



# Full wwPDB X-ray Structure Validation Report ⓘ

Dec 10, 2022 – 12:07 PM EST

PDB ID : 1B0R  
Title : CRYSTAL STRUCTURE OF HLA-A\*0201 COMPLEXED WITH A PEPTIDE WITH THE CARBOXYL-TERMINAL GROUP SUBSTITUTED BY A METHYL GROUP  
Authors : Bouvier, M.; Guo, H.; Smith, K.J.; Wiley, D.C.  
Deposited on : 1998-11-12  
Resolution : 2.90 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
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.2

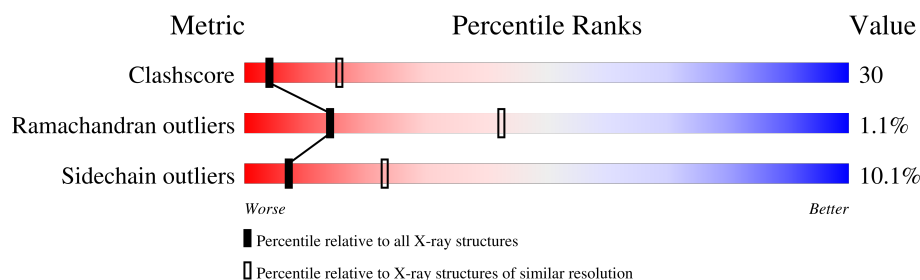
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.90 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))
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)

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  $\leq 5\%$ .

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	275	
2	B	100	
3	C	9	

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
3	CDE	C	709	-	-	X	-

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 3090 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 PROTEIN (HLA-A\*0201).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	269	Total	C	N	O	S	0	0	0
			2202	1379	402	412	9			

- Molecule 2 is a protein called PROTEIN (HLA-A\*0201).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	100	Total	C	N	O	S	0	0	0
			837	533	141	159	4			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	400	MET	-	initiating methionine	UNP P61769

- Molecule 3 is a protein called PROTEIN (INFLUENZA MATRIX PEPTIDE).

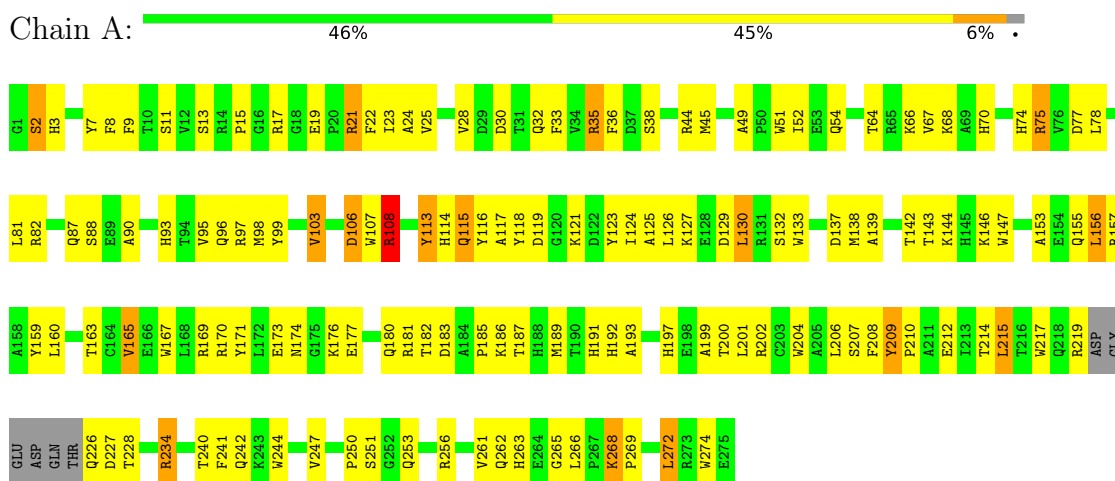
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	7	Total	C	N	O	0	0	0
			51	37	7	7			

### 3 Residue-property plots

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

Note EDS was not executed.

- Molecule 1: PROTEIN (HLA-A\*0201)



## 4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	49.60 Å   74.40 Å   121.40 Å 90.00°   90.00°   90.00°	Depositor
Resolution (Å)	6.00 – 2.90	Depositor
% Data completeness (in resolution range)	90.5 (6.00-2.90)	Depositor
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	X-PLOR 3.1	Depositor
R, $R_{free}$	0.253 , 0.314	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3090	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	15.0	wwPDB-VP

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CDE

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	0.55	0/2266	0.84	3/3073 (0.1%)
2	B	0.56	0/860	0.84	0/1162
3	C	0.92	0/44	0.89	0/57
All	All	0.56	0/3170	0.84	3/4292 (0.1%)

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
1	A	0	1

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	106	ASP	N-CA-C	-6.66	93.01	111.00
1	A	75	ARG	NE-CZ-NH1	5.70	123.15	120.30
1	A	108	ARG	NE-CZ-NH1	5.43	123.02	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	209	TYR	Sidechain

## 5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2202	0	2063	150	0
2	B	837	0	800	44	0
3	C	51	0	59	13	0
All	All	3090	0	2922	179	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 30.

