Full wwPDB X-ray Structure Validation Report (i)

Jun 19, 2024 – 01:56 PM EDT

PDB ID	:	4GFH
Title	:	Topoisomerase II-DNA-AMPPNP complex
Authors	:	Schmidt, B.H.; Osheroff, N.; Berger, J.M.
Deposited on	:	2012-08-03
Resolution	:	4.41 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:

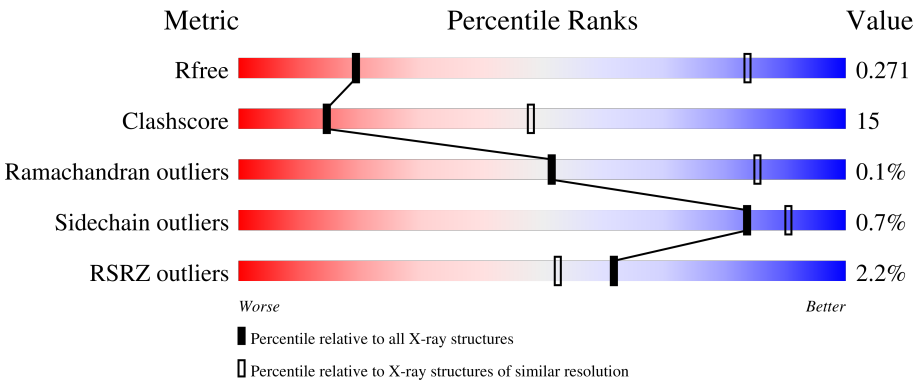
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 4.41 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1043 (5.00-3.80)
Clashscore	141614	1111 (5.00-3.80)
Ramachandran outliers	138981	1059 (5.00-3.80)
Sidechain outliers	138945	1041 (5.00-3.80)
RSRZ outliers	127900	1095 (5.08-3.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	1178	2%, 65%, 27%, • 6%
1	F	1178	2%, 65%, 27%, • 7%
2	B	11	45%, 45%, 9%
2	G	11	55%, 36%, 9%
3	C	15	53%, 47%

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Mol	Chain	Length	Quality of chain
3	H	15	53% 47%
4	D	11	82% 9% 9%
4	I	11	64% 27% 9%
5	E	15	73% 27%
5	J	15	60% 40%

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
1	PTR	F	782[A]	-	-	X	X

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 20236 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 topoisomerase 2.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	P	S			
1	A	1102	9042	5804	1515	1687	1	35	0	1	0
1	F	1098	9012	5788	1510	1678	1	35	0	1	0

- Molecule 2 is a DNA chain called DNA (5'-D(P*CP*CP*TP*AP*CP*TP*GP*CP*TP*AP*C)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	B	11	219	105	36	67	11	0	11	0
2	G	11	219	105	36	67	11	0	11	0

- Molecule 3 is a DNA chain called DNA (5'-D(*CP*GP*CP*GP*GP*TP*AP*GP*CP*AP*GP*TP*AP*GP*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
3	C	15	310	147	63	86	14	0	15	0
3	H	15	310	147	63	86	14	0	15	0

- Molecule 4 is a DNA chain called DNA (5'-D(P*GP*GP*AP*TP*GP*AP*CP*GP*AP*TP*(TSP))-3').

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	P	S			
4	D	11	230	109	44	65	11	1	0	11	0
4	I	11	230	109	44	65	11	1	0	11	0

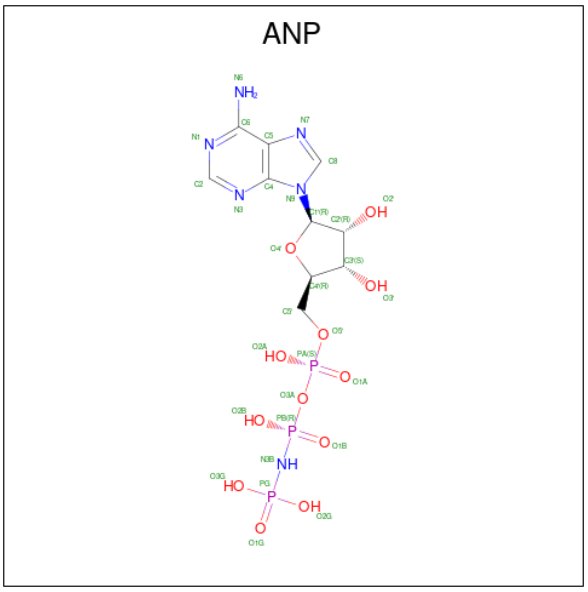
- Molecule 5 is a DNA chain called DNA (5'-D(*CP*GP*CP*GP*AP*AP*TP*CP*GP*TP*CP*AP*TP*CP*C)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
5	E	15	300	144	54	88	14	0	15	0
5	J	15	300	144	54	88	14	0	15	0

- Molecule 6 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
6	A	1	1	1	0	0
6	F	1	1	1	0	0

- Molecule 7 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (three-letter code: ANP) (formula: $C_{10}H_{17}N_6O_{12}P_3$).



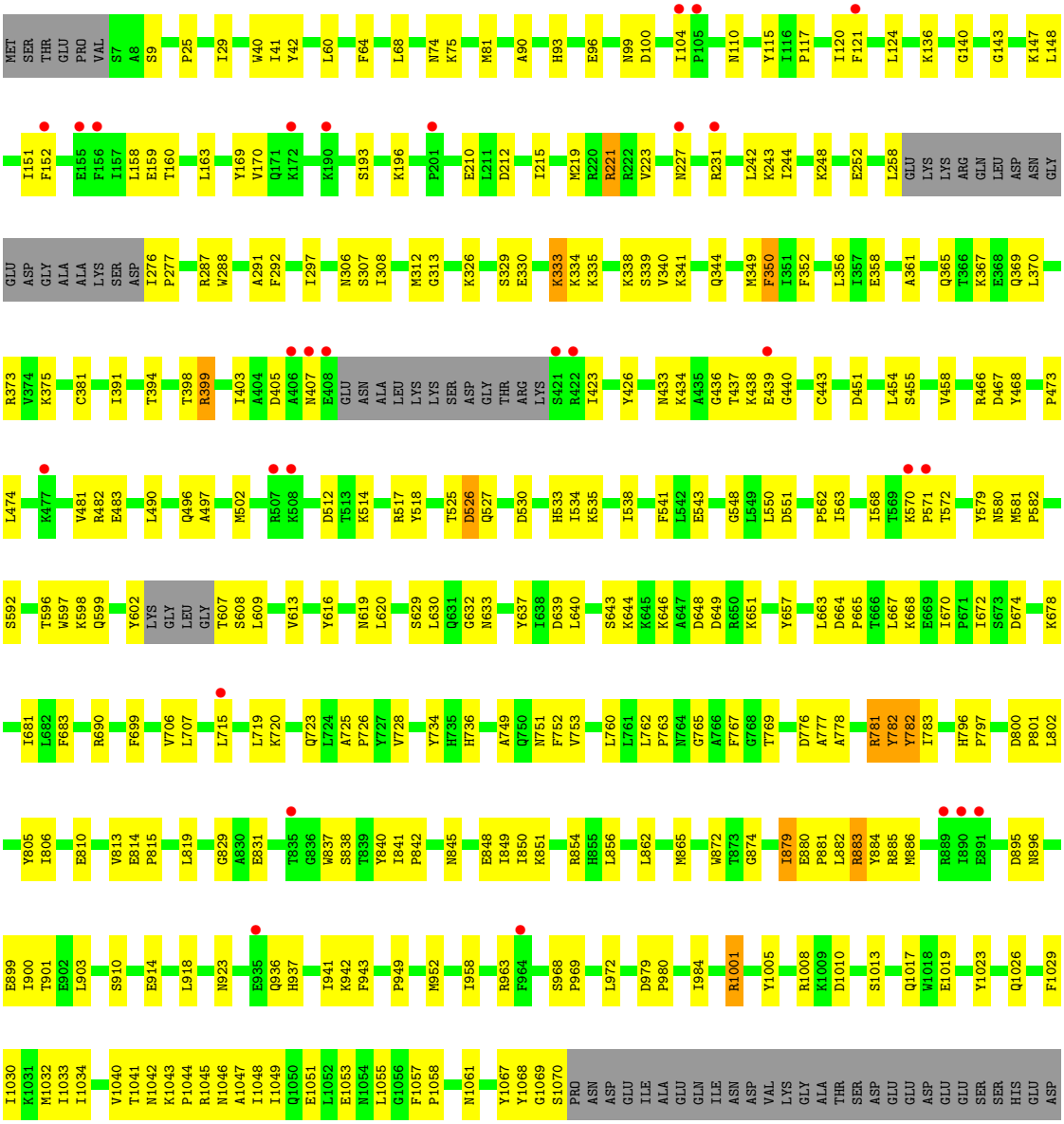
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
7	A	1	31	10	6	12	3	0	0
7	F	1	31	10	6	12	3	0	0

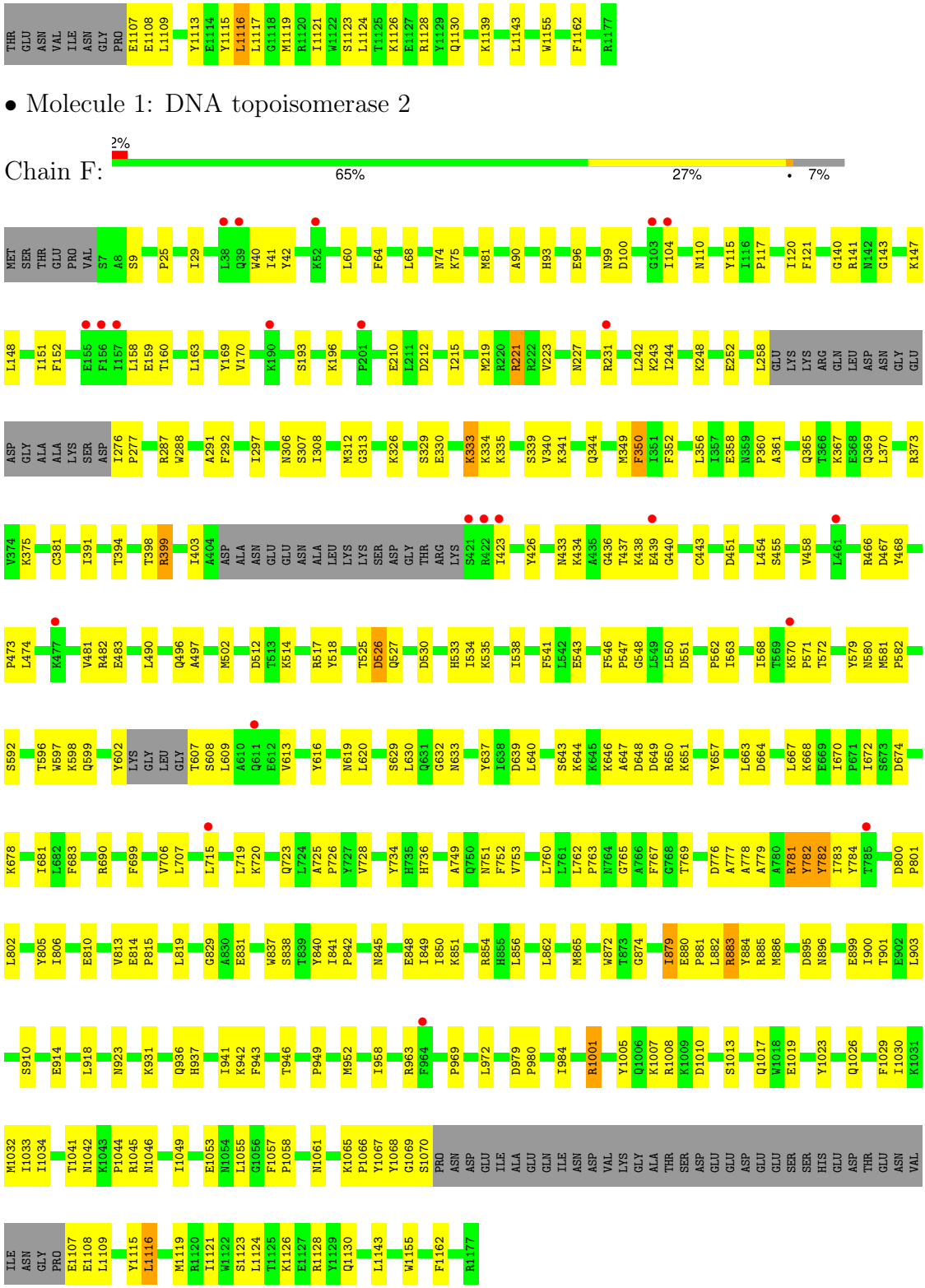
3 Residue-property plots (i)

