



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 10:43 PM GMT

PDB ID : 4YV9
Title : X-ray crystal structure of Streptococcus dysgalactiae SHP pheromone receptor Rgg2
Authors : Neiditch, M.B.; Parashar, V.
Deposited on : 2015-03-19
Resolution : 1.95 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
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

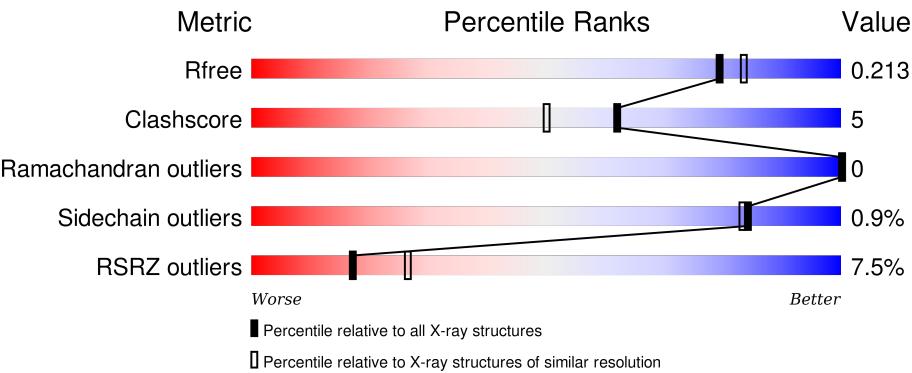
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.95 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.




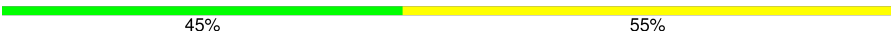

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	91344	1833 (1.96-1.96)
Clashscore	102246	1953 (1.96-1.96)
Ramachandran outliers	100387	1936 (1.96-1.96)
Sidechain outliers	100360	1936 (1.96-1.96)
RSRZ outliers	91569	1835 (1.96-1.96)

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. 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	284	<div><div>8%</div><div>82%8%•8%</div></div>
1	B	284	<div><div>8%</div><div>83%12%5%</div></div>
1	C	284	<div><div>9%</div><div>85%9%6%</div></div>
1	D	284	<div><div>2%</div><div>86%7%7%</div></div>
2	E	11	<div><div>9%</div><div>91%</div></div>

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Mol	Chain	Length	Quality of chain
2	F	11	
2	G	11	
2	H	11	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	DAL	E	1	-	-	X	-
3	SO4	A	303	-	-	-	X
3	SO4	B	302	-	-	-	X
3	SO4	C	302	-	-	-	X
3	SO4	C	303	-	-	-	X

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 9879 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 Transcriptional regulator.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	261	Total	C	N	O	S	Se	0	1	0
			2186	1412	357	411	3	3			
1	B	270	Total	C	N	O	S	Se	0	0	0
			2252	1450	370	426	3	3			
1	C	268	Total	C	N	O	S	Se	0	0	0
			2239	1442	367	424	3	3			
1	D	264	Total	C	N	O	S	Se	0	0	0
			2208	1422	360	420	3	3			

- Molecule 2 is a protein called Cyclosporin A.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	E	11	Total	C	N	O	0	0	0
			85	62	11	12			
2	F	11	Total	C	N	O	0	0	0
			85	62	11	12			
2	G	11	Total	C	N	O	0	0	0
			85	62	11	12			
2	H	11	Total	C	N	O	0	0	0
			85	62	11	12			

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

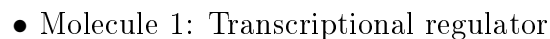


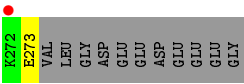
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total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

- Molecule 4 is water.

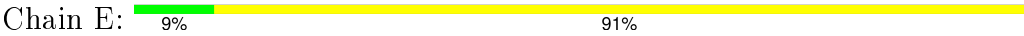
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	178	Total 178	O 178	0	0
4	B	130	Total 130	O 130	0	0
4	C	148	Total 148	O 148	0	0
4	D	122	Total 122	O 122	0	0
4	E	4	Total 4	O 4	0	0
4	G	4	Total 4	O 4	0	0
4	H	3	Total 3	O 3	0	0

- Molecule 1: Transcriptional regulator

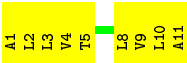




● Molecule 2: Cyclosporin A



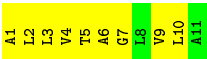
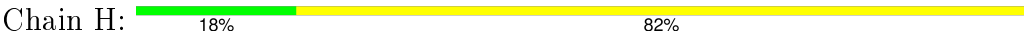
● Molecule 2: Cyclosporin A