All (179) 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:187:THR:HG21	1:A:261:VAL:HG21	1.34	1.06
1:A:19:GLU:HB3	1:A:75:ARG:HH21	1.15	1.04
1:A:19:GLU:HB3	1:A:75:ARG:NH2	1.75	1.00
1:A:127:LYS:HD2	1:A:132:SER:HB2	1.46	0.95
1:A:108:ARG:HH11	1:A:108:ARG:HG2	1.33	0.94
1:A:21:ARG:HG2	1:A:21:ARG:HH11	1.38	0.88
1:A:193:ALA:HA	1:A:199:ALA:HA	1.58	0.85
1:A:49:ALA:O	1:A:52:ILE:HG22	1.77	0.83
1:A:119:ASP:HB3	2:B:400:MET:HB3	1.60	0.82
1:A:97:ARG:NH1	3:C:706:VAL:HB	1.95	0.81
1:A:22:PHE:H	1:A:38:SER:HB2	1.49	0.77
2:B:440:LEU:HD21	2:B:481:ARG:NH1	2.00	0.77
1:A:119:ASP:HB3	2:B:400:MET:CB	2.17	0.74
1:A:11:SER:HA	1:A:21:ARG:O	1.89	0.72
2:B:422:PHE:CE2	2:B:469:GLU:HG3	2.24	0.72
1:A:19:GLU:CB	1:A:75:ARG:NH2	2.53	0.72
1:A:108:ARG:HG2	1:A:108:ARG:NH1	2.00	0.67
1:A:121:LYS:HE2	2:B:401:ILE:CD1	2.23	0.67
1:A:107:TRP:HZ2	1:A:180:GLN:OE1	1.78	0.66
1:A:214:THR:HB	1:A:262:GLN:HB2	1.76	0.66
1:A:155:GLN:HE22	3:C:707:PHE:HZ	1.44	0.66
1:A:44:ARG:HA	1:A:64:THR:HG23	1.79	0.65
1:A:114:HIS:O	1:A:115:GLN:HG2	1.97	0.63
2:B:405:PRO:HB2	2:B:427:VAL:HG12	1.80	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:127:LYS:HD2	1:A:132:SER:CB	2.24	0.62
1:A:11:SER:HB3	1:A:95:VAL:CG1	2.30	0.62
1:A:19:GLU:CB	1:A:75:ARG:HH21	2.03	0.61
1:A:81:LEU:HD23	1:A:118:TYR:CD1	2.34	0.61
1:A:209:TYR:CD1	1:A:241:PHE:HE1	2.19	0.60
1:A:121:LYS:HE2	2:B:401:ILE:HG13	1.83	0.60
1:A:130:LEU:HB2	1:A:157:ARG:HD2	1.84	0.60
1:A:108:ARG:HH11	1:A:108:ARG:CG	2.12	0.60
1:A:143:THR:HG21	3:C:709:CDE:HG23	1.83	0.59
1:A:64:THR:O	1:A:67:VAL:HG12	2.02	0.59
1:A:121:LYS:HE2	2:B:401:ILE:HD11	1.83	0.59
1:A:2:SER:O	1:A:3:HIS:CD2	2.55	0.59
2:B:440:LEU:HD21	2:B:481:ARG:HH12	1.66	0.59
1:A:64:THR:O	1:A:68:LYS:HG2	2.01	0.58
2:B:425:CYS:HB2	2:B:439:LEU:HD21	1.85	0.58
1:A:210:PRO:O	1:A:263:HIS:HE1	1.87	0.58
2:B:405:PRO:HB2	2:B:427:VAL:CG1	2.34	0.58
1:A:44:ARG:HA	1:A:64:THR:CG2	2.34	0.58
2:B:475:LYS:HD3	2:B:475:LYS:H	1.70	0.56
1:A:13:SER:O	1:A:15:PRO:HD3	2.05	0.56
1:A:155:GLN:NE2	3:C:707:PHE:CZ	2.70	0.56
1:A:187:THR:HB	1:A:272:LEU:HD21	1.87	0.55
1:A:93:HIS:HD2	1:A:119:ASP:OD2	1.89	0.55
1:A:176:LYS:NZ	1:A:181:ARG:HH22	2.05	0.55
1:A:98:MET:O	1:A:114:HIS:O	2.25	0.55
1:A:121:LYS:HE2	2:B:401:ILE:CG1	2.37	0.55
1:A:82:ARG:HG3	1:A:87:GLN:HB2	1.88	0.55
1:A:95:VAL:HG23	1:A:116:TYR:CZ	2.42	0.54
1:A:115:GLN:HA	1:A:125:ALA:HA	1.89	0.54
2:B:442:ASN:HA	2:B:477:GLU:HG3	1.89	0.54
1:A:67:VAL:O	1:A:70:HIS:HB2	2.09	0.53
1:A:25:VAL:HB	1:A:32:GLN:NE2	2.24	0.53
1:A:167:TRP:CZ3	1:A:170:ARG:NE	2.77	0.53
2:B:419:LYS:O	2:B:472:PRO:HD2	2.09	0.53
1:A:54:GLN:HE22	1:A:174:ASN:HB3	1.74	0.52
