



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 06:31 AM GMT

PDB ID : 2XEF
Title : HUMAN GLUTAMATE CARBOXYPEPTIDASE II IN COMPLEX WITH
ANTIBODY-RECRUITING MOLECULE ARM-P8
Authors : Zhang, A.X.; Murelli, R.P.; Barinka, C.; Michel, J.; Cocleaza, A.; Jorgensen,
W.L.; Lubkowski, J.; Spiegel, D.A.
Deposited on : 2010-05-14
Resolution : 1.59 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
<http://wwpdb.org/validation/2016/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 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

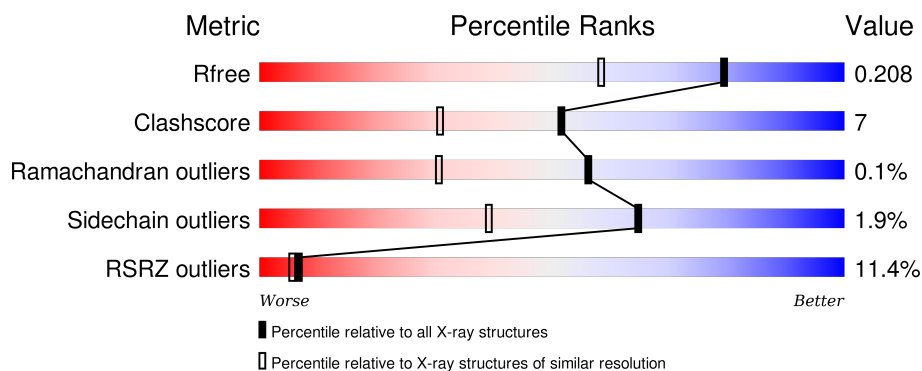
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.59 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}	91344	2475 (1.60-1.60)
Clashscore	102246	2732 (1.60-1.60)
Ramachandran outliers	100387	2654 (1.60-1.60)
Sidechain outliers	100360	2653 (1.60-1.60)
RSRZ outliers	91569	2479 (1.60-1.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments 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	709	

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
2	AR8	A	1770[B]	-	-	-	X

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	NAG	A	1756	-	-	-	X
6	NAG	A	1758	-	-	-	X
6	NAG	A	1761	-	-	-	X
7	NAG	A	1757	-	-	-	X
8	NAG	A	1763	-	-	-	X

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 6687 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.

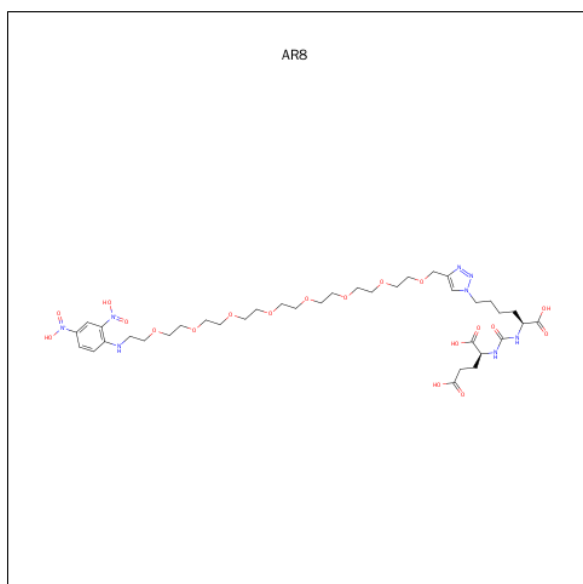
- Molecule 1 is a protein called GLUTAMATE CARBOXYPEPTIDASE 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	694	5798	3733	960	1081	24	0	53	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	42	ARG	-	EXPRESSION TAG	UNP Q04609
A	43	SER	-	EXPRESSION TAG	UNP Q04609
A	593	GLN	LEU	CONFLICT	UNP Q04609

- Molecule 2 is N-{[(1S)-5-{4-[25-({2,4-BIS[HYDROXY(OXO)AMMONIO]PHENYL}AMINO)-2,5,8,11,14,17,20,23-OCTAOXAPENTACOS-1-YL]-1H-1,2,3-TRIAZOL-1-YL}-1-CARBOXYPENTYL]CARBAMOYL}-L-GLUTAMIC ACID (three-letter code: AR8) (formula: C₃₇H₆₀N₈O₁₉).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	35	1
			128	74	16	38		

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total	Zn	0	0
			2	2		

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

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

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Cl	0	0
			1	1		

- Molecule 6 is a polymer of unknown type called SUGAR (2-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	2	Total	C	N	O	0	0
			28	16	2	10		
6	A	2	Total	C	N	O	0	0
			28	16	2	10		
6	A	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 7 is SUGAR (N-ACETYL-D-GLUCOSAMINE) (three-letter code: NAG) (formula: C₈H₁₅NO₆).



