Full wwPDB X-ray Structure Validation Report (i)

Jun 23, 2024 – 05:51 AM EDT

PDB ID	:	6HD0
Title	:	Common mode of remodeling AAA ATPases p97/CDC48 by their disassembly cofactors ASPL/PUX1
Authors	:	Heinemann, U.; Roske, Y.; Banchenko, S.
Deposited on	:	2018-08-17
Resolution	:	3.73 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:

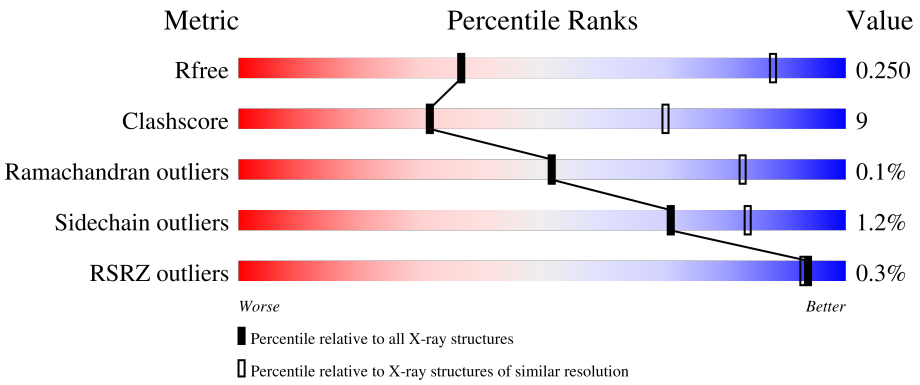
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (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 3.73 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	1089 (3.90-3.54)
Clashscore	141614	1012 (3.88-3.56)
Ramachandran outliers	138981	1114 (3.90-3.54)
Sidechain outliers	138945	1110 (3.90-3.54)
RSRZ outliers	127900	1020 (3.90-3.54)

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	481	74% 17% 9%
1	B	481	69% 21% • 9%
1	C	481	74% 17% 9%
1	T	481	% 70% 21% 9%
1	U	481	69% 22% 9%

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Mol	Chain	Length	Quality of chain
1	V	481	74% 17% • 9%
2	D	251	24% 6% 70%
2	E	251	19% 11% 70%
2	F	251	24% 6% 70%
2	G	251	26% • 70%
2	I	251	22% 8% 70%
2	K	251	% 23% 7% 70%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 24434 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.

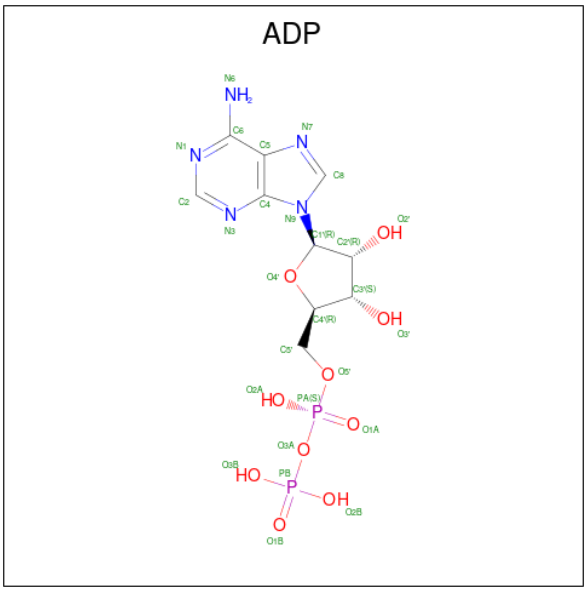
- Molecule 1 is a protein called Transitional endoplasmic reticulum ATPase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	439	3435	2157	607	653	18	0	0	0
1	T	440	3441	2160	608	655	18	0	0	0
1	U	440	3441	2160	608	655	18	0	0	0
1	V	440	3441	2160	608	655	18	0	0	0
1	A	440	3441	2160	608	655	18	0	0	0
1	C	437	3419	2148	605	648	18	0	0	0

- Molecule 2 is a protein called Plant UBX domain-containing protein 1.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	G	75	609	402	101	106	0	0	0
2	D	75	609	402	101	106	0	0	0
2	E	75	609	402	101	106	0	0	0
2	F	75	609	402	101	106	0	0	0
2	K	75	609	402	101	106	0	0	0
2	I	75	609	402	101	106	0	0	0

- Molecule 3 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



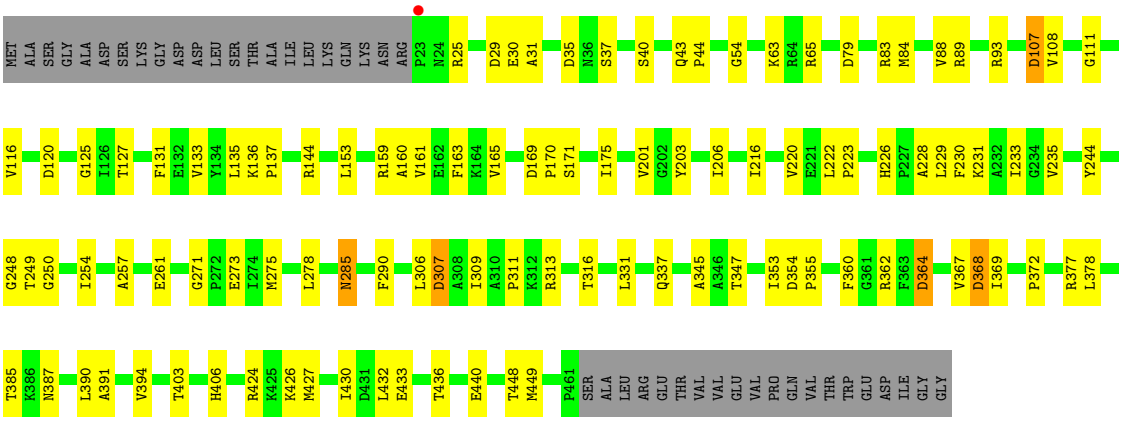
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	T	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	U	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	V	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	C	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

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.

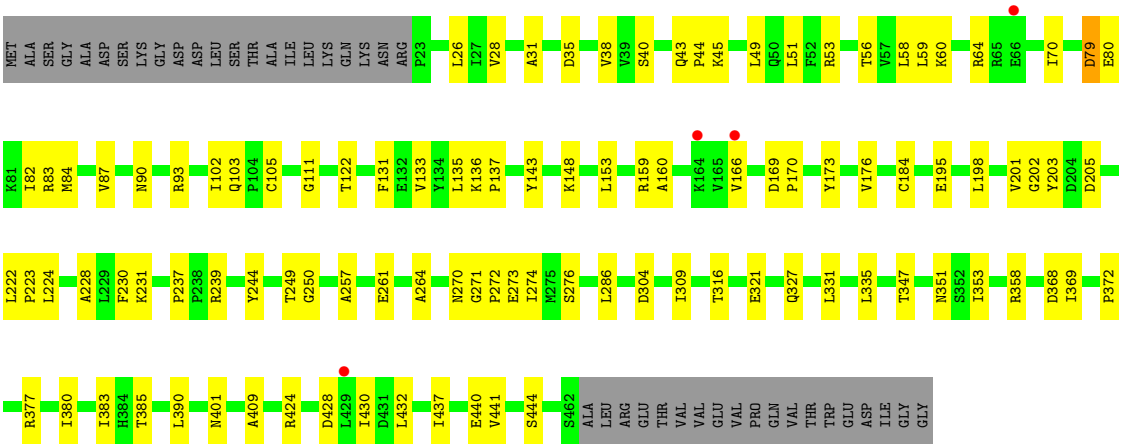
• Molecule 1: Transitional endoplasmic reticulum ATPase

Chain B:



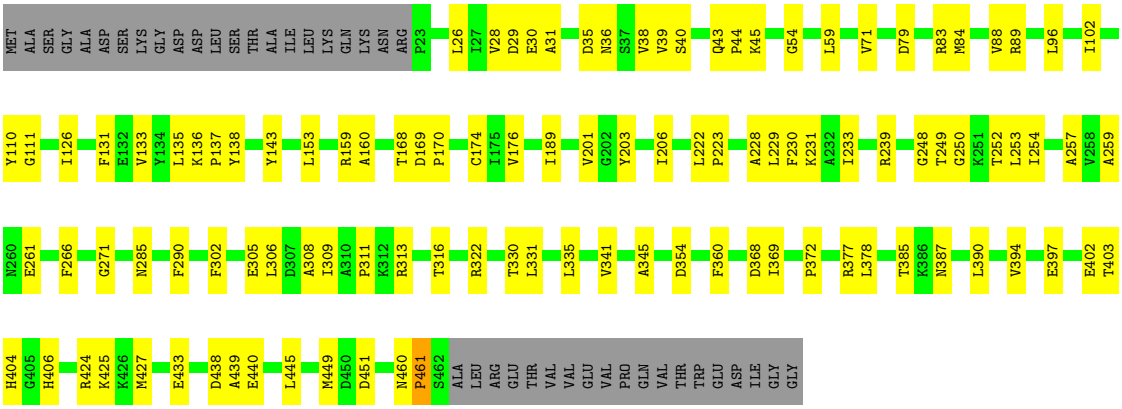
• Molecule 1: Transitional endoplasmic reticulum ATPase

Chain T:



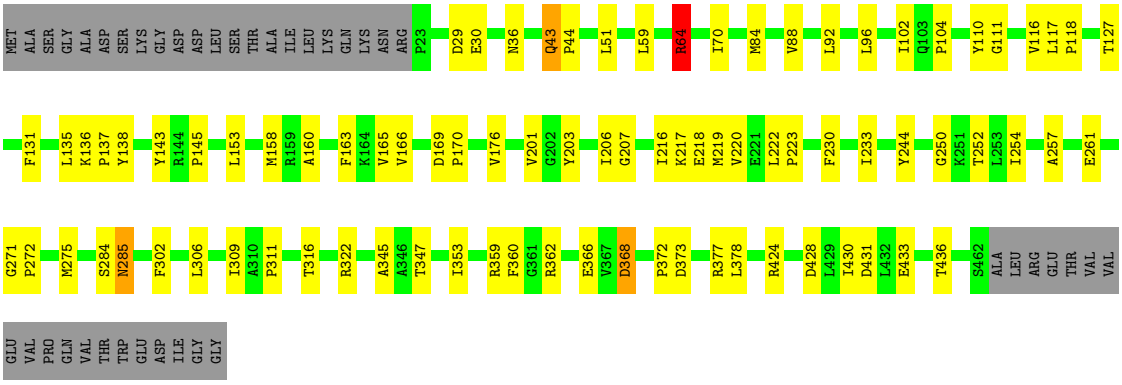
• Molecule 1: Transitional endoplasmic reticulum ATPase

Chain U:



• Molecule 1: Transitional endoplasmic reticulum ATPase

Chain V:

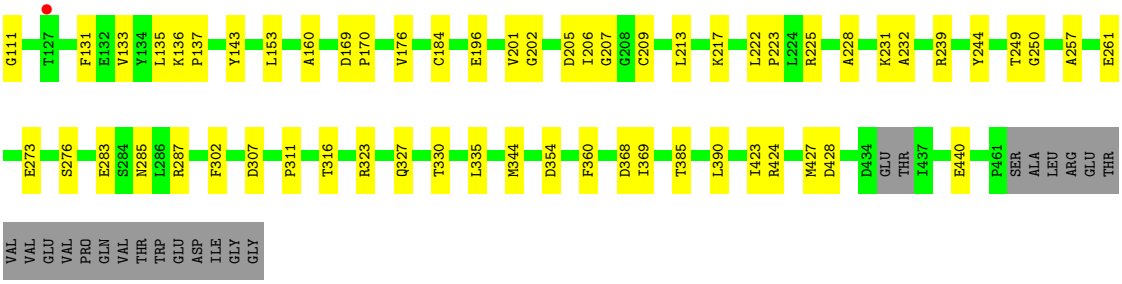


• Molecule 1: Transitional endoplasmic reticulum ATPase

Chain A:

