



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2018 – 02:39 am GMT

PDB ID : 5ERP  
Title : Crystal structure of human Desmocollin-2 ectodomain fragment EC2-5  
Authors : Harrison, O.J.; Brasch, J.; Shapiro, L.  
Deposited on : 2015-11-14  
Resolution : 2.70 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

<https://www.wwpdb.org/validation/2017/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 : 1.7.3 (157068), CSD as539be (2018)  
Xtriage (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

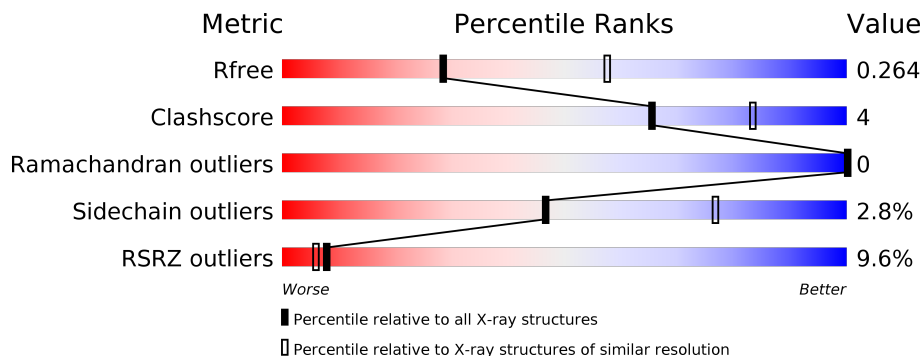
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.70 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	2449 (2.70-2.70)
Clashscore	122126	2756 (2.70-2.70)
Ramachandran outliers	120053	2716 (2.70-2.70)
Sidechain outliers	120020	2716 (2.70-2.70)
RSRZ outliers	108989	2376 (2.70-2.70)

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	451	
1	B	451	

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	CA	B	621	-	-	-	X
7	EDO	A	822	-	-	-	X

## 2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 14287 atoms, of which 6991 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.

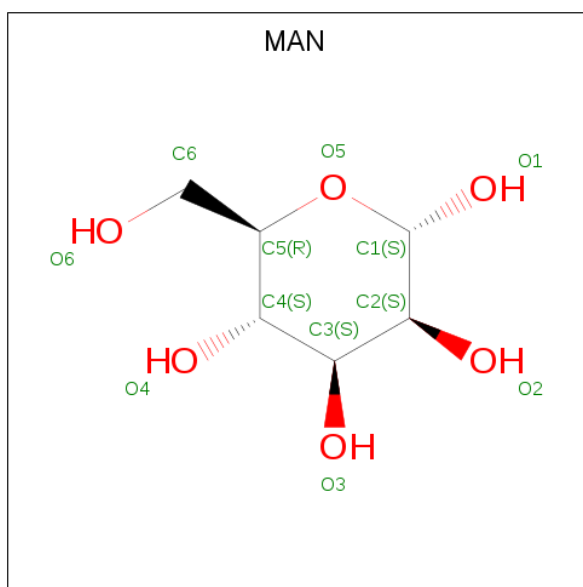
- Molecule 1 is a protein called Desmocollin-2.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	443	6802	2140	3358	575	710	19	0	0	0
1	B	438	6733	2121	3323	569	701	19	0	0	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	546	HIS	-	expression tag	UNP Q02487
A	547	HIS	-	expression tag	UNP Q02487
A	548	HIS	-	expression tag	UNP Q02487
A	549	HIS	-	expression tag	UNP Q02487
A	550	HIS	-	expression tag	UNP Q02487
A	551	HIS	-	expression tag	UNP Q02487
B	546	HIS	-	expression tag	UNP Q02487
B	547	HIS	-	expression tag	UNP Q02487
B	548	HIS	-	expression tag	UNP Q02487
B	549	HIS	-	expression tag	UNP Q02487
B	550	HIS	-	expression tag	UNP Q02487
B	551	HIS	-	expression tag	UNP Q02487

- Molecule 2 is ALPHA-D-MANNOSE (three-letter code: MAN) (formula: C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).



