



Full wwPDB X-ray Structure Validation Report ⓘ

May 21, 2020 – 07:38 pm BST

PDB ID : 3PVL
Title : Structure of myosin VIIa MyTH4-FERM-SH3 in complex with the CEN1 of Sans
Authors : Wu, L.; Pan, L.F.; Wei, Z.Y.; Zhang, M.J.
Deposited on : 2010-12-07
Resolution : 2.80 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 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 : 2.11
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) : 2.11

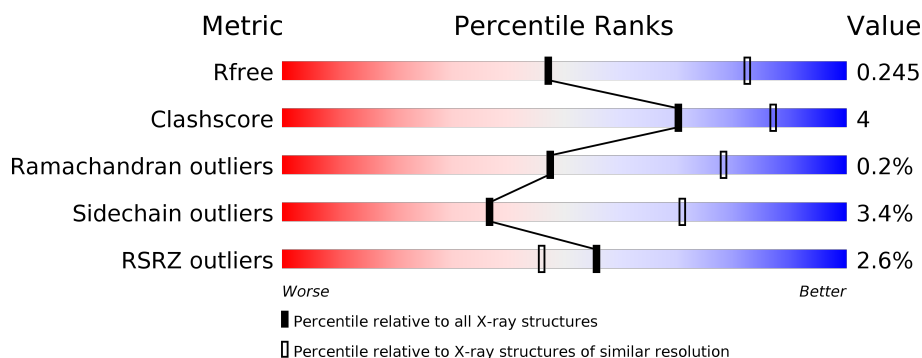
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria 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	655	<div> <div>2%</div> <div> <div></div> <div>81%</div> <div>9%</div> <div>9%</div> </div> </div>
2	B	96	<div> <div>17%</div> <div>83%</div> </div>

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
4	PO4	B	10	-	-	-	X

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 4997 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 Myosin VIIa isoform 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	597	4766	3056	804	885	21	0	1	0

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	GLU	DELETION	UNP Q5MJ57
A	?	-	THR	DELETION	UNP Q5MJ57
A	?	-	GLN	DELETION	UNP Q5MJ57
A	?	-	LEU	DELETION	UNP Q5MJ57
A	?	-	PRO	DELETION	UNP Q5MJ57
A	?	-	GLU	DELETION	UNP Q5MJ57
A	?	-	GLY	DELETION	UNP Q5MJ57
A	?	-	GLN	DELETION	UNP Q5MJ57
A	?	-	LYS	DELETION	UNP Q5MJ57
A	?	-	LYS	DELETION	UNP Q5MJ57
A	?	-	THR	DELETION	UNP Q5MJ57
A	?	-	SER	DELETION	UNP Q5MJ57
A	?	-	VAL	DELETION	UNP Q5MJ57
A	?	-	ARG	DELETION	UNP Q5MJ57
A	?	-	HIS	DELETION	UNP Q5MJ57
A	?	-	LYS	DELETION	UNP Q5MJ57
A	?	-	LEU	DELETION	UNP Q5MJ57
A	?	-	VAL	DELETION	UNP Q5MJ57
A	?	-	HIS	DELETION	UNP Q5MJ57
A	?	-	LEU	DELETION	UNP Q5MJ57
A	?	-	THR	DELETION	UNP Q5MJ57
A	?	-	LEU	DELETION	UNP Q5MJ57
A	?	-	LYS	DELETION	UNP Q5MJ57
A	?	-	LYS	DELETION	UNP Q5MJ57
A	?	-	LYS	DELETION	UNP Q5MJ57
A	?	-	LYS	DELETION	UNP Q5MJ57
A	?	-	SER	DELETION	UNP Q5MJ57
A	?	-	LYS	DELETION	UNP Q5MJ57

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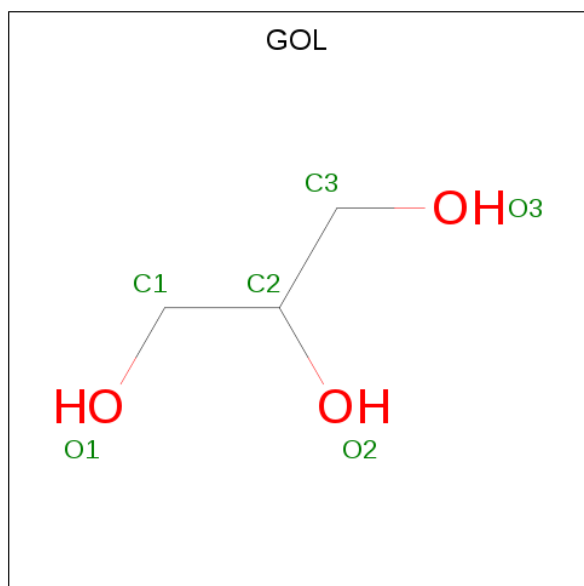
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Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	LEU	DELETION	UNP Q5MJ57
A	?	-	THR	DELETION	UNP Q5MJ57
A	?	-	GLU	DELETION	UNP Q5MJ57

- Molecule 2 is a protein called Usher syndrome type-1G protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	16	Total	C	N	O	S	0	0	0
			129	82	26	20	1			

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

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

- Molecule 4 is PHOSPHATE ION (three-letter code: PO4) (formula: O₄P).



