



wwPDB X-ray Structure Validation Summary Report ⓘ

May 24, 2020 – 05:18 pm BST

PDB ID : 2PMZ
Title : Archaeal RNA polymerase from *Sulfolobus solfataricus*
Authors : Murakami, K.S.
Deposited on : 2007-04-23
Resolution : 3.40 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 ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.11
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) : 2.11

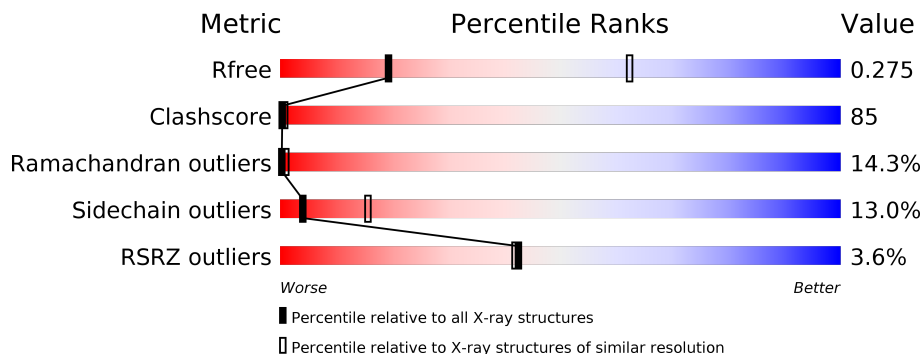
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.40 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.



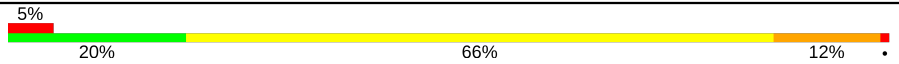
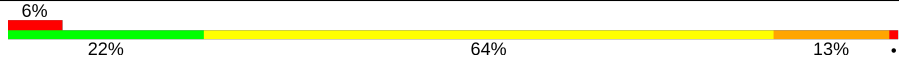
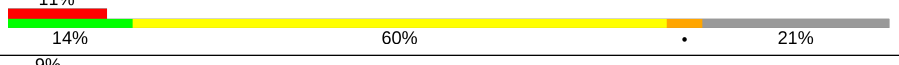
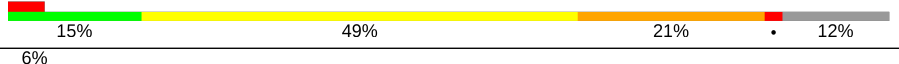
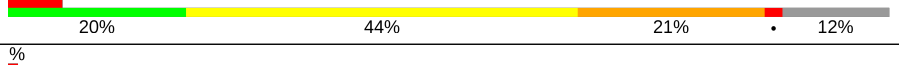

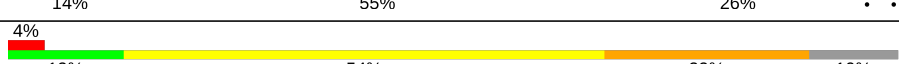
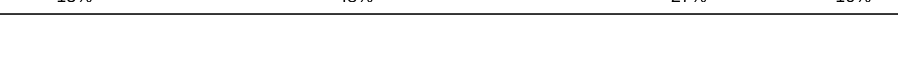
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1026 (3.48-3.32)
Clashscore	141614	1055 (3.48-3.32)
Ramachandran outliers	138981	1038 (3.48-3.32)
Sidechain outliers	138945	1038 (3.48-3.32)
RSRZ outliers	127900	2173 (3.50-3.30)

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 on 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 $\leq 5\%$. 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	880	
1	Q	880	
2	C	392	
2	G	392	
3	B	1124	
3	R	1124	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
4	D	265	
4	S	265	
5	E	180	
5	T	180	
6	F	113	
6	U	113	
7	H	84	
7	V	84	
8	K	95	
8	W	95	
9	L	92	
9	X	92	
10	N	66	
10	Y	66	
11	P	48	
11	Z	48	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
14	F3S	D	1001	-	-	X	-
14	F3S	S	1001	-	-	X	-

2 Entry composition [i](#)

There are 14 unique types of molecules in this entry. The entry contains 48122 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 A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	776	6173	3936	1081	1135	21	0	0	0
1	Q	776	6173	3936	1081	1135	21	0	0	0

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	C	279	2169	1376	375	412	6	0	0	0
2	G	279	2169	1376	375	412	6	0	0	0

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	B	1090	8645	5483	1529	1602	31	0	0	0
3	R	1090	8645	5483	1529	1602	31	0	0	0

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	264	2114	1355	342	403	14	0	0	0
4	S	264	2114	1355	342	403	14	0	0	0

- Molecule 5 is a protein called DNA-directed RNA polymerase subunit E.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	E	176	Total	C	N	O	S	0	0	0
			1402	903	236	259	4			
5	T	176	Total	C	N	O	S	0	0	0
			1402	903	236	259	4			

- Molecule 6 is a protein called DNA-directed RNA polymerase subunit F.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	F	89	Total	C	N	O	S	0	0	0
			694	433	115	142	4			
6	U	89	Total	C	N	O	S	0	0	0
			694	433	115	142	4			

- Molecule 7 is a protein called DNA-directed RNA polymerase subunit H.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
7	H	74	Total	C	N	O	0	0	0
			611	397	109	105			
7	V	74	Total	C	N	O	0	0	0
			611	397	109	105			

- Molecule 8 is a protein called DNA-directed RNA polymerase subunit K.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
8	K	82	Total	C	N	O	S	0	0	0
			658	420	121	116	1			
8	W	82	Total	C	N	O	S	0	0	0
			658	420	121	116	1			

- Molecule 9 is a protein called DNA-directed RNA polymerase subunit L.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
9	L	92	Total	C	N	O	S	0	0	0
			723	459	121	141	2			
9	X	92	Total	C	N	O	S	0	0	0
			723	459	121	141	2			

- Molecule 10 is a protein called DNA-directed RNA polymerase subunit N.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	N	64	Total	C	N	O	S	0	0	0
			514	326	94	88	6			

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	Y	64	Total	C	N	O	S	0	0	0
			514	326	94	88	6			

- Molecule 11 is a protein called DNA-directed RNA polymerase subunit P.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
11	P	43	Total	C	N	O	S	0	0	0
			346	230	58	53	5			
11	Z	43	Total	C	N	O	S	0	0	0
			346	230	58	53	5			

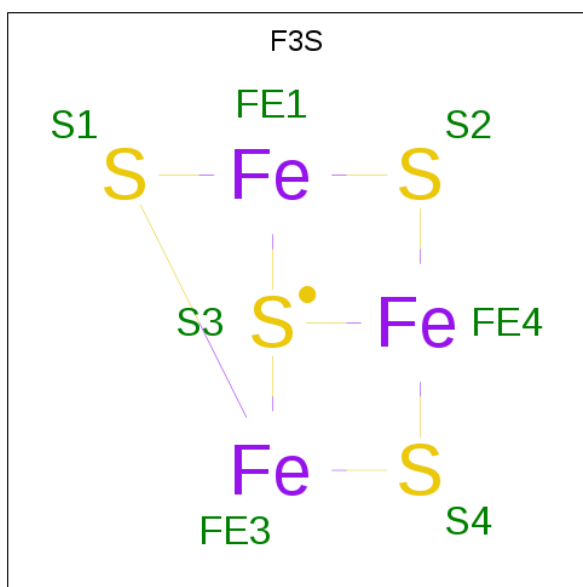
- Molecule 12 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
12	P	1	Total	Zn	0	0
			1	1		
12	Q	1	Total	Zn	0	0
			1	1		
12	B	1	Total	Zn	0	0
			1	1		
12	Z	1	Total	Zn	0	0
			1	1		
12	A	1	Total	Zn	0	0
			1	1		
12	N	1	Total	Zn	0	0
			1	1		
12	R	1	Total	Zn	0	0
			1	1		
12	Y	1	Total	Zn	0	0
			1	1		

- Molecule 13 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
13	Q	1	Total	Mg	0	0
			1	1		
13	A	1	Total	Mg	0	0
			1	1		

- Molecule 14 is FE3-S4 CLUSTER (three-letter code: F3S) (formula: Fe₃S₄).

