WORLDWIDE PDB
PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

Aug 28, 2023 – 09:17 AM EDT

PDB ID	:	3KTX
Title	:	Crystal structure of Leishmania mexicana pyruvate kinase (LmPYK)in complex with 1,3,6,8-pyrenetetrasulfonic acid
Authors	:	Morgan, H.P.; Walkinshaw, M.D.
Deposited on	:	2009-11-26
Resolution	:	2.10 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 (i) 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 (i)) 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
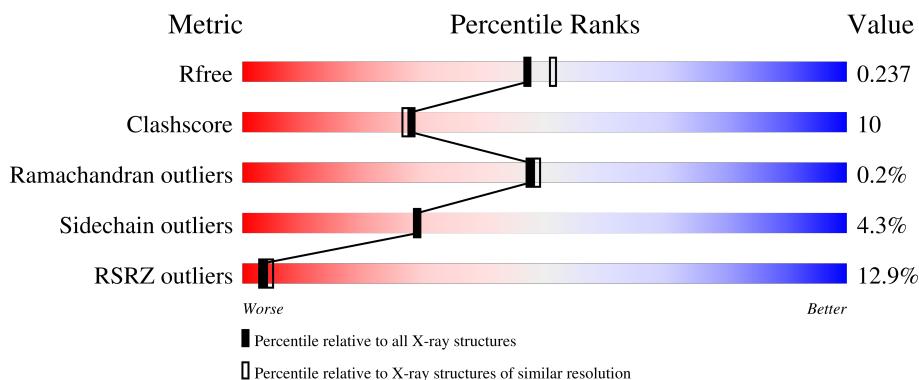
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION
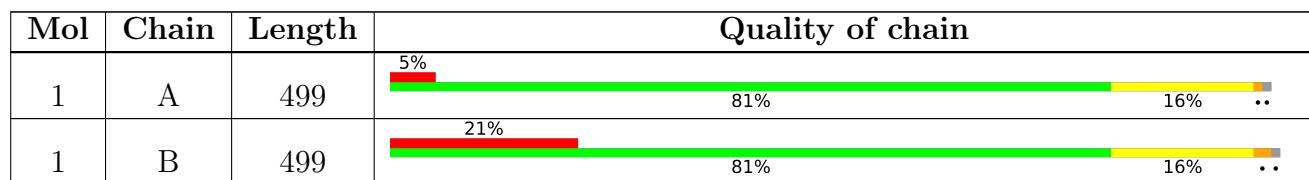
The reported resolution of this entry is 2.10 Å.

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
Rfree		0.237
Clashscore		10
Ramachandran outliers		0.2%
Sidechain outliers		4.3%
RSRZ outliers		12.9%

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))
R_{free}	130704	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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	499	5% ... 81% ... 16% ..
1	B	499	21% ... 81% ... 16% ..

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:

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	PTK	A	501	-	-	X	-

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 8214 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.
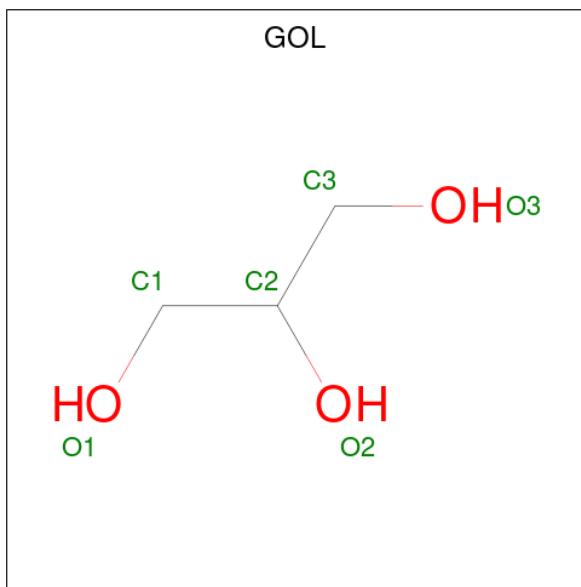
- Molecule 1 is a protein called Pyruvate kinase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	492	Total	C	N	O	S	0	0	0
			3753	2339	660	728	26			
1	B	492	Total	C	N	O	S	0	0	0
			3753	2339	660	728	26			

There are 8 discrepancies between the modelled and reference sequences:
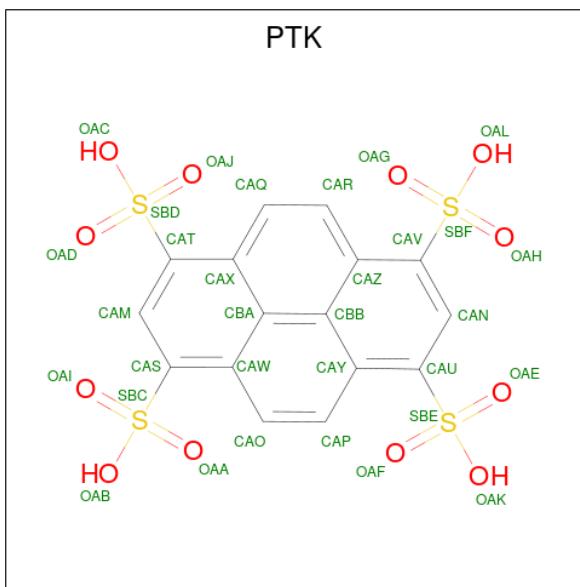
Chain	Residue	Modelled	Actual	Comment	Reference
A	382	SER	GLY	conflict	UNP Q27686
A	389	TYR	SER	conflict	UNP Q27686
A	404	ARG	ALA	conflict	UNP Q27686
A	405	SER	GLY	conflict	UNP Q27686
B	382	SER	GLY	conflict	UNP Q27686
B	389	TYR	SER	conflict	UNP Q27686
B	404	ARG	ALA	conflict	UNP Q27686
B	405	SER	GLY	conflict	UNP Q27686

- Molecule 2 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).

