



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 18, 2023 – 01:33 am GMT

PDB ID : 4BE9
Title : Open conformation of *O. piceae* sterol esterase
Authors : Gutierrez-Fernandez, J.; Vaquero, M.E.; Prieto, A.; Barriuso, J.; Gonzalez, M.J.; Hermoso, J.A.
Deposited on : 2013-03-06
Resolution : 2.00 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

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 : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
buster-report : 1.1.7 (2018)
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

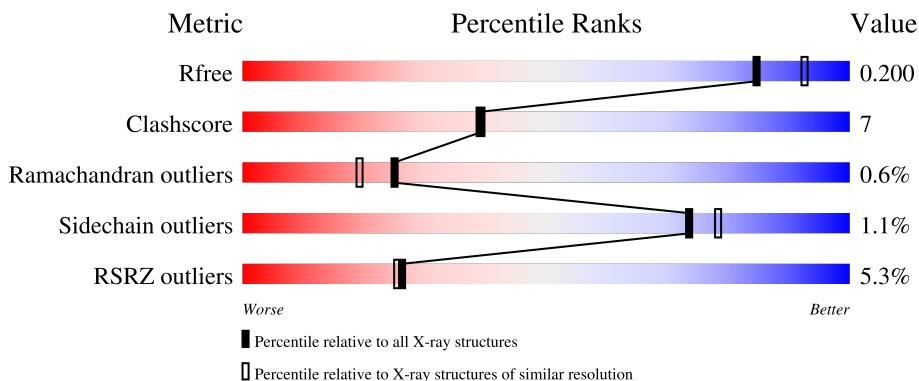
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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 $\leq 5\%$. 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	545	 92% 7% .
1	B	545	 10% 78% 19% ..

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	PGE	B	1556	-	-	-	X
6	PEG	B	1553	-	-	-	X
6	PEG	B	1555	-	-	-	X

2 Entry composition i

There are 9 unique types of molecules in this entry. The entry contains 9295 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 STEROL ESTERASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	538	4178	2701	670	797	10	0	6	0
1	B	537	4140	2672	666	792	10	0	3	0

There are 16 discrepancies between the modelled and reference sequences:

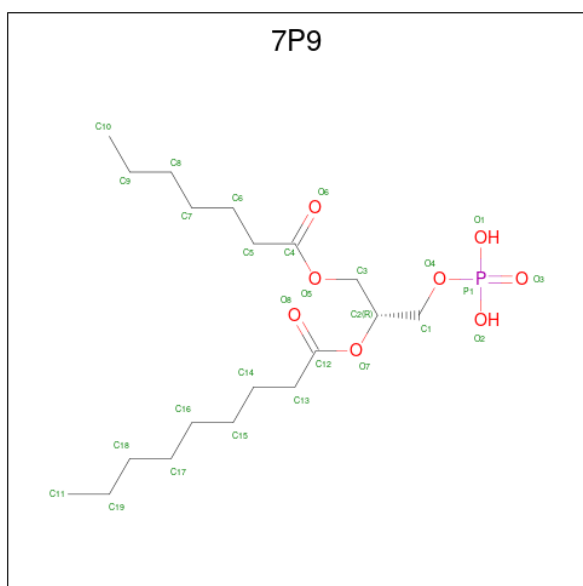
Chain	Residue	Modelled	Actual	Comment	Reference
A	5	GLU	-	expression tag	UNP Q2TFW1
A	6	ALA	-	expression tag	UNP Q2TFW1
A	7	GLU	-	expression tag	UNP Q2TFW1
A	8	ALA	-	expression tag	UNP Q2TFW1
A	9	TYR	-	expression tag	UNP Q2TFW1
A	10	VAL	-	expression tag	UNP Q2TFW1
A	11	GLU	-	expression tag	UNP Q2TFW1
A	12	PHE	-	expression tag	UNP Q2TFW1
B	5	GLU	-	expression tag	UNP Q2TFW1
B	6	ALA	-	expression tag	UNP Q2TFW1
B	7	GLU	-	expression tag	UNP Q2TFW1
B	8	ALA	-	expression tag	UNP Q2TFW1
B	9	TYR	-	expression tag	UNP Q2TFW1
B	10	VAL	-	expression tag	UNP Q2TFW1
B	11	GLU	-	expression tag	UNP Q2TFW1
B	12	PHE	-	expression tag	UNP Q2TFW1

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).



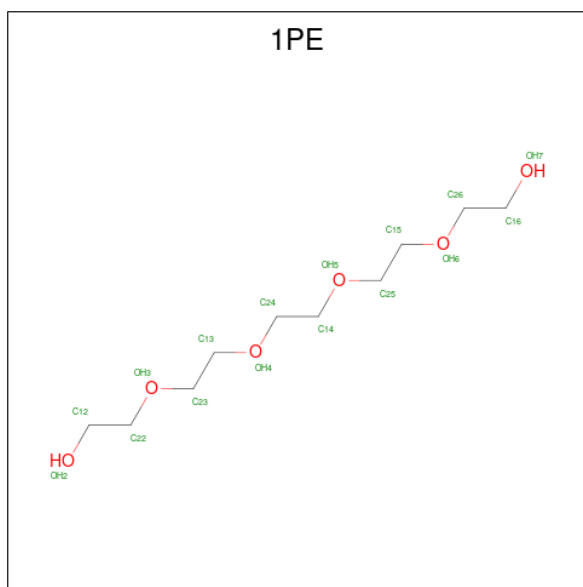
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	B	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 3 is [(2R)-2-heptanoyloxy-3-phosphonoxy-propyl] nonanoate (three-letter code: 7P9) (formula: C₁₉H₃₇O₈P).



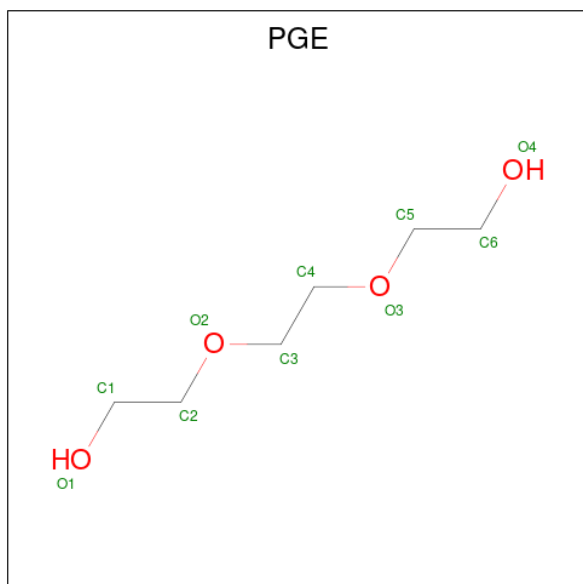
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	O	P	0	0
			28	19	8	1		
3	B	1	Total	C	O	P	0	0
			28	19	8	1		

- Molecule 4 is PENTAETHYLENE GLYCOL (three-letter code: 1PE) (formula: $C_{10}H_{22}O_6$).



