



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 07:04 PM GMT

PDB ID : 4NM8  
Title : Crystal structure of broadly neutralizing antibody CR8043 bound to H3 influenza hemagglutinin  
Authors : Lee, P.S.; Wilson, I.A.  
Deposited on : 2013-11-14  
Resolution : 4.00 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](mailto: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.

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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

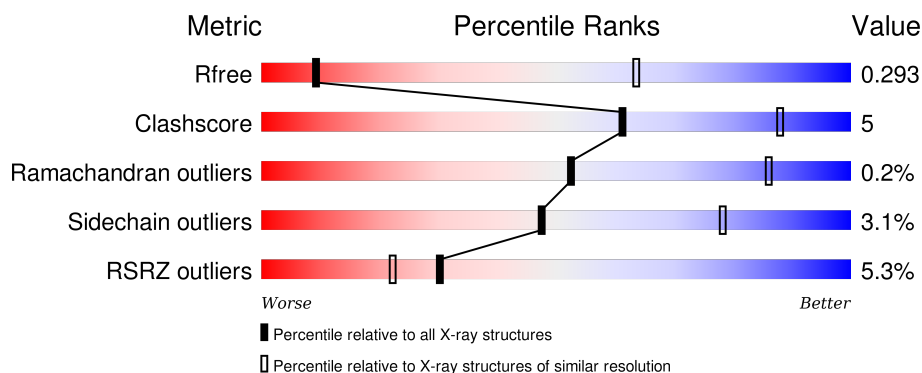
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 4.00 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	1010 (4.42-3.56)
Clashscore	102246	1052 (4.40-3.60)
Ramachandran outliers	100387	1005 (4.40-3.60)
Sidechain outliers	100360	1013 (4.42-3.58)
RSRZ outliers	91569	1013 (4.42-3.56)

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  $\geq 3$ , 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	323	<div> <div></div> <div>89% 9% .</div> </div>
1	C	323	<div> <div></div> <div>90% 8% .</div> </div>
1	E	323	<div> <div>5%</div> <div>85% 13% .</div> </div>
2	B	176	<div> <div></div> <div>84% 13% ..</div> </div>
2	D	176	<div> <div></div> <div>89% 8% ..</div> </div>

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Mol	Chain	Length	Quality of chain
2	F	176	
3	L	220	
3	M	220	
3	N	220	
4	H	230	
4	I	230	
4	J	230	

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
6	NAG	E	503	-	-	-	X

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 21672 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 HA1 Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	318	Total	C	N	O	S	0	0	0
			2452	1537	431	471	13			
1	C	318	Total	C	N	O	S	0	0	0
			2452	1537	431	471	13			
1	E	317	Total	C	N	O	S	0	0	0
			2443	1531	429	470	13			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	7	ALA	-	EXPRESSION TAG	UNP Q91MA7
A	8	ASP	-	EXPRESSION TAG	UNP Q91MA7
A	9	PRO	-	EXPRESSION TAG	UNP Q91MA7
A	10	GLY	-	EXPRESSION TAG	UNP Q91MA7
C	7	ALA	-	EXPRESSION TAG	UNP Q91MA7
C	8	ASP	-	EXPRESSION TAG	UNP Q91MA7
C	9	PRO	-	EXPRESSION TAG	UNP Q91MA7
C	10	GLY	-	EXPRESSION TAG	UNP Q91MA7
E	7	ALA	-	EXPRESSION TAG	UNP Q91MA7
E	8	ASP	-	EXPRESSION TAG	UNP Q91MA7
E	9	PRO	-	EXPRESSION TAG	UNP Q91MA7
E	10	GLY	-	EXPRESSION TAG	UNP Q91MA7

- Molecule 2 is a protein called Hemagglutinin HA2 Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	172	Total	C	N	O	S	0	0	0
			1391	863	243	279	6			
2	D	171	Total	C	N	O	S	0	0	0
			1382	858	241	277	6			
2	F	171	Total	C	N	O	S	0	0	0
			1382	858	241	277	6			

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	123	GLY	ARG	CONFLICT	UNP Q91MA7
D	123	GLY	ARG	CONFLICT	UNP Q91MA7
F	123	GLY	ARG	CONFLICT	UNP Q91MA7

- Molecule 3 is a protein called Antibody CR8043, Light Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	L	217	Total	C	N	O	S	0	0	0
			1685	1058	282	340	5			
3	M	217	Total	C	N	O	S	0	0	0
			1685	1058	282	340	5			
3	N	217	Total	C	N	O	S	0	0	0
			1685	1058	282	340	5			

- Molecule 4 is a protein called Antibody CR8043, Heavy Chain.

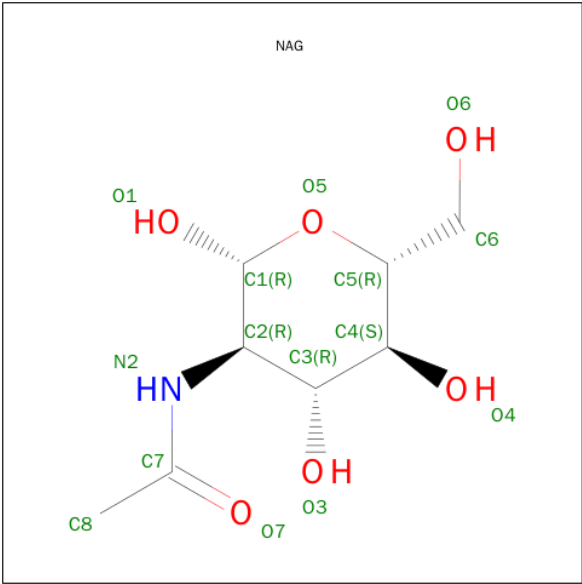
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	H	215	Total	C	N	O	S	0	0	0
			1621	1024	279	312	6			
4	I	211	Total	C	N	O	S	0	0	0
			1601	1012	275	308	6			
4	J	213	Total	C	N	O	S	0	0	0
			1613	1020	277	310	6			

- Molecule 5 is a polymer of unknown type called SUGAR (2-MER).

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

- Molecule 6 is SUGAR (N-ACETYL-D-GLUCOSAMINE) (three-letter code: NAG) (formula:

C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).

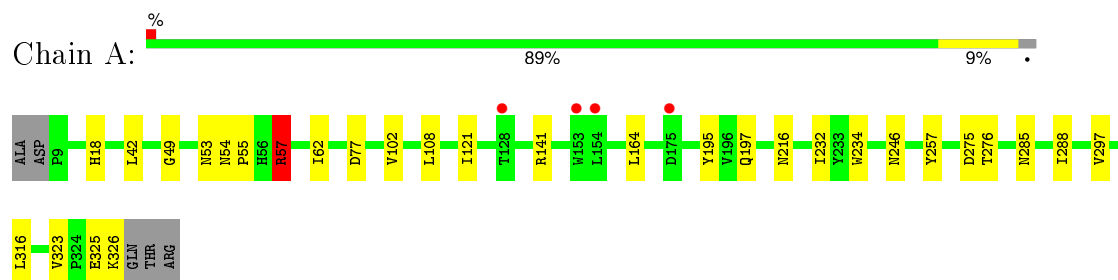


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	B	1	Total	C	N	O	0	0
			14	8	1	5		
6	C	1	Total	C	N	O	0	0
			14	8	1	5		
6	C	1	Total	C	N	O	0	0
			14	8	1	5		
6	D	1	Total	C	N	O	0	0
			14	8	1	5		
6	E	1	Total	C	N	O	0	0
			14	8	1	5		
6	E	1	Total	C	N	O	0	0
			14	8	1	5		
6	E	1	Total	C	N	O	0	0
			14	8	1	5		
6	F	1	Total	C	N	O	0	0
			14	8	1	5		

