



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 29, 2024 – 01:45 pm GMT

PDB ID : 9FIT
Title : Structure-guided discovery of selective USP7 inhibitors with in vivo activity
Authors : Baker, L.M.; Murray, J.; Hubbard, R.E.; Whitehead, N.
Deposited on : 2024-05-29
Resolution : 2.70 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 : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 3.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.003 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

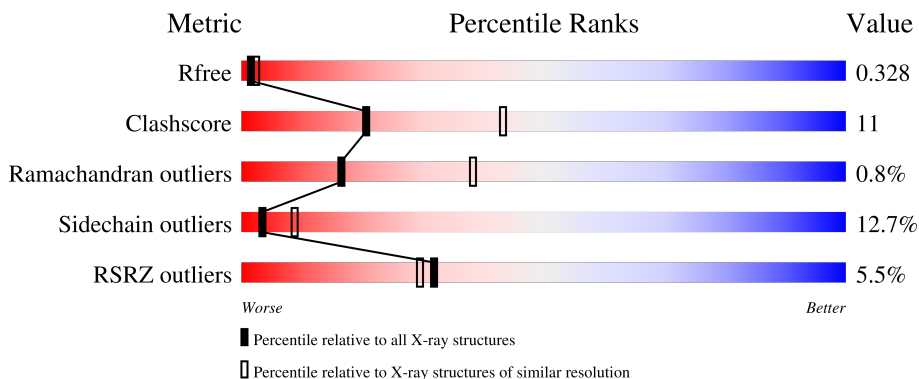
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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}	164625	3333 (2.70-2.70)
Clashscore	180529	3684 (2.70-2.70)
Ramachandran outliers	177936	3633 (2.70-2.70)
Sidechain outliers	177891	3633 (2.70-2.70)
RSRZ outliers	164620	3333 (2.70-2.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	355	
1	B	355	

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 10730 atoms, of which 5280 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.

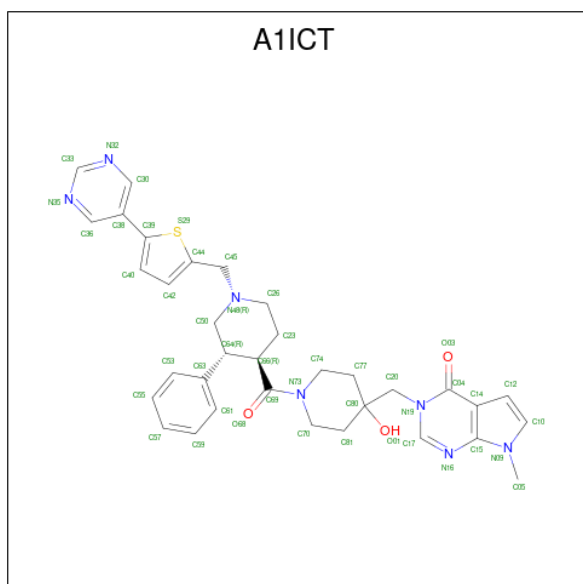
- Molecule 1 is a protein called Ubiquitin carboxyl-terminal hydrolase 7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
1	A	327	5240	1670	2602	447	505	16	73	0	0
1	B	326	5237	1672	2602	443	505	15	72	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	206	GLY	-	expression tag	UNP Q93009
A	409	ALA	PHE	engineered mutation	UNP Q93009
B	206	GLY	-	expression tag	UNP Q93009
B	409	ALA	PHE	engineered mutation	UNP Q93009

- Molecule 2 is 7-methyl-3-[[4-oxidanyl-1-[(3 {R},4 {R})-3-phenyl-1-[(5-pyrimidin-5-ylthio)hen-2-yl)methyl]piperidin-4-yl]carbonyl-piperidin-4-yl]methyl]pyrrolo[2,3-d]pyrimidin-4-one (three-letter code: A1ICT) (formula: C₃₄H₃₇N₇O₃S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
2	A	1	Total	C	H	N	O	S	4	0
			83	34	38	7	3	1		
2	B	1	Total	C	H	N	O	S	4	0
			83	34	38	7	3	1		

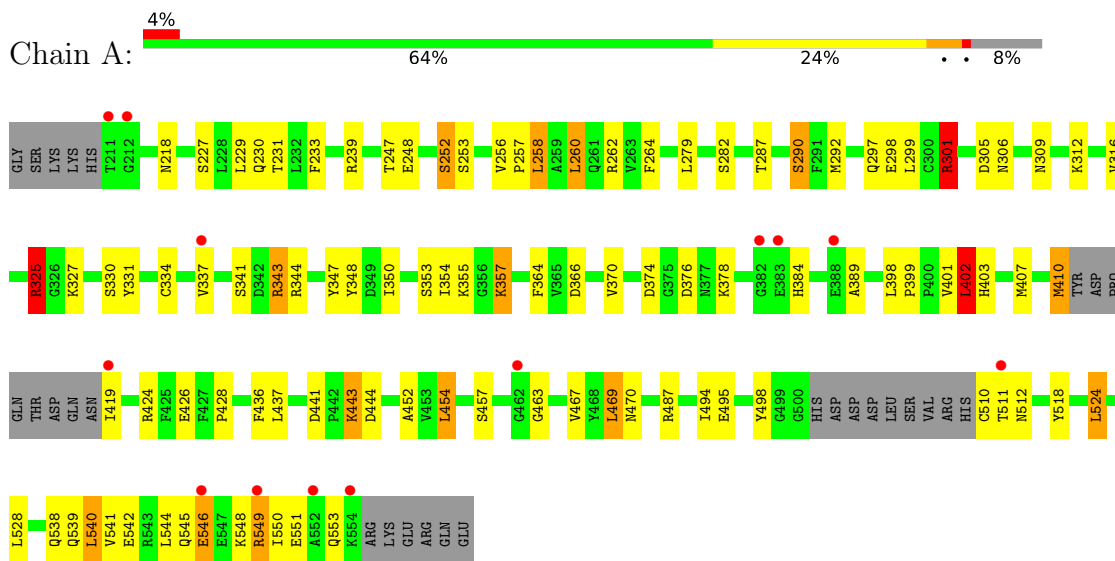
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	45	Total	O	0	0
			45	45		
3	B	42	Total	O	0	0
			42	42		

