



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2024 – 11:37 AM EDT

PDB ID : 2P6P
Title : X-ray crystal structure of C-C bond-forming dTDP-D-Olivose-transferase UrdGT2
Authors : Mittler, M.; Bechthold, A.; Schulz, G.E.
Deposited on : 2007-03-19
Resolution : 1.88 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 : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 1.20.1
EDS : 2.36.2
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36.2

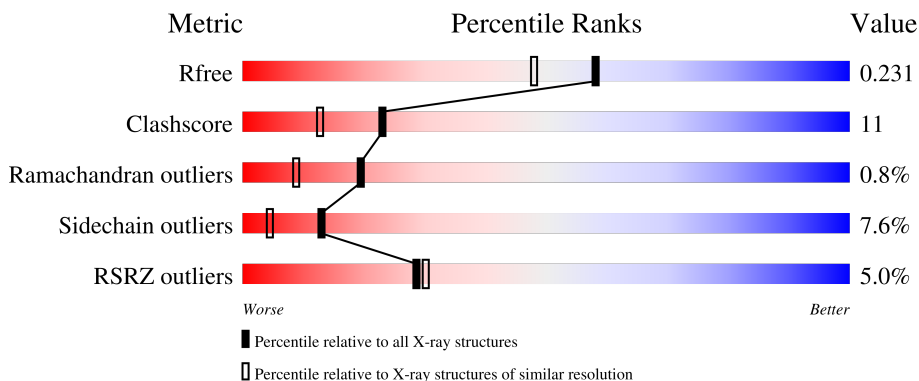
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

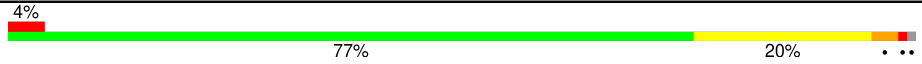
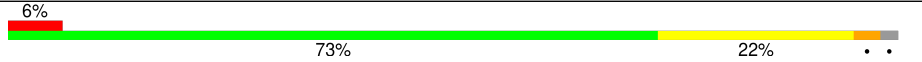
The reported resolution of this entry is 1.88 Å.

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	9470 (1.90-1.86)
Clashscore	141614	10282 (1.90-1.86)
Ramachandran outliers	138981	10152 (1.90-1.86)
Sidechain outliers	138945	10152 (1.90-1.86)
RSRZ outliers	127900	9303 (1.90-1.86)

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	384	
1	B	384	

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 6209 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 Glycosyl transferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	382	Total 2889	C 1818	N 528	O 529	S 14	0	0	0
1	B	376	Total 2865	C 1803	N 527	O 521	S 14	0	3	0

- Molecule 2 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

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

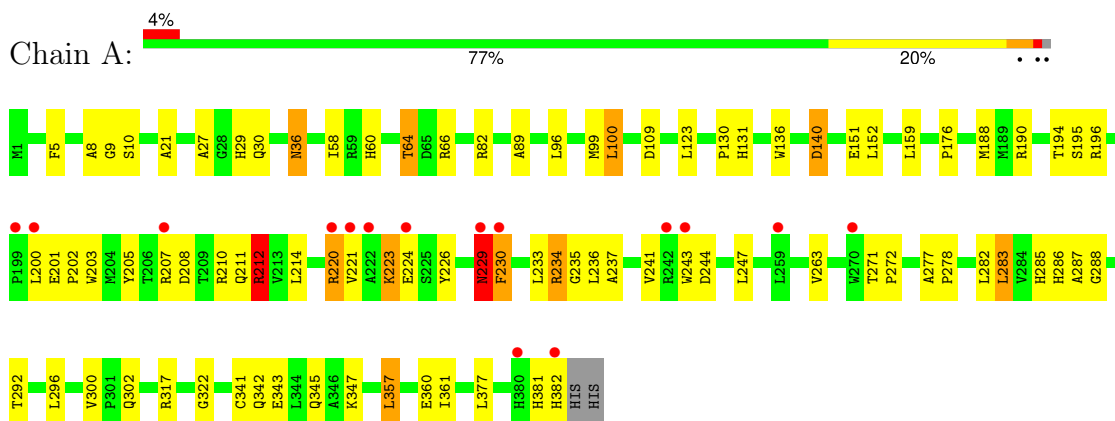
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	211	Total	O	0	0
			211	211		
3	B	202	Total	O	0	0
			202	202		

