



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 13, 2017 – 08:44 pm GMT

PDB ID : 4R9J
Title : L-ficolin complexed to glucosamine-6-sulfate
Authors : Laffly, E.; Lacroix, M.; Martin, L.; Vassal-Stermann, E.; Thielens, N.; Gaboriaud, C.
Deposited on : 2014-09-05
Resolution : 2.10 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 : 1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix) : 1.9-1692
EDS : trunk28620
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)
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) : recalc28949

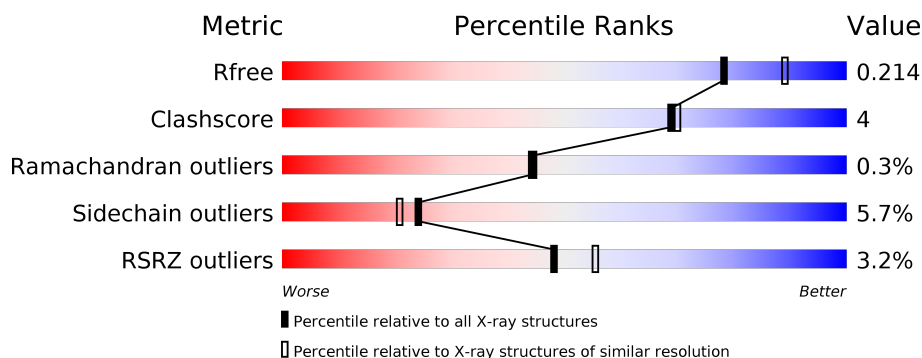
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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}	100719	4243 (2.10-2.10)
Clashscore	112137	4788 (2.10-2.10)
Ramachandran outliers	110173	4740 (2.10-2.10)
Sidechain outliers	110143	4741 (2.10-2.10)
RSRZ outliers	101464	4275 (2.10-2.10)

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	217	<div> <div>3%</div> <div> <div></div> <div>86%</div> <div>11%</div> <div>.</div> </div> </div>
1	B	217	<div> <div>5%</div> <div> <div></div> <div>84%</div> <div>13%</div> <div>.</div> </div> </div>
1	G	217	<div> <div>%</div> <div> <div></div> <div>85%</div> <div>12%</div> <div>.</div> </div> </div>

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
3	ACT	B	301	-	-	-	X
4	SO4	G	305	-	-	-	X
5	NAG	G	306	-	-	-	X
6	3LJ	B	304	-	-	-	X
6	3LJ	B	305	-	-	-	X

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 5653 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 Ficolin-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	G	217	Total	C	N	O	S	0	4	0
			1769	1112	313	335	9			
1	A	217	Total	C	N	O	S	0	3	0
			1760	1109	310	332	9			
1	B	217	Total	C	N	O	S	0	2	0
			1752	1105	308	330	9			

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	G	1	Total	Ca	0	0
			1	1		
2	B	1	Total	Ca	0	0
			1	1		
2	A	2	Total	Ca	0	0
			2	2		

- Molecule 3 is ACETATE ION (three-letter code: ACT) (formula: C₂H₃O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	G	1	Total	C	O	0	0
			4	2	2		
3	G	1	Total	C	O	0	0
			4	2	2		
3	G	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	B	1	Total	C	O	0	0
			4	2	2		
3	B	1	Total	C	O	0	0
			4	2	2		

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O₄S).

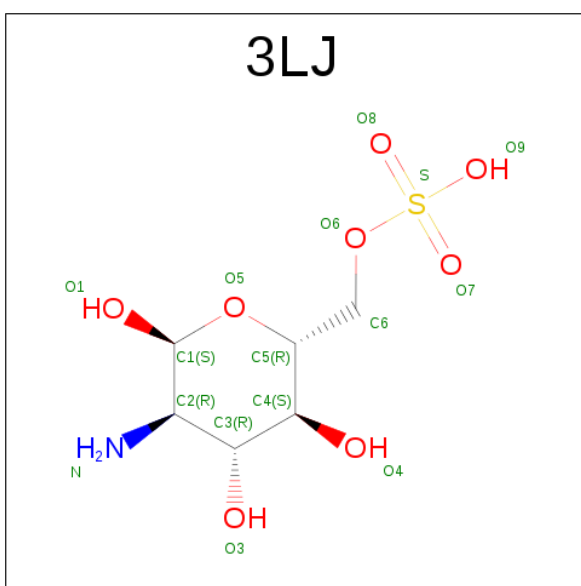


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	G	1	Total	O	S	0	0
			5	4	1		

- Molecule 5 is a polymer of unknown type called SUGAR (3-MER).

