



# Full wwPDB X-ray Structure Validation Report ⓘ

Dec 17, 2023 – 03:38 PM EST

PDB ID : 4W8J  
Title : Structure of the full-length insecticidal protein Cry1Ac reveals intriguing details of toxin packaging into in vivo formed crystals  
Authors : Evdokimov, A.G.; Moshiri, F.; Sturman, E.J.; Rydel, T.J.; Zheng, M.; Seale, J.W.; Franklin, S.  
Deposited on : 2014-08-25  
Resolution : 2.78 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
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) : 2.36

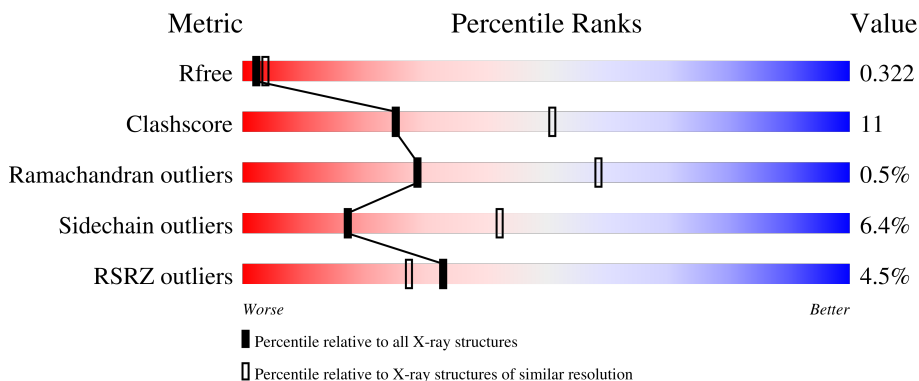
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.78 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	4107 (2.80-2.76)
Clashscore	141614	4575 (2.80-2.76)
Ramachandran outliers	138981	4487 (2.80-2.76)
Sidechain outliers	138945	4489 (2.80-2.76)
RSRZ outliers	127900	4027 (2.80-2.76)

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  $\geq 3$ , 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	1184	

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 8206 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 Pesticidal crystal protein cry1Ac.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	1017	8152	5170	1406	1567	9	0	0	0

There are 22 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	148	LEU	PHE	conflict	UNP M4LET9
A	462	VAL	PHE	conflict	UNP M4LET9
A	661	SER	CYS	engineered mutation	UNP M4LET9
A	730	SER	CYS	engineered mutation	UNP M4LET9
A	796	SER	CYS	engineered mutation	UNP M4LET9
A	802	SER	CYS	engineered mutation	UNP M4LET9
A	814	SER	CYS	engineered mutation	UNP M4LET9
A	816	SER	CYS	engineered mutation	UNP M4LET9
A	822	SER	CYS	engineered mutation	UNP M4LET9
A	837	SER	CYS	engineered mutation	UNP M4LET9
A	990	SER	CYS	engineered mutation	UNP M4LET9
A	1025	SER	CYS	engineered mutation	UNP M4LET9
A	1045	SER	CYS	engineered mutation	UNP M4LET9
A	1063	SER	CYS	engineered mutation	UNP M4LET9
A	1076	SER	CYS	engineered mutation	UNP M4LET9
A	1125	SER	CYS	engineered mutation	UNP M4LET9
A	1179	HIS	-	expression tag	UNP M4LET9
A	1180	HIS	-	expression tag	UNP M4LET9
A	1181	HIS	-	expression tag	UNP M4LET9
A	1182	HIS	-	expression tag	UNP M4LET9
A	1183	HIS	-	expression tag	UNP M4LET9
A	1184	HIS	-	expression tag	UNP M4LET9

- Molecule 2 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	3	Total K 3 3	0	0

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Ca 1 1	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	50	Total O 50 50	0	0



VAL THR SER ASN ASP TYR THR VAL ASN GLN GLU GLU TYR GLY GLY ALA TYR THR SER ARG ASN ARG GLY TYR ASN GLU ALA PRO SER VAL PRO ALA ASP TYR ALA SER VAL TYR GLU LYS SER TYR THR ASP GLY ARG ARG GLU ASN PRO SER GLU PHE ASN ARG GLY TYR ARG ASP

