



Full wwPDB X-ray Structure Validation Report

Feb 27, 2014 – 04:17 PM GMT

PDB ID : 4L1U
Title : Crystal Structure of Human Rtf1 Plus3 Domain in Complex with Spt5 CTR Phosphopeptide
Authors : Wier, A.D.; Heroux, A.; VanDemark, A.P.
Deposited on : 2013-06-03
Resolution : 2.42 Å(reported)

This is a full wwPDB validation report for a publicly released PDB entry.
We welcome your comments at validation@mail.wwpdb.org
A user guide is available at <http://wwpdb.org/ValidationPDFNotes.html>

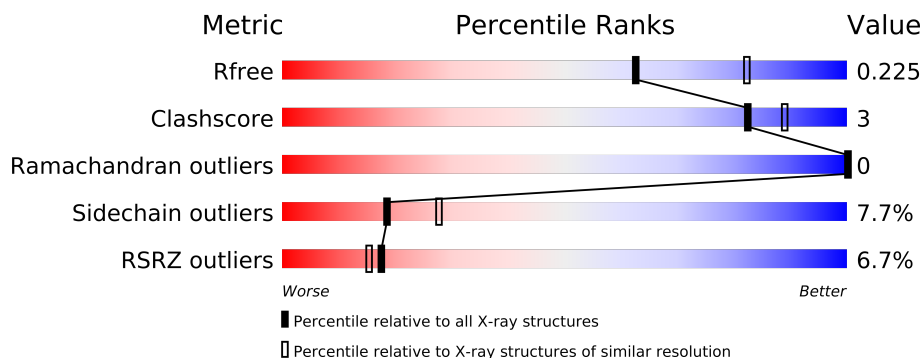
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.15 2013
Xtriage (Phenix) : dev-1323
EDS : stable22639
Percentile statistics : 21963
Refmac : 5.8.0049
CCP4 : 6.3.0 (Settle)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : stable22683

1 Overall quality at a glance

The reported resolution of this entry is 2.42 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}	66092	2496 (2.44-2.40)
Clashscore	79885	3124 (2.44-2.40)
Ramachandran outliers	78287	3067 (2.44-2.40)
Sidechain outliers	78261	3068 (2.44-2.40)
RSRZ outliers	66119	2499 (2.44-2.40)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	138	
1	B	138	
1	C	138	
1	D	138	
1	E	138	
1	F	138	
2	G	13	
2	H	13	
2	I	13	
2	J	13	

The following table lists non-polymeric compounds that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Geometry	Electron density
3	SO4	B	501	-	X
3	SO4	B	503	-	X
3	SO4	B	505	-	X
3	SO4	C	504	-	X
3	SO4	D	505	-	X
4	GOL	A	504	-	X
4	GOL	D	508	-	X

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 13705 atoms, of which 6712 are hydrogens and 0 are deuterium.

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 RNA polymerase-associated protein RTF1 homolog.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	130	Total 2123	C 671	H 1067	N 190	O 188	S 7	0	0	0
1	B	134	Total 2183	C 689	H 1095	N 198	O 194	S 7	0	0	0
1	C	130	Total 2125	C 672	H 1069	N 190	O 187	S 7	0	0	0
1	D	136	Total 2182	C 699	H 1078	N 201	O 197	S 7	0	0	0
1	E	134	Total 2190	C 689	H 1102	N 198	O 194	S 7	0	0	0
1	F	134	Total 2178	C 689	H 1090	N 198	O 194	S 7	0	0	0

There are 36 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	347	GLY	-	EXPRESSION TAG	UNP Q92541
A	348	ASP	-	EXPRESSION TAG	UNP Q92541
A	349	ILE	-	EXPRESSION TAG	UNP Q92541
A	350	THR	-	EXPRESSION TAG	UNP Q92541
A	351	HIS	-	EXPRESSION TAG	UNP Q92541
A	352	MET	-	EXPRESSION TAG	UNP Q92541
B	347	GLY	-	EXPRESSION TAG	UNP Q92541
B	348	ASP	-	EXPRESSION TAG	UNP Q92541
B	349	ILE	-	EXPRESSION TAG	UNP Q92541
B	350	THR	-	EXPRESSION TAG	UNP Q92541
B	351	HIS	-	EXPRESSION TAG	UNP Q92541
B	352	MET	-	EXPRESSION TAG	UNP Q92541
C	347	GLY	-	EXPRESSION TAG	UNP Q92541
C	348	ASP	-	EXPRESSION TAG	UNP Q92541
C	349	ILE	-	EXPRESSION TAG	UNP Q92541
C	350	THR	-	EXPRESSION TAG	UNP Q92541
C	351	HIS	-	EXPRESSION TAG	UNP Q92541

