



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 22, 2024 – 09:30 AM EDT

PDB ID : 3RJQ
Title : Crystal structure of anti-HIV llama VHH antibody A12 in complex with C186 gp120
Authors : Chen, L.; McLellan, J.S.; Kwon, Y.D.; Schmidt, S.; Wu, X.; Zhou, T.; Yang, Y.; Zhang, B.; Forsman, A.; Weiss, R.A.; Verrips, T.; Mascola, J.; Kwong, P.D.
Deposited on : 2011-04-15
Resolution : 2.60 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 1.20.1
EDS : 3.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.003 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

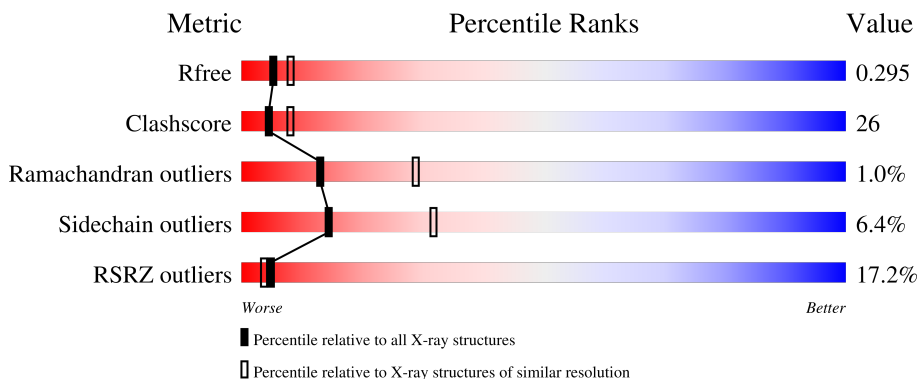
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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}	164625	3775 (2.60-2.60)
Clashscore	180529	4181 (2.60-2.60)
Ramachandran outliers	177936	4129 (2.60-2.60)
Sidechain outliers	177891	4129 (2.60-2.60)
RSRZ outliers	164620	3775 (2.60-2.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	382	
2	B	143	

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	734	X	-	-	-
3	NAG	A	897	X	-	-	-

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 3390 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.

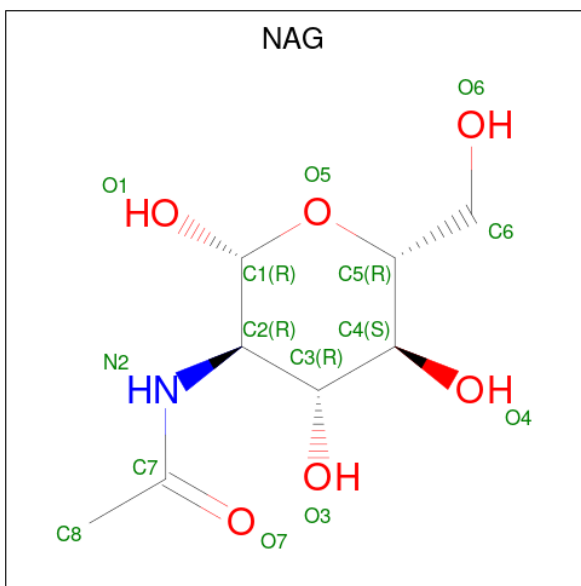
- Molecule 1 is a protein called C186 gp120.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	292	2302	1443	396	446	17	0	0	0

- Molecule 2 is a protein called Llama VHH A12.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	127	976	609	169	194	4	2	0	0