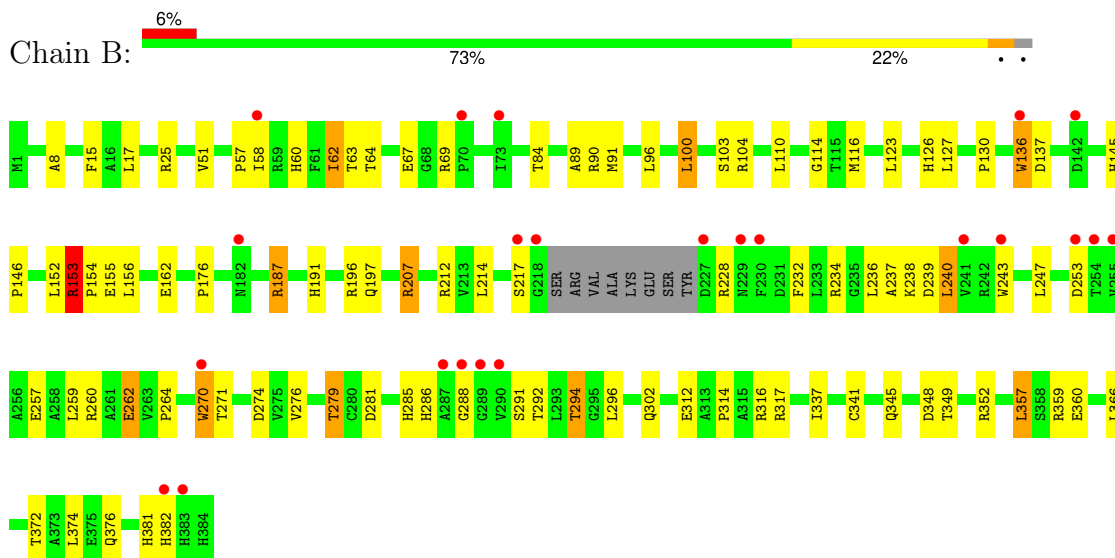
3 Residue-property plots [i](#)

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: Glycosyl transferase



- Molecule 1: Glycosyl transferase



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	65.87Å 78.90Å 133.96Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	68.04 – 1.88 67.99 – 1.88	Depositor EDS
% Data completeness (in resolution range)	99.7 (68.04-1.88) 99.7 (67.99-1.88)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	6.40	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.79 (at 1.88Å)	Xtrriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.188 , 0.230 0.189 , 0.231	Depositor DCC
R_{free} test set	2868 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	23.2	Xtrriage
Anisotropy	0.361	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 47.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6209	wwPDB-VP
Average B, all atoms (Å ²)	30.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.98% 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: 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	0.70	2/2958 (0.1%)	0.77	2/4046 (0.0%)
1	B	0.66	0/2944	0.84	7/4025 (0.2%)
All	All	0.68	2/5902 (0.0%)	0.80	9/8071 (0.1%)

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	A	0	2

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	201	GLU	CG-CD	6.59	1.61	1.51
1	A	201	GLU	CD-OE1	6.30	1.32	1.25

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	207	ARG	NE-CZ-NH2	-14.83	112.89	120.30
1	B	207	ARG	NE-CZ-NH1	9.50	125.05	120.30
1	B	153	ARG	NE-CZ-NH2	-7.63	116.49	120.30
1	B	187	ARG	NE-CZ-NH1	7.08	123.84	120.30
1	B	153	ARG	NE-CZ-NH1	6.55	123.57	120.30
1	A	212	ARG	NE-CZ-NH1	-6.45	117.08	120.30
1	B	359	ARG	NE-CZ-NH2	-5.50	117.55	120.30
1	B	274	ASP	CB-CG-OD1	5.29	123.06	118.30
1	A	229	ASN	C-N-CA	5.27	134.88	121.70

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	210	ARG	Peptide
1	A	229	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	2889	0	2896	65	0
1	B	2865	0	2868	65	1
2	A	30	0	40	8	0
2	B	12	0	16	2	0
3	A	211	0	0	12	0
3	B	202	0	0	16	0
All	All	6209	0	5820	132	1

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 11.