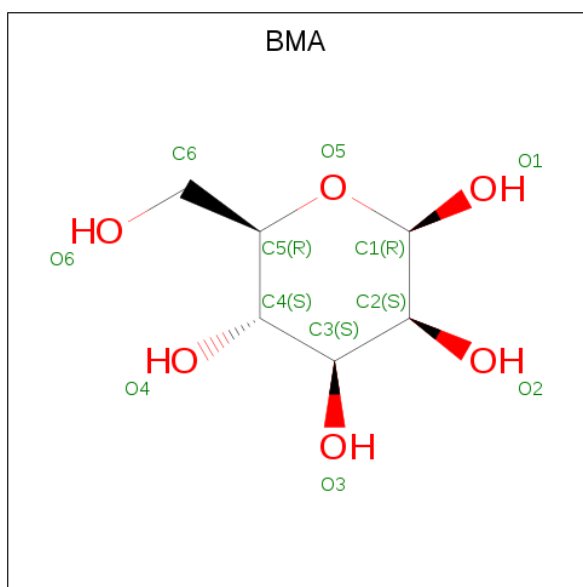
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	H	O		
2	A	1	22	6	11	5	0	0
2	A	1	22	6	11	5	0	0
2	A	1	22	6	11	5	0	0
2	A	1	22	6	11	5	0	0
2	A	1	22	6	11	5	0	0
2	B	1	22	6	11	5	0	0
2	B	1	22	6	11	5	0	0
2	B	1	22	6	11	5	0	0
2	B	1	22	6	11	5	0	0
2	B	1	22	6	11	5	0	0

- Molecule 3 is N-ACETYL-D-GLUCOSAMINE (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	H	N	O		
3	A	1	Total	C	H	N	O	0	0
			28	8	14	1	5		
3	A	1	Total	C	H	N	O	0	0
			28	8	14	1	5		
3	A	1	Total	C	H	N	O	0	0
			28	8	14	1	5		
3	A	1	Total	C	H	N	O	0	0
			28	8	14	1	5		
3	B	1	Total	C	H	N	O	0	0
			28	8	14	1	5		
3	B	1	Total	C	H	N	O	0	0
			28	8	14	1	5		
3	B	1	Total	C	H	N	O	0	0
			28	8	14	1	5		
3	B	1	Total	C	H	N	O	0	0
			28	8	14	1	5		

- Molecule 4 is BETA-D-MANNOSE (three-letter code: BMA) (formula: C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
4	A	1	Total	C	H	O	0	0
			22	6	11	5		
4	B	1	Total	C	H	O	0	0
			22	6	11	5		
4	B	1	Total	C	H	O	0	0
			22	6	11	5		

- Molecule 5 is CALCIUM ION (three-letter code: CA) (formula: Ca).

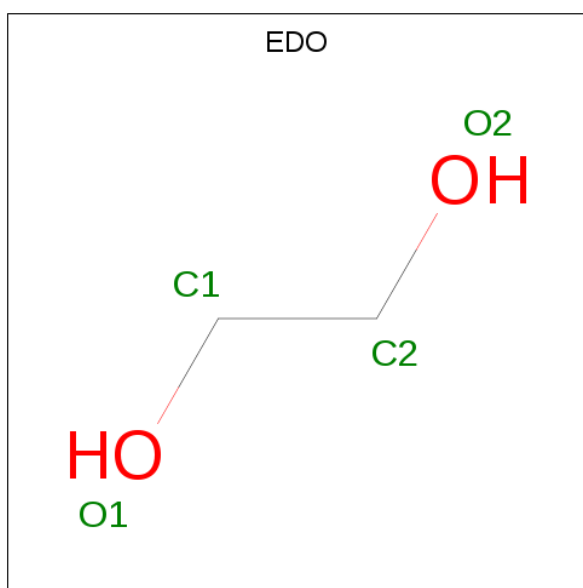
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	11	Total	Ca	0	0
			11	11		
5	A	10	Total	Ca	0	0
			10	10		

- Molecule 6 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



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

- Molecule 7 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	A	1	Total	C	H	O	0	0
			10	2	6	2		
7	A	1	Total	C	H	O	0	0
			10	2	6	2		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	A	1	Total	C	H	O	0	0
			10	2	6	2		
7	B	1	Total	C	H	O	0	0
			10	2	6	2		
7	B	1	Total	C	H	O	0	0
			10	2	6	2		

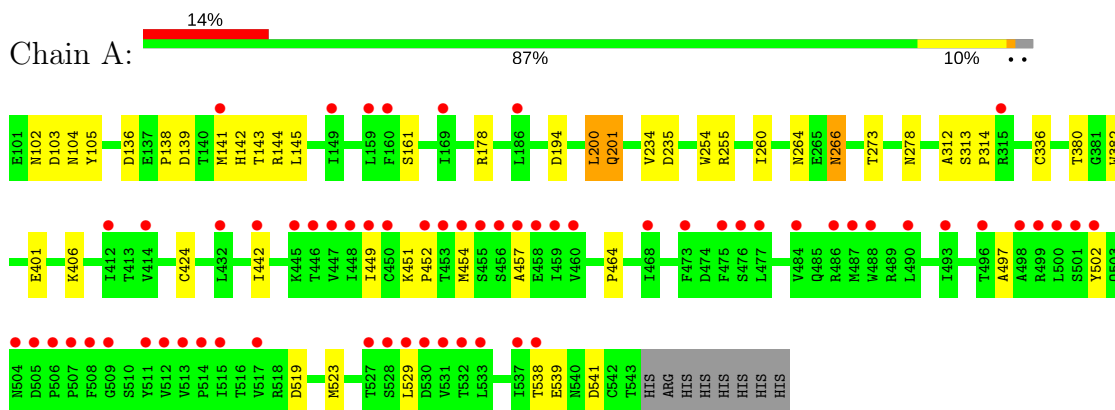
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	59	Total	O	0	0
			59	59		
8	B	52	Total	O	0	0
			52	52		