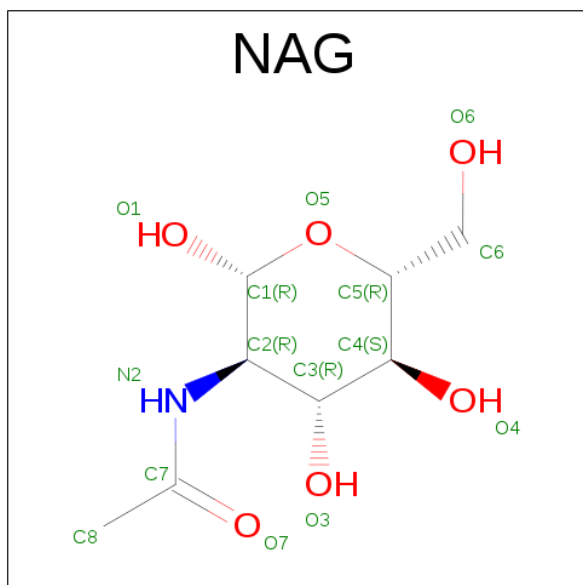
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	G	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 6 is 2-AMINO-2-DEOXY-6-O-SULFO-ALPHA-D-GLUCOPYRANOSE (three-letter code: 3LJ) (formula: C₆H₁₃NO₈S).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	N	O	S	
			16	6	1	8	1	
6	B	1	Total	C	N	O	S	
			16	6	1	8	1	
6	B	1	Total	C	N	O	S	
			16	6	1	8	1	

- Molecule 7 is SUGAR (N-ACETYL-D-GLUCOSAMINE) (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	A	1	Total	C	N	O		
			14	8	1	5		

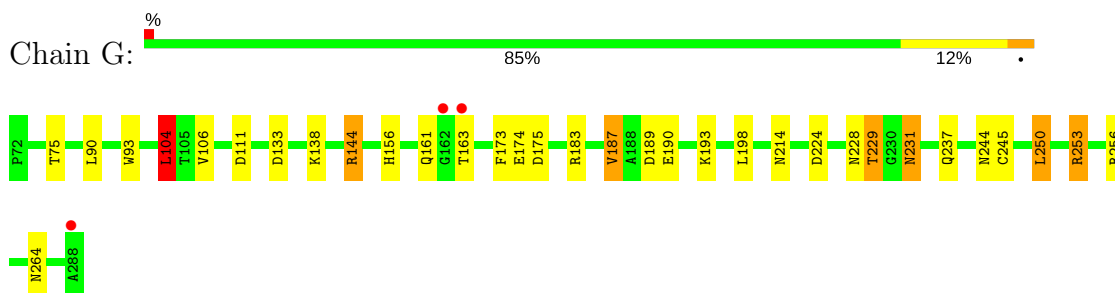
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	G	89	Total	O		
			89	89	0	0
8	A	99	Total	O		
			99	99	0	0
8	B	46	Total	O		
			46	46	0	0

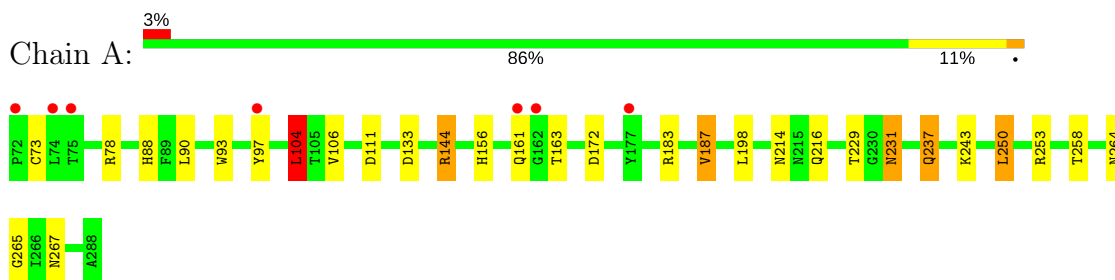
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

