Full wwPDB X-ray Structure Validation Report (i)

Nov 2, 2026 – 10:26 AM JST

PDB ID	:	44HQ / pdb_000044hq
Title	:	Crystal structure of human glutaminyl cyclase in complex with Inhibitor 5
Authors	:	Li, G.-B.; Chen, Z.-Y.; Li, R.
Deposited on	:	2026-07-29
Resolution	:	2.43 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 (i) 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 (i)) were used in the production of this report:

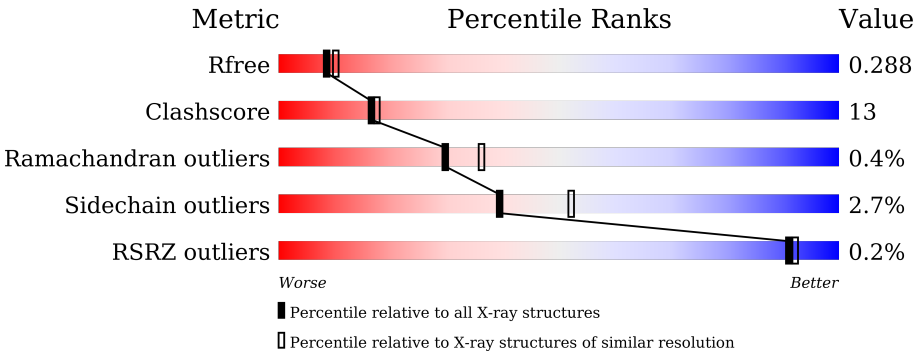
MolProbity	:	4-5-2 with Phenix2.2
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	2.2
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.43 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}	180053	2340 (2.46-2.42)
Clashscore	190562	2400 (2.46-2.42)
Ramachandran outliers	187476	2379 (2.46-2.42)
Sidechain outliers	187428	2379 (2.46-2.42)
RSRZ outliers	180081	2340 (2.46-2.42)

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

Mol	Chain	Length	Quality of chain
1	A	328	70% 28% ·
1	B	328	73% 25% ··
1	C	328	69% 27% ··
1	D	328	70% 28% ··
1	E	328	72% 26% ·
1	F	328	% 62% 35% ··

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	A1FDL	B	401	-	X	-	-

2 Entry composition (i)

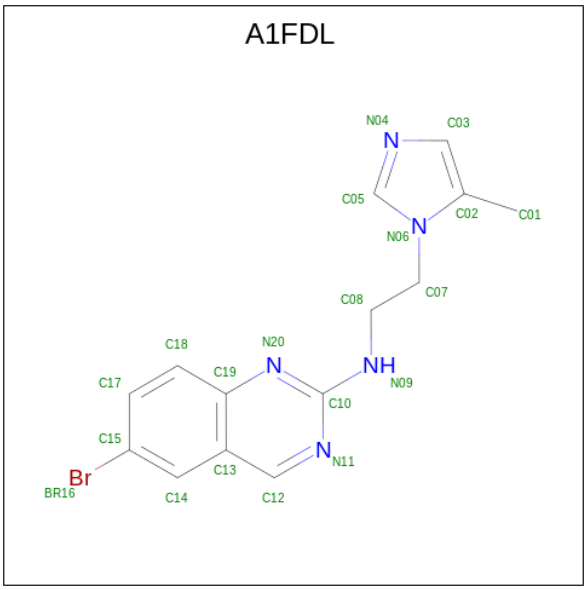
There are 5 unique types of molecules in this entry. The entry contains 31150 atoms, of which 15235 are hydrogens and 0 are deuteriums.

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 Glutaminyl-peptide cyclotransferase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	322	Total	C	H	N	O	S	0	0	0
			5130	1670	2525	449	477	9			
1	B	322	Total	C	H	N	O	S	0	0	0
			5130	1670	2525	449	477	9			
1	C	322	Total	C	H	N	O	S	0	0	0
			5129	1670	2524	449	477	9			
1	D	322	Total	C	H	N	O	S	0	0	0
			5131	1670	2526	449	477	9			
1	E	322	Total	C	H	N	O	S	0	0	0
			5131	1670	2526	449	477	9			
1	F	322	Total	C	H	N	O	S	0	0	0
			5130	1670	2525	449	477	9			

- Molecule 2 is 6-bromanyl- {N}-[2-(5-methylimidazol-1-yl)ethyl]quinazolin-2-amine (CCD ID: A1FDL) (formula: $C_{14}H_{14}BrN_5$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	Br	C	H	N	0	0
			34	1	14	14	5		
2	B	1	Total	Br	C	H	N	0	0
			34	1	14	14	5		
2	C	1	Total	Br	C	H	N	0	0
			34	1	14	14	5		
2	D	1	Total	Br	C	H	N	0	0
			34	1	14	14	5		
2	E	1	Total	Br	C	H	N	0	0
			34	1	14	14	5		
2	F	1	Total	Br	C	H	N	0	0
			34	1	14	14	5		

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Zn	0	0
			1	1		
3	B	1	Total	Zn	0	0
			1	1		
3	C	1	Total	Zn	0	0
			1	1		
3	D	1	Total	Zn	0	0
			1	1		
3	E	1	Total	Zn	0	0
			1	1		
3	F	1	Total	Zn	0	0
			1	1		

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	1	Total	Mg	0	0
			1	1		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	27	Total	O	0	0
			27	27		
5	B	31	Total	O	0	0
			31	31		

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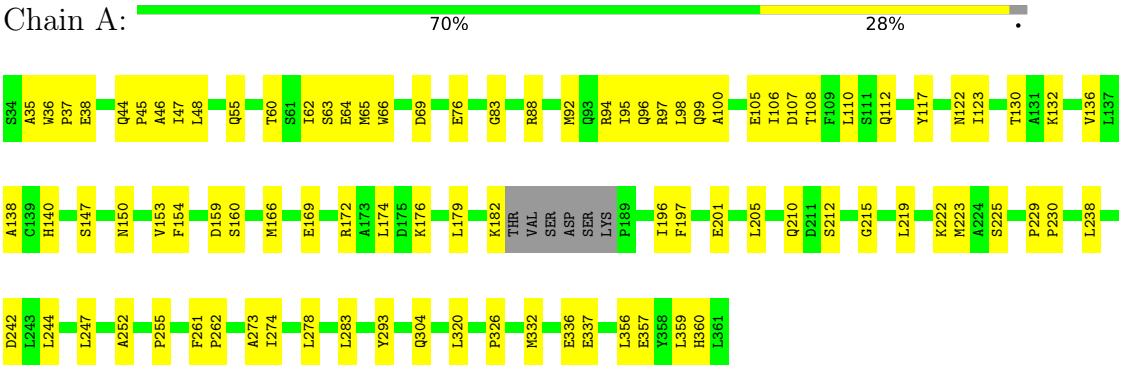
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	C	26	Total O 26 26	0	0
5	D	31	Total O 31 31	0	0
5	E	25	Total O 25 25	0	0
5	F	18	Total O 18 18	0	0

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.

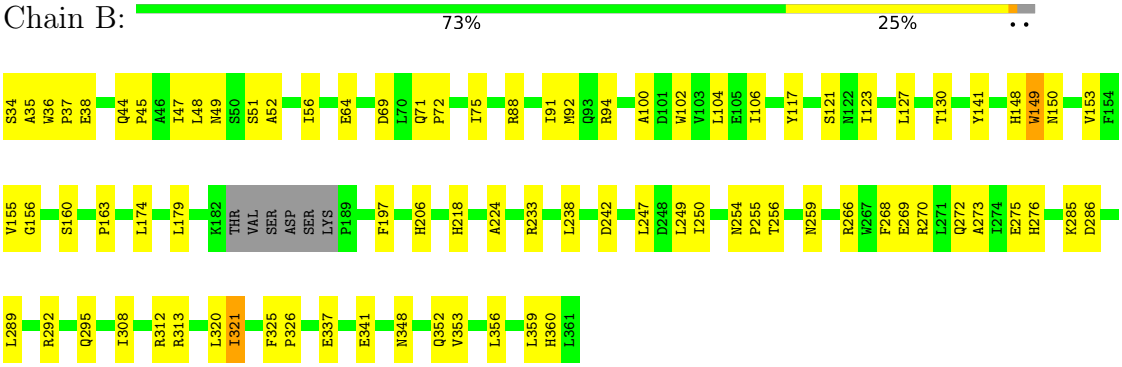
• Molecule 1: Glutaminyl-peptide cyclotransferase

Chain A:



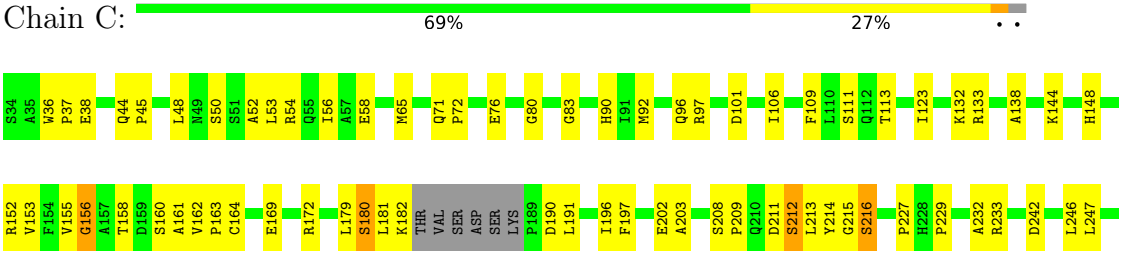
• Molecule 1: Glutaminyl-peptide cyclotransferase

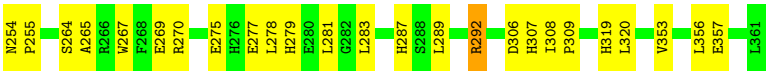
Chain B:



• Molecule 1: Glutaminyl-peptide cyclotransferase

Chain C:

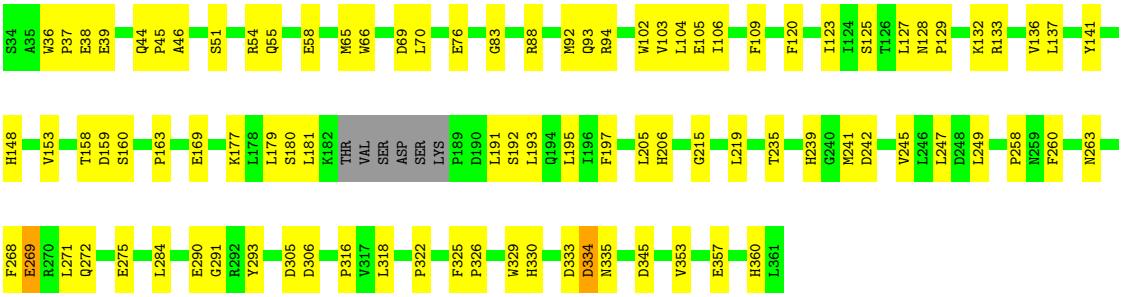




• Molecule 1: Glutaminyl-peptide cyclotransferase

Chain D:

