

wwPDB X-ray Structure Validation Summary Report (i)

Jun 24, 2024 – 02:13 PM EDT

PDB ID	:	5TBZ
Title	:	E. Coli RNA Polymerase complexed with NusG
Authors	:	Liu, B.; Steitz, T.A.
Deposited on	:	2016-09-13
Resolution	:	7.00 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 types of validation reports are described at http://www.wwpdb.org/validation/2017/FAQs#types.

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	:	2.37.1
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)	:	2.37.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure: $X\text{-}RAY \, DIFFRACTION$

The reported resolution of this entry is 7.00 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	1004 (10.00-3.90)			
Clashscore	141614	1069 (10.00-3.90)			
Ramachandran outliers	138981	1002 (10.00-3.90)			
Sidechain outliers	138945	1002 (10.00-3.86)			
RSRZ outliers	127900	1004 (9.50-3.80)			

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							
			26%							
1	А	242	73%	18%		• 7%				
			47%							
1	В	242	69%	18%	•	11%				
			23%							
1	F	242	72%	20%		• 7%				
			38%							
1	G	242	71%	17%	•	11%				
			32%							
2	С	1342	77%		20%	••				



Contr	nued fron	<i>i</i> previous	page									
Mol	Chain	Length	Quality of ch	Quality of chain								
			34%									
2	Н	1342	75%		21% ••							
			29%									
3	D	1407	63%	26%	• 7%							
			35%									
3	Ι	1407	64%	25%	• 7%							
			27%									
4	J	181	61%	18% •	19%							
			33%									
4	K	181	56%	22% •	• 19%							



2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 50147 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.

Mol	Chain	Residues		Ate	oms			ZeroOcc	AltConf	Trace
1	Δ	225	Total	С	Ν	0	\mathbf{S}	0	0	0
	A	220	1740	1082	309	343	6	0	0	0
1	D	215	Total	С	Ν	0	S	0	0	0
	I B	210	1657	1034	291	326	6	0		0
1	Б	225	Total	С	Ν	0	S	0	0	0
	Г	220	1740	1082	309	343	6	0	0	0
1	1 G	216	Total	С	Ν	0	\mathbf{S}	0	0	0
		210	1667	1040	294	327	6		0	0

• Molecule 1 is a protein called DNA-directed RNA polymerase subunit alpha.

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	l Actual Comment		Reference
А	-6	ALA	-	expression tag	UNP P0A7Z6
А	-5	HIS	-	expression tag	UNP P0A7Z6
А	-4	HIS	-	expression tag	UNP P0A7Z6
А	-3	HIS	-	expression tag	UNP P0A7Z6
А	-2	HIS	-	expression tag	UNP P0A7Z6
А	-1	HIS	-	expression tag	UNP P0A7Z6
А	0	HIS	-	expression tag	UNP P0A7Z6
В	-6	ALA	-	expression tag	UNP P0A7Z6
В	-5	HIS	-	expression tag	UNP P0A7Z6
В	-4	HIS	-	expression tag	UNP P0A7Z6
В	-3	HIS	-	expression tag	UNP P0A7Z6
В	-2	HIS	-	expression tag	UNP P0A7Z6
В	-1	HIS	-	expression tag	UNP P0A7Z6
В	0	HIS	-	expression tag	UNP P0A7Z6
F	-6	ALA	-	expression tag	UNP P0A7Z6
F	-5	HIS	-	expression tag	UNP P0A7Z6
F	-4	HIS	-	expression tag	UNP P0A7Z6
F	-3	HIS	-	expression tag	UNP P0A7Z6
F	-2	HIS	-	expression tag	UNP P0A7Z6
F	-1	HIS	-	expression tag	UNP P0A7Z6
F	0	HIS	-	expression tag	UNP P0A7Z6