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Chain	Residue	Modelled	Actual	Comment	Reference
C	352	MET	-	EXPRESSION TAG	UNP Q92541
D	347	GLY	-	EXPRESSION TAG	UNP Q92541
D	348	ASP	-	EXPRESSION TAG	UNP Q92541
D	349	ILE	-	EXPRESSION TAG	UNP Q92541
D	350	THR	-	EXPRESSION TAG	UNP Q92541
D	351	HIS	-	EXPRESSION TAG	UNP Q92541
D	352	MET	-	EXPRESSION TAG	UNP Q92541
E	347	GLY	-	EXPRESSION TAG	UNP Q92541
E	348	ASP	-	EXPRESSION TAG	UNP Q92541
E	349	ILE	-	EXPRESSION TAG	UNP Q92541
E	350	THR	-	EXPRESSION TAG	UNP Q92541
E	351	HIS	-	EXPRESSION TAG	UNP Q92541
E	352	MET	-	EXPRESSION TAG	UNP Q92541
F	347	GLY	-	EXPRESSION TAG	UNP Q92541
F	348	ASP	-	EXPRESSION TAG	UNP Q92541
F	349	ILE	-	EXPRESSION TAG	UNP Q92541
F	350	THR	-	EXPRESSION TAG	UNP Q92541
F	351	HIS	-	EXPRESSION TAG	UNP Q92541
F	352	MET	-	EXPRESSION TAG	UNP Q92541

- Molecule 2 is a protein called Transcription elongation factor SPT5.

Mol	Chain	Residues	Atoms							ZeroOcc	AltConf	Trace
2	G	8	Total	C	H	N	O	P	S	0	0	0
			116	36	53	11	14	1	1			
2	H	11	Total	C	H	N	O	P	S	0	0	0
			141	47	57	15	20	1	1			
2	I	5	Total	C	H	N	O	P	S	0	0	0
			80	29	31	8	10	1	1			
2	J	5	Total	C	H	N	O	P	S	0	0	0
			81	23	38	8	10	1	1			

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



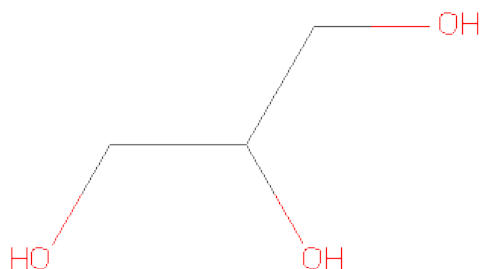
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	H	O	0	0
			14	3	8	3		
4	C	1	Total	C	H	O	0	0
			14	3	8	3		
4	D	1	Total	C	H	O	0	0
			14	3	8	3		
4	F	1	Total	C	H	O	0	0
			14	3	8	3		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	13	Total	O	0	0
			13	13		
5	B	25	Total	O	0	0
			25	25		
5	C	15	Total	O	0	0
			15	15		
5	D	18	Total	O	0	0
			18	18		
5	E	13	Total	O	0	0
			13	13		
5	F	16	Total	O	0	0
			16	16		
5	G	3	Total	O	0	0
			3	3		
5	H	1	Total	O	0	0
			1	1		

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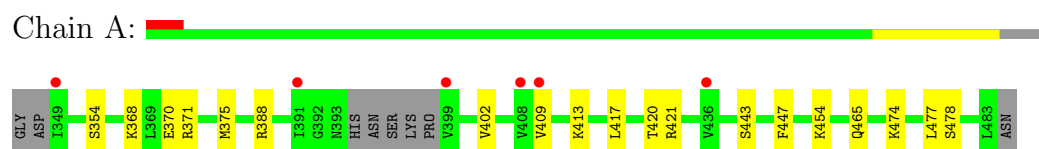
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	I	1	Total	O	0	0
			1	1		

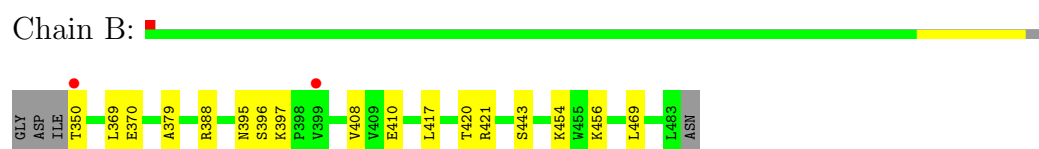
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