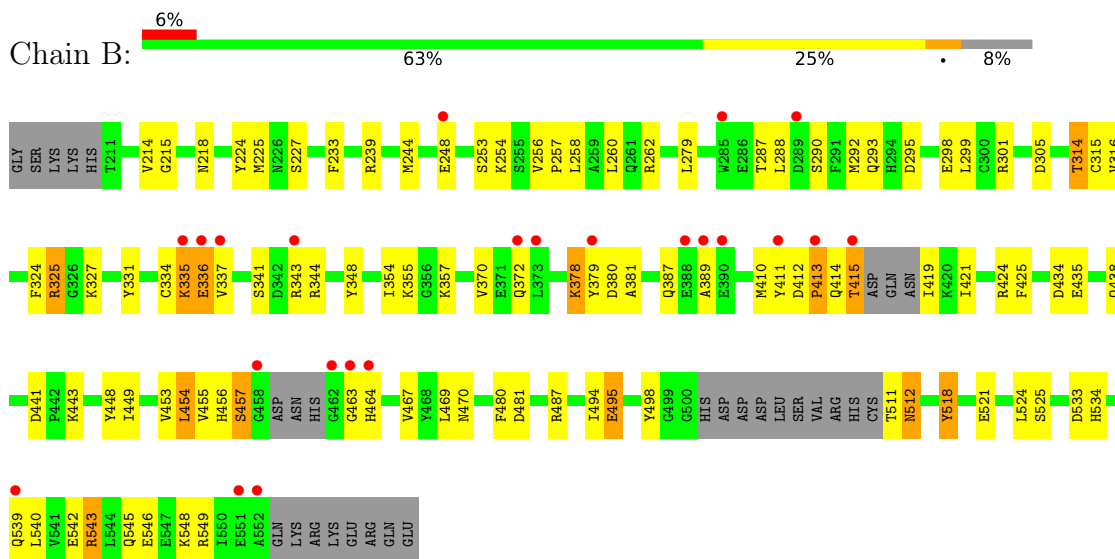
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Ubiquitin carboxyl-terminal hydrolase 7



- Molecule 1: Ubiquitin carboxyl-terminal hydrolase 7



4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	74.76Å 67.69Å 77.51Å 90.00° 90.54° 90.00°	Depositor
Resolution (Å)	21.66 – 2.70 21.66 – 2.70	Depositor EDS
% Data completeness (in resolution range)	96.7 (21.66-2.70) 96.5 (21.66-2.70)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.76 (at 2.19Å)	Xtrriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.273 , 0.328 0.273 , 0.328	Depositor DCC
R_{free} test set	1080 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	10.6	Xtrriage
Anisotropy	1.521	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 24.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.000 for l,k,-h 0.014 for h,-k,-l 0.024 for l,-k,h	Xtrriage
F_o, F_c correlation	0.85	EDS
Total number of atoms	10730	wwPDB-VP
Average B, all atoms (Å ²)	30.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 24.17 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 4.0408e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: A1ICT

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	0.48	0/2690	0.93	5/3626 (0.1%)
1	B	0.46	0/2687	0.94	6/3622 (0.2%)
All	All	0.47	0/5377	0.94	11/7248 (0.2%)

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	3
1	B	0	1
All	All	0	4

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	543	ARG	NE-CZ-NH2	-9.12	115.74	120.30
1	A	402	LEU	CB-CG-CD2	6.75	122.47	111.00
1	A	325	ARG	NE-CZ-NH1	6.52	123.56	120.30
1	A	410	MET	CG-SD-CE	6.08	109.93	100.20
1	B	244	MET	CG-SD-CE	5.70	109.32	100.20
1	A	301	ARG	CD-NE-CZ	5.44	131.22	123.60
1	B	424	ARG	NE-CZ-NH2	-5.37	117.62	120.30
1	B	262	ARG	NE-CZ-NH1	5.22	122.91	120.30
1	B	254	LYS	N-CA-CB	-5.07	101.48	110.60
1	B	518	TYR	CB-CA-C	-5.05	100.30	110.40
1	A	402	LEU	CB-CG-CD1	-5.01	102.49	111.00

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	424	ARG	Sidechain
1	A	510	CYS	Peptide
1	A	549	ARG	Sidechain
1	B	543	ARG	Sidechain

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	2638	2602	2587	61	2
1	B	2635	2602	2589	53	2
2	A	45	38	0	1	0
2	B	45	38	0	2	0
3	A	45	0	0	7	0
3	B	42	0	0	9	0
All	All	5450	5280	5176	116	2

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 11.