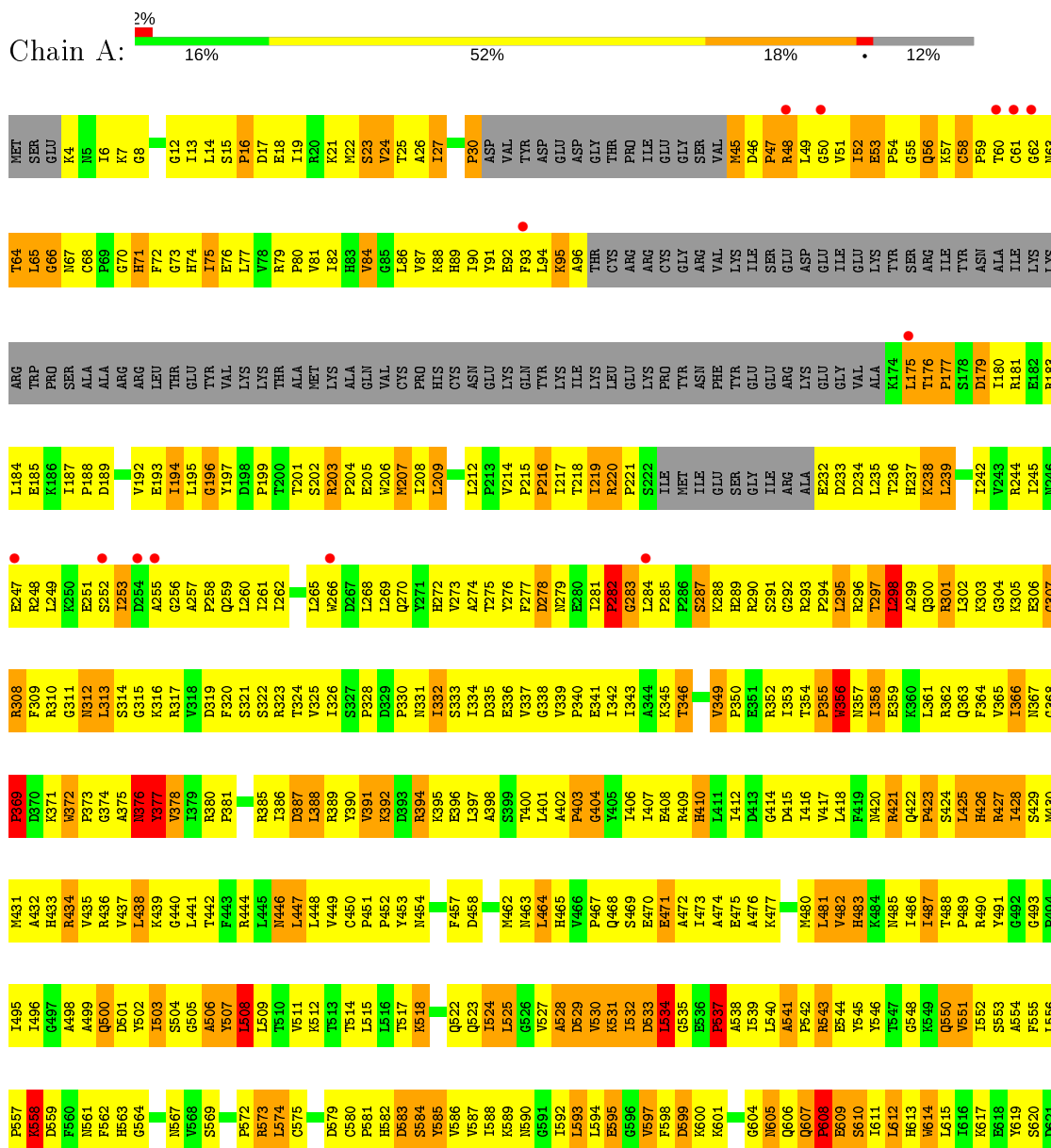


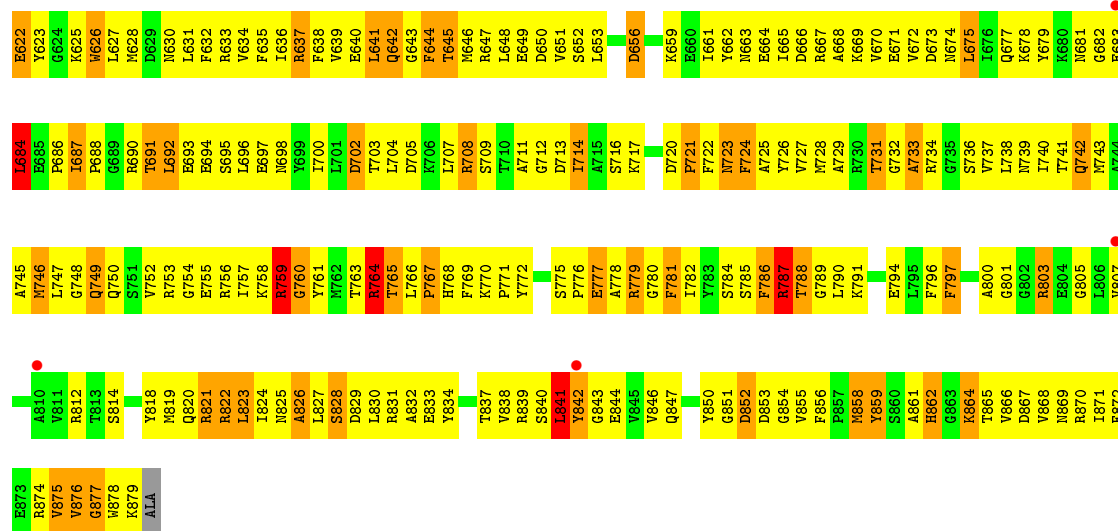
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
14	D	1	Total	Fe	S	0	0
			7	3	4		
14	S	1	Total	Fe	S	0	0
			7	3	4		

3 Residue-property plots

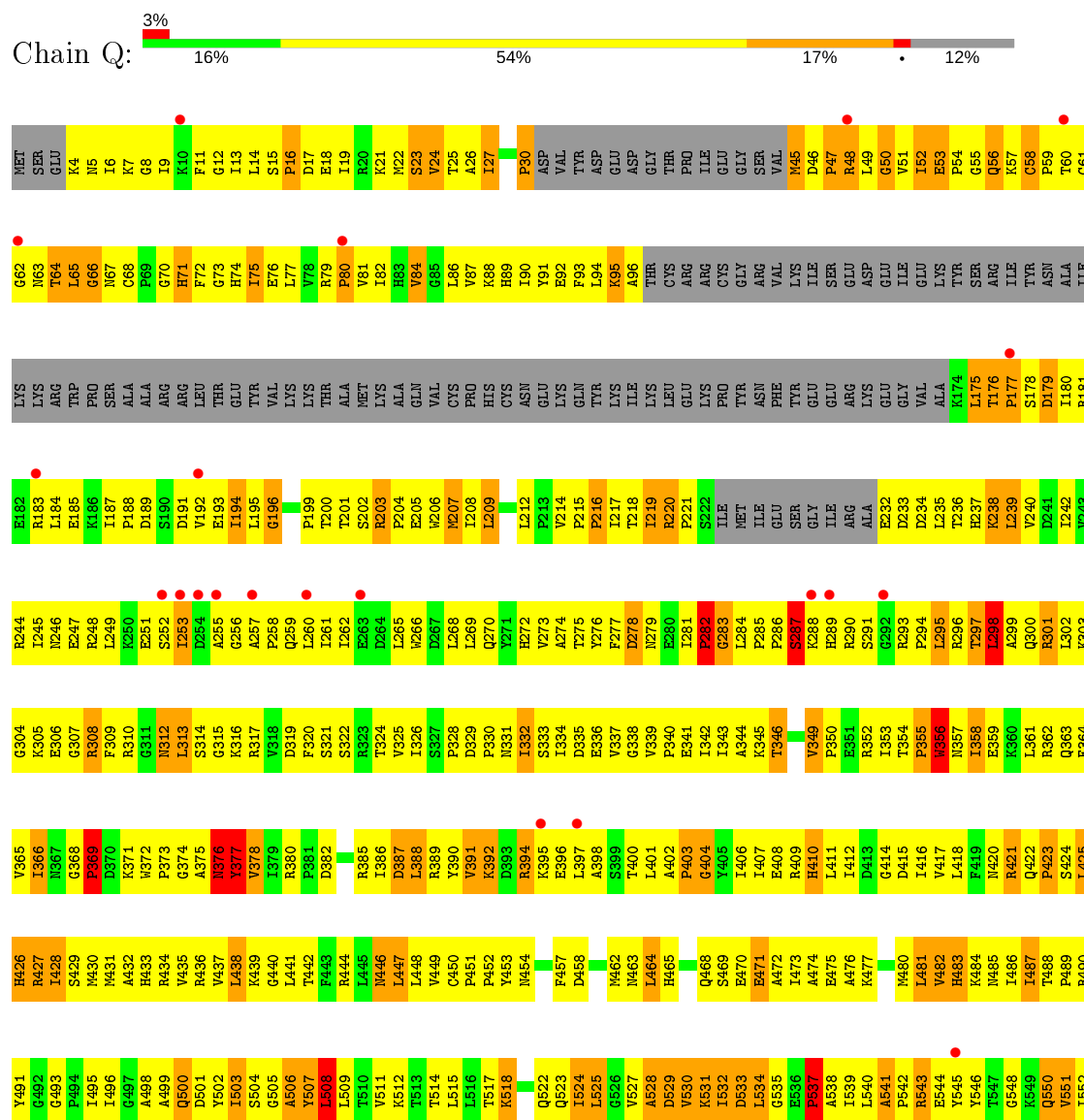
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are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

