



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 8, 2020 – 03:19 PM BST

PDB ID : 5KAQ
Title : Crystal structure of broadly neutralizing Influenza A antibody 31.a.83 in complex with Hemagglutinin Hong Kong 1968.
Authors : Joyce, M.G.; Thomas, P.V.; Wheatley, A.K.; McDermott, A.B.; Mascola, J.R.; Kwong, P.D.
Deposited on : 2016-06-01
Resolution : 3.51 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.13.1
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.13.1

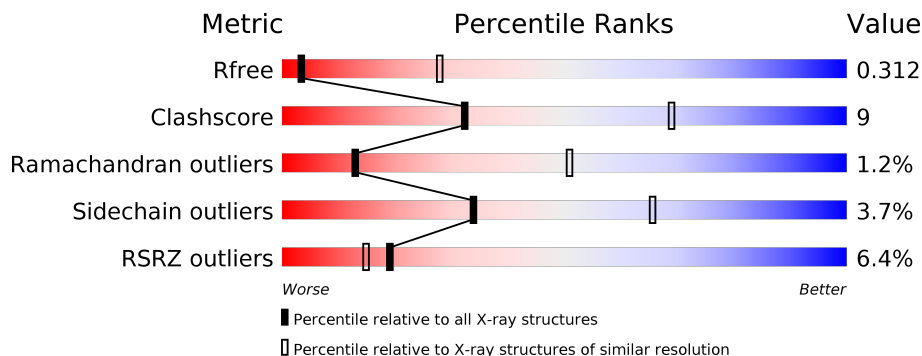
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.51 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}	130704	1161 (3.60-3.44)
Clashscore	141614	1244 (3.60-3.44)
Ramachandran outliers	138981	1206 (3.60-3.44)
Sidechain outliers	138945	1207 (3.60-3.44)
RSRZ outliers	127900	1080 (3.60-3.44)

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 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	512	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background-color: red; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: green; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: yellow; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: orange; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: grey; margin-bottom: 2px;"></div> </div> <p style="font-size: small; margin-top: 5px;"> % 75% 19% • 6% </p>
1	B	512	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background-color: red; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: green; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: yellow; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: orange; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: grey; margin-bottom: 2px;"></div> </div> <p style="font-size: small; margin-top: 5px;"> 3% 74% 18% • 6% </p>
1	C	512	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background-color: red; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: green; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: yellow; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: orange; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: grey; margin-bottom: 2px;"></div> </div> <p style="font-size: small; margin-top: 5px;"> 4% 73% 20% • 6% </p>
2	F	236	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background-color: red; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: green; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: yellow; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: orange; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: grey; margin-bottom: 2px;"></div> </div> <p style="font-size: small; margin-top: 5px;"> 9% 65% 29% • • </p>
2	H	236	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background-color: red; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: green; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: yellow; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: orange; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: grey; margin-bottom: 2px;"></div> </div> <p style="font-size: small; margin-top: 5px;"> 7% 74% 23% • • </p>
2	Q	236	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background-color: red; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: green; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: yellow; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: orange; margin-bottom: 2px;"></div> <div style="width: 100%; height: 10px; background-color: grey; margin-bottom: 2px;"></div> </div> <p style="font-size: small; margin-top: 5px;"> 6% 72% 25% • • </p>

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Mol	Chain	Length	Quality of chain
3	G	214	<p>33% 77% 20%</p>
3	L	214	<p>5% 78% 20%</p>
3	R	214	<p>4% 74% 24%</p>

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
4	NAG	C	601	-	-	-	X

2 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 21766 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 Hemagglutinin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	481	Total 3786	C 2362	N 662	O 743	S 19	1	0	0
1	C	482	Total 3797	C 2368	N 666	O 744	S 19	1	0	0
1	B	480	Total 3788	C 2363	N 664	O 742	S 19	0	0	0

There are 21 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	506	SER	-	expression tag	UNP E1AFM4
A	507	GLY	-	expression tag	UNP E1AFM4
A	508	ARG	-	expression tag	UNP E1AFM4
A	509	LEU	-	expression tag	UNP E1AFM4
A	510	VAL	-	expression tag	UNP E1AFM4
A	511	PRO	-	expression tag	UNP E1AFM4
A	512	ARG	-	expression tag	UNP E1AFM4
C	506	SER	-	expression tag	UNP E1AFM4
C	507	GLY	-	expression tag	UNP E1AFM4
C	508	ARG	-	expression tag	UNP E1AFM4
C	509	LEU	-	expression tag	UNP E1AFM4
C	510	VAL	-	expression tag	UNP E1AFM4
C	511	PRO	-	expression tag	UNP E1AFM4
C	512	ARG	-	expression tag	UNP E1AFM4
B	506	SER	-	expression tag	UNP E1AFM4
B	507	GLY	-	expression tag	UNP E1AFM4
B	508	ARG	-	expression tag	UNP E1AFM4
B	509	LEU	-	expression tag	UNP E1AFM4
B	510	VAL	-	expression tag	UNP E1AFM4
B	511	PRO	-	expression tag	UNP E1AFM4
B	512	ARG	-	expression tag	UNP E1AFM4

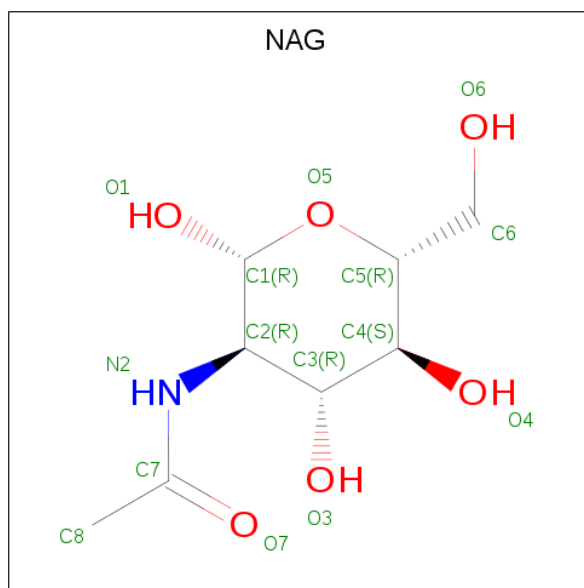
- Molecule 2 is a protein called ANTIBODY 31.A.83 FAB HEAVY CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	F	232	Total	C	N	O	S	1	0	0
			1733	1093	285	347	8			
2	H	233	Total	C	N	O	S	0	0	0
			1742	1098	286	350	8			
2	Q	233	Total	C	N	O	S	0	0	0
			1742	1098	286	350	8			

- Molecule 3 is a protein called ANTIBODY 31.A.83 FAB LIGHT CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	G	213	Total	C	N	O	S	0	0	0
			1642	1025	279	332	6			
3	L	213	Total	C	N	O	S	0	0	0
			1642	1025	279	332	6			
3	R	213	Total	C	N	O	S	0	0	0
			1642	1025	279	332	6			

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



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

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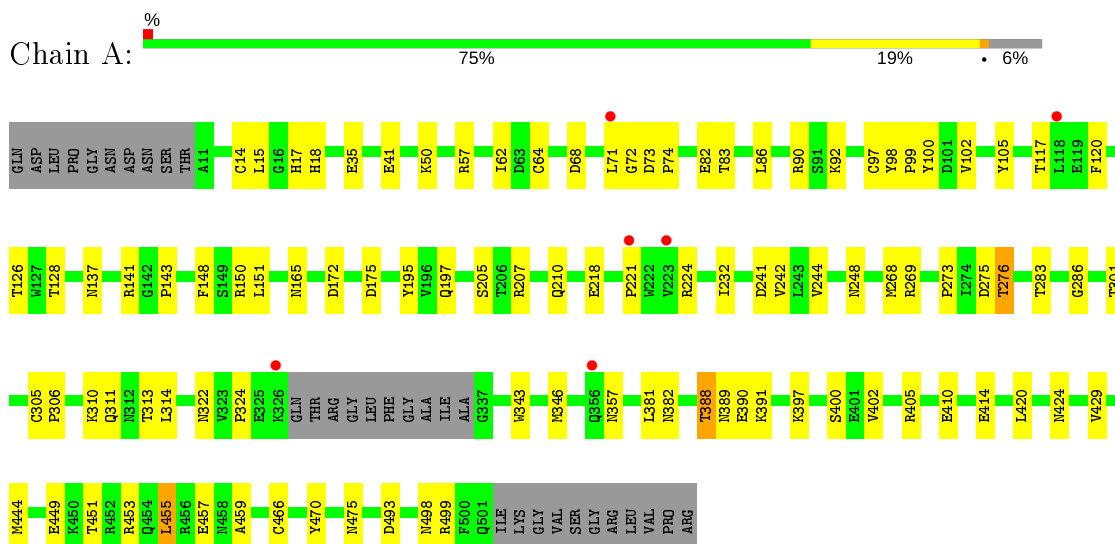
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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	C	1	Total	C	N	O	0	0
			14	8	1	5		
4	C	1	Total	C	N	O	0	0
			14	8	1	5		
4	C	1	Total	C	N	O	0	0
	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