All (132) 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:207:ARG:HG2	3:A:1151:HOH:O	1.60	1.01
1:B:291:SER:O	3:B:1157:HOH:O	1.79	0.99
1:A:223:LYS:O	1:A:223:LYS:HG2	1.68	0.93
1:B:317:ARG:HD2	3:B:1126:HOH:O	1.68	0.93
1:B:292:THR:HG21	3:B:1206:HOH:O	1.74	0.85
1:B:212:ARG:HH11	1:B:279:THR:CG2	1.89	0.84
1:B:312:GLU:O	1:B:316:ARG:HG3	1.78	0.84
1:B:341:CYS:O	1:B:345:GLN:HG3	1.80	0.80
1:B:285:HIS:CE1	1:B:302:GLN:HE21	2.00	0.79
1:A:196:ARG:HG2	3:A:1061:HOH:O	1.85	0.77
1:A:243:TRP:CZ2	1:A:342:GLN:HG3	2.22	0.73
1:A:203:TRP:CZ2	1:A:271:THR:HG21	2.25	0.72
1:A:203:TRP:O	1:A:212:ARG:NH1	2.23	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:203:TRP:CH2	1:A:271:THR:HG21	2.26	0.70
1:B:212:ARG:HH11	1:B:279:THR:HG23	1.57	0.69
1:B:285:HIS:HE1	1:B:302:GLN:HE21	1.40	0.68
1:A:285:HIS:HD1	1:A:287:ALA:H	1.42	0.67
1:A:223:LYS:O	1:A:223:LYS:CG	2.37	0.67
1:A:109:ASP:O	1:A:382:HIS:HE1	1.77	0.67
1:B:285:HIS:HE1	1:B:302:GLN:NE2	1.93	0.67
1:A:100:LEU:HD13	1:A:123:LEU:HD23	1.77	0.66
1:B:239:ASP:O	3:B:1155:HOH:O	2.12	0.66
1:A:188:MET:HG2	3:A:1098:HOH:O	1.95	0.66
1:B:285:HIS:CE1	1:B:302:GLN:NE2	2.63	0.66
1:A:60:HIS:O	1:A:64:THR:HG23	1.96	0.64
1:A:322:GLY:CA	2:A:1003:GOL:H2	2.27	0.64
1:B:91:MET:HG3	3:B:1026:HOH:O	1.97	0.64
1:B:137:ASP:HB3	3:B:1187:HOH:O	1.95	0.64
1:A:322:GLY:HA3	2:A:1003:GOL:H2	1.78	0.64
1:B:212:ARG:HH11	1:B:279:THR:HG21	1.61	0.63
1:B:103:SER:HB3	1:B:127:LEU:HD11	1.79	0.63
1:A:66:ARG:CD	1:A:151:GLU:OE1	2.48	0.62
1:A:131:HIS:HD2	3:A:1093:HOH:O	1.81	0.61
1:B:288:GLY:HA2	2:B:1004:GOL:H11	1.81	0.61
1:A:36:ASN:H	1:A:36:ASN:HD22	1.47	0.61
1:A:229:ASN:O	1:A:286:HIS:CE1	2.55	0.60
1:B:191:HIS:NE2	1:B:294:THR:HG22	2.18	0.59
1:A:10:SER:HB2	1:A:224:GLU:HG3	1.85	0.58
2:B:1004:GOL:H11	3:B:1154:HOH:O	2.03	0.58
1:B:207:ARG:HD2	3:B:1006:HOH:O	2.03	0.57
1:A:96:LEU:HG	1:A:100:LEU:HD22	1.84	0.57
1:B:187:ARG:HD2	3:B:1013:HOH:O	2.04	0.56
1:B:187:ARG:CD	3:B:1013:HOH:O	2.53	0.56
1:A:29:HIS:CE1	2:A:1007:GOL:H11	2.40	0.56
1:A:292:THR:HA	1:A:302:GLN:HE22	1.71	0.56
1:B:197:GLN:NE2	3:B:1041:HOH:O	2.40	0.55
2:A:1007:GOL:H32	3:A:1202:HOH:O	2.07	0.55
1:B:296:LEU:HD22	1:B:357:LEU:HD23	1.88	0.55
1:A:220:ARG:H	1:A:220:ARG:HH21	1.56	0.54
1:A:237:ALA:CB	1:A:263:VAL:HG21	2.38	0.54
1:A:109:ASP:O	1:A:382:HIS:CE1	2.59	0.54
1:A:229:ASN:HA	1:A:230:PHE:HB2	1.89	0.54
1:B:110:LEU:HD21	1:B:374:LEU:HD22	1.90	0.54
1:B:270:TRP:N	1:B:270:TRP:CD1	2.75	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:341:CYS:O	1:A:345:GLN:HB2	2.08	0.53
1:B:63:THR:HG22	1:B:64:THR:N	2.23	0.53
1:A:82:ARG:NH1	3:A:1123:HOH:O	2.42	0.53
1:A:66:ARG:HD2	1:A:151:GLU:OE1	2.09	0.52
1:B:217:SER:OG	1:B:286:HIS:HD2	1.92	0.52
1:B:126:HIS:HE1	3:B:1039:HOH:O	1.93	0.52
1:B:212:ARG:NH1	1:B:279:THR:CG2	2.67	0.52
1:B:63:THR:HG22	1:B:64:THR:H	1.74	0.51
1:A:130:PRO:HG3	1:A:381:HIS:CG	2.45	0.51
1:A:277:ALA:HB3	1:A:278:PRO:HD3	1.93	0.51
1:B:348[A]:ASP:OD2	1:B:352:ARG:HD3	2.11	0.51
1:B:212:ARG:NH1	1:B:279:THR:HG21	2.26	0.51