Continu	eu jioni pre	vious puye			
Chain	Residue	Modelled	Actual	Comment	Reference
G	-6	ALA	-	expression tag	UNP P0A7Z6
G	-5	HIS	-	expression tag	UNP P0A7Z6
G	-4	HIS	-	expression tag	UNP P0A7Z6
G	-3	HIS	-	expression tag	UNP P0A7Z6
G	-2	HIS	-	expression tag	UNP P0A7Z6
G	-1	HIS	-	expression tag	UNP P0A7Z6
G	0	HIS	-	expression tag	UNP P0A7Z6

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

Mol	Chain	Residues		Atoms					AltConf	Trace
2	С	1319	Total 10401	C 6524	N 1814	O 2020	S 43	0	1	0
2	Н	1319	Total 10401	C 6524	N 1814	O 2020	S 43	0	1	0

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

Mol	Chain	Residues		Atoms				ZeroOcc	AltConf	Trace
3	D	1302	Total 10085	C 6326	N 1800	O 1911	S 48	0	0	0
3	Ι	1306	Total 10126	C 6353	N 1809	O 1916	S 48	0	0	0

• Molecule 4 is a protein called Transcription termination/antitermination protein NusG.

Mol	Chain	Residues		Atoms					AltConf	Trace
4	J	147	Total	С	Ν	0	S	0	0	0
	1 0		1165	740	201	217	7	Ŭ	Ŭ	Ŭ
4	K	1.47	Total	С	Ν	0	\mathbf{S}	0	0	0
4 K	147	1165	740	201	217	7	0	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-directed RNA polymerase subunit alpha