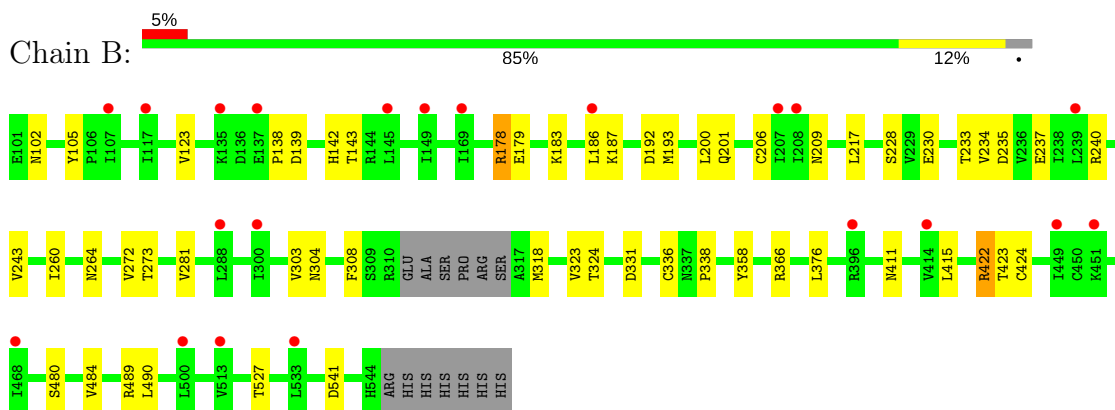
### 3 Residue-property plots

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: Desmocollin-2



- Molecule 1: Desmocollin-2



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	146.22Å 94.17Å 126.31Å 90.00° 93.66° 90.00°	Depositor
Resolution (Å)	79.12 – 2.70 79.12 – 2.70	Depositor EDS
% Data completeness (in resolution range)	97.4 (79.12-2.70) 86.7 (79.12-2.70)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.48 (at 2.69Å)	Xtrriage
Refinement program	PHENIX dev_1810	Depositor
R, $R_{free}$	0.224 , 0.262 0.226 , 0.264	Depositor DCC
$R_{free}$ test set	1951 reflections (4.23%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	67.3	Xtrriage
Anisotropy	0.402	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 55.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	14287	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	110.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.71% 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, 0.333 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, CA, EDO, SO4, 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	0.29	1/3505 (0.0%)	0.52	0/4778
1	B	0.25	0/3470	0.50	0/4729
All	All	0.27	1/6975 (0.0%)	0.51	0/9507

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	497	ALA	CA-CB	5.16	1.63	1.52

There are no bond angle outliers.

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	3444	3358	3355	28	0
1	B	3410	3323	3321	27	1
2	A	55	55	49	1	0
2	B	66	66	60	4	0
3	A	56	56	50	4	0
3	B	70	70	61	0	0
4	A	11	11	9	1	0
4	B	22	22	18	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	10	0	0	0	0
5	B	11	0	0	0	0
6	A	5	0	0	0	0
6	B	5	0	0	0	0
7	A	12	18	18	0	0
7	B	8	12	11	1	0
8	A	59	0	0	0	0
8	B	52	0	0	0	0
All	All	7296	6991	6952	62	1

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 4.

