



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 08:16 AM UTC

PDB ID : 6RR0 / pdb_00006rr0
Title : Crystal structure of the Sir4 H-BRCT domain in complex with Ubp10 pT123 peptide
Authors : Deshpande, I.; Keusch, J.J.; Challa, K.; Iesmantavicius, V.; Gasser, S.M.; Gut, H.
Deposited on : 2019-05-16
Resolution : 2.18 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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/XrayValidationReportHelp>

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:

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

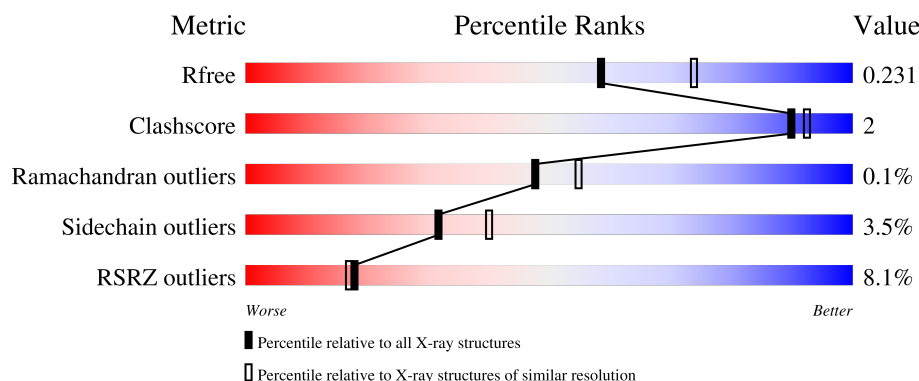
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.18 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)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	8975 (2.20-2.16)
Clashscore	190562	9786 (2.20-2.16)
Ramachandran outliers	187476	9664 (2.20-2.16)
Sidechain outliers	187428	9664 (2.20-2.16)
RSRZ outliers	180081	8979 (2.20-2.16)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	127	3% 81% 10% 9%
1	B	127	3% 76% 15% 7%
1	C	127	6% 80% 9% 9%
1	D	127	3% 80% 7% 13%
1	E	127	6% 80% 9% 11%

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Mol	Chain	Length	Quality of chain
1	F	127	
1	G	127	
2	H	12	
2	I	12	
2	J	12	
2	K	12	
2	L	12	
2	M	12	
2	N	12	

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 7527 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 Regulatory protein SIR4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	116	Total	C	N	O	S	0	0	0
			959	613	159	183	4			
1	B	118	Total	C	N	O	S	0	1	0
			985	628	164	189	4			
1	C	115	Total	C	N	O	S	0	1	0
			962	616	160	182	4			
1	D	111	Total	C	N	O	S	0	1	0
			928	592	154	178	4			
1	E	113	Total	C	N	O	S	0	2	0
			955	609	159	183	4			
1	F	113	Total	C	N	O	S	0	1	0
			950	607	160	179	4			
1	G	112	Total	C	N	O	S	0	0	0
			929	594	154	177	4			

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	959	GLY	-	expression tag	UNP P11978
A	960	PRO	-	expression tag	UNP P11978
B	959	GLY	-	expression tag	UNP P11978
B	960	PRO	-	expression tag	UNP P11978
C	959	GLY	-	expression tag	UNP P11978
C	960	PRO	-	expression tag	UNP P11978
D	959	GLY	-	expression tag	UNP P11978
D	960	PRO	-	expression tag	UNP P11978
E	959	GLY	-	expression tag	UNP P11978
E	960	PRO	-	expression tag	UNP P11978
F	959	GLY	-	expression tag	UNP P11978
F	960	PRO	-	expression tag	UNP P11978
G	959	GLY	-	expression tag	UNP P11978
G	960	PRO	-	expression tag	UNP P11978

