



Full wwPDB X-ray Structure Validation Report

Mar 1, 2014 – 12:43 AM GMT

PDB ID : 3N1Z
Title : X-ray Crystal Structure of Toluene/o-Xylene Monooxygenase Hydroxylase
T201S Mutant
Authors : McCormick, M.S.; Sazinsky, M.H.; Lippard, S.J.
Deposited on : 2010-05-17
Resolution : 2.90 Å(reported)

This is a full wwPDB validation report for a publicly released PDB entry.
We welcome your comments at validation@mail.wwpdb.org
A user guide is available at <http://wwpdb.org/ValidationPDFNotes.html>

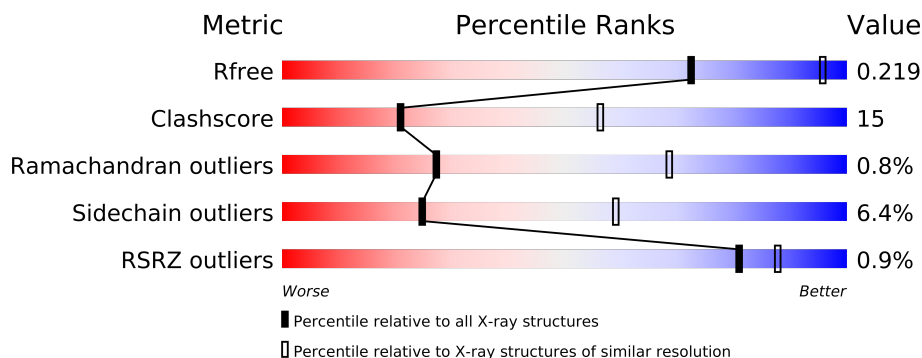
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.15 2013
Xtriage (Phenix) : dev-1323
EDS : stable22639
Percentile statistics : 21963
Refmac : 5.8.0049
CCP4 : 6.3.0 (Settle)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : stable22683

1 Overall quality at a glance

The reported resolution of this entry is 2.90 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}	66092	1053 (2.90-2.90)
Clashscore	79885	1326 (2.90-2.90)
Ramachandran outliers	78287	1290 (2.90-2.90)
Sidechain outliers	78261	1292 (2.90-2.90)
RSRZ outliers	66119	1054 (2.90-2.90)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	498	
2	B	330	
3	C	86	

The following table lists non-polymeric compounds that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Geometry	Electron density
5	P6G	A	501	-	X
5	P6G	A	502	-	X

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 7491 atoms, of which 0 are hydrogen and 0 are deuterium.

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 Toluene o-xylene monooxygenase component.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	491	Total	C	N	O	S	0	0	0
			4015	2563	673	753	26			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	201	SER	THR	ENGINEERED MUTATION	UNP Q6IV66

- Molecule 2 is a protein called Toluene o-xylene monooxygenase component.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	322	Total	C	N	O	S	0	0	0
			2641	1674	467	490	10			

- Molecule 3 is a protein called Toluene o-xylene monooxygenase component.

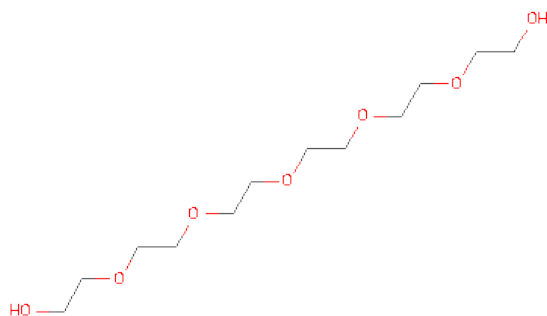
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	83	Total	C	N	O	S	0	0	0
			676	425	120	126	5			

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

- Molecule 5 is HEXAETHYLENE GLYCOL (three-letter code: P6G) (formula: $C_{12}H_{26}O_7$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			19	12	7		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			19	12	7		

- Molecule 6 is FE (III) ION (three-letter code: FE) (formula: Fe).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	2	Total	Fe	0	0
			2	2		

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	48	Total	O	0	0
			48	48		
7	B	44	Total	O	0	0
			44	44		
7	C	9	Total	O	0	0
			9	9		

