WORLDWIDE PDB
PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Aug 14, 2023 – 10:01 PM EDT

PDB ID	:	1RVY
Title	:	E75Q MUTANT OF RABBIT CYTOSOLIC SERINE HYDROXYMETHYL TRANSFERASE, COMPLEX WITH GLYCINE
Authors	:	Szebenyi, D.M.; Musayev, F.N.; Di Salvo, M.L.; Safo, M.K.; Schirch, V.
Deposited on	:	2003-12-15
Resolution	:	2.90 Å(reported)

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

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

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

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

|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35
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)	:	2.35

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 2.90 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	Percentile Ranks	Value
Clashscore		17
Ramachandran outliers		1.1%
Sidechain outliers		3.0%
RSRZ outliers		1.4%

Worse ────────────────────────────── *Better*

■ Percentile relative to all X-ray structures
▯ Percentile relative to X-ray structures of similar resolution
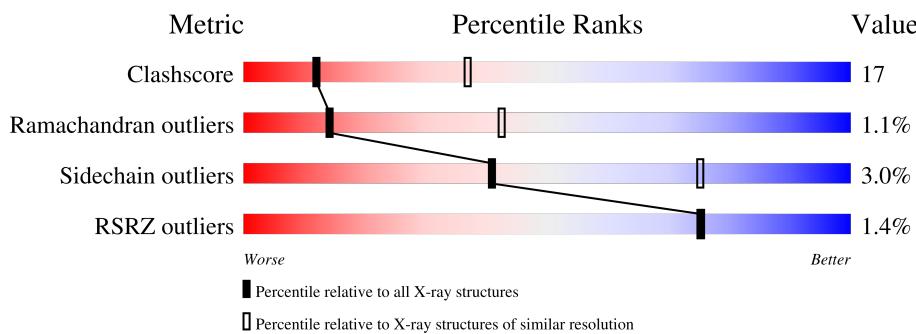
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (2.90-2.90)

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 of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	483	.% ▮ 65% ▮ 29% ▮ · ·
1	B	483	2% ▮ 65% ▮ 29% ▮ · ·
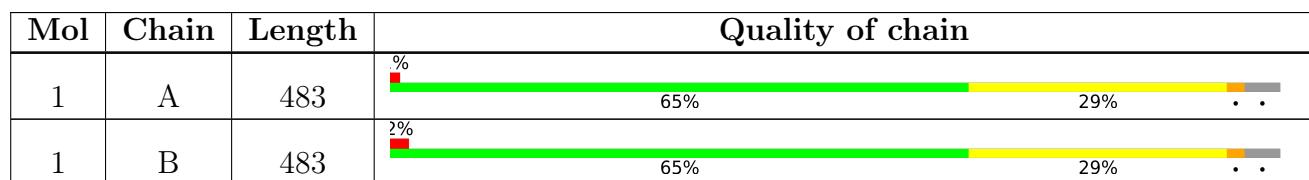
The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	PLG	A	500[B]	-	X	X	-
4	PLP	B	600	-	X	-	-

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 7352 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 Serine hydroxymethyltransferase, cytosolic.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	463	Total 3585	C 2256	N 642	O 669	S 18	0	1	0
1	B	466	Total 3605	C 2268	N 645	O 674	S 18	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	75	GLN	GLU	engineered mutation	UNP P07511
B	75	GLN	GLU	engineered mutation	UNP P07511

- Molecule 2 is N-GLYCINE-[3-HYDROXY-2-METHYL-5-PHOSPHONOOXYMETHYL-PYRIDIN-4-YL-METHANE] (three-letter code: PLG) (formula: $C_{10}H_{15}N_2O_7P$).
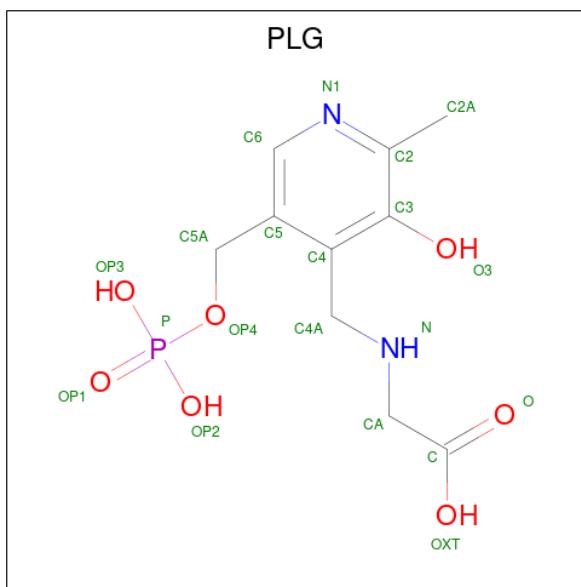
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 40	C 20	N 4	O 14	P 2	0	1

- Molecule 3 is PHOSPHATE ION (three-letter code: PO4) (formula: O_4P).

PO4
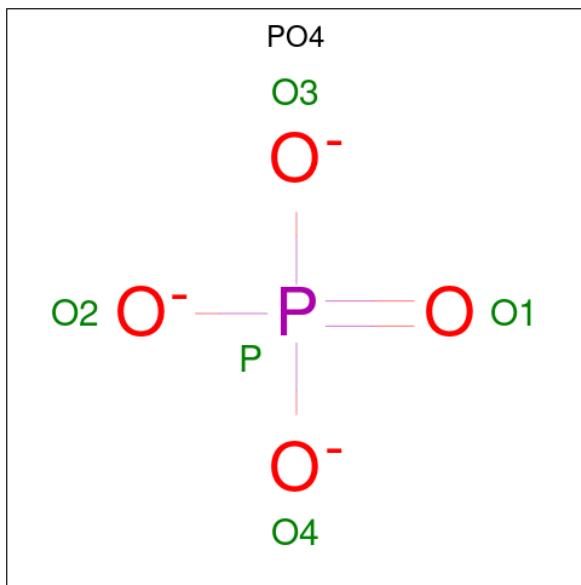
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total 5	O 4	P 1	0	0

- Molecule 4 is PYRIDOXAL-5'-PHOSPHATE (three-letter code: PLP) (formula: $C_8H_{10}NO_6P$).

