Full wwPDB X-ray Structure Validation Report (i)

Sep 7, 2023 – 07:00 AM EDT

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PDB ID	:	4FYG
Title	:	Structural basis for substrate recognition by a novel Legionella phosphoinositide phosphatase
Authors	:	Hsu, F.S.; Zhu, W.; Brennan, L.; Tao, L.; Luo, Z.Q.; Mao, Y.
Deposited on	:	2012-07-04
Resolution	:	2.82 Å(reported)

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.82 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.
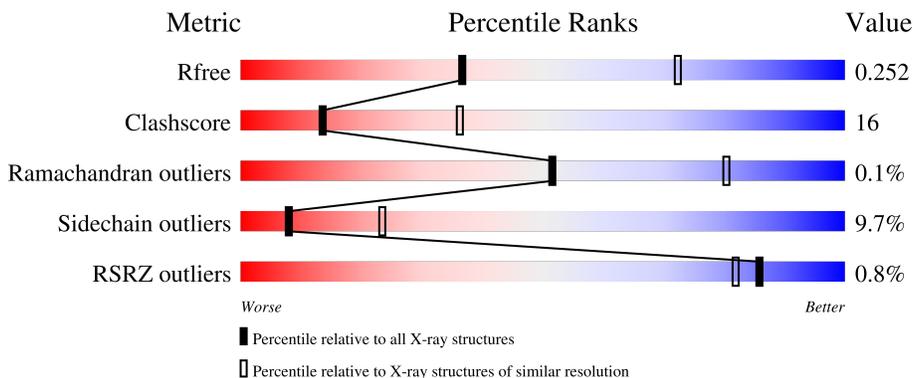
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3617 (2.84-2.80)
Clashscore	141614	4060 (2.84-2.80)
Ramachandran outliers	138981	3978 (2.84-2.80)
Sidechain outliers	138945	3980 (2.84-2.80)
RSRZ outliers	127900	3552 (2.84-2.80)

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	761	68% 26% · ·

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 5968 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 SidF, inhibitor of growth family, member 3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	743	Total 5923	C 3680	N 1059	O 1165	S 19	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	SER	-	expression tag	UNP Q5ZSD5
A	645	SER	CYS	engineered mutation	UNP Q5ZSD5

- Molecule 2 is (2R)-3-{[(S)-hydroxy{[(1S,2R,3R,4S,5S,6S)-2,3,6-trihydroxy-4,5-bis(phosphon ooxy)cyclohexyl]oxy}phosphoryl]oxy}propane-1,2-diyl dibutanoate (three-letter code: 3PT) (formula: $C_{17}H_{33}O_{19}P_3$).

3PT
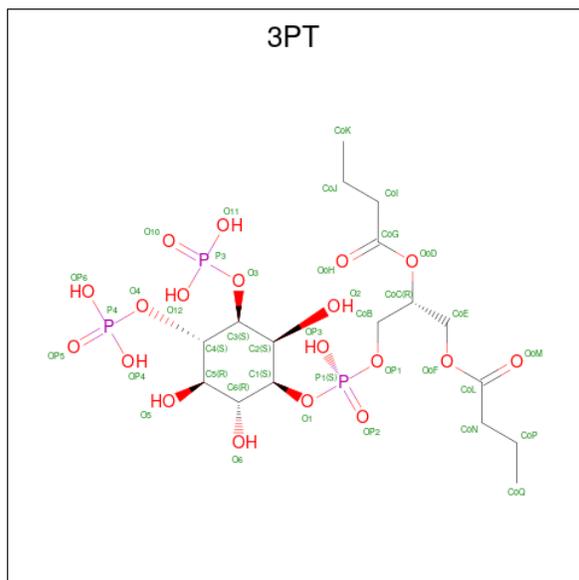
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total 39	C 17	O 19	P 3	0	0

• Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	6	Total 6	O 6	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: SidF, inhibitor of growth family, member 3
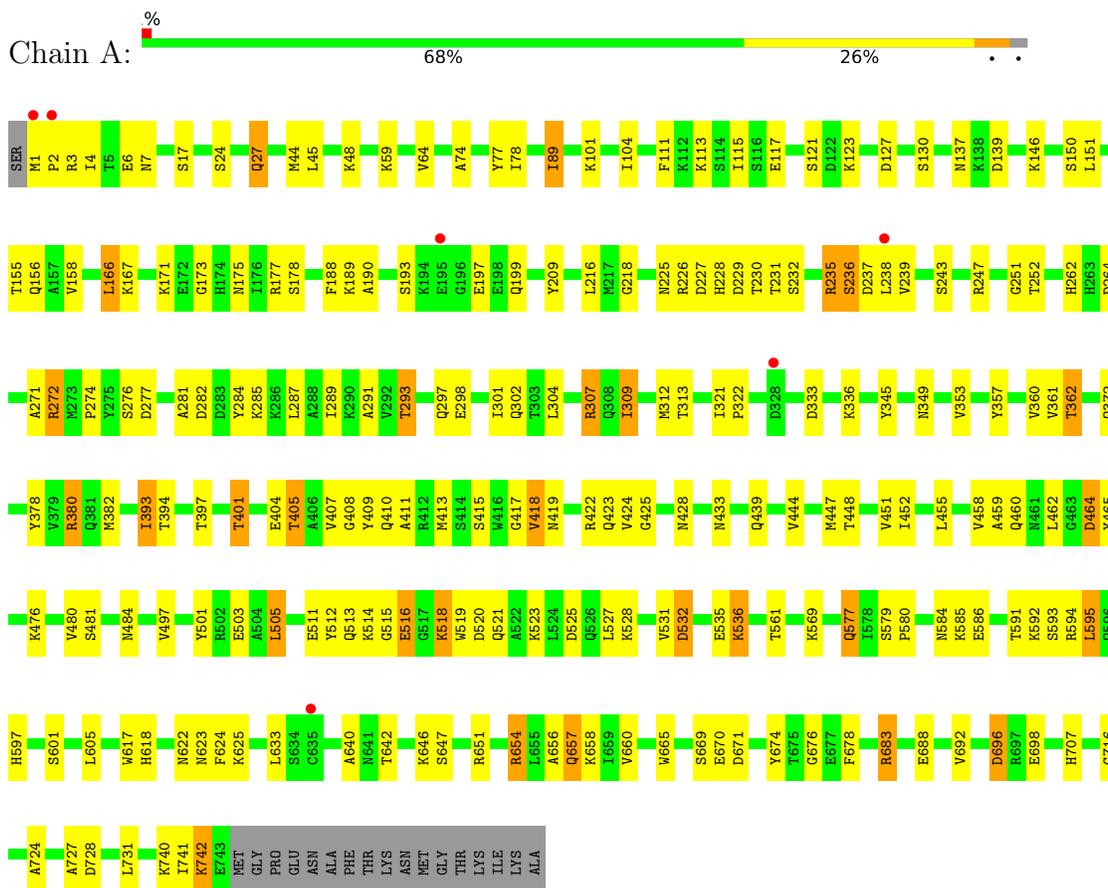
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	71.23Å 114.83Å 124.37Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	36.58 – 2.82 36.30 – 2.82	Depositor EDS
% Data completeness (in resolution range)	96.0 (36.58-2.82) 96.1 (36.30-2.82)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.30 (at 2.81Å)	Xtriage
Refinement program	REFMAC 5.0	Depositor
R, R_{free}	0.179 , 0.252 0.183 , 0.252	Depositor DCC
R_{free} test set	1250 reflections (5.15%)	wwPDB-VP
Wilson B-factor (Å^2)	65.9	Xtriage
Anisotropy	0.587	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 43.3	EDS
L-test for twinning[2]	$< |L| > = 0.49, < L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	5968	wwPDB-VP
Average B, all atoms (Å^2)	70.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.94% 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: 3PT

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	0.68	2/6028 (0.0%)	0.80	5/8122 (0.1%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	617	TRP	CD2-CE2	6.04	1.48	1.41
1	A	665	TRP	CD2-CE2	5.32	1.47	1.41

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	166	LEU	CA-CB-CG	5.61	128.21	115.30
1	A	307	ARG	NE-CZ-NH1	-5.26	117.67	120.30
1	A	696	ASP	CB-CG-OD1	5.20	122.98	118.30
1	A	307	ARG	NE-CZ-NH2	5.13	122.86	120.30
1	A	405	THR	CB-CA-C	-5.06	97.93	111.60

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	5923	0	5809	189	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	39	0	28	2	0
3	A	6	0	0	1	0
All	All	5968	0	5837	189	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 16.