4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	182.83Å 182.83Å 68.86Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	50.00 – 2.90 45.71 – 2.90	Depositor EDS
% Data completeness (in resolution range)	100.0 (50.00-2.90) 100.0 (45.71-2.90)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	7.28 (at 2.91Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.184 , 0.225 0.181 , 0.219	Depositor DCC
R_{free} test set	1480 reflections (5.01%)	DCC
Wilson B-factor (Å ²)	31.2	Xtriage
Anisotropy	0.988	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 13.6	EDS
Estimated twinning fraction	0.028 for -h,-k,l	Xtriage
L-test for twinning	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Outliers	0 of 29597 reflections	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	7491	wwPDB-VP
Average B, all atoms (Å ²)	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.10% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, FE, P6G

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	0.40	0/4139	0.66	2/5625 (0.0%)
2	B	0.40	0/2713	0.64	0/3688
3	C	0.39	0/690	0.66	0/934
All	All	0.40	0/7542	0.65	2/10247 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	283	LEU	CA-CB-CG	5.41	127.73	115.30
1	A	393	LEU	CA-CB-CG	5.17	127.19	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4015	0	3764	135	0
2	B	2641	0	2537	83	0
3	C	676	0	667	31	0
4	A	12	0	16	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	6	0	8	1	0
5	A	38	0	52	8	0
6	A	2	0	0	0	0
7	A	48	0	0	2	0
7	B	44	0	0	0	0
7	C	9	0	0	0	0
All	All	7491	0	7044	223	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 15.

All (223) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:367:ASP:HB3	1:A:410:ASN:ND2	1.65	1.09
3:C:63:PRO:HD2	3:C:66:MET:HE3	1.35	1.09
2:B:21:ASN:O	2:B:22:ARG:HB2	1.60	0.99
2:B:318:LYS:O	2:B:322:ARG:HG3	1.67	0.93
1:A:464:LEU:HD22	5:A:502:P6G:H111	1.53	0.91
1:A:393:LEU:HD22	5:A:502:P6G:H121	1.50	0.90
1:A:2:SER:N	2:B:105:ASN:HD22	1.72	0.88
1:A:416:ASP:OD2	1:A:427:HIS:HD2	1.57	0.87
1:A:425:LEU:HD23	3:C:76:THR:HG22	1.55	0.87
1:A:367:ASP:HB3	1:A:410:ASN:HD21	1.40	0.86
1:A:113:ARG:HH11	2:B:144:GLN:HE21	1.23	0.85
1:A:427:HIS:CE1	3:C:76:THR:HG23	2.12	0.85
1:A:427:HIS:HE1	3:C:76:THR:HG23	1.41	0.84
2:B:188:ARG:HH11	2:B:188:ARG:HG2	1.45	0.81
2:B:188:ARG:HH11	2:B:188:ARG:CG	1.95	0.80
1:A:427:HIS:HE1	3:C:76:THR:CG2	1.93	0.79
2:B:168:HIS:HD2	2:B:257:GLN:HE21	1.30	0.77
1:A:351:SER:OG	1:A:354:GLU:HG3	1.85	0.76
1:A:394:PRO:HG3	5:A:502:P6G:H182	1.67	0.76
1:A:47:TYR:CE1	1:A:240:PRO:HB2	2.22	0.74
1:A:78:ARG:HG3	1:A:78:ARG:HH11	1.52	0.73
2:B:21:ASN:O	2:B:22:ARG:CB	2.38	0.71
1:A:338:TRP:CD1	1:A:390:PRO:HG3	2.25	0.71
1:A:398:ASN:HD22	1:A:427:HIS:H	1.38	0.69
1:A:113:ARG:HH11	2:B:144:GLN:NE2	1.91	0.68
1:A:416:ASP:OD2	1:A:427:HIS:CD2	2.45	0.68
1:A:139:GLN:HE22	2:B:83:TYR:H	1.42	0.67
2:B:162:HIS:HE1	2:B:227:LYS:HZ2	1.42	0.67
2:B:24:ARG:O	2:B:24:ARG:HG2	1.94	0.67

