



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 3, 2024 – 07:38 PM EST

PDB ID : 1MPY  
Title : STRUCTURE OF CATECHOL 2,3-DIOXYGENASE (METAPYROCAT-  
CHASE) FROM PSEUDOMONAS PUTIDA MT-2  
Authors : Kita, A.; Kita, S.; Fujisawa, I.; Inaka, K.; Ishida, T.; Horiike, K.; Nozaki, M.;  
Miki, K.  
Deposited on : 1998-10-20  
Resolution : 2.80 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)  
Xtrriage (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) : 2.36

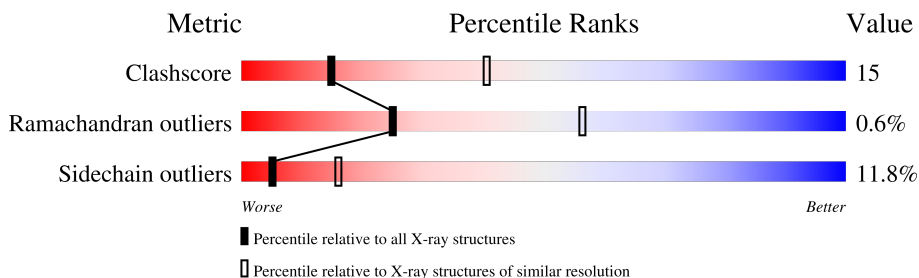
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.80 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	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)

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  $\geq 3$ , 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	307	
1	B	307	
1	C	307	
1	D	307	

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 10044 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.

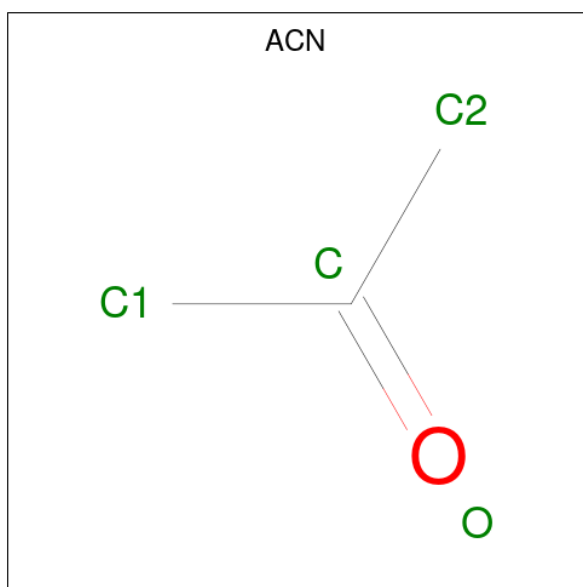
- Molecule 1 is a protein called CATECHOL 2,3-DIOXYGENASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	307	2478	1574	430	460	14	0	0	0
1	B	307	2478	1574	430	460	14	0	0	0
1	C	307	2478	1574	430	460	14	0	0	0
1	D	307	2478	1574	430	460	14	0	0	0

- Molecule 2 is FE (II) ION (three-letter code: FE2) (formula: Fe).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Fe	0	0
			1	1		
2	B	1	Total	Fe	0	0
			1	1		
2	C	1	Total	Fe	0	0
			1	1		
2	D	1	Total	Fe	0	0
			1	1		

- Molecule 3 is ACETONE (three-letter code: ACN) (formula: C<sub>3</sub>H<sub>6</sub>O).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 4 3 1	0	0
3	B	1	Total C O 4 3 1	0	0
3	C	1	Total C O 4 3 1	0	0
3	D	1	Total C O 4 3 1	0	0

- Molecule 4 is water.

