WORLDWIDE PDB PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report (i)

Sep 20, 2023 – 03:46 PM EDT

PDB ID	:	5I2D
Title	:	Crystal structure of T. thermophilus TTHB099 class II transcription activation complex: TAP-RPo
Authors	:	Feng, Y.; Zhang, Y.; Ebright, R.H.
Deposited on	:	2016-02-08
Resolution	:	4.41 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:

|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
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)	:	2.35.1

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 4.41 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.
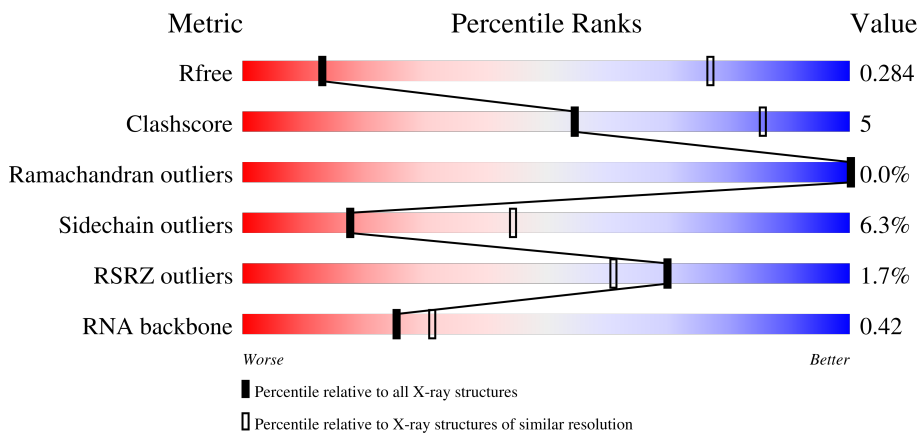
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1043 (5.00-3.80)
Clashscore	141614	1111 (5.00-3.80)
Ramachandran outliers	138981	1059 (5.00-3.80)
Sidechain outliers	138945	1041 (5.00-3.80)
RSRZ outliers	127900	1095 (5.08-3.70)
RNA backbone	3102	1058 (5.60-3.00)

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

Mol	Chain	Length	Quality of chain
1	A	315	
1	B	315	
1	L	315	
1	M	315	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	C	1119	81% 17%
2	N	1119	82% 16%
3	D	1524	75% 14% 11%
3	O	1524	74% 14% 11%
4	E	99	85% 10% 5%
4	P	99	81% 14% 5%
5	F	443	64% 13% 22%
5	Q	443	63% 14% 22%
6	G	215	75% 13% 9%
6	H	215	77% 12% 9%
6	R	215	73% 16% 9%
6	S	215	77% 13% 9%
7	I	72	49% 38% 6% 8%
7	T	72	50% 39% 8%
8	J	72	50% 39% 8%
8	U	72	51% 38% 8%
9	K	4	50% 25% 25%
9	V	4	75% 25%

2 Entry composition ⓘ

There are 11 unique types of molecules in this entry. The entry contains 66882 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-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	284	Total	C	N	O	S	0	0	0
			2231	1421	387	421	2			
1	B	280	Total	C	N	O	S	0	0	0
			2199	1401	381	415	2			
1	L	284	Total	C	N	O	S	0	0	0
			2231	1421	387	421	2			
1	M	280	Total	C	N	O	S	0	0	0
			2199	1401	381	415	2			

- Molecule 2 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	1111	Total	C	N	O	S	0	0	0
			8770	5548	1564	1634	24			
2	N	1111	Total	C	N	O	S	0	0	0
			8770	5548	1564	1634	24			

- Molecule 3 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	D	1363	Total	C	N	O	S	0	0	0
			10754	6804	1906	2011	33			
3	O	1363	Total	C	N	O	S	0	0	0
			10754	6804	1906	2011	33			

- Molecule 4 is a protein called DNA-directed RNA polymerase subunit omega.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	E	94	Total	C	N	O	S	0	0	0
			761	486	132	139	4			
4	P	94	Total	C	N	O	S	0	0	0
			761	486	132	139	4			

- Molecule 5 is a protein called RNA polymerase sigma factor SigA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	F	346	Total 2807	C 1770	N 509	O 524	S 4	0	0	0
5	Q	346	Total 2807	C 1770	N 509	O 524	S 4	0	0	0

