WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

Oct 29, 2024 – 09:06 PM EDT

PDB ID	:	4LSR
Title	:	Crystal structure of broadly and potently neutralizing antibody VRC-CH31 in complex with HIV-1 clade A/E stran 93TH057 gp120 with LOOP D and Loop V5 from clade A strain KER_2018_11
Authors	:	Zhou, T.; Moquin, S.; Kwong, P.D.
Deposited on	:	2013-07-23
Resolution	:	2.28 Å(reported)

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

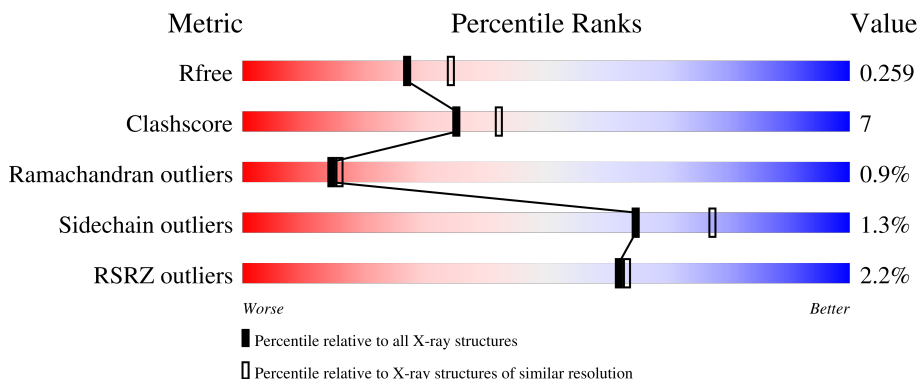|		
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (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 2.28 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	Percentile Ranks	Value
Rfree		0.259
Clashscore		7
Ramachandran outliers		0.9%
Sidechain outliers		1.3%
RSRZ outliers		2.2%

Worse ... *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	164625	8487 (2.30-2.26)
Clashscore	180529	9437 (2.30-2.26)
Ramachandran outliers	177936	9341 (2.30-2.26)
Sidechain outliers	177891	9342 (2.30-2.26)
RSRZ outliers	164620	8487 (2.30-2.26)

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	G	356	85% ... 11% · ·
2	H	236	74% ... 17% · 8%
3	L	210	83% ... 16% ·

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:

![Worldwide Protein Data Bank logo]

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
5	SO4	G	513	-	-	X	-

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 6316 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 ENVELOPE GLYCOPROTEIN GP120 WITH LOOP D AND V5 FROM STRAIN ker_2018_11.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	G	345	Total	C	N	O	S	0	0	0
			2700	1692	472	513	23			

- Molecule 2 is a protein called HEAVY CHAIN OF ANTIBODY VRC-CH31.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	217	Total	C	N	O	S	0	0	0
			1652	1044	288	314	6			

- Molecule 3 is a protein called LIGHT CHAIN OF ANTIBODY VRC-CH31 (N70D MUTATION).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	L	208	Total	C	N	O	S	0	0	0
			1589	989	270	325	5			

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).

NAG

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	G	1	Total 14	C 8	N 1	O 5	0	0
4	G	1	Total 14	C 8	N 1	O 5	0	0
4	G	1	Total 14	C 8	N 1	O 5	0	0
4	G	1	Total 14	C 8	N 1	O 5	0	0
4	G	1	Total 14	C 8	N 1	O 5	0	0
4	G	1	Total 14	C 8	N 1	O 5	0	0
4	G	1	Total 14	C 8	N 1	O 5	0	0
4	G	1	Total 14	C 8	N 1	O 5	0	0
4	G	1	Total 14	C 8	N 1	O 5	0	0

• Molecule 5 is SULFATE ION (three-letter code: SO4) (formula: O_4S).

