wwPDB X-ray Structure Validation Summary Report (i)

Oct 10, 2021 – 07:10 PM EDT

PDB ID	:	3GLG
Title	:	Crystal Structure of a Mutant (gammaT157A) E. coli Clamp Loader Bound to Primer-Template DNA
Authors	:	Simonetta, K.R.; Seyedin, S.N.; Kuriyan, J.
Deposited on	:	2009-03-12
Resolution	:	3.25 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 following versions of software and data (see references (i)) were used in the production of this report:

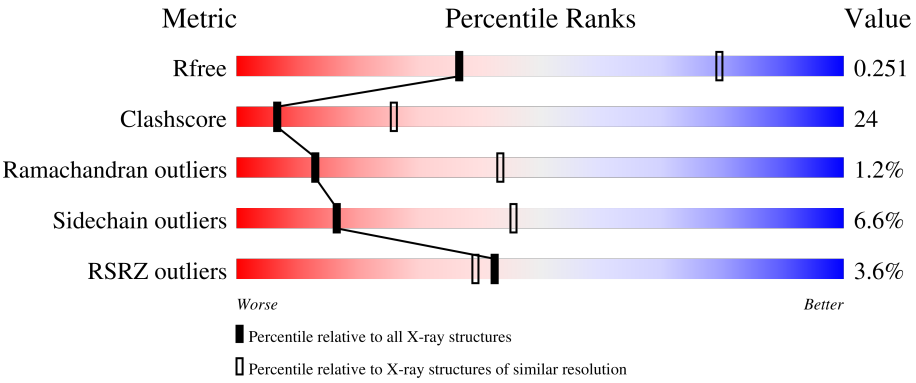
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.23.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.23.2

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 3.25 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	1191 (3.30-3.22)
Clashscore	141614	1251 (3.30-3.22)
Ramachandran outliers	138981	1229 (3.30-3.22)
Sidechain outliers	138945	1228 (3.30-3.22)
RSRZ outliers	127900	1154 (3.30-3.22)

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	343	15% 50% 43% 5%
1	F	343	7% 54% 38% 5%
2	B	395	4% 54% 35% 8%
2	C	395	3% 53% 34% 8%
2	D	395	3% 55% 32% 8%

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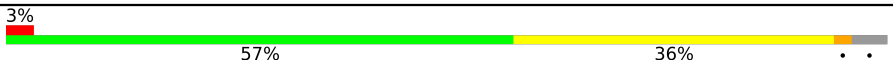
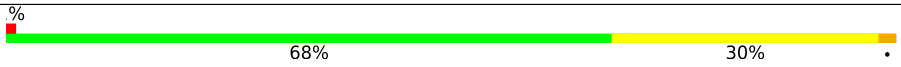
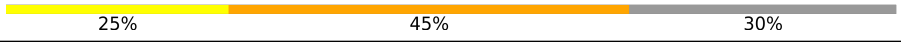
Mol	Chain	Length	Quality of chain
2	G	395	
2	H	395	
2	I	395	
3	E	334	
3	J	334	
4	K	20	
4	M	20	
5	L	10	
5	N	10	

2 Entry composition (i)

There are 9 unique types of molecules in this entry. The entry contains 28746 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 polymerase III subunit delta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	333	Total	C	N	O	S	0	0	0
			2650	1678	482	480	10			
1	F	333	Total	C	N	O	S	0	0	0
			2650	1678	482	480	10			

- Molecule 2 is a protein called DNA polymerase III subunit tau.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	364	Total	C	N	O	S	0	0	0
			2827	1778	511	522	16			
2	C	365	Total	C	N	O	S	0	0	0
			2836	1783	513	524	16			
2	D	362	Total	C	N	O	S	0	0	0
			2816	1769	510	521	16			
2	G	378	Total	C	N	O	S	0	0	0
			2939	1851	529	542	17			
2	H	365	Total	C	N	O	S	0	0	0
			2836	1783	513	524	16			
2	I	362	Total	C	N	O	S	0	0	0
			2816	1769	510	521	16			

There are 138 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-21	MET	-	expression tag	UNP P06710
B	-20	GLY	-	expression tag	UNP P06710
B	-19	SER	-	expression tag	UNP P06710
B	-18	SER	-	expression tag	UNP P06710
B	-17	HIS	-	expression tag	UNP P06710
B	-16	HIS	-	expression tag	UNP P06710
B	-15	HIS	-	expression tag	UNP P06710
B	-14	HIS	-	expression tag	UNP P06710

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-13	HIS	-	expression tag	UNP P06710
B	-12	HIS	-	expression tag	UNP P06710
B	-11	SER	-	expression tag	UNP P06710
B	-10	SER	-	expression tag	UNP P06710
B	-9	GLY	-	expression tag	UNP P06710
B	-8	LEU	-	expression tag	UNP P06710
B	-7	GLU	-	expression tag	UNP P06710
B	-6	VAL	-	expression tag	UNP P06710
B	-5	LEU	-	expression tag	UNP P06710
B	-4	PHE	-	expression tag	UNP P06710
B	-3	GLN	-	expression tag	UNP P06710
B	-2	GLY	-	expression tag	UNP P06710
B	-1	PRO	-	expression tag	UNP P06710
B	0	HIS	-	expression tag	UNP P06710
B	157	ALA	THR	engineered mutation	UNP P06710
C	-21	MET	-	expression tag	UNP P06710
C	-20	GLY	-	expression tag	UNP P06710
C	-19	SER	-	expression tag	UNP P06710
C	-18	SER	-	expression tag	UNP P06710
C	-17	HIS	-	expression tag	UNP P06710
C	-16	HIS	-	expression tag	UNP P06710
C	-15	HIS	-	expression tag	UNP P06710
C	-14	HIS	-	expression tag	UNP P06710
C	-13	HIS	-	expression tag	UNP P06710
C	-12	HIS	-	expression tag	UNP P06710
C	-11	SER	-	expression tag	UNP P06710
C	-10	SER	-	expression tag	UNP P06710
C	-9	GLY	-	expression tag	UNP P06710
C	-8	LEU	-	expression tag	UNP P06710
C	-7	GLU	-	expression tag	UNP P06710
C	-6	VAL	-	expression tag	UNP P06710
C	-5	LEU	-	expression tag	UNP P06710
C	-4	PHE	-	expression tag	UNP P06710
C	-3	GLN	-	expression tag	UNP P06710
C	-2	GLY	-	expression tag	UNP P06710
C	-1	PRO	-	expression tag	UNP P06710
C	0	HIS	-	expression tag	UNP P06710
C	157	ALA	THR	engineered mutation	UNP P06710
D	-21	MET	-	expression tag	UNP P06710
D	-20	GLY	-	expression tag	UNP P06710
D	-19	SER	-	expression tag	UNP P06710
D	-18	SER	-	expression tag	UNP P06710

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-17	HIS	-	expression tag	UNP P06710
D	-16	HIS	-	expression tag	UNP P06710
D	-15	HIS	-	expression tag	UNP P06710
D	-14	HIS	-	expression tag	UNP P06710
D	-13	HIS	-	expression tag	UNP P06710
D	-12	HIS	-	expression tag	UNP P06710
D	-11	SER	-	expression tag	UNP P06710
D	-10	SER	-	expression tag	UNP P06710
D	-9	GLY	-	expression tag	UNP P06710
D	-8	LEU	-	expression tag	UNP P06710
D	-7	GLU	-	expression tag	UNP P06710
D	-6	VAL	-	expression tag	UNP P06710
D	-5	LEU	-	expression tag	UNP P06710
D	-4	PHE	-	expression tag	UNP P06710
D	-3	GLN	-	expression tag	UNP P06710
D	-2	GLY	-	expression tag	UNP P06710
D	-1	PRO	-	expression tag	UNP P06710
D	0	HIS	-	expression tag	UNP P06710
D	157	ALA	THR	engineered mutation	UNP P06710
G	-21	MET	-	expression tag	UNP P06710
G	-20	GLY	-	expression tag	UNP P06710
G	-19	SER	-	expression tag	UNP P06710
G	-18	SER	-	expression tag	UNP P06710
G	-17	HIS	-	expression tag	UNP P06710
G	-16	HIS	-	expression tag	UNP P06710
G	-15	HIS	-	expression tag	UNP P06710
G	-14	HIS	-	expression tag	UNP P06710
G	-13	HIS	-	expression tag	UNP P06710
G	-12	HIS	-	expression tag	UNP P06710
G	-11	SER	-	expression tag	UNP P06710
G	-10	SER	-	expression tag	UNP P06710
G	-9	GLY	-	expression tag	UNP P06710
G	-8	LEU	-	expression tag	UNP P06710
G	-7	GLU	-	expression tag	UNP P06710
G	-6	VAL	-	expression tag	UNP P06710
G	-5	LEU	-	expression tag	UNP P06710
G	-4	PHE	-	expression tag	UNP P06710
G	-3	GLN	-	expression tag	UNP P06710
G	-2	GLY	-	expression tag	UNP P06710
G	-1	PRO	-	expression tag	UNP P06710
G	0	HIS	-	expression tag	UNP P06710
G	157	ALA	THR	engineered mutation	UNP P06710