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	-19	MET	-	initiating methionine	UNP Q5SKW1
F	-18	GLY	-	expression tag	UNP Q5SKW1
F	-17	SER	-	expression tag	UNP Q5SKW1
F	-16	SER	-	expression tag	UNP Q5SKW1
F	-15	HIS	-	expression tag	UNP Q5SKW1
F	-14	HIS	-	expression tag	UNP Q5SKW1
F	-13	HIS	-	expression tag	UNP Q5SKW1
F	-12	HIS	-	expression tag	UNP Q5SKW1
F	-11	HIS	-	expression tag	UNP Q5SKW1
F	-10	HIS	-	expression tag	UNP Q5SKW1
F	-9	SER	-	expression tag	UNP Q5SKW1
F	-8	SER	-	expression tag	UNP Q5SKW1
F	-7	GLY	-	expression tag	UNP Q5SKW1
F	-6	LEU	-	expression tag	UNP Q5SKW1
F	-5	VAL	-	expression tag	UNP Q5SKW1
F	-4	PRO	-	expression tag	UNP Q5SKW1
F	-3	ARG	-	expression tag	UNP Q5SKW1
F	-2	GLY	-	expression tag	UNP Q5SKW1
F	-1	SER	-	expression tag	UNP Q5SKW1
F	0	HIS	-	expression tag	UNP Q5SKW1
Q	-19	MET	-	initiating methionine	UNP Q5SKW1
Q	-18	GLY	-	expression tag	UNP Q5SKW1
Q	-17	SER	-	expression tag	UNP Q5SKW1
Q	-16	SER	-	expression tag	UNP Q5SKW1
Q	-15	HIS	-	expression tag	UNP Q5SKW1
Q	-14	HIS	-	expression tag	UNP Q5SKW1
Q	-13	HIS	-	expression tag	UNP Q5SKW1
Q	-12	HIS	-	expression tag	UNP Q5SKW1
Q	-11	HIS	-	expression tag	UNP Q5SKW1
Q	-10	HIS	-	expression tag	UNP Q5SKW1
Q	-9	SER	-	expression tag	UNP Q5SKW1
Q	-8	SER	-	expression tag	UNP Q5SKW1
Q	-7	GLY	-	expression tag	UNP Q5SKW1
Q	-6	LEU	-	expression tag	UNP Q5SKW1

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
Q	-5	VAL	-	expression tag	UNP Q5SKW1
Q	-4	PRO	-	expression tag	UNP Q5SKW1
Q	-3	ARG	-	expression tag	UNP Q5SKW1
Q	-2	GLY	-	expression tag	UNP Q5SKW1
Q	-1	SER	-	expression tag	UNP Q5SKW1
Q	0	HIS	-	expression tag	UNP Q5SKW1

- Molecule 6 is a protein called Transcriptional regulator, Crp family.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	G	195	Total	C	N	O	S	0	0	0
			1559	974	293	288	4			
6	H	195	Total	C	N	O	S	0	0	0
			1559	974	293	288	4			
6	R	195	Total	C	N	O	S	0	0	0
			1559	974	293	288	4			
6	S	195	Total	C	N	O	S	0	0	0
			1559	974	293	288	4			

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	-19	MET	-	initiating methionine	UNP Q53W63
G	-18	GLY	-	expression tag	UNP Q53W63
G	-17	SER	-	expression tag	UNP Q53W63
G	-16	SER	-	expression tag	UNP Q53W63
G	-15	HIS	-	expression tag	UNP Q53W63
G	-14	HIS	-	expression tag	UNP Q53W63
G	-13	HIS	-	expression tag	UNP Q53W63
G	-12	HIS	-	expression tag	UNP Q53W63
G	-11	HIS	-	expression tag	UNP Q53W63
G	-10	HIS	-	expression tag	UNP Q53W63
G	-9	SER	-	expression tag	UNP Q53W63
G	-8	SER	-	expression tag	UNP Q53W63
G	-7	GLY	-	expression tag	UNP Q53W63
G	-6	LEU	-	expression tag	UNP Q53W63
G	-5	VAL	-	expression tag	UNP Q53W63
G	-4	PRO	-	expression tag	UNP Q53W63
G	-3	ARG	-	expression tag	UNP Q53W63
G	-2	GLY	-	expression tag	UNP Q53W63
G	-1	SER	-	expression tag	UNP Q53W63
G	0	HIS	-	expression tag	UNP Q53W63

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
H	-19	MET	-	initiating methionine	UNP Q53W63
H	-18	GLY	-	expression tag	UNP Q53W63
H	-17	SER	-	expression tag	UNP Q53W63
H	-16	SER	-	expression tag	UNP Q53W63
H	-15	HIS	-	expression tag	UNP Q53W63
H	-14	HIS	-	expression tag	UNP Q53W63
H	-13	HIS	-	expression tag	UNP Q53W63
H	-12	HIS	-	expression tag	UNP Q53W63
H	-11	HIS	-	expression tag	UNP Q53W63
H	-10	HIS	-	expression tag	UNP Q53W63
H	-9	SER	-	expression tag	UNP Q53W63
H	-8	SER	-	expression tag	UNP Q53W63
H	-7	GLY	-	expression tag	UNP Q53W63
H	-6	LEU	-	expression tag	UNP Q53W63
H	-5	VAL	-	expression tag	UNP Q53W63
H	-4	PRO	-	expression tag	UNP Q53W63
H	-3	ARG	-	expression tag	UNP Q53W63
H	-2	GLY	-	expression tag	UNP Q53W63
H	-1	SER	-	expression tag	UNP Q53W63
H	0	HIS	-	expression tag	UNP Q53W63
R	-19	MET	-	initiating methionine	UNP Q53W63
R	-18	GLY	-	expression tag	UNP Q53W63
R	-17	SER	-	expression tag	UNP Q53W63
R	-16	SER	-	expression tag	UNP Q53W63
R	-15	HIS	-	expression tag	UNP Q53W63
R	-14	HIS	-	expression tag	UNP Q53W63
R	-13	HIS	-	expression tag	UNP Q53W63
R	-12	HIS	-	expression tag	UNP Q53W63
R	-11	HIS	-	expression tag	UNP Q53W63
R	-10	HIS	-	expression tag	UNP Q53W63
R	-9	SER	-	expression tag	UNP Q53W63
R	-8	SER	-	expression tag	UNP Q53W63
R	-7	GLY	-	expression tag	UNP Q53W63
R	-6	LEU	-	expression tag	UNP Q53W63
R	-5	VAL	-	expression tag	UNP Q53W63
R	-4	PRO	-	expression tag	UNP Q53W63
R	-3	ARG	-	expression tag	UNP Q53W63
R	-2	GLY	-	expression tag	UNP Q53W63
R	-1	SER	-	expression tag	UNP Q53W63
R	0	HIS	-	expression tag	UNP Q53W63
S	-19	MET	-	initiating methionine	UNP Q53W63
S	-18	GLY	-	expression tag	UNP Q53W63

