



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 17, 2023 – 02:13 AM EDT

PDB ID : 2DXS  
Title : Crystal structure of HCV NS5B RNA polymerase complexed with a tetracyclic inhibitor  
Authors : Adachi, T.; Tsuruha, J.; Doi, S.; Murase, K.; Ikegashira, K.; Watanabe, S.; Uehara, K.; Orita, T.; Nomura, A.; Kamada, M.  
Deposited on : 2006-08-30  
Resolution : 2.20 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](mailto: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>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
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) : 2.36

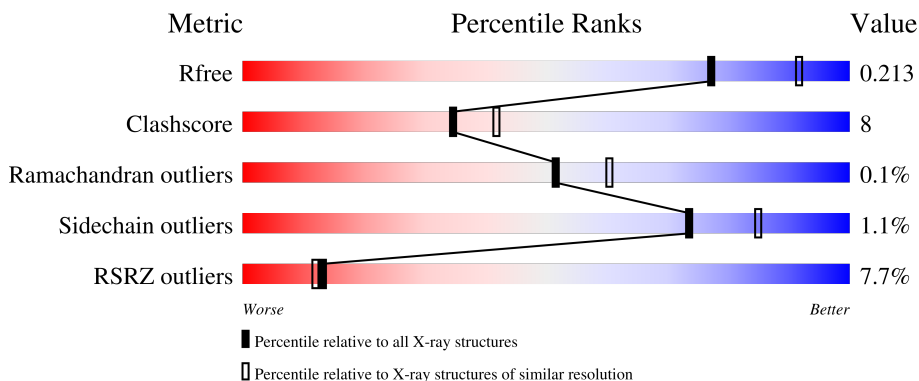
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.20 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	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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  $\geq 3$ , 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	552	 6% 76% 16% • 6%
1	B	552	 9% 74% 19% 6%

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 8690 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.

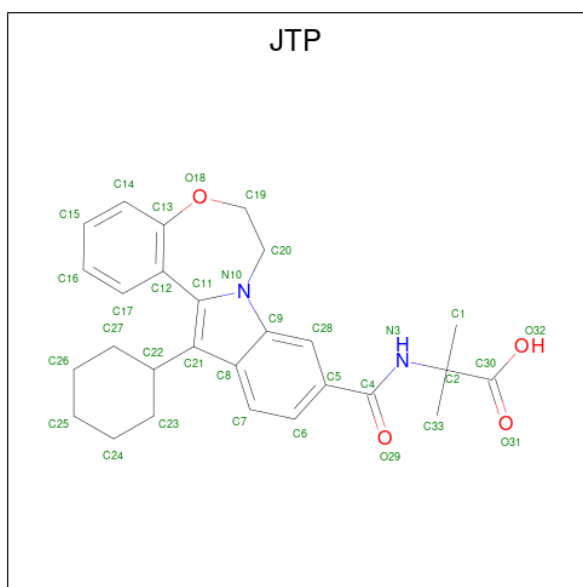
- Molecule 1 is a protein called Genome polyprotein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	517	4020	2536	709	745	30	0	0	0
1	B	517	4020	2536	709	745	30	0	0	0

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	544	GLN	ARG	SEE REMARK 999	UNP P26663
A	545	GLY	-	cloning artifact	UNP P26663
A	546	SER	-	cloning artifact	UNP P26663
A	547	HIS	-	cloning artifact	UNP P26663
A	548	HIS	-	cloning artifact	UNP P26663
A	549	ASP	-	cloning artifact	UNP P26663
A	550	HIS	-	cloning artifact	UNP P26663
A	551	HIS	-	cloning artifact	UNP P26663
A	552	HIS	-	cloning artifact	UNP P26663
B	544	GLN	ARG	SEE REMARK 999	UNP P26663
B	545	GLY	-	cloning artifact	UNP P26663
B	546	SER	-	cloning artifact	UNP P26663
B	547	HIS	-	cloning artifact	UNP P26663
B	548	HIS	-	cloning artifact	UNP P26663
B	549	ASP	-	cloning artifact	UNP P26663
B	550	HIS	-	cloning artifact	UNP P26663
B	551	HIS	-	cloning artifact	UNP P26663
B	552	HIS	-	cloning artifact	UNP P26663

- Molecule 2 is N-[(13-CYCLOHEXYL-6,7-DIHYDROINDOLO[1,2-D][1,4]BENZOXAZEPIN-10-YL)CARBONYL]-2-METHYL-L-ALANINE (three-letter code: JTP) (formula: C<sub>27</sub>H<sub>30</sub>N<sub>2</sub>O<sub>4</sub>).