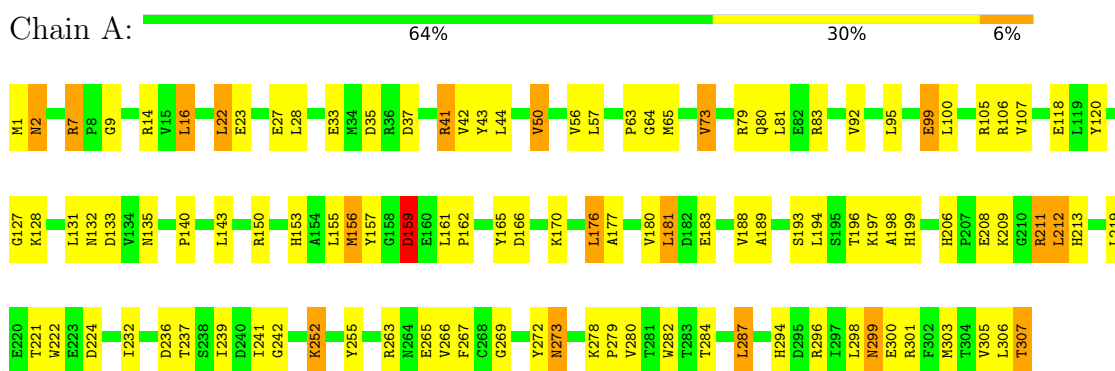
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	32	Total O 32 32	0	0
4	B	24	Total O 24 24	0	0
4	C	23	Total O 23 23	0	0
4	D	33	Total O 33 33	0	0

### 3 Residue-property plots

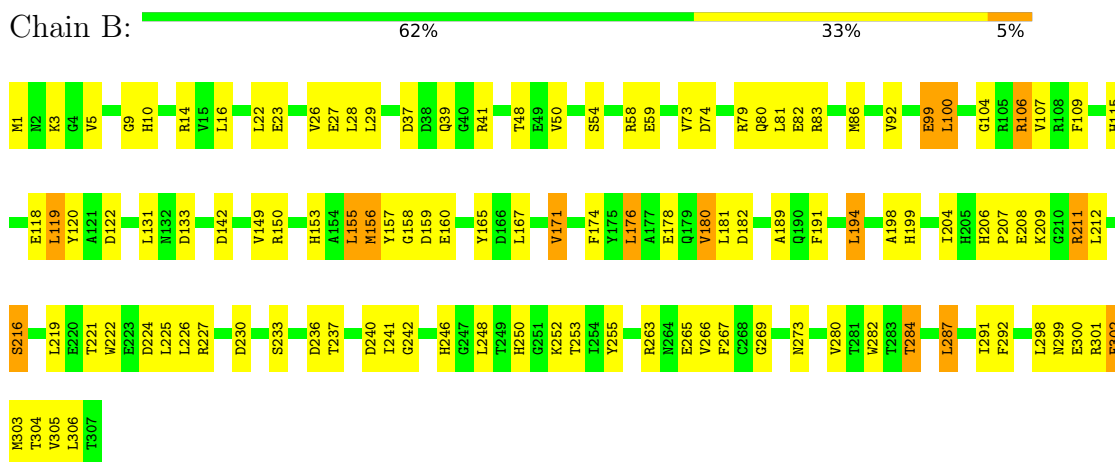
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded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

