



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2018 – 06:14 pm GMT

PDB ID : 4KU1
Title : Role of the hinge and C-gamma-2/C-gamma-3 interface in immunoglobulin G1 Fc domain motions: implications for Fc engineering
Authors : Frank, M.; Walker, R.; Lanzilotta, W.N.; Prestegard, J.H.; Barb, A.W.
Deposited on : 2013-05-21
Resolution : 1.90 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 : 1.7.3 (157068), CSD as539be (2018)
Xtrriage (Phenix) : 1.13
EDS : trunk30967
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Refmac : 5.8.0158
CCP4 : 7.0 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk30967

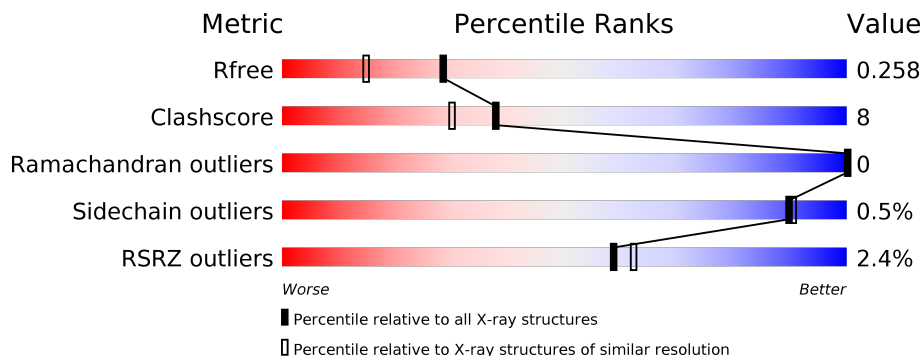
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 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}	111664	5502 (1.90-1.90)
Clashscore	122126	6115 (1.90-1.90)
Ramachandran outliers	120053	6048 (1.90-1.90)
Sidechain outliers	120020	6048 (1.90-1.90)
RSRZ outliers	108989	5379 (1.90-1.90)

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

Mol	Chain	Length	Quality of chain
1	A	208	
1	B	208	

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
5	GAL	A	510	-	-	-	X

2 Entry composition [i](#)

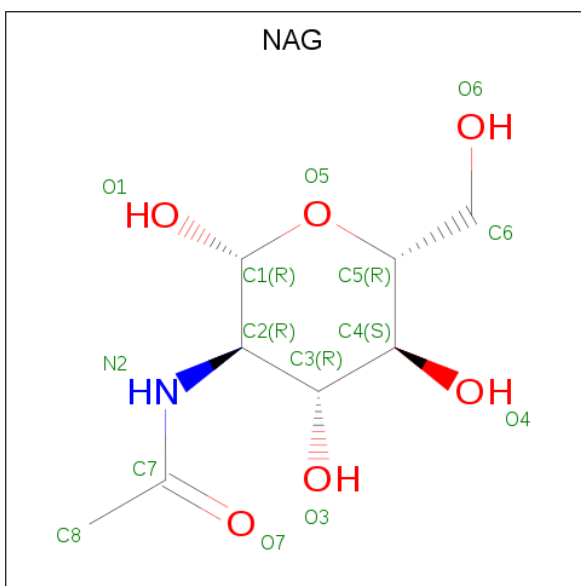
There are 8 unique types of molecules in this entry. The entry contains 3750 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Ig gamma-1 chain C region.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	207	Total 1672	C 1065	N 282	O 319	S 6	0	2	0
1	B	208	Total 1686	C 1073	N 283	O 324	S 6	0	4	0

- Molecule 2 is N-ACETYL-D-GLUCOSAMINE (three-letter code: NAG) (formula: C₈H₁₅NO₆).