All (189) 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:516:GLU:HA	1:A:519:TRP:CE3	1.43	1.49
1:A:516:GLU:HB2	1:A:519:TRP:CZ3	1.71	1.25
1:A:516:GLU:HA	1:A:519:TRP:CD2	1.77	1.19
1:A:741:ILE:O	1:A:742:LYS:HD2	1.41	1.17
1:A:516:GLU:CA	1:A:519:TRP:CE3	2.33	1.10
1:A:516:GLU:CB	1:A:519:TRP:CZ3	2.36	1.09
1:A:380:ARG:HH11	1:A:380:ARG:HG3	1.08	1.07
1:A:515:GLY:C	1:A:519:TRP:CE2	2.30	1.04
1:A:422:ARG:NH1	1:A:618:HIS:O	1.90	1.04
1:A:741:ILE:C	1:A:742:LYS:HD2	1.83	0.99
1:A:178:SER:HB3	1:A:231:THR:HG23	1.47	0.96
1:A:516:GLU:N	1:A:519:TRP:CE2	2.36	0.94
1:A:515:GLY:CA	1:A:519:TRP:NE1	2.30	0.93
1:A:1:MET:N	1:A:2:PRO:HD2	1.83	0.93
1:A:516:GLU:HA	1:A:519:TRP:CZ3	2.04	0.93
1:A:424:VAL:CG1	1:A:428:ASN:HB3	1.99	0.93
1:A:516:GLU:CA	1:A:519:TRP:CZ3	2.52	0.92
1:A:190:ALA:H	1:A:199:GLN:HE21	1.10	0.91
1:A:622:ASN:HD22	1:A:625:LYS:HE3	1.39	0.87
1:A:1:MET:H2	1:A:2:PRO:HD2	1.38	0.86
1:A:1:MET:N	1:A:2:PRO:CD	2.37	0.86
1:A:516:GLU:CA	1:A:519:TRP:CD2	2.55	0.85
1:A:515:GLY:C	1:A:519:TRP:NE1	2.30	0.85
1:A:424:VAL:HG13	1:A:428:ASN:HB3	1.57	0.85
1:A:272:ARG:HH11	1:A:297:GLN:HE22	1.21	0.84
1:A:515:GLY:O	1:A:519:TRP:CD1	2.30	0.84
1:A:740:LYS:NZ	2:A:801:3PT:OP4	2.15	0.79
1:A:236:SER:O	1:A:277:ASP:OD1	2.01	0.78
1:A:515:GLY:O	1:A:519:TRP:CG	2.35	0.78
1:A:516:GLU:N	1:A:519:TRP:CZ2	2.52	0.78
1:A:6:GLU:HG3	1:A:7:ASN:N	1.99	0.78