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



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

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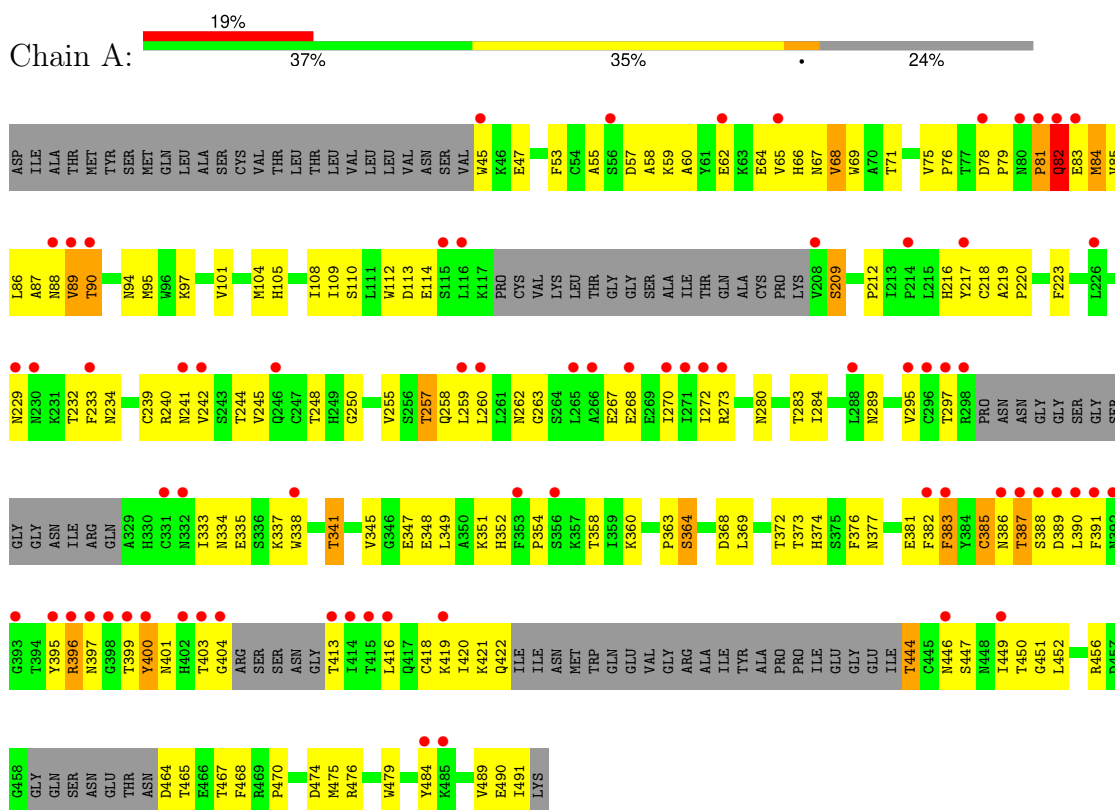
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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
	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

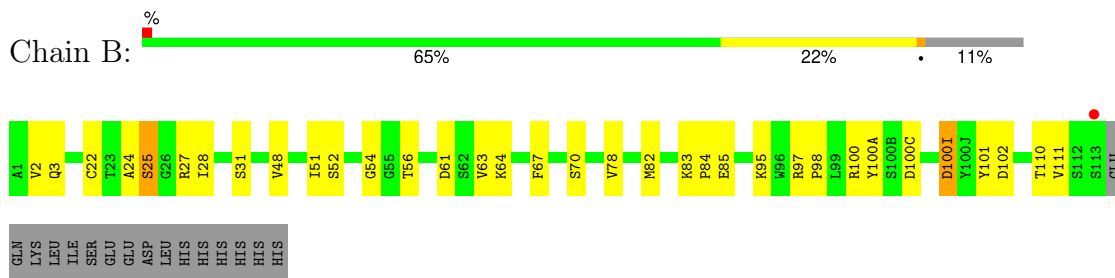
3 Residue-property plots i

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: C186 gp120



- Molecule 2: Llama VHH A12



4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	66.60Å 66.60Å 266.92Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	23.47 – 2.60 23.47 – 2.60	Depositor EDS
% Data completeness (in resolution range)	69.0 (23.47-2.60) 68.9 (23.47-2.60)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	5.97 (at 2.60Å)	Xtrriage
Refinement program	PHENIX (phenix.refine: 1.6.4_486)	Depositor
R, R_{free}	0.255 , 0.299 0.262 , 0.295	Depositor DCC
R_{free} test set	659 reflections (4.92%)	wwPDB-VP
Wilson B-factor (Å ²)	52.2	Xtrriage
Anisotropy	0.126	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.26 , 91.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	3390	wwPDB-VP
Average B, all atoms (Å ²)	123.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.90% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section:
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	0.27	0/2348	0.48	1/3181 (0.0%)
2	B	0.27	0/999	0.45	0/1353
All	All	0.27	0/3347	0.47	1/4534 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	81	PRO	C-N-CA	5.27	134.87	121.70

There are no chirality outliers.