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Chain	Residue	Modelled	Actual	Comment	Reference
H	-21	MET	-	expression tag	UNP P06710
H	-20	GLY	-	expression tag	UNP P06710
H	-19	SER	-	expression tag	UNP P06710
H	-18	SER	-	expression tag	UNP P06710
H	-17	HIS	-	expression tag	UNP P06710
H	-16	HIS	-	expression tag	UNP P06710
H	-15	HIS	-	expression tag	UNP P06710
H	-14	HIS	-	expression tag	UNP P06710
H	-13	HIS	-	expression tag	UNP P06710
H	-12	HIS	-	expression tag	UNP P06710
H	-11	SER	-	expression tag	UNP P06710
H	-10	SER	-	expression tag	UNP P06710
H	-9	GLY	-	expression tag	UNP P06710
H	-8	LEU	-	expression tag	UNP P06710
H	-7	GLU	-	expression tag	UNP P06710
H	-6	VAL	-	expression tag	UNP P06710
H	-5	LEU	-	expression tag	UNP P06710
H	-4	PHE	-	expression tag	UNP P06710
H	-3	GLN	-	expression tag	UNP P06710
H	-2	GLY	-	expression tag	UNP P06710
H	-1	PRO	-	expression tag	UNP P06710
H	0	HIS	-	expression tag	UNP P06710
H	157	ALA	THR	engineered mutation	UNP P06710
I	-21	MET	-	expression tag	UNP P06710
I	-20	GLY	-	expression tag	UNP P06710
I	-19	SER	-	expression tag	UNP P06710
I	-18	SER	-	expression tag	UNP P06710
I	-17	HIS	-	expression tag	UNP P06710
I	-16	HIS	-	expression tag	UNP P06710
I	-15	HIS	-	expression tag	UNP P06710
I	-14	HIS	-	expression tag	UNP P06710
I	-13	HIS	-	expression tag	UNP P06710
I	-12	HIS	-	expression tag	UNP P06710
I	-11	SER	-	expression tag	UNP P06710
I	-10	SER	-	expression tag	UNP P06710
I	-9	GLY	-	expression tag	UNP P06710
I	-8	LEU	-	expression tag	UNP P06710
I	-7	GLU	-	expression tag	UNP P06710
I	-6	VAL	-	expression tag	UNP P06710
I	-5	LEU	-	expression tag	UNP P06710
I	-4	PHE	-	expression tag	UNP P06710
I	-3	GLN	-	expression tag	UNP P06710

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Chain	Residue	Modelled	Actual	Comment	Reference
I	-2	GLY	-	expression tag	UNP P06710
I	-1	PRO	-	expression tag	UNP P06710
I	0	HIS	-	expression tag	UNP P06710
I	157	ALA	THR	engineered mutation	UNP P06710

- Molecule 3 is a protein called DNA polymerase III subunit delta'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	334	Total	C	N	O	S	0	0	0
			2601	1655	468	465	13			
3	J	334	Total	C	N	O	S	0	0	0
			2601	1655	468	465	13			

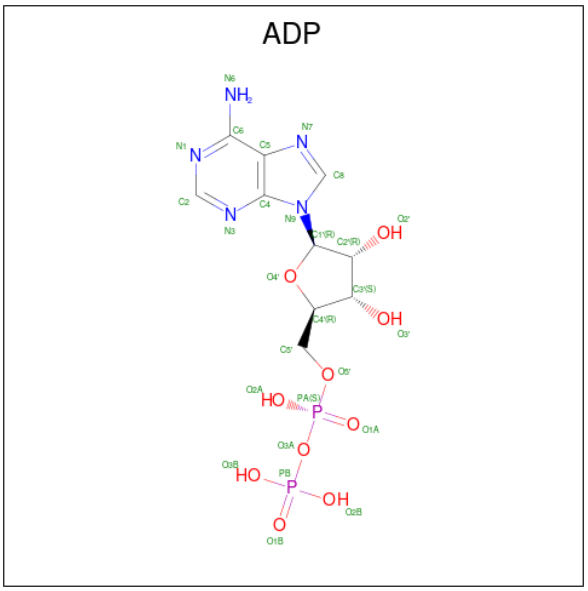
- Molecule 4 is a DNA chain called DNA (5'-D(*TP*TP*TP*TP*TP*TP*TP*TP*TP*TP*TP*TP*AP*TP*AP*GP*GP*CP*CP*AP*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	K	14	Total	C	N	O	P	0	0	0
			287	138	48	87	14			
4	M	14	Total	C	N	O	P	0	0	0
			287	138	48	87	14			

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

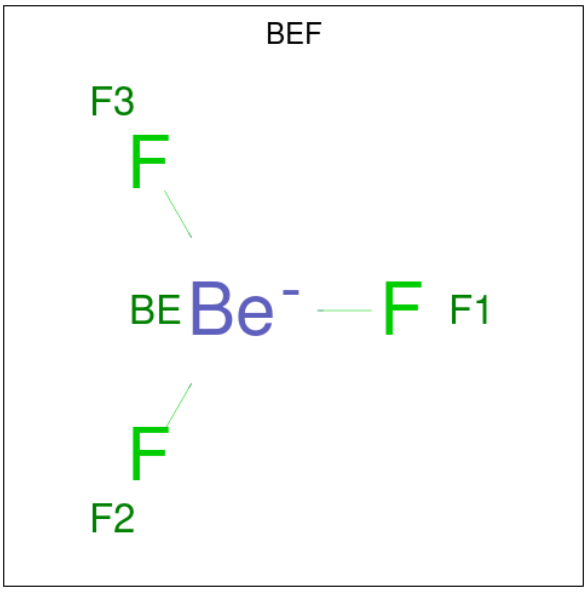
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	L	10	Total	C	N	O	P	0	0	0
			200	97	35	59	9			
5	N	10	Total	C	N	O	P	0	0	0
			200	97	35	59	9			

- Molecule 6 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
6	C	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
6	D	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
6	G	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
6	H	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
6	I	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

- Molecule 7 is BERYLLIUM TRIFLUORIDE ION (three-letter code: BEF) (formula: BeF_3).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	B	1	Total Be F 4 1 3	0	0
7	C	1	Total Be F 4 1 3	0	0
7	D	1	Total Be F 4 1 3	0	0
7	G	1	Total Be F 4 1 3	0	0
7	I	1	Total Be F 4 1 3	0	0
7	I	1	Total Be F 4 1 3	0	0

- Molecule 8 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	B	1	Total Mg 1 1	0	0
8	C	1	Total Mg 1 1	0	0
8	D	1	Total Mg 1 1	0	0
8	G	1	Total Mg 1 1	0	0
8	H	1	Total Mg 1 1	0	0
8	I	1	Total Mg 1 1	0	0

- Molecule 9 is ZINC ION (three-letter code: ZN) (formula: Zn).

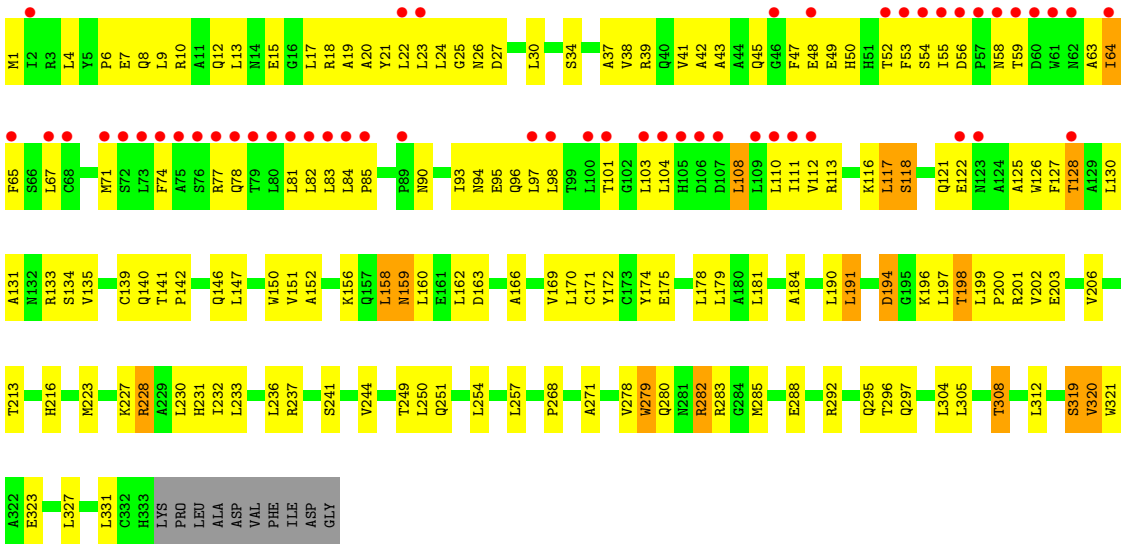
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	B	1	Total Zn 1 1	0	0
9	C	1	Total Zn 1 1	0	0
9	D	1	Total Zn 1 1	0	0
9	E	1	Total Zn 1 1	0	0
9	G	1	Total Zn 1 1	0	0
9	H	1	Total Zn 1 1	0	0
9	I	1	Total Zn 1 1	0	0
9	J	1	Total Zn 1 1	0	0

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.

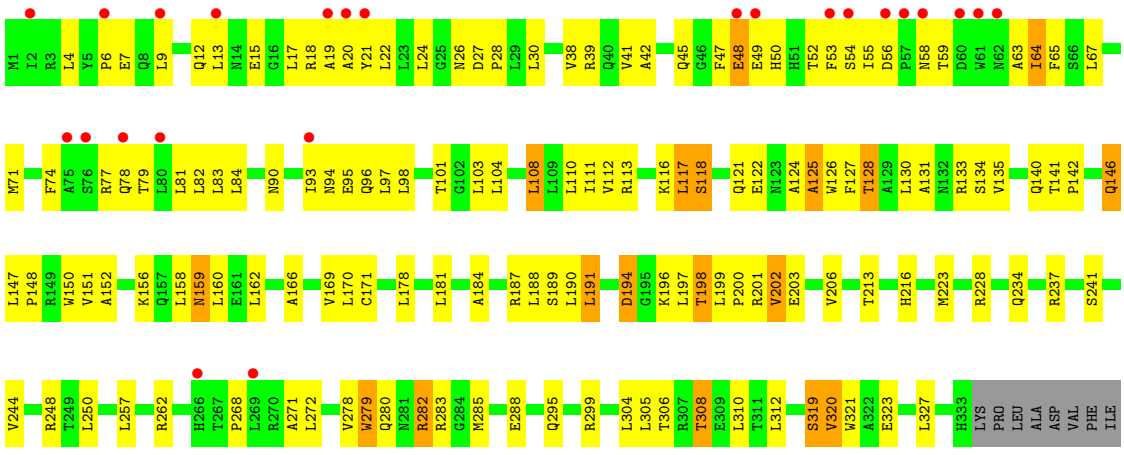
• Molecule 1: DNA polymerase III subunit delta

Chain A:



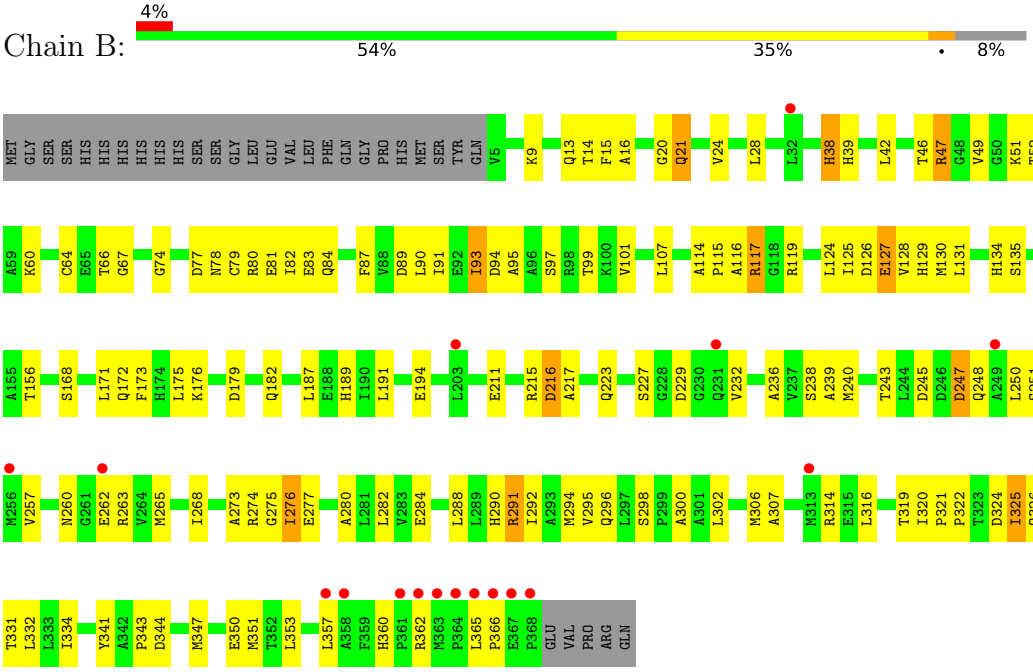
• Molecule 1: DNA polymerase III subunit delta

Chain F:



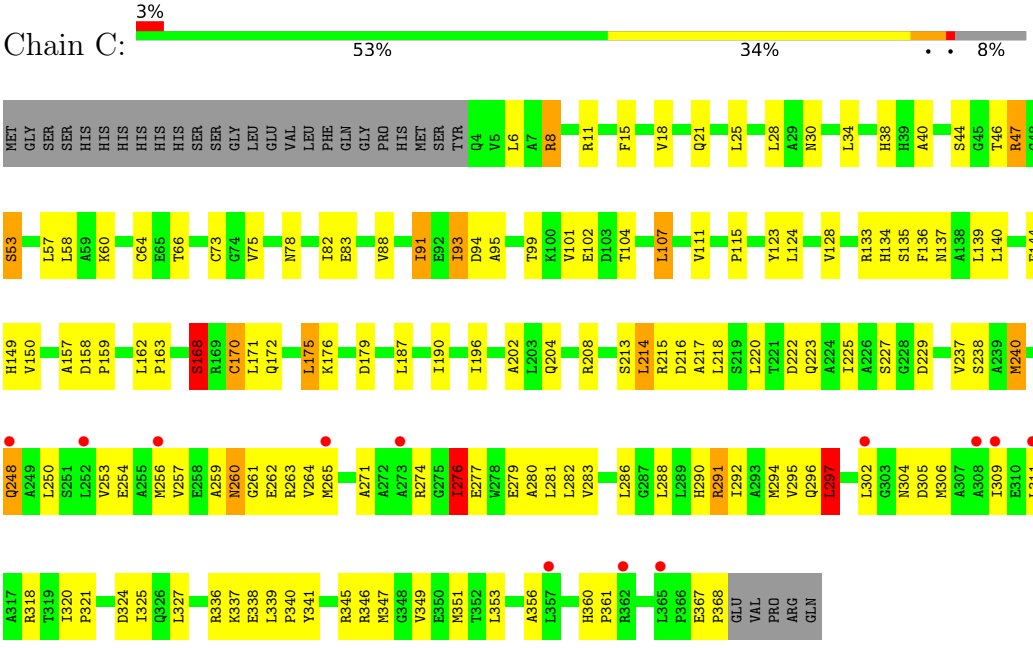
• Molecule 2: DNA polymerase III subunit tau

Chain B:



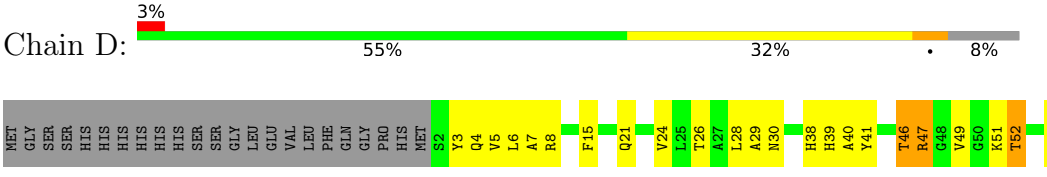
• Molecule 2: DNA polymerase III subunit tau

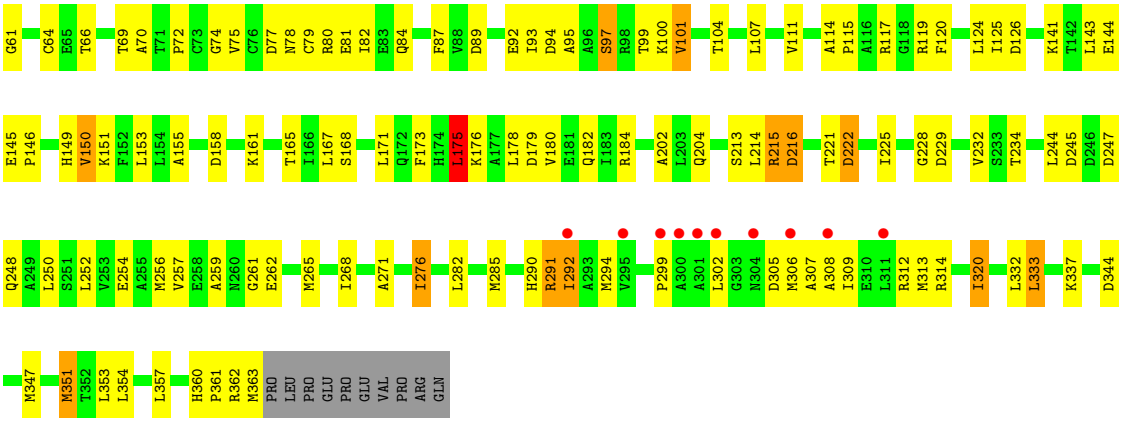
Chain C:



• Molecule 2: DNA polymerase III subunit tau

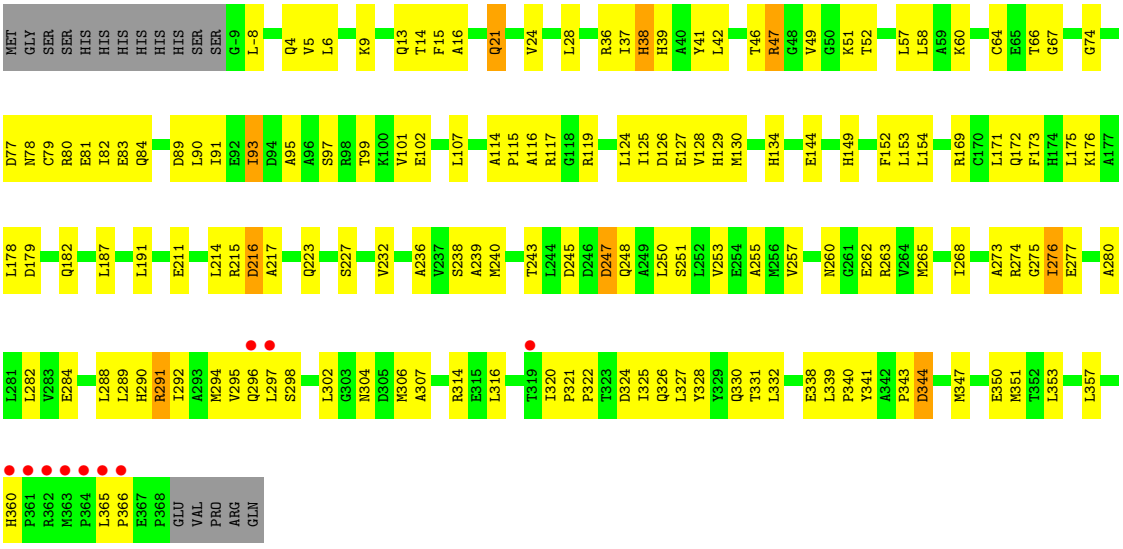
Chain D:





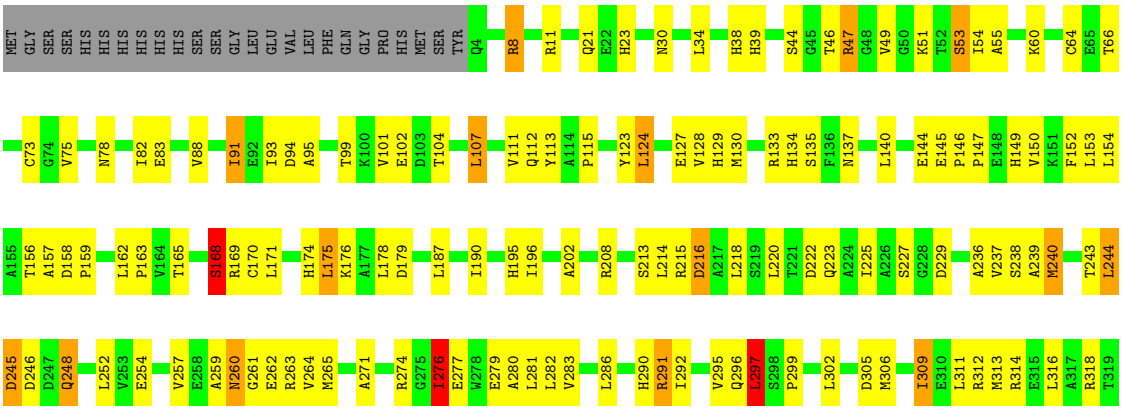
• Molecule 2: DNA polymerase III subunit tau

Chain G:



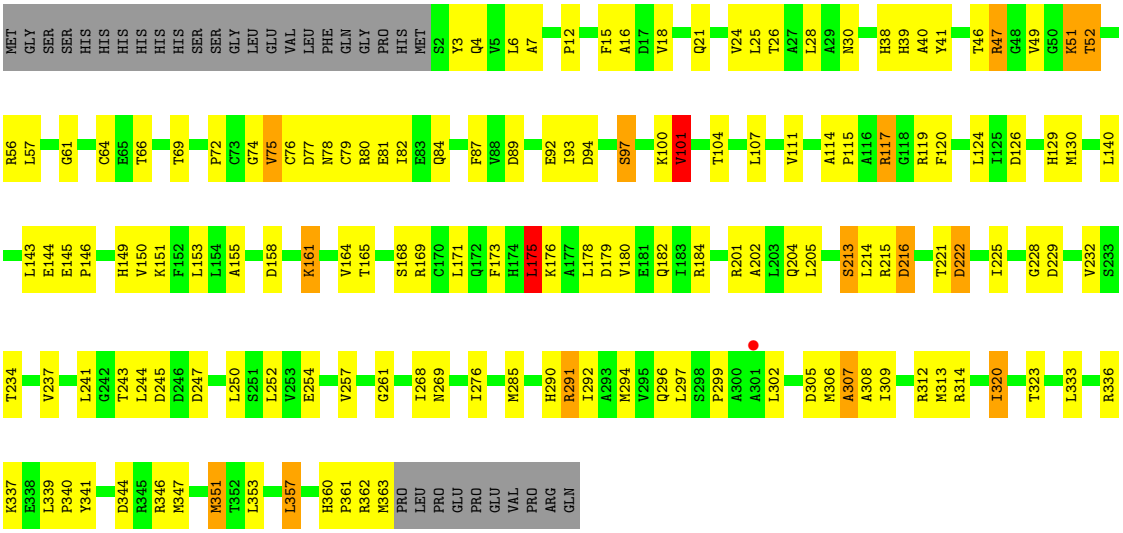
• Molecule 2: DNA polymerase III subunit tau

Chain H:



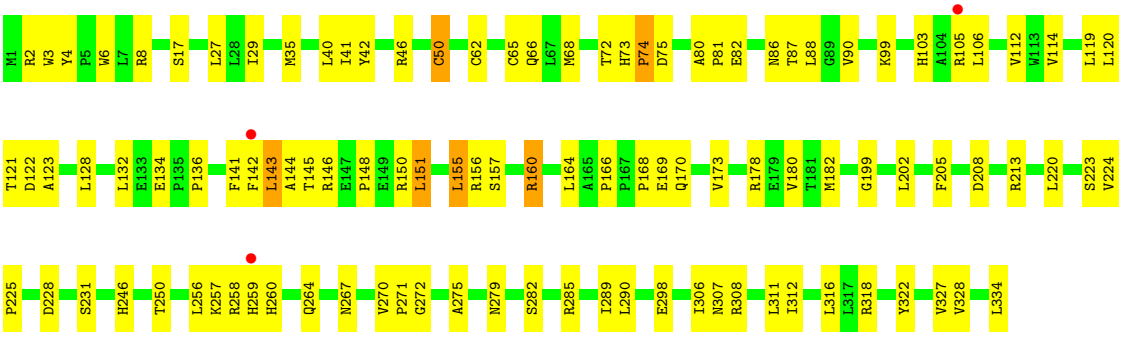
• Molecule 2: DNA polymerase III subunit tau

Chain I:



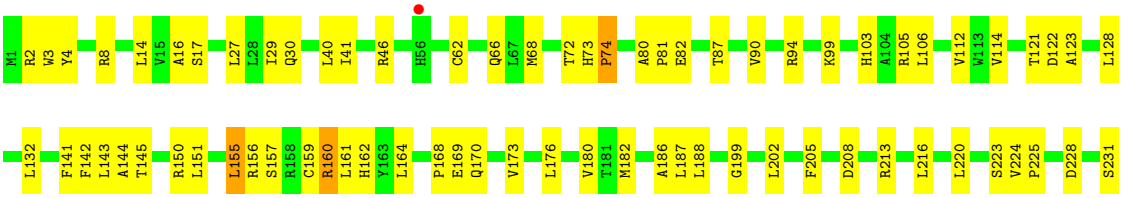
• Molecule 3: DNA polymerase III subunit delta'

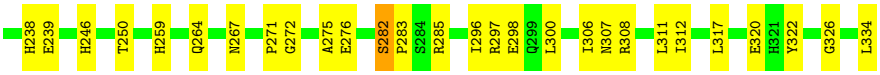
Chain E:



• Molecule 3: DNA polymerase III subunit delta'

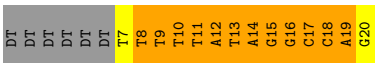
Chain J:





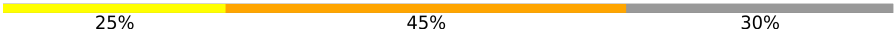
• Molecule 4: DNA (5'-D(*TP*TP*TP*TP*TP*TP*TP*TP*TP*TP*TP*TP*AP*TP*AP*GP*GP*CP*CP*AP*G)-3')

Chain K:



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

Chain M:



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

Chain L:

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

Chain N:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	100.10Å 219.10Å 274.66Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.24 – 3.25 49.24 – 3.25	Depositor EDS
% Data completeness (in resolution range)	98.6 (49.24-3.25) 98.7 (49.24-3.25)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.46 (at 3.25Å)	Xtriage
Refinement program	PHENIX (phenix.refine)	Depositor
R, R_{free}	0.224 , 0.263 0.211 , 0.251	Depositor DCC
R_{free} test set	4745 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å^2)	97.8	Xtriage
Anisotropy	0.250	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 60.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.52$, $< L^2 > = 0.36$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	28746	wwPDB-VP
Average B, all atoms (Å^2)	119.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.16% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

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

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	0.66	0/2697	0.73	0/3664
1	F	0.68	0/2697	0.73	0/3664
2	B	0.68	1/2874 (0.0%)	0.78	0/3897
2	C	0.66	1/2883 (0.0%)	0.82	2/3909 (0.1%)
2	D	0.68	0/2861	0.86	1/3876 (0.0%)
2	G	0.68	1/2990 (0.0%)	0.78	1/4054 (0.0%)
2	H	0.82	4/2883 (0.1%)	0.90	2/3909 (0.1%)
2	I	0.86	2/2861 (0.1%)	0.93	2/3876 (0.1%)
3	E	0.85	0/2666	0.89	1/3639 (0.0%)
3	J	0.84	1/2666 (0.0%)	0.88	0/3639
4	K	1.92	6/320 (1.9%)	2.63	39/492 (7.9%)
4	M	1.81	3/320 (0.9%)	2.51	21/492 (4.3%)
5	L	1.58	4/223 (1.8%)	2.69	24/342 (7.0%)
5	N	1.76	4/223 (1.8%)	2.58	25/342 (7.3%)
All	All	0.81	27/29164 (0.1%)	0.97	118/39795 (0.3%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	C	0	1
2	H	0	1
3	E	0	1
3	J	0	1
All	All	0	4

The worst 5 of 27 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	M	14	DA	C3'-O3'	-8.93	1.32	1.44
2	B	127	GLU	CG-CD	7.35	1.62	1.51
2	H	127	GLU	CD-OE1	7.06	1.33	1.25
4	K	11	DT	C3'-O3'	-7.03	1.34	1.44
4	K	14	DA	C3'-O3'	-6.89	1.34	1.44

The worst 5 of 118 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	K	10	DT	O4'-C1'-N1	-13.46	98.58	108.00
4	M	10	DT	O4'-C1'-N1	-13.27	98.71	108.00
4	K	19	DA	O4'-C1'-N9	-11.97	99.62	108.00
4	M	11	DT	O5'-P-OP2	-10.33	96.40	105.70
5	L	7	DT	N3-C4-O4	10.13	125.98	119.90

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	C	245	ASP	Peptide
3	E	264	GLN	Peptide
2	H	245	ASP	Peptide
3	J	264	GLN	Peptide

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2650	0	2703	161	0
1	F	2650	0	2703	162	0
2	B	2827	0	2877	152	1
2	C	2836	0	2884	169	0
2	D	2816	0	2861	146	0
2	G	2939	0	2985	153	0
2	H	2836	0	2884	175	1
2	I	2816	0	2861	138	1
3	E	2601	0	2603	87	1
3	J	2601	0	2603	94	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	K	287	0	161	20	0
4	M	287	0	161	17	0
5	L	200	0	115	5	0
5	N	200	0	115	6	0
6	B	27	0	12	4	0
6	C	27	0	12	3	0
6	D	27	0	12	3	0
6	G	27	0	12	4	0
6	H	27	0	12	2	0
6	I	27	0	12	3	0
7	B	4	0	0	1	0
7	C	4	0	0	0	0
7	D	4	0	0	1	0
7	G	4	0	0	1	0
7	I	8	0	0	0	0
8	B	1	0	0	0	0
8	C	1	0	0	0	0
8	D	1	0	0	0	0
8	G	1	0	0	0	0
8	H	1	0	0	0	0
8	I	1	0	0	0	0
9	B	1	0	0	0	0
9	C	1	0	0	0	0
9	D	1	0	0	0	0
9	E	1	0	0	0	0
9	G	1	0	0	0	0
9	H	1	0	0	0	0
9	I	1	0	0	0	0
9	J	1	0	0	0	0
All	All	28746	0	28588	1348	2

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 24.

