WORLDWIDE PDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

Jul 17, 2024 – 08:08 PM JST

PDB ID	:	8WII
Title	:	Crystal structure of E. coli ThrS catalytic domain mutant G463A in complex with Obafluorin
Authors	:	Qiao, H.; Wang, Z.; Wang, J.; Fang, P.
Deposited on	:	2023-09-24
Resolution	:	2.98 Å(reported)

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

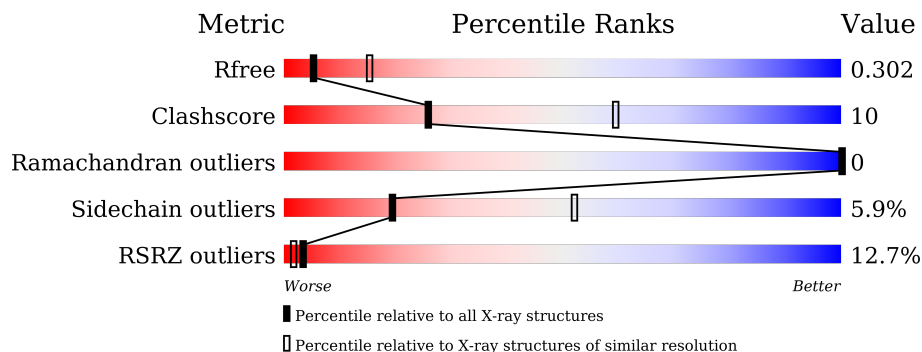|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 2.98 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		0.302
Clashscore		10
Ramachandran outliers		0
Sidechain outliers		5.9%
RSRZ outliers		12.7%

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	2754 (3.00-2.96)
Clashscore	141614	3103 (3.00-2.96)
Ramachandran outliers	138981	2993 (3.00-2.96)
Sidechain outliers	138945	2996 (3.00-2.96)
RSRZ outliers	127900	2644 (3.00-2.96)

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	410	12% 71% 24% • •
1	B	410	13% 73% 22% • • •

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	WE3	B	701	-	-	-	X

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 6597 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.
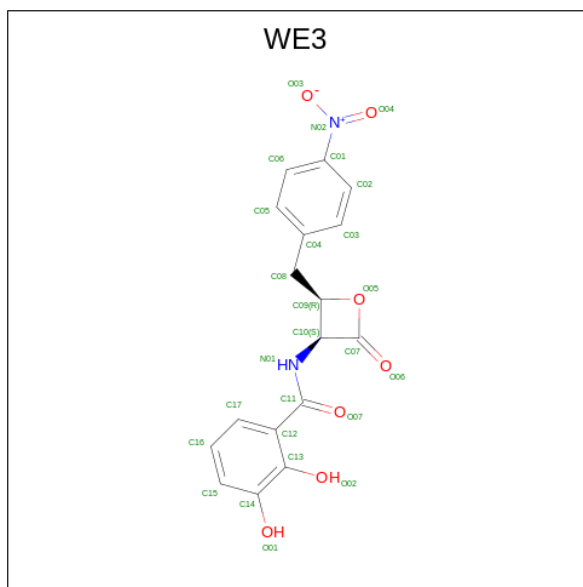
- Molecule 1 is a protein called Threonine–tRNA ligase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	401	Total 3273	C 2067	N 576	O 607	S 23	0	0	0
1	B	401	Total 3270	C 2065	N 576	O 607	S 22	0	0	0

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	241	MET	-	initiating methionine	UNP A0A8S7FUD7
A	463	ALA	GLY	engineered mutation	UNP A0A8S7FUD7
A	643	LEU	-	expression tag	UNP A0A8S7FUD7
A	644	GLU	-	expression tag	UNP A0A8S7FUD7
A	645	HIS	-	expression tag	UNP A0A8S7FUD7
A	646	HIS	-	expression tag	UNP A0A8S7FUD7
A	647	HIS	-	expression tag	UNP A0A8S7FUD7
A	648	HIS	-	expression tag	UNP A0A8S7FUD7
A	649	HIS	-	expression tag	UNP A0A8S7FUD7
A	650	HIS	-	expression tag	UNP A0A8S7FUD7
B	241	MET	-	initiating methionine	UNP A0A8S7FUD7
B	463	ALA	GLY	engineered mutation	UNP A0A8S7FUD7
B	643	LEU	-	expression tag	UNP A0A8S7FUD7
B	644	GLU	-	expression tag	UNP A0A8S7FUD7
B	645	HIS	-	expression tag	UNP A0A8S7FUD7
B	646	HIS	-	expression tag	UNP A0A8S7FUD7
B	647	HIS	-	expression tag	UNP A0A8S7FUD7
B	648	HIS	-	expression tag	UNP A0A8S7FUD7
B	649	HIS	-	expression tag	UNP A0A8S7FUD7
B	650	HIS	-	expression tag	UNP A0A8S7FUD7

- Molecule 2 is {N}-[(2 {R},3 {S})-2-[(4-nitrophenyl)methyl]-4-oxidanylidene-oxetan-3-yl]-2,3-bis(oxidanyl)benzamide (three-letter code: WE3) (formula: $C_{17}H_{14}N_2O_7$) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			26	17	2	7		
2	B	1	Total	C	N	O	0	0
			26	17	2	7		

• Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

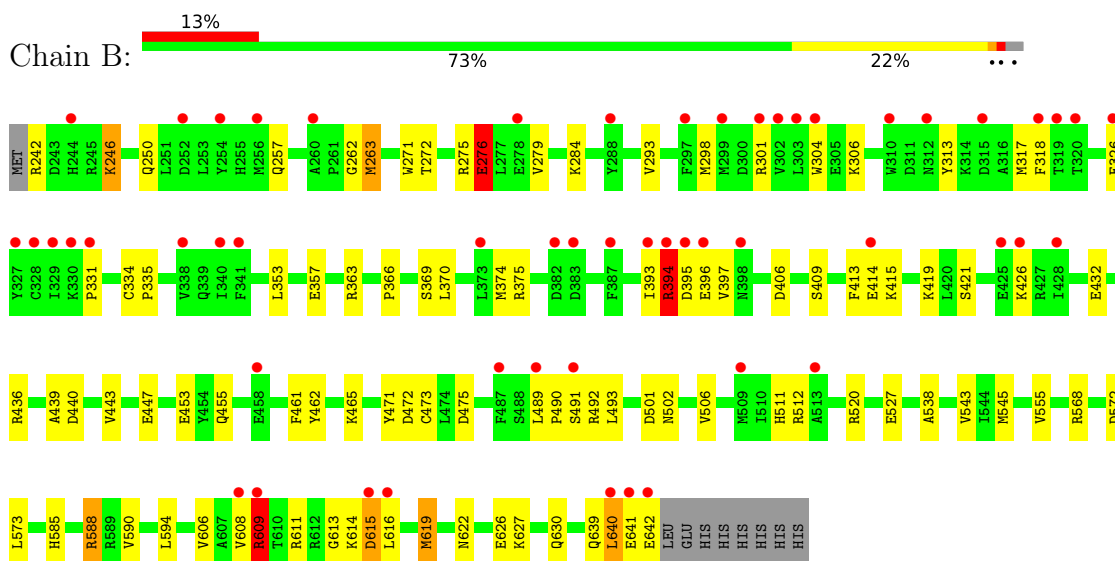| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Zn	0	0
			1	1		
3	B	1	Total	Zn	0	0
			1	1		

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: Threonine–tRNA ligase

Chain A:

- Molecule 1: Threonine–tRNA ligase

Chain B:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	90.40Å 108.81Å 113.77Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	78.64 – 2.98 78.64 – 2.98	Depositor EDS
% Data completeness (in resolution range)	99.3 (78.64-2.98) 99.4 (78.64-2.98)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.22 (at 2.96Å)	Xtriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.246 , 0.298 0.250 , 0.302	Depositor DCC
R_{free} test set	1115 reflections (4.75%)	wwPDB-VP
Wilson B-factor (Å^2)	61.5	Xtriage
Anisotropy	0.598	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.27 , 24.6	EDS
L-test for twinning[2]	$< |L| > = 0.47, < L^2 > = 0.30$	Xtriage
Estimated twinning fraction	0.010 for -h,l,k	Xtriage
F_o,F_c correlation	0.88	EDS
Total number of atoms	6597	wwPDB-VP
Average B, all atoms (Å^2)	69.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.62% 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: ZN, WE3

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	0.34	0/3344	0.71	11/4503 (0.2%)
1	B	0.42	3/3341 (0.1%)	0.76	14/4500 (0.3%)
All	All	0.38	3/6685 (0.0%)	0.73	25/9003 (0.3%)

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
1	B	0	5
All	All	0	7

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	609	ARG	CG-CD	7.47	1.70	1.51
1	B	609	ARG	CB-CG	7.14	1.71	1.52
1	B	276	GLU	CD-OE1	5.81	1.32	1.25

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	609	ARG	CA-CB-CG	15.59	147.70	113.40
1	A	314	LYS	CD-CE-NZ	-13.33	81.04	111.70
1	A	602	GLU	CA-CB-CG	10.87	137.31	113.40
1	B	609	ARG	CG-CD-NE	9.45	131.64	111.80
1	B	609	ARG	NE-CZ-NH1	8.84	124.72	120.30
1	A	306	LYS	CA-CB-CG	7.69	130.31	113.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	609	ARG	NE-CZ-NH2	-7.64	116.48	120.30
1	B	394	ARG	CB-CA-C	-7.31	95.77	110.40
1	A	306	LYS	CG-CD-CE	-7.13	90.51	111.90
1	A	602	GLU	N-CA-CB	7.12	123.42	110.60
1	B	393	ILE	C-N-CA	-6.73	104.87	121.70
1	B	615	ASP	CB-CG-OD1	-6.64	112.32	118.30
1	A	619	MET	CA-CB-CG	6.55	124.44	113.30
1	B	609	ARG	CD-NE-CZ	6.54	132.76	123.60
1	B	640	LEU	CA-CB-CG	6.36	129.93	115.30
1	B	426	LYS	CD-CE-NZ	5.88	125.23	111.70
1	A	619	MET	CB-CG-SD	-5.68	95.37	112.40
1	B	609	ARG	CB-CG-CD	5.63	126.24	111.60
1	A	320	THR	OG1-CB-CG2	5.55	122.78	110.00
1	B	414	GLU	CA-CB-CG	5.52	125.55	113.40
1	A	602	GLU	CB-CA-C	-5.52	99.37	110.40
1	A	250	GLN	CA-CB-CG	5.35	125.18	113.40
1	B	615	ASP	CB-CG-OD2	5.33	123.10	118.30
1	B	394	ARG	N-CA-CB	5.26	120.06	110.60
1	A	638	LYS	CD-CE-NZ	5.11	123.45	111.70