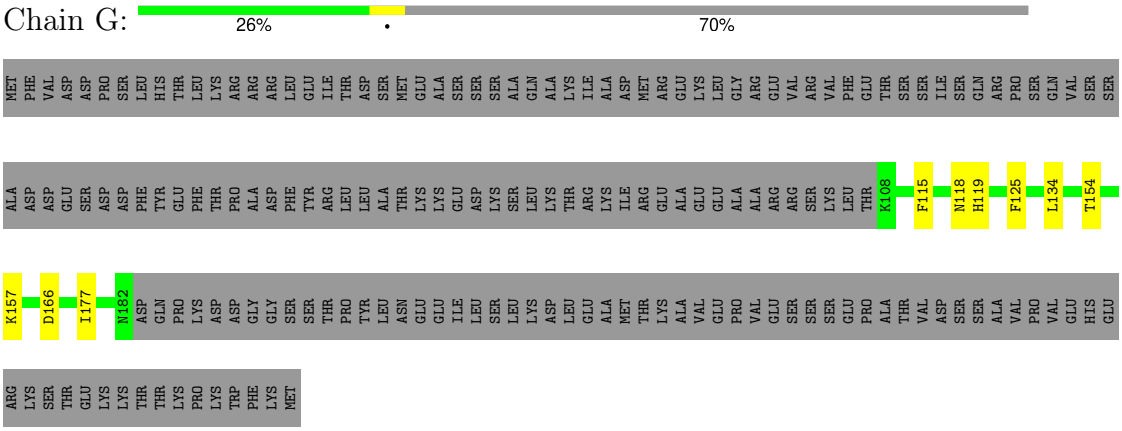
• Molecule 1: Transitional endoplasmic reticulum ATPase

Chain C:



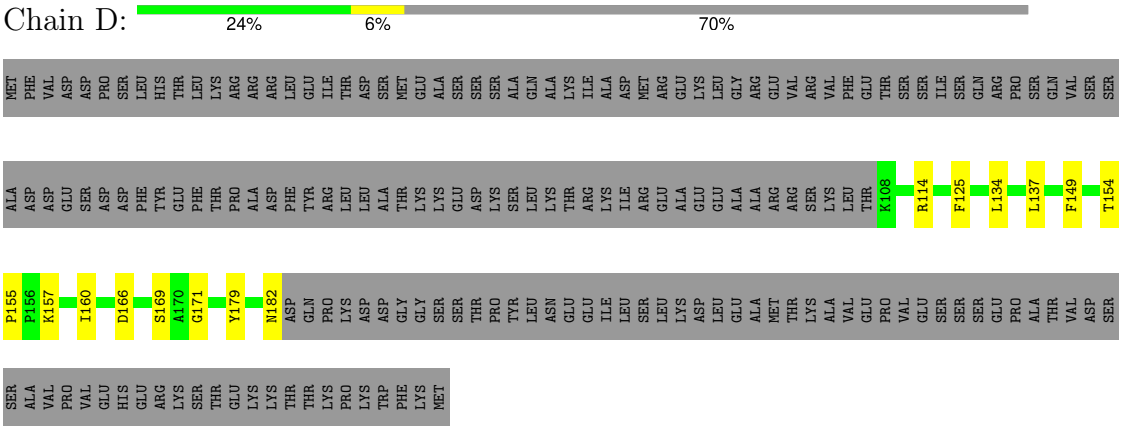
- Molecule 2: Plant UBX domain-containing protein 1

Chain G:



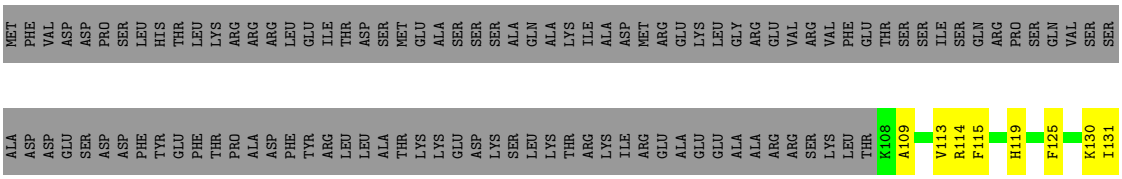
- Molecule 2: Plant UBX domain-containing protein 1

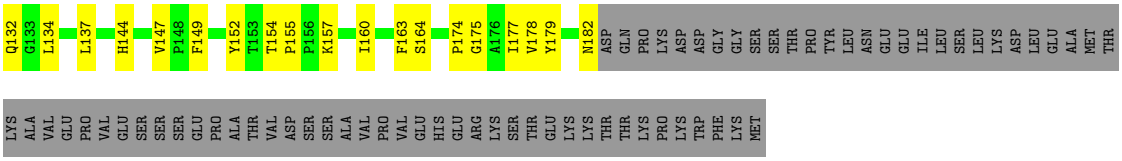
Chain D:



- Molecule 2: Plant UBX domain-containing protein 1

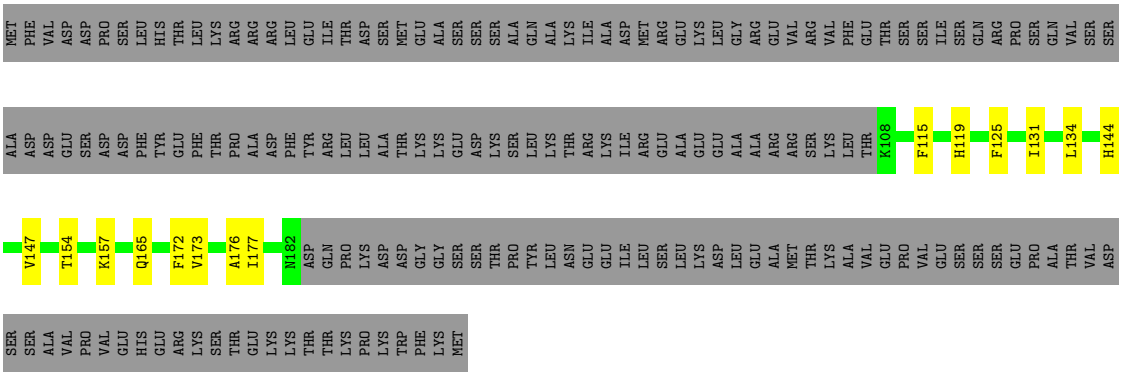
Chain E:





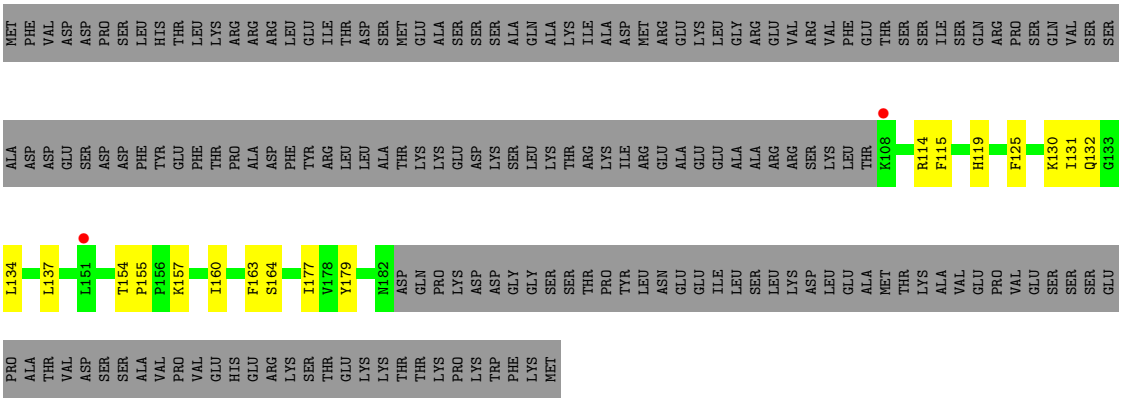
• Molecule 2: Plant UBX domain-containing protein 1

Chain F:



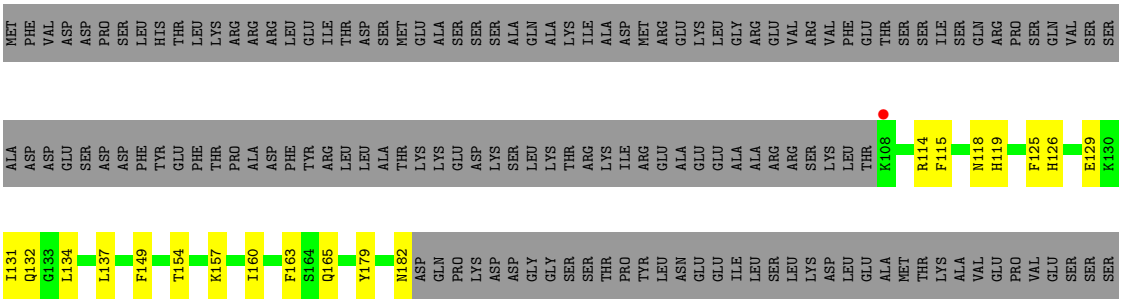
• Molecule 2: Plant UBX domain-containing protein 1

Chain K:



• Molecule 2: Plant UBX domain-containing protein 1

Chain I:



GLU
PRO
ALA
THR
VAL
ASP
SER
SER
ALA
VAL
PRO
VAL
GLU
HIS
GLU
ARG
LYS
SER
THR
GLU
LYS
LYS
THR
THR
LYS
PRO
LYS
TRP
PHE
LYS
MET

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 31	Depositor
Cell constants a, b, c, α, β, γ	185.12Å 185.12Å 122.43Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	48.98 – 3.73 48.98 – 3.73	Depositor EDS
% Data completeness (in resolution range)	58.9 (48.98-3.73) 59.0 (48.98-3.73)	Depositor EDS
R_{merge}	0.31	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.52 (at 3.77Å)	Xtriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.208 , 0.253 0.208 , 0.250	Depositor DCC
R_{free} test set	2607 reflections (9.03%)	wwPDB-VP
Wilson B-factor (Å^2)	90.6	Xtriage
Anisotropy	0.043	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 63.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.40$, $< L^2 > = 0.22$	Xtriage
Estimated twinning fraction	0.155 for -h,-k,l 0.156 for h,-h-k,-l 0.319 for -k,-h,-l	Xtriage
Reported twinning fraction	0.470 for -k,-h,-l	Depositor
Outliers	0 of 28861 reflections	Xtriage
F_o,F_c correlation	0.90	EDS
Total number of atoms	24434	wwPDB-VP
Average B, all atoms (Å^2)	133.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.34% 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: ADP

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	0.65	0/3495	0.73	0/4723
1	B	0.65	0/3489	0.73	0/4715
1	C	0.65	0/3472	0.72	0/4690
1	T	0.65	0/3495	0.71	0/4723
1	U	0.65	0/3495	0.73	0/4723
1	V	0.65	0/3495	0.73	1/4723 (0.0%)
2	D	0.63	0/629	0.69	0/856
2	E	0.63	0/629	0.68	0/856
2	F	0.63	0/629	0.68	0/856
2	G	0.62	0/629	0.70	0/856
2	I	0.62	0/629	0.69	0/856
2	K	0.63	0/629	0.70	0/856
All	All	0.65	0/24715	0.72	1/33433 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	V	64	ARG	CG-CD-NE	5.61	123.59	111.80

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	3441	0	3492	60	4
1	B	3435	0	3487	86	0
1	C	3419	0	3473	56	0
1	T	3441	0	3492	85	1
1	U	3441	0	3492	74	0
1	V	3441	0	3492	58	3
2	D	609	0	606	11	0
2	E	609	0	606	17	0
2	F	609	0	606	10	0
2	G	609	0	606	7	0
2	I	609	0	606	11	0
2	K	609	0	606	11	0
3	A	27	0	12	3	0
3	B	27	0	12	4	0
3	C	27	0	12	2	0
3	T	27	0	12	2	0
3	U	27	0	12	1	0
3	V	27	0	12	4	0
All	All	24434	0	24636	441	4

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 9.