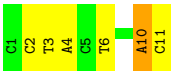
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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 topoisomerase 2

Chain A:

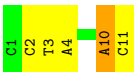



THR GLU ASN VAL ILE ASN GLY PRO E1107 E1108 L1109 Y1113 E1114 Y1115 L1116 L1117 G1118 M1119 R1120 I1121 W1122 S1123 L1124 T1125 K1126 E1127 R1128 Y1129 Q1130 K1139 L1143 W1155 F1162 R1177
• Molecule 1: DNA topoisomerase 2
Chain F:
2%
65%
27%
7%
MET SER THR GLU PRO VAL S7 A8 S9 P25 I29 L38 Q39 W40 I41 Y42 K52 L60 F64 L68 N74 K75 M81 A90 H93 E96 N99 D100 G103 I104 N110 Y115 I116 P117 I120 F121 G140 R141 N142 G143 K147
L148 I151 F152 E155 F156 I157 L158 E159 T160 L163 Y169 V170 K190 S193 K196 P201 E210 I211 D212 I215 M219 R220 R221 R222 V223 N227 R231 L242 K243 I244 K248 E252 L258 GLU LYS LYS ARG GLN LEU ASP ASN GLY GLU
ASP GLY ALA ALA LYS SER ASP I276 P277 R287 W288 A291 F292 I297 N306 S307 I308 M312 G313 K326 S329 E330 K333 K334 K335 S339 V340 K341 Q344 M349 F350 I351 F352 L356 I357 E358 N359 P360 A361 Q365 T366 K367 E368 Q369 L370 R373
V374 K375 C381 I391 T394 T398 R399 I403 A404 ASP ALA ASN GLU GLU ASN ALA LEU LYS LYS SER ASP GLY THR ARG LYS S421 R422 I423 Y426 N433 K434 A435 G436 T437 K438 E439 G440 C443 D451 L454 S455 V458 L461 R466 D467 Y468
P473 L474 K477 V481 R482 E483 L490 Q496 A497 M502 D512 T513 K514 R517 Y518 T525 D526 Q527 D530 H533 I534 K535 I538 F541 L542 E543 F546 P547 G548 L549 L550 D551 P562 I563 I568 T569 K570 P571 T572 Y579 N580 M581 P582
S592 T596 W597 K598 Q599 Y602 LYS GLY LEU GLY T607 S608 L609 A610 Q611 E612 V613 Y616 N619 L620 S629 L630 Q631 G632 N633 Y637 I638 D639 L640 S643 K644 K645 K646 A647 D648 D649 R650 K651 Y657 L663 D664 L667 K668 E669 I670 P671 I672 S673 D674
K678 I681 L682 F683 R690 F699 V706 L707 L715 L719 K720 Q723 L724 A725 P726 Y727 V728 Y734 H735 H736 A749 Q750 N751 F752 V753 L760 L761 L762 P763 N764 G765 A766 F767 G768 T769 D776 A777 A778 A779 A780 R781 Y782 Y782 I783 Y784 T785 D800 P801
L802 Y805 I806 E810 V813 E814 P815 L819 G829 A830 E831 W837 S838 T839 Y840 I841 P842 N845 E848 I849 I850 K851 R854 H855 L856 L862 M865 W872 T873 G874 I879 E880 P881 L882 R883 Y884 R885 M886 D895 N896 E899 I900 T901 E902 L903
S910 E914 L918 N923 K931 Q936 H937 I941 K942 F943 T946 P949 M952 I958 R963 F964 P969 L972 D979 P980 I984 R1001 Y1005 Q1006 K1007 R1008 K1009 D1010 S1013 Q1017 W1018 E1019 Y1023 Q1026 F1029 I1030 K1031
M1032 I1033 I1034 T1041 N1042 K1043 P1044 R1045 N1046 I1049 E1053 N1054 L1055 G1056 F1057 P1058 N1061 K1065 P1066 Y1067 Y1068 G1069 S1070 PRO ASN ASP GLU ILE ALA GLU GLN ILE ASN ASP VAL LYS GLY ALA THR SER ASP GLU GLU ASP GLU GLU SER SER HIS GLU ASP THR GLU ASN VAL
ILE ASN GLY PRO E1107 E1108 L1109 Y1115 L1116 M1119 R1120 I1121 W1122 S1123 L1124 T1125 K1126 E1127 R1128 Y1129 Q1130 L1143 W1155 F1162 R1177
• Molecule 2: DNA (5'-D(P*CP*CP*TP*AP*CP*TP*GP*CP*TP*AP*C)-3')
Chain B:
45%
45%
9%



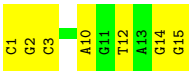
• Molecule 2: DNA (5'-D(P*CP*CP*TP*AP*CP*TP*GP*CP*TP*AP*C)-3')

Chain G:



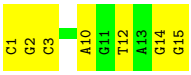
• Molecule 3: DNA (5'-D(*CP*GP*CP*GP*GP*TP*AP*GP*CP*AP*GP*TP*AP*GP*G)-3')

Chain C:



• Molecule 3: DNA (5'-D(*CP*GP*CP*GP*GP*TP*AP*GP*CP*AP*GP*TP*AP*GP*G)-3')

Chain H:



• Molecule 4: DNA (5'-D(P*GP*GP*AP*TP*GP*AP*CP*GP*AP*TP*(TSP))-3')

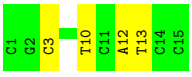
Chain D:

• Molecule 4: DNA (5'-D(P*GP*GP*AP*TP*GP*AP*CP*GP*AP*TP*(TSP))-3')

Chain I:

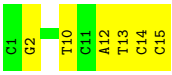
• Molecule 5: DNA (5'-D(*CP*GP*CP*GP*AP*AP*TP*CP*GP*TP*CP*AP*TP*CP*C)-3')

Chain E:



• Molecule 5: DNA (5'-D(*CP*GP*CP*GP*AP*AP*TP*CP*GP*TP*CP*AP*TP*CP*C)-3')

Chain J:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	169.13Å 169.88Å 169.21Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.99 – 4.41 46.99 – 4.41	Depositor EDS
% Data completeness (in resolution range)	91.2 (46.99-4.41) 90.9 (46.99-4.41)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.41 (at 4.45Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.7.3_928)	Depositor
R, R_{free}	0.239 , 0.275 0.236 , 0.271	Depositor DCC
R_{free} test set	1451 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å^2)	185.0	Xtriage
Anisotropy	0.049	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 213.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.52$, $< L^2 > = 0.35$	Xtriage
Estimated twinning fraction	0.000 for -h,l,k 0.000 for -k,-h,-l 0.389 for l,-k,h 0.000 for l,h,k 0.000 for k,l,h	Xtriage
F_o,F_c correlation	0.89	EDS
Total number of atoms	20236	wwPDB-VP
Average B, all atoms (Å^2)	248.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.36% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: ANP, PTR, MG, TSP

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	0.23	0/9218	0.45	2/12428 (0.0%)
1	F	0.23	0/9188	0.45	2/12387 (0.0%)
2	B	0.39	0/243	1.00	1/371 (0.3%)
2	G	0.39	0/243	0.99	1/371 (0.3%)
3	C	0.58	2/349 (0.6%)	0.96	0/539
3	H	0.46	0/349	0.98	0/539
4	D	0.47	0/236	0.94	1/363 (0.3%)
4	I	0.41	0/236	0.97	2/363 (0.6%)
5	E	0.43	0/335	0.98	0/514
5	J	0.43	0/335	0.95	0/514
All	All	0.26	2/20732 (0.0%)	0.54	9/28389 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	1[A]	DC	C4'-O4'	5.23	1.50	1.45
3	C	1[A]	DC	O3'-P	-5.03	1.55	1.61

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	I	10[B]	DT	C4'-C3'-O3'	6.17	125.13	109.70
2	G	10[A]	DA	O4'-C4'-C3'	-5.83	102.17	104.50
2	B	10[A]	DA	O4'-C4'-C3'	-5.75	102.20	104.50
1	A	879	ILE	CB-CA-C	-5.57	100.45	111.60
1	F	879	ILE	CB-CA-C	-5.56	100.48	111.60
4	I	10[B]	DT	C1'-O4'-C4'	-5.31	104.79	110.10
4	D	10[B]	DT	C1'-O4'-C4'	-5.30	104.80	110.10
1	A	1116	LEU	CB-CA-C	-5.25	100.22	110.20
1	F	1116	LEU	CB-CA-C	-5.25	100.23	110.20

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	9042	0	9077	308	0
1	F	9012	0	9056	306	0
2	B	219	0	114	6	0
2	G	219	0	118	6	0
3	C	310	0	146	5	0
3	H	310	0	147	7	0
4	D	230	0	108	1	0
4	I	230	0	108	6	0
5	E	300	0	154	3	0
5	J	300	0	153	7	0
6	A	1	0	0	0	0
6	F	1	0	0	0	0
7	A	31	0	13	2	0
7	F	31	0	13	3	0
All	All	20236	0	19207	606	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 15.

All (606) 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:F:29:ILE:HD13	1:F:152:PHE:CE2	1.73	1.24
1:A:29:ILE:HD13	1:A:152:PHE:CE2	1.73	1.23
1:F:29:ILE:CD1	1:F:152:PHE:CZ	2.38	1.06
1:A:29:ILE:CD1	1:A:152:PHE:CZ	2.38	1.05
1:A:29:ILE:HD13	1:A:152:PHE:CZ	1.93	1.02
1:F:29:ILE:HD13	1:F:152:PHE:CZ	1.93	1.01
1:F:778:ALA:HB1	1:F:782[A]:PTR:HD1	1.47	0.95
1:A:276:ILE:HG12	1:A:394:THR:HG22	1.50	0.94
1:F:437:THR:HG22	1:F:438:LYS:H	1.32	0.94

