



# Full wwPDB X-ray Structure Validation Report ⓘ

Jan 25, 2023 – 01:11 AM EST

PDB ID : 4FJ6  
Title : Crystal structure of a glycoside hydrolase family 33, candidate sialidase (BDI\_2946) from Parabacteroides distasonis ATCC 8503 at 1.90 Å resolution  
Authors : Joint Center for Structural Genomics (JCSG)  
Deposited on : 2012-06-11  
Resolution : 1.90 Å (reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](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.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.31.2  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

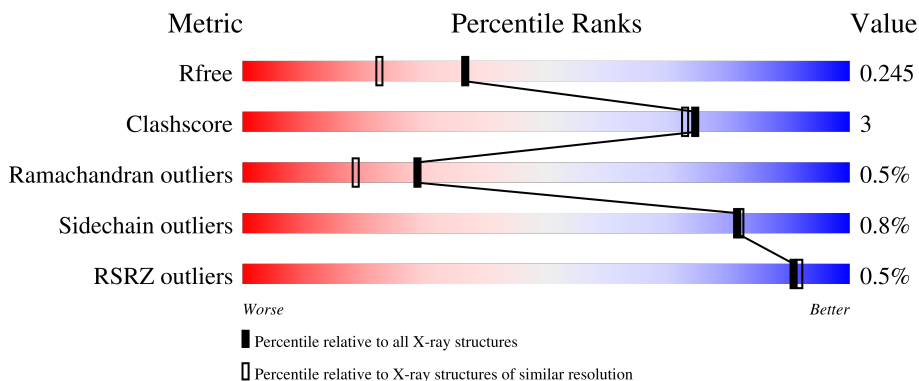
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.90 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

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

Mol	Chain	Length	Quality of chain
1	A	523	91% 8% .
1	B	523	92% 7% .
1	C	523	90% 9% .
1	D	523	93% 7%

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 18571 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 glycoside hydrolase family 33, candidate sialidase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	519	4107	2593	711	783	2	18	0	13	0
1	B	520	4091	2573	710	787	2	19	0	8	0
1	C	519	4078	2572	707	779	2	18	0	9	0
1	D	521	4100	2585	710	785	2	18	0	10	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	GLY	-	expression tag	UNP A6LG40
B	0	GLY	-	expression tag	UNP A6LG40
C	0	GLY	-	expression tag	UNP A6LG40
D	0	GLY	-	expression tag	UNP A6LG40

- Molecule 2 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 6 3 3	0	0
2	A	1	Total C O 6 3 3	0	0
2	A	1	Total C O 6 3 3	0	0
2	A	1	Total C O 6 3 3	0	0
2	B	1	Total C O 6 3 3	0	0
2	B	1	Total C O 6 3 3	0	0
2	B	1	Total C O 12 6 6	0	1
2	C	1	Total C O 6 3 3	0	0
2	C	1	Total C O 6 3 3	0	0
2	C	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	D	1	6	3	3	0	0

- Molecule 3 is PHOSPHATE ION (three-letter code: PO4) (formula: O<sub>4</sub>P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	O	P		
3	A	1	5	4	1	0	0
3	A	1	5	4	1	0	0
3	A	1	5	4	1	0	0
3	A	1	5	4	1	0	0
3	A	1	5	4	1	0	0
3	B	1	5	4	1	0	0
3	B	1	5	4	1	0	0
3	B	1	5	4	1	0	0
3	C	1	5	4	1	0	0
3	C	1	5	4	1	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	C	1	Total O P 5 4 1	0	0
3	C	1	Total O P 5 4 1	0	0
3	C	1	Total O P 5 4 1	0	0
3	D	1	Total O P 5 4 1	0	0
3	D	1	Total O P 5 4 1	0	0
3	D	1	Total O P 5 4 1	0	0
3	D	1	Total O P 5 4 1	0	0

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	2	Total Cl 2 2	0	0
4	D	1	Total Cl 1 1	0	0