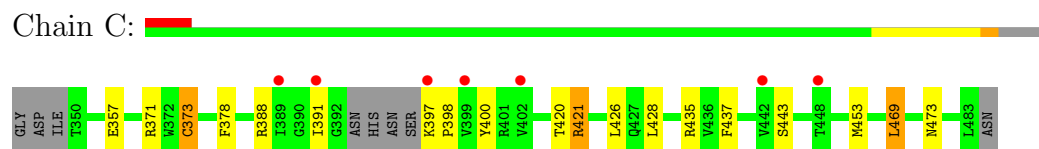
- Molecule 1: RNA polymerase-associated protein RTF1 homolog



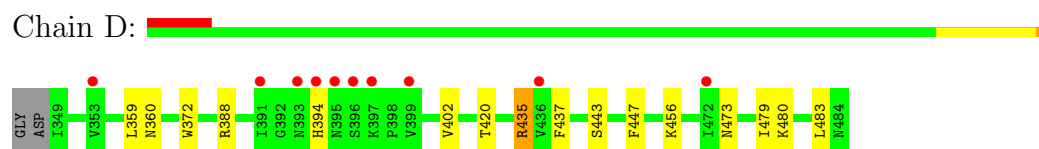
- Molecule 1: RNA polymerase-associated protein RTF1 homolog



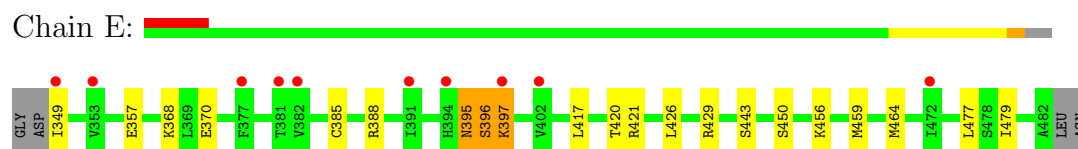
- Molecule 1: RNA polymerase-associated protein RTF1 homolog



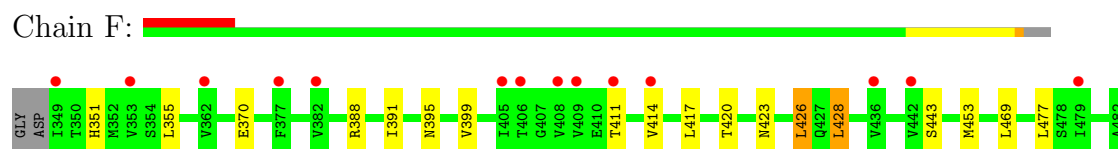
- Molecule 1: RNA polymerase-associated protein RTF1 homolog



- Molecule 1: RNA polymerase-associated protein RTF1 homolog



- Molecule 1: RNA polymerase-associated protein RTF1 homolog



LEU
ASN

- Molecule 2: Transcription elongation factor SPT5

Chain G: 

TYR
GLY
SER
G781
S782
Y787
G786
SER
GLN

- Molecule 2: Transcription elongation factor SPT5

Chain H: 

TYR
GLY
S780
G781
T784
G788
S789
Q790

- Molecule 2: Transcription elongation factor SPT5

Chain I: 

TYR
GLY
SER
GLY
SER
R783
Y784
F785
M786
Y787
GLY
SER
GLN

- Molecule 2: Transcription elongation factor SPT5

Chain J: 

TYR
GLY
SER
GLY
S782
R783
T784
F785
M786
TYR
GLY
SER
GLN

4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	112.93Å 172.51Å 58.48Å 90.00° 107.00° 90.00°	Depositor
Resolution (Å)	46.92 – 2.42 46.92 – 2.42	Depositor EDS
% Data completeness (in resolution range)	99.5 (46.92-2.42) 95.8 (46.92-2.42)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.62 (at 2.42Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8.2_1309)	Depositor
R, R_{free}	0.178 , 0.226 0.178 , 0.225	Depositor DCC
R_{free} test set	1922 reflections (4.96%)	DCC
Wilson B-factor (Å ²)	39.9	Xtriage
Anisotropy	0.088	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.41 , 41.4	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Outliers	1 of 40281 reflections (0.002%)	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	13705	wwPDB-VP
Average B, all atoms (Å ²)	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.49% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: TPO, GOL, SO4

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	0.52	0/1075	0.61	0/1442
1	B	0.54	0/1110	0.61	0/1491
1	C	0.59	1/1076 (0.1%)	0.59	0/1443
1	D	0.47	0/1126	0.60	0/1513
1	E	0.51	0/1110	0.59	0/1491
1	F	0.46	0/1110	0.60	0/1491
2	G	0.37	0/52	0.40	0/65
2	H	0.37	0/73	0.50	0/93
2	I	0.30	0/38	0.43	0/47
2	J	0.31	0/31	0.58	0/37
All	All	0.51	1/6801 (0.0%)	0.60	0/9113