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:437:THR:HG22	1:A:438:LYS:H	1.32	0.93
1:F:29:ILE:HD11	1:F:152:PHE:CZ	2.05	0.92
1:F:276:ILE:HG12	1:F:394:THR:HG22	1.50	0.91
1:A:29:ILE:HD11	1:A:152:PHE:CZ	2.05	0.90
1:A:333:LYS:HG3	1:A:339:SER:HB3	1.54	0.89
1:F:333:LYS:HG3	1:F:339:SER:HB3	1.54	0.88
1:F:879:ILE:HD11	1:F:885:ARG:HG3	1.55	0.88
1:A:879:ILE:HD11	1:A:885:ARG:HG3	1.55	0.88
1:A:291:ALA:HB3	1:A:352:PHE:HB2	1.58	0.86
1:F:291:ALA:HB3	1:F:352:PHE:HB2	1.58	0.84
1:A:74:ASN:HB3	1:A:81:MET:HE1	1.61	0.80
1:F:74:ASN:HB3	1:F:81:MET:HE1	1.63	0.80
1:A:778:ALA:HB1	1:A:782[A]:PTR:HD1	1.64	0.79
1:F:437:THR:CG2	1:F:438:LYS:H	1.96	0.79
1:F:454:LEU:HD22	1:F:473:PRO:HG3	1.66	0.78
1:A:454:LEU:HD22	1:A:473:PRO:HG3	1.66	0.78
1:A:437:THR:CG2	1:A:438:LYS:H	1.96	0.77
1:A:849:ILE:HA	1:A:865:MET:HE1	1.67	0.77
1:A:633:ASN:O	1:A:637:TYR:HD1	1.68	0.76
1:F:570:LYS:HB2	1:F:596:THR:OG1	1.87	0.75
1:A:570:LYS:HB2	1:A:596:THR:OG1	1.85	0.75
1:F:633:ASN:O	1:F:637:TYR:HD1	1.68	0.75
1:F:849:ILE:HA	1:F:865:MET:HE1	1.67	0.74
1:A:276:ILE:CG1	1:A:394:THR:HG22	2.17	0.74
1:F:437:THR:HG22	1:F:438:LYS:N	2.02	0.74
1:A:436:GLY:HA2	1:A:517:ARG:HA	1.70	0.74
1:A:437:THR:HG22	1:A:438:LYS:N	2.02	0.73
1:F:436:GLY:HA2	1:F:517:ARG:HA	1.70	0.73
1:F:276:ILE:CG1	1:F:394:THR:HG22	2.17	0.73
1:A:725:ALA:HB3	1:A:726:PRO:HD3	1.70	0.73
1:A:850:ILE:HG22	1:A:854:ARG:NH1	2.04	0.72
1:F:292:PHE:HE1	1:F:349:MET:HG2	1.55	0.72
1:F:725:ALA:HB3	1:F:726:PRO:HD3	1.70	0.71
1:A:399:ARG:HG3	1:A:399:ARG:HH11	1.56	0.71
1:F:850:ILE:HG22	1:F:854:ARG:NH1	2.04	0.71
1:F:481:VAL:HG11	1:F:541:PHE:HD1	1.56	0.71
1:A:292:PHE:HE1	1:A:349:MET:HG2	1.55	0.70
1:A:481:VAL:HG11	1:A:541:PHE:HD1	1.56	0.70
1:A:856:LEU:HG	1:A:862:LEU:HD21	1.74	0.69
1:A:936:GLN:O	1:A:942:LYS:HB2	1.93	0.69
1:F:399:ARG:HG3	1:F:399:ARG:HH11	1.56	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:936:GLN:O	1:F:942:LYS:HB2	1.93	0.69
1:F:856:LEU:HG	1:F:862:LEU:HD21	1.74	0.68
1:A:936:GLN:O	1:A:942:LYS:CB	2.42	0.68
1:F:936:GLN:O	1:F:942:LYS:CB	2.42	0.67
1:A:831:GLU:HG3	1:A:840:TYR:HD1	1.60	0.67
1:F:831:GLU:HG3	1:F:840:TYR:HD1	1.60	0.67
1:F:620:LEU:HD23	1:F:620:LEU:H	1.60	0.66
1:F:399:ARG:HH11	1:F:399:ARG:CG	2.09	0.66
1:A:399:ARG:HH11	1:A:399:ARG:CG	2.09	0.65
1:F:668:LYS:O	1:F:668:LYS:HG3	1.96	0.65
1:A:571:PRO:HD3	1:A:596:THR:OG1	1.96	0.65
1:A:668:LYS:O	1:A:668:LYS:HG3	1.96	0.65
1:A:726:PRO:HG2	1:F:726:PRO:HG2	1.78	0.65
1:F:571:PRO:HD3	1:F:596:THR:OG1	1.97	0.65
4:I:1[B]:DG:N2	5:J:15[B]:DC:O2	2.29	0.65
1:F:1058:PRO:HB3	1:F:1068:TYR:CD1	2.32	0.65
1:A:1058:PRO:HB3	1:A:1068:TYR:CD1	2.32	0.64
1:A:512:ASP:HB3	1:A:514:LYS:HG2	1.79	0.64
1:F:512:ASP:HB3	1:F:514:LYS:HG2	1.79	0.64
1:A:620:LEU:HD23	1:A:620:LEU:H	1.61	0.64
1:A:525:THR:OG1	1:A:535:LYS:HE3	1.98	0.64
1:A:715:LEU:HD11	1:A:719:LEU:HD22	1.80	0.64
1:A:767:PHE:CE1	1:A:783:ILE:HB	2.33	0.64
1:F:215:ILE:O	1:F:219:MET:HG3	1.98	0.64
1:F:525:THR:OG1	1:F:535:LYS:HE3	1.98	0.64
1:F:767:PHE:CE1	1:F:783:ILE:HB	2.33	0.63
1:F:881:PRO:O	1:F:882:LEU:HB2	1.98	0.63
1:A:881:PRO:O	1:A:882:LEU:HB2	1.98	0.63
1:F:715:LEU:HD11	1:F:719:LEU:HD22	1.80	0.63
1:F:903:LEU:HG	1:F:941:ILE:HD13	1.81	0.63
1:A:215:ILE:O	1:A:219:MET:HG3	1.98	0.62
1:F:344:GLN:OE1	1:F:403:ILE:HG21	1.99	0.62
1:F:1032:MET:HE1	1:F:1055:LEU:HD13	1.81	0.62
1:F:782[A]:PTR:HE2	1:F:782[A]:PTR:O1P	1.99	0.62
1:F:1058:PRO:HB3	1:F:1068:TYR:CE1	2.35	0.62
1:A:344:GLN:OE1	1:A:403:ILE:HG21	1.99	0.62
1:A:903:LEU:HG	1:A:941:ILE:HD13	1.81	0.62
1:A:1058:PRO:HB3	1:A:1068:TYR:CE1	2.35	0.62
1:A:1032:MET:HE1	1:A:1055:LEU:HD13	1.82	0.61
1:A:481:VAL:HG11	1:A:541:PHE:CD1	2.36	0.61
1:F:690:ARG:HD2	4:I:10[B]:DT:H5'	1.82	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1029:PHE:O	1:A:1033:ILE:HG13	2.01	0.61
1:A:340:VAL:HG11	1:A:344:GLN:OE1	2.01	0.60
1:F:340:VAL:HG11	1:F:344:GLN:OE1	2.01	0.60
1:A:619:ASN:OD1	1:A:619:ASN:O	2.20	0.60
1:F:619:ASN:OD1	1:F:619:ASN:O	2.20	0.60
1:F:958:ILE:HD12	1:F:963:ARG:HD2	1.83	0.60
2:G:2[A]:DC:C6	2:G:3[A]:DT:H72	2.36	0.60
1:A:223:VAL:HG12	1:A:242:LEU:HD11	1.84	0.60
1:A:752:PHE:O	1:A:753:VAL:C	2.40	0.60
1:A:482:ARG:NH2	1:A:639:ASP:HA	2.17	0.60
1:F:223:VAL:HG12	1:F:242:LEU:HD11	1.84	0.60
1:F:1029:PHE:O	1:F:1033:ILE:HG13	2.01	0.60
1:A:330:GLU:O	1:A:334:LYS:HB2	2.02	0.59
1:F:227:ASN:HD22	1:F:242:LEU:HB2	1.67	0.59
1:F:454:LEU:HD22	1:F:473:PRO:CG	2.31	0.59
1:A:958:ILE:HD12	1:A:963:ARG:HD2	1.83	0.59
1:F:482:ARG:NH2	1:F:639:ASP:HA	2.17	0.59
1:A:802:LEU:HD11	1:A:1008:ARG:HB2	1.84	0.59
1:F:481:VAL:HG11	1:F:541:PHE:CD1	2.36	0.59
1:F:1030:ILE:HG23	1:F:1124:LEU:HD23	1.85	0.59
1:A:227:ASN:HD22	1:A:242:LEU:HB2	1.67	0.58
1:F:276:ILE:HD12	1:F:277:PRO:HD2	1.86	0.58
1:A:454:LEU:HD22	1:A:473:PRO:CG	2.31	0.58
1:F:29:ILE:HD11	1:F:152:PHE:CE1	2.38	0.58
1:F:433:ASN:HB2	1:F:467:ASP:HA	1.85	0.58
1:F:330:GLU:O	1:F:334:LYS:HB2	2.03	0.58
1:F:571:PRO:HD3	1:F:596:THR:HG1	1.67	0.58
1:F:592:SER:HB2	1:F:597:TRP:CZ2	2.39	0.58
1:F:802:LEU:HD11	1:F:1008:ARG:HB2	1.84	0.58
1:A:749:ALA:O	1:A:763:PRO:HG3	2.04	0.58
1:A:29:ILE:HD11	1:A:152:PHE:CE1	2.38	0.58
1:F:1123:SER:HA	1:F:1128:ARG:HB3	1.85	0.58
1:A:437:THR:O	1:A:440:GLY:N	2.37	0.57
1:A:592:SER:HB2	1:A:597:TRP:CZ2	2.39	0.57
1:F:749:ALA:O	1:F:763:PRO:HG3	2.04	0.57
1:F:776:ASP:N	1:F:776:ASP:OD1	2.35	0.57
1:F:1069:GLY:O	1:F:1070:SER:CB	2.53	0.57
1:A:140:GLY:HA2	7:A:1202:ANP:O2G	2.04	0.57
1:A:1030:ILE:HG23	1:A:1124:LEU:HD23	1.85	0.57
1:A:1123:SER:HA	1:A:1128:ARG:HB3	1.85	0.57
1:F:140:GLY:HA2	7:F:1202:ANP:O2G	2.04	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:752:PHE:O	1:F:753:VAL:C	2.40	0.57
1:F:1067:TYR:CE1	1:F:1070:SER:N	2.73	0.57
1:A:433:ASN:HB2	1:A:467:ASP:HA	1.85	0.57
1:F:437:THR:O	1:F:440:GLY:N	2.37	0.57
1:A:1067:TYR:CE1	1:A:1070:SER:N	2.73	0.57
1:A:1069:GLY:O	1:A:1070:SER:CB	2.53	0.57
1:A:344:GLN:OE1	1:A:403:ILE:HD13	2.05	0.56
1:F:632:GLY:O	1:F:633:ASN:HB2	2.05	0.56
1:F:344:GLN:OE1	1:F:403:ILE:HD13	2.06	0.56
1:F:752:PHE:HD1	1:F:753:VAL:O	1.89	0.56
1:F:782[A]:PTR:O1P	1:F:782[A]:PTR:CE2	2.51	0.56
1:F:306:ASN:O	1:F:307:SER:HB2	2.05	0.56
1:A:306:ASN:O	1:A:307:SER:HB2	2.05	0.56
1:A:276:ILE:HD12	1:A:277:PRO:HD2	1.86	0.56
1:A:831:GLU:CG	1:A:840:TYR:HD1	2.18	0.56
1:A:979:ASP:HB2	1:A:980:PRO:HD2	1.88	0.56
1:A:657:TYR:HB2	1:A:681:ILE:CD1	2.36	0.56
1:F:455:SER:O	1:F:458:VAL:HG22	2.06	0.56
1:F:699:PHE:CZ	1:F:707:LEU:HD12	2.41	0.56
1:A:455:SER:O	1:A:458:VAL:HG22	2.06	0.56
1:A:466:ARG:NH1	1:F:937:HIS:H	2.04	0.55
1:F:548:GLY:HA2	1:F:551:ASP:OD2	2.06	0.55
1:F:657:TYR:HB2	1:F:681:ILE:CD1	2.36	0.55
1:F:781:ARG:NH1	1:F:782[A]:PTR:O3P	2.39	0.55
1:A:632:GLY:O	1:A:633:ASN:HB2	2.05	0.55