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:235:ARG:HB3	1:A:274:PRO:HA	1.66	0.76
1:A:741:ILE:O	1:A:742:LYS:CD	2.30	0.76
1:A:515:GLY:N	1:A:519:TRP:NE1	2.33	0.76
1:A:380:ARG:HG3	1:A:380:ARG:NH1	1.87	0.76
1:A:481:SER:HA	1:A:484:ASN:HB2	1.69	0.76
1:A:528:LYS:O	1:A:532:ASP:OD2	2.05	0.74
1:A:683:ARG:HH11	1:A:696:ASP:CG	1.92	0.73
1:A:304:LEU:HB2	1:A:353:VAL:HG21	1.70	0.73
1:A:127:ASP:H	1:A:137:ASN:HD21	1.36	0.72
1:A:362:THR:HG22	1:A:417:GLY:HA3	1.70	0.72
1:A:424:VAL:HG13	1:A:428:ASN:CB	2.19	0.72
1:A:516:GLU:CB	1:A:519:TRP:CH2	2.72	0.71
1:A:394:THR:HG22	1:A:404:GLU:HG3	1.72	0.71
1:A:516:GLU:HB2	1:A:519:TRP:HZ3	1.52	0.71
1:A:178:SER:HB3	1:A:231:THR:CG2	2.21	0.70
1:A:515:GLY:H	1:A:519:TRP:HE1	1.38	0.70
1:A:302:GLN:HE21	1:A:394:THR:H	1.37	0.70
1:A:740:LYS:O	1:A:742:LYS:HD3	1.93	0.69
1:A:190:ALA:H	1:A:199:GLN:NE2	1.89	0.69
1:A:424:VAL:H	1:A:433:ASN:HD21	1.37	0.69
1:A:1:MET:HB3	1:A:225:ASN:HB3	1.75	0.67
1:A:515:GLY:C	1:A:519:TRP:CD1	2.68	0.67
1:A:424:VAL:HG11	1:A:428:ASN:HB3	1.74	0.67
1:A:515:GLY:N	1:A:519:TRP:HE1	1.93	0.66
1:A:1:MET:H3	1:A:2:PRO:CD	2.07	0.66
1:A:579:SER:HB3	1:A:580:PRO:CD	2.25	0.66
1:A:199:GLN:OE1	1:A:252:THR:HG22	1.95	0.65
1:A:515:GLY:CA	1:A:519:TRP:CE2	2.78	0.65
1:A:380:ARG:HH11	1:A:380:ARG:CG	1.96	0.65
1:A:462:LEU:HD21	1:A:594:ARG:NH1	2.12	0.65
1:A:232:SER:HB2	1:A:647:SER:HB2	1.79	0.65
1:A:515:GLY:C	1:A:519:TRP:CD2	2.71	0.64
1:A:515:GLY:CA	1:A:519:TRP:HE1	2.11	0.64
1:A:409:TYR:CE2	1:A:411:ALA:HB2	2.32	0.64
1:A:151:LEU:O	1:A:155:THR:HG23	1.98	0.63
1:A:209:TYR:O	1:A:226:ARG:NH1	2.31	0.62
1:A:272:ARG:NH1	1:A:297:GLN:HE22	1.95	0.62
1:A:173:GLY:O	1:A:177:ARG:HB2	1.98	0.62
1:A:380:ARG:HB2	1:A:413:MET:SD	2.39	0.61
1:A:418:VAL:HG21	1:A:624:PHE:CE2	2.36	0.61
1:A:654:ARG:HH21	1:A:657:GLN:HE22	1.48	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:683:ARG:NH1	1:A:696:ASP:CG	2.54	0.61
1:A:372:GLN:HE22	1:A:651:ARG:HH12	1.50	0.59
1:A:584:ASN:ND2	1:A:586:GLU:H	2.00	0.59
1:A:178:SER:CB	1:A:231:THR:HG23	2.27	0.59
1:A:228:HIS:HD2	1:A:230:THR:H	1.49	0.59
1:A:579:SER:HB3	1:A:580:PRO:HD2	1.84	0.59
1:A:372:GLN:NE2	1:A:651:ARG:HH12	2.01	0.59
1:A:1:MET:H3	1:A:2:PRO:HD2	1.67	0.58
1:A:304:LEU:HD13	1:A:640:ALA:HB3	1.85	0.58
1:A:515:GLY:HA2	1:A:519:TRP:NE1	2.19	0.58
1:A:333:ASP:HB3	1:A:336:LYS:HG2	1.85	0.57