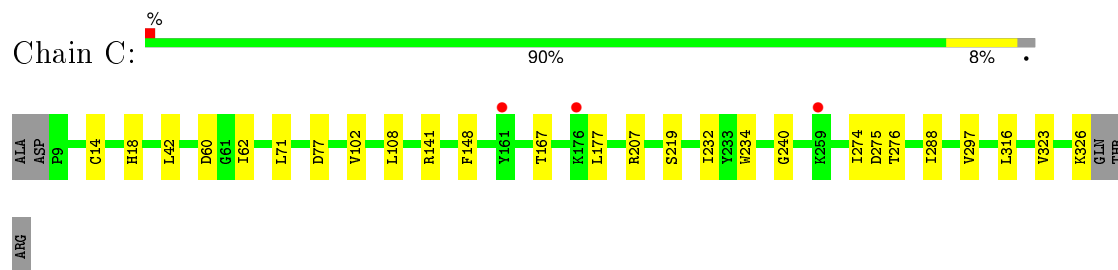
### 3 Residue-property plots [i](#)

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.

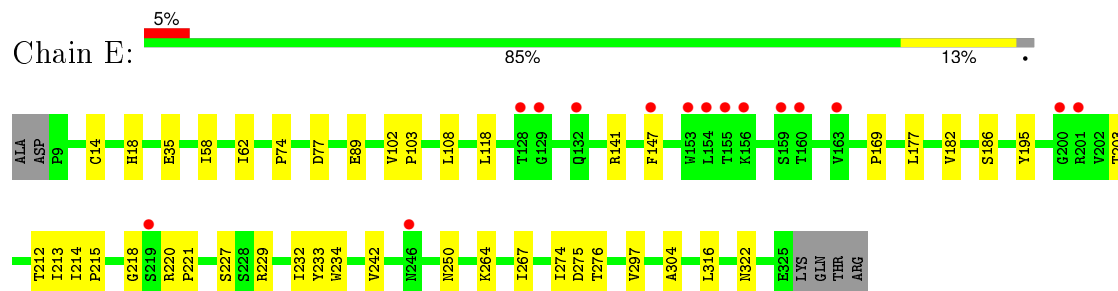
- Molecule 1: Hemagglutinin HA1 Chain



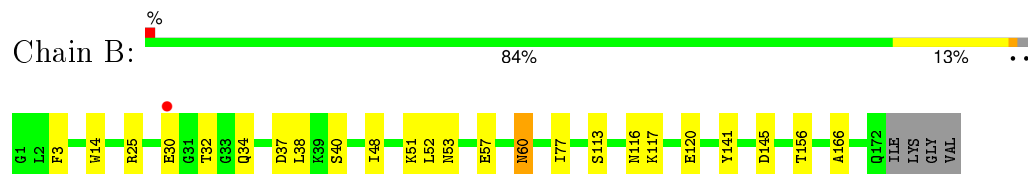
- Molecule 1: Hemagglutinin HA1 Chain



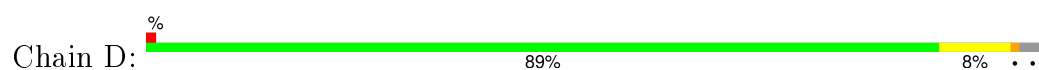
- Molecule 1: Hemagglutinin HA1 Chain



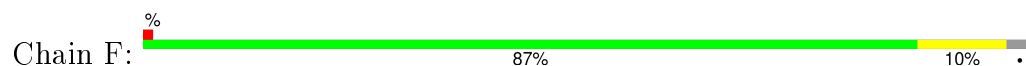
- Molecule 2: Hemagglutinin HA2 Chain



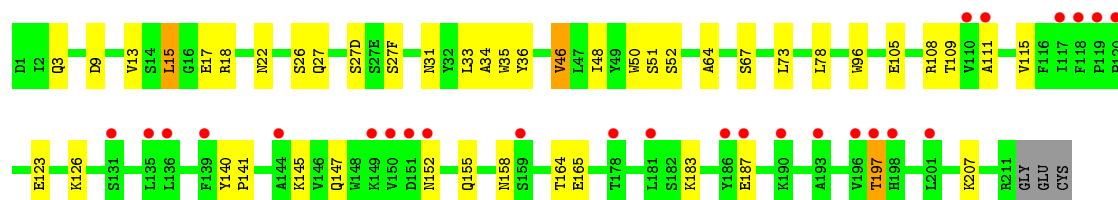
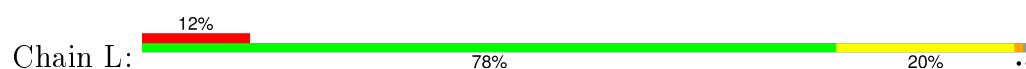
- Molecule 2: Hemagglutinin HA2 Chain



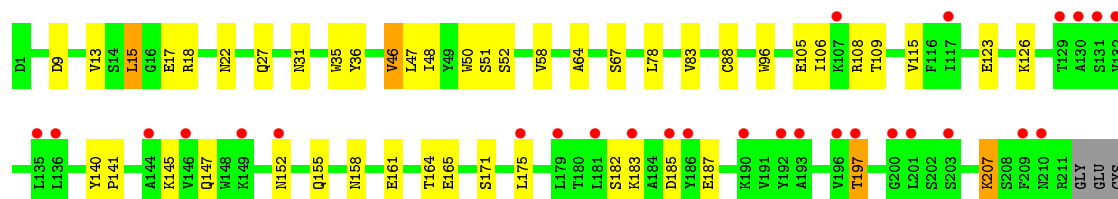
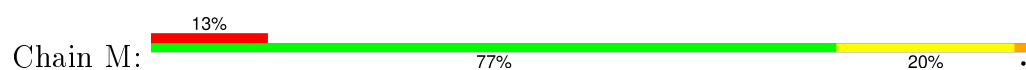
- Molecule 2: Hemagglutinin HA2 Chain



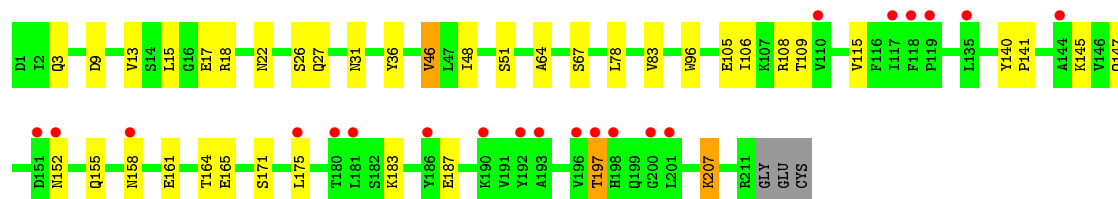
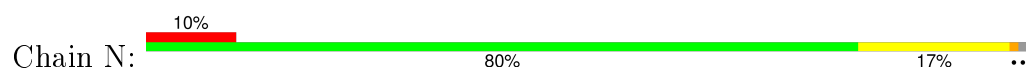
- Molecule 3: Antibody CR8043, Light Chain