PLP
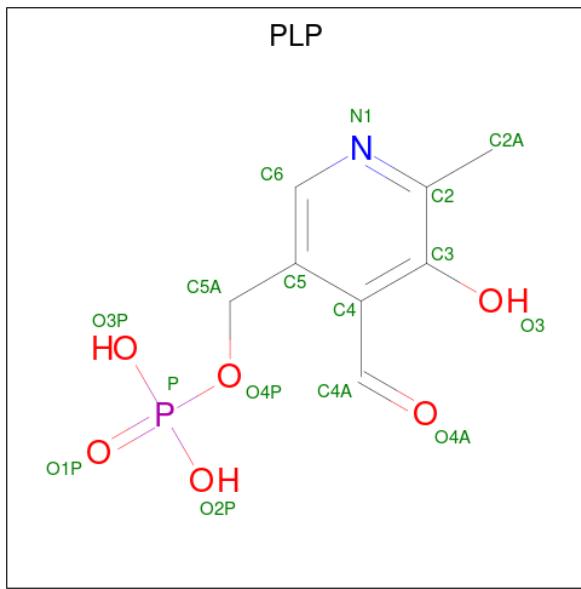
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	B	1	Total 15	C 8	N 1	O 5	P 1	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	52	Total 52	O 52	0	0
5	B	50	Total 50	O 50	0	0

3 Residue-property plots ⓘ

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: Serine hydroxymethyltransferase, cytosolic

Chain A:

• Molecule 1: Serine hydroxymethyltransferase, cytosolic

Chain B:
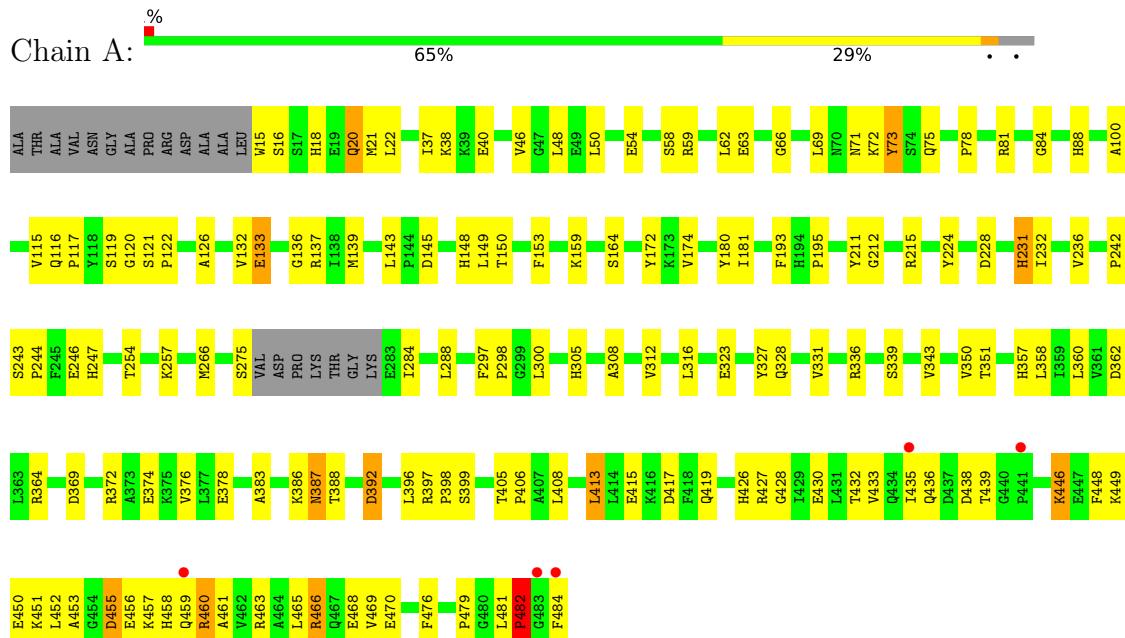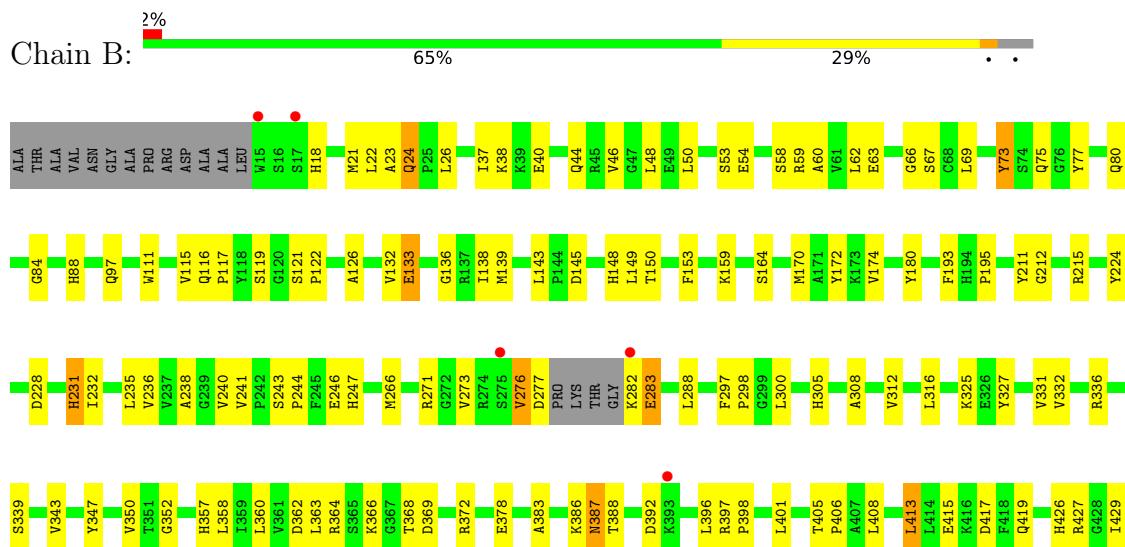
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α, β, γ	114.70Å 114.70Å 156.37Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	27.16 – 2.90	Depositor
	27.15 – 2.90	EDS
% Data completeness	92.7 (27.16-2.90)	Depositor
(in resolution range)	92.8 (27.15-2.90)	EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.19	Depositor
$< I/\sigma(I) >$ [1]	2.57 (at 2.89Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.220 , 0.283	Depositor
	0.219 , (Not available)	DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å^2)	35.7	Xtriage
Anisotropy	0.372	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.26 , 32.4	EDS
L-test for twinning[2]	$< |L| > = 0.51, < L^2 > = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	7352	wwPDB-VP
Average B, all atoms (Å^2)	33.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.99% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5   Model quality ⓘ

5.1   Standard geometry ⓘ

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

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	0.37	0/3663	0.63	2/4948 (0.0%)
1	B	0.38	0/3678	0.63	1/4969 (0.0%)
All	All	0.38	0/7341	0.63	3/9917 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	460	ARG	NE-CZ-NH2	-6.31	117.14	120.30
1	A	460	ARG	NE-CZ-NH1	6.02	123.31	120.30
1	B	460	ARG	NE-CZ-NH1	-5.12	117.74	120.30

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	3585	0	3566	148	0
1	B	3605	0	3584	121	0
2	A	40	0	21	8	0
3	B	5	0	0	0	0
4	B	15	0	6	1	0
5	A	52	0	0	6	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	B	50	0	0	3	0
All	All	7352	0	7177	248	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 17.

