Full wwPDB X-ray Structure Validation Report ⓘ

Oct 15, 2024 – 08:36 AM JST

PDB ID	:	5Z68
Title	:	Structure of the recombination mediator protein RecF-ATP in RecFOR pathway
Authors	:	Tang, Q.; Liu, Y.-P.; Yan, X.-X.
Deposited on	:	2018-01-22
Resolution	:	3.00 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:

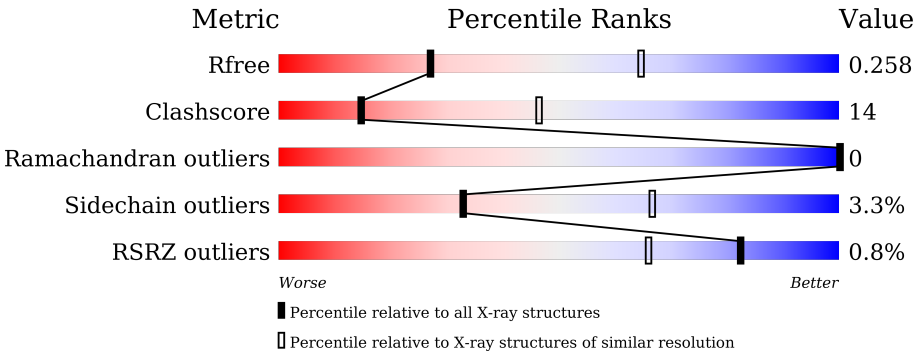
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.00 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	2511 (3.00-3.00)
Clashscore	180529	2866 (3.00-3.00)
Ramachandran outliers	177936	2778 (3.00-3.00)
Sidechain outliers	177891	2781 (3.00-3.00)
RSRZ outliers	164620	2523 (3.00-3.00)

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	373	71% 25%
1	B	373	72% 25%
1	C	373	65% 34%
1	D	373	66% 31%

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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	IMD	A	403	-	-	X	-
3	IMD	B	403	-	-	X	-
3	IMD	B	404	-	-	X	-
3	IMD	C	402	-	-	X	-
3	IMD	D	405	-	-	X	-

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 11923 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 DNA replication and repair protein RecF.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	368	Total	C	N	O	S	5	1	0
			2915	1866	480	558	11			
1	B	368	Total	C	N	O	S	4	2	0
			2921	1870	488	552	11			
1	C	373	Total	C	N	O	S	2	0	0
			2922	1867	490	554	11			
1	D	363	Total	C	N	O	S	3	1	0
			2828	1814	471	533	10			

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	HIS	-	expression tag	UNP Q8RDL3
A	-6	HIS	-	expression tag	UNP Q8RDL3
A	-5	HIS	-	expression tag	UNP Q8RDL3
A	-4	HIS	-	expression tag	UNP Q8RDL3
A	-3	ALA	-	expression tag	UNP Q8RDL3
A	-2	TYR	-	expression tag	UNP Q8RDL3
A	-1	TYR	-	expression tag	UNP Q8RDL3
A	0	SER	-	expression tag	UNP Q8RDL3
A	362	ASP	-	expression tag	UNP Q8RDL3
A	363	LYS	-	expression tag	UNP Q8RDL3
A	364	LEU	-	expression tag	UNP Q8RDL3
A	365	ALA	-	expression tag	UNP Q8RDL3
B	-7	HIS	-	expression tag	UNP Q8RDL3
B	-6	HIS	-	expression tag	UNP Q8RDL3
B	-5	HIS	-	expression tag	UNP Q8RDL3
B	-4	HIS	-	expression tag	UNP Q8RDL3
B	-3	ALA	-	expression tag	UNP Q8RDL3
B	-2	TYR	-	expression tag	UNP Q8RDL3
B	-1	TYR	-	expression tag	UNP Q8RDL3
B	0	SER	-	expression tag	UNP Q8RDL3
B	362	ASP	-	expression tag	UNP Q8RDL3

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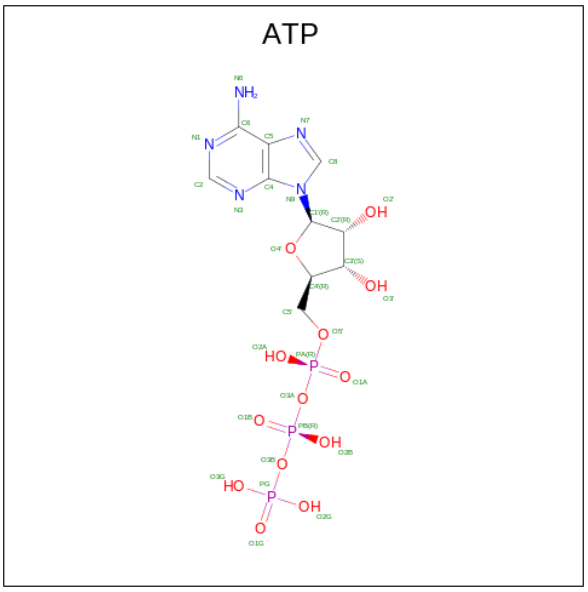
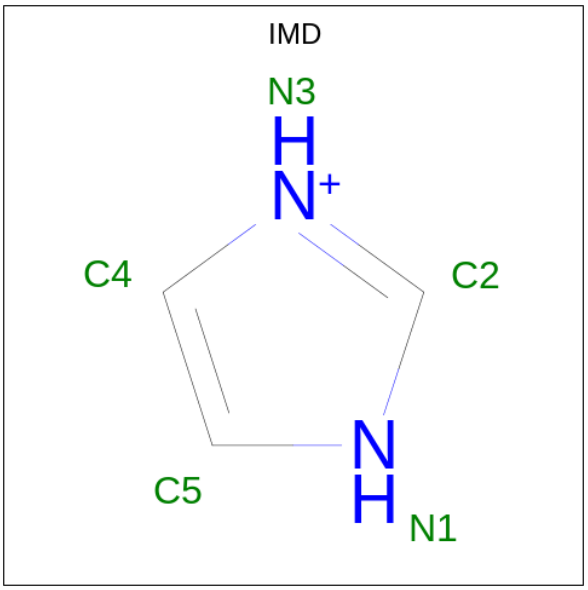
Chain	Residue	Modelled	Actual	Comment	Reference
B	363	LYS	-	expression tag	UNP Q8RDL3
B	364	LEU	-	expression tag	UNP Q8RDL3
B	365	ALA	-	expression tag	UNP Q8RDL3
C	-7	HIS	-	expression tag	UNP Q8RDL3
C	-6	HIS	-	expression tag	UNP Q8RDL3
C	-5	HIS	-	expression tag	UNP Q8RDL3
C	-4	HIS	-	expression tag	UNP Q8RDL3
C	-3	ALA	-	expression tag	UNP Q8RDL3
C	-2	TYR	-	expression tag	UNP Q8RDL3
C	-1	TYR	-	expression tag	UNP Q8RDL3
C	0	SER	-	expression tag	UNP Q8RDL3
C	362	ASP	-	expression tag	UNP Q8RDL3
C	363	LYS	-	expression tag	UNP Q8RDL3
C	364	LEU	-	expression tag	UNP Q8RDL3
C	365	ALA	-	expression tag	UNP Q8RDL3
D	-7	HIS	-	expression tag	UNP Q8RDL3
D	-6	HIS	-	expression tag	UNP Q8RDL3
D	-5	HIS	-	expression tag	UNP Q8RDL3
D	-4	HIS	-	expression tag	UNP Q8RDL3
D	-3	ALA	-	expression tag	UNP Q8RDL3
D	-2	TYR	-	expression tag	UNP Q8RDL3
D	-1	TYR	-	expression tag	UNP Q8RDL3
D	0	SER	-	expression tag	UNP Q8RDL3
D	362	ASP	-	expression tag	UNP Q8RDL3
D	363	LYS	-	expression tag	UNP Q8RDL3
D	364	LEU	-	expression tag	UNP Q8RDL3
D	365	ALA	-	expression tag	UNP Q8RDL3

- Molecule 2 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			31	10	5	13	3		
2	B	1	Total	C	N	O	P	0	0
			31	10	5	13	3		
2	C	1	Total	C	N	O	P	0	0
			31	10	5	13	3		
2	D	1	Total	C	N	O	P	0	0
			31	10	5	13	3		

- Molecule 3 is IMIDAZOLE (three-letter code: IMD) (formula: $C_3H_5N_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N 5 3 2	0	0
3	A	1	Total C N 5 3 2	0	0
3	A	1	Total C N 5 3 2	0	0
3	A	1	Total C N 5 3 2	0	0
3	A	1	Total C N 5 3 2	0	0
3	A	1	Total C N 5 3 2	0	0
3	B	1	Total C N 5 3 2	0	0
3	B	1	Total C N 5 3 2	0	0
3	B	1	Total C N 5 3 2	0	0
3	B	1	Total C N 5 3 2	0	0
3	B	1	Total C N 5 3 2	0	0
3	C	1	Total C N 5 3 2	0	0
3	C	1	Total C N 5 3 2	0	0
3	C	1	Total C N 5 3 2	0	0
3	C	1	Total C N 5 3 2	0	0
3	D	1	Total C N 5 3 2	0	0
3	D	1	Total C N 5 3 2	0	0
3	D	1	Total C N 5 3 2	0	0
3	D	1	Total C N 5 3 2	0	0
3	D	1	Total C N 5 3 2	0	0
3	D	1	Total C N 5 3 2	0	0

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

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

- Molecule 5 is water.