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

- Molecule 6 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	G	141	Total O 141 141		0	0
6	H	58	Total O 58 58		0	0
6	L	25	Total O 25 25		0	0

3 Residue-property plots ⓘ

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.
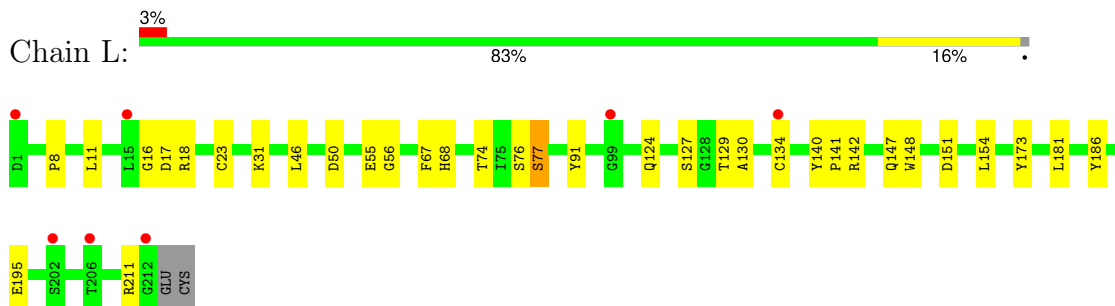
• Molecule 1: ENVELOPE GLYCOPROTEIN GP120 WITH LOOP D AND V5 FROM STRAIN ker_2018_11
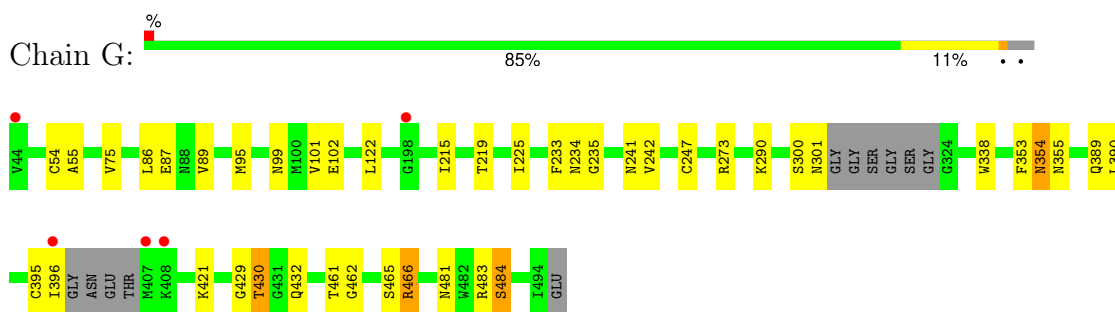
• Molecule 2: HEAVY CHAIN OF ANTIBODY VRC-CH31
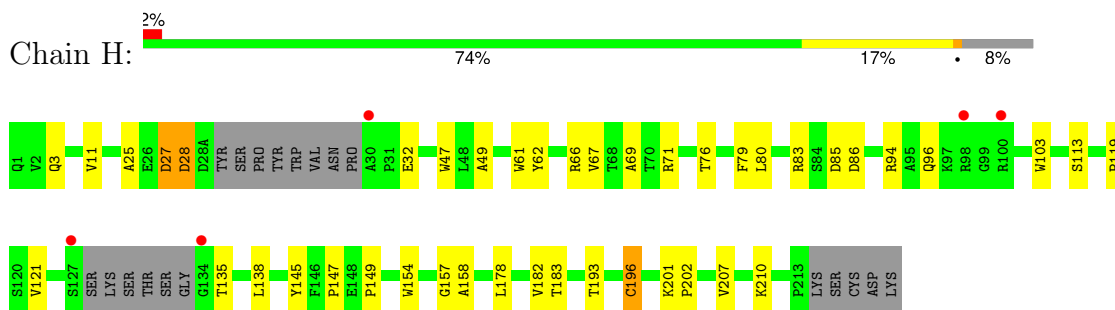
• Molecule 3: LIGHT CHAIN OF ANTIBODY VRC-CH31 (N70D MUTATION)