There are no planarity outliers.

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	2302	0	2199	150	0
2	B	976	0	922	24	0
3	A	112	0	104	10	0
All	All	3390	0	3225	170	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 26.

All (170) 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:389:ASP:OD1	1:A:403:THR:HG22	1.45	1.16
1:A:389:ASP:CA	1:A:403:THR:HG21	1.77	1.15
1:A:395:TYR:CD2	1:A:399:THR:HB	1.81	1.14
1:A:81:PRO:HA	1:A:82:GLN:HB3	1.10	1.06
1:A:389:ASP:CB	1:A:403:THR:HG21	1.86	1.06
1:A:81:PRO:HA	1:A:82:GLN:CB	1.86	1.05
1:A:395:TYR:HD2	1:A:399:THR:HB	0.92	1.05
1:A:241:ASN:OD1	3:A:741:NAG:H2	1.54	1.03
1:A:389:ASP:OD1	1:A:403:THR:CG2	2.06	1.02
1:A:81:PRO:CA	1:A:82:GLN:HB3	1.91	1.01
1:A:419:LYS:HD3	1:A:420:ILE:H	1.28	0.96
1:A:82:GLN:HG2	1:A:82:GLN:O	1.66	0.94
1:A:389:ASP:HA	1:A:403:THR:HG21	1.44	0.94
1:A:395:TYR:OH	1:A:401:ASN:HB2	1.70	0.91
1:A:389:ASP:HA	1:A:403:THR:CG2	2.03	0.88
1:A:395:TYR:HD2	1:A:399:THR:CB	1.83	0.88
1:A:241:ASN:OD1	3:A:741:NAG:C2	2.07	0.85
1:A:420:ILE:HG22	1:A:421:LYS:H	1.40	0.85
1:A:382:PHE:HB2	1:A:421:LYS:HG3	1.59	0.84
1:A:83:GLU:HG2	1:A:245:VAL:HG12	1.59	0.83
1:A:45:TRP:N	1:A:491:ILE:HA	1.94	0.82
1:A:90:THR:HG22	1:A:240:ARG:HG3	1.66	0.78
1:A:421:LYS:O	1:A:422:GLN:HB2	1.87	0.75
1:A:419:LYS:HD3	1:A:420:ILE:N	2.01	0.73
1:A:64:GLU:HA	1:A:209:SER:HB2	1.69	0.72
1:A:389:ASP:HB3	1:A:403:THR:HG21	1.71	0.71
1:A:358:THR:HB	1:A:465:THR:HG22	1.73	0.71
1:A:95:MET:SD	1:A:273:ARG:HD2	2.32	0.70
1:A:389:ASP:CB	1:A:403:THR:CG2	2.67	0.70
1:A:404:GLY:H	3:A:892:NAG:H62	1.57	0.70
1:A:234:ASN:O	1:A:273:ARG:HG2	1.92	0.69
1:A:229:ASN:CG	3:A:741:NAG:O6	2.31	0.69
1:A:420:ILE:HG22	1:A:421:LYS:N	2.08	0.68
1:A:79:PRO:C	1:A:81:PRO:HD3	2.15	0.68
1:A:79:PRO:O	1:A:81:PRO:HD3	1.94	0.67
1:A:110:SER:O	1:A:114:GLU:HG2	1.95	0.66
1:A:64:GLU:OE1	1:A:66:HIS:HB2	1.96	0.65
1:A:272:ILE:HG12	1:A:352:HIS:CE1	2.31	0.65
1:A:474:ASP:OD1	1:A:476:ARG:HG3	1.97	0.64