GOL

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

- Molecule 3 is pyrene-1,3,6,8-tetrasulfonic acid (three-letter code: PTK) (formula: $C_{16}H_{10}O_{12}S_4$).

PTK

OAC
HO
OAJ
S
SBD
CAQ　CAR
CAV
SBF
CAT
OAD
CAX
CAZ
CAM
CBA
CBB
CAN
CAS
CAW
CAY
CAU
OAE
SBC
S
SBE
S
HO
CAO　CAP
OAF
OH
OAA
OAK
OAB

OAG
O
OAL
OH
S
O
OAH

OAI
O

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	O	S	0	0
			32	16	12	4		
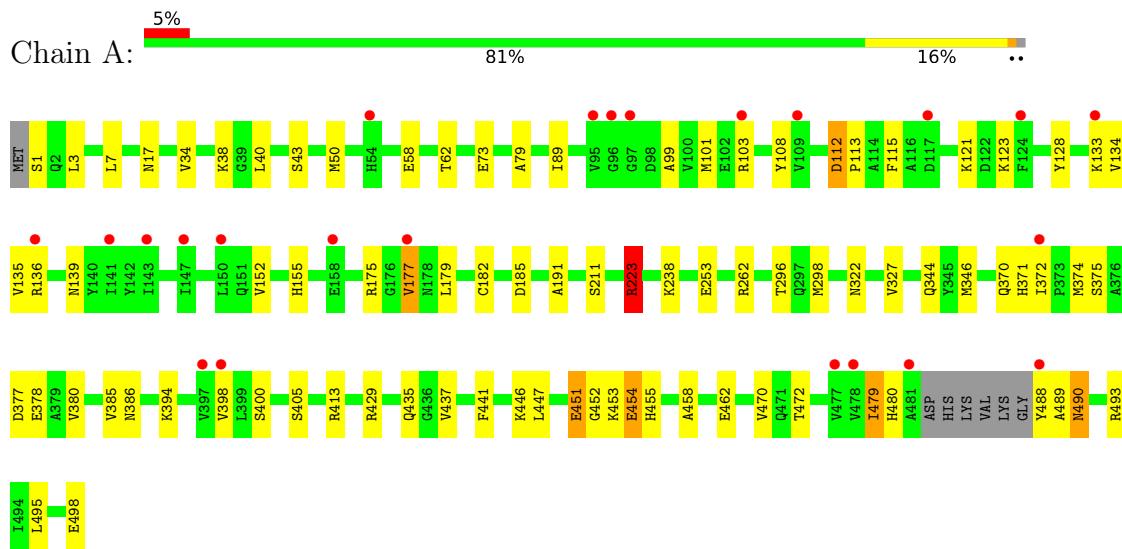
• Molecule 4 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	344	Total	O	0	0
			344	344		
4	B	296	Total	O	0	0
			296	296		

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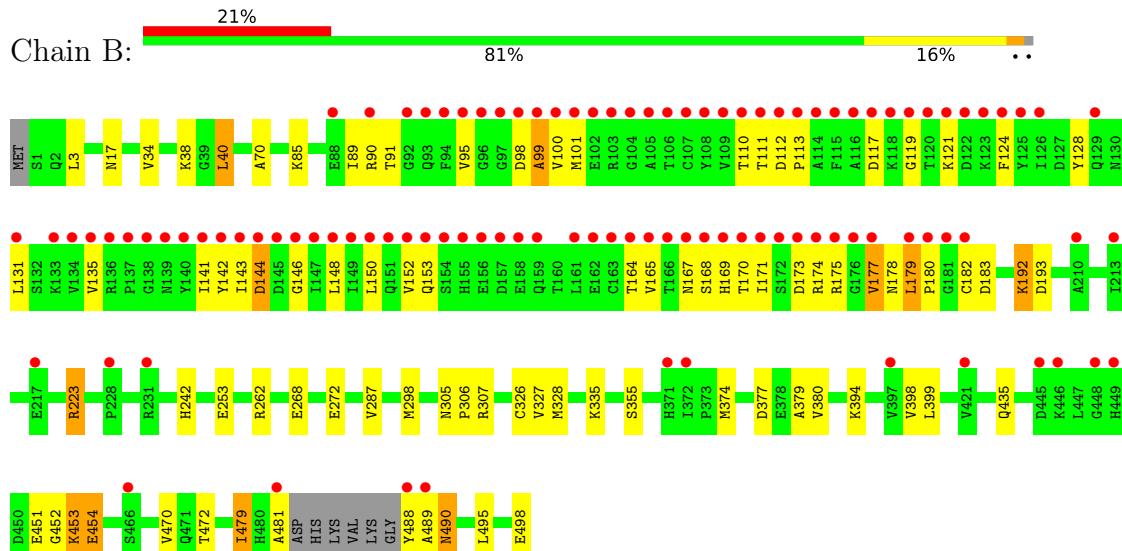
3 Residue-property plots ⓘ

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: Pyruvate kinase

Chain A:

- Molecule 1: Pyruvate kinase

Chain B:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α, β, γ	122.86Å 129.86Å 165.20Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.69 – 2.10 20.69 – 2.10	Depositor EDS
% Data completeness (in resolution range)	100.0 (20.69-2.10) 100.0 (20.69-2.10)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	0.08	Depositor
$< I/\sigma(I) >$ [1]	3.33 (at 2.09Å)	Xtriage
Refinement program	REFMAC 5.5.0072	Depositor
R, R_{free}	0.186 , 0.239 0.186 , 0.237	Depositor DCC
R_{free} test set	3865 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å^2)	32.6	Xtriage
Anisotropy	0.039	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.39 , 60.0	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	8214	wwPDB-VP
Average B, all atoms (Å^2)	44.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.61% 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: GOL, PTK