● Molecule 2: Cyclosporin A



● Molecule 2: Cyclosporin A



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	68.39Å 99.43Å 99.88Å 90.00° 97.00° 90.00°	Depositor
Resolution (Å)	39.14 – 1.95 39.14 – 1.95	Depositor EDS
% Data completeness (in resolution range)	99.7 (39.14-1.95) 99.8 (39.14-1.95)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.08	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.07 (at 1.95Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.9_1692)	Depositor
R, R_{free}	0.188 , 0.213 0.188 , 0.213	Depositor DCC
R_{free} test set	1994 reflections (2.07%)	DCC
Wilson B-factor (Å ²)	35.0	Xtriage
Anisotropy	0.544	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 55.1	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Outliers	0 of 96438 reflections	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	9879	wwPDB-VP
Average B, all atoms (Å ²)	51.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.14% 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, 0.375 respectively for untwinned datasets, and 0.333, 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: ABA, MLE, DAL, MVA, SO4, BMT, SAR

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	0.43	0/2227	0.53	0/2991
1	B	0.37	0/2295	0.50	0/3087
1	C	0.39	0/2281	0.47	0/3067
1	D	0.41	0/2248	0.50	0/3020
2	E	0.64	0/10	1.13	0/11
2	F	0.26	0/10	0.58	0/11
2	G	0.38	0/10	0.65	0/11
2	H	0.32	0/10	0.58	0/11
All	All	0.40	0/9091	0.50	0/12209

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

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	13	ARG	Peptide

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	2186	0	2197	21	0
1	B	2252	0	2247	23	0
1	C	2239	0	2227	18	0
1	D	2208	0	2195	16	0
2	E	85	0	109	11	0
2	F	85	0	110	7	0
2	G	85	0	109	4	0
2	H	85	0	110	11	0
3	A	20	0	0	0	0
3	B	10	0	0	0	0
3	C	15	0	0	0	0
3	D	20	0	0	0	0
4	A	178	0	0	3	0
4	B	130	0	0	2	0
4	C	148	0	0	1	0
4	D	122	0	0	2	0
4	E	4	0	0	1	0
4	G	4	0	0	0	0
4	H	3	0	0	0	0
All	All	9879	0	9304	101	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 5.