All (248) 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:257[B]:LYS:NZ	2:A:500[B]:PLG:H4A2	1.41	1.34
1:A:15:TRP:HD1	1:A:16:SER:H	1.04	0.99
1:A:257[B]:LYS:HZ3	2:A:500[B]:PLG:C4A	1.74	0.99
1:B:277:ASP:HB3	1:B:282:LYS:HB3	1.45	0.98
1:A:257[B]:LYS:HZ3	2:A:500[B]:PLG:H4A2	0.87	0.98
1:A:275:SER:HB3	1:A:284:ILE:HD11	1.50	0.93
1:A:257[B]:LYS:NZ	2:A:500[B]:PLG:C4A	2.31	0.90
1:B:59:ARG:HG3	1:B:481:LEU:HD23	1.55	0.87
1:A:386:LYS:HD2	1:A:398:PRO:HG3	1.58	0.83
1:A:257[B]:LYS:HZ1	2:A:500[B]:PLG:H4A2	1.43	0.82
1:A:466:ARG:HD3	1:A:470:GLU:OE2	1.80	0.82
1:A:59:ARG:HG3	1:A:481:LEU:HD23	1.61	0.82
1:A:436:GLN:O	1:A:439:THR:HG22	1.80	0.82
1:B:387:ASN:HD22	1:B:388:THR:N	1.79	0.80
1:A:387:ASN:HD22	1:A:388:THR:N	1.80	0.79
1:A:15:TRP:CD1	1:A:16:SER:N	2.51	0.79
1:A:15:TRP:HD1	1:A:16:SER:N	1.82	0.78
1:B:466:ARG:HD3	1:B:470:GLU:OE2	1.83	0.78
1:A:484:PHE:CZ	1:B:67:SER:HA	2.20	0.76
1:B:386:LYS:HD2	1:B:398:PRO:HG3	1.67	0.76
1:B:444:THR:HG23	1:B:447:GLU:H	1.51	0.74
1:B:143:LEU:HD21	1:B:149:LEU:HD23	1.69	0.74
1:A:428:GLY:O	1:A:432:THR:HG23	1.88	0.74
1:A:172:TYR:HB2	5:A:521:HOH:O	1.87	0.73
1:B:159:LYS:HD3	1:B:164:SER:O	1.89	0.73
1:A:159:LYS:HD3	1:A:164:SER:O	1.89	0.72
1:B:350:VAL:HG21	1:B:360:LEU:HD23	1.70	0.72
1:A:350:VAL:HG12	1:A:351:THR:HG23	1.72	0.70
1:B:415:GLU:O	1:B:419:GLN:HG3	1.91	0.70
1:B:413:LEU:HD22	1:B:476:PHE:CE2	2.27	0.69
1:A:327:TYR:HB2	1:B:18:HIS:CD2	2.27	0.69
1:B:59:ARG:HG3	1:B:481:LEU:CD2	2.24	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:132:VAL:O	1:A:133:GLU:HB2	1.94	0.67
1:A:145:ASP:OD2	1:A:174:VAL:HG22	1.94	0.67
1:B:132:VAL:O	1:B:133:GLU:HB2	1.93	0.66
1:A:415:GLU:O	1:A:419:GLN:HG3	1.95	0.66
1:A:376:VAL:HB	1:A:432:THR:HG22	1.76	0.66
1:B:387:ASN:HD22	1:B:387:ASN:C	1.97	0.66
1:B:224:TYR:CE1	1:B:288:LEU:HD21	2.31	0.66
1:A:143:LEU:HD21	1:A:149:LEU:HD23	1.77	0.66
1:A:387:ASN:HD22	1:A:387:ASN:C	1.97	0.65
1:A:372:ARG:HH21	1:A:397:ARG:NH1	1.95	0.64
1:B:59:ARG:O	1:B:63:GLU:HG3	1.97	0.64
1:B:372:ARG:HH21	1:B:397:ARG:NH1	1.96	0.64
1:A:139:MET:HG3	1:A:195:PRO:HB3	1.80	0.64
1:B:148:HIS:HD2	1:B:150:THR:OG1	1.81	0.64
1:A:376:VAL:CB	1:A:432:THR:HG22	2.28	0.64
1:B:273:VAL:HG13	1:B:283:GLU:HG3	1.81	0.63
1:B:75:GLN:HB3	1:B:297:PHE:CZ	2.34	0.63
1:B:139:MET:HG3	1:B:195:PRO:HB3	1.81	0.62
1:A:232:ILE:O	1:A:236:VAL:HG23	2.00	0.62
1:B:336:ARG:HG3	1:B:336:ARG:HH11	1.64	0.62
1:A:336:ARG:HG3	1:A:336:ARG:HH11	1.64	0.62
1:A:73:TYR:HB2	1:B:54:GLU:OE2	1.99	0.62
1:B:405:THR:N	1:B:406:PRO:CD	2.63	0.61
1:A:224:TYR:CE1	1:A:288:LEU:HD21	2.35	0.61
1:A:339:SER:O	1:A:343:VAL:HG23	2.00	0.61
1:A:405:THR:N	1:A:406:PRO:CD	2.64	0.60
1:B:444:THR:HG22	1:B:447:GLU:OE1	2.00	0.60
1:B:97:GLN:NE2	5:B:638:HOH:O	2.32	0.60
1:B:308:ALA:O	1:B:312:VAL:HG23	2.02	0.60
1:B:232:ILE:O	1:B:236:VAL:HG23	2.01	0.60
1:A:446:LYS:O	1:A:450:GLU:HG3	2.02	0.59
1:A:308:ALA:O	1:A:312:VAL:HG23	2.02	0.59
1:A:242:PRO:HD2	5:A:562:HOH:O	2.03	0.59
1:B:38:LYS:NZ	1:B:483:GLY:O	2.28	0.59
1:A:148:HIS:HD2	1:A:150:THR:OG1	1.85	0.59
1:A:84:GLY:HA3	1:B:378:GLU:OE1	2.03	0.58
1:A:59:ARG:O	1:A:63:GLU:HG3	2.03	0.58
1:A:458:HIS:O	1:A:461:ALA:N	2.37	0.58
1:A:372:ARG:HB3	1:A:448:PHE:CE2	2.39	0.57
1:B:413:LEU:HD22	1:B:476:PHE:CD2	2.40	0.57
1:B:145:ASP:OD2	1:B:174:VAL:HG22	2.03	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:350:VAL:HG21	1:B:360:LEU:CD2	2.34	0.57
1:A:275:SER:HB3	1:A:284:ILE:CD1	2.28	0.57
1:A:405:THR:H	1:A:406:PRO:HD3	1.69	0.57
1:B:339:SER:O	1:B:343:VAL:HG23	2.05	0.57
1:A:22:LEU:HA	1:B:58:SER:HB2	1.87	0.56
1:A:121:SER:HB2	1:A:122:PRO:HD3	1.86	0.56
1:A:479:PRO:CG	1:B:22:LEU:HD13	2.35	0.56
1:B:80:GLN:HG2	1:B:80:GLN:O	2.05	0.56
1:B:228:ASP:CG	4:B:600:PLP:H2A2	2.26	0.56
1:B:358:LEU:C	1:B:358:LEU:HD12	2.25	0.56
1:A:358:LEU:HD12	1:A:358:LEU:C	2.27	0.55
1:A:71:ASN:HA	5:A:613:HOH:O	2.06	0.55
1:A:446:LYS:HA	1:A:449:LYS:HG2	1.88	0.55
1:B:405:THR:H	1:B:406:PRO:HD3	1.70	0.55
1:A:59:ARG:HD3	1:B:23:ALA:O	2.06	0.55
1:A:62:LEU:HD13	1:B:66:GLY:O	2.06	0.55
1:A:327:TYR:O	1:A:331:VAL:HG23	2.07	0.55
1:A:66:GLY:O	1:B:62:LEU:HD13	2.06	0.55
1:A:59:ARG:HG3	1:A:481:LEU:CD2	2.34	0.55
1:A:275:SER:O	1:A:284:ILE:HG12	2.07	0.54
1:A:413:LEU:HD22	1:A:476:PHE:CE2	2.41	0.54
1:B:405:THR:N	1:B:406:PRO:HD3	2.23	0.54
1:A:457:LYS:HD3	1:A:457:LYS:N	2.23	0.54
1:A:115:VAL:HG12	1:A:266:MET:CE	2.37	0.54
1:A:433:VAL:O	1:A:436:GLN:HB3	2.08	0.54
1:B:231:HIS:HD2	1:B:357:HIS:NE2	2.06	0.54
1:A:479:PRO:HB3	1:B:22:LEU:HD13	1.91	0.53
1:B:446:LYS:O	1:B:450:GLU:HG3	2.09	0.53
1:A:54:GLU:OE2	1:B:73:TYR:HB2	2.08	0.53
1:A:231:HIS:HD2	1:A:357:HIS:NE2	2.06	0.53
1:B:429:ILE:O	1:B:433:VAL:HG23	2.09	0.53
1:A:21:MET:HG3	5:A:655:HOH:O	2.09	0.52
1:A:38:LYS:HG3	1:A:484:PHE:O	2.08	0.52
1:B:211:TYR:CZ	1:B:244:PRO:HB3	2.45	0.52
1:B:413:LEU:HD13	1:B:417:ASP:HB3	1.92	0.52
1:B:350:VAL:HG23	1:B:360:LEU:O	2.09	0.52
1:B:427:ARG:HH22	1:B:468:GLU:CD	2.13	0.52
1:A:378:GLU:OE1	1:B:84:GLY:HA3	2.10	0.52
1:B:37:ILE:HG21	1:B:484:PHE:CE1	2.45	0.52
1:A:413:LEU:HD13	1:A:417:ASP:HB3	1.92	0.51
1:A:465:LEU:O	1:A:469:VAL:HG23	2.11	0.51