1:B:276:VAL:O	1:B:279:THR:HB	2.11	0.50
1:A:140:ASP:HB3	3:A:1080:HOH:O	2.09	0.50
1:A:9:GLY:HA3	1:A:58:ILE:CG2	2.42	0.50
1:B:207:ARG:HH22	1:B:281:ASP:CG	2.14	0.50
1:A:60:HIS:HD2	3:A:1130:HOH:O	1.94	0.50
1:A:9:GLY:HA3	1:A:58:ILE:HG23	1.95	0.49
1:A:296:LEU:HD22	1:A:357:LEU:HD23	1.94	0.49
1:A:202:PRO:HA	1:A:205:TYR:CZ	2.48	0.48
1:A:286:HIS:HE1	3:A:1124:HOH:O	1.97	0.47
1:B:372:THR:HG22	1:B:376:GLN:HE21	1.79	0.47
1:A:36:ASN:HD22	1:A:36:ASN:N	2.11	0.47
1:A:223:LYS:HG3	3:A:1041:HOH:O	2.15	0.47
1:B:84:THR:HG22	1:B:116:MET:CE	2.45	0.47
2:A:1006:GOL:C3	3:A:1142:HOH:O	2.62	0.47
1:A:220:ARG:H	1:A:220:ARG:NH2	2.13	0.47
1:A:195:SER:OG	1:A:272:PRO:HB3	2.14	0.46
1:B:100:LEU:O	1:B:104:ARG:HG3	2.15	0.46
1:A:60:HIS:CD2	3:A:1130:HOH:O	2.68	0.46
1:A:200:LEU:HB2	1:B:51:VAL:HG23	1.97	0.46
1:B:96:LEU:O	1:B:100:LEU:HB2	2.16	0.46
1:B:257:GLU:HG2	1:B:260:ARG:HH21	1.80	0.46
1:A:237:ALA:O	1:A:241:VAL:HG23	2.16	0.45
1:B:100:LEU:HD13	1:B:123:LEU:HD23	1.98	0.45
1:B:89:ALA:HB1	1:B:152:LEU:HG	1.98	0.45
1:B:153:ARG:HB3	1:B:154:PRO:HD3	1.99	0.45
1:B:314:PRO:HB2	3:B:1079:HOH:O	2.17	0.44
1:B:212:ARG:NH1	1:B:279:THR:HG23	2.28	0.44
1:A:229:ASN:C	1:A:229:ASN:HD22	2.21	0.44
1:B:236:LEU:HD13	1:B:337:ILE:HG21	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:243:TRP:CH2	1:A:342:GLN:HG3	2.52	0.43
1:B:243:TRP:HB2	3:B:1155:HOH:O	2.17	0.43
1:B:262:GLU:O	1:B:264:PRO:HD3	2.18	0.43
1:A:322:GLY:HA2	2:A:1003:GOL:H2	1.99	0.43
1:B:84:THR:HG22	1:B:116:MET:HE3	1.99	0.43
1:A:30:GLN:NE2	2:A:1006:GOL:O3	2.51	0.43
1:A:243:TRP:HZ2	1:A:342:GLN:HG3	1.81	0.43
1:B:232:PHE:CZ	1:B:236:LEU:HD22	2.54	0.43
1:A:27:ALA:O	2:A:1007:GOL:H31	2.18	0.43
1:B:292:THR:HG23	3:B:1095:HOH:O	2.19	0.43
1:A:263:VAL:HG22	1:A:263:VAL:O	2.19	0.42
1:B:62:ILE:HA	1:B:90:ARG:HH21	1.84	0.42
1:A:190:ARG:HG3	1:A:361:ILE:O	2.19	0.42
1:B:234:ARG:NH1	1:B:238:LYS:HE2	2.34	0.42
1:A:343:GLU:HG3	1:A:347:LYS:HG3	2.02	0.42
1:A:226:TYR:CE1	1:A:288:GLY:HA3	2.55	0.42
1:B:15:PHE:HZ	1:B:196[A]:ARG:HG3	1.84	0.42
1:B:276:VAL:O	1:B:279:THR:HG22	2.20	0.42
1:A:140:ASP:OD1	1:A:317:ARG:NH1	2.49	0.42
1:A:5:PHE:CZ	1:A:21:ALA:HA	2.55	0.42
1:A:234:ARG:HG2	1:A:235:GLY:N	2.35	0.42
1:A:285:HIS:NE2	1:A:302:GLN:NE2	2.68	0.42
1:B:57:PRO:HD2	1:B:60:HIS:ND1	2.35	0.42
1:B:237:ALA:HA	1:B:247:LEU:CD2	2.50	0.41
1:B:234:ARG:HE	1:B:262:GLU:HG2	1.84	0.41
1:B:240:LEU:HD23	1:B:247:LEU:HD13	2.01	0.41
1:B:114:GLY:HA3	1:B:136:TRP:CE3	2.55	0.41
1:B:176:PRO:HD2	1:B:360:GLU:OE2	2.21	0.41
1:A:89:ALA:HB1	1:A:152:LEU:HG	2.02	0.41
1:B:196[A]:ARG:NH1	3:B:1104:HOH:O	2.54	0.41
1:B:130:PRO:HG3	1:B:381[B]:HIS:CG	2.55	0.41
1:A:99:MET:HB3	1:A:123:LEU:HD11	2.04	0.40
1:A:226:TYR:CZ	1:A:288:GLY:HA3	2.57	0.40
1:A:283:LEU:HD13	1:A:300:VAL:HG11	2.04	0.40
1:B:145:HIS:N	1:B:146:PRO:CD	2.84	0.40
1:B:214:LEU:HD23	1:B:214:LEU:C	2.42	0.40
1:A:176:PRO:HD2	1:A:360:GLU:OE1	2.22	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:155:GLU:OE2	1:B:349:THR:OG1[3_656]	2.06	0.14