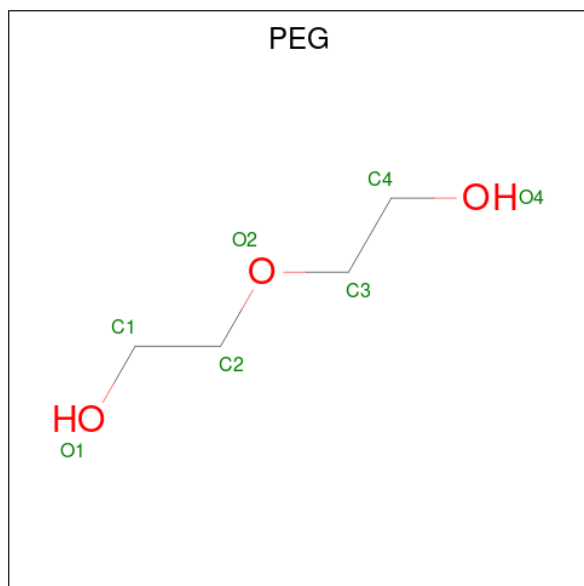
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			16	10	6		

- Molecule 5 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula: $C_6H_{14}O_4$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			10	6	4		
5	A	1	Total	C	O	0	0
			10	6	4		
5	B	1	Total	C	O	0	0
			10	6	4		

- Molecule 6 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: $C_4H_{10}O_3$).



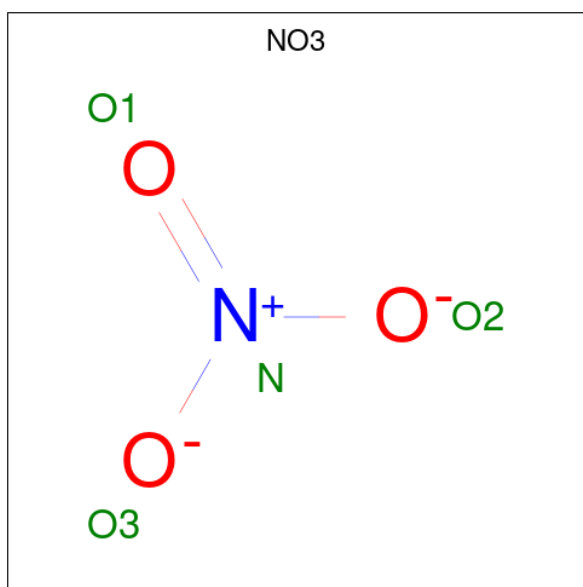
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			7	4	3		
6	A	1	Total	C	O	0	0
			7	4	3		
6	B	1	Total	C	O	0	0
			7	4	3		
6	B	1	Total	C	O	0	0
			7	4	3		
6	B	1	Total	C	O	0	0
			7	4	3		
6	B	1	Total	C	O	0	0
			7	4	3		

- Molecule 7 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 8 is NITRATE ION (three-letter code: NO3) (formula: NO₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	N	O	0	0
			4	1	3		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	B	1	Total	N	O	0	0
			4	1	3		

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	528	Total	O	0	0
			528	528		
9	B	237	Total	O	0	0
			237	237		

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.

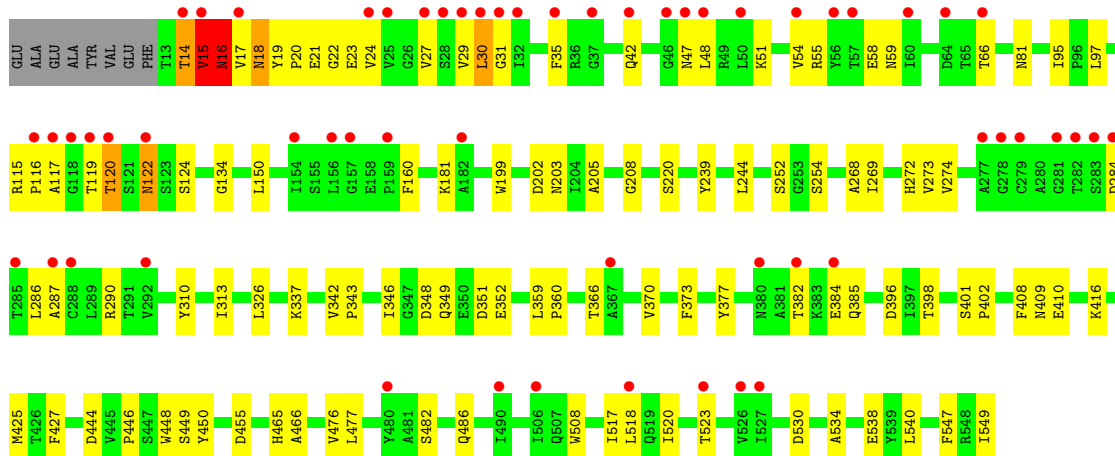
• Molecule 1: STEROL ESTERASE

Chain A:  92% 7%



• Molecule 1: STEROL ESTERASE

Chain B:  10% 78% 19%



4 Data and refinement statistics i

Property	Value	Source
Space group	I 41	Depositor
Cell constants a, b, c, α , β , γ	164.12Å 164.12Å 93.99Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	43.56 – 2.00 47.00 – 2.00	Depositor EDS
% Data completeness (in resolution range)	100.0 (43.56-2.00) 100.0 (47.00-2.00)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.20 (at 2.00Å)	Xtrriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, R_{free}	0.168 , 0.206 0.165 , 0.200	Depositor DCC
R_{free} test set	4204 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å ²)	28.5	Xtrriage
Anisotropy	0.073	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 59.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.023 for -k,-h,-l	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	9295	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.82% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: NAG, 1PE, PGE, GOL, PEG, NO3, 7P9

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	0.43	0/4283	0.55	0/5841
1	B	0.34	0/4243	0.48	0/5786
All	All	0.39	0/8526	0.52	0/11627

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	15	VAL	Peptide
1	B	16[B]	ASN	Peptide

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	4178	0	4089	29	0
1	B	4140	0	4056	89	0
2	A	28	0	26	1	0
2	B	14	0	13	1	0
3	A	28	0	37	5	0
3	B	28	0	37	3	0
4	A	16	0	22	5	0
5	A	20	0	28	0	0
5	B	10	0	14	0	0
6	A	14	0	20	0	0
6	B	28	0	40	0	0
7	A	6	0	8	2	0
7	B	12	0	16	0	0
8	A	4	0	0	1	0
8	B	4	0	0	1	0
9	A	528	0	0	12	0
9	B	237	0	0	10	0
All	All	9295	0	8406	125	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 7.