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Full wwPDB X-ray Structure Validation Report

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:327:TYR:O	1:B:331:VAL:HG23	2.10	0.51
1:A:405:THR:N	1:A:406:PRO:HD3	2.25	0.51
1:B:119:SER:C	1:B:122:PRO:HD2	2.31	0.51
1:A:257[B]:LYS:HZ1	2:A:500[B]:PLG:HA2	1.76	0.51
1:A:460:ARG:HA	1:A:463:ARG:NH1	2.25	0.51
1:A:16:SER:O	1:A:20:GLN:NE2	2.44	0.50
1:A:211:TYR:CZ	1:A:244:PRO:HB3	2.46	0.50
1:B:121:SER:HB2	1:B:122:PRO:HD3	1.94	0.50
1:A:408:LEU:HB3	1:A:413:LEU:HG	1.93	0.50
1:A:451:LYS:HE3	1:A:455:ASP:OD2	2.11	0.50
1:B:297:PHE:CD1	1:B:298:PRO:HA	2.47	0.50
1:B:111:TRP:O	1:B:271:ARG:NH2	2.43	0.49
1:B:369:ASP:HB2	1:B:398:PRO:O	2.13	0.49
1:B:444:THR:CG2	1:B:447:GLU:HG3	2.42	0.49
1:A:336:ARG:HG3	1:A:336:ARG:NH1	2.27	0.49
1:B:460:ARG:HA	1:B:463:ARG:NH1	2.28	0.49
1:A:435:ILE:HB	1:A:448:PHE:CE1	2.47	0.48
1:B:273:VAL:CG1	1:B:283:GLU:HG3	2.43	0.48
1:A:362:ASP:OD1	1:A:364:ARG:HB2	2.14	0.48
1:B:115:VAL:HG12	1:B:266:MET:CE	2.43	0.48
1:B:408:LEU:HB3	1:B:413:LEU:HG	1.95	0.48
1:B:336:ARG:HG3	1:B:336:ARG:NH1	2.27	0.48
1:A:369:ASP:HB2	1:A:398:PRO:O	2.13	0.48
1:B:77:TYR:HB2	1:B:80:GLN:NE2	2.29	0.48
1:A:58:SER:HB3	1:B:22:LEU:HD23	1.95	0.48
1:A:350:VAL:HG21	1:A:360:LEU:HD23	1.96	0.47
1:B:362:ASP:OD1	1:B:364:ARG:HB2	2.14	0.47
1:A:116:GLN:N	1:A:117:PRO:CD	2.78	0.47
1:A:257[B]:LYS:HZ1	2:A:500[B]:PLG:CA	2.28	0.47
1:B:116:GLN:N	1:B:117:PRO:CD	2.77	0.47
1:A:88:HIS:HD2	1:B:40:GLU:HA	1.79	0.47
1:A:413:LEU:HD23	1:A:413:LEU:H	1.78	0.47
1:A:40:GLU:HA	1:B:88:HIS:HD2	1.79	0.47
1:B:18:HIS:O	1:B:21:MET:HB3	2.13	0.47
1:A:435:ILE:CG2	1:A:451:LYS:HB3	2.45	0.47
1:B:132:VAL:HG21	1:B:138:ILE:HD11	1.96	0.47
1:A:396:LEU:N	1:A:396:LEU:HD22	2.30	0.47
1:B:246:GLU:HB3	1:B:247:HIS:CE1	2.50	0.47
1:A:115:VAL:HG12	1:A:266:MET:HE3	1.96	0.46
1:A:435:ILE:HD13	1:A:452:LEU:HA	1.96	0.46
1:B:115:VAL:HG12	1:B:266:MET:HE2	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:372:ARG:HB3	1:B:448:PHE:CZ	2.51	0.46
1:A:413:LEU:HD22	1:A:476:PHE:CD2	2.50	0.46
1:A:427:ARG:HH22	1:A:468:GLU:CD	2.19	0.46
1:B:238:ALA:HA	1:B:325:LYS:HD3	1.98	0.46
1:A:481:LEU:HD12	1:A:484:PHE:CZ	2.50	0.46
1:B:363:LEU:HD11	1:B:401:LEU:CD1	2.46	0.46
1:A:18:HIS:NE2	1:B:327:TYR:HB2	2.31	0.45
1:A:479:PRO:CB	1:B:22:LEU:HD13	2.46	0.45
1:A:376:VAL:CG1	1:A:432:THR:HG22	2.47	0.45
1:B:465:LEU:O	1:B:469:VAL:HG23	2.16	0.45
1:A:236:VAL:HG13	1:A:243:SER:HA	1.98	0.45
1:A:458:HIS:C	1:A:460:ARG:N	2.69	0.45
1:A:48:LEU:HD12	1:A:469:VAL:HG13	1.99	0.45
1:A:132:VAL:CG1	1:A:136:GLY:HA3	2.47	0.45
1:A:46:VAL:O	1:A:470:GLU:HG2	2.17	0.45
1:A:69:LEU:HD11	1:B:37:ILE:HG12	1.98	0.45
1:A:455:ASP:OD1	1:A:457:LYS:HG2	2.17	0.45
1:A:100:ALA:HA	1:A:316:LEU:HD13	1.99	0.45
1:A:132:VAL:HG12	1:A:136:GLY:HA3	1.98	0.45
1:B:172:TYR:HA	5:B:647:HOH:O	2.17	0.45
1:B:387:ASN:C	1:B:387:ASN:ND2	2.68	0.45
1:B:126:ALA:HA	1:B:300:LEU:CD1	2.47	0.44
1:B:26:LEU:HD23	1:B:484:PHE:HZ	1.81	0.44
1:A:126:ALA:HA	1:A:300:LEU:CD1	2.48	0.44
1:B:23:ALA:O	1:B:24:GLN:C	2.56	0.44
1:A:350:VAL:C	1:A:351:THR:HG23	2.38	0.44
1:A:481:LEU:O	1:A:482:PRO:C	2.55	0.44