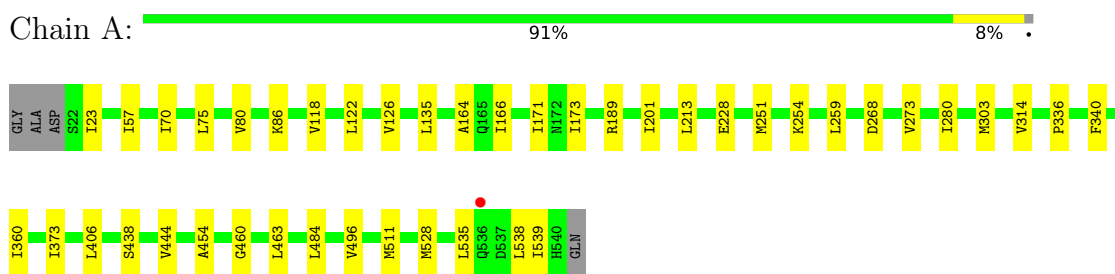
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	500	Total O 504 504	0	4
5	B	475	Total O 478 478	0	3
5	C	496	Total O 497 497	0	1
5	D	529	Total O 532 532	0	3

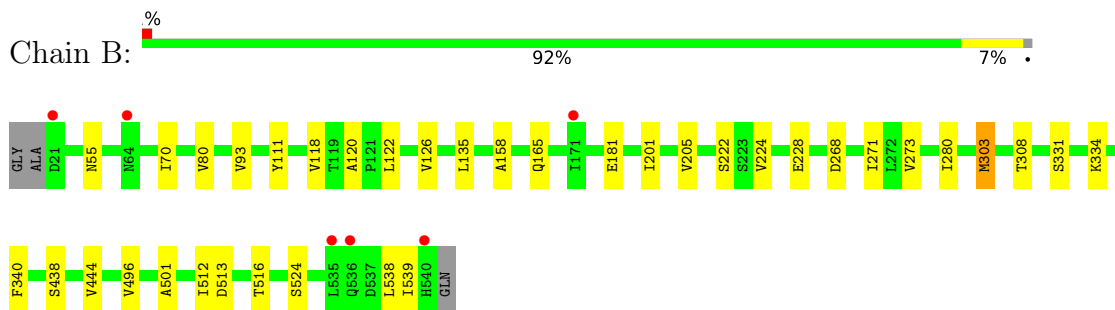
### 3 Residue-property plots [i](#)

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

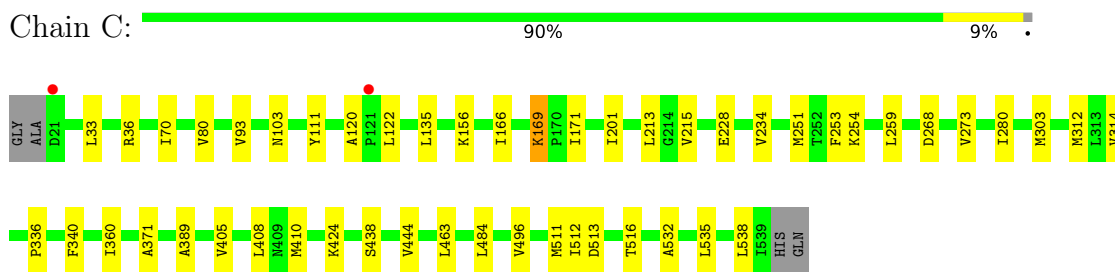
- Molecule 1: glycoside hydrolase family 33, candidate sialidase



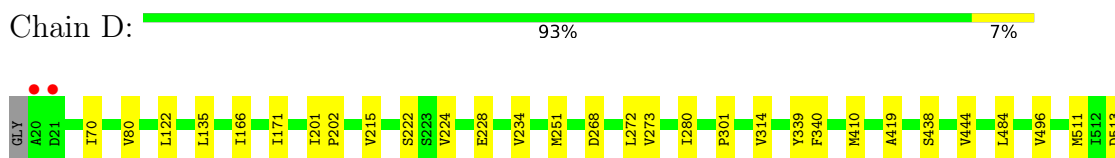
- Molecule 1: glycoside hydrolase family 33, candidate sialidase



- Molecule 1: glycoside hydrolase family 33, candidate sialidase



- Molecule 1: glycoside hydrolase family 33, candidate sialidase



T516
M528
K534
L536
L538
I539
H540
GLN



## 4 Data and refinement statistics i

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	171.74Å 171.74Å 243.79Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	29.77 – 1.90 29.77 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.1 (29.77-1.90) 99.1 (29.77-1.90)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.07 (at 1.91Å)	Xtrriage
Refinement program	REFMAC 5.6.0117	Depositor
R, $R_{free}$	0.207 , 0.243 0.212 , 0.245	Depositor DCC
$R_{free}$ test set	10525 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	19.6	Xtrriage
Anisotropy	0.164	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 39.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.27$	Xtrriage
Estimated twinning fraction	0.048 for h,-h-k,-l	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	18571	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	27.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 45.13 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.3813e-04.*

<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: PO4, GOL, CL

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	0/4213	0.68	0/5692
1	B	0.38	0/4184	0.68	0/5657
1	C	0.37	0/4173	0.67	0/5643
1	D	0.37	0/4198	0.68	0/5677
All	All	0.37	0/16768	0.68	0/22669

There are no bond length outliers.