1:A:516:GLU:N	1:A:519:TRP:CD2	2.69	0.57
1:A:515:GLY:N	1:A:519:TRP:CD1	2.72	0.56
1:A:251:GLY:HA2	1:A:262:HIS:CD2	2.40	0.56
1:A:282:ASP:OD2	1:A:284:TYR:HB2	2.05	0.56
1:A:302:GLN:HG3	1:A:393:ILE:HG23	1.88	0.56
1:A:77:TYR:HE1	1:A:155:THR:CG2	2.19	0.56
1:A:378:TYR:O	1:A:382:MET:HG2	2.05	0.56
1:A:6:GLU:HG3	1:A:7:ASN:H	1.70	0.56
1:A:521:GLN:O	1:A:525:ASP:OD2	2.24	0.56
1:A:264:ASP:OD1	1:A:307:ARG:NH1	2.40	0.55
1:A:622:ASN:HD22	1:A:625:LYS:CE	2.16	0.55
1:A:622:ASN:HA	1:A:625:LYS:HE3	1.88	0.55
1:A:113:LYS:O	1:A:117:GLU:HG3	2.07	0.55
1:A:77:TYR:OH	1:A:155:THR:HG21	2.08	0.54
1:A:188:PHE:CD2	1:A:698:GLU:HG2	2.42	0.54
1:A:252:THR:HG23	1:A:262:HIS:NE2	2.23	0.54
1:A:448:THR:HG22	1:A:605:LEU:HD11	1.90	0.54
1:A:512:TYR:CD1	1:A:512:TYR:O	2.61	0.53
1:A:24:SER:O	1:A:27:GLN:HG3	2.09	0.53
1:A:111:PHE:O	1:A:115:ILE:HG13	2.07	0.53
1:A:654:ARG:NH2	1:A:728:ASP:OD1	2.38	0.53
1:A:678:PHE:O	1:A:683:ARG:NH2	2.42	0.53
1:A:407:VAL:HG12	1:A:408:GLY:O	2.09	0.53
1:A:272:ARG:HA	3:A:905:HOH:O	2.09	0.52
1:A:74:ALA:O	1:A:78:ILE:HG12	2.09	0.52
1:A:397:THR:OG1	1:A:401:THR:HB	2.10	0.51
1:A:422:ARG:HG2	1:A:423:GLN:N	2.26	0.51
1:A:216:LEU:C	1:A:218:GLY:H	2.12	0.51
1:A:465:TYR:HA	1:A:577:GLN:NE2	2.25	0.51
1:A:362:THR:H	1:A:372:GLN:NE2	2.09	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:237:ASP:C	1:A:237:ASP:OD2	2.48	0.50
1:A:656:ALA:O	1:A:660:VAL:HG23	2.11	0.50
1:A:247:ARG:CZ	1:A:307:ARG:HG3	2.41	0.50
1:A:516:GLU:CA	1:A:519:TRP:CH2	2.92	0.50
1:A:696:ASP:HB3	1:A:727:ALA:HB2	1.94	0.50
1:A:527:LEU:O	1:A:531:VAL:HG23	2.12	0.50
1:A:230:THR:O	1:A:243:SER:HA	2.12	0.50
1:A:237:ASP:OD2	1:A:237:ASP:O	2.30	0.49
1:A:444:VAL:O	1:A:448:THR:HG23	2.12	0.49
1:A:380:ARG:NH1	1:A:380:ARG:CG	2.63	0.49
1:A:515:GLY:HA2	1:A:519:TRP:CE2	2.48	0.49
1:A:272:ARG:HH11	1:A:297:GLN:NE2	2.02	0.49
1:A:458:VAL:CG1	1:A:458:VAL:O	2.61	0.49
1:A:591:THR:O	1:A:595:LEU:HD22	2.13	0.49
1:A:584:ASN:HD22	1:A:586:GLU:H	1.61	0.48
1:A:597:HIS:O	1:A:601:SER:HB3	2.14	0.48
1:A:127:ASP:N	1:A:137:ASN:HD21	2.08	0.48
1:A:2:PRO:HG2	1:A:45:LEU:HD21	1.94	0.48
1:A:579:SER:CB	1:A:580:PRO:CD	2.91	0.48
1:A:235:ARG:NH1	1:A:271:ALA:O	2.46	0.48
1:A:455:LEU:O	1:A:459:ALA:N	2.44	0.48
1:A:189:LYS:HE2	1:A:193:SER:OG	2.14	0.47
1:A:304:LEU:CB	1:A:353:VAL:HG21	2.39	0.47
1:A:291:ALA:HB2	1:A:505:LEU:HD22	1.96	0.47