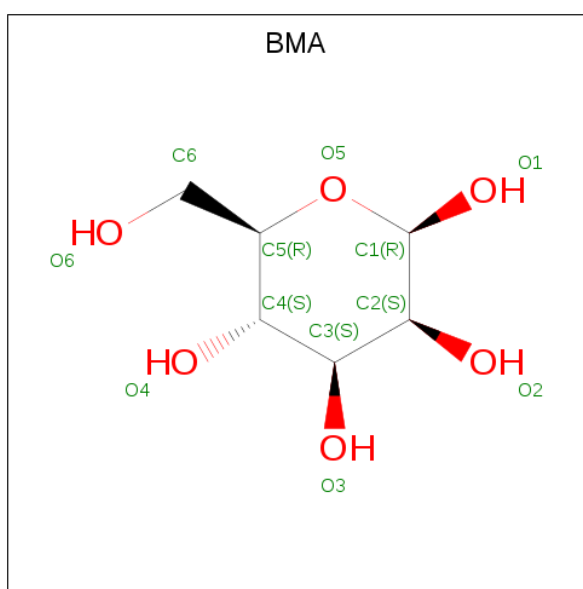
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	Total 14	C 8	N 1	O 5	0	0
2	A	1	Total 14	C 8	N 1	O 5	0	0
2	A	1	Total 14	C 8	N 1	O 5	0	0
2	A	1	Total 14	C 8	N 1	O 5	0	0

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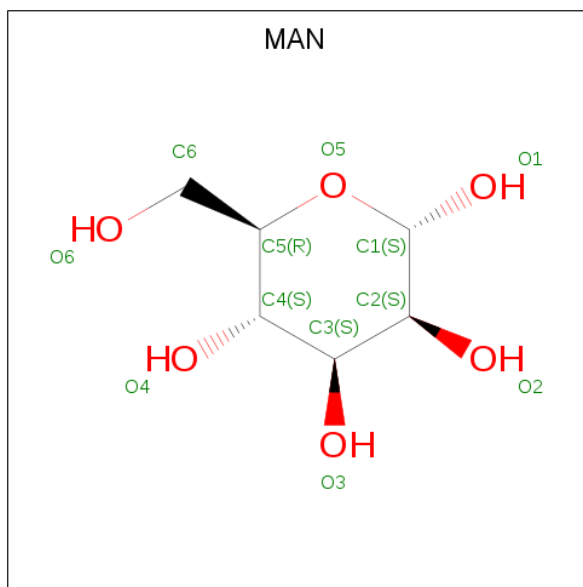
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	B	1	Total	C	N	O	0	0
			14	8	1	5		
2	B	1	Total	C	N	O	0	0
			14	8	1	5		
2	B	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 3 is BETA-D-MANNOSE (three-letter code: BMA) (formula: C₆H₁₂O₆).



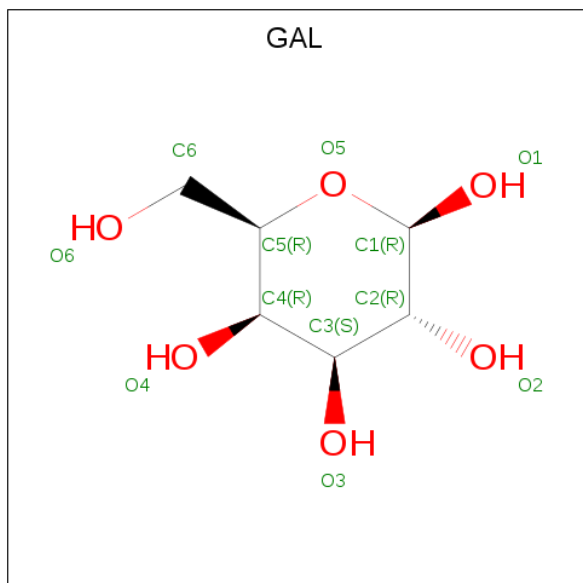
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
3	A	1	Total	C	O	0	0
			11	6	5		
3	B	1	Total	C	O	0	0
			11	6	5		

- Molecule 4 is ALPHA-D-MANNOSE (three-letter code: MAN) (formula: C₆H₁₂O₆).