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	380/384 (99%)	369 (97%)	6 (2%)	5 (1%)	12	3
1	B	375/384 (98%)	364 (97%)	10 (3%)	1 (0%)	41	30
All	All	755/768 (98%)	733 (97%)	16 (2%)	6 (1%)	19	9

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	211	GLN
1	A	244	ASP
1	A	229	ASN
1	A	230	PHE
1	B	8	ALA
1	A	8	ALA

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	300/302 (99%)	278 (93%)	22 (7%)	14	5
1	B	298/302 (99%)	275 (92%)	23 (8%)	13	4

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	598/604 (99%)	553 (92%)	45 (8%)	13 5

All (45) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	36	ASN
1	A	64	THR
1	A	100	LEU
1	A	136	TRP
1	A	140	ASP
1	A	159	LEU
1	A	194	THR
1	A	208	ASP
1	A	212	ARG
1	A	214	LEU
1	A	220	ARG
1	A	221	VAL
1	A	223	LYS
1	A	229	ASN
1	A	233	LEU
1	A	234	ARG
1	A	236	LEU
1	A	247	LEU
1	A	282	LEU
1	A	283	LEU
1	A	357	LEU
1	A	377	LEU
1	B	17	LEU
1	B	25	ARG
1	B	58	ILE
1	B	62	ILE
1	B	67	GLU
1	B	69	ARG
1	B	100	LEU
1	B	136	TRP
1	B	153	ARG
1	B	156	LEU
1	B	162	GLU
1	B	228	ARG
1	B	240	LEU
1	B	253	ASP
1	B	259	LEU

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Mol	Chain	Res	Type
1	B	262	GLU
1	B	270	TRP
1	B	271	THR
1	B	279	THR
1	B	294	THR
1	B	357	LEU
1	B	366	LEU
1	B	382	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	30	GLN
1	A	36	ASN
1	A	126	HIS
1	A	131	HIS
1	A	197	GLN
1	A	229	ASN
1	A	286	HIS
1	A	302	GLN
1	A	382	HIS
1	B	37	GLN
1	B	126	HIS
1	B	131	HIS
1	B	197	GLN
1	B	229	ASN
1	B	285	HIS
1	B	286	HIS
1	B	302	GLN
1	B	376	GLN
1	B	382	HIS