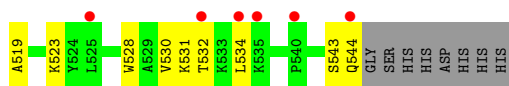


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
2	A	1	Total	C	N	O	0	0
			33	27	2	4		
2	B	1	Total	C	N	O	0	0
			33	27	2	4		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	303	Total	O	0	0
			303	303		
3	B	281	Total	O	0	0
			281	281		





## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	96.45Å 67.23Å 97.85Å 90.00° 93.78° 90.00°	Depositor
Resolution (Å)	29.99 – 2.20 29.99 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.0 (29.99-2.20) 99.2 (29.99-2.20)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.94 (at 2.20Å)	Xtrriage
Refinement program	CNX 2005	Depositor
R, $R_{free}$	0.217 , 0.259 0.213 , 0.213	Depositor DCC
$R_{free}$ test set	3177 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	22.7	Xtrriage
Anisotropy	1.084	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.39 , 57.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.023 for l,-k,h	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	8690	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	30.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.46% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: JTP

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	0.30	0/4104	0.47	0/5567
1	B	0.30	0/4104	0.47	0/5567
All	All	0.30	0/8208	0.47	0/11134

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 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	4020	0	4056	64	0
1	B	4020	0	4056	73	0
2	A	33	0	29	1	0
2	B	33	0	29	0	0
3	A	303	0	0	2	0
3	B	281	0	0	2	0
All	All	8690	0	8170	135	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 8.