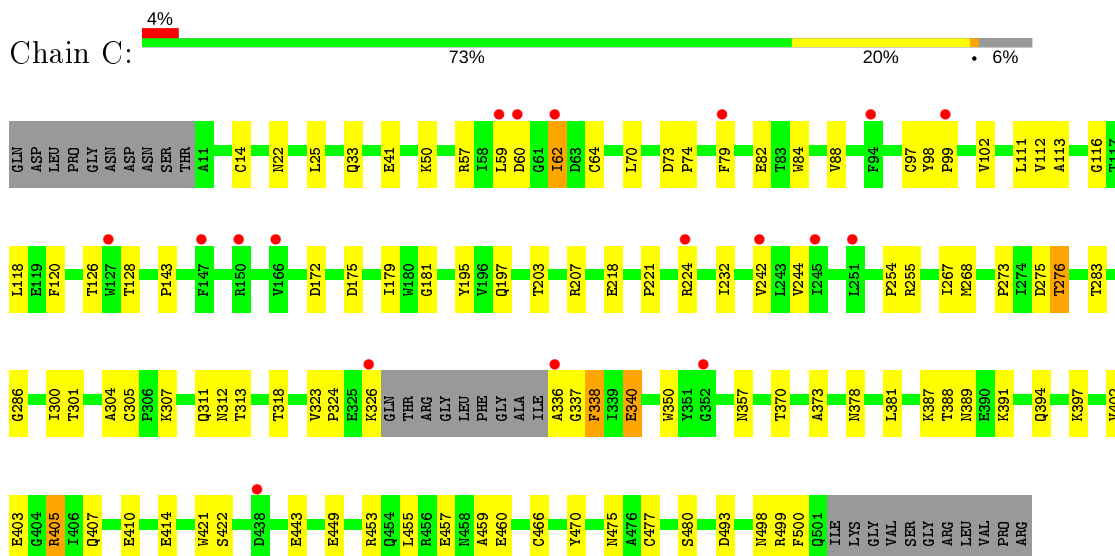
3 Residue-property plots [i](#)

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.

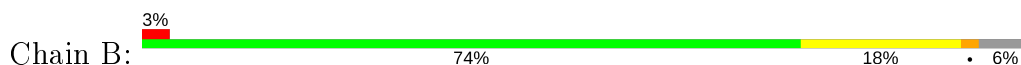
- Molecule 1: Hemagglutinin

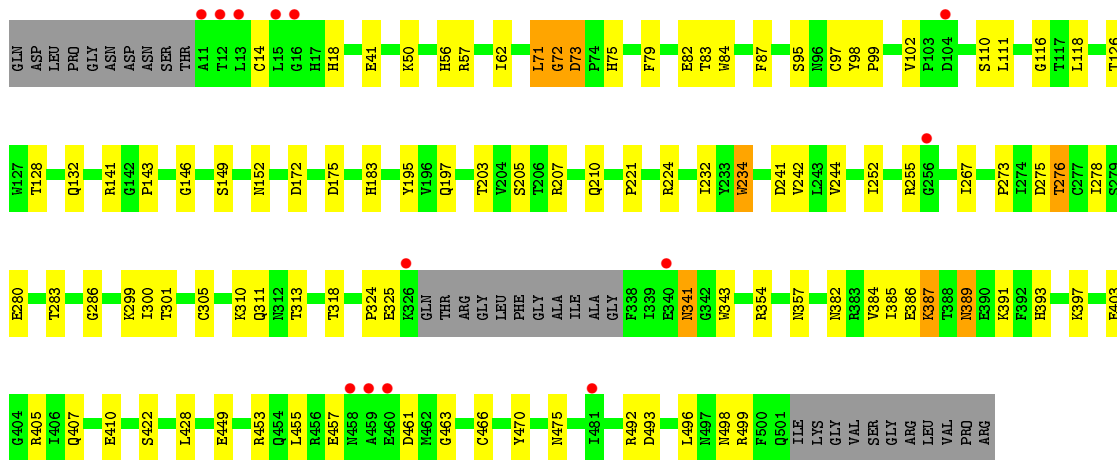


- Molecule 1: Hemagglutinin

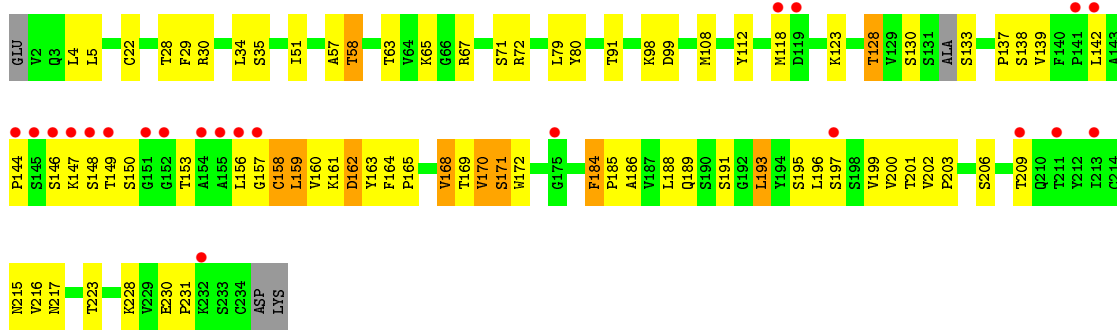


- Molecule 1: Hemagglutinin

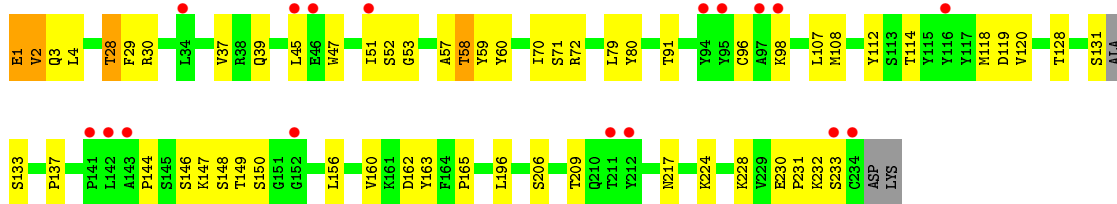
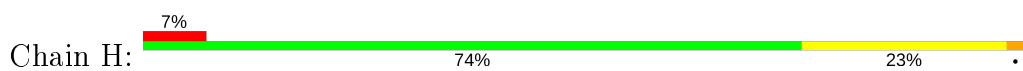




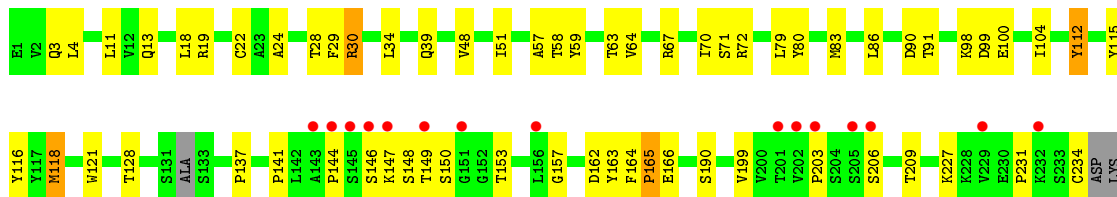
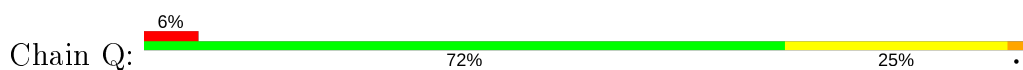
● Molecule 2: ANTIBODY 31.A.83 FAB HEAVY CHAIN



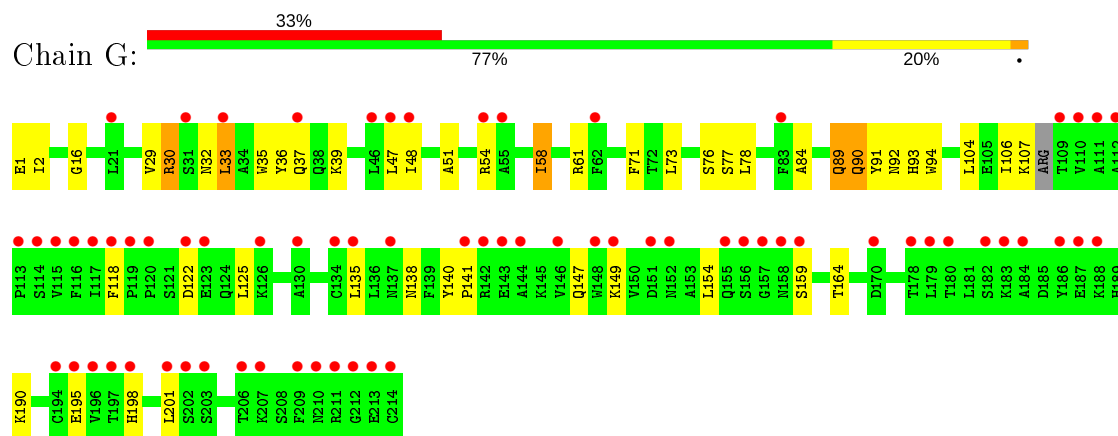
● Molecule 2: ANTIBODY 31.A.83 FAB HEAVY CHAIN



