Full wwPDB X-ray Structure Validation Report

Feb 15, 2024 – 06:29 AM EST

PDB ID	:	3OZM
Title	:	Crystal structure of enolase superfamily member from Bordetella bronchiseptica complexed with Mg, m-Xylarate and L-Lyxarate
Authors	:	Fedorov, A.A.; Fedorov, E.V.; Wichelecki, D.; Gerlt, J.A.; Almo, S.C.
Deposited on	:	2010-09-25
Resolution	:	1.60 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

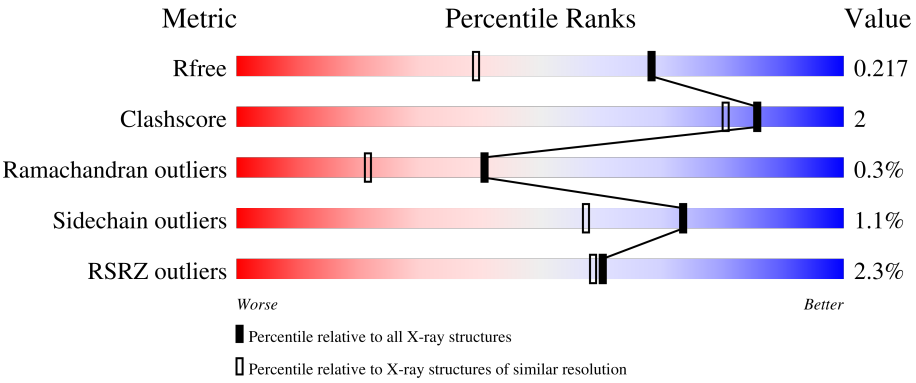
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.60 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	3398 (1.60-1.60)
Clashscore	141614	3665 (1.60-1.60)
Ramachandran outliers	138981	3564 (1.60-1.60)
Sidechain outliers	138945	3563 (1.60-1.60)
RSRZ outliers	127900	3321 (1.60-1.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=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 <=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	389	94% 5%
1	B	389	2% 96%
1	C	389	2% 94% 5%
1	D	389	2% 89% 9%
1	E	389	2% 93% 6%

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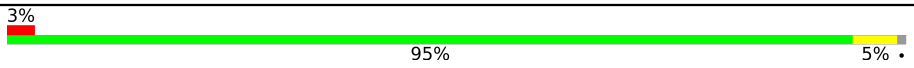
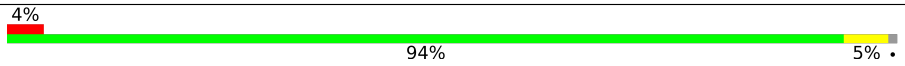
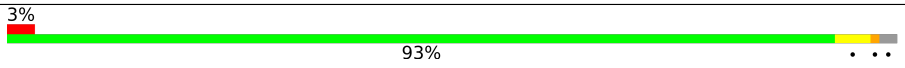
Mol	Chain	Length	Quality of chain
1	F	389	
1	G	389	
1	H	389	

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 26586 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 Putative mandelate racemase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	386	Total	C	N	O	S	0	4	0
			2990	1884	539	556	11			
1	B	386	Total	C	N	O	S	0	10	0
			3037	1914	548	564	11			
1	C	386	Total	C	N	O	S	0	9	0
			3026	1908	544	563	11			
1	D	381	Total	C	N	O	S	0	10	0
			3011	1899	544	558	10			
1	E	386	Total	C	N	O	S	0	10	0
			3042	1917	551	563	11			
1	F	386	Total	C	N	O	S	0	9	0
			3031	1911	547	562	11			
1	G	386	Total	C	N	O	S	0	10	0
			3037	1913	548	564	12			
1	H	380	Total	C	N	O	S	0	0	0
			2926	1846	527	544	9			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	2	SER	-	expression tag	UNP Q7WEE8
A	3	LEU	-	expression tag	UNP Q7WEE8
B	2	SER	-	expression tag	UNP Q7WEE8
B	3	LEU	-	expression tag	UNP Q7WEE8
C	2	SER	-	expression tag	UNP Q7WEE8
C	3	LEU	-	expression tag	UNP Q7WEE8
D	2	SER	-	expression tag	UNP Q7WEE8
D	3	LEU	-	expression tag	UNP Q7WEE8
E	2	SER	-	expression tag	UNP Q7WEE8
E	3	LEU	-	expression tag	UNP Q7WEE8
F	2	SER	-	expression tag	UNP Q7WEE8
F	3	LEU	-	expression tag	UNP Q7WEE8
G	2	SER	-	expression tag	UNP Q7WEE8

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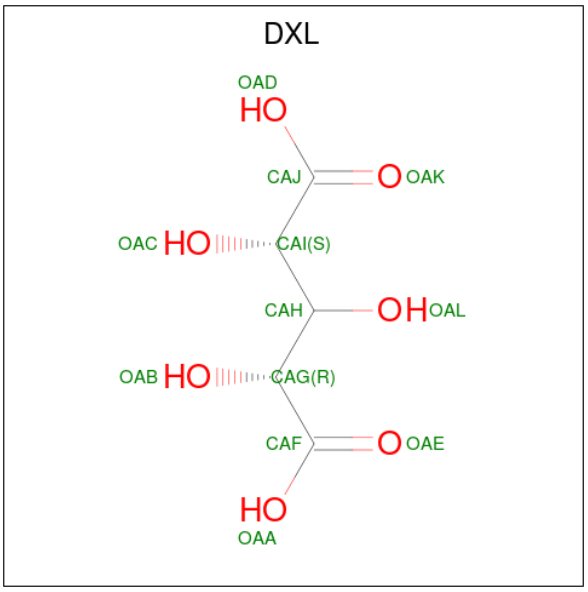
Chain	Residue	Modelled	Actual	Comment	Reference
G	3	LEU	-	expression tag	UNP Q7WEE8
H	2	SER	-	expression tag	UNP Q7WEE8
H	3	LEU	-	expression tag	UNP Q7WEE8