The worst 5 of 1348 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)
2:H:351:MET:HE1	2:I:290:HIS:HA	1.17	1.12
2:D:362:ARG:O	2:D:363:MET:HG2	1.50	1.09
1:F:118:SER:HB3	1:F:121:GLN:HG3	1.38	1.05
2:D:361:PRO:HB3	3:J:272:GLY:HA2	1.42	1.01

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:118:SER:HB3	1:A:121:GLN:HG3	1.42	1.01

All (2) 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)
2:B:117:ARG:NH2	2:I:117:ARG:NE[2_555]	1.94	0.26
3:E:178:ARG:NH2	2:H:195:HIS:O[4_545]	2.06	0.14

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	331/343 (96%)	292 (88%)	33 (10%)	6 (2%)	8	35
1	F	331/343 (96%)	291 (88%)	34 (10%)	6 (2%)	8	35
2	B	362/395 (92%)	330 (91%)	28 (8%)	4 (1%)	14	46
2	C	363/395 (92%)	337 (93%)	22 (6%)	4 (1%)	14	46
2	D	360/395 (91%)	328 (91%)	28 (8%)	4 (1%)	14	46
2	G	376/395 (95%)	343 (91%)	30 (8%)	3 (1%)	19	52
2	H	363/395 (92%)	331 (91%)	29 (8%)	3 (1%)	19	52
2	I	360/395 (91%)	326 (91%)	28 (8%)	6 (2%)	9	36
3	E	332/334 (99%)	305 (92%)	24 (7%)	3 (1%)	17	50
3	J	332/334 (99%)	303 (91%)	26 (8%)	3 (1%)	17	50
All	All	3510/3724 (94%)	3186 (91%)	282 (8%)	42 (1%)	13	43

5 of 42 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	15	GLU
1	A	159	ASN
1	A	319	SER
2	D	307	ALA
3	E	74	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	283/291 (97%)	261 (92%)	22 (8%)	12	38
1	F	283/291 (97%)	261 (92%)	22 (8%)	12	38
2	B	300/328 (92%)	283 (94%)	17 (6%)	20	51
2	C	301/328 (92%)	276 (92%)	25 (8%)	11	36
2	D	298/328 (91%)	277 (93%)	21 (7%)	15	43
2	G	312/328 (95%)	295 (95%)	17 (5%)	22	53
2	H	301/328 (92%)	278 (92%)	23 (8%)	13	39
2	I	298/328 (91%)	279 (94%)	19 (6%)	17	47
3	E	270/270 (100%)	256 (95%)	14 (5%)	23	53
3	J	270/270 (100%)	259 (96%)	11 (4%)	30	60
All	All	2916/3090 (94%)	2725 (93%)	191 (7%)	16	45

5 of 191 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	228	ARG
2	H	168	SER
1	F	308	THR
2	G	227	SER
2	H	240	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 59 such sidechains are listed below:

Mol	Chain	Res	Type
3	E	267	ASN
3	J	56	HIS
2	G	4	GLN
3	J	54	GLN
2	I	204	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)

Of 26 ligands modelled in this entry, 14 are monoatomic - leaving 12 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	$\#\|Z\| > 2$
6	ADP	H	408	8,7	24,29,29	1.15	2 (8%)	29,45,45	1.37	5 (17%)
6	ADP	B	400	8,7	24,29,29	1.19	2 (8%)	29,45,45	1.48	6 (20%)
6	ADP	C	402	8,7	24,29,29	1.15	2 (8%)	29,45,45	1.52	5 (17%)
6	ADP	G	406	8,7	24,29,29	1.20	3 (12%)	29,45,45	1.47	5 (17%)
6	ADP	D	404	8,7	24,29,29	1.18	2 (8%)	29,45,45	1.53	5 (17%)
6	ADP	I	410	8,7	24,29,29	1.41	3 (12%)	29,45,45	1.62	6 (20%)
7	BEF	I	409	6	0,3,3	-	-	-		
7	BEF	I	411	6	0,3,3	-	-	-		

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
7	BEF	B	401	6	0,3,3	-	-	-		
7	BEF	C	403	6	0,3,3	-	-	-		
7	BEF	G	407	6	0,3,3	-	-	-		
7	BEF	D	405	6	0,3,3	-	-	-		

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
6	ADP	H	408	8,7	-	0/12/32/32	0/3/3/3
6	ADP	B	400	8,7	-	3/12/32/32	0/3/3/3
6	ADP	C	402	8,7	-	1/12/32/32	0/3/3/3
6	ADP	G	406	8,7	-	3/12/32/32	0/3/3/3
6	ADP	D	404	8,7	-	5/12/32/32	0/3/3/3
6	ADP	I	410	8,7	-	2/12/32/32	0/3/3/3

The worst 5 of 14 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	I	410	ADP	C2'-C1'	-3.69	1.48	1.53
6	C	402	ADP	C2'-C1'	-3.01	1.49	1.53
6	D	404	ADP	C2'-C1'	-2.93	1.49	1.53
6	B	400	ADP	C5-C4	2.73	1.48	1.40
6	G	406	ADP	C5-C4	2.58	1.47	1.40

The worst 5 of 32 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	C	402	ADP	N3-C2-N1	-3.88	122.61	128.68
6	I	410	ADP	PA-O3A-PB	-3.54	120.69	132.83
6	I	410	ADP	O2B-PB-O1B	3.52	124.45	110.68
6	C	402	ADP	O2B-PB-O1B	3.35	123.80	110.68
6	H	408	ADP	C4-C5-N7	-3.35	105.91	109.40

There are no chirality outliers.

5 of 14 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	B	400	ADP	C5'-O5'-PA-O2A

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Mol	Chain	Res	Type	Atoms
6	D	404	ADP	PA-O3A-PB-O3B
6	D	404	ADP	C5'-O5'-PA-O2A
6	G	406	ADP	C5'-O5'-PA-O2A
6	I	410	ADP	PA-O3A-PB-O3B

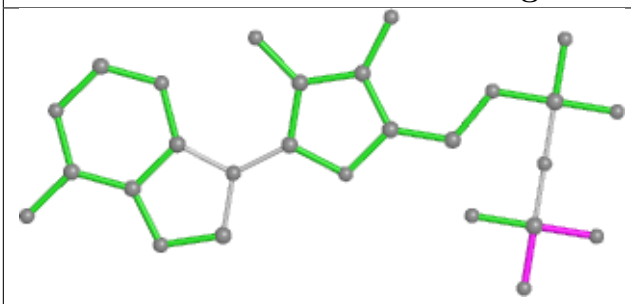
There are no ring outliers.

9 monomers are involved in 22 short contacts:

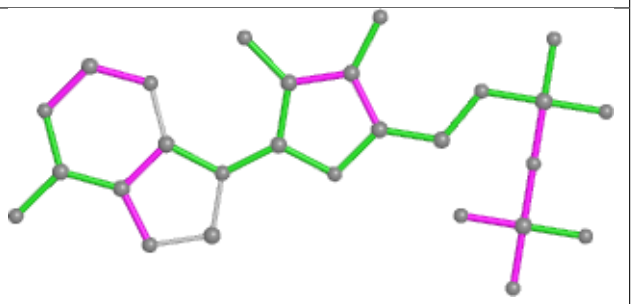
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	H	408	ADP	2	0
6	B	400	ADP	4	0
6	C	402	ADP	3	0
6	G	406	ADP	4	0
6	D	404	ADP	3	0
6	I	410	ADP	3	0
7	B	401	BEF	1	0
7	G	407	BEF	1	0
7	D	405	BEF	1	0