1:A:1030:ILE:O	1:A:1034:ILE:HG13	2.07	0.55
3:C:14[A]:DG:H2"	3:C:15[A]:DG:OP2	2.06	0.55
1:F:831:GLU:CG	1:F:840:TYR:HD1	2.18	0.55
1:A:752:PHE:HD1	1:A:753:VAL:O	1.89	0.55
1:A:548:GLY:HA2	1:A:551:ASP:OD2	2.06	0.55
1:A:629:SER:O	1:A:630:LEU:C	2.45	0.55
1:A:776:ASP:OD1	1:A:776:ASP:N	2.35	0.55
1:A:699:PHE:CZ	1:A:707:LEU:HD12	2.41	0.55
1:F:104:ILE:HB	1:F:160:THR:HG21	1.89	0.55
1:F:979:ASP:HB2	1:F:980:PRO:HD2	1.88	0.54
1:F:1067:TYR:CZ	1:F:1069:GLY:HA3	2.42	0.54
1:A:1032:MET:HE1	1:A:1057:PHE:HE2	1.72	0.54
1:F:629:SER:O	1:F:630:LEU:C	2.45	0.54
1:A:690:ARG:HD2	4:D:10[B]:DT:H5'	1.90	0.54
1:F:563:ILE:HD12	1:F:580:ASN:HA	1.90	0.54
1:A:308:ILE:HD13	1:A:367:LYS:HD2	1.90	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:340:VAL:HG12	1:F:341:LYS:N	2.23	0.54
4:I:2[B]:DG:O6	5:J:14[B]:DC:N4	2.41	0.54
1:A:104:ILE:HB	1:A:160:THR:HG21	1.89	0.54
1:A:338:LYS:HD3	1:A:407:ASN:O	2.08	0.54
1:A:1119:MET:O	1:F:1121:ILE:HG13	2.08	0.54
1:F:1030:ILE:O	1:F:1034:ILE:HG13	2.07	0.54
1:A:563:ILE:O	1:A:602:TYR:HB2	2.08	0.53
1:A:563:ILE:HD12	1:A:580:ASN:HA	1.90	0.53
1:F:657:TYR:HB2	1:F:681:ILE:HD13	1.90	0.53
1:F:805:TYR:CE2	1:F:815:PRO:HG3	2.43	0.53
1:A:657:TYR:HB2	1:A:681:ILE:HD13	1.90	0.53
1:A:805:TYR:CE2	1:A:815:PRO:HG3	2.43	0.53
1:F:227:ASN:HB3	1:F:244:ILE:HD11	1.91	0.53
1:F:1032:MET:HE1	1:F:1057:PHE:HE2	1.73	0.53
1:A:1067:TYR:CZ	1:A:1069:GLY:HA3	2.42	0.53
1:F:333:LYS:CA	1:F:339:SER:HB2	2.38	0.53
1:A:340:VAL:HG12	1:A:341:LYS:N	2.24	0.53
1:F:333:LYS:HG3	1:F:339:SER:CB	2.33	0.53
1:A:937:HIS:H	1:F:466:ARG:NH1	2.07	0.53
1:F:563:ILE:O	1:F:602:TYR:HB2	2.08	0.53
1:F:838:SER:HB3	5:J:10[B]:DT:H5'	1.90	0.53
1:F:805:TYR:HA	1:F:815:PRO:HA	1.91	0.53
1:A:227:ASN:HB3	1:A:244:ILE:HD11	1.91	0.52
1:F:720:LYS:HG2	1:F:723:GLN:CD	2.30	0.52
1:A:423:ILE:HD11	1:A:517:ARG:HH22	1.74	0.52
1:A:581:MET:HB2	1:A:582:PRO:HD3	1.91	0.52
1:F:734:TYR:CE2	1:F:736:HIS:HB2	2.43	0.52
1:F:568:ILE:HG22	1:F:572:THR:O	2.10	0.52
1:F:707:LEU:HD11	1:F:760:LEU:HD13	1.91	0.52
1:A:333:LYS:CA	1:A:339:SER:HB2	2.38	0.52
1:F:248:LYS:HE2	1:F:252:GLU:OE2	2.10	0.52
1:A:805:TYR:HA	1:A:815:PRO:HA	1.91	0.52
1:F:308:ILE:HD13	1:F:367:LYS:HD2	1.90	0.52
1:F:526:ASP:O	1:F:527:GLN:HB3	2.10	0.52
1:A:720:LYS:HG2	1:A:723:GLN:CD	2.30	0.52
1:F:423:ILE:HD11	1:F:517:ARG:HH22	1.74	0.52
1:F:527:GLN:O	1:F:527:GLN:HG3	2.10	0.52
1:F:333:LYS:HA	1:F:339:SER:HB2	1.92	0.52
1:A:640:LEU:HA	1:A:646:LYS:HD2	1.92	0.52
1:A:707:LEU:HD11	1:A:760:LEU:HD13	1.91	0.52
1:A:734:TYR:CE2	1:A:736:HIS:HB2	2.43	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1121:ILE:HG13	1:F:1119:MET:O	2.09	0.51
1:A:437:THR:C	1:A:439:GLU:N	2.62	0.51
1:F:581:MET:HB2	1:F:582:PRO:HD3	1.91	0.51
1:A:248:LYS:HE2	1:A:252:GLU:OE2	2.10	0.51
1:F:648:ASP:HA	1:F:651:LYS:HD2	1.93	0.51
1:A:526:ASP:O	1:A:527:GLN:HB3	2.10	0.51
1:F:276:ILE:HD12	1:F:277:PRO:CD	2.41	0.51
1:A:288:TRP:CG	1:A:381:CYS:HB2	2.46	0.51
1:A:663:LEU:HD21	1:A:670:ILE:HG23	1.92	0.51
1:A:936:GLN:O	1:A:942:LYS:HB3	2.10	0.51
1:A:437:THR:O	1:A:439:GLU:N	2.44	0.51
1:A:436:GLY:HA3	1:A:517:ARG:HD2	1.93	0.51
1:A:568:ILE:HG22	1:A:572:THR:O	2.10	0.51
1:A:148:LEU:O	1:A:152:PHE:HD2	1.94	0.51
1:F:434:LYS:HD3	1:F:439:GLU:CD	2.31	0.51
1:A:333:LYS:HG3	1:A:339:SER:CB	2.33	0.51
1:A:333:LYS:HA	1:A:339:SER:HB2	1.92	0.51
1:A:527:GLN:O	1:A:527:GLN:HG3	2.10	0.51
1:A:648:ASP:HA	1:A:651:LYS:HD2	1.93	0.51
1:F:437:THR:C	1:F:439:GLU:N	2.62	0.51
1:F:64:PHE:CE2	1:F:68:LEU:HD11	2.46	0.50
1:F:831:GLU:HG3	1:F:840:TYR:CD1	2.45	0.50
1:F:845:ASN:HB3	1:F:848:GLU:HG2	1.93	0.50
1:A:29:ILE:CD1	1:A:152:PHE:CE1	2.94	0.50
1:A:474:LEU:HD11	1:A:538:ILE:HD11	1.92	0.50
1:F:437:THR:O	1:F:439:GLU:N	2.44	0.50
1:F:640:LEU:HA	1:F:646:LYS:HD2	1.92	0.50
1:F:663:LEU:HD21	1:F:670:ILE:HG23	1.92	0.50
1:A:159:GLU:HG3	1:A:170:VAL:HG22	1.93	0.50
1:A:329:SER:O	1:A:333:LYS:HB2	2.11	0.50
1:F:159:GLU:HG3	1:F:170:VAL:HG22	1.93	0.50
1:F:288:TRP:CG	1:F:381:CYS:HB2	2.46	0.50
1:F:881:PRO:O	1:F:882:LEU:CB	2.60	0.50
1:F:900:ILE:HB	1:F:943:PHE:HB2	1.93	0.50
1:A:120:ILE:HG13	1:A:121:PHE:CD2	2.47	0.50
1:A:881:PRO:O	1:A:882:LEU:CB	2.60	0.50
1:F:143:GLY:H	7:F:1202:ANP:HNB1	1.59	0.50
1:F:776:ASP:O	1:F:777:ALA:O	2.29	0.50
1:F:936:GLN:O	1:F:942:LYS:HB3	2.10	0.50
1:A:276:ILE:HD12	1:A:277:PRO:CD	2.41	0.50
1:A:143:GLY:H	7:A:1202:ANP:HNB1	1.59	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:437:THR:C	1:A:439:GLU:H	2.14	0.50
1:A:776:ASP:O	1:A:777:ALA:O	2.29	0.50
1:A:159:GLU:HA	1:A:169:TYR:O	2.12	0.50
1:F:231:ARG:HH12	1:F:356:LEU:HD11	1.77	0.50
1:A:490:LEU:HA	1:A:496:GLN:NE2	2.27	0.50
1:A:25:PRO:HB3	1:A:152:PHE:HZ	1.76	0.50
1:A:900:ILE:HB	1:A:943:PHE:HB2	1.93	0.50
1:F:148:LEU:O	1:F:152:PHE:HD2	1.95	0.50
1:F:159:GLU:HA	1:F:169:TYR:O	2.12	0.50
2:G:2[A]:DC:H1'	2:G:3[A]:DT:H5'	1.92	0.50
1:F:474:LEU:HD11	1:F:538:ILE:HD11	1.92	0.49
1:F:490:LEU:HA	1:F:496:GLN:NE2	2.27	0.49
1:A:231:ARG:HH12	1:A:356:LEU:HD11	1.77	0.49
1:A:64:PHE:CE2	1:A:68:LEU:HD11	2.46	0.49
1:F:643:SER:HB3	1:F:646:LYS:HG3	1.94	0.49
1:A:530:ASP:O	1:A:534:ILE:HG12	2.12	0.49
2:B:11[A]:DC:N4	3:H:1[A]:DC:N4	2.60	0.49
1:F:1070:SER:O	1:F:1070:SER:OG	2.30	0.49
1:A:643:SER:HB3	1:A:646:LYS:HG3	1.94	0.49
1:F:436:GLY:HA3	1:F:517:ARG:HD2	1.93	0.49
1:F:437:THR:C	1:F:439:GLU:H	2.14	0.49
1:A:838:SER:HB3	5:E:10[B]:DT:H5'	1.94	0.49
1:A:326:LYS:O	1:A:330:GLU:HG3	2.13	0.49
1:A:434:LYS:HD3	1:A:439:GLU:CD	2.31	0.49
1:F:326:LYS:O	1:F:330:GLU:HG3	2.13	0.49
1:F:562:PRO:HG3	1:F:579:TYR:HE1	1.78	0.49
1:F:646:LYS:O	1:F:649:ASP:HB2	2.13	0.49
1:F:883:ARG:O	1:F:884:TYR:CD1	2.66	0.49
1:A:562:PRO:HG3	1:A:579:TYR:HE1	1.78	0.49
1:A:646:LYS:O	1:A:649:ASP:HB2	2.13	0.49
1:A:1044:PRO:HB3	1:F:1126:LYS:HE2	1.94	0.49
1:F:570:LYS:CB	1:F:596:THR:OG1	2.60	0.49
1:F:736:HIS:CG	2:G:10[A]:DA:H5"	2.47	0.49
1:A:845:ASN:HB3	1:A:848:GLU:HG2	1.94	0.48
1:A:1061:ASN:HB2	1:A:1108:GLU:OE2	2.13	0.48
1:F:120:ILE:HG13	1:F:121:PHE:CD2	2.47	0.48
1:F:490:LEU:HD23	1:F:490:LEU:O	2.13	0.48
1:A:312:MET:HE1	1:F:369:GLN:OE1	2.14	0.48
1:A:734:TYR:CZ	1:A:736:HIS:HB2	2.48	0.48
1:F:734:TYR:CZ	1:F:736:HIS:HB2	2.48	0.48
1:F:752:PHE:CD1	1:F:753:VAL:O	2.65	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:883:ARG:O	1:A:884:TYR:CD1	2.66	0.48
1:F:25:PRO:HB3	1:F:152:PHE:HZ	1.76	0.48
1:F:530:ASP:O	1:F:534:ILE:HG12	2.13	0.48
1:F:1061:ASN:HB2	1:F:1108:GLU:OE2	2.13	0.48
1:A:369:GLN:OE1	1:F:312:MET:HE1	2.12	0.48
5:J:12[B]:DA:H2"	5:J:13[B]:DT:O5'	2.13	0.48
1:A:607:THR:HA	1:F:765:GLY:HA2	1.95	0.48
1:A:720:LYS:HD3	1:A:781:ARG:HA	1.96	0.48
1:A:752:PHE:CD1	1:A:753:VAL:O	2.65	0.48
1:A:490:LEU:HD23	1:A:490:LEU:O	2.13	0.48
1:A:736:HIS:CG	2:B:10[A]:DA:H5"	2.48	0.48
1:A:40:TRP:O	1:A:221:ARG:HD3	2.14	0.48