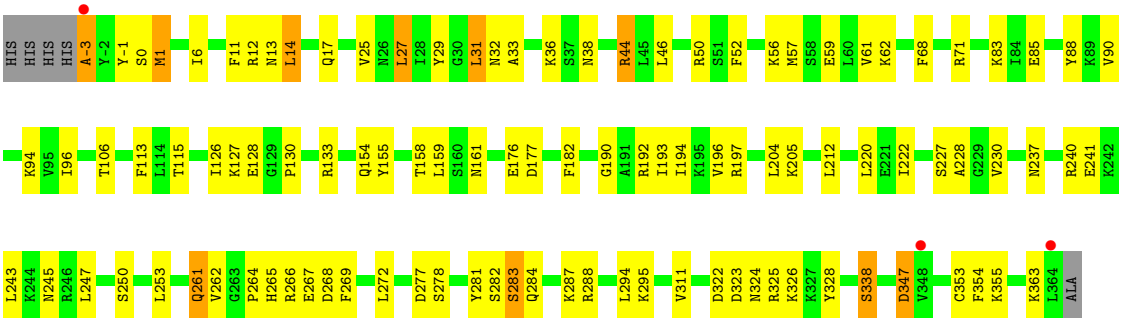
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	40	Total O 40 40	0	0
5	B	34	Total O 34 34	0	0
5	C	16	Total O 16 16	0	0
5	D	14	Total O 14 14	0	0

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.

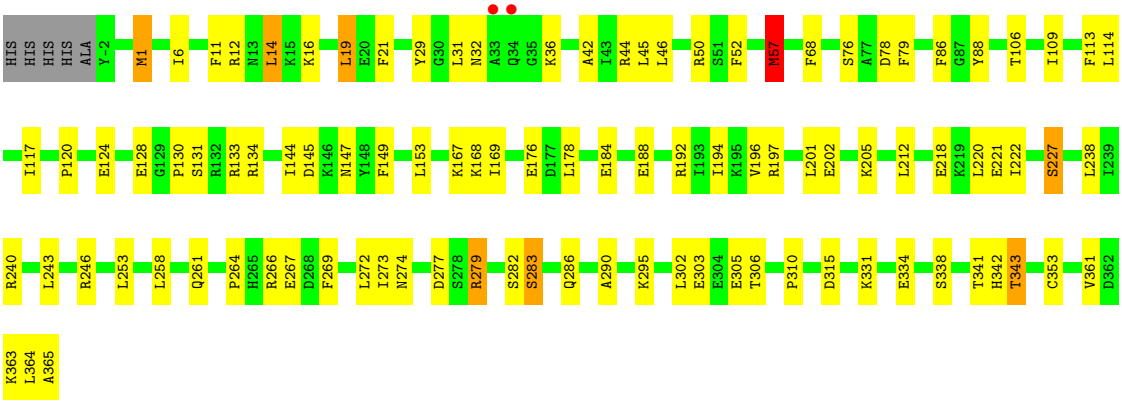
• Molecule 1: DNA replication and repair protein RecF

Chain A:



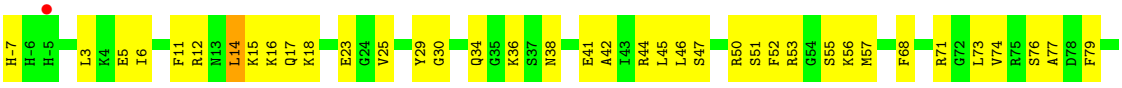
• Molecule 1: DNA replication and repair protein RecF

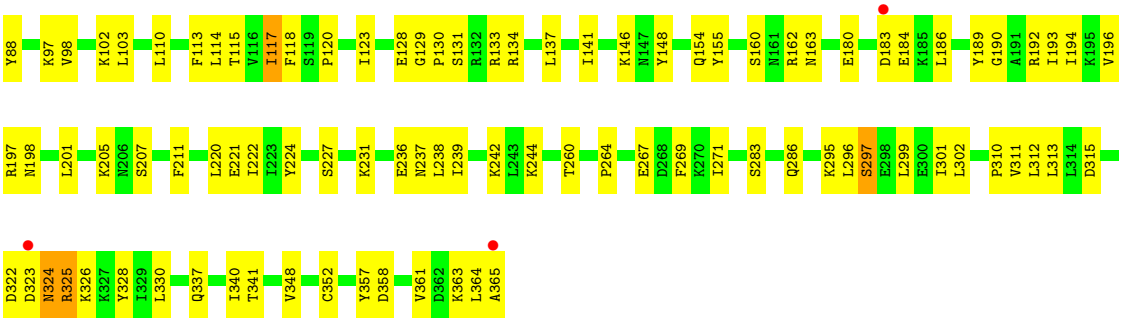
Chain B:



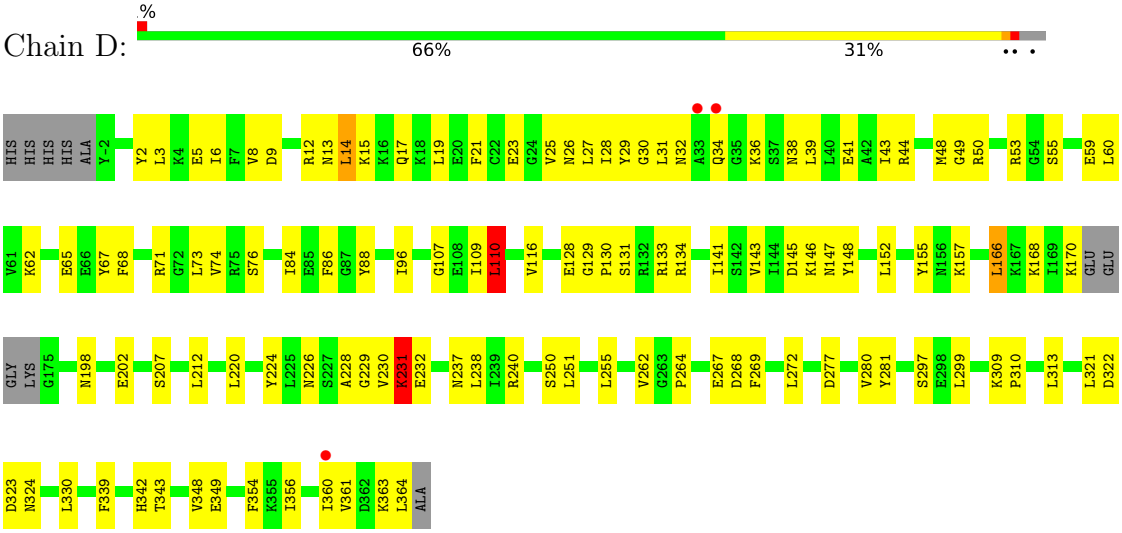
• Molecule 1: DNA replication and repair protein RecF

Chain C:





• Molecule 1: DNA replication and repair protein RecF



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	108.12Å 138.82Å 179.57Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.86 – 3.00 19.86 – 3.00	Depositor EDS
% Data completeness (in resolution range)	99.7 (19.86-3.00) 99.5 (19.86-3.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.37 (at 2.98Å)	Xtriage
Refinement program	PHENIX 1.9_1692	Depositor
R, R_{free}	0.195 , 0.255 0.204 , 0.258	Depositor DCC
R_{free} test set	2644 reflections (4.84%)	wwPDB-VP
Wilson B-factor (Å^2)	74.5	Xtriage
Anisotropy	0.759	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 60.4	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	11923	wwPDB-VP
Average B, all atoms (Å^2)	85.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.66% 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, IMD, ATP

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	0.52	0/2958	0.75	4/3977 (0.1%)
1	B	0.53	0/2966	0.75	5/3983 (0.1%)
1	C	0.42	0/2967	0.65	3/3992 (0.1%)
1	D	0.48	0/2871	0.76	7/3863 (0.2%)
All	All	0.49	0/11762	0.73	19/15815 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	1
1	D	0	1
All	All	0	3

There are no bond length outliers.

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	127	LYS	CB-CA-C	-17.25	75.90	110.40
1	D	110	LEU	CA-CB-CG	10.32	139.03	115.30
1	A	-3	ALA	N-CA-C	-9.39	85.65	111.00
1	B	57	MET	CB-CA-C	-9.27	91.86	110.40
1	D	229	GLY	N-CA-C	9.15	135.98	113.10
1	C	231	LYS	CB-CA-C	-8.11	94.19	110.40
1	D	228	ALA	CB-CA-C	-7.44	98.94	110.10
1	C	324	ASN	CB-CA-C	-6.99	96.43	110.40
1	A	-3	ALA	CB-CA-C	6.68	120.13	110.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	43	ILE	CB-CA-C	-6.45	98.70	111.60
1	A	90	VAL	CB-CA-C	-6.32	99.38	111.40
1	B	279	ARG	NE-CZ-NH1	5.93	123.27	120.30
1	B	31	LEU	CA-CB-CG	5.92	128.91	115.30
1	B	238	LEU	CA-CB-CG	5.56	128.09	115.30
1	D	231	LYS	CB-CA-C	-5.48	99.44	110.40
1	D	231	LYS	N-CA-C	5.41	125.60	111.00
1	D	231	LYS	C-N-CA	5.12	134.51	121.70
1	C	14	LEU	CA-CB-CG	5.03	126.86	115.30
1	B	19	LEU	CA-CB-CG	5.03	126.86	115.30

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	347	ASP	Peptide
1	B	57	MET	Peptide
1	D	231	LYS	Peptide

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2915	0	2864	67	1
1	B	2921	0	2897	74	1
1	C	2922	0	2856	91	0
1	D	2828	0	2778	86	0
2	A	31	0	12	3	0
2	B	31	0	12	4	0
2	C	31	0	12	2	0
2	D	31	0	12	2	0
3	A	30	0	30	9	0
3	B	25	0	25	11	0
3	C	20	0	20	11	0
3	D	30	0	30	8	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	40	0	0	2	0
5	B	34	0	0	3	0
5	C	16	0	0	1	0
5	D	14	0	0	0	0
All	All	11923	0	11548	320	1

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 14.