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F231 V232 ASP LEU ARG

• Molecule 2: DNA-directed RNA polymerase subunit beta

ILE PHE GLY PRO VAL KG6	D67 Y68 E69 C70 L71 L71 C72	G73 K74 Y75 K76 R77 L78	K79 H80 R81 E86 K87	C80 (90) (90) (92) (193)	94 195 195 197 198 198 190	H101 H102 G102 H104 E106 E106 L107	A108 8109 7110 7111 A112 H113 1114 W115	K118 8119 1119 1121 8122 8122 1124
G125 L126 L127 L128 D129 M130	P131 135 E136 R137 V138	L139 TYR PHE GLU SER TYR	VAL VAL ILE GLU GLY GLY MET	THR THR ASN GLU GLU ARG	GLN GLN E169 E162 E163	L169 6173 0174 E175 F176 D177	A178 K179 M180 G181 A182 A182 A184 I185	0186 1187 1188 1188 1190 8191 1192 1193
1194 R202 L205 N206	E207 T208 T212 K215	K216 A226 F227 V228 Q229	5230 6231 N232 K233 P234 P234 P235	M230 M237 1238 1239 T240	L242 P243 V244 L245 P246 P247 P247	1249 1249 1250 1252 1252 1252	F260 S263 D264 N266 N266 D267	Y269 R270 R271 V272 1273 N274 N274 N276
N277 R278 L279 K280 R281 L282	A286 D289 1290 1291	V292 R293 N294 E295 K296 R297	M298 E300 1209 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200	L304 L305 L306 L307 N309	G310 R311 R312 G313 G313 R314 A315 T315	1317 6318 8319 8320 8321 8321 8322 8323	L324 K325 K325 L327 A328 D329 M330 T331	q335 G336 R337 F338 R339 R339 Q340 Q340
L342 L343 R346 V347 D348	Y349 S350 G351 R352 S353 V354	1355 1356 V357 0358 P359	H364 Q365 C366 G367 L368 P369 V370	K371 K371 M372 A373 L374	F377 F378 F380 F381 1381 T381	1334	K395 A396 A397 K398 K398 M400 E404	E405 E406 V407 V408 V408 V408 D410 I411 L412
D413 E414 V415 I416 H419	P420 V421 L422 L423 N424 R425	A426 P427 T428 L429 H430 R431	L432 6433 1434 F437 F437 F437	F440 L441 1442 E443 6444	K445 A446 1447 Q448 L449 H450 H450	1452 1452 1453 1453 1455 1456 1458 1458 1458	D460 F461 D462 G463 H463 H469 H469	P471 L472 1487 1490 ● L491 ●
P 493 A 494 N 495 G 496 E 497 P 498	1499 1500 V501 P502 S503 q504	D505 V506 V507 L508 Y511	Y512 M513 T514 R515 N519	G524 M525 V526 L527 T528	G529 P530 K531 E532 A533 E533 E534	L536 7537 R538 H545 H545	R551 1552 1552 8560 6561 6561 1563 1564	A565 L569 V574 G575 R576 A577
1578 1579 1680 1581 1582 V583	P584 K585 G586 L587 P588 Y589	S590 1591 V592 N593 G597	A600 1601 8603 8603 8603 8604	L005 C608 Y609 R610	L612 P616 T617 A621	M625 F629 B634 636 € G636	A637 SG38 V G39 F647 F647	S655 E658 A659 E660 V661 A662 A662 E663
1664 Q665 L666 Q667 F668	G671 L672 R678 I685	W686 A689 R692 V693	NG97 NG97 V706	N 10 K7 15 Q7 16 N7 20	M7 24 A7 30 A7 34	I737 R738 A741 G742 M743 M743 M744	G745 L746 M747 A748 K749 T755 E756	P757 P758 1760 V769 L770 Q771
Y772 F773 T774 S775 L783	L788 K789 T790 A791 N792	S793	V801 D802 V803 4804 Q805 D806	V808 V809 C814	E818 G819 M821 M822 M822 T823 T823	V 825 1826 1826 1826 1828 6828 0830 ●	L835 R836 D837 L840 L840 T844	D847 V848 1849 K850 K850 L855 I856
L857 V858 P859 R860 N861 T862	L863 L864 L871 E874	N875 S876 S876 V877 D878 A879 V880	K881 V882 R883 S884 V885 V885	1890 1890 1892 1893 1893 1893 1894	C895 A896 C898 Y899 G990 G900	1902 1902 1903 1905 1908 1908	N910 E913 A914 C915 G916 C916 V917	A919 A920 1921 1923 1924 E925 P926
G927 T928 Q929 L930 T931 M932	R933 H936 ILLE GLY GLY	ALA A941 S942 R943 A944	1950 1951 1958 1958 1958	1900 1962 1963 1963 1964 1964 1965	V966 V967 N968 G971 K972 K972	1975 1976 1976 8977 8978 1979 1980	E981 L982 L983 L985 L985 L985 E985 E987 E988	6989 1991 K992 K993 S994 Y995 K996
V997 P998 Y999 G1000 A1001 V1002	L1003 A1004 K1005 G1006 D1007 G1008	E1009 V1017 A1018 N1019 W1020	P1026 V1027 11028 T1029 E1030	M1040	q1044 T1045 T1046 T1047 E1052	L1059 V1060 V1061 L1062 D1063 S1064	R1067 11068 K1072 D1073 L1074 R1075 P1075	A1077 L1078 D1082 A1083 Q1084 G1085
11090 • P1091 • G1092 • A1097 • Q1098 •	Y1099 • F1100 • L1101 • P1102 • G1103 • K1104 •	A1105 • 11106 • V1107 • Q1108 • L1109 •	Dilli G1112 Q1113 Q1114 T1115 S1116 S1116	A1117 01119 11120 11121 A1122	R1123 11124 P1125 S1128 G1129 G1120	11131 11131 11132 11133 11134 11134 11138 11139	F1145 E1152 11155 L1156	V1163 S1164 F1165 F1165 K1167 E1168 F1169 K1170