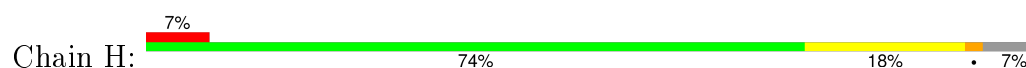
- Molecule 3: Antibody CR8043, Light Chain



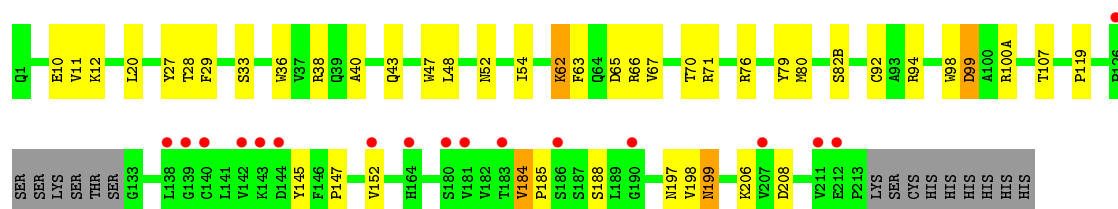
- Molecule 3: Antibody CR8043, Light Chain



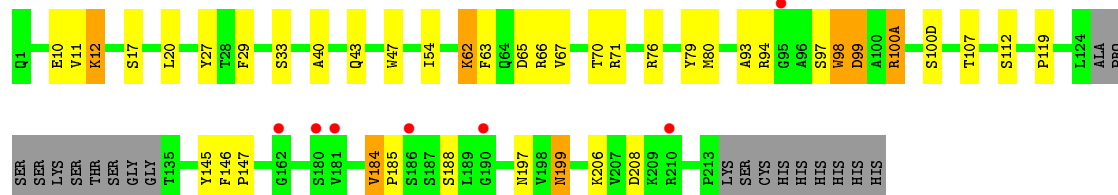
- Molecule 4: Antibody CR8043, Heavy Chain



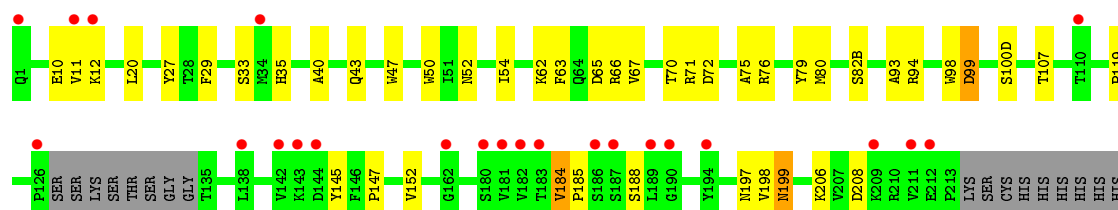
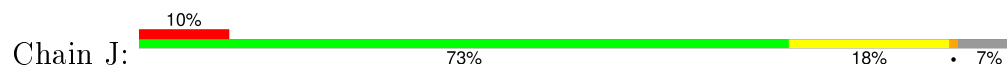




• Molecule 4: Antibody CR8043, Heavy Chain



• Molecule 4: Antibody CR8043, Heavy Chain



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	241.49Å 142.35Å 170.72Å 90.00° 133.46° 90.00°	Depositor
Resolution (Å)	43.82 – 4.00 46.73 – 4.00	Depositor EDS
% Data completeness (in resolution range)	97.4 (43.82-4.00) 97.5 (46.73-4.00)	Depositor EDS
$R_{merge}$	0.20	Depositor
$R_{sym}$	0.20	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.03 (at 4.00Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8.1_1168)	Depositor
R, $R_{free}$	0.240 , 0.292 0.240 , 0.293	Depositor DCC
$R_{free}$ test set	1730 reflections (5.01%)	DCC
Wilson B-factor (Å <sup>2</sup> )	127.3	Xtriage
Anisotropy	0.188	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 44.7	EDS
Estimated twinning fraction	0.000 for h+2*k,-h-l 0.005 for h,-k,-h-l 0.000 for -h-2*k,-k,l	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	5 of 34584 reflections (0.014%)	Xtriage
$F_o, F_c$ correlation	0.87	EDS
Total number of atoms	21672	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	68.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.25% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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

### 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	0.36	0/2509	0.64	1/3418 (0.0%)
1	C	0.35	0/2509	0.61	0/3418
1	E	0.35	0/2500	0.63	0/3407
2	B	0.39	0/1415	0.63	1/1902 (0.1%)
2	D	0.39	0/1406	0.60	0/1890
2	F	0.37	0/1406	0.58	0/1890
3	L	0.32	0/1725	0.59	0/2347
3	M	0.31	0/1725	0.58	0/2347
3	N	0.32	0/1725	0.57	0/2347
4	H	0.34	0/1662	0.59	0/2265
4	I	0.34	0/1641	0.60	0/2236
4	J	0.32	0/1654	0.59	0/2255
All	All	0.35	0/21877	0.60	2/29722 (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

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	52	LEU	CB-CG-CD2	-8.17	97.11	111.00
1	A	57	ARG	CG-CD-NE	-5.59	100.06	111.80

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	57	ARG	Sidechain

## 5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2452	0	2404	15	0
1	C	2452	0	2403	15	0
1	E	2443	0	2390	26	0
2	B	1391	0	1306	19	0
2	D	1382	0	1298	21	0
2	F	1382	0	1298	18	0
3	L	1685	0	1627	22	0
3	M	1685	0	1627	23	0
3	N	1685	0	1627	20	0
4	H	1621	0	1588	29	0
4	I	1601	0	1570	28	0
4	J	1613	0	1582	28	0
5	A	84	0	75	2	0
5	C	56	0	50	2	0
5	E	28	0	25	1	0
6	B	14	0	13	1	0
6	C	28	0	26	1	0
6	D	14	0	13	2	0
6	E	42	0	39	0	0
6	F	14	0	13	1	0
All	All	21672	0	20974	234	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 5.

All (234) 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)
4:I:11:VAL:HG21	4:I:147:PRO:HG3	1.45	0.95