- Molecule 2 is a protein called Ubiquitin carboxyl-terminal hydrolase 10.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	10	Total	C	N	O	P	0	0	0
			78	46	10	21	1			
2	I	11	Total	C	N	O	P	0	0	0
			84	49	11	23	1			
2	J	9	Total	C	N	O	P	0	0	0
			70	40	9	20	1			
2	K	9	Total	C	N	O	P	0	0	0
			70	40	9	20	1			
2	L	12	Total	C	N	O	P	0	0	0
			90	52	12	25	1			
2	M	10	Total	C	N	O	P	0	0	0
			78	46	10	21	1			
2	N	9	Total	C	N	O	P	0	0	0
			70	40	9	20	1			

- Molecule 3 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total	Cl	0	0
			2	2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	46	Total	O	0	0
			46	46		
4	B	57	Total	O	0	0
			57	57		
4	C	62	Total	O	0	0
			62	62		
4	D	36	Total	O	0	0
			36	36		
4	E	42	Total	O	0	0
			42	42		
4	F	32	Total	O	0	0
			32	32		
4	G	16	Total	O	0	0
			16	16		
4	H	3	Total	O	0	0
			3	3		
4	I	1	Total	O	0	0
			1	1		

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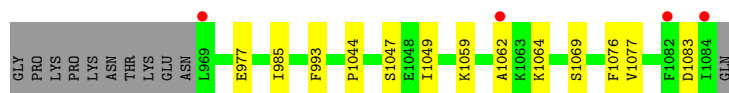
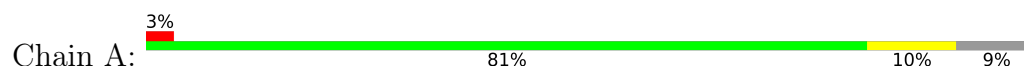
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	J	3	Total 3	O 3	0	0
4	K	7	Total 7	O 7	0	0
4	L	7	Total 7	O 7	0	0
4	M	1	Total 1	O 1	0	0
4	N	4	Total 4	O 4	0	0

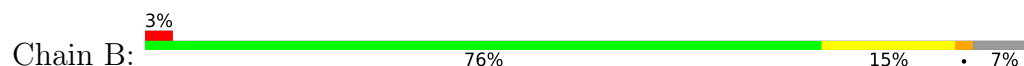
3 Residue-property plots

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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). 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.

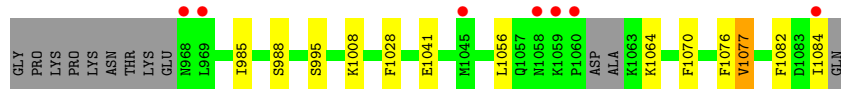
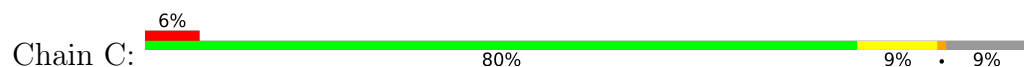
• Molecule 1: Regulatory protein SIR4



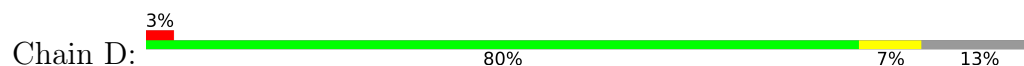
• Molecule 1: Regulatory protein SIR4



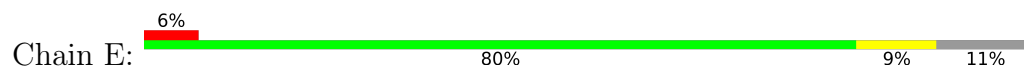
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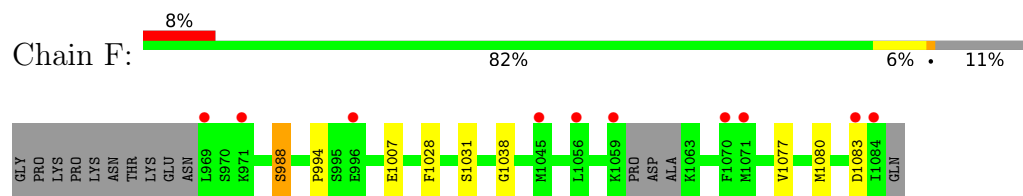
• Molecule 1: Regulatory protein SIR4