- Molecule 2 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

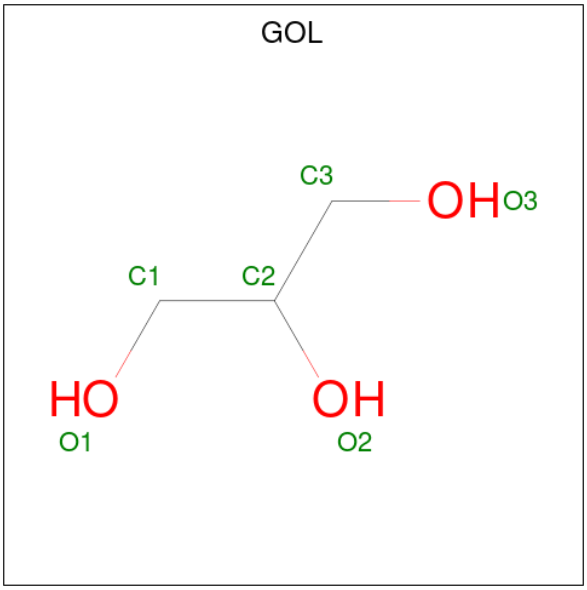
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Mg 1 1	0	0
2	B	1	Total Mg 1 1	0	0
2	C	1	Total Mg 1 1	0	0
2	D	1	Total Mg 1 1	0	0
2	E	1	Total Mg 1 1	0	0
2	F	1	Total Mg 1 1	0	0
2	G	1	Total Mg 1 1	0	0
2	H	1	Total Mg 1 1	0	0

- Molecule 3 is D-xylaric acid (three-letter code: DXL) (formula: $C_5H_8O_7$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 12 5 7	0	0
3	B	1	Total C O 12 5 7	0	0
3	C	1	Total C O 12 5 7	0	0
3	E	1	Total C O 12 5 7	0	0
3	F	1	Total C O 12 5 7	0	0
3	G	1	Total C O 12 5 7	0	0

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

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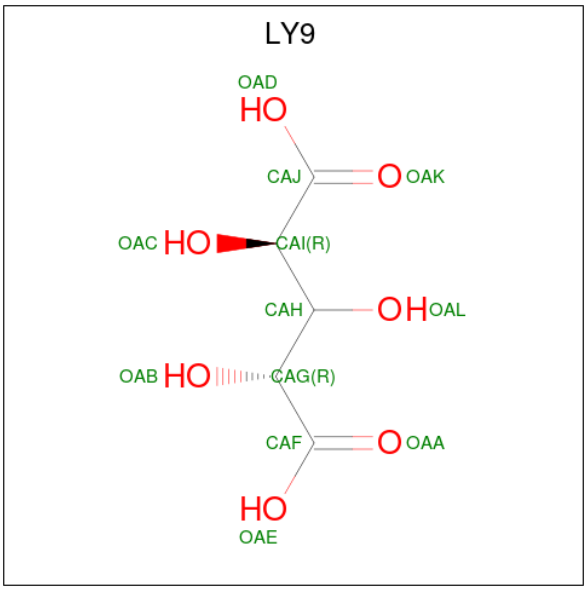
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	D	1	Total C O 6 3 3	0	0
4	E	1	Total C O 6 3 3	0	0
4	G	1	Total C O 6 3 3	0	0
4	H	1	Total C O 6 3 3	0	0

- Molecule 5 is L-arabinaric acid (three-letter code: LY9) (formula: $C_5H_8O_7$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	D	1	Total C O 12 5 7	0	0
5	H	1	Total C O 12 5 7	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	318	Total O 318 318	0	0
6	B	306	Total O 306 306	0	0
6	C	288	Total O 288 288	0	0

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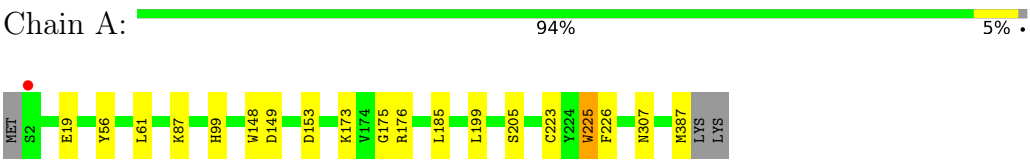
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	D	306	Total O 306 306	0	0
6	E	269	Total O 269 269	0	0
6	F	313	Total O 313 313	0	0
6	G	277	Total O 277 277	0	0
6	H	245	Total O 245 245	0	0

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.