1:A:217:TYR:O	1:A:248:THR:HG23	1.99	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:47:GLU:HA	1:A:489:VAL:HG12	1.81	0.62
1:A:259:LEU:HD13	1:A:449:ILE:HD13	1.82	0.61
1:A:270:ILE:HB	1:A:348:GLU:HG3	1.82	0.61
1:A:335:GLU:HG3	1:A:413:THR:HA	1.83	0.61
1:A:64:GLU:HB3	1:A:67:ASN:HD22	1.65	0.61
1:A:389:ASP:CG	1:A:403:THR:CG2	2.69	0.61
1:A:64:GLU:OE2	1:A:66:HIS:HD2	1.84	0.60
1:A:297:THR:HB	1:A:444:THR:HB	1.83	0.60
1:A:386:ASN:OD1	1:A:388:SER:OG	2.18	0.60
1:A:263:GLY:O	1:A:450:THR:HG21	2.02	0.60
1:A:363:PRO:HG3	1:A:388:SER:HA	1.85	0.59
2:B:3:GLN:HB2	2:B:25:SER:OG	2.02	0.59
1:A:272:ILE:HG12	1:A:352:HIS:HE1	1.68	0.59
1:A:260:LEU:HD12	1:A:451:GLY:HA3	1.85	0.58
2:B:2:VAL:CG1	2:B:24:ALA:HB1	2.33	0.58
1:A:420:ILE:CG2	1:A:421:LYS:H	2.16	0.57
1:A:349:LEU:HD13	1:A:468:PHE:CE2	2.40	0.57
1:A:53:PHE:CZ	1:A:218:CYS:HB2	2.40	0.57
1:A:389:ASP:CG	1:A:403:THR:HG22	2.25	0.57
1:A:232:THR:O	1:A:232:THR:HG22	2.04	0.56
2:B:95:LYS:HD2	2:B:100(I):ASP:O	2.07	0.55
1:A:347:GLU:O	1:A:351:LYS:HG3	2.07	0.55
1:A:464:ASP:OD2	1:A:465:THR:HG23	2.06	0.55
1:A:75:VAL:CG1	1:A:76:PRO:HD2	2.38	0.54
1:A:268:GLU:O	1:A:289:ASN:ND2	2.40	0.54
1:A:84:MET:HB2	1:A:244:THR:HB	1.90	0.54
1:A:67:ASN:O	1:A:71:THR:HG23	2.08	0.54
1:A:373:THR:HB	1:A:385:CYS:O	2.08	0.54
1:A:360:LYS:HE3	1:A:465:THR:HG21	1.90	0.53
2:B:48:VAL:HG13	2:B:63:VAL:HG21	1.90	0.53
1:A:85:VAL:C	1:A:86:LEU:HD23	2.28	0.53
2:B:63:VAL:HG13	2:B:67:PHE:HB2	1.89	0.53
1:A:474:ASP:HB2	2:B:101:TYR:CE1	2.44	0.52
1:A:94:ASN:ND2	1:A:97:LYS:HB2	2.23	0.52
1:A:83:GLU:HG2	1:A:245:VAL:CG1	2.38	0.51
1:A:272:ILE:HD12	1:A:272:ILE:O	2.11	0.51
1:A:386:ASN:O	1:A:416:LEU:HB3	2.10	0.51
1:A:451:GLY:C	1:A:452:LEU:HD12	2.31	0.51
1:A:64:GLU:OE2	1:A:66:HIS:CD2	2.64	0.50
1:A:280:ASN:HB2	1:A:456:ARG:O	2.11	0.50
1:A:381:GLU:HB2	1:A:383:PHE:CE2	2.46	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:391:PHE:CD1	1:A:470:PRO:HG3	2.46	0.50
1:A:335:GLU:HG3	1:A:413:THR:CA	2.41	0.50