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

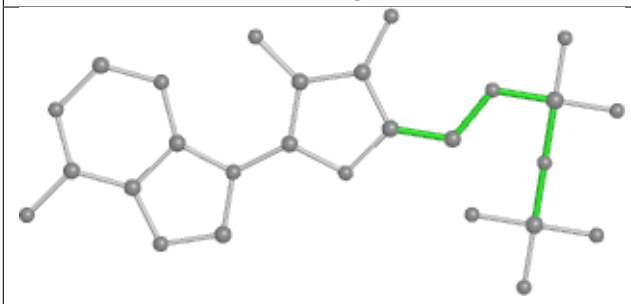
Ligand ADP H 408



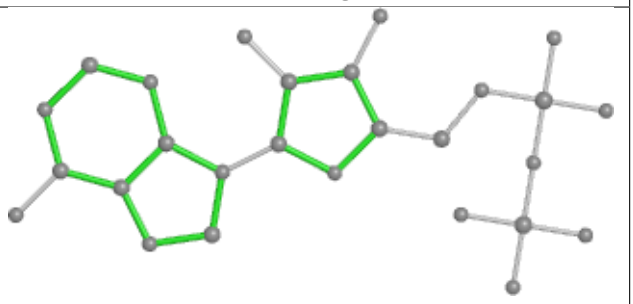
Bond lengths



Bond angles

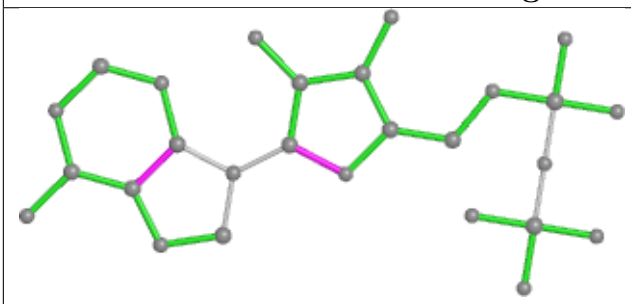


Torsions

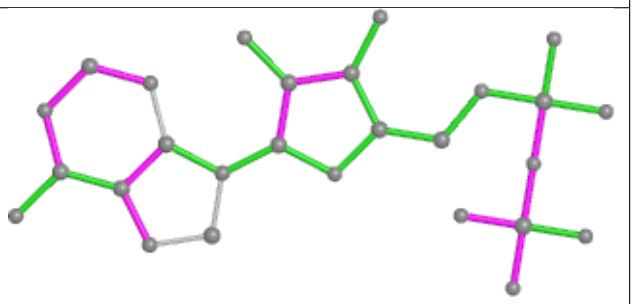


Rings

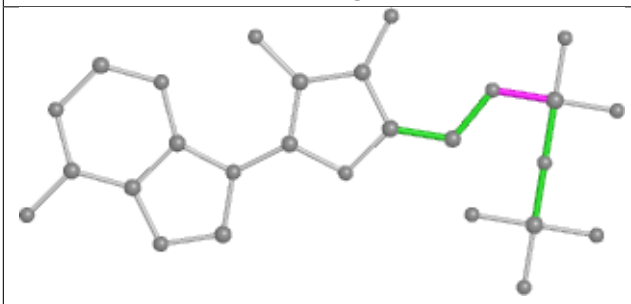
Ligand ADP B 400



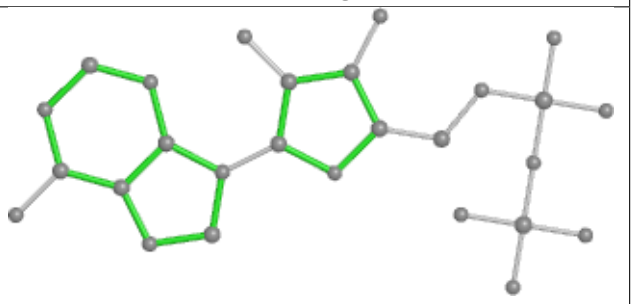
Bond lengths



Bond angles

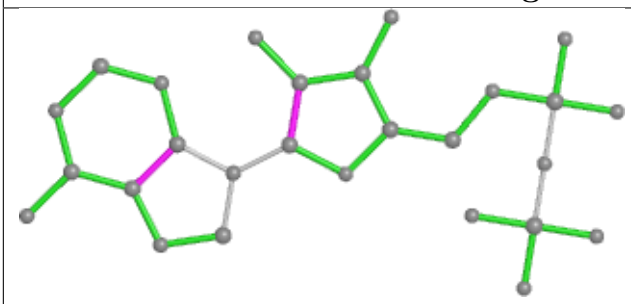


Torsions

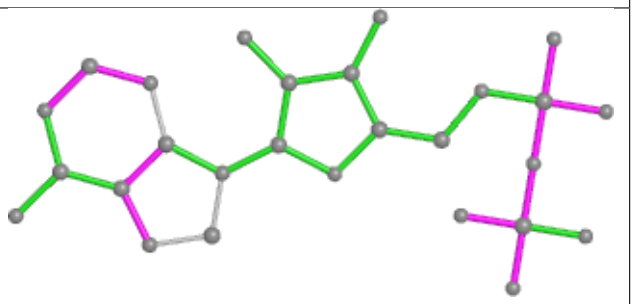


Rings

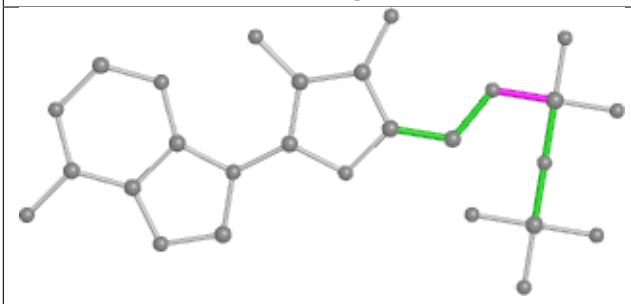
Ligand ADP C 402



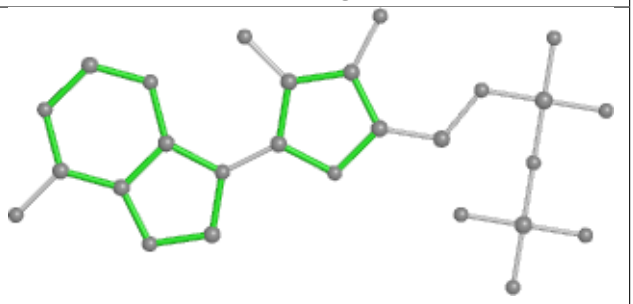
Bond lengths



Bond angles

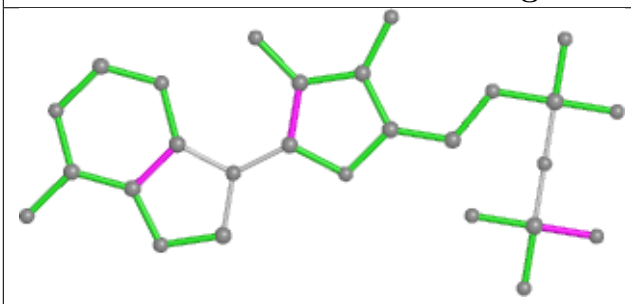


Torsions

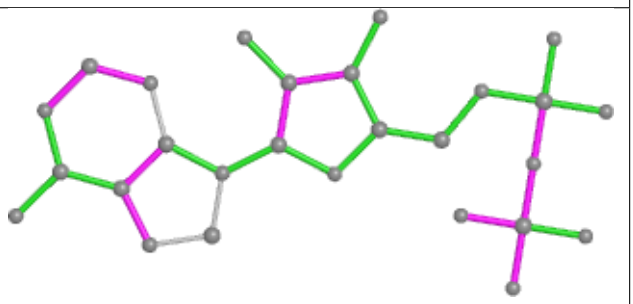


Rings

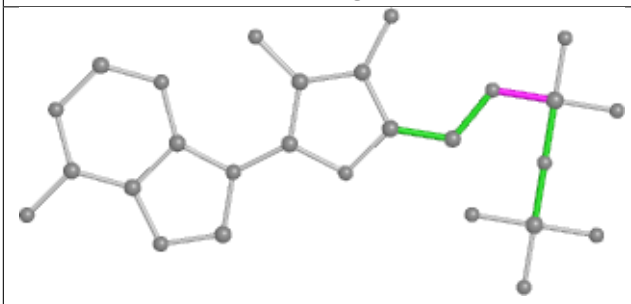
Ligand ADP G 406



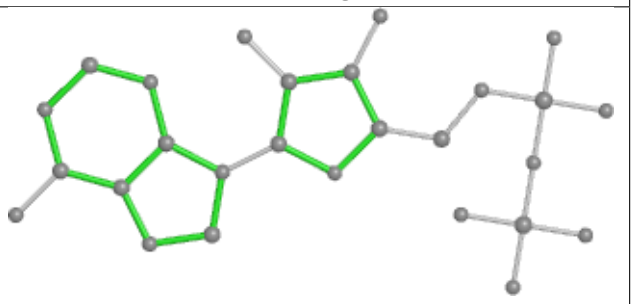
Bond lengths



Bond angles

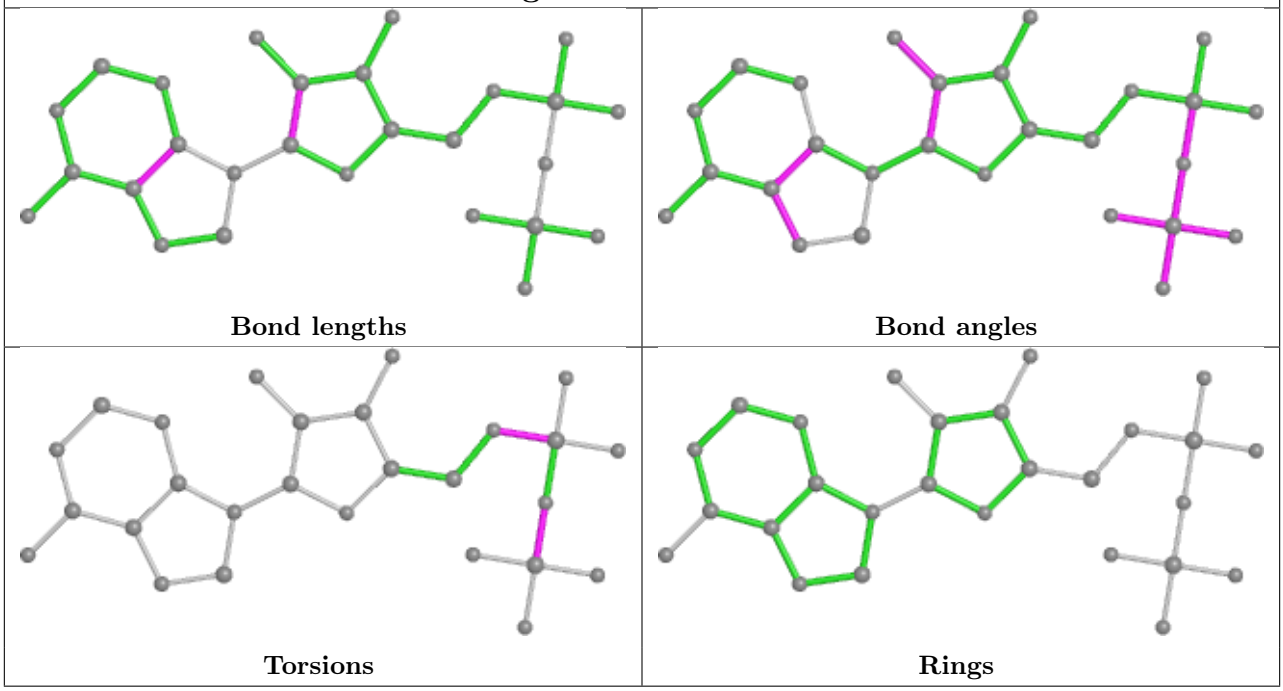


Torsions

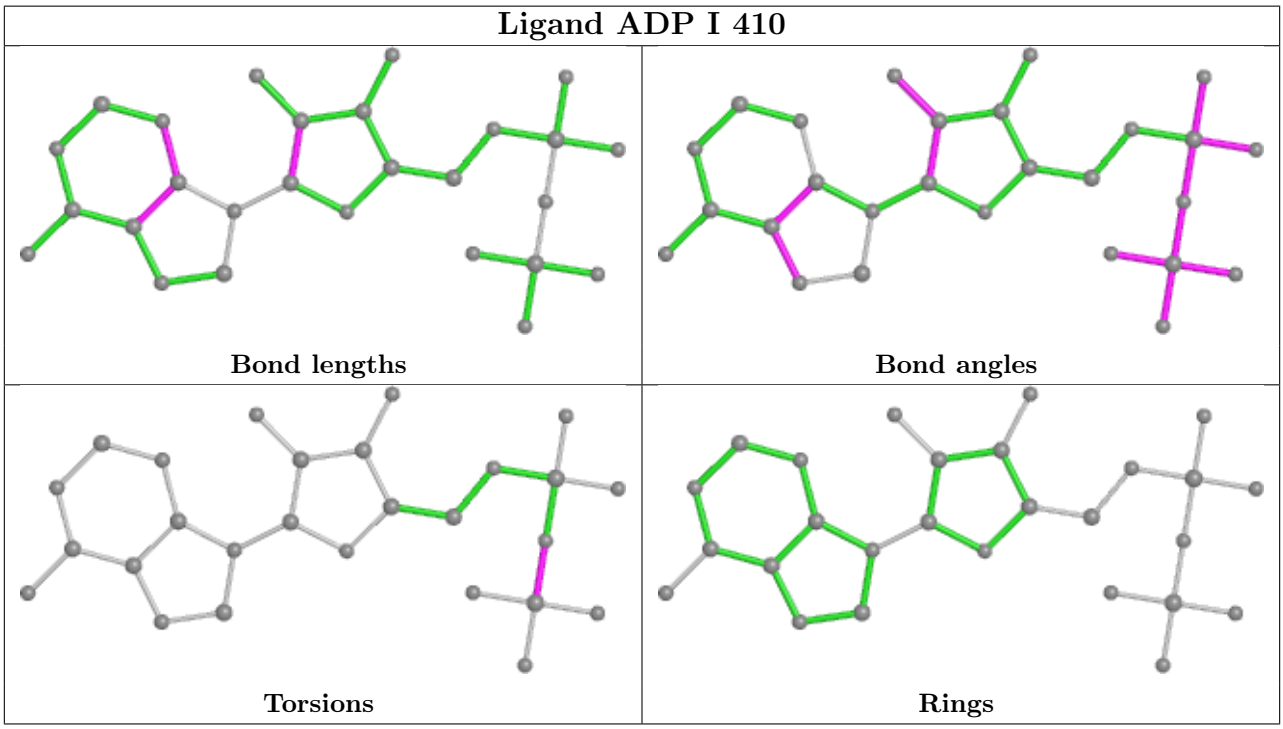


Rings

Ligand ADP D 404



Ligand ADP I 410



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	333/343 (97%)	0.69	52 (15%) 2 2	81, 139, 220, 252	0
1	F	333/343 (97%)	0.26	24 (7%) 15 15	76, 140, 204, 232	0
2	B	364/395 (92%)	0.17	17 (4%) 31 28	85, 134, 185, 215	0
2	C	365/395 (92%)	0.12	12 (3%) 46 43	76, 127, 196, 216	0
2	D	362/395 (91%)	0.12	10 (2%) 53 50	77, 117, 173, 206	0
2	G	378/395 (95%)	-0.03	10 (2%) 56 52	87, 118, 166, 207	0
2	H	365/395 (92%)	-0.17	0 100 100	68, 99, 141, 168	0
2	I	362/395 (91%)	-0.08	1 (0%) 94 94	63, 92, 135, 203	0
3	E	334/334 (100%)	-0.11	3 (0%) 84 84	74, 94, 145, 184	0
3	J	334/334 (100%)	-0.18	1 (0%) 94 94	71, 93, 140, 186	0
4	K	14/20 (70%)	-0.22	0 100 100	84, 95, 192, 198	0