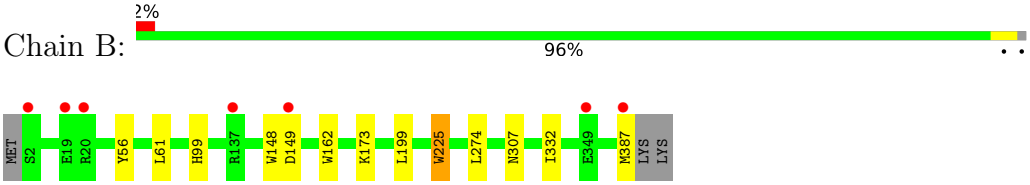
• Molecule 1: Putative mandelate racemase

Chain A:



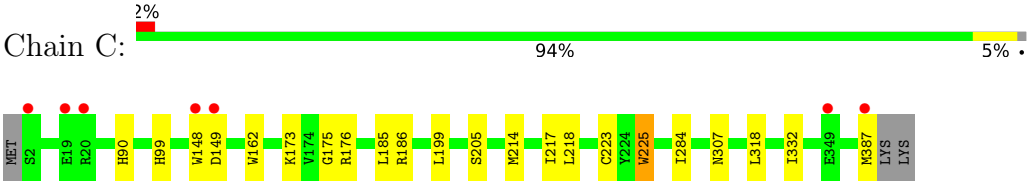
• Molecule 1: Putative mandelate racemase

Chain B:



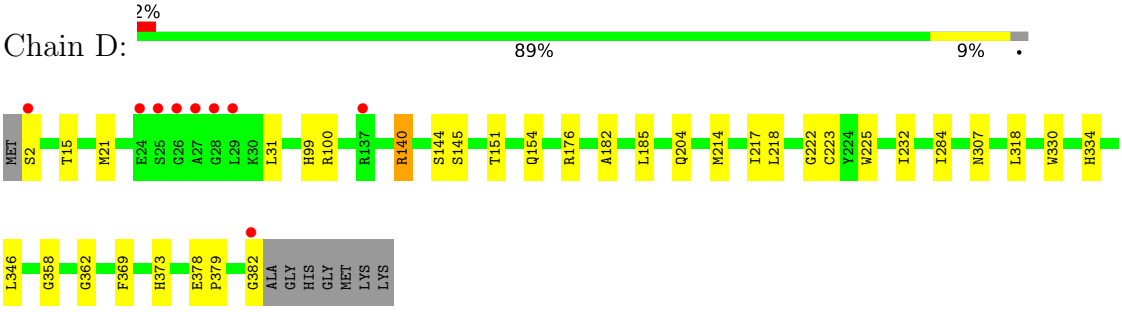
• Molecule 1: Putative mandelate racemase

Chain C:



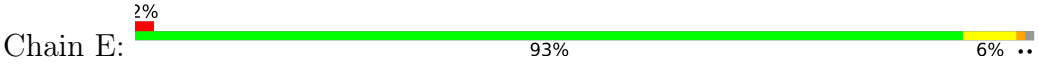
• Molecule 1: Putative mandelate racemase

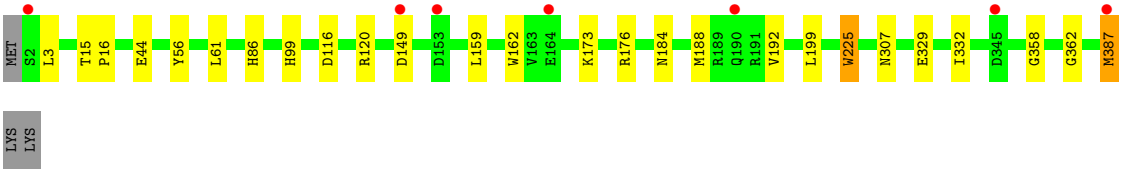
Chain D:



• Molecule 1: Putative mandelate racemase

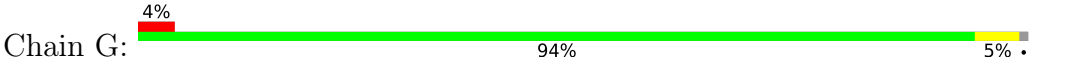
Chain E:

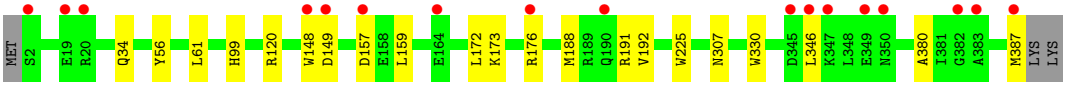




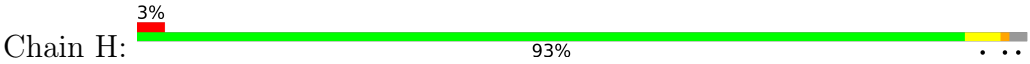
• Molecule 1: Putative mandelate racemase

• Molecule 1: Putative mandelate racemase





• Molecule 1: Putative mandelate racemase



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	91.17Å 134.34Å 146.75Å 90.00° 97.03° 90.00°	Depositor
Resolution (Å)	39.00 – 1.60 39.00 – 1.60	Depositor EDS
% Data completeness (in resolution range)	95.4 (39.00-1.60) 95.5 (39.00-1.60)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.15 (at 1.60Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.5_2)	Depositor
R, R_{free}	0.191 , 0.222 0.186 , 0.217	Depositor DCC
R_{free} test set	22044 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å^2)	18.7	Xtriage
Anisotropy	0.109	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 42.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	26586	wwPDB-VP
Average B, all atoms (Å^2)	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 71.41 % 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 2.6397e-06. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 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: LY9, MG, DXL, GOL