All (135) 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:96:SER:HB3	1:B:168:ARG:HH21	1.45	0.81
1:A:461:GLN:H	1:A:461:GLN:HE21	1.34	0.76
1:B:408:TRP:O	1:B:412:ILE:HG13	1.86	0.74
1:A:515:GLY:HA2	1:A:519:ALA:HB2	1.71	0.72
1:B:223:CYS:HB3	3:B:2201:HOH:O	1.89	0.72
1:B:13:PRO:HG3	1:B:42:SER:OG	1.90	0.71
1:B:337:ARG:O	1:B:341:GLU:HG3	1.91	0.71
1:A:505:ARG:HH22	1:A:531:LYS:HD3	1.57	0.70
1:B:508:ARG:CZ	1:B:530:VAL:HG21	2.20	0.70
1:A:457:LEU:HD13	1:A:517:ARG:HB2	1.75	0.68
1:A:337:ARG:O	1:A:341:GLU:HG3	1.95	0.67
1:A:368:SER:HB3	1:A:384:LEU:HD22	1.77	0.66
1:A:139:MET:HE2	1:A:160:ILE:HD11	1.77	0.65
1:A:347:SER:O	1:A:349:PRO:HD3	1.97	0.65
1:A:508:ARG:CZ	1:A:530:VAL:HG21	2.28	0.64
1:B:124:LYS:HE3	1:B:128:GLU:OE2	1.98	0.64
1:B:196:SER:OG	1:B:199:GLN:HG3	1.98	0.63
1:A:223:CYS:HB3	3:A:1206:HOH:O	1.99	0.62
1:B:515:GLY:HA2	1:B:519:ALA:HB2	1.81	0.62
1:B:82:LEU:HD11	1:B:248:GLU:HB3	1.83	0.60
1:B:99:SER:HB2	1:B:165:LEU:HB3	1.82	0.60
1:B:141:LYS:HD2	1:B:158:ARG:HH21	1.67	0.59
1:B:336:LEU:HD22	1:B:356:PRO:HG3	1.84	0.59
1:B:346:TYR:O	1:B:347:SER:HB3	2.04	0.58
1:A:543:SER:O	1:A:544:GLN:HB3	2.04	0.58
1:B:429:PHE:O	1:B:433:LEU:HG	2.05	0.57
1:A:9:ALA:HB3	1:A:274:CYS:HA	1.86	0.57
1:A:372:VAL:HG22	1:A:382:TYR:CD1	2.39	0.56
1:A:346:TYR:O	1:A:347:SER:HB3	2.05	0.56
1:B:231:ASN:O	1:B:235:VAL:HG23	2.05	0.56
1:B:347:SER:O	1:B:349:PRO:HD3	2.05	0.56
1:A:145:PHE:CE2	1:A:155:LYS:HD2	2.41	0.56
1:A:503:ARG:HH22	2:A:1000:JTP:H13	1.71	0.56
1:B:96:SER:HB3	1:B:168:ARG:NH2	2.20	0.56
1:B:145:PHE:CE2	1:B:155:LYS:HD2	2.42	0.55
1:A:231:ASN:O	1:A:235:VAL:HG23	2.06	0.55
1:B:314:LEU:HB3	1:B:321:VAL:CG1	2.38	0.54
1:A:45:ALA:O	1:A:49:GLN:HG3	2.07	0.54
1:B:268:ASN:HD21	1:B:272:GLN:HB2	1.73	0.54
1:B:372:VAL:HG22	1:B:382:TYR:CD1	2.42	0.54
1:A:13:PRO:HG3	1:A:42:SER:OG	2.08	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:112:SER:HA	1:B:453:SER:O	2.09	0.53
1:B:139:MET:HE2	1:B:160:ILE:HD11	1.91	0.53
1:B:534:LEU:HD12	1:B:534:LEU:N	2.22	0.53
1:B:268:ASN:ND2	1:B:272:GLN:HB2	2.24	0.53
1:A:499:VAL:O	1:A:503:ARG:HG3	2.09	0.52
1:A:374:HIS:HA	1:A:379:LYS:O	2.10	0.52
1:B:219:TYR:HB3	1:B:320:LEU:HD23	1.90	0.52
1:B:257:THR:HA	1:B:261:TYR:HB2	1.92	0.52
1:B:433:LEU:HD22	1:B:438:GLN:HB2	1.92	0.51
1:A:453:SER:O	1:B:112:SER:HA	2.11	0.51
1:B:106:LYS:HE3	1:B:110:ASN:ND2	2.25	0.51
1:B:543:SER:O	1:B:544:GLN:HB3	2.10	0.51
1:B:141:LYS:CD	1:B:158:ARG:HH21	2.22	0.51
1:A:424:ILE:HD13	1:A:489:LEU:HD21	1.93	0.51
1:A:257:THR:HA	1:A:261:TYR:HB2	1.92	0.50
1:A:336:LEU:HD22	1:A:356:PRO:HG3	1.93	0.50
1:A:394:ARG:O	1:A:398:GLU:HG3	2.11	0.50
1:B:523:LYS:HG3	1:B:534:LEU:HD22	1.93	0.50
1:A:372:VAL:HG22	1:A:382:TYR:CE1	2.47	0.50
1:A:446:GLN:NE2	1:A:451:CYS:HB2	2.26	0.50
1:A:515:GLY:CA	1:A:519:ALA:HB2	2.39	0.50
1:A:531:LYS:HG2	1:A:532:THR:H	1.76	0.49
1:A:347:SER:C	1:A:349:PRO:HD3	2.33	0.49
1:A:446:GLN:HE22	1:A:451:CYS:HB2	1.78	0.49
1:B:508:ARG:HH21	1:B:534:LEU:HD11	1.78	0.49
1:A:89:CYS:HB3	1:A:108:VAL:O	2.12	0.48