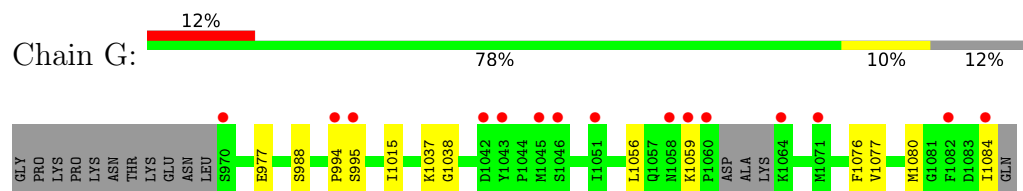
• Molecule 1: Regulatory protein SIR4



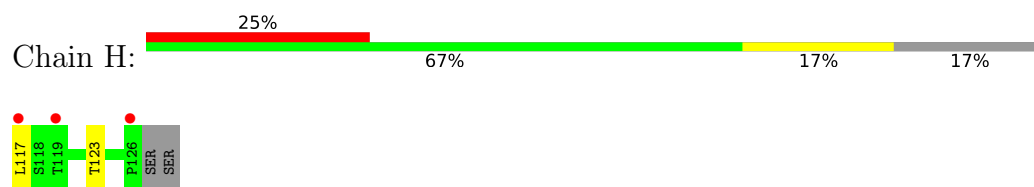
● Molecule 1: Regulatory protein SIR4



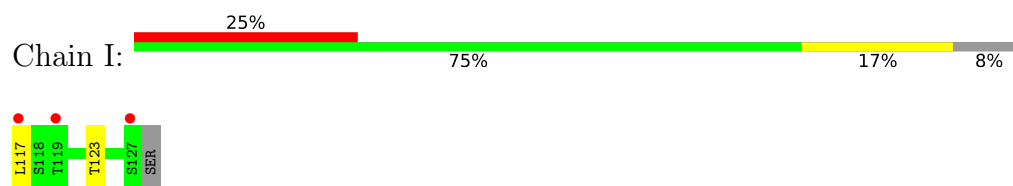
● Molecule 1: Regulatory protein SIR4



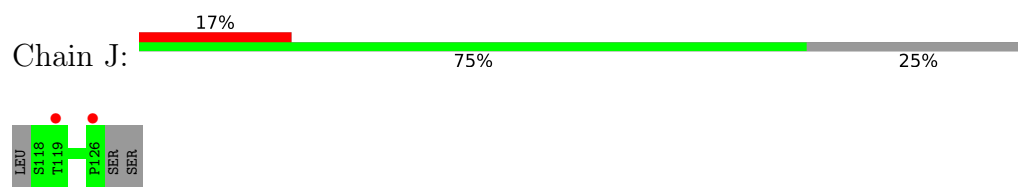
● Molecule 2: Ubiquitin carboxyl-terminal hydrolase 10



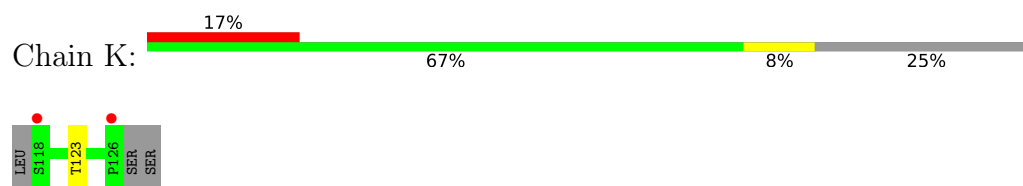
● Molecule 2: Ubiquitin carboxyl-terminal hydrolase 10