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
3:C:39:ILE:CG2	3:C:45:PRO:HG3	2.25	0.67
2:B:34:ASN:HD22	2:B:34:ASN:N	1.93	0.66
2:B:301:GLU:HA	2:B:314:ILE:HD13	1.79	0.65
3:C:63:PRO:CD	3:C:66:MET:HE3	2.22	0.64
1:A:182:THR:HA	2:B:54:MET:HG2	1.79	0.64
2:B:168:HIS:CD2	2:B:257:GLN:HE21	2.15	0.63
1:A:491:TYR:O	1:A:492:GLN:HB2	1.98	0.63
1:A:8:ASP:O	2:B:174:ARG:NH2	2.32	0.63
1:A:140:ILE:HG21	1:A:227:ILE:HD11	1.81	0.63
1:A:314:PRO:HD2	1:A:317:TRP:CE3	2.34	0.62
1:A:398:ASN:ND2	1:A:427:HIS:H	1.98	0.62
2:B:21:ASN:N	2:B:21:ASN:OD1	2.31	0.62
1:A:2:SER:N	2:B:105:ASN:ND2	2.46	0.62
1:A:137:HIS:CD2	1:A:227:ILE:HD12	2.34	0.62
1:A:336:TRP:O	1:A:339:ARG:HB2	1.99	0.62
1:A:489:LYS:HG3	1:A:489:LYS:O	2.00	0.61
2:B:305:SER:HB3	2:B:314:ILE:HD11	1.82	0.61
1:A:367:ASP:CB	1:A:410:ASN:HD21	2.12	0.61
1:A:417:TYR:CE2	1:A:430:SER:HA	2.36	0.61
2:B:164:ARG:NH2	2:B:260:ASP:OD2	2.35	0.60
1:A:339:ARG:HB3	1:A:340:PRO:CD	2.30	0.60
1:A:460:GLN:HA	1:A:461:PRO:C	2.22	0.60
1:A:339:ARG:HG2	1:A:480:ASP:HA	1.82	0.60
2:B:14:THR:HG23	2:B:15:TRP:O	2.01	0.59
1:A:253:GLU:N	1:A:253:GLU:OE1	2.33	0.59
1:A:294:MET:O	1:A:299:VAL:HG23	2.02	0.59
1:A:391:GLU:HA	1:A:464:LEU:HD11	1.85	0.59
1:A:339:ARG:HB3	1:A:340:PRO:HD3	1.85	0.59
1:A:203:MET:HG2	1:A:297:TRP:HB3	1.84	0.59
1:A:137:HIS:O	1:A:141:GLN:HB2	2.02	0.58
1:A:368:THR:HA	1:A:409:GLY:HA3	1.84	0.58
1:A:344:TRP:O	1:A:346:PRO:HD3	2.04	0.58
1:A:95:LEU:HD13	1:A:344:TRP:CZ3	2.39	0.57
1:A:95:LEU:HD23	1:A:276:ILE:HD11	1.86	0.57
1:A:416:ASP:H	3:C:56:HIS:CE1	2.22	0.57
2:B:204:GLU:OE1	2:B:298:LYS:NZ	2.37	0.57
2:B:162:HIS:HE1	2:B:227:LYS:NZ	2.03	0.57
2:B:81:LEU:HD11	2:B:263:ARG:HD2	1.87	0.57
1:A:47:TYR:HB3	1:A:120:ALA:HB1	1.86	0.56
2:B:23:ARG:O	2:B:23:ARG:HG2	2.05	0.56
2:B:314:ILE:O	2:B:318:LYS:HB2	2.06	0.56
2:B:33:THR:HB	2:B:34:ASN:HD22	1.71	0.56

