Full wwPDB X-ray Structure Validation Report (i)

Nov 17, 2026 – 01:30 PM EST

PDB ID	:	9OUA / pdb_00009oua
Title	:	Crystal structure of the Netrin-1 (NET1) in complex with UNC5B
Authors	:	Rafiei, F.; Gupta, M.; Bailey-Elkin, B.A.; Koch, M.; Stetefeld, J.
Deposited on	:	2025-05-28
Resolution	:	5.30 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 (i) 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 (1)) were used in the production of this report:

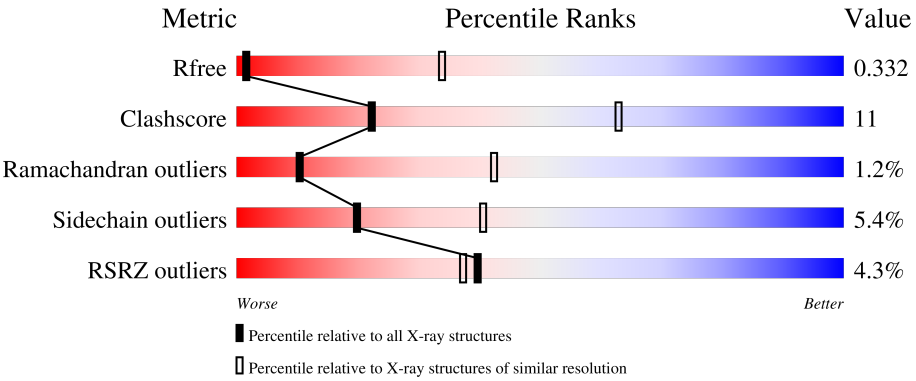
MolProbity	:	4-5-2 with Phenix2.2
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.2
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

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 5.30 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	1042 (6.60-4.00)
Clashscore	190562	1098 (6.60-4.00)
Ramachandran outliers	187476	1008 (6.64-3.96)
Sidechain outliers	187428	1006 (6.64-3.94)
RSRZ outliers	180081	1036 (6.60-4.00)

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 <=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	443	4% 70% 23% • 6%
2	B	231	3% 64% 17% • 18%

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	NAG	A	503	-	-	X	-
3	NAG	A	505	-	-	X	-
3	NAG	B	301	-	-	X	-
3	NAG	B	302	-	-	X	-
5	BMA	A	506	-	-	X	-

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 4933 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 Netrin-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	417	Total	C	N	O	S	0	0	0
			3272	2008	607	619	38			

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	22	ALA	-	insertion	UNP Q90922
A	23	PRO	-	insertion	UNP Q90922
A	24	LEU	-	insertion	UNP Q90922
A	25	ALA	-	insertion	UNP Q90922
A	459	GLY	-	expression tag	UNP Q90922
A	460	SER	-	expression tag	UNP Q90922
A	461	LEU	-	expression tag	UNP Q90922
A	462	VAL	-	expression tag	UNP Q90922
A	463	PRO	-	expression tag	UNP Q90922
A	464	ARG	-	expression tag	UNP Q90922

- Molecule 2 is a protein called Netrin receptor UNC5B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	189	Total	C	N	O	S	0	0	0
			1543	979	270	288	6			

There are 7 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	23	ALA	-	insertion	UNP Q8K1S3
B	24	PRO	-	insertion	UNP Q8K1S3
B	249	SER	-	expression tag	UNP Q8K1S3
B	250	LEU	-	expression tag	UNP Q8K1S3
B	251	VAL	-	expression tag	UNP Q8K1S3
B	252	PRO	-	expression tag	UNP Q8K1S3

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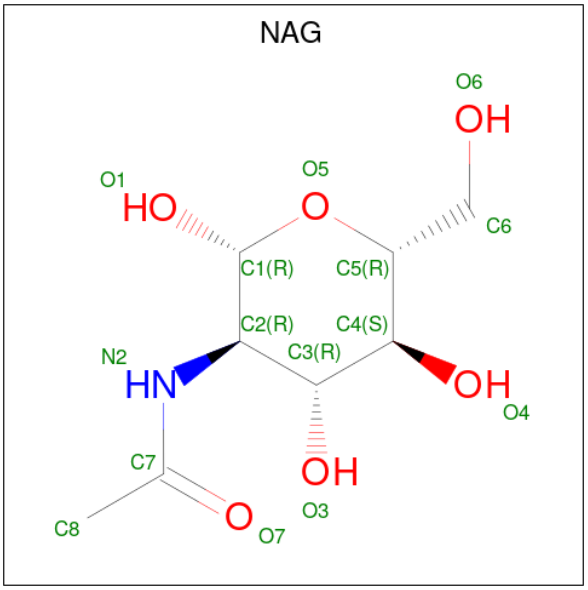
Chain	Residue	Modelled	Actual	Comment	Reference
B	253	ARG	-	expression tag	UNP Q8K1S3