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	373	CYS	CB-SG	-6.05	1.72	1.82

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1056	1067	0	4	0
1	B	1088	1095	0	5	0
1	C	1056	1069	0	10	0
1	D	1104	1078	0	5	0
1	E	1088	1102	0	10	0
1	F	1088	1090	0	7	0
2	G	63	53	0	0	0
2	H	84	57	0	1	0
2	I	49	31	0	0	0
2	J	43	38	0	1	0
3	A	15	0	0	0	0
3	B	35	0	0	0	0
3	C	20	0	0	0	0
3	D	35	0	0	1	0
3	E	25	0	0	0	0
3	F	15	0	0	0	0
4	A	6	8	0	1	0
4	C	6	8	0	0	0
4	D	6	8	0	0	0
4	F	6	8	0	0	0
5	A	13	0	0	0	0
5	B	25	0	0	0	0
5	C	15	0	0	1	0
5	D	18	0	0	0	0
5	E	13	0	0	2	0
5	F	16	0	0	0	0
5	G	3	0	0	0	0
5	H	1	0	0	0	0
5	I	1	0	0	0	0
All	All	6993	6712	0	42	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 3.

All (42) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:C:397:LYS:N	1:C:398:PRO:CD	2.45	0.79
1:C:397:LYS:N	1:C:398:PRO:HD3	1.99	0.77
1:E:421:ARG:NH2	5:E:613:HOH:O	2.30	0.62
1:D:388:ARG:HH11	1:D:443:SER:HG	1.48	0.62
1:A:388:ARG:HH11	1:A:443:SER:HG	1.52	0.57
1:E:388:ARG:HH11	1:E:443:SER:HG	1.54	0.55
1:B:395:ASN:O	1:B:396:SER:OG	2.26	0.54

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:F:388:ARG:HH11	1:F:443:SER:HG	1.56	0.53
1:C:371:ARG:NH1	5:C:610:HOH:O	2.43	0.52
1:E:429:ARG:NE	5:E:608:HOH:O	2.42	0.52
1:C:388:ARG:HH11	1:C:443:SER:HG	1.56	0.51
1:E:395:ASN:O	1:E:396:SER:HB2	2.11	0.50
1:B:388:ARG:HH11	1:B:443:SER:HG	1.59	0.49
1:E:385:CYS:SG	1:E:479:ILE:HD13	2.53	0.48
1:A:420:THR:OG1	1:A:421:ARG:N	2.47	0.47
4:A:504:GOL:O3	4:A:504:GOL:O1	2.18	0.47
1:A:370:GLU:HG2	1:A:417:LEU:HG	1.96	0.46
1:E:459:MET:SD	1:E:464:MET:HE1	2.56	0.46
1:B:420:THR:OG1	1:B:421:ARG:N	2.48	0.45
1:D:473:ASN:ND2	3:D:504:SO4:O1	2.44	0.45
1:F:443:SER:OG	2:J:784:TPO:O3P	2.35	0.45
1:F:370:GLU:HG2	1:F:417:LEU:HG	1.99	0.45
1:E:420:THR:HG1	1:E:421:ARG:N	2.14	0.44
1:A:402:VAL:HG22	1:A:447:PHE:CD1	2.52	0.44
1:C:469:LEU:HD13	1:C:473:ASN:ND2	2.33	0.44
1:F:426:LEU:HB3	1:F:428:LEU:HD11	1.99	0.44
1:E:397:LYS:HE3	1:E:397:LYS:HB2	1.82	0.43
1:B:379:ALA:HA	1:B:408:VAL:HG22	2.00	0.43
1:F:411:THR:HG23	1:F:423:ASN:HA	2.00	0.42
1:C:420:THR:HG1	1:C:421:ARG:H	1.66	0.42
1:C:400:TYR:OH	2:H:784:TPO:O3P	2.37	0.42
1:B:370:GLU:HG2	1:B:417:LEU:HG	2.01	0.42
1:C:373:CYS:HA	1:C:378:PHE:CD1	2.55	0.41
1:C:428:LEU:HD13	1:C:437:PHE:CD1	2.55	0.41
1:D:372:TRP:CZ2	1:D:483:LEU:HD22	2.56	0.41
1:E:370:GLU:HG2	1:E:417:LEU:HG	2.02	0.41
1:F:391:ILE:HD11	1:F:399:VAL:HG13	2.02	0.41
1:E:395:ASN:HB3	1:E:397:LYS:HD3	2.02	0.40
1:F:414:VAL:HG22	1:F:423:ASN:ND2	2.37	0.40
1:D:435:ARG:HD2	1:D:437:PHE:CZ	2.56	0.40
1:C:373:CYS:HA	1:C:378:PHE:CE1	2.56	0.40
1:D:402:VAL:HG22	1:D:447:PHE:CD1	2.56	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone ⓘ