1:A:838:SER:HB3	3:C:10[A]:DA:H5'	1.95	0.48
1:F:720:LYS:HD3	1:F:781:ARG:HA	1.96	0.48
1:F:838:SER:HB3	3:H:10[A]:DA:H5'	1.94	0.48
3:H:14[A]:DG:H2"	3:H:15[A]:DG:OP2	2.14	0.48
1:F:227:ASN:CG	1:F:244:ILE:HG13	2.35	0.47
1:F:329:SER:O	1:F:333:LYS:HB2	2.14	0.47
1:A:117:PRO:HB3	1:A:158:LEU:CD2	2.45	0.47
1:A:872:TRP:CH2	1:A:886:MET:HG3	2.49	0.47
1:A:850:ILE:HD11	1:A:1162:PHE:CE1	2.50	0.47
1:F:918:LEU:HD11	1:F:923:ASN:HB2	1.96	0.47
1:A:1005:TYR:CZ	1:A:1155:TRP:HA	2.50	0.47
1:A:831:GLU:HG3	1:A:840:TYR:CD1	2.45	0.47
1:F:571:PRO:CD	1:F:596:THR:HG1	2.27	0.47
1:F:690:ARG:NH1	4:I:10[B]:DT:H4'	2.30	0.47
1:F:845:ASN:HB3	1:F:848:GLU:CG	2.45	0.47
5:E:12[B]:DA:H2"	5:E:13[B]:DT:O5'	2.14	0.47
1:F:117:PRO:HB3	1:F:158:LEU:CD2	2.45	0.47
1:F:399:ARG:CG	1:F:399:ARG:NH1	2.71	0.47
1:F:779:ALA:O	1:F:782[A]:PTR:HB3	2.14	0.47
1:F:1005:TYR:CZ	1:F:1155:TRP:HA	2.50	0.47
1:A:81:MET:HG3	1:A:100:ASP:OD1	2.15	0.47
1:A:806:ILE:O	1:A:813:VAL:HG22	2.15	0.47
1:A:845:ASN:HB3	1:A:848:GLU:CG	2.45	0.47
1:A:872:TRP:CZ2	1:A:874:GLY:HA3	2.50	0.47
1:F:81:MET:HG3	1:F:100:ASP:OD1	2.15	0.47
1:F:872:TRP:CZ2	1:F:874:GLY:HA3	2.50	0.47
1:A:227:ASN:CG	1:A:244:ILE:HG13	2.35	0.47
1:A:443:CYS:SG	1:A:468:TYR:HA	2.55	0.47
1:A:810:GLU:O	1:A:810:GLU:HG2	2.15	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:806:ILE:O	1:F:813:VAL:HG22	2.15	0.47
1:F:40:TRP:O	1:F:221:ARG:HD3	2.14	0.46
1:A:60:LEU:HD23	1:A:215:ILE:HG12	1.97	0.46
1:A:1049:ILE:O	1:A:1053:GLU:HG2	2.15	0.46
1:F:1019:GLU:O	1:F:1023:TYR:HD2	1.98	0.46
1:F:1045:ARG:O	1:F:1049:ILE:HG13	2.16	0.46
4:I:2[B]:DG:N1	5:J:14[B]:DC:N3	2.63	0.46
1:A:242:LEU:O	1:A:243:LYS:HB2	2.15	0.46
1:A:765:GLY:HA2	1:F:607:THR:HA	1.98	0.46
1:A:918:LEU:HD11	1:A:923:ASN:HB2	1.97	0.46
1:A:1070:SER:O	1:A:1070:SER:OG	2.30	0.46
1:F:751:ASN:CG	1:F:763:PRO:HG2	2.36	0.46
1:F:872:TRP:CH2	1:F:886:MET:HG3	2.49	0.46
1:A:163:LEU:HD13	1:A:193:SER:HB3	1.98	0.46
1:A:1045:ARG:O	1:A:1049:ILE:HG13	2.16	0.46
1:F:443:CYS:SG	1:F:468:TYR:HA	2.55	0.46
1:F:850:ILE:HD11	1:F:1162:PHE:CE1	2.50	0.46
1:F:502:MET:SD	1:F:518:TYR:HB2	2.55	0.46
1:A:502:MET:SD	1:A:518:TYR:HB2	2.55	0.46
1:A:1139:LYS:HD3	1:A:1139:LYS:HA	1.80	0.46
1:F:1067:TYR:HE1	1:F:1070:SER:H	1.61	0.46
1:A:110:ASN:OD1	1:F:9:SER:HB3	2.15	0.46
1:A:1019:GLU:O	1:A:1023:TYR:HD2	1.98	0.46
1:F:60:LEU:HD23	1:F:215:ILE:HG12	1.97	0.46
1:F:242:LEU:O	1:F:243:LYS:HB2	2.15	0.46
1:F:1049:ILE:O	1:F:1053:GLU:HG2	2.15	0.46
1:A:751:ASN:CG	1:A:763:PRO:HG2	2.36	0.46
1:F:630:LEU:HD23	1:F:672:ILE:HD12	1.98	0.46
1:F:810:GLU:O	1:F:810:GLU:HG2	2.15	0.46
1:F:850:ILE:HD11	1:F:1162:PHE:HE1	1.81	0.46
1:A:571:PRO:HD3	1:A:596:THR:HG1	1.80	0.46
1:A:1126:LYS:HE2	1:F:1044:PRO:HB3	1.96	0.46
1:F:837:TRP:CD1	1:F:984:ILE:HD13	2.52	0.46
1:A:667:LEU:O	1:A:668:LYS:HB3	2.17	0.45
1:A:850:ILE:HD11	1:A:1162:PHE:HE1	1.81	0.45
1:A:1044:PRO:O	1:A:1046:ASN:N	2.49	0.45
1:F:365:GLN:O	1:F:367:LYS:HG3	2.16	0.45
1:A:608:SER:O	1:A:609:LEU:C	2.54	0.45
1:A:726:PRO:CG	1:F:726:PRO:HG2	2.46	0.45
1:A:767:PHE:CE2	1:A:783:ILE:HD12	2.52	0.45
1:A:901:THR:HA	1:A:941:ILE:O	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:512:ASP:CB	1:F:514:LYS:HG2	2.47	0.45
1:A:212:ASP:OD1	1:A:212:ASP:C	2.55	0.45
1:A:399:ARG:CG	1:A:399:ARG:NH1	2.71	0.45
1:A:837:TRP:CD1	1:A:984:ILE:HD13	2.51	0.45
1:F:212:ASP:OD1	1:F:212:ASP:C	2.55	0.45
1:A:800:ASP:HB2	1:A:801:PRO:HD3	1.99	0.45
1:F:29:ILE:CD1	1:F:152:PHE:CE1	2.94	0.45
1:F:533:HIS:HB2	1:F:683:PHE:CD2	2.52	0.45
1:F:608:SER:O	1:F:609:LEU:C	2.54	0.45
1:A:1126:LYS:O	1:A:1130:GLN:HG2	2.17	0.45
1:F:667:LEU:O	1:F:668:LYS:HB3	2.17	0.45
1:F:706:VAL:HA	1:F:728:VAL:HG11	1.99	0.45
1:F:1044:PRO:O	1:F:1046:ASN:N	2.49	0.45
1:A:96:GLU:CD	1:A:196:LYS:HE3	2.37	0.45
1:A:365:GLN:O	1:A:367:LYS:HG3	2.16	0.45
1:F:367:LYS:HZ1	7:F:1202:ANP:PG	2.40	0.45
1:F:723:GLN:C	1:F:726:PRO:HD2	2.37	0.45
1:A:276:ILE:CD1	1:A:277:PRO:HD2	2.47	0.45
1:F:96:GLU:CD	1:F:196:LYS:HE3	2.37	0.45
1:F:163:LEU:HD13	1:F:193:SER:HB3	1.98	0.45
1:F:562:PRO:HG3	1:F:579:TYR:CE1	2.52	0.45
1:A:29:ILE:CD1	1:A:152:PHE:CE2	2.61	0.45
1:A:533:HIS:HB2	1:A:683:PHE:CD2	2.52	0.45
1:A:592:SER:HB2	1:A:597:TRP:CE2	2.52	0.45
1:A:1107:GLU:HG2	1:A:1109:LEU:H	1.82	0.45
1:A:570:LYS:CB	1:A:596:THR:OG1	2.60	0.44
1:F:842:PRO:HG3	1:F:972:LEU:CD2	2.48	0.44
1:A:292:PHE:CZ	1:A:391:ILE:HG23	2.52	0.44
1:A:842:PRO:HG3	1:A:972:LEU:CD2	2.48	0.44
1:F:373:ARG:CZ	1:F:375:LYS:HE2	2.47	0.44
1:F:667:LEU:HD23	1:F:667:LEU:HA	1.82	0.44
1:F:800:ASP:HB2	1:F:801:PRO:HD3	1.99	0.44
1:F:1107:GLU:HG2	1:F:1109:LEU:H	1.82	0.44
1:A:373:ARG:CZ	1:A:375:LYS:HE2	2.47	0.44
1:A:706:VAL:HA	1:A:728:VAL:HG11	1.99	0.44
1:F:276:ILE:CD1	1:F:277:PRO:HD2	2.47	0.44
1:F:1126:LYS:O	1:F:1130:GLN:HG2	2.17	0.44
1:A:1017:GLN:HG2	1:A:1143:LEU:HD21	2.00	0.44
1:F:292:PHE:CZ	1:F:391:ILE:HG23	2.52	0.44
1:F:901:THR:HA	1:F:941:ILE:O	2.17	0.44
1:A:630:LEU:HD23	1:A:672:ILE:HD12	1.98	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1067:TYR:HE1	1:A:1070:SER:H	1.61	0.44
1:A:1069:GLY:O	1:A:1070:SER:HB3	2.18	0.44
1:F:762:LEU:HA	1:F:763:PRO:HD3	1.80	0.44
1:F:767:PHE:CE2	1:F:783:ILE:HD12	2.52	0.44
1:F:1001:ARG:HD2	1:F:1001:ARG:O	2.18	0.44
1:A:723:GLN:C	1:A:726:PRO:HD2	2.37	0.44
1:F:482:ARG:O	1:F:483:GLU:CB	2.66	0.44
1:F:543:GLU:HB2	1:F:550:LEU:HD12	2.00	0.44
1:A:895:ASP:O	1:A:896:ASN:HB2	2.17	0.44
1:A:1001:ARG:HA	1:A:1001:ARG:HD3	1.73	0.44
1:A:1115:TYR:CE2	1:A:1116:LEU:HG	2.53	0.44
1:F:482:ARG:C	1:F:483:GLU:HG2	2.37	0.44
1:F:592:SER:HB2	1:F:597:TRP:CE2	2.52	0.44
1:A:338:LYS:HB3	1:A:407:ASN:HB3	1.99	0.44
1:A:338:LYS:HB3	1:A:407:ASN:CB	2.47	0.44
1:A:1001:ARG:HD2	1:A:1001:ARG:O	2.18	0.44
2:B:11[A]:DC:C4	3:H:1[A]:DC:C4	3.06	0.44
1:A:276:ILE:HA	1:A:277:PRO:HD3	1.84	0.44
1:A:482:ARG:C	1:A:483:GLU:HG2	2.37	0.44
1:F:276:ILE:HA	1:F:277:PRO:HD3	1.84	0.44
1:F:287:ARG:HH12	1:F:358:GLU:HG3	1.83	0.44
1:F:292:PHE:CE2	1:F:391:ILE:HG23	2.53	0.44
1:F:580:ASN:ND2	1:F:582:PRO:HD2	2.33	0.44
1:F:895:ASP:O	1:F:896:ASN:HB2	2.17	0.44
1:F:1069:GLY:O	1:F:1070:SER:HB3	2.18	0.44
1:A:512:ASP:CB	1:A:514:LYS:HG2	2.47	0.43
1:A:1029:PHE:CZ	1:A:1033:ILE:HD11	2.53	0.43
1:F:74:ASN:HD22	1:F:99:ASN:ND2	2.16	0.43
1:F:1029:PHE:CZ	1:F:1033:ILE:HD11	2.53	0.43
1:A:9:SER:HB3	1:F:110:ASN:OD1	2.18	0.43
1:A:437:THR:CG2	1:A:438:LYS:N	2.65	0.43
1:A:74:ASN:HD22	1:A:99:ASN:ND2	2.16	0.43
1:A:361:ALA:O	1:A:370:LEU:HD12	2.19	0.43
1:A:543:GLU:HB2	1:A:550:LEU:HD12	1.99	0.43
1:F:896:ASN:HD21	1:F:949:PRO:HG3	1.83	0.43
1:F:1017:GLN:HG2	1:F:1143:LEU:HD21	2.00	0.43
1:A:405:ASP:OD1	1:A:405:ASP:O	2.37	0.43
1:A:287:ARG:HH12	1:A:358:GLU:HG3	1.83	0.43
1:A:297:ILE:O	1:F:341:LYS:HE2	2.18	0.43
1:A:580:ASN:ND2	1:A:582:PRO:HD2	2.33	0.43