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	4107	0	4126	27	0
1	B	4091	0	4062	22	0
1	C	4078	0	4069	35	0
1	D	4100	0	4099	26	0
2	A	24	0	32	0	0
2	B	24	0	32	0	0
2	C	18	0	24	0	0
2	D	30	0	40	0	0
3	A	25	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	15	0	0	0	0
3	C	25	0	0	0	0
3	D	20	0	0	0	0
4	B	2	0	0	0	0
4	D	1	0	0	0	0
5	A	504	0	0	0	0
5	B	478	0	0	0	0
5	C	497	0	0	0	0
5	D	532	0	0	1	0
All	All	18571	0	16484	107	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 3.

All (107) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:371:ALA:HB3	1:C:410[B]:MSE:HE2	1.13	1.08
1:D:528[B]:MSE:CE	1:D:528[B]:MSE:HA	1.99	0.93
1:C:215[B]:VAL:HG12	1:C:234:VAL:HG22	1.47	0.92
1:C:371:ALA:HB3	1:C:410[B]:MSE:CE	2.02	0.87
1:C:273:VAL:HG22	1:C:280[A]:ILE:HD12	1.57	0.87
1:C:371:ALA:CB	1:C:410[B]:MSE:HE2	2.05	0.82
1:D:528[B]:MSE:HA	1:D:528[B]:MSE:HE3	1.60	0.81
1:C:213:LEU:HD11	1:C:280[B]:ILE:HD13	1.65	0.79
1:A:213:LEU:HD11	1:A:280[B]:ILE:HD13	1.65	0.78
1:C:166:ILE:HD12	1:C:171:ILE:HD12	1.65	0.77
1:C:389:ALA:HB3	1:C:410[B]:MSE:HE1	1.66	0.77
1:B:303[A]:MSE:HE1	1:B:334:LYS:O	1.85	0.77
1:C:389:ALA:HB3	1:C:410[B]:MSE:CE	2.17	0.74
1:B:512:ILE:HB	1:B:516[B]:THR:HG23	1.72	0.71
1:D:202:PRO:HB3	1:D:528[B]:MSE:HE1	1.74	0.70
1:C:408:LEU:HD23	1:C:410[B]:MSE:HE3	1.76	0.68
1:A:80:VAL:HG11	1:A:135:LEU:HB2	1.77	0.67
1:D:511:MSE:HE1	1:D:535[B]:LEU:HD11	1.76	0.67
1:A:213:LEU:CD1	1:A:280[B]:ILE:HD13	2.26	0.66
1:B:70:ILE:HG21	1:B:122:LEU:HD22	1.78	0.65
1:D:215[B]:VAL:HG12	1:D:234:VAL:HG22	1.80	0.64
1:A:496:VAL:HG23	1:A:538:LEU:HD23	1.80	0.64
1:C:496:VAL:HG23	1:C:538:LEU:HD23	1.79	0.64
1:B:512:ILE:HD12	1:B:516[A]:THR:HG22	1.81	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:273:VAL:HG22	1:B:280:ILE:HD12	1.79	0.63
1:A:273:VAL:HG22	1:A:280[A]:ILE:HD12	1.80	0.62
1:C:213:LEU:CD1	1:C:280[B]:ILE:HD13	2.30	0.62
1:B:201:ILE:HG21	1:B:268:ASP:HA	1.82	0.62
1:D:528[B]:MSE:HA	1:D:528[B]:MSE:HE2	1.80	0.61