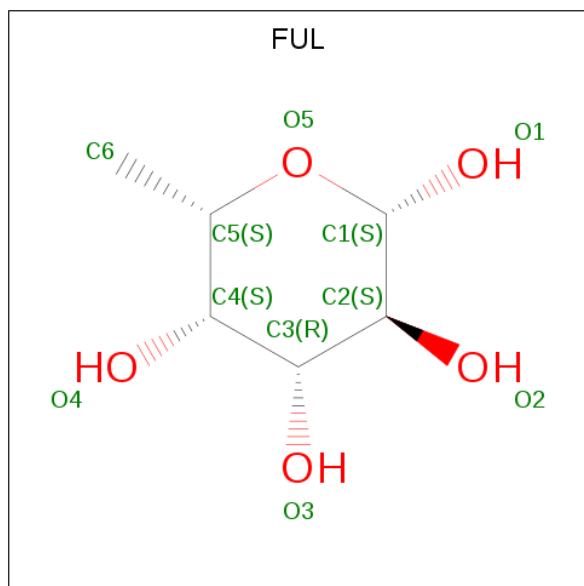
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 11 6 5	0	0
4	A	1	Total C O 11 6 5	0	0
4	B	1	Total C O 11 6 5	0	0
4	B	1	Total C O 11 6 5	0	0

- Molecule 5 is BETA-D-GALACTOSE (three-letter code: GAL) (formula: C₆H₁₂O₆).



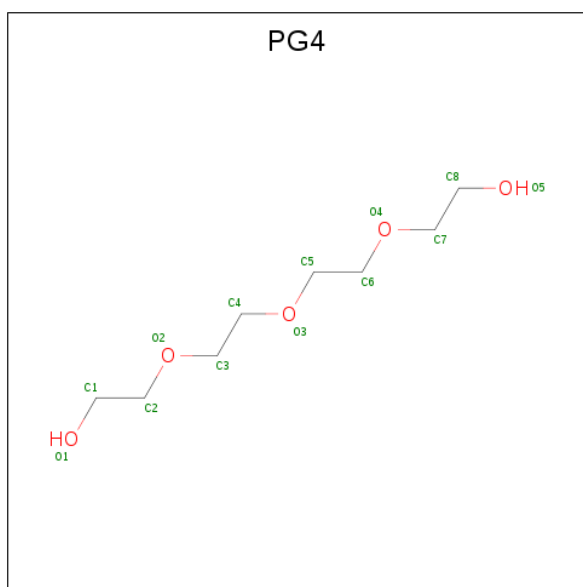
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			11	6	5		
5	A	1	Total	C	O	0	0
			11	6	5		
5	B	1	Total	C	O	0	0
			11	6	5		

- Molecule 6 is BETA-L-FUCOSE (three-letter code: FUL) (formula: C₆H₁₂O₅).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			10	6	4		
6	B	1	Total	C	O	0	0
			10	6	4		

- Molecule 7 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: C₈H₁₈O₅).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total C O 13 8 5	0	0

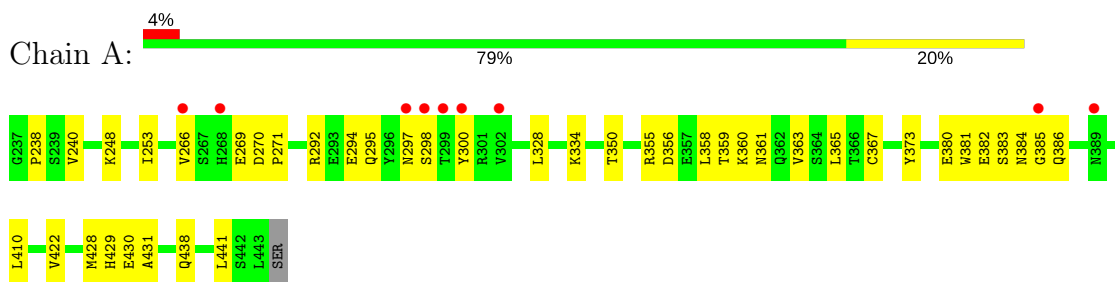
- Molecule 8 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	66	Total O 66 66	0	0
8	B	82	Total O 82 82	0	0