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:272:LEU:O	1:A:276:ILE:HD13	2.05	0.56
1:A:345:ASP:O	1:A:482:ALA:HB2	2.06	0.56
2:B:20:GLY:C	2:B:21:ASN:OD1	2.44	0.56
2:B:34:ASN:ND2	2:B:34:ASN:N	2.54	0.55
2:B:166:LEU:HD22	2:B:166:LEU:O	2.06	0.55
2:B:188:ARG:CG	2:B:188:ARG:NH1	2.61	0.55
1:A:418:GLN:HE22	3:C:78:THR:H	1.53	0.55
1:A:416:ASP:H	3:C:56:HIS:HE1	1.55	0.55
2:B:45:PRO:HG2	2:B:55:GLN:OE1	2.07	0.55
1:A:93:MET:SD	4:A:500:GOL:H12	2.46	0.55
2:B:304:CYS:HB2	2:B:314:ILE:HG12	1.89	0.55
2:B:59:LYS:HA	2:B:63:PHE:HD2	1.72	0.54
1:A:35:GLY:O	1:A:37:ARG:HG3	2.08	0.54
2:B:174:ARG:HD3	2:B:174:ARG:O	2.07	0.54
2:B:282:ARG:O	2:B:286:GLN:HG3	2.07	0.54
1:A:299:VAL:O	1:A:303:GLU:HG3	2.08	0.54
1:A:24:THR:OG1	1:A:27:GLU:HG3	2.07	0.54
1:A:153:ARG:NH1	2:B:12:LEU:HD22	2.23	0.53
1:A:366:ASN:HA	1:A:370:GLY:HA3	1.90	0.53
1:A:105:TYR:O	1:A:108:SER:HB3	2.08	0.53
3:C:9:ASN:HB2	3:C:16:ILE:HG12	1.90	0.53
2:B:24:ARG:O	2:B:24:ARG:CG	2.56	0.53
1:A:7:GLU:H	1:A:7:GLU:CD	2.12	0.53
3:C:23:THR:HA	3:C:68:VAL:HB	1.92	0.52
1:A:139:GLN:HE22	2:B:82:VAL:HG13	1.74	0.52
1:A:359:GLU:HB2	1:A:366:ASN:ND2	2.24	0.52
1:A:339:ARG:CG	1:A:480:ASP:HA	2.40	0.51
1:A:400:CYS:O	1:A:402:LEU:HG	2.10	0.51
1:A:379:ASN:HD22	1:A:384:LYS:HE3	1.74	0.51
1:A:339:ARG:CD	1:A:480:ASP:HA	2.41	0.51
1:A:100:ILE:HD11	5:A:501:P6G:H91	1.92	0.51
2:B:203:ARG:O	2:B:207:GLU:HG3	2.10	0.51
2:B:194:GLU:HA	2:B:203:ARG:NH1	2.26	0.51
3:C:56:HIS:HD2	3:C:80:ASP:OD1	1.93	0.51
1:A:187:ALA:HB2	1:A:257:MET:HE1	1.94	0.50
1:A:139:GLN:NE2	2:B:82:VAL:HG13	2.27	0.50
1:A:166:GLU:HA	1:A:471:MET:HB3	1.92	0.50
3:C:10:PHE:CE1	3:C:81:ILE:HG21	2.46	0.50
1:A:303:GLU:OE2	1:A:313:LYS:HE2	2.11	0.50
1:A:99:ALA:O	1:A:100:ILE:HD13	2.12	0.50
2:B:35:LEU:HB2	2:B:149:SER:CB	2.43	0.49
3:C:54:ARG:HG3	3:C:80:ASP:HB2	1.93	0.49