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	602	GLU	Peptide
1	A	619	MET	Peptide
1	B	276	GLU	Sidechain
1	B	394	ARG	Sidechain,Peptide
1	B	609	ARG	Peptide
1	B	641	GLU	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	3273	0	3205	69	0
1	B	3270	0	3198	73	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	26	0	0	1	0
2	B	26	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
All	All	6597	0	6403	136	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 (136) 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:B:609:ARG:HB2	1:B:614:LYS:O	1.60	0.99
1:B:609:ARG:HH11	1:B:615:ASP:HB2	1.34	0.93
1:A:320:THR:HG21	1:B:318:PHE:HD2	1.33	0.93
1:A:423:ARG:NH2	1:A:434:TRP:HB3	1.85	0.91
1:B:609:ARG:NH1	1:B:615:ASP:HB2	1.85	0.91
1:A:605:LYS:HD2	1:A:619:MET:HA	1.51	0.90
1:B:284:LYS:NZ	1:B:406:ASP:OD1	2.06	0.89
1:B:276:GLU:OE2	1:B:568:ARG:NH1	2.07	0.88
1:B:369:SER:O	1:B:375:ARG:NH1	2.12	0.82
1:B:609:ARG:NH2	1:B:613:GLY:O	2.18	0.75
1:A:423:ARG:CZ	1:A:434:TRP:HB3	2.16	0.75
1:B:415:LYS:HG2	1:B:471:TYR:HB2	1.69	0.75
1:B:242:ARG:O	1:B:527:GLU:HG2	1.87	0.73
1:B:394:ARG:O	1:B:397:VAL:N	2.22	0.72
1:A:242:ARG:HH21	1:A:530:ALA:HB2	1.55	0.71
1:B:608:VAL:HG13	1:B:616:LEU:HB2	1.71	0.70
1:B:609:ARG:HB2	1:B:615:ASP:HA	1.73	0.69
1:B:394:ARG:NH2	1:B:395:ASP:OD1	2.26	0.69
1:B:609:ARG:CB	1:B:615:ASP:HA	2.22	0.68
1:A:538:ALA:O	1:A:568:ARG:NH1	2.26	0.68
1:B:334:CYS:SG	1:B:511:HIS:CE1	2.87	0.68
1:B:306:LYS:HD3	1:B:492:ARG:O	1.94	0.67
1:B:394:ARG:O	1:B:396:GLU:N	2.28	0.67
1:A:423:ARG:HD3	1:A:427:ARG:NH2	2.11	0.66
1:B:609:ARG:NE	1:B:613:GLY:O	2.29	0.66
1:B:639:GLN:HB2	1:B:642:GLU:HB3	1.78	0.66
1:B:394:ARG:HH21	1:B:395:ASP:CG	2.00	0.65
1:B:272:THR:O	1:B:276:GLU:HB2	1.96	0.65
1:A:246:LYS:O	1:A:250:GLN:HB2	1.96	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:320:THR:CG2	1:B:318:PHE:HD2	2.10	0.62
1:A:339:GLN:HE21	1:B:257:GLN:HE22	1.48	0.61
1:A:608:VAL:HG12	1:A:616:LEU:HD23	1.82	0.60
1:B:419:LYS:NZ	1:B:453:GLU:OE1	2.34	0.60
1:A:603:SER:HB2	1:A:605:LYS:HG3	1.83	0.59
1:A:628:LEU:O	1:A:632:ILE:HD12	2.02	0.59
1:B:262:GLY:HA3	1:B:370:LEU:HD13	1.85	0.59
1:A:301:ARG:NE	1:A:326:GLU:OE2	2.36	0.59
1:A:595:VAL:HB	1:A:607:ALA:HB3	1.85	0.58
1:B:304:TRP:CZ3	1:B:335:PRO:HG2	2.38	0.58
1:B:335:PRO:HB3	1:B:493:LEU:HD11	1.86	0.58
1:B:432:GLU:O	1:B:436:ARG:HG3	2.04	0.58
1:A:301:ARG:HG3	1:A:310:TRP:CZ2	2.39	0.57
1:A:338:VAL:HG21	1:A:493:LEU:HD22	1.87	0.57
1:B:608:VAL:O	1:B:609:ARG:HB3	2.04	0.57
1:B:421:SER:HB2	1:B:465:LYS:HG3	1.88	0.56
1:B:306:LYS:HD2	1:B:493:LEU:HD23	1.87	0.56
1:B:640:LEU:O	1:B:642:GLU:HG3	2.06	0.56
1:A:296:PRO:HB2	1:B:263:MET:HE3	1.88	0.55
1:B:331:PRO:O	1:B:363:ARG:NH1	2.39	0.55
1:B:462:TYR:CG	1:B:489:LEU:HD11	2.42	0.55
1:A:574:ARG:NH1	1:A:584:GLU:OE1	2.38	0.55
1:A:603:SER:CB	1:A:605:LYS:HG3	2.37	0.55
1:B:334:CYS:HB2	1:B:335:PRO:HD3	1.90	0.54
1:A:488:SER:O	1:A:492:ARG:HG2	2.08	0.53
1:A:394:ARG:HD3	1:A:447:GLU:OE1	2.08	0.53
1:A:423:ARG:HH21	1:A:438:GLU:CD	2.10	0.53
1:B:615:ASP:O	1:B:616:LEU:HD13	2.08	0.53
1:A:610:THR:HG23	1:A:616:LEU:HD21	1.90	0.53
1:A:423:ARG:HH22	1:A:434:TRP:HB3	1.73	0.52
1:B:369:SER:OG	1:B:375:ARG:NH1	2.37	0.52
1:A:307:THR:HG22	1:A:493:LEU:HD11	1.90	0.52
1:B:609:ARG:HG2	1:B:615:ASP:CG	2.30	0.52