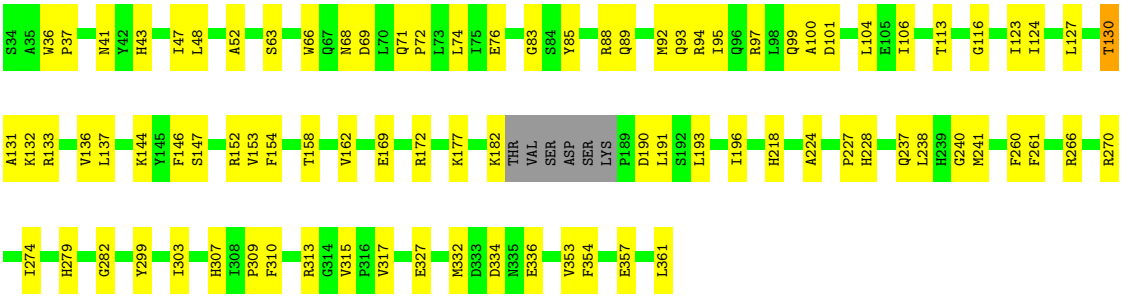




• Molecule 1: Glutaminyl-peptide cyclotransferase

Chain E:

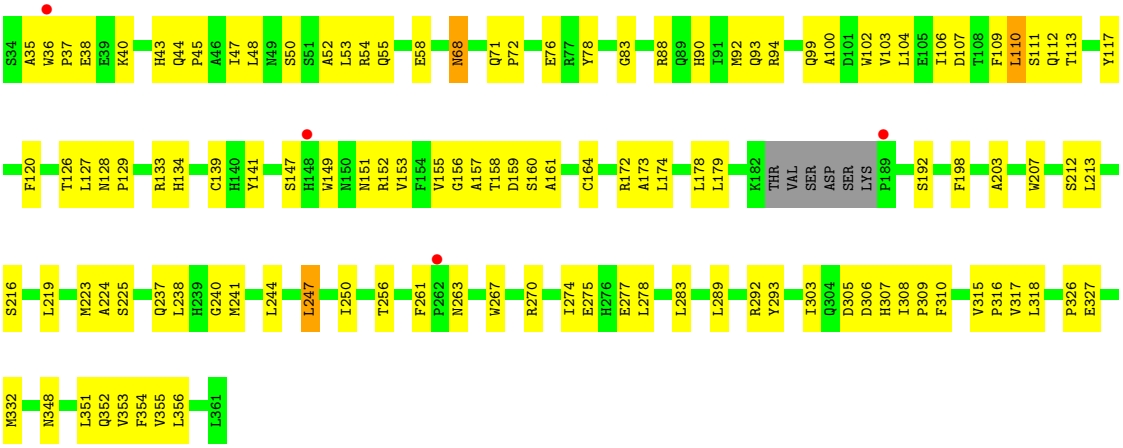




• Molecule 1: Glutaminyl-peptide cyclotransferase

Chain F:





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	78.75Å 78.13Å 97.17Å 83.05° 69.26° 67.66°	Depositor
Resolution (Å)	47.61 – 2.43 47.61 – 2.43	Depositor EDS
% Data completeness (in resolution range)	97.8 (47.61-2.43) 97.8 (47.61-2.43)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.21 (at 2.42Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.204 , 0.286 0.209 , 0.288	Depositor DCC
R_{free} test set	1998 reflections (2.65%)	wwPDB-VP
Wilson B-factor (Å^2)	48.2	Xtriage
Anisotropy	0.133	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.38 , 35.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	31150	wwPDB-VP
Average B, all atoms (Å^2)	59.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.20% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MG, A1FDL, ZN

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	0.60	0/2682	0.76	0/3649
1	B	0.60	0/2682	0.79	0/3649
1	C	0.62	0/2682	0.76	0/3649
1	D	0.60	0/2682	0.75	2/3649 (0.1%)
1	E	0.60	1/2682 (0.0%)	0.74	0/3649
1	F	0.58	1/2682 (0.0%)	0.75	2/3649 (0.1%)
All	All	0.60	2/16092 (0.0%)	0.76	4/21894 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	162	VAL	CA-CB	-7.68	1.50	1.54
1	F	128	ASN	C-O	7.13	1.27	1.23

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	159	ASP	CA-C-N	5.17	131.00	121.70
1	D	159	ASP	C-N-CA	5.17	131.00	121.70
1	F	159	ASP	CA-C-N	5.05	130.79	121.70
1	F	159	ASP	C-N-CA	5.05	130.79	121.70

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen

atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2605	2525	2524	59	1
1	B	2605	2525	2524	51	0
1	C	2605	2524	2524	66	1
1	D	2605	2526	2524	63	1
1	E	2605	2526	2524	66	1
1	F	2605	2525	2524	97	2
2	A	20	14	0	0	0
2	B	20	14	0	0	0
2	C	20	14	0	0	0
2	D	20	14	0	0	0
2	E	20	14	0	0	0
2	F	20	14	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
3	F	1	0	0	0	0
4	B	1	0	0	0	0
5	A	27	0	0	4	0
5	B	31	0	0	1	0
5	C	26	0	0	3	0
5	D	31	0	0	4	0
5	E	25	0	0	4	0
5	F	18	0	0	2	0
All	All	15915	15235	15144	398	3

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 13.

All (398) 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:337:GLU:OE2	1:C:97:ARG:NH2	1.88	1.06
1:D:93:GLN:OE1	5:D:501:HOH:O	1.84	0.94
1:E:41:ASN:ND2	5:E:501:HOH:O	2.01	0.92
1:A:222:LYS:NZ	5:A:502:HOH:O	2.03	0.92
1:E:153:VAL:C	1:E:332:MET:HE1	1.95	0.91
1:D:271:LEU:HD11	1:D:318:LEU:HD21	1.51	0.89