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	0/3057	0.54	0/4156
1	B	0.33	0/3104	0.52	0/4220
1	C	0.34	0/3093	0.52	0/4206
1	D	0.33	0/3077	0.53	0/4184
1	E	0.33	0/3109	0.53	0/4226
1	F	0.34	0/3098	0.53	0/4212
1	G	0.33	0/3104	0.53	0/4219
1	H	0.32	0/2992	0.51	0/4071
All	All	0.34	0/24634	0.53	0/33494

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

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	2990	0	2941	10	0
1	B	3037	0	2992	9	0
1	C	3026	0	2980	15	0
1	D	3011	0	2973	21	0
1	E	3042	0	3000	18	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	3031	0	2988	12	0
1	G	3037	0	2990	13	0
1	H	2926	0	2880	10	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
2	E	1	0	0	0	0
2	F	1	0	0	0	0
2	G	1	0	0	0	0
2	H	1	0	0	0	0
3	A	12	0	5	2	0
3	B	12	0	5	2	0
3	C	12	0	5	3	0
3	E	12	0	5	4	0
3	F	12	0	6	3	0
3	G	12	0	5	3	0
4	A	6	0	8	0	0
4	B	12	0	16	0	0
4	C	18	0	24	1	0
4	D	6	0	8	2	0
4	E	6	0	8	2	0
4	G	6	0	8	0	0
4	H	6	0	8	0	0
5	D	12	0	5	0	0
5	H	12	0	5	0	0
6	A	318	0	0	0	0
6	B	306	0	0	0	0
6	C	288	0	0	0	0
6	D	306	0	0	3	0
6	E	269	0	0	4	0
6	F	313	0	0	2	0
6	G	277	0	0	1	0
6	H	245	0	0	2	0
All	All	26586	0	23865	106	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 2.