TYR THR PRO LEU P1138 L1146 D1153 K1154 V1155 W1156 Y1157 E1158 I1159 T1162 E1163 E1172 E1178 HIS HIS HIS HIS HIS HIS

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	87.31Å 87.31Å 266.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	82.97 – 2.78 39.18 – 2.78	Depositor EDS
% Data completeness (in resolution range)	98.8 (82.97-2.78) 98.9 (39.18-2.78)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.33 (at 2.77Å)	Xtrriage
Refinement program	REFMAC 5.5.0109	Depositor
R, $R_{free}$	0.226 , 0.332 0.217 , 0.322	Depositor DCC
$R_{free}$ test set	1340 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	53.4	Xtrriage
Anisotropy	0.002	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 40.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.35$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	8206	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	53.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.04% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: K, CA

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	0.61	0/8335	0.71	0/11317

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 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	8152	0	7896	171	0
2	A	3	0	0	0	0
3	A	1	0	0	0	0
4	A	50	0	0	8	0
All	All	8206	0	7896	171	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 11.

All (171) 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:922:GLN:HB2	1:A:925:THR:CG2	2.03	0.88
1:A:722:THR:HG22	1:A:860:ARG:HG2	1.54	0.87
1:A:100:LEU:HD11	1:A:160:VAL:HG11	1.56	0.86
1:A:715:VAL:HG21	1:A:757:GLU:HG3	1.57	0.84
1:A:213:THR:HG22	4:A:1329:HOH:O	1.80	0.80
1:A:922:GLN:HB2	1:A:925:THR:HG23	1.63	0.78
1:A:74:ASP:OD1	1:A:93:ARG:NH2	2.15	0.78
1:A:1033:ARG:HB3	1:A:1172:GLU:HG2	1.68	0.76
1:A:346:PRO:O	1:A:347:GLN:HB3	1.86	0.75
1:A:508:ILE:HG12	1:A:511:ARG:HH21	1.49	0.75
1:A:100:LEU:HD11	1:A:160:VAL:CG1	2.17	0.75
1:A:713:ASP:HB3	1:A:716:PHE:H	1.52	0.73
1:A:927:ILE:HA	1:A:930:ILE:HD12	1.68	0.72
1:A:987:GLY:HA2	1:A:999:VAL:HG11	1.72	0.72
1:A:708:THR:HB	1:A:722:THR:OG1	1.91	0.71
1:A:707:ILE:HG12	1:A:723:LEU:HD22	1.71	0.70
1:A:917:GLN:NE2	1:A:917:GLN:HA	2.11	0.65
1:A:756:ILE:HG21	1:A:759:SER:HB2	1.77	0.65
