



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 16, 2023 – 01:33 AM JST

PDB ID : 6KCN
Title : Crystal structure of plasmodium lysyl-tRNA synthetase in complex with a cladosporin derivative 4
Authors : Zhou, J.; Fang, P.
Deposited on : 2019-06-28
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

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 : 1.8.5 (274361), CSD as541be (2020)
Xtrriage (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

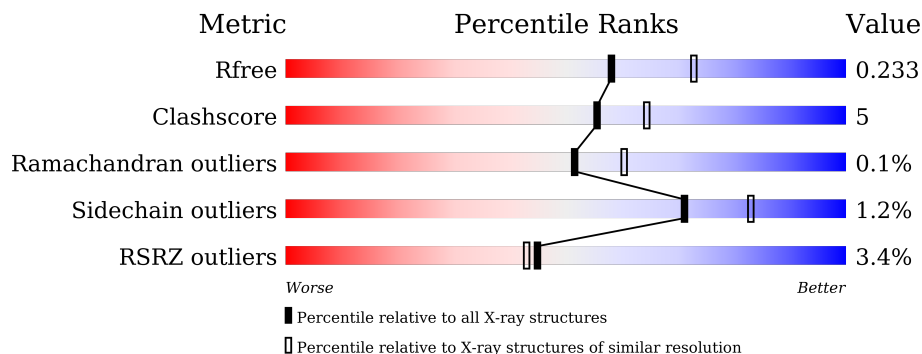
1 Overall quality at a glance

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 ≥ 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	516	
1	B	516	
1	C	516	
1	D	516	

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 16848 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 Lysine-tRNA ligase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	499	3958	2551	656	734	17	0	0	0
1	B	500	3940	2533	654	736	17	0	0	0
1	C	497	3932	2535	650	730	17	0	0	0
1	D	502	3990	2570	668	736	16	0	0	0

There are 36 discrepancies between the modelled and reference sequences:

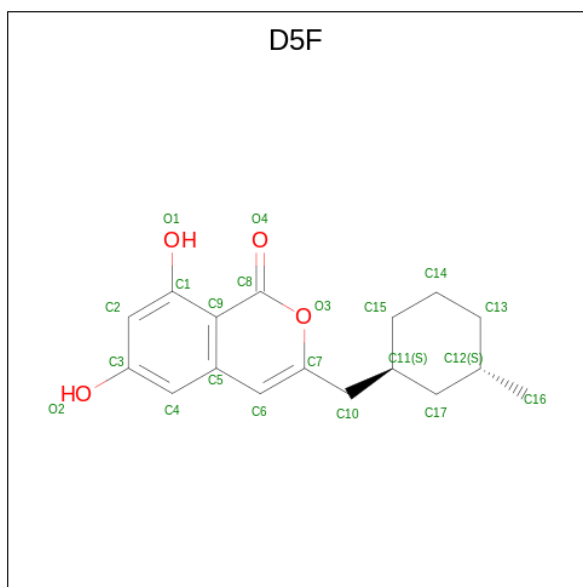
Chain	Residue	Modelled	Actual	Comment	Reference
A	76	MET	-	initiating methionine	UNP W7JP72
A	584	GLY	-	expression tag	UNP W7JP72
A	585	GLY	-	expression tag	UNP W7JP72
A	586	HIS	-	expression tag	UNP W7JP72
A	587	HIS	-	expression tag	UNP W7JP72
A	588	HIS	-	expression tag	UNP W7JP72
A	589	HIS	-	expression tag	UNP W7JP72
A	590	HIS	-	expression tag	UNP W7JP72
A	591	HIS	-	expression tag	UNP W7JP72
B	76	MET	-	initiating methionine	UNP W7JP72
B	584	GLY	-	expression tag	UNP W7JP72
B	585	GLY	-	expression tag	UNP W7JP72
B	586	HIS	-	expression tag	UNP W7JP72
B	587	HIS	-	expression tag	UNP W7JP72
B	588	HIS	-	expression tag	UNP W7JP72
B	589	HIS	-	expression tag	UNP W7JP72
B	590	HIS	-	expression tag	UNP W7JP72
B	591	HIS	-	expression tag	UNP W7JP72
C	76	MET	-	initiating methionine	UNP W7JP72
C	584	GLY	-	expression tag	UNP W7JP72
C	585	GLY	-	expression tag	UNP W7JP72

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
C	586	HIS	-	expression tag	UNP W7JP72
C	587	HIS	-	expression tag	UNP W7JP72
C	588	HIS	-	expression tag	UNP W7JP72
C	589	HIS	-	expression tag	UNP W7JP72
C	590	HIS	-	expression tag	UNP W7JP72
C	591	HIS	-	expression tag	UNP W7JP72
D	76	MET	-	initiating methionine	UNP W7JP72
D	584	GLY	-	expression tag	UNP W7JP72
D	585	GLY	-	expression tag	UNP W7JP72
D	586	HIS	-	expression tag	UNP W7JP72
D	587	HIS	-	expression tag	UNP W7JP72
D	588	HIS	-	expression tag	UNP W7JP72
D	589	HIS	-	expression tag	UNP W7JP72
D	590	HIS	-	expression tag	UNP W7JP72
D	591	HIS	-	expression tag	UNP W7JP72

- Molecule 2 is 3-[[[(1 {S},3 {S})-3-methylcyclohexyl]methyl]-6,8-bis(oxidanyl)isochromen-1-one (three-letter code: D5F) (formula: C₁₇H₂₀O₄) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			21	17	4		
2	B	1	Total	C	O	0	0
			21	17	4		
2	C	1	Total	C	O	0	0
			21	17	4		

Continued on next page...

Continued from previous page...

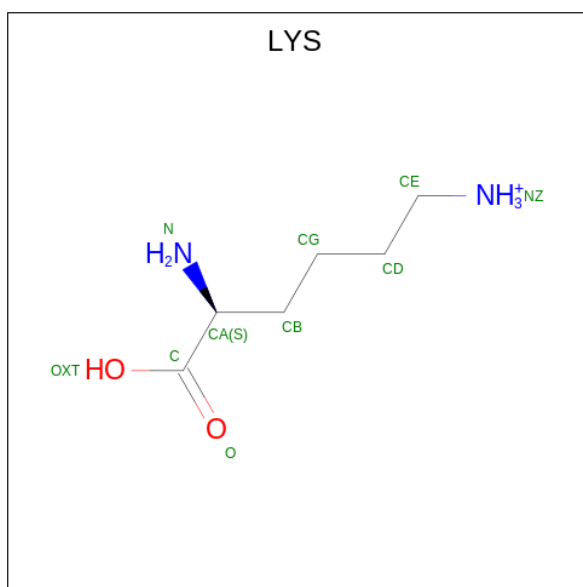
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	D	1	21	17	4	0	0

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 4 is LYSINE (three-letter code: LYS) (formula: $C_6H_{15}N_2O_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			10	6	2	2		
4	B	1	Total	C	N	O	0	0
			10	6	2	2		
4	C	1	Total	C	N	O	0	0
			10	6	2	2		
4	D	1	Total	C	N	O	0	0
			10	6	2	2		