All (106) 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:D:15:THR:HG22	1:D:373:HIS:CD2	2.18	0.78
1:C:173:LYS:NZ	3:C:391:DXL:HAI	2.01	0.76
1:B:173:LYS:NZ	3:B:391:DXL:HAI	2.02	0.74
4:E:392:GOL:H31	6:E:2125:HOH:O	1.90	0.71
1:E:173:LYS:NZ	3:E:391:DXL:HAI	2.06	0.71
1:A:173:LYS:NZ	3:A:391:DXL:HAI	2.06	0.70
1:B:173:LYS:HZ1	3:B:391:DXL:HAI	1.55	0.69
1:H:25:SER:OG	1:H:30:LYS:HG3	1.94	0.67
1:G:173:LYS:NZ	3:G:391:DXL:HAI	2.09	0.66
1:A:148:TRP:O	1:A:149:ASP:HB2	1.97	0.65
1:A:173:LYS:HZ1	3:A:391:DXL:HAI	1.61	0.64
1:D:151:THR:OG1	1:D:154:GLN:HG3	1.98	0.63
1:B:387:MET:HE3	1:H:86:HIS:HB2	1.79	0.62
1:C:173:LYS:HZ1	3:C:391:DXL:HAI	1.66	0.60
1:E:173:LYS:HZ1	3:E:391:DXL:HAI	1.66	0.59
1:F:173:LYS:NZ	3:F:391:DXL:HAI	2.18	0.59
1:D:185[B]:LEU:HD21	1:D:223:CYS:SG	2.44	0.58
1:F:330:TRP:CZ2	1:F:346:LEU:HB2	2.39	0.57
1:C:173:LYS:HZ2	3:C:391:DXL:HAI	1.68	0.57
1:G:149:ASP:OD1	1:G:176:ARG:NH2	2.37	0.57
1:C:149:ASP:CG	1:C:176:ARG:HH22	2.08	0.56
1:D:223:CYS:O	4:D:392:GOL:H11	2.06	0.56
1:G:173:LYS:HZ1	3:G:391:DXL:HAI	1.69	0.55
1:B:148:TRP:O	1:B:149:ASP:HB2	2.07	0.54
4:C:394:GOL:H32	6:E:2216:HOH:O	2.05	0.54
1:F:149:ASP:CG	1:F:176:ARG:HH22	2.11	0.54
1:E:159:LEU:HG	1:E:192:VAL:HG11	1.90	0.52
1:F:148:TRP:O	1:F:149:ASP:HB2	2.09	0.52
1:C:149:ASP:OD1	1:C:176:ARG:NH2	2.41	0.52
1:D:222:GLY:O	4:D:392:GOL:H12	2.09	0.52
1:D:217[B]:ILE:HD12	6:D:1492:HOH:O	2.09	0.52
1:E:149:ASP:OD1	1:E:176:ARG:NH2	2.37	0.52
1:E:173:LYS:HZ2	3:E:391:DXL:HAI	1.75	0.52
1:E:199:LEU:HD23	1:E:225:TRP:CZ2	2.45	0.51
1:D:2:SER:HB3	6:D:2390:HOH:O	2.09	0.51
1:A:175:GLY:HA3	1:A:205[B]:SER:OG	2.10	0.51
1:B:162:TRP:CZ2	1:B:332:ILE:HD13	2.46	0.51
1:C:148:TRP:O	1:C:149:ASP:HB2	2.11	0.50
1:H:125:PRO:HG3	1:H:357:GLN:O	2.12	0.50
4:E:392:GOL:H12	6:E:2125:HOH:O	2.12	0.50
1:G:159:LEU:HG	1:G:192:VAL:HG11	1.94	0.50
1:D:330:TRP:CE2	1:D:346:LEU:HD23	2.47	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:15:THR:HG21	1:D:369:PHE:HZ	1.76	0.49
1:D:182:ALA:HB2	1:D:217[B]:ILE:HD13	1.95	0.49
1:A:149:ASP:OD1	1:A:176:ARG:NH2	2.35	0.48
1:B:199:LEU:HD23	1:B:225:TRP:CZ2	2.49	0.48
1:C:162:TRP:CZ2	1:C:332:ILE:HD13	2.48	0.48
1:F:325:PRO:HD2	6:F:1786:HOH:O	2.13	0.48
1:C:186:ARG:NH2	1:C:217[A]:ILE:HD12	2.30	0.47
1:C:387:MET:HE3	1:E:86:HIS:HB2	1.96	0.47
1:H:199:LEU:HD23	1:H:225:TRP:CE2	2.50	0.47
1:D:15:THR:HG21	1:D:369:PHE:CZ	2.50	0.47
1:F:173:LYS:HZ2	3:F:391:DXL:HAI	1.80	0.46
1:D:284:ILE:HG23	1:D:318:LEU:HD11	1.97	0.46
1:D:140:ARG:NH2	6:D:2005:HOH:O	2.48	0.46
1:F:186:ARG:NH2	1:F:217[A]:ILE:HD12	2.31	0.45
1:B:56:TYR:HB2	1:B:61:LEU:HD11	1.97	0.45
1:D:31:LEU:HD11	1:D:382:GLY:HA2	1.96	0.45
1:F:34:GLN:HB3	1:F:58:LEU:HD11	1.98	0.45
1:C:90:HIS:HB2	1:E:387:MET:HG3	1.98	0.45
1:H:199:LEU:HD23	1:H:225:TRP:CZ2	2.51	0.45
1:E:199:LEU:HD23	1:E:225:TRP:CE2	2.51	0.45
1:G:173:LYS:HZ2	3:G:391:DXL:HAI	1.80	0.45
1:A:56:TYR:HB2	1:A:61:LEU:HD11	1.98	0.45
1:D:204:GLN:OE1	1:D:232[B]:ILE:HG23	2.17	0.45
1:D:214[B]:MET:O	1:D:218:LEU:HG	2.17	0.44
1:G:172:LEU:HD22	1:G:188:MET:SD	2.58	0.44
1:E:120:ARG:CZ	6:E:2125:HOH:O	2.66	0.44
1:G:148:TRP:O	1:G:149:ASP:HB2	2.18	0.44
1:G:56:TYR:HB2	1:G:61:LEU:HD11	1.99	0.44
1:A:87:LYS:HA	1:G:387:MET:SD	2.58	0.43
1:E:184:ASN:O	1:E:188:MET:HG3	2.18	0.43
1:H:25:SER:CB	1:H:30:LYS:HE3	2.47	0.43
1:G:157:ASP:OD1	1:G:191[A]:ARG:NH1	2.46	0.43
1:C:199:LEU:HD23	1:C:225:TRP:CZ2	2.54	0.43
1:B:199:LEU:HD23	1:B:225:TRP:CE2	2.53	0.43
1:D:378:GLU:HA	1:D:379:PRO:HD3	1.86	0.42
1:A:199:LEU:HD23	1:A:225:TRP:CZ2	2.54	0.42
1:D:144:SER:HA	1:D:145:SER:HA	1.83	0.42
1:F:191[A]:ARG:NH2	6:F:1904:HOH:O	2.52	0.42
1:C:214[B]:MET:O	1:C:218:LEU:HG	2.19	0.42
1:G:34:GLN:OE1	1:G:380:ALA:HB2	2.20	0.42
1:H:195:ASP:HB2	6:H:1730:HOH:O	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:148:TRP:O	1:A:149:ASP:CB	2.67	0.42
1:D:21:MET:HE2	1:D:334:HIS:HB2	2.02	0.42
1:E:358:GLY:C	1:E:362:GLY:HA2	2.40	0.42
1:H:120:ARG:NH1	6:H:1524:HOH:O	2.53	0.42
1:C:284:ILE:HG23	1:C:318:LEU:HD11	2.01	0.41
1:E:162:TRP:CZ2	1:E:332:ILE:HD13	2.55	0.41
1:E:329:GLU:OE2	3:E:391:DXL:OAD	2.38	0.41
1:D:100:ARG:HB2	1:F:100:ARG:HB2	2.03	0.41
1:F:173:LYS:HZ1	3:F:391:DXL:HAI	1.84	0.41
1:A:185:LEU:HD21	1:A:223:CYS:SG	2.61	0.41
1:B:274:LEU:HD12	1:B:274:LEU:N	2.36	0.41
1:G:120:ARG:NH1	6:G:2394:HOH:O	2.53	0.41
1:G:330:TRP:CE2	1:G:346:LEU:HD13	2.56	0.41
1:E:116:ASP:CG	1:E:120:ARG:HE	2.24	0.40
1:F:3:LEU:HD22	1:F:44:GLU:HB2	2.01	0.40
1:D:358:GLY:C	1:D:362:GLY:HA2	2.42	0.40
1:E:15:THR:HA	1:E:16:PRO:HD3	1.94	0.40
1:H:356:PRO:HB2	1:H:362:GLY:HA3	2.02	0.40
1:C:175:GLY:HA3	1:C:205[B]:SER:OG	2.22	0.40
1:C:185[B]:LEU:HD21	1:C:223:CYS:SG	2.61	0.40
1:E:3:LEU:HD22	1:E:44:GLU:HB2	2.03	0.40
1:E:56:TYR:HB2	1:E:61:LEU:HD11	2.03	0.40
1:H:151:THR:OG1	1:H:154:GLN:HG3	2.22	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	388/389 (100%)	373 (96%)	14 (4%)	1 (0%)	41	21
1	B	394/389 (101%)	382 (97%)	11 (3%)	1 (0%)	41	21