4	M	14/20 (70%)	-0.24	0 100 100	82, 96, 193, 210	0
5	L	10/10 (100%)	-0.71	0 100 100	92, 95, 102, 105	0
5	N	10/10 (100%)	-0.71	0 100 100	83, 92, 107, 109	0
All	All	3578/3784 (94%)	0.07	130 (3%) 42 39	63, 112, 191, 252	0

The worst 5 of 130 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	53	PHE	12.6
1	A	55	ILE	11.0
1	A	61	TRP	8.5
1	A	128	THR	6.8
1	A	54	SER	6.6

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)

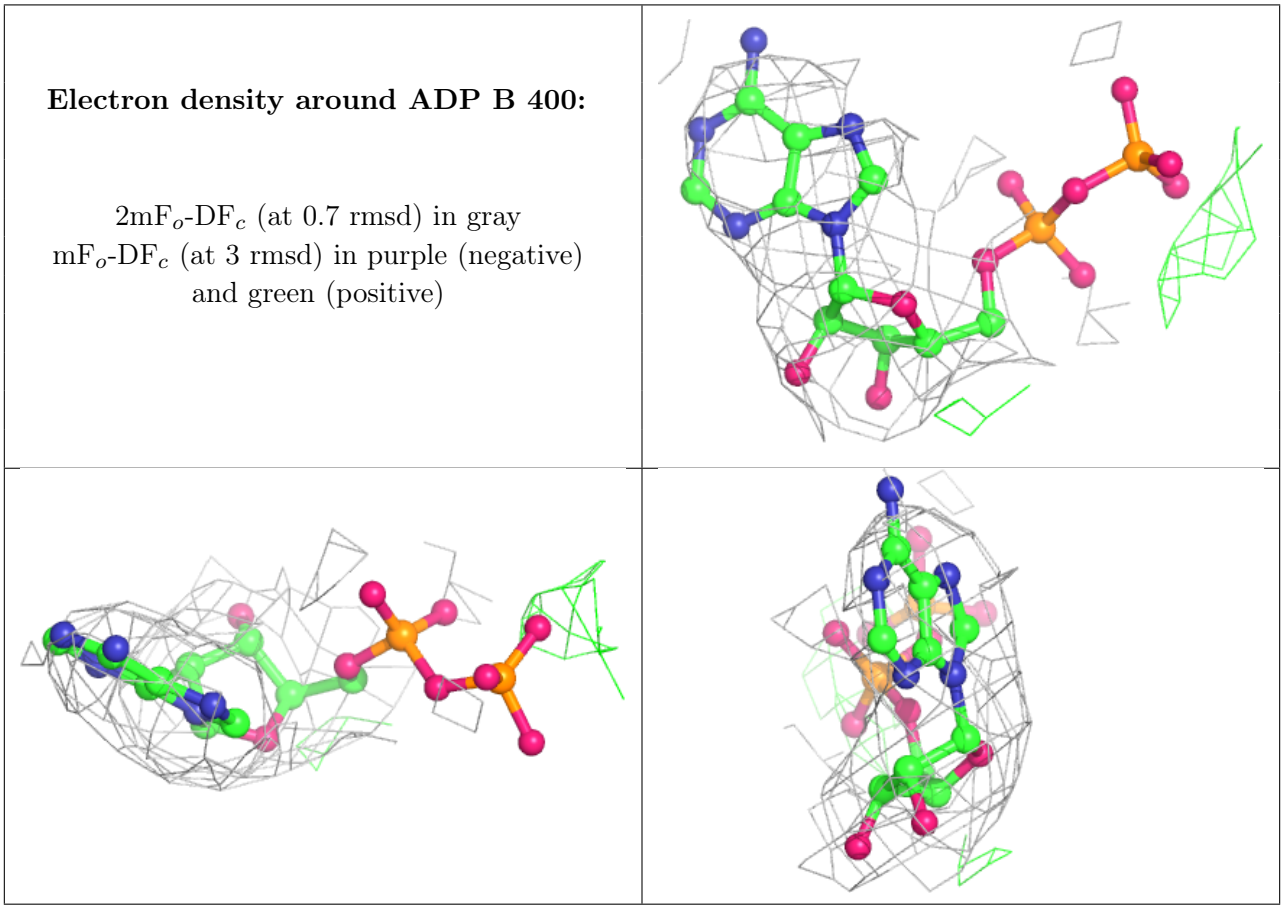
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
8	MG	G	415	1/1	0.89	0.35	89,89,89,89	0
8	MG	D	414	1/1	0.92	0.41	85,85,85,85	0
6	ADP	B	400	27/27	0.93	0.26	100,109,115,117	0
7	BEF	I	411	4/4	0.94	0.33	76,76,77,78	0
8	MG	C	413	1/1	0.94	0.35	88,88,88,88	0
6	ADP	G	406	27/27	0.94	0.23	91,98,104,105	0
7	BEF	D	405	4/4	0.94	0.26	105,105,106,107	0
8	MG	I	417	1/1	0.94	0.36	67,67,67,67	0
9	ZN	E	421	1/1	0.95	0.12	146,146,146,146	0
9	ZN	J	425	1/1	0.95	0.13	143,143,143,143	0
7	BEF	C	403	4/4	0.96	0.24	95,96,96,97	0
8	MG	H	416	1/1	0.96	0.29	63,63,63,63	0
8	MG	B	412	1/1	0.96	0.46	89,89,89,89	0
6	ADP	C	402	27/27	0.96	0.18	90,99,104,106	0
7	BEF	G	407	4/4	0.96	0.28	96,96,97,97	0
7	BEF	I	409	4/4	0.97	0.22	72,72,72,72	0
7	BEF	B	401	4/4	0.97	0.36	94,95,95,95	0
6	ADP	D	404	27/27	0.97	0.19	92,103,109,111	0
9	ZN	D	420	1/1	0.97	0.10	157,157,157,157	0
6	ADP	H	408	27/27	0.97	0.19	74,76,81,82	0
9	ZN	I	424	1/1	0.97	0.13	117,117,117,117	0
6	ADP	I	410	27/27	0.97	0.23	67,74,78,79	0
9	ZN	B	418	1/1	0.98	0.09	163,163,163,163	0
9	ZN	G	422	1/1	0.98	0.12	198,198,198,198	0
9	ZN	C	419	1/1	0.99	0.06	149,149,149,149	0
9	ZN	H	423	1/1	0.99	0.11	121,121,121,121	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.