1:D:496:VAL:HG23	1:D:538:LEU:HD23	1.84	0.60
1:B:513:ASP:OD1	1:B:516[B]:THR:HG22	2.02	0.59
1:A:201:ILE:HG21	1:A:268:ASP:HA	1.84	0.59
1:C:80:VAL:HG11	1:C:135:LEU:HB2	1.85	0.58
1:D:70:ILE:HG21	1:D:122:LEU:HD22	1.87	0.57
1:B:118:VAL:HG21	1:B:126:VAL:HG13	1.85	0.57
1:A:463:LEU:HD23	1:A:484:LEU:HD23	1.86	0.57
1:C:303:MSE:HE1	1:C:336:PRO:CD	2.36	0.56
1:A:70:ILE:HG21	1:A:122:LEU:HD22	1.88	0.55
1:C:408:LEU:CD2	1:C:410[B]:MSE:HE3	2.38	0.54
1:D:80:VAL:HG11	1:D:135:LEU:HB2	1.89	0.54
1:B:158:ALA:HB2	1:B:181[B]:GLU:HG2	1.88	0.54
1:D:410:MSE:HE3	1:D:419:ALA:CB	2.38	0.53
1:B:55:ASN:HD21	1:B:165[B]:GLN:NE2	2.07	0.53
1:C:201:ILE:HG21	1:C:268:ASP:HA	1.91	0.53
1:C:70:ILE:HG21	1:C:122:LEU:HD22	1.91	0.52
1:C:93:VAL:HG21	1:C:111:TYR:CG	2.45	0.52
1:C:251:MSE:HE2	1:C:314:VAL:HG22	1.92	0.51
1:C:463:LEU:HD23	1:C:484:LEU:HD23	1.93	0.50
1:D:201:ILE:HG21	1:D:268:ASP:HA	1.93	0.50
1:B:80:VAL:HG11	1:B:135:LEU:HB2	1.93	0.50
1:A:511:MSE:HE1	1:A:535[B]:LEU:HD11	1.93	0.49
1:B:303[A]:MSE:HE3	1:B:331:SER:HA	1.93	0.49
1:A:303[A]:MSE:HE1	1:A:336:PRO:HD3	1.94	0.49
1:D:273[A]:VAL:HG22	1:D:280:ILE:HD12	1.94	0.49
1:C:253:PHE:CE1	1:C:312:MSE:HE2	2.49	0.48
1:C:303:MSE:HE1	1:C:336:PRO:CG	2.44	0.48
1:B:70:ILE:CG2	1:B:122:LEU:HD22	2.43	0.47
1:D:166:ILE:HD12	1:D:171:ILE:HD12	1.97	0.47
1:A:360:ILE:HD12	1:A:360:ILE:C	2.36	0.46
1:C:120:ALA:HA	1:C:122:LEU:HD12	1.97	0.46
1:A:118:VAL:HG21	1:A:126:VAL:CG1	2.45	0.46
1:D:166:ILE:HB	1:D:171:ILE:HD11	1.97	0.46
1:C:303:MSE:HE1	1:C:336:PRO:HD3	1.97	0.46
1:B:512:ILE:HD12	1:B:516[A]:THR:CG2	2.47	0.45
1:D:511:MSE:CE	1:D:535[B]:LEU:HD11	2.45	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:251:MSE:HE2	1:A:314:VAL:HG22	1.98	0.44
1:D:410:MSE:HE3	1:D:419:ALA:HB3	1.99	0.44
1:D:251:MSE:HE2	1:D:314:VAL:HG22	2.00	0.44
1:A:189:ARG:HB2	1:A:528:MSE:HB2	2.00	0.44
1:B:501:ALA:HB3	1:B:524:SER:CB	2.48	0.44
1:C:511:MSE:HE3	1:C:513:ASP:O	2.18	0.43