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:358:LEU:HD13	1:A:365:TRP:CZ2	2.48	0.49
1:A:55:TYR:HB3	1:A:56:PRO:HD3	1.94	0.48
2:B:145:ILE:O	2:B:145:ILE:HG13	2.13	0.48
2:B:161:ASP:O	2:B:164:ARG:HB3	2.13	0.48
1:A:197:GLU:O	1:A:202:ASN:HB2	2.13	0.48
2:B:219:PHE:CZ	2:B:271:LEU:HD23	2.49	0.48
1:A:225:SER:O	1:A:229:THR:HG23	2.14	0.48
1:A:153:ARG:HB3	1:A:477:VAL:HG12	1.96	0.47
2:B:285:LEU:O	2:B:289:VAL:HG23	2.14	0.47
2:B:154:CYS:HB3	2:B:267:TRP:CE2	2.48	0.47
3:C:75:PRO:O	3:C:76:THR:HB	2.15	0.47
1:A:393:LEU:HD22	5:A:502:P6G:C12	2.35	0.47
1:A:10:TYR:CZ	1:A:52:LYS:HB3	2.50	0.47
2:B:18:LEU:O	2:B:21:ASN:OD1	2.33	0.47
1:A:393:LEU:N	1:A:393:LEU:HD23	2.30	0.47
1:A:109:THR:HG23	2:B:144:GLN:HB2	1.97	0.47
2:B:93:GLN:HE22	2:B:259:ARG:HD3	1.80	0.47
1:A:491:TYR:O	1:A:492:GLN:CB	2.63	0.46
3:C:54:ARG:NH1	3:C:80:ASP:OD2	2.48	0.46
3:C:47:PRO:C	3:C:49:LYS:H	2.18	0.46
1:A:139:GLN:NE2	7:A:523:HOH:O	2.45	0.46
1:A:47:TYR:CD1	1:A:240:PRO:HB2	2.51	0.46
1:A:78:ARG:NH1	1:A:78:ARG:HG3	2.27	0.46
2:B:276:LEU:HD22	2:B:282:ARG:HB2	1.98	0.46
1:A:367:ASP:HB3	1:A:410:ASN:HD22	1.68	0.46
1:A:427:HIS:CE1	3:C:76:THR:CG2	2.80	0.46
2:B:201:GLY:HA3	2:B:299:ALA:HA	1.97	0.45
2:B:35:LEU:HB2	2:B:149:SER:HB3	1.99	0.45
2:B:293:GLU:N	2:B:294:PRO:CD	2.79	0.45
1:A:196:PHE:CZ	5:A:501:P6G:H61	2.52	0.45
2:B:44:ARG:NH1	2:B:48:LEU:O	2.49	0.45
2:B:304:CYS:HB3	2:B:313:ALA:HB3	1.98	0.45
2:B:131:LEU:HD21	2:B:230:VAL:HG22	1.99	0.45
1:A:263:TRP:CE2	1:A:432:ALA:HB3	2.52	0.45
1:A:204:GLN:HB2	1:A:269:PHE:HZ	1.82	0.45
3:C:76:THR:O	3:C:76:THR:HG23	2.16	0.45
1:A:338:TRP:NE1	1:A:390:PRO:HG3	2.32	0.45
1:A:345:ASP:HB3	1:A:482:ALA:HA	1.98	0.45
1:A:305:GLN:HG3	7:A:547:HOH:O	2.17	0.45
3:C:52:ARG:HG3	3:C:52:ARG:HH11	1.81	0.45
1:A:167:TRP:CD1	5:A:502:P6G:H172	2.52	0.44
1:A:47:TYR:OH	1:A:237:GLN:HA	2.17	0.44

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:78:ARG:CG	1:A:78:ARG:HH11	2.22	0.44
1:A:203:MET:CG	1:A:297:TRP:HB3	2.45	0.44
2:B:322:ARG:O	2:B:326:GLN:HG3	2.17	0.44
1:A:396:ILE:HG22	1:A:397:CYS:O	2.16	0.44
1:A:250:LYS:HB3	1:A:253:GLU:HB2	2.00	0.44
1:A:178:ASP:HA	2:B:48:LEU:HD11	2.00	0.44
1:A:449:ASN:C	1:A:449:ASN:OD1	2.54	0.44
2:B:117:TRP:CE3	2:B:245:GLU:HG3	2.53	0.44
2:B:133:HIS:O	2:B:136:GLN:HB3	2.17	0.44
1:A:452:ASP:O	1:A:456:LYS:HG3	2.18	0.44
2:B:143:HIS:CD2	2:B:143:HIS:C	2.91	0.44
2:B:12:LEU:HD12	2:B:12:LEU:HA	1.83	0.44
1:A:389:VAL:HG21	5:A:502:P6G:H21	1.99	0.44
1:A:166:GLU:OE1	1:A:168:ALA:HB3	2.18	0.44
1:A:203:MET:HA	1:A:203:MET:HE2	2.00	0.44
1:A:37:ARG:NH2	1:A:257:MET:HE1	2.33	0.44
1:A:404:ILE:HG12	1:A:429:GLY:HA2	2.00	0.43
1:A:90:VAL:O	1:A:94:GLN:HG3	2.18	0.43
1:A:113:ARG:HD3	2:B:144:GLN:NE2	2.33	0.43
2:B:215:TRP:HE1	4:B:331:GOL:C1	2.31	0.43
1:A:153:ARG:CZ	2:B:12:LEU:HD22	2.48	0.43
3:C:8:SER:O	3:C:16:ILE:HA	2.18	0.43
1:A:379:ASN:ND2	1:A:384:LYS:HE3	2.34	0.43
1:A:152:SER:HA	2:B:11:PRO:HG3	2.01	0.43
1:A:100:ILE:HG22	1:A:104:GLU:HG3	2.01	0.43
1:A:274:GLY:HA2	1:A:290:PHE:CD1	2.53	0.43
1:A:100:ILE:HG22	1:A:104:GLU:CG	2.49	0.43
3:C:52:ARG:NH1	3:C:52:ARG:HG3	2.34	0.43
1:A:339:ARG:HE	1:A:339:ARG:HB2	1.54	0.42
1:A:206:LEU:HD13	1:A:228:GLN:CD	2.40	0.42
1:A:245:LEU:HD23	1:A:245:LEU:HA	1.76	0.42
2:B:174:ARG:NE	2:B:174:ARG:HA	2.34	0.42
3:C:75:PRO:O	3:C:76:THR:CB	2.67	0.42
1:A:127:ALA:HB2	1:A:237:GLN:HE22	1.85	0.42
3:C:23:THR:O	3:C:68:VAL:HB	2.19	0.42
1:A:396:ILE:N	1:A:396:ILE:HD13	2.35	0.42
1:A:97:PHE:CD2	1:A:145:PRO:HB3	2.55	0.42
1:A:341:THR:O	1:A:473:LEU:HD11	2.19	0.42
1:A:47:TYR:CB	1:A:120:ALA:HB1	2.48	0.42
2:B:217:GLU:HG3	2:B:288:TRP:CD1	2.55	0.42
2:B:68:LYS:HB2	2:B:278:LYS:HE2	2.01	0.42
1:A:87:PRO:HG2	1:A:483:HIS:CD2	2.55	0.42