All (441) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:40:SER:OG	1:A:83:ARG:HB2	1.53	1.08
1:B:222:LEU:HB2	1:B:223:PRO:HD3	1.60	0.83
1:T:105:CYS:HG	1:T:173:TYR:HH	1.27	0.83
2:G:177:ILE:HG22	1:U:54:GLY:HA3	1.62	0.82
2:E:154:THR:HG22	2:E:157:LYS:HA	1.63	0.79
1:T:60:LYS:HE3	1:T:103:GLN:CD	2.04	0.78
1:T:38:VAL:CG2	2:D:155:PRO:HG3	2.12	0.78
1:T:437:ILE:HD13	1:U:229:LEU:HD13	1.66	0.77
1:A:403:THR:HB	1:A:406:HIS:CG	2.20	0.76
1:B:228:ALA:HA	1:B:231:LYS:HE2	1.68	0.75
1:V:127:THR:HB	1:V:436:THR:HG21	1.69	0.72
1:B:111:GLY:HA2	1:B:170:PRO:HG3	1.71	0.72
1:T:437:ILE:CD1	1:U:229:LEU:HD13	2.21	0.70
1:A:40:SER:OG	1:A:83:ARG:CB	2.35	0.70
1:U:335:LEU:HD11	1:U:341:VAL:HB	1.73	0.69
1:T:430:ILE:HG22	1:T:432:LEU:HG	1.75	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:T:87:VAL:HG22	1:T:198:LEU:CD1	2.22	0.69
1:U:203:TYR:CE2	1:U:261:GLU:HG2	2.28	0.69
1:C:131:PHE:HA	1:C:135:LEU:HD23	1.73	0.68
1:T:31:ALA:HA	1:T:83:ARG:HB3	1.74	0.68
1:T:111:GLY:HA2	1:T:170:PRO:CG	2.24	0.68
1:B:430:ILE:HD12	1:B:430:ILE:H	1.58	0.67
1:V:153:LEU:HD11	1:V:160:ALA:HB1	1.76	0.67
1:V:131:PHE:HA	1:V:135:LEU:HD23	1.77	0.67
1:T:250:GLY:HA3	3:T:501:ADP:N7	2.10	0.67
1:V:430:ILE:O	1:A:25:ARG:NH2	2.27	0.67
1:B:31:ALA:HA	1:B:83:ARG:HB3	1.78	0.66
1:T:38:VAL:HG21	2:D:155:PRO:HG3	1.76	0.66
1:V:30:GLU:OE2	1:V:217:LYS:NZ	2.28	0.66
1:U:249:THR:HG21	1:U:369:ILE:HG21	1.78	0.66
1:B:40:SER:HB3	1:B:83:ARG:HB2	1.77	0.66
1:T:38:VAL:HG22	2:D:155:PRO:HG3	1.77	0.66
1:T:270:ASN:HD22	1:T:304:ASP:HB3	1.60	0.66
1:U:230:PHE:HA	1:U:233:ILE:HG22	1.77	0.65
1:B:108:VAL:HG11	1:B:175:ILE:HD11	1.78	0.65
1:U:372:PRO:O	1:U:377:ARG:NH1	2.29	0.65
1:B:133:VAL:HG11	1:B:440:GLU:HG2	1.79	0.65
1:B:229:LEU:HD11	1:A:433:GLU:HG3	1.79	0.65
1:V:136:LYS:HB2	1:V:137:PRO:HD3	1.78	0.65
1:B:131:PHE:HA	1:B:135:LEU:HD23	1.78	0.65
1:T:222:LEU:HB2	1:T:223:PRO:HD3	1.79	0.65
1:B:306:LEU:HD22	1:B:345:ALA:HB1	1.78	0.65
1:B:133:VAL:CG1	1:B:440:GLU:HG2	2.27	0.64
1:U:131:PHE:HA	1:U:135:LEU:HD23	1.79	0.64
1:C:136:LYS:HB2	1:C:137:PRO:HD3	1.79	0.64
1:T:111:GLY:HA2	1:T:170:PRO:HG2	1.78	0.64
1:A:131:PHE:HA	1:A:135:LEU:HD23	1.78	0.64
1:U:425:LYS:HD3	1:U:451:ASP:OD1	1.98	0.64
1:B:250:GLY:HA2	3:B:501:ADP:O2A	1.97	0.64
1:T:35:ASP:HB3	1:T:38:VAL:HB	1.80	0.64
1:B:201:VAL:HG12	1:B:257:ALA:HB2	1.79	0.63
1:A:70:ILE:HG21	2:K:155:PRO:HD2	1.80	0.63
1:T:131:PHE:HA	1:T:135:LEU:HD23	1.81	0.63
1:T:133:VAL:HG11	1:T:440:GLU:HA	1.81	0.63
1:C:228:ALA:HA	1:C:231:LYS:HE2	1.79	0.63
1:T:90:ASN:ND2	1:T:198:LEU:CD2	2.62	0.62
1:V:244:TYR:HB2	1:V:368:ASP:HA	1.79	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:153:LEU:HD11	1:C:160:ALA:HB1	1.79	0.62
1:T:87:VAL:HG22	1:T:198:LEU:HD11	1.81	0.62
1:A:136:LYS:HB2	1:A:137:PRO:HD3	1.79	0.62
1:B:426:LYS:O	1:B:430:ILE:CD1	2.48	0.62
1:B:360:PHE:HA	1:B:364:ASP:HB3	1.82	0.61
1:U:136:LYS:HB2	1:U:137:PRO:HD3	1.83	0.61
1:C:222:LEU:HB2	1:C:223:PRO:HD3	1.81	0.61
1:V:306:LEU:HD22	1:V:345:ALA:HB1	1.83	0.61
1:B:136:LYS:HB2	1:B:137:PRO:HD3	1.83	0.61
1:T:40:SER:HB3	1:T:83:ARG:HB2	1.81	0.61
1:T:90:ASN:ND2	1:T:198:LEU:HD23	2.16	0.61
1:B:250:GLY:HA3	3:B:501:ADP:C8	2.36	0.60
1:A:403:THR:HB	1:A:406:HIS:CD2	2.35	0.60
1:A:372:PRO:O	1:A:377:ARG:NH1	2.34	0.60
2:F:154:THR:HG22	2:F:157:LYS:HA	1.83	0.60
1:B:430:ILE:HD12	1:B:430:ILE:N	2.16	0.60
2:E:131:ILE:HD13	2:E:160:ILE:HG21	1.82	0.60
1:T:153:LEU:HD11	1:T:160:ALA:HB1	1.84	0.60
1:U:385:THR:HB	1:U:390:LEU:HD11	1.84	0.60
1:B:108:VAL:HG11	1:B:175:ILE:CD1	2.32	0.60
1:T:90:ASN:HD22	1:T:198:LEU:CD2	2.15	0.60
1:U:201:VAL:HG11	1:U:253:LEU:CD1	2.32	0.60
1:B:230:PHE:HA	1:B:233:ILE:HG22	1.83	0.59
1:T:271:GLY:HA2	1:T:309:ILE:HD11	1.84	0.59
2:G:125:PHE:CZ	2:G:134:LEU:HD13	2.37	0.59
1:A:437:ILE:HD12	1:A:437:ILE:N	2.18	0.59
1:B:226:HIS:CB	1:B:229:LEU:HD12	2.33	0.59
2:G:118:ASN:OD1	1:U:110:TYR:CD1	2.56	0.59
1:A:54:GLY:HA3	2:K:177:ILE:HG22	1.85	0.59
1:A:239:ARG:NH1	1:A:335:LEU:O	2.35	0.59
1:B:347:THR:HG21	1:B:353:ILE:HD11	1.83	0.59
1:A:222:LEU:HB2	1:A:223:PRO:HD3	1.85	0.59
1:T:136:LYS:HB2	1:T:137:PRO:HD3	1.84	0.58
2:K:115:PHE:HB2	2:K:119:HIS:HB2	1.85	0.58
1:B:216:ILE:HD11	1:B:367:VAL:HG11	1.84	0.58
1:B:250:GLY:HA2	3:B:501:ADP:PA	2.44	0.58
1:A:421:GLN:HA	1:A:424:ARG:HD2	1.85	0.58
1:B:153:LEU:HD11	1:B:160:ALA:HB1	1.84	0.58
1:T:90:ASN:HD22	1:T:198:LEU:HD23	1.69	0.58
1:U:403:THR:HB	1:U:406:HIS:HB2	1.84	0.58
1:U:228:ALA:HA	1:U:231:LYS:HE2	1.84	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:132:GLN:N	2:E:163:PHE:O	2.35	0.57
1:B:54:GLY:HA3	2:F:177:ILE:HG22	1.86	0.57
1:V:143:TYR:HA	1:V:176:VAL:O	2.04	0.57
1:U:31:ALA:HA	1:U:83:ARG:HB3	1.86	0.57
1:U:239:ARG:NH1	1:U:335:LEU:O	2.38	0.57
1:T:105:CYS:SG	1:T:173:TYR:OH	2.50	0.57
1:B:116:VAL:HG12	1:B:165:VAL:HA	1.85	0.56
1:U:201:VAL:HG11	1:U:253:LEU:HD12	1.88	0.56
1:C:133:VAL:HG11	1:C:440:GLU:HA	1.87	0.56
2:K:130:LYS:HD2	2:K:164:SER:HA	1.87	0.56
2:I:132:GLN:HB2	2:I:163:PHE:HB3	1.88	0.56
1:C:244:TYR:HB2	1:C:368:ASP:HA	1.87	0.56
2:G:154:THR:HG22	2:G:157:LYS:HA	1.88	0.55
1:V:29:ASP:OD1	1:V:30:GLU:N	2.38	0.55
1:V:116:VAL:HG12	1:V:165:VAL:HA	1.87	0.55
1:T:60:LYS:HE3	1:T:103:GLN:NE2	2.21	0.55
1:C:201:VAL:HG12	1:C:257:ALA:HB2	1.89	0.55
1:T:274:ILE:HG21	1:T:286:LEU:HD21	1.88	0.55
1:B:127:THR:HB	1:B:436:THR:HG21	1.89	0.55
1:C:131:PHE:HD1	1:C:184:CYS:SG	2.30	0.55
1:U:460:ASN:OD1	1:U:461:PRO:HD2	2.07	0.55
1:B:206:ILE:HD13	1:B:254:ILE:HA	1.89	0.55
1:B:426:LYS:O	1:B:430:ILE:HD12	2.07	0.55
1:V:201:VAL:HG12	1:V:257:ALA:HB2	1.88	0.54
1:B:278:LEU:HD23	1:C:323:ARG:CD	2.37	0.54
1:V:222:LEU:HB2	1:V:223:PRO:HD3	1.88	0.54
1:U:43:GLN:HB3	1:U:44:PRO:HD3	1.89	0.54
1:B:424:ARG:HG3	1:C:222:LEU:HD11	1.89	0.54
1:U:259:ALA:HB1	1:U:266:PHE:HB2	1.88	0.54
2:D:154:THR:HG22	2:D:157:LYS:HA	1.89	0.54
1:T:228:ALA:HA	1:T:231:LYS:HE2	1.88	0.54
1:T:222:LEU:HD11	1:C:424:ARG:HG3	1.90	0.54
2:K:154:THR:HG22	2:K:157:LYS:HA	1.89	0.54
1:B:278:LEU:HD23	1:C:323:ARG:NE	2.22	0.54
1:B:206:ILE:HD11	1:B:257:ALA:HB3	1.89	0.54
1:T:87:VAL:HG22	1:T:198:LEU:HD13	1.88	0.54
1:T:122:THR:O	1:T:159:ARG:NH1	2.41	0.54
1:A:425:LYS:NZ	1:A:450:ASP:OD2	2.41	0.53
2:I:154:THR:HG22	2:I:157:LYS:HA	1.89	0.53
1:T:271:GLY:HA2	1:T:309:ILE:CD1	2.38	0.53
1:B:133:VAL:HG11	1:B:440:GLU:HA	1.91	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:U:305:GLU:OE2	1:V:359:ARG:NH1	2.42	0.53
1:C:143:TYR:HA	1:C:176:VAL:O	2.08	0.53
1:U:26:LEU:HD21	1:U:45:LYS:HE2	1.89	0.53
1:B:222:LEU:HD11	1:A:424:ARG:HE	1.74	0.52
1:T:56:THR:HA	1:T:70:ILE:HD13	1.91	0.52
1:U:201:VAL:HG12	1:U:257:ALA:HB2	1.91	0.52
1:A:228:ALA:HA	1:A:231:LYS:HE2	1.91	0.52
2:K:125:PHE:CZ	2:K:134:LEU:HD13	2.45	0.52
1:B:271:GLY:HA2	1:B:309:ILE:HG13	1.92	0.52
1:U:169:ASP:HB3	1:U:170:PRO:HD3	1.91	0.52
1:U:222:LEU:HB2	1:U:223:PRO:HD3	1.91	0.52
1:A:433:GLU:HA	1:A:433:GLU:OE1	2.09	0.52
1:T:441:VAL:O	1:T:444:SER:OG	2.24	0.52
1:C:209:CYS:HB2	1:C:213:LEU:HG	1.92	0.52
1:B:203:TYR:CE2	1:B:261:GLU:HG2	2.44	0.52
1:B:250:GLY:HA3	3:B:501:ADP:N7	2.25	0.51
2:E:130:LYS:HB3	2:E:164:SER:HA	1.92	0.51
1:B:54:GLY:HA3	2:F:177:ILE:CG2	2.41	0.51
1:A:201:VAL:HG12	1:A:257:ALA:HB2	1.92	0.51
1:C:239:ARG:NH1	1:C:335:LEU:O	2.43	0.51
1:B:433:GLU:HA	1:B:433:GLU:OE1	2.10	0.51
1:U:313:ARG:NE	1:U:354:ASP:OD2	2.43	0.51
1:V:158:MET:SD	1:A:233:ILE:HD11	2.50	0.51
1:B:222:LEU:CB	1:B:223:PRO:HD3	2.37	0.51
2:F:131:ILE:HD12	2:F:165:GLN:HB3	1.93	0.51
1:B:275:MET:HA	1:B:275:MET:CE	2.39	0.51
1:V:43:GLN:HE21	1:V:43:GLN:HA	1.76	0.51
1:U:36:ASN:ND2	1:U:138:TYR:OH	2.44	0.51
1:A:127:THR:HB	1:A:436:THR:HG21	1.92	0.51
1:A:245:GLY:O	1:A:348:ASN:HA	2.10	0.51
1:A:402:GLU:HB3	1:A:456:LEU:HD21	1.93	0.51
1:A:250:GLY:HA3	3:A:501:ADP:C8	2.46	0.50
1:C:43:GLN:HB3	1:C:44:PRO:HD3	1.93	0.50
2:D:125:PHE:CZ	2:D:134:LEU:HD13	2.46	0.50
1:U:306:LEU:HD22	1:U:345:ALA:HB1	1.92	0.50
1:V:207:GLY:H	3:V:501:ADP:HN62	1.58	0.50
2:E:134:LEU:O	2:E:137:LEU:HB3	2.10	0.50
1:B:159:ARG:HA	1:B:387:ASN:HD22	1.77	0.50
1:A:434:ASP:O	1:A:435:GLU:HG2	2.11	0.50
1:T:347:THR:HG21	1:T:353:ILE:HD11	1.94	0.50
1:U:111:GLY:HA2	1:U:170:PRO:HG2	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:U:133:VAL:HG11	1:U:440:GLU:HA	1.94	0.50
1:V:84:MET:HB2	1:V:88:VAL:HG21	1.94	0.50
1:V:169:ASP:HB3	1:V:170:PRO:HD3	1.94	0.50
1:C:131:PHE:HD1	1:C:184:CYS:HG	1.56	0.50
2:I:114:ARG:HD2	2:I:179:TYR:CE2	2.47	0.50
1:B:385:THR:HB	1:B:390:LEU:HD11	1.93	0.50
1:C:98:ASP:OD1	1:C:225:ARG:NH2	2.44	0.50
1:B:29:ASP:OD1	1:B:30:GLU:N	2.44	0.49
1:T:53:ARG:NH1	2:D:171:GLY:O	2.45	0.49
1:A:302:PHE:HA	1:A:344:MET:O	2.12	0.49
1:B:362:ARG:NH2	1:A:305:GLU:OE2	2.46	0.49
1:A:203:TYR:CE2	1:A:261:GLU:HG2	2.47	0.49
1:U:271:GLY:HA2	1:U:309:ILE:HG13	1.95	0.49
1:A:169:ASP:HB3	1:A:170:PRO:HD3	1.95	0.49
1:T:64:ARG:HG3	1:T:64:ARG:O	2.12	0.49
1:B:248:GLY:HA3	1:C:360:PHE:CE1	2.48	0.49
1:U:40:SER:HB3	1:U:83:ARG:HB2	1.94	0.49
1:V:117:LEU:HG	1:V:166:VAL:HG21	1.95	0.49
1:C:273:GLU:O	1:C:276:SER:OG	2.30	0.49
2:D:149:PHE:HA	2:D:182:ASN:HA	1.93	0.49
1:U:153:LEU:HD11	1:U:160:ALA:HB1	1.95	0.48
1:U:250:GLY:HA3	3:U:501:ADP:C8	2.48	0.48
1:V:206:ILE:HD11	1:V:257:ALA:HB3	1.95	0.48
1:C:63:LYS:O	1:C:65:ARG:HG3	2.13	0.48
2:E:144:HIS:HB3	2:E:147:VAL:HB	1.95	0.48
1:B:169:ASP:N	1:B:170:PRO:HD2	2.29	0.48
1:T:273:GLU:OE1	1:U:330:THR:HG23	2.13	0.48
1:B:290:PHE:CE2	1:B:331:LEU:HD13	2.48	0.48
1:B:311:PRO:HG2	1:B:316:THR:HB	1.94	0.48
1:V:311:PRO:HG2	1:V:316:THR:HB	1.95	0.48
1:U:394:VAL:HG22	1:U:449:MET:HA	1.95	0.48
1:A:84:MET:HB2	1:A:88:VAL:HG21	1.95	0.48
1:U:29:ASP:OD1	1:U:30:GLU:N	2.47	0.48
1:U:378:LEU:HD23	1:U:397:GLU:HA	1.95	0.48
1:B:107:ASP:OD1	1:B:107:ASP:N	2.47	0.48
1:B:403:THR:HB	1:B:406:HIS:HB2	1.96	0.48
1:T:49:LEU:HB2	1:T:51:LEU:HG	1.96	0.48
1:T:424:ARG:O	1:T:428:ASP:HB3	2.14	0.48
1:U:424:ARG:HH11	1:V:218:GLU:HB2	1.79	0.48