1:A:86:LEU:HB3	1:A:89:VAL:HG11	1.94	0.50
1:A:364:SER:HB3	1:A:372:THR:HA	1.93	0.50
2:B:52:SER:HB2	2:B:100(C):ASP:O	2.12	0.50
2:B:61:ASP:HA	2:B:64:LYS:HE2	1.93	0.50
1:A:259:LEU:HB2	1:A:374:HIS:CE1	2.47	0.50
1:A:338:TRP:CZ2	1:A:390:LEU:HG	2.47	0.49
1:A:377:ASN:OD1	1:A:377:ASN:C	2.50	0.49
1:A:349:LEU:HD13	1:A:468:PHE:HE2	1.78	0.49
1:A:456:ARG:HD3	1:A:468:PHE:HE1	1.76	0.49
1:A:268:GLU:O	3:A:789:NAG:H83	2.13	0.49
1:A:297:THR:CB	1:A:444:THR:HB	2.42	0.49
1:A:333:ILE:HD12	1:A:390:LEU:HD13	1.93	0.49
1:A:65:VAL:HG13	1:A:209:SER:O	2.13	0.48
1:A:381:GLU:HB2	1:A:383:PHE:HE2	1.77	0.48
1:A:400:TYR:N	1:A:400:TYR:CD2	2.81	0.48
2:B:22:CYS:HB3	2:B:78:VAL:HG12	1.96	0.48
1:A:297:THR:HB	1:A:444:THR:HA	1.96	0.48
1:A:363:PRO:CG	1:A:388:SER:HA	2.44	0.48
1:A:389:ASP:C	1:A:403:THR:HG21	2.31	0.47
1:A:45:TRP:N	1:A:490:GLU:O	2.47	0.47
1:A:223:PHE:CE1	1:A:490:GLU:HB3	2.49	0.47
1:A:374:HIS:CD2	1:A:376:PHE:CD1	3.02	0.47
1:A:391:PHE:CG	1:A:470:PRO:HG3	2.50	0.47
1:A:216:HIS:CE1	1:A:250:GLY:N	2.83	0.47
1:A:389:ASP:HA	1:A:403:THR:HG23	1.93	0.47
1:A:257:THR:O	1:A:258:GLN:HB2	2.15	0.47
2:B:31:SER:HB3	2:B:97:ARG:O	2.15	0.47
1:A:45:TRP:CG	1:A:45:TRP:O	2.68	0.46
1:A:59:LYS:HD2	1:A:62:GLU:OE2	2.15	0.46
1:A:105:HIS:O	1:A:109:ILE:HG13	2.15	0.46
1:A:476:ARG:NH2	2:B:102:ASP:OD1	2.49	0.46
1:A:113:ASP:OD2	2:B:27:ARG:NH2	2.48	0.46
3:A:892:NAG:H83	3:A:892:NAG:H2	1.80	0.46
2:B:67:PHE:CE1	2:B:82:MET:HB3	2.51	0.46
1:A:368:ASP:O	1:A:372:THR:HG23	2.16	0.46
1:A:219:ALA:HA	1:A:220:PRO:HD3	1.84	0.46
1:A:262:ASN:OD1	1:A:447:SER:HB2	2.15	0.46
1:A:400:TYR:N	1:A:400:TYR:HD2	2.13	0.46
2:B:83:LYS:HB3	2:B:85:GLU:OE1	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:60:ALA:HA	1:A:71:THR:HG21	1.98	0.46
1:A:85:VAL:O	1:A:86:LEU:HD23	2.16	0.46
1:A:484:TYR:H	1:A:484:TYR:HD1	1.64	0.45
2:B:84:PRO:HA	2:B:111:VAL:HB	1.97	0.45
2:B:51:ILE:HA	2:B:56:THR:O	2.17	0.45
1:A:68:VAL:HG12	1:A:69:TRP:N	2.31	0.45
1:A:112:TRP:CZ3	2:B:98:PRO:HB2	2.52	0.45