All (320) 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:57:MET:H	3:B:403:IMD:H2	1.27	0.97
1:A:50:ARG:HE	3:A:403:IMD:H4	1.31	0.94
1:C:323:ASP:OD1	1:C:324:ASN:N	2.05	0.89
1:D:13:ASN:ND2	1:D:34:GLN:O	2.07	0.88
1:C:50:ARG:HE	3:C:402:IMD:H5	1.41	0.84
1:B:1:MET:HE1	1:B:113:PHE:HA	1.62	0.81
1:D:363:LYS:HG2	1:D:364:LEU:HG	1.61	0.80
1:A:52:PHE:HA	3:A:403:IMD:H5	1.64	0.78
1:C:283:SER:HB3	1:C:286:GLN:HB2	1.67	0.77
1:C:29:TYR:OH	1:C:365:ALA:O	2.02	0.76
1:D:128:GLU:O	1:D:133:ARG:NH2	2.20	0.74
1:A:212:LEU:HD23	1:A:220:LEU:HB2	1.67	0.74
1:C:30:GLY:O	1:C:36:LYS:NZ	2.18	0.73
1:C:98:VAL:HG23	1:C:103:LEU:HD11	1.68	0.73
1:A:268:ASP:OD1	1:A:269:PHE:N	2.20	0.73
1:C:3:LEU:HD12	1:C:74:VAL:HG12	1.71	0.72
1:A:71:ARG:HD3	1:A:83:LYS:HE2	1.70	0.72
1:B:128:GLU:O	1:B:133:ARG:NH2	2.22	0.72
1:D:3:LEU:HA	1:D:74:VAL:HG12	1.71	0.70
1:D:360:ILE:HG22	1:D:360:ILE:O	1.91	0.70
1:C:330:LEU:HD11	1:C:348:VAL:HG13	1.73	0.70
1:A:323:ASP:HA	1:A:326:LYS:HB3	1.74	0.69
1:B:264:PRO:HA	1:B:267:GLU:HG3	1.74	0.69
1:A:32:ASN:HA	2:A:401:ATP:O1G	1.93	0.68
1:B:50:ARG:NH1	3:B:404:IMD:HN3	1.92	0.67
1:B:184:GLU:HG3	1:B:240[B]:ARG:HH22	1.59	0.67
1:D:44:ARG:HH21	3:D:402:IMD:C4	2.08	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:2:TYR:CE1	1:D:23:GLU:HG2	2.29	0.66
1:C:15:LYS:HB3	3:C:403:IMD:HN1	1.60	0.66
1:C:76:SER:HB3	1:C:79:PHE:HB2	1.79	0.65
1:D:342:HIS:CG	1:D:343:THR:H	2.15	0.65
1:A:190:GLY:O	1:A:194:ILE:HG12	1.95	0.65
1:C:50:ARG:HH21	3:C:402:IMD:H5	1.61	0.65
1:A:158:THR:HA	1:A:161:ASN:HB2	1.79	0.64
1:D:49:GLY:HA2	1:D:86:PHE:HE2	1.63	0.64
1:C:50:ARG:NE	3:C:402:IMD:H5	2.12	0.64
1:D:354:PHE:HB3	1:D:361:VAL:HG12	1.80	0.63
1:A:283:SER:OG	1:A:284:GLN:N	2.30	0.63
1:C:34:GLN:N	2:C:401:ATP:O1B	2.29	0.62
1:A:197:ARG:NH1	1:A:267:GLU:OE1	2.31	0.62
1:C:17:GLN:HE22	1:C:361:VAL:HG23	1.63	0.62
1:D:131:SER:HB3	3:D:405:IMD:H5	1.80	0.62
1:D:268:ASP:OD1	1:D:269:PHE:N	2.33	0.62
1:D:330:LEU:HD11	1:D:348:VAL:HG23	1.81	0.62
1:D:110:LEU:O	1:D:146:LYS:NZ	2.33	0.61
1:D:41:GLU:OE1	1:D:60:LEU:HD21	2.00	0.61
1:B:124:GLU:HB3	1:B:128:GLU:HG3	1.82	0.61
1:B:176:GLU:HB3	1:B:178:LEU:HG	1.83	0.61
1:B:261:GLN:O	1:B:266:ARG:HD2	2.00	0.61
1:B:363:LYS:HG3	1:B:364:LEU:N	2.15	0.61
1:A:205:LYS:HD2	3:A:405:IMD:HN3	1.66	0.61
1:A:325:ARG:HA	1:A:328:TYR:HB3	1.83	0.60
1:C:110:LEU:HB2	1:C:146:LYS:HZ2	1.65	0.60
1:B:19:LEU:HD21	1:B:361:VAL:HG21	1.82	0.60
1:C:41:GLU:OE2	1:C:53:ARG:NH1	2.31	0.60
1:C:205:LYS:HG2	1:C:222:ILE:HB	1.83	0.60
1:D:36:LYS:NZ	1:D:342:HIS:O	2.31	0.60
1:C:115:THR:HG22	1:C:311:VAL:HB	1.84	0.60
1:A:29:TYR:CE1	1:A:355:LYS:HB2	2.38	0.59
1:B:194:ILE:HD12	1:B:243:LEU:HD11	1.85	0.59
1:B:220:LEU:HD22	1:B:221:GLU:H	1.66	0.59
1:D:130:PRO:HG2	3:D:406:IMD:H4	1.83	0.59
1:A:36:LYS:NZ	2:A:401:ATP:O1G	2.25	0.59
1:B:169:ILE:HG12	1:B:176:GLU:HG2	1.84	0.59
1:D:41:GLU:OE2	1:D:53:ARG:NH2	2.35	0.59
1:A:227:SER:HB3	1:A:262:VAL:O	2.03	0.58
1:C:68:PHE:CE2	1:C:88:TYR:HB3	2.38	0.58
1:A:126:ILE:HG21	1:A:287:LYS:HG2	1.86	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:130:PRO:HD2	5:A:527:HOH:O	2.03	0.58
1:B:29:TYR:OH	1:B:365:ALA:O	2.13	0.58
1:C:53:ARG:NH2	2:C:401:ATP:O1A	2.34	0.58
1:C:56:LYS:HD2	1:C:57:MET:H	1.68	0.58
1:C:328:TYR:O	1:C:330:LEU:N	2.36	0.58
1:D:17:GLN:HE22	1:D:360:ILE:H	1.51	0.58
1:B:106:THR:O	1:B:109:ILE:HG22	2.04	0.57
1:B:283:SER:HB3	1:B:286:GLN:HG2	1.86	0.57
1:A:50:ARG:HH11	3:A:403:IMD:C4	2.17	0.57
1:A:133:ARG:NH1	1:A:268:ASP:OD2	2.37	0.57
1:D:264:PRO:HA	1:D:267:GLU:CD	2.24	0.57
1:B:76:SER:HB2	1:B:79:PHE:HB2	1.86	0.57
1:D:50:ARG:HH11	3:D:402:IMD:HN1	1.52	0.57
1:C:180:GLU:HA	1:C:183:ASP:HB2	1.87	0.57
1:C:50:ARG:HE	3:C:402:IMD:C5	2.16	0.57
1:C:302:LEU:HD23	1:C:310:PRO:HG3	1.85	0.56
1:A:29:TYR:CZ	1:A:355:LYS:HB2	2.40	0.56
1:C:198:ASN:HD22	1:C:224:TYR:HD2	1.54	0.56
1:D:212:LEU:HD23	1:D:220:LEU:HB2	1.88	0.56
1:C:47:SER:HA	1:C:113:PHE:HB3	1.86	0.56
1:B:279:ARG:NH2	5:B:503:HOH:O	2.38	0.56
1:A:283:SER:OG	2:B:401:ATP:O2G	2.24	0.55
1:A:288:ARG:NH1	5:A:504:HOH:O	2.38	0.55
1:C:41:GLU:OE1	1:C:51:SER:HB2	2.06	0.55
1:D:15:LYS:O	1:D:17:GLN:HG2	2.06	0.55
1:A:261:GLN:HG3	1:A:266:ARG:NH2	2.21	0.55
1:A:50:ARG:HH11	3:A:403:IMD:HN3	1.54	0.55
1:B:133:ARG:HG2	1:B:269:PHE:CE1	2.41	0.55
1:B:6:ILE:HG22	1:B:21:PHE:CE2	2.41	0.54
1:B:11:PHE:CE2	1:B:42:ALA:HB2	2.42	0.54
1:A:33:ALA:HA	2:A:401:ATP:H5'2	1.89	0.54
1:B:1:MET:CE	1:B:113:PHE:HD1	2.21	0.54
1:B:342:HIS:CG	1:B:343:THR:H	2.24	0.54
1:A:159:LEU:HD21	1:A:265:HIS:CD2	2.43	0.53
1:A:61:VAL:HG12	1:A:62:LYS:O	2.08	0.53
1:D:28:ILE:HD13	1:D:39:LEU:HD23	1.89	0.53
1:A:128:GLU:O	1:A:133:ARG:NH2	2.41	0.53
1:B:50:ARG:NH1	3:B:404:IMD:N3	2.56	0.53
1:B:202:GLU:HA	1:B:205:LYS:HD2	1.91	0.53
1:D:155:TYR:OH	1:D:264:PRO:HD2	2.09	0.53
1:C:192:ARG:O	1:C:196:VAL:HG23	2.08	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:273:ILE:HD11	1:B:290:ALA:HB2	1.91	0.53
2:B:401:ATP:O3G	5:B:501:HOH:O	2.19	0.53
1:D:96:ILE:HD13	1:D:109:ILE:HD12	1.90	0.53
1:A:71:ARG:HG3	1:A:85:GLU:HG2	1.91	0.53
1:B:57:MET:HB2	3:B:403:IMD:H2	1.90	0.53
1:D:145:ASP:OD1	1:D:147:ASN:HB2	2.09	0.53
1:A:52:PHE:HA	3:A:403:IMD:C5	2.36	0.52
1:C:76:SER:OG	1:C:77:ALA:N	2.40	0.52
1:A:50:ARG:NE	3:A:403:IMD:H4	2.11	0.52
1:B:205:LYS:HG2	1:B:222:ILE:HB	1.92	0.52
1:D:107:GLY:O	1:D:110:LEU:HD13	2.09	0.52
1:D:8:VAL:HG21	1:D:14:LEU:HB3	1.91	0.52
1:A:27:LEU:HD23	1:A:353:CYS:HB2	1.91	0.52
1:C:110:LEU:HB2	1:C:146:LYS:NZ	2.24	0.52
1:A:1:MET:HE1	1:A:113:PHE:HA	1.92	0.52
1:A:243:LEU:O	1:A:247:LEU:HB2	2.10	0.52
1:B:120:PRO:HD3	1:B:315:ASP:O	2.10	0.52
1:A:278:SER:O	1:A:282:SER:OG	2.27	0.51
1:C:323:ASP:CG	1:C:324:ASN:H	2.10	0.51
1:D:131:SER:HB3	3:D:405:IMD:C5	2.40	0.51
1:B:218:GLU:HG2	1:B:274:ASN:OD1	2.09	0.51
1:A:12:ARG:O	1:A:62:LYS:HG3	2.11	0.51
1:B:192:ARG:O	1:B:196:VAL:HG23	2.11	0.51
1:B:130:PRO:HD2	3:B:406:IMD:HN3	1.76	0.51
1:B:315:ASP:HA	1:B:341:THR:OG1	2.11	0.51
1:C:201:LEU:O	1:C:205:LYS:HG3	2.12	0.51
1:D:354:PHE:HB3	1:D:361:VAL:CG1	2.41	0.51
1:B:227:SER:HB2	1:B:243:LEU:HD21	1.93	0.50
1:C:118:PHE:CE2	1:C:295:LYS:HB3	2.46	0.50
1:B:220:LEU:HD22	1:B:221:GLU:N	2.26	0.50
1:D:49:GLY:HA2	1:D:86:PHE:CE2	2.46	0.50
1:D:62:LYS:HB3	1:D:65:GLU:HG3	1.94	0.50
1:A:44:ARG:HH21	3:A:403:IMD:C2	2.24	0.50
1:C:50:ARG:NH2	3:C:402:IMD:H5	2.24	0.50
1:C:97:LYS:HG2	1:C:102:LYS:HA	1.93	0.50
1:D:251:LEU:O	1:D:255:LEU:HG	2.12	0.50
1:C:23:GLU:HA	1:C:337:GLN:HG3	1.92	0.50
1:C:239:ILE:HA	1:C:242:LYS:HB2	1.94	0.50
1:D:13:ASN:HB3	1:D:38:ASN:HD22	1.77	0.50
1:C:117:ILE:HD12	1:C:313:LEU:HB2	1.95	0.49
1:A:237:ASN:HA	1:A:240:ARG:NH1	2.27	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:133:ARG:HG2	1:B:269:PHE:CZ	2.48	0.49
1:C:42:ALA:O	1:C:45:LEU:HB3	2.12	0.49
1:A:205:LYS:HA	1:A:222:ILE:HD12	1.95	0.49
1:C:295:LYS:HA	1:C:295:LYS:HD2	1.62	0.49
1:D:129:GLY:HA3	3:D:405:IMD:C4	2.42	0.49
1:D:224:TYR:OH	1:D:267:GLU:OE1	2.28	0.49
1:B:57:MET:H	3:B:403:IMD:C2	2.13	0.49
1:C:131:SER:HB3	3:C:404:IMD:N1	2.28	0.48
1:D:321:LEU:HG	1:D:322:ASP:H	1.79	0.48
1:A:57:MET:HE3	1:A:94:LYS:HD3	1.95	0.48
1:C:148:TYR:CE2	1:C:193:ILE:HG23	2.48	0.48