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

- Molecule 8 is a polymer of unknown type called SUGAR (4-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	A	4	Total	C	N	O	0	0
			50	28	2	20		

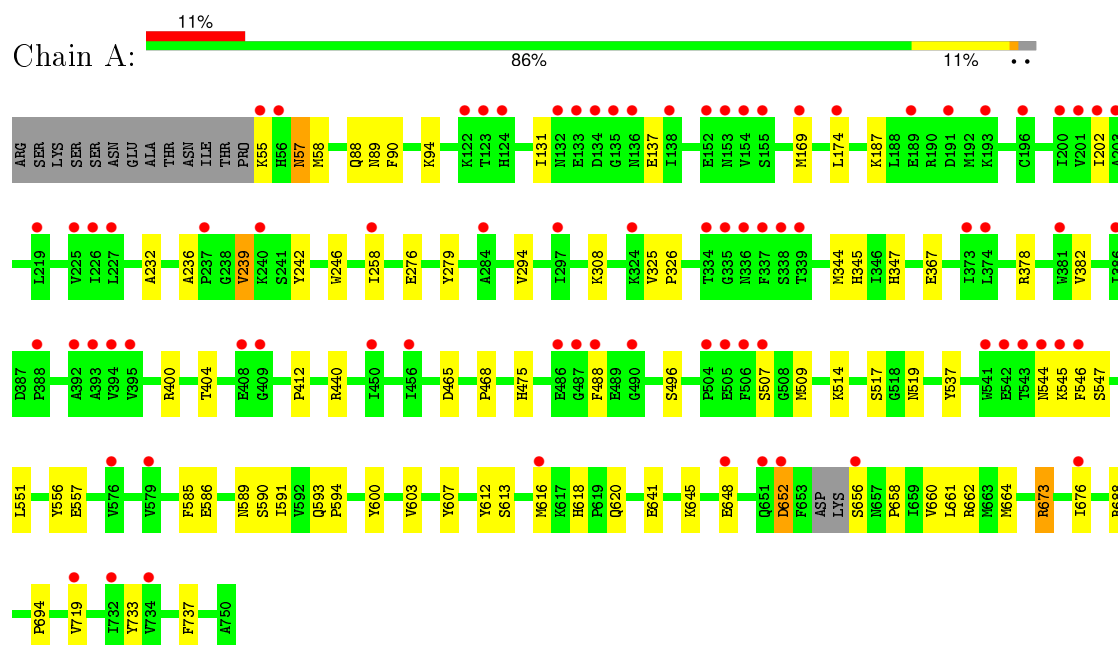
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	581	Total	O	0	0
			581	581		

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 errors 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: GLUTAMATE CARBOXYPEPTIDASE 2



4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α , β , γ	101.84Å 130.03Å 158.74Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 1.59 28.57 – 1.59	Depositor EDS
% Data completeness (in resolution range)	96.9 (30.00-1.59) 96.9 (28.57-1.59)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.13 (at 1.58Å)	Xtriage
Refinement program	REFMAC 5.4.0057	Depositor
R, R_{free}	0.161 , 0.183 0.188 , 0.208	Depositor DCC
R_{free} test set	2025 reflections (1.50%)	DCC
Wilson B-factor (Å ²)	21.0	Xtriage
Anisotropy	0.040	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 60.6	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	0 of 137667 reflections	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	6687	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.62% 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, 0.375 respectively for untwinned datasets, and 0.333, 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: ZN, BMA, NAG, CL, AR8, CA, 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	0.83	2/6104 (0.0%)	0.84	5/8269 (0.1%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	557	GLU	CB-CG	-5.74	1.41	1.52
1	A	737	PHE	CD2-CE2	5.68	1.50	1.39