2:B:405:PRO:CA	2:B:430:PHE:HB3	2.39	0.52
1:A:208:PHE:CE1	1:A:241:PHE:HB2	2.45	0.52
1:A:28:VAL:HG23	1:A:33:PHE:CE1	2.44	0.52
2:B:422:PHE:CZ	2:B:469:GLU:HG3	2.44	0.52
1:A:187:THR:HA	1:A:204:TRP:O	2.10	0.52
1:A:66:LYS:HE2	3:C:702:ILE:HG13	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:74:HIS:HE1	1:A:97:ARG:NH1	2.08	0.52
1:A:147:TRP:CZ2	3:C:709:CDE:HG22	2.45	0.52
1:A:234:ARG:HG3	2:B:410:TYR:CZ	2.44	0.52
1:A:30:ASP:HB3	1:A:241:PHE:CZ	2.45	0.52
1:A:8:PHE:HB3	2:B:456:PHE:CE2	2.46	0.51
2:B:423:LEU:HB3	2:B:468:THR:HG22	1.91	0.51
1:A:11:SER:HB3	1:A:95:VAL:HG13	1.91	0.51
1:A:97:ARG:HH12	3:C:706:VAL:HB	1.71	0.51
1:A:121:LYS:HG2	2:B:401:ILE:HD12	1.93	0.51
1:A:119:ASP:CB	2:B:400:MET:HB3	2.35	0.51
1:A:177:GLU:O	1:A:181:ARG:HG3	2.11	0.50
1:A:78:LEU:HD21	1:A:95:VAL:HG12	1.92	0.50
1:A:202:ARG:NH1	2:B:499:MET:HG3	2.26	0.50
1:A:142:THR:HG22	1:A:146:LYS:HE3	1.94	0.50
1:A:176:LYS:NZ	1:A:181:ARG:NH2	2.60	0.50
1:A:23:ILE:HD12	2:B:454:LEU:HD12	1.95	0.49
1:A:107:TRP:HB3	1:A:169:ARG:HG2	1.93	0.49
1:A:170:ARG:HA	1:A:173:GLU:OE2	2.12	0.49
1:A:234:ARG:HG3	2:B:410:TYR:CE2	2.47	0.49
1:A:77:ASP:HB3	1:A:116:TYR:OH	2.12	0.49
1:A:97:ARG:NH1	3:C:706:VAL:CB	2.71	0.49
1:A:117:ALA:HB1	1:A:121:LYS:O	2.12	0.49
1:A:209:TYR:HD1	1:A:241:PHE:HE1	1.59	0.49
1:A:191:HIS:HB2	1:A:274:TRP:CZ2	2.48	0.48
2:B:405:PRO:HA	2:B:430:PHE:HB3	1.94	0.48
1:A:21:ARG:CZ	1:A:23:ILE:HD11	2.43	0.48
1:A:30:ASP:HB3	1:A:241:PHE:HZ	1.78	0.48
1:A:139:ALA:O	1:A:142:THR:HB	2.12	0.48
1:A:219:ARG:HA	1:A:256:ARG:O	2.13	0.48
1:A:185:PRO:HD2	1:A:266:LEU:HG	1.96	0.48
2:B:451:HIS:HA	2:B:465:LEU:O	2.14	0.48
1:A:66:LYS:O	1:A:70:HIS:ND1	2.40	0.48
1:A:99:TYR:HA	1:A:113:TYR:O	2.14	0.48
1:A:176:LYS:HZ2	1:A:181:ARG:NH2	2.10	0.48
2:B:440:LEU:HD22	2:B:443:GLY:O	2.13	0.47
1:A:28:VAL:HG23	1:A:33:PHE:CD1	2.49	0.47
1:A:204:TRP:CH2	1:A:244:TRP:CD1	3.03	0.47
1:A:24:ALA:O	1:A:35:ARG:HA	2.14	0.47
1:A:119:ASP:HB3	2:B:400:MET:HB2	1.96	0.47
1:A:182:THR:HG22	1:A:183:ASP:N	2.29	0.47
2:B:437:VAL:HG22	2:B:482:VAL:HG22	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:445:ARG:HH21	2:B:447:GLU:HG2	1.80	0.47
2:B:484:HIS:O	2:B:486:THR:N	2.48	0.47
1:A:186:LYS:HD2	1:A:207:SER:OG	2.14	0.47
1:A:95:VAL:HG21	1:A:116:TYR:OH	2.15	0.46
1:A:192:HIS:O	1:A:200:THR:N	2.47	0.46
1:A:9:PHE:O	1:A:96:GLN:HA	2.15	0.46
1:A:156:LEU:O	1:A:159:TYR:N	2.47	0.46
1:A:124:ILE:HD11	1:A:144:LYS:HB2	1.98	0.46
1:A:204:TRP:CE3	1:A:206:LEU:HD21	2.51	0.46
1:A:74:HIS:CE1	1:A:97:ARG:NH1	2.83	0.46
1:A:133:TRP:NE1	1:A:153:ALA:HB2	2.31	0.46
2:B:423:LEU:HB3	2:B:468:THR:CG2	2.46	0.45
1:A:142:THR:CG2	1:A:146:LYS:HE3	2.46	0.45