1:C:259:LEU:HD11	1:D:135:LEU:HD11	2.00	0.43
1:A:166:ILE:HD12	1:A:171:ILE:HD13	2.01	0.43
1:A:303[A]:MSE:HE1	1:A:336:PRO:CD	2.47	0.43
1:D:540:HIS:N	5:D:914:HOH:O	2.50	0.43
1:D:70:ILE:CG2	1:D:122:LEU:HD22	2.48	0.43
1:C:33:LEU:HD12	1:C:36:ARG:HD2	2.00	0.43
1:B:222:SER:OG	1:B:224:VAL:HG22	2.18	0.43
1:D:484:LEU:HD21	1:D:539:ILE:HD13	2.00	0.43
1:B:496:VAL:HG23	1:B:538:LEU:HD23	2.00	0.43
1:D:516[B]:THR:HG22	1:D:534:LYS:HA	2.01	0.42
1:C:169[B]:LYS:HB3	1:C:169[B]:LYS:HE2	1.71	0.42
1:A:539:ILE:HD12	1:A:539:ILE:N	2.34	0.42
1:D:301:PRO:HD3	1:D:339:TYR:CD2	2.54	0.42
1:B:539:ILE:HD12	1:B:539:ILE:N	2.34	0.42
1:D:511:MSE:HE3	1:D:513:ASP:O	2.20	0.42
1:A:57:ILE:HD11	1:A:75:LEU:HD13	2.00	0.42
1:A:118:VAL:HG21	1:A:126:VAL:HG13	2.02	0.42
1:B:120:ALA:HA	1:B:122:LEU:HD12	2.00	0.42
1:A:511:MSE:CE	1:A:535[B]:LEU:HD11	2.50	0.41
1:C:360:ILE:C	1:C:360:ILE:HD12	2.40	0.41
1:C:512:ILE:HD12	1:C:516:THR:HG22	2.02	0.41
1:A:23:ILE:HD11	1:A:166:ILE:HD11	2.02	0.41
1:A:164:ALA:HB2	1:A:173:ILE:HD11	2.03	0.41
1:A:373[A]:ILE:HD12	1:A:406:LEU:HD13	2.01	0.41
1:B:205:VAL:HG13	1:B:271:ILE:HG23	2.02	0.41
1:C:511:MSE:HE1	1:C:535:LEU:HD11	2.01	0.41
1:C:516:THR:HG21	1:C:532:ALA:HB1	2.01	0.41
1:D:222:SER:OG	1:D:224[A]:VAL:HG22	2.20	0.41
1:B:93:VAL:HG21	1:B:111:TYR:CG	2.55	0.41
1:C:405:VAL:HG22	1:C:424:LYS:HG2	2.03	0.41
1:C:259:LEU:HD11	1:D:135:LEU:CD1	2.50	0.41
1:A:273:VAL:HG22	1:A:280[A]:ILE:CD1	2.49	0.40
1:A:454:ALA:HB1	1:A:460:GLY:O	2.21	0.40
1:A:86[A]:LYS:HE2	1:A:86[A]:LYS:HB3	1.86	0.40
1:C:389:ALA:HB3	1:C:410[B]:MSE:HE3	2.01	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:259:LEU:HD11	1:B:135:LEU:CD1	2.51	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	530/523 (101%)	510 (96%)	17 (3%)	3 (1%)	25	15
1	B	526/523 (101%)	502 (95%)	22 (4%)	2 (0%)	34	24
1	C	526/523 (101%)	507 (96%)	16 (3%)	3 (1%)	25	15
1	D	529/523 (101%)	511 (97%)	16 (3%)	2 (0%)	34	24
All	All	2111/2092 (101%)	2030 (96%)	71 (3%)	10 (0%)	29	18