All (125) 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:B:15:VAL:HG22	1:B:16[B]:ASN:HB2	1.20	1.11
1:B:534:ALA:O	1:B:538:GLU:HG2	1.68	0.92
1:B:120:THR:HG23	1:B:122:ASN:H	1.35	0.91
1:B:30:LEU:H	1:B:30:LEU:HD12	1.33	0.91
1:B:55:ARG:NH2	9:B:2004:HOH:O	2.02	0.90
1:B:18:ASN:ND2	1:B:23:GLU:OE1	2.04	0.90
1:A:391:ASN:OD1	9:A:2393:HOH:O	1.91	0.89
1:B:15:VAL:HG22	1:B:16[B]:ASN:CB	2.05	0.85
1:B:284:ASP:HB3	1:B:287:ALA:HB3	1.56	0.85
1:B:396:ASP:OD1	1:B:398:THR:HG22	1.80	0.81
1:B:30:LEU:H	1:B:30:LEU:CD1	1.95	0.79
1:B:477:LEU:N	3:B:1551:7P9:O8	2.11	0.78
1:B:42:GLN:HB2	1:B:54:VAL:CG2	2.15	0.76
1:B:203:ASN:ND2	9:B:2004:HOH:O	2.19	0.76
1:B:95:ILE:CD1	1:B:97:LEU:HB3	2.16	0.75
1:B:42:GLN:HB2	1:B:54:VAL:HG23	1.67	0.74
7:A:1556:GOL:H2	9:A:2374:HOH:O	1.95	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:A:1557:NO3:O2	9:A:2531:HOH:O	2.09	0.67
2:A:1550:NAG:O7	9:A:2395:HOH:O	2.12	0.67
1:A:293:ASP:OD2	9:A:2340:HOH:O	2.12	0.67
1:B:396:ASP:CG	1:B:398:THR:HG22	2.16	0.65
1:B:29:VAL:HG12	1:B:30:LEU:HD13	1.81	0.63
1:B:15:VAL:CG2	1:B:16[B]:ASN:HB2	2.13	0.62
1:B:19:TYR:HB2	1:B:20:PRO:HD2	1.79	0.62
1:B:19:TYR:HB2	1:B:20:PRO:CD	2.31	0.61
1:B:202:ASP:HB2	9:B:2004:HOH:O	2.01	0.60
1:B:120:THR:HG23	1:B:122:ASN:N	2.10	0.59
1:B:24:VAL:CG1	1:B:35:PHE:CD2	2.86	0.58
1:B:30:LEU:HD12	1:B:30:LEU:N	2.06	0.57
1:A:98[A]:PHE:HZ	3:B:1551:7P9:H103	1.69	0.57
1:B:81:ASN:ND2	8:B:1559:NO3:O3	2.36	0.56
1:B:284:ASP:HB3	1:B:287:ALA:CB	2.30	0.56
1:B:508:TRP:CD2	1:B:518:LEU:HD12	2.41	0.56
1:B:14:THR:HG23	1:B:15:VAL:N	2.20	0.56
1:B:16[B]:ASN:HB3	1:B:17:VAL:HG23	1.87	0.55
1:A:255:VAL:HG13	1:A:330:PRO:HB2	1.89	0.54
1:B:199:TRP:HA	9:B:2004:HOH:O	2.07	0.54
1:B:24:VAL:HG12	1:B:35:PHE:CD2	2.42	0.54
1:B:450:TYR:CD2	1:B:520:ILE:HD12	2.43	0.53
1:A:105:SER:HB2	9:A:2148:HOH:O	2.07	0.53
3:A:1552:7P9:H52C	3:A:1552:7P9:C2	2.38	0.53
1:B:408:PHE:O	1:B:409:ASN:HB2	2.08	0.53
1:B:42:GLN:CB	1:B:54:VAL:HG23	2.36	0.53
3:A:1552:7P9:O2	9:A:2472:HOH:O	2.09	0.52
1:B:15:VAL:HG13	1:B:15:VAL:O	2.08	0.52
1:A:257:PRO:HD2	4:A:1553:1PE:OH6	2.10	0.52
1:B:373:PHE:CE2	1:B:425:MET:HE1	2.44	0.52
1:B:313:ILE:O	1:B:313:ILE:CG2	2.57	0.52
1:A:238:LYS:HE2	9:A:2288:HOH:O	2.08	0.51
1:A:426:THR:HG23	4:A:1553:1PE:H242	1.93	0.51
1:B:120:THR:CG2	1:B:122:ASN:HB2	2.40	0.51
1:B:465:HIS:O	1:B:466:ALA:HB3	2.11	0.51
1:B:29:VAL:HG12	1:B:30:LEU:H	1.75	0.51
1:B:446:PRO:HB2	1:B:448:TRP:CH2	2.46	0.51
1:B:42:GLN:CG	1:B:54:VAL:HG23	2.41	0.51
1:A:510:GLN:NE2	9:A:2495:HOH:O	2.08	0.50
1:B:269:ILE:O	1:B:273:VAL:HG23	2.11	0.50
1:B:410:GLU:OE1	1:B:416:LYS:HG3	2.10	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:54:VAL:HG22	9:B:2013:HOH:O	2.12	0.50
1:A:374:GLN:OE1	1:A:383:LYS:HB2	2.11	0.50
1:A:315:LEU:CD1	4:A:1553:1PE:H131	2.43	0.49
3:A:1552:7P9:H52C	3:A:1552:7P9:HA	1.93	0.49
1:A:257:PRO:CD	4:A:1553:1PE:H162	2.43	0.48