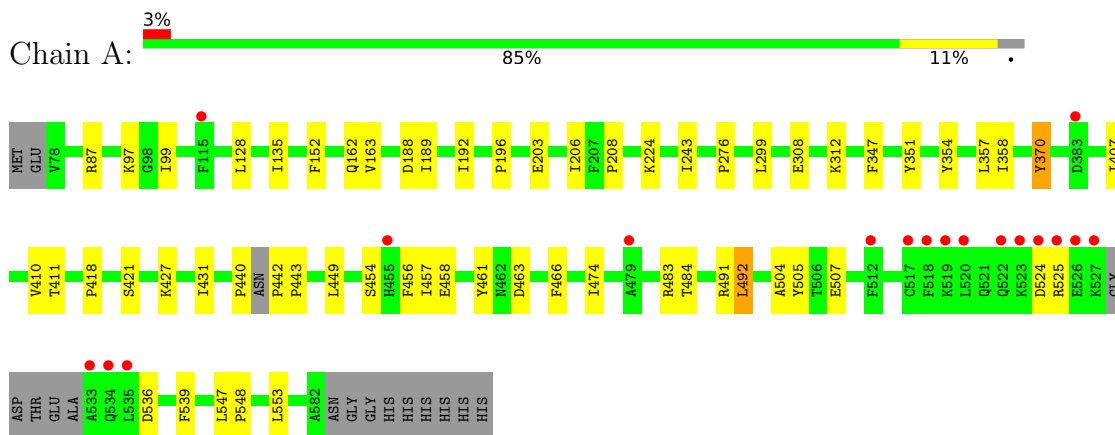
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	216	Total	O	0	0
			216	216		
5	B	223	Total	O	0	0
			223	223		
5	C	202	Total	O	0	0
			202	202		
5	D	239	Total	O	0	0
			239	239		

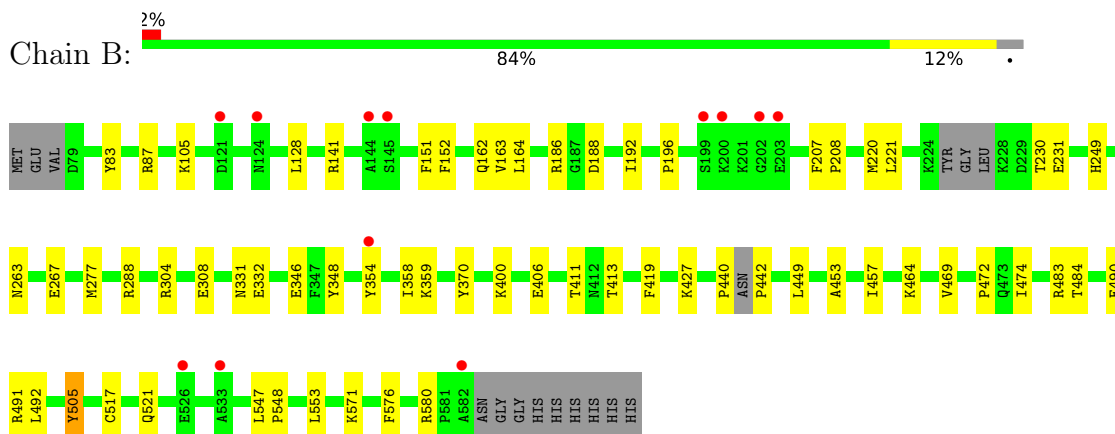
3 Residue-property plots [i](#)

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.

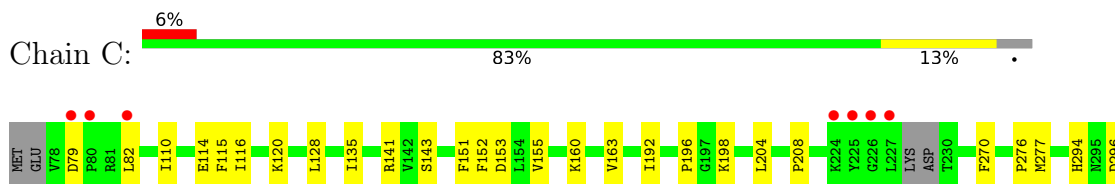
- Molecule 1: Lysine-tRNA ligase

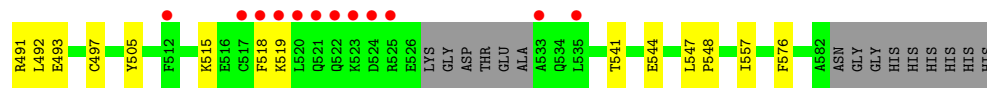


- Molecule 1: Lysine-tRNA ligase

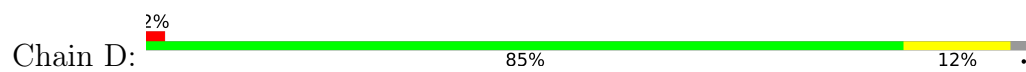


- Molecule 1: Lysine-tRNA ligase





● Molecule 1: Lysine-tRNA ligase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	71.17Å 89.92Å 100.04Å 76.70° 72.95° 80.11°	Depositor
Resolution (Å)	49.06 – 2.20 49.06 – 2.19	Depositor EDS
% Data completeness (in resolution range)	92.0 (49.06-2.20) 91.8 (49.06-2.19)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.96 (at 2.20Å)	Xtrriage
Refinement program	PHENIX 1.13_2998	Depositor
R, R_{free}	0.188 , 0.233 0.189 , 0.233	Depositor DCC
R_{free} test set	5338 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	30.1	Xtrriage
Anisotropy	0.541	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 46.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	16848	wwPDB-VP
Average B, all atoms (Å ²)	38.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.96% of the height of the origin peak. No significant pseudotranslation is detected.*

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: GOL, D5F

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	0.32	0/4055	0.46	0/5494
1	B	0.36	0/4037	0.48	0/5477
1	C	0.33	0/4029	0.46	0/5461
1	D	0.35	0/4087	0.46	0/5533
All	All	0.34	0/16208	0.47	0/21965

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	3958	0	3801	38	0
1	B	3940	0	3749	46	0
1	C	3932	0	3765	41	0
1	D	3990	0	3868	42	0
2	A	21	0	0	0	0
2	B	21	0	0	1	0
2	C	21	0	0	0	0
2	D	21	0	0	1	0
3	A	6	0	8	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	6	0	8	0	0
3	C	12	0	16	0	0
4	A	10	0	12	0	0
4	B	10	0	12	0	0
4	C	10	0	12	0	0
4	D	10	0	12	0	0
5	A	216	0	0	0	0
5	B	223	0	0	3	0
5	C	202	0	0	1	0
5	D	239	0	0	2	0
All	All	16848	0	15263	158	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 5.