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	673	ARG	NE-CZ-NH2	-10.36	115.12	120.30
1	A	440	ARG	NE-CZ-NH2	-7.58	116.51	120.30
1	A	465	ASP	CB-CG-OD1	5.49	123.24	118.30
1	A	673	ARG	NE-CZ-NH1	5.09	122.84	120.30
1	A	55	LYS	N-CA-CB	5.03	119.66	110.60

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5798	0	5699	76	1

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	128	0	114	4	0
3	A	2	0	0	0	0
4	A	1	0	0	0	0
5	A	1	0	0	0	0
6	A	84	0	75	2	0
7	A	42	0	39	1	0
8	A	50	0	43	0	1
9	A	581	0	0	20	1
All	All	6687	0	5970	82	2

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 (82) 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:660[A]:VAL:O	1:A:664[A]:MET:HG2	1.16	1.28
1:A:593[B]:GLN:NE2	1:A:594:PRO:HD2	1.81	0.95
1:A:660[A]:VAL:O	1:A:664[A]:MET:CG	2.12	0.94
1:A:89[B]:ASN:HD21	1:A:378:ARG:HH21	1.00	0.92
1:A:733:TYR:HE2	9:A:2549:HOH:O	1.61	0.83
1:A:89[B]:ASN:ND2	1:A:378:ARG:HH21	1.75	0.83
1:A:593[B]:GLN:HA	1:A:593[B]:GLN:NE2	1.93	0.80
1:A:641:GLU:HG3	9:A:2447:HOH:O	1.84	0.78
1:A:89[B]:ASN:HD21	1:A:378:ARG:NH2	1.81	0.73
1:A:400:ARG:O	1:A:404[B]:THR:HG23	1.89	0.73
1:A:620[B]:GLN:OE1	9:A:2426:HOH:O	2.07	0.71
1:A:131:ILE:HG22	1:A:137:GLU:HG2	1.74	0.70
1:A:593[B]:GLN:HE22	1:A:594:PRO:HD2	1.58	0.66
1:A:612:TYR:CZ	1:A:616:MET:HG3	2.30	0.66
1:A:613[B]:SER:OG	9:A:2420:HOH:O	2.15	0.65
1:A:593[B]:GLN:CA	1:A:593[B]:GLN:HE21	2.11	0.64
1:A:593[B]:GLN:HE21	1:A:594:PRO:HD2	1.59	0.63
1:A:88:GLN:NE2	9:A:2027:HOH:O	2.30	0.63
1:A:593[B]:GLN:NE2	1:A:593[B]:GLN:CA	2.52	0.62
1:A:593[B]:GLN:NE2	1:A:594:PRO:CD	2.60	0.62
1:A:733:TYR:CE2	9:A:2549:HOH:O	2.43	0.62
1:A:236:ALA:O	1:A:239[A]:VAL:HG13	1.99	0.62
1:A:603[B]:VAL:CG1	1:A:607:TYR:CE2	2.84	0.60
1:A:688[B]:ARG:NH2	9:A:2495:HOH:O	2.35	0.59
1:A:90[B]:PHE:CZ	1:A:94:LYS:HD3	2.37	0.59