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	C	393/389 (101%)	380 (97%)	12 (3%)	1 (0%)	41 21
1	D	389/389 (100%)	378 (97%)	10 (3%)	1 (0%)	41 21
1	E	394/389 (101%)	382 (97%)	11 (3%)	1 (0%)	41 21
1	F	393/389 (101%)	379 (96%)	13 (3%)	1 (0%)	41 21
1	G	394/389 (101%)	379 (96%)	14 (4%)	1 (0%)	41 21
1	H	378/389 (97%)	365 (97%)	11 (3%)	2 (0%)	29 11
All	All	3123/3112 (100%)	3018 (97%)	96 (3%)	9 (0%)	41 21

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	307	ASN
1	B	307	ASN
1	C	307	ASN
1	D	307	ASN
1	E	307	ASN
1	F	307	ASN
1	G	307	ASN
1	H	307	ASN
1	H	26	GLY

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	304/303 (100%)	298 (98%)	6 (2%)	55 31
1	B	310/303 (102%)	308 (99%)	2 (1%)	86 77
1	C	309/303 (102%)	307 (99%)	2 (1%)	86 77
1	D	308/303 (102%)	304 (99%)	4 (1%)	69 50
1	E	310/303 (102%)	307 (99%)	3 (1%)	76 61
1	F	309/303 (102%)	307 (99%)	2 (1%)	86 77

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	G	310/303 (102%)	308 (99%)	2 (1%)	86 77
1	H	297/303 (98%)	292 (98%)	5 (2%)	60 38
All	All	2457/2424 (101%)	2431 (99%)	26 (1%)	73 57

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	19	GLU
1	A	99	HIS
1	A	153	ASP
1	A	225	TRP
1	A	226	PHE
1	A	387	MET
1	B	99	HIS
1	B	225	TRP
1	C	99	HIS
1	C	225	TRP
1	D	99	HIS
1	D	140	ARG
1	D	176	ARG
1	D	225	TRP
1	E	99	HIS
1	E	225	TRP
1	E	387	MET
1	F	99	HIS
1	F	225	TRP
1	G	99	HIS
1	G	225	TRP
1	H	2	SER
1	H	99	HIS
1	H	120	ARG
1	H	176	ARG
1	H	225	TRP

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

5.3.3 RNA

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 26 ligands modelled in this entry, 8 are monoatomic - leaving 18 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	$\#\|Z\| > 2$
4	GOL	B	392	-	5,5,5	0.38	0	5,5,5	0.40	0
4	GOL	C	393	-	5,5,5	0.31	0	5,5,5	0.49	0
4	GOL	H	392	-	5,5,5	0.27	0	5,5,5	0.53	0
5	LY9	D	391	2	11,11,11	0.97	0	14,15,15	1.08	0
3	DXL	A	391	2	11,11,11	1.15	0	14,15,15	1.45	2 (14%)
4	GOL	D	392	-	5,5,5	0.31	0	5,5,5	0.59	0
4	GOL	E	392	-	5,5,5	0.38	0	5,5,5	0.17	0
3	DXL	C	391	2	11,11,11	1.22	1 (9%)	14,15,15	1.40	2 (14%)
5	LY9	H	391	2	11,11,11	1.00	0	14,15,15	0.93	0
3	DXL	G	391	2	11,11,11	1.11	0	14,15,15	1.39	2 (14%)
4	GOL	A	392	-	5,5,5	0.33	0	5,5,5	0.23	0
3	DXL	B	391	2	11,11,11	1.14	0	14,15,15	1.24	1 (7%)
4	GOL	C	394	-	5,5,5	0.40	0	5,5,5	0.40	0
4	GOL	B	393	-	5,5,5	0.36	0	5,5,5	0.35	0
3	DXL	E	391	2	11,11,11	1.19	0	14,15,15	1.31	2 (14%)
3	DXL	F	391	2	11,11,11	1.09	0	14,15,15	1.42	3 (21%)
4	GOL	G	392	-	5,5,5	0.42	0	5,5,5	0.28	0
4	GOL	C	392	-	5,5,5	0.31	0	5,5,5	0.91	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
4	GOL	B	392	-	-	2/4/4/4	-
4	GOL	C	393	-	-	2/4/4/4	-
4	GOL	H	392	-	-	0/4/4/4	-
5	LY9	D	391	2	-	2/16/16/16	-
3	DXL	A	391	2	-	6/16/16/16	-
4	GOL	D	392	-	-	2/4/4/4	-
4	GOL	E	392	-	-	2/4/4/4	-
3	DXL	C	391	2	-	8/16/16/16	-
5	LY9	H	391	2	-	2/16/16/16	-
3	DXL	G	391	2	-	8/16/16/16	-
4	GOL	A	392	-	-	0/4/4/4	-
3	DXL	B	391	2	-	8/16/16/16	-
4	GOL	C	394	-	-	2/4/4/4	-
4	GOL	B	393	-	-	1/4/4/4	-
3	DXL	E	391	2	-	4/16/16/16	-
3	DXL	F	391	2	-	8/16/16/16	-
4	GOL	G	392	-	-	0/4/4/4	-
4	GOL	C	392	-	-	2/4/4/4	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	391	DXL	CAI-CAJ	2.03	1.55	1.52