1:U:143:TYR:HA	1:U:176:VAL:O	2.14	0.47
1:U:311:PRO:HG2	1:U:316:THR:HB	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:115:PHE:HB2	2:E:119:HIS:HB2	1.96	0.47
2:G:177:ILE:HG22	1:U:54:GLY:CA	2.39	0.47
1:A:31:ALA:HA	1:A:83:ARG:HB3	1.96	0.47
1:T:272:PRO:O	1:T:276:SER:N	2.44	0.47
1:B:127:THR:HB	1:B:436:THR:CG2	2.45	0.47
1:T:153:LEU:HB2	1:T:198:LEU:HD12	1.97	0.47
1:V:250:GLY:HA3	3:V:501:ADP:C8	2.48	0.47
1:C:423:ILE:O	1:C:427:MET:N	2.46	0.47
1:B:25:ARG:NH2	1:A:431:ASP:O	2.47	0.47
1:V:271:GLY:HA2	1:V:309:ILE:HG13	1.97	0.47
1:V:372:PRO:O	1:V:377:ARG:NH1	2.48	0.47
1:V:111:GLY:HA2	1:V:170:PRO:HG2	1.96	0.47
1:C:249:THR:HG21	1:C:369:ILE:HG22	1.96	0.47
1:C:250:GLY:HA3	3:C:501:ADP:N7	2.29	0.47
1:C:287:ARG:HD2	1:C:327:GLN:HE22	1.80	0.47
1:U:433:GLU:HA	1:U:433:GLU:OE1	2.15	0.47
2:I:149:PHE:HA	2:I:182:ASN:HA	1.97	0.47
1:T:26:LEU:HD22	1:T:80:GLU:O	2.15	0.47
1:U:159:ARG:HA	1:U:387:ASN:HD22	1.78	0.47
1:U:206:ILE:HD13	1:U:254:ILE:HA	1.97	0.46
1:B:63:LYS:O	1:B:65:ARG:HG3	2.15	0.46
1:C:424:ARG:O	1:C:428:ASP:HB3	2.15	0.46
2:K:114:ARG:NH1	2:K:179:TYR:OH	2.48	0.46
1:C:54:GLY:HA3	2:E:177:ILE:HG22	1.98	0.46
1:C:169:ASP:HB3	1:C:170:PRO:HD3	1.98	0.46
1:B:378:LEU:C	1:B:378:LEU:HD13	2.36	0.46
1:A:399:VAL:C	1:A:401:ASN:H	2.19	0.46
1:V:135:LEU:N	1:V:135:LEU:HD22	2.31	0.46
1:A:135:LEU:N	1:A:135:LEU:HD22	2.30	0.46
1:B:133:VAL:HG11	1:B:440:GLU:CG	2.45	0.46
1:B:313:ARG:NE	1:B:313:ARG:HA	2.31	0.46
1:T:59:LEU:HD22	1:T:102:ILE:HG22	1.97	0.46
1:U:39:VAL:HG23	1:U:71:VAL:HA	1.98	0.46
1:A:396:LEU:O	1:A:400:ALA:N	2.28	0.46
1:A:153:LEU:HD11	1:A:160:ALA:HB1	1.98	0.46
1:V:203:TYR:CE2	1:V:261:GLU:HG2	2.51	0.46
1:T:270:ASN:ND2	1:T:304:ASP:OD2	2.49	0.46
1:V:285:ASN:HD22	1:V:285:ASN:HA	1.67	0.46
1:B:43:GLN:HB3	1:B:44:PRO:HD3	1.97	0.45
1:T:60:LYS:NZ	1:T:103:GLN:OE1	2.45	0.45
1:U:308:ALA:O	1:V:322:ARG:NH2	2.49	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:V:51:LEU:HD21	1:V:104:PRO:HG3	1.97	0.45
1:A:402:GLU:CB	1:A:456:LEU:HD21	2.46	0.45
1:C:311:PRO:O	1:C:354:ASP:HB2	2.16	0.45
1:T:131:PHE:HD2	1:T:184:CYS:HB2	1.81	0.45
1:T:244:TYR:OH	1:T:358:ARG:NH2	2.50	0.45
1:T:45:LYS:HE3	1:T:49:LEU:HD11	1.98	0.45
1:B:427:MET:HA	1:B:430:ILE:HD13	1.98	0.45
1:C:52:PHE:CD2	2:E:175:GLY:HA3	2.51	0.45
1:C:202:GLY:N	1:C:205:ASP:OD2	2.50	0.45
2:I:115:PHE:HB2	2:I:119:HIS:HB2	1.98	0.45
1:T:59:LEU:CD2	1:T:102:ILE:HG22	2.47	0.45
1:T:430:ILE:H	1:T:430:ILE:HD12	1.81	0.45
1:V:220:VAL:C	1:V:223:PRO:HD2	2.37	0.45
1:C:52:PHE:HD2	2:E:175:GLY:HA3	1.80	0.45
1:B:391:ALA:HB3	1:B:394:VAL:HG23	1.99	0.45
1:T:79:ASP:OD1	1:T:79:ASP:N	2.50	0.45
1:T:148:LYS:HE2	1:T:166:VAL:O	2.17	0.45
1:T:230:PHE:CZ	1:T:237:PRO:HB3	2.51	0.45
1:C:207:GLY:O	3:C:501:ADP:N6	2.46	0.45
1:B:430:ILE:HG22	1:B:432:LEU:HD13	1.98	0.45
1:T:43:GLN:HB3	1:T:44:PRO:HD3	1.98	0.45
1:T:385:THR:HB	1:T:390:LEU:HD11	1.98	0.45
1:C:111:GLY:HA2	1:C:170:PRO:HG2	1.98	0.45
1:T:60:LYS:HE3	1:T:103:GLN:OE1	2.17	0.45
1:V:59:LEU:HD22	1:V:102:ILE:HG22	1.99	0.45
1:C:33:ASN:OD1	1:C:34:GLU:N	2.50	0.45
1:B:135:LEU:N	1:B:135:LEU:HD22	2.31	0.44
1:V:244:TYR:HE2	1:V:366:GLU:HB3	1.82	0.44
1:A:54:GLY:HA3	2:K:177:ILE:CG2	2.47	0.44
1:B:354:ASP:OD1	1:B:355:PRO:HD2	2.17	0.44
2:G:118:ASN:OD1	1:U:110:TYR:CE1	2.69	0.44
1:T:201:VAL:HG12	1:T:257:ALA:HB2	2.00	0.44
1:T:249:THR:HG21	1:T:369:ILE:HG22	2.00	0.44
1:U:89:ARG:NH1	1:U:261:GLU:OE2	2.50	0.44
1:C:96:LEU:HD12	1:C:96:LEU:N	2.32	0.44
1:B:307:ASP:N	1:B:307:ASP:OD1	2.50	0.44
1:U:201:VAL:HG11	1:U:253:LEU:HD11	1.99	0.44
1:T:372:PRO:O	1:T:377:ARG:NH1	2.50	0.44
1:V:424:ARG:O	1:V:428:ASP:HB3	2.18	0.44
1:A:274:ILE:HG21	1:A:286:LEU:HD21	2.00	0.44
2:F:125:PHE:CZ	2:F:134:LEU:HD13	2.53	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:T:250:GLY:HA3	3:T:501:ADP:C8	2.53	0.44
1:U:168:THR:HB	1:U:174:CYS:SG	2.57	0.44
1:V:127:THR:CB	1:V:436:THR:HG21	2.42	0.44
1:A:357:LEU:O	1:A:363:PHE:HB2	2.18	0.44
1:V:118:PRO:HB3	1:V:163:PHE:CE1	2.53	0.44
1:A:285:ASN:HD22	1:A:285:ASN:N	2.16	0.44
1:C:385:THR:HB	1:C:390:LEU:HD11	1.98	0.44
2:D:160:ILE:HD12	2:D:160:ILE:N	2.33	0.44
1:T:143:TYR:HA	1:T:176:VAL:O	2.17	0.43
1:T:271:GLY:HA2	1:T:309:ILE:HG13	2.00	0.43
1:U:59:LEU:HD22	1:U:102:ILE:HG22	2.00	0.43
1:A:118:PRO:O	1:A:188:PRO:HA	2.18	0.43
1:A:147:ARG:HA	1:A:173:TYR:HA	2.00	0.43
1:B:84:MET:HB2	1:B:88:VAL:HG21	2.00	0.43
1:T:93:ARG:NH2	1:T:195:GLU:HG2	2.33	0.43
1:V:36:ASN:ND2	1:V:138:TYR:OH	2.45	0.43
1:V:272:PRO:O	1:V:275:MET:N	2.52	0.43
1:A:43:GLN:HB3	1:A:44:PRO:HD3	2.00	0.43
1:C:131:PHE:CD1	1:C:184:CYS:SG	3.10	0.43
2:E:114:ARG:HD2	2:E:179:TYR:CE2	2.53	0.43
2:F:144:HIS:HB3	2:F:147:VAL:CG2	2.48	0.43
2:F:144:HIS:HB3	2:F:147:VAL:HB	1.99	0.43
1:A:398:GLN:O	1:A:402:GLU:HG3	2.18	0.43
1:V:207:GLY:N	3:V:501:ADP:HN62	2.16	0.43
1:C:302:PHE:HA	1:C:344:MET:O	2.18	0.43
1:B:35:ASP:OD1	1:B:144:ARG:NH1	2.51	0.43
1:U:35:ASP:HB3	1:U:38:VAL:HB	2.00	0.43
1:U:126:ILE:CG2	1:U:439:ALA:HB2	2.49	0.43
1:V:43:GLN:HB3	1:V:44:PRO:HD3	1.99	0.43
1:V:96:LEU:N	1:V:96:LEU:HD12	2.34	0.43
1:V:250:GLY:HA2	3:V:501:ADP:PA	2.59	0.43
1:A:35:ASP:HB3	1:A:38:VAL:HB	1.99	0.43
2:D:166:ASP:OD1	2:D:169:SER:HB2	2.19	0.43
1:B:120:ASP:N	1:B:120:ASP:OD1	2.52	0.43
1:U:248:GLY:HA3	1:V:360:PHE:CE2	2.54	0.43
1:A:384:HIS:NE2	3:A:501:ADP:H2	2.17	0.43
1:C:95:ARG:HD2	1:C:261:GLU:O	2.19	0.43
1:B:133:VAL:HG13	1:B:440:GLU:HG2	2.00	0.43
1:B:235:VAL:HG11	1:A:420:LEU:HG	2.01	0.43
1:T:135:LEU:HD22	1:T:135:LEU:N	2.33	0.43
1:V:347:THR:HG21	1:V:353:ILE:HD11	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:30:GLU:OE2	1:C:217:LYS:NZ	2.37	0.43
1:C:135:LEU:HD22	1:C:135:LEU:N	2.34	0.43
1:B:244:TYR:HB2	1:B:368:ASP:HA	1.99	0.43
1:C:35:ASP:HB3	1:C:38:VAL:HB	2.00	0.43
1:B:161:VAL:HG12	1:B:163:PHE:CE2	2.54	0.42
1:T:202:GLY:N	1:T:205:ASP:OD2	2.50	0.42
1:B:108:VAL:CG1	1:B:175:ILE:CD1	2.97	0.42
1:B:125:GLY:HA3	1:C:232:ALA:HB2	2.01	0.42
1:T:169:ASP:HB3	1:T:170:PRO:HD3	2.01	0.42
1:C:63:LYS:O	1:C:64:ARG:HG2	2.18	0.42
2:G:115:PHE:HB2	2:G:119:HIS:HB2	2.00	0.42
1:T:239:ARG:NH1	1:T:335:LEU:O	2.53	0.42
1:T:380:ILE:O	1:T:383:ILE:HB	2.18	0.42
1:A:133:VAL:HG11	1:A:440:GLU:HA	2.01	0.42
1:B:249:THR:HG21	1:B:369:ILE:HG21	2.01	0.42
1:T:327:GLN:O	1:T:331:LEU:HG	2.19	0.42
1:U:394:VAL:HG22	1:U:449:MET:CA	2.49	0.42
1:A:376:GLY:O	1:A:379:GLU:HB3	2.20	0.42
2:E:137:LEU:HD23	2:E:137:LEU:C	2.40	0.42
1:U:427:MET:HE2	1:U:445:LEU:HD21	2.01	0.42
1:U:126:ILE:HG23	1:U:439:ALA:HB2	2.02	0.42
1:U:252:THR:HA	1:U:302:PHE:CZ	2.54	0.42
1:A:337:GLN:N	1:A:337:GLN:CD	2.73	0.42
1:B:285:ASN:HD22	1:B:285:ASN:HA	1.54	0.42
1:T:409:ALA:HB1	1:U:360:PHE:CD2	2.54	0.42
1:U:135:LEU:N	1:U:135:LEU:HD22	2.34	0.42
1:A:252:THR:HA	1:A:302:PHE:CE2	2.54	0.42
2:E:149:PHE:HA	2:E:182:ASN:HA	2.00	0.42
2:I:125:PHE:CZ	2:I:134:LEU:HD13	2.55	0.42
1:U:133:VAL:HG11	1:U:440:GLU:HG2	2.00	0.42
1:V:216:ILE:HA	1:V:219:MET:HE3	2.01	0.42
1:B:394:VAL:HG22	1:B:449:MET:N	2.35	0.42
1:T:90:ASN:O	1:T:93:ARG:NH1	2.52	0.42
1:A:390:LEU:HD23	1:A:447:VAL:CG1	2.49	0.42
2:E:109:ALA:HA	2:E:174:PRO:O	2.20	0.42
2:F:172:PHE:HD1	2:F:176:ALA:HB3	1.85	0.42
1:V:206:ILE:HG21	1:V:254:ILE:HG12	2.01	0.42
1:C:31:ALA:HA	1:C:83:ARG:HB3	2.02	0.42
1:B:89:ARG:O	1:B:93:ARG:N	2.53	0.41
1:T:43:GLN:N	1:T:44:PRO:CD	2.83	0.41
1:V:433:GLU:OE1	1:V:433:GLU:HA	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:43:GLN:OE1	2:F:173:VAL:HG22	2.21	0.41
1:T:58:LEU:HB3	1:T:103:GLN:O	2.19	0.41
1:V:70:ILE:HD11	1:V:145:PRO:HG3	2.01	0.41
1:V:88:VAL:O	1:V:92:LEU:N	2.52	0.41
1:V:252:THR:HA	1:V:302:PHE:CZ	2.55	0.41
1:A:434:ASP:C	1:A:435:GLU:HG2	2.40	0.41
2:E:125:PHE:CZ	2:E:134:LEU:HD13	2.55	0.41
1:U:206:ILE:HD11	1:U:257:ALA:CB	2.51	0.41
1:U:285:ASN:HD22	1:U:285:ASN:HA	1.67	0.41
1:U:305:GLU:OE2	1:V:362:ARG:NH2	2.52	0.41
1:V:223:PRO:HA	1:V:230:PHE:CD2	2.56	0.41
1:V:233:ILE:HD12	1:V:233:ILE:HA	1.97	0.41
1:C:206:ILE:HD11	1:C:257:ALA:HB3	2.02	0.41
1:B:372:PRO:O	1:B:377:ARG:NH1	2.53	0.41
1:T:203:TYR:CE2	1:T:261:GLU:HG2	2.55	0.41
1:V:158:MET:CE	1:A:233:ILE:HD11	2.50	0.41
2:D:134:LEU:O	2:D:137:LEU:HB3	2.19	0.41
1:B:337:GLN:H	1:B:337:GLN:CD	2.23	0.41
1:T:437:ILE:CD1	1:U:229:LEU:CD1	2.95	0.41
1:U:84:MET:HB2	1:U:88:VAL:HG21	2.02	0.41
1:A:421:GLN:HE21	1:A:425:LYS:HD2	1.84	0.41
1:C:29:ASP:OD1	1:C:30:GLU:N	2.54	0.41
1:C:56:THR:HG21	1:C:108:VAL:HG21	2.01	0.41
1:C:283:GLU:HB3	1:C:327:GLN:NE2	2.36	0.41
2:D:114:ARG:HD2	2:D:179:TYR:CE2	2.54	0.41
1:T:60:LYS:CE	1:T:103:GLN:OE1	2.68	0.41
1:V:110:TYR:CE1	2:I:118:ASN:HA	2.55	0.41
1:V:378:LEU:C	1:V:378:LEU:HD13	2.41	0.41
1:C:209:CYS:CB	1:C:213:LEU:HG	2.50	0.41
2:K:134:LEU:O	2:K:137:LEU:HB3	2.20	0.41
1:B:273:GLU:OE1	1:C:330:THR:HG23	2.21	0.41
1:B:275:MET:HA	1:B:275:MET:HE3	2.02	0.41
1:T:271:GLY:HA2	1:T:309:ILE:CG1	2.51	0.41
1:A:384:HIS:NE2	3:A:501:ADP:C2	2.88	0.41
1:A:424:ARG:O	1:A:428:ASP:HB3	2.21	0.41
1:C:70:ILE:HG13	2:E:155:PRO:HD2	2.03	0.41
1:C:307:ASP:OD1	1:C:307:ASP:N	2.54	0.41
2:F:115:PHE:HB2	2:F:119:HIS:HB2	2.03	0.41
2:I:126:HIS:ND1	2:I:129:GLU:OE2	2.54	0.41
1:U:290:PHE:CD1	1:U:331:LEU:HD13	2.56	0.41
1:T:224:LEU:HD11	1:T:264:ALA:CB	2.51	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:U:233:ILE:HD12	1:U:233:ILE:HA	1.91	0.40
2:K:131:ILE:HD13	2:K:160:ILE:HG21	2.03	0.40
2:I:137:LEU:C	2:I:137:LEU:HD23	2.42	0.40
1:U:201:VAL:CG1	1:U:253:LEU:HD11	2.50	0.40
1:C:95:ARG:NH2	1:C:196:GLU:OE1	2.54	0.40
1:B:220:VAL:C	1:B:223:PRO:HD2	2.41	0.40
1:T:321:GLU:OE2	1:U:322:ARG:HD3	2.22	0.40
2:E:113:VAL:HA	2:E:178:VAL:O	2.21	0.40
2:K:132:GLN:HB2	2:K:163:PHE:HB3	2.02	0.40
2:I:131:ILE:HD12	2:I:165:GLN:HB3	2.02	0.40
1:T:31:ALA:HB2	1:T:84:MET:N	2.36	0.40
1:A:111:GLY:HA2	1:A:170:PRO:HG2	2.03	0.40
2:I:160:ILE:HD12	2:I:160:ILE:N	2.37	0.40
1:T:28:VAL:HA	1:T:82:ILE:HG23	2.02	0.40
1:U:28:VAL:HG13	1:U:96:LEU:HA	2.03	0.40

