

wwPDB X-ray Structure Validation Summary Report (i)

May 28, 2020 – 09:25 pm BST

PDB ID	:	1Y1W
Title	:	Complete RNA Polymerase II elongation complex
Authors	:	Cramer, P.; Kettenberger, H.; Armache, KJ.
Deposited on	:	2004-11-19
Resolution	:	4.00 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 (1)) were used in the production of this report:

MolProbity	:	4.02b-467
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 (i)

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

The reported resolution of this entry is 4.00 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	$egin{array}{c} { m Whole \ archive} \ (\#{ m Entries}) \end{array}$	${f Similar\ resolution}\ (\#{ m Entries,\ resolution\ range}({ m \AA}))$
R_{free}	130704	1087 (4.30-3.70)
Clashscore	141614	$1148 \ (4.30-3.70)$
Ramachandran outliers	138981	1108 (4.30-3.70)
Sidechain outliers	138945	1099 (4.30-3.70)
RNA backbone	3102	1048 (5.00-3.00)

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 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 <=5%

Mol	Chain	Length		Quality of chain	
1	Т	19	32%	68%	6
2	Ν	7	14%	71%	14%
3	Р	10		80%	20%
4	А	1733	25%	45%	10% • 18%
5	В	1224	27%	50%	13% 9%
6	С	318	27%	45%	10% • 16%



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Mol	Chain	Length		Qua	ality of chain		
7	D	221	34%		38%	8%	20%
8	Е	215	43%			51%	6%
9	F	155	18%	30%	6% •	46%	
10	G	171	40%		49%)	9% •
11	Н	146	33%		47%	11%	9%
12	Ι	122	35%		47%		13% ••
13	J	70	23%		47%	23%	7%
14	K	120	34%		51%		10% 5%
15	L	70	21%	30%	14%	34%	



2 Entry composition (i)

There are 17 unique types of molecules in this entry. The entry contains 31802 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 DNA chain called 5'-D(P*AP*GP*TP*AP*CP*TP*TP*AP*CP*GP*CP*C P*TP*GP*GP*TP*CP*AP*T)-3'.

Mol	Chain	Residues		At	oms			ZeroOcc	AltConf	Trace
1	Т	19	Total 387	C 185	N 67	0 116	Р 19	21	0	0

• Molecule 2 is a DNA chain called 5'-D(*AP*AP*GP*TP*AP*CP*T)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	Ν	7	Total 141	C 69	N 27	O 39	Р 6	20	0	0

• Molecule 3 is a RNA chain called 5'-R(*AP*AP*GP*AP*CP*CP*AP*GP*GP*C)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	Р	10	Total 214	$\begin{array}{c} \mathrm{C} \\ 97 \end{array}$	N 44	O 64	Р 9	0	0	0

• Molecule 4 is a protein called DNA-directed RNA polymerase II largest subunit.

Mol	Chain	Residues		Α	toms		ZeroOcc	AltConf	Trace	
4	А	1416	Total 11140	C 7021	N 1946	0 2111	S 62	0	0	0

• Molecule 5 is a protein called DNA-directed RNA polymerase II 140 kDa polypeptide.

Mol	Chain	Residues		Α	toms		ZeroOcc	AltConf	Trace	
5	В	1112	Total 8836	$\begin{array}{c} \mathrm{C} \\ 5594 \end{array}$	N 1548	O 1639	${ m S}\ 55$	0	0	0

• Molecule 6 is a protein called DNA-directed RNA polymerase II 45 kDa polypeptide.



Mol	Chain	Residues		At	oms		ZeroOcc	AltConf	Trace	
6	С	266	Total 2095	C 1317	N 348	O 417	S 13	0	0	0

• Molecule 7 is a protein called DNA-directed RNA polymerase II 32 kDa polypeptide.

Mol	Chain	Residues		At	oms			ZeroOcc	AltConf	Trace
7	D	177	Total 1356	C 840	N 241	О 273	${ m S} 2$	0	0	0

• Molecule 8 is a protein called DNA-directed RNA polymerases I, II, and III 27 kDa polypeptide.