All (62) 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)
2:A:801:MAN:C6	2:A:801:MAN:O6	1.65	1.43
4:B:608:BMA:O2	2:B:609:MAN:O2	2.00	0.76
1:B:336:CYS:N	1:B:424:CYS:SG	2.64	0.71
1:B:192:ASP:OD1	1:B:200:LEU:N	2.29	0.65
1:A:454:MET:O	1:A:502:TYR:OH	2.13	0.63
1:A:336:CYS:N	1:A:424:CYS:SG	2.72	0.62
1:A:141:MET:SD	1:A:144:ARG:NH2	2.72	0.62
1:A:105:TYR:HD1	1:A:200:LEU:HB3	1.65	0.61
3:A:807:NAG:O3	4:A:808:BMA:O5	2.14	0.60
1:A:102:ASN:OD1	1:A:103:ASP:N	2.35	0.59
1:B:183:LYS:HE2	1:B:209:ASN:OD1	2.04	0.58
1:B:138:PRO:HA	1:B:143:THR:HG21	1.88	0.56
1:B:102:ASN:ND2	1:B:193:MET:SD	2.78	0.55
3:A:807:NAG:H3	3:A:807:NAG:H83	1.88	0.55
1:A:449:ILE:HG12	1:A:457:ALA:HB2	1.88	0.55
1:B:331:ASP:O	1:B:422:ARG:NH2	2.40	0.54
1:A:266:ASN:ND2	1:A:266:ASN:O	2.39	0.51
1:A:451:LYS:N	1:A:452:PRO:CD	2.74	0.51
1:B:411:ASN:CG	7:B:627:EDO:H12	2.32	0.50
1:B:178:ARG:NH1	1:B:179:GLU:OE2	2.44	0.50
1:A:519:ASP:OD1	1:A:523:MET:N	2.45	0.50
1:A:538:THR:O	1:A:539:GLU:HB3	2.11	0.49
1:A:141:MET:SD	1:A:194:ASP:HB2	2.53	0.49
1:B:105:TYR:HE1	1:B:200:LEU:HD22	1.77	0.49
1:B:230:GLU:O	1:B:233:THR:OG1	2.30	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:102:ASN:HB2	1:A:136:ASP:OD2	2.13	0.48
1:B:187:LYS:HE3	2:B:611:MAN:H2	1.95	0.48
1:A:138:PRO:HA	1:A:143:THR:HG21	1.96	0.48
1:A:102:ASN:HB3	1:A:142:HIS:ND1	2.28	0.47
1:B:338:PRO:O	1:B:358:TYR:OH	2.24	0.47
1:A:380:THR:HG21	1:A:382:TRP:CE2	2.50	0.47
1:B:186:LEU:O	1:B:206:CYS:N	2.47	0.46
1:B:183:LYS:HG3	1:B:209:ASN:OD1	2.16	0.46
1:A:313:SER:N	1:A:314:PRO:HD3	2.31	0.45
1:A:442:ILE:HG21	1:A:529:LEU:HD21	1.99	0.45
1:B:303:VAL:HG12	1:B:304:ASN:N	2.31	0.45
1:A:234:VAL:HG22	1:A:235:ASP:N	2.32	0.45
1:A:260:ILE:HG21	1:A:264:ASN:HB2	1.97	0.45
2:B:610:MAN:HO3	2:B:611:MAN:HO6	1.59	0.44
1:A:105:TYR:CD1	1:A:200:LEU:HB3	2.49	0.44
1:A:312:ALA:C	1:A:314:PRO:HD3	2.38	0.44
1:B:102:ASN:HB3	1:B:142:HIS:HB3	2.00	0.44
1:B:217:LEU:HD13	1:B:308:PHE:CD1	2.53	0.44
1:A:541:ASP:OD2	1:A:541:ASP:N	2.50	0.43
1:B:234:VAL:HG22	1:B:235:ASP:N	2.34	0.43
1:B:240:ARG:HG2	1:B:281:VAL:HG22	2.01	0.43
1:B:541:ASP:N	1:B:541:ASP:OD1	2.52	0.43
1:A:401:GLU:HG2	1:A:464:PRO:HB2	2.00	0.42
1:B:260:ILE:HG21	1:B:264:ASN:HB2	2.01	0.42
1:B:303:VAL:HG23	1:B:318:MET:HE3	2.01	0.42
4:B:608:BMA:O2	2:B:609:MAN:C2	2.67	0.42
1:B:237:GLU:HB2	1:B:281:VAL:CG1	2.50	0.42
1:A:201:GLN:NE2	1:A:201:GLN:O	2.53	0.42
1:B:415:LEU:HD11	1:B:423:THR:HB	2.02	0.42
1:A:406:LYS:H	3:A:806:NAG:H83	1.84	0.42
1:B:480:SER:HB2	1:B:484:VAL:CG2	2.51	0.41
1:A:104:ASN:HB2	1:A:136:ASP:OD2	2.20	0.41
3:A:810:NAG:H3	3:A:810:NAG:H83	2.03	0.41
1:B:105:TYR:CE1	1:B:200:LEU:HD22	2.55	0.41
1:B:490:LEU:O	1:B:490:LEU:HD12	2.20	0.41
1:A:254:TRP:CH2	1:A:278:ASN:HB2	2.55	0.41
1:A:312:ALA:HB1	1:A:314:PRO:HD3	2.02	0.40

All (1) 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)
1:B:228:SER:O	1:B:489:ARG:NH2[3_555]	2.18	0.02