1:B:508:ARG:NH2	1:B:534:LEU:HD11	2.27	0.48
1:B:428:HIS:O	1:B:431:SER:HB3	2.13	0.48
1:A:314:LEU:HB3	1:A:321:VAL:CG1	2.44	0.48
1:B:262:ILE:HG13	1:B:263:GLY:N	2.29	0.48
1:A:543:SER:O	1:A:544:GLN:CB	2.61	0.48
1:B:89:CYS:HB3	1:B:108:VAL:O	2.13	0.48
1:B:187:MET:SD	1:B:292:THR:HG22	2.55	0.47
1:B:144:VAL:HB	1:B:394:ARG:HG2	1.97	0.47
1:A:429:PHE:O	1:A:433:LEU:HG	2.14	0.47
1:B:423:MET:HA	1:B:528:TRP:CZ2	2.49	0.47
1:B:45:ALA:O	1:B:49:GLN:HG3	2.15	0.47
1:A:141:LYS:HD2	1:A:158:ARG:NH1	2.30	0.47
1:B:347:SER:C	1:B:349:PRO:HD3	2.35	0.46
1:A:508:ARG:NE	1:A:530:VAL:HG21	2.31	0.46
1:A:40:THR:HB	1:A:157:ALA:HB2	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:50:LYS:HE2	1:A:50:LYS:HB3	1.71	0.46
1:A:355:GLN:HA	1:A:356:PRO:HD3	1.82	0.46
1:A:523:LYS:HG3	1:A:534:LEU:CD2	2.46	0.45
1:B:374:HIS:HA	1:B:379:LYS:O	2.15	0.45
1:B:439:LEU:O	1:B:457:LEU:HG	2.16	0.45
1:A:200:ARG:NH2	1:A:365:SER:OG	2.39	0.45
1:B:486:ALA:O	1:B:490:ARG:HG3	2.17	0.45
1:B:141:LYS:NZ	1:B:158:ARG:NH2	2.65	0.45
1:B:119:ILE:HD13	1:B:169:VAL:HG11	1.98	0.45
1:B:390:THR:HB	1:B:391:PRO:HD3	1.98	0.45
1:B:403:THR:HB	1:B:404:PRO:HD2	1.99	0.45
1:B:82:LEU:HG	1:B:249:ALA:HB2	1.99	0.45
1:A:390:THR:HB	1:A:391:PRO:HD3	1.99	0.44
1:B:227:THR:HB	1:B:347:SER:O	2.16	0.44
1:B:461:GLN:HG2	3:B:2222:HOH:O	2.17	0.44
1:B:100:LYS:HB3	1:B:100:LYS:HE2	1.71	0.44
1:A:346:TYR:O	1:A:347:SER:CB	2.65	0.44
1:A:534:LEU:HD12	1:A:534:LEU:N	2.32	0.44
1:A:416:ALA:HB3	1:A:417:PRO:HD3	1.98	0.44
1:B:346:TYR:O	1:B:347:SER:CB	2.66	0.44
1:B:50:LYS:HE2	1:B:50:LYS:HB3	1.63	0.44
1:B:388:PRO:C	1:B:391:PRO:HD2	2.38	0.44
1:A:182:LEU:N	1:A:183:PRO:HD2	2.33	0.43
1:B:372:VAL:HG12	1:B:373:ALA:N	2.33	0.43
1:A:219:TYR:HB3	1:A:320:LEU:HD23	1.99	0.43
1:A:96:SER:HB3	1:A:168:ARG:HH21	1.84	0.43
1:B:531:LYS:HG3	1:B:532:THR:H	1.83	0.43
1:B:385:THR:OG1	1:B:386:ARG:N	2.52	0.43
1:A:439:LEU:HB2	3:A:1259:HOH:O	2.19	0.42
1:A:48:ARG:HG2	1:A:159:LEU:HG	2.01	0.42
1:A:82:LEU:HD11	1:A:248:GLU:HB3	2.00	0.42
1:B:141:LYS:NZ	1:B:158:ARG:HH21	2.16	0.42
1:A:187:MET:SD	1:A:292:THR:HG22	2.59	0.42
1:A:539:ILE:HA	1:A:540:PRO:HD3	1.82	0.42
1:B:40:THR:HB	1:B:157:ALA:HB2	2.01	0.42
1:A:227:THR:HB	1:A:347:SER:O	2.20	0.41
1:A:501:ARG:O	1:A:505:ARG:HG3	2.20	0.41
1:B:44:SER:HA	1:B:47:LEU:HD13	2.01	0.41
1:A:191:TYR:CZ	1:A:193:PHE:HB2	2.55	0.41
1:B:355:GLN:HA	1:B:356:PRO:HD3	1.83	0.41
1:B:47:LEU:HD12	1:B:47:LEU:N	2.36	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:368:SER:HB3	1:B:384:LEU:HD22	2.03	0.41
1:A:134:ILE:HG13	1:A:259:ARG:HB3	2.02	0.41
1:A:416:ALA:N	1:A:417:PRO:CD	2.84	0.41
1:A:523:LYS:HG3	1:A:534:LEU:HD22	2.02	0.41
1:B:257:THR:O	1:B:262:ILE:HG12	2.21	0.41
1:A:409:LEU:HD21	1:A:454:ILE:HB	2.03	0.41
1:A:155:LYS:NZ	1:A:155:LYS:HB3	2.36	0.40
1:B:313:MET:HG2	1:B:322:VAL:HG22	2.02	0.40
1:B:372:VAL:HG22	1:B:382:TYR:CE1	2.56	0.40
1:B:416:ALA:N	1:B:417:PRO:CD	2.84	0.40
1:B:146:CYS:SG	1:B:147:VAL:N	2.95	0.40
1:B:308:LEU:HB2	1:B:311:CYS:SG	2.61	0.40