1:A:50:LEU:HB2	1:A:383:ALA:O	2.17	0.44
1:A:75:GLN:HB3	1:A:297:PHE:CZ	2.53	0.44
1:A:139:MET:HE2	1:A:195:PRO:HG3	1.99	0.44
1:A:297:PHE:CD1	1:A:298:PRO:HA	2.53	0.44
1:B:143:LEU:HD22	1:B:153:PHE:CD1	2.53	0.44
1:A:212:GLY:HA2	1:A:247:HIS:CD2	2.53	0.43
1:A:458:HIS:O	1:A:459:GLN:C	2.54	0.43
1:B:426:HIS:O	1:B:430:GLU:HG3	2.18	0.43
1:A:115:VAL:HG12	1:A:266:MET:HE2	2.00	0.43
1:B:212:GLY:HA2	1:B:247:HIS:CD2	2.54	0.43
1:A:78:PRO:HG3	1:A:81:ARG:NH2	2.34	0.43
1:A:266:MET:HE1	1:A:316:LEU:HD11	1.99	0.43
1:B:276:VAL:HB	1:B:277:ASP:H	1.60	0.43
1:A:453:ALA:HA	1:A:459:GLN:NE2	2.33	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:236:VAL:HG13	1:B:243:SER:HA	2.01	0.43
1:A:119:SER:C	1:A:122:PRO:HD2	2.38	0.43
1:A:426:HIS:O	1:A:430:GLU:HG3	2.18	0.43
1:B:442:ARG:HD3	1:B:442:ARG:HA	1.82	0.43
1:A:100:ALA:HB2	1:A:266:MET:HE1	2.00	0.43
1:B:132:VAL:CG1	1:B:136:GLY:HA3	2.49	0.43
1:B:174:VAL:HB	1:B:180:TYR:O	2.18	0.43
1:A:143:LEU:HD22	1:A:153:PHE:CD1	2.54	0.43
1:A:174:VAL:HG12	1:A:181:ILE:HA	2.01	0.43
1:A:387:ASN:C	1:A:387:ASN:ND2	2.68	0.43
1:A:228:ASP:CG	2:A:500[A]:PLG:H2A2	2.39	0.43
1:A:246:GLU:HB3	1:A:247:HIS:CE1	2.54	0.43
1:A:37:ILE:HG12	1:B:69:LEU:HD11	2.01	0.42
1:B:46:VAL:O	1:B:470:GLU:HG2	2.19	0.42
1:B:139:MET:HE2	1:B:195:PRO:HG3	2.01	0.42
1:B:170:MET:HE1	1:B:193:PHE:HB2	2.02	0.42
1:A:18:HIS:CD2	1:B:327:TYR:HB2	2.55	0.42
1:A:388:THR:HG22	1:A:398:PRO:HB3	2.01	0.42
1:A:456:GLU:O	1:A:460:ARG:HB3	2.19	0.42
1:B:240:VAL:O	1:B:240:VAL:HG12	2.20	0.42
1:B:48:LEU:HD12	1:B:469:VAL:HG13	2.01	0.42
1:A:456:GLU:O	1:A:460:ARG:CB	2.68	0.42
1:A:376:VAL:HG11	1:A:432:THR:HG22	2.01	0.42
1:A:458:HIS:O	1:A:460:ARG:N	2.53	0.42
1:A:174:VAL:HB	1:A:180:TYR:O	2.19	0.42
1:A:172:TYR:HA	5:A:547:HOH:O	2.20	0.42
1:A:413:LEU:N	1:A:413:LEU:CD2	2.83	0.42
1:A:392:ASP:OD1	1:A:399:SER:OG	2.25	0.41
1:A:323:GLU:HB3	1:B:18:HIS:HB2	2.02	0.41
1:B:445:LEU:O	1:B:449:LYS:HG3	2.19	0.41
1:A:350:VAL:O	1:A:351:THR:HG23	2.20	0.41
1:B:368:THR:HG23	1:B:369:ASP:N	2.35	0.41
5:A:551:HOH:O	1:B:60:ALA:HB2	2.19	0.41
1:B:235:LEU:HB3	1:B:241:VAL:HG22	2.02	0.41
1:B:396:LEU:N	1:B:396:LEU:HD22	2.34	0.41
1:A:120:GLY:HA3	1:A:254:THR:HG22	2.03	0.41
1:A:457:LYS:HD3	1:A:457:LYS:H	1.84	0.41
1:B:372:ARG:HB3	1:B:448:PHE:CE2	2.56	0.41
1:B:50:LEU:HB2	1:B:383:ALA:O	2.21	0.41
1:B:282:LYS:HA	1:B:282:LYS:HE2	2.02	0.41
1:A:72:LYS:HD2	5:B:557:HOH:O	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:374:GLU:OE2	1:A:386:LYS:HG2	2.21	0.41
1:B:240:VAL:HG11	1:B:332:VAL:HG21	2.02	0.41
1:B:347:TYR:CE2	1:B:366:LYS:HG3	2.56	0.41
1:A:137:ARG:HB3	1:A:193:PHE:CE2	2.56	0.40
1:A:446:LYS:O	1:A:449:LYS:HG3	2.20	0.40
1:A:481:LEU:HD12	1:A:484:PHE:HZ	1.85	0.40
1:B:40:GLU:OE2	1:B:44:GLN:HG3	2.21	0.40
1:B:266:MET:HE1	1:B:316:LEU:HD11	2.02	0.40
1:A:433:VAL:O	1:A:436:GLN:CB	2.69	0.40
1:B:132:VAL:O	1:B:133:GLU:CB	2.64	0.40
1:B:413:LEU:H	1:B:413:LEU:HD23	1.86	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	460/483 (95%)	415 (90%)	41 (9%)	4 (1%)	17	48
1	B	462/483 (96%)	423 (92%)	33 (7%)	6 (1%)	12	37
All	All	922/966 (95%)	838 (91%)	74 (8%)	10 (1%)	14	42