1:A:566:GLN:O	1:A:569:ASP:HB2	1.97	0.65
1:A:1051:ILE:H	1:A:1051:ILE:HD12	1.62	0.64
1:A:394:SER:OG	1:A:395:ASN:N	2.31	0.64
1:A:1162:THR:HG22	1:A:1163:GLU:HG2	1.81	0.63
1:A:539:ILE:HG23	1:A:593:SER:HB2	1.81	0.63
1:A:656:LEU:HB2	1:A:665:LYS:HD2	1.79	0.62
1:A:151:GLN:O	1:A:152:ASN:HB2	1.99	0.62
1:A:713:ASP:OD1	1:A:715:VAL:N	2.30	0.61
1:A:517:PRO:HA	1:A:586:ILE:HG22	1.81	0.61
1:A:513:TYR:OH	1:A:515:GLU:HG3	2.01	0.60
1:A:861:LEU:HD13	1:A:864:LEU:HD21	1.83	0.59
1:A:383:LEU:HD12	1:A:451:PRO:HG2	1.83	0.59
1:A:917:GLN:HA	1:A:917:GLN:HE21	1.67	0.59
1:A:33:TYR:N	1:A:33:TYR:CD1	2.67	0.59
1:A:546:GLY:HA3	1:A:584:GLY:HA3	1.84	0.59
1:A:112:GLU:HG3	1:A:115:ARG:HH21	1.69	0.58
1:A:504:SER:OG	1:A:511:ARG:NH1	2.36	0.58
1:A:430:LEU:HD12	1:A:454:SER:O	2.04	0.58
1:A:690:PHE:HB3	1:A:693:ILE:HD11	1.87	0.57
1:A:1048:ILE:HA	1:A:1156:TRP:O	2.04	0.57
1:A:778:VAL:HG22	1:A:824:HIS:HB2	1.85	0.57
1:A:158:LEU:HD11	1:A:207:ALA:HA	1.87	0.56
1:A:948:LEU:HA	4:A:1320:HOH:O	2.06	0.56
1:A:45:PHE:CE1	1:A:49:GLU:HG3	2.41	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:765:TYR:HB2	1:A:849:ILE:HB	1.87	0.55
1:A:1049:HIS:HB3	1:A:1055:THR:HB	1.87	0.55
1:A:41:SER:HA	4:A:1304:HOH:O	2.06	0.55
1:A:535:SER:HB3	1:A:598:VAL:HG23	1.89	0.54
1:A:536:VAL:HG13	1:A:562:LEU:HG	1.88	0.54
1:A:138:ASN:HD22	1:A:192:ARG:HH11	1.56	0.54
1:A:922:GLN:HB2	1:A:925:THR:HG22	1.89	0.54
1:A:314:TYR:HB2	1:A:402:ARG:NH2	2.23	0.53
1:A:1034:VAL:HG23	1:A:1058:LEU:HD12	1.89	0.53
1:A:769:TYR:N	4:A:1346:HOH:O	2.42	0.52
1:A:739:ILE:HD13	1:A:866:PHE:CD2	2.44	0.52
1:A:112:GLU:CD	1:A:115:ARG:HH21	2.12	0.52
1:A:269:THR:HG21	1:A:413:ILE:HD11	1.92	0.51
1:A:360:ARG:NH2	1:A:408:ASP:OD2	2.38	0.51
1:A:914:VAL:HG12	1:A:914:VAL:O	2.10	0.51
1:A:87:ARG:HG3	1:A:88:ILE:N	2.25	0.51
1:A:269:THR:CG2	1:A:413:ILE:HD11	2.40	0.51
1:A:1046:VAL:HG22	1:A:1159:ILE:HG12	1.92	0.51
1:A:360:ARG:HD2	1:A:410:LEU:HD13	1.92	0.51
1:A:616:TYR:O	1:A:619:GLU:HG3	2.10	0.51
1:A:384:ASP:OD1	1:A:384:ASP:N	2.43	0.51
1:A:439:GLY:HA2	1:A:449:ARG:NH1	2.25	0.51
1:A:100:LEU:HD21	1:A:160:VAL:HG13	1.92	0.50
1:A:378:GLN:OE1	1:A:378:GLN:HA	2.12	0.50
1:A:158:LEU:O	1:A:161:TYR:HB3	2.11	0.50
1:A:387:GLU:HG2	1:A:398:SER:OG	2.11	0.50
1:A:488:ILE:HD12	1:A:489:SER:H	1.77	0.50