Mol	Chain	Residues		At	oms			ZeroOcc	AltConf	Trace
8	E	214	Total 1752	C 1111	N 309	0 321	S 11	0	0	0

• Molecule 9 is a protein called DNA-directed RNA polymerases I, II, and III 23 kDa polypeptide.

Mol	Chain	Residues		At	oms			ZeroOcc	AltConf	Trace
9	F	84	Total 679	C 434	N 115	0 127	S 3	0	0	0

• Molecule 10 is a protein called DNA-directed RNA polymerase II 19 kDa polypeptide.

Mol	Chain	Residues		At	oms			ZeroOcc	AltConf	Trace
10	G	171	Total 1340	C 861	N 222	O 249	S 8	0	0	0

• Molecule 11 is a protein called DNA-directed RNA polymerases I, II, and III 14.5 kDa polypeptide.

Mol	Chain	Residues		At	oms			ZeroOcc	AltConf	Trace
11	Н	133	Total 1068	C 673	N 180	0 211	$\frac{S}{4}$	0	0	0

• Molecule 12 is a protein called DNA-directed RNA polymerase II subunit 9.

Mol	Chain	Residues		\mathbf{A}^{\dagger}	toms			ZeroOcc	AltConf	Trace
12	Ι	119	Total 971	C 596	N 179	O 186	S 10	0	0	0

• Molecule 13 is a protein called DNA-directed RNA polymerases I/II/III subunit 10.



Mol	Chain	Residues		Ato	\mathbf{ms}			ZeroOcc	AltConf	Trace
13	J	65	Total 532	C 339	N 93	0 94	S 6	0	0	0

• Molecule 14 is a protein called DNA-directed RNA polymerase II 13.6 kDa polypeptide.

Mol	Chain	Residues		At	oms			ZeroOcc	AltConf	Trace
14	K	114	Total 919	C 590	N 156	0 171	${ m S} 2$	0	0	0

• Molecule 15 is a protein called DNA-directed RNA polymerases I, II, and III 7.7 kDa polypeptide.

Mol	Chain	Residues		Atc	\mathbf{ms}			ZeroOcc	AltConf	Trace
15	L	46	Total 363	C 224	N 72	O 63	$\frac{S}{4}$	0	0	0

• Molecule 16 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
16	J	1	Total Zn 1 1	0	0
16	В	1	Total Zn 1 1	0	0
16	Ι	2	Total Zn 2 2	0	0
16	С	1	Total Zn 1 1	0	0
16	А	2	Total Zn 2 2	0	0
16	L	1	Total Zn 1 1	0	0

• Molecule 17 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
17	А	1	Total Mg 1 1	0	0



3 Residue-property plots (i)

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. Residues are colorcoded 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. 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: 5'-D(P*AP*GP*TP*AP*CP*TP*TP*AP*CP*GP*CP*CP*TP*GP*GP*TP*CP* AP*T)-3'