1:B:31:GLY:O	1:B:117:ALA:N	2.40	0.48
1:B:342:VAL:O	1:B:343:PRO:C	2.52	0.48
1:B:450:TYR:HB3	1:B:508:TRP:CZ2	2.48	0.47
1:B:239:TYR:CB	1:B:244:LEU:HD21	2.45	0.47
1:B:382:THR:OG1	1:B:385:GLN:HG3	2.15	0.47
1:A:451:LEU:HD21	7:A:1556:GOL:H11	1.97	0.47
1:B:349:GLN:O	1:B:352:GLU:HG2	2.15	0.47
1:B:401:SER:HA	1:B:402:PRO:C	2.36	0.47
1:B:220:SER:HA	1:B:252:SER:O	2.15	0.46
1:B:29:VAL:HG12	1:B:30:LEU:N	2.29	0.46
1:A:396:ASP:OD2	1:A:398:THR:OG1	2.20	0.46
1:B:517:ILE:HG23	1:B:530:ASP:HB2	1.98	0.45
1:B:220:SER:HB3	9:B:2065:HOH:O	2.15	0.45
1:B:384:GLU:H	1:B:384:GLU:CD	2.19	0.45
1:A:257:PRO:HD2	4:A:1553:1PE:H162	1.98	0.45
1:B:19:TYR:HE2	1:B:21:GLU:HB3	1.81	0.45
1:B:286:LEU:HD12	1:B:286:LEU:O	2.16	0.45
1:A:408:PHE:O	1:A:409:ASN:HB2	2.16	0.45
1:B:348:ASP:OD1	1:B:427:PHE:HB3	2.17	0.45
1:B:366:THR:O	1:B:370:VAL:HG23	2.17	0.44
1:B:47:ASN:HB2	9:B:2019:HOH:O	2.17	0.44
1:A:63:LYS:HB2	9:A:2083:HOH:O	2.18	0.44
1:A:465:HIS:O	1:A:466:ALA:HB3	2.16	0.44
1:A:134:GLY:HA3	1:A:138:LEU:O	2.17	0.44
1:B:24:VAL:CG1	1:B:35:PHE:HD2	2.29	0.44
1:B:540:LEU:HD12	1:B:547:PHE:CE2	2.52	0.44
1:A:401:SER:O	1:A:416:LYS:HA	2.18	0.44
1:B:51:LYS:HD3	1:B:290:ARG:NH2	2.33	0.44
1:B:359:LEU:N	1:B:360:PRO:CD	2.81	0.44
1:B:27:VAL:HG23	1:B:66:THR:HA	2.00	0.43
1:B:115:ARG:HD2	1:B:119:THR:HB	2.01	0.43
1:A:401:SER:HA	1:A:402:PRO:C	2.38	0.43
1:B:346:ILE:O	1:B:449:SER:HA	2.18	0.43
1:B:22:GLY:HA2	1:B:59:ASN:HD21	1.83	0.43
1:B:29:VAL:HG12	1:B:30:LEU:CD1	2.48	0.43
1:B:351:ASP:OD1	1:B:402:PRO:HA	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:444:ASP:OD1	9:B:2203:HOH:O	2.22	0.43
1:B:482[B]:SER:O	1:B:486:GLN:HG3	2.19	0.43
1:B:268:ALA:O	1:B:272:HIS:ND1	2.52	0.43
1:B:455:ASP:OD1	3:B:1551:7P9:H32C	2.19	0.42
1:B:29:VAL:O	1:B:31:GLY:N	2.53	0.42
1:B:313:ILE:O	1:B:313:ILE:HG22	2.19	0.42
1:A:12:PHE:HA	9:A:2001:HOH:O	2.19	0.42
1:B:205:ALA:O	1:B:208:GLY:N	2.45	0.42
1:B:377:TYR:O	1:B:549:ILE:HD12	2.19	0.42
1:A:93:ILE:HG23	1:A:98[B]:PHE:CE2	2.55	0.42
1:B:373:PHE:CZ	1:B:425:MET:HE1	2.54	0.42
1:B:476:VAL:HA	1:B:477:LEU:HA	1.78	0.42
1:B:115:ARG:HB2	1:B:116:PRO:HD2	2.03	0.41
1:A:344:MET:O	1:A:447:SER:HA	2.20	0.41
1:A:511:TRP:CZ2	1:A:515:LYS:HG2	2.55	0.41
1:B:239:TYR:HB2	1:B:244:LEU:HD21	2.03	0.41
1:B:326:LEU:HD12	1:B:326:LEU:HA	1.88	0.41
1:A:476:VAL:HG12	3:A:1552:7P9:H151	2.02	0.41
1:B:48:LEU:HG	9:B:2016:HOH:O	2.20	0.41
1:B:150:LEU:CD2	1:B:160:PHE:O	2.69	0.41
1:B:181:LYS:NZ	9:B:2084:HOH:O	2.50	0.41
3:A:1552:7P9:H152	3:A:1552:7P9:O7	2.21	0.40
1:A:219:GLU:HA	1:A:251:ASN:O	2.21	0.40
1:A:443:PRO:HD2	9:A:2453:HOH:O	2.22	0.40
1:A:351:ASP:OD1	1:A:402:PRO:HA	2.21	0.40
1:B:310:TYR:CE1	2:B:1550:NAG:H5	2.55	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	542/545 (99%)	525 (97%)	16 (3%)	1 (0%)	47	44
1	B	538/545 (99%)	503 (94%)	29 (5%)	6 (1%)	14	8
All	All	1080/1090 (99%)	1028 (95%)	45 (4%)	7 (1%)	25	19