All (101) 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)
2:H:5:BMT:HD12	2:H:6:ABA:HG3	1.58	0.83
1:D:82:LYS:NZ	4:D:401:HOH:O	2.17	0.78
2:E:7:SAR:N	2:E:8:MLE:HN1	2.03	0.74
1:D:88:ASN:ND2	1:D:91:LYS:HE2	2.02	0.74
1:D:71:THR:HG22	1:D:74:PHE:H	1.53	0.73
2:E:1:DAL:HB3	2:E:11:ALA:HA	1.72	0.71
2:E:6:ABA:C	2:E:8:MLE:HN1	2.22	0.70
1:C:34:SER:OG	1:C:38:ARG:NH1	2.27	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:268:GLU:OE1	1:A:271:ARG:NH1	2.29	0.65
1:A:71:THR:N	4:A:402:HOH:O	2.31	0.64
1:B:245:ASP:OD1	1:B:248:ARG:NH2	2.30	0.63
1:B:80:VAL:HG11	1:B:112:ILE:HD13	1.81	0.63
1:D:175:GLU:H	1:D:175:GLU:CD	2.03	0.62
1:B:67:SER:OG	1:B:69:THR:OG1	2.14	0.62
1:B:25:ASP:OD2	1:B:54:LYS:NZ	2.36	0.58
1:A:42:GLU:HB3	1:B:44:SER:HB2	1.87	0.57
1:B:81:ARG:HD3	2:F:11:ALA:HA	1.85	0.56
1:B:202:ASP:OD1	1:B:202:ASP:N	2.38	0.55
1:B:108:MSE:HE3	1:B:150:ASN:ND2	2.21	0.55
1:D:202:ASP:N	1:D:202:ASP:OD1	2.40	0.54
1:B:77:LEU:HD21	1:B:108:MSE:HE1	1.90	0.53
1:B:77:LEU:CD2	1:B:108:MSE:HE1	2.39	0.53
2:E:8:MLE:HN3	2:E:8:MLE:HD22	1.91	0.52
1:B:216:ARG:NH2	4:B:404:HOH:O	2.41	0.52
1:A:244:LYS:HE2	1:A:274:VAL:HG13	1.92	0.52
1:B:235:LYS:NZ	4:B:409:HOH:O	2.43	0.52
1:D:81:ARG:HG3	4:D:452:HOH:O	2.09	0.52
1:C:176:GLN:HG3	1:D:74:PHE:CD1	2.45	0.52
1:A:231:HIS:HE1	4:A:555:HOH:O	1.92	0.52
1:C:205:HIS:O	1:C:209:GLU:HG2	2.10	0.51
2:E:1:DAL:N	4:E:101:HOH:O	2.33	0.51
1:C:35:ARG:HG3	1:C:40:GLU:HB2	1.92	0.51
1:A:117:GLU:HG3	1:A:119:THR:HG22	1.93	0.51
1:A:31:SER:O	1:A:35:ARG:HB2	2.11	0.50
1:C:208:ILE:O	1:C:212:GLU:HG3	2.10	0.50
1:A:135:PHE:CD1	1:A:162:LEU:HD21	2.47	0.49
2:G:2:MLE:HD12	2:G:4:MVA:HG22	1.94	0.49
1:A:158:ASN:OD1	1:D:203:HIS:NE2	2.41	0.48
1:A:13:ARG:NE	1:A:37:GLU:OE2	2.45	0.48
2:H:9:VAL:HA	2:H:10:MLE:HA	1.60	0.48
1:C:244:LYS:HZ3	1:C:248:ARG:HH12	1.62	0.48
1:C:12:LEU:HD21	1:C:65:THR:HG21	1.95	0.48
1:D:61:GLU:O	1:D:65:THR:HB	2.14	0.47
1:C:4:GLU:HG2	1:C:66:HIS:CE1	2.48	0.47
2:H:1:DAL:HA	2:H:2:MLE:HN1	1.40	0.47
1:A:238:GLN:NE2	4:A:405:HOH:O	2.38	0.47
1:B:244:LYS:HE2	1:B:274:VAL:HG13	1.95	0.47
2:F:1:DAL:HA	2:F:2:MLE:HN1	1.50	0.47
2:H:2:MLE:HA	2:H:3:MLE:HN1	1.62	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:174:SER:HB3	1:B:64:SER:HB2	1.97	0.47
2:F:3:MLE:HA	2:F:4:MVA:HN1	1.70	0.46
1:C:238:GLN:NE2	1:C:240:GLN:OE1	2.48	0.46
1:A:36:PHE:CE1	1:A:43:ILE:HG12	2.49	0.46
2:G:2:MLE:HA	2:G:3:MLE:HN1	1.60	0.46
1:B:86:GLU:HG3	1:B:88:ASN:HB2	1.98	0.46
2:E:5:BMT:HZ	2:E:10:MLE:HD11	1.98	0.46
1:D:190:ASN:OD1	2:H:5:BMT:HD13	2.16	0.45
2:H:2:MLE:HD12	2:H:4:MVA:HN2	1.99	0.45
2:G:5:BMT:O	2:G:7:SAR:HA2	2.16	0.45