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	1.13	7/3808 (0.2%)	0.92	5/5154 (0.1%)
1	B	1.05	4/3808 (0.1%)	0.93	5/5154 (0.1%)
All	All	1.09	11/7616 (0.1%)	0.93	10/10308 (0.1%)

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	451	GLU	CG-CD	6.53	1.61	1.51
1	A	458	ALA	CA-CB	6.21	1.65	1.52
1	A	191	ALA	CA-CB	6.09	1.65	1.52
1	A	437	VAL	CB-CG2	5.83	1.65	1.52
1	A	441	PHE	CE2-CZ	5.68	1.48	1.37
1	B	326	CYS	CB-SG	-5.66	1.72	1.81
1	B	192	LYS	CE-NZ	5.64	1.63	1.49
1	A	58	GLU	CG-CD	5.61	1.60	1.51
1	B	355	SER	CB-OG	5.59	1.49	1.42
1	A	385	VAL	CB-CG2	5.21	1.63	1.52
1	B	272	GLU	CG-CD	5.06	1.59	1.51

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	99	ALA	CB-CA-C	21.84	142.85	110.10
1	B	99	ALA	N-CA-C	-7.84	89.83	111.00
1	A	223	ARG	NE-CZ-NH2	-7.18	116.71	120.30
1	A	112	ASP	CB-CG-OD1	6.26	123.94	118.30
1	B	495	LEU	CA-CB-CG	6.16	129.46	115.30
1	B	193	ASP	CB-CG-OD1	5.56	123.31	118.30
1	A	50	MET	CG-SD-CE	5.28	108.64	100.20
1	A	413	ARG	NE-CZ-NH2	-5.12	117.74	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	495	LEU	CA-CB-CG	5.06	126.94	115.30
1	B	40	LEU	CB-CG-CD1	5.01	119.51	111.00

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	3753	0	3752	67	0
1	B	3753	0	3752	72	0
2	A	30	0	40	2	0
2	B	6	0	8	3	0
3	A	32	0	10	10	0
4	A	344	0	0	12	0
4	B	296	0	0	6	0
All	All	8214	0	7562	150	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 10.

All (150) 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)
3:A:501:PTK:OAB	3:A:501:PTK:HAO	1.39	1.19
3:A:501:PTK:HAQ	3:A:501:PTK:OAJ	1.44	1.15
3:A:501:PTK:OAK	3:A:501:PTK:HAP	1.43	1.09
3:A:501:PTK:HAR	3:A:501:PTK:OAG	1.43	1.06
1:A:223:ARG:HD2	4:A:553:HOH:O	1.58	1.01
1:B:142:TYR:CE1	1:B:180:PRO:HG2	2.01	0.95
1:A:99:ALA:HB1	1:A:101:MET:CE	1.96	0.94
1:B:253:GLU:HG3	4:B:591:HOH:O	1.68	0.92
1:A:377:ASP:HB3	1:A:488:TYR:CD2	2.07	0.90
1:A:298:MET:CE	1:A:327:VAL:HB	2.07	0.84
1:A:455:HIS:HD2	4:A:559:HOH:O	1.61	0.83