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	16[A]	ASN
1	B	16[B]	ASN
1	B	30	LEU
1	A	254	SER
1	B	254	SER
1	B	15	VAL
1	B	134	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	449/448 (100%)	449 (100%)	0	100	100
1	B	445/448 (99%)	434 (98%)	11 (2%)	47	49
All	All	894/896 (100%)	883 (99%)	11 (1%)	73	76

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	14	THR
1	B	16[A]	ASN
1	B	16[B]	ASN
1	B	18	ASN
1	B	58	GLU
1	B	120	THR
1	B	122	ASN
1	B	124	SER
1	B	274	VAL

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Mol	Chain	Res	Type
1	B	337	LYS
1	B	523	THR

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

Mol	Chain	Res	Type
1	B	18	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](#)

20 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$
3	7P9	B	1551	-	27,27,27	1.85	4 (14%)	31,32,32	2.02	5 (16%)
2	NAG	B	1550	1	14,14,15	0.44	0	17,19,21	0.93	1 (5%)
2	NAG	A	1550	1	14,14,15	0.50	0	17,19,21	1.14	2 (11%)
2	NAG	A	1551	1	14,14,15	0.55	0	17,19,21	1.07	1 (5%)
4	1PE	A	1553	-	15,15,15	0.69	0	14,14,14	1.57	2 (14%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	PEG	A	1555	-	6,6,6	0.67	0	5,5,5	1.71	1 (20%)
7	GOL	B	1558	-	5,5,5	0.33	0	5,5,5	0.59	0
6	PEG	B	1552	-	6,6,6	0.74	0	5,5,5	1.48	0
7	GOL	B	1557	-	5,5,5	0.39	0	5,5,5	0.19	0
5	PGE	A	1554	-	9,9,9	0.87	1 (11%)	8,8,8	1.52	0
8	NO3	A	1557	-	1,3,3	3.49	1 (100%)	0,3,3	-	-
6	PEG	B	1553	-	6,6,6	0.74	0	5,5,5	1.55	1 (20%)
5	PGE	A	1558	-	9,9,9	0.88	0	8,8,8	1.55	0
3	7P9	A	1552	-	27,27,27	1.82	4 (14%)	31,32,32	2.02	8 (25%)
6	PEG	A	1559	-	6,6,6	0.70	0	5,5,5	1.61	1 (20%)
7	GOL	A	1556	-	5,5,5	0.36	0	5,5,5	0.16	0
8	NO3	B	1559	-	1,3,3	3.60	1 (100%)	0,3,3	-	-
5	PGE	B	1556	-	9,9,9	0.85	0	8,8,8	1.63	0
6	PEG	B	1555	-	6,6,6	0.73	0	5,5,5	1.52	0
6	PEG	B	1554	-	6,6,6	0.78	0	5,5,5	1.39	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
6	PEG	A	1559	-	-	2/4/4/4	-
7	GOL	A	1556	-	-	3/4/4/4	-
5	PGE	A	1558	-	-	2/7/7/7	-
6	PEG	A	1555	-	-	1/4/4/4	-
7	GOL	B	1558	-	-	2/4/4/4	-
6	PEG	B	1552	-	-	1/4/4/4	-
7	GOL	B	1557	-	-	2/4/4/4	-
5	PGE	A	1554	-	-	3/7/7/7	-
6	PEG	B	1554	-	-	1/4/4/4	-
3	7P9	B	1551	-	-	16/29/29/29	-
2	NAG	B	1550	1	-	0/6/23/26	0/1/1/1
6	PEG	B	1555	-	-	1/4/4/4	-
5	PGE	B	1556	-	-	3/7/7/7	-
6	PEG	B	1553	-	-	1/4/4/4	-
2	NAG	A	1550	1	-	4/6/23/26	0/1/1/1
2	NAG	A	1551	1	-	2/6/23/26	0/1/1/1
3	7P9	A	1552	-	-	21/29/29/29	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	1PE	A	1553	-	-	10/13/13/13	-

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1551	7P9	O6-C4	5.21	1.38	1.22
3	B	1551	7P9	O8-C12	5.21	1.38	1.22
3	A	1552	7P9	O6-C4	5.13	1.37	1.22
3	A	1552	7P9	O8-C12	5.12	1.37	1.22
3	B	1551	7P9	O7-C2	-3.93	1.36	1.46
3	A	1552	7P9	O7-C2	-3.68	1.37	1.46
8	B	1559	NO3	O1-N	3.60	1.40	1.24
8	A	1557	NO3	O1-N	3.49	1.40	1.24
3	A	1552	7P9	O5-C3	-2.99	1.38	1.45
3	B	1551	7P9	O5-C3	-2.91	1.38	1.45
5	A	1554	PGE	O2-C2	-2.00	1.33	1.42

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1551	7P9	O7-C12-O8	-6.15	108.83	123.70
3	B	1551	7P9	O5-C4-O6	-5.38	110.02	123.59
3	A	1552	7P9	O5-C4-O6	-5.03	110.91	123.59
3	A	1552	7P9	O7-C12-O8	-4.71	112.31	123.70
3	A	1552	7P9	O8-C12-C13	-4.45	106.39	123.73
3	B	1551	7P9	O6-C4-C5	-4.12	107.66	123.73
3	B	1551	7P9	O5-C3-C2	4.04	120.19	108.43
3	A	1552	7P9	O6-C4-C5	-3.95	108.33	123.73
3	A	1552	7P9	O5-C3-C2	3.80	119.49	108.43
3	B	1551	7P9	O8-C12-C13	-3.51	110.02	123.73
2	A	1551	NAG	C2-N2-C7	-2.76	118.98	122.90
3	A	1552	7P9	C15-C14-C13	2.49	122.14	113.19
2	A	1550	NAG	C1-O5-C5	2.47	115.54	112.19
2	B	1550	NAG	O5-C5-C6	2.34	110.87	107.20
4	A	1553	1PE	C23-OH3-C22	2.34	123.41	113.29
6	A	1555	PEG	O2-C2-C1	2.15	119.52	110.07
6	B	1553	PEG	O2-C2-C1	2.11	119.36	110.07
3	A	1552	7P9	C2-O7-C12	2.11	122.99	117.79
3	A	1552	7P9	O7-C12-C13	-2.08	107.02	111.50
2	A	1550	NAG	C8-C7-N2	2.07	119.60	116.10
6	A	1559	PEG	O2-C2-C1	2.03	118.97	110.07
4	A	1553	1PE	C26-OH6-C15	2.01	122.00	113.29

There are no chirality outliers.