F347	S348 1340	R350	T351	V352 T352	1303 S354	<u>G355</u>	D356 D357	1358 N358		V364	G365 11266		<mark>\$369</mark>		K372	Y376		T381 D207	7302 Y383	N384	1385 D266	B387	1388		2004	P396	UUCH	P400	G401	A402 K403	Y404	V405 T406	R407	D408	5409 6410	D411	R412	1413 D414	L415	R416 VA17	5418	K419 PADO	A421	G422
D423	1424 0425	L426	0427	Y428	6429 W430	K431	V432 F433	R434	H435		D438 M420	D440	P441	V442	L443 F444	N445	R446	0447 DAA0	5449	L450	H451 VAEO	M453	S454	M455 M466	A457	H458	R459 11/20	K461	V462	1463 P464	Y465	5466 TA67	F468	R469	L4/0 N471	L472	S473	v4/4 T475	S476	P477	1479	A480	P482	D483
G484	D485 F486	M487	N488	L489	V491	P492	Q 493	T497	R498	A499	E500	0503	L504	C505	A506 V507	P508		I511 VE12	S513	P514	0515 ce 16	N5 17	K5 18	P519	M521		V524	0526 D526	T527	87.01	I531	R532 KF33	1534	T535	LD30 R537		F540	1541 E542	L543	D544 0545	V546	L547 ME 40	M5 49	1550
Y551	W552 Vega	P554	D555	W556	1000 (1558	V559	I560 DFG1	T562	P563	A564	I565 Teee	K567	P568	K569	P570 L571	W572	<mark>S573</mark>	G574 V575	0576	1577	L578 CE70	V580		N584	1586	H587	L588	R590	F591	2.69.T	T595	T596 T507	L598	S599	K601	D602	N603	6604 M605	L606		D000	G610	I613	F614
G615	V616 V617	E618	K619	K620	1621 V622	G623	S624	NG26	G627	G628	L629	HG31	V632	V633	K637		C642	TRAF	F646	G647	N648 TE40	10-19 10550	K651	V652 Vees	N654		L658 Hefo	N660	G661	F662 S663	T664	GGG5 TRAG	6667	D668		A671	D672	G0/3 P674	T675	M676	I679	T680	T682	I683
A684	E685 A686	K687		V690 1 601	D692	V693	T694 Krof	E696	A697	<mark>0698</mark>	A699 M700	L701		T709	L710 R711	E712	S713	F714 E716		<mark>V718</mark>	V719 B720	F721	L722	N723 8724	A725	R726	D727	A729	G730	K/31 L732		N736 1 737	K738	D739	L/40 N741	N742	V743	N/44 0745	M746	V747	S751	K752	5754	F755
I756	N757 1758		M761	S762	A / 03 C764	V765	G766 0767	0768	S769	0 <u>770</u>	B-77 A	1775 1775		F779	V780 D781	R782	T783	L784 D785	F / 63 H786	F787	S788 V780	D790	D791	D704	E795	S796	K797	F799	V800	E801 N802	S803	Y804 T 005	R806	G807	1809 1809	P810	0811	E812 F813	F814	F815 H016	4817	M818	6820 6820	R821
E822	G823 1824	1825 1825	D826	1827 7231	4020 V829	K830	T831 4832	E833	T834	G 835	Y836 T027	103/	R839	R840	L841 V842	K843	A8 44	L845 F046	D847	1848	M8 49	Y852	D853	N854 TO EE	1033 1856	R857	N858	1860 L860	G861	N862 V863	I864	0865 Toeee	1867 1867	Y868	6989 E870	D871	6872 1072	D874	A875		4001 S882	1883 No 04	1885	1886
G887	6888 3 80	D890	<mark>4891</mark>	2000	7897 7897	R898	V899	L901	L902	N903	T904	H906	T907	L908	D909 P910	S911	L912	L913 F014	F T P J	191 <mark>9</mark>	L920	D922		<mark>q926</mark>	L929	D930		1933 K934	0 935	TA30	D939	R940 V041	F942	L943	V946	F947	V948	D949	N953	W954 Doff	L956	P957	N959	1960 1
R961	R962 T063	1964	0965	N966	A30/ []968	0 969	1970 F071	H972	1973		2979	1981	T982	1983	K984 D985	1986	V987	1988	D992	<mark>1993</mark>	0994 PD0F	N996	L997	1998 1000	L1000	R1001	G1002	N1004	E1005	11006 11007	Q1008	N1009	Q1011	R1012	A1014	V1015	T1016	F1018	C1019	C1020	L1022	R1023	R1025	L1026
A1027	T1028	R1030	V1031	L1032	41033 E1034	Y1035	R1036 11037	T1038	K1039	<mark>q1040</mark>	A1041	W1044	V1045		N1048 11049	E1050	A1051	Q1052 E1053	L1054	R1055	S1056	V1058	H1059	P1060	E1062	M1063	V1064	V1066	L1067	A1068 A1069	Q1070	S1071	G1073	E1074	A1076		L1081	THR	PHE	SIH	ALA	GLY	ALA	SER
K1092	K1093 V1004	T1095	S1096	61097 11000	P1099	R1100	L1101 K1102		L1105	N1106	V1107	N1110	M1111	K1112	T1113 P1114	S1115	L1116	T1117 V1118	Y1119	L1120	E1121	G1123	H1124	D44 07	Jotta	01130	1 1 2 2	11134		E1139 H1140	T1141	T1142 11142	K1144		1114/ 11148	A1149	S1150	E1151 I1152	Y1153	Y1154 D1155	P1156	D1157	R1159	S1160
T1161	V1162 T1163	P1164	E1165	D1166	E1168	I1169	11170		H1173		L1176 TEII	ASP	GLU	GLU	AL.A GL.U	GLN	SER	PHE	д1187	Q1188	S1189	1611A	L.1192	L1193	L1195	E1196	L1197	R1199		ZOZIW	K1205	D1206	T1208	M1209	01210 01211	V1212	G1213	E1214 R1215	11216	K1217	T1219	F1220	N1222	D1223
L1224	11007	W1228		D1231	L1236	I1237	11238 B1230	C1240	R1241	V1242	V1243	PRO	TYS	SER	ASP	ALA	GLU	THR	610 A1254	E1255	E1256	1.1260	K1261	100 A	E1207 N1265	T1266	M1267	00717	11271	R1274	G1275	T1770	E1280	R1281	V 1282 V 1283	M1284		K1290 K1290	V1291	P1292	P1294	T1295	Y1298	V1299
K1300	E1301	E1303	W1304	V1305	E1307	T1308	D1309	V1311	N1312	L1313	S1314 E1215	V1316	M1317	T1318	V1319 P1320		D1323	P1324 T1275	R1326	11327	Y1328 T1320	11329 N1330	S1331	F1332	11333 D1334	I 1335	M1336	V1338	L1339	61340 11341	E1342	A1343	R1345	A1346	A134/ L1348	Y1349	K1350 E1251	L1352		V1355 T1266	00011	D1359	Y1362	V1363