1:A:1005:TYR:CE2	1:A:1155:TRP:CG	3.07	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:2[A]:DG:N2	3:H:3[A]:DC:N3	2.66	0.43
1:F:525:THR:O	1:F:527:GLN:N	2.52	0.43
1:A:75:LYS:HE2	1:A:231:ARG:O	2.19	0.43
1:A:562:PRO:HG3	1:A:579:TYR:CE1	2.52	0.43
1:A:570:LYS:N	1:A:571:PRO:HD2	2.34	0.43
1:A:899:GLU:HA	1:A:943:PHE:O	2.19	0.43
1:F:769:THR:N	1:F:776:ASP:OD2	2.52	0.43
1:A:769:THR:N	1:A:776:ASP:OD2	2.52	0.43
1:F:75:LYS:HE2	1:F:231:ARG:O	2.19	0.43
1:F:1007:LYS:HB2	1:F:1007:LYS:HE3	1.82	0.43
1:F:1026:GLN:O	1:F:1030:ILE:HG12	2.19	0.43
1:A:451:ASP:HA	1:A:454:LEU:HB3	2.00	0.43
1:A:726:PRO:HG2	1:F:726:PRO:CG	2.46	0.43
1:A:896:ASN:HD21	1:A:949:PRO:HG3	1.83	0.43
1:A:969:PRO:HG2	3:C:12[A]:DT:H5"	2.00	0.43
1:F:1005:TYR:CE2	1:F:1155:TRP:CG	3.07	0.43
1:A:726:PRO:HB3	1:F:723:GLN:HA	2.00	0.43
1:A:292:PHE:CE2	1:A:391:ILE:HG23	2.53	0.42
1:A:598:LYS:HD3	1:A:599:GLN:N	2.34	0.42
1:F:779:ALA:H	1:F:782[A]:PTR:HD1	1.83	0.42
1:A:29:ILE:HD13	1:A:152:PHE:CD2	2.43	0.42
1:A:398:THR:HG22	1:F:490:LEU:HD21	2.01	0.42
1:A:723:GLN:HA	1:F:726:PRO:HB3	2.01	0.42
1:A:1042:ASN:HB3	1:A:1043:LYS:H	1.68	0.42
1:F:570:LYS:N	1:F:571:PRO:HD2	2.34	0.42
1:F:1115:TYR:CE2	1:F:1116:LEU:HG	2.53	0.42
1:A:482:ARG:O	1:A:483:GLU:CB	2.66	0.42
1:A:667:LEU:HD23	1:A:667:LEU:HA	1.82	0.42
1:F:147:LYS:O	1:F:151:ILE:HG13	2.20	0.42
1:F:598:LYS:HD3	1:F:599:GLN:N	2.34	0.42
1:F:361:ALA:O	1:F:370:LEU:HD12	2.19	0.42
1:F:674:ASP:O	1:F:678:LYS:HB2	2.19	0.42
1:A:313:GLY:O	1:A:369:GLN:HA	2.20	0.42
1:A:674:ASP:O	1:A:678:LYS:HB2	2.19	0.42
2:B:2[A]:DC:H1'	2:B:3[A]:DT:H5'	2.01	0.42
1:F:426:TYR:CZ	1:F:497:ALA:HA	2.55	0.42
1:F:451:ASP:HA	1:F:454:LEU:HB3	2.00	0.42
1:F:613:VAL:O	1:F:616:TYR:HB2	2.20	0.42
1:A:115:TYR:HB3	1:A:117:PRO:HD2	2.01	0.42
1:A:258:LEU:HD21	1:A:350:PHE:CD1	2.55	0.42
1:A:335:LYS:NZ	2:G:4[A]:DA:OP1	2.53	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:231:ARG:HH22	1:F:356:LEU:HD11	1.85	0.42
1:A:525:THR:O	1:A:527:GLN:N	2.52	0.42
1:A:1026:GLN:O	1:A:1030:ILE:HG12	2.19	0.42
1:F:899:GLU:HA	1:F:943:PHE:O	2.19	0.42
1:A:147:LYS:O	1:A:151:ILE:HG13	2.20	0.42
1:A:643:SER:O	1:A:644:LYS:C	2.58	0.42
1:A:829:GLY:HA3	1:A:841:ILE:O	2.20	0.42
1:F:883:ARG:C	1:F:884:TYR:CD1	2.93	0.42
1:F:910:SER:O	1:F:914:GLU:HG3	2.20	0.42
1:F:949:PRO:O	1:F:952:MET:HB2	2.20	0.42
1:A:580:ASN:HB2	1:A:582:PRO:HD2	2.02	0.42
1:A:883:ARG:C	1:A:884:TYR:CD1	2.93	0.42
1:A:968:SER:HA	1:A:969:PRO:HD3	1.83	0.42
3:C:3[A]:DC:N3	3:H:2[A]:DG:N2	2.68	0.42
1:F:74:ASN:HB3	1:F:81:MET:CE	2.41	0.42
1:F:849:ILE:CA	1:F:865:MET:HE1	2.46	0.42
1:A:93:HIS:CE1	1:A:210:GLU:HA	2.55	0.42
1:A:426:TYR:CZ	1:A:497:ALA:HA	2.55	0.42
1:A:1041:THR:CG2	1:F:1034:ILE:HG12	2.50	0.42
2:B:4[A]:DA:OP1	1:F:335:LYS:NZ	2.52	0.42
1:A:231:ARG:HH22	1:A:356:LEU:HD11	1.85	0.41
1:A:341:LYS:HE2	1:F:297:ILE:O	2.20	0.41
1:A:646:LYS:HB3	1:A:649:ASP:HB2	2.02	0.41
1:A:819:LEU:HD21	1:A:1001:ARG:HA	2.02	0.41
1:A:1034:ILE:HG12	1:F:1041:THR:CG2	2.50	0.41
1:F:93:HIS:CE1	1:F:210:GLU:HA	2.55	0.41
1:F:313:GLY:O	1:F:369:GLN:HA	2.20	0.41
1:A:136:LYS:HE3	1:A:136:LYS:HB2	1.88	0.41
1:A:613:VAL:O	1:A:616:TYR:HB2	2.20	0.41
1:A:1041:THR:O	1:A:1042:ASN:HB2	2.20	0.41
1:F:41:ILE:HG22	1:F:42:TYR:N	2.35	0.41
1:F:423:ILE:HD11	1:F:517:ARG:NH2	2.35	0.41
1:F:1041:THR:O	1:F:1042:ASN:HB2	2.20	0.41
1:A:949:PRO:O	1:A:952:MET:HB2	2.20	0.41
1:F:115:TYR:HB3	1:F:117:PRO:HD2	2.02	0.41
1:F:340:VAL:CG1	1:F:344:GLN:OE1	2.68	0.41
1:F:969:PRO:HG2	3:H:12[A]:DT:H5"	2.02	0.41
1:A:796:HIS:HA	1:A:797:PRO:HD3	1.91	0.41
1:F:1010:ASP:O	1:F:1013:SER:HB2	2.20	0.41
1:F:141:ARG:HD3	1:F:360:PRO:HD2	2.03	0.41
1:F:333:LYS:CG	1:F:339:SER:HB3	2.38	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:690:ARG:NH1	2:G:10[A]:DA:H4'	2.36	0.41
1:F:769:THR:HG23	1:F:776:ASP:OD2	2.20	0.41
1:F:819:LEU:HD21	1:F:1001:ARG:HA	2.02	0.41
1:A:581:MET:N	1:A:582:PRO:CD	2.83	0.41
1:A:814:GLU:HG2	1:A:815:PRO:O	2.20	0.41
1:F:546:PHE:HA	1:F:547:PRO:HD2	1.95	0.41
1:F:814:GLU:HG2	1:F:815:PRO:O	2.20	0.41
1:A:482:ARG:O	1:A:483:GLU:HB2	2.20	0.41
1:A:490:LEU:HD21	1:F:398:THR:HG22	2.03	0.41
1:A:769:THR:HG23	1:A:776:ASP:OD2	2.20	0.41
1:A:1041:THR:HG21	1:F:1034:ILE:HA	2.03	0.41
1:F:482:ARG:O	1:F:483:GLU:HB2	2.20	0.41
1:F:580:ASN:HB2	1:F:582:PRO:HD2	2.02	0.41
1:F:647:ALA:HA	1:F:650:ARG:NH1	2.36	0.41
1:F:657:TYR:CD2	1:F:657:TYR:C	2.93	0.41
1:A:910:SER:O	1:A:914:GLU:HG3	2.20	0.41
1:A:1010:ASP:O	1:A:1013:SER:HB2	2.20	0.41
1:F:90:ALA:O	1:F:93:HIS:HD2	2.04	0.41
1:F:423:ILE:CD1	1:F:517:ARG:HH22	2.34	0.41
1:F:581:MET:N	1:F:582:PRO:CD	2.83	0.41
1:A:41:ILE:HG22	1:A:42:TYR:N	2.35	0.41
1:A:90:ALA:O	1:A:93:HIS:HD2	2.04	0.41
1:A:1026:GLN:HA	1:A:1116:LEU:CD2	2.51	0.41
1:A:1067:TYR:HE1	1:A:1070:SER:N	2.18	0.41
1:F:258:LEU:HD21	1:F:350:PHE:CD1	2.55	0.41
1:F:643:SER:O	1:F:644:LYS:C	2.58	0.41
1:F:720:LYS:HB3	1:F:784:TYR:CE2	2.56	0.41
1:F:829:GLY:HA3	1:F:841:ILE:O	2.20	0.41
4:I:1[B]:DG:N1	5:J:15[B]:DC:N3	2.69	0.41
1:A:423:ILE:CD1	1:A:517:ARG:HH22	2.34	0.41
1:A:851:LYS:HA	1:A:854:ARG:NH2	2.36	0.41
1:F:646:LYS:HB3	1:F:649:ASP:HB2	2.02	0.41
1:F:837:TRP:CG	1:F:984:ILE:HD13	2.56	0.41
1:F:851:LYS:HA	1:F:854:ARG:NH2	2.36	0.41
1:F:931:LYS:HB3	1:F:946:THR:O	2.21	0.41
1:F:1026:GLN:HA	1:F:1116:LEU:CD2	2.51	0.41
1:F:1065:LYS:HA	1:F:1066:PRO:HD3	1.77	0.41
1:A:124:LEU:HD21	1:A:151:ILE:HD11	2.03	0.40
1:A:762:LEU:HA	1:A:763:PRO:HD3	1.80	0.40
1:A:1053:GLU:HB3	1:A:1113:TYR:OH	2.21	0.40
1:A:1123:SER:HA	1:A:1128:ARG:CB	2.51	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:333:LYS:CG	1:A:339:SER:HB3	2.38	0.40
1:A:423:ILE:HD11	1:A:517:ARG:NH2	2.35	0.40
1:A:668:LYS:O	1:A:668:LYS:CG	2.67	0.40
1:A:723:GLN:O	1:A:726:PRO:HD2	2.22	0.40
1:A:1040:VAL:HG13	1:A:1048:ILE:CD1	2.51	0.40
1:A:1047:ALA:O	1:A:1051:GLU:HG3	2.22	0.40
1:F:434:LYS:HD3	1:F:439:GLU:OE1	2.21	0.40
2:G:10[A]:DA:H2'	2:G:11[A]:DC:H6	1.87	0.40
1:A:879:ILE:HG22	1:A:880:GLU:HG3	2.04	0.40
1:A:1117:LEU:O	1:F:1121:ILE:HB	2.21	0.40
1:F:664:ASP:HB3	1:F:667:LEU:HG	2.03	0.40
1:A:312:MET:HB3	1:A:312:MET:HE2	1.86	0.40
1:A:454:LEU:O	1:A:458:VAL:HG13	2.22	0.40
1:A:849:ILE:CA	1:A:865:MET:HE1	2.45	0.40
5:E:3[B]:DC:N3	5:J:2[B]:DG:N1	2.69	0.40
1:F:879:ILE:HG22	1:F:880:GLU:HG3	2.04	0.40
1:A:434:LYS:HD3	1:A:439:GLU:OE1	2.21	0.40
1:A:664:ASP:HA	1:A:665:PRO:HD3	1.93	0.40
1:A:979:ASP:HB2	1:A:980:PRO:CD	2.52	0.40
1:A:1034:ILE:HA	1:F:1041:THR:HG21	2.04	0.40
2:B:6[A]:DT:H6	2:B:6[A]:DT:H2'	1.73	0.40
1:F:437:THR:CG2	1:F:438:LYS:N	2.65	0.40
1:F:707:LEU:HD23	1:F:707:LEU:HA	1.79	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	1091/1178 (93%)	1038 (95%)	52 (5%)	1 (0%)	51 85
1	F	1087/1178 (92%)	1034 (95%)	52 (5%)	1 (0%)	51 85