All (116) 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:297:GLN:O	1:A:301:ARG:HG3	1.56	1.06
1:A:301:ARG:HG2	1:A:301:ARG:HH11	1.27	0.99
1:B:487:ARG:NH2	3:B:701:HOH:O	2.02	0.91
1:A:325:ARG:NH1	1:A:348:TYR:OH	2.05	0.89
1:A:325:ARG:HH11	1:A:325:ARG:HG3	1.35	0.88
1:A:541:VAL:O	1:A:545:GLN:HG2	1.78	0.84
1:A:298:GLU:HA	1:A:301:ARG:HD2	1.60	0.82
1:A:403:HIS:NE2	3:A:703:HOH:O	2.13	0.82
1:A:227:SER:HB3	1:A:454:LEU:HD13	1.73	0.69
1:B:334:CYS:HA	1:B:389:ALA:HB2	1.74	0.69
1:B:301:ARG:NH1	3:B:704:HOH:O	2.26	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:297:GLN:O	1:A:301:ARG:CG	2.38	0.67
1:A:262:ARG:HD3	3:A:736:HOH:O	1.94	0.66
1:B:227:SER:HB3	1:B:454:LEU:HD13	1.79	0.65
1:B:301:ARG:CZ	3:B:704:HOH:O	2.43	0.64
1:A:546:GLU:HG2	1:A:550:ILE:HD12	1.77	0.63
1:B:335:LYS:HD3	1:B:372:GLN:HE22	1.64	0.63
1:A:353:SER:O	1:A:357:LYS:HG3	1.99	0.62
1:B:449:ILE:HD11	1:B:521:GLU:HG3	1.82	0.61
1:B:412:ASP:O	1:B:415:THR:N	2.30	0.61
1:B:545:GLN:O	1:B:549:ARG:HG3	1.99	0.61
1:B:301:ARG:CZ	1:B:301:ARG:HA	2.31	0.60
1:A:325:ARG:NH1	1:A:325:ARG:HG3	2.04	0.60
1:A:301:ARG:HH11	1:A:301:ARG:CG	2.11	0.57
1:B:334:CYS:HA	1:B:389:ALA:CB	2.35	0.57
1:B:454:LEU:N	1:B:454:LEU:CD2	2.67	0.57
1:B:463:GLY:HA3	3:B:718:HOH:O	2.05	0.57
1:A:331:TYR:OH	1:A:370:VAL:HG22	2.05	0.56
1:A:256:VAL:HB	1:A:257:PRO:HD3	1.88	0.56
1:B:441:ASP:OD2	1:B:443:LYS:HB2	2.06	0.56
1:B:412:ASP:O	1:B:413:PRO:C	2.45	0.55
1:A:463:GLY:N	3:A:707:HOH:O	2.40	0.55
1:B:425:PHE:N	1:B:498:TYR:O	2.40	0.55
1:B:301:ARG:NH2	3:B:704:HOH:O	2.39	0.55
1:B:248:GLU:HG2	1:B:539:GLN:OE1	2.08	0.54
1:A:282:SER:O	3:A:704:HOH:O	2.18	0.53
1:B:331:TYR:HA	1:B:341:SER:O	2.08	0.53
1:A:354:ILE:HG13	1:A:355:LYS:N	2.23	0.53
1:A:548:LYS:O	1:A:551:GLU:HB3	2.09	0.53
1:B:454:LEU:N	1:B:454:LEU:HD23	2.24	0.53
1:B:256:VAL:HB	1:B:257:PRO:HD3	1.91	0.53
1:B:453:VAL:HG12	1:B:455:VAL:HG23	1.91	0.52
1:A:301:ARG:HG2	1:A:301:ARG:NH1	2.05	0.52
1:A:334:CYS:HA	1:A:389:ALA:HB2	1.92	0.52
1:B:336:GLU:HG3	1:B:337:VAL:N	2.25	0.51
1:A:399:PRO:HG2	1:A:401:VAL:O	2.11	0.51
1:A:256:VAL:HG22	1:A:282:SER:OG	2.10	0.50
2:B:601:A1ICT:C69	2:B:601:A1ICT:C61	2.89	0.50
1:B:512:ASN:O	3:B:702:HOH:O	2.19	0.50
1:A:524:LEU:CD2	1:A:528:LEU:HD12	2.41	0.49
1:B:467:VAL:HG13	1:B:480:PHE:HB2	1.94	0.49
1:A:403:HIS:ND1	3:A:701:HOH:O	1.94	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:454:LEU:CD2	1:A:454:LEU:N	2.76	0.48
1:B:295:ASP:O	1:B:298:GLU:HB2	2.12	0.48
1:A:287:THR:OG1	1:A:290:SER:HB2	2.14	0.48
1:A:347:TYR:OH	1:A:398:LEU:HA	2.14	0.48
1:B:331:TYR:OH	1:B:370:VAL:HG22	2.14	0.48