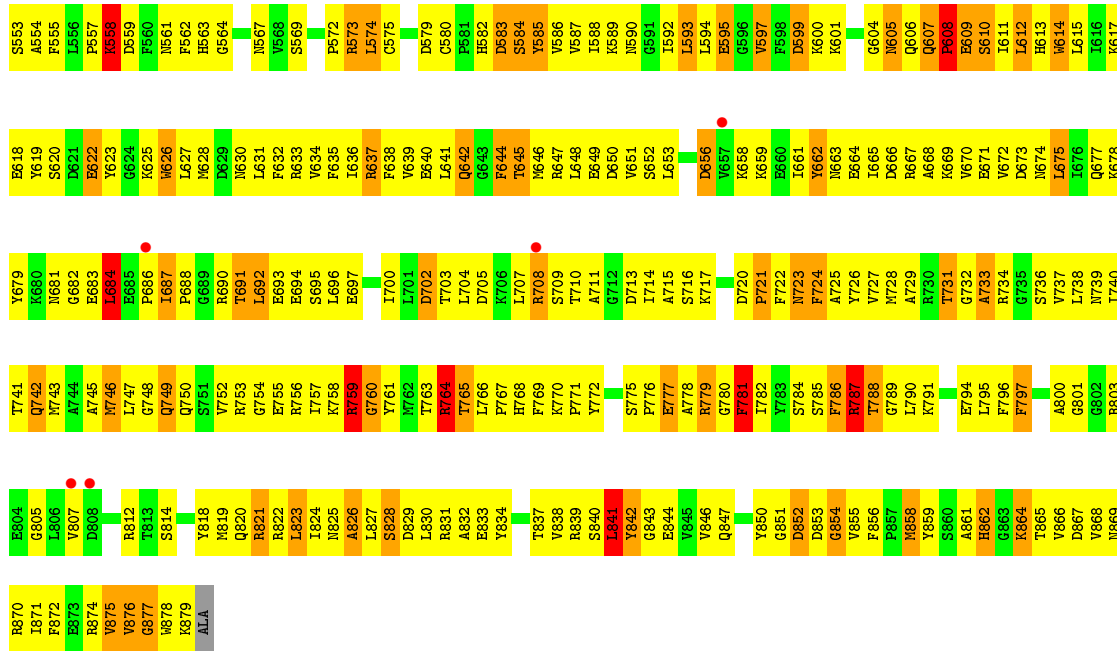
- Molecule 1: DNA-directed RNA polymerase subunit A



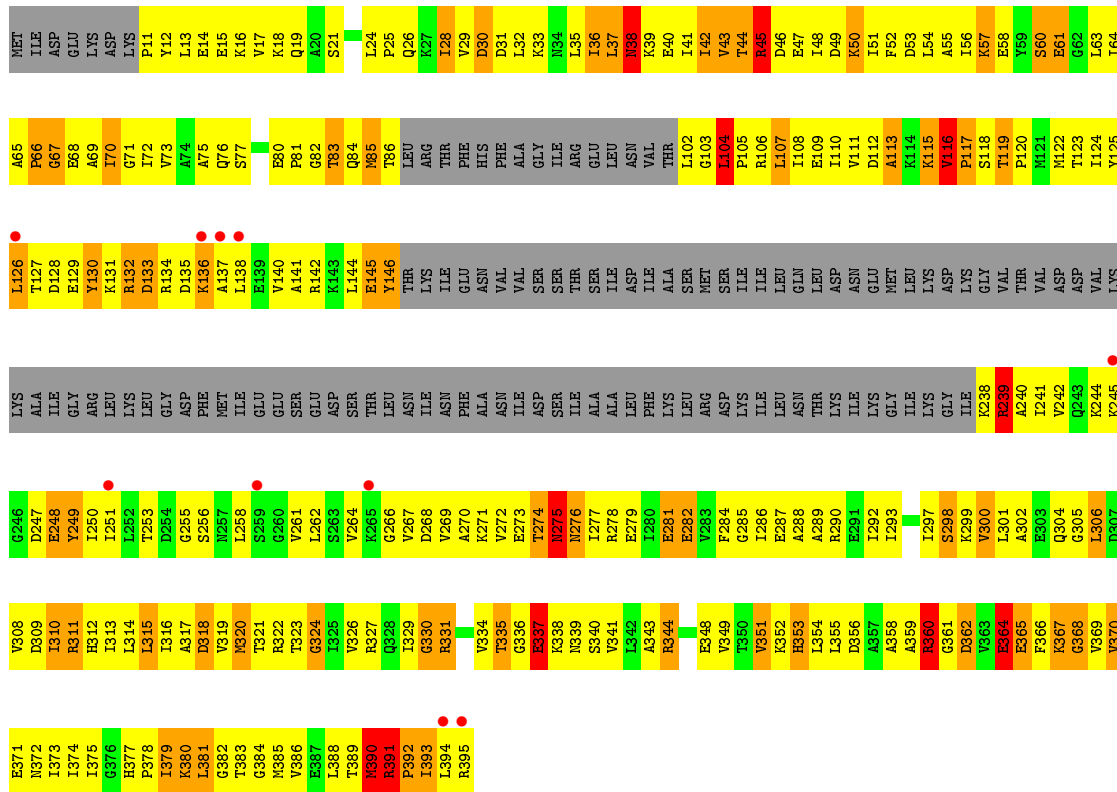


• Molecule 1: DNA-directed RNA polymerase subunit A



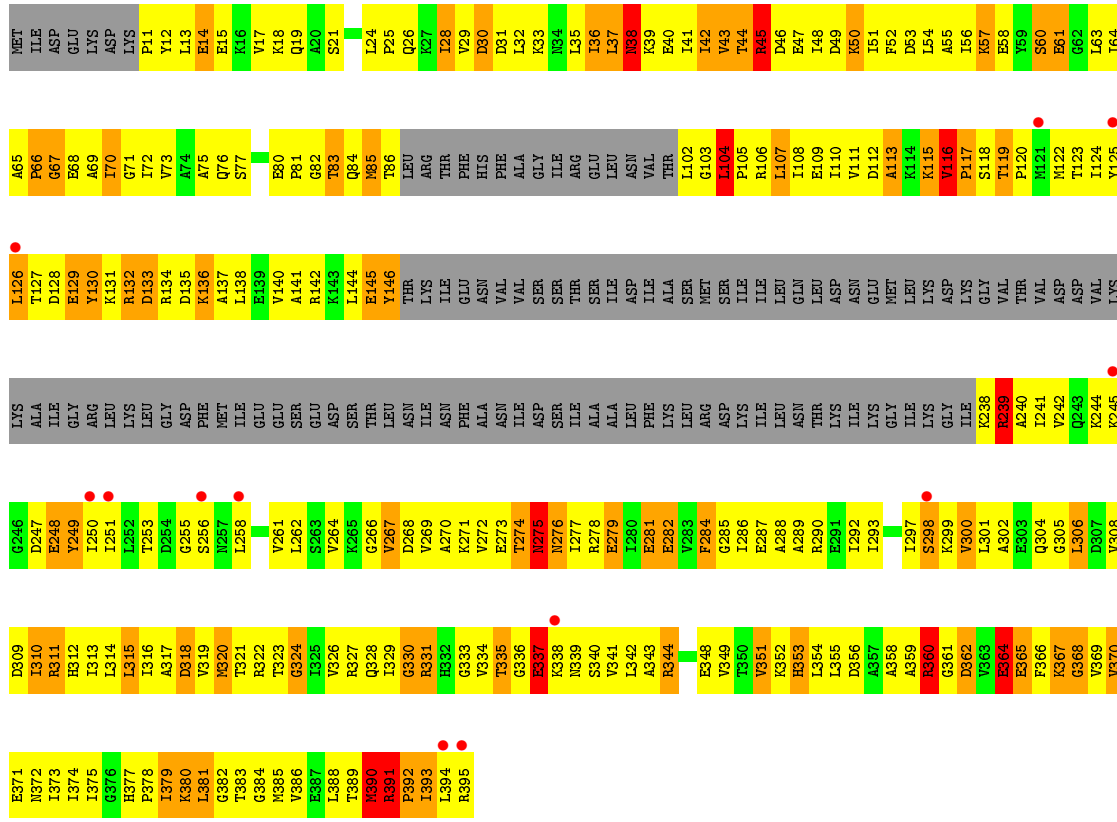


• Molecule 2: DNA-directed RNA polymerase subunit A''