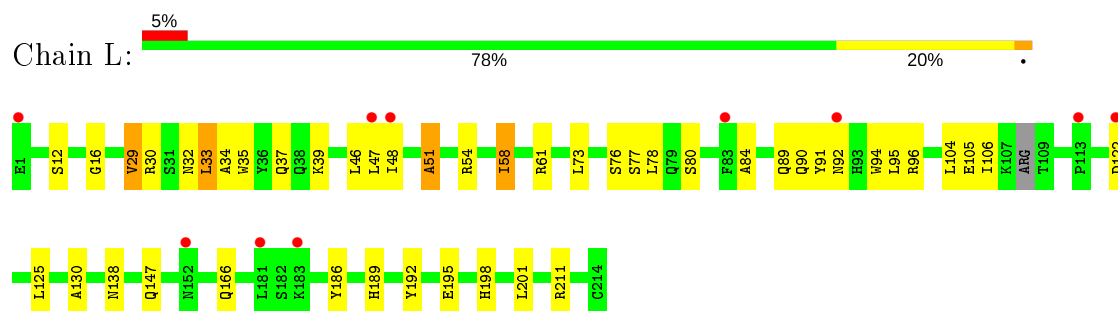
● Molecule 2: ANTIBODY 31.A.83 FAB HEAVY CHAIN



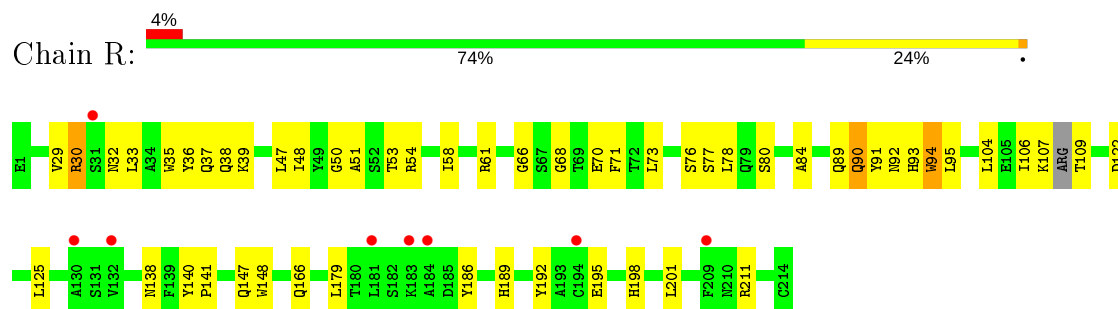
- Molecule 3: ANTIBODY 31.A.83 FAB LIGHT CHAIN



- Molecule 3: ANTIBODY 31.A.83 FAB LIGHT CHAIN



- Molecule 3: ANTIBODY 31.A.83 FAB LIGHT CHAIN



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	279.44Å 154.28Å 157.94Å 90.00° 116.86° 90.00°	Depositor
Resolution (Å)	41.88 – 3.51 48.86 – 3.51	Depositor EDS
% Data completeness (in resolution range)	78.9 (41.88-3.51) 78.9 (48.86-3.51)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.40 (at 3.48Å)	Xtrriage
Refinement program	PHENIX (1.10.1_2155: ???)	Depositor
R, R_{free}	0.270 , 0.313 0.270 , 0.312	Depositor DCC
R_{free} test set	2989 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å ²)	125.2	Xtrriage
Anisotropy	0.018	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 111.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	21766	wwPDB-VP
Average B, all atoms (Å ²)	171.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.30% 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: 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	0.24	0/3865	0.42	0/5242
1	B	0.24	0/3867	0.41	0/5244
1	C	0.24	0/3876	0.41	0/5256
2	F	0.27	0/1776	0.48	0/2423
2	H	0.26	0/1784	0.46	0/2432
2	Q	0.26	0/1784	0.47	0/2432
3	G	0.24	0/1676	0.45	0/2274
3	L	0.25	0/1676	0.43	0/2274
3	R	0.24	0/1676	0.44	0/2274
All	All	0.25	0/21980	0.43	0/29851

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
2	Q	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	Q	30	ARG	Peptide

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	3786	0	3637	60	0
1	B	3788	0	3645	65	0
1	C	3797	0	3654	65	0
2	F	1733	0	1684	46	0
2	H	1742	0	1692	40	0
2	Q	1742	0	1692	35	0
3	G	1642	0	1591	31	0
3	L	1642	0	1591	33	0
3	R	1642	0	1591	35	0
4	A	84	0	78	0	0
4	B	84	0	78	0	0
4	C	84	0	78	0	0
All	All	21766	0	21011	378	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 9.