1:A:19:GLU:CG	1:A:75:ARG:NH2	2.79	0.45
1:A:19:GLU:HG2	1:A:75:ARG:NH2	2.32	0.45
1:A:30:ASP:HB2	1:A:209:TYR:HE1	1.82	0.45
1:A:11:SER:O	1:A:95:VAL:HG12	2.17	0.45
1:A:35:ARG:HD3	2:B:453:ASP:OD2	2.17	0.45
1:A:167:TRP:CE3	1:A:171:TYR:CE1	3.04	0.45
1:A:268:LYS:NZ	1:A:269:PRO:HD2	2.32	0.45
3:C:702:ILE:HB	3:C:703:LEU:H	1.68	0.45
1:A:22:PHE:N	1:A:38:SER:HB2	2.24	0.44
1:A:176:LYS:HZ1	1:A:181:ARG:HH22	1.65	0.44
1:A:209:TYR:HD1	1:A:241:PHE:CE1	2.34	0.44
1:A:52:ILE:HD12	1:A:52:ILE:HA	1.90	0.44
1:A:253:GLN:OE1	1:A:256:ARG:NH1	2.51	0.44
1:A:2:SER:HB2	1:A:103:VAL:O	2.18	0.44
1:A:250:PRO:HB2	1:A:253:GLN:HG3	1.99	0.43
2:B:403:ARG:NH2	2:B:459:ASP:O	2.51	0.43
1:A:95:VAL:CG2	1:A:116:TYR:CZ	3.01	0.43
1:A:130:LEU:HD13	1:A:160:LEU:HD12	2.01	0.43
1:A:202:ARG:HH12	2:B:499:MET:HG3	1.82	0.43
1:A:206:LEU:HD23	1:A:242:GLN:HB3	2.01	0.43
1:A:114:HIS:O	1:A:115:GLN:CG	2.64	0.43
1:A:123:TYR:CE2	3:C:709:CDE:HG12	2.54	0.43
1:A:251:SER:O	1:A:253:GLN:HG2	2.19	0.43
2:B:470:PHE:HD2	2:B:478:TYR:CE2	2.37	0.43
1:A:21:ARG:NH1	1:A:21:ARG:CG	2.82	0.42
1:A:21:ARG:NH1	1:A:23:ILE:HD11	2.34	0.42
1:A:217:TRP:HD1	1:A:228:THR:HG23	1.84	0.42
1:A:8:PHE:CD1	1:A:8:PHE:N	2.87	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:98:MET:SD	1:A:98:MET:C	2.98	0.42
2:B:422:PHE:HA	2:B:468:THR:O	2.19	0.42
1:A:176:LYS:HA	1:A:180:GLN:HG3	2.00	0.42
2:B:439:LEU:HD11	2:B:466:TYR:O	2.20	0.42
1:A:207:SER:HA	1:A:240:THR:HB	2.00	0.42
1:A:263:HIS:CD2	1:A:265:GLY:H	2.38	0.42
1:A:268:LYS:CE	1:A:269:PRO:HD2	2.50	0.41
2:B:410:TYR:CD1	2:B:410:TYR:N	2.87	0.41
1:A:54:GLN:NE2	1:A:174:ASN:HB3	2.36	0.41
2:B:423:LEU:O	2:B:467:TYR:HA	2.20	0.41
1:A:21:ARG:HG2	1:A:21:ARG:NH1	2.16	0.41
1:A:88:SER:OG	1:A:90:ALA:HB3	2.20	0.41
1:A:33:PHE:HB3	1:A:51:TRP:CZ2	2.55	0.41
1:A:165:VAL:O	1:A:169:ARG:HG3	2.20	0.41
1:A:185:PRO:HD3	1:A:263:HIS:CD2	2.56	0.41
1:A:2:SER:HB2	1:A:3:HIS:H	1.77	0.41
1:A:226:GLN:O	1:A:227:ASP:HB2	2.20	0.41
2:B:484:HIS:C	2:B:486:THR:H	2.24	0.41
1:A:170:ARG:HG3	1:A:174:ASN:ND2	2.36	0.41
1:A:189:MET:SD	1:A:201:LEU:HG	2.60	0.41
1:A:253:GLN:O	1:A:256:ARG:HG3	2.21	0.41
2:B:429:GLY:HA2	2:B:461:SER:HB2	2.02	0.41
1:A:227:ASP:O	1:A:247:VAL:HG23	2.21	0.41
2:B:404:THR:HG23	2:B:486:THR:HB	2.03	0.41
1:A:116:TYR:CE1	3:C:709:CDE:HG11	2.56	0.41
1:A:7:TYR:CE2	3:C:702:ILE:HG23	2.56	0.40
1:A:70:HIS:HE1	3:C:703:LEU:O	2.04	0.40
1:A:215:LEU:HD12	1:A:215:LEU:HA	1.82	0.40
1:A:107:TRP:CZ2	1:A:180:GLN:OE1	2.65	0.40
1:A:126:LEU:HD13	1:A:133:TRP:CH2	2.56	0.40
1:A:23:ILE:HA	1:A:36:PHE:O	2.21	0.40
1:A:187:THR:HG22	1:A:204:TRP:O	2.22	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles ⓘ