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:99:ALA:HB1	1:A:101:MET:HE2	1.60	0.82
1:B:143:ILE:O	1:B:144:ASP:HB2	1.80	0.82
3:A:501:PTK:OAK	3:A:501:PTK:CAP	2.29	0.80
1:A:375:SER:OG	1:A:377:ASP:OD2	2.01	0.79
1:A:135:VAL:HG11	1:A:152:VAL:HG21	1.64	0.77
1:B:143:ILE:O	1:B:144:ASP:CB	2.32	0.77
1:A:298:MET:HE1	1:A:327:VAL:HB	1.68	0.76
3:A:501:PTK:OAB	3:A:501:PTK:CAO	2.26	0.76
1:A:99:ALA:CB	1:A:101:MET:CE	2.63	0.75
1:B:298:MET:HE3	1:B:327:VAL:HB	1.69	0.74
1:B:169:HIS:HD2	1:B:171:ILE:HG23	1.51	0.74
1:A:446:LYS:HE2	4:A:713:HOH:O	1.86	0.74
1:A:446:LYS:HE3	4:A:813:HOH:O	1.88	0.74
2:B:499:GOL:O3	4:B:743:HOH:O	1.78	0.74
1:A:398:VAL:HG13	1:A:479:ILE:HD13	1.68	0.74
1:A:472:THR:HG23	1:A:498:GLU:OXT	1.89	0.73
1:B:169:HIS:CD2	1:B:171:ILE:HG23	2.23	0.73
3:A:501:PTK:OAJ	3:A:501:PTK:CAQ	2.30	0.73
1:A:136:ARG:H	1:A:139:ASN:ND2	1.87	0.72
1:A:374:MET:HE1	1:A:378:GLU:HG3	1.73	0.71
1:B:121:LYS:HE3	4:B:715:HOH:O	1.92	0.70
1:B:135:VAL:HG11	1:B:152:VAL:HG21	1.74	0.70
1:A:253:GLU:HG3	4:A:761:HOH:O	1.91	0.70
1:B:100:VAL:HG22	1:B:170:THR:HG23	1.74	0.70
2:B:499:GOL:C3	4:B:743:HOH:O	2.36	0.70
1:A:298:MET:HE2	1:A:327:VAL:HB	1.74	0.69
1:B:142:TYR:CD1	1:B:180:PRO:HG2	2.27	0.69
1:A:377:ASP:HB3	1:A:488:TYR:CE2	2.29	0.68
1:B:479:ILE:HD11	1:B:489:ALA:HB1	1.76	0.66
1:A:155:HIS:HD2	4:A:811:HOH:O	1.78	0.65
1:A:490:ASN:H	1:A:490:ASN:HD22	1.43	0.65
1:B:394:LYS:HB2	1:B:470:VAL:HG12	1.79	0.65
1:A:1:SER:N	4:A:695:HOH:O	2.30	0.64
1:B:99:ALA:HB1	1:B:121:LYS:HB3	1.79	0.64
1:A:380:VAL:HG21	1:A:490:ASN:HA	1.80	0.63
1:A:101:MET:CE	1:A:121:LYS:HA	2.28	0.63
1:B:142:TYR:HB3	1:B:146:GLY:HA2	1.79	0.63
3:A:501:PTK:HAP	3:A:501:PTK:HOAK	1.61	0.62
1:B:90:ARG:HE	1:B:174:ARG:HB3	1.64	0.62
1:B:298:MET:HE3	1:B:327:VAL:CB	2.30	0.61
1:B:85:LYS:HD3	1:B:192:LYS:HD3	1.83	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:501:PTK:OAG	3:A:501:PTK:CAR	2.30	0.59
1:A:298:MET:HE1	1:A:327:VAL:CG1	2.32	0.59
1:B:298:MET:CE	1:B:327:VAL:HB	2.30	0.59
1:B:89:ILE:HB	1:B:177:VAL:HG22	1.84	0.59
1:A:298:MET:HE1	1:A:327:VAL:CB	2.33	0.58
1:A:479:ILE:HG12	1:A:480:HIS:N	2.18	0.58
1:B:178:ASN:O	1:B:180:PRO:HD3	2.03	0.58
1:B:153:GLN:NE2	1:B:164:THR:OG1	2.37	0.57
1:B:95:VAL:HG23	1:B:119:GLY:O	2.04	0.57
1:B:141:ILE:CG2	1:B:143:ILE:HD11	2.35	0.57
1:B:148:LEU:HB2	1:B:169:HIS:CD2	2.39	0.57
1:A:462:GLU:OE1	4:A:576:HOH:O	2.18	0.57
1:B:142:TYR:HB2	1:B:178:ASN:HB2	1.87	0.56
1:A:298:MET:HE3	1:A:346:MET:HE2	1.86	0.56
1:A:298:MET:HE3	1:A:346:MET:CE	2.36	0.56
1:B:380:VAL:HG21	1:B:490:ASN:HA	1.88	0.56
1:B:180:PRO:HB3	1:B:268:GLU:HB2	1.88	0.56
1:B:298:MET:HE3	1:B:327:VAL:CG1	2.37	0.55
1:B:479:ILE:HD11	1:B:489:ALA:CB	2.35	0.55
1:A:134:VAL:HG13	1:A:182:CYS:HB3	1.88	0.55
1:A:101:MET:HE1	1:A:121:LYS:HA	1.88	0.55
1:A:322:ASN:HA	2:A:502:GOL:H11	1.88	0.54
1:A:99:ALA:CB	1:A:101:MET:HE3	2.37	0.54
1:B:298:MET:CE	1:B:327:VAL:HG12	2.38	0.54
1:B:298:MET:CE	1:B:327:VAL:CB	2.85	0.54
1:B:180:PRO:HB3	1:B:268:GLU:CB	2.37	0.54
3:A:501:PTK:HAO	3:A:501:PTK:HOAB	1.64	0.53
1:B:131:LEU:HD11	1:B:141:ILE:HD11	1.89	0.53
1:B:223:ARG:HD2	4:B:637:HOH:O	2.10	0.53
1:A:136:ARG:H	1:A:139:ASN:HD22	1.57	0.52
1:A:135:VAL:HG13	1:A:139:ASN:HB2	1.91	0.51
1:B:89:ILE:HG23	1:B:128:TYR:HB2	1.93	0.51
1:A:3:LEU:C	1:A:3:LEU:HD23	2.31	0.51
1:A:103:ARG:HH21	1:A:103:ARG:HB2	1.75	0.51
1:B:298:MET:HE1	1:B:327:VAL:HG12	1.93	0.51
1:A:89:ILE:CG2	1:A:177:VAL:HG22	2.41	0.50
1:B:307:ARG:HG2	4:B:783:HOH:O	2.12	0.50
1:B:141:ILE:HG21	1:B:143:ILE:HD11	1.93	0.50
1:A:455:HIS:CD2	4:A:559:HOH:O	2.48	0.50
1:B:179:LEU:HB3	1:B:182:CYS:HB2	1.93	0.49
1:B:490:ASN:HD22	1:B:490:ASN:H	1.60	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:110:THR:HG22	1:B:124:PHE:O	2.12	0.49
1:B:472:THR:HG23	1:B:498:GLU:OXT	2.12	0.49
1:A:43:SER:HB3	1:A:344:GLN:HG3	1.94	0.49
1:A:488:TYR:HA	2:A:499:GOL:H31	1.94	0.49
1:A:374:MET:CE	1:A:378:GLU:HG3	2.42	0.48
1:B:3:LEU:HD23	1:B:3:LEU:C	2.33	0.48
1:B:452:GLY:HA3	1:B:454:GLU:OE2	2.14	0.48
1:A:115:PHE:CZ	1:A:123:LYS:HE2	2.48	0.47
1:B:335:LYS:HE3	2:B:499:GOL:H12	1.95	0.47
1:A:451:GLU:H	1:A:451:GLU:CD	2.18	0.47
1:A:211:SER:HA	1:A:238:LYS:HD3	1.95	0.47
1:A:108:TYR:O	1:A:123:LYS:HA	2.14	0.47
1:B:91:THR:O	1:B:174:ARG:HA	2.15	0.47
1:B:98:ASP:O	1:B:99:ALA:HB2	2.15	0.47
1:B:179:LEU:O	1:B:182:CYS:HB2	2.14	0.47
1:A:452:GLY:HA3	1:A:454:GLU:OE2	2.15	0.47
1:A:99:ALA:HB3	1:A:101:MET:HE3	1.96	0.46
1:A:446:LYS:HG2	1:A:447:LEU:HD23	1.98	0.46
1:A:38:LYS:NZ	1:A:73:GLU:OE1	2.36	0.46
1:A:490:ASN:HD22	1:A:490:ASN:N	2.10	0.46
1:A:493:ARG:NH2	4:A:788:HOH:O	2.48	0.46
1:B:101:MET:HB3	1:B:165:VAL:HG11	1.98	0.46
1:A:479:ILE:HD11	1:A:489:ALA:HB1	1.98	0.45
1:B:399:LEU:CD2	1:B:453:LYS:HG3	2.45	0.45
1:A:128:TYR:OH	1:A:185:ASP:OD2	2.20	0.45
1:B:142:TYR:CD1	1:B:180:PRO:CG	2.99	0.45
1:A:298:MET:CE	1:A:346:MET:CE	2.95	0.45
1:A:62:THR:HG23	4:A:827:HOH:O	2.17	0.45
1:A:370:GLN:HG3	1:A:374:MET:HE3	1.97	0.44
1:B:452:GLY:O	1:B:453:LYS:HB2	2.18	0.44
1:A:370:GLN:HG3	1:A:374:MET:CE	2.48	0.44
1:B:89:ILE:CG2	1:B:128:TYR:HB2	2.48	0.44
1:B:481:ALA:HB2	1:B:488:TYR:O	2.17	0.43
1:B:298:MET:CE	1:B:327:VAL:CG1	2.95	0.43
1:B:398:VAL:HG13	1:B:479:ILE:HD13	2.00	0.43
1:B:180:PRO:HA	1:B:268:GLU:OE2	2.18	0.43
1:A:298:MET:CE	1:A:346:MET:HE2	2.48	0.43
1:A:400:SER:HB2	1:A:405:SER:OG	2.19	0.43
1:B:183:ASP:OD1	1:B:242:HIS:HE1	2.02	0.42
1:A:79:ALA:HB2	1:A:429:ARG:O	2.19	0.42
1:B:135:VAL:CG1	1:B:152:VAL:HG21	2.46	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:7:LEU:HD11	1:B:287:VAL:HG21	2.00	0.42
1:B:148:LEU:HD13	1:B:169:HIS:HB3	2.02	0.42
1:B:451:GLU:H	1:B:451:GLU:CD	2.22	0.42
1:B:298:MET:HE2	1:B:328:MET:H	1.84	0.42
1:B:34:VAL:O	1:B:38:LYS:HG3	2.20	0.41
1:B:150:LEU:HD22	1:B:165:VAL:HG22	2.02	0.41
1:A:452:GLY:C	1:A:454:GLU:OE2	2.58	0.41
1:B:100:VAL:HG22	1:B:170:THR:CG2	2.46	0.41
1:A:386:ASN:HB3	4:A:596:HOH:O	2.19	0.41
1:B:38:LYS:HG2	1:B:70:ALA:HB1	2.01	0.41
1:B:305:ASN:HB3	1:B:306:PRO:HD2	2.02	0.41
1:B:490:ASN:HD22	1:B:490:ASN:N	2.19	0.41
1:A:394:LYS:HB2	1:A:470:VAL:HG12	2.01	0.41
1:B:374:MET:HE2	1:B:379:ALA:N	2.36	0.41
1:A:112:ASP:HA	1:A:113:PRO:HD3	1.71	0.40
1:B:377:ASP:HB3	1:B:488:TYR:CD2	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	488/499 (98%)	477 (98%)	10 (2%)	1 (0%)	47	49
1	B	488/499 (98%)	462 (95%)	25 (5%)	1 (0%)	47	49
All	All	976/998 (98%)	939 (96%)	35 (4%)	2 (0%)	47	49