All (158) 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:C:418:PRO:HG2	1:C:421:SER:HB3	1.55	0.87
1:D:418:PRO:HG2	1:D:421:SER:HB3	1.61	0.83
1:B:288:ARG:HG2	1:B:331:ASN:HB3	1.61	0.80
1:C:416:GLU:O	1:C:424:THR:HG21	1.81	0.79
1:C:141:ARG:HB3	1:C:153:ASP:HB2	1.74	0.69
1:C:432:ILE:HG23	1:C:437:ILE:HB	1.73	0.69
1:D:536:ASP:OD1	1:D:539:PHE:N	2.24	0.69
1:B:449:LEU:HD12	1:B:474:ILE:HD11	1.74	0.69
1:D:406:GLU:HG3	1:D:457:ILE:HD12	1.75	0.68
1:C:152:PHE:HB2	1:C:163:VAL:HB	1.76	0.67
1:B:354:TYR:OH	1:B:469:VAL:HB	1.94	0.67
1:A:440:PRO:C	1:A:442:PRO:HD2	2.16	0.66
1:B:87:ARG:NH2	1:B:188:ASP:OD1	2.29	0.66
1:B:449:LEU:CD1	1:B:474:ILE:HD11	2.26	0.65
1:A:411:THR:HG21	1:A:431:ILE:HD12	1.77	0.65
1:C:79:ASP:HB3	1:C:82:LEU:HB2	1.77	0.65
1:A:418:PRO:HG2	1:A:421:SER:HB3	1.80	0.64
1:C:413:THR:HG21	1:C:431:ILE:HD11	1.78	0.64
1:D:547:LEU:HD12	1:D:548:PRO:HD2	1.80	0.64
1:D:525:ARG:NH2	1:D:532:ALA:O	2.30	0.63
1:B:249:HIS:ND1	5:B:702:HOH:O	2.31	0.62
1:A:152:PHE:HB2	1:A:163:VAL:HB	1.81	0.62
1:C:515:LYS:O	1:C:519:LYS:N	2.29	0.61

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:281:ILE:HD11	1:D:536:ASP:HB2	1.83	0.61
1:B:230:THR:HG22	1:B:231:GLU:H	1.65	0.60
1:B:419:PHE:HB2	1:B:474:ILE:HD13	1.84	0.60
1:D:491:ARG:HA	1:D:505:TYR:HB3	1.84	0.60
1:C:276:PRO:HG3	1:D:576:PHE:HB2	1.84	0.59
1:C:491:ARG:HA	1:C:505:TYR:HB3	1.85	0.59
1:A:192:ILE:HG23	1:A:208:PRO:HB3	1.84	0.58
1:B:354:TYR:HE2	1:B:491:ARG:O	1.85	0.58
1:A:407:ILE:HG13	1:A:457:ILE:HD11	1.86	0.58
1:B:547:LEU:HD12	1:B:548:PRO:HD2	1.84	0.58
1:B:354:TYR:OH	1:B:469:VAL:CG1	2.52	0.57
1:A:299:LEU:HD11	1:B:580:ARG:HA	1.86	0.57
1:B:491:ARG:HA	1:B:505:TYR:HB3	1.85	0.57
1:A:491:ARG:HA	1:A:505:TYR:HB3	1.87	0.57
1:C:192:ILE:HG23	1:C:208:PRO:HB3	1.85	0.57
1:A:547:LEU:HD12	1:A:548:PRO:HD2	1.86	0.56
1:D:440:PRO:C	1:D:442:PRO:HD2	2.26	0.56
1:C:410:VAL:HG11	1:C:456:PHE:HB3	1.87	0.56
1:D:128:LEU:HB2	1:D:196:PRO:HG2	1.87	0.55
1:D:407:ILE:HA	1:D:457:ILE:HD11	1.88	0.55
1:A:440:PRO:O	1:A:442:PRO:HD2	2.07	0.55
1:B:152:PHE:HB2	1:B:163:VAL:HB	1.87	0.55
1:B:411:THR:HG23	1:B:413:THR:H	1.70	0.55
1:D:353:ASP:OD2	1:D:483:ARG:NH2	2.41	0.53
1:A:536:ASP:OD2	1:A:539:PHE:N	2.37	0.53
1:C:354:TYR:CD1	1:C:490:GLU:HB3	2.43	0.53
1:D:382:LYS:HD2	1:D:497:CYS:HB3	1.91	0.53
1:B:192:ILE:HG23	1:B:208:PRO:HB3	1.91	0.53
1:B:406:GLU:HG3	1:B:457:ILE:HD12	1.91	0.53
1:D:308:GLU:HG3	1:D:312:LYS:HE3	1.90	0.53
1:A:224:LYS:HG2	1:A:243:ILE:HG22	1.91	0.52
1:D:417:GLN:HG2	1:D:419:PHE:CE2	2.44	0.52
1:C:427:LYS:O	1:C:431:ILE:HG12	2.09	0.52
1:D:417:GLN:HG2	1:D:419:PHE:CZ	2.45	0.52
1:C:541:THR:O	1:C:544:GLU:HG2	2.10	0.52
1:A:128:LEU:HB2	1:A:196:PRO:HG2	1.90	0.52
1:C:515:LYS:HA	1:C:518:PHE:HB2	1.92	0.52
1:C:491:ARG:NH2	1:C:493:GLU:OE2	2.44	0.51
1:C:270:PHE:HA	1:C:321:LYS:HB3	1.92	0.51
1:C:544:GLU:HG3	1:D:219:HIS:CD2	2.45	0.51
1:C:547:LEU:HD12	1:C:548:PRO:HD2	1.92	0.51