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:219:LEU:O	1:A:223:MET:HG3	1.76	0.85
1:D:268:PHE:HA	1:D:271:LEU:HD12	1.63	0.80
1:E:154:PHE:N	1:E:332:MET:HE1	1.97	0.79
1:A:293:TYR:OH	5:A:501:HOH:O	2.00	0.78
1:E:270:ARG:O	1:E:274:ILE:HG13	1.83	0.78
1:D:291:GLY:O	5:D:502:HOH:O	2.00	0.77
1:B:88:ARG:HG3	1:B:123:ILE:HD11	1.66	0.77
1:B:218:HIS:ND1	5:B:501:HOH:O	2.19	0.74
1:D:284:LEU:O	5:D:503:HOH:O	2.06	0.74
1:B:233:ARG:NH2	1:C:80:GLY:O	2.22	0.73
1:C:101:ASP:OD1	1:C:101:ASP:O	2.07	0.72
1:F:92:MET:HG2	1:F:104:LEU:HD22	1.72	0.70
1:F:237:GLN:O	5:F:501:HOH:O	2.10	0.69
1:E:92:MET:SD	1:E:106:ILE:HD11	2.33	0.69
1:E:357:GLU:OE1	5:E:502:HOH:O	2.10	0.69
1:A:210:GLN:N	1:A:210:GLN:OE1	2.25	0.67
1:D:92:MET:SD	1:D:106:ILE:HD11	2.35	0.67
1:F:92:MET:CE	1:F:106:ILE:HD11	2.24	0.66
1:D:219:LEU:HD12	1:D:219:LEU:O	1.96	0.66
1:F:36:TRP:N	1:F:37:PRO:CD	2.59	0.66
1:E:137:LEU:HD13	1:E:193:LEU:HD11	1.77	0.66
1:E:227:PRO:O	5:E:503:HOH:O	2.15	0.65
1:B:92:MET:SD	1:B:106:ILE:HD11	2.36	0.65
1:A:69:ASP:OD1	1:A:94:ARG:NE	2.29	0.65
1:F:35:ALA:C	1:F:37:PRO:HD2	2.22	0.65
1:B:35:ALA:O	1:B:38:GLU:HG2	1.97	0.65
1:F:247:LEU:HB3	1:F:250:ILE:HD12	1.80	0.64
1:A:44:GLN:HG3	1:A:45:PRO:HD2	1.80	0.63
1:B:150:ASN:O	1:B:150:ASN:OD1	2.17	0.63
1:F:110:LEU:HD21	1:F:117:TYR:HD2	1.64	0.63
1:C:179:LEU:HD23	1:C:179:LEU:O	1.97	0.63
1:E:48:LEU:HD12	1:E:357:GLU:HG3	1.81	0.62
1:E:158:THR:HG23	1:E:334:ASP:OD1	2.00	0.62
1:B:102:TRP:HA	1:B:127:LEU:HD23	1.81	0.62
1:D:92:MET:CE	1:D:106:ILE:HD11	2.30	0.61
1:A:166:MET:HE2	1:A:247:LEU:HD13	1.83	0.61
1:F:103:VAL:HG12	1:F:126:THR:O	2.00	0.61
1:B:224:ALA:HB2	1:B:238:LEU:HD13	1.84	0.60
1:C:92:MET:SD	1:C:106:ILE:HD11	2.41	0.60
1:C:65:MET:HG3	1:C:169:GLU:HB2	1.85	0.59
1:E:307:HIS:C	1:E:309:PRO:HD2	2.28	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:241:MET:HE1	1:F:310:PHE:CD2	2.37	0.59
1:F:47:ILE:HG22	1:F:270:ARG:NH2	2.18	0.59
1:B:100:ALA:HA	1:B:179:LEU:HD13	1.86	0.58
1:B:123:ILE:HB	1:B:197:PHE:HB2	1.86	0.58
1:C:353:VAL:O	1:C:357:GLU:HG3	2.03	0.58
1:B:91:ILE:HD13	1:B:197:PHE:CD2	2.40	0.57
1:D:329:TRP:CZ2	1:D:330:HIS:CE1	2.93	0.57
1:F:274:ILE:O	1:F:278:LEU:HG	2.04	0.57
1:B:106:ILE:HG22	1:B:106:ILE:O	2.03	0.57
1:A:88:ARG:O	1:A:92:MET:HG3	2.05	0.57
1:D:275:GLU:OE2	1:D:293:TYR:N	2.36	0.57
1:D:163:PRO:HB3	1:D:247:LEU:HB2	1.87	0.57
1:E:172:ARG:HG2	1:E:172:ARG:HH11	1.70	0.56
1:F:48:LEU:HD12	1:F:353:VAL:HG13	1.87	0.56
1:F:203:ALA:HB2	1:F:207:TRP:HA	1.86	0.56
1:B:44:GLN:HG3	1:B:45:PRO:HD2	1.87	0.56
1:C:179:LEU:HD23	1:C:179:LEU:C	2.30	0.56
1:F:36:TRP:HZ3	1:F:240:GLY:HA2	1.71	0.56
1:F:54:ARG:O	1:F:58:GLU:HG2	2.06	0.56
1:A:36:TRP:N	1:A:37:PRO:CD	2.69	0.55
1:B:52:ALA:O	1:B:56:ILE:HG12	2.05	0.55
1:B:69:ASP:OD1	1:B:94:ARG:NE	2.38	0.55
1:B:247:LEU:CD2	1:B:320:LEU:HD12	2.35	0.55
1:D:345:ASP:OD2	5:D:504:HOH:O	2.18	0.55
1:E:144:LYS:HD2	1:E:146:PHE:CE2	2.41	0.55
1:A:247:LEU:CD2	1:A:320:LEU:HD12	2.36	0.55
1:A:176:LYS:HG2	5:F:508:HOH:O	2.06	0.54
1:B:49:ASN:OD1	1:B:51:SER:OG	2.24	0.54
1:A:99:GLN:O	1:A:179:LEU:HD21	2.07	0.54
1:F:224:ALA:HB2	1:F:238:LEU:HD22	1.89	0.54
1:D:148:HIS:CE1	1:D:153:VAL:HG22	2.43	0.54
1:E:238:LEU:HD23	1:E:238:LEU:O	2.08	0.54
1:F:92:MET:CG	1:F:104:LEU:HD22	2.36	0.54
1:F:76:GLU:O	1:F:83:GLY:HA3	2.07	0.54
1:F:158:THR:O	1:F:160:SER:HA	2.08	0.53
1:A:92:MET:O	1:A:96:GLN:HG3	2.09	0.53
1:E:36:TRP:N	1:E:37:PRO:CD	2.72	0.53
1:A:176:LYS:HD2	1:F:78:TYR:OH	2.09	0.53
1:F:110:LEU:HD21	1:F:117:TYR:CD2	2.43	0.53
1:C:52:ALA:O	1:C:56:ILE:HG12	2.09	0.53
1:D:258:PRO:HG2	1:D:260:PHE:CZ	2.44	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:123:ILE:HB	1:C:197:PHE:HB2	1.91	0.53
1:E:152:ARG:CB	1:E:332:MET:HE2	2.38	0.53
1:F:198:PHE:CE2	1:F:216:SER:HA	2.43	0.53
1:E:136:VAL:HG21	1:E:241:MET:HG2	1.91	0.53
1:E:241:MET:HE1	1:E:310:PHE:CD2	2.44	0.53
1:F:277:GLU:HG3	1:F:277:GLU:O	2.08	0.53
1:F:305:ASP:H	1:F:308:ILE:HD13	1.74	0.53
1:D:36:TRP:N	1:D:37:PRO:CD	2.72	0.53
1:F:244:LEU:HB3	1:F:317:VAL:HG22	1.91	0.53
1:F:219:LEU:HD12	1:F:223:MET:HG3	1.91	0.52
1:C:50:SER:HA	1:C:53:LEU:HD12	1.91	0.52
1:D:92:MET:HG2	1:D:104:LEU:HD13	1.91	0.52
1:F:52:ALA:O	1:F:53:LEU:C	2.53	0.52
1:A:252:ALA:O	1:A:255:PRO:HD3	2.10	0.52
1:F:72:PRO:HG2	1:F:90:HIS:NE2	2.24	0.52
1:F:307:HIS:CE1	1:F:308:ILE:HD12	2.44	0.52
1:C:36:TRP:N	1:C:37:PRO:CD	2.73	0.52
1:F:44:GLN:HG3	1:F:45:PRO:HD2	1.92	0.52
1:F:247:LEU:HD12	1:F:247:LEU:N	2.25	0.52
1:F:152:ARG:HB2	1:F:332:MET:HG3	1.92	0.51
1:F:174:LEU:HD22	1:F:356:LEU:HD21	1.92	0.51
1:B:92:MET:HG2	1:B:104:LEU:HD13	1.92	0.51
1:F:35:ALA:C	1:F:37:PRO:CD	2.83	0.51
1:C:155:VAL:O	1:C:156:GLY:C	2.51	0.51
1:C:247:LEU:CD2	1:C:320:LEU:HD12	2.41	0.51
1:E:299:TYR:CE2	1:E:303:ILE:HD11	2.45	0.51
1:F:36:TRP:N	1:F:37:PRO:HD3	2.24	0.51
1:F:36:TRP:CZ3	1:F:240:GLY:HA2	2.44	0.51
1:B:36:TRP:N	1:B:37:PRO:CD	2.74	0.51
1:E:69:ASP:OD2	5:E:504:HOH:O	2.19	0.51
1:F:76:GLU:OE2	1:F:78:TYR:HE2	1.94	0.51
1:A:76:GLU:O	1:A:83:GLY:HA3	2.11	0.51
1:E:48:LEU:CD1	1:E:357:GLU:HG3	2.40	0.51
1:F:213:LEU:HB3	1:F:216:SER:OG	2.11	0.51
1:C:36:TRP:CD1	1:C:132:LYS:HD2	2.46	0.51
1:D:39:GLU:HB3	1:D:133:ARG:NH1	2.26	0.51
1:B:88:ARG:HD3	1:B:141:TYR:OH	2.11	0.51
1:F:308:ILE:O	1:F:309:PRO:C	2.53	0.51
1:B:88:ARG:HA	1:B:123:ILE:HD11	1.93	0.50
1:C:265:ALA:O	1:C:269:GLU:HG3	2.12	0.50
1:F:179:LEU:C	1:F:179:LEU:HD23	2.35	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:238:LEU:HD11	1:B:313:ARG:HD2	1.93	0.50
1:D:88:ARG:HA	1:D:123:ILE:HD11	1.94	0.50
1:A:48:LEU:HD13	1:A:357:GLU:HG3	1.93	0.50
1:B:359:LEU:O	1:B:360:HIS:HB2	2.11	0.50
1:D:249:LEU:HB2	1:D:322:PRO:HD2	1.93	0.50
1:F:52:ALA:O	1:F:55:GLN:N	2.44	0.50
1:D:109:PHE:CE1	1:D:120:PHE:HB2	2.46	0.50
1:E:48:LEU:HD12	1:E:357:GLU:CG	2.42	0.50
1:A:182:LYS:NZ	5:A:507:HOH:O	2.44	0.50
1:C:213:LEU:HB3	1:C:216:SER:OG	2.12	0.49
1:D:76:GLU:O	1:D:83:GLY:HA3	2.12	0.49
1:F:92:MET:HE1	1:F:106:ILE:HD11	1.94	0.49
1:F:149:TRP:O	1:F:152:ARG:N	2.45	0.49
1:F:275:GLU:OE2	1:F:293:TYR:N	2.32	0.49
1:C:289:LEU:O	1:C:292:ARG:HD2	2.13	0.49
1:E:43:HIS:O	1:E:266:ARG:NH2	2.43	0.49
1:D:219:LEU:HD12	1:D:219:LEU:C	2.34	0.49
1:E:68:ASN:HB3	1:E:94:ARG:NH1	2.27	0.49
1:E:238:LEU:HD23	1:E:238:LEU:C	2.37	0.49
1:A:154:PHE:N	1:A:332:MET:SD	2.86	0.49
1:F:307:HIS:O	1:F:308:ILE:C	2.56	0.49
1:C:275:GLU:OE2	1:C:287:HIS:HE1	1.95	0.49
1:D:177:LYS:O	1:D:180:SER:HB3	2.13	0.49
1:E:144:LYS:HD2	1:E:146:PHE:CZ	2.48	0.49
1:E:85:TYR:HA	1:E:88:ARG:NH2	2.27	0.49
1:D:141:TYR:HB3	1:D:197:PHE:HB3	1.94	0.49
1:A:47:ILE:HA	1:A:357:GLU:HG2	1.95	0.49
1:B:272:GLN:O	1:B:273:ALA:C	2.55	0.49
1:C:133:ARG:HB2	1:C:190:ASP:O	2.13	0.48
1:B:276:HIS:CE1	1:B:289:LEU:HD11	2.48	0.48
1:C:202:GLU:OE1	5:C:501:HOH:O	2.20	0.48
1:F:307:HIS:CE1	1:F:308:ILE:CD1	2.96	0.48
1:C:211:ASP:O	1:C:212:SER:HB3	2.13	0.48
1:A:35:ALA:O	1:A:38:GLU:HG2	2.12	0.48
1:B:48:LEU:HB3	1:B:52:ALA:HB3	1.94	0.48
1:E:66:TRP:O	1:E:71:GLN:HG2	2.12	0.48
1:F:88:ARG:O	1:F:92:MET:HE3	2.13	0.48
1:D:271:LEU:CD1	1:D:318:LEU:HD21	2.33	0.48
1:D:333:ASP:O	1:D:335:ASN:N	2.46	0.48
1:E:169:GLU:OE2	1:E:172:ARG:NH2	2.45	0.48
1:C:54:ARG:O	1:C:58:GLU:HG3	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:235:THR:HA	1:D:239:HIS:ND1	2.29	0.48
1:E:113:THR:N	1:E:116:GLY:O	2.47	0.48
1:D:109:PHE:CZ	1:D:215:GLY:HA2	2.49	0.48
1:A:100:ALA:HA	1:A:179:LEU:HD23	1.96	0.48
1:E:36:TRP:CG	1:E:132:LYS:HD2	2.49	0.48
1:E:48:LEU:HD23	1:E:52:ALA:HB1	1.96	0.48
1:E:237:GLN:O	1:E:240:GLY:N	2.46	0.48
1:B:148:HIS:CE1	1:B:153:VAL:HG22	2.48	0.47
1:C:56:ILE:HD12	1:C:356:LEU:CD1	2.44	0.47
1:C:161:ALA:O	1:C:164:CYS:HB2	2.14	0.47
1:F:76:GLU:OE1	1:F:153:VAL:CG2	2.62	0.47
1:E:47:ILE:HA	1:E:357:GLU:HG2	1.96	0.47
1:F:179:LEU:HD23	1:F:179:LEU:O	2.14	0.47
1:B:47:ILE:HD12	1:B:270:ARG:CZ	2.44	0.47
1:D:65:MET:HG3	1:D:169:GLU:HB2	1.96	0.47
1:D:192:SER:OG	1:D:193:LEU:N	2.47	0.47
1:E:47:ILE:HG12	1:E:270:ARG:NH2	2.30	0.47
1:E:307:HIS:HB2	1:E:317:VAL:HG21	1.96	0.47
1:A:174:LEU:HD22	1:A:356:LEU:HD11	1.96	0.47
1:C:181:LEU:O	1:C:182:LYS:CB	2.63	0.47
1:D:271:LEU:HD11	1:D:318:LEU:CD2	2.33	0.47
1:C:172:ARG:HG2	1:C:172:ARG:HH11	1.79	0.47
1:E:228:HIS:CB	1:E:237:GLN:HA	2.45	0.47
1:E:279:HIS:C	1:E:279:HIS:CD2	2.93	0.47
1:A:140:HIS:HB2	1:A:201:GLU:HB2	1.96	0.47
1:C:44:GLN:HG3	1:C:45:PRO:HD2	1.97	0.47
1:C:233:ARG:O	1:C:233:ARG:CG	2.63	0.47
1:D:158:THR:OG1	1:D:334:ASP:OD2	2.31	0.47
1:F:54:ARG:HG2	1:F:283:LEU:HD21	1.97	0.47
1:D:36:TRP:CG	1:D:132:LYS:CE	2.98	0.46
1:F:310:PHE:HB3	1:F:315:VAL:CG2	2.45	0.46