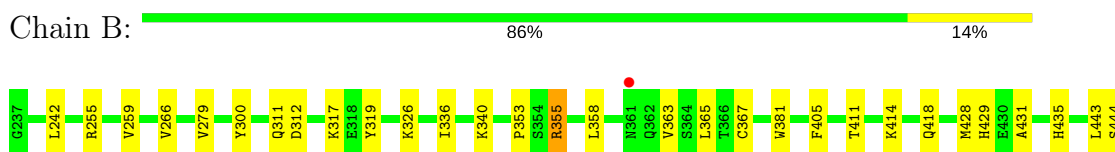
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Ig gamma-1 chain C region



- Molecule 1: Ig gamma-1 chain C region



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	49.15Å 79.86Å 128.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 1.90 39.93 – 1.90	Depositor EDS
% Data completeness (in resolution range)	98.3 (50.00-1.90) 98.3 (39.93-1.90)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.55 (at 1.91Å)	Xtrriage
Refinement program	REFMAC 5.5.0102	Depositor
R, R_{free}	0.212 , 0.258 0.214 , 0.258	Depositor DCC
R_{free} test set	1991 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	27.1	Xtrriage
Anisotropy	0.195	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 41.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	3750	wwPDB-VP
Average B, all atoms (Å ²)	31.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.13% 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: BMA, NAG, PG4, GAL, FUL, MAN

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	1.08	1/1721 (0.1%)	0.86	1/2344 (0.0%)
1	B	1.21	4/1741 (0.2%)	0.99	0/2372
All	All	1.14	5/3462 (0.1%)	0.93	1/4716 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	405	PHE	CE1-CZ	6.82	1.50	1.37
1	B	319	TYR	CD1-CE1	5.86	1.48	1.39
1	B	319	TYR	CD2-CE2	5.73	1.48	1.39
1	A	373	TYR	CD1-CE1	5.34	1.47	1.39
1	B	405	PHE	CE2-CZ	5.09	1.47	1.37

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	438	GLN	CB-CA-C	-5.42	99.56	110.40

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	430	GLU	Mainchain

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	1672	0	1644	33	0
1	B	1686	0	1656	20	0
2	A	56	0	47	8	0
2	B	56	0	48	0	0
3	A	11	0	6	0	0
3	B	11	0	8	0	0
4	A	22	0	18	3	0
4	B	22	0	18	0	0
5	A	22	0	20	1	0
5	B	11	0	10	0	0
6	A	10	0	10	0	0
6	B	10	0	10	0	0
7	A	13	0	18	0	0
8	A	66	0	0	1	0
8	B	82	0	0	6	0
All	All	3750	0	3513	57	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 8.

All (57) 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:297:ASN:HD21	2:A:501:NAG:C1	1.16	1.57
1:A:294:GLU:OE2	1:A:300:TYR:HE1	1.27	1.17
1:A:294:GLU:OE2	1:A:300:TYR:CE1	2.08	1.03
1:A:297:ASN:O	1:A:298:SER:HB2	1.69	0.92
1:A:297:ASN:HD21	2:A:501:NAG:C2	1.83	0.90
1:B:411[A]:THR:HG22	8:B:601:HOH:O	1.72	0.89
1:B:411[A]:THR:CG2	8:B:601:HOH:O	2.21	0.88
1:A:380:GLU:OE1	8:A:665:HOH:O	1.92	0.87