All (378) 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:C:449:GLU:OE2	1:C:453:ARG:NH1	1.78	1.16
1:B:449:GLU:OE2	1:B:453:ARG:NH1	1.82	1.10
1:A:449:GLU:OE2	1:A:453:ARG:NH1	1.86	1.08
2:Q:98:LYS:NZ	2:Q:100:GLU:OE1	2.13	0.81
3:R:30:ARG:NH2	3:R:91:TYR:OH	2.15	0.79
1:C:57:ARG:HH12	1:C:59:LEU:HD13	1.49	0.78
3:L:189:HIS:O	3:L:211:ARG:NH1	2.16	0.77
1:B:234:TRP:H	1:B:234:TRP:HE3	1.32	0.76
3:R:30:ARG:HH21	3:R:91:TYR:HH	1.33	0.74
2:F:157:GLY:HA2	2:F:199:VAL:HG12	1.69	0.74
2:H:52:SER:HB3	2:H:112:TYR:HD1	1.52	0.74
3:L:32:ASN:HB3	3:L:91:TYR:HB3	1.69	0.73
2:F:153:THR:HG22	2:F:201:THR:HG22	1.70	0.72
1:C:387:LYS:O	1:C:389:ASN:N	2.21	0.71
1:A:306:PRO:HA	1:A:388:THR:HG21	1.71	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:99:PRO:HA	1:B:224:ARG:HH21	1.53	0.71
2:F:164:PHE:HB2	2:F:193:LEU:HB3	1.71	0.70
1:B:300:ILE:HG13	1:B:397:LYS:HD2	1.72	0.70
2:H:1:GLU:OE2	2:H:3:GLN:N	2.16	0.70
1:B:141:ARG:HG2	1:B:146:GLY:HA3	1.74	0.70
2:H:57:ALA:HA	2:H:58:THR:HG22	1.74	0.70
3:G:29:VAL:HG21	3:G:90:GLN:HB2	1.74	0.69
1:C:50:LYS:HG2	1:C:273:PRO:HG2	1.73	0.69
1:A:99:PRO:HA	1:A:224:ARG:HH21	1.57	0.69
3:R:29:VAL:HG21	3:R:90:GLN:HB2	1.75	0.68
1:A:72:GLY:O	1:A:141:ARG:NH2	2.25	0.68
2:F:186:ALA:HB2	2:F:196:LEU:HB2	1.75	0.68
3:G:92:ASN:O	3:G:93:HIS:ND1	2.27	0.68
3:L:106:ILE:HB	3:L:166:GLN:HE22	1.57	0.67
3:R:78:LEU:HD11	3:R:104:LEU:HD21	1.75	0.67
3:R:37:GLN:HB2	3:R:47:LEU:HD11	1.77	0.66
1:A:389:ASN:HB2	1:A:391:LYS:HE2	1.77	0.66
1:A:50:LYS:HG2	1:A:273:PRO:HG2	1.78	0.66
2:F:169:THR:HB	2:F:217:ASN:HB2	1.76	0.66
1:C:326:LYS:HD3	1:C:340:GLU:HG2	1.77	0.66
2:F:51:ILE:HA	2:F:57:ALA:HB3	1.79	0.65
1:A:420:LEU:O	1:A:424:ASN:ND2	2.30	0.65
1:A:405:ARG:NH2	1:C:410:GLU:OE2	2.26	0.65
1:C:318:THR:HG22	1:C:381:LEU:HD11	1.79	0.65
3:L:78:LEU:HD11	3:L:104:LEU:HD21	1.78	0.65
1:A:35:GLU:OE2	1:A:322:ASN:ND2	2.30	0.65
1:A:397:LYS:HG2	1:A:414:GLU:HG2	1.80	0.64
1:B:275:ASP:OD1	1:B:276:THR:N	2.30	0.64
2:H:28:THR:HG21	2:H:98:LYS:NZ	2.13	0.64
1:C:275:ASP:OD1	1:C:276:THR:N	2.31	0.64
2:Q:63:THR:O	2:Q:67:ARG:NH2	2.30	0.64
1:B:403:GLU:HB2	1:B:407:GLN:HB2	1.80	0.63
2:Q:51:ILE:HA	2:Q:57:ALA:HB3	1.79	0.63
1:A:15:LEU:HD11	1:A:451:THR:HG21	1.81	0.62
3:G:37:GLN:HB2	3:G:47:LEU:HD11	1.81	0.62
2:F:142:LEU:HD22	3:G:118:PHE:HB3	1.81	0.61
3:L:37:GLN:HB2	3:L:47:LEU:HD11	1.81	0.61
3:R:106:ILE:HB	3:R:166:GLN:HE22	1.65	0.61
3:G:78:LEU:HD11	3:G:104:LEU:HD21	1.81	0.61
1:A:68:ASP:OD1	1:A:100:TYR:OH	2.14	0.61
1:B:56:HIS:NE2	1:B:280:GLU:OE1	2.33	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:72:GLY:HA3	1:B:149:SER:H	1.65	0.60
1:C:99:PRO:HA	1:C:224:ARG:HH21	1.66	0.60
2:F:130:SER:HB3	2:F:164:PHE:HZ	1.66	0.60
2:F:139:VAL:HG22	2:F:160:VAL:HG22	1.84	0.60
3:R:54:ARG:HB2	3:R:58:ILE:HD11	1.83	0.60
2:Q:91:THR:HG23	2:Q:128:THR:HA	1.82	0.59
2:F:30:ARG:NH1	2:F:72:ARG:HG3	2.16	0.59
2:F:200:VAL:HG22	2:F:201:THR:H	1.67	0.59
1:C:14:CYS:HA	1:C:466:CYS:HA	1.84	0.59
1:A:283:THR:OG1	1:A:286:GLY:O	2.20	0.59
1:B:50:LYS:HG2	1:B:273:PRO:HG2	1.84	0.58
2:F:184:PHE:HB2	2:F:196:LEU:HD11	1.83	0.58
1:A:14:CYS:HA	1:A:466:CYS:HA	1.84	0.58
1:C:402:VAL:HG11	1:B:111:LEU:HD13	1.84	0.58
2:Q:57:ALA:HA	2:Q:58:THR:OG1	2.04	0.58
2:F:137:PRO:HD2	2:F:223:THR:HB	1.87	0.57
2:H:71:SER:HB3	2:H:80:TYR:HB2	1.86	0.57
1:A:283:THR:HG22	1:A:301:THR:HG22	1.87	0.57
2:H:112:TYR:CE2	2:H:114:THR:HA	2.40	0.56
1:A:57:ARG:NH1	1:A:83:THR:O	2.37	0.56
2:F:130:SER:HB3	2:F:164:PHE:CZ	2.39	0.56
2:Q:30:ARG:NH1	2:Q:72:ARG:HG3	2.20	0.56
3:R:32:ASN:HA	3:R:50:GLY:HA2	1.87	0.56
2:F:57:ALA:HA	2:F:58:THR:OG1	2.05	0.56
3:L:198:HIS:HB3	3:L:201:LEU:HB2	1.87	0.56
1:B:183:HIS:HB2	1:B:252:ILE:HD11	1.87	0.56
2:F:202:VAL:HG12	2:F:203:PRO:HD2	1.87	0.56
3:R:36:TYR:HE2	3:R:89:GLN:HG2	1.70	0.55
2:F:148:SER:O	2:F:150:SER:N	2.40	0.55
2:F:162:ASP:H	2:F:195:SER:HB2	1.71	0.55
1:A:275:ASP:OD1	1:A:276:THR:N	2.40	0.55
3:R:39:LYS:HG3	3:R:84:ALA:HB2	1.89	0.55
1:A:455:LEU:HD13	1:A:459:ALA:HB3	1.87	0.55
1:A:148:PHE:HB2	1:A:151:LEU:HB2	1.89	0.55
1:B:14:CYS:HA	1:B:466:CYS:HA	1.89	0.55
2:H:4:LEU:HD23	2:H:98:LYS:HE2	1.89	0.55
1:C:311:GLN:HE22	1:C:422:SER:HB3	1.72	0.54
1:B:389:ASN:HB2	1:B:391:LYS:HE2	1.89	0.54
1:C:283:THR:HG22	1:C:301:THR:HG22	1.89	0.54
3:G:54:ARG:HB2	3:G:58:ILE:HD11	1.90	0.54
2:H:47:TRP:CD1	3:L:96:ARG:NH1	2.75	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:457:GLU:OE1	1:A:499:ARG:NH1	2.33	0.54
2:H:1:GLU:OE2	2:H:3:GLN:HB2	2.08	0.54
2:H:28:THR:HG21	2:H:98:LYS:HZ1	1.72	0.54
1:B:384:VAL:HG23	1:B:428:LEU:HD21	1.90	0.53
1:B:384:VAL:HG13	1:B:385:ILE:HG23	1.89	0.53
1:B:71:LEU:HD11	1:B:232:ILE:HG13	1.91	0.53
2:H:91:THR:HG23	2:H:128:THR:HA	1.90	0.53
3:L:30:ARG:H	3:L:91:TYR:HE1	1.57	0.53
3:R:186:TYR:O	3:R:192:TYR:OH	2.25	0.53
3:R:68:GLY:O	3:R:70:GLU:N	2.40	0.53
1:A:381:LEU:HD21	2:Q:104:ILE:HG13	1.89	0.53
1:A:402:VAL:HG11	1:C:111:LEU:HD13	1.91	0.52
1:B:195:TYR:O	1:B:197:GLN:N	2.40	0.52
1:B:301:THR:HB	1:B:305:CYS:SG	2.49	0.52
1:B:457:GLU:HB3	1:B:499:ARG:NH1	2.24	0.52
1:C:41:GLU:OE2	1:C:313:THR:HA	2.10	0.52
1:B:357:ASN:ND2	1:B:475:ASN:OD1	2.40	0.52
2:Q:34:LEU:HD23	2:Q:98:LYS:HA	1.91	0.52
1:B:41:GLU:OE2	1:B:313:THR:HA	2.10	0.52
2:F:142:LEU:HD12	2:F:157:GLY:HA3	1.91	0.52
2:F:22:CYS:HB3	2:F:79:LEU:HB3	1.90	0.52
2:H:51:ILE:HG23	2:H:72:ARG:HH21	1.74	0.52
3:L:186:TYR:O	3:L:192:TYR:OH	2.27	0.52
1:A:410:GLU:OE2	1:B:405:ARG:NH2	2.43	0.52
3:L:48:ILE:HA	3:L:54:ARG:HA	1.91	0.52
1:A:195:TYR:O	1:A:197:GLN:N	2.41	0.51
1:B:283:THR:HG22	1:B:301:THR:HG22	1.92	0.51
2:Q:148:SER:O	2:Q:150:SER:N	2.42	0.51
1:C:195:TYR:O	1:C:197:GLN:N	2.42	0.51
3:L:39:LYS:HG3	3:L:84:ALA:HB2	1.93	0.51
1:A:57:ARG:NH2	1:A:82:GLU:OE1	2.41	0.51
3:L:147:GLN:HB2	3:L:195:GLU:HB3	1.91	0.51