1:D:233:TYR:CE1	1:D:273:GLU:OE2	2.69	0.45
1:A:35:ARG:HG2	1:A:40:GLU:OE1	2.17	0.45
1:C:235:LYS:HA	1:C:238:GLN:HG2	1.98	0.44
1:B:108:MSE:HE3	1:B:150:ASN:HD22	1.83	0.44
1:D:137:VAL:HG21	1:D:144:GLU:HG2	2.00	0.44
2:H:3:MLE:HD23	2:H:5:BMT:C	2.48	0.44
2:E:1:DAL:CB	2:E:11:ALA:HA	2.43	0.44
1:B:186:GLN:HA	2:F:5:BMT:HH2	1.99	0.44
1:C:176:GLN:HG3	1:D:74:PHE:CE1	2.52	0.44
1:A:32:GLN:HA	1:A:35:ARG:HB2	1.99	0.44
2:E:1:DAL:HA	2:E:2:MLE:HN1	1.69	0.44
1:B:90:ALA:O	1:B:93:LEU:HB2	2.17	0.44
2:E:3:MLE:HA	2:E:4:MVA:HN1	1.85	0.44
2:E:6:ABA:HA	2:E:7:SAR:HN1	1.55	0.43
1:B:76:LEU:HD13	1:B:99:TYR:CZ	2.53	0.43
1:C:21:SER:HB3	1:C:30:LYS:NZ	2.33	0.43
1:B:34:SER:HB3	1:B:38:ARG:HH12	1.83	0.43
1:A:5:LEU:HD11	1:B:49:LEU:HD22	2.01	0.43
1:A:13:ARG:NH1	1:A:20:ILE:HG13	2.33	0.43
1:A:7:LYS:H	1:A:7:LYS:HG2	1.54	0.43
2:G:1:DAL:HA	2:G:2:MLE:HN1	1.75	0.43
2:F:2:MLE:HA	2:F:3:MLE:HN1	1.55	0.43
1:B:213:PHE:HA	1:B:216:ARG:NH1	2.34	0.43
1:C:268:GLU:HA	1:C:271:ARG:HH21	1.84	0.42
1:B:93:LEU:HA	1:B:93:LEU:HD23	1.86	0.42
2:F:8:MLE:O	2:F:11:ALA:N	2.49	0.42
2:F:9:VAL:HA	2:F:10:MLE:HA	1.59	0.42
2:H:3:MLE:HA	2:H:3:MLE:HD22	1.84	0.42
2:E:3:MLE:HB2	2:E:6:ABA:HG3	2.01	0.42
1:A:61:GLU:O	1:A:65:THR:HG23	2.20	0.42
1:C:10:ARG:HG3	1:C:13:ARG:HH21	1.84	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:265:SER:HB3	2:H:4:MVA:HG11	2.02	0.41
1:A:35:ARG:HG2	1:A:40:GLU:CD	2.39	0.41
1:C:268:GLU:OE2	1:C:271:ARG:NH2	2.53	0.41
2:H:5:BMT:O	2:H:7:SAR:HA2	2.20	0.41
1:D:139:GLN:NE2	1:D:172:ALA:HB2	2.35	0.41
1:C:76:LEU:HD11	1:C:109:ILE:HD11	2.03	0.41
2:H:6:ABA:HA	2:H:7:SAR:HA2	1.74	0.41
1:A:31:SER:HB2	1:A:35:ARG:HH21	1.85	0.41
1:D:83:TYR:CD1	1:D:91:LYS:HE3	2.55	0.40
1:C:4:GLU:HG3	1:C:4:GLU:O	2.21	0.40
1:C:7:LYS:HG3	4:C:408:HOH:O	2.21	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	256/284 (90%)	251 (98%)	5 (2%)	0	100	100
1	B	268/284 (94%)	264 (98%)	4 (2%)	0	100	100
1	C	264/284 (93%)	261 (99%)	3 (1%)	0	100	100
1	D	258/284 (91%)	252 (98%)	6 (2%)	0	100	100
2	E	1/11 (9%)	1 (100%)	0	0	100	100
2	F	1/11 (9%)	1 (100%)	0	0	100	100
2	G	1/11 (9%)	1 (100%)	0	0	100	100
2	H	1/11 (9%)	1 (100%)	0	0	100	100
All	All	1050/1180 (89%)	1032 (98%)	18 (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	246/261 (94%)	242 (98%)	4 (2%)	70	66
1	B	253/261 (97%)	250 (99%)	3 (1%)	78	75
1	C	251/261 (96%)	250 (100%)	1 (0%)	93	93
1	D	248/261 (95%)	247 (100%)	1 (0%)	93	93
2	E	1/1 (100%)	1 (100%)	0	100	100
2	F	1/1 (100%)	1 (100%)	0	100	100
2	G	1/1 (100%)	1 (100%)	0	100	100
2	H	1/1 (100%)	1 (100%)	0	100	100
All	All	1002/1048 (96%)	993 (99%)	9 (1%)	84	83