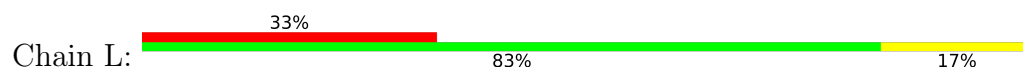
● Molecule 2: Ubiquitin carboxyl-terminal hydrolase 10

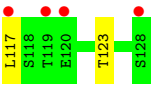


● Molecule 2: Ubiquitin carboxyl-terminal hydrolase 10

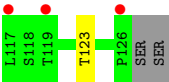
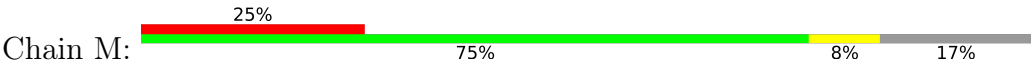


● Molecule 2: Ubiquitin carboxyl-terminal hydrolase 10





● Molecule 2: Ubiquitin carboxyl-terminal hydrolase 10



● Molecule 2: Ubiquitin carboxyl-terminal hydrolase 10



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	70.04Å 75.28Å 95.91Å 90.00° 97.24° 90.00°	Depositor
Resolution (Å)	47.57 – 2.18 47.57 – 2.18	Depositor EDS
% Data completeness (in resolution range)	99.9 (47.57-2.18) 99.9 (47.57-2.18)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.14	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.37 (at 2.18Å)	Xtriage
Refinement program	BUSTER 2.11.5	Depositor
R, R_{free}	0.196 , 0.218 0.205 , 0.231	Depositor DCC
R_{free} test set	2587 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	42.6	Xtriage
Anisotropy	0.164	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 44.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7527	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.86% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: TPO, CL

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	0.82	0/977	1.29	4/1312 (0.3%)
1	B	0.88	1/1003 (0.1%)	1.26	4/1346 (0.3%)
1	C	0.87	0/979	1.31	5/1313 (0.4%)
1	D	0.84	0/944	1.27	2/1265 (0.2%)
1	E	0.87	1/971 (0.1%)	1.31	5/1299 (0.4%)
1	F	0.82	1/966 (0.1%)	1.29	2/1293 (0.2%)
1	G	0.78	1/946 (0.1%)	1.28	4/1269 (0.3%)
2	H	0.77	0/67	1.02	0/90
2	I	0.77	0/73	0.99	0/98
2	J	0.73	0/59	0.98	0/79
2	K	0.75	0/59	0.92	0/79
2	L	0.94	0/79	1.02	0/106
2	M	0.80	0/67	1.02	0/90
2	N	0.81	0/59	0.99	0/79
All	All	0.84	4/7249 (0.1%)	1.27	26/9718 (0.3%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	1080	MET	SD-CE	-7.80	1.60	1.79
1	E	1080	MET	SD-CE	-6.67	1.62	1.79
1	G	1080	MET	SD-CE	-6.30	1.63	1.79
1	F	1080	MET	SD-CE	-5.50	1.65	1.79

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	1076	PHE	CA-C-N	6.01	128.69	120.46
1	C	1076	PHE	C-N-CA	6.01	128.69	120.46
1	C	995	SER	CA-C-N	5.86	131.69	122.78