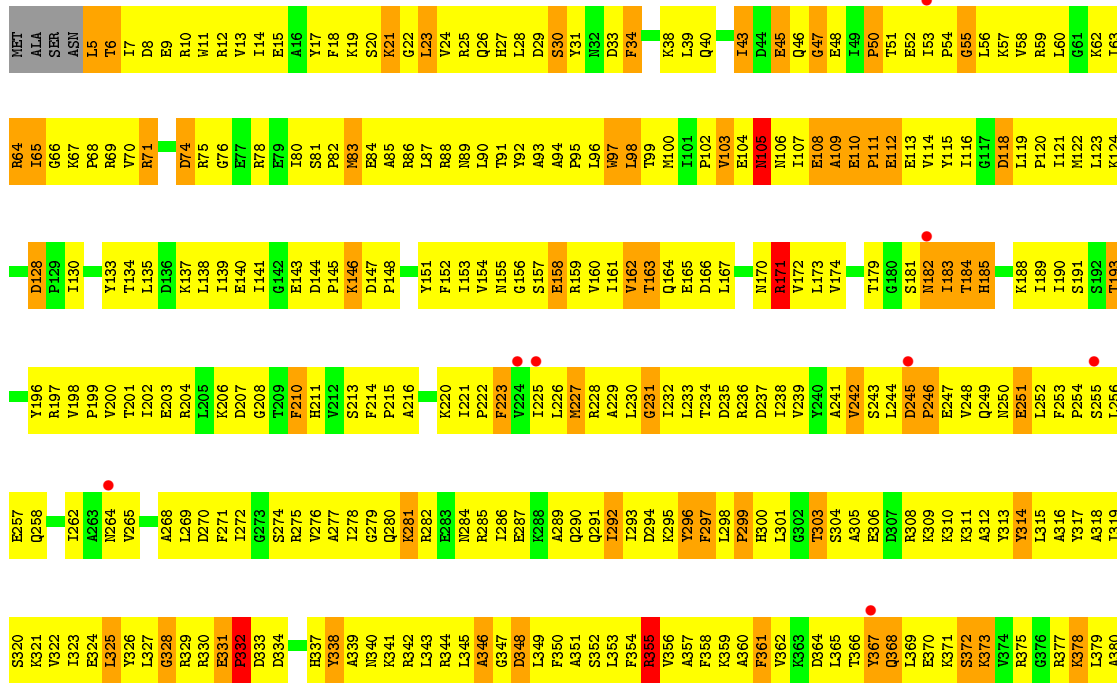
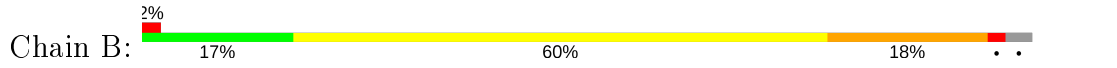


• Molecule 2: DNA-directed RNA polymerase subunit A''



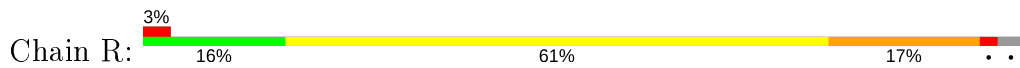


• Molecule 3: DNA-directed RNA polymerase subunit B

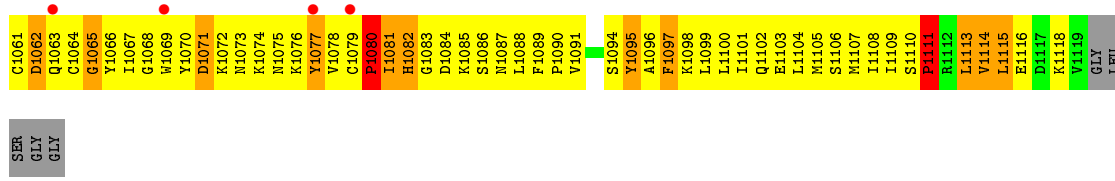


L381	R443	ARG	E566	A627	A692	T753	S815	D876	D941	R1004	Y1066
K362	D444	VAL	V666	L628	H693	F754	P816	K877	A942	G1004	I1067
A383	L446	THR	H567	L694	H694	F755	P817	F878	T943	G1007	G1068
L384	R445	THR	V568	P630	L695	R756	R818	A879	P944	P1008	G1069
V385	T448	GLY	N569	L633	H696	L757	PHE	S880	F945	V1009	I1070
R386	T449	GLY	C570	L634	H697	V758	LEU	R881	Y946	Q1010	D1071
E387	Q449	GLU	D571	H635	H698	S759	GLN	H882	K947	L1011	K1072
D388	W450	ASP	S572	P635	Q699		GLU	G883	T948	L1012	N1073
I389	W451	GLN	G573	T638	R700	E762	PHE	Q884	F949	T1013	K1074
V390	K452	ASN	R574	H639	P701	V763	LVS	K885	I950	R1014	N1075
T391	M453	ASN	V575	H639	L702	K764	GLU	G886	E951	Q1015	K1076
E392	K454	TVR	R576	L640	V703	V765	LEU	V887	Q952	P1016	Y1077
R393	P455	TVR	R577	E641	Q704	P766	SER	I888	L953	T1017	V1078
L394	F456	LEU	R578	L642	T705	G767	PRO	G889	Q954	E1018	C1079
R395	E457	LEU	L579	H643	R706	G768	GLU	M890	N955	A1021	P1080
H396	T458	LEU	L580	S644	A707	G769	GLN	L891	E956	I1081	I1081
A397	P459	K519	S581	P645	L708	E770	A331	R892	I957	R1022	H1082
L398	E460	V520	V582	A646	D709	D771	K332	P893	L958	G1023	G1083
A399	G461	V521	V583	L647	I710	K772	R833	Q894	R959	G1024	D1084
T400	P462	L522	S584	L650	I711	I773	D834	V895	Y962	G1025	K1085
G401	M463		H585	T651	G712	M775	T835	D896	R963	L1026	S1086
N402	S464		N586	A652	Y713		S336	M897	L964	R1027	G22
W403	C465		P687	L652	T714		I837	P898	P964	F1028	N1087
V404	E466		L588	S653	N715	A778	V838	D965	D965	G1029	L1088
G405	L467		I527	L654	R716	G779	T839	Y899	A966	E1030	F1089
G406	V468		G528	L655	P717	V780	R840	T900	T967	M1031	P1090
R407	M469		V529	L656	A718	R781		S901	E968	E1032	V1091
	L470		L591	P656	G719	R782	E843	K902	R969	R1033	S1094
	L471		D532	T657	G719	R783	M844	G903	Y970	R1034	I1095
	L472		L594	P658	N720	K784	G845	V904	Y971	G1035	A1096
	M473		G534	E659	N721	K785	I846	V905	F972	F1036	F1097
	A474		E535	H660	A722	K786	V847	P906	G973	L1037	K1098
	Q475		L596	H661	I723	R787	D848	D907	R974	L1038	L1099
	L414		L597	Q662	L724	E788	D849	I908	R974	G1039	L1100
	D415		E537	S663	A725	Y789	L849	I909	Q976	F1040	I1101
	T416		N538	P664	V726	R789	V850	N911	Q977	T1041	Q1102
	V417		K539	R665	M727	R790	L851	P912	K978	A1042	E1103
	G418		L540	H666	S728	L791	I852	N913	F980	M1043	L1104
	L419		R601	T667	F729	L792	T853	H913	S981	L1044	M1105
	L420		R602	Q668	I730	E793	E884	A914	R982	K1045	S1106
	M421		R603	Q669	G731	D794	T855	L915	S981	D1046	E1107
	R422		R604	S670	N733	N795	R856	R916	R982	K1047	I1108
	I423		D605	A671	M734	G796	E857	R917	Y984	R1048	I1109
	V425		R545	D606	M734	V797	G858	M918	F985	L1049	S1110
	L426		R545	L607	E735	V798	N859	M919	G986	L1050	P1111
	R427		E548	V608	D736	S799	R860	T920	Y987	D1051	L1112
	R428		I549	R612	S737	R800	L861	L921	V988	M1052	L1113
	V429		S550	R613	I738	E801	V862	G922	V988	S1053	L1114
	I430		D651	L613	L739	V802	K863	Q923	Y989	D1054	L1115
	S431		E552	E614	M740	E803	V864	I924	Y990	P1055	L1115
	S432		V553	V615	N741	V804	R865	M925	Q991	T1056	P1111
	L433		N554	L616	N741	K805	R866	E926	K992	T1056	T51
	A434		V555	D617	R742	G806	R867	S926	L993	M1057	E52
	R435		G556	A618	S743	G807	D868	G930	H994	I1058	I113
	G436		V495	E619	V744	G808	L869	K931	H995	Y1059	L114
	Q437		P496	E620	V745	D808	R870	Y932	N996	V1060	P54
	Q438		V497	E621	E746	V809	R871	M925		C1061	G55
	M439		E498	E622	R747	L810	I871	A833	K1000	D1062	L56
	V500		E499	H623	G746	I811	P872	A834	L1001	Q1063	K57
	F440		V501	A624	M749	G812	T873	L935	L1002	G1064	V58
	E441		I501	E563	Y750	K813	R874		A1003	D1065	R59
	A442		M564	V626	V814	V814	G875	V940			L60