1:A:511:GLU:HA	1:A:514:LYS:HD2	1.95	0.47
1:A:683:ARG:HG2	1:A:724:ALA:O	2.15	0.47
1:A:2:PRO:HG2	1:A:45:LEU:CD2	2.45	0.47
1:A:447:MET:O	1:A:451:VAL:HG23	2.15	0.46
1:A:646:LYS:NZ	2:A:801:3PT:OP5	2.45	0.46
1:A:89:ILE:HD11	1:A:101:LYS:HG2	1.98	0.46
1:A:289:ILE:O	1:A:293:THR:HG23	2.16	0.46
1:A:216:LEU:C	1:A:218:GLY:N	2.69	0.46
1:A:501:TYR:HE1	1:A:531:VAL:HG13	1.81	0.45
1:A:448:THR:O	1:A:452:ILE:HG12	2.17	0.45
1:A:512:TYR:CD1	1:A:512:TYR:C	2.90	0.45
1:A:190:ALA:N	1:A:199:GLN:HE21	1.94	0.45
1:A:289:ILE:O	1:A:293:THR:CG2	2.65	0.45
1:A:451:VAL:O	1:A:455:LEU:HG	2.17	0.45
1:A:516:GLU:HB3	1:A:519:TRP:CH2	2.50	0.45
1:A:77:TYR:CE1	1:A:155:THR:CG2	3.00	0.45
1:A:362:THR:HG21	1:A:419:ASN:OD1	2.18	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:669:SER:C	1:A:671:ASP:H	2.20	0.44
1:A:104:ILE:HD12	1:A:158:VAL:HG13	1.99	0.44
1:A:287:LEU:HD11	1:A:531:VAL:HG11	1.99	0.44
1:A:304:LEU:HD13	1:A:640:ALA:CB	2.47	0.44
1:A:123:LYS:HG2	1:A:139:ASP:HB3	1.99	0.44
1:A:633:LEU:HA	1:A:633:LEU:HD12	1.72	0.44
1:A:302:GLN:HA	1:A:393:ILE:HG13	1.99	0.44
1:A:592:LYS:HE3	1:A:592:LYS:HB2	1.76	0.44
1:A:291:ALA:HB2	1:A:505:LEU:CD2	2.48	0.43
1:A:674:TYR:CZ	1:A:676:GLY:HA2	2.53	0.43
1:A:480:VAL:O	1:A:480:VAL:HG13	2.18	0.43
1:A:422:ARG:HG2	1:A:423:GLN:H	1.84	0.43
1:A:155:THR:O	1:A:156:GLN:C	2.56	0.43
1:A:281:ALA:HB1	1:A:285:LYS:HB3	2.01	0.42
1:A:380:ARG:CB	1:A:413:MET:SD	3.07	0.42
1:A:309:ILE:HA	1:A:312:MET:HE2	2.00	0.42
1:A:357:TYR:HA	1:A:642:THR:O	2.19	0.42
1:A:464:ASP:OD1	1:A:464:ASP:N	2.48	0.42
1:A:707:HIS:CD2	1:A:716:GLY:H	2.37	0.42
1:A:229:ASP:O	1:A:230:THR:C	2.58	0.41
1:A:1:MET:H3	1:A:2:PRO:HD3	1.85	0.41
1:A:361:VAL:HG22	1:A:372:GLN:HE21	1.86	0.41
1:A:535:GLU:O	1:A:536:LYS:C	2.59	0.41
1:A:1:MET:O	1:A:227:ASP:CG	2.58	0.41
1:A:301:ILE:HG12	1:A:409:TYR:CD1	2.56	0.41
1:A:321:ILE:O	1:A:322:PRO:C	2.59	0.41
1:A:731:LEU:HD23	1:A:731:LEU:HA	1.93	0.41
1:A:235:ARG:O	1:A:276:SER:HB2	2.20	0.41
1:A:345:TYR:O	1:A:349:ASN:HB2	2.21	0.41
1:A:514:LYS:HB3	1:A:518:LYS:HB2	2.02	0.41
1:A:189:LYS:HE3	1:A:197:GLU:O	2.21	0.41
1:A:515:GLY:O	1:A:519:TRP:CD2	2.69	0.41
1:A:424:VAL:HG13	1:A:425:GLY:N	2.36	0.40
1:A:422:ARG:CG	1:A:423:GLN:N	2.84	0.40
1:A:3:ARG:HD3	1:A:3:ARG:HA	1.82	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	741/761 (97%)	690 (93%)	50 (7%)	1 (0%)	51 80