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

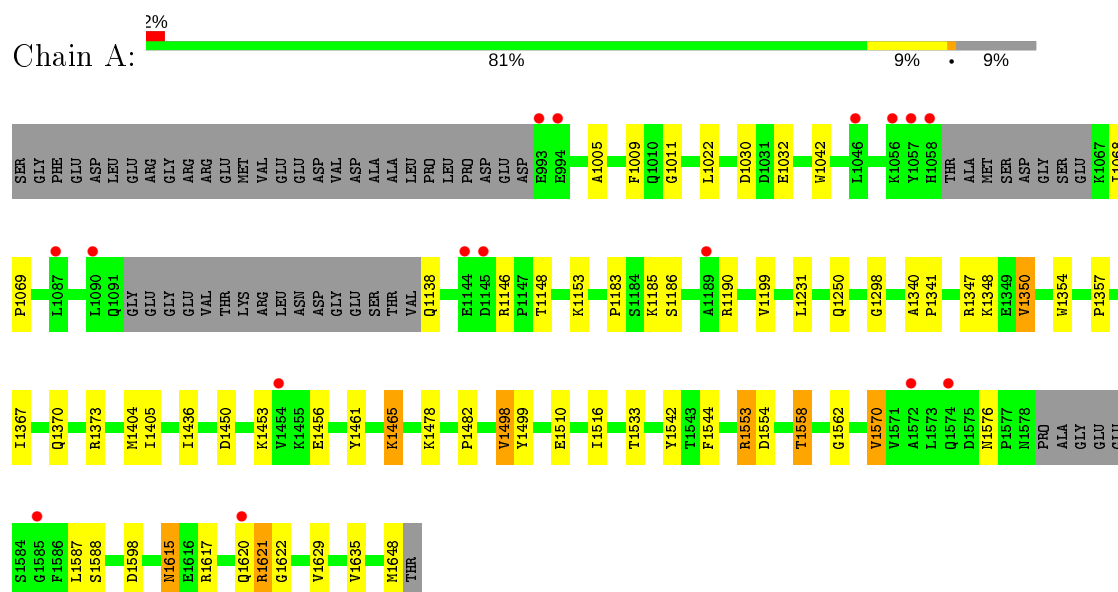
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	38	Total	O	0	0
			38	38		

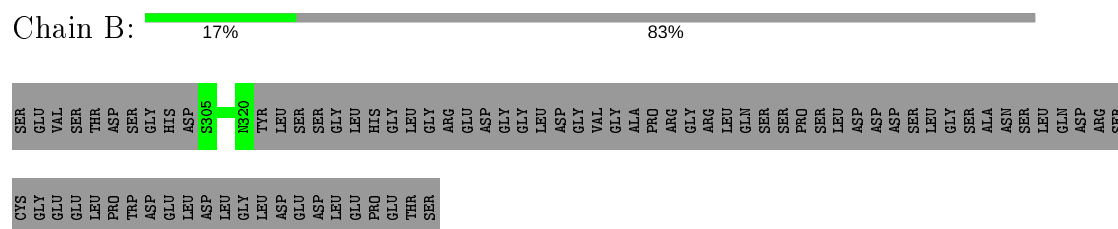
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of 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: Myosin VIIa isoform 1



- Molecule 2: Usher syndrome type-1G protein



4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	98.86 Å 98.86 Å 242.28 Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	50.00 – 2.80 49.45 – 2.80	Depositor EDS
% Data completeness (in resolution range)	99.6 (50.00-2.80) 99.6 (49.45-2.80)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.05 (at 2.81 Å)	Xtriage
Refinement program	REFMAC 5.5.0072	Depositor
R, R_{free}	0.228 , 0.259 0.217 , 0.245	Depositor DCC
R_{free} test set	1740 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	73.3	Xtriage
Anisotropy	0.222	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 40.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.025 for -h,-k,l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	4997	wwPDB-VP
Average B, all atoms (Å ²)	68.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.18% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, PO4

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	0.38	0/4884	0.51	0/6622
2	B	0.41	0/131	0.56	0/174
All	All	0.38	0/5015	0.51	0/6796

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	4766	0	4702	35	0
2	B	129	0	134	0	0
3	A	48	0	64	0	0
3	B	6	0	8	1	0
4	A	5	0	0	0	0
4	B	5	0	0	0	0
5	A	38	0	0	0	0
All	All	4997	0	4908	35	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 4.