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	7	LYS
1	A	40	GLU
1	A	113	LEU
1	A	271	ARG
1	B	119	THR
1	B	139	GLN
1	B	241	VAL
1	C	65	THR
1	D	113	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	D	139	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

36 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	DAL	E	1	2	3,4,5	0.68	0	0,4,6	0.00	-
2	MLE	E	10	2	7,8,9	1.79	1 (14%)	4,9,11	0.82	0
2	MLE	E	2	2	7,8,9	1.66	1 (14%)	4,9,11	1.25	1 (25%)
2	MLE	E	3	2	7,8,9	1.70	1 (14%)	4,9,11	1.25	1 (25%)
2	MVA	E	4	2	6,7,8	1.85	1 (16%)	6,8,10	1.19	1 (16%)
2	BMT	E	5	2	11,12,13	0.85	1 (9%)	11,14,16	1.15	1 (9%)
2	ABA	E	6	2	4,5,6	0.44	0	3,5,7	1.30	1 (33%)
2	SAR	E	7	2	4,4,5	2.00	1 (25%)	2,3,5	3.51	2 (100%)
2	MLE	E	8	2	7,8,9	1.75	1 (14%)	4,9,11	1.45	1 (25%)
2	DAL	F	1	2	3,4,5	0.57	0	0,4,6	0.00	-
2	MLE	F	10	2	7,8,9	1.84	1 (14%)	4,9,11	0.86	0
2	MLE	F	2	2	7,8,9	1.81	1 (14%)	4,9,11	0.95	0
2	MLE	F	3	2	7,8,9	1.82	1 (14%)	4,9,11	1.25	1 (25%)
2	MVA	F	4	2	6,7,8	1.95	1 (16%)	6,8,10	1.09	0
2	BMT	F	5	2	11,12,13	0.87	1 (9%)	11,14,16	1.24	1 (9%)
2	ABA	F	6	2	4,5,6	0.50	0	3,5,7	1.16	0
2	SAR	F	7	2	4,4,5	1.73	1 (25%)	2,3,5	1.59	0
2	MLE	F	8	2	7,8,9	1.79	1 (14%)	4,9,11	0.68	0
2	DAL	G	1	2	3,4,5	0.56	0	0,4,6	0.00	-
2	MLE	G	10	2	7,8,9	1.84	1 (14%)	4,9,11	0.75	0
2	MLE	G	2	2	7,8,9	1.78	1 (14%)	4,9,11	1.20	1 (25%)
2	MLE	G	3	2	7,8,9	1.82	1 (14%)	4,9,11	1.38	1 (25%)
2	MVA	G	4	2	6,7,8	1.92	1 (16%)	6,8,10	1.22	1 (16%)
2	BMT	G	5	2	11,12,13	0.88	1 (9%)	11,14,16	1.44	2 (18%)
2	ABA	G	6	2	4,5,6	0.53	0	3,5,7	1.18	1 (33%)
2	SAR	G	7	2	4,4,5	1.72	1 (25%)	2,3,5	1.14	0
2	MLE	G	8	2	7,8,9	1.75	1 (14%)	4,9,11	0.88	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	DAL	H	1	2	3,4,5	0.60	0	0,4,6	0.00	-
2	MLE	H	10	2	7,8,9	1.81	1 (14%)	4,9,11	0.87	0
2	MLE	H	2	2	7,8,9	1.80	1 (14%)	4,9,11	1.20	1 (25%)
2	MLE	H	3	2	7,8,9	1.83	1 (14%)	4,9,11	1.29	1 (25%)
2	MVA	H	4	2	6,7,8	1.96	1 (16%)	6,8,10	1.17	0
2	BMT	H	5	2	11,12,13	0.95	1 (9%)	11,14,16	2.32	3 (27%)
2	ABA	H	6	2	4,5,6	0.46	0	3,5,7	1.25	1 (33%)
2	SAR	H	7	2	4,4,5	1.70	1 (25%)	2,3,5	1.00	0
2	MLE	H	8	2	7,8,9	1.77	1 (14%)	4,9,11	0.74	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
2	DAL	E	1	2	-	0/0/2/4	0/0/0/0
2	MLE	E	10	2	-	0/4/8/10	0/0/0/0
2	MLE	E	2	2	-	0/4/8/10	0/0/0/0
2	MLE	E	3	2	-	0/4/8/10	0/0/0/0
2	MVA	E	4	2	-	0/5/8/10	0/0/0/0
2	BMT	E	5	2	-	0/13/16/18	0/0/0/0
2	ABA	E	6	2	-	0/2/4/6	0/0/0/0
2	SAR	E	7	2	-	0/1/2/3	0/0/0/0
2	MLE	E	8	2	-	0/4/8/10	0/0/0/0
2	DAL	F	1	2	-	0/0/2/4	0/0/0/0
2	MLE	F	10	2	-	0/4/8/10	0/0/0/0
2	MLE	F	2	2	-	0/4/8/10	0/0/0/0
2	MLE	F	3	2	-	0/4/8/10	0/0/0/0
2	MVA	F	4	2	-	0/5/8/10	0/0/0/0
2	BMT	F	5	2	-	0/13/16/18	0/0/0/0
2	ABA	F	6	2	-	0/2/4/6	0/0/0/0
2	SAR	F	7	2	-	0/1/2/3	0/0/0/0
2	MLE	F	8	2	-	0/4/8/10	0/0/0/0
2	DAL	G	1	2	-	0/0/2/4	0/0/0/0
2	MLE	G	10	2	-	0/4/8/10	0/0/0/0
2	MLE	G	2	2	-	0/4/8/10	0/0/0/0
2	MLE	G	3	2	-	0/4/8/10	0/0/0/0
2	MVA	G	4	2	-	0/5/8/10	0/0/0/0
2	BMT	G	5	2	-	0/13/16/18	0/0/0/0
2	ABA	G	6	2	-	0/2/4/6	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	SAR	G	7	2	-	0/1/2/3	0/0/0/0
2	MLE	G	8	2	-	0/4/8/10	0/0/0/0
2	DAL	H	1	2	-	0/0/2/4	0/0/0/0
2	MLE	H	10	2	-	0/4/8/10	0/0/0/0
2	MLE	H	2	2	-	0/4/8/10	0/0/0/0
2	MLE	H	3	2	-	0/4/8/10	0/0/0/0
2	MVA	H	4	2	-	0/5/8/10	0/0/0/0
2	BMT	H	5	2	-	0/13/16/18	0/0/0/0
2	ABA	H	6	2	-	0/2/4/6	0/0/0/0
2	SAR	H	7	2	-	0/1/2/3	0/0/0/0
2	MLE	H	8	2	-	0/4/8/10	0/0/0/0