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:H:11:VAL:HG21	4:H:147:PRO:HG3	1.49	0.94
3:N:108:ARG:NH1	3:N:109:THR:O	2.10	0.84
4:J:11:VAL:HG21	4:J:147:PRO:HG3	1.59	0.82
3:L:108:ARG:NH1	3:L:109:THR:O	2.14	0.80
4:H:33:SER:HB3	4:H:98:TRP:HA	1.63	0.79
3:M:108:ARG:NH1	3:M:109:THR:O	2.16	0.78
3:N:13:VAL:HG23	3:N:78:LEU:HD22	1.66	0.78
4:J:199:ASN:HD21	4:J:206:LYS:HE3	1.50	0.76
3:M:13:VAL:HG23	3:M:78:LEU:HD22	1.67	0.74
4:J:33:SER:HB3	4:J:98:TRP:HA	1.69	0.74
4:J:29:PHE:HB2	4:J:76:ARG:HG2	1.72	0.70
2:D:32:THR:HG21	4:I:54:ILE:HD13	1.73	0.69
4:I:199:ASN:HD21	4:I:206:LYS:HE3	1.58	0.69
2:F:32:THR:HG21	4:J:54:ILE:HD13	1.73	0.69
4:H:199:ASN:HD21	4:H:206:LYS:HE3	1.57	0.68
3:L:13:VAL:HG23	3:L:78:LEU:HD22	1.73	0.68
4:I:29:PHE:HB2	4:I:76:ARG:HG2	1.77	0.67
4:I:33:SER:HB3	4:I:98:TRP:HA	1.76	0.67
3:N:96:TRP:HB2	4:J:47:TRP:CG	2.31	0.65
4:H:99:ASP:OD2	4:H:100(A):ARG:HB2	1.96	0.65
1:E:169:PRO:HA	1:E:242:VAL:HG12	1.78	0.64
4:J:63:PHE:O	4:J:67:VAL:HG12	1.98	0.64
1:C:297:VAL:HA	5:C:505:NAG:H82	1.81	0.63
4:J:52:ASN:HD21	4:J:98:TRP:HZ3	1.46	0.62
4:H:63:PHE:O	4:H:67:VAL:HG12	1.99	0.62
3:L:36:TYR:CE2	3:L:46:VAL:HG13	2.33	0.62
3:L:96:TRP:HB2	4:H:47:TRP:CG	2.35	0.62
1:E:275:ASP:OD1	1:E:276:THR:N	2.29	0.61
2:D:156:THR:HG21	6:D:201:NAG:H82	1.82	0.61
1:E:141:ARG:NH2	1:E:147:PHE:O	2.33	0.61
1:A:275:ASP:OD1	1:A:276:THR:N	2.32	0.61
3:M:108:ARG:HD2	3:M:171:SER:HB2	1.81	0.61
4:I:184:VAL:HG22	4:I:185:PRO:HD2	1.83	0.61
1:A:297:VAL:HA	5:A:505:NAG:H82	1.82	0.61
2:B:32:THR:HG21	4:H:54:ILE:HD13	1.82	0.60
4:I:63:PHE:O	4:I:67:VAL:HG12	2.01	0.60
4:J:70:THR:HB	4:J:79:TYR:HB2	1.84	0.59
4:H:70:THR:HB	4:H:79:TYR:HB2	1.84	0.58
1:C:207:ARG:NH1	1:C:240:GLY:O	2.36	0.58
4:J:33:SER:CB	4:J:98:TRP:HA	2.34	0.57
1:E:297:VAL:HA	5:E:504:NAG:H82	1.86	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:N:155:GLN:HE21	3:N:158:ASN:HD21	1.52	0.57
2:D:113:SER:OG	2:D:117:LYS:HE2	2.04	0.57
3:N:96:TRP:HB2	4:J:47:TRP:CD1	2.40	0.56
3:L:164:THR:HG22	3:L:165:GLU:O	2.05	0.56
3:N:145:LYS:HB3	3:N:197:THR:OG1	2.05	0.56
1:C:275:ASP:OD1	1:C:276:THR:N	2.34	0.56
4:J:50:TRP:CH2	4:J:99:ASP:HA	2.41	0.56
2:F:25:ARG:NE	4:J:98:TRP:HZ2	2.03	0.56
4:J:184:VAL:HG22	4:J:185:PRO:HD2	1.88	0.56
4:H:184:VAL:HG22	4:H:185:PRO:HD2	1.87	0.56
2:F:141:TYR:O	2:F:166:ALA:HA	2.06	0.55
2:D:14:TRP:HB3	2:D:25:ARG:NH2	2.22	0.55
4:J:40:ALA:HB3	4:J:43:GLN:HG3	1.88	0.55
4:H:20:LEU:HD22	4:H:107:THR:HG21	1.89	0.55
3:N:36:TYR:CE2	3:N:46:VAL:HG13	2.42	0.55
1:A:77:ASP:OD2	1:A:141:ARG:NH1	2.38	0.55
4:H:33:SER:CB	4:H:98:TRP:HA	2.33	0.54
1:A:108:LEU:HB2	1:A:234:TRP:CZ3	2.41	0.54
3:M:161:GLU:HG2	3:M:175:LEU:HD21	1.88	0.54
4:I:99:ASP:OD1	4:I:100(A):ARG:HB2	2.08	0.54
1:C:102:VAL:HG22	1:C:232:ILE:HB	1.90	0.54
4:I:70:THR:HB	4:I:79:TYR:HB2	1.89	0.54
2:B:32:THR:HG21	4:H:54:ILE:CD1	2.38	0.53
2:B:113:SER:OG	2:B:117:LYS:HE2	2.07	0.53
3:M:155:GLN:HE21	3:M:158:ASN:HD21	1.56	0.53
4:I:20:LEU:HD22	4:I:107:THR:HG21	1.90	0.53
3:L:31:ASN:ND2	3:L:67:SER:HA	2.24	0.53
2:D:32:THR:HG21	4:I:54:ILE:CD1	2.39	0.52
3:N:48:ILE:HG21	3:N:64:ALA:HB3	1.90	0.52
2:B:38:LEU:HD13	3:L:27(F):SER:O	2.10	0.52
4:J:197:ASN:ND2	4:J:208:ASP:OD2	2.28	0.52
3:L:183:LYS:O	3:L:187:GLU:HG2	2.10	0.52
3:L:48:ILE:HG21	3:L:64:ALA:HB3	1.92	0.52
2:D:124:ARG:HD3	2:F:134:GLY:HA2	1.90	0.51
3:N:164:THR:HG22	3:N:165:GLU:O	2.10	0.51
4:H:29:PHE:HB2	4:H:76:ARG:HG2	1.93	0.51
3:M:36:TYR:CE2	3:M:46:VAL:HG13	2.45	0.51
2:D:34:GLN:NE2	4:I:99:ASP:OD2	2.44	0.51
3:L:115:VAL:HB	3:L:207:LYS:HD3	1.92	0.51
3:M:96:TRP:HB2	4:I:47:TRP:CG	2.46	0.51
2:B:156:THR:HG21	6:B:201:NAG:H82	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:N:108:ARG:HD2	3:N:171:SER:HB2	1.93	0.51
4:H:36:TRP:CH2	4:H:92:CYS:HB3	2.46	0.50
4:H:52:ASN:HD21	4:H:98:TRP:HZ3	1.60	0.50
3:M:164:THR:HG22	3:M:165:GLU:O	2.12	0.50
4:H:197:ASN:ND2	4:H:208:ASP:OD2	2.35	0.50
3:M:115:VAL:HB	3:M:207:LYS:HD3	1.94	0.49
3:M:145:LYS:HB3	3:M:197:THR:OG1	2.11	0.49
3:M:31:ASN:ND2	3:M:67:SER:HA	2.27	0.49
2:D:3:PHE:CE1	2:D:113:SER:HB2	2.46	0.49
1:E:102:VAL:HG22	1:E:232:ILE:HB	1.94	0.49
3:L:123:GLU:HA	3:L:126:LYS:NZ	2.27	0.49
4:I:29:PHE:CB	4:I:76:ARG:HG2	2.42	0.49
1:C:167:THR:HB	6:C:504:NAG:H62	1.94	0.49
2:D:25:ARG:HD3	4:I:98:TRP:HZ2	1.77	0.48
2:D:141:TYR:O	2:D:166:ALA:HA	2.13	0.48
1:E:186:SER:HA	1:E:218:GLY:O	2.13	0.48
4:H:152:VAL:HG22	4:H:198:VAL:HG22	1.95	0.48
2:B:37:ASP:OD2	2:B:40:SER:OG	2.22	0.48
4:I:197:ASN:ND2	4:I:208:ASP:OD2	2.37	0.48
4:I:112:SER:HB3	4:I:146:PHE:CZ	2.49	0.48
4:I:11:VAL:CG2	4:I:147:PRO:HG3	2.32	0.48
4:H:82(B):SER:O	4:H:82(B):SER:OG	2.32	0.48
2:F:60:ASN:HD22	2:F:60:ASN:H	1.62	0.48
2:B:60:ASN:N	2:B:60:ASN:HD22	2.12	0.47
3:L:3:GLN:HB2	3:L:26:SER:HB3	1.95	0.47
1:A:57:ARG:HG3	1:A:57:ARG:HH11	1.79	0.47
1:E:89:GLU:HG3	1:E:267:ILE:HD11	1.95	0.47
3:N:115:VAL:HB	3:N:207:LYS:HD3	1.97	0.47
3:M:183:LYS:O	3:M:187:GLU:HG2	2.15	0.47
4:J:119:PRO:HB3	4:J:145:TYR:HB3	1.97	0.47
2:D:60:ASN:HD22	2:D:60:ASN:N	2.12	0.47
4:H:119:PRO:HB3	4:H:145:TYR:HB3	1.95	0.47
1:E:182:VAL:HG21	1:E:213:ILE:HG21	1.95	0.47
4:I:40:ALA:HB3	4:I:43:GLN:HG3	1.96	0.47
4:I:119:PRO:HB3	4:I:145:TYR:HB3	1.97	0.46
2:B:14:TRP:HB3	2:B:25:ARG:NH2	2.29	0.46
4:J:152:VAL:HG22	4:J:198:VAL:HG22	1.98	0.46
1:C:177:LEU:HD11	1:C:234:TRP:HB2	1.97	0.46
4:I:93:ALA:HB1	4:I:100(D):SER:OG	2.16	0.46
3:M:35:TRP:CZ3	3:M:88:CYS:HB3	2.51	0.46
4:H:38:ARG:HD3	4:H:48:LEU:HD21	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:149:ILE:HA	2:F:152:ILE:HD12	1.97	0.46