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).

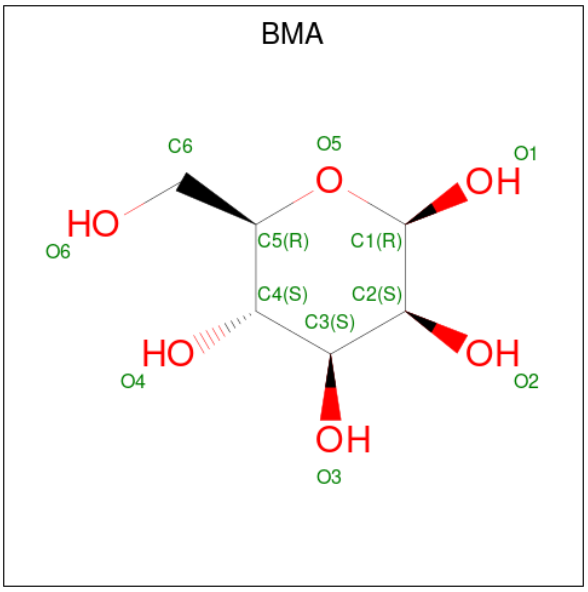


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O 14 8 1 5	0	0
3	A	1	Total C N O 14 8 1 5	0	0
3	A	1	Total C N O 14 8 1 5	0	0
3	A	1	Total C N O 14 8 1 5	0	0
3	B	1	Total C N O 14 8 1 5	0	0
3	B	1	Total C N O 14 8 1 5	0	0

- Molecule 4 is CALCIUM ION (CCD ID: CA) (formula: Ca).

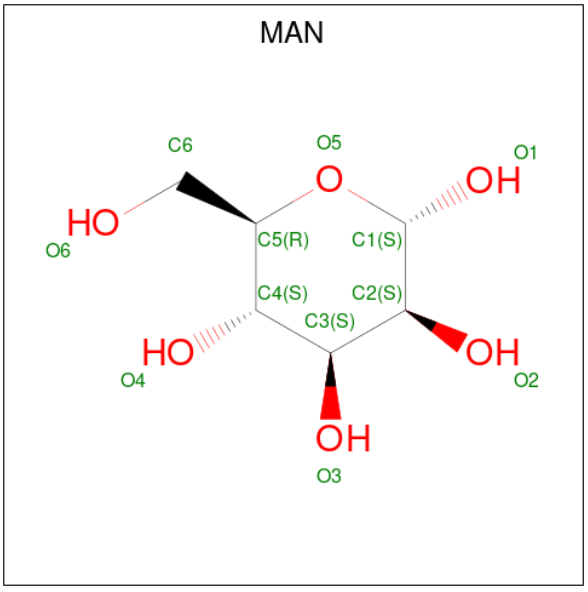
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Ca 1 1	0	0

- Molecule 5 is beta-D-mannopyranose (CCD ID: BMA) (formula: $C_6H_{12}O_6$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 11 6 5	0	0
5	B	1	Total C O 11 6 5	0	0

- Molecule 6 is alpha-D-mannopyranose (CCD ID: MAN) (formula: $C_6H_{12}O_6$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 11 6 5	0	0