1:A:540:LEU:HD22	1:A:544:LEU:HD11	1.95	0.48
1:B:464:HIS:CE1	1:B:481:ASP:OD1	2.68	0.47
1:A:260:LEU:HD22	1:A:264:PHE:CE1	2.50	0.47
1:A:331:TYR:HA	1:A:341:SER:O	2.14	0.47
1:A:309:ASN:O	1:A:312:LYS:N	2.39	0.47
1:A:252:SER:HA	1:A:258:LEU:HD12	1.96	0.47
1:B:214:VAL:HG22	1:B:215:GLY:N	2.29	0.47
1:B:448:TYR:HB3	1:B:518:TYR:HB3	1.97	0.47
1:A:297:GLN:OE1	1:A:297:GLN:N	2.28	0.46
1:B:354:ILE:HG13	1:B:355:LYS:N	2.29	0.46
1:B:412:ASP:O	1:B:414:GLN:N	2.48	0.46
1:A:428:PRO:O	1:A:518:TYR:OH	2.28	0.46
1:A:357:LYS:HE2	1:A:366:ASP:CG	2.36	0.46
1:B:378:LYS:HB3	1:B:387:GLN:O	2.16	0.45
1:B:314:THR:OG1	1:B:316:VAL:HG12	2.17	0.45
1:A:426:GLU:HG3	1:A:498:TYR:CE2	2.51	0.45
1:A:233:PHE:CE1	1:A:239:ARG:HD3	2.51	0.45
1:A:441:ASP:HB3	1:A:444:ASP:O	2.17	0.45
1:B:464:HIS:HE1	1:B:481:ASP:OD1	2.00	0.45
1:B:435:GLU:HB3	3:B:740:HOH:O	2.15	0.45
1:A:229:LEU:HA	1:A:229:LEU:HD23	1.84	0.44
1:B:335:LYS:HD3	1:B:372:GLN:NE2	2.30	0.44
1:B:454:LEU:HD22	1:B:467:VAL:HG23	1.98	0.44
1:B:410:MET:SD	1:B:421:ILE:HD11	2.57	0.44
1:A:454:LEU:HD22	1:A:467:VAL:HG23	2.00	0.44
1:A:399:PRO:HD2	1:A:402:LEU:HD23	1.99	0.44
1:B:456:HIS:CG	1:B:457:SER:N	2.85	0.44
1:B:324:PHE:O	1:B:348:TYR:HA	2.18	0.44
1:A:230:GLN:O	1:A:231:THR:C	2.55	0.43
1:A:419:ILE:HG23	1:A:419:ILE:O	2.17	0.43
1:B:546:GLU:HA	1:B:549:ARG:CZ	2.48	0.43
1:A:407:MET:HG2	2:A:601:A1ICT:C10	2.48	0.43
1:B:233:PHE:CE1	1:B:239:ARG:HD3	2.53	0.43
1:B:227:SER:HB3	1:B:454:LEU:CD1	2.44	0.43
1:A:337:VAL:HG11	1:A:384:HIS:ND1	2.34	0.43
1:A:247:THR:HG21	1:A:258:LEU:HA	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:398:LEU:HD12	1:A:437:LEU:HD21	2.00	0.42
1:A:347:TYR:HA	3:A:721:HOH:O	2.19	0.42
1:A:325:ARG:NH1	1:A:348:TYR:CZ	2.86	0.42
1:A:470:ASN:O	1:A:470:ASN:CG	2.59	0.42
1:B:495:GLU:H	1:B:495:GLU:HG2	1.11	0.42
1:A:364:PHE:HB3	1:A:436:PHE:CE1	2.55	0.41
1:A:260:LEU:HD23	1:A:260:LEU:HA	1.83	0.41
1:A:347:TYR:CE2	1:A:350:ILE:HD11	2.54	0.41
1:B:315:CYS:HB2	3:B:719:HOH:O	2.19	0.41
2:B:601:A1ICT:C04	2:B:601:A1ICT:C81	2.99	0.41
1:A:452:ALA:HB2	1:A:469:LEU:CD2	2.50	0.41
1:B:224:TYR:O	1:B:225:MET:C	2.59	0.41
1:B:301:ARG:HG3	1:B:305:ASP:OD2	2.20	0.41
1:A:239:ARG:HG3	1:A:264:PHE:CD2	2.56	0.41
1:B:379:TYR:O	1:B:381:ALA:N	2.54	0.41
1:A:538:GLN:O	1:A:539:GLN:C	2.59	0.41
1:A:343:ARG:HG2	3:A:725:HOH:O	2.20	0.40
1:B:378:LYS:HB3	1:B:378:LYS:HE3	1.77	0.40
1:A:252:SER:HA	1:A:258:LEU:CD1	2.50	0.40
1:B:325:ARG:HB2	1:B:348:TYR:CE2	2.56	0.40
1:B:525:SER:HA	3:B:737:HOH:O	2.20	0.40
1:B:354:ILE:O	1:B:357:LYS:N	2.48	0.40
1:A:443:LYS:HA	1:A:443:LYS:HD2	1.65	0.40