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	64.93Å 67.73Å 220.12Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.50 – 2.28 39.50 – 2.28	Depositor EDS
% Data completeness (in resolution range)	90.5 (39.50-2.28) 90.5 (39.50-2.28)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	0.11	Depositor
$< I/\sigma(I) >$ [1]	2.70 (at 2.29Å)	Xtriage
Refinement program	PHENIX dev_998	Depositor
R, R_{free}	0.194 , 0.258 0.197 , 0.259	Depositor DCC
R_{free} test set	2075 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å^2)	41.1	Xtriage
Anisotropy	0.781	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 55.3	EDS
L-test for twinning[2]	$< |L| > = 0.46, < L^2 > = 0.28$	Xtriage
Estimated twinning fraction	0.037 for k,h,-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	6316	wwPDB-VP
Average B, all atoms (Å^2)	71.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.04% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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: NAG, SO4

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$|Z|$ >5	RMSZ	#$|Z|$ >5
1	G	0.31	0/2756	0.49	0/3738
2	H	0.29	0/1695	0.48	0/2314
3	L	0.26	0/1619	0.43	0/2192
All	All	0.29	0/6070	0.47	0/8244

There are no bond length outliers.

There are no bond angle outliers.

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	G	2700	0	2635	39	0
2	H	1652	0	1608	29	0
3	L	1589	0	1545	22	0
4	G	126	0	117	4	0
5	G	20	0	0	2	0
5	H	5	0	0	0	0
6	G	141	0	0	10	0
6	H	58	0	0	2	0
6	L	25	0	0	3	0
All	All	6316	0	5905	88	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 7.