1:B:594:LEU:HB3	1:B:606:VAL:HG21	1.92	0.51
1:A:242:ARG:O	1:A:527:GLU:HG2	2.10	0.51
1:B:394:ARG:NH2	1:B:395:ASP:CG	2.63	0.51
1:B:543:VAL:HG23	1:B:590:VAL:HG11	1.92	0.51
1:B:639:GLN:HB2	1:B:642:GLU:CB	2.40	0.50
1:A:320:THR:HG21	1:B:318:PHE:CD2	2.26	0.50
1:A:489:LEU:O	1:A:493:LEU:HD12	2.12	0.50
1:A:442:ALA:O	1:A:446:GLU:HG3	2.12	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:394:ARG:NH1	1:A:447:GLU:OE2	2.45	0.49
1:A:335:PRO:O	1:A:339:GLN:HG2	2.12	0.49
1:A:562:LEU:HD22	1:A:567:ILE:HD13	1.94	0.49
1:B:419:LYS:NZ	1:B:453:GLU:HB2	2.29	0.48
1:B:246:LYS:HD3	1:B:250:GLN:HE22	1.78	0.48
1:A:331:PRO:HB3	1:A:363:ARG:HD3	1.95	0.48
1:A:620:ASP:OD1	1:A:621:VAL:N	2.47	0.48
1:B:622:ASN:O	1:B:626:GLU:HG3	2.13	0.48
1:B:313:TYR:O	1:B:317:MET:HG3	2.13	0.48
1:A:572:ASP:OD2	1:A:585:HIS:NE2	2.43	0.47
1:B:538:ALA:O	1:B:568:ARG:NH2	2.37	0.47
1:A:390:GLU:HA	1:A:393:ILE:HG13	1.97	0.47
1:A:497:TYR:CE1	1:A:505:LYS:HB2	2.50	0.47
1:A:533:PHE:O	1:A:611:ARG:NH2	2.37	0.47
1:B:394:ARG:O	1:B:395:ASP:C	2.51	0.47
1:B:275:ARG:O	1:B:279:VAL:HG23	2.15	0.47
1:B:590:VAL:O	1:B:611:ARG:HB3	2.14	0.47
1:B:616:LEU:HD22	1:B:616:LEU:N	2.30	0.46
1:B:366:PRO:O	1:B:369:SER:HB3	2.15	0.46
1:A:304:TRP:CZ3	1:A:335:PRO:HG2	2.50	0.46
1:B:304:TRP:HA	1:B:304:TRP:CE3	2.51	0.46
1:B:609:ARG:CZ	1:B:613:GLY:O	2.63	0.46
1:B:639:GLN:C	1:B:642:GLU:HB2	2.36	0.46
1:A:547:ILE:HG22	1:A:548:THR:HG23	1.98	0.46
1:A:309:HIS:HE1	1:A:489:LEU:HD11	1.80	0.46
1:A:543:VAL:HG11	1:A:585:HIS:CD2	2.50	0.45
1:A:618:SER:O	1:A:619:MET:HB3	2.16	0.45
1:A:433:MET:HG2	1:A:487:PHE:HD2	1.82	0.45
1:B:555:VAL:HG21	1:B:573:LEU:HD21	1.98	0.45
1:A:243:ASP:O	1:A:247:ILE:HG13	2.17	0.45
1:B:413:PHE:HE1	1:B:472:ASP:HA	1.82	0.45
1:A:292:GLU:OE1	1:B:271:TRP:NE1	2.43	0.44
1:A:393:ILE:HD11	1:A:508:VAL:HG21	1.99	0.44
1:A:242:ARG:HH11	1:A:474:LEU:HD11	1.82	0.44
1:B:627:LYS:HD2	1:B:640:LEU:HD21	1.99	0.44
1:A:468:PHE:HB2	1:A:481:GLY:HA3	1.99	0.44
1:B:439:ALA:O	1:B:443:VAL:HG13	2.17	0.44
1:A:247:ILE:HA	1:A:250:GLN:HB3	2.00	0.44
1:A:424:PRO:O	1:A:427:ARG:HD3	2.18	0.44
1:B:262:GLY:CA	1:B:370:LEU:HD13	2.47	0.44
1:A:517:SER:HB2	2:A:701:WE3:C02	2.47	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:293:VAL:O	1:B:357:GLU:HG3	2.18	0.44
1:A:545:MET:HE1	1:A:585:HIS:HD2	1.83	0.43
1:B:419:LYS:HD2	1:B:455:GLN:HG3	2.01	0.43
1:A:621:VAL:HA	1:A:624:VAL:HG12	2.00	0.43
1:A:582:ILE:O	1:A:586:THR:OG1	2.28	0.42
1:A:620:ASP:HB3	1:A:623:GLU:HB3	2.01	0.42
1:A:484:GLN:HG3	1:A:511:HIS:HB2	2.02	0.42
1:A:602:GLU:O	1:A:604:GLY:N	2.52	0.42
1:B:491:SER:OG	1:B:506:VAL:HG11	2.20	0.42
1:B:301:ARG:O	1:B:304:TRP:N	2.52	0.42
1:A:465:LYS:HB3	1:A:484:GLN:HG2	2.02	0.42
1:B:608:VAL:HG11	1:B:619:MET:SD	2.60	0.42
1:B:585:HIS:HA	1:B:588:ARG:HB2	2.01	0.41
1:A:351:LEU:HD12	1:A:389:THR:HG22	2.01	0.41
1:A:301:ARG:HG3	1:A:310:TRP:CE2	2.55	0.41
1:A:542:VAL:HG13	1:A:594:LEU:HD13	2.02	0.41
1:A:335:PRO:HA	1:A:338:VAL:HG22	2.03	0.41
1:A:423:ARG:HH22	1:A:434:TRP:C	2.24	0.41
1:A:309:HIS:CE1	1:A:489:LEU:HD11	2.54	0.41
1:A:248:GLY:HA2	1:A:253:LEU:HB2	2.03	0.41
1:A:280:PHE:O	1:A:284:LYS:HG2	2.21	0.41
1:A:461:PHE:CD2	1:A:461:PHE:C	2.93	0.41
1:B:489:LEU:N	1:B:490:PRO:HD2	2.36	0.41
1:B:374:MET:HA	1:B:520:ARG:HG3	2.03	0.41
1:B:545:MET:HG2	1:B:572:ASP:HB3	2.02	0.41