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	126/138 (91%)	124 (98%)	2 (2%)	0	100	100
1	B	132/138 (96%)	129 (98%)	3 (2%)	0	100	100
1	C	126/138 (91%)	124 (98%)	2 (2%)	0	100	100
1	D	134/138 (97%)	132 (98%)	2 (2%)	0	100	100
1	E	132/138 (96%)	131 (99%)	1 (1%)	0	100	100
1	F	132/138 (96%)	129 (98%)	3 (2%)	0	100	100
2	G	5/13 (38%)	5 (100%)	0	0	100	100
2	H	8/13 (62%)	7 (88%)	1 (12%)	0	100	100
2	I	2/13 (15%)	2 (100%)	0	0	100	100
2	J	2/13 (15%)	2 (100%)	0	0	100	100
All	All	799/880 (91%)	785 (98%)	14 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	115/122 (94%)	104 (90%)	11 (10%)	12	17
1	B	119/122 (98%)	112 (94%)	7 (6%)	28	41
1	C	115/122 (94%)	108 (94%)	7 (6%)	26	39
1	D	121/122 (99%)	113 (93%)	8 (7%)	24	35
1	E	119/122 (98%)	109 (92%)	10 (8%)	16	23
1	F	119/122 (98%)	110 (92%)	9 (8%)	19	28

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	G	5/9 (56%)	4 (80%)	1 (20%)	2	2
2	H	8/9 (89%)	7 (88%)	1 (12%)	7	8
2	I	4/9 (44%)	3 (75%)	1 (25%)	1	1
2	J	4/9 (44%)	3 (75%)	1 (25%)	1	1
All	All	729/768 (95%)	673 (92%)	56 (8%)	18	28

All (56) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	354	SER
1	A	368	LYS
1	A	371	ARG
1	A	375	MET
1	A	409	VAL
1	A	413	LYS
1	A	454	LYS
1	A	465	GLN
1	A	474	LYS
1	A	477	LEU
1	A	478	SER
1	B	350	THR
1	B	369	LEU
1	B	397	LYS
1	B	410	GLU
1	B	454	LYS
1	B	456	LYS
1	B	469	LEU
1	C	357	GLU
1	C	391	ILE
1	C	421	ARG
1	C	426	LEU
1	C	435	ARG
1	C	453	MET
1	C	469	LEU
1	D	359	LEU
1	D	360	ASN
1	D	394	HIS
1	D	420	THR
1	D	435	ARG
1	D	456	LYS
1	D	479	ILE

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Mol	Chain	Res	Type
1	D	480	LYS
1	E	349	ILE
1	E	357	GLU
1	E	368	LYS
1	E	395	ASN
1	E	396	SER
1	E	397	LYS
1	E	426	LEU
1	E	450	SER
1	E	456	LYS
1	E	477	LEU
1	F	351	HIS
1	F	355	LEU
1	F	395	ASN
1	F	420	THR
1	F	426	LEU
1	F	428	LEU
1	F	453	MET
1	F	469	LEU
1	F	477	LEU
2	G	782	SER
2	H	790	GLN
2	I	783	ARG
2	J	783	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	445	GLN
1	C	416	GLN
1	C	445	GLN
1	E	395	ASN
1	E	445	GLN
1	E	465	GLN
1	F	374	HIS
1	F	394	HIS
1	F	445	GLN

5.3.3 RNA ⓘ

There are no RNA chains in this entry.

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

4 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	G	784	2	10,10,11	6.39	4 (40%)	12,14,16	1.47	2 (16%)
2	TPO	H	784	2	10,10,11	6.29	4 (40%)	12,14,16	1.27	2 (16%)
2	TPO	I	784	2	10,10,11	6.23	3 (30%)	12,14,16	2.04	4 (33%)
2	TPO	J	784	2	10,10,11	5.86	3 (30%)	12,14,16	1.14	1 (8%)

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	G	784	2	-	0/9/11/13	0/0/0/0
2	TPO	H	784	2	-	0/9/11/13	0/0/0/0
2	TPO	I	784	2	-	0/9/11/13	0/0/0/0
2	TPO	J	784	2	-	0/9/11/13	0/0/0/0