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	144	ASP
1	A	296	THR

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	411/417 (99%)	395 (96%)	16 (4%)	32	33
1	B	411/417 (99%)	392 (95%)	19 (5%)	27	26
All	All	822/834 (99%)	787 (96%)	35 (4%)	29	29

All (35) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	17	ASN
1	A	34	VAL
1	A	40	LEU
1	A	133	LYS
1	A	175	ARG
1	A	177	VAL
1	A	179	LEU
1	A	223	ARG
1	A	262	ARG
1	A	371	HIS
1	A	372	ILE
1	A	435	GLN
1	A	453	LYS
1	A	454	GLU
1	A	479	ILE
1	A	490	ASN
1	B	17	ASN
1	B	40	LEU
1	B	111	THR
1	B	112	ASP
1	B	113	PRO
1	B	117	ASP
1	B	167	ASN
1	B	168	SER
1	B	173	ASP
1	B	175	ARG
1	B	177	VAL

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Mol	Chain	Res	Type
1	B	179	LEU
1	B	223	ARG
1	B	262	ARG
1	B	435	GLN
1	B	453	LYS
1	B	454	GLU
1	B	479	ILE
1	B	490	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	17	ASN
1	A	139	ASN
1	A	153	GLN
1	A	178	ASN
1	A	435	GLN
1	A	471	GLN
1	A	490	ASN
1	B	17	ASN
1	B	69	GLN
1	B	153	GLN
1	B	242	HIS
1	B	490	ASN