All (88) 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:L:55:GLU:OE1	6:L:322:HOH:O	1.87	0.92
1:G:273:ARG:NH1	6:G:701:HOH:O	2.04	0.89
1:G:233:PHE:O	6:G:684:HOH:O	2.04	0.75
3:L:46:LEU:O	6:L:322:HOH:O	2.09	0.70
1:G:300:SER:O	6:G:725:HOH:O	2.11	0.69
1:G:354:ASN:O	1:G:355:ASN:OD1	2.13	0.66
1:G:241:ASN:ND2	6:G:719:HOH:O	2.28	0.66
1:G:290:LYS:NZ	5:G:513:SO4:O2	2.28	0.65
1:G:462:GLY:O	1:G:465:SER:OG	2.17	0.62
2:H:149:PRO:O	6:H:428:HOH:O	2.16	0.61
1:G:432:GLN:NE2	6:G:680:HOH:O	2.35	0.60
1:G:290:LYS:NZ	5:G:513:SO4:S	2.77	0.57
3:L:140:TYR:CG	3:L:141:PRO:HA	2.39	0.56
1:G:461:THR:HG23	1:G:462:GLY:N	2.21	0.55
3:L:147:GLN:HB2	3:L:154:LEU:CD1	2.37	0.55
1:G:86:LEU:HB2	1:G:89:VAL:CG1	2.38	0.53
1:G:101:VAL:HG21	1:G:483:ARG:HG2	1.91	0.53
1:G:389:GLN:HA	4:G:509:NAG:H81	1.90	0.53
1:G:99:ASN:HA	1:G:102:GLU:HG2	1.91	0.52
3:L:134:CYS:HB2	3:L:148:TRP:CH2	2.45	0.52
3:L:67:PHE:O	6:L:324:HOH:O	2.19	0.52
1:G:300:SER:OG	1:G:301:ASN:N	2.42	0.51
2:H:27:ASP:O	2:H:28:ASP:CB	2.58	0.51
1:G:86:LEU:HB2	1:G:89:VAL:HG11	1.93	0.51
2:H:178:LEU:C	2:H:178:LEU:HD12	2.30	0.51
1:G:353:PHE:O	1:G:354:ASN:C	2.48	0.50
1:G:95:MET:SD	1:G:273:ARG:HD3	2.52	0.50
1:G:481:ASN:O	1:G:484:SER:HB3	2.12	0.49
2:H:3:GLN:HG3	2:H:103:TRP:O	2.11	0.49
2:H:96:GLN:HA	2:H:96:GLN:OE1	2.13	0.49
4:G:503:NAG:H82	3:L:91:TYR:CZ	2.46	0.49
1:G:122:LEU:HD12	1:G:122:LEU:N	2.26	0.49
2:H:193:THR:HG23	2:H:210:LYS:HE3	1.94	0.49
3:L:134:CYS:HB2	3:L:148:TRP:CZ2	2.48	0.49
3:L:31:LYS:O	3:L:50:ASP:HA	2.13	0.48
2:H:66:ARG:NH2	2:H:86:ASP:OD2	2.45	0.48
2:H:67:VAL:CG1	2:H:80:LEU:HD11	2.43	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:L:140:TYR:CD2	3:L:141:PRO:HA	2.49	0.48
3:L:147:GLN:HG3	3:L:195:GLU:HB3	1.96	0.48
1:G:89:VAL:CG1	1:G:242:VAL:HB	2.43	0.48
2:H:154:TRP:CE2	2:H:182:VAL:CG2	2.96	0.48
1:G:338:TRP:CE2	1:G:390:LEU:HD22	2.49	0.48
1:G:95:MET:SD	1:G:235:GLY:HA3	2.54	0.47
1:G:234:ASN:HA	6:G:684:HOH:O	2.15	0.47
2:H:83:ARG:HD2	6:H:412:HOH:O	2.15	0.47
3:L:142:ARG:HB2	3:L:173:TYR:CE2	2.50	0.46
4:G:503:NAG:H82	3:L:91:TYR:CE2	2.51	0.46
2:H:138:LEU:O	2:H:182:VAL:N	2.46	0.46
2:H:11:VAL:HG21	2:H:147:PRO:HG3	1.97	0.46
1:G:273:ARG:NH2	6:G:684:HOH:O	2.44	0.46
1:G:55:ALA:HA	1:G:75:VAL:O	2.16	0.46
3:L:124:GLN:O	3:L:127:SER:HB3	2.16	0.45
2:H:47:TRP:CZ2	2:H:49:ALA:HA	2.52	0.45
2:H:85:ASP:OD1	2:H:85:ASP:C	2.55	0.45
2:H:121:VAL:CG1	2:H:207:VAL:HG11	2.47	0.45
1:G:353:PHE:O	1:G:355:ASN:N	2.50	0.45
2:H:201:LYS:N	2:H:202:PRO:CD	2.80	0.44
3:L:129:THR:HG22	3:L:130:ALA:N	2.32	0.44
1:G:421:LYS:NZ	6:G:663:HOH:O	2.45	0.44
1:G:461:THR:CG2	1:G:462:GLY:N	2.80	0.44
2:H:119:PRO:HB3	2:H:145:TYR:HB3	1.99	0.44
2:H:25:ALA:O	2:H:76:THR:HB	2.18	0.43
3:L:181:LEU:CD1	3:L:186:TYR:HB2	2.48	0.43
1:G:466:ARG:HD3	2:H:61:TRP:CD2	2.54	0.43
1:G:247:CYS:HB2	6:G:720:HOH:O	2.19	0.42
3:L:18:ARG:NH1	3:L:74:THR:HG21	2.34	0.42
3:L:8:PRO:CG	3:L:11:LEU:HD23	2.49	0.42
1:G:54:CYS:HB2	1:G:215:ILE:CG2	2.50	0.42
2:H:154:TRP:CH2	2:H:196:CYS:HB3	2.55	0.42
1:G:395:CYS:C	1:G:396:ILE:HG12	2.41	0.41
2:H:27:ASP:CA	2:H:76:THR:HG21	2.50	0.41
3:L:16:GLY:HA2	3:L:77:SER:HB2	2.02	0.41
2:H:27:ASP:O	2:H:28:ASP:CG	2.58	0.41
2:H:69:ALA:HA	2:H:79:PHE:O	2.20	0.41
1:G:461:THR:HG23	1:G:462:GLY:H	1.85	0.41
2:H:27:ASP:O	2:H:28:ASP:HB2	2.20	0.41
1:G:219:THR:HG23	1:G:225:ILE:CG1	2.51	0.41
2:H:154:TRP:CE2	2:H:182:VAL:HG21	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:L:17:ASP:OD1	3:L:18:ARG:N	2.54	0.41
1:G:461:THR:CG2	2:H:62:TYR:CE2	3.04	0.41
2:H:135:THR:CG2	2:H:183:THR:HG23	2.50	0.40
3:L:55:GLU:HG2	3:L:56:GLY:N	2.36	0.40
1:G:273:ARG:NE	6:G:684:HOH:O	2.32	0.40
4:G:503:NAG:H82	3:L:91:TYR:OH	2.21	0.40
1:G:89:VAL:HG11	1:G:242:VAL:HB	2.01	0.40
1:G:429:GLY:O	1:G:430:THR:O	2.40	0.40
2:H:157:GLY:O	2:H:158:ALA:C	2.59	0.40
2:H:32:GLU:HB3	2:H:94:ARG:NH2	2.36	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	G	339/356 (95%)	320 (94%)	16 (5%)	3 (1%)	14	16
2	H	211/236 (89%)	205 (97%)	5 (2%)	1 (0%)	25	30
3	L	206/210 (98%)	193 (94%)	10 (5%)	3 (2%)	8	7
All	All	756/802 (94%)	718 (95%)	31 (4%)	7 (1%)	14	16