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:164:LEU:HD12	1:B:207:PHE:CE2	2.46	0.51
1:B:354:TYR:OH	1:B:469:VAL:CB	2.59	0.50
1:D:114:GLU:HA	1:D:117:GLU:HB3	1.94	0.50
1:A:357:LEU:HD13	1:A:504:ALA:HB1	1.93	0.50
1:D:417:GLN:OE1	1:D:487:GLY:HA3	2.11	0.50
1:C:128:LEU:HB2	1:C:196:PRO:HG2	1.94	0.49
1:B:164:LEU:O	1:B:208:PRO:HD2	2.12	0.49
1:C:143:SER:HB2	1:C:151:PHE:HB2	1.94	0.49
1:C:343:THR:HG22	1:C:557:ILE:HD12	1.95	0.49
1:C:155:VAL:HG12	1:C:160:LYS:HB2	1.94	0.49
1:C:576:PHE:HB2	1:D:276:PRO:HG3	1.93	0.49
1:A:87:ARG:NH2	1:A:188:ASP:OD1	2.46	0.48
1:D:449:LEU:HD12	1:D:474:ILE:HD11	1.95	0.48
1:C:576:PHE:HB2	1:D:276:PRO:CG	2.43	0.48
1:B:440:PRO:O	1:B:442:PRO:N	2.46	0.48
1:B:453:ALA:HA	1:B:457:ILE:HG12	1.95	0.48
1:B:472:PRO:HB2	1:B:474:ILE:HG12	1.96	0.48
1:C:321:LYS:NZ	5:C:703:HOH:O	2.38	0.48
1:C:410:VAL:HG13	1:C:411:THR:HG23	1.96	0.47
1:B:358:ILE:HD13	1:B:400:LYS:HD3	1.96	0.47
1:A:358:ILE:HD13	1:A:492:LEU:HD13	1.95	0.47
1:A:135:ILE:HD11	1:A:206:ILE:HG21	1.96	0.47
1:D:518:PHE:HD2	1:D:535:LEU:HD12	1.80	0.47
1:A:162:GLN:HG3	1:A:203:GLU:CG	2.45	0.47
1:C:110:ILE:HG13	1:C:114:GLU:HB2	1.96	0.47
1:B:186:ARG:NH1	1:B:221:LEU:O	2.48	0.46
1:D:164:LEU:O	1:D:208:PRO:HD2	2.15	0.46
1:B:249:HIS:CE1	5:B:702:HOH:O	2.67	0.46
1:C:308:GLU:HG3	1:C:312:LYS:HE3	1.97	0.46
1:A:483:ARG:HG3	1:A:484:THR:HG23	1.98	0.46
1:B:354:TYR:HD2	1:B:490:GLU:O	1.97	0.46
1:C:277:MET:HA	1:C:304:ARG:HD3	1.96	0.46
1:D:432:ILE:HG23	1:D:437:ILE:HB	1.98	0.46
1:B:517:CYS:O	1:B:521:GLN:HG2	2.16	0.46
1:A:370:TYR:HD1	1:A:370:TYR:O	1.99	0.46
1:B:308:GLU:HG3	1:B:348:TYR:OH	2.16	0.45
1:C:294:HIS:CE1	1:C:296:ASP:HB3	2.51	0.45
1:B:277:MET:HA	1:B:304:ARG:HD3	1.97	0.45
1:D:192:ILE:HG23	1:D:208:PRO:HB3	1.99	0.45
1:B:332:GLU:OE2	2:B:601:D5F:O2	2.34	0.45
1:D:370:TYR:HD1	1:D:370:TYR:O	2.00	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:180:CYS:HA	1:D:183:LYS:HE2	1.98	0.45
1:A:449:LEU:HD12	1:A:474:ILE:HD11	1.98	0.45
1:D:370:TYR:HD2	1:D:376:TYR:CZ	2.35	0.45
1:B:83:TYR:CD2	1:B:220:MET:HG3	2.52	0.44
1:B:128:LEU:HB2	1:B:196:PRO:HG2	1.99	0.44
1:A:440:PRO:O	1:A:442:PRO:C	2.56	0.44
1:C:449:LEU:HD13	1:C:472:PRO:HG2	1.99	0.44
1:A:454:SER:HA	1:A:458:GLU:CD	2.37	0.44
1:D:110:ILE:HG13	1:D:114:GLU:HG3	1.99	0.43
1:A:461:TYR:HB2	1:A:466:PHE:CD1	2.54	0.43
1:C:198:LYS:HG2	1:C:204:LEU:HA	2.01	0.43
1:D:522:GLN:O	1:D:526:GLU:HG2	2.19	0.43
1:D:463:ASP:OD1	1:D:463:ASP:N	2.45	0.43
1:B:151:PHE:HD2	1:B:162:GLN:HE21	1.67	0.43
1:A:308:GLU:HG3	1:A:312:LYS:HE3	2.01	0.42
1:A:347:PHE:CE2	1:A:553:LEU:HD22	2.53	0.42
1:A:505:TYR:HE1	1:A:507:GLU:OE2	2.02	0.42
1:C:116:ILE:O	1:C:120:LYS:HG3	2.18	0.42
1:A:276:PRO:CG	1:B:576:PHE:HB2	2.49	0.42
1:B:483:ARG:HG3	1:B:484:THR:HG23	2.01	0.42
1:B:406:GLU:CG	1:B:457:ILE:HD12	2.49	0.42
1:B:411:THR:HG23	1:B:413:THR:N	2.33	0.42
1:D:110:ILE:CG1	1:D:114:GLU:HG3	2.50	0.42
1:B:354:TYR:HE2	1:B:491:ARG:C	2.23	0.42
1:D:406:GLU:HG2	1:D:457:ILE:HG23	2.02	0.42
1:A:427:LYS:O	1:A:431:ILE:HG23	2.19	0.42
1:C:377:LYS:HA	1:C:392:ILE:O	2.20	0.42
1:A:97:LYS:HB3	1:A:99:ILE:HD12	2.01	0.42
1:A:189:ILE:HG21	1:B:548:PRO:HB3	2.02	0.42
1:A:440:PRO:O	1:A:442:PRO:CD	2.68	0.42
1:C:115:PHE:CZ	1:C:196:PRO:HB3	2.54	0.42
1:C:115:PHE:CD2	1:C:135:ILE:HD11	2.55	0.42
1:C:294:HIS:HE1	1:C:296:ASP:HB3	1.84	0.41
1:D:277:MET:HA	1:D:304:ARG:HD3	2.01	0.41
1:A:276:PRO:HG3	1:B:576:PHE:HB2	2.02	0.41
1:A:410:VAL:HG11	1:A:456:PHE:HB3	2.02	0.41
1:A:491:ARG:HG3	1:A:505:TYR:HD2	1.85	0.41
1:D:407:ILE:O	1:D:411:THR:HG22	2.21	0.41
1:A:351:TYR:O	1:B:105:LYS:HE3	2.21	0.41
1:B:263:ASN:O	1:B:267:GLU:HG2	2.21	0.41
1:C:390:ILE:HD11	1:C:497:CYS:SG	2.60	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:164:LEU:HD12	1:B:207:PHE:CD2	2.56	0.41
1:B:346:GLU:HA	1:B:553:LEU:O	2.21	0.41
1:D:174:LYS:HB2	5:D:799:HOH:O	2.20	0.41
1:C:453:ALA:HA	1:C:457:ILE:HD13	2.03	0.40
1:D:312:LYS:HE2	1:D:507:GLU:OE1	2.22	0.40
1:A:440:PRO:O	1:A:442:PRO:O	2.39	0.40
1:B:464:LYS:NZ	5:B:715:HOH:O	2.51	0.40
1:D:332:GLU:OE2	2:D:601:D5F:O2	2.39	0.40
1:D:404:VAL:HG22	5:D:708:HOH:O	2.21	0.40
1:D:559:ARG:HA	1:D:562:MET:HE2	2.03	0.40
1:A:463:ASP:OD1	1:A:463:ASP:N	2.54	0.40
1:D:224:LYS:HA	1:D:243:ILE:CG2	2.51	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	493/516 (96%)	490 (99%)	2 (0%)	1 (0%)	47	55
1	B	494/516 (96%)	492 (100%)	2 (0%)	0	100	100
1	C	491/516 (95%)	488 (99%)	3 (1%)	0	100	100
1	D	496/516 (96%)	494 (100%)	2 (0%)	0	100	100
All	All	1974/2064 (96%)	1964 (100%)	9 (0%)	1 (0%)	51	60

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	443	PRO

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	416/464 (90%)	411 (99%)	5 (1%)	71	83
1	B	414/464 (89%)	407 (98%)	7 (2%)	60	74
1	C	413/464 (89%)	410 (99%)	3 (1%)	84	91
1	D	424/464 (91%)	419 (99%)	5 (1%)	71	83
All	All	1667/1856 (90%)	1647 (99%)	20 (1%)	71	83