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	2178/2356 (92%)	2072 (95%)	104 (5%)	2 (0%)	51 85

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	526	ASP
1	F	526	ASP

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	992/1055 (94%)	985 (99%)	7 (1%)	84 90
1	F	989/1055 (94%)	982 (99%)	7 (1%)	84 90
All	All	1981/2110 (94%)	1967 (99%)	14 (1%)	84 90

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	221	ARG
1	A	333	LYS
1	A	350	PHE
1	A	399	ARG
1	A	781	ARG
1	A	883	ARG
1	A	1001	ARG
1	F	221	ARG
1	F	333	LYS
1	F	350	PHE
1	F	399	ARG
1	F	781	ARG
1	F	883	ARG
1	F	1001	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such

sidechains are listed below:

Mol	Chain	Res	Type
1	A	99	ASN
1	A	227	ASN
1	A	496	GLN
1	A	619	ASN
1	A	1167	GLN
1	F	99	ASN
1	F	227	ASN
1	F	619	ASN
1	F	1167	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

4 non-standard protein/DNA/RNA residues are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	TSP	I	11[B]	4	17,21,22	3.30	6 (35%)	21,30,33	2.57	7 (33%)
4	TSP	D	11[B]	4	17,21,22	3.30	6 (35%)	21,30,33	2.50	7 (33%)
1	PTR	A	782[A]	1	15,16,17	2.03	1 (6%)	17,22,24	0.60	0
1	PTR	F	782[A]	1	15,16,17	2.03	1 (6%)	17,22,24	0.61	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
4	TSP	I	11[B]	4	-	2/7/21/22	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	TSP	D	11[B]	4	-	2/7/21/22	0/2/2/2
1	PTR	A	782[A]	1	-	2/10/11/13	0/1/1/1
1	PTR	F	782[A]	1	-	2/10/11/13	0/1/1/1

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	782[A]	PTR	OH-CZ	-7.69	1.23	1.40
1	A	782[A]	PTR	OH-CZ	-7.65	1.23	1.40
4	I	11[B]	TSP	O4-C4	7.10	1.37	1.23
4	D	11[B]	TSP	O4-C4	7.06	1.37	1.23
4	I	11[B]	TSP	C2'-C3'	-6.15	1.36	1.52
4	D	11[B]	TSP	C2'-C3'	-6.09	1.37	1.52
4	I	11[B]	TSP	C4-C5	-5.61	1.35	1.44
4	D	11[B]	TSP	C4-C5	-5.52	1.35	1.44
4	D	11[B]	TSP	C6-C5	4.94	1.42	1.34
4	I	11[B]	TSP	C6-C5	4.89	1.42	1.34
4	D	11[B]	TSP	O5'-C5'	-3.67	1.33	1.44
4	I	11[B]	TSP	O5'-C5'	-3.54	1.33	1.44
4	D	11[B]	TSP	O4'-C4'	-3.29	1.37	1.45
4	I	11[B]	TSP	O4'-C4'	-3.24	1.37	1.45

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	I	11[B]	TSP	C5-C4-N3	5.68	120.26	115.32
4	D	11[B]	TSP	C5-C4-N3	5.52	120.12	115.32
4	I	11[B]	TSP	C4-N3-C2	-5.41	120.25	127.34
4	D	11[B]	TSP	C4-N3-C2	-5.33	120.36	127.34
4	I	11[B]	TSP	O4-C4-C5	-4.85	119.37	124.92
4	D	11[B]	TSP	O4-C4-C5	-4.76	119.47	124.92
4	I	11[B]	TSP	N3-C2-N1	3.75	119.77	114.89
4	D	11[B]	TSP	N3-C2-N1	3.71	119.72	114.89
4	D	11[B]	TSP	C5-C6-N1	-3.24	119.79	123.31
4	I	11[B]	TSP	C5-C6-N1	-3.10	119.94	123.31
4	D	11[B]	TSP	C6-C5-C4	2.39	119.99	118.02
4	I	11[B]	TSP	C6-C5-C4	2.20	119.84	118.02
4	I	11[B]	TSP	C5M-C5-C6	-2.14	119.95	122.85
4	D	11[B]	TSP	C5M-C5-C6	-2.01	120.14	122.85

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	D	11[B]	TSP	O4'-C4'-C5'-O5'
4	I	11[B]	TSP	O4'-C4'-C5'-O5'
4	I	11[B]	TSP	C3'-C4'-C5'-O5'
4	D	11[B]	TSP	C3'-C4'-C5'-O5'
1	F	782[A]	PTR	CA-CB-CG-CD2
1	F	782[A]	PTR	CA-CB-CG-CD1
1	A	782[A]	PTR	CA-CB-CG-CD2
1	A	782[A]	PTR	CA-CB-CG-CD1

There are no ring outliers.

2 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	782[A]	PTR	1	0
1	F	782[A]	PTR	6	0

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 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	$\#\|Z\| > 2$
7	ANP	F	1202	6	29,33,33	1.61	8 (27%)	31,52,52	1.44	3 (9%)
7	ANP	A	1202	6	29,33,33	1.60	8 (27%)	31,52,52	1.44	3 (9%)

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
7	ANP	F	1202	6	-	4/14/38/38	0/3/3/3
7	ANP	A	1202	6	-	4/14/38/38	0/3/3/3

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	1202	ANP	C6-N6	2.70	1.43	1.34
7	F	1202	ANP	C6-N6	2.68	1.43	1.34
7	F	1202	ANP	PG-O3G	-2.55	1.50	1.56
7	A	1202	ANP	PG-O3G	-2.54	1.50	1.56
7	F	1202	ANP	PB-O1B	2.52	1.50	1.46
7	A	1202	ANP	PB-O1B	2.51	1.50	1.46
7	A	1202	ANP	PG-O2G	-2.50	1.50	1.56
7	F	1202	ANP	PG-O2G	-2.50	1.50	1.56
7	F	1202	ANP	PB-O2B	-2.43	1.50	1.56
7	F	1202	ANP	O4'-C4'	-2.42	1.39	1.45
7	A	1202	ANP	PB-O2B	-2.42	1.50	1.56
7	A	1202	ANP	O4'-C4'	-2.39	1.39	1.45
7	F	1202	ANP	PG-O1G	2.32	1.49	1.46
7	A	1202	ANP	PG-O1G	2.29	1.49	1.46
7	F	1202	ANP	O3'-C3'	-2.23	1.37	1.43
7	A	1202	ANP	O3'-C3'	-2.21	1.37	1.43

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	F	1202	ANP	C4'-O4'-C1'	4.15	113.72	109.92
7	A	1202	ANP	C4'-O4'-C1'	4.14	113.72	109.92
7	A	1202	ANP	N3-C2-N1	-4.06	123.16	128.67
7	F	1202	ANP	N3-C2-N1	-4.02	123.21	128.67
7	F	1202	ANP	O4'-C1'-N9	2.25	111.72	108.75
7	A	1202	ANP	O4'-C1'-N9	2.22	111.69	108.75

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	1202	ANP	PB-N3B-PG-O1G
7	A	1202	ANP	PA-O3A-PB-O2B
7	F	1202	ANP	PB-N3B-PG-O1G

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Mol	Chain	Res	Type	Atoms
7	F	1202	ANP	PA-O3A-PB-O2B
7	A	1202	ANP	PA-O3A-PB-O1B
7	F	1202	ANP	PA-O3A-PB-O1B
7	A	1202	ANP	PG-N3B-PB-O3A
7	F	1202	ANP	PG-N3B-PB-O3A

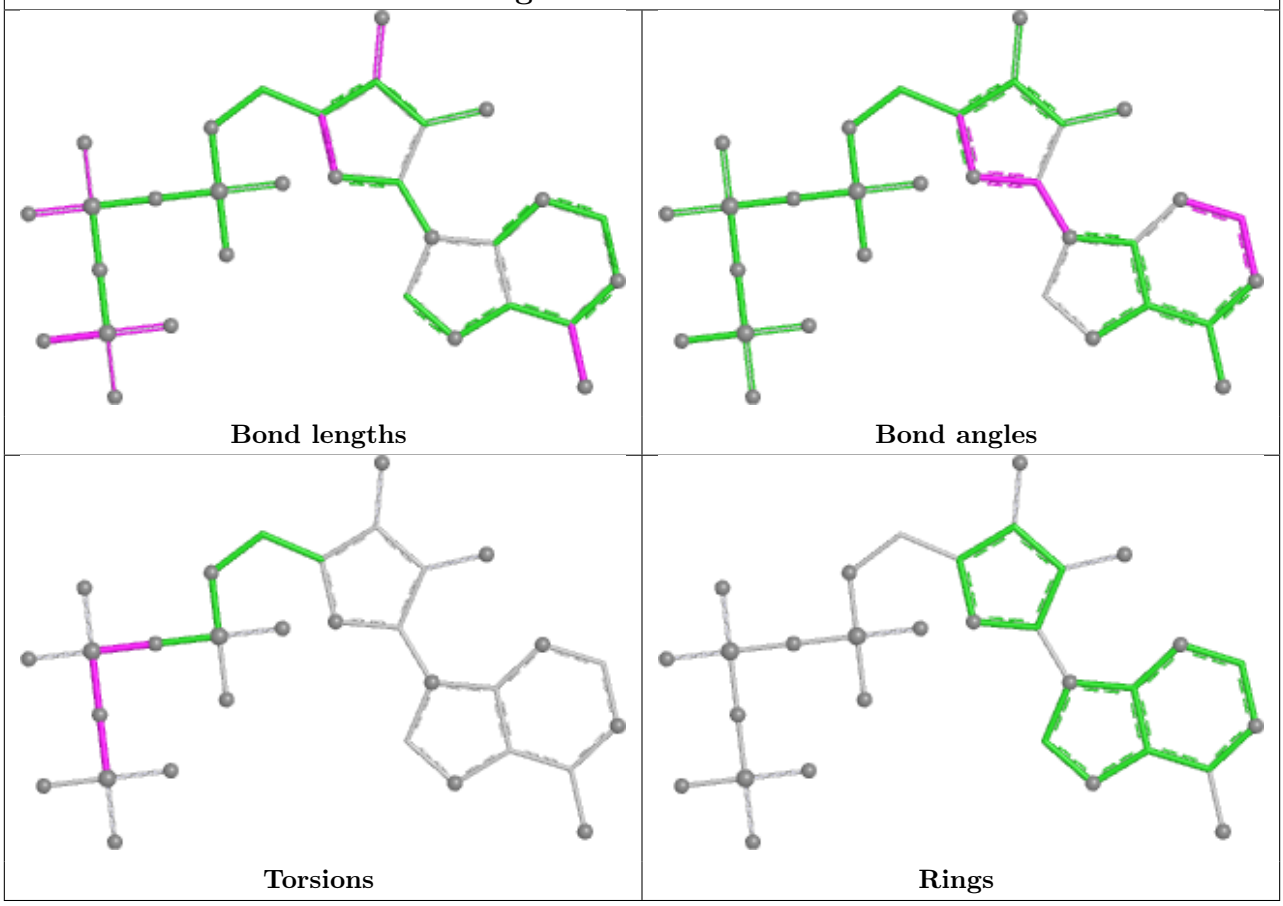
There are no ring outliers.