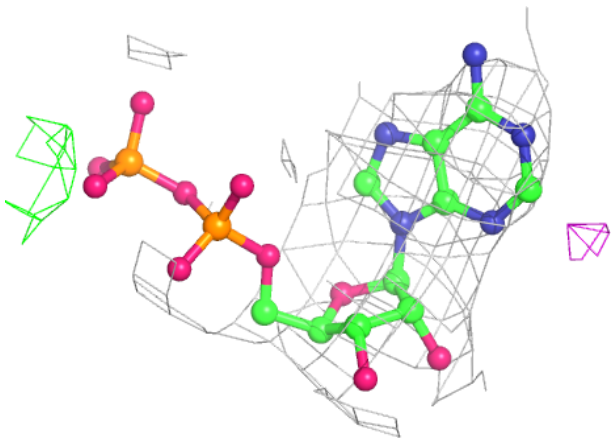
Electron density around ADP B 400:

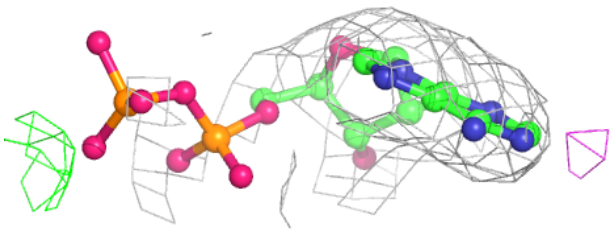
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

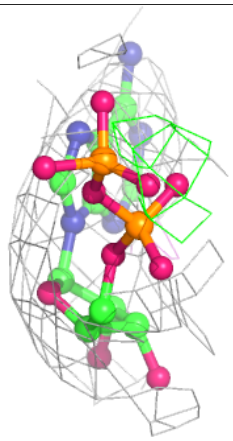


Electron density around ADP G 406:

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

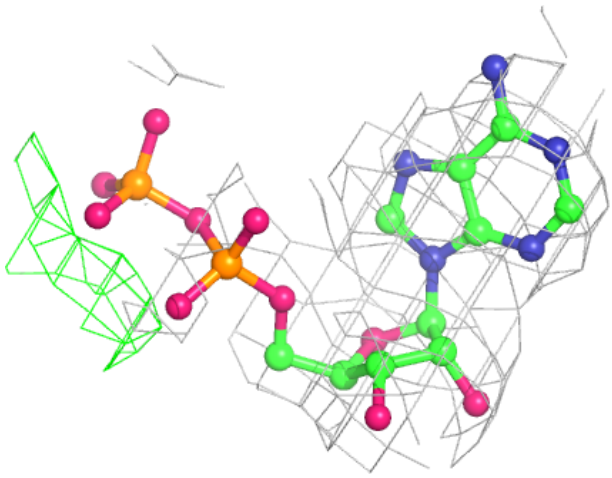


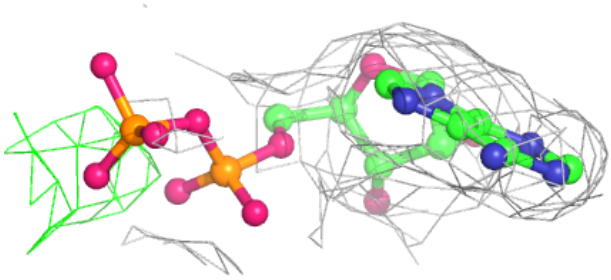


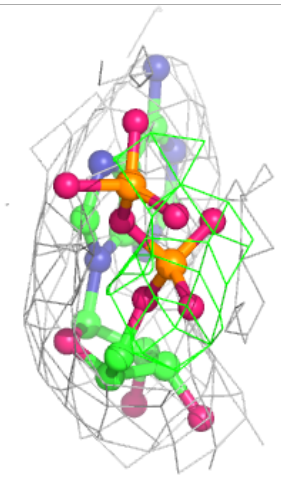


Electron density around ADP C 402:

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

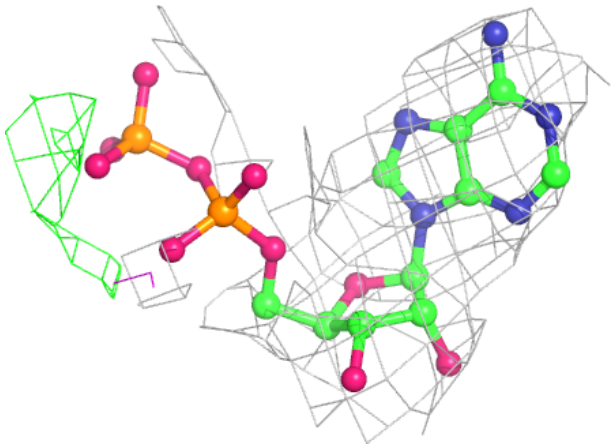


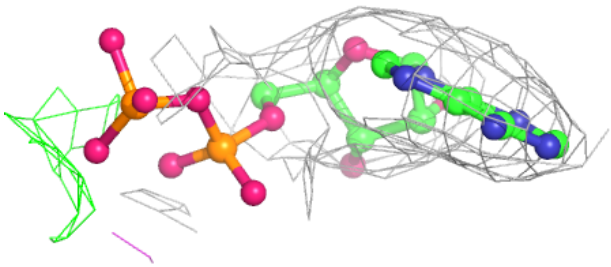


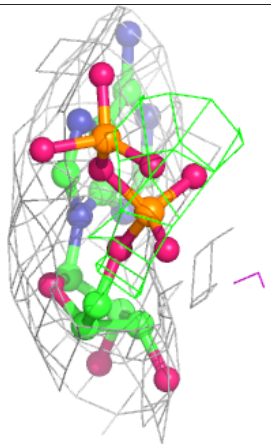


Electron density around ADP D 404:

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

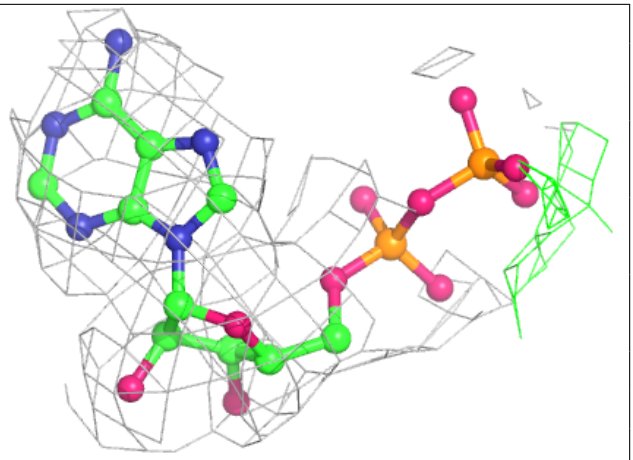


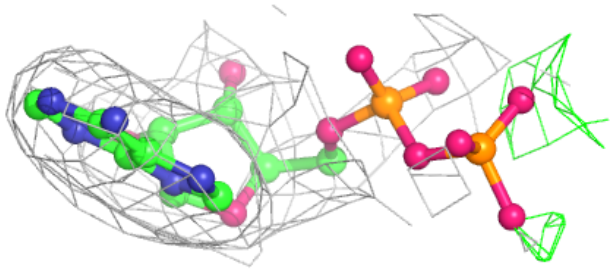


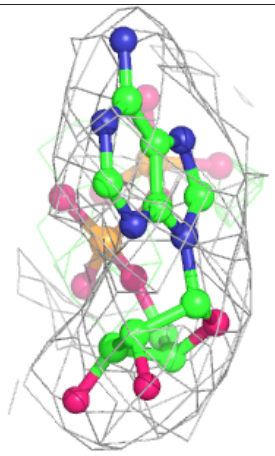


Electron density around ADP H 408:

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

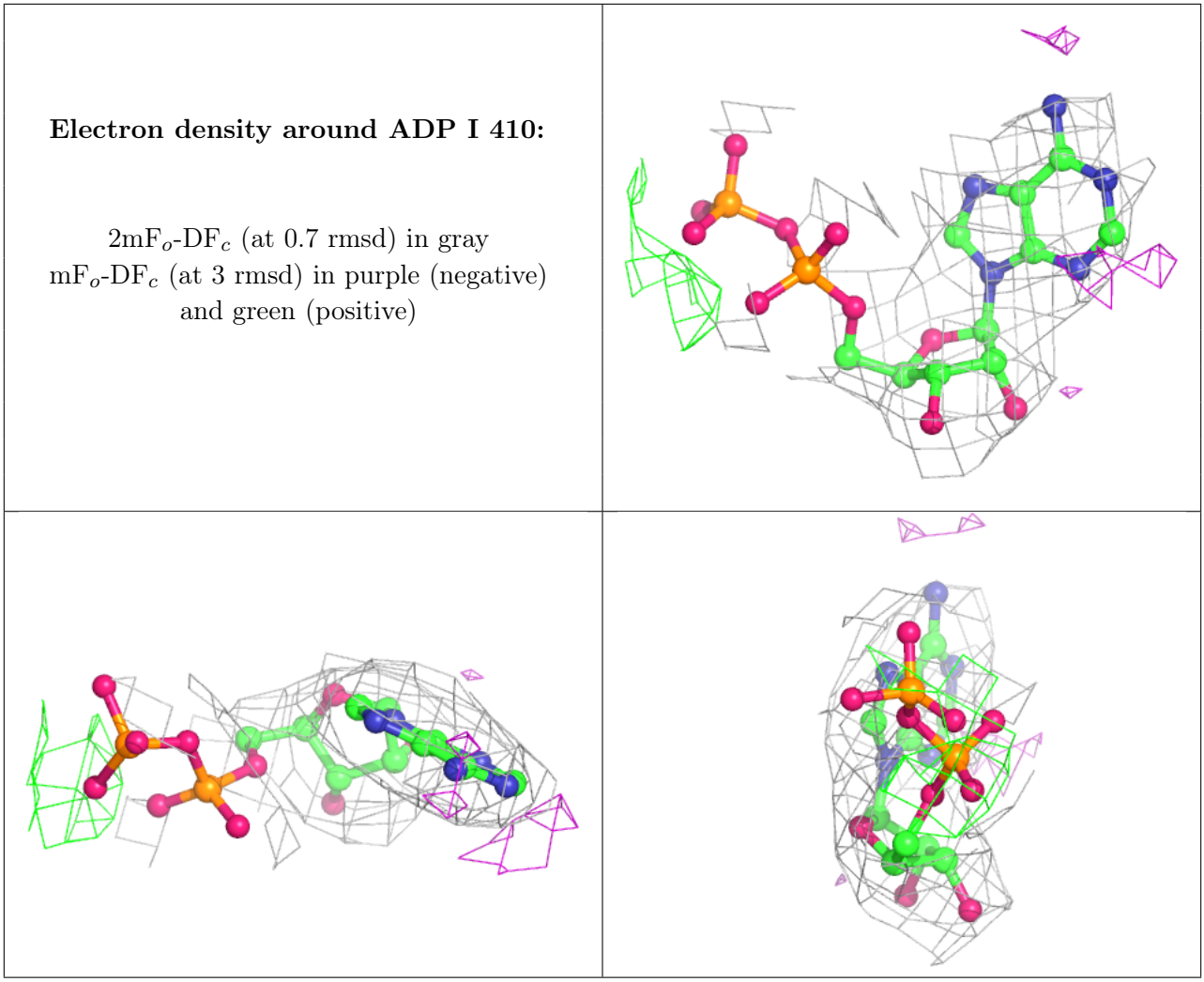






Electron density around ADP I 410:

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



6.5 Other polymers

There are no such residues in this entry.