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	784	TPO	O-C	19.75	1.25	1.11
2	H	784	TPO	O-C	19.45	1.24	1.11
2	I	784	TPO	O-C	19.05	1.24	1.11
2	J	784	TPO	O-C	18.01	1.23	1.11
2	I	784	TPO	CA-C	3.29	1.54	1.48
2	J	784	TPO	CA-C	2.93	1.53	1.48
2	G	784	TPO	CA-C	2.52	1.53	1.48
2	H	784	TPO	CA-C	2.45	1.52	1.48
2	I	784	TPO	P-O2P	2.27	1.63	1.54
2	J	784	TPO	P-O2P	2.15	1.62	1.54
2	G	784	TPO	P-O3P	2.13	1.62	1.54

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	784	TPO	P-O2P	2.12	1.62	1.54
2	H	784	TPO	P-O2P	2.07	1.62	1.54
2	H	784	TPO	P-O3P	2.02	1.62	1.54

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	I	784	TPO	C-CA-N	-4.14	105.21	111.94
2	G	784	TPO	C-CA-N	-3.90	105.59	111.94
2	I	784	TPO	CB-CA-N	3.28	114.17	109.60
2	I	784	TPO	OG1-CB-CA	2.54	111.81	107.55
2	J	784	TPO	P-OG1-CB	-2.52	109.07	120.17
2	I	784	TPO	OG1-CB-CG2	-2.19	106.46	110.13
2	G	784	TPO	P-OG1-CB	-2.10	110.94	120.17
2	H	784	TPO	OG1-CB-CA	-2.09	104.04	107.55
2	H	784	TPO	P-OG1-CB	-2.07	111.04	120.17

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5.5 Carbohydrates

There are no carbohydrates in this entry.

5.6 Ligand geometry

33 ligands 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	$\# Z > 2$
3	SO4	A	501	-	4,4,4	0.26	0	6,6,6	0.22	0
3	SO4	A	502	-	4,4,4	0.21	0	6,6,6	0.20	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	SO4	A	503	-	4,4,4	0.18	0	6,6,6	0.14	0
4	GOL	A	504	-	5,5,5	0.33	0	5,5,5	0.37	0
3	SO4	B	501	-	4,4,4	0.55	0	6,6,6	0.21	0
3	SO4	B	502	-	4,4,4	0.24	0	6,6,6	0.28	0
3	SO4	B	503	-	4,4,4	0.21	0	6,6,6	0.12	0
3	SO4	B	504	-	4,4,4	0.26	0	6,6,6	0.06	0
3	SO4	B	505	-	4,4,4	0.31	0	6,6,6	0.25	0
3	SO4	B	506	-	4,4,4	0.22	0	6,6,6	0.14	0
3	SO4	B	507	-	4,4,4	0.17	0	6,6,6	0.10	0
3	SO4	C	501	-	4,4,4	0.20	0	6,6,6	0.22	0
3	SO4	C	502	-	4,4,4	0.18	0	6,6,6	0.13	0
3	SO4	C	503	-	4,4,4	0.26	0	6,6,6	0.17	0
3	SO4	C	504	-	4,4,4	0.59	0	6,6,6	0.54	0
4	GOL	C	505	-	5,5,5	0.38	0	5,5,5	0.77	0
3	SO4	D	501	-	4,4,4	0.15	0	6,6,6	0.27	0
3	SO4	D	502	-	4,4,4	0.21	0	6,6,6	0.28	0
3	SO4	D	503	-	4,4,4	0.18	0	6,6,6	0.13	0
3	SO4	D	504	-	4,4,4	0.23	0	6,6,6	0.11	0
3	SO4	D	505	-	4,4,4	0.21	0	6,6,6	0.20	0
3	SO4	D	506	-	4,4,4	0.20	0	6,6,6	0.14	0
3	SO4	D	507	-	4,4,4	0.22	0	6,6,6	0.09	0
4	GOL	D	508	-	5,5,5	0.29	0	5,5,5	0.29	0
3	SO4	E	501	-	4,4,4	0.19	0	6,6,6	0.27	0
3	SO4	E	502	-	4,4,4	0.20	0	6,6,6	0.11	0
3	SO4	E	503	-	4,4,4	0.22	0	6,6,6	0.14	0
3	SO4	E	504	-	4,4,4	0.31	0	6,6,6	0.24	0
3	SO4	E	505	-	4,4,4	0.22	0	6,6,6	0.19	0
3	SO4	F	501	-	4,4,4	0.10	0	6,6,6	0.16	0
3	SO4	F	502	-	4,4,4	0.17	0	6,6,6	0.06	0
3	SO4	F	503	-	4,4,4	0.21	0	6,6,6	0.10	0
4	GOL	F	504	-	5,5,5	0.31	0	5,5,5	0.23	0