There are no symmetry-related clashes.

## 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	511/552 (93%)	500 (98%)	10 (2%)	1 (0%)	47	55
1	B	511/552 (93%)	501 (98%)	10 (2%)	0	100	100
All	All	1022/1104 (93%)	1001 (98%)	20 (2%)	1 (0%)	51	60

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	347	SER

### 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	442/472 (94%)	435 (98%)	7 (2%)	62	76
1	B	442/472 (94%)	439 (99%)	3 (1%)	84	91
All	All	884/944 (94%)	874 (99%)	10 (1%)	73	85

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	96	SER
1	A	100	LYS
1	A	155	LYS
1	A	158	ARG
1	A	311	CYS
1	A	461	GLN
1	A	498	ARG
1	B	50	LYS
1	B	155	LYS
1	B	498	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	110	ASN
1	A	402	HIS
1	A	428	HIS
1	A	446	GLN
1	A	461	GLN
1	B	272	GLN
1	B	446	GLN

### 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](#)

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	JTP	B	2000	-	31,37,37	2.22	9 (29%)	39,55,55	1.39	6 (15%)
2	JTP	A	1000	-	31,37,37	2.19	10 (32%)	39,55,55	1.39	6 (15%)

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	JTP	B	2000	-	-	2/15/37/37	0/4/5/5
2	JTP	A	1000	-	-	3/15/37/37	0/4/5/5

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	2000	JTP	C21-C8	5.84	1.46	1.40
2	A	1000	JTP	C21-C8	5.71	1.46	1.40
2	B	2000	JTP	C2-C30	4.63	1.58	1.53
2	B	2000	JTP	O31-C30	4.45	1.36	1.22
2	A	1000	JTP	O31-C30	4.41	1.36	1.22
2	B	2000	JTP	C20-C19	4.24	1.56	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1000	JTP	C2-C30	4.09	1.58	1.53
2	A	1000	JTP	C20-C19	3.97	1.56	1.51
2	A	1000	JTP	C28-C5	3.72	1.43	1.37
2	B	2000	JTP	C28-C5	3.45	1.43	1.37
2	A	1000	JTP	O32-C30	-2.69	1.20	1.30
2	B	2000	JTP	O32-C30	-2.63	1.20	1.30
2	A	1000	JTP	C7-C6	2.46	1.41	1.36
2	B	2000	JTP	C7-C6	2.44	1.41	1.36
2	B	2000	JTP	C16-C17	2.38	1.42	1.36
2	A	1000	JTP	C6-C5	2.34	1.43	1.39
2	B	2000	JTP	C6-C5	2.32	1.43	1.39
2	A	1000	JTP	C16-C17	2.26	1.41	1.36
2	A	1000	JTP	C20-N10	2.18	1.50	1.49

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	2000	JTP	O18-C19-C20	4.20	115.57	112.62
2	A	1000	JTP	O18-C19-C20	4.01	115.43	112.62
2	A	1000	JTP	C19-C20-N10	3.38	113.83	111.18
2	B	2000	JTP	C2-N3-C4	3.01	128.52	122.42
2	B	2000	JTP	C19-C20-N10	2.97	113.51	111.18
2	A	1000	JTP	O31-C30-C2	-2.86	113.29	121.60
2	B	2000	JTP	O31-C30-C2	-2.85	113.33	121.60
2	A	1000	JTP	O32-C30-C2	2.84	124.18	114.91
2	B	2000	JTP	O32-C30-C2	2.81	124.09	114.91
2	A	1000	JTP	C2-N3-C4	2.78	128.05	122.42
2	B	2000	JTP	C33-C2-N3	-2.06	104.88	109.11
2	A	1000	JTP	C27-C22-C21	-2.04	110.37	114.63

There are no chirality outliers.

All (5) torsion outliers are listed below:

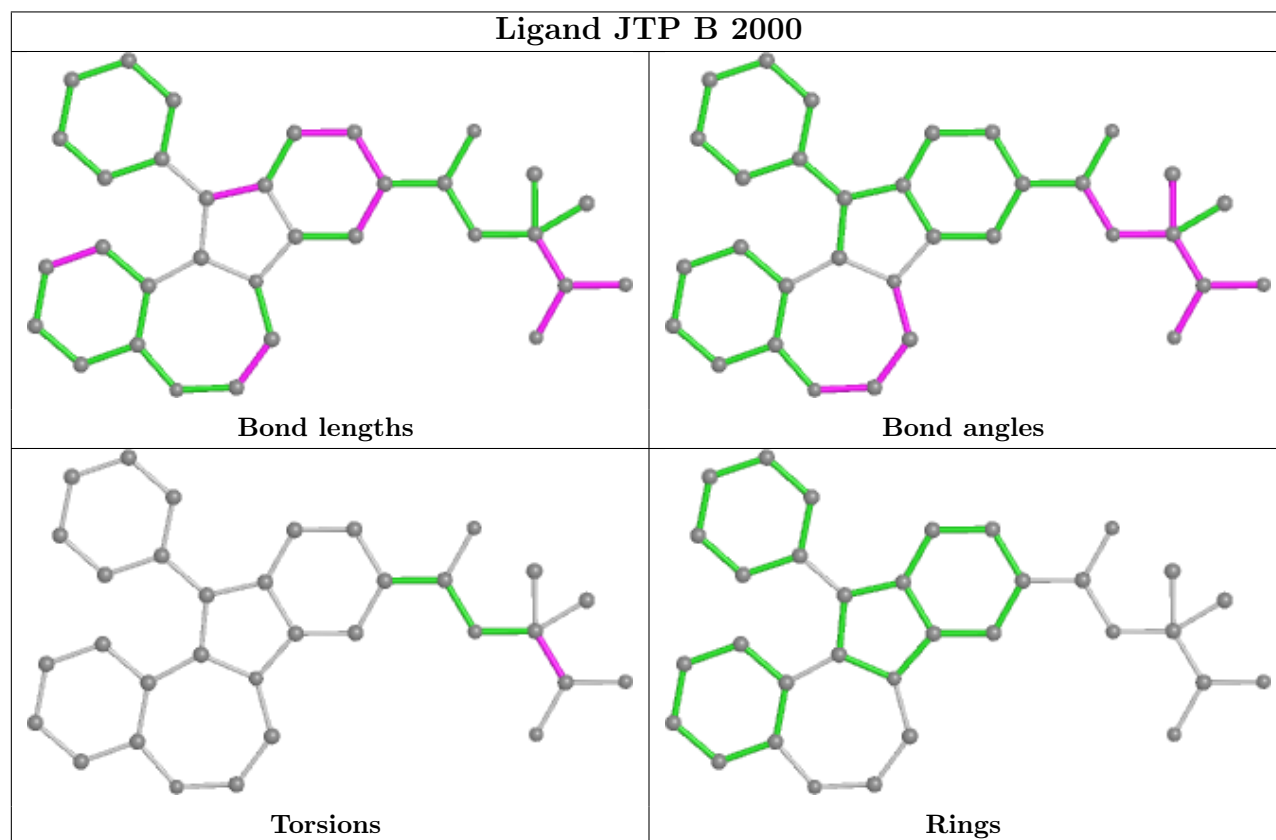
Mol	Chain	Res	Type	Atoms
2	A	1000	JTP	N3-C2-C30-O31
2	A	1000	JTP	N3-C2-C30-O32
2	B	2000	JTP	N3-C2-C30-O31
2	B	2000	JTP	N3-C2-C30-O32
2	A	1000	JTP	C33-C2-C30-O31

There are no ring outliers.