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	995	SER	C-N-CA	5.86	131.69	122.78
1	E	995	SER	CA-C-N	5.74	132.51	121.54
1	E	995	SER	C-N-CA	5.74	132.51	121.54
1	C	1028	PHE	CA-CB-CG	5.65	119.45	113.80
1	G	1076	PHE	CA-C-N	5.57	128.09	120.46
1	G	1076	PHE	C-N-CA	5.57	128.09	120.46
1	A	993	PHE	N-CA-C	-5.55	102.79	109.72
1	B	1076	PHE	CA-C-N	5.54	128.04	120.46
1	B	1076	PHE	C-N-CA	5.54	128.04	120.46
1	D	1076	PHE	CA-C-N	5.50	128.00	120.46
1	D	1076	PHE	C-N-CA	5.50	128.00	120.46
1	A	1076	PHE	CA-C-N	5.44	127.91	120.46
1	A	1076	PHE	C-N-CA	5.44	127.91	120.46
1	B	1042	ASP	CA-CB-CG	5.40	118.00	112.60
1	E	1028	PHE	CA-CB-CG	5.29	119.09	113.80
1	A	1083	ASP	CA-CB-CG	5.26	117.86	112.60
1	E	1076	PHE	CA-C-N	5.26	127.66	120.46
1	E	1076	PHE	C-N-CA	5.26	127.66	120.46
1	F	1083	ASP	CA-CB-CG	5.26	117.86	112.60
1	B	1041	GLU	CB-CG-CD	5.07	121.22	112.60
1	G	1037	LYS	CA-C-N	5.06	126.69	120.51
1	G	1037	LYS	C-N-CA	5.06	126.69	120.51
1	F	1028	PHE	CA-CB-CG	5.05	118.85	113.80

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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	959	0	957	4	0
1	B	985	0	981	8	0
1	C	962	0	963	6	0
1	D	928	0	920	2	0
1	E	955	0	951	3	0
1	F	950	0	952	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	G	929	0	923	2	0
2	H	78	0	70	1	0
2	I	84	0	75	1	0
2	J	70	0	59	0	0
2	K	70	0	59	0	0
2	L	90	0	80	1	0
2	M	78	0	70	0	0
2	N	70	0	59	0	0
3	A	2	0	0	1	0
4	A	46	0	0	0	0
4	B	57	0	0	0	0
4	C	62	0	0	0	0
4	D	36	0	0	0	0
4	E	42	0	0	0	0
4	F	32	0	0	0	0
4	G	16	0	0	0	0
4	H	3	0	0	0	0
4	I	1	0	0	0	0
4	J	3	0	0	0	0
4	K	7	0	0	0	0
4	L	7	0	0	0	0
4	M	1	0	0	0	0
4	N	4	0	0	0	0
All	All	7527	0	7119	26	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 2.

All (26) 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:C:985:ILE:HD11	2:L:117:LEU:HD13	1.68	0.76
1:C:1008:LYS:HD2	1:C:1070:PHE:CZ	2.30	0.66
1:C:1008:LYS:HD2	1:C:1070:PHE:HZ	1.62	0.64
1:E:1008:LYS:HD2	1:E:1070:PHE:HZ	1.62	0.64
1:E:1011:LEU:HB3	1:E:1084:ILE:HD11	1.83	0.61
1:E:1008:LYS:HD2	1:E:1070:PHE:CZ	2.38	0.58
1:B:985:ILE:HD11	2:I:117:LEU:HD13	1.89	0.54
1:A:1069:SER:HB2	3:A:1101:CL:CL	2.46	0.53
1:B:1015:ILE:HG21	1:B:1077:VAL:HG13	1.92	0.51
1:B:992:GLU:OE1	1:B:1047:SER:HB2	2.10	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:994:PRO:HG3	1:F:1038:GLY:HA3	1.95	0.49
1:B:988:SER:HB2	1:B:1031:SER:OG	2.12	0.48
1:B:1034:ILE:HG21	1:B:1049:ILE:HD11	1.95	0.47
1:C:1077:VAL:HG13	1:C:1082:PHE:O	2.14	0.47
1:B:1078:SER:HB3	1:C:1041:GLU:HB2	1.97	0.47
1:F:988:SER:HB2	1:F:1031:SER:OG	2.14	0.46
1:D:1034:ILE:HG21	1:D:1049:ILE:HD11	1.98	0.46
1:B:994:PRO:HG3	1:B:1038:GLY:HA3	1.99	0.44
1:B:994:PRO:HB3	1:B:1043:TYR:CD1	2.52	0.44
1:G:1015:ILE:HD11	1:G:1084:ILE:HD13	2.00	0.44
1:A:1059:LYS:HB3	1:A:1062:ALA:HB2	2.00	0.43
1:D:994:PRO:HG3	1:D:1038:GLY:HA3	2.00	0.43
1:G:994:PRO:HG3	1:G:1038:GLY:HA3	2.00	0.43
1:A:985:ILE:HD11	2:H:117:LEU:HD13	2.02	0.41
1:A:1044:PRO:O	1:A:1047:SER:HB3	2.20	0.41
1:C:1056:LEU:HD13	1:C:1064:LYS:HB2	2.03	0.41