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
S	-17	SER	-	expression tag	UNP Q53W63
S	-16	SER	-	expression tag	UNP Q53W63
S	-15	HIS	-	expression tag	UNP Q53W63
S	-14	HIS	-	expression tag	UNP Q53W63
S	-13	HIS	-	expression tag	UNP Q53W63
S	-12	HIS	-	expression tag	UNP Q53W63
S	-11	HIS	-	expression tag	UNP Q53W63
S	-10	HIS	-	expression tag	UNP Q53W63
S	-9	SER	-	expression tag	UNP Q53W63
S	-8	SER	-	expression tag	UNP Q53W63
S	-7	GLY	-	expression tag	UNP Q53W63
S	-6	LEU	-	expression tag	UNP Q53W63
S	-5	VAL	-	expression tag	UNP Q53W63
S	-4	PRO	-	expression tag	UNP Q53W63
S	-3	ARG	-	expression tag	UNP Q53W63
S	-2	GLY	-	expression tag	UNP Q53W63
S	-1	SER	-	expression tag	UNP Q53W63
S	0	HIS	-	expression tag	UNP Q53W63

- Molecule 7 is a DNA chain called DNA (72-MER).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
7	I	66	Total 1349	C 639	N 246	O 398	P 66	0	0	0
7	T	66	Total 1349	C 639	N 246	O 398	P 66	0	0	0

- Molecule 8 is a DNA chain called DNA (72-MER).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
8	J	66	Total 1367	C 645	N 267	O 390	P 65	0	0	0
8	U	66	Total 1367	C 645	N 267	O 390	P 65	0	0	0

- Molecule 9 is a RNA chain called RNA (5'-R(*UP*CP*GP*A)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
9	K	4	Total 82	C 38	N 15	O 26	P 3	0	0	0
9	V	4	Total 82	C 38	N 15	O 26	P 3	0	0	0

- Molecule 10 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	D	2	Total 2	Zn 2	0	0
10	O	2	Total 2	Zn 2	0	0

- Molecule 11 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	D	1	Total 1	Mg 1	0	0
11	O	1	Total 1	Mg 1	0	0

3 Residue-property plots ⓘ

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-directed RNA polymerase subunit alpha
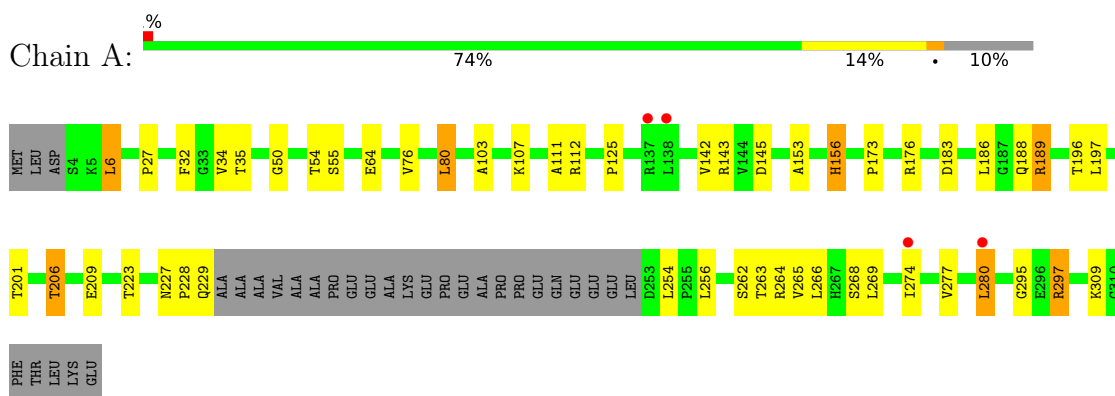
• Molecule 1: DNA-directed RNA polymerase subunit alpha

• Molecule 1: DNA-directed RNA polymerase subunit alpha

• Molecule 1: DNA-directed RNA polymerase subunit alpha

Chain M:

• Molecule 2: DNA-directed RNA polymerase subunit beta

Chain C:

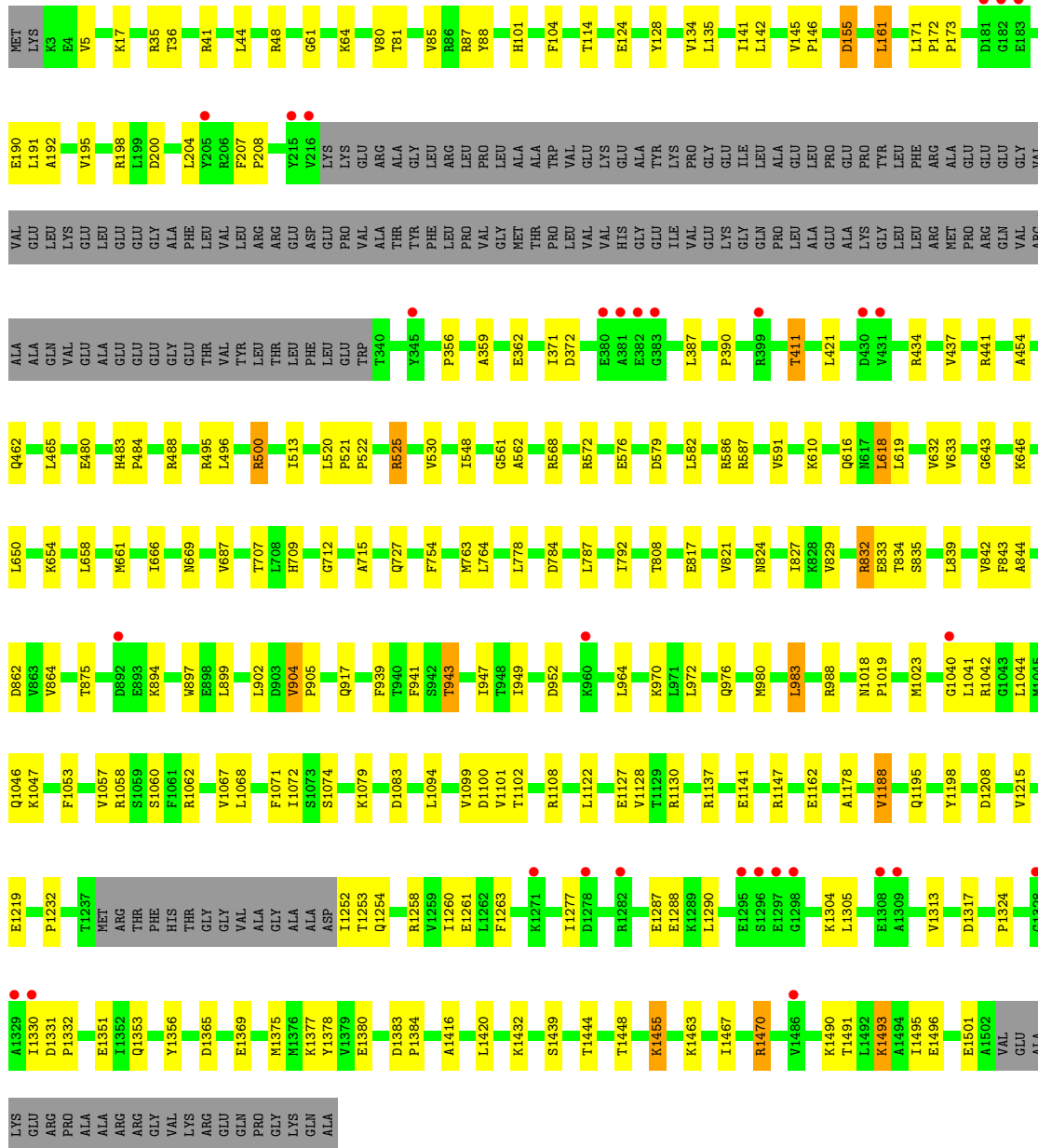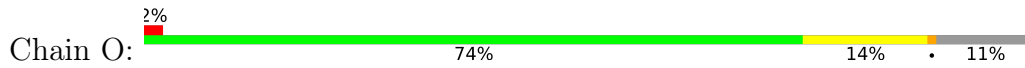• Molecule 2: DNA-directed RNA polymerase subunit beta