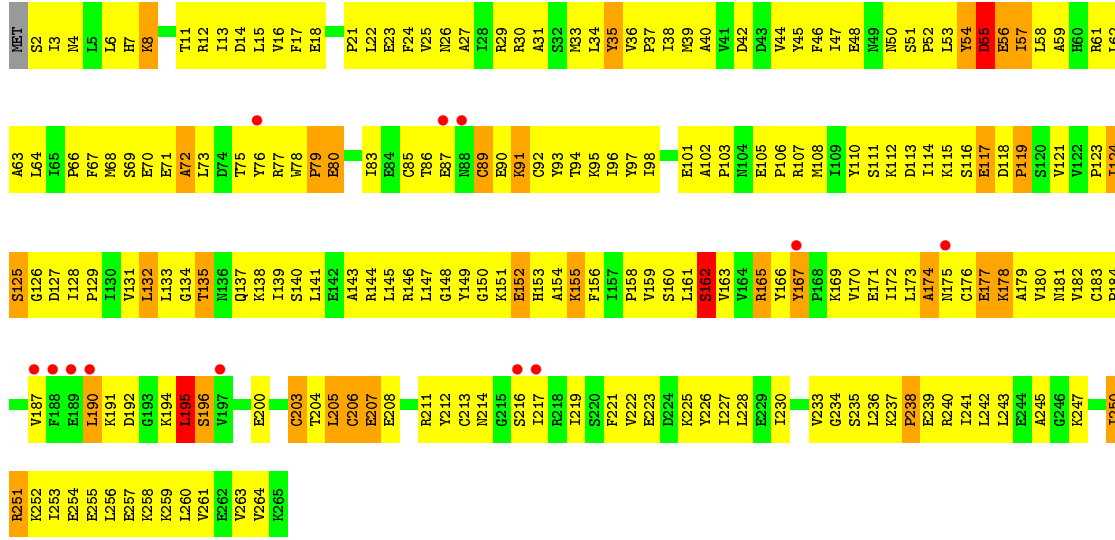
• Molecule 3: DNA-directed RNA polymerase subunit B



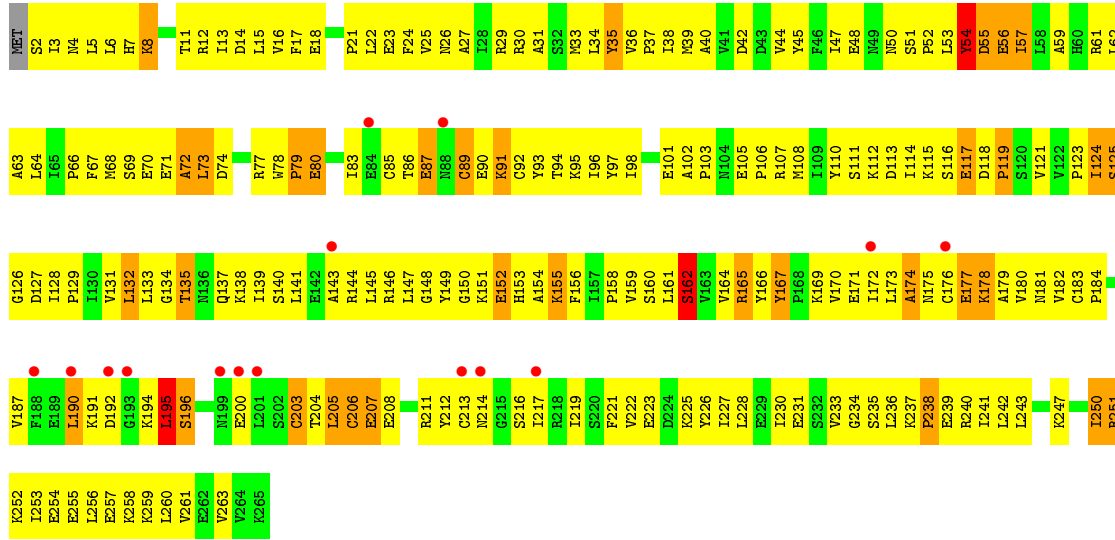
WET	Y1066	K1118
ALA	I1067	V1119
SER	G1068	GLY
ASN	W1069	LEU
T5	I1070	SER
L6	D1071	GLY
I7	K1072	GLY
D8	N1073	
E9	K1074	
R10	N1075	
W11	K1076	
R12	Y1077	
V13	V1078	
I14	C1079	
E15	P1080	
A16	I1081	
R17	H1082	
F18	G1083	
K19	D1084	
S20	K1085	
K21	S1086	
G22	N1087	
L23	L1088	
V24	F1089	
R25	P1090	
Q26	V1091	
H27	M1031	
L28	E1032	
D29	R1033	
S30	D1034	
Y31	G1035	
R32	F1036	
A33	L1037	
F34	G1038	
V35	F1039	
R36	I1101	
N37	Q1102	
K38	E1103	
L39	L1104	
Q40	M1105	
E41	S1106	
I42	I1107	
I43	I1108	
E44	I1109	
D44	S1110	
E45	P1111	
Q46	L1112	
G47	L1113	
E48	L1114	
I49	V1115	
P50	L1115	
T51	P1111	
E52	E112	
I53	I113	
V54	V114	
P54	Y115	
G55	Y116	
L56	G117	
K57	D118	
V58	L119	
R59	P120	
L60	I121	