1:C:325:ARG:H	1:C:325:ARG:HG2	1.50	0.48
1:D:12:ARG:NH1	1:D:59:GLU:O	2.47	0.48
1:A:354:PHE:CE2	1:A:363:LYS:HG3	2.49	0.48
1:B:282:SER:HB2	1:B:286:GLN:HG3	1.96	0.48
1:C:155:TYR:CE2	1:C:186:LEU:HD22	2.49	0.48
1:B:149:PHE:CE2	1:B:153:LEU:HD11	2.49	0.47
1:B:145:ASP:OD1	1:B:147:ASN:HB2	2.14	0.47
1:B:167:LYS:HG3	1:B:258:LEU:HD13	1.96	0.47
1:A:11:PHE:O	1:A:14:LEU:HB2	2.15	0.47
1:B:16:LYS:H	3:B:402:IMD:C4	2.27	0.47
1:D:25:VAL:HG21	1:D:330:LEU:HD22	1.96	0.47
1:B:144:ILE:HD13	1:B:305:GLU:HB2	1.97	0.47
1:B:68:PHE:CE2	1:B:88:TYR:HB3	2.50	0.47
1:B:78:ASP:OD1	1:B:78:ASP:N	2.41	0.47
1:C:128:GLU:O	1:C:133:ARG:NH2	2.48	0.47
1:C:190:GLY:O	1:C:194:ILE:HG13	2.15	0.47
1:D:110:LEU:HD23	1:D:143:VAL:HA	1.96	0.47
1:D:342:HIS:CG	1:D:343:THR:N	2.82	0.47
1:A:68:PHE:CE2	1:A:88:TYR:HB3	2.49	0.47
1:B:52:PHE:HA	3:B:404:IMD:C5	2.45	0.47
1:D:12:ARG:HD3	2:D:401:ATP:N7	2.30	0.47
1:C:11:PHE:HD1	1:C:68:PHE:CD1	2.33	0.47
1:C:120:PRO:HD3	1:C:315:ASP:O	2.14	0.47
1:A:25:VAL:HG22	1:A:338:SER:OG	2.15	0.47
1:D:250:SER:HB2	1:D:262:VAL:HG23	1.96	0.47
1:B:57:MET:N	3:B:403:IMD:H2	2.12	0.46
1:D:17:GLN:HE22	1:D:360:ILE:N	2.13	0.46
1:B:50:ARG:NE	3:B:404:IMD:H4	2.31	0.46
1:D:237:ASN:OD1	1:D:238:LEU:HD22	2.16	0.46
1:D:166:LEU:HD12	1:D:255:LEU:HB3	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:207:SER:HB3	1:D:297:SER:OG	2.14	0.46
1:C:5:GLU:OE1	1:C:73:LEU:HD12	2.16	0.46
1:A:176:GLU:HG3	1:A:177:ASP:H	1.80	0.46
1:C:120:PRO:O	1:C:123:ILE:HG12	2.15	0.46
1:D:32:ASN:ND2	2:D:401:ATP:O3G	2.48	0.46
1:C:184:GLU:OE1	1:C:244:LYS:NZ	2.31	0.46
1:D:226:ASN:HD21	1:D:230:VAL:HG12	1.81	0.46
1:D:342:HIS:CD2	1:D:343:THR:H	2.34	0.46
1:A:155:TYR:OH	1:A:264:PRO:HD2	2.16	0.46
1:C:296:LEU:HD23	1:C:296:LEU:HA	1.76	0.46
1:D:339:PHE:CD2	1:D:339:PHE:N	2.84	0.46
1:A:1:MET:HE2	1:A:1:MET:HB3	1.72	0.45
1:B:197:ARG:NH2	5:B:504:HOH:O	2.47	0.45
1:B:134:ARG:NH2	1:B:266:ARG:HA	2.31	0.45
1:C:363:LYS:HG2	1:C:364:LEU:HG	1.98	0.45
1:A:56:LYS:HG2	1:A:59:GLU:OE2	2.16	0.45
1:A:281:TYR:O	2:B:401:ATP:H2'	2.17	0.45
1:B:188:GLU:HA	1:B:240[A]:ARG:HG3	1.97	0.45
1:C:34:GLN:OE1	1:C:358:ASP:N	2.41	0.45
1:D:5:GLU:HG2	1:D:73:LEU:HD12	1.99	0.45
1:B:212:LEU:HD12	1:B:212:LEU:HA	1.68	0.45
1:D:133:ARG:HG2	1:D:269:PHE:CZ	2.51	0.45
1:D:198:ASN:O	1:D:202:GLU:HG3	2.16	0.45
1:C:29:TYR:HE2	1:C:365:ALA:HA	1.82	0.45
1:C:18:LYS:HE2	1:C:71:ARG:HH22	1.82	0.45
1:C:12:ARG:HD3	1:C:38:ASN:OD1	2.16	0.45
1:A:115:THR:HG22	1:A:311:VAL:HB	1.99	0.44
1:C:25:VAL:HG13	1:C:340:ILE:HD12	1.98	0.44
1:D:30:GLY:O	1:D:31:LEU:HD23	2.17	0.44
1:C:264:PRO:HA	1:C:267:GLU:HG3	1.99	0.44
1:A:192:ARG:O	1:A:196:VAL:HG23	2.17	0.44
1:B:32:ASN:HA	2:B:401:ATP:O3B	2.18	0.44
1:D:339:PHE:N	1:D:339:PHE:HD2	2.15	0.44
1:D:60:LEU:HD23	1:D:60:LEU:HA	1.82	0.44
1:D:6:ILE:HG22	1:D:21:PHE:CE2	2.53	0.44
1:C:162:ARG:NH1	1:C:260:THR:OG1	2.51	0.44
1:C:236:GLU:HA	1:C:239:ILE:CG2	2.48	0.44
1:B:1:MET:CE	1:B:114:LEU:H	2.31	0.44
1:C:237:ASN:HB2	1:C:238:LEU:HD12	2.00	0.44
1:D:27:LEU:HD22	1:D:349:GLU:O	2.17	0.44
1:D:71:ARG:HA	1:D:84:ILE:O	2.18	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:157:LYS:HB2	1:D:157:LYS:HE3	1.89	0.44
1:C:154:GLN:HG3	1:C:189:TYR:CZ	2.53	0.44
3:D:405:IMD:C2	3:D:406:IMD:H5	2.48	0.44
1:A:295:LYS:HD2	1:A:295:LYS:HA	1.65	0.43
1:C:297:SER:O	1:C:301:ILE:HG13	2.18	0.43
1:C:323:ASP:O	1:C:326:LYS:N	2.48	0.43
1:D:309:LYS:HA	1:D:310:PRO:HD3	1.78	0.43
1:C:52:PHE:CE1	1:C:53:ARG:HG3	2.53	0.43
1:B:36:LYS:HB3	1:B:341:THR:CG2	2.49	0.43
1:D:323:ASP:OD1	1:D:324:ASN:N	2.38	0.43
1:A:354:PHE:CD2	1:A:363:LYS:HG3	2.54	0.43
1:A:250:SER:HA	1:A:253:LEU:HD23	1.99	0.43
1:C:129:GLY:HA3	3:C:404:IMD:N3	2.34	0.43
1:D:280:VAL:HG23	1:D:281:TYR:CD1	2.53	0.43
1:D:356:ILE:HD12	1:D:361:VAL:HG22	2.00	0.43
1:A:31:LEU:HD12	1:A:31:LEU:HA	1.74	0.43
1:C:160:SER:HA	1:C:163:ASN:HB2	2.00	0.43
1:D:29:TYR:O	1:D:356:ILE:HG22	2.19	0.43
1:B:283:SER:N	1:B:286:GLN:HG2	2.34	0.43
1:C:133:ARG:HB3	1:C:269:PHE:CE1	2.54	0.43
1:C:315:ASP:HA	1:C:341:THR:OG1	2.19	0.43
1:D:9:ASP:OD2	1:D:67:TYR:OH	2.09	0.43
1:D:141:ILE:HG21	1:D:148:TYR:CD2	2.54	0.43
1:A:272:LEU:HD23	1:A:277:ASP:HA	2.01	0.43
1:C:44:ARG:HH21	3:C:402:IMD:C2	2.31	0.43
1:C:113:PHE:O	1:C:114:LEU:HD23	2.18	0.43
1:C:194:ILE:HD12	1:C:239:ILE:HD11	2.01	0.43
1:C:220:LEU:HD21	1:C:271:ILE:CG2	2.49	0.42
1:B:277:ASP:OD1	1:B:279:ARG:HB3	2.18	0.42
1:C:141:ILE:HD11	1:C:197:ARG:HA	2.01	0.42
1:D:116:VAL:HG11	1:D:299:LEU:HD13	2.01	0.42
1:D:148:TYR:CE1	1:D:152:LEU:HD22	2.54	0.42
1:D:109:ILE:O	1:D:109:ILE:HG12	2.19	0.42
1:C:130:PRO:HB2	1:C:134:ARG:HH12	1.85	0.42
1:C:220:LEU:HD22	1:C:221:GLU:H	1.84	0.42
1:D:272:LEU:HD23	1:D:277:ASP:HA	2.01	0.42
1:A:133:ARG:HG2	1:A:269:PHE:CZ	2.55	0.42
1:C:-7:HIS:HB3	5:C:509:HOH:O	2.20	0.42
1:A:241:GLU:O	1:A:245:ASN:N	2.49	0.42
1:B:168:LYS:HA	1:B:168:LYS:HD3	1.88	0.42
1:C:299:LEU:HD12	1:C:312:LEU:HD21	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:357:TYR:CD2	1:C:358:ASP:HB2	2.55	0.42
1:B:130:PRO:HG2	3:B:406:IMD:H2	2.02	0.41
1:C:52:PHE:CD1	1:C:53:ARG:HG3	2.55	0.41
1:D:12:ARG:HB3	1:D:38:ASN:ND2	2.35	0.41
1:B:221:GLU:HB3	1:B:272:LEU:HB2	2.01	0.41
1:A:52:PHE:CA	3:A:403:IMD:H5	2.44	0.41
1:A:322:ASP:C	1:A:324:ASN:H	2.23	0.41
1:B:295:LYS:HA	1:B:295:LYS:HD2	1.79	0.41
1:A:161:ASN:HB3	1:A:182:PHE:HE1	1.85	0.41
1:B:201:LEU:O	1:B:205:LYS:HG3	2.20	0.41
1:B:342:HIS:CG	1:B:343:THR:N	2.89	0.41
1:C:16:LYS:H	3:C:403:IMD:HN1	1.66	0.41
1:D:21:PHE:HB3	1:D:26:ASN:ND2	2.34	0.41
1:D:27:LEU:HD11	1:D:348:VAL:HG11	2.02	0.41
1:D:130:PRO:O	1:D:134:ARG:HB2	2.21	0.41
1:A:27:LEU:HB3	1:A:353:CYS:HB3	2.03	0.41
1:A:228:ALA:HB3	1:A:230:VAL:HG22	2.03	0.41
1:B:44:ARG:HD2	1:B:117:ILE:CG2	2.51	0.41
1:D:68:PHE:CE2	1:D:88:TYR:HB3	2.56	0.41
1:D:231:LYS:HB3	1:D:232:GLU:H	1.60	0.41
1:D:313:LEU:HD12	1:D:313:LEU:N	2.34	0.41
1:C:137:LEU:HD12	1:C:137:LEU:HA	1.88	0.41
1:A:12:ARG:HD3	1:A:38:ASN:OD1	2.21	0.41
1:A:204:LEU:HD11	1:A:294:LEU:HD12	2.03	0.41
1:B:353:CYS:O	1:B:364:LEU:N	2.54	0.41
1:C:50:ARG:CZ	3:C:402:IMD:H5	2.51	0.41
1:C:207:SER:O	1:C:211:PHE:HD2	2.03	0.41
1:C:352:CYS:HB2	1:C:363:LYS:HE3	2.03	0.41
1:B:6:ILE:HG22	1:B:21:PHE:HE2	1.82	0.40
1:B:253:LEU:HD12	1:B:253:LEU:H	1.86	0.40
1:C:11:PHE:O	1:C:14:LEU:HD12	2.21	0.40
1:D:226:ASN:ND2	1:D:230:VAL:HG12	2.35	0.40
1:B:11:PHE:O	1:B:14:LEU:HB2	2.21	0.40
1:B:303:GLU:O	1:B:306:THR:O	2.39	0.40
1:D:19:LEU:HD21	1:D:361:VAL:HB	2.02	0.40
1:D:168:LYS:C	1:D:170:LYS:H	2.24	0.40
1:B:282:SER:HA	1:B:286:GLN:HE21	1.86	0.40
1:C:5:GLU:OE2	1:C:18:LYS:HD3	2.21	0.40
1:C:98:VAL:HG23	1:C:103:LEU:CD1	2.45	0.40
1:C:155:TYR:OH	1:C:264:PRO:HD2	2.21	0.40
1:A:96:ILE:HD11	1:A:106:THR:HG23	2.04	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:45:LEU:HD21	1:B:86:PHE:CD1	2.57	0.40
1:B:302:LEU:HD23	1:B:310:PRO:CG	2.51	0.40
1:B:331:LYS:O	1:B:334:GLU:HG2	2.21	0.40
1:D:17:GLN:OE1	1:D:19:LEU:HD11	2.22	0.40
1:D:130:PRO:HD2	3:D:405:IMD:C2	2.52	0.40
1:D:237:ASN:HB3	1:D:240:ARG:NH1	2.36	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:-3:ALA:O	1:B:246:ARG:NH2[4_455]	2.10	0.10