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

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:287:THR:O	1:B:288:LEU:CD2[1_554]	1.69	0.51
1:A:287:THR:O	1:B:288:LEU:HD23[1_554]	1.15	0.45

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was

analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	321/355 (90%)	290 (90%)	29 (9%)	2 (1%)	22	45
1	B	318/355 (90%)	287 (90%)	28 (9%)	3 (1%)	14	35
All	All	639/710 (90%)	577 (90%)	57 (9%)	5 (1%)	16	38

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	380	ASP
1	B	413	PRO
1	A	306	ASN
1	B	494	ILE
1	A	494	ILE

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	292/320 (91%)	254 (87%)	38 (13%)	3	8
1	B	292/320 (91%)	256 (88%)	36 (12%)	4	9
All	All	584/640 (91%)	510 (87%)	74 (13%)	3	9

All (74) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	218	ASN
1	A	248	GLU
1	A	252	SER
1	A	253	SER
1	A	258	LEU
1	A	260	LEU
1	A	279	LEU
1	A	290	SER
1	A	292	MET

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Mol	Chain	Res	Type
1	A	299	LEU
1	A	301	ARG
1	A	305	ASP
1	A	316	VAL
1	A	325	ARG
1	A	327	LYS
1	A	330	SER
1	A	343	ARG
1	A	344	ARG
1	A	357	LYS
1	A	374	ASP
1	A	376	ASP
1	A	378	LYS
1	A	402	LEU
1	A	410	MET
1	A	443	LYS
1	A	454	LEU
1	A	457	SER
1	A	469	LEU
1	A	487	ARG
1	A	495	GLU
1	A	511	THR
1	A	512	ASN
1	A	524	LEU
1	A	540	LEU
1	A	542	GLU
1	A	546	GLU
1	A	549	ARG
1	A	553	GLN
1	B	218	ASN
1	B	253	SER
1	B	258	LEU
1	B	260	LEU
1	B	279	LEU
1	B	287	THR
1	B	290	SER
1	B	292	MET
1	B	293	GLN
1	B	299	LEU
1	B	314	THR
1	B	325	ARG
1	B	327	LYS

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Mol	Chain	Res	Type
1	B	335	LYS
1	B	336	GLU
1	B	343	ARG
1	B	344	ARG
1	B	378	LYS
1	B	411	TYR
1	B	415	THR
1	B	419	ILE
1	B	434	ASP
1	B	438	GLN
1	B	454	LEU
1	B	457	SER
1	B	469	LEU
1	B	470	ASN
1	B	495	GLU
1	B	511	THR
1	B	512	ASN
1	B	524	LEU
1	B	533	ASP
1	B	534	HIS
1	B	540	LEU
1	B	542	GLU
1	B	548	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	218	ASN
1	A	372	GLN
1	A	422	ASN
1	A	512	ASN
1	B	218	ASN
1	B	293	GLN
1	B	372	GLN
1	B	422	ASN
1	B	447	ASN
1	B	512	ASN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

2 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	A1ICT	A	601	-	48,51,51	3.07	19 (39%)	48,74,74	2.98	21 (43%)
2	A1ICT	B	601	-	48,51,51	2.75	21 (43%)	48,74,74	2.51	18 (37%)

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	A1ICT	A	601	-	-	0/24/50/50	0/7/7/7
2	A1ICT	B	601	-	-	7/24/50/50	0/7/7/7

All (40) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	601	A1ICT	C14-C04	-9.04	1.29	1.47
2	A	601	A1ICT	C63-C64	-8.39	1.39	1.51
2	B	601	A1ICT	C45-C44	8.08	1.61	1.51
2	B	601	A1ICT	C14-C04	-6.84	1.33	1.47
2	A	601	A1ICT	C14-C15	-6.63	1.31	1.41
2	A	601	A1ICT	C04-N19	-6.30	1.31	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	601	A1ICT	C17-N16	5.93	1.36	1.29
2	B	601	A1ICT	C44-S29	5.31	1.84	1.73
2	B	601	A1ICT	C14-C15	-5.23	1.33	1.41
2	B	601	A1ICT	C63-C64	-5.08	1.44	1.51
2	A	601	A1ICT	C33-N32	5.06	1.43	1.33
2	B	601	A1ICT	C17-N16	4.87	1.34	1.29
2	A	601	A1ICT	C10-C12	-4.69	1.29	1.37
2	A	601	A1ICT	C45-C44	4.35	1.56	1.51
2	A	601	A1ICT	C81-C80	4.27	1.57	1.52
2	B	601	A1ICT	C81-C80	4.08	1.56	1.52
2	B	601	A1ICT	C33-N32	4.04	1.41	1.33
2	B	601	A1ICT	C36-N35	3.43	1.41	1.34
2	B	601	A1ICT	C33-N35	3.40	1.40	1.33
2	B	601	A1ICT	C04-N19	-3.32	1.35	1.39
2	B	601	A1ICT	C30-N32	3.23	1.41	1.34
2	A	601	A1ICT	C50-C64	3.17	1.59	1.53
2	A	601	A1ICT	C33-N35	3.05	1.39	1.33
2	A	601	A1ICT	C36-N35	3.02	1.40	1.34
2	A	601	A1ICT	C30-N32	2.99	1.40	1.34
2	A	601	A1ICT	C17-N19	2.64	1.40	1.36
2	A	601	A1ICT	C12-C14	-2.61	1.30	1.42
2	B	601	A1ICT	C23-C66	-2.60	1.48	1.53
2	A	601	A1ICT	C70-N73	2.58	1.51	1.47
2	B	601	A1ICT	C10-C12	-2.57	1.33	1.37
2	A	601	A1ICT	C10-N09	-2.40	1.33	1.37
2	B	601	A1ICT	C50-C64	2.32	1.58	1.53
2	A	601	A1ICT	C20-C80	2.28	1.57	1.54
2	A	601	A1ICT	C44-S29	-2.21	1.69	1.73
2	B	601	A1ICT	C66-C69	2.16	1.56	1.51
2	B	601	A1ICT	C45-N48	2.16	1.51	1.47
2	B	601	A1ICT	C77-C80	-2.12	1.50	1.52
2	B	601	A1ICT	C20-C80	2.11	1.57	1.54
2	B	601	A1ICT	C69-N73	2.07	1.37	1.34
2	B	601	A1ICT	C10-N09	-2.07	1.34	1.37