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

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants	248.16Å 313.78Å 162.79Å	Deperitor
a, b, c, α , β , γ	90.00° 130.23° 90.00°	Depositor
$\mathbf{P}_{\text{assolution}}(\hat{\mathbf{A}})$	162.19 - 7.00	Depositor
Resolution (A)	49.91 - 7.00	EDS
% Data completeness	96.0 (162.19-7.00)	Depositor
(in resolution range)	93.3 (49.91-7.00)	EDS
R _{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) > 1$	$1.04 (at 6.68 \text{\AA})$	Xtriage
Refinement program	REFMAC 5.8.0155	Depositor
D D.	0.330 , 0.395	Depositor
Λ, Λ_{free}	0.330 , 0.395	DCC
R_{free} test set	707 reflections (4.90%)	wwPDB-VP
Wilson B-factor $(Å^2)$	314.0	Xtriage
Anisotropy	0.296	Xtriage
Bulk solvent $k_{sol}(e/Å^3), B_{sol}(Å^2)$	0.37, 500.0	EDS
L-test for twinning ²	$< L >=0.35, < L^2>=0.18$	Xtriage
Estimated twinning fraction	0.185 for -h-2*l,-k,l	Xtriage
F_o, F_c correlation	0.78	EDS
Total number of atoms	50147	wwPDB-VP
Average B, all atoms $(Å^2)$	330.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: The largest off-origin peak in the Patterson function is 4.98% 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)

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	Bond	Bond lengths		ond angles
	Unam	RMSZ	# Z > 5	RMSZ	# Z > 5
1	А	0.45	0/1761	0.72	0/2387
1	В	0.46	0/1676	0.71	0/2271
1	F	0.45	0/1761	0.74	0/2387
1	G	0.47	0/1687	0.70	0/2286
2	С	0.43	0/10569	0.67	0/14258
2	Н	0.43	0/10569	0.67	0/14258
3	D	0.44	0/10233	0.76	5/13816~(0.0%)
3	Ι	0.44	0/10277	0.74	1/13877~(0.0%)
4	J	0.50	0/1188	0.70	0/1603
4	Κ	0.50	0/1188	0.74	1/1603~(0.1%)
All	All	0.44	0/50909	0.71	7/68746~(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
2	С	0	2
2	Н	0	2
3	D	0	1
3	Ι	0	1
4	Κ	0	1
All	All	0	7

There are no bond length outliers.

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	$Observed(^{o})$	$Ideal(^{o})$
3	D	1194	ARG	NE-CZ-NH2	-6.82	116.89	120.30
3	D	239	LEU	CA-CB-CG	5.33	127.56	115.30
3	D	173	GLY	N-CA-C	5.30	126.36	113.10

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Mol	Chain	Res	Type	Atoms	\mathbf{Z}	$Observed(^{o})$	$Ideal(^{o})$
3	Ι	117	LEU	CA-CB-CG	5.29	127.46	115.30
4	K	73	MET	C-N-CA	5.27	134.87	121.70

There are no chirality outliers.

5 of 7 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	С	57	PHE	Peptide
2	С	855	PRO	Peptide
3	D	1178	THR	Peptide
2	Н	57	PHE	Peptide
2	Н	855	PRO	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	А	1740	0	1767	40	0
1	В	1657	0	1686	40	0
1	F	1740	0	1767	38	0
1	G	1667	0	1693	35	0
2	С	10401	0	10414	216	0
2	Н	10401	0	10414	232	0
3	D	10085	0	10303	380	2
3	Ι	10126	0	10341	316	0
4	J	1165	0	1145	26	0
4	K	1165	0	1145	30	0
All	All	50147	0	50675	1182	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 12.

The worst 5 of 1182 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)
3:I:1001:ALA:HA	3:I:1020:TRP:HE1	1.12	1.13

<i>J</i> 1	1 0		
Atom-1	Atom-2	$\begin{array}{c} \text{Interatomic} \\ \text{distance} \ (\text{\AA}) \end{array}$	Clash overlap (Å)
4:K:29:HIS:HB3	4:K:82:LEU:HG	1.35	1.06
3:D:226:ALA:HB1	3:D:227:PHE:HA	1.31	1.06
3:D:247:PRO:HB3	3:I:53:ARG:HH12	1.18	1.06
3:D:1001:ALA:HA	3:D:1020:TRP:HE1	1.12	1.06

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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)	
3:D:184:ALA:O	3:D:191:SER:OG[2_957]	2.03	0.17	
3:D:1183:SER:OG	3:D:1183:SER:OG[2_957]	2.12	0.08	