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:504:MAN:C2	2:A:505:NAG:C1	2.53	0.86
1:A:429:HIS:HD2	1:A:431:ALA:H	1.29	0.77
1:B:429:HIS:HD2	1:B:431:ALA:H	1.30	0.77
1:A:429:HIS:CD2	1:A:431:ALA:H	2.05	0.75
1:B:429:HIS:CD2	1:B:431:ALA:H	2.04	0.74
1:A:294:GLU:CD	1:A:300:TYR:HE1	1.96	0.66
1:A:385:GLY:O	1:A:386:GLN:NE2	2.30	0.63
1:A:383:SER:OG	1:A:422:VAL:O	2.10	0.62
1:A:253:ILE:HD12	1:A:253:ILE:H	1.66	0.61
1:A:365:LEU:HD12	1:A:410:LEU:HD23	1.83	0.61
2:A:509:NAG:H62	5:A:510:GAL:C1	2.33	0.58
1:B:259:VAL:HG13	1:B:336:ILE:HD11	1.87	0.56
1:B:358:LEU:HD23	1:B:363:VAL:HG11	1.88	0.55
1:A:269:GLU:HG3	1:A:270:ASP:OD2	2.06	0.54
1:A:355:ARG:HA	1:A:358:LEU:HD12	1.89	0.54
4:A:504:MAN:O2	2:A:505:NAG:C2	2.51	0.53
1:A:297:ASN:CG	2:A:501:NAG:C1	2.76	0.51
1:A:294:GLU:CD	1:A:300:TYR:CE1	2.78	0.51
1:A:266:VAL:HB	1:A:300:TYR:HB2	1.95	0.49
1:B:266:VAL:HB	1:B:300:TYR:HB2	1.95	0.48
1:B:311:GLN:NE2	8:B:634:HOH:O	2.22	0.48
1:A:248:LYS:HE3	1:A:428:MET:CE	2.44	0.48
1:A:384:ASN:O	1:A:386:GLN:HG2	2.13	0.48
1:B:340:LYS:HA	8:B:629:HOH:O	2.14	0.47
1:A:350:THR:HB	1:A:441:LEU:HB2	1.96	0.47
1:A:297:ASN:O	1:A:298:SER:CB	2.47	0.47
1:B:353:PRO:HD3	1:B:365:LEU:CD2	2.44	0.47
1:A:238:PRO:HD2	1:A:328:LEU:HD21	1.96	0.46
1:B:242:LEU:HD23	1:B:336:ILE:HG23	1.97	0.46
1:B:414:LYS:O	1:B:418[B]:GLN:HG3	2.15	0.46
1:A:294:GLU:OE2	1:A:300:TYR:CD1	2.66	0.46
1:B:443:LEU:HD23	1:B:444:SER:HB3	1.98	0.45
1:A:382:GLU:HB3	1:A:386:GLN:O	2.16	0.45
1:A:367:CYS:HB2	1:A:381:TRP:CZ2	2.52	0.44
1:B:428:MET:HA	1:B:435:HIS:O	2.18	0.44
4:A:504:MAN:H2	2:A:505:NAG:C1	2.42	0.43
1:A:358:LEU:HD23	1:A:363:VAL:HG11	1.99	0.43
1:B:279:VAL:CG1	1:B:317:LYS:HD2	2.49	0.43
1:B:312:ASP:CG	1:B:317:LYS:HE2	2.39	0.42
1:B:355:ARG:HG2	1:B:355:ARG:H	1.31	0.42
1:A:240:VAL:O	1:A:334:LYS:HE2	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:359:THR:HG23	1:A:360:LYS:HD3	2.02	0.42
1:B:367:CYS:HB2	1:B:381:TRP:CZ2	2.55	0.41
1:A:356:ASP:O	1:A:359:THR:HG22	2.19	0.41
1:B:255:ARG:HD2	8:B:665:HOH:O	2.20	0.41
1:B:326:LYS:HG3	8:B:609:HOH:O	2.21	0.41
1:A:271:PRO:HB2	1:A:292:ARG:HH11	1.86	0.40
1:A:297:ASN:ND2	2:A:501:NAG:C2	2.62	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	207/208 (100%)	203 (98%)	4 (2%)	0	100	100
1	B	210/208 (101%)	208 (99%)	2 (1%)	0	100	100
All	All	417/416 (100%)	411 (99%)	6 (1%)	0	100	100

There are no Ramachandran outliers to report.