• Molecule 4: DNA-directed RNA polymerase subunit D

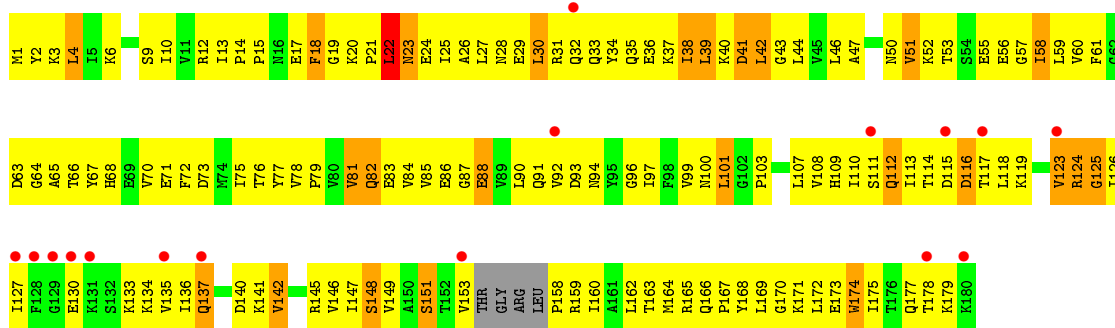


• Molecule 4: DNA-directed RNA polymerase subunit D

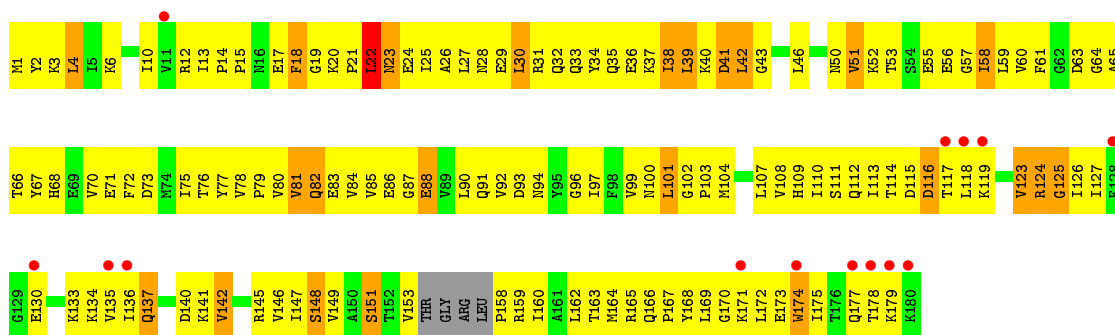


• Molecule 5: DNA-directed RNA polymerase subunit E

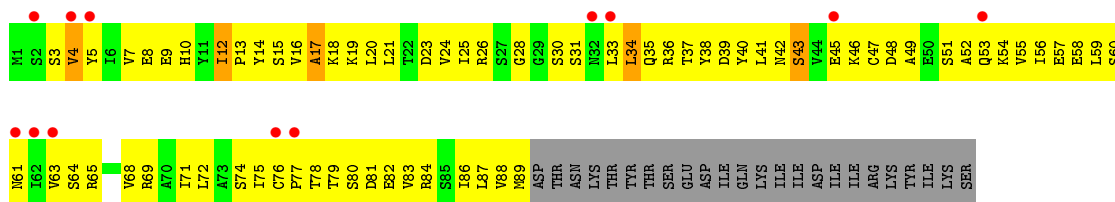
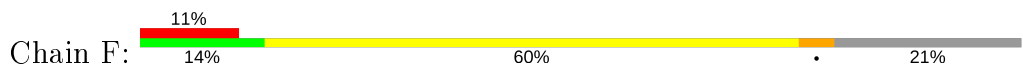




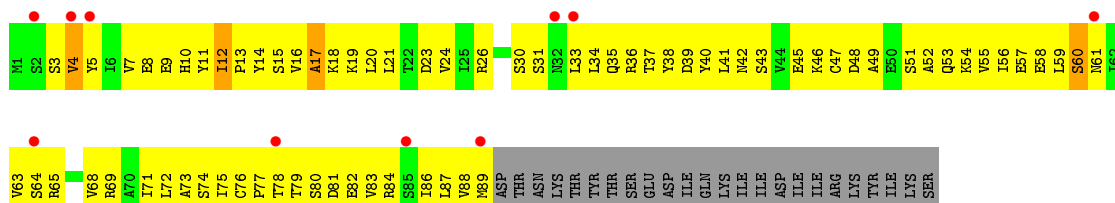
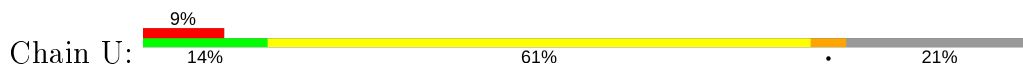
• Molecule 5: DNA-directed RNA polymerase subunit E



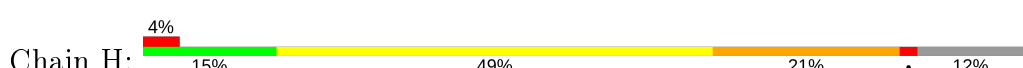
• Molecule 6: DNA-directed RNA polymerase subunit F



• Molecule 6: DNA-directed RNA polymerase subunit F

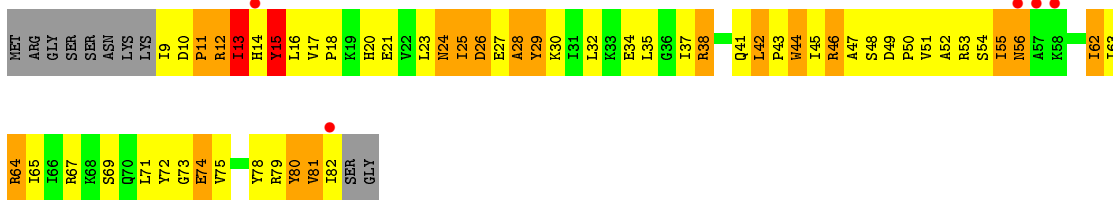
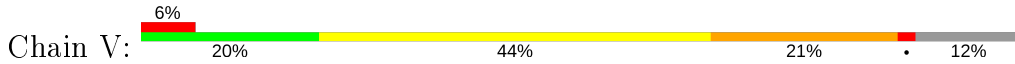


• Molecule 7: DNA-directed RNA polymerase subunit H

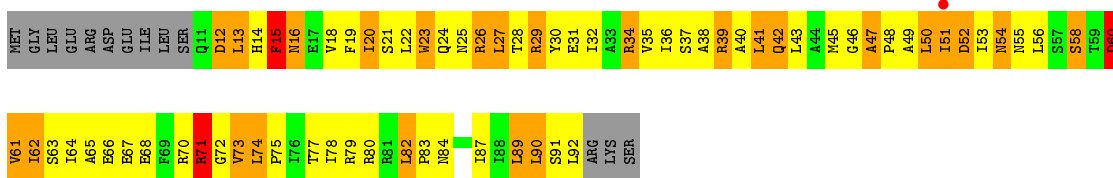




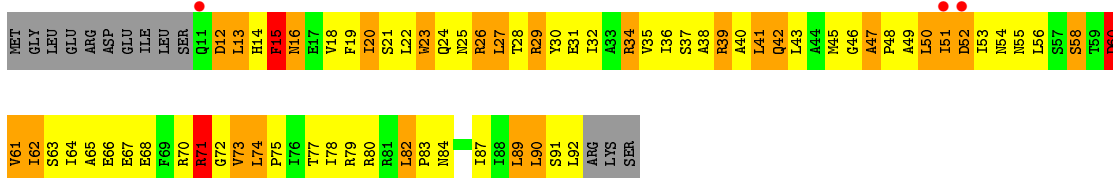
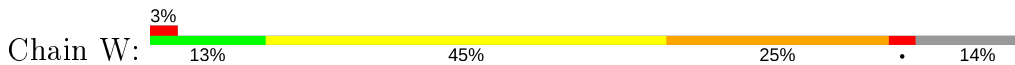
• Molecule 7: DNA-directed RNA polymerase subunit H



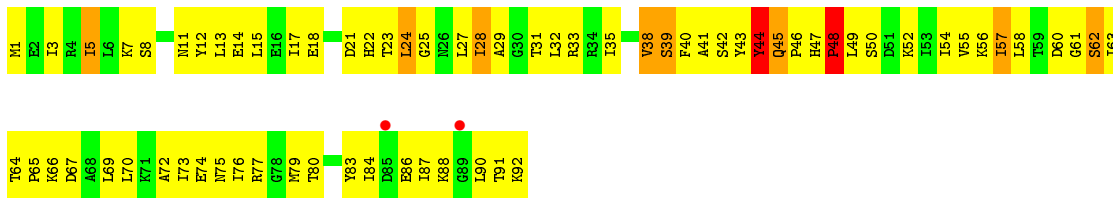
• Molecule 8: DNA-directed RNA polymerase subunit K



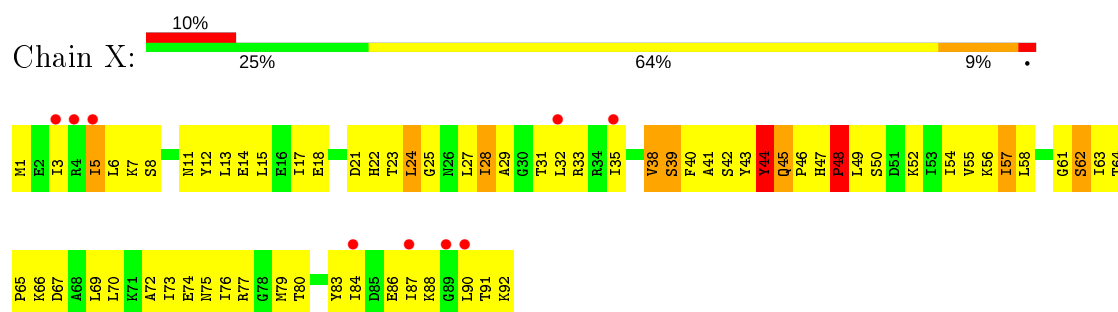
• Molecule 8: DNA-directed RNA polymerase subunit K