1:A:987:GLY:CA	1:A:999:VAL:HG11	2.42	0.50
1:A:431:SER:HB3	1:A:454:SER:HB2	1.93	0.50
1:A:162:VAL:HG21	1:A:240:VAL:HG13	1.94	0.49
1:A:112:GLU:CG	1:A:115:ARG:HH21	2.25	0.49
1:A:236:LEU:O	1:A:240:VAL:HB	2.11	0.49
1:A:99:ARG:HD2	1:A:147:LEU:HD13	1.94	0.49
1:A:509:GLN:HA	1:A:509:GLN:OE1	2.13	0.49
1:A:138:ASN:HD22	1:A:192:ARG:NH1	2.10	0.48
1:A:634:GLN:HE22	1:A:671:LYS:HE3	1.78	0.48
1:A:39:SER:OG	1:A:239:THR:HG22	2.14	0.48
1:A:484:ASN:HB3	1:A:512:GLY:HA2	1.96	0.48
1:A:346:PRO:O	1:A:347:GLN:CB	2.58	0.48
1:A:998:ASP:N	1:A:998:ASP:OD1	2.47	0.48
1:A:345:ALA:HB1	1:A:346:PRO:HD2	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:259:THR:O	1:A:259:THR:HG23	2.14	0.47
1:A:991:TRP:CE3	1:A:1018:VAL:HG12	2.49	0.47
1:A:741:GLU:HG3	1:A:843:ASP:HA	1.96	0.47
1:A:525:THR:HB	1:A:527:TYR:CE1	2.49	0.47
1:A:543:VAL:HG22	1:A:589:VAL:HG22	1.97	0.47
1:A:738:LYS:HB2	1:A:847:TRP:CZ3	2.49	0.47
1:A:201:GLY:HA2	1:A:567:SER:OG	2.15	0.47
1:A:511:ARG:NH1	1:A:592:PHE:O	2.47	0.47
1:A:767:ILE:HB	1:A:847:TRP:HB2	1.95	0.47
1:A:38:ILE:HD12	1:A:76:PHE:HE1	1.78	0.47
1:A:1146:LEU:C	1:A:1146:LEU:HD12	2.35	0.47
1:A:693:ILE:O	1:A:694:ASN:HB2	2.15	0.46
1:A:968:THR:O	1:A:971:SER:HB2	2.16	0.46
1:A:1043:GLU:H	1:A:1162:THR:HB	1.80	0.46
1:A:319:HIS:NE2	1:A:433:VAL:O	2.44	0.45
1:A:51:VAL:HB	1:A:258:ARG:HG2	1.98	0.45
1:A:232:PHE:CZ	1:A:236:LEU:HD22	2.52	0.45
1:A:33:TYR:N	1:A:33:TYR:HD1	2.13	0.45
1:A:334:THR:OG1	1:A:335:PHE:N	2.49	0.45
1:A:67:ILE:HD12	1:A:67:ILE:HA	1.86	0.45
1:A:489:SER:HA	1:A:497:ASP:OD1	2.17	0.45
1:A:65:TRP:CE2	1:A:167:LEU:HD22	2.52	0.45
1:A:1057:GLU:OE1	1:A:1059:LYS:HE3	2.17	0.45
1:A:504:SER:HB2	1:A:594:GLY:HA2	1.99	0.45
1:A:1033:ARG:HB3	1:A:1172:GLU:CG	2.44	0.45
1:A:215:LEU:HD13	1:A:232:PHE:HD1	1.81	0.44
1:A:345:ALA:HB1	1:A:346:PRO:CD	2.47	0.44
1:A:335:PHE:HB2	4:A:1341:HOH:O	2.18	0.44
1:A:387:GLU:HG3	1:A:400:VAL:HG22	2.00	0.44
1:A:494:THR:HG21	1:A:498:LEU:HD21	1.98	0.44
1:A:532:ARG:CG	1:A:572:TYR:CE2	3.00	0.44
1:A:713:ASP:HB3	1:A:716:PHE:N	2.26	0.44
1:A:877:LEU:O	1:A:880:VAL:HG12	2.18	0.44
1:A:542:ASN:HA	1:A:551:PHE:O	2.18	0.44
1:A:705:THR:HG23	1:A:706:GLY:N	2.32	0.44
1:A:913:PHE:C	1:A:915:ASN:H	2.20	0.44
1:A:141:LEU:HD13	1:A:168:HIS:HA	1.99	0.44
1:A:308:ASP:HB2	1:A:317:SER:HB3	1.99	0.44