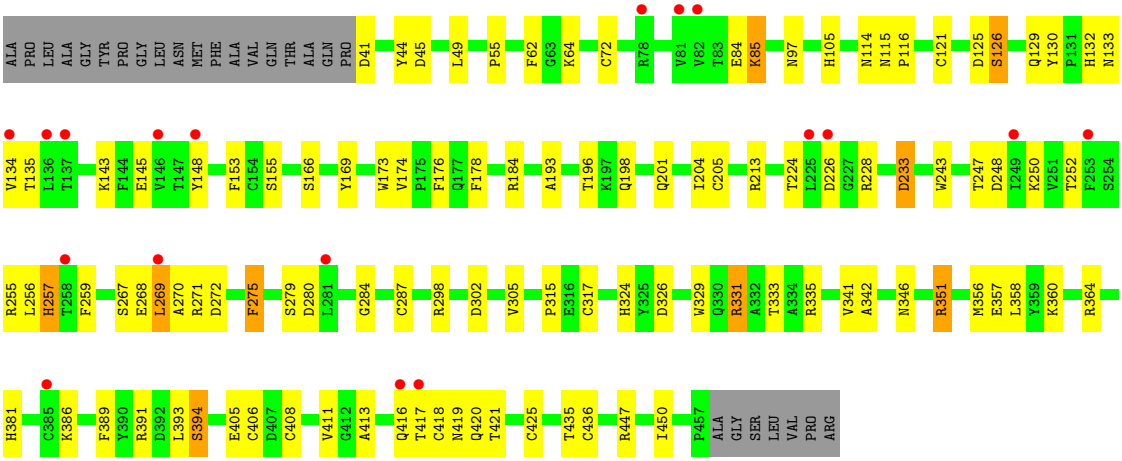
3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry 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: Netrin-1

Chain A:

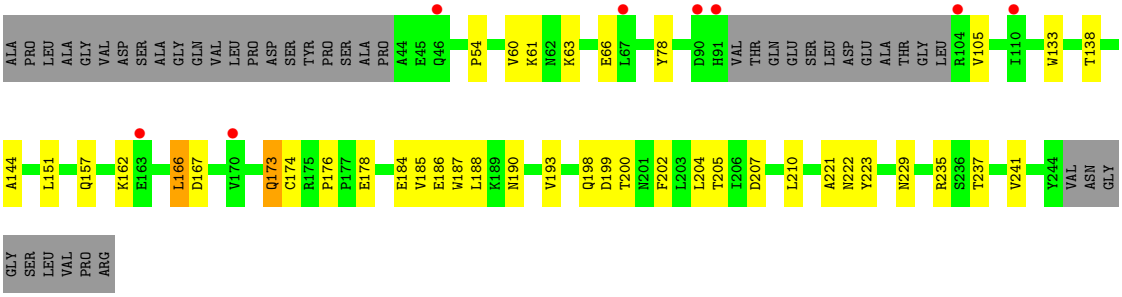




• Molecule 2: Netrin receptor UNC5B

Chain B:





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α, β, γ	79.86Å 79.86Å 383.51Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	46.98 – 5.30 46.98 – 5.30	Depositor EDS
% Data completeness (in resolution range)	97.0 (46.98-5.30) 97.0 (46.98-5.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.64 (at 5.39Å)	Xtriage
Refinement program	PHENIX 1.21.1-5286-5286	Depositor
R, R_{free}	0.245 , 0.312 0.253 , 0.332	Depositor DCC
R_{free} test set	552 reflections (9.76%)	wwPDB-VP
Wilson B-factor (Å^2)	248.4	Xtriage
Anisotropy	0.474	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.27 , 551.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.41$, $< L^2 > = 0.24$	Xtriage
Estimated twinning fraction	0.157 for -h,-k,l	Xtriage
F_o,F_c correlation	0.90	EDS
Total number of atoms	4933	wwPDB-VP
Average B, all atoms (Å^2)	363.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.19% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: CA, BMA, MAN, NAG

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	0.49	0/3353	0.85	1/4539 (0.0%)
2	B	0.50	0/1577	0.79	0/2146
All	All	0.49	0/4930	0.83	1/6685 (0.0%)

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	4

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	233	ASP	CA-CB-CG	5.66	118.26	112.60

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	184	ARG	Sidechain
1	A	271	ARG	Sidechain
1	A	364	ARG	Sidechain
1	A	447	ARG	Sidechain

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3272	0	3087	65	0
2	B	1543	0	1514	19	0
3	A	56	0	52	17	0
3	B	28	0	26	10	0
4	A	1	0	0	0	0
5	A	11	0	10	6	0
5	B	11	0	10	3	0
6	A	11	0	10	2	0
All	All	4933	0	4709	102	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 11.