All (39) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	A1ICT	C14-C04-N19	11.16	120.31	113.80
2	A	601	A1ICT	N19-C17-N16	-8.76	118.73	126.34
2	B	601	A1ICT	N19-C17-N16	-8.36	119.07	126.34
2	B	601	A1ICT	C61-C63-C53	-4.94	112.13	118.29

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	601	A1ICT	C80-C20-N19	-4.81	104.61	114.00
2	A	601	A1ICT	C23-C66-C64	4.66	114.77	109.58
2	B	601	A1ICT	C14-C04-N19	4.58	116.47	113.80
2	A	601	A1ICT	C30-N32-C33	4.53	121.59	115.80
2	B	601	A1ICT	C59-C61-C63	4.35	126.03	120.65
2	B	601	A1ICT	C64-C50-N48	4.32	117.38	110.63
2	A	601	A1ICT	C23-C66-C69	4.22	115.80	109.50
2	A	601	A1ICT	C80-C20-N19	-4.02	106.14	114.00
2	B	601	A1ICT	C05-N09-C10	3.98	132.46	124.89
2	B	601	A1ICT	C20-N19-C17	-3.95	113.84	119.30
2	B	601	A1ICT	C30-N32-C33	3.83	120.70	115.80
2	A	601	A1ICT	C26-N48-C50	-3.65	103.93	109.52
2	B	601	A1ICT	N35-C33-N32	-3.56	119.65	126.61
2	A	601	A1ICT	C36-C38-C30	3.46	120.06	114.66
2	A	601	A1ICT	C10-C12-C14	3.30	109.73	105.71
2	A	601	A1ICT	N35-C33-N32	-3.19	120.38	126.61
2	A	601	A1ICT	C63-C64-C66	-3.09	107.02	112.84
2	A	601	A1ICT	C17-N19-C04	-3.08	119.50	121.90
2	A	601	A1ICT	C26-C23-C66	-3.06	106.45	111.59
2	A	601	A1ICT	C64-C50-N48	2.93	115.21	110.63
2	A	601	A1ICT	C64-C66-C69	-2.86	106.94	111.19
2	B	601	A1ICT	C36-N35-C33	2.76	119.34	115.80
2	B	601	A1ICT	C57-C55-C53	2.71	124.32	120.19
2	A	601	A1ICT	C74-N73-C70	2.65	117.72	112.62
2	B	601	A1ICT	C36-C38-C30	2.56	118.65	114.66
2	B	601	A1ICT	C10-C12-C14	2.39	108.62	105.71
2	B	601	A1ICT	C61-C63-C64	2.38	125.59	121.08
2	A	601	A1ICT	C77-C74-N73	-2.30	106.39	110.92
2	A	601	A1ICT	C23-C26-N48	-2.25	107.62	111.11
2	A	601	A1ICT	C66-C69-N73	-2.18	114.84	118.99
2	B	601	A1ICT	C59-C57-C55	-2.16	115.92	119.93
2	B	601	A1ICT	C26-C23-C66	-2.10	108.06	111.59
2	A	601	A1ICT	C38-C30-N32	-2.07	117.92	123.48
2	A	601	A1ICT	C77-C80-C81	-2.03	107.48	109.85
2	B	601	A1ICT	O68-C69-C66	-2.01	118.33	121.88

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	601	A1ICT	C44-C45-N48-C26
2	B	601	A1ICT	C30-C38-C39-S29