1:A:383:PHE:N	1:A:383:PHE:CD2	2.84	0.45
1:A:55:ALA:HA	1:A:75:VAL:O	2.17	0.45
1:A:397:ASN:OD1	3:A:897:NAG:C7	2.65	0.45
1:A:47:GLU:CA	1:A:489:VAL:HG12	2.46	0.45
1:A:258:GLN:HG2	1:A:470:PRO:HB2	1.99	0.44
1:A:84:MET:SD	1:A:84:MET:N	2.90	0.44
1:A:66:HIS:CE1	1:A:212:PRO:HA	2.52	0.44
1:A:255:VAL:HG13	1:A:475:MET:SD	2.58	0.44
1:A:104:MET:O	1:A:108:ILE:HG12	2.18	0.44
1:A:283:THR:HG22	1:A:284:ILE:N	2.32	0.44
1:A:295:VAL:HG13	1:A:446:ASN:OD1	2.18	0.44
1:A:387:THR:O	1:A:387:THR:HG23	2.18	0.43
1:A:270:ILE:H	3:A:789:NAG:H61	1.82	0.43
1:A:58:ALA:HB1	1:A:71:THR:HG23	2.00	0.43
1:A:87:ALA:C	1:A:89:VAL:H	2.21	0.43
2:B:3:GLN:HB2	2:B:25:SER:CB	2.48	0.43
2:B:3:GLN:O	2:B:24:ALA:HA	2.18	0.43
1:A:101:VAL:HG13	1:A:479:TRP:HB2	2.00	0.43
1:A:87:ALA:O	1:A:88:ASN:HB2	2.19	0.42
2:B:54:GLY:HA3	2:B:100(C):ASP:OD1	2.19	0.42
1:A:369:LEU:HD23	2:B:100(A):TYR:HB2	2.01	0.42
1:A:452:LEU:HD12	1:A:452:LEU:N	2.34	0.42
1:A:447:SER:HB3	3:A:762:NAG:HN2	1.85	0.42
1:A:75:VAL:HG13	1:A:76:PRO:HD2	2.01	0.42
1:A:255:VAL:HG13	1:A:475:MET:HG3	2.02	0.42
1:A:90:THR:HA	1:A:239:CYS:O	2.20	0.41
1:A:289:ASN:ND2	3:A:789:NAG:C7	2.76	0.41
2:B:63:VAL:CG1	2:B:67:PHE:HB2	2.50	0.41
1:A:341:THR:O	1:A:345:VAL:HG23	2.20	0.41
1:A:348:GLU:HA	1:A:351:LYS:HG3	2.03	0.41
1:A:295:VAL:HG22	1:A:446:ASN:CG	2.41	0.41
1:A:78:ASP:HA	1:A:79:PRO:HD3	1.90	0.41
1:A:403:THR:HG22	1:A:404:GLY:N	2.36	0.41
2:B:100:ARG:O	2:B:100:ARG:HG3	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:334:ASN:OD1	1:A:337:LYS:HG3	2.20	0.41
1:A:349:LEU:HD22	1:A:468:PHE:CE2	2.55	0.41
1:A:396:ARG:HG3	1:A:397:ASN:N	2.35	0.41
2:B:24:ALA:CB	2:B:28:ILE:HD11	2.51	0.40
1:A:421:LYS:HE3	1:A:421:LYS:HB3	1.97	0.40
1:A:364:SER:CB	1:A:372:THR:HA	2.52	0.40
1:A:232:THR:O	1:A:232:THR:CG2	2.70	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	280/382 (73%)	253 (90%)	24 (9%)	3 (1%)	12	26
2	B	125/143 (87%)	118 (94%)	6 (5%)	1 (1%)	16	34
All	All	405/525 (77%)	371 (92%)	30 (7%)	4 (1%)	13	29