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	399/410 (97%)	393 (98%)	6 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	399/410 (97%)	391 (98%)	8 (2%)	0	100	100
All	All	798/820 (97%)	784 (98%)	14 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	355/365 (97%)	331 (93%)	24 (7%)	16	46
1	B	354/365 (97%)	336 (95%)	18 (5%)	24	57
All	All	709/730 (97%)	667 (94%)	42 (6%)	19	52

All (42) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	252	ASP
1	A	263	MET
1	A	282	ARG
1	A	306	LYS
1	A	319	THR
1	A	325	ARG
1	A	334	CYS
1	A	347	SER
1	A	363	ARG
1	A	374	MET
1	A	433	MET
1	A	455	GLN
1	A	461	PHE
1	A	465	LYS
1	A	479	GLN
1	A	492	ARG
1	A	501	ASP
1	A	502	ASN

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Mol	Chain	Res	Type
1	A	504	ARG
1	A	548	THR
1	A	577	LYS
1	A	588	ARG
1	A	614	LYS
1	A	633	ARG
1	B	246	LYS
1	B	263	MET
1	B	298	MET
1	B	326	GLU
1	B	353	LEU
1	B	409	SER
1	B	440	ASP
1	B	447	GLU
1	B	461	PHE
1	B	473	CYS
1	B	475	ASP
1	B	501	ASP
1	B	502	ASN
1	B	512	ARG
1	B	588	ARG
1	B	609	ARG
1	B	619	MET
1	B	630	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	257	GLN
1	A	455	GLN
1	B	250	GLN
1	B	257	GLN
1	B	309	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)

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z|$ > 2	Counts	RMSZ	#$|Z|$ > 2
2	WE3	A	701	3	24,28,28	3.43	7 (29%)	32,40,40	1.56	2 (6%)
2	WE3	B	701	3	24,28,28	3.41	5 (20%)	32,40,40	1.89	4 (12%)

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	WE3	A	701	3	-	7/13/28/28	0/3/3/3
2	WE3	B	701	3	-	6/13/28/28	0/3/3/3

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	701	WE3	O04-N02	10.98	1.41	1.22
2	B	701	WE3	O04-N02	10.96	1.41	1.22
2	A	701	WE3	O06-C07	7.93	1.41	1.21
2	B	701	WE3	O06-C07	7.91	1.41	1.21
2	B	701	WE3	C11-N01	6.21	1.47	1.34
2	A	701	WE3	C11-N01	5.98	1.47	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	701	WE3	O05-C07	-5.75	1.32	1.36
2	A	701	WE3	O05-C07	-5.75	1.32	1.36
2	B	701	WE3	O01-C14	2.35	1.41	1.36
2	A	701	WE3	C08-C09	2.23	1.55	1.52
2	A	701	WE3	O01-C14	2.21	1.40	1.36
2	A	701	WE3	C08-C04	2.01	1.56	1.51

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	701	WE3	O05-C07-O06	7.08	134.44	126.65
2	B	701	WE3	C04-C08-C09	-6.46	103.97	113.42
2	B	701	WE3	O05-C07-O06	5.82	133.05	126.65
2	B	701	WE3	O06-C07-C10	-3.32	133.55	138.74
2	A	701	WE3	O06-C07-C10	-3.02	134.03	138.74
2	B	701	WE3	C12-C11-N01	2.55	121.52	116.80