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	G	430	THR
2	H	28	ASP
1	G	354	ASN
3	L	68	HIS
1	G	87	GLU
3	L	76	SER
3	L	211	ARG

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	G	308/314 (98%)	306 (99%)	2 (1%)	84	91
2	H	180/198 (91%)	176 (98%)	4 (2%)	47	62
3	L	180/182 (99%)	177 (98%)	3 (2%)	56	70
All	All	668/694 (96%)	659 (99%)	9 (1%)	65	77

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

Mol	Chain	Res	Type
1	G	466	ARG
1	G	484	SER
2	H	27	ASP
2	H	71	ARG
2	H	113	SER
2	H	196	CYS
3	L	23	CYS
3	L	77	SER
3	L	151	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	G	216	HIS
1	G	422	GLN

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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

14 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	#$|Z| > 2$
4	NAG	G	509	1	14,14,15	0.54	0	17,19,21	1.27	2 (11%)
4	NAG	G	504	1	14,14,15	0.54	0	17,19,21	1.31	1 (5%)
5	SO4	G	510	-	4,4,4	0.23	0	6,6,6	0.12	0
4	NAG	G	505	1	14,14,15	0.51	0	17,19,21	0.59	0
5	SO4	H	301	-	4,4,4	0.24	0	6,6,6	0.09	0
4	NAG	G	503	1	14,14,15	0.58	0	17,19,21	0.73	0
5	SO4	G	511	-	4,4,4	0.26	0	6,6,6	0.05	0
4	NAG	G	501	1	14,14,15	0.59	0	17,19,21	0.70	1 (5%)
4	NAG	G	508	1	14,14,15	0.54	0	17,19,21	0.83	1 (5%)
4	NAG	G	507	1	14,14,15	0.60	0	17,19,21	0.90	1 (5%)
5	SO4	G	513	-	4,4,4	0.24	0	6,6,6	0.05	0
5	SO4	G	512	-	4,4,4	0.26	0	6,6,6	0.08	0
4	NAG	G	506	1	14,14,15	0.51	0	17,19,21	0.74	0
4	NAG	G	502	1	14,14,15	0.61	0	17,19,21	0.85	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
4	NAG	G	509	1	-	2/6/23/26	0/1/1/1
4	NAG	G	504	1	-	0/6/23/26	0/1/1/1
4	NAG	G	505	1	-	0/6/23/26	0/1/1/1
4	NAG	G	503	1	-	1/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	G	501	1	-	3/6/23/26	0/1/1/1
4	NAG	G	508	1	-	0/6/23/26	0/1/1/1
4	NAG	G	507	1	-	3/6/23/26	0/1/1/1
4	NAG	G	506	1	-	1/6/23/26	0/1/1/1
4	NAG	G	502	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	G	504	NAG	C1-O5-C5	4.32	117.98	112.19
4	G	509	NAG	O5-C1-C2	3.36	116.49	111.29
4	G	509	NAG	O5-C5-C6	2.49	112.50	107.66
4	G	508	NAG	C2-N2-C7	-2.24	119.90	122.90
4	G	501	NAG	C1-O5-C5	2.03	114.90	112.19
4	G	507	NAG	O5-C1-C2	2.02	114.42	111.29