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:236:ALA:HB3	1:A:239[A]:VAL:HG11	1.86	0.58
1:A:591[B]:ILE:HD11	9:A:2074:HOH:O	2.05	0.56
1:A:412:PRO:HA	1:A:589[B]:ASN:OD1	2.06	0.56
1:A:308:LYS:HB2	9:A:2242:HOH:O	2.07	0.55
1:A:232:ALA:O	1:A:545:LYS:HE2	2.06	0.55
1:A:90[B]:PHE:HE2	1:A:94:LYS:HZ3	1.54	0.55
1:A:586[B]:GLU:OE2	1:A:590[B]:SER:OG	2.23	0.55
1:A:517:SER:HB2	1:A:694:PRO:HG3	1.89	0.54
1:A:645[B]:LYS:HE3	9:A:2453:HOH:O	2.07	0.54
1:A:656[B]:SER:O	1:A:658[B]:PRO:HD3	2.08	0.53
1:A:89[B]:ASN:HD22	1:A:89[B]:ASN:C	2.12	0.53
1:A:648:GLU:O	1:A:652:ASP:HB3	2.08	0.52
6:A:1756:NAG:H81	9:A:2033:HOH:O	2.08	0.52
1:A:603[B]:VAL:HG12	1:A:607:TYR:CE2	2.43	0.52
1:A:603[B]:VAL:HG13	1:A:607:TYR:CZ	2.44	0.52
1:A:603[B]:VAL:CG1	1:A:607:TYR:CZ	2.94	0.50
2:A:1770[A]:AR8:HBE2	2:A:1770[A]:AR8:HAU2	1.93	0.50
1:A:242:TYR:OH	9:A:2165:HOH:O	2.18	0.50
1:A:131:ILE:CG2	1:A:137:GLU:HG2	2.42	0.49
1:A:236:ALA:HB3	1:A:239[A]:VAL:CG1	2.42	0.49
1:A:90[B]:PHE:CE2	1:A:94:LYS:NZ	2.81	0.48
1:A:174[A]:LEU:HG	1:A:202:ILE:HG22	1.95	0.48
1:A:475:HIS:CE1	1:A:509[B]:MET:CE	2.97	0.47
1:A:367:GLU:OE1	1:A:662[B]:ARG:NH1	2.47	0.47
1:A:676:ILE:HG23	1:A:688[B]:ARG:HB3	1.95	0.47
1:A:586[B]:GLU:CD	1:A:590[B]:SER:OG	2.55	0.46
1:A:58[B]:MET:HG3	1:A:585:PHE:CG	2.51	0.46
1:A:593[B]:GLN:HE21	1:A:594:PRO:CD	2.26	0.45
1:A:586[B]:GLU:HG3	1:A:590[B]:SER:OG	2.18	0.44
1:A:169:MET:HA	1:A:344:MET:O	2.18	0.44
1:A:347:HIS:CE1	9:A:2066:HOH:O	2.70	0.44
1:A:468:PRO:HG2	1:A:603[A]:VAL:HG21	1.99	0.44
1:A:89[B]:ASN:ND2	1:A:89[B]:ASN:C	2.72	0.43
1:A:347:HIS:HE1	9:A:2066:HOH:O	2.02	0.43
1:A:618:HIS:HE1	9:A:2525:HOH:O	2.02	0.43
1:A:488:PHE:CE1	1:A:496:SER:HA	2.53	0.43
1:A:468:PRO:CG	1:A:603[A]:VAL:HG21	2.49	0.43
1:A:137:GLU:OE2	1:A:345:HIS:CE1	2.72	0.42
1:A:514[A]:LYS:HG3	9:A:2358:HOH:O	2.18	0.42
1:A:325:VAL:HB	1:A:326:PRO:HD2	2.00	0.42
1:A:88:GLN:CD	9:A:2027:HOH:O	2.58	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:246:TRP:CD1	7:A:1760:NAG:H83	2.55	0.42
1:A:645[B]:LYS:HD3	1:A:645[B]:LYS:HA	1.94	0.41
1:A:544:ASN:HB3	1:A:546:PHE:CE2	2.54	0.41
2:A:1770[B]:AR8:CCC	2:A:1770[B]:AR8:OAC	2.67	0.41
1:A:688[B]:ARG:CZ	9:A:2490:HOH:O	2.67	0.41
1:A:551:LEU:HD22	1:A:556:TYR:HB2	2.02	0.41
1:A:57:ASN:HD22	1:A:57:ASN:C	2.23	0.41
1:A:137:GLU:OE2	1:A:345:HIS:HE1	2.03	0.41
1:A:591[B]:ILE:HG13	9:A:2400:HOH:O	2.21	0.41
1:A:258:ILE:HD13	1:A:294:VAL:HB	2.03	0.41
1:A:661[A]:LEU:O	1:A:664[A]:MET:HB2	2.21	0.41
2:A:1770[A]:AR8:OAK	2:A:1770[A]:AR8:NBO	2.47	0.40
6:A:1756:NAG:H83	9:A:2564:HOH:O	2.21	0.40
1:A:57:ASN:N	1:A:57:ASN:ND2	2.69	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:A:2469:HOH:O	9:A:2469:HOH:O[2_565]	1.04	1.16
1:A:276[A]:GLU:OE1	8:A:1765:BMA:O2[2_565]	1.96	0.24

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	A	743/709 (105%)	725 (98%)	17 (2%)	1 (0%)	56 31

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	382	VAL

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	A	644/605 (106%)	632 (98%)	12 (2%)	65 39