There are no chirality outliers.
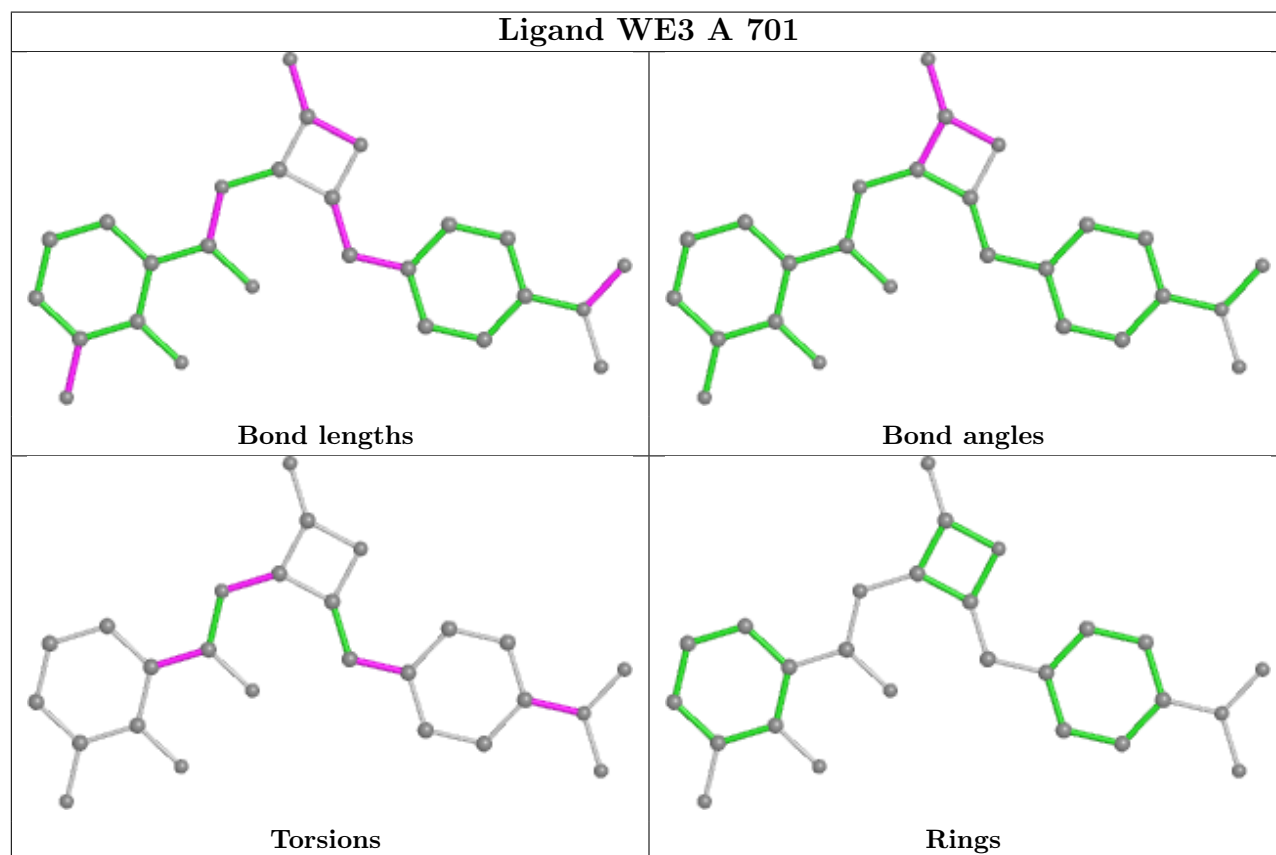
All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	701	WE3	C02-C01-N02-O04
2	B	701	WE3	C06-C01-N02-O04
2	B	701	WE3	N01-C11-C12-C13
2	A	701	WE3	N01-C11-C12-C13
2	B	701	WE3	O07-C11-C12-C13
2	A	701	WE3	O07-C11-C12-C13
2	A	701	WE3	C05-C04-C08-C09
2	A	701	WE3	C03-C04-C08-C09
2	A	701	WE3	C07-C10-N01-C11
2	B	701	WE3	C07-C10-N01-C11
2	B	701	WE3	C04-C08-C09-C10
2	A	701	WE3	C06-C01-N02-O04
2	A	701	WE3	C02-C01-N02-O04

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	701	WE3	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 WE3 A 701

Bond lengths

Bond angles

Torsions

Rings

Ligand WE3 B 701

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(Å^2)	Q<0.9
1	A	401/410 (97%)	0.92	48 (11%)	4	2	40, 62, 101, 146	253 (63%)
1	B	401/410 (97%)	0.97	54 (13%)	3	1	42, 68, 97, 143	244 (60%)
All	All	802/820 (97%)	0.94	102 (12%)	3	2	40, 65, 99, 146	497 (61%)

All (102) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	425	GLU	6.6
1	B	609	ARG	5.6
1	A	313	TYR	5.3
1	A	619	MET	4.7
1	B	329	ILE	4.7
1	B	304	TRP	4.5
1	A	328	CYS	4.5
1	A	311	ASP	4.4
1	B	394	ARG	4.3
1	A	314	LYS	4.1
1	B	319	THR	3.9
1	B	315	ASP	3.8
1	A	259	GLU	3.7
1	B	396	GLU	3.7
1	A	562	LEU	3.6
1	B	328	CYS	3.6
1	B	310	TRP	3.6
1	B	640	LEU	3.5
1	B	616	LEU	3.4
1	B	641	GLU	3.4
1	B	393	ILE	3.4
1	B	615	ASP	3.4
1	A	544	ILE	3.3
1	A	618	SER	3.3