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 X-ray entries followed by that with respect to entries of similar resolution.

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	114/127 (90%)	111 (97%)	3 (3%)	0	100	100
1	B	117/127 (92%)	116 (99%)	1 (1%)	0	100	100
1	C	112/127 (88%)	109 (97%)	3 (3%)	0	100	100
1	D	108/127 (85%)	106 (98%)	2 (2%)	0	100	100
1	E	111/127 (87%)	106 (96%)	5 (4%)	0	100	100
1	F	110/127 (87%)	106 (96%)	4 (4%)	0	100	100
1	G	108/127 (85%)	104 (96%)	3 (3%)	1 (1%)	14	12

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	H	7/12 (58%)	7 (100%)	0	0	100	100
2	I	8/12 (67%)	8 (100%)	0	0	100	100
2	J	6/12 (50%)	6 (100%)	0	0	100	100
2	K	6/12 (50%)	6 (100%)	0	0	100	100
2	L	9/12 (75%)	9 (100%)	0	0	100	100
2	M	7/12 (58%)	7 (100%)	0	0	100	100
2	N	6/12 (50%)	6 (100%)	0	0	100	100
All	All	829/973 (85%)	807 (97%)	21 (2%)	1 (0%)	48	55

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	G	1059	LYS

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	109/119 (92%)	105 (96%)	4 (4%)	30	38
1	B	112/119 (94%)	106 (95%)	6 (5%)	20	22
1	C	110/119 (92%)	107 (97%)	3 (3%)	39	50
1	D	106/119 (89%)	102 (96%)	4 (4%)	29	37
1	E	109/119 (92%)	105 (96%)	4 (4%)	30	38
1	F	108/119 (91%)	105 (97%)	3 (3%)	38	49
1	G	106/119 (89%)	101 (95%)	5 (5%)	23	28
2	H	9/11 (82%)	9 (100%)	0	100	100
2	I	10/11 (91%)	10 (100%)	0	100	100
2	J	8/11 (73%)	8 (100%)	0	100	100
2	K	8/11 (73%)	8 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	L	11/11 (100%)	11 (100%)	0	100	100
2	M	9/11 (82%)	9 (100%)	0	100	100
2	N	8/11 (73%)	8 (100%)	0	100	100
All	All	823/910 (90%)	794 (96%)	29 (4%)	32	40

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	977	GLU
1	A	1049	ILE
1	A	1064	LYS
1	A	1077	VAL
1	B	977	GLU
1	B	988	SER
1	B	1013	LYS
1	B	1063	LYS
1	B	1077	VAL
1	B	1085	GLN
1	C	988	SER
1	C	1077	VAL
1	C	1084	ILE
1	D	977	GLU
1	D	988	SER
1	D	1071	MET
1	D	1077	VAL
1	E	977	GLU
1	E	988	SER
1	E	1077	VAL
1	E	1083	ASP
1	F	988	SER
1	F	1007	GLU
1	F	1077	VAL
1	G	977	GLU
1	G	988	SER
1	G	995	SER
1	G	1056	LEU
1	G	1077	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	1085	GLN
1	C	1057	GLN
1	E	981	ASN
1	E	1026	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

