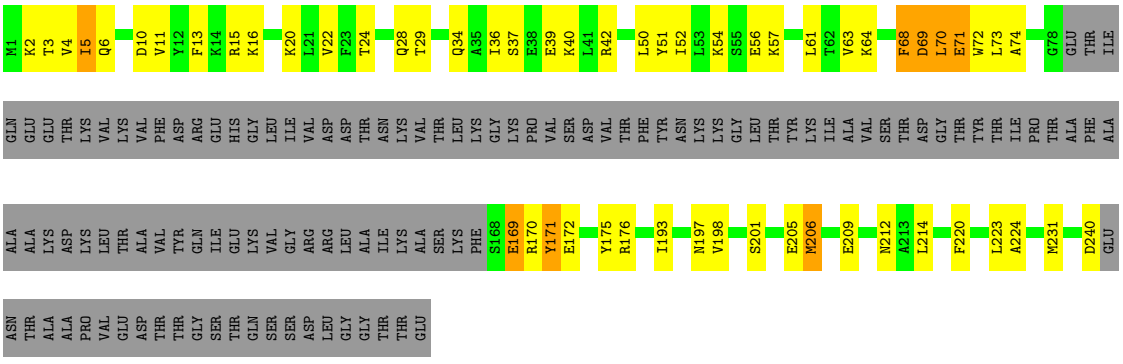




• Molecule 2: SPR

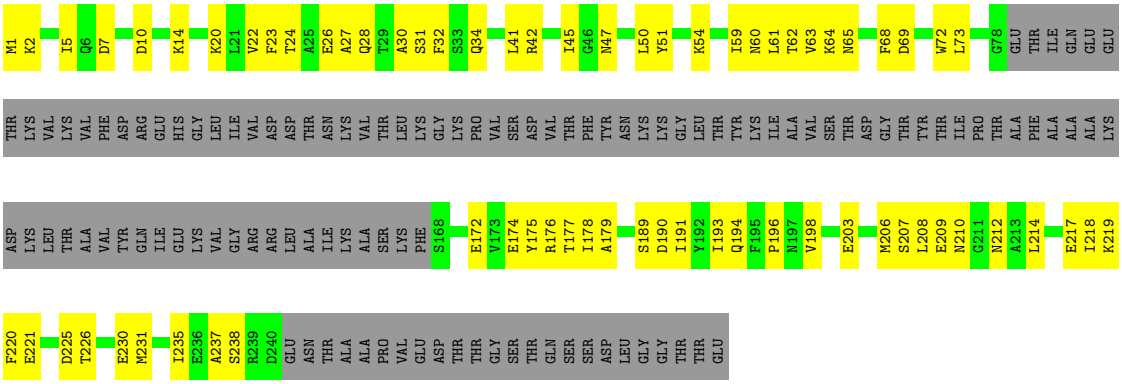
Chain C:





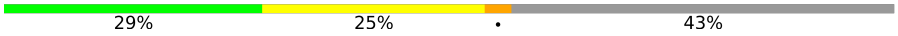
• Molecule 2: SPR

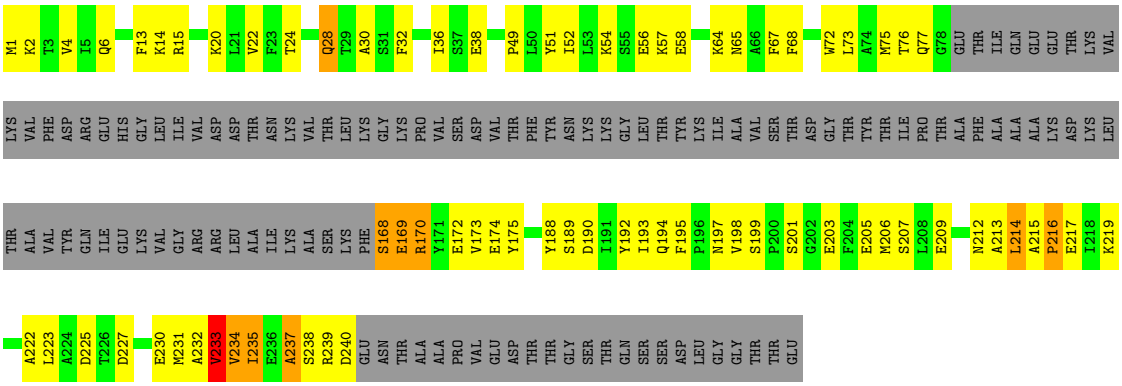
Chain D:



• Molecule 2: SPR

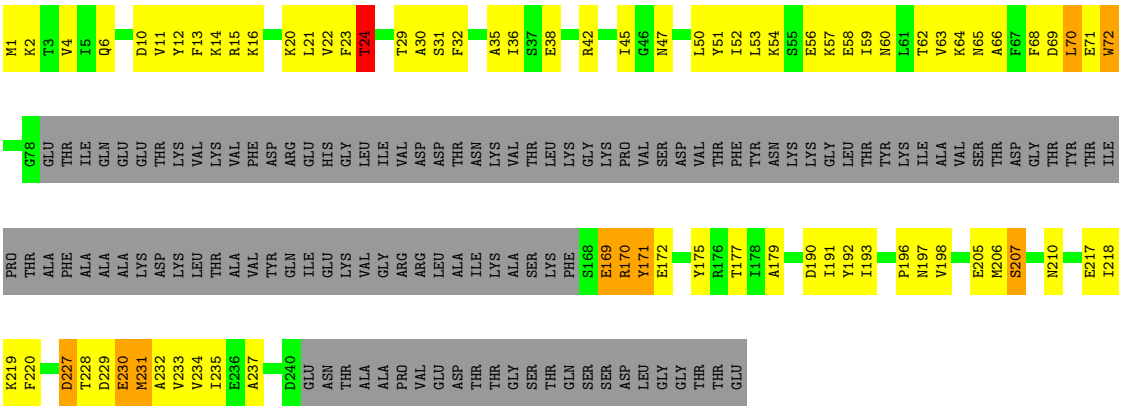
Chain G:





• Molecule 2: SPR

Chain H:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	49893	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	66	Depositor
Minimum defocus (nm)	1800	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor

5 Model quality

5.1 Standard geometry

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	0.37	9/8374 (0.1%)	0.78	33/11280 (0.3%)
1	B	0.24	0/8374	0.80	34/11280 (0.3%)
1	E	0.27	1/8374 (0.0%)	0.67	13/11280 (0.1%)
1	F	0.37	3/8374 (0.0%)	0.88	42/11280 (0.4%)
2	C	0.29	0/1218	0.80	4/1645 (0.2%)
2	D	0.15	0/1218	0.45	0/1645
2	G	0.45	0/1218	0.75	5/1645 (0.3%)
2	H	0.38	0/1218	1.23	11/1645 (0.7%)
All	All	0.32	13/38368 (0.0%)	0.80	142/51700 (0.3%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	E	0	1
2	H	0	1
All	All	0	3

The worst 5 of 13 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	580	SER	C-O	-11.02	1.10	1.23
1	A	582	ILE	N-CA	-7.17	1.38	1.46
1	A	584	VAL	N-CA	-6.32	1.39	1.46
1	A	607	GLU	CA-C	-6.31	1.45	1.52
1	F	961	ASN	CA-C	-6.25	1.44	1.52

The worst 5 of 142 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	601	TRP	N-CA-C	30.70	149.99	112.54
1	E	630	ASP	N-CA-C	-28.52	72.89	110.53
1	B	182	ASN	N-CA-C	23.94	137.06	110.97
1	F	392	GLY	N-CA-C	23.47	144.41	115.31
2	H	230	GLU	N-CA-C	23.36	142.73	111.90

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	580	SER	Mainchain
1	E	297	GLN	Peptide
2	H	24	THR	Peptide

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	8183	0	8010	503	0
1	B	8183	0	8010	426	0
1	E	8183	0	8010	517	0
1	F	8183	0	8010	569	0
2	C	1198	0	1159	67	0
2	D	1198	0	1159	76	0
2	G	1198	0	1159	101	0
2	H	1198	0	1159	111	0
All	All	37524	0	36676	2201	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 30.

The worst 5 of 2201 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:134:TYR:CD2	1:B:183:VAL:HG13	1.48	1.45
1:B:601:TRP:CD2	1:B:601:TRP:O	1.72	1.39

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:134:TYR:CD2	1:B:183:VAL:CG1	2.09	1.34
1:B:134:TYR:CE2	1:B:183:VAL:HG13	1.81	1.14
1:E:519:MET:SD	1:E:520:THR:O	2.04	1.14

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	981/1005 (98%)	883 (90%)	95 (10%)	3 (0%)	37	72
1	B	981/1005 (98%)	908 (93%)	71 (7%)	2 (0%)	44	78
1	E	981/1005 (98%)	867 (88%)	108 (11%)	6 (1%)	22	59
1	F	981/1005 (98%)	848 (86%)	129 (13%)	4 (0%)	30	67
2	C	147/264 (56%)	122 (83%)	25 (17%)	0	100	100
2	D	147/264 (56%)	111 (76%)	35 (24%)	1 (1%)	19	56
2	G	147/264 (56%)	116 (79%)	30 (20%)	1 (1%)	19	56
2	H	147/264 (56%)	109 (74%)	38 (26%)	0	100	100
All	All	4512/5076 (89%)	3964 (88%)	531 (12%)	17 (0%)	32	67

5 of 17 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	768	PRO
1	E	298	GLU
1	E	726	VAL
1	F	864	ASP
1	A	676	ILE

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	901/922 (98%)	885 (98%)	16 (2%)	54 71
1	B	901/922 (98%)	880 (98%)	21 (2%)	45 65
1	E	901/922 (98%)	886 (98%)	15 (2%)	56 72
1	F	901/922 (98%)	874 (97%)	27 (3%)	36 57
2	C	130/225 (58%)	124 (95%)	6 (5%)	23 45
2	D	130/225 (58%)	129 (99%)	1 (1%)	79 85
2	G	130/225 (58%)	123 (95%)	7 (5%)	18 40
2	H	130/225 (58%)	125 (96%)	5 (4%)	28 50
All	All	4124/4588 (90%)	4026 (98%)	98 (2%)	45 63

5 of 98 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	733	LEU
1	F	727	LYS
1	F	119	ASP
1	F	683	LYS
1	F	863	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 44 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	681	GLN
1	F	654	ASN
1	E	790	ASN
1	F	202	ASN
1	F	848	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.