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Mol	Chain	Res	Type	RSRZ
1	A	640	LEU	3.3
1	A	555	VAL	3.3
1	B	330	LYS	3.3
1	A	317	MET	3.2
1	B	491	SER	3.1
1	B	320	THR	3.1
1	B	297	PHE	3.0
1	A	312	ASN	3.0
1	A	310	TRP	3.0
1	A	297	PHE	3.0
1	B	326	GLU	3.0
1	A	307	THR	2.9
1	A	381	GLN	2.9
1	A	569	VAL	2.9
1	B	327	TYR	2.8
1	A	320	THR	2.8
1	B	278	GLU	2.8
1	B	254	TYR	2.8
1	B	288	TYR	2.7
1	B	387	PHE	2.7
1	B	428	ILE	2.7
1	A	331	PRO	2.7
1	B	338	VAL	2.7
1	B	318	PHE	2.7
1	A	309	HIS	2.7
1	A	353	LEU	2.6
1	B	395	ASP	2.6
1	B	513	ALA	2.6
1	B	414	GLU	2.6
1	B	426	LYS	2.6
1	A	488	SER	2.5
1	A	596	CYS	2.5
1	A	299	MET	2.5
1	B	299	MET	2.5
1	A	333	ASN	2.5
1	A	332	MET	2.5
1	A	375	ARG	2.5
1	B	340	ILE	2.4
1	B	509	MET	2.4
1	B	382	ASP	2.4
1	B	260	ALA	2.4
1	B	458	GLU	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	433	MET	2.4
1	B	252	ASP	2.4
1	A	504	ARG	2.4
1	A	254	TYR	2.3
1	B	642	GLU	2.3
1	B	301	ARG	2.3
1	A	298	MET	2.3
1	B	312	ASN	2.3
1	A	361	CYS	2.2
1	B	244	HIS	2.2
1	A	278	GLU	2.2
1	B	608	VAL	2.2
1	B	489	LEU	2.2
1	B	341	PHE	2.2
1	A	264	VAL	2.2
1	B	302	VAL	2.2
1	B	303	LEU	2.2
1	A	250	GLN	2.1
1	A	642	GLU	2.1
1	B	398	ASN	2.1
1	A	327	TYR	2.1
1	B	487	PHE	2.1
1	B	256	MET	2.1
1	B	331	PRO	2.1
1	B	383	ASP	2.1
1	A	428	ILE	2.1
1	A	263	MET	2.1
1	A	374	MET	2.1
1	A	517	SER	2.1
1	A	475	ASP	2.1
1	A	376	VAL	2.1
1	B	373	LEU	2.0
1	A	319	THR	2.0
1	A	362	HIS	2.0
1	A	260	ALA	2.0
1	A	616	LEU	2.0