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 \bullet Molecule 6: DNA-directed RNA polymerase II 45 kDa polypeptide



• Molecule 7: DNA-directed RNA polymerase II 32 kDa polypeptide



• Molecule 9: DNA-directed RNA polymerases I, II, and III 23 kDa polypeptide



• Molecule 10: DNA-directed RNA polymerase II 19 kDa polypeptide





B69 B69 N71 V12 N71 V12 N75 V73 N76 V75 N76 V75 N76 V76 N76 V76 N76 V77 N76 V76 N76 V76 N76 V77 N76 V76 N76 V77 N76 V76 N16 V76 N16 V11 N116 V116 N116 V116 N126 V128 N126 V128 N127 V130 V118 V111 N128 V128 N128 V130 N128 V130 N128 V130 V130

 \bullet Molecule 11: DNA-directed RNA polymerases I, II, and III 14.5 kDa polypeptide



• Molecule 12: DNA-directed RNA polymerase II subunit 9



 \bullet Molecule 13: DNA-directed RNA polymerases I/II/III subunit 10



• Molecule 14: DNA-directed RNA polymerase II 13.6 kDa polypeptide



• Molecule 15: DNA-directed RNA polymerases I, II, and III 7.7 kDa polypeptide



Chain L:	21%	30%	14%	34%	_
MET SER ARG GLU GLV CLL PHE FLC PRO	THR ASN LEU LEU ALA ALA ALA ALA	1617 1617 1618 1718 1718 1718 1726 1726 1726 1726 1726 1726 1726 1726	A32 835 836 836 837 138 138 138	T 43 D 44 D 44 D 44 C 48 C 48 C 48 C 48 C 48 C 48 C 48 C	L56 L57 K58 A59 A60 R60 K62





4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants	221.37Å 392.50 Å 283.18 Å	Deperitor
a, b, c, α , β , γ	90.00° 90.00° 90.00°	Depositor
Bosolution(A)	50.00 - 4.00	Depositor
	48.83 - 3.78	EDS
$\% { m Data \ completeness}$	(Not available) $(50.00-4.00)$	Depositor
(in resolution range)	94.4(48.83-3.78)	EDS
R _{merge}	(Not available)	Depositor
R _{sym}	(Not available)	Depositor
$< I/\sigma(I) > 1$	$0.00 (at 3.77 \text{\AA})$	Xtriage
Refinement program	CNS	Depositor
D D .	0.253 , 0.276	Depositor
Π, Π_{free}	0.260 , 0.274	DCC
R_{free} test set	2439 reflections $(2.00%)$	wwPDB-VP
Wilson B-factor $(Å^2)$	77.4	Xtriage
Anisotropy	0.284	Xtriage
Bulk solvent $k_{sol}(e/A^3), B_{sol}(A^2)$	0.18 , -11.4	EDS
L-test for twinning ²	$< L >=0.28, < L^2>=0.12$	Xtriage
Estimated twinning fraction	0.207 for 1/2 *h-1/2 *k,-3/2 *h-1/2 *k,-l	Vtriago
	$0.206 \text{ for } 1/2^{*}h+1/2^{*}k, 3/2^{*}h-1/2^{*}k, -1$	Attrage
F_o, F_c correlation	0.83	EDS
Total number of atoms	31802	wwPDB-VP
Average B, all atoms $(Å^2)$	89.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: The largest off-origin peak in the Patterson function is 1.51% of the height of the origin peak. No significant pseudotranslation is detected.