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	438	SER
1	C	254	LYS
1	C	438	SER
1	A	254	LYS
1	A	438	SER
1	A	444	VAL
1	B	438	SER
1	C	444	VAL
1	D	444	VAL
1	B	444	VAL

### 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	458/433 (106%)	456 (100%)	2 (0%)	91	91
1	B	454/433 (105%)	449 (99%)	5 (1%)	73	73
1	C	451/433 (104%)	445 (99%)	6 (1%)	69	68
1	D	456/433 (105%)	453 (99%)	3 (1%)	84	84
All	All	1819/1732 (105%)	1803 (99%)	16 (1%)	81	79

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	228	GLU
1	A	340	PHE
1	B	228	GLU
1	B	303[A]	MSE
1	B	303[B]	MSE
1	B	308	THR
1	B	340	PHE
1	C	103	ASN
1	C	156	LYS
1	C	169[A]	LYS
1	C	169[B]	LYS
1	C	228	GLU
1	C	340	PHE
1	D	228	GLU
1	D	272	LEU
1	D	340	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	D	168	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 36 ligands modelled in this entry, 3 are monoatomic - leaving 33 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	$\# Z  > 2$
3	PO4	D	607	-	4,4,4	0.85	0	6,6,6	0.52	0
2	GOL	A	604	-	5,5,5	0.35	0	5,5,5	0.47	0
2	GOL	A	603	-	5,5,5	0.23	0	5,5,5	0.34	0
3	PO4	A	606	-	4,4,4	0.93	0	6,6,6	0.31	0
2	GOL	D	603	-	5,5,5	0.36	0	5,5,5	0.44	0
3	PO4	B	607	-	4,4,4	1.07	0	6,6,6	0.60	0
3	PO4	D	609	-	4,4,4	1.10	0	6,6,6	0.53	0
2	GOL	C	603	-	5,5,5	0.33	0	5,5,5	0.40	0
2	GOL	D	606	-	5,5,5	0.35	0	5,5,5	0.12	0
3	PO4	A	608	-	4,4,4	0.91	0	6,6,6	0.45	0
3	PO4	B	606	-	4,4,4	0.80	0	6,6,6	0.36	0
2	GOL	A	601	-	5,5,5	0.43	0	5,5,5	0.65	0
2	GOL	A	602	-	5,5,5	0.36	0	5,5,5	0.30	0
2	GOL	C	601	-	5,5,5	0.34	0	5,5,5	0.17	0
3	PO4	C	606	-	4,4,4	0.89	0	6,6,6	0.62	0
3	PO4	C	607	-	4,4,4	0.88	0	6,6,6	0.48	0
3	PO4	A	607	-	4,4,4	0.84	0	6,6,6	0.89	0
3	PO4	B	608	-	4,4,4	0.89	0	6,6,6	0.48	0



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	GOL	D	604	-	5,5,5	0.28	0	5,5,5	0.61	0
2	GOL	B	605[B]	-	5,5,5	0.23	0	5,5,5	0.28	0
2	GOL	B	604	-	5,5,5	0.41	0	5,5,5	0.44	0
3	PO4	A	609	-	4,4,4	0.94	0	6,6,6	0.44	0
3	PO4	A	605	-	4,4,4	0.93	0	6,6,6	0.41	0
2	GOL	B	603	-	5,5,5	0.20	0	5,5,5	0.22	0
3	PO4	C	605	-	4,4,4	0.92	0	6,6,6	0.76	0
2	GOL	C	602	-	5,5,5	0.35	0	5,5,5	0.63	0
2	GOL	D	605	-	5,5,5	0.20	0	5,5,5	0.56	0
2	GOL	D	602	-	5,5,5	0.27	0	5,5,5	0.23	0
3	PO4	D	610	-	4,4,4	0.84	0	6,6,6	0.46	0
2	GOL	B	605[A]	-	5,5,5	0.27	0	5,5,5	0.34	0
3	PO4	C	604	-	4,4,4	0.80	0	6,6,6	0.71	0
3	PO4	D	608	-	4,4,4	1.03	0	6,6,6	0.45	0
3	PO4	C	608	-	4,4,4	0.91	0	6,6,6	0.41	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
2	GOL	B	603	-	-	2/4/4/4	-
2	GOL	C	603	-	-	3/4/4/4	-
2	GOL	D	606	-	-	2/4/4/4	-
2	GOL	C	602	-	-	2/4/4/4	-
2	GOL	A	604	-	-	1/4/4/4	-
2	GOL	A	603	-	-	0/4/4/4	-
2	GOL	D	602	-	-	0/4/4/4	-
2	GOL	A	601	-	-	4/4/4/4	-
2	GOL	B	605[A]	-	-	0/4/4/4	-
2	GOL	B	605[B]	-	-	0/4/4/4	-
2	GOL	D	605	-	-	2/4/4/4	-
2	GOL	D	604	-	-	0/4/4/4	-
2	GOL	D	603	-	-	0/4/4/4	-
2	GOL	A	602	-	-	2/4/4/4	-
2	GOL	B	604	-	-	2/4/4/4	-
2	GOL	C	601	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	601	GOL	O1-C1-C2-C3
2	B	603	GOL	C1-C2-C3-O3
2	B	604	GOL	C1-C2-C3-O3
2	C	601	GOL	O1-C1-C2-C3
2	C	602	GOL	O1-C1-C2-C3
2	D	605	GOL	O1-C1-C2-O2
2	D	605	GOL	O1-C1-C2-C3
2	D	606	GOL	O1-C1-C2-C3
2	A	601	GOL	O1-C1-C2-O2
2	C	601	GOL	O1-C1-C2-O2
2	A	601	GOL	C1-C2-C3-O3
2	A	602	GOL	C1-C2-C3-O3
2	C	602	GOL	O1-C1-C2-O2
2	D	606	GOL	O1-C1-C2-O2
2	A	601	GOL	O2-C2-C3-O3
2	A	602	GOL	O2-C2-C3-O3
2	B	604	GOL	O2-C2-C3-O3
2	B	603	GOL	O2-C2-C3-O3
2	C	603	GOL	O1-C1-C2-O2
2	A	604	GOL	C1-C2-C3-O3
2	C	603	GOL	C1-C2-C3-O3
2	C	603	GOL	O1-C1-C2-C3