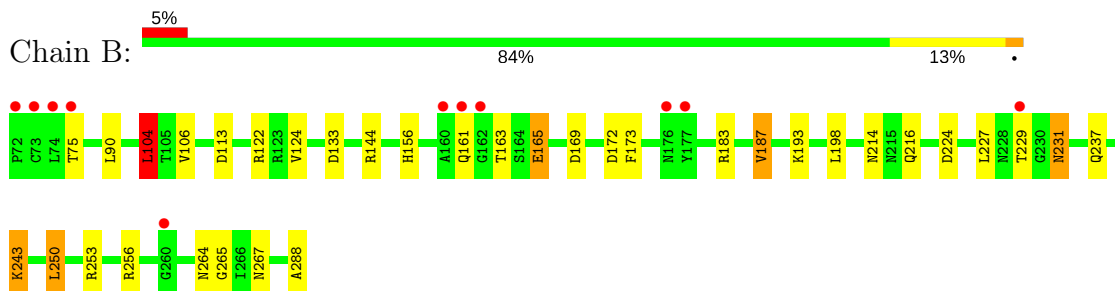
• Molecule 1: Ficolin-2



• Molecule 1: Ficolin-2



• Molecule 1: Ficolin-2



4 Data and refinement statistics

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α , β , γ	97.17Å 97.17Å 139.99Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	19.96 – 2.10 19.96 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.8 (19.96-2.10) 100.0 (19.96-2.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	6.12 (at 2.09Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.172 , 0.203 0.181 , 0.214	Depositor DCC
R_{free} test set	2259 reflections (5.26%)	DCC
Wilson B-factor (Å ²)	19.2	Xtriage
Anisotropy	0.116	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 45.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.026 for -h,-k,l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5653	wwPDB-VP
Average B, all atoms (Å ²)	21.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.32% 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: BMA, NAG, CA, SO4, 3LJ, ACT

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	0.95	0/1808	1.02	9/2446 (0.4%)
1	B	0.89	0/1800	0.98	9/2436 (0.4%)
1	G	0.97	0/1817	1.03	12/2459 (0.5%)
All	All	0.94	0/5425	1.01	30/7341 (0.4%)

There are no bond length outliers.

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	144	ARG	NE-CZ-NH2	-9.16	115.72	120.30
1	A	111	ASP	CB-CG-OD1	-8.58	110.58	118.30
1	B	133	ASP	CB-CG-OD1	6.93	124.54	118.30
1	B	144	ARG	NE-CZ-NH2	-6.33	117.13	120.30
1	A	250	LEU	CB-CG-CD1	6.30	121.71	111.00
1	G	253[A]	ARG	NE-CZ-NH1	6.19	123.39	120.30
1	G	253[B]	ARG	NE-CZ-NH1	6.19	123.39	120.30
1	A	172	ASP	CB-CG-OD2	-6.07	112.83	118.30
1	G	133	ASP	CB-CG-OD1	5.98	123.68	118.30
1	A	133	ASP	CB-CG-OD1	5.75	123.48	118.30
1	G	250	LEU	CB-CG-CD1	5.74	120.76	111.00
1	A	133	ASP	CB-CG-OD2	-5.72	113.16	118.30
1	G	224	ASP	CB-CG-OD1	5.69	123.42	118.30
1	G	189[A]	ASP	CB-CG-OD1	5.69	123.42	118.30
1	G	189[B]	ASP	CB-CG-OD1	5.69	123.42	118.30
1	G	104	LEU	CB-CG-CD2	5.68	120.65	111.00
1	B	250	LEU	CB-CG-CD1	5.62	120.55	111.00
1	B	169	ASP	CB-CG-OD2	5.54	123.29	118.30
1	B	104	LEU	CB-CG-CD2	5.54	120.42	111.00
1	G	111	ASP	CB-CG-OD2	5.38	123.15	118.30
1	B	224	ASP	CB-CG-OD1	5.37	123.14	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	144	ARG	NE-CZ-NH1	5.37	122.98	120.30
1	B	122	ARG	NE-CZ-NH1	5.33	122.97	120.30
1	A	144	ARG	NE-CZ-NH2	-5.29	117.66	120.30
1	A	183	ARG	NE-CZ-NH1	5.26	122.93	120.30
1	A	111	ASP	CB-CG-OD2	5.24	123.01	118.30
1	B	144	ARG	NE-CZ-NH1	5.16	122.88	120.30
1	A	104	LEU	CB-CG-CD2	5.13	119.72	111.00
1	G	193	LYS	CA-CB-CG	-5.05	102.28	113.40
1	B	172	ASP	CB-CG-OD1	5.03	122.83	118.30