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 ⓘ

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	#$|Z| > 2$
3	PTK	A	501	-	31,35,35	1.69	5 (16%)	48,60,60	1.35	4 (8%)
2	GOL	A	504	-	5,5,5	0.39	0	5,5,5	0.34	0
2	GOL	A	499	-	5,5,5	0.80	0	5,5,5	1.35	1 (20%)
2	GOL	A	500	-	5,5,5	0.69	0	5,5,5	1.15	0
2	GOL	A	503	-	5,5,5	0.46	0	5,5,5	0.79	0
2	GOL	A	502	-	5,5,5	0.75	0	5,5,5	1.73	2 (40%)
2	GOL	B	499	-	5,5,5	0.63	0	5,5,5	0.73	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	PTK	A	501	-	-	24/24/24/24	0/4/4/4
2	GOL	A	504	-	-	4/4/4/4	-
2	GOL	A	499	-	-	3/4/4/4	-
2	GOL	A	500	-	-	2/4/4/4	-
2	GOL	A	503	-	-	0/4/4/4	-
2	GOL	A	502	-	-	2/4/4/4	-
2	GOL	B	499	-	-	4/4/4/4	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	501	PTK	CAV-CAZ	-2.98	1.38	1.43
3	A	501	PTK	CAU-CAY	-2.92	1.38	1.43
3	A	501	PTK	CAS-CAW	-2.73	1.38	1.43
3	A	501	PTK	CAT-CAX	-2.62	1.38	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	501	PTK	CBB-CBA	-2.06	1.37	1.43

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	501	PTK	CAO-CAW-CAS	-3.65	118.82	123.60
3	A	501	PTK	CAP-CAY-CAU	-3.50	119.02	123.60
3	A	501	PTK	CAR-CAZ-CAV	-3.30	119.28	123.60
3	A	501	PTK	CAQ-CAX-CAT	-3.23	119.36	123.60
2	A	499	GOL	O2-C2-C1	2.67	120.90	109.12
2	A	502	GOL	O2-C2-C3	-2.56	97.86	109.12
2	A	502	GOL	O1-C1-C2	2.18	120.65	110.20

There are no chirality outliers.

All (39) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	499	GOL	O1-C1-C2-O2
2	A	499	GOL	O1-C1-C2-C3
2	B	499	GOL	O1-C1-C2-C3
2	B	499	GOL	C1-C2-C3-O3
3	A	501	PTK	CAM-CAS-SBC-OAA
3	A	501	PTK	CAM-CAS-SBC-OAI
3	A	501	PTK	CAW-CAS-SBC-OAA
3	A	501	PTK	CAW-CAS-SBC-OAI
3	A	501	PTK	CAM-CAT-SBD-OAC
3	A	501	PTK	CAM-CAT-SBD-OAD
3	A	501	PTK	CAM-CAT-SBD-OAJ
3	A	501	PTK	CAX-CAT-SBD-OAD
3	A	501	PTK	CAX-CAT-SBD-OAJ
3	A	501	PTK	CAN-CAU-SBE-OAE
3	A	501	PTK	CAN-CAU-SBE-OAF
3	A	501	PTK	CAY-CAU-SBE-OAE
3	A	501	PTK	CAY-CAU-SBE-OAF
3	A	501	PTK	CAN-CAV-SBF-OAG
3	A	501	PTK	CAN-CAV-SBF-OAH
3	A	501	PTK	CAN-CAV-SBF-OAL
3	A	501	PTK	CAZ-CAV-SBF-OAG
3	A	501	PTK	CAZ-CAV-SBF-OAH
2	A	500	GOL	O1-C1-C2-C3
2	A	502	GOL	C1-C2-C3-O3
2	A	504	GOL	O1-C1-C2-C3

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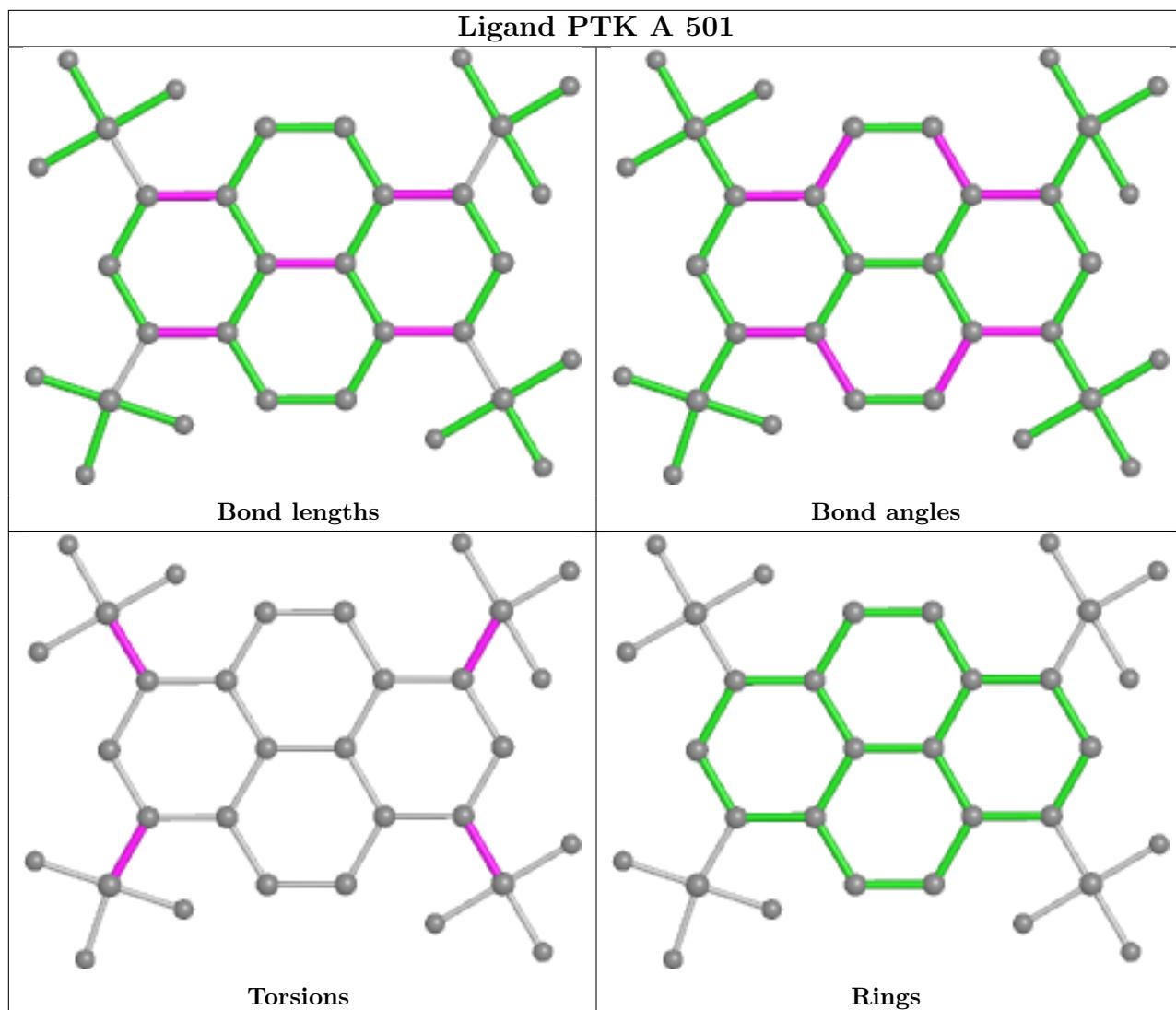
Mol	Chain	Res	Type	Atoms
2	B	499	GOL	O2-C2-C3-O3
2	B	499	GOL	O1-C1-C2-O2
2	A	504	GOL	O2-C2-C3-O3
2	A	504	GOL	C1-C2-C3-O3
3	A	501	PTK	CAM-CAS-SBC-OAB
3	A	501	PTK	CAW-CAS-SBC-OAB
3	A	501	PTK	CAX-CAT-SBD-OAC
3	A	501	PTK	CAN-CAU-SBE-OAK
3	A	501	PTK	CAY-CAU-SBE-OAK
3	A	501	PTK	CAZ-CAV-SBF-OAL
2	A	504	GOL	O1-C1-C2-O2
2	A	499	GOL	O2-C2-C3-O3
2	A	500	GOL	O1-C1-C2-O2
2	A	502	GOL	O2-C2-C3-O3