2:H:112:TYR:HE2	2:H:114:THR:HA	1.75	0.51
1:A:301:THR:HB	1:A:305:CYS:SG	2.50	0.50
2:H:47:TRP:HZ3	3:L:95:LEU:HG	1.77	0.50
1:B:102:VAL:HG22	1:B:232:ILE:HB	1.93	0.50
1:B:387:LYS:HB2	3:L:30:ARG:HG2	1.94	0.50
2:H:148:SER:O	2:H:150:SER:N	2.45	0.50
1:C:457:GLU:HB3	1:C:499:ARG:HH12	1.77	0.50
1:B:110:SER:HG	1:B:393:HIS:HE2	1.58	0.50
1:C:357:ASN:ND2	1:C:475:ASN:OD1	2.41	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:198:HIS:HB3	3:G:201:LEU:HB2	1.94	0.50
3:R:147:GLN:HB2	3:R:195:GLU:HB3	1.94	0.50
1:B:283:THR:OG1	1:B:286:GLY:O	2.24	0.49
1:C:350:TRP:HB2	1:C:370:THR:HG23	1.93	0.49
1:C:457:GLU:HB3	1:C:499:ARG:NH1	2.26	0.49
2:F:71:SER:HB3	2:F:80:TYR:HB2	1.93	0.49
2:Q:157:GLY:HA3	2:Q:199:VAL:HG12	1.92	0.49
2:H:60:TYR:CE1	2:H:70:ILE:HD13	2.48	0.49
3:L:54:ARG:HB2	3:L:58:ILE:HD11	1.94	0.49
1:A:86:LEU:HD21	1:A:268:MET:HE1	1.93	0.49
1:A:453:ARG:HE	1:B:463:GLY:HA2	1.77	0.49
3:G:106:ILE:HG22	3:G:107:LYS:HG3	1.95	0.49
2:Q:4:LEU:HD13	2:Q:22:CYS:SG	2.52	0.49
3:R:147:GLN:O	3:R:195:GLU:N	2.46	0.49
1:B:110:SER:OG	1:B:393:HIS:NE2	2.42	0.49
3:R:33:LEU:HD13	3:R:71:PHE:CG	2.47	0.49
1:B:79:PHE:HA	1:B:82:GLU:HG3	1.95	0.49
3:L:33:LEU:HD12	3:L:51:ALA:HA	1.94	0.49
1:A:97:CYS:SG	1:A:98:TYR:N	2.83	0.49
1:C:323:VAL:HG21	1:C:336:ALA:HB2	1.94	0.49
2:F:5:LEU:HB3	2:F:123:LYS:HE3	1.95	0.49
2:F:206:SER:HA	2:F:209:THR:HG22	1.95	0.49
2:F:164:PHE:HD2	2:F:193:LEU:HA	1.77	0.49
1:B:311:GLN:HE22	1:B:422:SER:HB3	1.79	0.48
2:F:170:VAL:HG23	2:F:216:VAL:HG22	1.95	0.48
1:C:57:ARG:NH1	1:C:59:LEU:HD13	2.24	0.48
3:G:33:LEU:HD22	3:G:71:PHE:CD1	2.48	0.48
2:H:217:ASN:HA	2:H:224:LYS:HG2	1.95	0.48
2:H:144:PRO:HD2	2:H:231:PRO:HA	1.94	0.48
3:R:51:ALA:O	3:R:53:THR:N	2.45	0.48
1:B:84:TRP:HZ3	1:B:118:LEU:HG	1.79	0.48
2:Q:39:GLN:OE1	3:R:38:GLN:NE2	2.34	0.48
3:G:1:GLU:HB2	3:G:93:HIS:NE2	2.28	0.48
1:C:301:THR:HB	1:C:305:CYS:SG	2.53	0.48
1:C:300:ILE:HG13	1:C:397:LYS:HD3	1.95	0.48
1:B:97:CYS:SG	1:B:98:TYR:N	2.85	0.48
2:F:65:LYS:HZ1	3:G:94:TRP:HH2	1.61	0.48
2:Q:39:GLN:HG3	2:Q:39:GLN:O	2.13	0.48
1:C:113:ALA:HB1	1:C:267:ILE:HB	1.95	0.47
2:F:163:TYR:CZ	2:F:168:VAL:HG22	2.49	0.47
3:R:30:ARG:HD2	3:R:91:TYR:HH	1.79	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:131:SER:O	2:H:133:SER:N	2.47	0.47
2:H:206:SER:HA	2:H:209:THR:HG22	1.95	0.47
2:H:37:VAL:HG22	2:H:47:TRP:HA	1.96	0.47
1:C:84:TRP:CE2	1:C:116:GLY:HA2	2.49	0.47
1:C:102:VAL:HG22	1:C:232:ILE:HB	1.96	0.47
2:F:171:SER:O	2:F:215:ASN:N	2.46	0.47
3:G:93:HIS:O	3:G:93:HIS:CG	2.68	0.47
2:H:118:MET:HE3	3:L:96:ARG:NH1	2.30	0.47
2:Q:57:ALA:HB1	2:Q:58:THR:O	2.15	0.47
1:A:218:GLU:OE2	1:C:203:THR:OG1	2.27	0.47
1:A:310:LYS:HB2	1:A:310:LYS:NZ	2.30	0.47
1:C:338:PHE:HD1	1:C:338:PHE:H	1.63	0.47
3:G:147:GLN:HB2	3:G:195:GLU:HB3	1.97	0.47
2:Q:59:TYR:CE2	3:R:94:TRP:HB2	2.50	0.47
3:R:198:HIS:HB3	3:R:201:LEU:HB2	1.97	0.47
2:Q:141:PRO:HD3	2:Q:227:LYS:HG2	1.96	0.47
1:A:314:LEU:HB3	1:A:429:VAL:HG11	1.97	0.47
1:C:126:THR:HG22	1:C:128:THR:HG23	1.97	0.46
1:A:457:GLU:HG3	1:B:499:ARG:HH21	1.79	0.46
1:C:73:ASP:OD1	1:C:74:PRO:HD2	2.15	0.46
2:F:35:SER:OG	2:F:99:ASP:OD2	2.29	0.46
3:R:80:SER:HA	3:R:106:ILE:HG12	1.97	0.46
3:G:36:TYR:HE2	3:G:89:GLN:HG2	1.81	0.46
1:C:389:ASN:HB2	1:C:391:LYS:HE2	1.97	0.46
3:G:47:LEU:HB3	3:G:48:ILE:HD12	1.98	0.46
2:Q:153:THR:HA	2:Q:203:PRO:HA	1.96	0.46
1:B:84:TRP:CE2	1:B:116:GLY:HA2	2.51	0.46
3:R:122:ASP:HA	3:R:125:LEU:HD12	1.97	0.46
3:G:140:TYR:CG	3:G:141:PRO:HA	2.51	0.46
1:C:283:THR:OG1	1:C:286:GLY:O	2.27	0.46
2:F:199:VAL:HG21	3:G:135:LEU:HD13	1.98	0.46
1:B:449:GLU:OE2	1:B:453:ARG:HD2	2.15	0.45
2:Q:164:PHE:HA	2:Q:165:PRO:HA	1.74	0.45
1:A:102:VAL:HG22	1:A:232:ILE:HB	1.97	0.45
3:L:12:SER:HA	3:L:105:GLU:HB2	1.99	0.45
2:F:91:THR:HG23	2:F:128:THR:HA	1.97	0.45
2:H:39:GLN:HB2	2:H:45:LEU:HD13	1.98	0.45
1:A:41:GLU:OE2	1:A:313:THR:HA	2.17	0.45
1:C:70:LEU:HD22	1:C:112:VAL:HG21	1.99	0.45
3:G:39:LYS:HG3	3:G:84:ALA:HB2	1.99	0.45
3:L:91:TYR:HB2	3:L:92:ASN:HB3	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:Q:83:MET:HB3	2:Q:86:LEU:HD21	1.98	0.45
1:B:73:ASP:OD1	1:B:75:HIS:N	2.50	0.45
1:A:310:LYS:HB2	1:A:310:LYS:HZ2	1.81	0.45
2:Q:22:CYS:HB3	2:Q:79:LEU:HB3	1.99	0.45
1:A:449:GLU:OE2	1:A:453:ARG:HD2	2.17	0.45
1:B:343:TRP:CH2	1:B:354:ARG:NH1	2.85	0.45
1:B:87:PHE:HB3	1:B:267:ILE:HG13	1.98	0.45
2:F:162:ASP:HA	2:F:193:LEU:HD13	1.97	0.45
3:R:66:GLY:HA3	3:R:71:PHE:CD2	2.52	0.45
1:A:126:THR:HG22	1:A:128:THR:HG23	1.98	0.45
1:A:470:TYR:HB3	1:A:498:ASN:HB2	1.97	0.45
1:B:325:GLU:OE2	1:B:341:ASN:ND2	2.50	0.44
1:C:455:LEU:HD13	1:C:459:ALA:HB3	1.99	0.44
3:G:48:ILE:HA	3:G:54:ARG:HA	1.99	0.44
1:A:244:VAL:HG21	1:B:221:PRO:HG3	1.99	0.44
1:B:152:ASN:HB2	1:B:255:ARG:HG2	1.99	0.44
1:A:35:GLU:HG2	1:A:322:ASN:HB3	1.99	0.44
1:C:397:LYS:HG2	1:C:414:GLU:HG2	2.00	0.44
3:G:91:TYR:HB2	3:G:92:ASN:HB2	1.99	0.44
1:A:71:LEU:HB3	1:A:148:PHE:HD2	1.82	0.44
2:Q:118:MET:HG3	2:Q:121:TRP:CZ2	2.53	0.44
2:Q:146:SER:OG	2:Q:147:LYS:N	2.50	0.44
2:Q:51:ILE:HD13	2:Q:72:ARG:HB2	2.00	0.44
1:C:405:ARG:NH1	1:B:410:GLU:OE1	2.51	0.44
1:C:59:LEU:HA	1:C:59:LEU:HD12	1.91	0.44
2:H:228:LYS:HZ2	2:H:230:GLU:HB3	1.82	0.44
2:H:231:PRO:O	2:H:233:SER:N	2.51	0.44
2:H:30:ARG:NH1	2:H:72:ARG:HG3	2.32	0.44
2:Q:71:SER:HB3	2:Q:80:TYR:HB2	2.00	0.44
1:A:357:ASN:ND2	1:A:475:ASN:OD1	2.50	0.44
1:B:318:THR:HB	2:H:107:LEU:HD22	1.99	0.44
2:H:4:LEU:HD11	2:H:96:CYS:O	2.18	0.44
3:R:106:ILE:HG22	3:R:107:LYS:HG3	1.98	0.44
3:R:32:ASN:HB2	3:R:91:TYR:HB3	1.99	0.44
2:F:184:PHE:N	2:F:184:PHE:CD1	2.86	0.44
1:C:79:PHE:HA	1:C:82:GLU:HG3	1.99	0.43
2:H:1:GLU:OE2	2:H:2:VAL:N	2.51	0.43
1:A:314:LEU:HD22	1:A:429:VAL:HG21	2.00	0.43
1:C:218:GLU:HG3	1:B:203:THR:HG21	2.00	0.43
1:C:460:GLU:OE2	1:B:492:ARG:NH2	2.48	0.43