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.



¹Intensities estimated from amplitudes.

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, 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).

Mal	Chain	Bo	nd lengths	B	ond angles
	Chain	RMSZ	# Z > 5	RMSZ	# Z > 5
1	Т	1.15	1/432~(0.2%)	1.03	1/664~(0.2%)
2	Ν	1.74	1/158~(0.6%)	0.91	1/242~(0.4%)
3	Р	1.17	2/240~(0.8%)	1.06	3/373~(0.8%)
4	А	0.50	0/11339	0.75	5/15334~(0.0%)
5	В	0.51	1/9008~(0.0%)	0.74	5/12146~(0.0%)
6	С	0.56	0/2133	0.76	0/2891
7	D	0.46	0/1365	0.71	0/1837
8	Е	0.45	0/1788	0.64	0/2406
9	F	0.56	0/691	0.80	0/933
10	G	0.55	0/1368	0.76	0/1844
11	Н	0.40	0/1086	0.65	0/1470
12	Ι	0.49	1/989~(0.1%)	0.72	0/1331
13	J	0.52	0/541	0.80	0/727
14	K	0.52	0/937	0.70	0/1265
15	Ĺ	0.47	0/365	0.74	0/485
All	All	0.54	6/32440~(0.0%)	0.75	15/43948~(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
5	В	0	1
6	С	0	1
All	All	0	2

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	$\operatorname{Observed}(\operatorname{\AA})$	Ideal(Å)
1	Т	10	DA	O3'-P	-9.11	1.50	1.61



Mol	Chain	\mathbf{Res}	Type	Atoms	Z	$\operatorname{Observed}(\operatorname{\AA})$	$\operatorname{Ideal}(\operatorname{\AA})$
2	Ν	6	DC	O3'-P	7.11	1.69	1.61
12	Ι	78	CYS	CB-SG	-6.30	1.71	1.82
3	Р	3	G	P-OP1	-6.03	1.38	1.49
5	В	503	GLY	CA-C	6.02	1.61	1.51

Continued from previous page...

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	$Observed(^{o})$	$Ideal(^{o})$
1	Т	10	DA	OP1-P-O3'	7.38	121.44	105.20
3	Р	3	G	O5'-P-OP1	-7.04	99.36	105.70
3	Р	2	A	C2'-C3'-O3'	6.95	124.82	113.70
2	N	6	DC	P-O3'-C3'	6.32	127.28	119.70
5	В	1185	CYS	N-CA-C	-6.23	94.17	111.00

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	\mathbf{Res}	Type	Group
5	В	503	GLY	Mainchain
6	С	82	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	Т	387	0	216	24	0
2	Ν	141	0	81	8	0
3	Р	214	0	111	13	0
4	А	11140	0	11217	1300	0
5	В	8836	0	8871	1003	0
6	С	2095	0	2051	255	0
7	D	1356	0	1319	117	0
8	Е	1752	0	1776	148	0
9	F	679	0	701	86	0
10	G	1340	0	1357	157	0
11	Н	1068	0	1040	110	0
12	Ι	971	0	930	105	0



	J	- <u>r</u>	1 - 5 -			
Mol	Chain	Non-H	${ m H(model)}$	H(added)	Clashes	Symm-Clashes
13	J	532	0	542	94	0
14	Κ	919	0	929	93	0
15	L	363	0	387	45	0
16	А	2	0	0	0	0
16	В	1	0	0	0	0
16	С	1	0	0	0	0
16	Ι	2	0	0	0	0
16	J	1	0	0	0	0
16	L	1	0	0	0	0
17	А	1	0	0	0	0
All	All	31802	0	31528	3238	0

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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 51.