All (4) 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:V:64:ARG:NH1	1:A:403:THR:OG1[3_654]	1.87	0.33
1:V:64:ARG:NH1	1:A:403:THR:O[3_654]	1.90	0.30
1:V:64:ARG:CZ	1:A:403:THR:OG1[3_654]	2.14	0.06
1:T:401:ASN:OD1	1:A:436:THR:OG1[2_545]	2.15	0.05

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	438/481 (91%)	415 (95%)	23 (5%)	0	100	100
1	B	437/481 (91%)	419 (96%)	18 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	433/481 (90%)	404 (93%)	29 (7%)	0	100	100
1	T	438/481 (91%)	417 (95%)	21 (5%)	0	100	100
1	U	438/481 (91%)	417 (95%)	20 (5%)	1 (0%)	47	78
1	V	438/481 (91%)	410 (94%)	27 (6%)	1 (0%)	47	78
2	D	73/251 (29%)	72 (99%)	1 (1%)	0	100	100
2	E	73/251 (29%)	70 (96%)	3 (4%)	0	100	100
2	F	73/251 (29%)	71 (97%)	2 (3%)	0	100	100
2	G	73/251 (29%)	66 (90%)	7 (10%)	0	100	100
2	I	73/251 (29%)	71 (97%)	2 (3%)	0	100	100
2	K	73/251 (29%)	70 (96%)	3 (4%)	0	100	100
All	All	3060/4392 (70%)	2902 (95%)	156 (5%)	2 (0%)	51	83

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	V	431	ASP
1	U	461	PRO

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	377/410 (92%)	374 (99%)	3 (1%)	81	89
1	B	376/410 (92%)	367 (98%)	9 (2%)	49	70
1	C	374/410 (91%)	371 (99%)	3 (1%)	81	89
1	T	377/410 (92%)	373 (99%)	4 (1%)	73	85
1	U	377/410 (92%)	371 (98%)	6 (2%)	62	79
1	V	377/410 (92%)	371 (98%)	6 (2%)	62	79
2	D	67/226 (30%)	67 (100%)	0	100	100
2	E	67/226 (30%)	66 (98%)	1 (2%)	65	81