All (35) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1553:ARG:HH11	1:A:1553:ARG:HG2	1.21	1.05
1:A:1068:ILE:HB	1:A:1069:PRO:HD2	1.62	0.80
1:A:1553:ARG:NH1	1:A:1553:ARG:HG2	1.98	0.77
1:A:1570:VAL:HG13	1:A:1629:VAL:HB	1.69	0.74
1:A:1005:ALA:O	1:A:1009:PHE:HB2	1.97	0.65
1:A:1587:LEU:HD11	1:A:1615:ASN:HB2	1.86	0.58
1:A:1588:SER:HB3	1:A:1620:GLN:HE22	1.70	0.57
1:A:1498:VAL:HG13	1:A:1516:ILE:HD11	1.88	0.56
1:A:1009:PHE:C	1:A:1011:GLY:H	2.08	0.55
1:A:1615:ASN:HD22	1:A:1617:ARG:H	1.55	0.54
1:A:1621:ARG:HG3	1:A:1622:GLY:N	2.24	0.53
1:A:1553:ARG:NH1	1:A:1554:ASP:OD1	2.43	0.51
1:A:1554:ASP:O	1:A:1558:THR:HG22	2.13	0.49
1:A:1354:TRP:CZ3	1:A:1562:GLY:HA3	2.48	0.49
1:A:1461:TYR:CZ	1:A:1465:LYS:HG3	2.48	0.48
1:A:1404:MET:HG2	1:A:1436:ILE:HG12	1.96	0.48
1:A:1478:LYS:HE3	1:A:1482:PRO:O	2.14	0.47
1:A:1499:TYR:CE2	1:A:1510:GLU:HG3	2.51	0.46
1:A:1348:LYS:HG3	1:A:1367:ILE:HG12	1.98	0.45
1:A:1022:LEU:HG	1:A:1042:TRP:CD1	2.51	0.45
1:A:1450:ASP:HB3	1:A:1453:LYS:HB2	2.00	0.44
1:A:1347:ARG:HB2	1:A:1370:GLN:OE1	2.18	0.43
1:A:1542:TYR:HB3	1:A:1544:PHE:CE1	2.53	0.43
1:A:1373:ARG:HH22	3:B:6:GOL:H2	1.84	0.42
1:A:1186:SER:O	1:A:1190:ARG:HG3	2.19	0.42
1:A:1199:VAL:HB	1:A:1231:LEU:HB2	2.00	0.42
1:A:1340:ALA:HA	1:A:1341:PRO:HD3	1.94	0.42
1:A:1498:VAL:CG1	1:A:1516:ILE:HD11	2.49	0.42
1:A:1009:PHE:C	1:A:1011:GLY:N	2.73	0.42
1:A:1357:PRO:HB2	1:A:1456:GLU:HG2	2.02	0.41
1:A:1298:GLY:HA2	1:A:1350:VAL:HG23	2.03	0.41
1:A:1185:LYS:HD2	1:A:1185:LYS:HA	1.81	0.41
1:A:1588:SER:HB3	1:A:1620:GLN:NE2	2.36	0.40
1:A:1148:THR:OG1	1:A:1153:LYS:HE3	2.21	0.40
1:A:1533:THR:HA	1:A:1542:TYR:O	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	590/655 (90%)	569 (96%)	20 (3%)	1 (0%)	47	78
2	B	14/96 (15%)	13 (93%)	1 (7%)	0	100	100
All	All	604/751 (80%)	582 (96%)	21 (4%)	1 (0%)	47	78

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1183	PRO

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	515/571 (90%)	497 (96%)	18 (4%)	36	70
2	B	14/80 (18%)	14 (100%)	0	100	100
All	All	529/651 (81%)	511 (97%)	18 (3%)	37	71

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1030	ASP
1	A	1032	GLU
1	A	1138	GLN
1	A	1146	ARG
1	A	1250	GLN

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Mol	Chain	Res	Type
1	A	1350	VAL
1	A	1405	ILE
1	A	1465	LYS
1	A	1498	VAL
1	A	1553	ARG
1	A	1558	THR
1	A	1570	VAL
1	A	1576	ASN
1	A	1598	ASP
1	A	1615	ASN
1	A	1621	ARG
1	A	1635	VAL
1	A	1648	MET

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1339	ASN
1	A	1460	ASN
1	A	1504	GLN
1	A	1604	GLN
1	A	1615	ASN
1	A	1620	GLN

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 ⓘ

There are no carbohydrates in this entry.