1:A:616:TYR:HB3	4:A:1345:HOH:O	2.17	0.44
1:A:638:LYS:HB2	1:A:641:VAL:HG23	2.00	0.44
1:A:763:GLU:HB3	1:A:851:LYS:HB3	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1019:SER:HB2	1:A:1158:GLU:HG2	2.00	0.44
1:A:387:GLU:HB2	1:A:404:SER:OG	2.17	0.44
1:A:438:SER:HB2	1:A:448:ILE:HD12	2.00	0.43
1:A:504:SER:CB	1:A:594:GLY:HA2	2.48	0.43
1:A:526:ARG:O	1:A:608:VAL:HG12	2.18	0.43
1:A:886:LYS:HE2	1:A:890:LYS:HD2	2.00	0.43
1:A:106:LEU:HD23	1:A:106:LEU:HA	1.80	0.43
1:A:284:ALA:HA	1:A:287:ILE:HD12	2.00	0.43
1:A:473:GLN:HG2	1:A:604:GLU:HG2	1.99	0.43
1:A:173:ARG:O	1:A:173:ARG:HG2	2.18	0.43
1:A:293:SER:HB2	1:A:294:PRO:HD2	2.00	0.43
1:A:173:ARG:HD2	1:A:250:TYR:HD1	1.83	0.43
1:A:215:LEU:HD13	1:A:232:PHE:CD1	2.54	0.43
1:A:68:PHE:HA	1:A:72:GLN:HG3	2.00	0.43
1:A:392:THR:HG21	1:A:396:LEU:HD13	2.01	0.43
1:A:536:VAL:HG23	1:A:537:THR:HG23	2.00	0.43
1:A:532:ARG:HG2	1:A:572:TYR:CE2	2.54	0.43
1:A:528:ARG:HD3	1:A:574:GLU:HB3	2.01	0.42
1:A:648:GLN:O	1:A:651:ASN:HB2	2.19	0.42
1:A:539:ILE:HG22	1:A:540:HIS:N	2.34	0.42
1:A:702:GLY:HA3	1:A:736:TYR:CE1	2.55	0.42
1:A:379:GLN:HB2	1:A:446:SER:HB3	2.00	0.42
1:A:851:LYS:HD2	1:A:948:LEU:HD13	2.01	0.42
1:A:837:SER:OG	1:A:884:GLU:OE2	2.37	0.42
1:A:926:ASN:HB2	4:A:1347:HOH:O	2.19	0.42
1:A:749:ARG:HD3	1:A:832:ASP:HB3	2.00	0.42
1:A:165:ALA:O	1:A:169:LEU:HG	2.19	0.42
1:A:540:HIS:HA	1:A:554:THR:HA	2.02	0.42
1:A:45:PHE:CD1	1:A:49:GLU:HG3	2.54	0.41
1:A:104:SER:O	1:A:108:GLN:HG3	2.19	0.41
1:A:238:LEU:HD23	1:A:238:LEU:HA	1.87	0.41
1:A:145:ILE:O	1:A:146:PRO:C	2.58	0.41
1:A:179:GLY:C	1:A:189:ILE:HD11	2.40	0.41
1:A:701:TRP:CE3	1:A:735:LEU:HG	2.56	0.41
1:A:662:LEU:HD23	1:A:662:LEU:HA	1.81	0.41
1:A:401:TYR:O	1:A:403:LYS:N	2.53	0.41
1:A:504:SER:OG	1:A:594:GLY:HA2	2.21	0.41
1:A:170:SER:HB3	1:A:250:TYR:CE1	2.55	0.41
1:A:325:PRO:HD3	1:A:333:PHE:HE1	1.86	0.41
1:A:639:THR:HG22	4:A:1309:HOH:O	2.21	0.41
1:A:249:ASN:OD1	1:A:249:ASN:N	2.52	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:306:TYR:CE2	1:A:337:LEU:HD11	2.56	0.41
1:A:316:TRP:CD1	1:A:316:TRP:C	2.95	0.41
1:A:702:GLY:HA3	1:A:736:TYR:CZ	2.56	0.40
1:A:704:SER:HB3	1:A:734:TYR:CE2	2.56	0.40
1:A:707:ILE:HG22	1:A:708:THR:N	2.36	0.40
1:A:669:SER:HA	1:A:672:VAL:HG12	2.04	0.40