All (28) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	5	BMT	CE-CZ	2.38	1.47	1.29
2	F	5	BMT	CE-CZ	2.39	1.47	1.29
2	G	5	BMT	CE-CZ	2.39	1.47	1.29
2	E	5	BMT	CE-CZ	2.47	1.47	1.29
2	H	7	SAR	O-C	3.23	1.40	1.19
2	G	7	SAR	O-C	3.27	1.41	1.19
2	F	7	SAR	O-C	3.31	1.41	1.19
2	E	7	SAR	O-C	3.44	1.42	1.19
2	E	2	MLE	O-C	4.29	1.39	1.19
2	E	3	MLE	O-C	4.39	1.40	1.19
2	E	8	MLE	O-C	4.49	1.40	1.19
2	G	8	MLE	O-C	4.50	1.40	1.19
2	E	4	MVA	O-C	4.50	1.40	1.19
2	H	8	MLE	O-C	4.51	1.40	1.19
2	G	4	MVA	O-C	4.57	1.40	1.19
2	F	8	MLE	O-C	4.58	1.41	1.19
2	G	2	MLE	O-C	4.61	1.41	1.19
2	H	4	MVA	O-C	4.62	1.41	1.19
2	E	10	MLE	O-C	4.64	1.41	1.19
2	F	4	MVA	O-C	4.67	1.41	1.19
2	F	2	MLE	O-C	4.68	1.41	1.19
2	H	10	MLE	O-C	4.68	1.41	1.19
2	H	2	MLE	O-C	4.68	1.41	1.19
2	H	3	MLE	O-C	4.69	1.41	1.19
2	G	3	MLE	O-C	4.69	1.41	1.19
2	F	3	MLE	O-C	4.71	1.41	1.19
2	F	10	MLE	O-C	4.72	1.41	1.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	10	MLE	O-C	4.76	1.41	1.19

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	5	BMT	CG2-CD2-CE	-5.59	105.39	113.81
2	H	5	BMT	CG2-CB-CA	-3.25	105.96	113.78
2	G	5	BMT	CG2-CD2-CE	-3.02	109.26	113.81
2	E	8	MLE	O-C-CA	-2.87	117.85	125.44
2	H	5	BMT	O-C-CA	-2.61	117.73	125.74
2	G	3	MLE	O-C-CA	-2.59	118.60	125.44
2	H	3	MLE	O-C-CA	-2.54	118.73	125.44
2	E	3	MLE	O-C-CA	-2.49	118.87	125.44
2	F	3	MLE	O-C-CA	-2.47	118.91	125.44
2	F	5	BMT	CG2-CD2-CE	-2.45	110.11	113.81
2	E	5	BMT	CG2-CD2-CE	-2.45	110.12	113.81
2	H	2	MLE	O-C-CA	-2.34	119.27	125.44
2	G	2	MLE	O-C-CA	-2.29	119.39	125.44
2	E	6	ABA	O-C-CA	-2.22	119.70	125.49
2	E	4	MVA	O-C-CA	-2.19	119.01	125.74
2	H	6	ABA	O-C-CA	-2.15	119.88	125.49
2	G	5	BMT	O-C-CA	-2.14	119.17	125.74
2	E	2	MLE	O-C-CA	-2.14	119.79	125.44
2	G	4	MVA	O-C-CA	-2.10	119.28	125.74
2	E	7	SAR	O-C-CA	-2.10	117.67	125.23
2	G	6	ABA	O-C-CA	-2.03	120.21	125.49
2	E	7	SAR	C-CA-N	4.50	128.34	112.81

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

30 monomers are involved in 32 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	1	DAL	4	0
2	E	10	MLE	1	0
2	E	2	MLE	1	0
2	E	3	MLE	2	0
2	E	4	MVA	1	0
2	E	5	BMT	1	0
2	E	6	ABA	3	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	7	SAR	2	0
2	E	8	MLE	3	0
2	F	1	DAL	1	0
2	F	10	MLE	1	0
2	F	2	MLE	2	0
2	F	3	MLE	2	0
2	F	4	MVA	1	0
2	F	5	BMT	1	0
2	F	8	MLE	1	0
2	G	1	DAL	1	0
2	G	2	MLE	3	0
2	G	3	MLE	1	0
2	G	4	MVA	1	0
2	G	5	BMT	1	0
2	G	7	SAR	1	0
2	H	1	DAL	1	0
2	H	10	MLE	1	0
2	H	2	MLE	3	0
2	H	3	MLE	3	0
2	H	4	MVA	2	0
2	H	5	BMT	4	0
2	H	6	ABA	2	0
2	H	7	SAR	2	0