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	392	ASP
1	A	482	PRO
1	B	392	ASP
1	B	276	VAL
1	A	455	ASP
1	B	482	PRO
1	B	24	GLN

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Mol	Chain	Res	Type
1	A	133	GLU
1	B	133	GLU
1	B	352	GLY

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	379/391 (97%)	367 (97%)	12 (3%)	39	73
1	B	381/391 (97%)	370 (97%)	11 (3%)	42	76
All	All	760/782 (97%)	737 (97%)	23 (3%)	41	75

All (23) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	20	GLN
1	A	73	TYR
1	A	215	ARG
1	A	231	HIS
1	A	305	HIS
1	A	328	GLN
1	A	387	ASN
1	A	413	LEU
1	A	438	ASP
1	A	446	LYS
1	A	466	ARG
1	A	482	PRO
1	B	53	SER
1	B	73	TYR
1	B	215	ARG
1	B	231	HIS
1	B	283	GLU
1	B	305	HIS
1	B	387	ASN
1	B	413	LEU

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Mol	Chain	Res	Type
1	B	439	THR
1	B	466	ARG
1	B	484	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	71	ASN
1	A	102	GLN
1	A	109	GLN
1	A	148	HIS
1	A	231	HIS
1	A	287	ASN
1	A	328	GLN
1	A	387	ASN
1	A	459	GLN
1	A	467	GLN
1	B	71	ASN
1	B	80	GLN
1	B	102	GLN
1	B	109	GLN
1	B	148	HIS
1	B	231	HIS
1	B	287	ASN
1	B	328	GLN
1	B	330	GLN
1	B	387	ASN
1	B	459	GLN
1	B	467	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 monosaccharides in this entry.

5.6　Ligand geometry　ⓘ

4 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	PO4	B	601	-	4,4,4	1.71	0	6,6,6	0.44	0
2	PLG	A	500[B]	-	20,20,20	5.40	13 (65%)	25,28,28	3.14	13 (52%)
4	PLP	B	600	1	15,15,16	4.66	10 (66%)	20,22,23	2.90	9 (45%)
2	PLG	A	500[A]	1	20,20,20	4.14	11 (55%)	25,28,28	2.81	9 (36%)

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	PLG	A	500[B]	-	-	2/12/12/12	0/1/1/1
4	PLP	B	600	1	-	1/6/6/8	0/1/1/1
2	PLG	A	500[A]	1	-	2/12/12/12	0/1/1/1

All (34) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	500[B]	PLG	C4A-C4	-15.52	1.32	1.51
2	A	500[A]	PLG	C3-C4	10.32	1.55	1.40
2	A	500[B]	PLG	C3-C4	10.11	1.55	1.40
4	B	600	PLP	C4A-C4	-8.66	1.33	1.51
2	A	500[A]	PLG	C3-C2	8.58	1.49	1.40
2	A	500[B]	PLG	C3-C2	8.48	1.49	1.40
4	B	600	PLP	C3-C2	7.38	1.48	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	600	PLP	C3-C4	7.29	1.55	1.40
4	B	600	PLP	P-O4P	-6.26	1.40	1.60
4	B	600	PLP	C5-C4	6.11	1.47	1.40
2	A	500[B]	PLG	C5-C4	5.84	1.48	1.40
2	A	500[A]	PLG	C5-C4	5.76	1.48	1.40
2	A	500[A]	PLG	P-OP4	-5.32	1.43	1.60
2	A	500[B]	PLG	P-OP4	-5.11	1.43	1.60
2	A	500[A]	PLG	C6-C5	4.43	1.47	1.37
2	A	500[B]	PLG	C6-C5	4.40	1.46	1.37
2	A	500[B]	PLG	CA-C	4.17	1.60	1.51
2	A	500[B]	PLG	C2-N1	4.15	1.41	1.33
4	B	600	PLP	C2-N1	4.02	1.41	1.33
2	A	500[B]	PLG	P-OP3	-3.97	1.39	1.54
4	B	600	PLP	P-O3P	-3.89	1.39	1.54
2	A	500[A]	PLG	C2-N1	3.88	1.41	1.33
2	A	500[A]	PLG	CA-C	3.87	1.59	1.51
2	A	500[A]	PLG	P-OP3	-3.80	1.40	1.54
4	B	600	PLP	C6-C5	3.63	1.45	1.37
4	B	600	PLP	P-O2P	-3.34	1.42	1.54
2	A	500[A]	PLG	C4A-C4	3.31	1.56	1.51
2	A	500[B]	PLG	CA-N	-3.27	1.38	1.46
2	A	500[B]	PLG	P-OP2	-3.09	1.42	1.54
2	A	500[A]	PLG	C6-N1	3.05	1.40	1.34
2	A	500[A]	PLG	P-OP2	-2.94	1.43	1.54
2	A	500[B]	PLG	C6-N1	2.84	1.40	1.34
4	B	600	PLP	C6-N1	2.76	1.40	1.34
2	A	500[B]	PLG	C5A-C5	2.32	1.57	1.50