All (75) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1552	7P9	C1-O4-P1-O1
3	A	1552	7P9	C1-O4-P1-O2
3	A	1552	7P9	C5-C4-O5-C3
3	A	1552	7P9	O8-C12-O7-C2
3	B	1551	7P9	C1-O4-P1-O1
3	B	1551	7P9	C1-O4-P1-O2
3	B	1551	7P9	O8-C12-O7-C2
7	B	1557	GOL	C1-C2-C3-O3
7	B	1557	GOL	O2-C2-C3-O3
7	B	1558	GOL	O1-C1-C2-C3
3	A	1552	7P9	C2-C3-O5-C4
4	A	1553	1PE	C15-C25-OH5-C14
4	A	1553	1PE	C25-C15-OH6-C26
5	A	1558	PGE	C3-C4-O3-C5
3	A	1552	7P9	O6-C4-O5-C3
4	A	1553	1PE	OH4-C13-C23-OH3
2	A	1550	NAG	C8-C7-N2-C2
2	A	1550	NAG	O7-C7-N2-C2
3	B	1551	7P9	C13-C12-O7-C2
3	A	1552	7P9	C4-C5-C6-C7
6	A	1559	PEG	O2-C3-C4-O4
3	A	1552	7P9	C16-C17-C18-C19
7	A	1556	GOL	O1-C1-C2-C3
7	A	1556	GOL	C1-C2-C3-O3
3	A	1552	7P9	C5-C6-C7-C8
7	B	1558	GOL	O1-C1-C2-O2
3	B	1551	7P9	C4-C5-C6-C7
5	B	1556	PGE	O1-C1-C2-O2
2	A	1551	NAG	C8-C7-N2-C2
3	A	1552	7P9	C13-C12-O7-C2
3	A	1552	7P9	C14-C15-C16-C17
3	A	1552	7P9	C12-C13-C14-C15
4	A	1553	1PE	OH5-C14-C24-OH4
4	A	1553	1PE	OH7-C16-C26-OH6
6	B	1554	PEG	O2-C3-C4-O4
3	A	1552	7P9	C7-C8-C9-C10
2	A	1550	NAG	C4-C5-C6-O6
4	A	1553	1PE	OH6-C15-C25-OH5
3	A	1552	7P9	C1-O4-P1-O3
3	A	1552	7P9	C17-C18-C19-C11

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Mol	Chain	Res	Type	Atoms
3	B	1551	7P9	C5-C4-O5-C3
6	B	1555	PEG	O1-C1-C2-O2
5	A	1558	PGE	O2-C3-C4-O3
3	A	1552	7P9	C1-C2-C3-O5
5	A	1554	PGE	C4-C3-O2-C2
6	A	1559	PEG	C1-C2-O2-C3
3	B	1551	7P9	O4-C1-C2-O7
4	A	1553	1PE	C12-C22-OH3-C23
4	A	1553	1PE	C24-C14-OH5-C25
6	A	1555	PEG	C4-C3-O2-C2
6	B	1552	PEG	C1-C2-O2-C3
6	B	1553	PEG	C1-C2-O2-C3
3	A	1552	7P9	O7-C2-C3-O5
3	B	1551	7P9	C14-C15-C16-C17
2	A	1551	NAG	O7-C7-N2-C2
2	A	1550	NAG	O5-C5-C6-O6
4	A	1553	1PE	C13-C23-OH3-C22
3	B	1551	7P9	O4-C1-C2-C3
5	A	1554	PGE	O1-C1-C2-O2
3	A	1552	7P9	C1-C2-O7-C12
5	B	1556	PGE	C1-C2-O2-C3
3	B	1551	7P9	C7-C8-C9-C10
3	B	1551	7P9	O6-C4-O5-C3
4	A	1553	1PE	C23-C13-OH4-C24
3	A	1552	7P9	O6-C4-C5-C6
3	A	1552	7P9	O7-C12-C13-C14
7	A	1556	GOL	O2-C2-C3-O3
3	B	1551	7P9	C1-O4-P1-O3
3	B	1551	7P9	C12-C13-C14-C15
3	B	1551	7P9	O8-C12-C13-C14
3	B	1551	7P9	O6-C4-C5-C6
5	B	1556	PGE	O2-C3-C4-O3
5	A	1554	PGE	O2-C3-C4-O3
3	A	1552	7P9	O8-C12-C13-C14
3	B	1551	7P9	O7-C12-C13-C14

There are no ring outliers.

8 monomers are involved in 19 short contacts:

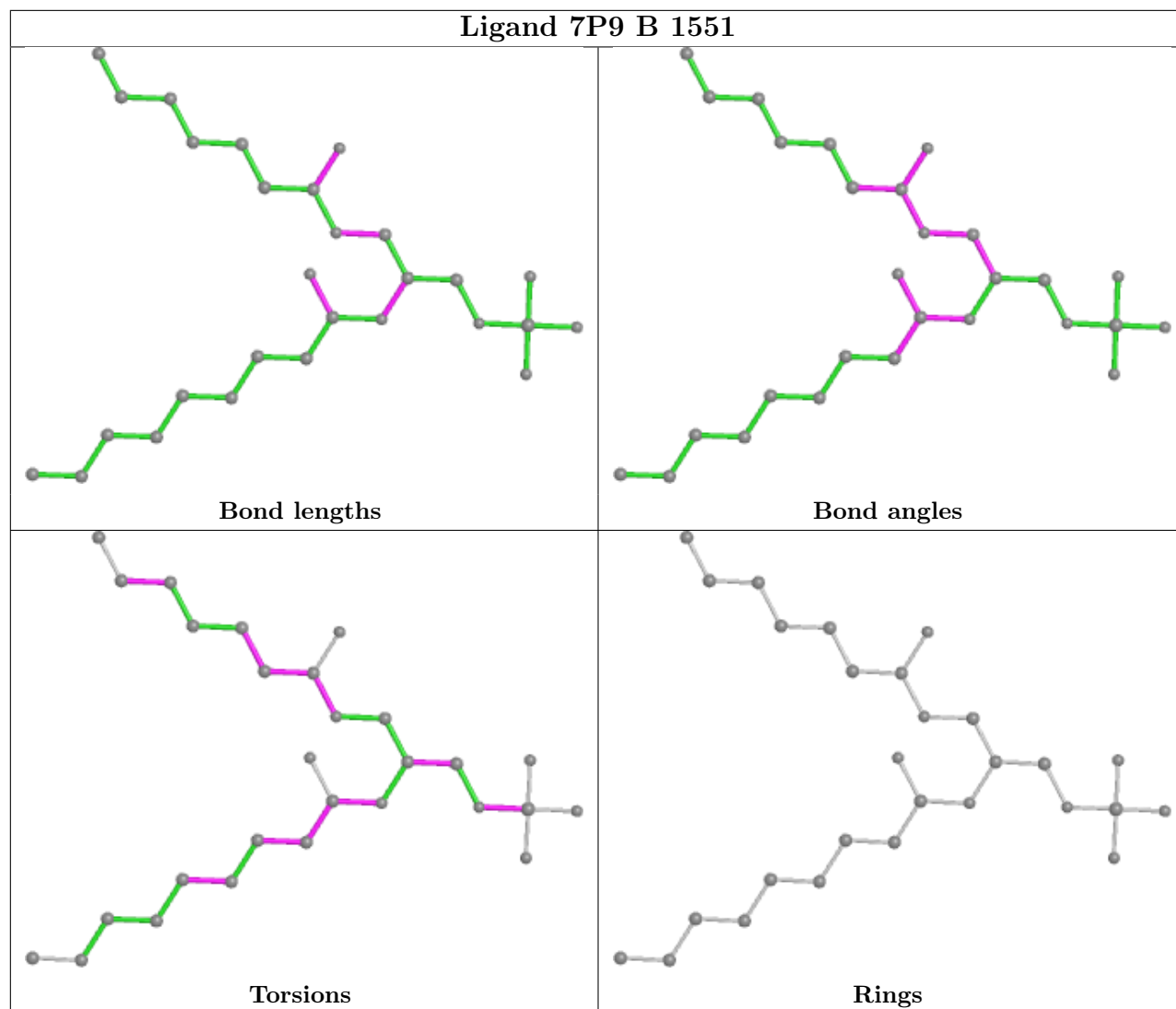
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	1551	7P9	3	0
2	B	1550	NAG	1	0