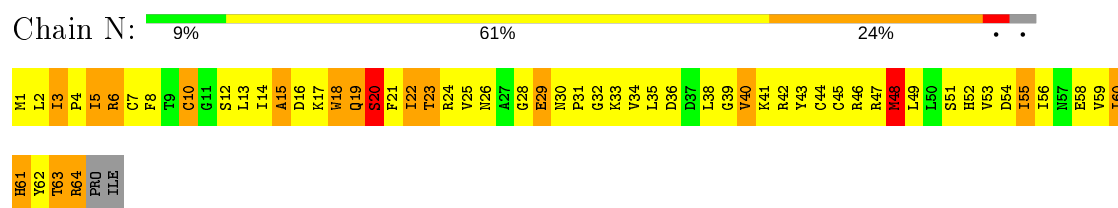
• Molecule 9: DNA-directed RNA polymerase subunit L



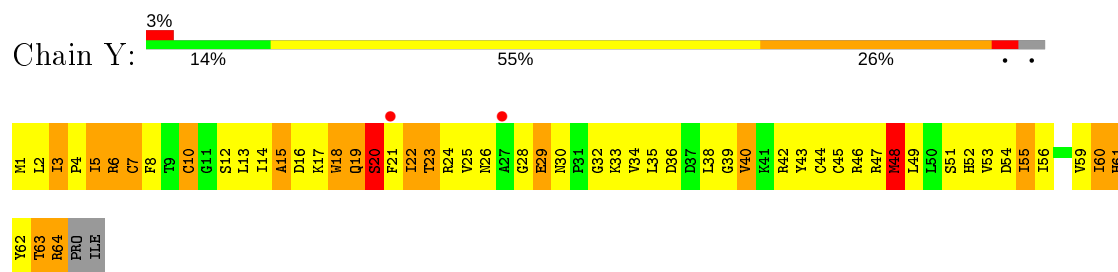
• Molecule 9: DNA-directed RNA polymerase subunit L



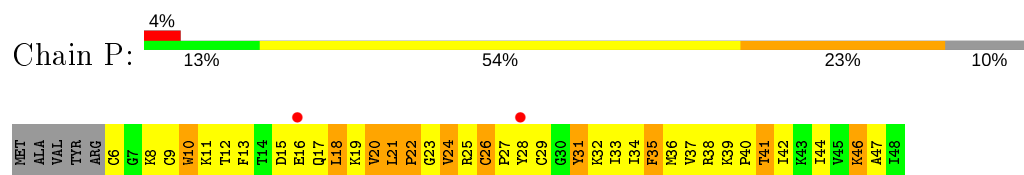
- Molecule 10: DNA-directed RNA polymerase subunit N



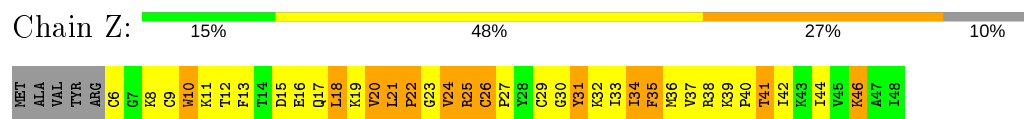
- Molecule 10: DNA-directed RNA polymerase subunit N



- Molecule 11: DNA-directed RNA polymerase subunit P



- Molecule 11: DNA-directed RNA polymerase subunit P



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	125.82Å 201.24Å 196.05Å 90.00° 100.92° 90.00°	Depositor
Resolution (Å)	39.79 – 3.40 39.79 – 3.40	Depositor EDS
% Data completeness (in resolution range)	80.4 (39.79-3.40) 80.3 (39.79-3.40)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.73 (at 3.40Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.274 , 0.343 0.271 , 0.275	Depositor DCC
R_{free} test set	5323 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	79.3	Xtrriage
Anisotropy	0.345	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.28 , 83.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.41$, $\langle L^2 \rangle = 0.23$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.86	EDS
Total number of atoms	48122	wwPDB-VP
Average B, all atoms (Å ²)	93.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.66% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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: ZN, F3S, 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	0.48	0/6306	0.80	4/8539 (0.0%)
1	Q	0.46	0/6306	0.79	4/8539 (0.0%)
2	C	0.46	0/2189	0.81	0/2947
2	G	0.43	0/2189	0.80	0/2947
3	B	0.46	0/8810	0.79	5/11921 (0.0%)
3	R	0.45	0/8810	0.79	3/11921 (0.0%)
4	D	0.40	0/2152	0.68	0/2911
4	S	0.37	0/2152	0.67	0/2911
5	E	0.38	0/1423	0.69	0/1919
5	T	0.37	0/1423	0.69	0/1919
6	F	0.35	0/701	0.63	0/949
6	U	0.35	0/701	0.62	0/949
7	H	0.44	0/625	0.76	0/848
7	V	0.41	0/625	0.76	0/848
8	K	0.50	0/667	0.82	0/903
8	W	0.49	0/667	0.81	0/903
9	L	0.39	0/733	0.72	0/986
9	X	0.38	0/733	0.72	0/986
10	N	0.38	0/523	0.75	0/705
10	Y	0.37	0/523	0.74	0/705
11	P	0.45	0/354	0.68	0/475
11	Z	0.46	0/354	0.67	0/475
All	All	0.44	0/48966	0.77	16/66206 (0.0%)

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
3	B	0	1

Continued on next page...

Continued from previous page...

Mol	Chain	#Chirality outliers	#Planarity outliers
3	R	0	1
4	D	0	1
4	S	0	1
All	All	0	4

There are no bond length outliers.

The worst 5 of 16 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	841	LEU	CA-CB-CG	7.67	132.93	115.30
1	Q	841	LEU	CA-CB-CG	7.56	132.69	115.30
3	B	436	GLY	N-CA-C	-6.16	97.70	113.10
3	R	436	GLY	N-CA-C	-5.97	98.17	113.10
1	A	508	LEU	N-CA-C	-5.89	95.11	111.00

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	B	314	TYR	Sidechain
4	D	54	TYR	Sidechain
3	R	314	TYR	Sidechain
4	S	54	TYR	Sidechain

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	6173	0	6243	1147	0
1	Q	6173	0	6243	1128	0
2	C	2169	0	2288	501	0
2	G	2169	0	2288	526	0
3	B	8645	0	8782	1656	0
3	R	8645	0	8780	1698	0
4	D	2114	0	2145	357	0
4	S	2114	0	2145	348	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	E	1402	0	1467	222	0
5	T	1402	0	1467	246	0
6	F	694	0	705	129	0
6	U	694	0	705	139	0
7	H	611	0	641	117	0
7	V	611	0	641	125	0
8	K	658	0	692	161	0
8	W	658	0	692	174	0
9	L	723	0	749	94	0
9	X	723	0	749	91	0
10	N	514	0	528	159	0
10	Y	514	0	529	151	0
11	P	346	0	376	63	0
11	Z	346	0	375	58	0
12	A	1	0	0	0	0
12	B	1	0	0	0	0
12	N	1	0	0	0	0
12	P	1	0	0	0	0
12	Q	1	0	0	0	0
12	R	1	0	0	0	0
12	Y	1	0	0	0	0
12	Z	1	0	0	0	0
13	A	1	0	0	0	0
13	Q	1	0	0	0	0
14	D	7	0	0	4	0
14	S	7	0	0	3	0
All	All	48122	0	49230	8272	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 85.