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

13 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	301	-	4,4,4	0.16	0	6,6,6	0.17	0
3	SO4	A	302	-	4,4,4	0.16	0	6,6,6	0.22	0
3	SO4	A	303	-	4,4,4	0.20	0	6,6,6	0.13	0
3	SO4	A	304	-	4,4,4	0.09	0	6,6,6	0.13	0
3	SO4	B	301	-	4,4,4	0.20	0	6,6,6	0.17	0
3	SO4	B	302	-	4,4,4	0.22	0	6,6,6	0.12	0
3	SO4	C	301	-	4,4,4	0.17	0	6,6,6	0.17	0
3	SO4	C	302	-	4,4,4	0.10	0	6,6,6	0.13	0
3	SO4	C	303	-	4,4,4	0.23	0	6,6,6	0.12	0
3	SO4	D	301	-	4,4,4	0.26	0	6,6,6	0.15	0
3	SO4	D	302	-	4,4,4	0.15	0	6,6,6	0.27	0
3	SO4	D	303	-	4,4,4	0.20	0	6,6,6	0.15	0
3	SO4	D	304	-	4,4,4	0.21	0	6,6,6	0.12	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	301	-	-	0/0/0/0	0/0/0/0
3	SO4	A	302	-	-	0/0/0/0	0/0/0/0
3	SO4	A	303	-	-	0/0/0/0	0/0/0/0
3	SO4	A	304	-	-	0/0/0/0	0/0/0/0
3	SO4	B	301	-	-	0/0/0/0	0/0/0/0
3	SO4	B	302	-	-	0/0/0/0	0/0/0/0
3	SO4	C	301	-	-	0/0/0/0	0/0/0/0
3	SO4	C	302	-	-	0/0/0/0	0/0/0/0
3	SO4	C	303	-	-	0/0/0/0	0/0/0/0
3	SO4	D	301	-	-	0/0/0/0	0/0/0/0
3	SO4	D	302	-	-	0/0/0/0	0/0/0/0
3	SO4	D	303	-	-	0/0/0/0	0/0/0/0
3	SO4	D	304	-	-	0/0/0/0	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.

No monomer is involved in short contacts.

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	258/284 (90%)	0.42	24 (9%) 11 17	25, 41, 99, 125	0
1	B	267/284 (94%)	0.55	23 (8%) 13 21	31, 51, 86, 113	0
1	C	265/284 (93%)	0.50	26 (9%) 10 15	27, 46, 82, 102	0
1	D	261/284 (91%)	0.12	6 (2%) 64 73	27, 44, 75, 112	0
2	E	2/11 (18%)	1.14	0 100 100	48, 48, 48, 76	0
2	F	2/11 (18%)	1.25	0 100 100	84, 84, 84, 142	0
2	G	2/11 (18%)	1.33	0 100 100	50, 50, 50, 77	0
2	H	2/11 (18%)	0.56	0 100 100	41, 41, 41, 80	0
All	All	1059/1180 (89%)	0.40	79 (7%) 17 26	25, 46, 86, 142	0

All (79) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	271	ARG	9.0
1	C	198	TYR	7.6
1	B	69	THR	6.7
1	A	39	GLY	6.5
1	A	33	ILE	6.0
1	B	198	TYR	5.7
1	B	68	LYS	5.6
1	C	272	LYS	5.3
1	A	241	VAL	4.7
1	A	40	GLU	4.5
1	B	236	LEU	4.5
1	A	28	LEU	4.5
1	A	23	LEU	4.4
1	A	36	PHE	4.4
1	A	38	ARG	4.4
1	B	202	ASP	4.1

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Mol	Chain	Res	Type	RSRZ
1	A	35	ARG	4.0
1	A	20	ILE	4.0
1	B	241	VAL	3.9
1	C	274	VAL	3.9
1	D	201	PHE	3.9
1	A	9	LEU	3.8
1	C	4	GLU	3.7
1	C	200	TYR	3.7
1	A	21	SER	3.6
1	C	241	VAL	3.5
1	B	201	PHE	3.4
1	C	201	PHE	3.4
1	B	239	GLY	3.4
1	C	273	GLU	3.4
1	C	271	ARG	3.3
1	A	31	SER	3.3
1	B	93	LEU	3.2
1	B	91	LYS	3.1
1	A	32	GLN	3.1
1	D	272	LYS	3.1
1	A	37	GLU	3.0
1	D	219	LEU	3.0
1	B	70	HIS	3.0
1	B	200	TYR	2.9
1	C	21	SER	2.9
1	C	219	LEU	2.9
1	A	11	ARG	2.9
1	B	271	ARG	2.9
1	A	22	SER	2.8
1	C	40	GLU	2.7
1	C	28	LEU	2.7
1	A	18	VAL	2.7
1	C	20	ILE	2.7
1	C	7	LYS	2.7
1	A	30	LYS	2.7
1	A	34	SER	2.7
1	B	233	TYR	2.6
1	C	236	LEU	2.6
1	C	38	ARG	2.6
1	B	67	SER	2.5
1	C	11	ARG	2.5
1	D	97	GLU	2.5