Chain N:
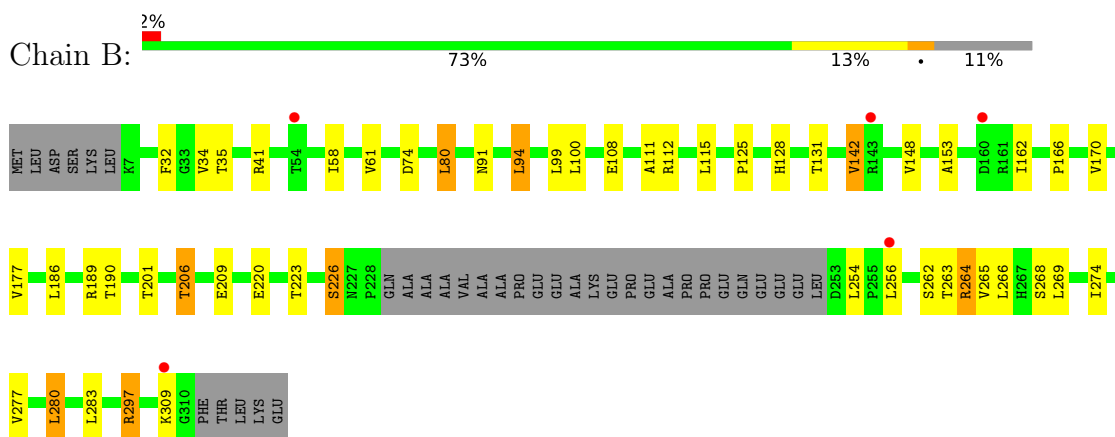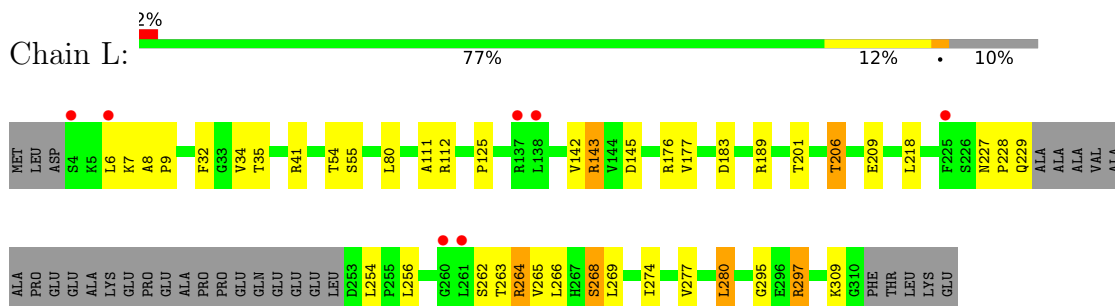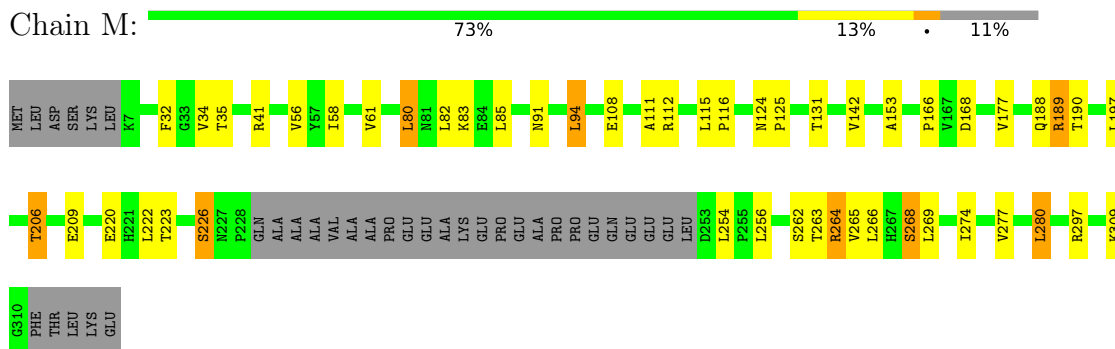
• Molecule 3: DNA-directed RNA polymerase subunit beta'
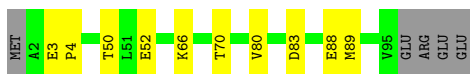
• Molecule 3: DNA-directed RNA polymerase subunit beta'

Chain O:

• Molecule 4: DNA-directed RNA polymerase subunit omega

Chain E:

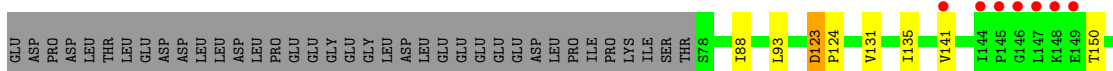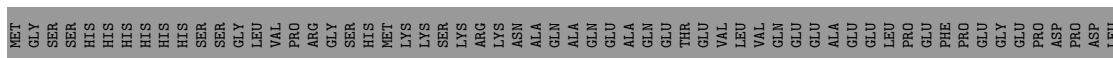• Molecule 4: DNA-directed RNA polymerase subunit omega

Chain P:

• Molecule 5: RNA polymerase sigma factor SigA

Chain F:

• Molecule 5: RNA polymerase sigma factor SigA

Chain Q:
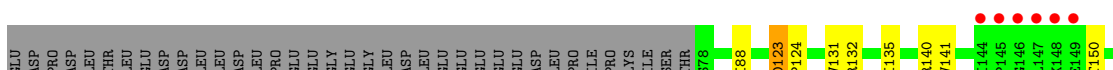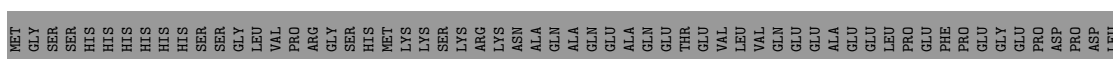
• Molecule 6: Transcriptional regulator, Crp family

Chain G:
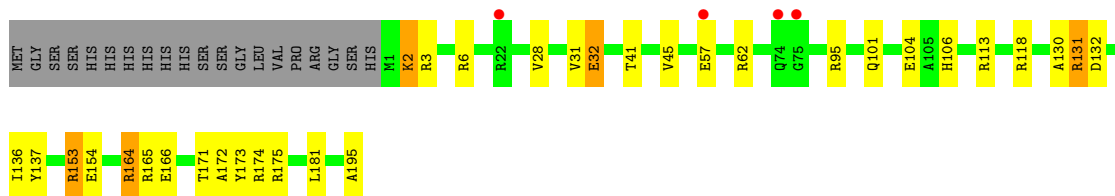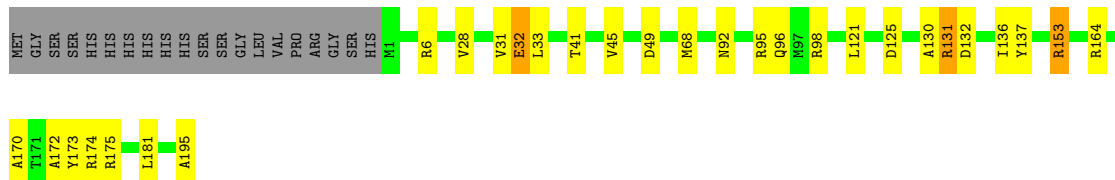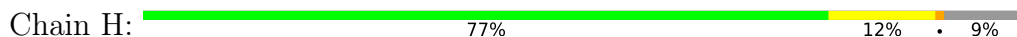
• Molecule 6: Transcriptional regulator, Crp family