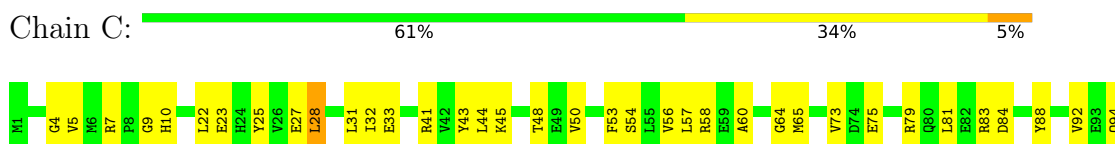
- Molecule 1: CATECHOL 2,3-DIOXYGENASE



- Molecule 1: CATECHOL 2,3-DIOXYGENASE



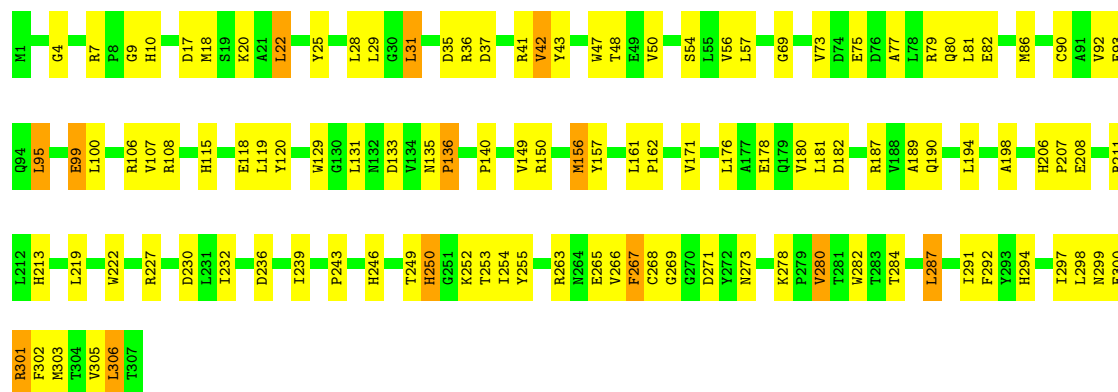
- Molecule 1: CATECHOL 2,3-DIOXYGENASE





- Molecule 1: CATECHOL 2,3-DIOXYGENASE

Chain D: 63% 33%



## 4 Data and refinement statistics

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

Property	Value	Source
Space group	P 42 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	264.00Å 264.00Å 59.80Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	10.00 – 2.80	Depositor
% Data completeness (in resolution range)	84.0 (10.00-2.80)	Depositor
$R_{merge}$	0.08	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	X-PLOR 3.1	Depositor
R, $R_{free}$	0.200 , 0.280	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	10044	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	14.0	wwPDB-VP

## 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: FE2, ACN

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	0/2542	0.80	6/3440 (0.2%)
1	B	0.53	0/2542	0.83	4/3440 (0.1%)
1	C	0.52	0/2542	0.85	5/3440 (0.1%)
1	D	0.51	0/2542	0.81	4/3440 (0.1%)
All	All	0.51	0/10168	0.82	19/13760 (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
1	C	0	2
All	All	0	3

There are no bond length outliers.

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	303	MET	CA-CB-CG	11.79	133.35	113.30
1	A	159	ASP	O-C-N	-9.30	107.81	122.70
1	C	159	ASP	O-C-N	-9.00	108.30	122.70
1	C	176	LEU	CA-CB-CG	8.86	135.68	115.30
1	D	303	MET	CB-CA-C	-6.54	97.33	110.40
1	D	303	MET	N-CA-CB	6.44	122.20	110.60
1	D	306	LEU	CA-CB-CG	6.27	129.72	115.30
1	B	216	SER	CB-CA-C	-6.26	98.21	110.10
1	A	1	MET	CG-SD-CE	6.14	110.02	100.20
1	A	156	MET	CG-SD-CE	6.12	109.99	100.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	160	GLU	C-N-CA	-5.92	106.91	121.70
1	C	146	MET	CG-SD-CE	5.83	109.53	100.20
1	A	181	LEU	CA-CB-CG	5.81	128.66	115.30
1	A	269	GLY	N-CA-C	5.74	127.44	113.10
1	B	160	GLU	O-C-N	5.54	131.57	122.70
1	A	2	ASN	O-C-N	5.35	131.27	122.70
1	C	155	LEU	CA-CB-CG	5.28	127.45	115.30
1	C	159	ASP	CA-C-N	5.27	128.79	117.20
1	B	100	LEU	N-CA-C	-5.19	96.98	111.00

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	159	ASP	Mainchain
1	C	159	ASP	Mainchain
1	C	160	GLU	Mainchain

## 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	2478	0	2385	67	0
1	B	2478	0	2385	79	0
1	C	2478	0	2385	83	0
1	D	2478	0	2385	80	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	4	0	6	0	0
3	B	4	0	6	0	0
3	C	4	0	6	0	0
3	D	4	0	6	0	0
4	A	32	0	0	2	0
4	B	24	0	0	0	0
4	C	23	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	D	33	0	0	1	0
All	All	10044	0	9564	297	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 15.