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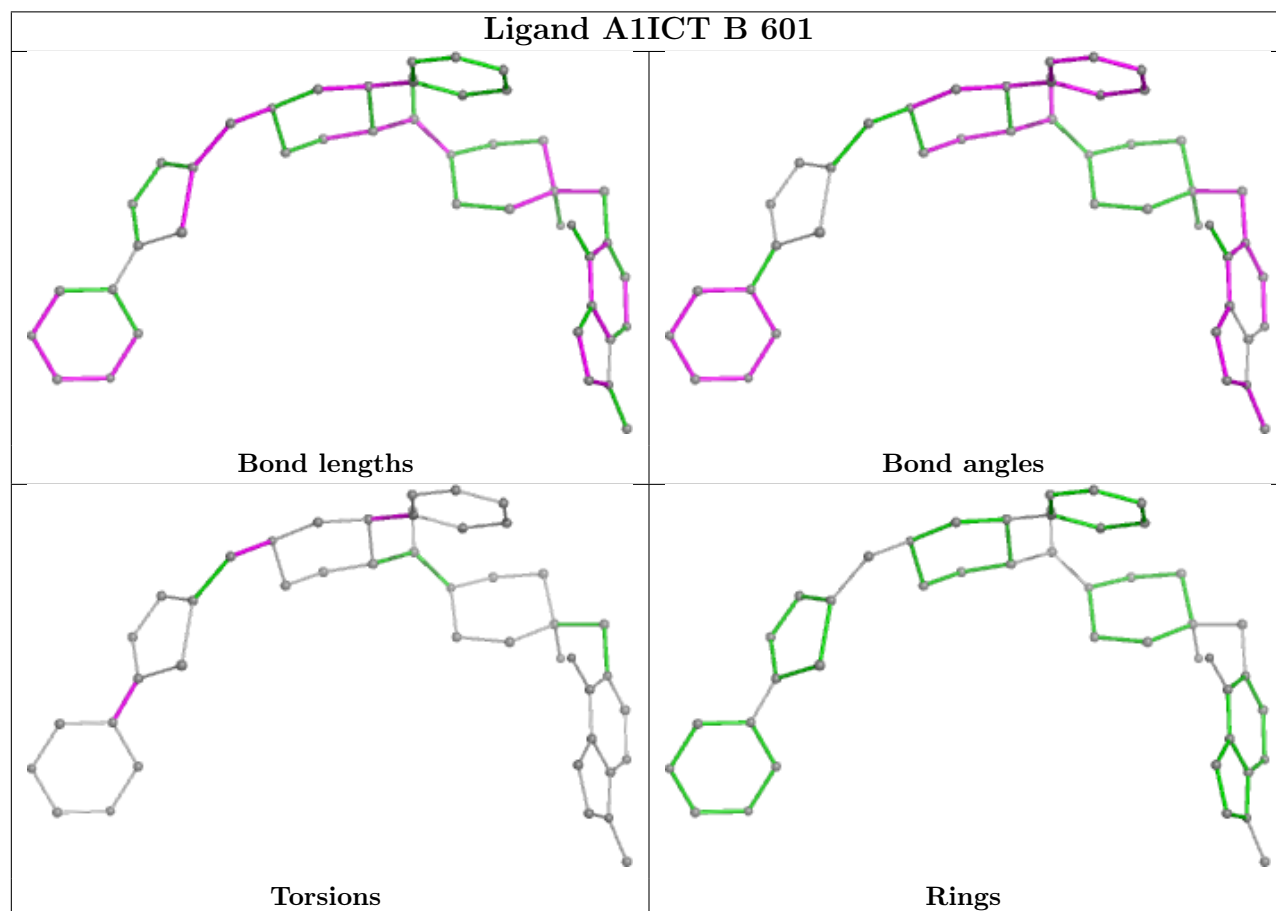
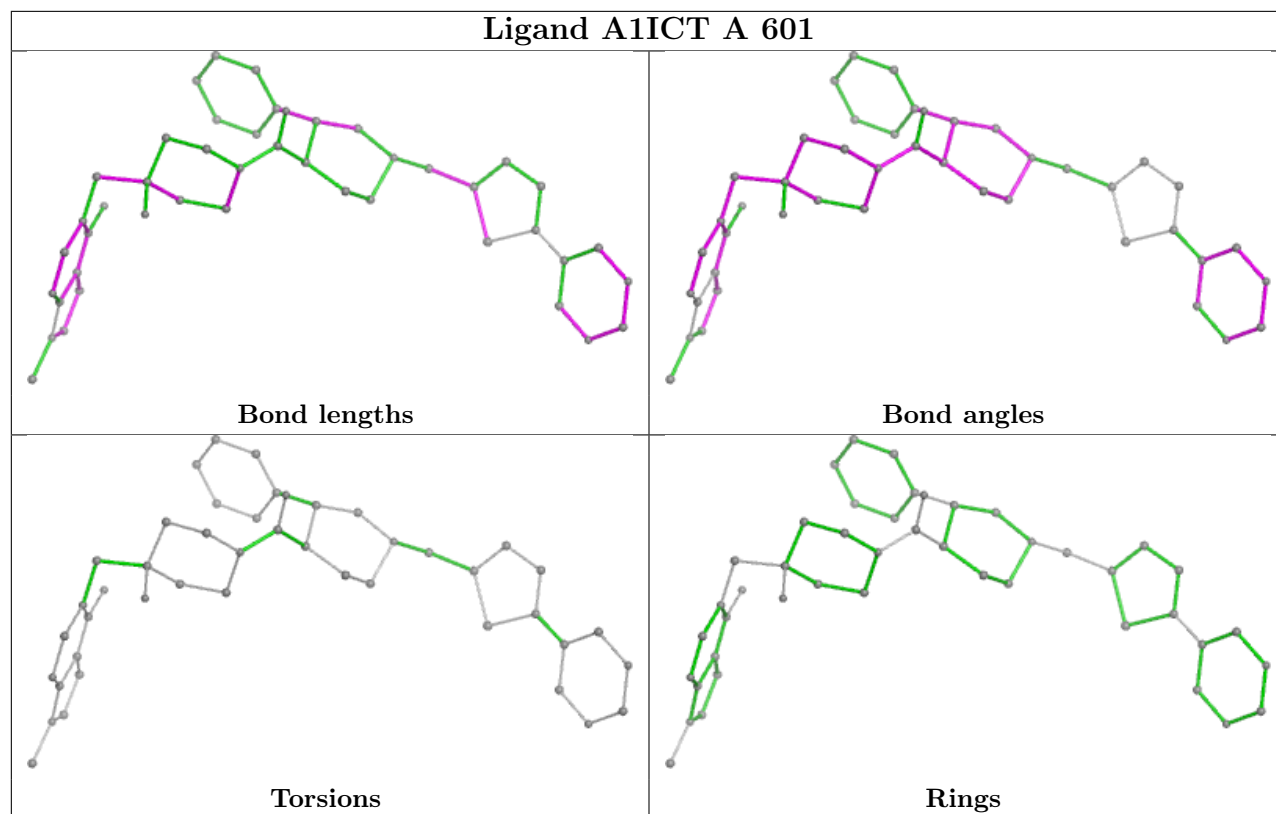
Mol	Chain	Res	Type	Atoms
2	B	601	A1ICT	C36-C38-C39-S29
2	B	601	A1ICT	C36-C38-C39-C40
2	B	601	A1ICT	C30-C38-C39-C40
2	B	601	A1ICT	C53-C63-C64-C66
2	B	601	A1ICT	C61-C63-C64-C66

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	601	A1ICT	1	0
2	B	601	A1ICT	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 than 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.