1:C:77:ASP:OD2	1:C:141:ARG:NH1	2.44	0.46
2:B:25:ARG:NE	4:H:98:TRP:HZ2	2.14	0.45
3:N:183:LYS:O	3:N:187:GLU:HG2	2.15	0.45
1:A:326:LYS:HB3	4:H:28:THR:HB	1.98	0.45
3:M:182:SER:OG	3:M:185:ASP:OD1	2.34	0.45
1:A:216:ASN:ND2	1:E:212:THR:HB	2.32	0.45
2:D:150:GLU:HG3	6:D:201:NAG:O5	2.17	0.45
1:E:316:LEU:HD23	2:F:52:LEU:HD13	1.98	0.45
4:I:62:LYS:HG3	4:I:62:LYS:H	1.53	0.45
3:M:15:LEU:HA	3:M:15:LEU:HD22	1.81	0.45
3:N:161:GLU:HG2	3:N:175:LEU:HD21	1.98	0.45
3:L:140:TYR:CG	3:L:141:PRO:HA	2.52	0.45
4:J:20:LEU:HD22	4:J:107:THR:HG21	1.99	0.45
4:J:65:ASP:OD1	4:J:66:ARG:HG3	2.15	0.45
3:L:145:LYS:HB3	3:L:197:THR:OG1	2.16	0.45
4:I:97:SER:OG	4:I:98:TRP:O	2.33	0.45
1:C:108:LEU:HB2	1:C:234:TRP:CZ3	2.52	0.45
2:D:14:TRP:CD1	2:D:25:ARG:CZ	3.00	0.44
2:F:113:SER:OG	2:F:117:LYS:HE2	2.17	0.44
1:A:121:ILE:HD13	1:A:257:TYR:CE2	2.53	0.44
4:H:65:ASP:OD1	4:H:66:ARG:HG3	2.17	0.44
2:B:30:GLU:OE2	2:B:145:ASP:HB2	2.17	0.44
1:A:102:VAL:HG22	1:A:232:ILE:HB	1.99	0.44
2:B:116:ASN:O	2:B:120:GLU:HG3	2.17	0.44
3:M:48:ILE:HG21	3:M:64:ALA:HB3	1.99	0.44
2:D:3:PHE:HZ	2:F:2:LEU:HB3	1.81	0.44
3:L:27(D):SER:OG	3:L:27(F):SER:HB3	2.17	0.44
1:E:220:ARG:N	1:E:227:SER:OG	2.49	0.44
1:E:304:ALA:HA	2:F:61:GLU:HA	1.99	0.44
4:I:33:SER:CB	4:I:98:TRP:HA	2.46	0.44
3:M:96:TRP:HB2	4:I:47:TRP:CD1	2.52	0.44
3:N:3:GLN:HB2	3:N:26:SER:HB3	2.00	0.44
3:M:140:TYR:CG	3:M:141:PRO:HA	2.53	0.44
1:C:60:ASP:HB2	1:C:274:ILE:HD11	2.00	0.44
2:B:48:ILE:HA	2:B:51:LYS:HG2	2.00	0.43
1:C:42:LEU:HD11	1:C:316:LEU:HB2	1.98	0.43
2:B:141:TYR:O	2:B:166:ALA:HA	2.18	0.43
1:E:220:ARG:HD3	1:E:229:ARG:HG2	1.99	0.43
5:A:503:NAG:HN2	1:C:219:SER:HG	1.61	0.43
5:C:502:NAG:H61	5:C:503:NAG:C7	2.48	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:14:TRP:CG	2:D:25:ARG:CZ	3.01	0.43
4:H:27:TYR:CE1	4:H:94:ARG:HD2	2.53	0.43
3:L:96:TRP:HB2	4:H:47:TRP:CD1	2.52	0.43
4:J:27:TYR:CE1	4:J:94:ARG:HD2	2.54	0.43
1:A:54:ASN:HD22	1:A:55:PRO:HA	1.82	0.43
3:N:83:VAL:CG2	3:N:106:ILE:HG13	2.48	0.43
2:B:3:PHE:CZ	2:D:2:LEU:HB3	2.53	0.43
1:E:14:CYS:HA	2:F:137:CYS:HA	2.01	0.43
2:F:14:TRP:CG	2:F:25:ARG:NH2	2.87	0.43
1:C:288:ILE:HG21	1:C:297:VAL:HG21	2.01	0.43
2:F:156:THR:HG21	6:F:201:NAG:HN2	1.83	0.43
3:L:35:TRP:CE2	3:L:73:LEU:HB2	2.53	0.43
4:I:27:TYR:CE1	4:I:94:ARG:HD2	2.54	0.43
1:E:35:GLU:OE2	1:E:322:ASN:ND2	2.45	0.43
3:N:96:TRP:HH2	4:J:100(D):SER:HB2	1.83	0.42
2:B:77:ILE:HD13	2:B:77:ILE:HA	1.80	0.42
1:A:42:LEU:HD11	1:A:316:LEU:HB2	2.01	0.42
2:F:14:TRP:CD1	2:F:25:ARG:CZ	3.03	0.42
3:M:31:ASN:HD21	3:M:67:SER:HA	1.85	0.42
2:F:167:LEU:HA	2:F:167:LEU:HD23	1.88	0.42
4:J:52:ASN:ND2	4:J:98:TRP:CE3	2.87	0.42
2:D:14:TRP:CZ2	2:D:25:ARG:HD2	2.54	0.42
1:E:108:LEU:HB2	1:E:234:TRP:CZ3	2.54	0.42
2:F:14:TRP:CZ2	2:F:25:ARG:HD2	2.54	0.42
1:A:288:ILE:HG21	1:A:297:VAL:HG21	2.01	0.42
3:L:50:TRP:C	3:L:52:SER:H	2.22	0.42
1:C:14:CYS:HA	2:D:137:CYS:HA	2.00	0.42
2:B:3:PHE:CE1	2:B:113:SER:HB2	2.55	0.42
4:H:40:ALA:HB3	4:H:43:GLN:HG3	2.01	0.42
2:B:53:ASN:O	2:B:57:GLU:HB2	2.20	0.42
1:C:71:LEU:O	1:C:148:PHE:HB3	2.19	0.42
4:J:52:ASN:ND2	4:J:98:TRP:CZ3	2.86	0.42
3:L:15:LEU:HA	3:L:15:LEU:HD22	1.77	0.42
1:A:164:LEU:O	1:A:246:ASN:HA	2.20	0.42
4:H:52:ASN:ND2	4:H:98:TRP:CZ3	2.87	0.41
1:E:195:TYR:CZ	1:E:250:ASN:HA	2.55	0.41
3:N:31:ASN:ND2	3:N:67:SER:HA	2.34	0.41
2:D:3:PHE:CZ	2:F:2:LEU:HB3	2.55	0.41
3:M:50:TRP:C	3:M:52:SER:H	2.24	0.41
2:D:14:TRP:HB3	2:D:25:ARG:HH21	1.84	0.41
4:I:12:LYS:HD2	4:I:17:SER:O	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:L:108:ARG:HH12	3:L:111:ALA:HB2	1.85	0.41
2:B:34:GLN:NE2	4:H:99:ASP:OD1	2.53	0.41
1:E:220:ARG:HB3	1:E:221:PRO:HD2	2.03	0.41
1:E:74:PRO:HA	1:E:77:ASP:OD2	2.21	0.41
1:E:58:ILE:HG21	1:E:274:ILE:HD12	2.03	0.41
3:M:123:GLU:HA	3:M:126:LYS:NZ	2.36	0.41
3:L:33:LEU:HD13	3:L:34:ALA:N	2.36	0.41
3:N:96:TRP:CZ2	4:J:35:HIS:CE1	3.09	0.41
2:B:3:PHE:HZ	2:D:2:LEU:HB3	1.85	0.41
1:C:60:ASP:HB2	1:C:274:ILE:CD1	2.50	0.41
1:E:177:LEU:HD11	1:E:234:TRP:HB2	2.03	0.41
3:M:47:LEU:HA	3:M:58:VAL:HG21	2.02	0.41
1:E:264:LYS:HD3	2:F:63:PHE:CZ	2.56	0.41
3:L:155:GLN:HE21	3:L:158:ASN:HD21	1.68	0.41
4:I:65:ASP:OD1	4:I:66:ARG:HG3	2.20	0.41
3:N:140:TYR:CG	3:N:141:PRO:HA	2.56	0.41
1:E:103:PRO:HG2	1:E:233:TYR:CE1	2.56	0.41
1:E:203:THR:HG23	1:E:212:THR:HG22	2.02	0.40
3:N:83:VAL:HG21	3:N:106:ILE:HG13	2.03	0.40
4:H:62:LYS:HG3	4:H:62:LYS:H	1.55	0.40
4:J:93:ALA:HB1	4:J:100(D):SER:OG	2.22	0.40
1:E:214:ILE:HA	1:E:215:PRO:HD3	1.94	0.40
3:M:83:VAL:CG2	3:M:106:ILE:HG13	2.51	0.40
4:J:82(B):SER:O	4:J:82(B):SER:OG	2.34	0.40
1:A:195:TYR:O	1:A:197:GLN:N	2.47	0.40
1:E:118:LEU:HA	1:E:118:LEU:HD23	1.89	0.40
4:J:72:ASP:HB3	4:J:75:ALA:HB3	2.03	0.40
1:A:49:GLY:HA2	1:A:285:ASN:O	2.21	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	316/323 (98%)	308 (98%)	7 (2%)	1 (0%)	46	82
1	C	316/323 (98%)	309 (98%)	6 (2%)	1 (0%)	46	82
1	E	315/323 (98%)	307 (98%)	7 (2%)	1 (0%)	46	82
2	B	170/176 (97%)	163 (96%)	7 (4%)	0	100	100
2	D	169/176 (96%)	162 (96%)	7 (4%)	0	100	100
2	F	169/176 (96%)	162 (96%)	7 (4%)	0	100	100
3	L	215/220 (98%)	209 (97%)	5 (2%)	1 (0%)	34	76
3	M	215/220 (98%)	210 (98%)	4 (2%)	1 (0%)	34	76
3	N	215/220 (98%)	210 (98%)	4 (2%)	1 (0%)	34	76
4	H	211/230 (92%)	207 (98%)	4 (2%)	0	100	100
4	I	207/230 (90%)	203 (98%)	4 (2%)	0	100	100
4	J	209/230 (91%)	204 (98%)	5 (2%)	0	100	100
All	All	2727/2847 (96%)	2654 (97%)	67 (2%)	6 (0%)	52	86