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	82	GLN
1	A	354	PRO
1	A	396	ARG
2	B	100(I)	ASP

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	260/334 (78%)	240 (92%)	20 (8%)	10	22
2	B	101/117 (86%)	98 (97%)	3 (3%)	36	63
All	All	361/451 (80%)	338 (94%)	23 (6%)	14	32

All (23) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	57	ASP
1	A	68	VAL
1	A	82	GLN
1	A	84	MET
1	A	89	VAL
1	A	90	THR
1	A	209	SER
1	A	233	PHE
1	A	242	VAL
1	A	257	THR
1	A	267	GLU
1	A	341	THR
1	A	364	SER
1	A	383	PHE
1	A	385	CYS
1	A	387	THR
1	A	400	TYR
1	A	418	CYS
1	A	444	THR
1	A	467	THR
2	B	25	SER
2	B	70	SER
2	B	110	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	66	HIS
1	A	67	ASN
1	A	82	GLN
1	A	246	GLN

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Mol	Chain	Res	Type
1	A	374	HIS
2	B	76	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](#)

8 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	NAG	A	886	1	14,14,15	0.54	0	17,19,21	0.97	0
3	NAG	A	892	-	14,14,15	0.44	0	17,19,21	1.32	3 (17%)
3	NAG	A	776	1	14,14,15	0.40	0	17,19,21	2.00	3 (17%)
3	NAG	A	789	1	14,14,15	0.44	0	17,19,21	0.89	1 (5%)
3	NAG	A	762	1	14,14,15	0.55	0	17,19,21	1.02	1 (5%)
3	NAG	A	897	1	14,14,15	0.61	0	17,19,21	1.12	2 (11%)
3	NAG	A	734	1	14,14,15	0.40	0	17,19,21	1.93	2 (11%)
3	NAG	A	741	1	14,14,15	0.71	0	17,19,21	1.35	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	A	886	1	-	4/6/23/26	0/1/1/1
3	NAG	A	892	-	-	2/6/23/26	0/1/1/1
3	NAG	A	776	1	-	3/6/23/26	0/1/1/1
3	NAG	A	789	1	-	4/6/23/26	0/1/1/1
3	NAG	A	897	1	1/1/5/7	0/6/23/26	0/1/1/1
3	NAG	A	762	1	-	2/6/23/26	0/1/1/1
3	NAG	A	734	1	1/1/5/7	2/6/23/26	0/1/1/1
3	NAG	A	741	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	776	NAG	C1-O5-C5	6.03	120.27	112.19
3	A	734	NAG	C1-O5-C5	5.97	120.19	112.19
3	A	734	NAG	O5-C1-C2	4.25	117.87	111.29
3	A	892	NAG	C1-O5-C5	3.56	116.95	112.19
3	A	741	NAG	O5-C1-C2	-3.39	106.04	111.29
3	A	776	NAG	O5-C1-C2	3.26	116.34	111.29
3	A	776	NAG	C4-C3-C2	-3.21	106.31	111.02
3	A	741	NAG	C1-O5-C5	-3.10	108.03	112.19
3	A	897	NAG	C1-O5-C5	2.70	115.80	112.19
3	A	892	NAG	C4-C3-C2	-2.47	107.40	111.02
3	A	762	NAG	C1-O5-C5	2.27	115.23	112.19
3	A	789	NAG	O5-C1-C2	-2.21	107.88	111.29
3	A	892	NAG	C2-N2-C7	-2.13	120.04	122.90
3	A	897	NAG	O5-C1-C2	2.10	114.54	111.29

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
3	A	734	NAG	C1
3	A	897	NAG	C1

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	789	NAG	C8-C7-N2-C2
3	A	789	NAG	O7-C7-N2-C2
3	A	886	NAG	O7-C7-N2-C2
3	A	892	NAG	C8-C7-N2-C2
3	A	892	NAG	O7-C7-N2-C2
3	A	886	NAG	C8-C7-N2-C2
3	A	762	NAG	O5-C5-C6-O6
3	A	886	NAG	O5-C5-C6-O6
3	A	886	NAG	C4-C5-C6-O6
3	A	789	NAG	O5-C5-C6-O6
3	A	789	NAG	C4-C5-C6-O6
3	A	734	NAG	C8-C7-N2-C2
3	A	762	NAG	C4-C5-C6-O6
3	A	734	NAG	O7-C7-N2-C2
3	A	776	NAG	C8-C7-N2-C2
3	A	776	NAG	O7-C7-N2-C2
3	A	776	NAG	O5-C5-C6-O6

There are no ring outliers.