All (102) 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)
3:B:302:NAG:O4	5:B:303:BMA:C1	1.71	1.38
3:B:301:NAG:O4	3:B:302:NAG:C1	1.77	1.32
3:A:504:NAG:O4	3:A:505:NAG:C1	1.97	1.12
5:A:506:BMA:O6	6:A:507:MAN:C1	2.04	1.05
3:B:301:NAG:HO4	3:B:302:NAG:C1	1.77	0.95
3:A:505:NAG:O4	5:A:506:BMA:C1	2.15	0.94
3:B:301:NAG:C4	3:B:302:NAG:C1	2.50	0.89
1:A:135:THR:HG22	1:A:252:THR:HG22	1.61	0.83
3:A:503:NAG:O7	3:A:503:NAG:C1	2.32	0.76
1:A:133:ASN:HD21	3:A:504:NAG:C1	1.99	0.74
1:A:126:SER:HA	1:A:275:PHE:HE2	1.53	0.74
3:A:504:NAG:C4	3:A:505:NAG:C1	2.65	0.73
1:A:97:ASN:HD21	3:A:501:NAG:C1	2.01	0.72
3:A:505:NAG:C4	5:A:506:BMA:C1	2.68	0.71
3:B:301:NAG:C1	3:B:301:NAG:H82	2.20	0.71
1:A:130:TYR:HE1	1:A:255:ARG:HA	1.56	0.70
3:A:505:NAG:HO4	5:A:506:BMA:C1	2.04	0.69
1:A:419:ASN:HB2	3:A:503:NAG:H61	1.74	0.69
1:A:129:GLN:O	1:A:132:HIS:ND1	2.16	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:301:NAG:O4	3:B:302:NAG:C2	2.42	0.68
3:B:302:NAG:HO4	5:B:303:BMA:C1	2.03	0.67
1:A:126:SER:HA	1:A:275:PHE:CE2	2.29	0.66
2:B:205:THR:HG22	2:B:207:ASP:H	1.59	0.66
1:A:305:VAL:HG23	1:A:315:PRO:HA	1.77	0.66
1:A:419:ASN:OD1	1:A:421:THR:N	2.30	0.64
2:B:151:LEU:HB2	2:B:229:ASN:HD21	1.62	0.63
2:B:188:LEU:O	2:B:223:TYR:HA	2.00	0.62
1:A:419:ASN:ND2	3:A:503:NAG:H4	2.15	0.62
3:B:301:NAG:C1	3:B:301:NAG:C8	2.80	0.59
3:A:505:NAG:H4	5:A:506:BMA:C1	2.32	0.58
1:A:419:ASN:HD22	3:A:503:NAG:C5	2.16	0.58
1:A:121:CYS:HB3	1:A:279:SER:HA	1.85	0.56
1:A:419:ASN:HD22	3:A:503:NAG:H4	1.71	0.56
1:A:356:MET:CB	2:B:237:THR:HG21	2.35	0.55
1:A:148:TYR:CE2	1:A:284:GLY:HA3	2.41	0.55
1:A:130:TYR:HH	1:A:256:LEU:H	1.54	0.54
1:A:213:ARG:HD3	1:A:257:HIS:CE1	2.43	0.54
1:A:196:THR:OG1	1:A:198:GLN:HB3	2.07	0.53
3:B:301:NAG:H4	3:B:302:NAG:C1	2.37	0.53
1:A:406:CYS:SG	1:A:418:CYS:N	2.77	0.52
1:A:408:CYS:HB2	1:A:416:GLN:HA	1.93	0.51
1:A:425:CYS:SG	1:A:435:THR:HA	2.51	0.51
1:A:130:TYR:CE1	1:A:255:ARG:HA	2.43	0.51
1:A:298:ARG:NE	1:A:302:ASP:OD1	2.45	0.50
1:A:413:ALA:HB2	1:A:436:CYS:HB2	1.94	0.50
1:A:105:HIS:ND1	1:A:121:CYS:O	2.41	0.49
2:B:190:ASN:HD21	2:B:221:ALA:CB	2.26	0.49
5:A:506:BMA:HO6	6:A:507:MAN:C1	2.20	0.49
1:A:326:ASP:HB3	1:A:341:VAL:HB	1.94	0.49
1:A:333:THR:OG1	1:A:335:ARG:NH2	2.46	0.49
1:A:317:CYS:O	1:A:329:TRP:NE1	2.46	0.48