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	367/373 (98%)	326 (89%)	41 (11%)	0	100	100
1	B	368/373 (99%)	334 (91%)	34 (9%)	0	100	100
1	C	371/373 (100%)	316 (85%)	55 (15%)	0	100	100
1	D	360/373 (96%)	311 (86%)	49 (14%)	0	100	100
All	All	1466/1492 (98%)	1287 (88%)	179 (12%)	0	100	100

There are no Ramachandran outliers to report.

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	308/339 (91%)	291 (94%)	17 (6%)	18	50
1	B	309/339 (91%)	300 (97%)	9 (3%)	37	70
1	C	307/339 (91%)	299 (97%)	8 (3%)	41	72
1	D	295/339 (87%)	289 (98%)	6 (2%)	50	78
All	All	1219/1356 (90%)	1179 (97%)	40 (3%)	33	67

All (40) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	-1	TYR
1	A	0	SER
1	A	1	MET
1	A	6	ILE
1	A	13	ASN
1	A	14	LEU
1	A	17	GLN
1	A	27	LEU
1	A	31	LEU
1	A	44	ARG
1	A	46	LEU
1	A	154	GLN
1	A	193	ILE
1	A	261	GLN
1	A	283	SER
1	A	338	SER
1	A	347	ASP
1	B	1	MET
1	B	12	ARG
1	B	14	LEU
1	B	46	LEU
1	B	131	SER
1	B	227	SER
1	B	283	SER
1	B	338	SER
1	B	343	THR
1	C	6	ILE
1	C	46	LEU
1	C	55	SER
1	C	117	ILE

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Mol	Chain	Res	Type
1	C	227	SER
1	C	297	SER
1	C	322	ASP
1	C	325	ARG
1	D	14	LEU
1	D	48	MET
1	D	55	SER
1	D	76	SER
1	D	110	LEU
1	D	166	LEU

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

Mol	Chain	Res	Type
1	B	324	ASN
1	B	342	HIS
1	D	342	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 29 ligands modelled in this entry, 4 are monoatomic - leaving 25 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	ATP	A	401	4	26,33,33	0.82	1 (3%)	31,52,52	2.39	9 (29%)
2	ATP	B	401	4	26,33,33	0.87	1 (3%)	31,52,52	1.44	7 (22%)
3	IMD	A	407	-	3,5,5	0.36	0	4,5,5	0.67	0
3	IMD	A	405	-	3,5,5	0.39	0	4,5,5	0.42	0
3	IMD	B	403	-	3,5,5	0.39	0	4,5,5	0.52	0
3	IMD	C	404	-	3,5,5	0.38	0	4,5,5	0.57	0
3	IMD	D	406	-	3,5,5	0.46	0	4,5,5	0.45	0
3	IMD	D	402	-	3,5,5	0.46	0	4,5,5	0.48	0
3	IMD	C	405	-	3,5,5	0.39	0	4,5,5	0.65	0
3	IMD	D	404	-	3,5,5	0.36	0	4,5,5	0.68	0
3	IMD	B	405	-	3,5,5	0.38	0	4,5,5	0.64	0
2	ATP	D	401	4	26,33,33	0.91	1 (3%)	31,52,52	1.63	5 (16%)
3	IMD	C	402	-	3,5,5	0.38	0	4,5,5	0.67	0
3	IMD	A	402	-	3,5,5	0.46	0	4,5,5	0.45	0
3	IMD	D	403	-	3,5,5	0.39	0	4,5,5	0.58	0
3	IMD	D	405	-	3,5,5	0.37	0	4,5,5	0.55	0
3	IMD	B	402	-	3,5,5	0.42	0	4,5,5	0.59	0
3	IMD	B	406	-	3,5,5	0.45	0	4,5,5	0.44	0
3	IMD	D	407	-	3,5,5	0.44	0	4,5,5	0.62	0
3	IMD	A	406	-	3,5,5	0.48	0	4,5,5	0.42	0
3	IMD	B	404	-	3,5,5	0.48	0	4,5,5	0.99	0
2	ATP	C	401	4	26,33,33	0.95	1 (3%)	31,52,52	1.53	7 (22%)
3	IMD	A	404	-	3,5,5	0.41	0	4,5,5	0.60	0
3	IMD	C	403	-	3,5,5	0.44	0	4,5,5	0.56	0
3	IMD	A	403	-	3,5,5	0.46	0	4,5,5	0.59	0