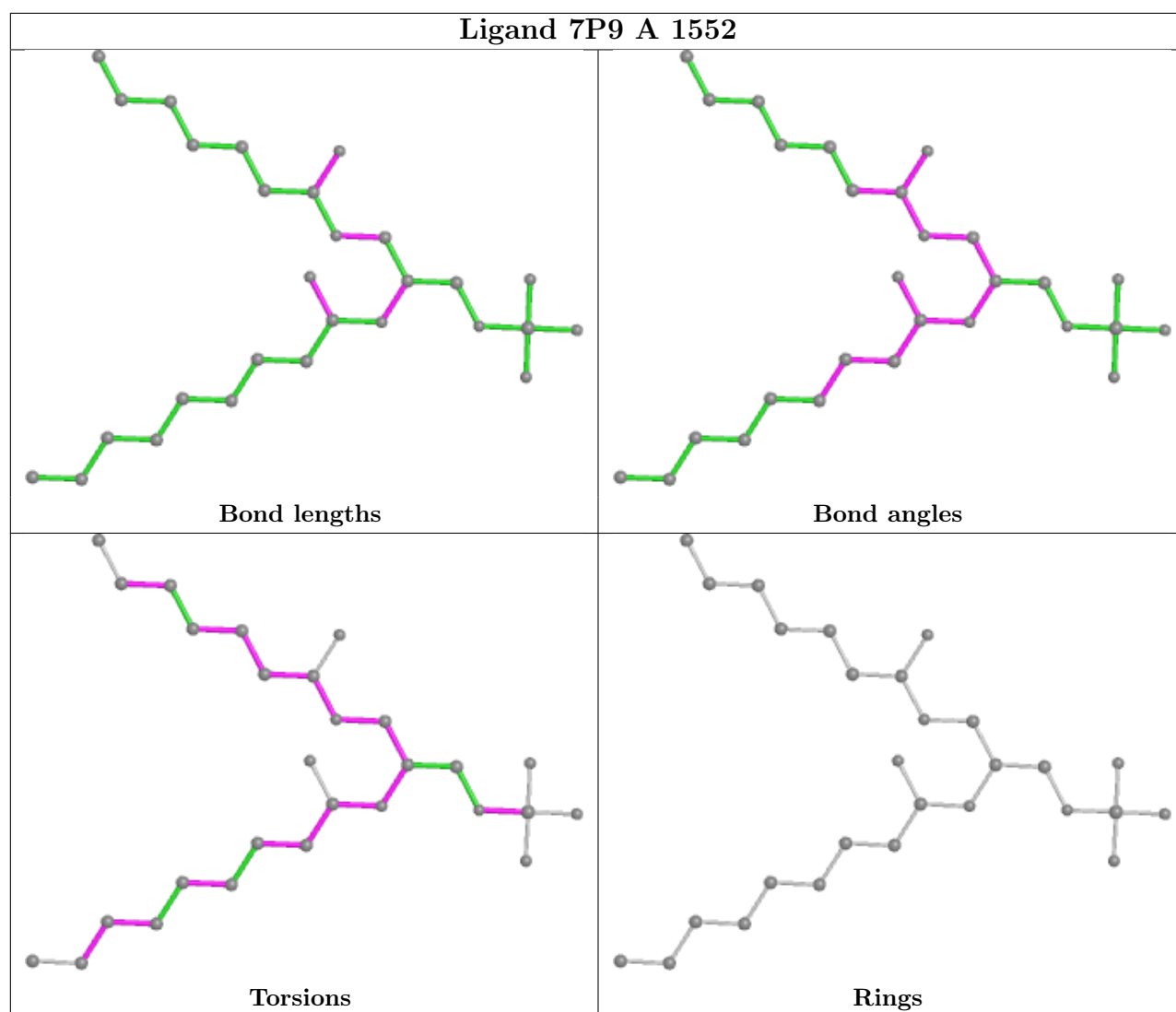
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1550	NAG	1	0
4	A	1553	1PE	5	0
8	A	1557	NO3	1	0
3	A	1552	7P9	5	0
7	A	1556	GOL	2	0
8	B	1559	NO3	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





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, 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	538/545 (98%)	-0.44	0 100 100	13, 22, 35, 54	0
1	B	537/545 (98%)	0.34	57 (10%) 6 5	24, 43, 67, 91	0
All	All	1075/1090 (98%)	-0.05	57 (5%) 26 25	13, 32, 62, 91	0

All (57) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	29	VAL	6.3
1	B	154	ILE	5.4
1	B	31	GLY	4.9
1	B	278	GLY	4.6
1	B	27	VAL	4.5
1	B	17	VAL	4.2
1	B	122	ASN	4.1
1	B	47	ASN	3.7
1	B	32	ILE	3.7
1	B	24	VAL	3.7
1	B	15	VAL	3.4
1	B	285	THR	3.3
1	B	117	ALA	3.2
1	B	277	ALA	3.2
1	B	279	CYS	3.2
1	B	282	THR	3.2
1	B	35	PHE	3.1
1	B	156	LEU	3.1
1	B	288	CYS	3.1
1	B	14	THR	3.1
1	B	57	THR	2.9
1	B	281	GLY	2.9
1	B	526	VAL	2.9
1	B	118	GLY	2.8