5 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	892	NAG	2	0
3	A	789	NAG	3	0
3	A	762	NAG	1	0
3	A	897	NAG	1	0
3	A	741	NAG	3	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	292/382 (76%)	1.39	71 (24%) 2 2	65, 135, 201, 256	0
2	B	127/143 (88%)	0.19	1 (0%) 82 79	47, 81, 113, 132	1 (0%)
All	All	419/525 (79%)	1.03	72 (17%) 5 4	47, 115, 194, 256	1 (0%)

All (72) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	389	ASP	10.0
1	A	82	GLN	6.7
1	A	449	ILE	5.6
1	A	399	THR	5.5
1	A	296	CYS	5.4
1	A	415	THR	5.1
1	A	403	THR	5.0
1	A	396	ARG	4.9
1	A	402	HIS	4.5
1	A	413	THR	4.4
1	A	208	VAL	4.4
1	A	271	ILE	4.3
1	A	404	GLY	4.1
1	A	298	ARG	3.9
1	A	229	ASN	3.8
1	A	246	GLN	3.7
1	A	398	GLY	3.7
1	A	115	SER	3.7
1	A	270	ILE	3.4
2	B	113	SER	3.4
1	A	259	LEU	3.3
1	A	356	SER	3.2
1	A	272	ILE	3.1
1	A	116	LEU	3.1

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Mol	Chain	Res	Type	RSRZ
1	A	90	THR	3.1
1	A	397	ASN	3.1
1	A	414	ILE	3.0
1	A	331	CYS	3.0
1	A	65	VAL	2.9
1	A	353	PHE	2.9
1	A	62	GLU	2.9
1	A	484	TYR	2.9
1	A	265	LEU	2.8
1	A	416	LEU	2.7
1	A	419	LYS	2.7
1	A	297	THR	2.7
1	A	230	ASN	2.7
1	A	391	PHE	2.7
1	A	226	LEU	2.6
1	A	387	THR	2.6
1	A	83	GLU	2.6
1	A	382	PHE	2.6
1	A	338	TRP	2.6
1	A	268	GLU	2.5
1	A	446	ASN	2.5
1	A	45	TRP	2.5
1	A	88	ASN	2.5
1	A	266	ALA	2.5
1	A	383	PHE	2.5
1	A	288	LEU	2.5
1	A	241	ASN	2.5
1	A	388	SER	2.4
1	A	260	LEU	2.4
1	A	386	ASN	2.4
1	A	485	LYS	2.4
1	A	217	TYR	2.3
1	A	80	ASN	2.3
1	A	56	SER	2.3
1	A	273	ARG	2.2
1	A	81	PRO	2.2
1	A	295	VAL	2.2
1	A	393	GLY	2.2
1	A	392	ASN	2.2
1	A	390	LEU	2.1
1	A	242	VAL	2.1
1	A	395	TYR	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	214	PRO	2.1
1	A	78	ASP	2.1
1	A	89	VAL	2.0
1	A	233	PHE	2.0
1	A	332	ASN	2.0
1	A	400	TYR	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 monosaccharides 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
3	NAG	A	741	14/15	0.56	0.31	181,209,250,257	0
3	NAG	A	892	14/15	0.63	0.15	122,163,173,174	0
3	NAG	A	897	14/15	0.63	0.26	138,142,148,149	0
3	NAG	A	776	14/15	0.70	0.11	92,128,156,161	0
3	NAG	A	886	14/15	0.72	0.15	118,134,152,153	0
3	NAG	A	789	14/15	0.73	0.12	117,138,153,156	0
3	NAG	A	734	14/15	0.77	0.19	121,140,148,149	0
3	NAG	A	762	14/15	0.80	0.21	109,144,172,178	0

6.5 Other polymers [i](#)

There are no such residues in this entry.