7 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
2	TPO	I	123	2	8,10,11	1.44	3 (37%)	10,14,16	1.06	0
2	TPO	L	123	2	8,10,11	1.23	1 (12%)	10,14,16	1.28	2 (20%)
2	TPO	H	123	2	8,10,11	1.33	1 (12%)	10,14,16	1.15	1 (10%)
2	TPO	N	123	2	8,10,11	1.40	2 (25%)	10,14,16	1.27	2 (20%)
2	TPO	J	123	2	8,10,11	1.24	0	10,14,16	1.06	0
2	TPO	K	123	2	8,10,11	1.55	2 (25%)	10,14,16	0.91	0
2	TPO	M	123	2	8,10,11	1.07	0	10,14,16	1.46	3 (30%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	TPO	I	123	2	-	1/9/11/13	-
2	TPO	L	123	2	-	1/9/11/13	-
2	TPO	H	123	2	-	2/9/11/13	-
2	TPO	N	123	2	-	1/9/11/13	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	TPO	J	123	2	-	1/9/11/13	-
2	TPO	K	123	2	-	1/9/11/13	-
2	TPO	M	123	2	-	1/9/11/13	-

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	K	123	TPO	CG2-CB	2.32	1.57	1.51
2	L	123	TPO	CG2-CB	2.24	1.57	1.51
2	I	123	TPO	P-OG1	-2.23	1.55	1.59
2	N	123	TPO	P-O3P	-2.21	1.46	1.54
2	N	123	TPO	CG2-CB	2.12	1.56	1.51
2	I	123	TPO	P-O3P	-2.11	1.47	1.54
2	K	123	TPO	P-O3P	-2.09	1.47	1.54
2	I	123	TPO	CG2-CB	2.08	1.56	1.51
2	H	123	TPO	CG2-CB	2.08	1.56	1.51

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	N	123	TPO	O3P-P-OG1	2.55	115.80	105.85
2	M	123	TPO	O3P-P-OG1	2.29	114.76	105.85
2	N	123	TPO	P-OG1-CB	-2.28	117.14	123.33
2	L	123	TPO	P-OG1-CB	-2.27	117.17	123.33
2	M	123	TPO	O3P-P-O1P	-2.26	102.01	110.83
2	M	123	TPO	P-OG1-CB	-2.13	117.54	123.33
2	H	123	TPO	O3P-P-OG1	2.06	113.88	105.85
2	L	123	TPO	O3P-P-OG1	2.02	113.73	105.85

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	H	123	TPO	O-C-CA-CB
2	I	123	TPO	O-C-CA-CB
2	J	123	TPO	O-C-CA-CB
2	K	123	TPO	O-C-CA-CB
2	L	123	TPO	O-C-CA-CB
2	M	123	TPO	O-C-CA-CB
2	N	123	TPO	O-C-CA-CB
2	H	123	TPO	CB-OG1-P-O2P

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å ²)	Q<0.9
1	A	116/127 (91%)	0.27	4 (3%)	48	47	34, 48, 82, 110	0
1	B	118/127 (92%)	0.25	4 (3%)	48	47	18, 48, 78, 105	1 (0%)
1	C	115/127 (90%)	0.10	7 (6%)	27	26	16, 42, 80, 106	1 (0%)
1	D	111/127 (87%)	0.28	4 (3%)	46	45	22, 50, 78, 126	1 (0%)
1	E	113/127 (88%)	0.26	7 (6%)	26	25	18, 49, 79, 124	2 (1%)
1	F	113/127 (88%)	0.60	10 (8%)	15	15	26, 56, 100, 134	1 (0%)
1	G	112/127 (88%)	0.88	15 (13%)	7	6	43, 69, 118, 157	0
2	H	9/12 (75%)	1.57	3 (33%)	1	1	59, 67, 93, 94	0
2	I	10/12 (83%)	1.33	3 (30%)	1	1	57, 71, 92, 109	0
2	J	8/12 (66%)	1.21	2 (25%)	2	1	55, 62, 87, 90	0
2	K	8/12 (66%)	1.07	2 (25%)	2	1	47, 56, 92, 94	0
2	L	11/12 (91%)	1.26	4 (36%)	1	1	46, 55, 87, 91	0
2	M	9/12 (75%)	1.61	3 (33%)	1	1	67, 77, 104, 107	0
2	N	8/12 (66%)	1.41	2 (25%)	2	1	66, 75, 101, 104	0
All	All	861/973 (88%)	0.45	70 (8%)	18	17	16, 52, 96, 157	6 (0%)