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	62	ILE
1	C	62	ILE
1	E	62	ILE
3	L	51	SER
3	M	51	SER
3	N	51	SER

### 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	279/283 (99%)	275 (99%)	4 (1%)	74	89
1	C	279/283 (99%)	276 (99%)	3 (1%)	80	91
1	E	278/283 (98%)	277 (100%)	1 (0%)	93	97

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	146/149 (98%)	145 (99%)	1 (1%)	88	94
2	D	145/149 (97%)	144 (99%)	1 (1%)	88	94
2	F	145/149 (97%)	145 (100%)	0	100	100
3	L	192/194 (99%)	181 (94%)	11 (6%)	25	65
3	M	192/194 (99%)	180 (94%)	12 (6%)	22	61
3	N	192/194 (99%)	180 (94%)	12 (6%)	22	61
4	H	178/193 (92%)	169 (95%)	9 (5%)	29	68
4	I	177/193 (92%)	166 (94%)	11 (6%)	23	62
4	J	178/193 (92%)	169 (95%)	9 (5%)	29	68
All	All	2381/2457 (97%)	2307 (97%)	74 (3%)	47	78

All (74) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	HIS
1	A	53	ASN
1	A	323	VAL
1	A	325	GLU
2	B	60	ASN
1	C	18	HIS
1	C	323	VAL
1	C	326	LYS
2	D	60	ASN
1	E	18	HIS
3	L	9	ASP
3	L	15	LEU
3	L	17	GLU
3	L	18	ARG
3	L	22	ASN
3	L	27	GLN
3	L	46	VAL
3	L	105	GLU
3	L	147	GLN
3	L	152	ASN
3	L	197	THR
4	H	10	GLU
4	H	12	LYS
4	H	62	LYS
4	H	71	ARG

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Mol	Chain	Res	Type
4	H	80	MET
4	H	99	ASP
4	H	184	VAL
4	H	188	SER
4	H	199	ASN
3	M	9	ASP
3	M	15	LEU
3	M	17	GLU
3	M	18	ARG
3	M	22	ASN
3	M	27	GLN
3	M	46	VAL
3	M	105	GLU
3	M	147	GLN
3	M	152	ASN
3	M	197	THR
3	M	207	LYS
4	I	10	GLU
4	I	12	LYS
4	I	62	LYS
4	I	71	ARG
4	I	80	MET
4	I	98	TRP
4	I	99	ASP
4	I	100(A)	ARG
4	I	184	VAL
4	I	188	SER
4	I	199	ASN
3	N	9	ASP
3	N	15	LEU
3	N	17	GLU
3	N	18	ARG
3	N	22	ASN
3	N	27	GLN
3	N	46	VAL
3	N	105	GLU
3	N	147	GLN
3	N	152	ASN
3	N	197	THR
3	N	207	LYS
4	J	10	GLU
4	J	12	LYS