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
3	SO4	A	501	-	-	0/0/0/0	0/0/0/0
3	SO4	A	502	-	-	0/0/0/0	0/0/0/0
3	SO4	A	503	-	-	0/0/0/0	0/0/0/0
4	GOL	A	504	-	-	0/4/4/4	0/0/0/0
3	SO4	B	501	-	-	0/0/0/0	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	SO4	B	502	-	-	0/0/0/0	0/0/0/0
3	SO4	B	503	-	-	0/0/0/0	0/0/0/0
3	SO4	B	504	-	-	0/0/0/0	0/0/0/0
3	SO4	B	505	-	-	0/0/0/0	0/0/0/0
3	SO4	B	506	-	-	0/0/0/0	0/0/0/0
3	SO4	B	507	-	-	0/0/0/0	0/0/0/0
3	SO4	C	501	-	-	0/0/0/0	0/0/0/0
3	SO4	C	502	-	-	0/0/0/0	0/0/0/0
3	SO4	C	503	-	-	0/0/0/0	0/0/0/0
3	SO4	C	504	-	-	0/0/0/0	0/0/0/0
4	GOL	C	505	-	-	0/4/4/4	0/0/0/0
3	SO4	D	501	-	-	0/0/0/0	0/0/0/0
3	SO4	D	502	-	-	0/0/0/0	0/0/0/0
3	SO4	D	503	-	-	0/0/0/0	0/0/0/0
3	SO4	D	504	-	-	0/0/0/0	0/0/0/0
3	SO4	D	505	-	-	0/0/0/0	0/0/0/0
3	SO4	D	506	-	-	0/0/0/0	0/0/0/0
3	SO4	D	507	-	-	0/0/0/0	0/0/0/0
4	GOL	D	508	-	-	0/4/4/4	0/0/0/0
3	SO4	E	501	-	-	0/0/0/0	0/0/0/0
3	SO4	E	502	-	-	0/0/0/0	0/0/0/0
3	SO4	E	503	-	-	0/0/0/0	0/0/0/0
3	SO4	E	504	-	-	0/0/0/0	0/0/0/0
3	SO4	E	505	-	-	0/0/0/0	0/0/0/0
3	SO4	F	501	-	-	0/0/0/0	0/0/0/0
3	SO4	F	502	-	-	0/0/0/0	0/0/0/0
3	SO4	F	503	-	-	0/0/0/0	0/0/0/0
4	GOL	F	504	-	-	0/4/4/4	0/0/0/0

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.

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.

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	130/138 (94%)	0.33	6 (4%) 31 28	27, 47, 79, 99	0
1	B	134/138 (97%)	0.29	2 (1%) 70 68	26, 44, 73, 97	0
1	C	130/138 (94%)	0.39	7 (5%) 25 22	28, 44, 67, 87	0
1	D	136/138 (98%)	0.42	10 (7%) 14 12	26, 45, 81, 117	0
1	E	134/138 (97%)	0.46	10 (7%) 14 12	30, 48, 81, 96	0
1	F	134/138 (97%)	0.49	14 (10%) 7 6	33, 52, 84, 110	0
2	G	8/13 (61%)	0.81	2 (25%) 1 1	42, 55, 76, 79	0
2	H	11/13 (84%)	1.37	5 (45%) 1 0	45, 61, 94, 98	0
2	I	5/13 (38%)	1.94	2 (40%) 1 0	68, 72, 79, 95	0
2	J	5/13 (38%)	1.39	0 100 100	71, 74, 104, 105	0
All	All	827/880 (93%)	0.43	58 (7%) 17 14	26, 47, 81, 117	0

All (58) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	I	784	TPO	4.6
1	B	399	VAL	4.4
1	A	399	VAL	3.6
1	A	391	ILE	3.6
1	C	399	VAL	3.5
1	D	397	LYS	3.3
1	F	442	VAL	3.3
1	D	391	ILE	3.1
1	D	394	HIS	3.1
1	C	391	ILE	3.1
1	F	377	PHE	3.0
1	E	402	VAL	3.0
1	F	409	VAL	3.0