### 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	441/451 (98%)	416 (94%)	25 (6%)	0	100	100
1	B	434/451 (96%)	410 (94%)	24 (6%)	0	100	100
All	All	875/902 (97%)	826 (94%)	49 (6%)	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	402/410 (98%)	393 (98%)	9 (2%)	55	83
1	B	398/410 (97%)	385 (97%)	13 (3%)	41	71
All	All	800/820 (98%)	778 (97%)	22 (3%)	47	77

All (22) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	139	ASP
1	A	145	LEU
1	A	161	SER

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Mol	Chain	Res	Type
1	A	178	ARG
1	A	200	LEU
1	A	201	GLN
1	A	255	ARG
1	A	266	ASN
1	A	273	THR
1	B	123	VAL
1	B	139	ASP
1	B	178	ARG
1	B	201	GLN
1	B	243	VAL
1	B	272	VAL
1	B	273	THR
1	B	323	VAL
1	B	324	THR
1	B	366	ARG
1	B	376	LEU
1	B	422	ARG
1	B	527	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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](#)

Of 51 ligands modelled in this entry, 21 are monoatomic - leaving 30 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
2	MAN	A	801	1	11,11,12	2.07	3 (27%)	15,15,17	2.79	4 (26%)
2	MAN	A	802	1	11,11,12	0.86	0	15,15,17	1.55	3 (20%)
2	MAN	A	803	1	11,11,12	0.93	0	15,15,17	1.09	2 (13%)
2	MAN	A	804	1	11,11,12	0.92	1 (9%)	15,15,17	1.01	1 (6%)
3	NAG	A	805	1	14,14,15	1.08	2 (14%)	17,19,21	1.01	1 (5%)
3	NAG	A	806	1,3	14,14,15	0.20	0	17,19,21	0.62	0
3	NAG	A	807	3,4	14,14,15	0.30	0	17,19,21	1.07	2 (11%)
4	BMA	A	808	3,2	11,11,12	0.68	0	15,15,17	0.77	0
2	MAN	A	809	4	11,11,12	0.65	0	15,15,17	0.95	1 (6%)
3	NAG	A	810	1	14,14,15	1.68	1 (7%)	17,19,21	1.55	4 (23%)
6	SO4	A	821	-	4,4,4	0.16	0	6,6,6	0.07	0
7	EDO	A	822	-	3,3,3	0.45	0	2,2,2	0.47	0
7	EDO	A	823	-	3,3,3	0.46	0	2,2,2	0.36	0
7	EDO	A	824	-	3,3,3	0.46	0	2,2,2	0.34	0
3	NAG	B	601	1	14,14,15	0.51	0	17,19,21	0.68	1 (5%)
3	NAG	B	602	1,3	14,14,15	1.88	2 (14%)	17,19,21	1.12	2 (11%)
3	NAG	B	603	3,4	14,14,15	0.40	0	17,19,21	0.65	0
4	BMA	B	604	3,2	11,11,12	0.79	0	15,15,17	0.86	0
2	MAN	B	605	4	11,11,12	0.76	0	15,15,17	1.01	2 (13%)
3	NAG	B	606	1,3	14,14,15	0.30	0	17,19,21	0.64	0
3	NAG	B	607	3,4	14,14,15	0.25	0	17,19,21	0.55	0
4	BMA	B	608	3,2	11,11,12	1.48	3 (27%)	15,15,17	1.50	4 (26%)
2	MAN	B	609	4	11,11,12	1.01	1 (9%)	15,15,17	2.23	4 (26%)
2	MAN	B	610	1	11,11,12	0.67	0	15,15,17	1.28	2 (13%)
2	MAN	B	611	1	11,11,12	0.68	0	15,15,17	1.34	3 (20%)
2	MAN	B	612	1	11,11,12	0.90	1 (9%)	15,15,17	1.27	2 (13%)
2	MAN	B	613	1	11,11,12	0.70	0	15,15,17	1.97	4 (26%)
6	SO4	B	625	-	4,4,4	0.16	0	6,6,6	0.09	0
7	EDO	B	626	-	3,3,3	0.45	0	2,2,2	0.32	0
7	EDO	B	627	-	3,3,3	0.69	0	2,2,2	2.17	1 (50%)