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	57	ASN
1	A	187	LYS
1	A	239[A]	VAL
1	A	239[B]	VAL
1	A	507	SER
1	A	519	ASN
1	A	537	TYR
1	A	547	SER
1	A	600	TYR
1	A	652	ASP
1	A	673	ARG
1	A	719	VAL

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	57	ASN
1	A	303	GLN
1	A	345	HIS
1	A	618	HIS

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 ⓘ

10 carbohydrates 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	$\# Z > 2$
6	NAG	A	1755	1,6	14,14,15	0.48	0	15,19,21	1.24	1 (6%)
6	NAG	A	1756	6	14,14,15	0.59	0	15,19,21	1.12	1 (6%)
6	NAG	A	1758	1,6	14,14,15	0.51	0	15,19,21	0.89	0
6	NAG	A	1761	1,6	14,14,15	0.77	0	15,19,21	1.10	0
6	NAG	A	1762	6	14,14,15	0.47	0	15,19,21	1.24	1 (6%)
8	NAG	A	1763	1,8	14,14,15	0.78	1 (7%)	15,19,21	1.07	2 (13%)
8	NAG	A	1764	8	14,14,15	0.83	1 (7%)	15,19,21	0.92	0
8	BMA	A	1765	8	11,11,12	0.56	0	14,15,17	1.17	1 (7%)
8	MAN	A	1766	8	11,11,12	0.55	0	14,15,17	1.15	1 (7%)
6	NAG	A	1767	6	14,14,15	0.40	0	15,19,21	0.80	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
6	NAG	A	1755	1,6	-	0/6/23/26	0/1/1/1
6	NAG	A	1756	6	-	0/6/23/26	0/1/1/1
6	NAG	A	1758	1,6	-	0/6/23/26	0/1/1/1
6	NAG	A	1761	1,6	-	0/6/23/26	0/1/1/1
6	NAG	A	1762	6	-	0/6/23/26	0/1/1/1
8	NAG	A	1763	1,8	-	0/6/23/26	0/1/1/1
8	NAG	A	1764	8	-	0/6/23/26	0/1/1/1
8	BMA	A	1765	8	-	0/2/19/22	0/1/1/1
8	MAN	A	1766	8	-	0/2/19/22	0/1/1/1
6	NAG	A	1767	6	-	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)
8	A	1764	NAG	O5-C1	-2.77	1.39	1.43
8	A	1763	NAG	C1-C2	2.06	1.55	1.52

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	1755	NAG	C2-N2-C7	-3.33	118.76	123.04
8	A	1765	BMA	O3-C3-C2	-2.93	104.71	110.00
8	A	1763	NAG	C2-N2-C7	-2.44	119.91	123.04
8	A	1763	NAG	O4-C4-C5	-2.38	102.94	109.24
6	A	1762	NAG	C8-C7-N2	2.14	120.20	116.11
8	A	1766	MAN	C1-C2-C3	2.46	112.45	109.54
6	A	1756	NAG	C2-N2-C7	3.23	127.19	123.04

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	1756	NAG	2	0
8	A	1765	BMA	0	1

5.6 Ligand geometry [i](#)

Of 9 ligands modelled in this entry, 4 are monoatomic - leaving 5 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the chemical component dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
7	NAG	A	1757	1	14,14,15	0.62	0	15,19,21	1.01	0
7	NAG	A	1759	1	14,14,15	0.37	0	15,19,21	2.33	5 (33%)
7	NAG	A	1760	1	14,14,15	0.59	0	15,19,21	1.56	3 (20%)
2	AR8	A	1770[A]	3	52,65,65	2.66	7 (13%)	52,79,79	1.40	7 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	AR8	A	1770[B]	-	52,65,65	2.95	12 (23%)	52,79,79	1.38	8 (15%)

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
7	NAG	A	1757	1	-	0/6/23/26	0/1/1/1
7	NAG	A	1759	1	-	0/6/23/26	0/1/1/1
7	NAG	A	1760	1	-	0/6/23/26	0/1/1/1
2	AR8	A	1770[A]	3	-	0/49/65/65	0/2/2/2
2	AR8	A	1770[B]	-	-	0/49/65/65	0/2/2/2