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	1760	0	1635	15	0
1	B	1752	0	1628	12	1
1	G	1769	0	1636	18	1
2	A	2	0	0	0	0
2	B	1	0	0	0	0
2	G	1	0	0	0	0
3	A	8	0	6	0	0
3	B	8	0	6	0	0
3	G	12	0	9	0	0
4	G	5	0	0	0	0
5	G	39	0	34	0	0
6	A	16	0	13	0	0
6	B	32	0	26	1	0
7	A	14	0	13	0	0
8	A	99	0	0	1	0
8	B	46	0	0	0	0
8	G	89	0	0	4	0
All	All	5653	0	5006	45	1

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 4.

All (45) 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:A:73:CYS:SG	1:A:78:ARG:NH2	2.59	0.75
1:G:229:THR:HG21	8:G:420:HOH:O	1.89	0.71
1:A:237:GLN:HE22	1:A:264:ASN:HD22	1.45	0.65
1:G:144:ARG:NH2	8:G:435:HOH:O	2.28	0.62
1:A:258[A]:THR:HG22	8:A:460:HOH:O	1.99	0.61
8:G:435:HOH:O	1:A:88:HIS:HD2	1.84	0.61
1:G:138:LYS:HE3	1:G:190:GLU:OE1	2.02	0.60
1:A:198:LEU:H	1:A:214:ASN:ND2	2.00	0.59
1:B:156:HIS:HD2	1:B:187:VAL:O	1.88	0.57
1:A:78:ARG:HD3	1:A:97:TYR:O	2.05	0.57
1:G:156:HIS:HD2	1:G:187:VAL:O	1.88	0.56
1:A:156:HIS:HD2	1:A:187:VAL:O	1.89	0.56
1:G:198:LEU:H	1:G:214:ASN:ND2	2.04	0.55
1:B:198:LEU:H	1:B:214:ASN:ND2	2.06	0.54
1:A:237:GLN:HE21	1:A:253:ARG:HD3	1.73	0.54
1:G:237:GLN:NE2	1:G:264:ASN:HD22	2.06	0.53
1:G:138:LYS:CE	1:G:190:GLU:OE1	2.57	0.53
1:G:237:GLN:HE22	1:G:253[A]:ARG:HH11	1.57	0.52
1:G:237:GLN:NE2	1:G:253[A]:ARG:HD3	2.25	0.51
1:B:104:LEU:HD13	1:B:106:VAL:CG1	2.42	0.50
1:B:165:GLU:CG	1:B:288:ALA:HA	2.42	0.49
1:G:228:ASN:ND2	1:G:244[A]:ASN:OD1	2.42	0.49
1:B:237[A]:GLN:NE2	1:B:264:ASN:HD22	2.10	0.49
1:A:104:LEU:HD13	1:A:106:VAL:CG1	2.42	0.49
1:B:231:ASN:HD22	1:B:231:ASN:C	2.16	0.49
1:B:237[A]:GLN:NE2	1:B:253:ARG:HD3	2.28	0.49
1:G:104:LEU:HD13	1:G:106:VAL:CG1	2.43	0.48
1:G:93:TRP:CZ2	1:G:144:ARG:HA	2.49	0.48
1:G:237:GLN:HE21	1:G:264:ASN:HD22	1.62	0.48
1:A:265:GLY:H	1:A:267:ASN:HD21	1.61	0.48
1:G:174:GLU:HG3	8:G:444:HOH:O	2.14	0.47
1:G:244[B]:ASN:N	1:G:245:CYS:HA	2.30	0.47
1:G:231:ASN:C	1:G:231:ASN:HD22	2.19	0.46
1:A:237:GLN:NE2	1:A:264:ASN:HD22	2.11	0.46
1:B:183:ARG:HB3	6:B:305:3LJ:O8	2.16	0.45
1:B:227:LEU:HD12	1:B:243:LYS:HG2	1.99	0.44
1:B:216:GLN:HB2	1:B:243:LYS:HE3	1.99	0.44
1:A:216:GLN:HB2	1:A:243:LYS:HE3	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:244[A]:ASN:N	1:G:245:CYS:HA	2.34	0.43
1:A:231:ASN:HD22	1:A:231:ASN:C	2.21	0.43
1:G:173:PHE:CE2	1:G:256:ARG:HA	2.54	0.43
1:A:93:TRP:CZ2	1:A:144:ARG:HA	2.54	0.43
1:B:173:PHE:CE1	1:B:256:ARG:HA	2.54	0.43
1:B:265:GLY:H	1:B:267:ASN:HD21	1.68	0.42
1:A:265:GLY:H	1:A:267:ASN:ND2	2.18	0.41