1:A:391:ARG:N	1:A:420:GLN:O	2.45	0.48
3:B:302:NAG:C4	5:B:303:BMA:C1	2.85	0.48
1:A:84:GLU:O	1:A:85:LYS:C	2.56	0.48
1:A:393:LEU:O	1:A:394:SER:CB	2.61	0.48
1:A:419:ASN:ND2	3:A:503:NAG:O5	2.46	0.47
1:A:133:ASN:ND2	3:A:504:NAG:C1	2.74	0.47
2:B:176:PRO:HG3	2:B:185:VAL:HG21	1.96	0.47
1:A:419:ASN:HD22	3:A:503:NAG:C4	2.28	0.47
2:B:190:ASN:ND2	2:B:221:ALA:HB1	2.29	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:115:ASN:ND2	1:A:116:PRO:O	2.47	0.47
1:A:173:TRP:CH2	1:A:250:LYS:HB2	2.50	0.47
1:A:145:GLU:OE2	1:A:331:ARG:NH2	2.44	0.47
1:A:356:MET:HG2	2:B:237:THR:HG21	1.97	0.46
1:A:268:GLU:O	1:A:270:ALA:N	2.49	0.46
3:A:504:NAG:H4	3:A:505:NAG:C1	2.42	0.45
1:A:121:CYS:HB3	1:A:279:SER:CA	2.46	0.45
1:A:45:ASP:N	1:A:49:LEU:O	2.49	0.45
2:B:223:TYR:HE2	2:B:241:VAL:HB	1.82	0.44
1:A:450:ILE:N	1:A:450:ILE:HD12	2.32	0.44
1:A:55:PRO:HG2	1:A:287:CYS:HB3	2.00	0.44
2:B:174:CYS:HB3	2:B:187:TRP:CZ2	2.52	0.44
2:B:166:LEU:O	2:B:167:ASP:HB2	2.17	0.44
1:A:153:PHE:HB3	1:A:155:SER:O	2.19	0.43
1:A:357:GLU:HA	1:A:360:LYS:HE3	2.00	0.43
1:A:114:ASN:HB2	1:A:280:ASP:OD1	2.18	0.43
1:A:272:ASP:O	1:A:275:PHE:HE1	2.01	0.43
1:A:143:LYS:HG2	1:A:247:THR:CG2	2.49	0.43
2:B:54:PRO:HB2	2:B:144:ALA:HB2	2.02	0.42
2:B:200:THR:C	2:B:202:PHE:H	2.26	0.42
1:A:389:PHE:CE2	1:A:405:GLU:HG2	2.55	0.42
2:B:157:GLN:NE2	2:B:173:GLN:OE1	2.53	0.42
1:A:425:CYS:HB2	1:A:436:CYS:SG	2.59	0.42
2:B:187:TRP:CE2	2:B:210:LEU:HB2	2.55	0.42
1:A:178:PHE:HB2	1:A:205:CYS:HA	2.01	0.42
1:A:324:HIS:HA	1:A:342:ALA:HA	2.02	0.42
2:B:162:LYS:O	2:B:241:VAL:HA	2.20	0.42
1:A:169:TYR:HA	1:A:248:ASP:OD1	2.19	0.41
1:A:419:ASN:OD1	1:A:419:ASN:C	2.62	0.41
1:A:72:CYS:HB3	1:A:125:ASP:HA	2.01	0.41
1:A:201:GLN:HG3	1:A:243:TRP:CE3	2.55	0.41
2:B:190:ASN:HD21	2:B:221:ALA:HB1	1.86	0.41
1:A:346:ASN:ND2	1:A:381:HIS:O	2.49	0.41
1:A:129:GLN:OE1	1:A:129:GLN:N	2.52	0.41
2:B:133:TRP:CD1	2:B:138:THR:HG22	2.55	0.41
1:A:224:THR:O	1:A:228:ARG:HD2	2.19	0.41
1:A:166:SER:HB2	1:A:173:TRP:CZ3	2.56	0.41
1:A:269:LEU:O	1:A:270:ALA:C	2.64	0.41
2:B:186:GLU:OE2	2:B:193:VAL:HG13	2.21	0.41
1:A:62:PHE:C	1:A:64:LYS:H	2.30	0.40
1:A:351:ARG:HH11	1:A:351:ARG:HB3	1.87	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:41:ASP:OD2	1:A:44:TYR:HD2	2.05	0.40