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	G	506	NAG	C1-C2-N2-C7
4	G	507	NAG	C1-C2-N2-C7
4	G	507	NAG	O7-C7-N2-C2
4	G	507	NAG	C8-C7-N2-C2
4	G	509	NAG	C8-C7-N2-C2
4	G	509	NAG	O7-C7-N2-C2
4	G	501	NAG	C8-C7-N2-C2
4	G	501	NAG	O7-C7-N2-C2
4	G	501	NAG	O5-C5-C6-O6
4	G	503	NAG	O5-C5-C6-O6

There are no ring outliers.

3 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	G	509	NAG	1	0
4	G	503	NAG	3	0
5	G	513	SO4	2	0

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	G	345/356 (96%)	-0.05	5 (1%)	73	74	30, 52, 102, 170	0
2	H	217/236 (91%)	0.15	5 (2%)	61	62	27, 65, 117, 153	0
3	L	208/210 (99%)	0.61	7 (3%)	48	50	62, 96, 127, 140	0
All	All	770/802 (96%)	0.18	17 (2%)	62	63	27, 66, 119, 170	0

All (17) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	396	ILE	3.8
3	L	202	SER	3.5
3	L	99	GLY	3.4
3	L	212	GLY	3.3
1	G	407	MET	2.9
3	L	1	ASP	2.8
2	H	30	ALA	2.7
2	H	127	SER	2.6
2	H	134	GLY	2.5
3	L	206	THR	2.5
1	G	44	VAL	2.4
3	L	134	CYS	2.4
1	G	408	LYS	2.3
1	G	198	GLY	2.2
3	L	15	LEU	2.2
2	H	98	ARG	2.1
2	H	100	ARG	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 (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
4	NAG	G	507	14/15	0.36	0.14	111,131,136,136	0
5	SO4	H	301	5/5	0.77	0.10	134,137,140,141	0
5	SO4	G	510	5/5	0.78	0.08	89,102,108,116	0
4	NAG	G	509	14/15	0.78	0.12	103,116,130,131	0
5	SO4	G	513	5/5	0.81	0.09	117,122,129,135	0
4	NAG	G	506	14/15	0.85	0.11	61,81,102,105	0
5	SO4	G	511	5/5	0.88	0.11	48,85,99,103	0
4	NAG	G	501	14/15	0.88	0.09	65,74,82,94	0
4	NAG	G	505	14/15	0.88	0.09	64,77,102,107	0
4	NAG	G	503	14/15	0.91	0.09	49,74,81,96	0
4	NAG	G	508	14/15	0.92	0.09	54,63,72,74	0
4	NAG	G	504	14/15	0.92	0.07	55,63,83,93	0
5	SO4	G	512	5/5	0.94	0.21	55,63,67,88	0
4	NAG	G	502	14/15	0.96	0.08	30,46,58,61	0

6.5 Other polymers (i)

There are no such residues in this entry.