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:183:ARG:NH1	1:B:288:ALA:O[4_545]	2.19	0.01

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	218/217 (100%)	207 (95%)	10 (5%)	1 (0%)	32	28
1	B	217/217 (100%)	207 (95%)	9 (4%)	1 (0%)	32	28
1	G	219/217 (101%)	208 (95%)	11 (5%)	0	100	100
All	All	654/651 (100%)	622 (95%)	30 (5%)	2 (0%)	44	44

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	163	THR
1	B	124	VAL

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	185/182 (102%)	177 (96%)	8 (4%)	33	32
1	B	184/182 (101%)	170 (92%)	14 (8%)	15	11
1	G	186/182 (102%)	175 (94%)	11 (6%)	23	19
All	All	555/546 (102%)	522 (94%)	33 (6%)	24	19

All (33) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	75[A]	THR
1	G	75[B]	THR
1	G	90	LEU
1	G	104	LEU
1	G	161	GLN
1	G	163	THR
1	G	175	ASP
1	G	187	VAL
1	G	229	THR
1	G	231	ASN
1	G	250	LEU
1	A	90	LEU
1	A	104	LEU
1	A	161	GLN
1	A	187	VAL
1	A	229	THR
1	A	231	ASN
1	A	237	GLN
1	A	250	LEU
1	B	75	THR
1	B	90[A]	LEU
1	B	90[B]	LEU
1	B	104	LEU
1	B	113	ASP
1	B	161	GLN
1	B	163	THR

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Mol	Chain	Res	Type
1	B	165	GLU
1	B	187	VAL
1	B	193	LYS
1	B	229	THR
1	B	231	ASN
1	B	243	LYS
1	B	250	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (21) such sidechains are listed below:

Mol	Chain	Res	Type
1	G	156	HIS
1	G	161	GLN
1	G	214	ASN
1	G	216	GLN
1	G	231	ASN
1	G	237	GLN
1	G	267	ASN
1	A	88	HIS
1	A	156	HIS
1	A	195	ASN
1	A	214	ASN
1	A	231	ASN
1	A	237	GLN
1	A	267	ASN
1	A	275	ASN
1	B	139	GLN
1	B	156	HIS
1	B	195	ASN
1	B	214	ASN
1	B	231	ASN
1	B	267	ASN

5.3.3 RNA ⓘ

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

3 carbohydrates 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
5	NAG	G	306	1,5	14,14,15	0.85	0	15,19,21	1.91	5 (33%)
5	NAG	G	307	5	14,14,15	0.80	0	15,19,21	1.45	2 (13%)
5	BMA	G	308	5	11,11,12	0.71	0	13,15,17	2.90	6 (46%)

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
5	NAG	G	306	1,5	-	0/6/23/26	0/1/1/1
5	NAG	G	307	5	-	0/6/23/26	0/1/1/1
5	BMA	G	308	5	-	0/2/19/22	0/1/1/1

There are no bond length outliers.