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
2	MAN	A	801	1	-	0/2/19/22	0/1/1/1
2	MAN	A	802	1	-	0/2/19/22	1/1/1/1
2	MAN	A	803	1	-	0/2/19/22	0/1/1/1
2	MAN	A	804	1	-	0/2/19/22	0/1/1/1
3	NAG	A	805	1	-	0/6/23/26	0/1/1/1
3	NAG	A	806	1,3	-	0/6/23/26	0/1/1/1
3	NAG	A	807	3,4	-	0/6/23/26	0/1/1/1
4	BMA	A	808	3,2	-	0/2/19/22	0/1/1/1
2	MAN	A	809	4	-	0/2/19/22	0/1/1/1
3	NAG	A	810	1	-	0/6/23/26	0/1/1/1
6	SO4	A	821	-	-	0/0/0/0	0/0/0/0
7	EDO	A	822	-	-	0/1/1/1	0/0/0/0
7	EDO	A	823	-	-	0/1/1/1	0/0/0/0
7	EDO	A	824	-	-	0/1/1/1	0/0/0/0
3	NAG	B	601	1	-	0/6/23/26	0/1/1/1
3	NAG	B	602	1,3	-	0/6/23/26	0/1/1/1
3	NAG	B	603	3,4	-	0/6/23/26	0/1/1/1
4	BMA	B	604	3,2	-	0/2/19/22	0/1/1/1
2	MAN	B	605	4	-	0/2/19/22	0/1/1/1
3	NAG	B	606	1,3	-	0/6/23/26	0/1/1/1
3	NAG	B	607	3,4	-	0/6/23/26	0/1/1/1
4	BMA	B	608	3,2	-	0/2/19/22	0/1/1/1
2	MAN	B	609	4	-	0/2/19/22	0/1/1/1
2	MAN	B	610	1	-	0/2/19/22	0/1/1/1
2	MAN	B	611	1	-	0/2/19/22	1/1/1/1
2	MAN	B	612	1	-	0/2/19/22	0/1/1/1
2	MAN	B	613	1	-	0/2/19/22	0/1/1/1
6	SO4	B	625	-	-	0/0/0/0	0/0/0/0
7	EDO	B	626	-	-	0/1/1/1	0/0/0/0
7	EDO	B	627	-	-	0/1/1/1	0/0/0/0

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	801	MAN	O5-C1	-2.44	1.39	1.43
4	B	608	BMA	C1-C2	-2.09	1.47	1.52
2	A	804	MAN	O5-C1	-2.09	1.40	1.43
4	B	608	BMA	O5-C5	2.01	1.47	1.43
2	A	801	MAN	O5-C5	2.01	1.47	1.43
2	B	612	MAN	O5-C5	2.38	1.48	1.43
3	A	805	NAG	C1-C2	2.38	1.55	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	609	MAN	C1-C2	2.59	1.58	1.52
3	B	602	NAG	C1-C2	2.73	1.56	1.52
4	B	608	BMA	O3-C3	3.03	1.50	1.43
3	A	805	NAG	O5-C1	3.23	1.49	1.43
2	A	801	MAN	O6-C6	5.57	1.65	1.42
3	B	602	NAG	O5-C1	5.80	1.53	1.43
3	A	810	NAG	O5-C1	6.04	1.53	1.43

All (43) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	609	MAN	O2-C2-C3	-4.07	102.24	110.19
2	A	802	MAN	O2-C2-C3	-2.52	105.28	110.19
2	B	610	MAN	O2-C2-C3	-2.38	105.55	110.19
7	B	627	EDO	O2-C2-C1	-2.37	95.32	112.09
2	B	605	MAN	O2-C2-C3	-2.34	105.62	110.19
2	B	613	MAN	O2-C2-C3	-2.32	105.67	110.19
2	B	611	MAN	O2-C2-C3	-2.28	105.73	110.19
2	A	809	MAN	O2-C2-C3	-2.26	105.79	110.19
3	B	602	NAG	C1-O5-C5	-2.25	109.10	112.19
4	B	608	BMA	O2-C2-C1	-2.23	104.68	109.17
2	A	804	MAN	O2-C2-C3	-2.21	105.88	110.19
3	A	810	NAG	C4-C3-C2	-2.20	107.79	111.02
2	A	801	MAN	O2-C2-C3	-2.17	105.96	110.19
2	B	612	MAN	O2-C2-C3	-2.09	106.11	110.19
2	A	803	MAN	O2-C2-C3	-2.07	106.15	110.19
2	A	801	MAN	C6-C5-C4	-2.04	108.17	112.99
4	B	608	BMA	O3-C3-C4	2.02	115.07	110.34
3	A	807	NAG	C1-C2-N2	2.05	113.99	110.49
3	B	602	NAG	O5-C5-C6	2.12	110.50	107.15
2	B	605	MAN	C1-O5-C5	2.17	115.18	112.19
2	A	802	MAN	O5-C1-C2	2.33	114.42	110.78
3	B	601	NAG	C1-O5-C5	2.35	115.42	112.19
2	A	803	MAN	C1-O5-C5	2.46	115.57	112.19
2	B	611	MAN	O2-C2-C1	2.46	114.14	109.17
3	A	810	NAG	C1-C2-N2	2.49	114.75	110.49
4	B	608	BMA	O3-C3-C2	2.53	114.74	110.04
2	B	609	MAN	O5-C1-C2	2.56	114.76	110.78
2	B	613	MAN	C1-C2-C3	2.72	113.10	109.66
2	B	610	MAN	C1-O5-C5	3.26	116.67	112.19
3	A	805	NAG	C1-O5-C5	3.26	116.68	112.19
3	A	807	NAG	C2-N2-C7	3.28	127.73	122.94