5.6 Ligand geometry ⓘ

11 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	$\# Z > 2$
4	PO4	B	10	-	4,4,4	0.89	0	6,6,6	0.42	0
3	GOL	B	6	-	5,5,5	0.39	0	5,5,5	0.17	0
3	GOL	A	3	-	5,5,5	0.38	0	5,5,5	0.26	0
3	GOL	A	4	-	5,5,5	0.33	0	5,5,5	0.37	0
3	GOL	A	7	-	5,5,5	0.34	0	5,5,5	0.31	0
3	GOL	A	9	-	5,5,5	0.36	0	5,5,5	0.25	0
3	GOL	A	2	-	5,5,5	0.37	0	5,5,5	0.41	0
4	PO4	A	11	-	4,4,4	0.89	0	6,6,6	0.36	0
3	GOL	A	1	-	5,5,5	0.36	0	5,5,5	0.21	0
3	GOL	A	8	-	5,5,5	0.34	0	5,5,5	0.21	0
3	GOL	A	5	-	5,5,5	0.37	0	5,5,5	0.28	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
3	GOL	B	6	-	-	2/4/4/4	-
3	GOL	A	3	-	-	2/4/4/4	-
3	GOL	A	4	-	-	2/4/4/4	-
3	GOL	A	7	-	-	4/4/4/4	-
3	GOL	A	9	-	-	0/4/4/4	-
3	GOL	A	2	-	-	2/4/4/4	-
3	GOL	A	1	-	-	2/4/4/4	-
3	GOL	A	8	-	-	2/4/4/4	-
3	GOL	A	5	-	-	4/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	6	GOL	C1-C2-C3-O3
3	A	4	GOL	O1-C1-C2-C3
3	A	7	GOL	O1-C1-C2-C3
3	A	7	GOL	C1-C2-C3-O3
3	A	2	GOL	O1-C1-C2-C3
3	A	1	GOL	O1-C1-C2-C3
3	A	8	GOL	O1-C1-C2-O2
3	A	8	GOL	O1-C1-C2-C3
3	A	5	GOL	O1-C1-C2-C3
3	A	5	GOL	C1-C2-C3-O3
3	B	6	GOL	O2-C2-C3-O3
3	A	7	GOL	O2-C2-C3-O3
3	A	2	GOL	O1-C1-C2-O2
3	A	1	GOL	O1-C1-C2-O2
3	A	5	GOL	O2-C2-C3-O3
3	A	5	GOL	O1-C1-C2-O2
3	A	7	GOL	O1-C1-C2-O2
3	A	4	GOL	O1-C1-C2-O2
3	A	3	GOL	O1-C1-C2-C3
3	A	3	GOL	O1-C1-C2-O2

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	6	GOL	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 [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, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	597/655 (91%)	0.24	16 (2%) 54 44	41, 63, 103, 136	0
2	B	16/96 (16%)	0.19	0 100 100	80, 87, 94, 100	0
All	All	613/751 (81%)	0.24	16 (2%) 56 46	41, 64, 102, 136	0

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1057	TYR	5.2
1	A	1145	ASP	4.8
1	A	1144	GLU	3.5
1	A	1056	LYS	2.8
1	A	1090	LEU	2.6
1	A	1454	VAL	2.4
1	A	1585	GLY	2.4
1	A	1574	GLN	2.4
1	A	1058	HIS	2.2
1	A	994	GLU	2.2
1	A	1046	LEU	2.1
1	A	1572	ALA	2.1
1	A	1087	LEU	2.0
1	A	1189	ALA	2.0
1	A	993	GLU	2.0
1	A	1620	GLN	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, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	GOL	A	7	6/6	0.57	0.28	103,106,108,109	0
3	GOL	A	9	6/6	0.67	0.32	110,113,116,117	0
3	GOL	A	2	6/6	0.74	0.32	98,101,101,101	0
4	PO4	B	10	5/5	0.76	0.42	152,153,153,154	0
3	GOL	A	3	6/6	0.79	0.37	112,113,114,115	0
3	GOL	B	6	6/6	0.79	0.17	90,94,97,98	0
4	PO4	A	11	5/5	0.79	0.27	114,115,115,117	0
3	GOL	A	8	6/6	0.81	0.58	89,91,91,92	0
3	GOL	A	5	6/6	0.83	0.37	77,87,93,93	0
3	GOL	A	4	6/6	0.84	0.15	109,111,112,113	0
3	GOL	A	1	6/6	0.91	0.30	79,88,90,90	0

6.5 Other polymers [i](#)

There are no such residues in this entry.