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	327/355 (92%)	0.43	13 (3%) 43 41	6, 24, 54, 69	0
1	B	326/355 (91%)	0.66	23 (7%) 23 21	7, 30, 68, 106	0
All	All	653/710 (91%)	0.55	36 (5%) 32 29	6, 27, 63, 106	0

All (36) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	415	THR	6.7
1	B	458	GLY	5.3
1	B	336	GLU	5.2
1	B	552	ALA	4.5
1	A	462	GLY	4.0
1	A	212	GLY	3.7
1	B	337	VAL	3.7
1	A	549	ARG	3.4
1	B	462	GLY	3.3
1	B	411	TYR	3.3
1	A	554	LYS	3.2
1	B	343	ARG	3.1
1	B	388	GLU	3.1
1	B	335	LYS	3.0
1	B	389	ALA	2.9
1	B	373	LEU	2.7
1	A	546	GLU	2.7
1	A	419	ILE	2.7
1	A	552	ALA	2.4
1	B	551	GLU	2.4
1	A	382	GLY	2.4
1	B	390	GLU	2.3
1	B	464	HIS	2.3
1	A	211	THR	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	383	GLU	2.3
1	B	379	TYR	2.2
1	B	413	PRO	2.2
1	B	248	GLU	2.1
1	A	511	THR	2.1
1	B	289	ASP	2.1
1	B	539	GLN	2.1
1	B	285	TRP	2.1
1	B	463	GLY	2.1
1	A	388	GLU	2.1
1	B	372	GLN	2.1
1	A	337	VAL	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

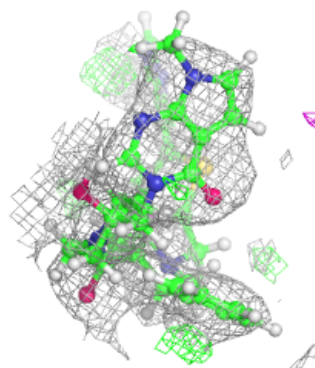
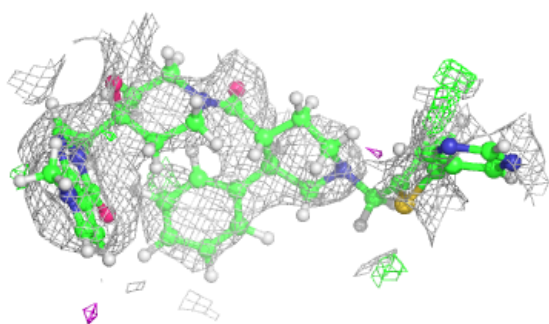
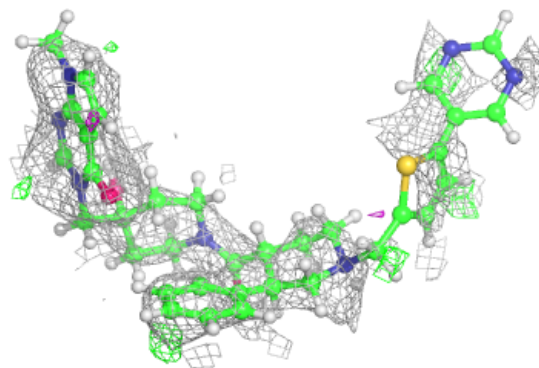
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	A1ICT	B	601	45/45	0.79	0.21	23,46,118,123	4
2	A1ICT	A	601	45/45	0.89	0.12	13,29,45,49	4

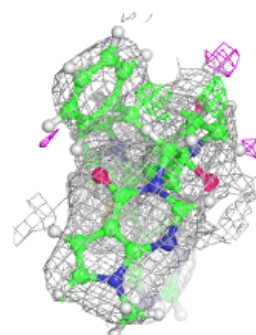
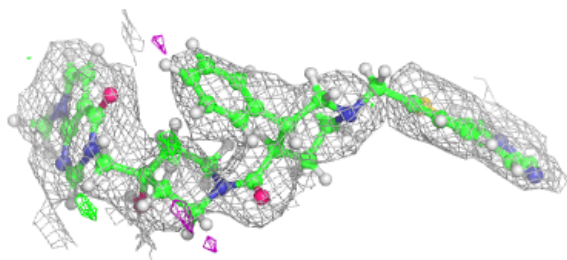
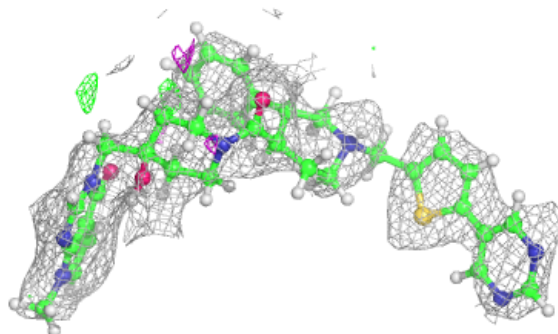
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around A1ICT B 601:

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

**Electron density around A1ICT A 601:**

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



6.5 Other polymers [i](#)

There are no such residues in this entry.