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	354	TYR
1	A	370	TYR
1	A	492	LEU
1	A	524	ASP
1	A	525	ARG
1	B	141	ARG
1	B	359	LYS
1	B	370	TYR
1	B	427	LYS
1	B	492	LEU
1	B	505	TYR
1	B	571	LYS
1	C	327	LYS
1	C	483	ARG
1	C	492	LEU
1	D	141	ARG
1	D	370	TYR
1	D	492	LEU
1	D	505	TYR
1	D	558	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	92	GLN
1	A	162	GLN
1	A	422	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

12 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GOL	A	602	-	5,5,5	0.89	0	5,5,5	1.00	0
2	D5F	D	601	-	23,23,23	1.88	3 (13%)	28,33,33	1.23	3 (10%)
3	GOL	B	602	-	5,5,5	0.92	0	5,5,5	1.00	0
2	D5F	A	601	-	23,23,23	1.89	4 (17%)	28,33,33	1.23	2 (7%)
4	LYS	C	604	-	8,9,9	0.82	1 (12%)	9,10,10	1.15	2 (22%)
4	LYS	D	602	-	8,9,9	0.81	1 (12%)	9,10,10	1.21	2 (22%)
3	GOL	C	602	-	5,5,5	0.91	0	5,5,5	0.97	0
2	D5F	B	601	-	23,23,23	1.88	3 (13%)	28,33,33	1.27	2 (7%)
4	LYS	B	603	-	8,9,9	0.79	1 (12%)	9,10,10	1.21	2 (22%)
3	GOL	C	603	-	5,5,5	0.89	0	5,5,5	0.98	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	LYS	A	603	-	8,9,9	0.79	1 (12%)	9,10,10	1.13	2 (22%)
2	D5F	C	601	-	23,23,23	1.85	3 (13%)	28,33,33	1.30	3 (10%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	A	602	-	-	3/4/4/4	-
2	D5F	D	601	-	-	0/4/14/14	0/3/3/3
3	GOL	B	602	-	-	2/4/4/4	-
2	D5F	A	601	-	-	2/4/14/14	0/3/3/3
4	LYS	C	604	-	-	0/9/9/9	-
4	LYS	D	602	-	-	0/9/9/9	-
3	GOL	C	602	-	-	2/4/4/4	-
2	D5F	B	601	-	-	2/4/14/14	0/3/3/3
4	LYS	B	603	-	-	0/9/9/9	-
3	GOL	C	603	-	-	4/4/4/4	-
4	LYS	A	603	-	-	0/9/9/9	-
2	D5F	C	601	-	-	0/4/14/14	0/3/3/3

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	601	D5F	C6-C7	8.03	1.39	1.33
2	A	601	D5F	C6-C7	8.00	1.39	1.33
2	B	601	D5F	C6-C7	7.96	1.39	1.33
2	C	601	D5F	C6-C7	7.74	1.39	1.33
2	C	601	D5F	C5-C6	-2.29	1.39	1.43
2	A	601	D5F	C5-C6	-2.19	1.39	1.43
4	C	604	LYS	OXT-C	-2.14	1.23	1.30
4	D	602	LYS	OXT-C	-2.13	1.23	1.30
2	D	601	D5F	C5-C6	-2.12	1.39	1.43
2	D	601	D5F	C9-C5	-2.10	1.39	1.42
2	C	601	D5F	C9-C5	-2.10	1.39	1.42
4	A	603	LYS	OXT-C	-2.09	1.23	1.30
2	B	601	D5F	C5-C6	-2.08	1.39	1.43
2	B	601	D5F	C9-C5	-2.08	1.39	1.42
2	A	601	D5F	C9-C5	-2.08	1.39	1.42

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	603	LYS	OXT-C	-2.06	1.23	1.30
2	A	601	D5F	C10-C7	2.02	1.51	1.49

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	D5F	O3-C8-O4	3.53	120.78	116.44
2	C	601	D5F	O3-C8-O4	3.48	120.73	116.44
2	B	601	D5F	O3-C8-O4	3.37	120.59	116.44
2	D	601	D5F	O3-C8-O4	3.34	120.55	116.44
2	B	601	D5F	C8-O3-C7	-3.30	120.33	122.23
2	D	601	D5F	C8-O3-C7	-3.30	120.33	122.23
2	C	601	D5F	C8-O3-C7	-3.24	120.36	122.23
2	A	601	D5F	C8-O3-C7	-3.20	120.38	122.23
4	B	603	LYS	OXT-C-O	-2.79	117.75	124.09
2	C	601	D5F	C15-C11-C10	-2.73	108.34	111.52
4	D	602	LYS	OXT-C-O	-2.69	117.98	124.09
4	C	604	LYS	OXT-C-O	-2.54	118.32	124.09
4	A	603	LYS	OXT-C-O	-2.50	118.42	124.09
4	D	602	LYS	OXT-C-CA	2.28	121.15	113.38
2	D	601	D5F	C15-C11-C10	-2.23	108.93	111.52
4	B	603	LYS	OXT-C-CA	2.18	120.80	113.38
4	C	604	LYS	OXT-C-CA	2.15	120.70	113.38
4	A	603	LYS	OXT-C-CA	2.12	120.62	113.38

There are no chirality outliers.

All (15) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	601	D5F	C11-C10-C7-O3
3	B	602	GOL	C1-C2-C3-O3
3	B	602	GOL	O2-C2-C3-O3
3	C	602	GOL	O1-C1-C2-C3
3	C	603	GOL	O1-C1-C2-C3
3	A	602	GOL	O1-C1-C2-C3
3	C	603	GOL	C1-C2-C3-O3
3	C	602	GOL	O1-C1-C2-O2
3	C	603	GOL	O1-C1-C2-O2
3	C	603	GOL	O2-C2-C3-O3
2	B	601	D5F	C11-C10-C7-O3
3	A	602	GOL	O1-C1-C2-O2
2	A	601	D5F	C11-C10-C7-C6

Continued on next page...

Continued from previous page...