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	195/194 (100%)	194 (100%)	1 (0%)	90	90

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	198/194 (102%)	197 (100%)	1 (0%)	90	90
All	All	393/388 (101%)	391 (100%)	2 (0%)	90	90

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	295	GLN
1	B	355	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	297	ASN
1	A	386	GLN
1	A	429	HIS
1	A	433	HIS
1	B	268	HIS
1	B	295	GLN
1	B	429	HIS

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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

20 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
2	NAG	A	501	1,2,6	14,14,15	0.55	0	17,19,21	1.50	2 (11%)
2	NAG	A	502	3,2	14,14,15	0.79	0	17,19,21	1.77	4 (23%)
3	BMA	A	503	2,4	11,11,12	2.78	7 (63%)	15,15,17	3.61	8 (53%)
4	MAN	A	504	3,2	11,11,12	0.55	0	15,15,17	1.26	1 (6%)
2	NAG	A	505	5,4	14,14,15	0.61	0	17,19,21	0.90	0
5	GAL	A	506	2	11,11,12	0.70	0	15,15,17	1.10	1 (6%)
6	FUL	A	507	2	9,10,11	0.56	0	13,14,16	1.80	4 (30%)
4	MAN	A	508	3,2	11,11,12	0.58	0	15,15,17	1.79	2 (13%)
2	NAG	A	509	5,4	14,14,15	0.69	0	17,19,21	1.38	3 (17%)
5	GAL	A	510	2	11,11,12	1.30	1 (9%)	15,15,17	2.22	4 (26%)
7	PG4	A	511	-	12,12,12	0.45	0	11,11,11	0.87	0
2	NAG	B	501	1,2,6	14,14,15	0.59	0	17,19,21	1.18	1 (5%)
2	NAG	B	502	3,2	14,14,15	1.44	2 (14%)	17,19,21	1.37	3 (17%)
3	BMA	B	503	2,4	11,11,12	0.77	0	15,15,17	1.51	4 (26%)
4	MAN	B	504	3,2	11,11,12	0.94	0	15,15,17	1.65	2 (13%)
2	NAG	B	505	5,4	14,14,15	0.96	0	17,19,21	1.12	0
5	GAL	B	506	2	11,11,12	0.79	0	15,15,17	2.09	3 (20%)
4	MAN	B	507	3,2	11,11,12	0.70	0	15,15,17	1.46	4 (26%)
6	FUL	B	508	2	9,10,11	0.95	0	13,14,16	2.31	5 (38%)
2	NAG	B	509	4	14,14,15	0.29	0	17,19,21	0.67	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	A	501	1,2,6	-	0/6/23/26	0/1/1/1
2	NAG	A	502	3,2	-	0/6/23/26	0/1/1/1
3	BMA	A	503	2,4	-	0/2/19/22	0/1/1/1
4	MAN	A	504	3,2	-	0/2/19/22	0/1/1/1
2	NAG	A	505	5,4	-	0/6/23/26	0/1/1/1
5	GAL	A	506	2	-	0/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	FUL	A	507	2	-	0/0/17/20	0/1/1/1
4	MAN	A	508	3,2	-	0/2/19/22	0/1/1/1
2	NAG	A	509	5,4	-	0/6/23/26	0/1/1/1
5	GAL	A	510	2	-	0/2/19/22	0/1/1/1
7	PG4	A	511	-	-	0/10/10/10	0/0/0/0
2	NAG	B	501	1,2,6	-	0/6/23/26	0/1/1/1
2	NAG	B	502	3,2	-	0/6/23/26	0/1/1/1
3	BMA	B	503	2,4	-	0/2/19/22	0/1/1/1
4	MAN	B	504	3,2	-	0/2/19/22	0/1/1/1
2	NAG	B	505	5,4	-	0/6/23/26	0/1/1/1
5	GAL	B	506	2	-	0/2/19/22	0/1/1/1
4	MAN	B	507	3,2	-	0/2/19/22	0/1/1/1
6	FUL	B	508	2	-	0/0/17/20	0/1/1/1
2	NAG	B	509	4	-	0/6/23/26	0/1/1/1