1:D:109:PHE:CZ	1:D:120:PHE:HB2	2.49	0.46
1:D:269:GLU:O	1:D:272:GLN:N	2.49	0.46
1:B:247:LEU:HD23	1:B:320:LEU:HD12	1.98	0.46
1:D:69:ASP:OD1	1:D:94:ARG:NE	2.38	0.46
1:A:205:LEU:C	1:A:205:LEU:HD13	2.40	0.46
1:A:273:ALA:O	1:A:274:ILE:C	2.57	0.46
1:A:359:LEU:O	1:A:360:HIS:HB2	2.16	0.46
1:F:103:VAL:HG11	1:F:129:PRO:HG3	1.97	0.46
1:A:62:ILE:CG2	1:A:63:SER:N	2.79	0.46
1:B:289:LEU:O	1:B:292:ARG:NE	2.49	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:36:TRP:CG	1:C:37:PRO:HD3	2.51	0.46
1:D:36:TRP:CE2	1:D:132:LYS:HD2	2.51	0.46
1:D:133:ARG:O	1:D:191:LEU:HA	2.16	0.46
1:E:71:GLN:N	1:E:72:PRO:CD	2.78	0.46
1:F:306:ASP:O	1:F:309:PRO:HD2	2.15	0.46
1:F:351:LEU:O	1:F:355:VAL:HG23	2.16	0.46
1:D:88:ARG:HG3	1:D:123:ILE:HD11	1.98	0.46
1:C:279:HIS:CD2	1:C:287:HIS:HD2	2.34	0.46
1:F:68:ASN:HB3	1:F:94:ARG:NH1	2.31	0.46
1:F:71:GLN:N	1:F:72:PRO:CD	2.79	0.46
1:D:102:TRP:CZ3	1:D:127:LEU:HG	2.50	0.46
1:E:133:ARG:O	1:E:191:LEU:HA	2.16	0.46
1:F:88:ARG:HB2	1:F:88:ARG:HH11	1.81	0.46
1:C:216:SER:HB2	1:C:309:PRO:HG2	1.97	0.45
1:E:66:TRP:O	1:E:71:GLN:CG	2.64	0.45
1:C:76:GLU:O	1:C:83:GLY:HA3	2.15	0.45
1:D:54:ARG:O	1:D:55:GLN:C	2.59	0.45
1:A:60:THR:OG1	1:A:169:GLU:OE2	2.29	0.45
1:E:353:VAL:O	1:E:354:PHE:C	2.59	0.45
1:B:308:ILE:O	1:B:312:ARG:HG2	2.16	0.45
1:C:267:TRP:O	1:C:270:ARG:N	2.49	0.45
1:E:279:HIS:O	1:E:282:GLY:N	2.35	0.45
1:C:211:ASP:HA	1:C:214:TYR:OH	2.16	0.45
1:E:88:ARG:HG3	1:E:123:ILE:HD11	1.98	0.45
1:E:152:ARG:C	1:E:332:MET:HE2	2.42	0.45
1:E:152:ARG:HB3	1:E:332:MET:HE2	1.99	0.45
1:F:88:ARG:HD3	1:F:141:TYR:OH	2.16	0.45
1:C:181:LEU:O	1:C:182:LYS:HB2	2.17	0.45
1:D:179:LEU:C	1:D:181:LEU:H	2.25	0.45
1:D:263:ASN:HD21	1:D:316:PRO:HA	1.82	0.45
1:E:310:PHE:HB3	1:E:315:VAL:HB	1.98	0.45
1:A:150:ASN:OD1	1:A:150:ASN:O	2.35	0.45
1:E:74:LEU:HD13	1:E:336:GLU:HB2	1.98	0.45
1:F:178:LEU:HD23	1:F:178:LEU:N	2.31	0.45
1:F:270:ARG:O	1:F:274:ILE:HD12	2.17	0.45
1:B:249:LEU:HD12	1:B:321:ILE:HD11	1.99	0.45
1:C:113:THR:HG22	1:C:214:TYR:CE1	2.52	0.45
1:C:281:LEU:HD12	1:C:283:LEU:HD22	1.99	0.45
1:D:103:VAL:HG21	1:D:129:PRO:HG3	1.98	0.45
1:A:159:ASP:N	1:A:160:SER:HA	2.31	0.45
1:E:94:ARG:O	1:E:97:ARG:HG2	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:266:ARG:HA	1:B:269:GLU:HG3	1.99	0.45
1:D:305:ASP:CG	1:D:306:ASP:H	2.25	0.45
1:F:207:TRP:CD1	1:F:207:TRP:C	2.95	0.45
1:C:208:SER:HB2	1:C:209:PRO:CD	2.47	0.44
1:D:353:VAL:O	1:D:357:GLU:HG3	2.16	0.44
1:B:285:LYS:O	1:B:286:ASP:C	2.61	0.44
1:C:281:LEU:HB2	1:C:283:LEU:HD13	1.99	0.44
1:B:247:LEU:HB3	1:B:250:ILE:CD1	2.47	0.44
1:C:72:PRO:HG2	1:C:90:HIS:NE2	2.33	0.44
1:C:138:ALA:HB2	1:C:196:ILE:HB	1.99	0.44
1:C:246:LEU:HD23	1:C:319:HIS:CD2	2.53	0.44
1:C:246:LEU:HD22	1:C:307:HIS:HB3	1.99	0.44
1:E:36:TRP:N	1:E:37:PRO:HD2	2.33	0.44
1:C:254:ASN:N	1:C:255:PRO:CD	2.80	0.44
1:F:247:LEU:HD12	1:F:247:LEU:H	1.82	0.44
1:F:318:LEU:HD12	1:F:318:LEU:HA	1.90	0.44
1:B:92:MET:SD	1:B:106:ILE:CD1	3.06	0.44
1:C:71:GLN:N	1:C:72:PRO:CD	2.81	0.44
1:C:162:VAL:O	1:C:163:PRO:C	2.58	0.44
1:D:290:GLU:HA	1:D:290:GLU:OE1	2.18	0.44
1:A:215:GLY:N	5:A:510:HOH:O	2.51	0.44
1:C:109:PHE:CZ	1:C:215:GLY:HA2	2.53	0.44
1:F:348:ASN:O	1:F:352:GLN:HG3	2.18	0.44
1:F:109:PHE:CZ	1:F:120:PHE:HB2	2.53	0.43
1:F:219:LEU:O	1:F:223:MET:HG3	2.17	0.43
1:C:144:LYS:NZ	1:C:203:ALA:O	2.51	0.43
1:E:101:ASP:O	1:E:127:LEU:HD23	2.18	0.43
1:B:254:ASN:N	1:B:255:PRO:CD	2.81	0.43
1:D:205:LEU:O	1:D:206:HIS:HD2	2.00	0.43
1:E:76:GLU:O	1:E:83:GLY:HA3	2.18	0.43
1:A:65:MET:HG3	1:A:169:GLU:HB2	1.99	0.43
1:E:177:LYS:O	1:E:361:LEU:HD13	2.18	0.43
1:E:241:MET:HE1	1:E:310:PHE:CE2	2.53	0.43
1:F:50:SER:HA	1:F:53:LEU:HD12	2.00	0.43
1:A:150:ASN:O	1:A:150:ASN:CG	2.62	0.43
1:C:65:MET:HE2	1:C:65:MET:HB3	1.94	0.43
1:D:125:SER:HB3	1:D:195:LEU:HB2	2.01	0.43
1:F:45:PRO:HD3	1:F:267:TRP:CH2	2.53	0.43
1:B:117:TYR:N	1:B:117:TYR:CD1	2.87	0.43
1:B:256:THR:HB	1:B:295:GLN:HG3	2.01	0.43
1:D:44:GLN:HG3	1:D:45:PRO:HD2	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:213:LEU:HB3	1:F:216:SER:HG	1.83	0.43
1:B:325:PHE:O	1:B:326:PRO:C	2.62	0.43
1:D:128:ASN:N	1:D:129:PRO:CD	2.82	0.43
1:F:43:HIS:HB2	1:F:133:ARG:NH2	2.34	0.43
1:A:36:TRP:CG	1:A:132:LYS:HD2	2.54	0.43
1:B:35:ALA:HA	1:B:37:PRO:HD2	2.01	0.43
1:B:160:SER:HB3	1:B:163:PRO:HG2	2.01	0.43
1:D:137:LEU:HD12	1:D:245:VAL:HB	2.00	0.43
1:E:89:GLN:O	1:E:93:GLN:HG3	2.19	0.43
1:D:136:VAL:HG21	1:D:241:MET:HE2	2.00	0.42
1:E:69:ASP:OD1	1:E:94:ARG:NE	2.52	0.42
1:E:260:PHE:HB2	1:E:261:PHE:CD2	2.54	0.42
1:F:155:VAL:O	1:F:156:GLY:C	2.62	0.42
1:D:46:ALA:HB2	1:D:360:HIS:CG	2.54	0.42
1:C:307:HIS:HD1	1:C:307:HIS:H	1.67	0.42
1:D:36:TRP:O	1:D:37:PRO:C	2.62	0.42
1:A:95:ILE:HA	1:A:98:LEU:HD12	2.01	0.42
1:A:172:ARG:HH11	1:A:172:ARG:HG2	1.84	0.42
1:C:106:ILE:N	1:C:106:ILE:HD13	2.34	0.42
1:C:308:ILE:HB	1:C:309:PRO:HD3	2.00	0.42
1:A:88:ARG:HA	1:A:123:ILE:HD11	2.01	0.42
1:A:138:ALA:CB	1:A:244:LEU:HD11	2.50	0.42
1:B:149:TRP:O	1:B:150:ASN:C	2.60	0.42
1:D:39:GLU:CB	1:D:133:ARG:NH1	2.83	0.42
1:E:172:ARG:HG2	1:E:172:ARG:NH1	2.32	0.42
1:F:153:VAL:O	1:F:153:VAL:HG13	2.19	0.42
1:F:261:PHE:HE2	1:F:317:VAL:HG12	1.85	0.42
1:F:310:PHE:HB3	1:F:315:VAL:HG21	2.01	0.42
1:C:48:LEU:HG	1:C:357:GLU:HG2	2.02	0.42
1:C:306:ASP:O	1:C:309:PRO:HD2	2.20	0.42
1:C:36:TRP:CE3	1:C:36:TRP:C	2.97	0.42
1:C:101:ASP:O	1:C:101:ASP:CG	2.62	0.42
1:E:238:LEU:CD1	1:E:313:ARG:HD3	2.50	0.42
1:F:40:LYS:HD2	1:F:316:PRO:HG2	2.01	0.42
1:F:134:HIS:CD2	1:F:192:SER:HB3	2.54	0.42
1:A:55:GLN:OE1	1:F:151:ASN:C	2.63	0.42
1:A:62:ILE:HD12	1:A:62:ILE:HA	1.95	0.42
1:D:136:VAL:HG21	1:D:241:MET:CE	2.50	0.42
1:E:124:ILE:HG23	1:E:196:ILE:HG12	2.01	0.42
1:F:112:GLN:HG3	1:F:113:THR:N	2.34	0.42
1:A:107:ASP:HB3	1:A:122:ASN:HB2	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:131:ALA:HA	1:E:190:ASP:OD1	2.18	0.42
1:F:99:GLN:O	1:F:100:ALA:C	2.63	0.42
1:F:326:PRO:O	1:F:327:GLU:C	2.61	0.42
1:D:66:TRP:HA	1:D:70:LEU:HB3	2.02	0.42
1:E:224:ALA:HB2	1:E:238:LEU:HD13	2.01	0.42
1:F:92:MET:SD	1:F:106:ILE:HD11	2.60	0.42
1:F:354:PHE:O	1:F:354:PHE:CD1	2.73	0.42
1:A:47:ILE:N	1:A:47:ILE:HD12	2.35	0.41
1:B:259:ASN:HB2	1:B:268:PHE:CD2	2.55	0.41
1:D:36:TRP:N	1:D:37:PRO:HD2	2.34	0.41
1:A:62:ILE:HG23	1:A:63:SER:N	2.36	0.41
1:A:94:ARG:HA	1:A:97:ARG:HD2	2.02	0.41
1:A:123:ILE:HB	1:A:197:PHE:HB2	2.01	0.41
1:C:133:ARG:O	1:C:191:LEU:HA	2.20	0.41
1:C:227:PRO:HB2	5:C:505:HOH:O	2.19	0.41
1:E:95:ILE:HG21	1:E:104:LEU:HD21	2.02	0.41
1:B:272:GLN:O	1:B:275:GLU:N	2.52	0.41
1:A:60:THR:HG23	1:A:60:THR:O	2.21	0.41
1:F:111:SER:OG	1:F:112:GLN:N	2.53	0.41
1:C:229:PRO:HD2	1:C:232:ALA:HB2	2.02	0.41
1:F:102:TRP:HA	1:F:127:LEU:HD23	2.01	0.41
1:B:117:TYR:N	1:B:117:TYR:HD1	2.19	0.41
1:C:36:TRP:CD2	1:C:37:PRO:HD3	2.54	0.41
1:C:277:GLU:O	1:C:278:LEU:C	2.63	0.41
1:F:76:GLU:OE1	1:F:153:VAL:HG21	2.20	0.41
1:F:267:TRP:HE3	1:F:354:PHE:CE2	2.37	0.41
1:F:355:VAL:O	1:F:356:LEU:C	2.63	0.41
1:A:112:GLN:OE1	1:A:117:TYR:CE1	2.73	0.41
1:B:348:ASN:O	1:B:352:GLN:HG3	2.21	0.41
1:C:158:THR:C	1:C:160:SER:HA	2.46	0.41
1:C:227:PRO:HD2	5:C:505:HOH:O	2.20	0.41
1:E:99:GLN:O	1:E:100:ALA:C	2.63	0.41
1:F:139:CYS:SG	1:F:164:CYS:SG	3.09	0.41
1:A:66:TRP:NE1	1:A:336:GLU:OE2	2.44	0.41
1:A:223:MET:HB2	1:A:238:LEU:HD13	2.03	0.41
1:A:278:LEU:HD23	1:A:283:LEU:HD12	2.02	0.41
1:B:352:GLN:O	1:B:353:VAL:C	2.64	0.41
1:C:148:HIS:HA	1:C:152:ARG:O	2.20	0.41
1:D:36:TRP:CD1	1:D:132:LYS:HE3	2.56	0.41
1:D:318:LEU:HD12	1:D:318:LEU:HA	1.97	0.41
1:E:130:THR:CG2	1:E:131:ALA:N	2.83	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:307:HIS:O	1:E:310:PHE:N	2.50	0.41
1:F:88:ARG:HB2	1:F:88:ARG:NH1	2.35	0.41
1:A:136:VAL:HG11	1:A:196:ILE:HD12	2.03	0.41
1:F:172:ARG:NH2	1:F:173:ALA:HB2	2.35	0.41
1:A:92:MET:SD	1:A:106:ILE:HD11	2.61	0.40
1:A:98:LEU:HD22	1:A:172:ARG:HA	2.02	0.40
1:B:71:GLN:N	1:B:72:PRO:CD	2.85	0.40
1:F:157:ALA:HA	1:F:161:ALA:HB3	2.03	0.40
1:B:155:VAL:O	1:B:156:GLY:C	2.65	0.40
1:C:71:GLN:N	1:C:72:PRO:HD2	2.37	0.40
1:A:229:PRO:O	1:A:230:PRO:C	2.62	0.40
1:A:261:PHE:HA	1:A:262:PRO:HD3	1.97	0.40
1:B:174:LEU:HD22	1:B:356:LEU:HD11	2.04	0.40
1:F:58:GLU:HA	1:F:58:GLU:OE1	2.21	0.40
1:F:289:LEU:O	1:F:292:ARG:HD3	2.21	0.40
1:F:303:ILE:O	1:F:307:HIS:HE1	2.04	0.40
1:F:307:HIS:HB2	1:F:317:VAL:HG21	2.04	0.40
1:A:36:TRP:CD2	1:A:132:LYS:HD2	2.56	0.40
1:D:106:ILE:HD12	1:D:106:ILE:HG23	1.84	0.40
1:D:325:PHE:O	1:D:326:PRO:C	2.65	0.40
1:F:354:PHE:CD1	1:F:354:PHE:C	3.00	0.40
1:A:46:ALA:HB3	1:A:360:HIS:HA	2.03	0.40
1:F:212:SER:O	1:F:213:LEU:C	2.64	0.40