1:C:457:GLU:O	1:C:499:ARG:NH1	2.52	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:34:LEU:HD23	2:F:98:LYS:HA	2.00	0.43
2:H:47:TRP:CZ3	3:L:95:LEU:HG	2.53	0.43
1:B:241:ASP:OD1	1:B:242:VAL:N	2.50	0.43
2:H:137:PRO:HB3	2:H:163:TYR:HB3	2.01	0.43
2:Q:137:PRO:HB3	2:Q:163:TYR:HB3	2.01	0.43
1:A:74:PRO:HD3	1:A:97:CYS:HB2	2.00	0.43
3:G:149:LYS:HE2	3:G:154:LEU:HD11	2.00	0.43
2:H:228:LYS:NZ	2:H:230:GLU:HB3	2.33	0.43
3:R:35:TRP:CE3	3:R:73:LEU:HD22	2.53	0.43
1:C:22:ASN:N	1:C:22:ASN:OD1	2.52	0.43
1:C:207:ARG:HG3	1:C:242:VAL:HG12	1.99	0.43
3:L:47:LEU:HB3	3:L:48:ILE:HD12	2.01	0.43
1:A:90:ARG:HB3	1:A:92:LYS:HG2	2.00	0.43
1:C:403:GLU:HB2	1:C:407:GLN:HB2	2.00	0.43
2:F:164:PHE:HA	2:F:165:PRO:HA	1.72	0.43
2:Q:48:VAL:HG13	2:Q:64:VAL:HG21	2.01	0.43
3:R:189:HIS:O	3:R:211:ARG:NH1	2.51	0.43
3:R:61:ARG:HD2	3:R:77:SER:O	2.19	0.43
3:R:93:HIS:C	3:R:95:LEU:H	2.22	0.43
1:A:241:ASP:OD1	1:A:242:VAL:N	2.51	0.43
1:C:88:VAL:HA	1:C:268:MET:O	2.18	0.43
2:F:186:ALA:HB1	2:F:195:SER:H	1.83	0.43
1:C:500:PHE:HD1	1:B:496:LEU:HD13	1.83	0.43
1:C:470:TYR:HB3	1:C:498:ASN:HB2	2.01	0.43
1:A:205:SER:HA	1:A:210:GLN:HA	2.00	0.42
1:C:25:LEU:HD23	1:C:33:GLN:HB3	2.01	0.42
3:G:30:ARG:HD2	3:G:91:TYR:OH	2.19	0.42
3:L:80:SER:HA	3:L:106:ILE:HG12	2.01	0.42
1:C:394:GLN:CD	1:C:397:LYS:HZ1	2.22	0.42
3:G:33:LEU:HD13	3:G:71:PHE:CD2	2.54	0.42
3:R:48:ILE:HA	3:R:54:ARG:HA	2.01	0.42
1:A:71:LEU:HB3	1:A:148:PHE:CD2	2.54	0.42
2:F:200:VAL:HG22	2:F:201:THR:N	2.34	0.42
3:G:35:TRP:CE2	3:G:73:LEU:HB2	2.54	0.42
2:Q:206:SER:HA	2:Q:209:THR:HG22	2.00	0.42
1:A:197:GLN:HE21	1:A:248:ASN:HB2	1.83	0.42
1:A:207:ARG:HG3	1:A:242:VAL:HG12	2.01	0.42
1:B:310:LYS:NZ	1:B:310:LYS:HB2	2.34	0.42
1:C:179:ILE:O	1:C:254:PRO:HB3	2.19	0.42
1:A:499:ARG:HH21	1:C:457:GLU:HG3	1.85	0.42
2:H:59:TYR:HE2	2:H:112:TYR:CG	2.38	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:L:92:ASN:N	3:L:92:ASN:OD1	2.52	0.42
1:A:221:PRO:HG3	1:C:244:VAL:HG21	2.01	0.42
2:F:146:SER:OG	2:F:147:LYS:N	2.51	0.42
3:G:61:ARG:HD2	3:G:77:SER:O	2.20	0.42
2:H:51:ILE:HG21	2:H:79:LEU:HD13	2.02	0.42
2:Q:112:TYR:HE1	2:Q:116:TYR:CD2	2.37	0.42
1:B:126:THR:HG22	1:B:128:THR:HG23	2.00	0.42
1:B:470:TYR:HB3	1:B:498:ASN:HB2	2.01	0.42
2:F:158:CYS:HB2	2:F:172:TRP:CZ2	2.55	0.42
3:G:122:ASP:HA	3:G:125:LEU:HD12	2.01	0.42
2:H:146:SER:OG	2:H:147:LYS:N	2.51	0.42
1:B:207:ARG:HG3	1:B:242:VAL:HG12	2.02	0.42
2:F:63:THR:O	2:F:67:ARG:NH2	2.53	0.42
3:G:2:ILE:HG22	3:G:93:HIS:CE1	2.55	0.42
1:A:17:HIS:HB3	1:A:444:MET:SD	2.60	0.42
1:B:387:LYS:HD3	3:L:30:ARG:HE	1.85	0.42
2:F:159:LEU:HA	2:F:197:SER:HA	2.02	0.42
2:H:160:VAL:HB	2:H:196:LEU:HB3	2.02	0.42
3:R:107:LYS:HD2	3:R:109:THR:N	2.35	0.42
1:B:341:ASN:N	1:B:341:ASN:OD1	2.51	0.42
1:C:60:ASP:HA	1:C:88:VAL:HG23	2.01	0.42
3:L:34:ALA:HB3	3:L:89:GLN:HG2	2.02	0.42
1:A:343:TRP:HB2	1:A:346:MET:HG3	2.02	0.42
1:A:382:ASN:HB2	2:Q:115:TYR:CE2	2.55	0.42
1:C:181:GLY:HA3	1:C:232:ILE:HD13	2.02	0.42
2:F:161:LYS:HA	2:F:195:SER:OG	2.19	0.42
2:F:188:LEU:HD12	2:F:189:GLN:O	2.20	0.42
1:C:378:ASN:HA	1:C:381:LEU:HB2	2.02	0.41
3:L:122:ASP:HA	3:L:125:LEU:HD12	2.01	0.41
2:Q:51:ILE:HB	2:Q:70:ILE:HD13	2.02	0.41
1:A:102:VAL:HB	1:A:105:TYR:HD1	1.86	0.41
1:C:499:ARG:NH2	1:B:457:GLU:OE1	2.53	0.41
3:L:61:ARG:HD2	3:L:77:SER:O	2.20	0.41
3:L:16:GLY:H	3:L:78:LEU:HB3	1.84	0.41
1:A:453:ARG:HG2	1:B:461:ASP:OD2	2.20	0.41
3:G:149:LYS:HD2	3:G:195:GLU:HB2	2.02	0.41
3:L:125:LEU:HD23	3:L:130:ALA:HB2	2.02	0.41
2:Q:24:ALA:HB3	2:Q:30:ARG:HD2	2.01	0.41
2:H:98:LYS:HG3	2:H:120:VAL:HB	2.01	0.41
2:H:28:THR:HG21	2:H:98:LYS:HZ2	1.85	0.41
3:L:30:ARG:N	3:L:91:TYR:HE1	2.18	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:R:140:TYR:CG	3:R:141:PRO:HA	2.55	0.41
1:B:205:SER:HA	1:B:210:GLN:HA	2.03	0.41
1:B:234:TRP:CE3	1:B:234:TRP:N	2.85	0.41
1:C:221:PRO:HG3	1:B:244:VAL:HG21	2.02	0.41
2:F:71:SER:O	2:F:79:LEU:HD12	2.20	0.41
2:Q:67:ARG:NH1	2:Q:90:ASP:OD2	2.54	0.41
3:L:35:TRP:CE3	3:L:73:LEU:HD22	2.56	0.41
3:R:92:ASN:OD1	3:R:92:ASN:N	2.52	0.41
1:B:57:ARG:NH1	1:B:83:THR:O	2.54	0.41
1:C:307:LYS:HD3	1:C:421:TRP:CE2	2.56	0.41
1:A:120:PHE:CD1	1:A:150:ARG:HD2	2.56	0.41
1:A:311:GLN:HG2	1:A:314:LEU:HD21	2.03	0.41
1:C:84:TRP:CZ3	1:C:118:LEU:HG	2.56	0.41
2:F:144:PRO:HD2	2:F:231:PRO:HA	2.02	0.41
1:B:95:SER:OG	1:B:224:ARG:NH1	2.54	0.41
1:B:382:ASN:O	1:B:386:GLU:HB2	2.21	0.41
3:G:16:GLY:H	3:G:78:LEU:HB3	1.86	0.41
1:B:132:GLN:O	1:B:152:ASN:ND2	2.54	0.40
1:C:120:PHE:HZ	1:C:255:ARG:HB2	1.86	0.40
1:C:373:ALA:HB2	1:C:443:GLU:HG3	2.03	0.40
2:F:228:LYS:HZ2	2:F:230:GLU:HB3	1.87	0.40
3:G:32:ASN:HB3	3:G:91:TYR:HB3	2.03	0.40
2:Q:144:PRO:HD2	2:Q:231:PRO:HA	2.02	0.40
2:Q:99:ASP:HB3	2:Q:116:TYR:HB3	2.04	0.40
3:R:148:TRP:CG	3:R:179:LEU:HD13	2.56	0.40
3:R:106:ILE:HD13	3:R:166:GLN:HE22	1.86	0.40
1:C:97:CYS:SG	1:C:98:TYR:N	2.89	0.40
1:B:457:GLU:HB3	1:B:499:ARG:HH12	1.86	0.40
1:C:62:ILE:H	1:C:62:ILE:HD13	1.86	0.40
3:G:35:TRP:CE3	3:G:73:LEU:HD22	2.57	0.40
2:H:57:ALA:HA	2:H:58:THR:CG2	2.49	0.40
3:L:29:VAL:HG23	3:L:91:TYR:CD1	2.57	0.40
2:H:119:ASP:HA	3:L:46:LEU:HD22	2.04	0.40
1:C:477:CYS:O	1:C:480:SER:OG	2.28	0.40
2:Q:11:LEU:HD12	2:Q:165:PRO:HG3	2.03	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	477/512 (93%)	453 (95%)	21 (4%)	3 (1%)	25	64
1	B	476/512 (93%)	450 (94%)	21 (4%)	5 (1%)	14	53
1	C	478/512 (93%)	450 (94%)	23 (5%)	5 (1%)	15	54
2	F	230/236 (98%)	209 (91%)	18 (8%)	3 (1%)	12	49
2	H	229/236 (97%)	209 (91%)	15 (7%)	5 (2%)	6	38
2	Q	229/236 (97%)	209 (91%)	17 (7%)	3 (1%)	12	49
3	G	209/214 (98%)	189 (90%)	17 (8%)	3 (1%)	11	47
3	L	209/214 (98%)	190 (91%)	15 (7%)	4 (2%)	8	41
3	R	209/214 (98%)	188 (90%)	18 (9%)	3 (1%)	11	47
All	All	2746/2886 (95%)	2547 (93%)	165 (6%)	34 (1%)	13	51