The worst 5 of 8272 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:238:LYS:NZ	1:A:297:THR:HB	1.42	1.31
1:Q:238:LYS:NZ	1:Q:297:THR:HB	1.43	1.31
1:A:803:ARG:HG2	3:B:444:ASP:HA	1.20	1.17
1:A:308:ARG:HH21	3:B:1099:LEU:HD13	1.10	1.16
3:R:329:ARG:HD2	3:R:562:PHE:HB3	1.24	1.15

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	768/880 (87%)	513 (67%)	136 (18%)	119 (16%)	0	0
1	Q	768/880 (87%)	509 (66%)	141 (18%)	118 (15%)	0	0
2	C	273/392 (70%)	158 (58%)	66 (24%)	49 (18%)	0	0
2	G	273/392 (70%)	161 (59%)	61 (22%)	51 (19%)	0	0
3	B	1084/1124 (96%)	698 (64%)	238 (22%)	148 (14%)	0	1
3	R	1084/1124 (96%)	698 (64%)	237 (22%)	149 (14%)	0	1
4	D	262/265 (99%)	166 (63%)	69 (26%)	27 (10%)	0	3
4	S	262/265 (99%)	167 (64%)	66 (25%)	29 (11%)	0	3
5	E	172/180 (96%)	123 (72%)	31 (18%)	18 (10%)	0	3
5	T	172/180 (96%)	122 (71%)	32 (19%)	18 (10%)	0	3
6	F	87/113 (77%)	56 (64%)	22 (25%)	9 (10%)	0	3
6	U	87/113 (77%)	56 (64%)	23 (26%)	8 (9%)	1	4
7	H	72/84 (86%)	46 (64%)	13 (18%)	13 (18%)	0	0
7	V	72/84 (86%)	44 (61%)	15 (21%)	13 (18%)	0	0
8	K	80/95 (84%)	44 (55%)	19 (24%)	17 (21%)	0	0
8	W	80/95 (84%)	44 (55%)	20 (25%)	16 (20%)	0	0
9	L	90/92 (98%)	64 (71%)	19 (21%)	7 (8%)	1	6
9	X	90/92 (98%)	66 (73%)	17 (19%)	7 (8%)	1	6
10	N	62/66 (94%)	30 (48%)	18 (29%)	14 (23%)	0	0
10	Y	62/66 (94%)	31 (50%)	18 (29%)	13 (21%)	0	0
11	P	41/48 (85%)	24 (58%)	10 (24%)	7 (17%)	0	0
11	Z	41/48 (85%)	23 (56%)	11 (27%)	7 (17%)	0	0
All	All	5982/6678 (90%)	3843 (64%)	1282 (21%)	857 (14%)	0	1

5 of 857 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	56	GLN
1	A	58	CYS
1	A	64	THR
1	A	65	LEU
1	A	194	ILE

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	675/766 (88%)	580 (86%)	95 (14%)	3	13
1	Q	675/766 (88%)	583 (86%)	92 (14%)	3	14
2	C	237/338 (70%)	201 (85%)	36 (15%)	3	11
2	G	237/338 (70%)	199 (84%)	38 (16%)	2	10
3	B	937/965 (97%)	807 (86%)	130 (14%)	3	13
3	R	937/965 (97%)	810 (86%)	127 (14%)	3	14
4	D	241/242 (100%)	224 (93%)	17 (7%)	14	44
4	S	241/242 (100%)	223 (92%)	18 (8%)	13	41
5	E	156/159 (98%)	142 (91%)	14 (9%)	9	32
5	T	156/159 (98%)	142 (91%)	14 (9%)	9	32
6	F	82/106 (77%)	79 (96%)	3 (4%)	34	62
6	U	82/106 (77%)	79 (96%)	3 (4%)	34	62
7	H	67/75 (89%)	54 (81%)	13 (19%)	1	4
7	V	67/75 (89%)	55 (82%)	12 (18%)	2	6
8	K	72/84 (86%)	57 (79%)	15 (21%)	1	3
8	W	72/84 (86%)	57 (79%)	15 (21%)	1	3
9	L	81/81 (100%)	75 (93%)	6 (7%)	13	42
9	X	81/81 (100%)	75 (93%)	6 (7%)	13	42
10	N	58/60 (97%)	50 (86%)	8 (14%)	3	14
10	Y	58/60 (97%)	49 (84%)	9 (16%)	2	11

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
11	P	39/43 (91%)	31 (80%)	8 (20%)	1	3
11	Z	39/43 (91%)	31 (80%)	8 (20%)	1	3
All	All	5290/5838 (91%)	4603 (87%)	687 (13%)	4	16

5 of 687 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
8	K	23	TRP
1	Q	425	LEU
6	U	5	TYR
8	K	74	LEU
1	Q	52	ILE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 175 such sidechains are listed below:

Mol	Chain	Res	Type
7	H	41	GLN
1	Q	376	ASN
5	T	109	HIS
8	K	42	GLN
1	Q	56	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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 12 ligands modelled in this entry, 10 are monoatomic - leaving 2 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
14	F3S	D	1001	4	0,9,9	0.00	-	-	-	-
14	F3S	S	1001	4	0,9,9	0.00	-	-	-	-

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
14	F3S	D	1001	4	-	-	0/3/3/3
14	F3S	S	1001	4	-	-	0/3/3/3

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.

2 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
14	D	1001	F3S	4	0
14	S	1001	F3S	3	0

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	776/880 (88%)	-0.17	17 (2%) 62 60	23, 75, 132, 186	0
1	Q	776/880 (88%)	-0.03	26 (3%) 45 44	29, 87, 145, 202	0
2	C	279/392 (71%)	-0.05	10 (3%) 42 42	29, 81, 153, 190	0
2	G	279/392 (71%)	0.00	12 (4%) 35 35	42, 97, 153, 181	0
3	B	1090/1124 (96%)	-0.19	17 (1%) 72 70	24, 78, 145, 196	0
3	R	1090/1124 (96%)	-0.10	33 (3%) 50 49	36, 84, 149, 196	0
4	D	264/265 (99%)	0.09	12 (4%) 33 33	44, 94, 144, 179	0
4	S	264/265 (99%)	0.22	15 (5%) 23 24	61, 111, 157, 192	0
5	E	176/180 (97%)	0.38	16 (9%) 9 10	39, 112, 189, 202	0
5	T	176/180 (97%)	0.35	14 (7%) 12 13	57, 113, 176, 202	0
6	F	89/113 (78%)	0.36	12 (13%) 3 4	73, 142, 182, 196	0
6	U	89/113 (78%)	0.60	10 (11%) 5 6	93, 141, 184, 201	0
7	H	74/84 (88%)	0.22	3 (4%) 37 36	46, 90, 137, 165	0
7	V	74/84 (88%)	0.20	5 (6%) 17 19	70, 101, 159, 198	0
8	K	82/95 (86%)	-0.25	1 (1%) 79 77	30, 72, 118, 154	0
8	W	82/95 (86%)	0.03	3 (3%) 41 40	47, 82, 139, 189	0
9	L	92/92 (100%)	0.01	2 (2%) 62 60	42, 81, 125, 200	0
9	X	92/92 (100%)	0.31	9 (9%) 7 9	52, 102, 140, 159	0
10	N	64/66 (96%)	-0.23	0 100 100	60, 90, 124, 174	0
10	Y	64/66 (96%)	-0.02	2 (3%) 49 48	61, 98, 145, 185	0
11	P	43/48 (89%)	-0.03	2 (4%) 31 31	48, 101, 137, 155	0
11	Z	43/48 (89%)	-0.12	0 100 100	64, 100, 144, 180	0
All	All	6058/6678 (90%)	-0.03	221 (3%) 42 42	23, 88, 153, 202	0

The worst 5 of 221 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	R	434	ALA	8.3
5	T	135	VAL	6.6
6	U	33	LEU	6.2
4	D	217	ILE	5.8
6	U	2	SER	5.7

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 carbohydrates 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(\AA^2)	Q<0.9
13	MG	A	1003	1/1	0.92	0.18	57,57,57,57	0
13	MG	Q	1003	1/1	0.97	0.25	60,60,60,60	0
12	ZN	B	2001	1/1	0.97	0.12	91,91,91,91	0
14	F3S	D	1001	7/7	0.97	0.12	79,80,80,80	0
12	ZN	R	2001	1/1	0.97	0.06	101,101,101,101	0
14	F3S	S	1001	7/7	0.98	0.11	111,111,112,113	0
12	ZN	A	1002	1/1	0.99	0.06	87,87,87,87	0
12	ZN	P	1001	1/1	0.99	0.10	103,103,103,103	0
12	ZN	N	1001	1/1	0.99	0.17	93,93,93,93	0
12	ZN	Z	1001	1/1	0.99	0.12	106,106,106,106	0
12	ZN	Q	1002	1/1	0.99	0.05	89,89,89,89	0
12	ZN	Y	1001	1/1	0.99	0.17	93,93,93,93	0

6.5 Other polymers [i](#)

There are no such residues in this entry.