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Mol	Chain	Res	Type
4	J	62	LYS
4	J	71	ARG
4	J	80	MET
4	J	99	ASP
4	J	184	VAL
4	J	188	SER
4	J	199	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	53	ASN
1	A	54	ASN
1	A	171	ASN
2	B	53	ASN
2	B	60	ASN
2	B	125	GLN
1	C	18	HIS
1	C	54	ASN
1	C	171	ASN
2	D	53	ASN
2	D	60	ASN
2	D	125	GLN
1	E	54	ASN
1	E	211	GLN
1	E	216	ASN
2	F	27	GLN
2	F	53	ASN
2	F	60	ASN
2	F	125	GLN
3	L	155	GLN
4	H	58	GLN
4	H	199	ASN
3	M	155	GLN
4	I	58	GLN
4	I	199	ASN
3	N	155	GLN
4	J	199	ASN

### 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 ⓘ

12 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$
5	NAG	A	501	1,5	14,14,15	0.50	0	15,19,21	1.17	2 (13%)
5	NAG	A	502	5	14,14,15	0.60	0	15,19,21	1.04	1 (6%)
5	NAG	A	503	1,5	14,14,15	0.55	0	15,19,21	0.83	0
5	NAG	A	504	5	14,14,15	0.59	0	15,19,21	0.98	0
5	NAG	A	505	1,5	14,14,15	0.53	0	15,19,21	1.06	1 (6%)
5	NAG	A	506	5	14,14,15	0.55	0	15,19,21	0.77	0
5	NAG	C	502	1,5	14,14,15	0.58	0	15,19,21	0.92	1 (6%)
5	NAG	C	503	5	14,14,15	0.52	0	15,19,21	0.73	0
5	NAG	C	505	1,5	14,14,15	0.52	0	15,19,21	0.66	0
5	NAG	C	506	5	14,14,15	0.54	0	15,19,21	0.83	0
5	NAG	E	504	1,5	14,14,15	0.54	0	15,19,21	0.69	0
5	NAG	E	505	5	14,14,15	0.50	0	15,19,21	0.77	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
5	NAG	A	501	1,5	-	0/6/23/26	0/1/1/1
5	NAG	A	502	5	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	A	503	1,5	-	0/6/23/26	0/1/1/1
5	NAG	A	504	5	-	0/6/23/26	0/1/1/1
5	NAG	A	505	1,5	-	0/6/23/26	0/1/1/1
5	NAG	A	506	5	-	0/6/23/26	0/1/1/1
5	NAG	C	502	1,5	-	0/6/23/26	0/1/1/1
5	NAG	C	503	5	-	0/6/23/26	0/1/1/1
5	NAG	C	505	1,5	-	0/6/23/26	0/1/1/1
5	NAG	C	506	5	-	0/6/23/26	0/1/1/1
5	NAG	E	504	1,5	-	0/6/23/26	0/1/1/1
5	NAG	E	505	5	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	501	NAG	C2-N2-C7	-3.10	119.06	123.04
5	A	502	NAG	C2-N2-C7	-2.24	120.16	123.04
5	C	502	NAG	C1-O5-C5	2.12	114.94	112.25
5	A	501	NAG	C1-O5-C5	2.64	115.60	112.25
5	A	505	NAG	C1-O5-C5	3.19	116.29	112.25

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

6 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	503	NAG	1	0
5	A	505	NAG	1	0
5	C	502	NAG	1	0
5	C	503	NAG	1	0
5	C	505	NAG	1	0
5	E	504	NAG	1	0

## 5.6 Ligand geometry

8 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and



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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
6	NAG	B	201	2	14,14,15	0.53	0	15,19,21	1.40	1 (6%)
6	NAG	C	501	1	14,14,15	0.48	0	15,19,21	0.96	2 (13%)
6	NAG	C	504	1	14,14,15	0.54	0	15,19,21	0.99	1 (6%)
6	NAG	D	201	2	14,14,15	0.55	0	15,19,21	1.64	3 (20%)
6	NAG	E	501	1	14,14,15	0.44	0	15,19,21	1.21	2 (13%)
6	NAG	E	502	1	14,14,15	0.49	0	15,19,21	1.35	1 (6%)
6	NAG	E	503	1	14,14,15	0.47	0	15,19,21	1.04	1 (6%)
6	NAG	F	201	2	14,14,15	0.53	0	15,19,21	1.53	2 (13%)

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	B	201	2	-	0/6/23/26	0/1/1/1
6	NAG	C	501	1	-	0/6/23/26	0/1/1/1
6	NAG	C	504	1	-	0/6/23/26	0/1/1/1
6	NAG	D	201	2	-	0/6/23/26	0/1/1/1
6	NAG	E	501	1	-	0/6/23/26	0/1/1/1
6	NAG	E	502	1	-	0/6/23/26	0/1/1/1
6	NAG	E	503	1	-	0/6/23/26	0/1/1/1
6	NAG	F	201	2	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	D	201	NAG	C6-C5-C4	-2.80	106.11	113.02
6	F	201	NAG	C2-N2-C7	-2.43	119.92	123.04
6	C	501	NAG	C2-N2-C7	-2.13	120.30	123.04
6	E	501	NAG	C2-N2-C7	-2.11	120.33	123.04
6	C	504	NAG	C1-O5-C5	2.32	115.19	112.25
6	C	501	NAG	C1-O5-C5	2.42	115.32	112.25

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	E	503	NAG	C1-O5-C5	2.84	115.85	112.25
6	D	201	NAG	O5-C5-C6	3.41	114.72	107.35
6	D	201	NAG	C1-O5-C5	3.42	116.58	112.25
6	E	501	NAG	C1-O5-C5	3.47	116.65	112.25
6	B	201	NAG	C1-O5-C5	4.26	117.65	112.25
6	F	201	NAG	C1-O5-C5	4.69	118.20	112.25
6	E	502	NAG	C1-O5-C5	4.75	118.28	112.25

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	B	201	NAG	1	0
6	C	504	NAG	1	0
6	D	201	NAG	2	0
6	F	201	NAG	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	318/323 (98%)	0.23	4 (1%) 79 70	20, 55, 110, 160	0
1	C	318/323 (98%)	0.11	3 (0%) 85 80	18, 51, 106, 132	0
1	E	317/323 (98%)	0.29	15 (4%) 35 26	19, 58, 136, 168	0
2	B	172/176 (97%)	0.13	1 (0%) 90 86	18, 34, 90, 135	0
2	D	171/176 (97%)	0.07	1 (0%) 90 86	18, 33, 88, 129	0
2	F	171/176 (97%)	0.10	1 (0%) 90 86	18, 36, 95, 161	0
3	L	217/220 (98%)	0.66	26 (11%) 6 6	20, 81, 162, 203	0
3	M	217/220 (98%)	0.61	28 (12%) 5 5	22, 79, 154, 177	0
3	N	217/220 (98%)	0.62	21 (9%) 10 7	22, 85, 165, 211	0
4	H	215/230 (93%)	0.43	17 (7%) 15 11	22, 76, 162, 203	0
4	I	211/230 (91%)	0.37	7 (3%) 50 38	25, 68, 153, 188	0
4	J	213/230 (92%)	0.53	23 (10%) 8 6	24, 78, 175, 209	0
All	All	2757/2847 (96%)	0.34	147 (5%) 30 22	18, 56, 150, 211	0