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	F	67/226 (30%)	67 (100%)	0	100	100
2	G	67/226 (30%)	66 (98%)	1 (2%)	65	81
2	I	67/226 (30%)	67 (100%)	0	100	100
2	K	67/226 (30%)	67 (100%)	0	100	100
All	All	2660/3816 (70%)	2627 (99%)	33 (1%)	71	84

All (33) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	37	SER
1	B	79	ASP
1	B	107	ASP
1	B	171	SER
1	B	285	ASN
1	B	307	ASP
1	B	364	ASP
1	B	368	ASP
1	B	448	THR
2	G	166	ASP
1	T	79	ASP
1	T	316	THR
1	T	351	ASN
1	T	368	ASP
1	U	79	ASP
1	U	189	ILE
1	U	368	ASP
1	U	402	GLU
1	U	404	HIS
1	U	438	ASP
1	V	43	GLN
1	V	64	ARG
1	V	284	SER
1	V	285	ASN
1	V	368	ASP
1	V	373	ASP
1	A	285	ASN
1	A	316	THR
1	A	364	ASP
1	C	79	ASP
1	C	285	ASN
1	C	316	THR

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Mol	Chain	Res	Type
2	E	152	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	103	GLN
1	B	285	ASN
1	B	387	ASN
2	G	165	GLN
1	T	36	ASN
1	T	90	ASN
1	T	270	ASN
1	T	285	ASN
1	T	296	ASN
1	T	340	HIS
1	U	36	ASN
1	U	43	GLN
1	U	270	ASN
1	U	285	ASN
1	U	401	ASN
1	V	43	GLN
1	V	285	ASN
1	A	115	HIS
1	A	285	ASN
1	A	296	ASN
1	A	406	HIS
1	C	270	ASN
1	C	327	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

6 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	ADP	V	501	-	24,29,29	0.72	0	29,45,45	0.79	1 (3%)
3	ADP	A	501	-	24,29,29	0.76	0	29,45,45	0.92	2 (6%)
3	ADP	B	501	-	24,29,29	0.75	0	29,45,45	0.84	1 (3%)
3	ADP	U	501	-	24,29,29	0.75	0	29,45,45	0.78	1 (3%)
3	ADP	C	501	-	24,29,29	0.77	0	29,45,45	0.73	1 (3%)
3	ADP	T	501	-	24,29,29	0.76	0	29,45,45	0.80	1 (3%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ADP	V	501	-	-	2/12/32/32	0/3/3/3
3	ADP	A	501	-	-	4/12/32/32	0/3/3/3
3	ADP	B	501	-	-	3/12/32/32	0/3/3/3
3	ADP	U	501	-	-	3/12/32/32	0/3/3/3
3	ADP	C	501	-	-	3/12/32/32	0/3/3/3
3	ADP	T	501	-	-	5/12/32/32	0/3/3/3

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	U	501	ADP	C5-C6-N6	2.37	123.92	120.31
3	A	501	ADP	C4'-O4'-C1'	2.33	112.06	109.92
3	C	501	ADP	C5-C6-N6	2.27	123.78	120.31
3	A	501	ADP	C5-C6-N6	2.25	123.74	120.31

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	V	501	ADP	C5-C6-N6	2.24	123.73	120.31
3	T	501	ADP	C5-C6-N6	2.17	123.61	120.31
3	B	501	ADP	C5-C6-N6	2.12	123.53	120.31

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	501	ADP	C5'-O5'-PA-O3A
3	T	501	ADP	C5'-O5'-PA-O3A
3	A	501	ADP	C5'-O5'-PA-O2A
3	A	501	ADP	C5'-O5'-PA-O3A
3	C	501	ADP	C5'-O5'-PA-O2A
3	T	501	ADP	PB-O3A-PA-O1A
3	U	501	ADP	PB-O3A-PA-O1A
3	V	501	ADP	PB-O3A-PA-O1A
3	B	501	ADP	PB-O3A-PA-O2A
3	T	501	ADP	C5'-O5'-PA-O1A
3	T	501	ADP	C5'-O5'-PA-O2A
3	A	501	ADP	C5'-O5'-PA-O1A
3	C	501	ADP	C5'-O5'-PA-O1A
3	C	501	ADP	C5'-O5'-PA-O3A
3	U	501	ADP	PB-O3A-PA-O2A
3	T	501	ADP	PB-O3A-PA-O2A
3	V	501	ADP	PB-O3A-PA-O2A
3	U	501	ADP	O4'-C4'-C5'-O5'
3	B	501	ADP	PB-O3A-PA-O1A
3	A	501	ADP	O4'-C4'-C5'-O5'

There are no ring outliers.

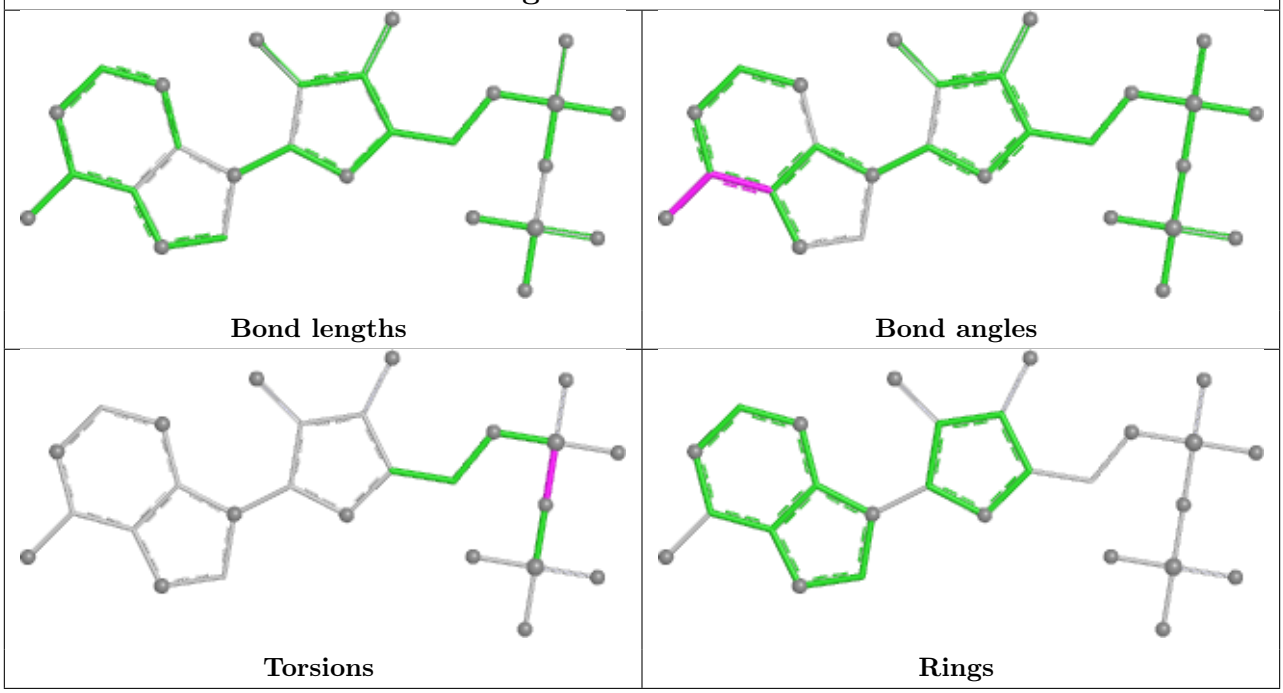
6 monomers are involved in 16 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	V	501	ADP	4	0
3	A	501	ADP	3	0
3	B	501	ADP	4	0
3	U	501	ADP	1	0
3	C	501	ADP	2	0
3	T	501	ADP	2	0

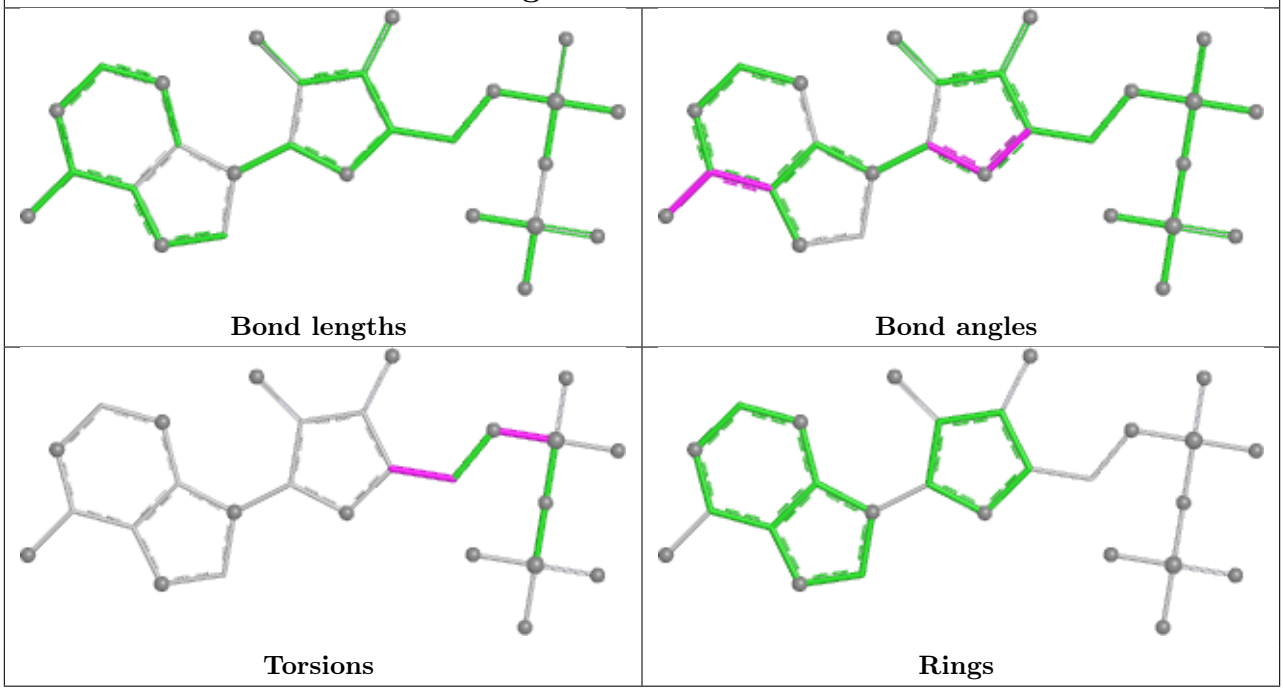
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

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.