Chain H:

• Molecule 6: Transcriptional regulator, Crp family

Chain R:

• Molecule 6: Transcriptional regulator, Crp family

Chain S:

• Molecule 7: DNA (72-MER)

Chain I:

• Molecule 7: DNA (72-MER)

Chain T:

DT DG DG G-54 T-50 T-49 G-48 T-47 G-46 C-43 C-42 A-41 C-40 C-37 A-36 C-35 C-31 A-30 A-29 G-28 G-27 C-24 G-23 T-22 C-21 T-17 G-13 T-12 C-1 T0 G1 T2 C3 A8 T9 G10 C11 DA DG DG

• Molecule 8: DNA (72-MER)

Chain J:

| 50% | 39% | • | 8% |

DC DC DT G-11 C-10 G-5 T0 C1 G2 A9 C13 G14 G15 C16 G24 G25 G26 C27 C28 T29 T30 G31 A32 C33 T34 G35 T36 T41 G42 G43 C44 T45 C46 A49 A50 G53 C54 DC DC DA

• Molecule 8: DNA (72-MER)

Chain U:

| 51% | 38% | • | 8% |

DC DC DT G-11 C-10 G-5 T0 C1 G2 A9 C13 G14 G15 C16 G24 G25 G26 C27 C28 T29 T30 G31 A32 C33 T34 G35 T36 T41 G42 G43 C44 T45 C46 A49 A50 G53 C54 DC DC DA

• Molecule 9: RNA (5'-R(*UP*CP*GP*A)-3')

Chain K:

| 50% | 25% | 25% |

U1 C2 G3 A4

• Molecule 9: RNA (5'-R(*UP*CP*GP*A)-3')

Chain V:

| 75% | 25% |

U1 C2 G3 A4
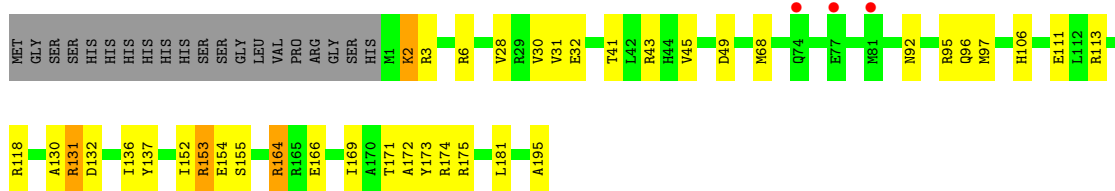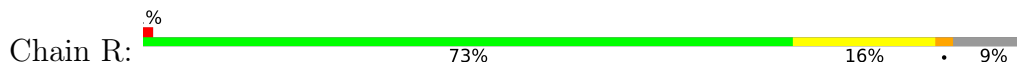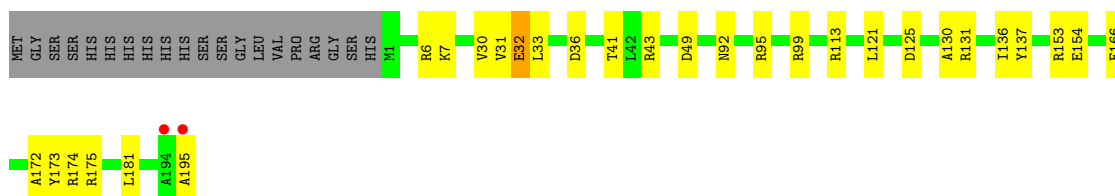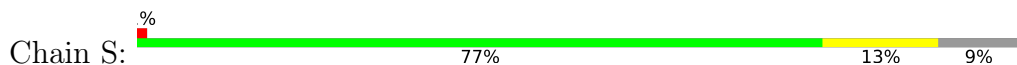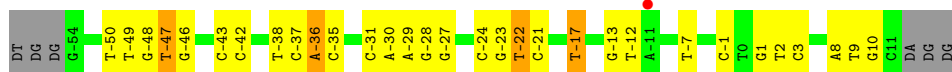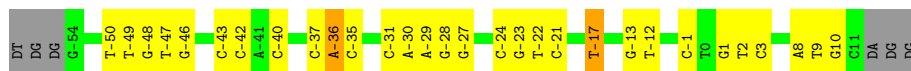
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	171.49Å　105.45Å　374.58Å 90.00°　102.39°　90.00°	Depositor
Resolution (Å)	49.31 – 4.41 49.39 – 4.41	Depositor EDS
% Data completeness (in resolution range)	85.8 (49.31-4.41) 84.9 (49.39-4.41)	Depositor EDS
R_{merge}	0.19	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.06 (at 4.45Å)	Xtriage
Refinement program	PHENIX 1.8_1069	Depositor
R, R_{free}	0.241 , 0.284 0.242 , 0.284	Depositor DCC
R_{free} test set	2033 reflections (2.49%)	wwPDB-VP
Wilson B-factor (Å^2)	156.7	Xtriage
Anisotropy	0.121	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.23 , 69.9	EDS
L-test for twinning[2]	$< |L| > = 0.47, < L^2 > = 0.30$	Xtriage
Estimated twinning fraction	0.000 for h,-k,-h-l	Xtriage
F_o,F_c correlation	0.90	EDS
Total number of atoms	66882	wwPDB-VP
Average B, all atoms (Å^2)	101.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 47.62 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 9.6653e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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: ZN, 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	0.21	0/2265	0.42	0/3069
1	B	0.21	0/2233	0.43	0/3027
1	L	0.21	0/2265	0.42	0/3069
1	M	0.21	0/2233	0.43	0/3027
2	C	0.21	0/8937	0.40	0/12087
2	N	0.21	0/8937	0.40	0/12087
3	D	0.20	0/10937	0.39	0/14781
3	O	0.20	0/10937	0.39	0/14781
4	E	0.21	0/775	0.37	0/1045
4	P	0.20	0/775	0.37	0/1045
5	F	0.21	0/2852	0.38	0/3837
5	Q	0.21	0/2852	0.38	0/3837
6	G	0.21	0/1580	0.41	0/2129
6	H	0.21	0/1580	0.40	0/2129
6	R	0.21	0/1580	0.41	0/2129
6	S	0.21	0/1580	0.40	0/2129
7	I	0.44	0/1511	1.06	8/2329 (0.3%)
7	T	0.44	0/1511	1.05	5/2329 (0.2%)
8	J	0.45	0/1538	0.98	5/2376 (0.2%)
8	U	0.45	0/1538	0.97	5/2376 (0.2%)
9	K	0.17	0/91	0.77	0/140
9	V	0.17	0/91	0.81	0/140
All	All	0.24	0/68598	0.50	23/93898 (0.0%)