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	415/443 (94%)	378 (91%)	31 (8%)	6 (1%)	9 38
2	B	185/231 (80%)	170 (92%)	14 (8%)	1 (0%)	24 63
All	All	600/674 (89%)	548 (91%)	45 (8%)	7 (1%)	10 42

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	134	VAL
1	A	269	LEU
1	A	394	SER
1	A	85	LYS
2	B	61	LYS
1	A	267	SER
1	A	193	ALA

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	367/385 (95%)	352 (96%)	15 (4%)	27	48
2	B	170/202 (84%)	156 (92%)	14 (8%)	10	31
All	All	537/587 (92%)	508 (95%)	29 (5%)	20	40

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

Mol	Chain	Res	Type
1	A	126	SER
1	A	174	VAL
1	A	176	PHE
1	A	204	ILE
1	A	226	ASP
1	A	233	ASP
1	A	257	HIS
1	A	259	PHE
1	A	275	PHE
1	A	331	ARG
1	A	351	ARG
1	A	358	LEU
1	A	386	LYS
1	A	411	VAL
1	A	417	THR
2	B	60	VAL
2	B	63	LYS
2	B	66	GLU
2	B	78	TYR
2	B	105	VAL
2	B	166	LEU
2	B	173	GLN
2	B	178	GLU
2	B	184	GLU
2	B	198	GLN
2	B	199	ASP
2	B	204	LEU
2	B	222	ASN
2	B	235	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	97	ASN

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Mol	Chain	Res	Type
1	A	133	ASN
1	A	198	GLN
1	A	257	HIS
1	A	263	ASN
1	A	330	GLN
1	A	420	GLN
2	B	62	ASN
2	B	88	GLN
2	B	154	ASN
2	B	190	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)

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 10 ligands modelled in this entry, 1 is monoatomic - leaving 9 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	NAG	A	501	-	14,14,15	0.40	0	17,19,21	1.38	3 (17%)
3	NAG	B	301	-	14,14,15	0.37	0	17,19,21	1.61	4 (23%)
5	BMA	A	506	-	11,11,12	0.40	0	15,15,17	0.63	1 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	NAG	A	505	-	14,14,15	0.38	0	17,19,21	1.71	5 (29%)
3	NAG	A	503	-	14,14,15	0.47	0	17,19,21	1.84	2 (11%)
3	NAG	A	504	-	14,14,15	0.45	0	17,19,21	0.67	0
5	BMA	B	303	-	11,11,12	0.43	0	15,15,17	0.44	0
6	MAN	A	507	-	11,11,12	0.33	0	15,15,17	0.59	0
3	NAG	B	302	-	14,14,15	0.40	0	17,19,21	1.16	2 (11%)

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	NAG	A	501	-	-	5/6/23/26	0/1/1/1
3	NAG	B	301	-	-	5/6/23/26	0/1/1/1
5	BMA	A	506	-	-	1/2/19/22	0/1/1/1
3	NAG	A	505	-	-	2/6/23/26	0/1/1/1
3	NAG	A	503	-	-	1/6/23/26	0/1/1/1
3	NAG	A	504	-	-	4/6/23/26	0/1/1/1
5	BMA	B	303	-	-	0/2/19/22	0/1/1/1
6	MAN	A	507	-	-	0/2/19/22	1/1/1/1
3	NAG	B	302	-	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	503	NAG	O5-C1-C2	6.57	121.46	111.29
3	A	505	NAG	C1-C2-N2	4.20	117.06	110.43
3	B	301	NAG	C1-C2-N2	3.96	116.67	110.43
3	A	501	NAG	O5-C1-C2	-3.55	105.79	111.29
3	B	301	NAG	O5-C1-C2	-3.23	106.30	111.29
3	A	505	NAG	O5-C1-C2	-3.20	106.33	111.29
3	B	302	NAG	O5-C1-C2	-3.07	106.54	111.29
3	A	501	NAG	C1-C2-N2	2.92	115.03	110.43
3	B	301	NAG	C2-N2-C7	2.76	126.60	122.90
3	B	302	NAG	C1-C2-N2	2.70	114.68	110.43
3	A	505	NAG	C1-O5-C5	2.54	115.59	112.19
3	A	505	NAG	C4-C3-C2	-2.37	107.54	111.02
3	A	501	NAG	C2-N2-C7	2.36	126.07	122.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	505	NAG	C2-N2-C7	2.27	125.95	122.90
3	A	503	NAG	C1-O5-C5	2.14	115.05	112.19
3	B	301	NAG	C3-C4-C5	2.08	114.00	110.23
5	A	506	BMA	C1-O5-C5	2.05	114.94	112.19