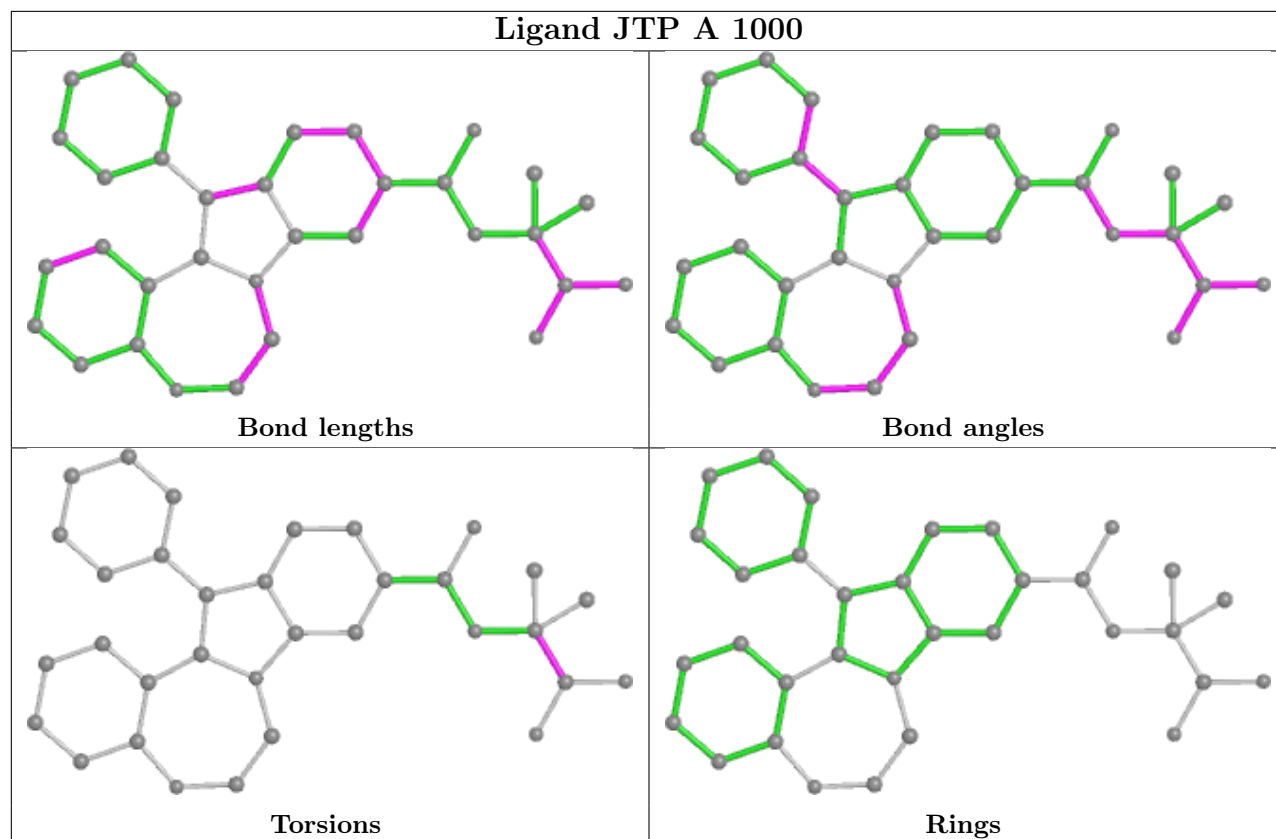
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1000	JTP	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 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	517/552 (93%)	0.31	32 (6%) 20   19	13, 26, 51, 77	0
1	B	517/552 (93%)	0.43	48 (9%) 8   7	13, 27, 57, 78	0
All	All	1034/1104 (93%)	0.37	80 (7%) 13   12	13, 26, 55, 78	0

All (80) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	532	THR	7.3
1	B	400	ALA	7.0
1	A	402	HIS	6.4
1	A	400	ALA	6.3
1	B	502	HIS	6.1
1	B	402	HIS	5.8
1	A	532	THR	5.5
1	B	404	PRO	4.6
1	B	405	VAL	4.2
1	A	401	ARG	4.2
1	A	403	THR	4.0
1	B	8	GLY	3.9
1	B	376	ALA	3.9
1	B	14	CYS	3.8
1	A	404	PRO	3.8
1	A	502	HIS	3.8
1	A	397	TRP	3.7
1	A	377	SER	3.7
1	A	47	LEU	3.7
1	A	378	GLY	3.6
1	A	14	CYS	3.3
1	B	57	LEU	3.3
1	B	525	LEU	3.3
1	A	153	GLY	3.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	397	TRP	3.3
1	B	9	ALA	3.2
1	B	535	LYS	3.2
1	A	8	GLY	3.2
1	B	378	GLY	3.2
1	A	535	LYS	3.2
1	B	430	PHE	3.1
1	B	406	ASN	3.1
1	B	403	THR	3.1
1	B	401	ARG	3.0
1	A	376	ALA	3.0
1	A	513	SER	3.0
1	B	153	GLY	2.9
1	B	377	SER	2.8
1	B	437	GLU	2.8
1	B	147	VAL	2.7
1	A	57	LEU	2.7
1	B	489	LEU	2.7
1	B	515	GLY	2.7
1	A	408	TRP	2.7
1	B	513	SER	2.6
1	B	514	GLN	2.6
1	A	43	ARG	2.6
1	B	47	LEU	2.6
1	B	38	TYR	2.6
1	B	504	ALA	2.6
1	B	491	LYS	2.5
1	B	379	LYS	2.4
1	B	544	GLN	2.4
1	B	13	PRO	2.4
1	A	147	VAL	2.3
1	B	505	ARG	2.3
1	B	506	SER	2.3
1	B	146	CYS	2.3
1	B	426	MET	2.3
1	A	55	ASP	2.3
1	A	424	ILE	2.3
1	A	435	ALA	2.2
1	B	495	PRO	2.2
1	B	509	ALA	2.2
1	B	540	PRO	2.2
1	A	38	TYR	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	272	GLN	2.1
1	B	534	LEU	2.1
1	A	413	ILE	2.1
1	B	424	ILE	2.1
1	A	405	VAL	2.1
1	A	506	SER	2.1
1	B	498	ARG	2.0
1	A	406	ASN	2.0
1	A	353	PRO	2.0
1	B	412	ILE	2.0
1	A	436	GLN	2.0
1	B	459	LEU	2.0
1	B	7	THR	2.0
1	A	9	ALA	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](#)