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	476	LYS

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	640/654 (98%)	578 (90%)	62 (10%)	8 23

All (62) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	ILE
1	A	17	SER
1	A	27	GLN
1	A	44	MET
1	A	48	LYS
1	A	59	LYS
1	A	64	VAL
1	A	89	ILE
1	A	121	SER
1	A	130	SER

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Mol	Chain	Res	Type
1	A	146	LYS
1	A	150	SER
1	A	166	LEU
1	A	167	LYS
1	A	171	LYS
1	A	175	ASN
1	A	235	ARG
1	A	236	SER
1	A	238	LEU
1	A	239	VAL
1	A	272	ARG
1	A	293	THR
1	A	298	GLU
1	A	309	ILE
1	A	313	THR
1	A	360	VAL
1	A	362	THR
1	A	380	ARG
1	A	393	ILE
1	A	401	THR
1	A	405	THR
1	A	410	GLN
1	A	415	SER
1	A	418	VAL
1	A	439	GLN
1	A	460	GLN
1	A	464	ASP
1	A	497	VAL
1	A	503	GLU
1	A	505	LEU
1	A	513	GLN
1	A	516	GLU
1	A	518	LYS
1	A	520	ASP
1	A	523	LYS
1	A	532	ASP
1	A	536	LYS
1	A	561	THR
1	A	569	LYS
1	A	577	GLN
1	A	585	LYS
1	A	593	SER

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Mol	Chain	Res	Type
1	A	595	LEU
1	A	623	ASN
1	A	654	ARG
1	A	657	GLN
1	A	658	LYS
1	A	670	GLU
1	A	683	ARG
1	A	688	GLU
1	A	692	VAL
1	A	742	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (29) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	26	ASN
1	A	56	GLN
1	A	137	ASN
1	A	175	ASN
1	A	199	GLN
1	A	225	ASN
1	A	228	HIS
1	A	242	ASN
1	A	297	GLN
1	A	302	GLN
1	A	365	GLN
1	A	372	GLN
1	A	381	GLN
1	A	433	ASN
1	A	454	ASN
1	A	550	ASN
1	A	563	HIS
1	A	566	GLN
1	A	584	ASN
1	A	615	ASN
1	A	618	HIS
1	A	619	HIS
1	A	622	ASN
1	A	623	ASN
1	A	657	GLN
1	A	662	ASN
1	A	691	ASN
1	A	703	GLN

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Mol	Chain	Res	Type
1	A	721	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 ⓘ

1 ligand is 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	3PT	A	801	-	39,39,39	1.31	2 (5%)	53,57,57	1.66	12 (22%)

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	3PT	A	801	-	-	15/36/60/60	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	801	3PT	O0D-C0G	5.03	1.48	1.34
2	A	801	3PT	O0F-C0L	4.97	1.47	1.33

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	801	3PT	O0D-C0G-C0I	5.25	122.83	111.50
2	A	801	3PT	C0C-O0D-C0G	3.46	126.31	117.79
2	A	801	3PT	O0F-C0L-C0N	3.26	122.14	111.91
2	A	801	3PT	O3-P3-O10	-2.82	98.50	109.39
2	A	801	3PT	O0F-C0L-O0M	-2.57	117.12	123.59
2	A	801	3PT	O0D-C0G-O0H	-2.36	117.99	123.70
2	A	801	3PT	C5-C6-C1	2.33	115.01	109.68
2	A	801	3PT	O5-C5-C6	-2.31	105.01	110.35
2	A	801	3PT	O5-C5-C4	-2.28	103.91	109.94
2	A	801	3PT	C5-C4-C3	2.24	116.78	111.66
2	A	801	3PT	O1-C1-C6	-2.17	103.62	108.66
2	A	801	3PT	C0E-O0F-C0L	2.07	124.80	117.12

There are no chirality outliers.

All (15) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	801	3PT	O0H-C0G-O0D-C0C
2	A	801	3PT	C0B-OP1-P1-OP2
2	A	801	3PT	C4-O4-P4-OP5
2	A	801	3PT	C0C-C0E-O0F-C0L
2	A	801	3PT	C0I-C0G-O0D-C0C
2	A	801	3PT	C0N-C0L-O0F-C0E
2	A	801	3PT	O0M-C0L-O0F-C0E
2	A	801	3PT	C0B-OP1-P1-O1
2	A	801	3PT	C1-O1-P1-OP1
2	A	801	3PT	C0G-C0I-C0J-C0K
2	A	801	3PT	C0L-C0N-C0P-C0Q
2	A	801	3PT	O0D-C0C-C0E-O0F
2	A	801	3PT	C0B-C0C-C0E-O0F
2	A	801	3PT	C0B-OP1-P1-OP3
2	A	801	3PT	C0B-C0C-O0D-C0G