All (70) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	969	LEU	6.2
1	A	1084	ILE	6.0
1	F	1084	ILE	5.8
1	G	1060	PRO	5.3
1	D	1084	ILE	5.3
1	C	1060	PRO	5.2
1	G	1084	ILE	4.2
2	H	119	THR	4.0

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Mol	Chain	Res	Type	RSRZ
2	N	127	SER	3.6
2	M	117	LEU	3.5
1	D	1059	LYS	3.5
2	M	126	PRO	3.5
1	C	1084	ILE	3.4
1	B	1084	ILE	3.3
1	F	1045	MET	3.3
2	J	119	THR	3.3
1	G	1046	SER	3.2
1	G	1045	MET	3.1
2	I	119	THR	3.1
2	L	117	LEU	3.0
2	L	128	SER	3.0
1	A	969	LEU	2.9
1	D	970	SER	2.9
1	F	1059	LYS	2.9
2	H	126	PRO	2.8
1	F	1070	PHE	2.8
1	G	1082	PHE	2.8
2	H	117	LEU	2.8
1	E	1059	LYS	2.8
1	E	1084	ILE	2.8
1	E	1082	PHE	2.7
1	F	1056	LEU	2.7
2	I	117	LEU	2.7
1	G	970	SER	2.7
1	G	1042	ASP	2.7
1	B	1064	LYS	2.7
1	B	1045	MET	2.6
2	L	119	THR	2.6
1	F	971	LYS	2.6
2	K	126	PRO	2.6
1	C	968	ASN	2.6
1	G	1058	ASN	2.5
2	N	119	THR	2.5
1	C	1045	MET	2.4
1	E	1056	LEU	2.4
1	E	1045	MET	2.4
1	F	1071	MET	2.4
1	C	969	LEU	2.3
1	F	1083	ASP	2.3
2	M	119	THR	2.3

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Mol	Chain	Res	Type	RSRZ
1	E	995	SER	2.3
2	I	127	SER	2.2
1	A	1082	PHE	2.2
1	B	1061	ASP	2.2
1	E	1071	MET	2.2
1	F	996	GLU	2.2
1	C	1059	LYS	2.2
2	J	126	PRO	2.2
2	K	118	SER	2.1
1	D	1064	LYS	2.1
1	G	1043	TYR	2.1
1	G	1051	ILE	2.1
1	G	994	PRO	2.1
1	G	1059	LYS	2.1
1	G	1064	LYS	2.1
1	G	995	SER	2.1
1	G	1071	MET	2.0
2	L	120	GLU	2.0
1	C	1058	ASN	2.0
1	A	1062	ALA	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	TPO	M	123	11/12	0.95	0.08	60,62,66,67	0
2	TPO	I	123	11/12	0.96	0.08	51,53,55,57	0
2	TPO	H	123	11/12	0.97	0.06	48,52,54,54	0
2	TPO	N	123	11/12	0.97	0.07	56,59,61,62	0
2	TPO	L	123	11/12	0.98	0.05	40,43,45,45	0
2	TPO	J	123	11/12	0.98	0.05	51,53,57,58	0
2	TPO	K	123	11/12	0.98	0.05	36,40,42,42	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	CL	A	1102	1/1	0.80	0.15	102,102,102,102	0
3	CL	A	1101	1/1	0.91	0.11	87,87,87,87	0

6.5 Other polymers [i](#)

There are no such residues in this entry.