All (147) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	L	197	THR	6.1
3	L	144	ALA	5.7
4	J	183	THR	5.5
3	N	193	ALA	5.1
3	M	181	LEU	5.0
3	N	197	THR	4.9
4	H	144	ASP	4.8
3	N	117	ILE	4.5
3	M	197	THR	4.4
3	N	181	LEU	4.1
4	H	143	LYS	4.1

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
3	N	201	LEU	4.0
3	L	201	LEU	3.8
4	J	186	SER	3.8
3	L	149	LYS	3.8
4	H	180	SER	3.7
3	M	201	LEU	3.7
4	I	180	SER	3.6
3	L	196	VAL	3.5
3	L	159	SER	3.5
4	J	12	LYS	3.4
4	J	138	LEU	3.4
4	J	182	VAL	3.4
3	L	187	GLU	3.4
3	M	196	VAL	3.4
4	H	139	GLY	3.3
1	E	153	TRP	3.3
4	J	209	LYS	3.2
3	M	107	LYS	3.2
3	L	181	LEU	3.2
3	N	151	ASP	3.2
3	M	186	TYR	3.2
3	L	136	LEU	3.1
3	L	119	PRO	3.1
4	H	183	THR	3.1
4	J	162	GLY	3.1
4	H	138	LEU	3.1
3	N	144	ALA	3.0
4	H	212	GLU	3.0
3	M	144	ALA	3.0
3	M	130	ALA	3.0
3	M	193	ALA	3.0
4	H	211	VAL	3.0
3	M	146	VAL	3.0
4	H	190	GLY	3.0
3	N	196	VAL	2.9
1	A	154	LEU	2.9
3	N	152	ASN	2.9
3	M	209	PHE	2.9
3	N	192	TYR	2.9
4	J	194	TYR	2.9
4	J	211	VAL	2.9
1	E	160	THR	2.9

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Mol	Chain	Res	Type	RSRZ
3	M	185	ASP	2.8
4	J	144	ASP	2.8
1	E	159	SER	2.8
4	H	181	VAL	2.8
3	L	110	VAL	2.8
4	I	95	GLY	2.7
3	L	193	ALA	2.7
1	E	154	LEU	2.7
3	L	151	ASP	2.7
3	L	152	ASN	2.7
3	L	118	PHE	2.7
3	N	186	TYR	2.7
3	L	198	HIS	2.7
3	L	135	LEU	2.7
4	I	181	VAL	2.6
4	H	142	VAL	2.6
1	E	219	SER	2.6
3	M	175	LEU	2.6
1	E	246	ASN	2.6
3	L	117	ILE	2.6
3	M	183	LYS	2.6
3	M	131	SER	2.5
4	J	110	THR	2.5
1	A	128	THR	2.5
1	A	153	TRP	2.5
3	M	149	LYS	2.5
3	N	180	THR	2.5
3	M	192	TYR	2.5
4	J	189	LEU	2.5
3	M	152	ASN	2.5
4	H	186	SER	2.5
4	I	210	ARG	2.5
4	J	11	VAL	2.5
1	E	147	PHE	2.4
3	N	135	LEU	2.4
3	L	186	TYR	2.4
4	J	190	GLY	2.4
4	J	181	VAL	2.4
4	I	186	SER	2.4
3	N	175	LEU	2.4
4	J	180	SER	2.4
4	I	162	GLY	2.4

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Mol	Chain	Res	Type	RSRZ
1	E	155	THR	2.4
1	E	128	THR	2.4
3	L	131	SER	2.4
3	N	118	PHE	2.4
3	N	200	GLY	2.4
4	H	152	VAL	2.4
3	M	190	LYS	2.3
3	M	136	LEU	2.3
3	M	200	GLY	2.3
1	E	201	ARG	2.3
2	D	63	PHE	2.3
1	C	259	LYS	2.3
1	E	156	LYS	2.3
3	M	135	LEU	2.3
3	L	120	PRO	2.3
1	A	175	ASP	2.3
4	J	187	SER	2.3
3	N	158	ASN	2.3
3	N	198	HIS	2.3
1	C	176	LYS	2.3
3	L	111	ALA	2.3
4	J	126	PRO	2.3
1	E	129	GLY	2.2
3	L	178	THR	2.2
4	H	164	HIS	2.2
4	H	140	CYS	2.2
4	J	212	GLU	2.2
1	E	163	VAL	2.2
3	N	190	LYS	2.2
3	M	132	VAL	2.1
3	M	117	ILE	2.1
2	B	30	GLU	2.1
4	J	142	VAL	2.1
4	J	34	MET	2.1
4	H	207	VAL	2.1
3	N	119	PRO	2.1
3	N	110	VAL	2.1
4	J	143	LYS	2.1
1	E	200	GLY	2.1
3	L	190	LYS	2.1
3	M	129	THR	2.1
4	J	1	GLN	2.1

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Mol	Chain	Res	Type	RSRZ
3	M	179	LEU	2.1
1	E	132	GLN	2.0
3	L	139	PHE	2.0
4	I	190	GLY	2.0
2	F	63	PHE	2.0
1	C	161	TYR	2.0
3	M	210	ASN	2.0
4	H	126	PRO	2.0
3	L	150	VAL	2.0
3	M	203	SER	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
5	NAG	E	504	14/15	0.77	0.28	-0.16	49,59,64,65	0
5	NAG	A	501	14/15	0.86	0.25	-0.17	59,71,75,76	0
5	NAG	A	505	14/15	0.79	0.23	-1.02	36,46,51,51	0
5	NAG	C	502	14/15	0.69	0.27	-1.18	80,92,97,99	0
5	NAG	A	504	14/15	0.83	0.30	-	114,127,130,130	0
5	NAG	E	505	14/15	0.57	0.41	-	101,107,112,112	0
5	NAG	C	505	14/15	0.79	0.30	-	45,55,60,61	0
5	NAG	A	502	14/15	0.78	0.27	-	102,111,115,115	0
5	NAG	A	503	14/15	0.83	0.32	-	101,113,116,117	0
5	NAG	A	506	14/15	0.74	0.33	-	90,96,101,101	0
5	NAG	C	503	14/15	0.60	0.63	-	119,131,133,134	0
5	NAG	C	506	14/15	0.74	0.34	-	89,95,101,101	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
6	NAG	E	501	14/15	0.83	0.31	0.98	70,81,86,87	0
6	NAG	C	501	14/15	0.81	0.31	0.83	81,93,97,98	0
6	NAG	E	503	14/15	0.62	0.42	0.04	95,108,111,112	0
6	NAG	E	502	14/15	0.73	0.33	-0.33	67,80,85,87	0
6	NAG	C	504	14/15	0.68	0.37	-1.23	83,96,99,101	0
6	NAG	F	201	14/15	0.80	0.32	-	92,103,109,111	0
6	NAG	D	201	14/15	0.70	0.41	-	93,104,110,111	0
6	NAG	B	201	14/15	0.82	0.25	-	80,91,96,98	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.