All (3) 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:D:38:GLU:OE1	1:E:147:SER:OG[1_465]	1.89	0.31
1:A:147:SER:OG	1:F:38:GLU:OE2[1_455]	2.12	0.08
1:C:38:GLU:OE1	1:F:147:SER:H[1_465]	1.58	0.02

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	318/328 (97%)	290 (91%)	26 (8%)	2 (1%)	21 25
1	B	318/328 (97%)	295 (93%)	23 (7%)	0	100 100
1	C	318/328 (97%)	296 (93%)	19 (6%)	3 (1%)	14 16
1	D	318/328 (97%)	297 (93%)	20 (6%)	1 (0%)	36 44
1	E	318/328 (97%)	289 (91%)	28 (9%)	1 (0%)	36 44
1	F	318/328 (97%)	293 (92%)	25 (8%)	0	100 100
All	All	1908/1968 (97%)	1760 (92%)	141 (7%)	7 (0%)	30 36

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	156	GLY
1	C	180	SER
1	D	334	ASP
1	A	326	PRO
1	E	218	HIS
1	A	212	SER
1	C	212	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	284/290 (98%)	275 (97%)	9 (3%)	34 46
1	B	284/290 (98%)	273 (96%)	11 (4%)	28 40
1	C	284/290 (98%)	276 (97%)	8 (3%)	38 51
1	D	284/290 (98%)	278 (98%)	6 (2%)	47 60
1	E	284/290 (98%)	280 (99%)	4 (1%)	59 70
1	F	284/290 (98%)	276 (97%)	8 (3%)	38 51
All	All	1704/1740 (98%)	1658 (97%)	46 (3%)	39 52

All (46) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	64	GLU
1	A	105	GLU
1	A	108	THR
1	A	110	LEU
1	A	130	THR
1	A	153	VAL
1	A	225	SER
1	A	242	ASP
1	A	304	GLN
1	B	34	SER
1	B	64	GLU
1	B	75	ILE
1	B	121	SER
1	B	130	THR
1	B	149	TRP
1	B	206	HIS
1	B	242	ASP
1	B	321	ILE
1	B	337	GLU
1	B	341	GLU
1	C	96	GLN
1	C	111	SER
1	C	153	VAL
1	C	180	SER
1	C	216	SER
1	C	242	ASP
1	C	264	SER
1	C	292	ARG
1	D	51	SER
1	D	58	GLU
1	D	105	GLU
1	D	160	SER
1	D	242	ASP
1	D	269	GLU
1	E	63	SER
1	E	130	THR
1	E	182	LYS
1	E	327	GLU
1	F	68	ASN
1	F	93	GLN
1	F	107	ASP
1	F	110	LEU

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Mol	Chain	Res	Type
1	F	225	SER
1	F	247	LEU
1	F	256	THR
1	F	263	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (21) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	93	GLN
1	A	96	GLN
1	A	206	HIS
1	A	237	GLN
1	B	148	HIS
1	B	272	GLN
1	B	279	HIS
1	C	89	GLN
1	C	96	GLN
1	C	128	ASN
1	C	254	ASN
1	C	276	HIS
1	C	287	HIS
1	C	296	ASN
1	E	112	GLN
1	E	218	HIS
1	E	338	ASN
1	F	206	HIS
1	F	210	GLN
1	F	296	ASN
1	F	307	HIS

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains (i)

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 13 ligands modelled in this entry, 7 are monoatomic - leaving 6 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	A1FDL	D	401	3	22,22,22	2.18	6 (27%)	27,30,30	2.40	13 (48%)
2	A1FDL	F	401	3	22,22,22	2.68	7 (31%)	27,30,30	2.54	10 (37%)
2	A1FDL	A	401	3	22,22,22	2.67	8 (36%)	27,30,30	2.35	12 (44%)
2	A1FDL	B	401	3	22,22,22	2.40	8 (36%)	27,30,30	2.83	17 (62%)
2	A1FDL	E	401	3	22,22,22	2.53	8 (36%)	27,30,30	2.55	13 (48%)
2	A1FDL	C	401	3	22,22,22	2.26	8 (36%)	27,30,30	2.15	11 (40%)

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	A1FDL	D	401	3	-	0/6/6/6	0/3/3/3
2	A1FDL	F	401	3	-	2/6/6/6	0/3/3/3
2	A1FDL	A	401	3	-	0/6/6/6	0/3/3/3
2	A1FDL	B	401	3	-	0/6/6/6	0/3/3/3
2	A1FDL	E	401	3	-	1/6/6/6	0/3/3/3
2	A1FDL	C	401	3	-	1/6/6/6	0/3/3/3