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	G	308	BMA	C6-C5-C4	-4.92	101.48	113.00
5	G	306	NAG	C1-C2-N2	-3.65	104.25	110.49
5	G	307	NAG	C1-O5-C5	-3.43	107.43	112.17
5	G	306	NAG	C4-C3-C2	-3.02	106.59	111.02
5	G	308	BMA	O2-C2-C3	-2.77	104.73	110.17
5	G	307	NAG	O7-C7-C8	-2.31	117.84	122.06
5	G	308	BMA	O4-C4-C3	-2.29	105.37	110.36
5	G	306	NAG	C6-C5-C4	-2.20	107.84	113.00
5	G	306	NAG	O7-C7-N2	-2.02	118.03	121.92
5	G	306	NAG	C8-C7-N2	3.34	122.15	116.11
5	G	308	BMA	C1-O5-C5	3.45	116.93	112.17
5	G	308	BMA	C1-C2-C3	4.98	115.97	109.65

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	G	308	BMA	C3-C4-C5	5.72	120.29	110.22

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.6 Ligand geometry

Of 16 ligands modelled in this entry, 4 are monoatomic - leaving 12 for Mogul analysis.

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	ACT	A	302	-	1,3,3	2.06	1 (100%)	0,3,3	0.00	-
3	ACT	A	303	-	1,3,3	1.06	0	0,3,3	0.00	-
6	3LJ	A	305	-	16,16,16	1.12	0	20,24,24	2.57	5 (25%)
7	NAG	A	306	1	14,14,15	0.81	0	15,19,21	2.95	7 (46%)
3	ACT	B	301	-	1,3,3	2.13	1 (100%)	0,3,3	0.00	-
3	ACT	B	303	-	1,3,3	1.65	0	0,3,3	0.00	-
6	3LJ	B	304	-	16,16,16	1.03	1 (6%)	20,24,24	2.24	3 (15%)
6	3LJ	B	305	-	16,16,16	1.06	1 (6%)	20,24,24	1.80	6 (30%)
3	ACT	G	302	-	1,3,3	0.08	0	0,3,3	0.00	-
3	ACT	G	303	-	1,3,3	4.11	1 (100%)	0,3,3	0.00	-
3	ACT	G	304	-	1,3,3	1.16	0	0,3,3	0.00	-
4	SO4	G	305	-	4,4,4	0.37	0	6,6,6	0.55	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	ACT	A	302	-	-	0/0/0/0	0/0/0/0
3	ACT	A	303	-	-	0/0/0/0	0/0/0/0
6	3LJ	A	305	-	-	0/6/26/26	0/1/1/1
7	NAG	A	306	1	-	0/6/23/26	0/1/1/1
3	ACT	B	301	-	-	0/0/0/0	0/0/0/0
3	ACT	B	303	-	-	0/0/0/0	0/0/0/0
6	3LJ	B	304	-	-	0/6/26/26	0/1/1/1
6	3LJ	B	305	-	-	0/6/26/26	0/1/1/1
3	ACT	G	302	-	-	0/0/0/0	0/0/0/0
3	ACT	G	303	-	-	0/0/0/0	0/0/0/0
3	ACT	G	304	-	-	0/0/0/0	0/0/0/0
4	SO4	G	305	-	-	0/0/0/0	0/0/0/0

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	304	3LJ	C2-N	-2.23	1.43	1.47
3	A	302	ACT	CH3-C	2.06	1.51	1.48
3	B	301	ACT	CH3-C	2.13	1.51	1.48
6	B	305	3LJ	O9-S	2.25	1.62	1.50
3	G	303	ACT	CH3-C	4.11	1.54	1.48