### 5.3.1 Protein backbone ⓘ

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

of similar resolution.

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	265/275 (96%)	230 (87%)	33 (12%)	2 (1%)	19	51
2	B	98/100 (98%)	96 (98%)	1 (1%)	1 (1%)	15	45
3	C	3/9 (33%)	2 (67%)	0	1 (33%)	0	0
All	All	366/384 (95%)	328 (90%)	34 (9%)	4 (1%)	14	42

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	197	HIS
1	A	130	LEU
2	B	485	VAL
3	C	702	ILE

### 5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	226/231 (98%)	205 (91%)	21 (9%)	9	27
2	B	95/95 (100%)	85 (90%)	10 (10%)	7	21
3	C	5/6 (83%)	3 (60%)	2 (40%)	0	0
All	All	326/332 (98%)	293 (90%)	33 (10%)	7	23

All (33) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	SER
1	A	17	ARG
1	A	21	ARG
1	A	35	ARG
1	A	45	MET

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	A	103	VAL
1	A	106	ASP
1	A	108	ARG
1	A	113	TYR
1	A	115	GLN
1	A	129	ASP
1	A	137	ASP
1	A	138	MET
1	A	156	LEU
1	A	163	THR
1	A	165	VAL
1	A	212	GLU
1	A	215	LEU
1	A	234	ARG
1	A	268	LYS
1	A	272	LEU
2	B	400	MET
2	B	404	THR
2	B	411	SER
2	B	420	SER
2	B	438	ASP
2	B	454	LEU
2	B	470	PHE
2	B	475	LYS
2	B	488	SER
2	B	499	MET
3	C	702	ILE
3	C	703	LEU

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	54	GLN
1	A	74	HIS
1	A	93	HIS
1	A	115	GLN
1	A	192	HIS
1	A	218	GLN
1	A	263	HIS

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is modelled in this entry.

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	$\# Z  > 2$
3	CDE	C	709	3	5,5,5	0.85	0	4,6,6	0.53	0

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
3	CDE	C	709	3	-	4/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	709	CDE	N-CA-CB-CG1
3	C	709	CDE	N-CA-CB-CG2
3	C	709	CDE	C-CA-CB-CG1
3	C	709	CDE	C-CA-CB-CG2

There are no ring outliers.

1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	709	CDE	4	0

## 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

### 6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

### 6.4 Ligands

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers

EDS was not executed - this section is therefore empty.