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1770[B]	AR8	NBM-NBN	-6.79	1.24	1.34
2	A	1770[A]	AR8	NBM-NBN	-6.41	1.24	1.34
2	A	1770[B]	AR8	CCE-NCK	-5.82	1.33	1.45
2	A	1770[B]	AR8	NBN-NCJ	-5.17	1.24	1.34
2	A	1770[A]	AR8	CCE-NCK	-5.14	1.35	1.45
2	A	1770[A]	AR8	NBN-NCJ	-4.98	1.24	1.34
2	A	1770[B]	AR8	CBL-CCD	-3.98	1.40	1.50
2	A	1770[A]	AR8	CBL-CCD	-3.79	1.41	1.50
2	A	1770[B]	AR8	CAO-CCD	-2.05	1.33	1.36
2	A	1770[B]	AR8	CBB-CBC	2.07	1.59	1.48
2	A	1770[A]	AR8	OBT-CAX	2.13	1.51	1.42
2	A	1770[B]	AR8	OBS-CAU	2.20	1.51	1.42
2	A	1770[B]	AR8	OBW-CBC	3.05	1.55	1.42
2	A	1770[B]	AR8	OBR-CAS	3.13	1.55	1.42
2	A	1770[B]	AR8	CAR-NBO	3.25	1.53	1.46
2	A	1770[A]	AR8	OAF-NCL	9.78	1.41	1.22
2	A	1770[B]	AR8	OAF-NCL	10.54	1.43	1.22
2	A	1770[A]	AR8	OAE-NCK	11.10	1.44	1.22
2	A	1770[B]	AR8	OAE-NCK	11.99	1.45	1.22

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	1760	NAG	C2-N2-C7	-2.90	119.31	123.04
2	A	1770[A]	AR8	CAQ-CAP-CB	-2.86	103.51	113.66

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1770[A]	AR8	CAN-CCG-CCF	-2.83	119.20	121.62
7	A	1760	NAG	O3-C3-C4	-2.71	104.23	110.34
2	A	1770[B]	AR8	CCD-CAO-NCJ	-2.68	102.76	107.12
2	A	1770[B]	AR8	CAR-NBO-CCF	-2.67	116.16	123.15
2	A	1770[A]	AR8	CCD-CAO-NCJ	-2.58	102.91	107.12
7	A	1759	NAG	C6-C5-C4	-2.57	106.67	113.02
7	A	1759	NAG	C4-C3-C2	-2.44	107.44	111.23
2	A	1770[B]	AR8	CAS-OBR-CAT	-2.41	102.97	113.31
2	A	1770[A]	AR8	CCG-CCF-NBO	-2.28	119.15	123.69
2	A	1770[B]	AR8	CAQ-CAP-CB	-2.17	105.93	113.66
2	A	1770[B]	AR8	CAO-CCD-NBM	-2.13	108.00	111.42
2	A	1770[A]	AR8	CAO-CCD-NBM	-2.09	108.06	111.42
2	A	1770[B]	AR8	CAM-CCF-NBO	-2.02	118.28	121.74
7	A	1759	NAG	C2-N2-C7	2.09	125.73	123.04
7	A	1759	NAG	C8-C7-N2	2.10	120.12	116.11
7	A	1760	NAG	C1-O5-C5	3.28	116.41	112.25
2	A	1770[A]	AR8	OBY-CBL-CCD	3.88	122.32	110.87
2	A	1770[B]	AR8	NBM-NBN-NCJ	4.00	110.33	107.31
2	A	1770[A]	AR8	NBM-NBN-NCJ	4.15	110.44	107.31
2	A	1770[B]	AR8	OBY-CBL-CCD	4.17	123.17	110.87
7	A	1759	NAG	C1-O5-C5	7.38	121.62	112.25

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	1760	NAG	1	0
2	A	1770[A]	AR8	3	0
2	A	1770[B]	AR8	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

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	694/709 (97%)	0.65	79 (11%) 7 5	13, 23, 42, 62	1 (0%)