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	ATP	A	401	4	-	5/18/38/38	0/3/3/3
2	ATP	B	401	4	-	8/18/38/38	0/3/3/3
3	IMD	A	407	-	-	-	0/1/1/1
3	IMD	A	405	-	-	-	0/1/1/1
3	IMD	B	403	-	-	-	0/1/1/1
3	IMD	C	404	-	-	-	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	IMD	D	406	-	-	-	0/1/1/1
3	IMD	D	402	-	-	-	0/1/1/1
3	IMD	C	405	-	-	-	0/1/1/1
3	IMD	D	404	-	-	-	0/1/1/1
3	IMD	B	405	-	-	-	0/1/1/1
2	ATP	D	401	4	-	5/18/38/38	0/3/3/3
3	IMD	C	402	-	-	-	0/1/1/1
3	IMD	A	402	-	-	-	0/1/1/1
3	IMD	D	403	-	-	-	0/1/1/1
3	IMD	D	405	-	-	-	0/1/1/1
3	IMD	B	402	-	-	-	0/1/1/1
3	IMD	B	406	-	-	-	0/1/1/1
3	IMD	D	407	-	-	-	0/1/1/1
3	IMD	A	406	-	-	-	0/1/1/1
3	IMD	B	404	-	-	-	0/1/1/1
2	ATP	C	401	4	-	7/18/38/38	0/3/3/3
3	IMD	A	404	-	-	-	0/1/1/1
3	IMD	C	403	-	-	-	0/1/1/1
3	IMD	A	403	-	-	-	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	401	ATP	C5-C4	2.49	1.47	1.40
2	C	401	ATP	C5-C4	2.36	1.47	1.40
2	D	401	ATP	C5-C4	2.29	1.47	1.40
2	A	401	ATP	C5-C4	2.17	1.46	1.40

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	401	ATP	PB-O3B-PG	-8.12	104.96	132.83
2	A	401	ATP	PA-O3A-PB	-6.12	111.84	132.83
2	A	401	ATP	O4'-C1'-C2'	-3.89	101.24	106.93
2	D	401	ATP	PA-O3A-PB	-3.64	120.35	132.83
2	A	401	ATP	N3-C2-N1	-3.37	123.40	128.68
2	B	401	ATP	O3G-PG-O2G	3.15	119.67	107.64
2	D	401	ATP	C4-C5-N7	-3.14	106.13	109.40
2	D	401	ATP	PB-O3B-PG	-3.11	122.16	132.83
2	C	401	ATP	N3-C2-N1	-3.01	123.97	128.68
2	D	401	ATP	O4'-C1'-C2'	-3.01	102.53	106.93
2	D	401	ATP	N3-C2-N1	-2.85	124.23	128.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	401	ATP	PA-O3A-PB	-2.75	123.41	132.83
2	B	401	ATP	N3-C2-N1	-2.70	124.45	128.68
2	B	401	ATP	C1'-N9-C4	-2.65	121.99	126.64
2	B	401	ATP	O4'-C1'-C2'	-2.61	103.11	106.93
2	A	401	ATP	O3G-PG-O1G	2.58	120.80	110.68
2	B	401	ATP	C4-C5-N7	-2.55	106.74	109.40
2	C	401	ATP	C4-C5-N7	-2.48	106.81	109.40
2	C	401	ATP	PA-O3A-PB	-2.39	124.61	132.83
2	C	401	ATP	O2B-PB-O1B	2.29	123.58	112.24
2	A	401	ATP	C1'-N9-C4	-2.28	122.63	126.64
2	C	401	ATP	C5'-C4'-C3'	-2.23	106.81	115.18
2	A	401	ATP	O3G-PG-O2G	2.13	115.76	107.64
2	C	401	ATP	O3G-PG-O2G	2.12	115.74	107.64
2	C	401	ATP	O3B-PG-O1G	-2.05	99.82	111.19
2	A	401	ATP	O2B-PB-O1B	2.03	122.26	112.24
2	A	401	ATP	C4-C5-N7	-2.02	107.30	109.40
2	B	401	ATP	O2G-PG-O3B	-2.01	97.91	104.64

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	ATP	C5'-O5'-PA-O2A
2	A	401	ATP	C5'-O5'-PA-O3A
2	B	401	ATP	PB-O3B-PG-O3G
2	B	401	ATP	C5'-O5'-PA-O3A
2	B	401	ATP	O4'-C4'-C5'-O5'
2	B	401	ATP	C3'-C4'-C5'-O5'
2	C	401	ATP	C5'-O5'-PA-O1A
2	C	401	ATP	C5'-O5'-PA-O2A
2	C	401	ATP	C3'-C4'-C5'-O5'
2	D	401	ATP	C5'-O5'-PA-O2A
2	D	401	ATP	C5'-O5'-PA-O3A
2	D	401	ATP	O4'-C4'-C5'-O5'
2	A	401	ATP	O4'-C4'-C5'-O5'
2	D	401	ATP	C3'-C4'-C5'-O5'
2	C	401	ATP	O4'-C4'-C5'-O5'
2	A	401	ATP	C3'-C4'-C5'-O5'
2	B	401	ATP	PB-O3B-PG-O2G
2	A	401	ATP	C5'-O5'-PA-O1A
2	B	401	ATP	C5'-O5'-PA-O2A
2	D	401	ATP	C5'-O5'-PA-O1A

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Mol	Chain	Res	Type	Atoms
2	C	401	ATP	PB-O3B-PG-O1G
2	C	401	ATP	C5'-O5'-PA-O3A
2	C	401	ATP	PG-O3B-PB-O2B
2	B	401	ATP	C5'-O5'-PA-O1A
2	B	401	ATP	PB-O3B-PG-O1G

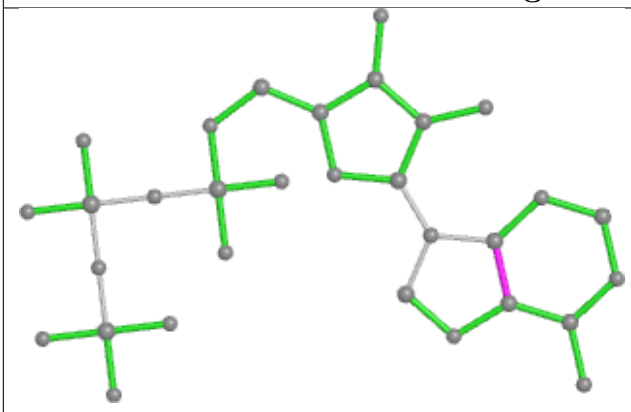
There are no ring outliers.

16 monomers are involved in 50 short contacts:

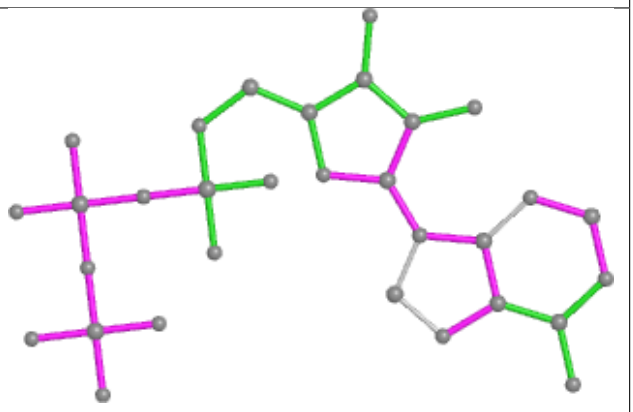
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	401	ATP	3	0
2	B	401	ATP	4	0
3	A	405	IMD	1	0
3	B	403	IMD	4	0
3	C	404	IMD	2	0
3	D	406	IMD	2	0
3	D	402	IMD	2	0
2	D	401	ATP	2	0
3	C	402	IMD	7	0
3	D	405	IMD	5	0
3	B	402	IMD	1	0
3	B	406	IMD	2	0
3	B	404	IMD	4	0
2	C	401	ATP	2	0
3	C	403	IMD	2	0
3	A	403	IMD	8	0