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	503	BMA	O2-C2	-5.11	1.32	1.43
3	A	503	BMA	O3-C3	-4.67	1.31	1.43
2	B	502	NAG	O5-C1	-3.38	1.38	1.43
3	A	503	BMA	O5-C5	-3.23	1.36	1.43
3	A	503	BMA	O4-C4	-2.82	1.36	1.43
3	A	503	BMA	C6-C5	-2.43	1.43	1.51
3	A	503	BMA	O5-C1	-2.29	1.40	1.43
3	A	503	BMA	O6-C6	-2.19	1.33	1.42
2	B	502	NAG	O7-C7	2.12	1.28	1.23
5	A	510	GAL	O6-C6	3.22	1.56	1.42

All (51) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	510	GAL	C1-C2-C3	-6.67	101.22	109.66
3	A	503	BMA	O4-C4-C5	-6.26	93.63	109.31
3	A	503	BMA	O2-C2-C3	-6.07	98.36	110.19
3	A	503	BMA	O2-C2-C1	-5.05	98.99	109.17
4	A	504	MAN	O5-C1-C2	-3.36	105.53	110.78
4	B	504	MAN	O2-C2-C3	-3.35	103.66	110.19
2	B	502	NAG	O3-C3-C2	-2.78	103.44	109.39
3	A	503	BMA	O3-C3-C2	-2.61	105.17	110.04
4	B	507	MAN	O2-C2-C3	-2.58	105.16	110.19
3	B	503	BMA	O6-C6-C5	-2.52	102.49	111.29

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	507	MAN	O5-C1-C2	-2.45	106.96	110.78
2	A	502	NAG	O7-C7-C8	-2.39	117.75	122.07
2	B	501	NAG	C3-C4-C5	-2.26	106.19	110.24
5	B	506	GAL	O6-C6-C5	-2.19	103.66	111.29
2	A	509	NAG	O3-C3-C4	-2.17	105.28	110.34
2	A	502	NAG	O3-C3-C4	-2.12	105.39	110.34
5	A	510	GAL	C1-O5-C5	-2.11	109.28	112.19
4	A	508	MAN	C2-C3-C4	-2.11	107.21	110.87
3	B	503	BMA	O3-C3-C4	-2.10	105.44	110.34
4	B	507	MAN	O5-C5-C6	2.04	110.38	107.15
5	A	506	GAL	C1-C2-C3	2.11	112.33	109.66
5	A	510	GAL	C3-C4-C5	2.14	114.06	110.24
2	B	502	NAG	O7-C7-C8	2.16	125.97	122.07
3	A	503	BMA	O5-C5-C4	2.29	116.40	110.83
6	B	508	FUL	C1-O5-C5	2.30	117.48	112.39
3	B	503	BMA	O5-C1-C2	2.31	114.37	110.78
2	A	501	NAG	C1-C2-N2	2.31	114.44	110.49
6	A	507	FUL	O5-C1-C2	2.36	114.45	110.78
6	A	507	FUL	C1-C2-C3	2.40	112.70	109.66
2	B	502	NAG	C1-O5-C5	2.43	115.53	112.19
2	A	509	NAG	O4-C4-C5	2.60	115.81	109.31
6	A	507	FUL	C2-C3-C4	2.65	115.47	110.87
5	B	506	GAL	O2-C2-C1	2.73	114.67	109.17
2	A	509	NAG	C3-C4-C5	2.76	115.18	110.24
6	B	508	FUL	O5-C5-C4	2.79	114.15	109.62
2	A	502	NAG	C1-C2-N2	2.80	115.28	110.49
6	B	508	FUL	O3-C3-C4	2.87	117.03	110.34
5	A	510	GAL	O5-C5-C6	3.02	111.92	107.15
6	B	508	FUL	O5-C1-C2	3.18	115.73	110.78
3	B	503	BMA	O5-C5-C6	3.23	112.25	107.15
3	A	503	BMA	C6-C5-C4	3.30	120.79	112.99
4	B	507	MAN	C1-O5-C5	3.37	116.82	112.19
4	B	504	MAN	C1-O5-C5	3.40	116.87	112.19
6	A	507	FUL	C1-O5-C5	3.64	120.44	112.39
6	B	508	FUL	C1-C2-C3	4.66	115.56	109.66
2	A	501	NAG	O5-C5-C6	4.96	115.00	107.15
3	A	503	BMA	O5-C1-C2	5.03	118.62	110.78
2	A	502	NAG	C1-O5-C5	5.11	119.22	112.19
4	A	508	MAN	C1-O5-C5	5.45	119.68	112.19
3	A	503	BMA	C1-C2-C3	5.89	117.11	109.66
5	B	506	GAL	O5-C5-C6	6.55	117.51	107.15