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	B	305	3LJ	O9-S-O8	-4.02	94.56	108.79
7	A	306	NAG	O5-C1-C2	-3.46	106.66	111.47
6	A	305	3LJ	O4-C4-C3	-3.27	103.24	110.36
6	B	305	3LJ	O9-S-O7	-2.70	99.22	108.79
7	A	306	NAG	C2-N2-C7	-2.57	119.20	122.94
7	A	306	NAG	C4-C3-C2	-2.26	107.71	111.02
7	A	306	NAG	O7-C7-N2	-2.21	117.66	121.92
7	A	306	NAG	C8-C7-N2	2.10	119.89	116.11
7	A	306	NAG	O3-C3-C2	2.13	113.95	109.39
6	B	305	3LJ	C1-O5-C5	2.19	117.34	113.39
6	B	304	3LJ	O6-S-O8	2.25	113.72	106.78
6	B	305	3LJ	O7-S-O8	2.40	122.62	112.25
6	B	305	3LJ	O6-S-O8	2.51	114.50	106.78
6	B	305	3LJ	O6-S-O7	3.64	117.99	106.78
6	A	305	3LJ	O4-C4-C5	4.07	119.53	109.28
6	A	305	3LJ	C1-O5-C5	4.32	121.19	113.39
6	A	305	3LJ	C1-C2-C3	4.79	116.91	110.60
6	B	304	3LJ	C1-O5-C5	5.27	122.90	113.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	305	3LJ	O5-C1-C2	6.71	117.34	109.51
6	B	304	3LJ	O5-C1-C2	7.07	117.76	109.51
7	A	306	NAG	C1-O5-C5	9.33	125.03	112.17

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	B	305	3LJ	1	0

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	217/217 (100%)	-0.35	7 (3%) 48 55	10, 16, 38, 82	0
1	B	217/217 (100%)	-0.06	11 (5%) 29 35	12, 23, 44, 78	0
1	G	217/217 (100%)	-0.44	3 (1%) 75 79	9, 16, 29, 46	0
All	All	651/651 (100%)	-0.28	21 (3%) 48 55	9, 18, 39, 82	0

All (21) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	161	GLN	5.6
1	B	74	LEU	4.8
1	B	75	THR	3.8
1	B	162	GLY	3.8
1	B	72	PRO	3.7
1	B	73	CYS	3.6
1	A	74	LEU	3.5
1	A	72	PRO	3.3
1	A	161	GLN	3.2
1	A	162	GLY	2.9
1	B	160	ALA	2.6
1	G	288	ALA	2.6
1	A	177	TYR	2.5
1	B	177	TYR	2.5
1	B	260	GLY	2.5
1	B	229	THR	2.4
1	A	97	TYR	2.3
1	A	75	THR	2.2
1	G	163	THR	2.2
1	G	162	GLY	2.1
1	B	176	ASN	2.1

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

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

6.3 Carbohydrates ⓘ

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
5	NAG	G	306	14/15	0.93	0.14	4.67	17,20,25,25	0
5	BMA	G	308	11/12	0.82	0.24	-	38,46,51,62	0
5	NAG	G	307	14/15	0.95	0.20	-	24,26,31,35	0

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	RSCC	RSR	LLDF	B-factors(Å ²)	Q<0.9
6	3LJ	B	304	16/16	0.95	0.24	5.83	35,44,50,54	0
4	SO4	G	305	5/5	0.98	0.11	3.67	24,27,29,35	0
6	3LJ	B	305	16/16	0.94	0.19	3.64	31,36,39,43	0
3	ACT	B	301	4/4	0.94	0.10	2.33	23,28,28,29	0
6	3LJ	A	305	16/16	0.98	0.12	1.59	15,28,31,36	0
3	ACT	A	303	4/4	0.91	0.11	0.47	26,26,27,28	0
3	ACT	G	304	4/4	0.97	0.10	0.34	22,23,25,30	0
3	ACT	B	303	4/4	0.94	0.14	0.33	31,33,34,35	0
3	ACT	G	302	4/4	0.98	0.10	-0.15	17,18,18,18	0
3	ACT	A	302	4/4	0.95	0.09	-0.21	16,17,18,18	0
2	CA	B	302	1/1	0.95	0.06	-2.09	28,28,28,28	0
2	CA	A	301	1/1	1.00	0.02	-2.31	16,16,16,16	0
2	CA	G	301	1/1	0.99	0.04	-3.06	11,11,11,11	0
3	ACT	G	303	4/4	0.93	0.12	-	27,36,37,45	0
2	CA	A	304	1/1	0.91	0.09	-	29,29,29,29	0
7	NAG	A	306	14/15	0.79	0.29	-	38,52,59,71	0

6.5 Other polymers [i](#)

There are no such residues in this entry.