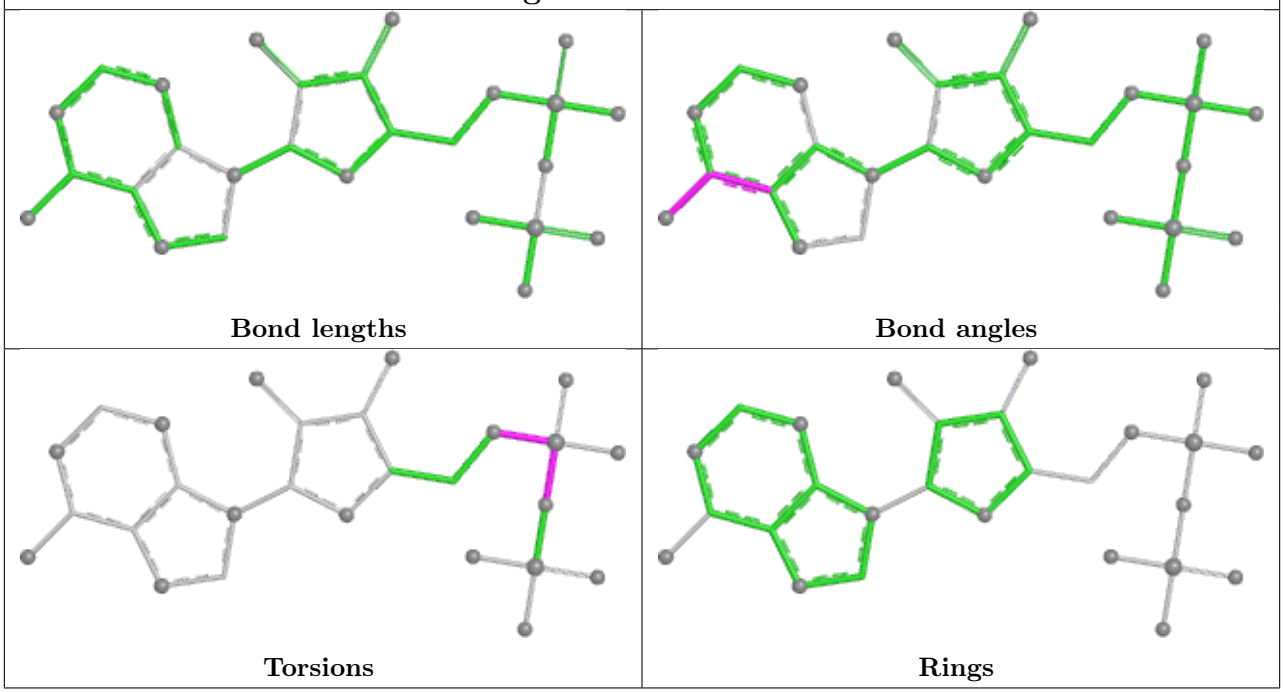
Ligand ADP V 501



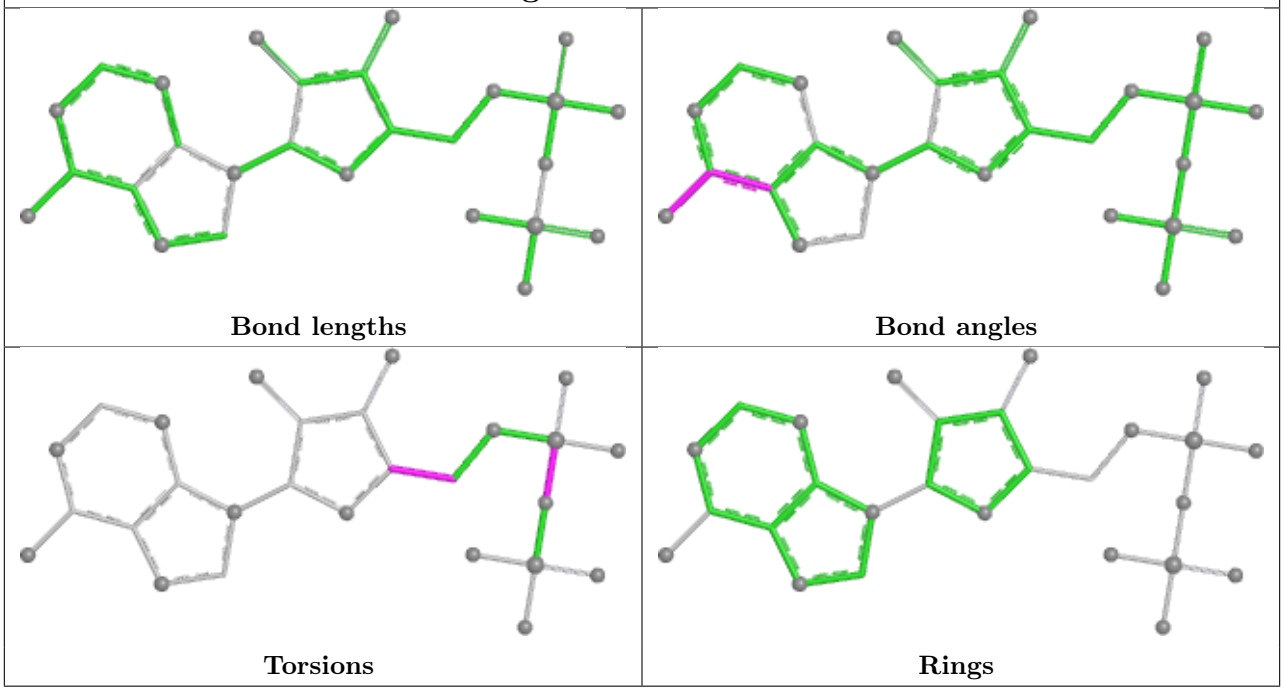
Ligand ADP A 501



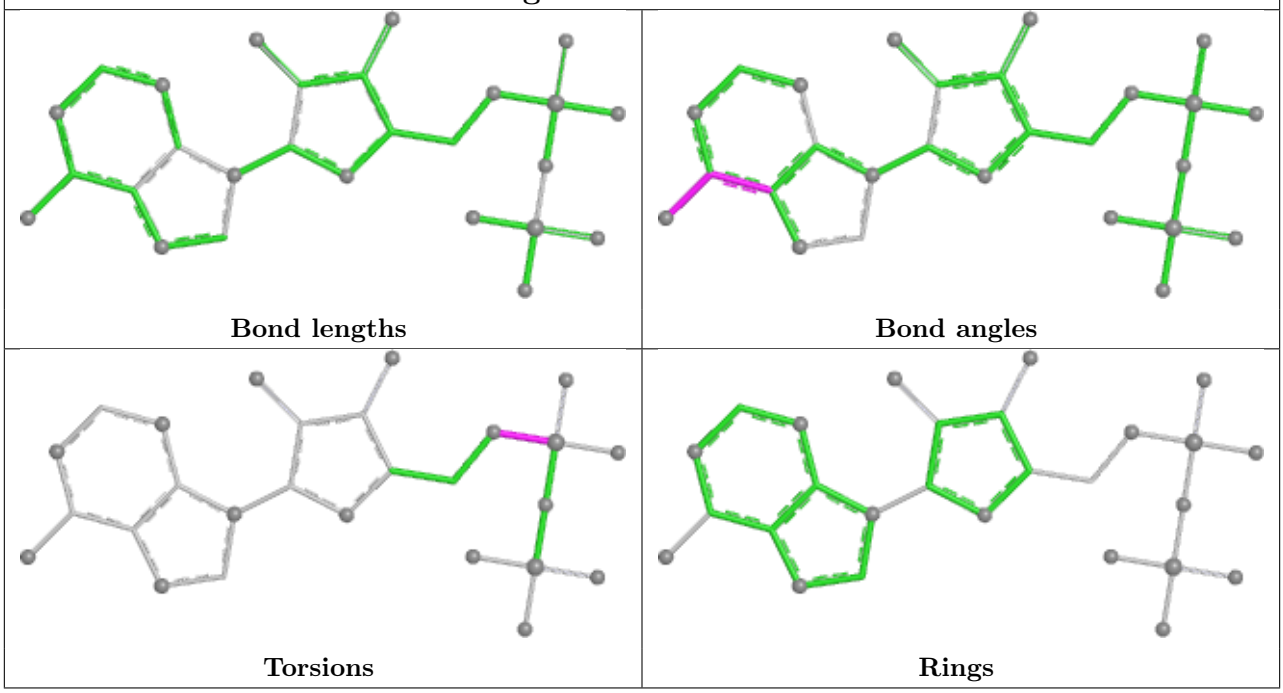
Ligand ADP B 501



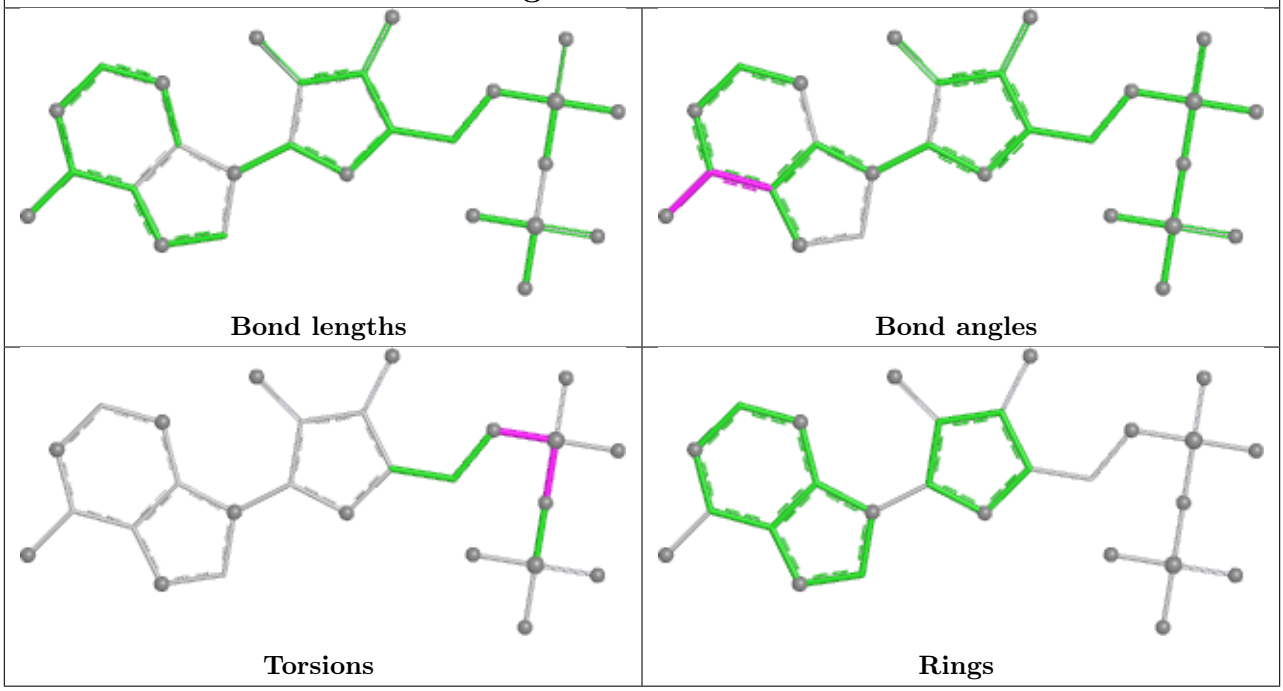
Ligand ADP U 501



Ligand ADP C 501



Ligand ADP T 501



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	440/481 (91%)	-0.39	0	100	100	75, 129, 174, 190	0
1	B	439/481 (91%)	-0.39	1 (0%)	95	95	68, 127, 180, 203	0
1	C	437/481 (90%)	-0.39	1 (0%)	95	95	73, 126, 181, 215	0
1	T	440/481 (91%)	-0.28	4 (0%)	84	80	72, 138, 198, 222	0
1	U	440/481 (91%)	-0.45	0	100	100	56, 118, 164, 203	0
1	V	440/481 (91%)	-0.37	0	100	100	69, 123, 169, 209	0
2	D	75/251 (29%)	-0.31	0	100	100	95, 155, 190, 201	0
2	E	75/251 (29%)	-0.43	0	100	100	106, 141, 174, 184	0
2	F	75/251 (29%)	-0.30	0	100	100	103, 159, 201, 215	0
2	G	75/251 (29%)	-0.57	0	100	100	78, 133, 172, 183	0
2	I	75/251 (29%)	-0.23	1 (1%)	77	72	110, 160, 217, 229	0
2	K	75/251 (29%)	0.18	2 (2%)	54	46	176, 217, 247, 266	0
All	All	3086/4392 (70%)	-0.36	9 (0%)	94	93	56, 131, 191, 266	0

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	T	429	LEU	3.5
1	C	127	THR	3.3
1	T	164	LYS	2.7
1	T	166	VAL	2.5
2	K	151	LEU	2.5
1	B	23	PRO	2.3
2	K	108	LYS	2.2
2	I	108	LYS	2.2
1	T	66	GLU	2.1

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

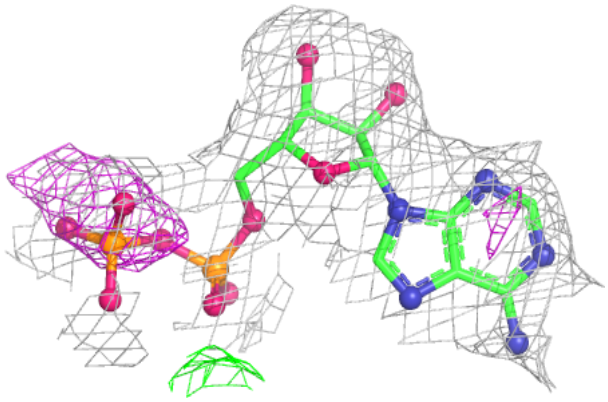
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

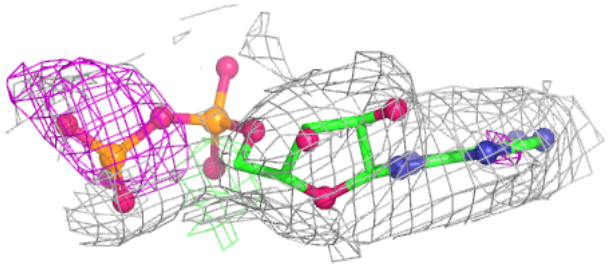
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	ADP	B	501	27/27	0.95	0.19	79,83,86,86	0
3	ADP	U	501	27/27	0.95	0.20	65,72,74,74	0
3	ADP	A	501	27/27	0.95	0.20	73,78,83,84	0
3	ADP	C	501	27/27	0.95	0.21	61,70,84,86	0
3	ADP	T	501	27/27	0.96	0.23	70,77,81,83	0
3	ADP	V	501	27/27	0.96	0.21	63,71,76,77	0