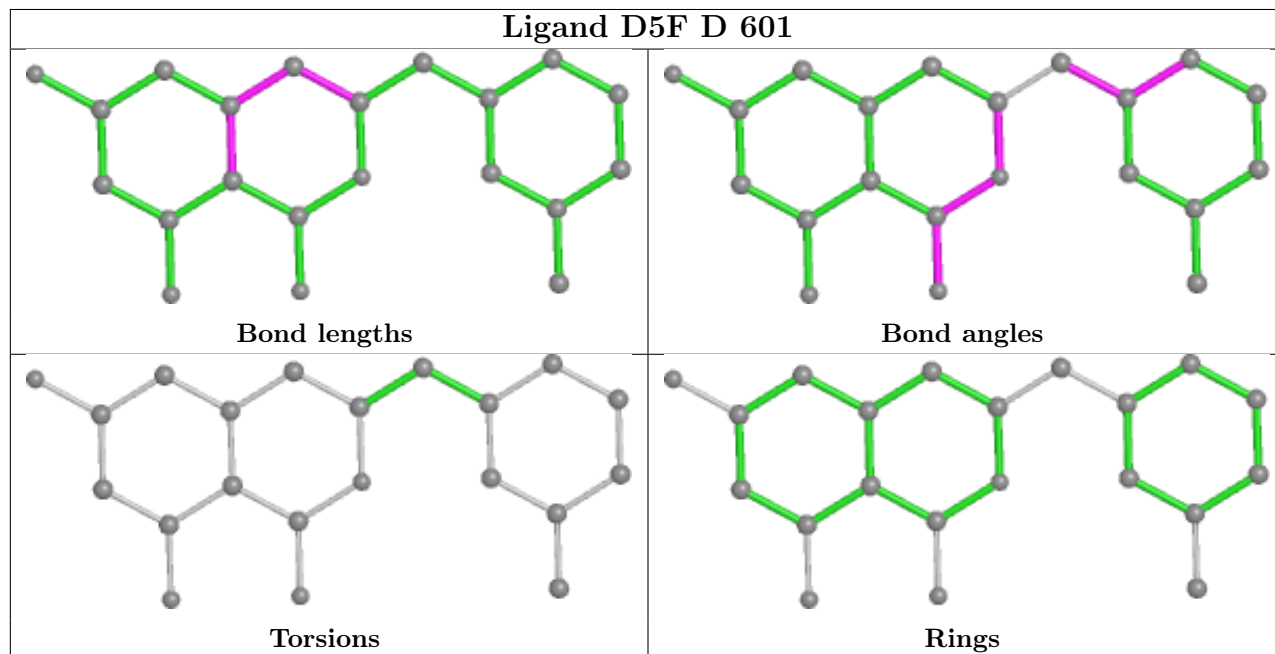
Mol	Chain	Res	Type	Atoms
3	A	602	GOL	O2-C2-C3-O3
2	B	601	D5F	C11-C10-C7-C6

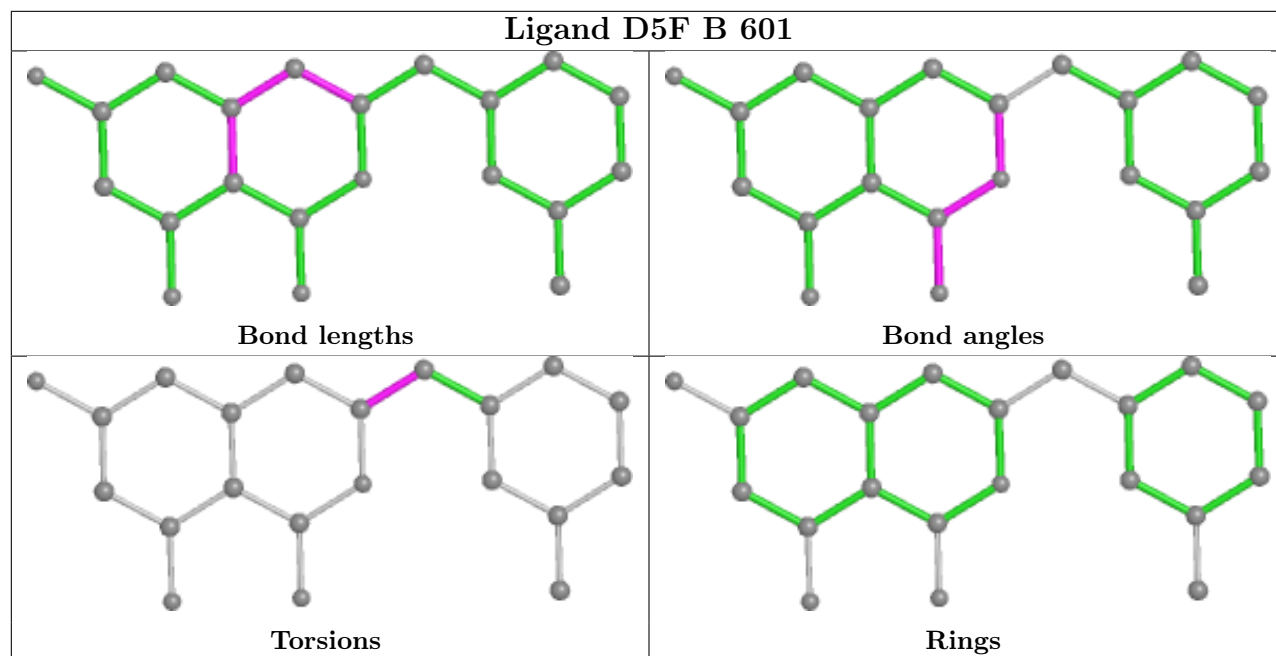
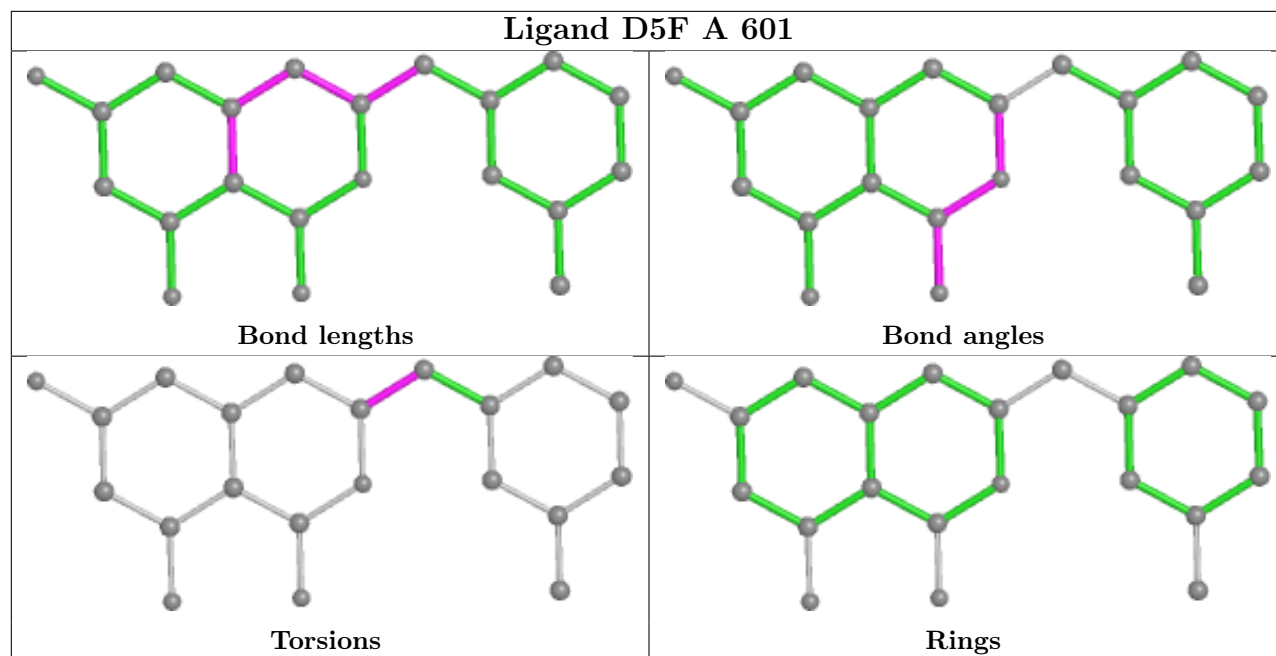
There are no ring outliers.