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Mol	Chain	Res	Type	RSRZ
1	D	268	GLU	2.5
1	B	238	GLN	2.4
1	B	97	GLU	2.4
1	C	239	GLY	2.4
1	B	101	HIS	2.4
1	B	226	VAL	2.4
1	C	199	SER	2.3
1	A	7	LYS	2.3
1	A	8	THR	2.3
1	C	24	ALA	2.3
1	C	233	TYR	2.2
1	A	29	SER	2.2
1	C	22	SER	2.2
1	B	90	ALA	2.1
1	B	82	LYS	2.1
1	C	66	HIS	2.1
1	C	70	HIS	2.1
1	B	222	TYR	2.1
1	C	157	TYR	2.1
1	B	272	LYS	2.0
1	A	14	GLN	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	RSCC	RSR	LLDF	B-factors(Å ²)	Q<0.9
2	ABA	E	6	6/7	0.94	0.10	-	43,46,53,59	0
2	MLE	F	10	9/10	0.78	0.26	-	95,103,116,122	0
2	MVA	E	4	8/9	0.90	0.12	-	42,44,47,48	0
2	MLE	E	8	9/10	0.87	0.15	-	37,44,47,48	0
2	MLE	F	8	9/10	0.91	0.17	-	79,85,91,91	0
2	MLE	G	8	9/10	0.91	0.14	-	52,54,56,59	0
2	MLE	G	10	9/10	0.94	0.16	-	53,60,68,72	0
2	MLE	H	10	9/10	0.95	0.15	-	44,57,67,69	0
2	ABA	F	6	6/7	0.90	0.27	-	79,85,86,87	0
2	DAL	G	1	5/6	0.93	0.09	-	48,54,59,66	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(\AA^2)	Q<0.9
2	DAL	E	1	5/6	0.89	0.13	-	41,42,58,60	0
2	MVA	H	4	8/9	0.88	0.14	-	76,80,90,94	0
2	BMT	E	5	13/14	0.93	0.10	-	40,44,52,53	0
2	MLE	H	3	9/10	0.87	0.15	-	55,71,77,78	0
2	BMT	F	5	13/14	0.78	0.36	-	94,101,107,108	0
2	MVA	G	4	8/9	0.96	0.12	-	61,64,68,69	0
2	ABA	G	6	6/7	0.93	0.09	-	48,50,52,52	0
2	MLE	H	8	9/10	0.97	0.13	-	42,47,59,61	0
2	MLE	G	2	9/10	0.87	0.20	-	77,84,96,99	0
2	MLE	E	2	9/10	0.91	0.14	-	43,48,53,58	0
2	ABA	H	6	6/7	0.92	0.13	-	58,68,74,76	0
2	MLE	F	2	9/10	0.76	0.35	-	117,133,155,156	0
2	SAR	E	7	5/6	0.87	0.17	-	45,46,50,56	0
2	SAR	H	7	5/6	0.97	0.09	-	53,57,67,68	0
2	SAR	F	7	5/6	0.94	0.17	-	80,81,85,88	0
2	MLE	E	10	9/10	0.92	0.12	-	37,41,46,53	0
2	DAL	H	1	5/6	0.85	0.13	-	57,57,63,71	0
2	DAL	F	1	5/6	0.93	0.12	-	62,64,71,74	0
2	MLE	E	3	9/10	0.94	0.13	-	40,43,44,50	0
2	MLE	H	2	9/10	0.89	0.18	-	84,98,107,108	0
2	SAR	G	7	5/6	0.92	0.09	-	50,53,55,57	0
2	BMT	H	5	13/14	0.83	0.20	-	83,89,97,99	0
2	BMT	G	5	13/14	0.95	0.12	-	54,60,63,63	0
2	MVA	F	4	8/9	0.91	0.21	-	112,117,124,126	0
2	MLE	G	3	9/10	0.82	0.21	-	58,61,75,78	0
2	MLE	F	3	9/10	0.78	0.30	-	99,108,121,125	0

6.3 Carbohydrates [i](#)

There are no carbohydrates 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. 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	RSCC	RSR	LLDF	B-factors(\AA^2)	Q<0.9
3	SO4	C	303	5/5	0.70	0.28	6.82	113,118,119,121	0
3	SO4	B	302	5/5	0.95	0.28	3.98	92,93,96,97	0
3	SO4	A	303	5/5	0.76	0.23	3.65	106,109,113,117	0
3	SO4	C	302	5/5	0.93	0.15	2.65	53,65,69,79	0
3	SO4	A	304	5/5	0.92	0.12	1.58	48,55,65,74	0
3	SO4	A	301	5/5	0.90	0.12	-0.20	72,74,86,88	0
3	SO4	D	301	5/5	0.96	0.08	-0.91	66,71,75,76	0
3	SO4	C	301	5/5	0.94	0.10	-0.92	78,86,88,89	0
3	SO4	D	302	5/5	0.97	0.06	-2.86	63,63,66,68	0
3	SO4	A	302	5/5	0.93	0.18	-	61,73,77,85	0
3	SO4	B	301	5/5	0.97	0.11	-	70,80,85,87	0
3	SO4	D	303	5/5	0.81	0.15	-	108,111,115,115	0
3	SO4	D	304	5/5	0.89	0.17	-	121,123,123,124	0

6.5 Other polymers [i](#)

There are no such residues in this entry.