All (31) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	600	PLP	O3P-P-O4P	8.21	128.58	106.73
2	A	500[A]	PLG	OP3-P-OP4	8.03	128.10	106.73
2	A	500[B]	PLG	OP3-P-OP4	8.01	128.06	106.73
2	A	500[A]	PLG	OP4-C5A-C5	7.51	123.67	109.35
2	A	500[B]	PLG	C4A-N-CA	6.57	119.44	112.58
2	A	500[B]	PLG	OP4-C5A-C5	6.12	121.02	109.35
4	B	600	PLP	O4P-C5A-C5	5.30	119.44	109.35
2	A	500[B]	PLG	C4-C4A-N	4.79	120.53	111.58
2	A	500[B]	PLG	C6-N1-C2	4.08	126.73	119.17
4	B	600	PLP	C6-N1-C2	3.96	126.49	119.17
2	A	500[A]	PLG	C6-N1-C2	3.93	126.45	119.17

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	B	600	PLP	C4A-C4-C5	-3.87	116.95	120.94
2	A	500[B]	PLG	O3-C3-C2	3.61	125.36	117.49
2	A	500[A]	PLG	O3-C3-C2	3.41	124.93	117.49
4	B	600	PLP	O3-C3-C2	3.38	124.86	117.49
2	A	500[A]	PLG	C4A-N-CA	-3.05	109.40	112.58
2	A	500[A]	PLG	OXT-C-CA	2.79	122.43	112.74
2	A	500[B]	PLG	C4A-C4-C3	2.75	122.99	120.04
2	A	500[B]	PLG	C5-C6-N1	-2.69	119.33	123.82
4	B	600	PLP	C5-C6-N1	-2.66	119.39	123.82
2	A	500[B]	PLG	OXT-C-CA	2.38	121.02	112.74
2	A	500[B]	PLG	C4A-C4-C5	-2.30	117.15	119.71
2	A	500[A]	PLG	C5-C6-N1	-2.28	120.03	123.82
4	B	600	PLP	O3P-P-O1P	-2.25	101.87	110.68
2	A	500[A]	PLG	C3-C2-N1	-2.25	117.86	120.77
2	A	500[B]	PLG	OP3-P-OP1	-2.11	102.42	110.68
2	A	500[A]	PLG	OXT-C-O	-2.11	118.04	123.30
2	A	500[B]	PLG	OXT-C-O	-2.06	118.16	123.30
4	B	600	PLP	C3-C2-N1	-2.06	118.10	120.77
4	B	600	PLP	C4-C3-C2	-2.01	117.10	120.07
2	A	500[B]	PLG	C4-C3-C2	-2.00	116.99	120.06

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	500[B]	PLG	C5-C4-C4A-N
2	A	500[A]	PLG	C4-C4A-N-CA
2	A	500[B]	PLG	C3-C4-C4A-N
4	B	600	PLP	C4-C5-C5A-O4P
2	A	500[A]	PLG	O-C-CA-N

There are no ring outliers.

3 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	500[B]	PLG	7	0
4	B	600	PLP	1	0
2	A	500[A]	PLG	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 then 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.

Ligand PLG A 500 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand PLG A 500 (A)