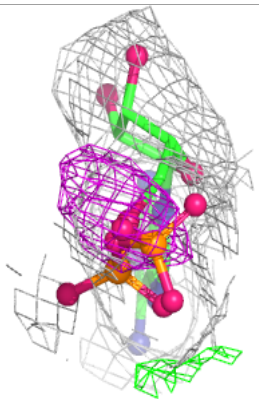
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around ADP B 501:

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

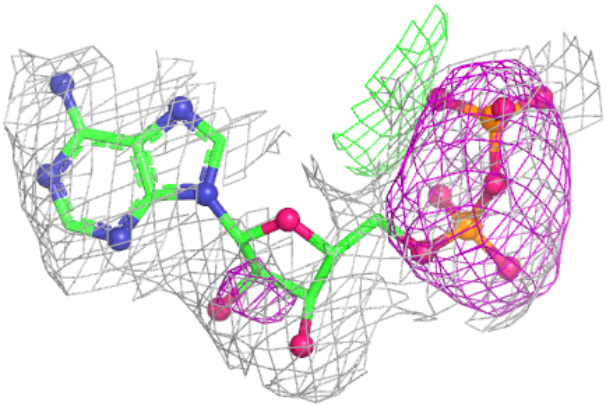


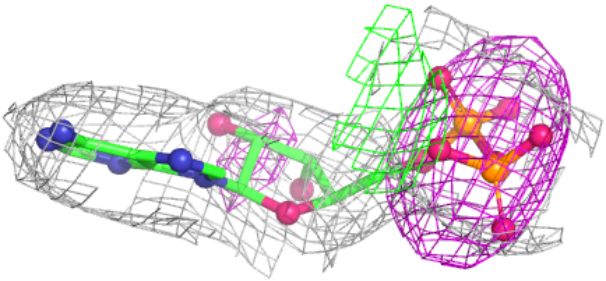


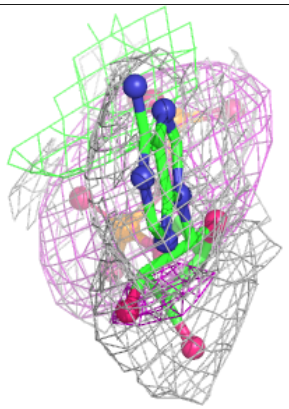


Electron density around ADP U 501:

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

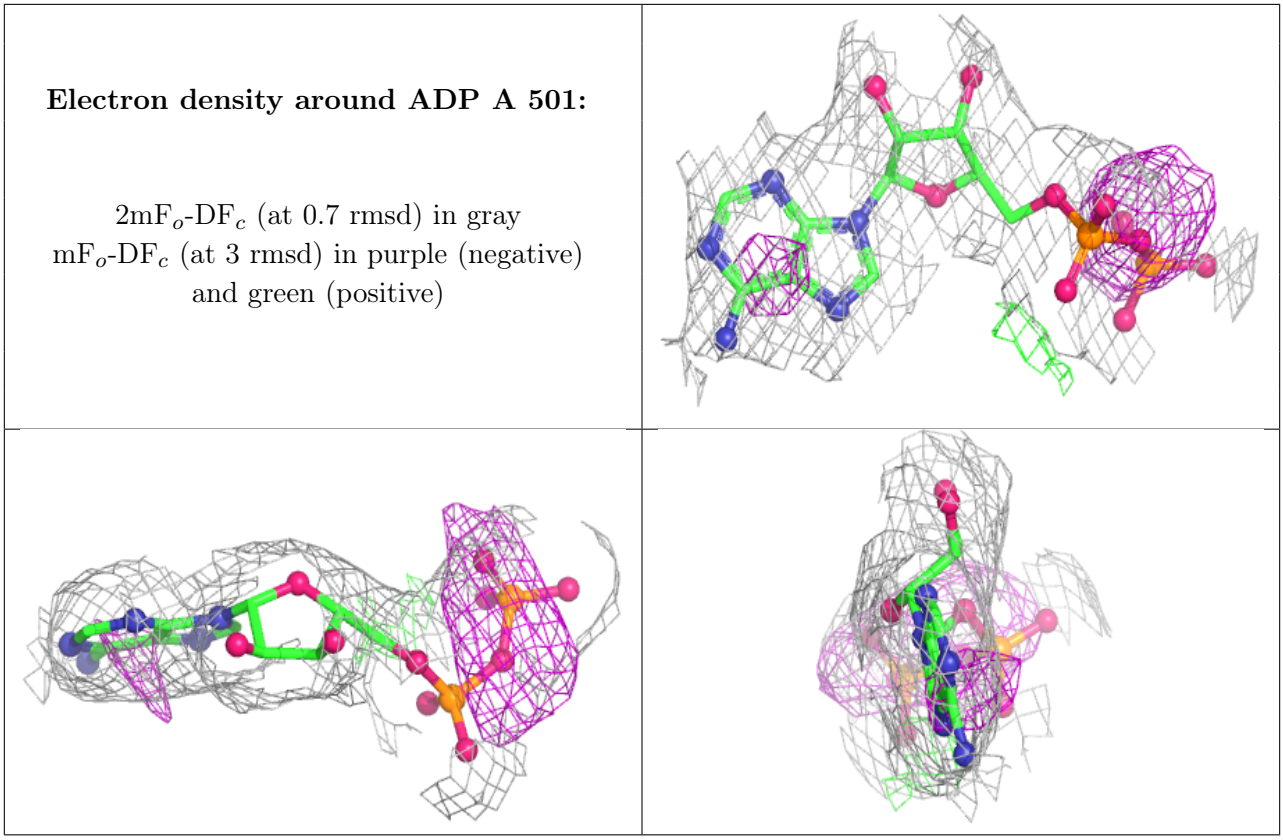






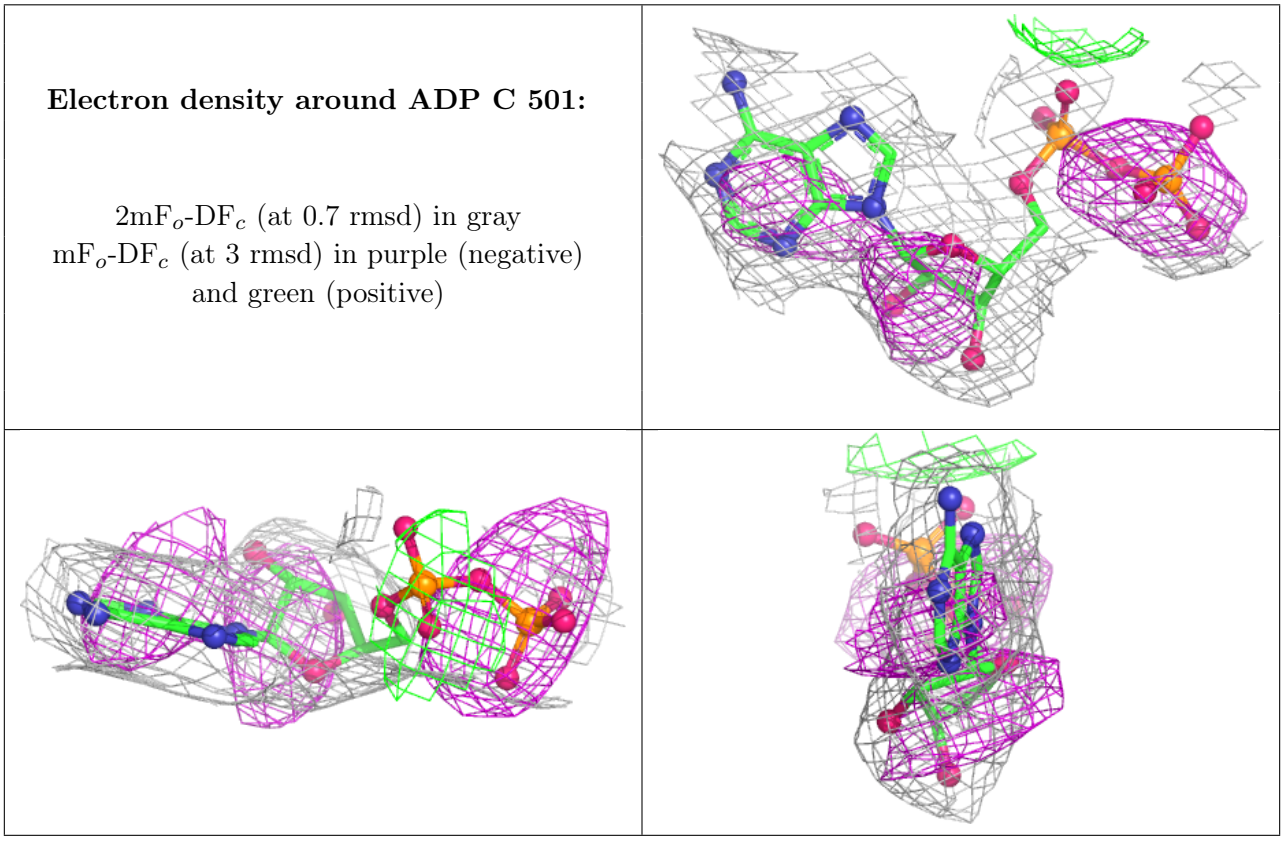
Electron density around ADP A 501:

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



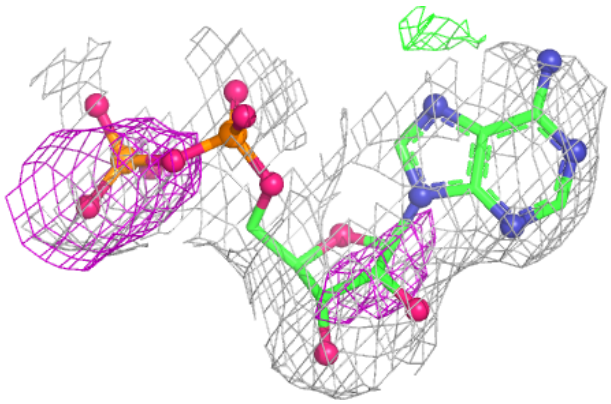
Electron density around ADP C 501:

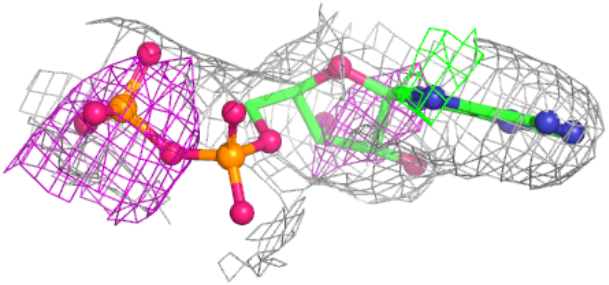
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

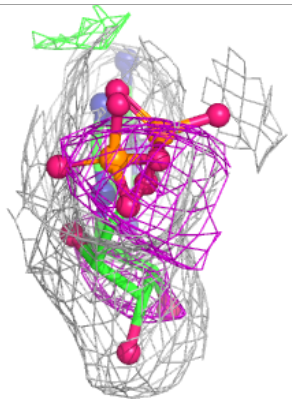


Electron density around ADP T 501:

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

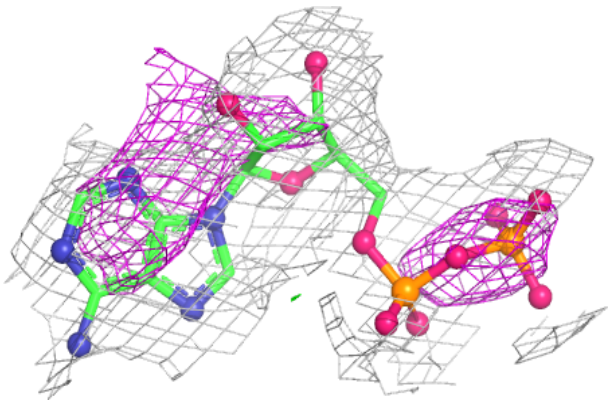


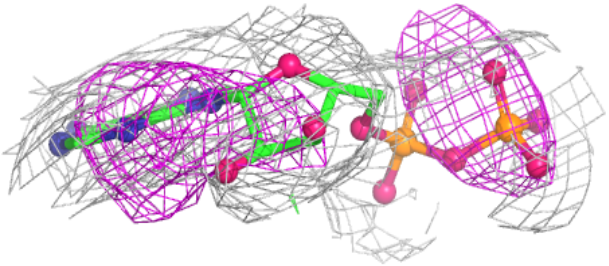


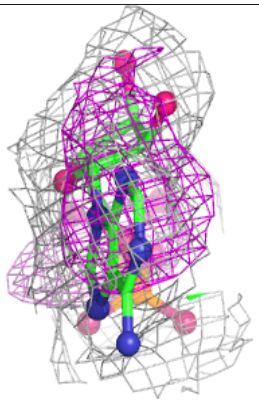


Electron density around ADP V 501:

$2mF_o$-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.