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	810	NAG	C1-O5-C5	3.39	116.85	112.19
2	B	611	MAN	C1-O5-C5	3.41	116.87	112.19
3	A	810	NAG	C2-N2-C7	3.50	128.06	122.94
2	B	612	MAN	C1-O5-C5	3.59	117.12	112.19
2	A	801	MAN	O5-C1-C2	3.71	116.56	110.78
2	B	609	MAN	C1-O5-C5	3.89	117.54	112.19
4	B	608	BMA	C1-O5-C5	3.93	117.59	112.19
2	B	613	MAN	O5-C1-C2	4.32	117.52	110.78
2	A	802	MAN	C1-O5-C5	4.47	118.33	112.19
2	B	613	MAN	C1-O5-C5	4.57	118.48	112.19
2	B	609	MAN	C1-C2-C3	5.28	116.34	109.66
2	A	801	MAN	C1-O5-C5	9.23	124.89	112.19

There are no chirality outliers.

There are no torsion outliers.

All (2) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	802	MAN	C1-C2-C3-C4-C5-O5
2	B	611	MAN	C1-C2-C3-C4-C5-O5

10 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	801	MAN	1	0
3	A	806	NAG	1	0
3	A	807	NAG	2	0
4	A	808	BMA	1	0
3	A	810	NAG	1	0
4	B	608	BMA	2	0
2	B	609	MAN	2	0
2	B	610	MAN	1	0
2	B	611	MAN	2	0
7	B	627	EDO	1	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	443/451 (98%)	0.90	64 (14%) <b>2</b> <b>1</b>	63, 89, 199, 224	0
1	B	438/451 (97%)	0.54	21 (4%) <b>30</b> <b>28</b>	61, 84, 124, 165	0
All	All	881/902 (97%)	0.72	85 (9%) <b>8</b> <b>6</b>	61, 86, 187, 224	0

All (85) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	511	TYR	12.6
1	A	531	VAL	9.7
1	A	529	LEU	9.6
1	A	513	VAL	9.1
1	A	533	LEU	8.8
1	A	528	SER	8.3
1	A	487	MET	7.7
1	A	500	LEU	7.4
1	A	515	ILE	6.9
1	A	477	LEU	6.8
1	A	459	ILE	6.5
1	A	505	ASP	6.4
1	A	512	VAL	6.3
1	A	449	ILE	6.2
1	A	454	MET	6.0
1	A	488	TRP	5.8
1	A	456	SER	5.5
1	A	457	ALA	5.5
1	A	530	ASP	5.2
1	A	455	SER	5.1
1	A	499	ARG	5.0
1	A	448	ILE	4.9
1	A	504	ASN	4.9
1	A	506	PRO	4.7

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	453	THR	4.7
1	A	447	VAL	4.5
1	A	538	THR	4.4
1	A	532	THR	3.7
1	A	412	ILE	3.7
1	A	460	VAL	3.6
1	A	493	ILE	3.5
1	B	396	ARG	3.5
1	A	446	THR	3.4
1	A	527	THR	3.3
1	B	186	LEU	3.3
1	A	502	TYR	3.3
1	B	207	ILE	3.2
1	A	517	VAL	3.2
1	A	501	SER	3.2
1	A	507	PRO	3.2
1	A	508	PHE	3.2
1	A	496	THR	3.1
1	A	514	PRO	3.1
1	A	486	ARG	3.1
1	A	445	LYS	3.0
1	B	533	LEU	3.0
1	A	498	ALA	3.0
1	A	169	ILE	2.9
1	A	473	PHE	2.8
1	A	186	LEU	2.7
1	B	468	ILE	2.7
1	A	484	VAL	2.7
1	B	451	LYS	2.7
1	A	432	LEU	2.7
1	A	458	GLU	2.6
1	A	476	SER	2.6
1	A	537	ILE	2.6
1	B	449	ILE	2.6
1	A	450	CYS	2.6
1	A	475	PHE	2.5
1	B	107	ILE	2.5
1	A	442	ILE	2.5
1	A	509	GLY	2.4
1	B	117	ILE	2.4
1	B	169	ILE	2.4
1	A	160	PHE	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	141	MET	2.3
1	B	300	ILE	2.3
1	B	288	LEU	2.2
1	A	468	ILE	2.1
1	B	414	VAL	2.1
1	B	239	LEU	2.1
1	A	315	ARG	2.1
1	B	149	ILE	2.1
1	A	452	PRO	2.1
1	B	137	GLU	2.1
1	A	149	ILE	2.1
1	B	145	LEU	2.1
1	B	500	LEU	2.1
1	A	159	LEU	2.1
1	A	414	VAL	2.1
1	B	135	LYS	2.1
1	A	490	LEU	2.0
1	B	513	VAL	2.0
1	B	208	ILE	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](#)