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	391	DXL	CAH-CAI-CAJ	3.10	113.22	109.32
3	F	391	DXL	OAE-CAF-CAG	-2.79	114.31	121.63
3	A	391	DXL	OAL-CAH-CAI	2.50	113.75	109.21
3	E	391	DXL	CAH-CAI-CAJ	2.42	112.37	109.32
3	G	391	DXL	OAE-CAF-CAG	-2.36	115.42	121.63
3	C	391	DXL	OAE-CAF-CAG	-2.35	115.45	121.63
3	B	391	DXL	OAE-CAF-CAG	-2.30	115.58	121.63
3	F	391	DXL	OAA-CAF-CAG	2.23	119.30	113.27
3	E	391	DXL	OAE-CAF-CAG	-2.22	115.80	121.63
3	G	391	DXL	CAH-CAI-CAJ	2.17	112.05	109.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	391	DXL	CAH-CAI-CAJ	2.15	112.02	109.32
3	F	391	DXL	OAL-CAH-CAI	2.05	112.94	109.21

There are no chirality outliers.

All (59) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	392	GOL	O1-C1-C2-C3
4	E	392	GOL	O1-C1-C2-C3
5	D	391	LY9	OAA-CAF-CAG-OAB
5	D	391	LY9	OAE-CAF-CAG-OAB
5	H	391	LY9	OAA-CAF-CAG-OAB
3	E	391	DXL	OAE-CAF-CAG-OAB
5	H	391	LY9	OAE-CAF-CAG-OAB
3	E	391	DXL	OAA-CAF-CAG-OAB
3	A	391	DXL	OAE-CAF-CAG-OAB
3	F	391	DXL	OAE-CAF-CAG-OAB
3	B	391	DXL	OAE-CAF-CAG-OAB
3	C	391	DXL	OAE-CAF-CAG-OAB
4	C	392	GOL	O1-C1-C2-C3
4	C	393	GOL	O1-C1-C2-C3
4	D	392	GOL	C1-C2-C3-O3
3	A	391	DXL	OAA-CAF-CAG-OAB
3	B	391	DXL	OAA-CAF-CAG-OAB
3	C	391	DXL	OAA-CAF-CAG-OAB
3	F	391	DXL	OAA-CAF-CAG-OAB
3	G	391	DXL	OAE-CAF-CAG-OAB
4	B	392	GOL	O1-C1-C2-O2
4	C	393	GOL	O1-C1-C2-O2
4	E	392	GOL	O1-C1-C2-O2
3	G	391	DXL	OAA-CAF-CAG-OAB
3	G	391	DXL	CAH-CAI-CAJ-OAD
3	G	391	DXL	CAH-CAI-CAJ-OAK
3	F	391	DXL	CAH-CAI-CAJ-OAD
4	D	392	GOL	O2-C2-C3-O3
4	C	392	GOL	O1-C1-C2-O2
4	C	394	GOL	O2-C2-C3-O3
3	B	391	DXL	CAH-CAI-CAJ-OAD
3	B	391	DXL	CAH-CAI-CAJ-OAK
3	G	391	DXL	OAE-CAF-CAG-CAH
3	C	391	DXL	CAF-CAG-CAH-OAL
3	C	391	DXL	OAE-CAF-CAG-CAH

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Mol	Chain	Res	Type	Atoms
3	F	391	DXL	CAH-CAI-CAJ-OAK
3	G	391	DXL	OAA-CAF-CAG-CAH
4	C	394	GOL	C1-C2-C3-O3
3	A	391	DXL	CAH-CAI-CAJ-OAK
3	C	391	DXL	OAA-CAF-CAG-CAH
3	C	391	DXL	CAH-CAI-CAJ-OAK
3	A	391	DXL	CAH-CAI-CAJ-OAD
3	C	391	DXL	CAH-CAI-CAJ-OAD
4	B	393	GOL	O1-C1-C2-C3
3	A	391	DXL	CAF-CAG-CAH-OAL
3	B	391	DXL	CAF-CAG-CAH-OAL
3	E	391	DXL	CAF-CAG-CAH-OAL
3	F	391	DXL	CAF-CAG-CAH-OAL
3	G	391	DXL	CAF-CAG-CAH-OAL
3	B	391	DXL	OAE-CAF-CAG-CAH
3	B	391	DXL	OAA-CAF-CAG-CAH
3	A	391	DXL	CAF-CAG-CAH-CAI
3	B	391	DXL	CAF-CAG-CAH-CAI
3	C	391	DXL	CAF-CAG-CAH-CAI
3	E	391	DXL	CAF-CAG-CAH-CAI
3	F	391	DXL	CAF-CAG-CAH-CAI
3	G	391	DXL	CAF-CAG-CAH-CAI
3	F	391	DXL	OAA-CAF-CAG-CAH
3	F	391	DXL	OAE-CAF-CAG-CAH

There are no ring outliers.