All (34) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	388	THR
3	L	94	TRP
3	R	94	TRP
1	A	62	ILE
1	C	337	GLY
1	B	387	LYS
2	H	232	LYS
3	L	76	SER
2	Q	149	THR
3	R	76	SER
1	C	304	ALA
2	F	133	SER
2	F	149	THR
3	G	76	SER
2	H	149	THR
3	L	51	ALA

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Mol	Chain	Res	Type
1	C	324	PRO
2	F	185	PRO
3	G	51	ALA
3	G	138	ASN
2	H	162	ASP
3	L	138	ASN
3	R	138	ASN
1	A	324	PRO
1	B	62	ILE
1	B	324	PRO
2	Q	162	ASP
1	C	143	PRO
1	B	143	PRO
2	H	53	GLY
1	A	143	PRO
1	B	72	GLY
2	H	165	PRO
2	Q	165	PRO

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	421/447 (94%)	406 (96%)	15 (4%)	35 66
1	B	422/447 (94%)	409 (97%)	13 (3%)	40 70
1	C	422/447 (94%)	412 (98%)	10 (2%)	49 76
2	F	195/198 (98%)	176 (90%)	19 (10%)	8 34
2	H	196/198 (99%)	189 (96%)	7 (4%)	35 66
2	Q	196/198 (99%)	185 (94%)	11 (6%)	21 55
3	G	186/187 (100%)	178 (96%)	8 (4%)	29 62
3	L	186/187 (100%)	182 (98%)	4 (2%)	52 77
3	R	186/187 (100%)	184 (99%)	2 (1%)	73 87
All	All	2410/2496 (97%)	2321 (96%)	89 (4%)	34 65

All (89) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	HIS
1	A	64	CYS
1	A	73	ASP
1	A	117	THR
1	A	137	ASN
1	A	165	ASN
1	A	172	ASP
1	A	175	ASP
1	A	269	ARG
1	A	276	THR
1	A	388	THR
1	A	390	GLU
1	A	400	SER
1	A	455	LEU
1	A	493	ASP
1	C	62	ILE
1	C	64	CYS
1	C	172	ASP
1	C	175	ASP
1	C	276	THR
1	C	312	ASN
1	C	338	PHE
1	C	340	GLU
1	C	405	ARG
1	C	493	ASP
2	F	4	LEU
2	F	28	THR
2	F	29	PHE
2	F	58	THR
2	F	108	MET
2	F	112	TYR
2	F	118	MET
2	F	128	THR
2	F	138	SER
2	F	156	LEU
2	F	158	CYS
2	F	159	LEU
2	F	162	ASP
2	F	168	VAL
2	F	170	VAL
2	F	171	SER
2	F	184	PHE

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Mol	Chain	Res	Type
2	F	191	SER
2	F	193	LEU
3	G	30	ARG
3	G	33	LEU
3	G	58	ILE
3	G	89	GLN
3	G	90	GLN
3	G	159	SER
3	G	164	THR
3	G	190	LYS
1	B	18	HIS
1	B	71	LEU
1	B	73	ASP
1	B	172	ASP
1	B	175	ASP
1	B	234	TRP
1	B	276	THR
1	B	278	ILE
1	B	299	LYS
1	B	341	ASN
1	B	389	ASN
1	B	455	LEU
1	B	493	ASP
2	H	1	GLU
2	H	2	VAL
2	H	28	THR
2	H	29	PHE
2	H	58	THR
2	H	108	MET
2	H	156	LEU
3	L	29	VAL
3	L	33	LEU
3	L	58	ILE
3	L	90	GLN
2	Q	3	GLN
2	Q	13	GLN
2	Q	18	LEU
2	Q	19	ARG
2	Q	28	THR
2	Q	29	PHE
2	Q	112	TYR
2	Q	118	MET

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Mol	Chain	Res	Type
2	Q	166	GLU
2	Q	190	SER
2	Q	234	CYS
3	R	30	ARG
3	R	90	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	132	GLN
1	A	382	ASN
3	L	166	GLN
3	R	166	GLN

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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

18 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	C	604	1	14,14,15	0.27	0	17,19,21	0.44	0
4	NAG	C	603	1	14,14,15	0.30	0	17,19,21	0.44	0
4	NAG	A	604	1	14,14,15	0.29	0	17,19,21	0.44	0
4	NAG	B	601	1	14,14,15	0.35	0	17,19,21	0.48	0
4	NAG	A	605	1	14,14,15	0.49	0	17,19,21	0.70	1 (5%)
4	NAG	C	601	-	14,14,15	0.22	0	17,19,21	0.40	0
4	NAG	B	605	1	14,14,15	0.27	0	17,19,21	0.43	0
4	NAG	B	602	1	14,14,15	0.31	0	17,19,21	0.47	0
4	NAG	C	605	1	14,14,15	0.27	0	17,19,21	0.44	0
4	NAG	A	602	1	14,14,15	0.32	0	17,19,21	0.47	0
4	NAG	C	602	1	14,14,15	0.32	0	17,19,21	0.53	0
4	NAG	A	606	1	14,14,15	0.28	0	17,19,21	0.40	0
4	NAG	A	601	1	14,14,15	0.61	1 (7%)	17,19,21	0.77	0
4	NAG	C	606	1	14,14,15	0.24	0	17,19,21	0.44	0
4	NAG	B	604	1	14,14,15	0.25	0	17,19,21	0.42	0
4	NAG	B	603	1	14,14,15	0.24	0	17,19,21	0.43	0
4	NAG	A	603	1	14,14,15	0.93	1 (7%)	17,19,21	1.29	1 (5%)
4	NAG	B	606	1	14,14,15	0.25	0	17,19,21	0.44	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	C	604	1	-	0/6/23/26	0/1/1/1
4	NAG	C	603	1	-	2/6/23/26	0/1/1/1
4	NAG	A	604	1	-	0/6/23/26	0/1/1/1
4	NAG	B	601	1	-	4/6/23/26	0/1/1/1
4	NAG	A	605	1	-	2/6/23/26	0/1/1/1
4	NAG	C	601	-	-	4/6/23/26	0/1/1/1
4	NAG	B	605	1	-	2/6/23/26	0/1/1/1
4	NAG	B	602	1	-	0/6/23/26	0/1/1/1
4	NAG	C	605	1	-	2/6/23/26	0/1/1/1
4	NAG	A	602	1	-	0/6/23/26	0/1/1/1
4	NAG	C	602	1	-	0/6/23/26	0/1/1/1
4	NAG	A	606	1	-	0/6/23/26	0/1/1/1
4	NAG	A	601	1	-	3/6/23/26	0/1/1/1
4	NAG	C	606	1	-	0/6/23/26	0/1/1/1
4	NAG	B	604	1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	B	603	1	-	2/6/23/26	0/1/1/1
4	NAG	A	603	1	-	2/6/23/26	0/1/1/1
4	NAG	B	606	1	-	0/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	603	NAG	O5-C1	3.37	1.49	1.43
4	A	601	NAG	O5-C1	-2.09	1.40	1.43

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	603	NAG	C1-O5-C5	5.07	119.06	112.19
4	A	605	NAG	C1-O5-C5	2.44	115.50	112.19

There are no chirality outliers.

All (23) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	601	NAG	O5-C5-C6-O6
4	A	605	NAG	O5-C5-C6-O6
4	A	603	NAG	O5-C5-C6-O6
4	C	601	NAG	O5-C5-C6-O6
4	C	603	NAG	O5-C5-C6-O6
4	A	605	NAG	C4-C5-C6-O6
4	B	601	NAG	O5-C5-C6-O6
4	C	601	NAG	C4-C5-C6-O6
4	B	601	NAG	C8-C7-N2-C2
4	B	601	NAG	O7-C7-N2-C2
4	C	601	NAG	C8-C7-N2-C2
4	C	601	NAG	O7-C7-N2-C2
4	C	603	NAG	C4-C5-C6-O6
4	B	603	NAG	O5-C5-C6-O6
4	B	605	NAG	O5-C5-C6-O6
4	A	603	NAG	C4-C5-C6-O6
4	B	605	NAG	C4-C5-C6-O6
4	A	601	NAG	C4-C5-C6-O6
4	C	605	NAG	O5-C5-C6-O6
4	C	605	NAG	C4-C5-C6-O6
4	B	603	NAG	C4-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
4	B	601	NAG	C4-C5-C6-O6
4	A	601	NAG	C3-C2-N2-C7

There are no ring outliers.