All (45) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	401	A1FDL	C10-N09	7.87	1.46	1.34
2	A	401	A1FDL	C10-N09	7.58	1.46	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	401	A1FDL	C10-N09	7.42	1.45	1.34
2	B	401	A1FDL	C10-N09	6.61	1.44	1.34
2	D	401	A1FDL	C10-N09	6.16	1.43	1.34
2	C	401	A1FDL	C10-N09	5.99	1.43	1.34
2	F	401	A1FDL	BR16-C15	4.70	1.99	1.90
2	B	401	A1FDL	BR16-C15	4.66	1.99	1.90
2	A	401	A1FDL	BR16-C15	4.47	1.99	1.90
2	F	401	A1FDL	C13-C19	-4.35	1.35	1.42
2	A	401	A1FDL	C13-C19	-4.34	1.35	1.42
2	F	401	A1FDL	C03-N04	-4.03	1.31	1.37
2	A	401	A1FDL	C02-N06	-3.92	1.31	1.38
2	E	401	A1FDL	BR16-C15	3.89	1.98	1.90
2	D	401	A1FDL	C02-N06	-3.84	1.31	1.38
2	E	401	A1FDL	C03-N04	-3.70	1.32	1.37
2	C	401	A1FDL	BR16-C15	3.69	1.97	1.90
2	E	401	A1FDL	C05-N06	-3.69	1.30	1.36
2	C	401	A1FDL	C02-N06	-3.55	1.32	1.38
2	A	401	A1FDL	C03-N04	-3.52	1.32	1.37
2	B	401	A1FDL	C13-C19	-3.42	1.36	1.42
2	C	401	A1FDL	C03-N04	-3.38	1.32	1.37
2	E	401	A1FDL	C14-C15	3.37	1.41	1.36
2	C	401	A1FDL	C13-C19	-3.29	1.37	1.42
2	B	401	A1FDL	C03-N04	-3.24	1.32	1.37
2	A	401	A1FDL	C05-N06	-3.16	1.31	1.36
2	F	401	A1FDL	C02-N06	-3.14	1.32	1.38
2	D	401	A1FDL	C05-N06	-3.12	1.31	1.36
2	B	401	A1FDL	C02-N06	-3.04	1.33	1.38
2	B	401	A1FDL	C05-N06	-3.03	1.31	1.36
2	E	401	A1FDL	C02-N06	-3.01	1.33	1.38
2	E	401	A1FDL	C13-C19	-2.84	1.37	1.42
2	F	401	A1FDL	C14-C15	2.84	1.41	1.36
2	D	401	A1FDL	C13-C19	-2.71	1.38	1.42
2	D	401	A1FDL	C03-N04	-2.69	1.33	1.37
2	A	401	A1FDL	C14-C15	2.60	1.40	1.36
2	D	401	A1FDL	BR16-C15	2.58	1.95	1.90
2	C	401	A1FDL	C14-C15	2.49	1.40	1.36
2	E	401	A1FDL	C01-C02	2.36	1.54	1.49
2	C	401	A1FDL	C05-N06	-2.19	1.33	1.36
2	F	401	A1FDL	C01-C02	2.18	1.53	1.49
2	B	401	A1FDL	C17-C15	2.14	1.42	1.38
2	A	401	A1FDL	C19-N20	-2.10	1.34	1.37
2	B	401	A1FDL	C18-C17	2.07	1.41	1.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	401	A1FDL	C01-C02	2.06	1.53	1.49

All (76) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	F	401	A1FDL	N11-C10-N20	-6.09	120.63	126.52
2	B	401	A1FDL	BR16-C15-C17	5.89	127.86	119.30
2	E	401	A1FDL	N11-C10-N20	-5.60	121.11	126.52
2	F	401	A1FDL	N06-C05-N04	-5.43	108.12	113.51
2	B	401	A1FDL	C08-N09-C10	-5.17	114.82	123.75
2	A	401	A1FDL	N06-C05-N04	-5.00	108.54	113.51
2	E	401	A1FDL	C01-C02-N06	5.00	128.79	122.80
2	C	401	A1FDL	C08-N09-C10	-4.54	115.91	123.75
2	B	401	A1FDL	N06-C05-N04	-4.52	109.02	113.51
2	E	401	A1FDL	N06-C05-N04	-4.47	109.07	113.51
2	D	401	A1FDL	C08-N09-C10	-4.44	116.08	123.75
2	B	401	A1FDL	C01-C02-N06	4.40	128.07	122.80
2	D	401	A1FDL	N06-C05-N04	-3.98	109.55	113.51
2	B	401	A1FDL	C13-C19-N20	-3.87	116.51	122.26
2	A	401	A1FDL	N11-C10-N20	-3.82	122.83	126.52
2	A	401	A1FDL	C10-N20-C19	3.81	121.82	115.60
2	B	401	A1FDL	BR16-C15-C14	-3.81	114.12	119.72
2	F	401	A1FDL	C10-N20-C19	3.78	121.76	115.60
2	C	401	A1FDL	N06-C05-N04	-3.73	109.80	113.51
2	E	401	A1FDL	C10-N20-C19	3.73	121.68	115.60
2	D	401	A1FDL	C13-C12-N11	-3.71	117.10	124.08
2	D	401	A1FDL	C13-C19-N20	-3.69	116.77	122.26
2	F	401	A1FDL	C17-C15-C14	-3.69	116.85	121.99
2	E	401	A1FDL	C08-N09-C10	-3.69	117.38	123.75
2	C	401	A1FDL	N11-C10-N20	-3.55	123.09	126.52
2	A	401	A1FDL	N09-C10-N11	3.48	122.44	117.22
2	F	401	A1FDL	C12-N11-C10	3.42	120.95	115.88
2	B	401	A1FDL	C18-C19-N20	3.42	123.91	118.69
2	F	401	A1FDL	C03-N04-C05	3.36	109.31	105.22
2	D	401	A1FDL	C08-C07-N06	-3.32	108.60	112.57
2	C	401	A1FDL	C13-C19-N20	-3.31	117.34	122.26
2	D	401	A1FDL	BR16-C15-C17	3.30	124.10	119.30
2	F	401	A1FDL	C01-C02-N06	3.25	126.70	122.80
2	C	401	A1FDL	C10-N20-C19	3.21	120.83	115.60
2	A	401	A1FDL	C01-C02-N06	3.14	126.56	122.80
2	C	401	A1FDL	C18-C19-N20	3.14	123.48	118.69
2	A	401	A1FDL	C08-N09-C10	-3.08	118.42	123.75

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	E	401	A1FDL	C12-N11-C10	3.08	120.45	115.88
2	D	401	A1FDL	C10-N20-C19	3.02	120.52	115.60
2	D	401	A1FDL	BR16-C15-C14	-3.02	115.28	119.72
2	D	401	A1FDL	N11-C10-N20	-2.92	123.69	126.52
2	B	401	A1FDL	C13-C12-N11	-2.88	118.67	124.08
2	B	401	A1FDL	C10-N20-C19	2.87	120.28	115.60
2	D	401	A1FDL	C12-N11-C10	2.85	120.11	115.88
2	B	401	A1FDL	C17-C15-C14	-2.85	118.01	121.99
2	A	401	A1FDL	C17-C15-C14	-2.79	118.11	121.99
2	E	401	A1FDL	C17-C15-C14	-2.75	118.16	121.99
2	C	401	A1FDL	C08-C07-N06	-2.74	109.29	112.57
2	A	401	A1FDL	C13-C19-N20	-2.70	118.24	122.26
2	D	401	A1FDL	C01-C02-N06	2.68	126.01	122.80
2	A	401	A1FDL	C18-C19-C13	2.66	121.83	119.04
2	B	401	A1FDL	C07-C08-N09	-2.61	102.54	110.30
2	D	401	A1FDL	C18-C19-N20	2.60	122.67	118.69
2	B	401	A1FDL	N11-C10-N20	-2.57	124.04	126.52
2	C	401	A1FDL	C13-C12-N11	-2.57	119.25	124.08
2	A	401	A1FDL	C13-C12-N11	-2.55	119.28	124.08
2	A	401	A1FDL	C03-N04-C05	2.55	108.32	105.22
2	F	401	A1FDL	C13-C12-N11	-2.55	119.29	124.08
2	E	401	A1FDL	C03-N04-C05	2.52	108.29	105.22
2	E	401	A1FDL	C05-N06-C02	2.44	109.44	106.37
2	C	401	A1FDL	C12-N11-C10	2.42	119.47	115.88
2	A	401	A1FDL	C05-N06-C02	2.37	109.35	106.37
2	C	401	A1FDL	C05-N06-C02	2.33	109.31	106.37
2	F	401	A1FDL	C13-C19-N20	-2.31	118.83	122.26
2	E	401	A1FDL	C13-C19-N20	-2.29	118.85	122.26
2	E	401	A1FDL	C07-N06-C05	-2.27	123.02	126.64
2	D	401	A1FDL	C05-N06-C02	2.27	109.23	106.37
2	C	401	A1FDL	C01-C02-N06	2.24	125.49	122.80
2	B	401	A1FDL	C03-N04-C05	2.23	107.94	105.22
2	B	401	A1FDL	C12-N11-C10	2.12	119.03	115.88
2	B	401	A1FDL	C05-N06-C02	2.10	109.01	106.37
2	E	401	A1FDL	C13-C12-N11	-2.07	120.18	124.08
2	E	401	A1FDL	N09-C10-N11	2.03	120.26	117.22
2	B	401	A1FDL	C07-N06-C05	-2.02	123.43	126.64
2	B	401	A1FDL	C01-C02-C03	-2.01	125.46	131.53
2	F	401	A1FDL	C18-C19-N20	2.01	121.76	118.69

There are no chirality outliers.

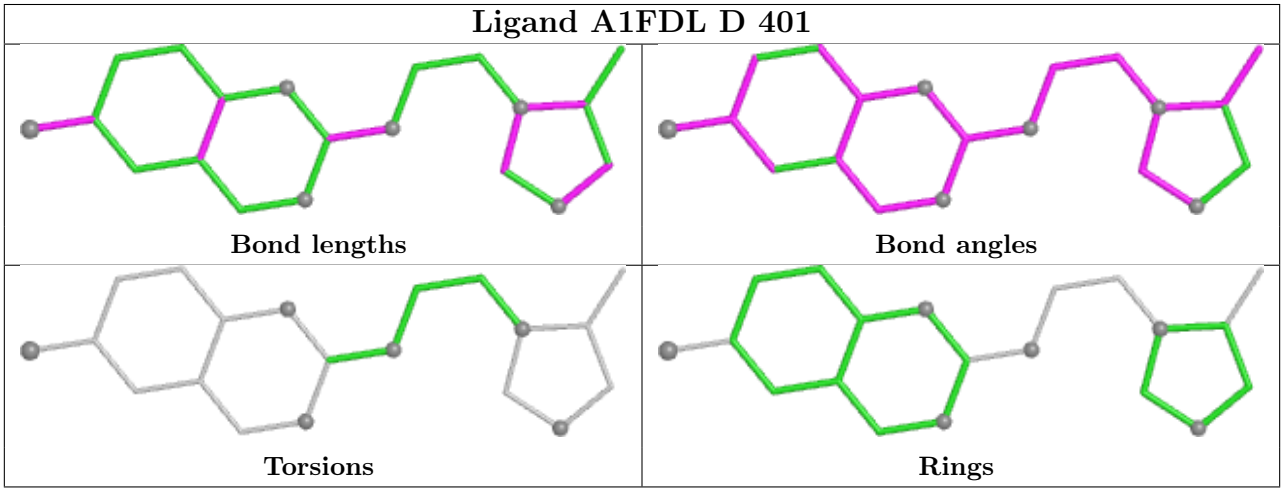
All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	F	401	A1FDL	N20-C10-N09-C08
2	F	401	A1FDL	N11-C10-N09-C08
2	E	401	A1FDL	N06-C07-C08-N09
2	C	401	A1FDL	N11-C10-N09-C08

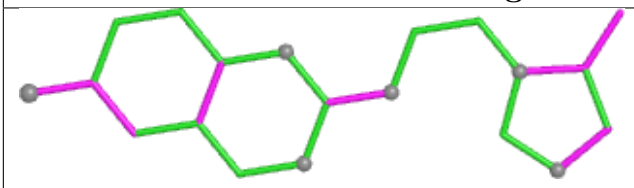
There are no ring outliers.