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	503	NAG	C1-C2-N2-C7
3	A	504	NAG	C8-C7-N2-C2
3	A	504	NAG	O7-C7-N2-C2
3	B	301	NAG	C1-C2-N2-C7
3	A	501	NAG	O5-C5-C6-O6
3	A	504	NAG	C4-C5-C6-O6
3	B	301	NAG	C8-C7-N2-C2
3	B	301	NAG	O7-C7-N2-C2
3	A	504	NAG	O5-C5-C6-O6
3	A	501	NAG	C4-C5-C6-O6
3	A	505	NAG	O5-C5-C6-O6
5	A	506	BMA	O5-C5-C6-O6
3	A	501	NAG	C8-C7-N2-C2
3	B	301	NAG	C4-C5-C6-O6
3	A	501	NAG	C3-C2-N2-C7
3	A	505	NAG	C3-C2-N2-C7
3	B	302	NAG	C3-C2-N2-C7
3	B	301	NAG	O5-C5-C6-O6
3	A	501	NAG	O7-C7-N2-C2
3	B	302	NAG	C1-C2-N2-C7

All (1) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	507	MAN	C1-C2-C3-C4-C5-O5

9 monomers are involved in 29 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	501	NAG	1	0
3	B	301	NAG	7	0
5	A	506	BMA	6	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	505	NAG	7	0
3	A	503	NAG	7	0
3	A	504	NAG	5	0
5	B	303	BMA	3	0
6	A	507	MAN	2	0
3	B	302	NAG	8	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	417/443 (94%)	0.07	18 (4%) 40 37	196, 354, 443, 565	0
2	B	189/231 (81%)	0.22	8 (4%) 40 38	271, 360, 454, 548	0
All	All	606/674 (89%)	0.12	26 (4%) 40 37	196, 356, 447, 565	0

All (26) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	81	VAL	3.7
1	A	136	LEU	3.3
1	A	148	TYR	3.2
1	A	249	ILE	3.1
2	B	110	ILE	3.1
1	A	417	THR	3.0
1	A	226	ASP	2.8
2	B	91	HIS	2.6
1	A	253	PHE	2.6
1	A	82	VAL	2.6
1	A	269	LEU	2.5
2	B	46	GLN	2.5
1	A	225	LEU	2.4
1	A	78	ARG	2.3
2	B	104	ARG	2.3
2	B	170	VAL	2.3
2	B	67	LEU	2.2
2	B	163	GLU	2.1
2	B	90	ASP	2.1
1	A	385	CYS	2.1
1	A	258	THR	2.1
1	A	416	GLN	2.1
1	A	281	LEU	2.1
1	A	134	VAL	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	137	THR	2.0
1	A	146	VAL	2.0

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

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

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(Å^2)	Q<0.9
5	BMA	B	303	11/12	0.61	0.09	387,433,480,481	0
3	NAG	A	505	14/15	0.82	0.09	298,456,501,527	0
6	MAN	A	507	11/12	0.83	0.09	291,434,454,464	0
3	NAG	A	503	14/15	0.84	0.10	206,293,385,423	0
3	NAG	B	302	14/15	0.85	0.11	356,447,469,514	0
3	NAG	A	504	14/15	0.90	0.13	291,397,455,458	0
5	BMA	A	506	11/12	0.90	0.11	354,429,453,509	0
3	NAG	B	301	14/15	0.91	0.08	278,373,413,444	0
3	NAG	A	501	14/15	0.92	0.09	260,317,345,369	0
4	CA	A	502	1/1	0.99	0.04	289,289,289,289	0

6.5 Other polymers (i)

There are no such residues in this entry.