2 monomers are involved in 5 short contacts:

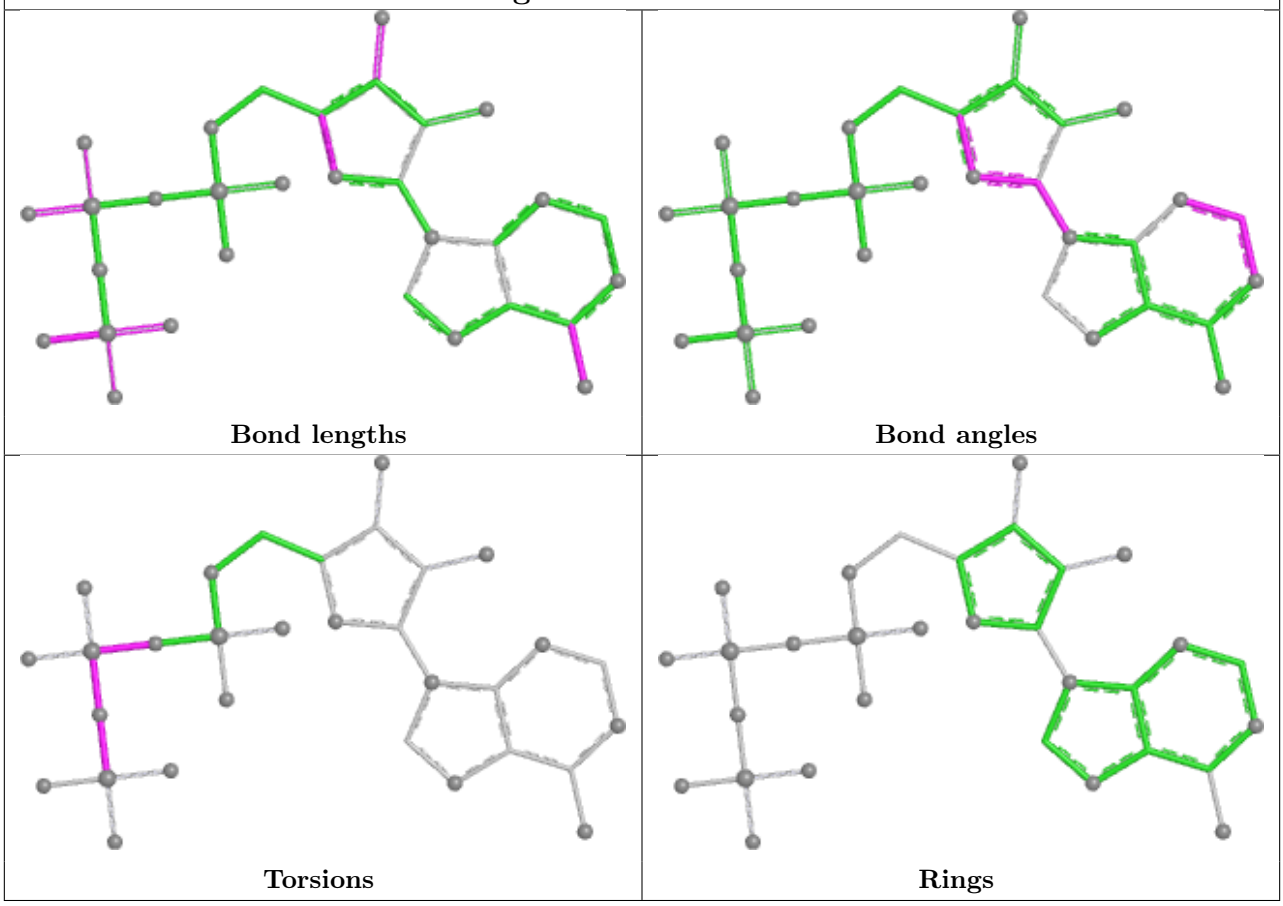
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	F	1202	ANP	3	0
7	A	1202	ANP	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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 ANP F 1202



Ligand ANP A 1202



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 (i)

6.1 Protein, DNA and RNA chains (i)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	1101/1178 (93%)	0.03	29 (2%)	56	46	150, 238, 317, 403	0
1	F	1097/1178 (93%)	0.02	22 (2%)	65	56	146, 240, 314, 414	0
2	B	11/11 (100%)	-0.32	0	100	100	174, 267, 347, 364	11 (100%)
2	G	11/11 (100%)	-0.26	0	100	100	158, 225, 331, 333	11 (100%)
3	C	15/15 (100%)	-0.56	0	100	100	216, 271, 425, 430	15 (100%)
3	H	15/15 (100%)	-0.46	0	100	100	203, 265, 377, 431	15 (100%)
4	D	10/11 (90%)	-0.52	0	100	100	165, 245, 364, 429	10 (100%)
4	I	10/11 (90%)	-0.31	0	100	100	168, 275, 401, 418	10 (100%)
5	E	15/15 (100%)	-0.53	0	100	100	162, 253, 360, 382	15 (100%)
5	J	15/15 (100%)	-0.47	0	100	100	180, 292, 332, 376	15 (100%)
All	All	2300/2460 (93%)	0.01	51 (2%)	62	52	146, 240, 322, 431	102 (4%)

All (51) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	408	GLU	6.0
1	F	422	ARG	5.9
1	A	422	ARG	5.7
1	A	477	LYS	4.1
1	F	421	SER	3.9
1	F	155	GLU	3.8
1	F	570	LYS	3.8
1	A	570	LYS	3.7
1	F	477	LYS	3.6
1	A	935	GLU	3.5
1	F	104	ILE	3.3
1	A	421	SER	3.3
1	A	172	LYS	3.3

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Mol	Chain	Res	Type	RSRZ
1	A	406	ALA	3.1
1	A	155	GLU	2.9
1	A	571	PRO	2.9
1	A	104	ILE	2.9
1	F	785	THR	2.8
1	A	715	LEU	2.8
1	A	508	LYS	2.8
1	F	190	LYS	2.7
1	A	190	LYS	2.5
1	A	890	ILE	2.5
1	A	152	PHE	2.4
1	A	407	ASN	2.4
1	F	231	ARG	2.4
1	A	156	PHE	2.4
1	A	231	ARG	2.4
1	A	507	ARG	2.3
1	F	964	PHE	2.3
1	F	715	LEU	2.3
1	A	889	ARG	2.3
1	A	891	GLU	2.2
1	A	105	PRO	2.2
1	A	835	THR	2.2
1	A	964	PHE	2.2
1	A	121	PHE	2.1
1	A	201	PRO	2.1
1	F	156	PHE	2.1
1	F	461	LEU	2.1
1	F	201	PRO	2.1
1	F	439	GLU	2.1
1	F	611	GLN	2.1
1	A	439	GLU	2.1
1	F	38	LEU	2.1
1	F	52	LYS	2.1
1	A	227	ASN	2.1
1	F	39	GLN	2.1
1	F	423	ILE	2.0
1	F	157	ILE	2.0
1	F	103	GLY	2.0

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

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
1	PTR	A	782[A]	16/17	0.70	0.26	281,285,288,289	16
1	PTR	F	782[A]	16/17	0.76	0.59	299,305,310,312	16
4	TSP	D	11[B]	20/21	0.84	0.41	501,508,514,517	20
4	TSP	I	11[B]	20/21	0.86	0.29	429,437,440,441	20

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

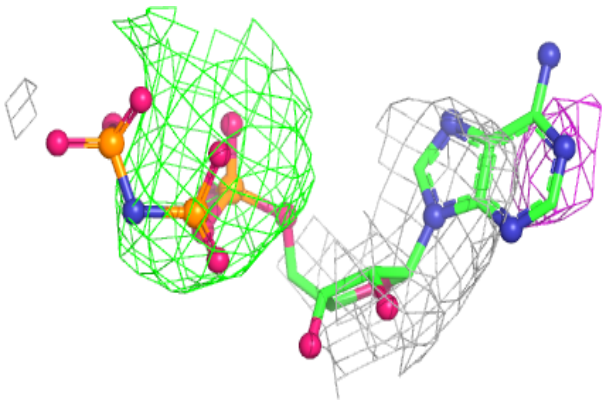
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

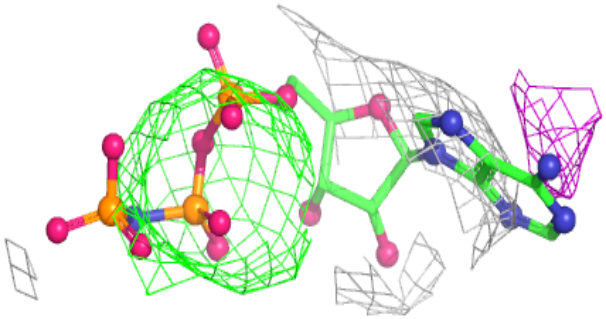
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
7	ANP	A	1202	31/31	0.93	0.36	230,235,236,237	0
7	ANP	F	1202	31/31	0.94	0.33	229,235,247,251	0
6	MG	A	1201	1/1	0.98	0.35	115,115,115,115	0
6	MG	F	1201	1/1	0.98	0.34	114,114,114,114	0

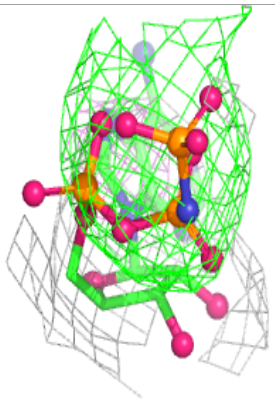
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around ANP A 1202:

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

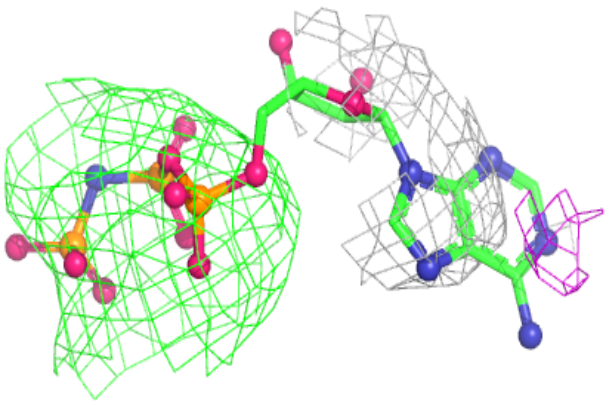


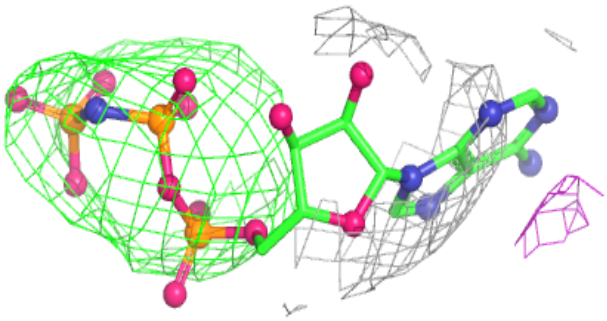


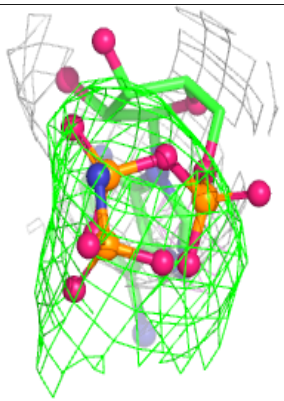


Electron density around ANP F 1202:

$2mF_o$-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.