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:267:LYS:HA	1:A:267:LYS:HD2	1.83	0.41
3:C:6:ILE:HG13	3:C:19:VAL:O	2.19	0.41
1:A:227:ILE:HD13	1:A:227:ILE:HA	1.88	0.41
1:A:162:ILE:HG22	1:A:162:ILE:O	2.20	0.41
1:A:139:GLN:NE2	2:B:83:TYR:H	2.12	0.41
3:C:7:MET:HB2	3:C:78:THR:HA	2.02	0.41
2:B:188:ARG:HH11	2:B:188:ARG:HG3	1.83	0.41
1:A:206:LEU:HA	1:A:206:LEU:HD12	1.94	0.41
2:B:232:GLU:O	2:B:237:GLN:HG2	2.21	0.41
1:A:193:THR:HG22	1:A:197:GLU:OE1	2.21	0.41
2:B:215:TRP:CG	2:B:216:GLY:N	2.89	0.41
3:C:11:GLU:HG2	3:C:12:ARG:HG3	2.01	0.41
2:B:280:GLY:HA2	2:B:283:GLU:OE1	2.20	0.41
3:C:74:ARG:O	3:C:75:PRO:C	2.56	0.41
1:A:404:ILE:O	3:C:15:VAL:HG23	2.21	0.41
1:A:81:PHE:HZ	1:A:215:ALA:O	2.03	0.41
3:C:66:MET:HG3	3:C:67:ILE:N	2.36	0.40
2:B:278:LYS:HG2	2:B:281:ASN:ND2	2.36	0.40
1:A:188:VAL:O	1:A:192:LEU:HB3	2.21	0.40
2:B:34:ASN:HA	2:B:73:ASN:OD1	2.21	0.40
1:A:228:GLN:HE21	1:A:228:GLN:HB3	1.69	0.40
2:B:274:MET:O	2:B:277:GLU:HG3	2.20	0.40
2:B:209:ALA:HA	2:B:292:TRP:CH2	2.57	0.40
1:A:153:ARG:NH1	2:B:12:LEU:HD13	2.36	0.40
2:B:194:GLU:O	2:B:203:ARG:NH1	2.55	0.40
1:A:175:PHE:CE1	1:A:179:MET:HG3	2.56	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	489/498 (98%)	454 (93%)	32 (6%)	3 (1%)	33	76
2	B	320/330 (97%)	301 (94%)	16 (5%)	3 (1%)	25	66

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	C	81/86 (94%)	72 (89%)	8 (10%)	1 (1%)	19	57
All	All	890/914 (97%)	827 (93%)	56 (6%)	7 (1%)	27	68

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	22	ARG
1	A	237	GLN
1	A	408	PRO
3	C	48	GLU
1	A	490	ALA
2	B	24	ARG
2	B	25	PRO

5.3.2 Protein sidechains ⓘ

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	416/422 (99%)	394 (95%)	22 (5%)	32	70
2	B	274/282 (97%)	252 (92%)	22 (8%)	17	45
3	C	77/79 (98%)	72 (94%)	5 (6%)	24	58
All	All	767/783 (98%)	718 (94%)	49 (6%)	25	59