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

There are no non-standard protein/DNA/RNA residues in this entry.
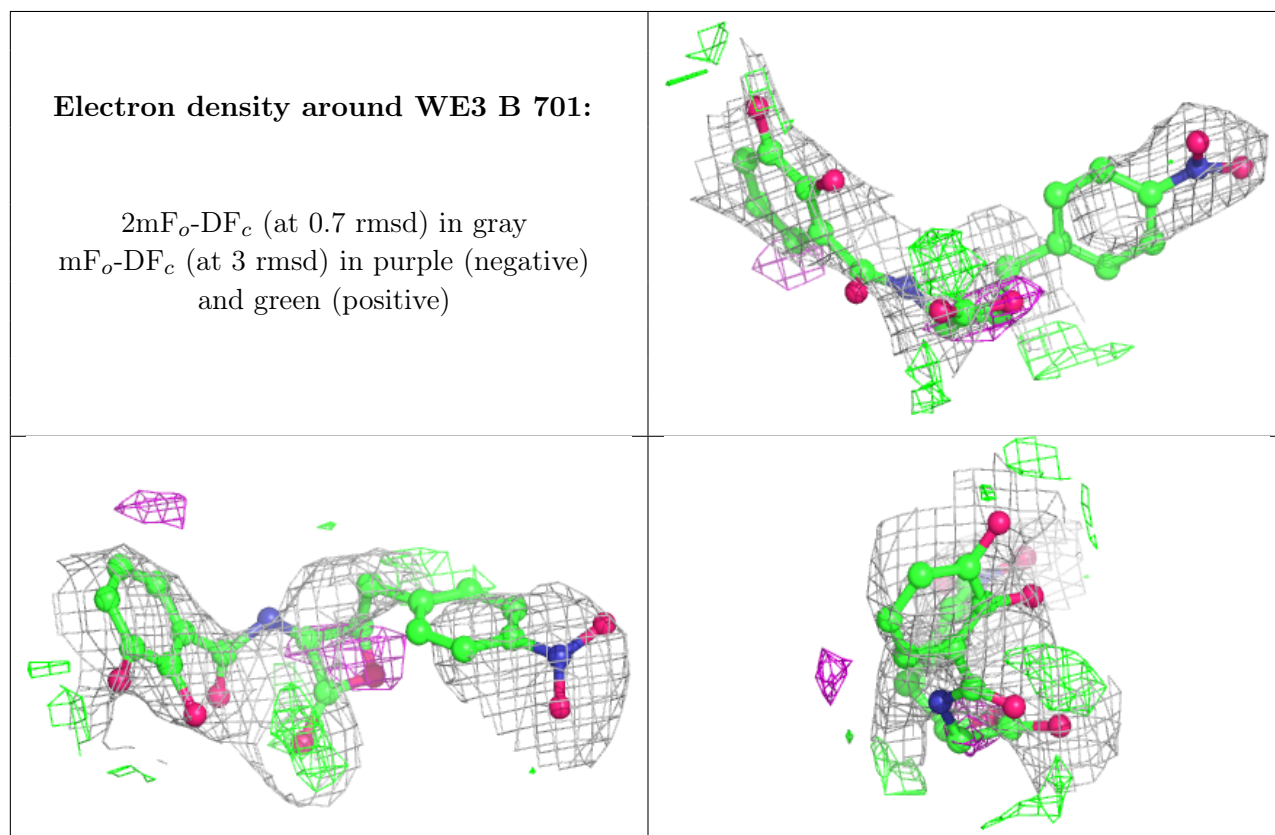
6.3 Carbohydrates (i)
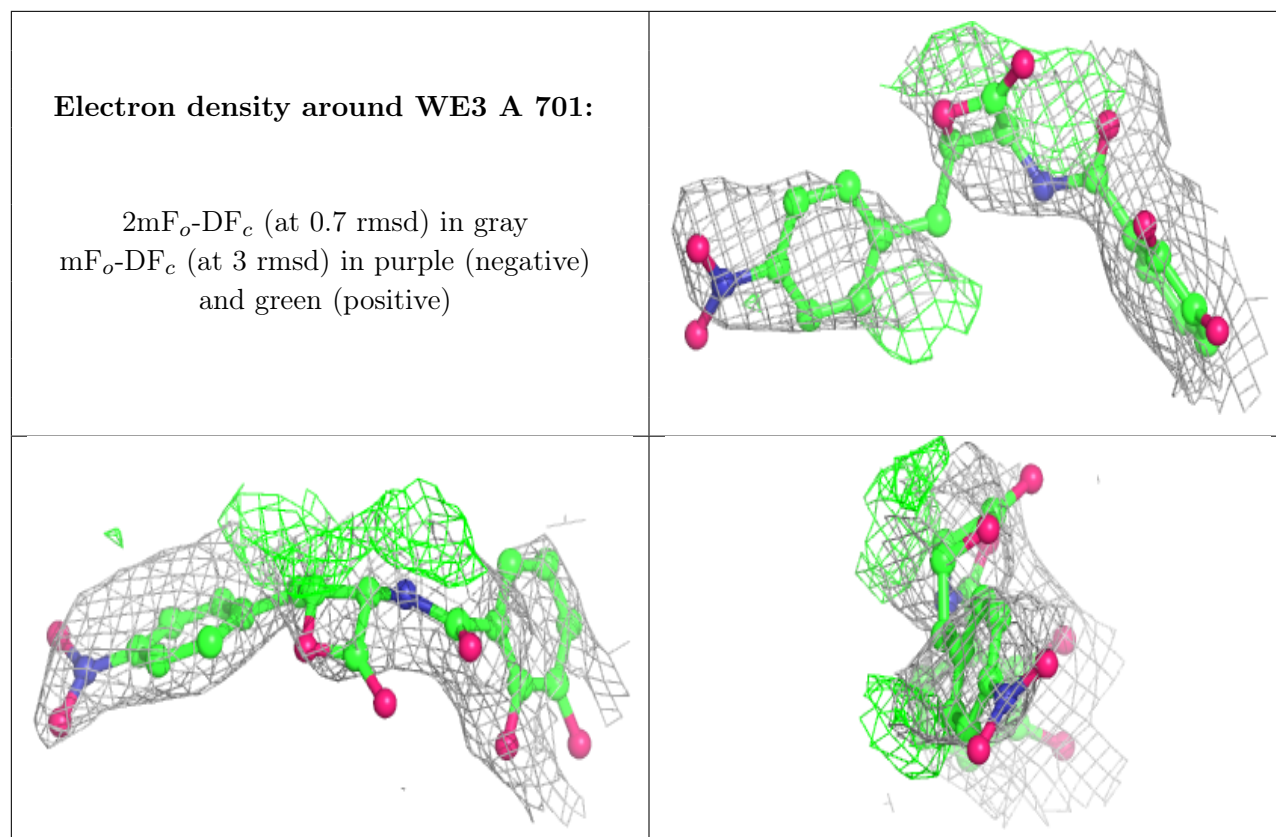
There are no monosaccharides in this entry.

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(Å^2)	Q<0.9
2	WE3	B	701	26/26	0.66	0.47	93,95,97,97	26
2	WE3	A	701	26/26	0.79	0.37	83,90,94,94	26
3	ZN	A	702	1/1	0.94	0.19	74,74,74,74	1
3	ZN	B	702	1/1	0.94	0.20	88,88,88,88	1

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 WE3 B 701:

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

Electron density around WE3 A 701:

$2mF_o\text{-}DF_c$ (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.