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

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

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

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	502/523 (95%)	-0.14	1 (0%) 95 95	18, 24, 37, 57	0
1	B	503/523 (96%)	-0.05	6 (1%) 79 81	18, 25, 39, 69	0
1	C	502/523 (95%)	-0.05	2 (0%) 92 93	18, 26, 41, 61	0
1	D	504/523 (96%)	-0.11	2 (0%) 92 93	16, 23, 36, 64	0
All	All	2011/2092 (96%)	-0.09	11 (0%) 91 92	16, 25, 39, 69	0

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	540	HIS	3.8
1	D	20	ALA	3.0
1	C	21	ASP	2.8
1	B	171	ILE	2.6
1	C	121	PRO	2.6
1	B	535	LEU	2.5
1	B	21	ASP	2.5
1	D	21	ASP	2.3
1	B	64	ASN	2.2
1	A	536	GLN	2.2
1	B	536	GLN	2.2

### 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 monosaccharides in this entry.

## 6.4 Ligands i

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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
4	CL	B	601	1/1	0.78	0.15	66,66,66,66	0
2	GOL	D	606	6/6	0.81	0.16	30,36,38,48	0
2	GOL	A	601	6/6	0.86	0.15	32,37,40,42	0
3	PO4	A	605	5/5	0.88	0.18	37,50,57,59	0
3	PO4	D	610	5/5	0.88	0.17	53,53,58,61	0
2	GOL	B	604	6/6	0.88	0.13	35,38,39,43	0
2	GOL	C	601	6/6	0.89	0.12	27,35,38,44	0
3	PO4	A	608	5/5	0.89	0.17	77,81,85,85	0
2	GOL	C	603	6/6	0.89	0.15	31,35,40,47	0
2	GOL	B	603	6/6	0.89	0.15	33,41,44,48	0
3	PO4	C	607	5/5	0.90	0.16	70,72,77,78	0
2	GOL	D	604	6/6	0.91	0.15	38,39,41,46	0
2	GOL	A	604	6/6	0.92	0.18	26,41,44,45	0
3	PO4	C	608	5/5	0.92	0.17	61,62,73,74	0
2	GOL	A	602	6/6	0.92	0.11	31,34,37,38	0
2	GOL	D	605	6/6	0.92	0.16	19,29,34,36	0
2	GOL	A	603	6/6	0.93	0.12	29,31,31,33	0
3	PO4	A	609	5/5	0.93	0.19	61,63,71,77	0
3	PO4	D	607	5/5	0.93	0.12	46,46,50,54	0
3	PO4	B	608	5/5	0.93	0.10	55,55,62,64	0
3	PO4	C	604	5/5	0.93	0.11	37,40,46,50	0
2	GOL	D	603	6/6	0.94	0.11	26,29,29,30	0
2	GOL	D	602	6/6	0.94	0.12	21,21,24,28	0
2	GOL	B	605[A]	6/6	0.95	0.14	25,27,30,30	6
2	GOL	C	602	6/6	0.95	0.10	23,28,31,33	0
2	GOL	B	605[B]	6/6	0.95	0.14	51,53,54,55	6
3	PO4	B	606	5/5	0.96	0.13	27,32,38,45	0
3	PO4	D	609	5/5	0.96	0.10	20,23,27,32	0
4	CL	B	602	1/1	0.96	0.09	50,50,50,50	0
4	CL	D	601	1/1	0.96	0.09	49,49,49,49	0
3	PO4	C	605	5/5	0.97	0.07	28,31,36,38	0
3	PO4	A	607	5/5	0.97	0.11	24,26,36,40	0
3	PO4	A	606	5/5	0.97	0.07	30,32,35,37	0
3	PO4	D	608	5/5	0.98	0.09	30,31,34,36	0
3	PO4	C	606	5/5	0.98	0.06	30,31,32,32	0
3	PO4	B	607	5/5	0.98	0.09	31,32,39,42	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.