There are no bond length outliers.

The worst 5 of 23 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	J	-10	DC	O4'-C4'-C3'	-7.85	101.29	106.00
8	U	-10	DC	O4'-C4'-C3'	-7.61	101.43	106.00

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	U	1	DC	O4'-C1'-N1	6.45	112.52	108.00
8	J	1	DC	O4'-C1'-N1	6.44	112.51	108.00
7	T	10	DG	C4'-C3'-C2'	-6.23	97.49	103.10

There are no chirality outliers.

There are no planarity outliers.

5.2   Too-close contacts   ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2231	0	2313	21	0
1	B	2199	0	2276	24	0
1	L	2231	0	2313	17	0
1	M	2199	0	2276	24	0
2	C	8770	0	8874	101	0
2	N	8770	0	8874	97	0
3	D	10754	0	10975	107	0
3	O	10754	0	10975	113	0
4	E	761	0	778	7	0
4	P	761	0	778	10	0
5	F	2807	0	2882	29	0
5	Q	2807	0	2882	31	0
6	G	1559	0	1587	24	0
6	H	1559	0	1587	20	0
6	R	1559	0	1587	29	0
6	S	1559	0	1587	18	0
7	I	1349	0	741	25	0
7	T	1349	0	741	27	0
8	J	1367	0	739	32	0
8	U	1367	0	739	28	0
9	K	82	0	44	2	0
9	V	82	0	44	2	0
10	D	2	0	0	0	0
10	O	2	0	0	0	0
11	D	1	0	0	0	0
11	O	1	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	66882	0	65592	692	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

The worst 5 of 692 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)
6:G:164:ARG:NH1	6:G:171:THR:OG1	2.20	0.75
8:U:15:DG:H2"	8:U:16:DC:H5"	1.66	0.75
2:N:630:ARG:CZ	2:N:707:ARG:HD3	2.17	0.74
2:N:683:ASN:HB3	2:N:872:ASN:HB2	1.69	0.74
6:R:164:ARG:NH1	6:R:171:THR:OG1	2.21	0.73

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	280/315 (89%)	269 (96%)	11 (4%)	0	100	100
1	B	276/315 (88%)	264 (96%)	12 (4%)	0	100	100
1	L	280/315 (89%)	269 (96%)	11 (4%)	0	100	100
1	M	276/315 (88%)	264 (96%)	12 (4%)	0	100	100
2	C	1107/1119 (99%)	1090 (98%)	17 (2%)	0	100	100
2	N	1107/1119 (99%)	1088 (98%)	19 (2%)	0	100	100
3	D	1357/1524 (89%)	1337 (98%)	19 (1%)	1 (0%)	51	85
3	O	1357/1524 (89%)	1339 (99%)	17 (1%)	1 (0%)	51	85
4	E	92/99 (93%)	89 (97%)	3 (3%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	P	92/99 (93%)	89 (97%)	3 (3%)	0	100	100
5	F	344/443 (78%)	337 (98%)	7 (2%)	0	100	100
5	Q	344/443 (78%)	337 (98%)	7 (2%)	0	100	100
6	G	193/215 (90%)	190 (98%)	3 (2%)	0	100	100
6	H	193/215 (90%)	190 (98%)	3 (2%)	0	100	100
6	R	193/215 (90%)	190 (98%)	3 (2%)	0	100	100
6	S	193/215 (90%)	190 (98%)	3 (2%)	0	100	100
All	All	7684/8490 (90%)	7532 (98%)	150 (2%)	2 (0%)	100	100