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, 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	B-factors(Å <sup>2</sup> )	Q<0.9
5	CA	B	621	1/1	0.49	0.49	217,217,217,217	0
7	EDO	A	824	4/4	0.51	0.34	98,118,122,133	0
7	EDO	A	823	4/4	0.62	0.21	135,162,168,168	0
7	EDO	A	822	4/4	0.73	0.72	106,128,132,132	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	BMA	A	808	11/12	0.73	0.17	177,195,231,234	0
2	MAN	B	609	11/12	0.79	0.15	164,186,218,222	0
7	EDO	B	626	4/4	0.80	0.23	92,110,126,126	0
2	MAN	B	605	11/12	0.81	0.14	150,172,202,207	0
3	NAG	A	805	14/15	0.81	0.16	121,149,181,193	0
5	CA	A	817	1/1	0.81	0.31	119,119,119,119	0
2	MAN	A	809	11/12	0.82	0.17	181,206,242,247	0
2	MAN	A	801	11/12	0.83	0.22	114,136,159,176	0
3	NAG	A	810	14/15	0.83	0.10	164,197,226,234	0
4	BMA	B	608	11/12	0.84	0.12	158,185,213,222	0
6	SO4	B	625	5/5	0.84	0.24	139,141,148,165	0
2	MAN	B	611	11/12	0.85	0.19	124,149,179,185	0
5	CA	B	614	1/1	0.86	0.21	103,103,103,103	0
4	BMA	B	604	11/12	0.87	0.10	145,170,196,200	0
3	NAG	A	807	14/15	0.88	0.25	138,166,193,202	0
2	MAN	A	804	11/12	0.88	0.25	113,147,171,194	0
3	NAG	B	601	14/15	0.88	0.14	99,123,145,155	0
7	EDO	B	627	4/4	0.89	0.33	97,132,142,158	0
2	MAN	B	612	11/12	0.89	0.33	116,143,183,187	0
3	NAG	B	602	14/15	0.89	0.15	82,117,141,157	0
2	MAN	B	613	11/12	0.89	0.27	124,149,178,179	0
3	NAG	B	603	14/15	0.89	0.15	96,124,161,193	0
2	MAN	A	802	11/12	0.90	0.21	108,133,157,166	0
5	CA	B	624	1/1	0.91	0.11	119,119,119,119	0
3	NAG	A	806	14/15	0.91	0.19	94,124,152,159	0
6	SO4	A	821	5/5	0.91	0.08	150,154,165,171	0
5	CA	A	820	1/1	0.91	0.24	123,123,123,123	0
3	NAG	B	607	14/15	0.92	0.15	93,130,163,184	0
2	MAN	A	803	11/12	0.92	0.20	94,119,141,144	0
5	CA	B	623	1/1	0.92	0.36	102,102,102,102	0
3	NAG	B	606	14/15	0.93	0.18	72,100,134,151	0
2	MAN	B	610	11/12	0.94	0.17	117,146,169,179	0
5	CA	A	811	1/1	0.95	0.30	116,116,116,116	0
5	CA	B	615	1/1	0.95	0.27	81,81,81,81	0
5	CA	B	619	1/1	0.95	0.29	77,77,77,77	0
5	CA	A	813	1/1	0.95	0.28	76,76,76,76	0
5	CA	B	620	1/1	0.95	0.25	92,92,92,92	0
5	CA	A	814	1/1	0.95	0.29	83,83,83,83	0
5	CA	B	616	1/1	0.95	0.22	91,91,91,91	0
5	CA	B	622	1/1	0.96	0.30	76,76,76,76	0
5	CA	A	818	1/1	0.96	0.26	110,110,110,110	0
5	CA	A	819	1/1	0.96	0.25	86,86,86,86	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
5	CA	A	816	1/1	0.98	0.25	74,74,74,74	0
5	CA	B	617	1/1	0.99	0.23	75,75,75,75	0
5	CA	B	618	1/1	0.99	0.27	72,72,72,72	0
5	CA	A	815	1/1	0.99	0.27	72,72,72,72	0
5	CA	A	812	1/1	0.99	0.28	81,81,81,81	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.