Bond lengths

Bond angles

Torsions

Rings
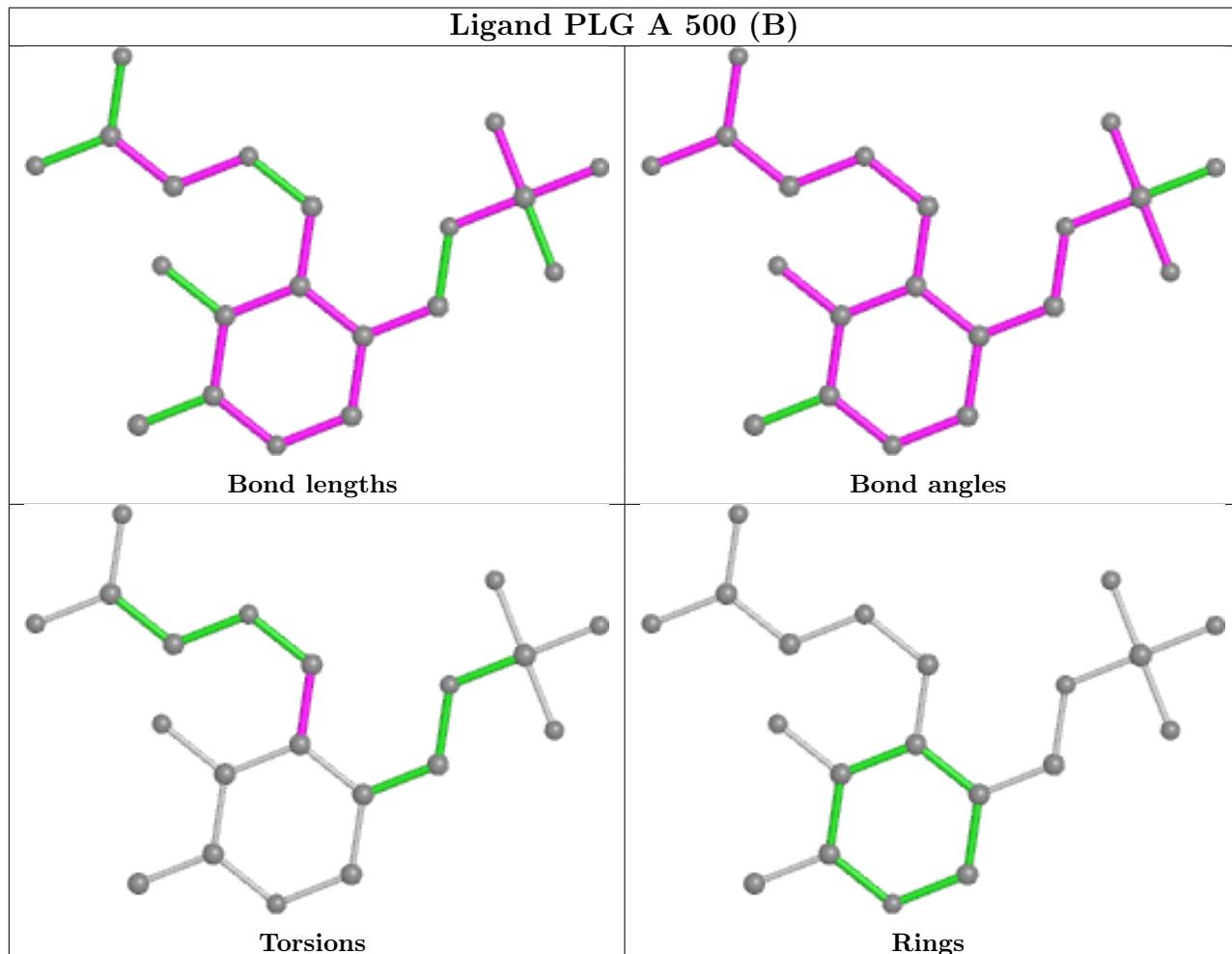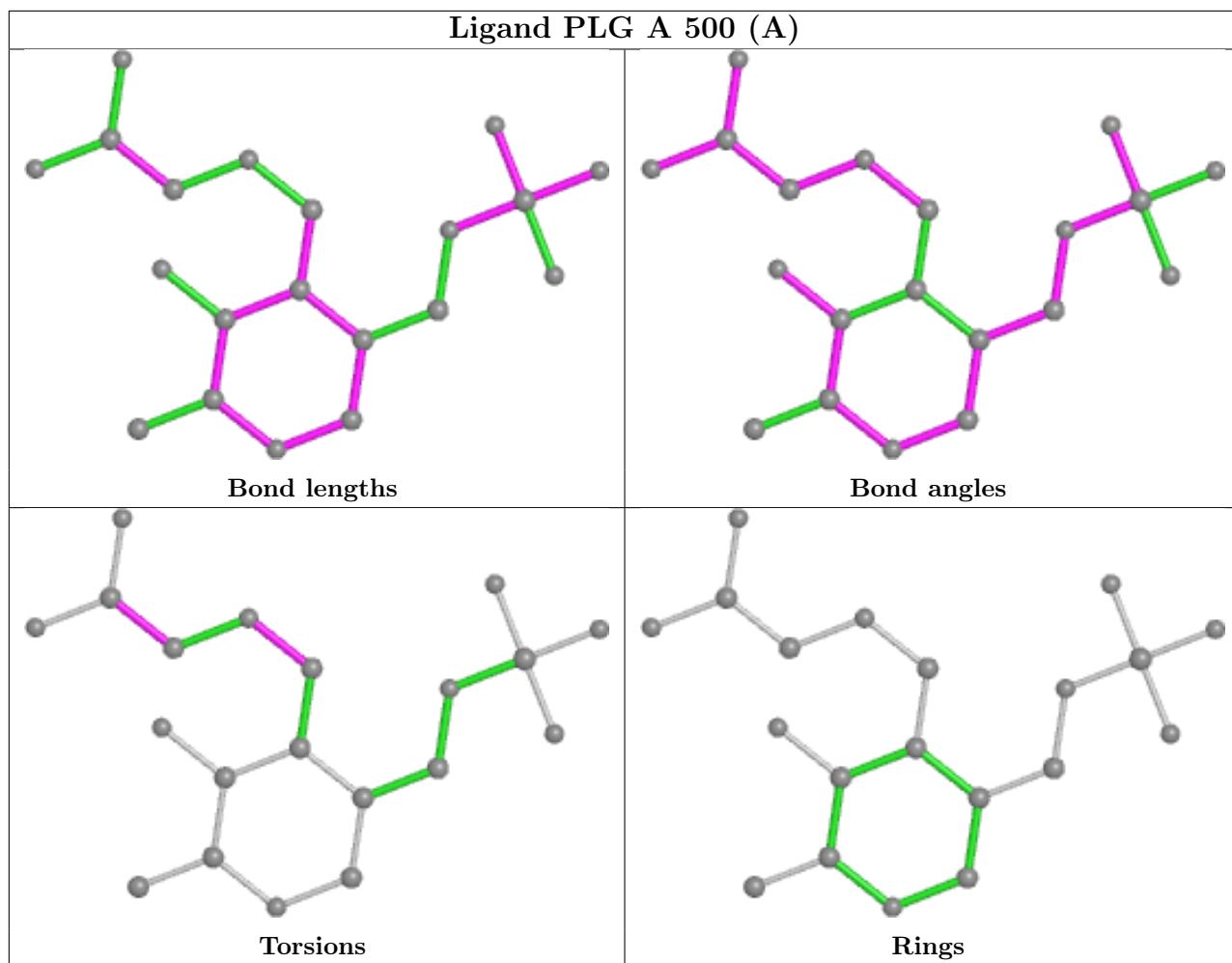
5.7 Other polymers ⓘ

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(Å²)	Q<0.9
1	A	463/483 (95%)	-0.31	5 (1%)	80	80	4, 27, 78, 151	0
1	B	466/483 (96%)	-0.36	8 (1%)	70	69	2, 26, 72, 140	0
All	All	929/966 (96%)	-0.34	13 (1%)	75	75	2, 26, 77, 151	0

All (13) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	484	PHE	3.9
1	B	483	GLY	3.7
1	A	459	GLN	3.4
1	B	484	PHE	3.3
1	B	393	LYS	3.1
1	A	441	PRO	2.7
1	B	17	SER	2.7
1	B	15	TRP	2.6
1	A	435	ILE	2.6
1	B	442	ARG	2.3
1	B	282	LYS	2.2
1	A	483	GLY	2.1
1	B	275	SER	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 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
2	PLG	A	500[A]	20/20	0.94	0.21	29,32,53,53	20
2	PLG	A	500[B]	20/20	0.94	0.21	26,30,68,68	20
3	PO4	B	601	5/5	0.94	0.18	69,70,71,71	0
4	PLP	B	600	15/16	0.95	0.17	24,26,29,30	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 PLG A 500 (A):

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

Electron density around PLG A 500 (B):

$2mF_o$-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 ⓘ

There are no such residues in this entry.