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	501	NAG	4	0
4	A	504	MAN	3	0
2	A	505	NAG	3	0
2	A	509	NAG	1	0
5	A	510	GAL	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	207/208 (99%)	0.37	9 (4%) 35 38	15, 31, 55, 67	0
1	B	208/208 (100%)	-0.02	1 (0%) 90 92	13, 26, 41, 55	0
All	All	415/416 (99%)	0.17	10 (2%) 59 62	13, 28, 50, 67	0

All (10) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	298	SER	6.8
1	A	385	GLY	3.8
1	A	299	THR	3.5
1	A	266	VAL	3.1
1	A	300	TYR	2.5
1	B	361	ASN	2.5
1	A	389	ASN	2.5
1	A	297	ASN	2.5
1	A	268	HIS	2.1
1	A	302	VAL	2.1

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 carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	GAL	A	510	11/12	0.40	0.71	97,99,100,101	0
6	FUL	A	507	10/11	0.51	0.38	84,87,87,88	0
2	NAG	A	501	14/15	0.67	0.22	55,60,66,70	0
2	NAG	B	509	14/15	0.74	0.38	85,89,90,90	0
6	FUL	B	508	10/11	0.75	0.23	52,57,60,61	0
4	MAN	A	508	11/12	0.77	0.25	59,64,68,74	0
4	MAN	A	504	11/12	0.78	0.17	51,52,53,56	0
2	NAG	A	509	14/15	0.80	0.25	81,87,88,93	0
3	BMA	A	503	11/12	0.81	0.14	51,52,57,58	0
2	NAG	A	502	14/15	0.86	0.14	51,53,55,56	0
7	PG4	A	511	13/13	0.89	0.14	42,44,49,50	0
2	NAG	B	501	14/15	0.91	0.11	31,34,39,42	0
4	MAN	B	507	11/12	0.92	0.14	41,46,48,48	0
2	NAG	A	505	14/15	0.92	0.12	39,44,51,51	0
2	NAG	B	502	14/15	0.93	0.09	25,29,34,40	0
3	BMA	B	503	11/12	0.93	0.10	27,31,34,37	0
5	GAL	A	506	11/12	0.93	0.10	33,36,43,47	0
4	MAN	B	504	11/12	0.94	0.10	27,29,37,39	0
2	NAG	B	505	14/15	0.95	0.08	23,28,37,38	0
5	GAL	B	506	11/12	0.97	0.10	21,22,26,32	0

6.5 Other polymers [i](#)

There are no such residues in this entry.