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Mol	Chain	Res	Type	RSRZ
1	D	353	VAL	2.9
1	E	377	PHE	2.9
1	C	389	ILE	2.9
1	C	397	LYS	2.8
1	F	349	ILE	2.8
1	F	408	VAL	2.8
1	A	409	VAL	2.8
1	F	382	VAL	2.7
1	D	399	VAL	2.6
1	C	442	VAL	2.6
1	E	397	LYS	2.6
1	A	408	VAL	2.6
2	G	788	GLY	2.6
2	H	781	GLY	2.5
1	E	353	VAL	2.5
1	F	436	VAL	2.5
1	F	479	ILE	2.5
1	F	414	VAL	2.5
2	H	790	GLN	2.4
1	D	395	ASN	2.4
1	D	472	ILE	2.4
1	E	391	ILE	2.4
1	D	393	ASN	2.4
1	E	394	HIS	2.4
1	E	349	ILE	2.4
1	D	436	VAL	2.4
2	H	789	SER	2.4
1	A	436	VAL	2.3
1	C	402	VAL	2.3
2	H	780	SER	2.3
1	C	448	THR	2.3
1	D	396	SER	2.3
1	F	353	VAL	2.3
2	I	786	MET	2.2
1	F	405	ILE	2.2
2	H	788	GLY	2.1
1	F	406	THR	2.1
1	E	381	THR	2.1
1	E	382	VAL	2.1
2	G	787	TYR	2.1
1	A	349	ILE	2.1
1	B	350	THR	2.0

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Mol	Chain	Res	Type	RSRZ
1	E	472	ILE	2.0
1	F	362	VAL	2.0
1	F	411	THR	2.0

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	RSR	LLDF	B-factors(Å ²)	Q<0.9
2	TPO	I	784	11/12	0.29	2.35	60,75,83,98	0
2	TPO	J	784	11/12	0.19	0.07	66,82,90,99	0
2	TPO	H	784	11/12	0.16	-0.22	30,47,56,61	0
2	TPO	G	784	11/12	0.14	-0.51	37,43,52,52	0

6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

6.4 Ligands ⓘ

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	RSR	LLDF	B-factors(Å ²)	Q<0.9
4	GOL	A	504	6/6	0.22	4.26	64,77,87,88	0
4	GOL	D	508	6/6	0.21	3.50	56,68,79,81	0
3	SO4	C	504	5/5	0.23	3.08	50,51,54,59	0
3	SO4	D	505	5/5	0.34	2.76	90,94,95,98	0
3	SO4	B	501	5/5	0.23	2.64	47,51,52,55	0
3	SO4	B	503	5/5	0.23	2.43	82,85,90,90	0
3	SO4	B	505	5/5	0.27	2.40	95,98,99,100	0

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Mol	Type	Chain	Res	Atoms	RSR	LLDF	B-factors(\AA^2)	Q<0.9
4	GOL	C	505	6/6	0.26	1.88	66,79,89,93	0
3	SO4	C	501	5/5	0.17	1.79	89,90,91,93	0
3	SO4	B	507	5/5	0.16	1.52	98,100,100,101	0
3	SO4	C	502	5/5	0.24	1.49	94,97,98,98	0
3	SO4	A	501	5/5	0.26	0.97	92,95,96,97	0
3	SO4	E	504	5/5	0.23	0.91	87,91,92,92	0
3	SO4	E	505	5/5	0.17	0.47	97,98,98,99	0
3	SO4	D	507	5/5	0.17	0.20	111,111,112,114	0
3	SO4	A	502	5/5	0.16	0.04	39,45,47,48	0
3	SO4	D	506	5/5	0.17	-0.20	99,100,100,102	0
3	SO4	C	503	5/5	0.23	-0.24	84,85,86,90	0
3	SO4	D	502	5/5	0.15	-0.35	41,44,49,52	0
3	SO4	F	501	5/5	0.17	-0.45	68,76,81,82	0
3	SO4	E	501	5/5	0.20	-0.46	83,86,87,89	0
3	SO4	B	506	5/5	0.15	-0.56	102,104,104,106	0
3	SO4	E	502	5/5	0.14	-0.77	87,89,91,93	0
3	SO4	B	502	5/5	0.14	-0.81	65,67,68,70	0
3	SO4	A	503	5/5	0.11	-1.09	95,98,99,99	0
3	SO4	D	503	5/5	0.14	-1.20	92,94,94,95	0
3	SO4	D	504	5/5	0.12	-1.45	63,65,68,72	0
3	SO4	F	502	5/5	0.12	-1.46	99,99,100,102	0
3	SO4	F	503	5/5	0.17	-1.68	111,113,115,116	0
3	SO4	D	501	5/5	0.13	-1.92	73,76,78,78	0
3	SO4	E	503	5/5	0.13	-1.94	92,94,95,96	0
3	SO4	B	504	5/5	0.13	-3.60	93,94,95,96	0
4	GOL	F	504	6/6	0.08	-4.93	59,72,85,86	0

6.5 Other polymers ⓘ

There are no such residues in this entry.