All (49) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	LYS
1	A	42	GLU
1	A	46	LYS
1	A	153	ARG
1	A	202	ASN
1	A	206	LEU
1	A	228	GLN
1	A	247	GLU
1	A	251	LYS

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Mol	Chain	Res	Type
1	A	269	PHE
1	A	280	TYR
1	A	283	LEU
1	A	284	GLU
1	A	304	ARG
1	A	309	LEU
1	A	321	MET
1	A	371	GLN
1	A	390	PRO
1	A	393	LEU
1	A	397	CYS
1	A	410	ASN
1	A	477	VAL
2	B	10	LYS
2	B	12	LEU
2	B	13	LYS
2	B	21	ASN
2	B	24	ARG
2	B	34	ASN
2	B	71	ASP
2	B	82	VAL
2	B	89	LEU
2	B	111	GLN
2	B	123	ARG
2	B	140	VAL
2	B	166	LEU
2	B	187	LYS
2	B	240	SER
2	B	243	GLN
2	B	248	THR
2	B	262	GLU
2	B	278	LYS
2	B	279	GLU
2	B	298	LYS
2	B	318	LYS
3	C	3	THR
3	C	48	GLU
3	C	54	ARG
3	C	66	MET
3	C	76	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	139	GLN
1	A	141	GLN
1	A	228	GLN
1	A	237	GLN
1	A	248	ASN
1	A	379	ASN
1	A	398	ASN
1	A	418	GLN
1	A	427	HIS
2	B	17	HIS
2	B	34	ASN
2	B	87	ASN
2	B	93	GLN
2	B	144	GLN
2	B	153	ASN
2	B	162	HIS
2	B	168	HIS
3	C	56	HIS

5.3.3 RNA ⓘ

There are no RNA chains 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 ⓘ

Of 7 ligands modelled in this entry, 2 are monoatomic - leaving 5 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	A	499	-	5,5,5	0.26	0	5,5,5	0.35	0
4	GOL	A	500	-	5,5,5	0.24	0	5,5,5	0.26	0
5	P6G	A	501	6	18,18,18	0.55	0	17,17,17	0.80	0
5	P6G	A	502	-	18,18,18	0.66	0	17,17,17	1.08	1 (5%)
4	GOL	B	331	-	5,5,5	0.29	0	5,5,5	0.87	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	A	499	-	-	0/4/4/4	0/0/0/0
4	GOL	A	500	-	-	0/4/4/4	0/0/0/0
5	P6G	A	501	6	-	0/16/16/16	0/0/0/0
5	P6G	A	502	-	-	0/16/16/16	0/0/0/0
4	GOL	B	331	-	-	0/4/4/4	0/0/0/0

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	502	P6G	C11-O10-C9	-2.19	103.75	113.38

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	491/498 (98%)	-0.43	2 (0%) 90 94	12, 25, 39, 55	0
2	B	322/330 (97%)	-0.44	6 (1%) 64 72	14, 23, 41, 78	0
3	C	83/86 (96%)	-0.52	0 100 100	21, 29, 39, 50	0
All	All	896/914 (98%)	-0.44	8 (0%) 81 88	12, 25, 40, 78	0

All (8) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	23	ARG	4.9
2	B	22	ARG	4.5
2	B	21	ASN	2.9
2	B	8	ALA	2.7
1	A	80	GLY	2.3
2	B	10	LYS	2.1
1	A	250	LYS	2.0
2	B	24	ARG	2.0

6.2 Non-standard residues in protein, DNA, RNA chains

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

6.3 Carbohydrates

There are no carbohydrates 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. LLDF column lists the quality of electron

density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	RSR	LLDF	B-factors(Å ²)	Q<0.9
5	P6G	A	502	19/19	0.30	6.55	38,47,75,75	0
5	P6G	A	501	19/19	0.35	5.33	44,59,64,64	0
4	GOL	A	500	6/6	0.19	1.70	38,39,40,44	0
4	GOL	B	331	6/6	0.19	0.81	28,28,31,32	0
6	FE	A	503	1/1	0.18	0.46	24,24,24,24	0
4	GOL	A	499	6/6	0.15	0.13	43,45,45,46	0
6	FE	A	504	1/1	0.16	-0.89	29,29,29,29	0

6.5 Other polymers ⓘ

There are no such residues in this entry.