9 monomers are involved in 22 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	391	DXL	2	0
4	D	392	GOL	2	0
4	E	392	GOL	2	0
3	C	391	DXL	3	0
3	G	391	DXL	3	0
3	B	391	DXL	2	0
4	C	394	GOL	1	0
3	E	391	DXL	4	0
3	F	391	DXL	3	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^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	386/389 (99%)	-0.44	1 (0%)	94	93	12, 18, 35, 49	0
1	B	386/389 (99%)	-0.33	7 (1%)	68	67	12, 20, 37, 51	0
1	C	386/389 (99%)	-0.28	7 (1%)	68	67	14, 20, 38, 51	0
1	D	381/389 (97%)	-0.31	9 (2%)	59	56	14, 20, 40, 80	0
1	E	386/389 (99%)	-0.30	7 (1%)	68	67	14, 20, 42, 58	0
1	F	386/389 (99%)	-0.26	12 (3%)	49	46	13, 19, 38, 52	0
1	G	386/389 (99%)	-0.10	17 (4%)	34	31	13, 20, 40, 57	0
1	H	380/389 (97%)	-0.11	10 (2%)	56	53	15, 22, 46, 88	0
All	All	3077/3112 (98%)	-0.27	70 (2%)	60	59	12, 20, 40, 88	0

All (70) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	27	ALA	12.2
1	H	25	SER	7.9
1	H	26	GLY	7.7
1	D	27	ALA	7.6
1	D	26	GLY	4.9
1	G	19	GLU	4.8
1	B	387	MET	4.7
1	H	28	GLY	4.4
1	G	149	ASP	4.2
1	F	387	MET	4.0
1	D	382	GLY	3.9
1	F	148	TRP	3.9
1	G	387	MET	3.9
1	D	28	GLY	3.7
1	H	29	LEU	3.5
1	C	387	MET	3.4

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Mol	Chain	Res	Type	RSRZ
1	D	25	SER	3.3
1	H	24	GLU	3.3
1	E	190	GLN	3.3
1	F	19	GLU	3.2
1	F	383	ALA	3.2
1	G	349	GLU	3.2
1	F	149	ASP	3.1
1	A	2	SER	3.0
1	B	349	GLU	3.0
1	D	2	SER	2.9
1	E	2	SER	2.8
1	B	20	ARG	2.8
1	H	376	LYS	2.7
1	C	20	ARG	2.7
1	E	153	ASP	2.7
1	B	2	SER	2.7
1	F	349	GLU	2.7
1	F	381	ILE	2.7
1	G	190	GLN	2.7
1	E	387	MET	2.7
1	H	2	SER	2.7
1	G	20	ARG	2.6
1	C	19	GLU	2.6
1	H	350	ASN	2.6
1	F	2	SER	2.6
1	G	350	ASN	2.6
1	G	164	GLU	2.5
1	F	20	ARG	2.5
1	D	137	ARG	2.4
1	G	2	SER	2.4
1	G	383	ALA	2.4
1	B	137	ARG	2.4
1	G	157	ASP	2.4
1	C	148	TRP	2.4
1	B	19	GLU	2.4
1	C	349	GLU	2.3
1	G	347	LYS	2.3
1	E	164	GLU	2.2
1	C	2	SER	2.2
1	G	176	ARG	2.2
1	H	379	PRO	2.2
1	B	149	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
1	G	346	LEU	2.2
1	E	149	ASP	2.2
1	D	29	LEU	2.1
1	D	24	GLU	2.1
1	G	382	GLY	2.1
1	G	345	ASP	2.1
1	F	385	HIS	2.1
1	F	28	GLY	2.1
1	C	149	ASP	2.0
1	F	347	LYS	2.0
1	E	345	ASP	2.0
1	G	148	TRP	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 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^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	GOL	A	392	6/6	0.81	0.19	35,36,42,46	0
4	GOL	B	392	6/6	0.87	0.15	30,33,39,40	0
4	GOL	B	393	6/6	0.88	0.27	28,40,45,48	0
4	GOL	E	392	6/6	0.88	0.20	38,40,45,45	0
4	GOL	G	392	6/6	0.88	0.14	30,34,35,40	0
4	GOL	C	394	6/6	0.89	0.31	29,44,45,52	0
4	GOL	C	392	6/6	0.90	0.19	21,32,36,39	0
4	GOL	C	393	6/6	0.91	0.13	28,42,45,45	0
4	GOL	H	392	6/6	0.91	0.13	19,29,31,37	0
3	DXL	F	391	12/12	0.92	0.13	18,33,36,36	0
5	LY9	H	391	12/12	0.92	0.11	18,31,57,66	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	GOL	D	392	6/6	0.93	0.15	18,35,37,38	0
3	DXL	A	391	12/12	0.94	0.08	18,24,28,34	0
3	DXL	B	391	12/12	0.94	0.10	17,27,31,36	0
3	DXL	E	391	12/12	0.94	0.09	17,28,34,38	0
5	LY9	D	391	12/12	0.95	0.10	15,24,47,58	0
3	DXL	G	391	12/12	0.95	0.08	19,28,39,41	0
3	DXL	C	391	12/12	0.96	0.07	17,26,35,35	0
2	MG	C	390	1/1	0.98	0.06	20,20,20,20	0
2	MG	B	390	1/1	0.99	0.08	19,19,19,19	0
2	MG	A	390	1/1	0.99	0.07	21,21,21,21	0
2	MG	E	390	1/1	0.99	0.05	22,22,22,22	0
2	MG	F	390	1/1	0.99	0.10	19,19,19,19	0
2	MG	G	390	1/1	0.99	0.08	19,19,19,19	0
2	MG	H	390	1/1	0.99	0.07	20,20,20,20	0
2	MG	D	390	1/1	1.00	0.09	16,16,16,16	0

6.5 Other polymers (i)

There are no such residues in this entry.