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

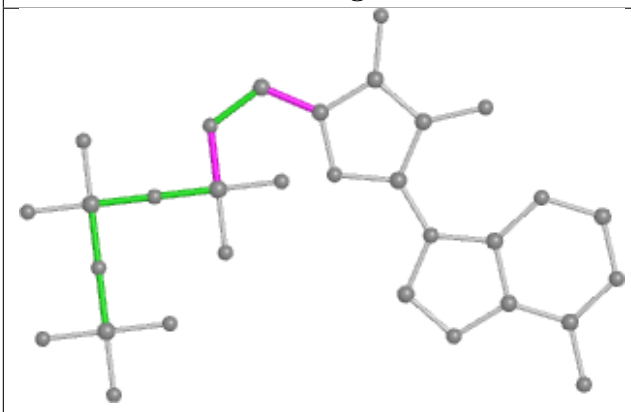
Ligand ATP A 401



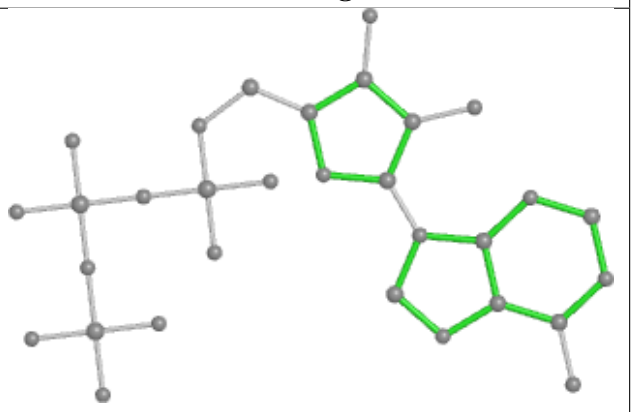
Bond lengths



Bond angles

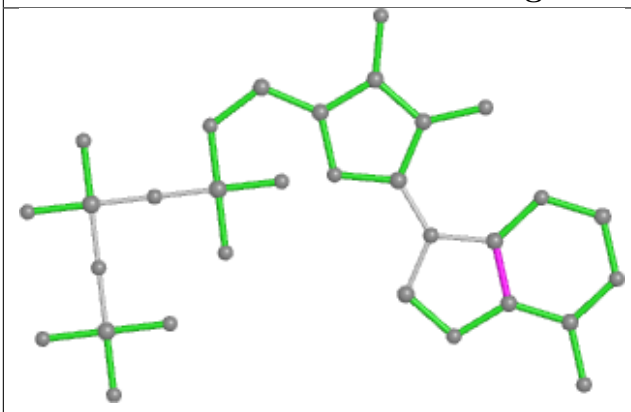


Torsions

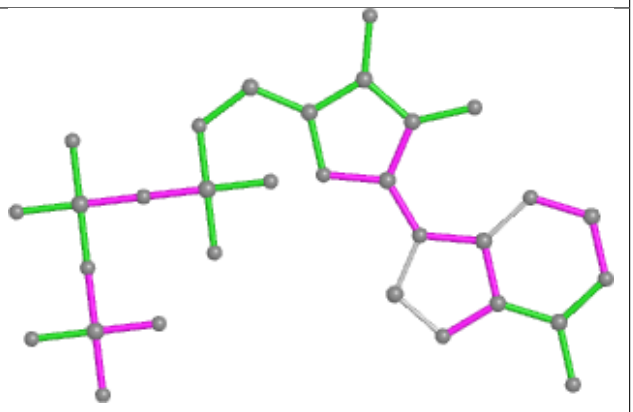


Rings

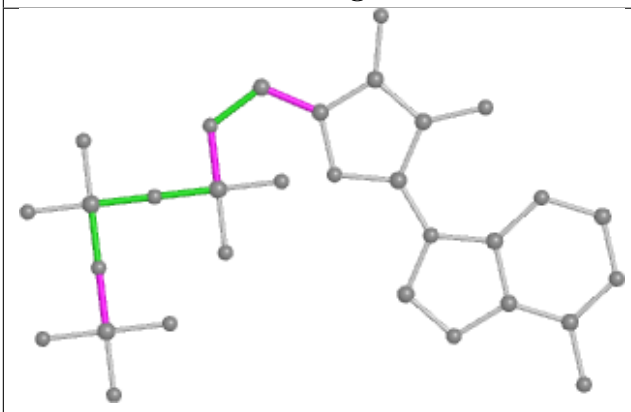
Ligand ATP B 401



Bond lengths



Bond angles



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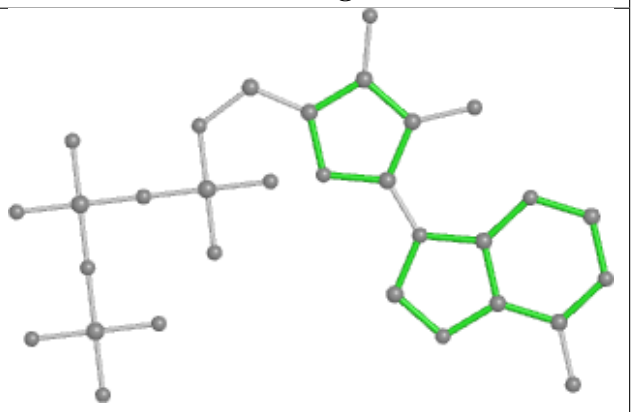
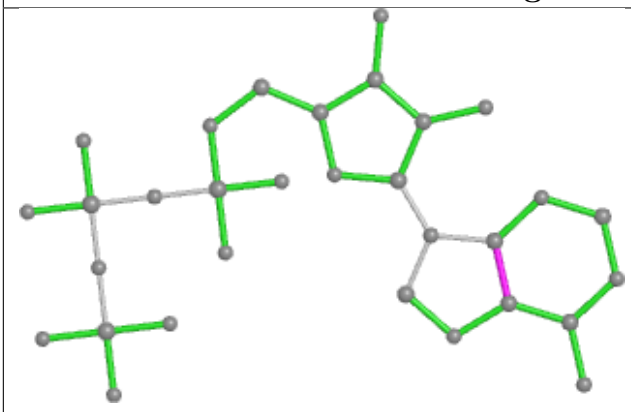
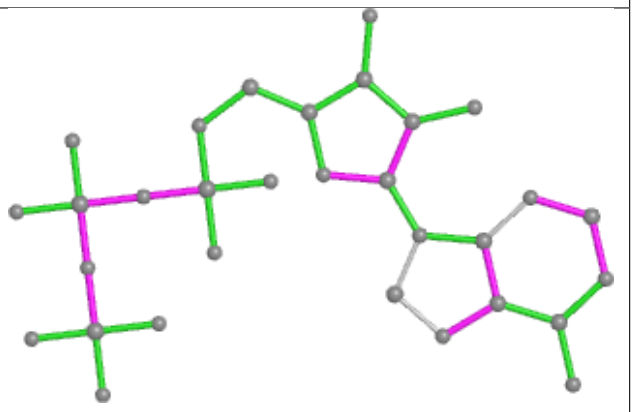


Rings

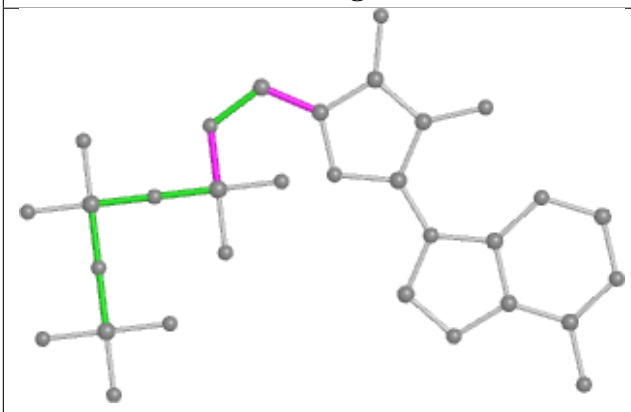
Ligand ATP D 401



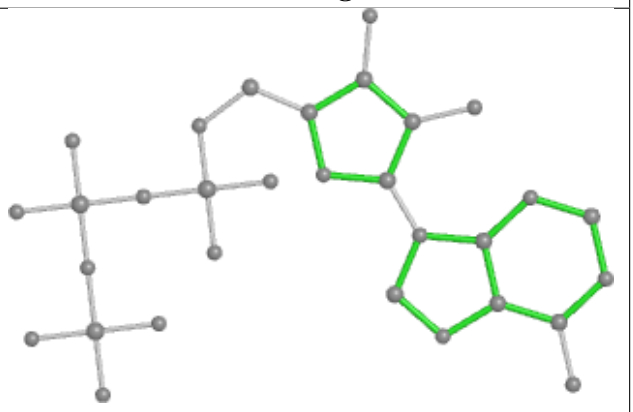
Bond lengths



Bond angles

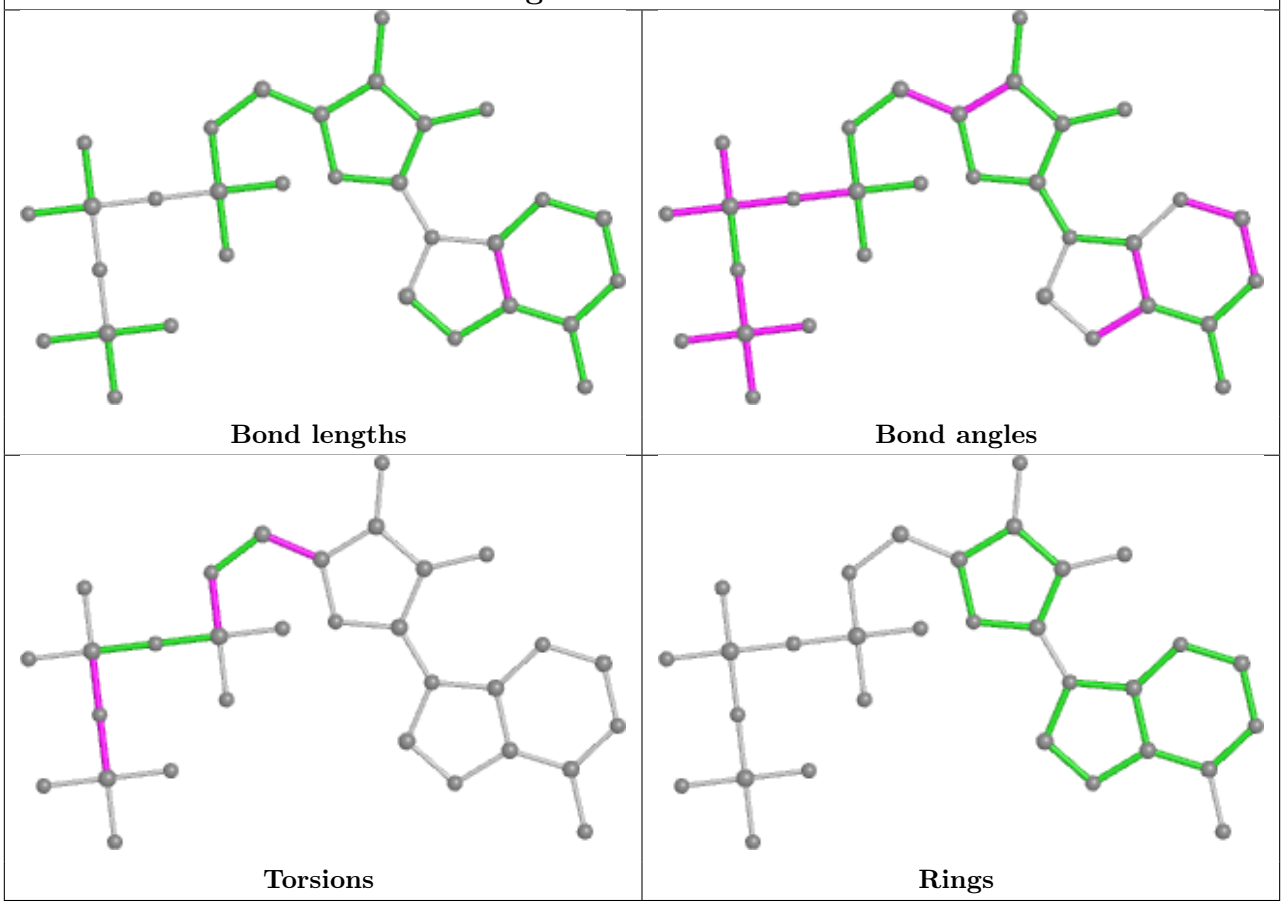


Torsions



Rings

Ligand ATP 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	368/373 (98%)	-0.45	3 (0%)	82	66	33, 70, 123, 149	18 (4%)
1	B	368/373 (98%)	-0.40	2 (0%)	87	75	33, 69, 117, 145	24 (6%)
1	C	373/373 (100%)	-0.07	4 (1%)	77	58	25, 100, 154, 189	6 (1%)
1	D	363/373 (97%)	-0.23	3 (0%)	82	66	52, 81, 136, 158	15 (4%)
All	All	1472/1492 (98%)	-0.29	12 (0%)	82	66	25, 80, 139, 189	63 (4%)