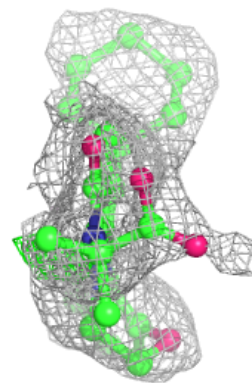
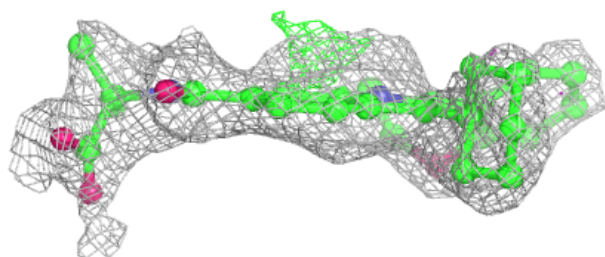
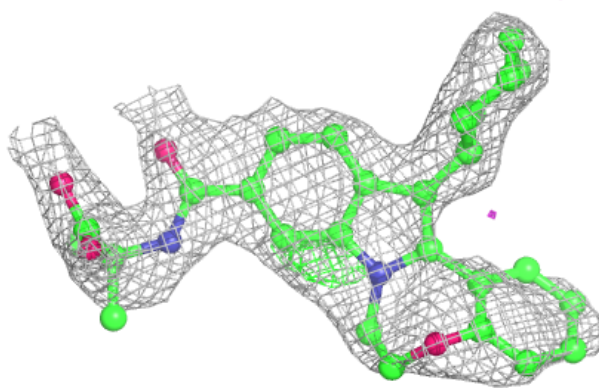
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	JTP	B	2000	33/33	0.68	0.30	62,66,69,70	0
2	JTP	A	1000	33/33	0.75	0.25	46,54,63,65	0

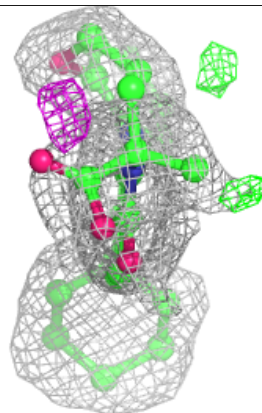
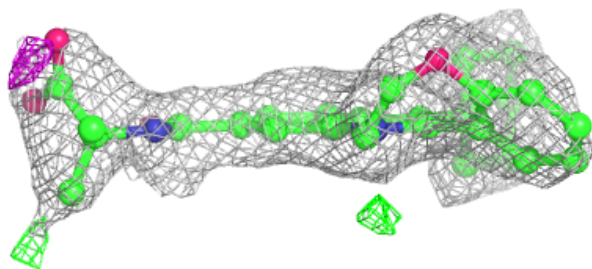
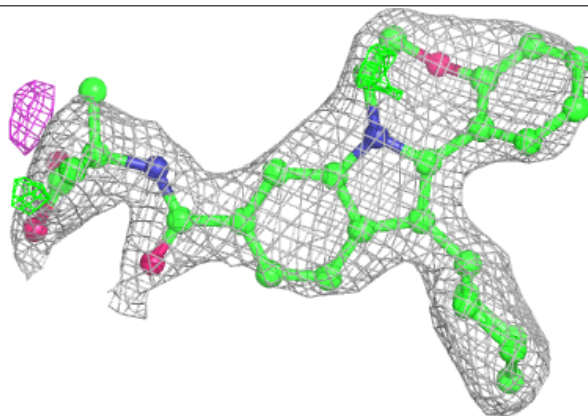
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around JTP B 2000:**

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

**Electron density around JTP A 1000:**

$2mF_o-DF_c$  (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.