The worst 5 of 3238 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)
7:D:40:HIS:HB3	10:G:73:LYS:NZ	1.61	1.14
14:K:47:ARG:HB3	14:K:47:ARG:HH11	1.00	1.14
4:A:53:LEU:HD23	4:A:54:ASN:H	1.08	1.12
4:A:76:GLU:O	4:A:76:GLU:HG3	1.53	1.08
4:A:53:LEU:HD23	4:A:54:ASN:N	1.70	1.07

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
4	А	1406/1733~(81%)	936 (67%)	311 (22%)	159 (11%)	0 6
5	В	1096/1224~(90%)	740 (68%)	215 (20%)	141 (13%)	0 4



Mol	Chain	Analysed	Favoured	Allowed	Outliers	Per	rce	ntiles
6	С	264/318~(83%)	166~(63%)	64 (24%)	34 (13%)		0	4
7	D	173/221 (78%)	118 (68%)	38 (22%)	17 (10%)	()	10
8	Е	212/215~(99%)	154 (73%)	44 (21%)	14 (7%)		1	17
9	F	82/155~(53%)	63 (77%)	16 (20%)	3 (4%)	•	3	28
10	G	169/171~(99%)	133 (79%)	24 (14%)	12 (7%)	•	1	16
11	Н	129/146~(88%)	85 (66%)	28 (22%)	16 (12%)		0	5
12	Ι	117/122~(96%)	79~(68%)	27 (23%)	11 (9%)	()	11
13	J	63/70~(90%)	34~(54%)	15(24%)	14(22%)		0	1
14	K	112/120~(93%)	87 (78%)	17 (15%)	8 (7%)	•	1	16
15	L	44/70~(63%)	17(39%)	18 (41%)	9 (20%)		0	2
All	All	3867/4565 (85%)	2612 (68%)	817 (21%)	438 (11%)		0	6

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5 of 438 Ramachandran outliers are listed below:

Mol	Chain	\mathbf{Res}	Type
4	А	5	GLN
4	А	48	ALA
4	А	54	ASN
4	А	55	ASP
4	А	57	ARG

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	Perc	entiles
4	А	1239/1520~(82%)	1125~(91%)	114 (9%)	9	32
5	В	964/1061~(91%)	873~(91%)	91~(9%)	8	31
6	С	234/274~(85%)	213~(91%)	21 (9%)	9	34
7	D	140/200~(70%)	124~(89%)	16 (11%)	5	25
8	Е	196/197~(100%)	188~(96%)	8 (4%)	30	57
9	F	74/137~(54%)	65~(88%)	9 (12%)	5	23



Mol	Chain	Analysed	Rotameric	Outliers	Perc	entiles
10	G	152/152~(100%)	139~(91%)	13 (9%)	10	37
11	Η	117/128~(91%)	109~(93%)	8 (7%)	16	44
12	Ι	113/116~(97%)	98 (87%)	15 (13%)	4	21
13	J	60/65~(92%)	55~(92%)	5 (8%)	11	38
14	K	99/102~(97%)	90 (91%)	9 (9%)	9	33
15	L	40/57~(70%)	37~(92%)	3 (8%)	13	41
All	All	3428/4009~(86%)	3116 (91%)	312 (9%)	9	33

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5 of 312 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	В	463	THR
5	В	901	PRO
12	Ι	78	CYS
5	В	485	ARG
5	В	636	PRO

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 84 such sidechains are listed below:

Mol	Chain	Res	Type
5	В	484	ASN
5	В	975	GLN
11	Н	131	ASN
5	В	516	ASN
5	В	734	HIS

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
3	Р	9/10~(90%)	1 (11%)	1 (11%)

All (1) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
3	Р	3	G

All (1) RNA pucker outliers are listed below:



Mol	Chain	Res	Type
3	Р	2	А

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 9 ligands modelled in this entry, 9 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 (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)

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates (i)

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands (i)

Unable to reproduce the depositors R factor - this section is therefore empty.

6.5 Other polymers (i)

Unable to reproduce the depositors R factor - this section is therefore empty.