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	1001/1184 (84%)	950 (95%)	46 (5%)	5 (0%)	29 58

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	347	GLN
1	A	917	GLN
1	A	1054	ASN
1	A	1052	GLU
1	A	1163	GLU

### 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	888/1036 (86%)	831 (94%)	57 (6%)	17 42

All (57) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	67	ILE
1	A	71	SER
1	A	147	LEU
1	A	150	VAL
1	A	180	GLN
1	A	181	ARG
1	A	213	THR
1	A	218	VAL
1	A	224	ARG
1	A	249	ASN
1	A	252	SER
1	A	258	ARG
1	A	265	ARG
1	A	304	THR
1	A	363	SER
1	A	371	PHE
1	A	381	SER
1	A	384	ASP
1	A	392	THR
1	A	404	SER
1	A	410	LEU
1	A	424	GLN
1	A	438	SER
1	A	458	ARG
1	A	482	LEU
1	A	508	ILE
1	A	509	GLN
1	A	560	THR
1	A	619	GLU
1	A	632	THR
1	A	640	ASN
1	A	657	SER
1	A	670	GLU
1	A	681	GLU
1	A	688	SER
1	A	691	LYS
1	A	692	ASP
1	A	705	THR

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Mol	Chain	Res	Type
1	A	730	SER
1	A	766	LEU
1	A	770	ASN
1	A	773	HIS
1	A	774	GLU
1	A	824	HIS
1	A	880	VAL
1	A	903	LYS
1	A	919	ASP
1	A	925	THR
1	A	945	LEU
1	A	966	ILE
1	A	983	ASP
1	A	998	ASP
1	A	1005	GLN
1	A	1013	GLU
1	A	1051	ILE
1	A	1055	THR
1	A	1155	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	85	ASN
1	A	194	ASN
1	A	301	ASN
1	A	770	ASN
1	A	855	GLN
1	A	917	GLN
1	A	1002	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 4 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

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	1017/1184 (85%)	0.38	46 (4%) 33 27	38, 52, 68, 92	0

All (46) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	371	PHE	6.7
1	A	783	SER	6.3
1	A	1138	PRO	5.6
1	A	379	GLN	4.8
1	A	369	ARG	4.4
1	A	508	ILE	4.3
1	A	592	PHE	4.1
1	A	280	PHE	3.6
1	A	277	ASP	3.3
1	A	1005	GLN	3.3
1	A	825	HIS	3.2
1	A	372	ASN	3.1
1	A	384	ASP	3.1
1	A	941	ARG	3.0
1	A	511	ARG	3.0
1	A	579	PHE	2.8
1	A	782	GLY	2.8
1	A	445	VAL	2.7
1	A	918	TYR	2.6
1	A	439	GLY	2.6
1	A	313	TYR	2.6
1	A	488	ILE	2.5
1	A	523	THR	2.5
1	A	957	ALA	2.5
1	A	1023	ARG	2.5
1	A	896	TRP	2.5
1	A	919	ASP	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	596	ALA	2.4
1	A	958	ILE	2.4
1	A	914	VAL	2.3
1	A	967	PHE	2.3
1	A	619	GLU	2.3
1	A	1153	ASP	2.3
1	A	490	GLY	2.2
1	A	1003	ASN	2.2
1	A	495	GLY	2.2
1	A	587	VAL	2.1
1	A	276	PHE	2.1
1	A	192	ARG	2.1
1	A	224	ARG	2.1
1	A	438	SER	2.1
1	A	964	GLY	2.1
1	A	944	TYR	2.1
1	A	496	GLY	2.1
1	A	1022	VAL	2.0
1	A	368	ARG	2.0

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

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

## 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> 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( $\text{\AA}^2$ )	Q<0.9
2	K	A	1202	1/1	0.87	0.10	88,88,88,88	0
2	K	A	1203	1/1	0.87	0.11	88,88,88,88	0
2	K	A	1201	1/1	0.92	0.19	84,84,84,84	0
3	CA	A	1204	1/1	0.96	0.07	90,90,90,90	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.