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	801	3PT	2	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 3PT A 801

Bond lengths   Bond angles

Torsions   Rings
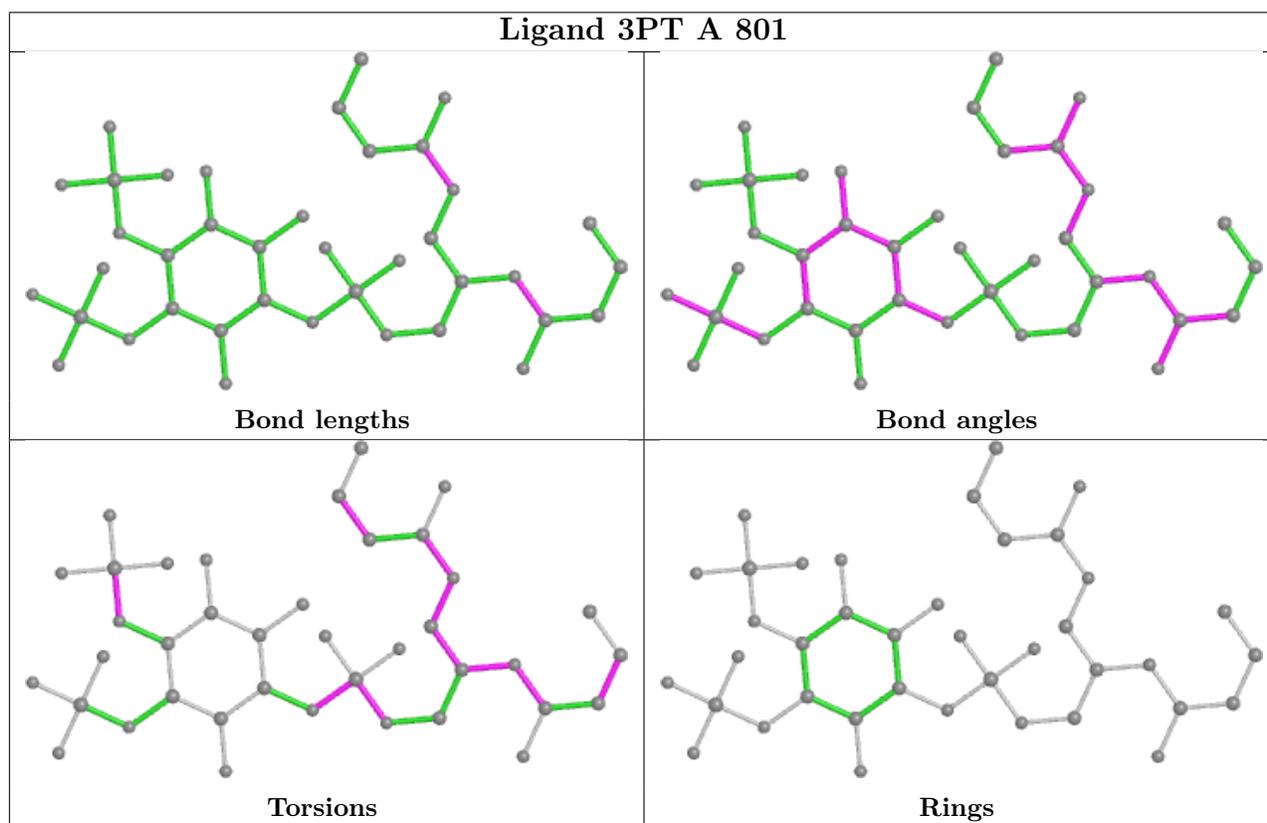
5.7 Other polymers ⓘ

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	743/761 (97%)	-0.19	6 (0%)	86	82	35, 65, 110, 142	0

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	2	PRO	3.8
1	A	195	GLU	2.9
1	A	1	MET	2.8
1	A	238	LEU	2.3
1	A	635	CYS	2.1
1	A	328	ASP	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(Å²)	Q<0.9
2	3PT	A	801	39/39	0.96	0.18	51,68,113,123	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 3PT A 801:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.