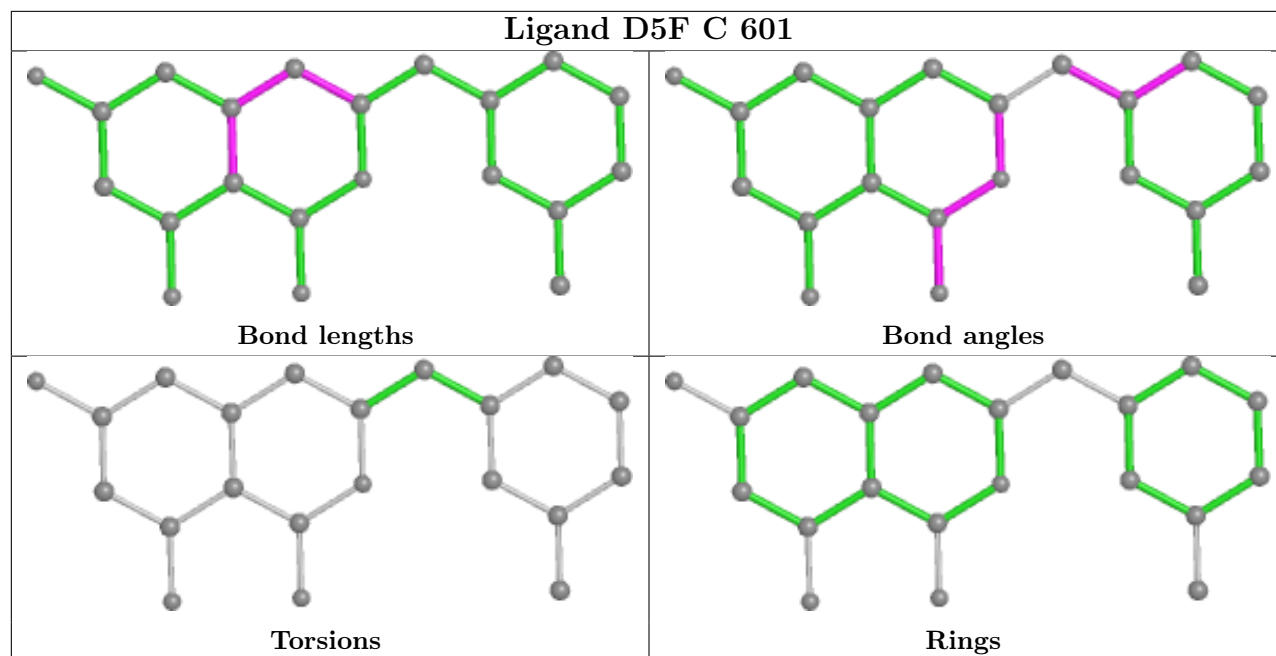
2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	601	D5F	1	0
2	B	601	D5F	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, 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	499/516 (96%)	0.10	18 (3%) 42 41	21, 33, 69, 103	0
1	B	500/516 (96%)	0.05	12 (2%) 59 56	21, 34, 72, 106	0
1	C	497/516 (96%)	0.24	29 (5%) 23 22	21, 35, 81, 133	0
1	D	502/516 (97%)	0.05	9 (1%) 68 66	21, 33, 67, 106	0
All	All	1998/2064 (96%)	0.11	68 (3%) 45 43	21, 34, 73, 133	0

All (68) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	533	ALA	7.8
1	C	225	TYR	7.3
1	C	523	LYS	6.1
1	A	524	ASP	5.6
1	C	525	ARG	5.6
1	D	225	TYR	5.3
1	C	522	GLN	5.0
1	A	533	ALA	4.9
1	A	534	GLN	4.8
1	C	519	LYS	4.8
1	C	517	CYS	4.7
1	C	524	ASP	4.4
1	C	410	VAL	4.3
1	A	518	PHE	4.3
1	C	521	GLN	4.1
1	A	535	LEU	4.0
1	A	527	LYS	4.0
1	A	520	LEU	4.0
1	D	229	ASP	3.8
1	A	525	ARG	3.7
1	C	520	LEU	3.7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	522	GLN	3.6
1	C	79	ASP	3.5
1	A	512	PHE	3.4
1	C	518	PHE	3.4
1	C	431	ILE	3.3
1	B	121	ASP	3.1
1	B	526	GLU	3.1
1	C	415	LEU	3.0
1	C	437	ILE	3.0
1	B	145	SER	3.0
1	C	227	LEU	2.8
1	A	517	CYS	2.8
1	D	528	GLY	2.7
1	C	425	ILE	2.7
1	D	78	VAL	2.6
1	B	533	ALA	2.6
1	B	582	ALA	2.6
1	C	535	LEU	2.6
1	C	424	THR	2.6
1	C	432	ILE	2.5
1	D	534	GLN	2.5
1	D	144	ALA	2.5
1	B	199	SER	2.4
1	A	523	LYS	2.4
1	C	80	PRO	2.4
1	A	479	ALA	2.3
1	C	441	ASN	2.3
1	B	202	GLY	2.3
1	C	512	PHE	2.3
1	B	144	ALA	2.3
1	D	145	SER	2.3
1	C	82	LEU	2.2
1	C	224	LYS	2.2
1	B	354	TYR	2.2
1	A	455	HIS	2.2
1	D	384	GLY	2.2
1	A	519	LYS	2.1
1	C	446	ALA	2.1
1	A	526	GLU	2.1
1	A	383	ASP	2.1
1	C	420	ASP	2.1
1	C	226	GLY	2.1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	124	ASN	2.1
1	B	203	GLU	2.1
1	B	200	LYS	2.1
1	A	115	PHE	2.1
1	D	525	ARG	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](#)

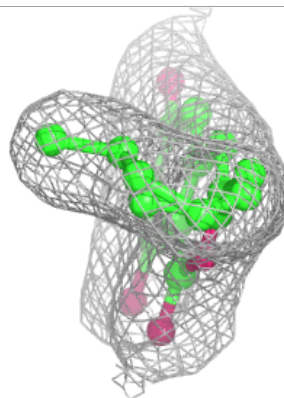
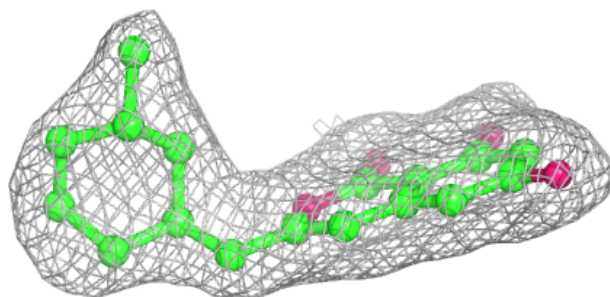
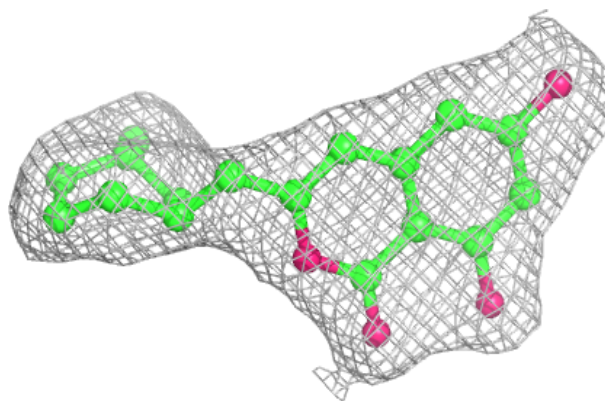
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	GOL	C	602	6/6	0.85	0.13	38,45,45,46	0
3	GOL	A	602	6/6	0.92	0.17	42,42,45,46	0
3	GOL	C	603	6/6	0.92	0.28	47,49,50,50	0
3	GOL	B	602	6/6	0.95	0.10	34,38,41,46	0
2	D5F	A	601	21/21	0.96	0.13	21,26,29,31	0
2	D5F	B	601	21/21	0.96	0.15	20,26,28,30	0
4	LYS	A	603	10/10	0.96	0.13	22,25,26,27	0
4	LYS	C	604	10/10	0.96	0.14	19,20,28,30	0
2	D5F	C	601	21/21	0.97	0.13	20,24,28,30	0
2	D5F	D	601	21/21	0.97	0.16	22,26,29,32	0
4	LYS	B	603	10/10	0.98	0.16	20,21,25,28	0
4	LYS	D	602	10/10	0.98	0.16	20,25,29,29	0