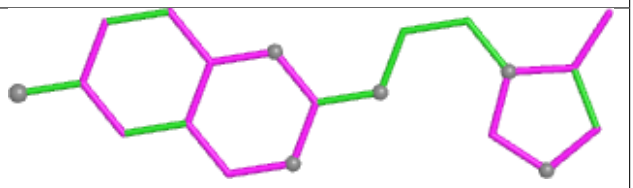
No monomer is involved in short contacts.

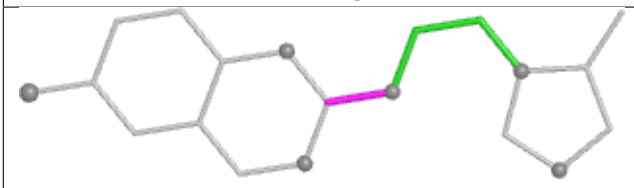
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

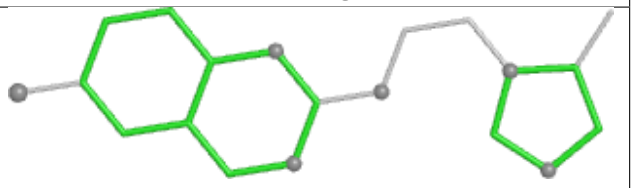


Ligand A1FDL F 401

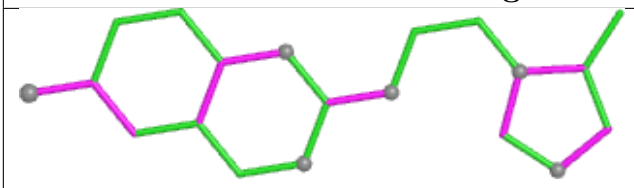

Bond lengths

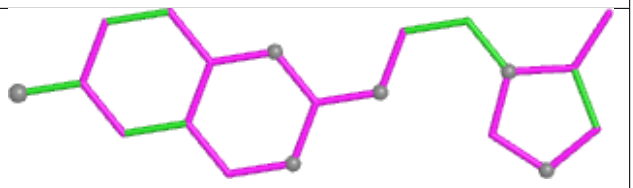

Bond angles

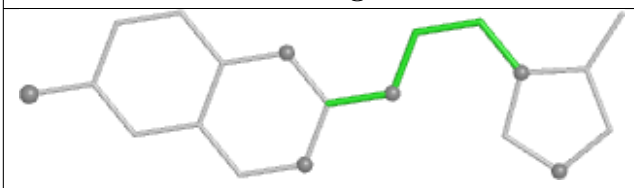

Torsions

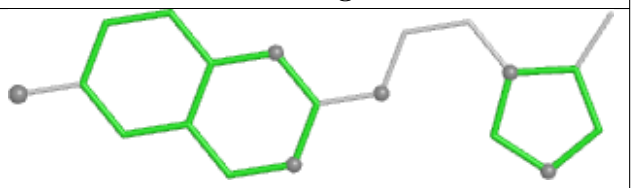

Rings

Ligand A1FDL A 401

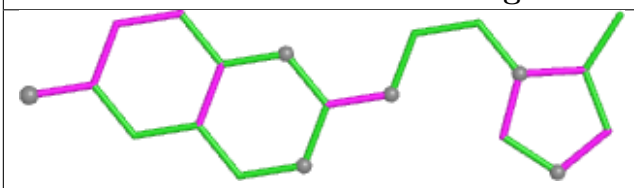

Bond lengths

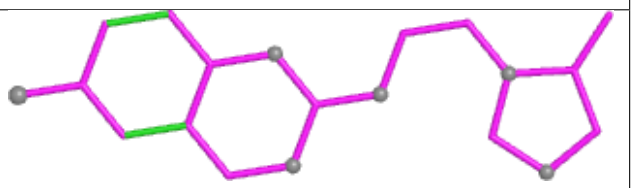

Bond angles

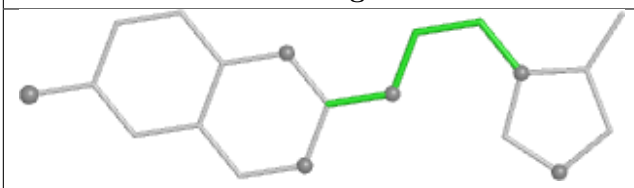

Torsions

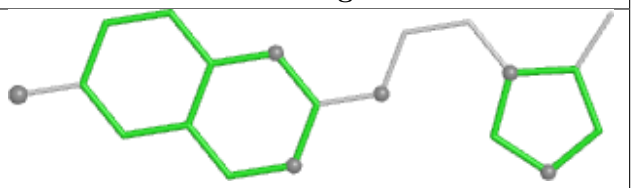

Rings

Ligand A1FDL B 401

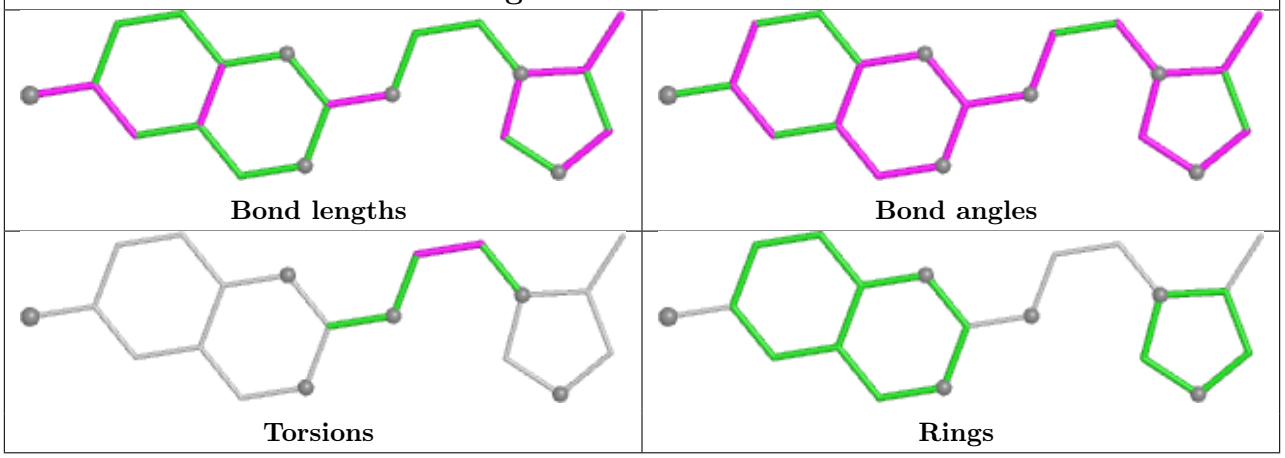

Bond lengths


Bond angles

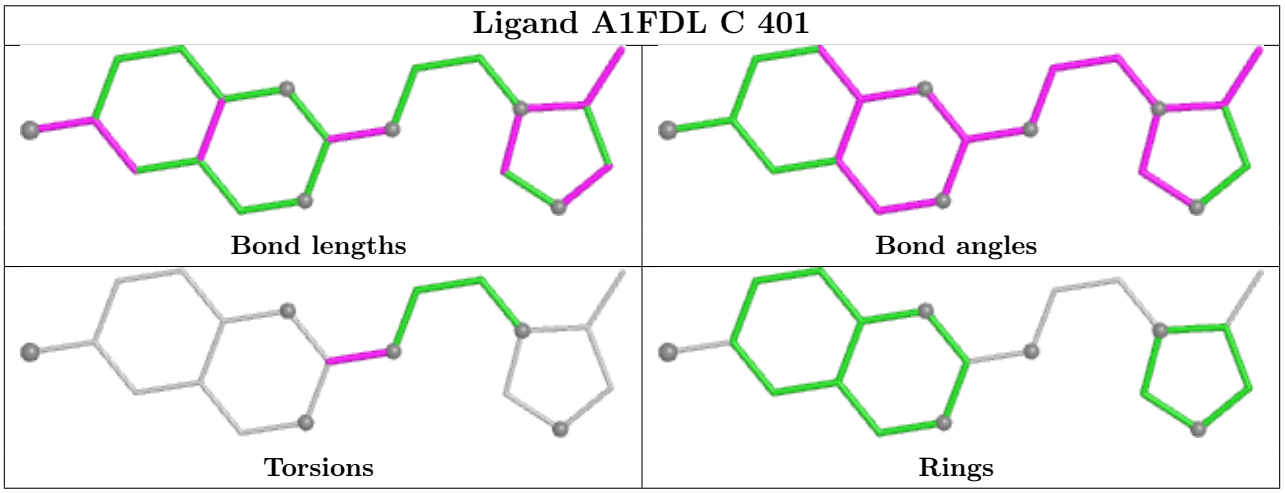

Torsions


Rings

Ligand A1FDL E 401



Ligand A1FDL C 401



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^{th} 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	322/328 (98%)	-0.43	0	100	100	34, 54, 73, 93	0
1	B	322/328 (98%)	-0.43	0	100	100	30, 54, 76, 99	0
1	C	322/328 (98%)	-0.44	0	100	100	34, 54, 76, 91	0
1	D	322/328 (98%)	-0.35	0	100	100	36, 57, 81, 94	0
1	E	322/328 (98%)	-0.26	0	100	100	38, 61, 81, 103	0
1	F	322/328 (98%)	-0.12	4 (1%)	76	78	46, 66, 88, 100	0
All	All	1932/1968 (98%)	-0.34	4 (0%)	91	92	30, 57, 81, 103	0

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	189	PRO	2.6
1	F	262	PRO	2.3
1	F	36	TRP	2.2
1	F	148	HIS	2.1

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

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

6.3 Carbohydrates

There are no oligosaccharides in this entry.