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	D	530	VAL
3	O	530	VAL

5.3.2   Protein sidechains ⓘ

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	249/273 (91%)	226 (91%)	23 (9%)	9	31
1	B	245/273 (90%)	223 (91%)	22 (9%)	9	32
1	L	249/273 (91%)	227 (91%)	22 (9%)	10	34
1	M	245/273 (90%)	225 (92%)	20 (8%)	11	37
2	C	936/941 (100%)	877 (94%)	59 (6%)	18	44
2	N	936/941 (100%)	876 (94%)	60 (6%)	17	44
3	D	1152/1279 (90%)	1086 (94%)	66 (6%)	20	48
3	O	1152/1279 (90%)	1087 (94%)	65 (6%)	21	48
4	E	83/88 (94%)	82 (99%)	1 (1%)	71	84
4	P	83/88 (94%)	82 (99%)	1 (1%)	71	84
5	F	301/388 (78%)	273 (91%)	28 (9%)	9	30

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	Q	301/388 (78%)	273 (91%)	28 (9%)	9	30
6	G	155/172 (90%)	150 (97%)	5 (3%)	39	62
6	H	155/172 (90%)	152 (98%)	3 (2%)	57	75
6	R	155/172 (90%)	150 (97%)	5 (3%)	39	62
6	S	155/172 (90%)	151 (97%)	4 (3%)	46	67
All	All	6552/7172 (91%)	6140 (94%)	412 (6%)	18	44

5 of 412 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	M	94	LEU
2	N	638	ASP
5	Q	417	LYS
1	M	226	SER
2	N	205	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 19 such sidechains are listed below:

Mol	Chain	Res	Type
2	N	538	GLN
6	R	108	GLN
6	S	108	GLN
3	O	1195	GLN
6	G	108	GLN

5.3.3   RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
9	K	3/4 (75%)	1 (33%)	0
9	V	3/4 (75%)	1 (33%)	0
All	All	6/8 (75%)	2 (33%)	0

All (2) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
9	K	2	C
9	V	2	C

There are no RNA pucker outliers to report.

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 6 ligands modelled in this entry, 6 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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, 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(Å²)	Q<0.9
1	A	284/315 (90%)	-0.13	4 (1%)	75	66	40, 111, 176, 252	0
1	B	280/315 (88%)	-0.16	5 (1%)	68	59	25, 117, 187, 259	0
1	L	284/315 (90%)	-0.21	7 (2%)	57	48	24, 117, 191, 242	0
1	M	280/315 (88%)	-0.29	0	100	100	39, 117, 182, 232	0
2	C	1111/1119 (99%)	-0.18	14 (1%)	77	68	10, 94, 167, 243	0
2	N	1111/1119 (99%)	-0.11	15 (1%)	75	66	3, 99, 174, 254	0
3	D	1363/1524 (89%)	-0.13	36 (2%)	56	46	6, 80, 179, 266	1 (0%)
3	O	1363/1524 (89%)	-0.14	30 (2%)	62	52	6, 79, 187, 278	1 (0%)
4	E	94/99 (94%)	-0.26	0	100	100	8, 68, 147, 194	0
4	P	94/99 (94%)	-0.36	0	100	100	19, 74, 143, 182	0
5	F	346/443 (78%)	-0.20	8 (2%)	60	51	27, 107, 192, 270	0
5	Q	346/443 (78%)	-0.26	8 (2%)	60	51	17, 104, 188, 271	0
6	G	195/215 (90%)	-0.21	4 (2%)	63	54	8, 64, 155, 220	0
6	H	195/215 (90%)	-0.24	0	100	100	14, 86, 160, 231	0
6	R	195/215 (90%)	-0.18	3 (1%)	73	64	7, 63, 151, 234	0
6	S	195/215 (90%)	-0.31	2 (1%)	82	74	17, 82, 163, 268	0
7	I	66/72 (91%)	-0.06	1 (1%)	73	64	60, 135, 247, 283	0
7	T	66/72 (91%)	-0.11	0	100	100	60, 134, 217, 302	0
8	J	66/72 (91%)	-0.06	0	100	100	40, 145, 238, 270	0
8	U	66/72 (91%)	-0.07	0	100	100	52, 137, 230, 280	0
9	K	4/4 (100%)	1.18	0	100	100	71, 79, 107, 113	0
9	V	4/4 (100%)	1.15	0	100	100	62, 74, 97, 217	0
All	All	8008/8786 (91%)	-0.17	137 (1%)	70	61	3, 94, 182, 302	2 (0%)

The worst 5 of 137 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
5	F	148	LYS	8.6
5	F	146	GLY	6.1
3	D	380	GLU	6.0
5	Q	148	LYS	5.8
5	F	147	LEU	5.7

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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
10	ZN	O	2002	1/1	0.93	0.08	65,65,65,65	0
10	ZN	D	2002	1/1	0.97	0.04	49,49,49,49	0
10	ZN	O	2001	1/1	0.98	0.14	53,53,53,53	0
10	ZN	D	2001	1/1	0.98	0.14	52,52,52,52	0
11	MG	D	2003	1/1	0.98	0.39	18,18,18,18	0
11	MG	O	2003	1/1	0.99	0.38	13,13,13,13	0

6.5 Other polymers ⓘ

There are no such residues in this entry.