All (12) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	323	ASP	6.3
1	D	34	GLN	4.3
1	B	33	ALA	2.9
1	B	34	GLN	2.8
1	C	-5	HIS	2.6
1	D	360	ILE	2.4
1	C	365	ALA	2.3
1	D	33	ALA	2.3
1	A	364	LEU	2.3
1	A	-3	ALA	2.1
1	A	348	VAL	2.1
1	C	183	ASP	2.0

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

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

6.3 Carbohydrates

There are no monosaccharides in this entry.

6.4 Ligands (i)

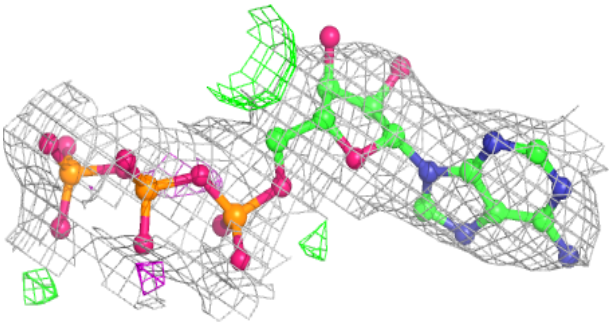
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

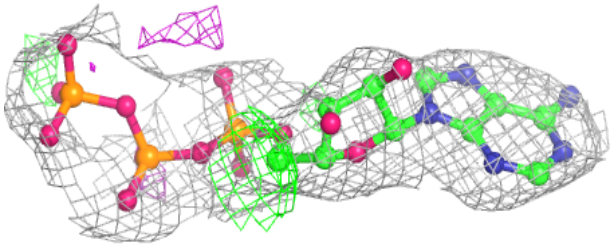
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	IMD	D	407	5/5	0.44	0.25	79,82,85,88	0
3	IMD	D	403	5/5	0.51	0.18	90,99,104,106	0
3	IMD	A	407	5/5	0.61	0.23	80,82,86,88	0
3	IMD	A	404	5/5	0.63	0.12	91,95,101,101	0
3	IMD	B	405	5/5	0.63	0.16	94,97,98,102	0
3	IMD	C	405	5/5	0.66	0.34	111,113,113,114	0
3	IMD	D	405	5/5	0.71	0.10	82,86,96,99	0
3	IMD	B	402	5/5	0.74	0.11	93,95,97,100	0
3	IMD	A	402	5/5	0.75	0.21	78,81,86,87	0
3	IMD	C	404	5/5	0.76	0.24	96,97,101,102	0
3	IMD	D	404	5/5	0.79	0.21	100,102,103,109	0
3	IMD	D	406	5/5	0.80	0.12	89,89,96,97	0
3	IMD	B	403	5/5	0.84	0.17	82,85,89,94	0
3	IMD	C	403	5/5	0.86	0.10	90,91,95,96	0
3	IMD	B	406	5/5	0.86	0.12	65,70,79,81	0
3	IMD	C	402	5/5	0.87	0.16	79,80,84,88	0
3	IMD	A	405	5/5	0.88	0.15	82,84,87,91	0
4	MG	D	408	1/1	0.89	0.09	77,77,77,77	0
3	IMD	A	403	5/5	0.91	0.14	59,62,66,72	0
2	ATP	D	401	31/31	0.91	0.10	73,86,107,109	1
3	IMD	D	402	5/5	0.91	0.13	66,67,76,82	0
3	IMD	B	404	5/5	0.93	0.09	62,65,69,71	0
4	MG	B	407	1/1	0.95	0.09	77,77,77,77	0
4	MG	A	408	1/1	0.95	0.07	81,81,81,81	0
2	ATP	B	401	31/31	0.96	0.07	59,73,82,89	0
3	IMD	A	406	5/5	0.96	0.10	81,88,93,96	0
4	MG	C	406	1/1	0.96	0.11	69,69,69,69	0
2	ATP	C	401	31/31	0.96	0.08	53,66,84,108	0
2	ATP	A	401	31/31	0.97	0.07	44,53,89,104	0

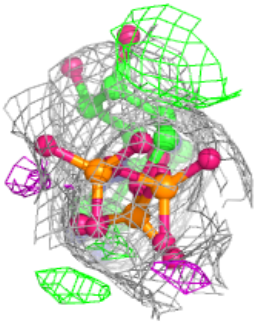
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around ATP 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)

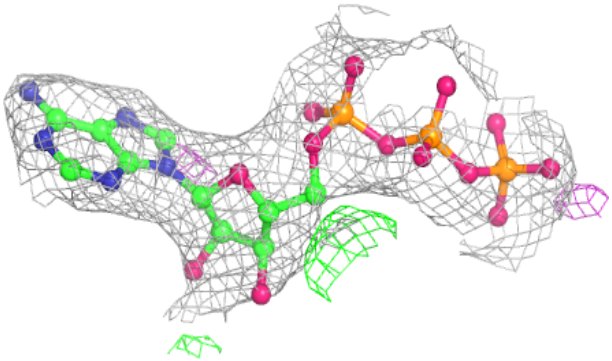


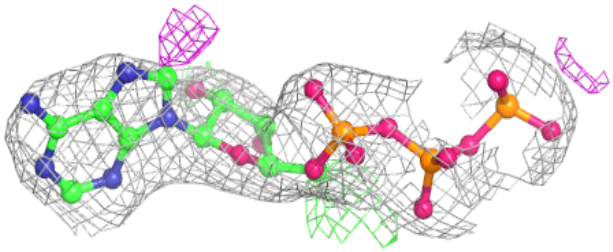


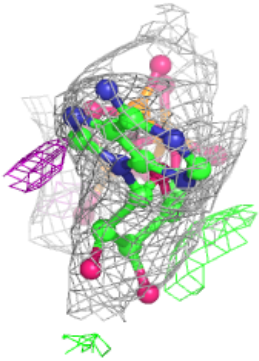


Electron density around ATP B 401:

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

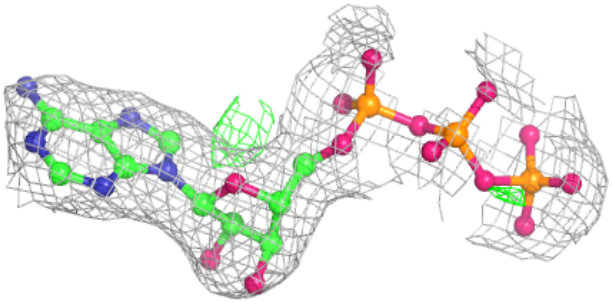


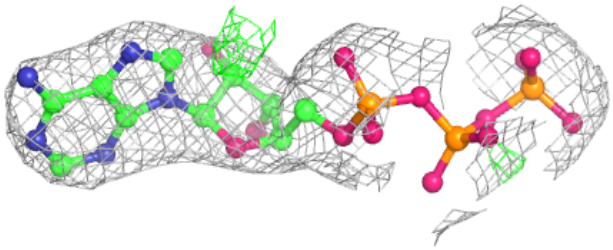


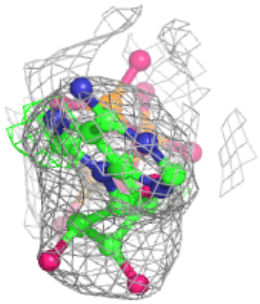


Electron density around ATP C 401:

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

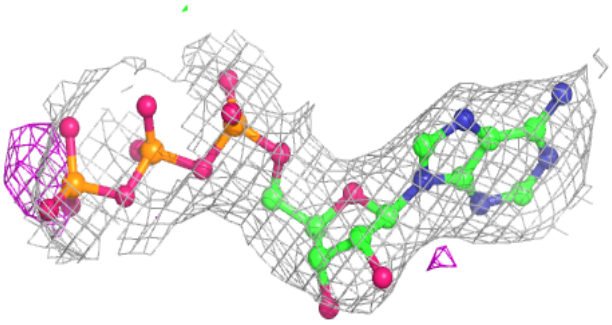


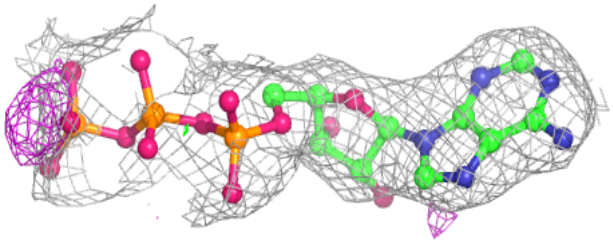


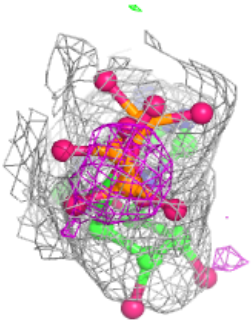


Electron density around ATP A 401:

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







6.5 Other polymers (i)

There are no such residues in this entry.