No monomer is involved in short contacts.

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	481/512 (93%)	0.10	6 (1%) 79 67	73, 139, 208, 368	3 (0%)
1	B	480/512 (93%)	0.15	13 (2%) 54 41	68, 150, 203, 287	0
1	C	482/512 (94%)	0.18	18 (3%) 41 30	87, 160, 221, 275	4 (0%)
2	F	232/236 (98%)	0.36	22 (9%) 8 6	87, 156, 332, 398	2 (0%)
2	H	233/236 (98%)	0.37	17 (7%) 15 12	122, 189, 276, 437	0
2	Q	233/236 (98%)	0.28	15 (6%) 19 15	75, 134, 278, 392	1 (0%)
3	G	213/214 (99%)	2.10	70 (32%) 0 0	97, 248, 529, 797	0
3	L	213/214 (99%)	0.48	10 (4%) 31 23	125, 191, 250, 306	1 (0%)
3	R	213/214 (99%)	0.19	8 (3%) 40 30	78, 157, 245, 295	0
All	All	2780/2886 (96%)	0.37	179 (6%) 19 15	68, 159, 296, 797	11 (0%)

All (179) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	G	119	PRO	14.5
3	G	157	GLY	13.7
3	G	156	SER	13.3
3	G	141	PRO	12.1
3	G	198	HIS	12.0
3	G	117	ILE	11.9
3	G	137	ASN	10.8
3	G	144	ALA	10.4
3	G	115	VAL	10.0
3	G	109	THR	9.2
3	G	143	GLU	8.9
3	G	158	ASN	8.3
3	G	120	PRO	8.2
3	G	186	TYR	7.8
3	G	148	TRP	7.2

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Mol	Chain	Res	Type	RSRZ
3	G	116	PHE	7.2
3	G	114	SER	7.1
3	G	142	ARG	7.1
3	G	110	VAL	7.0
3	G	122	ASP	6.6
3	G	211	ARG	6.6
3	G	155	GLN	6.4
3	G	113	PRO	6.3
3	G	126	LYS	6.2
3	G	183	LYS	5.7
3	G	209	PHE	5.6
2	F	209	THR	5.5
3	L	1	GLU	5.5
2	F	155	ALA	5.5
3	G	210	ASN	5.3
3	G	112	ALA	5.1
3	G	201	LEU	5.1
2	F	154	ALA	5.1
2	H	97	ALA	5.1
3	G	37	GLN	5.0
2	F	148	SER	5.0
3	G	202	SER	4.9
3	G	184	ALA	4.9
2	Q	145	SER	4.9
2	Q	146	SER	4.8
2	F	156	LEU	4.8
3	G	212	GLY	4.7
3	G	187	GLU	4.7
3	G	111	ALA	4.6
1	A	326	LYS	4.5
2	F	211	THR	4.4
2	H	98	LYS	4.4
1	B	458	ASN	4.4
3	G	151	ASP	4.3
3	R	183	LYS	4.3
3	G	179	LEU	4.3
3	G	206	THR	4.2
3	G	135	LEU	4.0
2	F	145	SER	4.0
2	Q	205	SER	3.9
1	C	336	ALA	3.8
3	G	130	ALA	3.8

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Mol	Chain	Res	Type	RSRZ
3	L	122	ASP	3.8
3	L	47	LEU	3.8
2	Q	147	LYS	3.7
3	G	170	ASP	3.7
3	G	207	LYS	3.7
3	G	159	SER	3.7
2	Q	229	VAL	3.5
3	G	182	SER	3.5
2	H	152	GLY	3.4
2	Q	156	LEU	3.4
3	G	194	CYS	3.4
2	H	233	SER	3.4
3	L	113	PRO	3.3
2	H	51	ILE	3.3
2	F	149	THR	3.3
3	G	118	PHE	3.2
3	G	146	VAL	3.2
1	B	326	LYS	3.2
1	B	15	LEU	3.2
2	H	45	LEU	3.2
2	H	211	THR	3.2
2	F	151	GLY	3.2
3	L	183	LYS	3.2
1	C	99	PRO	3.1
3	G	134	CYS	3.1
1	B	13	LEU	3.1
1	C	127	TRP	3.1
2	F	141	PRO	3.0
2	F	175	GLY	3.0
1	C	326	LYS	3.0
2	H	141	PRO	3.0
2	F	152	GLY	3.0
3	L	152	ASN	3.0
2	F	157	GLY	3.0
2	Q	232	LYS	3.0
3	R	184	ALA	2.9
2	H	234	CYS	2.9
2	Q	149	THR	2.9
3	G	149	LYS	2.9
2	Q	206	SER	2.9
3	G	196	VAL	2.8
3	G	180	THR	2.8

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Mol	Chain	Res	Type	RSRZ
3	G	33	LEU	2.8
3	G	188	LYS	2.8
1	C	251	LEU	2.8
3	G	203	SER	2.7
1	C	166	VAL	2.7
1	B	12	THR	2.7
2	H	34	LEU	2.7
3	G	152	ASN	2.7
2	Q	143	ALA	2.7
1	B	11	ALA	2.7
2	F	197	SER	2.7
2	H	94	TYR	2.7
2	F	142	LEU	2.6
2	F	144	PRO	2.6
3	G	47	LEU	2.6
2	Q	144	PRO	2.6
2	Q	203	PRO	2.6
3	G	31	SER	2.6
1	B	340	GLU	2.5
3	L	181	LEU	2.5
1	B	459	ALA	2.5
2	H	142	LEU	2.5
2	F	118	MET	2.5
2	F	213	ILE	2.5
1	C	147	PHE	2.5
3	G	213	GLU	2.5
1	C	60	ASP	2.5
2	H	212	TYR	2.5
3	G	48	ILE	2.4
1	A	221	PRO	2.4
3	G	46	LEU	2.4
1	C	94	PHE	2.4
2	Q	151	GLY	2.4
2	Q	202	VAL	2.4
1	C	242	VAL	2.4
3	R	209	PHE	2.3
3	L	92	ASN	2.3
3	L	48	ILE	2.3
1	A	118	LEU	2.3
3	G	195	GLU	2.3
2	F	147	LYS	2.3
1	B	16	GLY	2.3

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Mol	Chain	Res	Type	RSRZ
2	F	119	ASP	2.3
2	Q	201	THR	2.3
1	B	104	ASP	2.2
2	H	116	TYR	2.2
3	L	83	PHE	2.2
1	B	481	ILE	2.2
1	A	223	VAL	2.2
1	B	460	GLU	2.2
3	G	54	ARG	2.2
1	C	59	LEU	2.2
3	R	132	VAL	2.2
3	G	83	PHE	2.2
1	C	224	ARG	2.2
3	G	62	PHE	2.2
3	R	31	SER	2.2
3	R	181	LEU	2.2
2	F	232	LYS	2.2
3	R	194	CYS	2.2
1	A	356	GLN	2.2
1	C	150	ARG	2.1
3	G	197	THR	2.1
3	G	21	LEU	2.1
1	C	79	PHE	2.1
1	A	71	LEU	2.1
2	H	143	ALA	2.1
2	F	146	SER	2.1
3	G	214	CYS	2.1
3	G	55	ALA	2.1
3	R	130	ALA	2.1
1	C	245	ILE	2.1
2	H	46	GLU	2.1
1	C	352	GLY	2.1
1	C	438	ASP	2.0
1	C	62	ILE	2.0
2	H	95	TYR	2.0
1	B	256	GLY	2.0
3	G	178	THR	2.0
3	G	123	GLU	2.0

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	C	601	14/15	0.51	0.63	254,256,258,258	0
4	NAG	A	605	14/15	0.66	0.29	186,198,199,200	0
4	NAG	B	601	14/15	0.81	0.44	198,209,219,222	0
4	NAG	C	606	14/15	0.82	0.20	137,147,159,168	0
4	NAG	B	604	14/15	0.82	0.35	154,165,185,188	0
4	NAG	B	603	14/15	0.82	0.17	153,161,167,168	0
4	NAG	A	601	14/15	0.84	0.24	204,213,226,229	0
4	NAG	B	606	14/15	0.85	0.23	136,152,170,178	0
4	NAG	B	605	14/15	0.86	0.16	154,169,175,179	0
4	NAG	C	603	14/15	0.87	0.16	165,174,183,187	0
4	NAG	A	603	14/15	0.87	0.25	137,150,157,165	0
4	NAG	C	604	14/15	0.87	0.17	147,159,166,176	0
4	NAG	A	604	14/15	0.88	0.34	133,144,153,155	0
4	NAG	B	602	14/15	0.88	0.20	117,137,147,159	0
4	NAG	C	605	14/15	0.89	0.36	173,187,203,215	0
4	NAG	A	606	14/15	0.89	0.16	132,150,158,158	0
4	NAG	C	602	14/15	0.90	0.24	125,145,176,179	0
4	NAG	A	602	14/15	0.92	0.20	105,131,148,157	0

6.5 Other polymers [i](#)

There are no such residues in this entry.