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](#)

7 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
2	GOL	A	1005	-	5,5,5	0.52	0	5,5,5	0.95	0
2	GOL	B	1001	-	5,5,5	0.48	0	5,5,5	0.27	0
2	GOL	A	1003	-	5,5,5	0.52	0	5,5,5	0.90	0
2	GOL	A	1006	-	5,5,5	0.24	0	5,5,5	1.29	1 (20%)
2	GOL	B	1004	-	5,5,5	0.46	0	5,5,5	0.41	0
2	GOL	A	1007	-	5,5,5	0.33	0	5,5,5	0.64	0
2	GOL	A	1002	-	5,5,5	0.49	0	5,5,5	0.95	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GOL	A	1005	-	-	0/4/4/4	-
2	GOL	B	1001	-	-	0/4/4/4	-
2	GOL	A	1003	-	-	2/4/4/4	-
2	GOL	A	1006	-	-	2/4/4/4	-
2	GOL	B	1004	-	-	2/4/4/4	-
2	GOL	A	1007	-	-	2/4/4/4	-
2	GOL	A	1002	-	-	3/4/4/4	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1006	GOL	C3-C2-C1	-2.12	104.00	111.80

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1003	GOL	C1-C2-C3-O3
2	A	1006	GOL	C1-C2-C3-O3
2	A	1006	GOL	O2-C2-C3-O3
2	A	1007	GOL	O1-C1-C2-C3
2	B	1004	GOL	C1-C2-C3-O3
2	A	1002	GOL	O1-C1-C2-C3
2	A	1002	GOL	C1-C2-C3-O3
2	A	1002	GOL	O2-C2-C3-O3
2	B	1004	GOL	O2-C2-C3-O3
2	A	1007	GOL	O1-C1-C2-O2
2	A	1003	GOL	O2-C2-C3-O3

There are no ring outliers.

4 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1003	GOL	3	0
2	A	1006	GOL	2	0
2	B	1004	GOL	2	0
2	A	1007	GOL	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, 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	382/384 (99%)	0.30	15 (3%) 39 41	22, 28, 39, 47	0
1	B	376/384 (97%)	0.38	23 (6%) 21 22	19, 28, 44, 51	0
All	All	758/768 (98%)	0.34	38 (5%) 28 30	19, 28, 42, 51	0

All (38) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	270	TRP	7.0
1	B	218	GLY	5.8
1	B	289	GLY	5.5
1	A	243	TRP	5.1
1	B	73	ILE	4.7
1	B	182	ASN	4.2
1	B	243	TRP	4.1
1	B	254	THR	3.9
1	B	287	ALA	3.8
1	B	288	GLY	3.7
1	B	229	ASN	3.7
1	B	142	ASP	3.7
1	B	241	VAL	3.1
1	A	221	VAL	3.1
1	A	382	HIS	3.0
1	A	207	ARG	2.9
1	B	230	PHE	2.8
1	A	220	ARG	2.8
1	A	270	TRP	2.7
1	B	136	TRP	2.7
1	B	383	HIS	2.7
1	A	242	ARG	2.7
1	A	200	LEU	2.6
1	B	382	HIS	2.5

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Mol	Chain	Res	Type	RSRZ
1	B	255	VAL	2.4
1	A	380	HIS	2.4
1	B	217	SER	2.4
1	A	222	ALA	2.3
1	B	58	ILE	2.3
1	B	70	PRO	2.2
1	A	229	ASN	2.2
1	A	259	LEU	2.2
1	B	290	VAL	2.2
1	B	253	ASP	2.1
1	A	224	GLU	2.1
1	A	199	PRO	2.1
1	A	230	PHE	2.0
1	B	227	ASP	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, 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(\AA^2)	Q<0.9
2	GOL	A	1007	6/6	0.74	0.17	51,52,52,52	0
2	GOL	A	1006	6/6	0.77	0.21	36,40,40,46	0
2	GOL	B	1004	6/6	0.79	0.19	39,41,41,42	0
2	GOL	A	1003	6/6	0.81	0.28	37,43,44,47	0
2	GOL	A	1002	6/6	0.88	0.14	37,39,41,41	0
2	GOL	A	1005	6/6	0.95	0.16	29,30,33,33	0
2	GOL	B	1001	6/6	0.97	0.13	19,21,22,22	0

6.5 Other polymers [i](#)

There are no such residues in this entry.