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Mol	Chain	Res	Type	RSRZ
1	B	64	ASP	2.8
1	B	116	PRO	2.8
1	B	56	TYR	2.6
1	B	66	THR	2.6
1	B	292	VAL	2.6
1	B	284	ASP	2.6
1	B	384	GLU	2.6
1	B	380	ASN	2.6
1	B	283	SER	2.5
1	B	54	VAL	2.5
1	B	50	LEU	2.4
1	B	287	ALA	2.4
1	B	120	THR	2.4
1	B	367	ALA	2.4
1	B	523	THR	2.4
1	B	60	ILE	2.3
1	B	37	GLY	2.3
1	B	157	GLY	2.3
1	B	382	THR	2.3
1	B	42	GLN	2.3
1	B	48	LEU	2.3
1	B	490	ILE	2.3
1	B	527	ILE	2.2
1	B	518	LEU	2.2
1	B	119	THR	2.1
1	B	46	GLY	2.1
1	B	30	LEU	2.1
1	B	506	ILE	2.1
1	B	182	ALA	2.0
1	B	28	SER	2.0
1	B	480	TYR	2.0
1	B	159	PRO	2.0
1	B	25	VAL	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

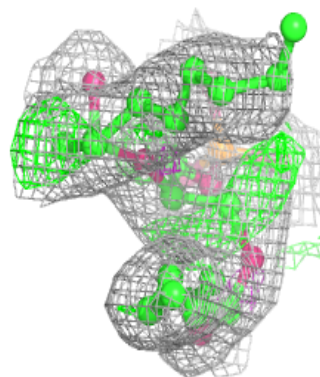
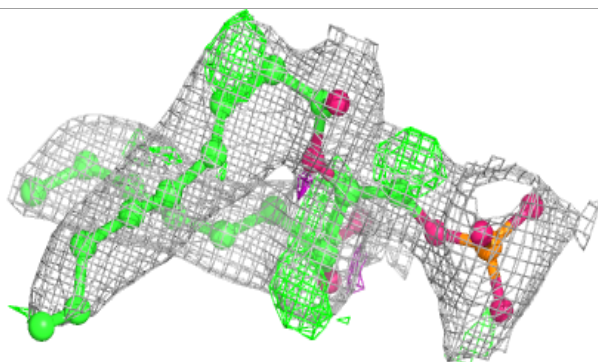
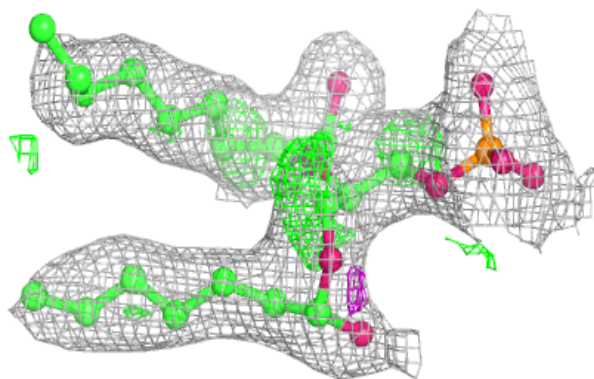
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	PGE	B	1556	10/10	0.55	0.41	66,71,73,74	0
6	PEG	A	1555	7/7	0.58	0.39	67,71,75,76	0
6	PEG	B	1553	7/7	0.60	0.54	88,89,91,93	0
5	PGE	A	1558	10/10	0.68	0.33	62,70,79,80	0
6	PEG	B	1555	7/7	0.70	0.54	87,88,91,91	0
6	PEG	B	1552	7/7	0.72	0.32	60,64,72,75	0
6	PEG	A	1559	7/7	0.73	0.38	70,77,85,87	0
8	NO3	B	1559	4/4	0.73	0.16	80,83,84,84	0
7	GOL	B	1557	6/6	0.77	0.18	59,63,65,65	0
4	1PE	A	1553	16/16	0.77	0.24	47,64,81,82	0
7	GOL	B	1558	6/6	0.79	0.14	41,49,52,53	0
5	PGE	A	1554	10/10	0.81	0.32	69,72,76,77	0
3	7P9	A	1552	28/28	0.83	0.16	23,51,59,66	0
3	7P9	B	1551	28/28	0.83	0.16	55,61,85,91	0
8	NO3	A	1557	4/4	0.86	0.17	42,54,58,62	0
2	NAG	B	1550	14/15	0.86	0.17	57,67,75,75	0
6	PEG	B	1554	7/7	0.87	0.17	74,75,83,84	0
7	GOL	A	1556	6/6	0.91	0.13	27,49,51,62	0
2	NAG	A	1550	14/15	0.92	0.11	39,44,53,59	0
2	NAG	A	1551	14/15	0.93	0.10	29,36,51,56	0

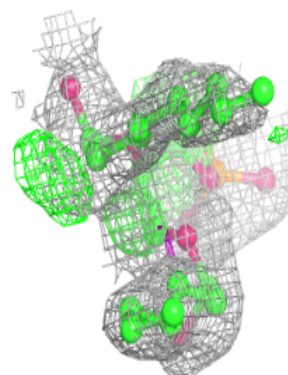
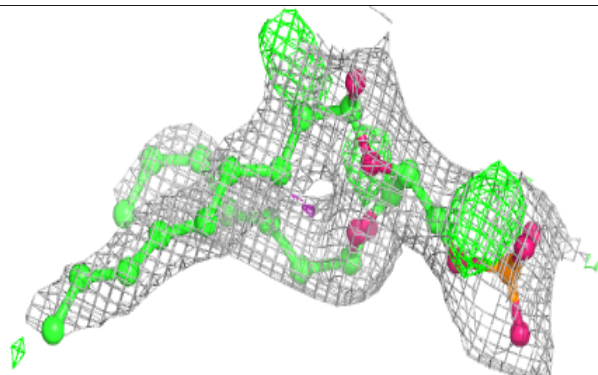
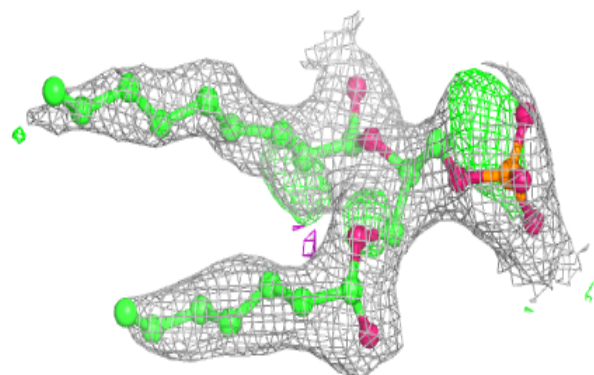
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around 7P9 A 1552:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

**Electron density around 7P9 B 1551:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers [i](#)

There are no such residues in this entry.