6.4 Ligands

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

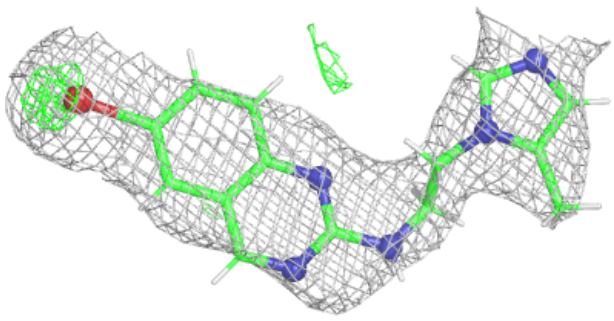
median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

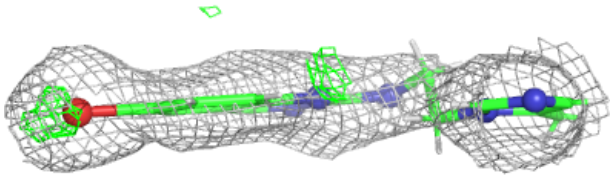
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	A1FDL	E	401	20/20	0.90	0.11	54,72,93,127	0
2	A1FDL	A	401	20/20	0.93	0.09	39,53,72,94	0
4	MG	B	403	1/1	0.93	0.06	44,44,44,44	0
2	A1FDL	F	401	20/20	0.95	0.09	42,67,86,87	0
2	A1FDL	B	401	20/20	0.96	0.08	35,59,85,91	0
2	A1FDL	D	401	20/20	0.97	0.07	40,55,67,75	0
2	A1FDL	C	401	20/20	0.97	0.07	39,54,66,69	0
3	ZN	F	402	1/1	0.99	0.02	42,42,42,42	0
3	ZN	B	402	1/1	0.99	0.04	52,52,52,52	0
3	ZN	D	402	1/1	1.00	0.02	47,47,47,47	0
3	ZN	E	402	1/1	1.00	0.02	50,50,50,50	0
3	ZN	A	402	1/1	1.00	0.02	41,41,41,41	0
3	ZN	C	402	1/1	1.00	0.02	50,50,50,50	0

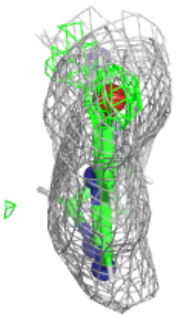
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around A1FDL E 401:

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

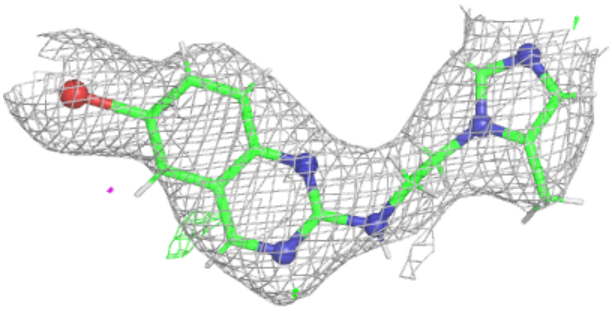


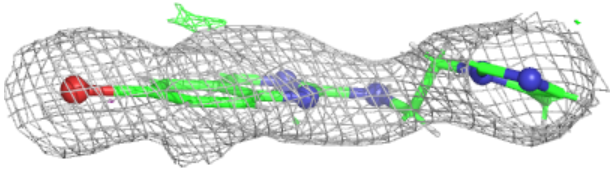


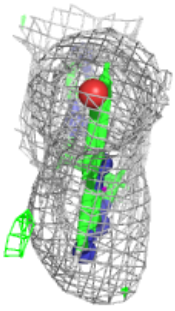


Electron density around A1FDL A 401:

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

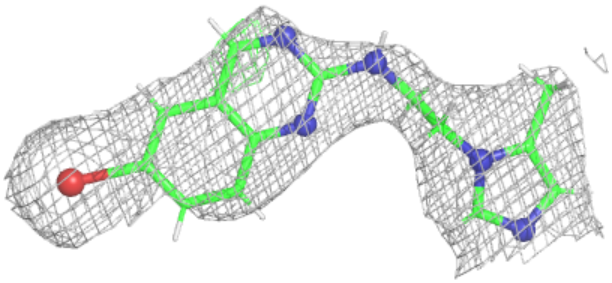


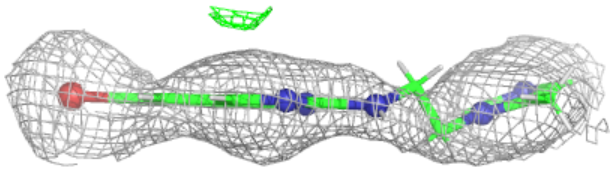


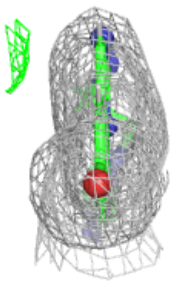


Electron density around A1FDL F 401:

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

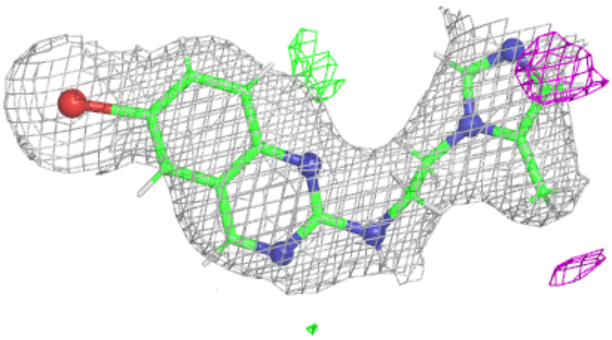


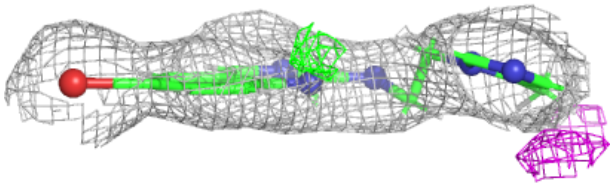


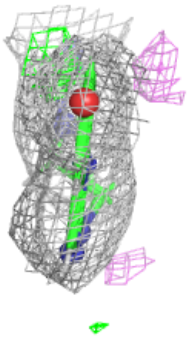


Electron density around A1FDL B 401:

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

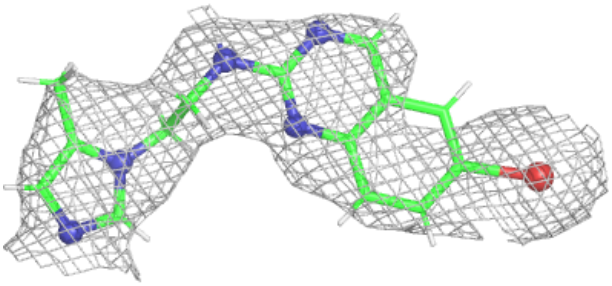


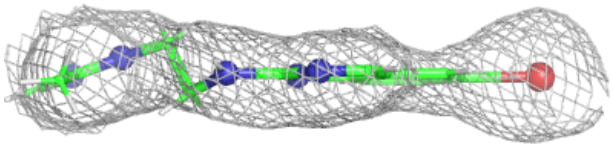


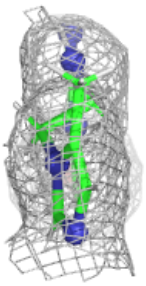


Electron density around A1FDL D 401:

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

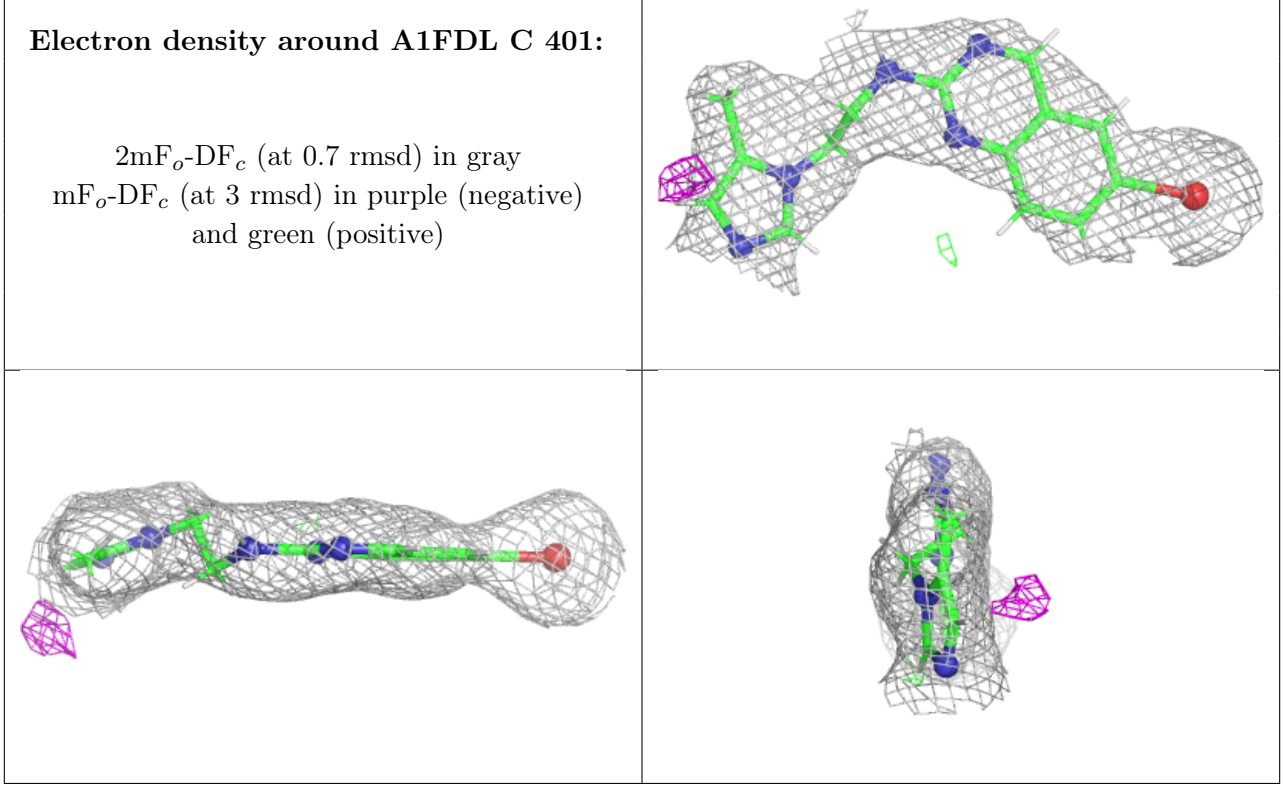






Electron density around A1FDL C 401:

$2mF_o$-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

There are no such residues in this entry.