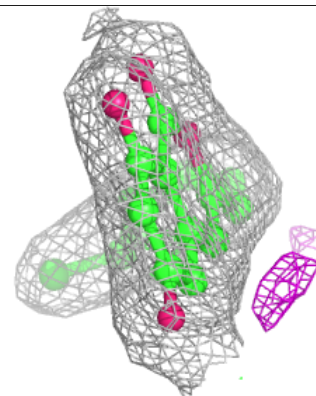
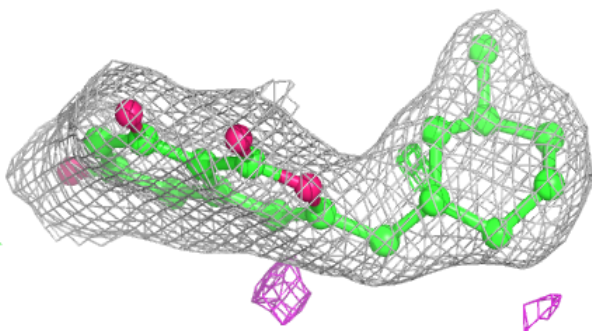
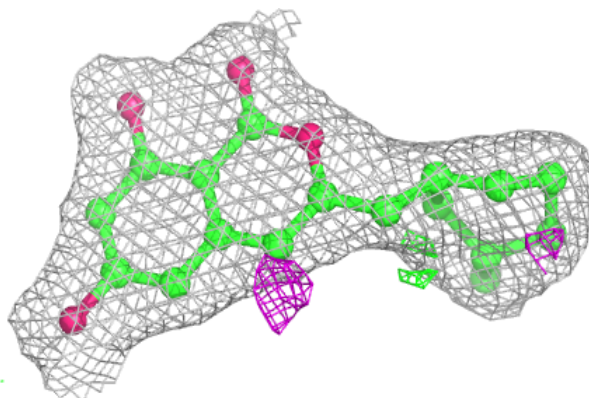
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around D5F 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)

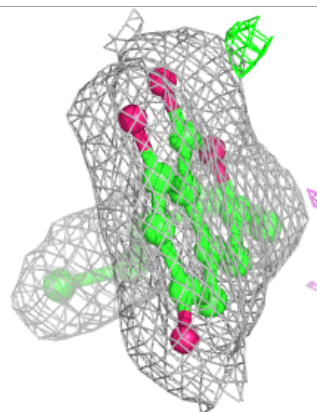
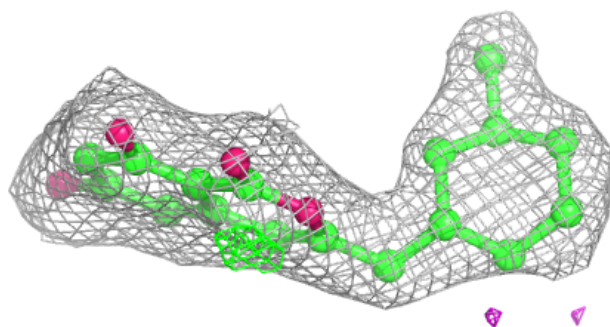
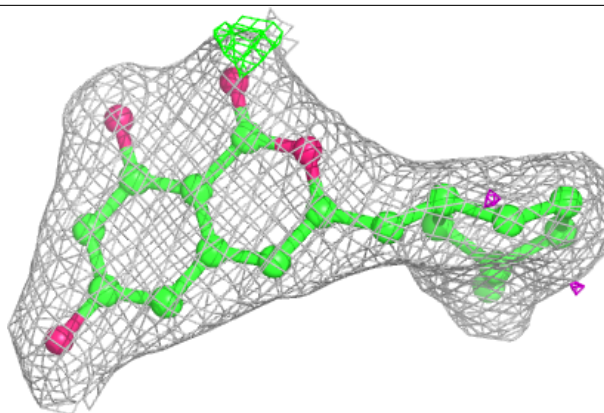
**Electron density around D5F B 601:**

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

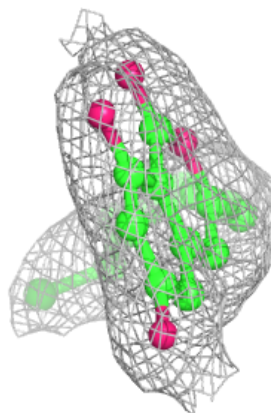
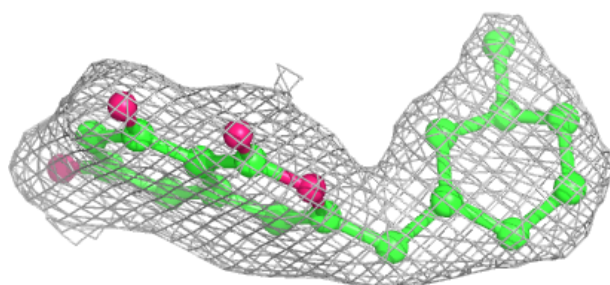
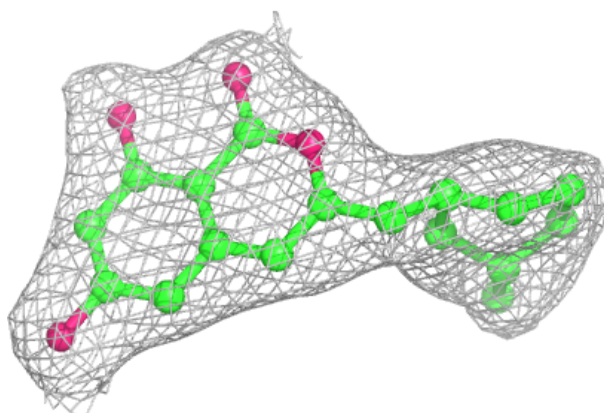


Electron density around D5F C 601:

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

**Electron density around D5F D 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.