All (79) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	55	LYS	7.2
1	A	719	VAL	6.6
1	A	155	SER	6.5
1	A	506	PHE	6.3
1	A	541	TRP	6.3
1	A	656[A]	SER	5.8
1	A	507	SER	5.5
1	A	153	ASN	5.4
1	A	226	ILE	5.4
1	A	545	LYS	5.3
1	A	134	ASP	5.0
1	A	505	GLU	4.4
1	A	652	ASP	4.4
1	A	336	ASN	4.4
1	A	542	GLU	4.4
1	A	544	ASN	4.3
1	A	651	GLN	4.2
1	A	135	GLY	4.2
1	A	337	PHE	4.2
1	A	546	PHE	4.1
1	A	227	LEU	4.0
1	A	123	THR	3.9
1	A	136	ASN	3.8
1	A	133	GLU	3.6
1	A	56	HIS	3.5
1	A	202	ILE	3.5
1	A	174[A]	LEU	3.4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	154	VAL	3.4
1	A	543	THR	3.4
1	A	335	GLY	3.3
1	A	225	VAL	3.3
1	A	189	GLU	3.3
1	A	339	THR	3.1
1	A	124	HIS	3.1
1	A	408	GLU	3.1
1	A	394	VAL	3.1
1	A	169	MET	3.1
1	A	576	VAL	3.0
1	A	138	ILE	2.9
1	A	237	PRO	2.9
1	A	487	GLY	2.9
1	A	486	GLU	2.9
1	A	201	VAL	2.9
1	A	284	ALA	2.9
1	A	324	LYS	2.8
1	A	152	GLU	2.8
1	A	732	ILE	2.8
1	A	122	LYS	2.7
1	A	334	THR	2.6
1	A	504	PRO	2.6
1	A	191	ASP	2.6
1	A	381	TRP	2.5
1	A	196	CYS	2.5
1	A	297	ILE	2.5
1	A	395	VAL	2.5
1	A	488	PHE	2.5
1	A	409	GLY	2.4
1	A	676	ILE	2.4
1	A	219	LEU	2.4
1	A	490	GLY	2.3
1	A	393	ALA	2.3
1	A	616	MET	2.3
1	A	648	GLU	2.3
1	A	386	ILE	2.3
1	A	203	ALA	2.3
1	A	392	ALA	2.3
1	A	456	ILE	2.3
1	A	388	PRO	2.2
1	A	374	LEU	2.2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	373	ILE	2.2
1	A	132	ASN	2.2
1	A	258	ILE	2.2
1	A	450	ILE	2.1
1	A	734	VAL	2.1
1	A	338	SER	2.1
1	A	240	LYS	2.1
1	A	200	ILE	2.1
1	A	579	VAL	2.1
1	A	193	LYS	2.0

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

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

6.3 Carbohydrates [i](#)

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
6	NAG	A	1756	14/15	0.50	0.32	5.87	38,44,48,51	0
6	NAG	A	1761	14/15	0.87	0.15	4.46	24,27,34,40	0
6	NAG	A	1758	14/15	0.73	0.21	2.95	35,39,43,48	0
8	NAG	A	1763	14/15	0.84	0.13	2.24	19,26,31,40	0
8	MAN	A	1766	11/12	0.88	0.22	1.51	38,42,45,47	0
6	NAG	A	1762	14/15	0.87	0.20	-	31,36,42,43	0
6	NAG	A	1767	14/15	0.80	0.34	-	51,55,59,60	0
6	NAG	A	1755	14/15	0.89	0.14	-	28,35,40,43	0
8	BMA	A	1765	11/12	0.83	0.22	-	31,35,36,38	0
8	NAG	A	1764	14/15	0.83	0.26	-	32,35,45,47	0

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains.

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	LLDF	B-factors(Å ²)	Q<0.9
2	AR8	A	1770[B]	64/64	0.88	0.20	2.88	18,56,74,74	64
7	NAG	A	1757	14/15	0.75	0.30	2.30	39,47,51,51	0
2	AR8	A	1770[A]	64/64	0.88	0.20	1.53	16,66,75,76	64
5	CL	A	1754	1/1	1.00	0.13	0.32	6,6,6,6	0
3	ZN	A	1751	1/1	0.99	0.13	0.15	6,6,6,6	0
3	ZN	A	1752	1/1	1.00	0.11	-0.81	5,5,5,5	0
4	CA	A	1753	1/1	1.00	0.07	-1.62	4,4,4,4	0
7	NAG	A	1759	14/15	0.72	0.28	-	54,61,65,66	0
7	NAG	A	1760	14/15	0.74	0.20	-	28,43,47,48	0

6.5 Other polymers ⓘ

There are no such residues in this entry.