There are no ring outliers.

4 monomers are involved in 15 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	501	PTK	10	0
2	A	499	GOL	1	0
2	A	502	GOL	1	0
2	B	499	GOL	3	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 PTK A 501

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	492/499 (98%)	0.08	23 (4%)	31	37	20, 34, 55, 70	0
1	B	492/499 (98%)	1.24	104 (21%)	1	0	22, 36, 124, 135	0
All	All	984/998 (98%)	0.66	127 (12%)	3	4	20, 35, 121, 135	0

All (127) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	171	ILE	18.4
1	B	172	SER	16.8
1	B	104	GLY	15.6
1	B	94	PHE	13.6
1	B	170	THR	13.4
1	B	95	VAL	13.0
1	B	149	ILE	11.7
1	B	165	VAL	11.5
1	B	103	ARG	11.4
1	B	166	THR	11.1
1	B	147	ILE	10.7
1	B	140	TYR	10.6
1	B	155	HIS	10.2
1	B	116	ALA	10.0
1	B	108	TYR	9.8
1	B	145	ASP	9.6
1	B	115	PHE	9.4
1	B	142	TYR	9.1
1	B	106	THR	9.1
1	B	99	ALA	9.1
1	B	105	ALA	8.8
1	B	113	PRO	8.6
1	B	146	GLY	8.6
1	B	154	SER	8.5

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Mol	Chain	Res	Type	RSRZ
1	B	150	LEU	8.5
1	B	136	ARG	8.5
1	B	122	ASP	8.5
1	B	169	HIS	8.4
1	A	488	TYR	7.7
1	B	167	ASN	7.6
1	B	96	GLY	7.5
1	B	148	LEU	7.5
1	B	109	VAL	7.5
1	B	101	MET	7.4
1	B	161	LEU	7.3
1	B	93	GLN	7.2
1	B	137	PRO	7.2
1	B	114	ALA	6.8
1	B	117	ASP	6.8
1	B	153	GLN	6.6
1	B	98	ASP	6.5
1	B	181	GLY	6.5
1	B	159	GLN	6.5
1	B	97	GLY	6.4
1	B	125	TYR	6.4
1	B	143	ILE	6.4
1	B	138	GLY	6.2
1	B	139	ASN	6.2
1	B	112	ASP	6.1
1	B	488	TYR	6.0
1	B	157	ASP	5.9
1	B	168	SER	5.9
1	B	156	GLU	5.4
1	B	163	CYS	5.4
1	B	92	GLY	5.4
1	B	107	CYS	5.2
1	B	158	GLU	5.2
1	B	152	VAL	5.1
1	B	126	ILE	5.1
1	B	141	ILE	5.1
1	B	124	PHE	4.8
1	B	121	LYS	4.8
1	B	100	VAL	4.7
1	B	182	CYS	4.7
1	B	133	LYS	4.6
1	B	164	THR	4.5

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Mol	Chain	Res	Type	RSRZ
1	B	175	ARG	4.5
1	B	118	LYS	4.4
1	A	109	VAL	4.3
1	B	162	GLU	4.2
1	B	129	GLN	4.2
1	B	489	ALA	4.2
1	B	481	ALA	4.1
1	B	176	GLY	4.0
1	B	110	THR	3.9
1	B	173	ASP	3.9
1	B	134	VAL	3.7
1	B	371	HIS	3.6
1	B	151	GLN	3.4
1	B	90	ARG	3.3
1	B	179	LEU	3.3
1	B	177	VAL	3.2
1	B	102	GLU	3.2
1	B	372	ILE	3.2
1	B	119	GLY	3.2
1	B	120	THR	3.1
1	B	180	PRO	3.1
1	A	103	ARG	3.1
1	B	397	VAL	3.1
1	A	397	VAL	3.0
1	B	144	ASP	3.0
1	A	54	HIS	3.0
1	B	213	ILE	2.9
1	B	228	PRO	2.9
1	A	150	LEU	2.8
1	B	449	HIS	2.8
1	B	131	LEU	2.8
1	A	372	ILE	2.8
1	A	95	VAL	2.8
1	B	111	THR	2.7
1	A	96	GLY	2.6
1	A	97	GLY	2.6
1	B	445	ASP	2.6
1	B	123	LYS	2.6
1	B	421	VAL	2.6
1	A	141	ILE	2.6
1	B	466	SER	2.5
1	A	147	ILE	2.5