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	P	erc	entiles
1	А	223/242~(92%)	182 (82%)	29 (13%)	12 (5%)		2	19
1	В	211/242~(87%)	175~(83%)	27~(13%)	9~(4%)		2	22
1	F	223/242~(92%)	183 (82%)	28 (13%)	12 (5%)		2	19
1	G	212/242~(88%)	177 (84%)	26~(12%)	9~(4%)		3	22
2	С	1316/1342~(98%)	1108 (84%)	172 (13%)	36~(3%)		5	31
2	Н	1316/1342~(98%)	1110 (84%)	168 (13%)	38~(3%)		4	29
3	D	1294/1407~(92%)	1023 (79%)	190 (15%)	81 (6%)		1	17
3	Ι	1300/1407~(92%)	1024 (79%)	197 (15%)	79~(6%)		1	17
4	J	141/181 (78%)	123 (87%)	15 (11%)	3(2%)		7	36
4	Κ	141/181 (78%)	117 (83%)	18 (13%)	6 (4%)		2	22
All	All	6377/6828 (93%)	5222 (82%)	870 (14%)	285(4%)		2	22

5 of 285 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	А	15	ASP
1	А	67	GLU
1	А	114	ASP
1	А	155	ALA
1	В	114	ASP

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent side chain 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	Percentile	s
1	А	193/208~(93%)	191~(99%)	2(1%)	76 86	
1	В	184/208~(88%)	182~(99%)	2(1%)	73 84	
1	F	193/208~(93%)	192 (100%)	1 (0%)	88 93	
1	G	185/208~(89%)	183 (99%)	2 (1%)	73 84	
2	С	1137/1157~(98%)	1121 (99%)	16 (1%)	67 80	
2	Н	1137/1157~(98%)	1120 (98%)	17 (2%)	65 80	
3	D	1087/1168~(93%)	1048 (96%)	39 (4%)	35 59	
3	Ι	1091/1168~(93%)	1054 (97%)	37 (3%)	37 60	
4	J	128/158~(81%)	122~(95%)	6 (5%)	26 51	
4	K	128/158 (81%)	121 (94%)	7 (6%)	21 47	
All	All	5463/5798~(94%)	5334 (98%)	129 (2%)	49 69	

5 of 129 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	Ι	1347	LEU
4	J	109	ASP
3	D	889	ASP
3	D	847	ASP
4	J	174	ASP

Sometimes side chains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 61 such side chains are listed below:

Mol	Chain	Res	Type
3	D	1249	ASN
3	Ι	341	ASN
2	Н	120	GLN
3	Ι	309	ASN
3	Ι	1268	ASN

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)

There are no ligands in this entry.

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	А	225/242~(92%)	1.34	64 (28%) 0 2	267, 330, 380, 416	0
1	В	215/242~(88%)	2.69	114 (53%) 0 1	266, 335, 388, 430	0
1	F	225/242~(92%)	1.26	55 (24%) 0 2	248, 320, 383, 403	0
1	G	216/242~(89%)	2.11	91 (42%) 0 1	279, 337, 380, 412	0
2	C	1319/1342~(98%)	1.62	431 (32%) 0 2	232, 313, 384, 510	0
2	Н	1319/1342~(98%)	1.75	450 (34%) 0 2	231, 315, 383, 482	0
3	D	1302/1407~(92%)	1.65	415 (31%) 0 2	230, 326, 424, 473	0
3	Ι	1306/1407~(92%)	2.06	498 (38%) 0 1	231, 332, 431, 492	0
4	J	147/181 (81%)	1.64	49 (33%) 0 2	300, 384, 446, 483	0
4	K	147/181 (81%)	2.13	59 (40%) 0 1	324, 413, 469, 491	0
All	All	6421/6828~(94%)	1.78	2226 (34%) 0 2	230, 324, 419, 510	0

The worst 5 of 2226 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	D	314	ARG	18.1
3	Ι	989	GLY	17.0
2	Н	788	SER	16.3
3	Ι	315	ALA	15.7
3	D	315	ALA	15.4

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)

There are no ligands in this entry.

6.5 Other polymers (i)

There are no such residues in this entry.