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Mol	Chain	Res	Type	RSRZ
1	B	231	ARG	2.5
1	B	446	LYS	2.5
1	B	174	ARG	2.4
1	A	477	VAL	2.4
1	A	124	PHE	2.4
1	A	481	ALA	2.4
1	A	478	VAL	2.3
1	B	448	GLY	2.3
1	A	117	ASP	2.3
1	A	133	LYS	2.3
1	B	217	GLU	2.2
1	B	135	VAL	2.2
1	A	177	VAL	2.2
1	A	398	VAL	2.1
1	B	88	GLU	2.1
1	A	158	GLU	2.1
1	B	210	ALA	2.0
1	A	143	ILE	2.0
1	A	136	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 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.
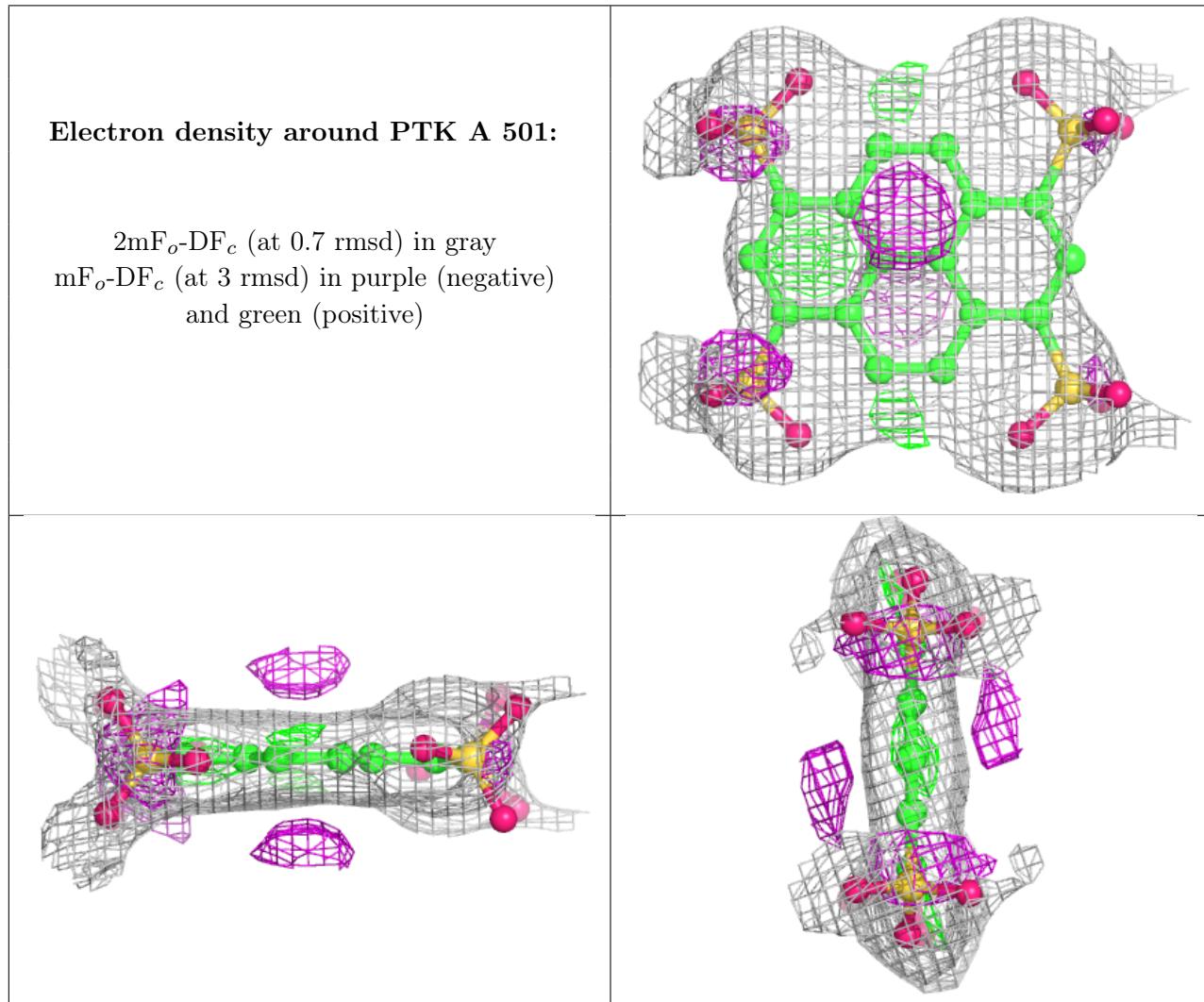
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
3	PTK	A	501	32/32	0.53	0.25	96,98,100,100	32
2	GOL	A	500	6/6	0.58	0.29	53,61,62,62	0
2	GOL	A	504	6/6	0.62	0.23	67,69,71,71	0
2	GOL	A	503	6/6	0.73	0.18	51,63,65,66	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	GOL	B	499	6/6	0.81	0.17	48,59,63,65	0
2	GOL	A	499	6/6	0.84	0.23	33,48,49,52	0
2	GOL	A	502	6/6	0.91	0.19	28,46,48,51	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 PTK A 501:

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.