All (297) 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:C:180:VAL:HG13	1:C:189:ALA:HB3	1.57	0.86
1:C:64:GLY:HA2	1:C:307:THR:HG23	1.58	0.86
1:A:241:ILE:HG22	1:A:255:TYR:HB2	1.61	0.82
1:C:79:ARG:HG3	1:C:79:ARG:HH11	1.42	0.82
1:B:180:VAL:HG13	1:B:189:ALA:HB3	1.62	0.78
1:A:99:GLU:HB3	1:A:106:ARG:HH21	1.48	0.76
1:A:95:LEU:HD12	1:A:99:GLU:HG3	1.66	0.75
1:C:159:ASP:OD1	1:C:159:ASP:O	2.06	0.74
1:A:211:ARG:NH1	1:A:307:THR:HB	2.04	0.72
1:A:135:ASN:ND2	1:C:286:GLN:HG3	2.05	0.72
1:C:156:MET:HE3	1:C:212:LEU:HD23	1.72	0.71
1:B:208:GLU:HG3	1:B:211:ARG:HD2	1.72	0.71
1:D:211:ARG:HE	1:D:211:ARG:HA	1.54	0.71
1:A:180:VAL:CG1	1:A:189:ALA:HB3	2.21	0.71
1:C:99:GLU:HG3	1:C:106:ARG:NH1	2.06	0.70
1:B:206:HIS:CD2	1:B:208:GLU:HG2	2.25	0.70
1:B:37:ASP:HB2	1:B:41:ARG:H	1.55	0.70
1:B:115:HIS:CD2	1:B:156:MET:HG2	2.26	0.69
1:D:115:HIS:CD2	1:D:156:MET:HG2	2.28	0.69
1:D:180:VAL:CG1	1:D:189:ALA:HB3	2.21	0.69
1:A:140:PRO:HD2	1:A:143:LEU:HD11	1.75	0.68
1:A:219:LEU:HD22	1:A:266:VAL:HG11	1.77	0.66
1:B:99:GLU:HG3	1:B:106:ARG:NH1	2.11	0.66
1:D:25:TYR:HD1	1:D:29:LEU:HD12	1.60	0.66
1:C:149:VAL:HG12	1:C:150:ARG:HG2	1.77	0.66
1:D:77:ALA:O	1:D:81:LEU:HD23	1.96	0.66
1:C:25:TYR:O	1:C:31:LEU:HB2	1.95	0.65
1:D:95:LEU:HD21	1:D:108:ARG:HB2	1.78	0.65
1:C:178:GLU:HG2	1:C:280:VAL:HG13	1.77	0.65
1:B:5:VAL:HG12	1:B:194:LEU:HD21	1.79	0.64
1:D:187:ARG:HD3	1:D:190:GLN:HB3	1.80	0.64
1:A:9:GLY:HA3	1:A:120:TYR:OH	1.98	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:265:GLU:HG2	1:A:266:VAL:N	2.12	0.64
1:D:106:ARG:HG2	1:D:120:TYR:HB3	1.81	0.63
1:D:92:VAL:CG1	1:D:107:VAL:HG13	2.30	0.62
1:A:33:GLU:HA	1:A:44:LEU:HG	1.80	0.62
1:A:219:LEU:HD22	1:A:266:VAL:CG1	2.29	0.62
1:D:10:HIS:HA	1:D:54:SER:O	2.00	0.62
1:B:302:PHE:CE2	1:B:303:MET:HG2	2.35	0.62
1:D:48:THR:HG21	1:D:149:VAL:HG13	1.81	0.62
1:B:99:GLU:HG3	1:B:106:ARG:HH12	1.65	0.62
1:A:211:ARG:HB3	1:A:211:ARG:HH11	1.65	0.61
1:C:28:LEU:O	1:C:145:GLY:HA3	2.01	0.61
1:C:227:ARG:HG2	1:C:227:ARG:HH11	1.66	0.60
1:A:99:GLU:HB3	1:A:106:ARG:NH2	2.15	0.60
1:C:156:MET:CE	1:C:212:LEU:HD23	2.32	0.59
1:B:227:ARG:HG2	1:B:227:ARG:HH11	1.67	0.59
1:B:284:THR:HA	1:B:287:LEU:HD23	1.84	0.59
1:A:211:ARG:HH12	1:A:306:LEU:HB3	1.68	0.59
1:C:252:LYS:O	1:C:267:PHE:HB2	2.03	0.59
1:D:301:ARG:H	1:D:301:ARG:HD3	1.68	0.59
1:B:23:GLU:O	1:B:27:GLU:HB2	2.03	0.59
1:A:252:LYS:O	1:A:267:PHE:HB2	2.02	0.58
1:D:95:LEU:HD23	1:D:106:ARG:HB2	1.85	0.58
1:B:3:LYS:HB3	1:B:81:LEU:HD21	1.84	0.58
1:D:25:TYR:CD1	1:D:29:LEU:HD12	2.38	0.58
1:B:37:ASP:HB3	1:B:39:GLN:H	1.68	0.58
1:B:10:HIS:HA	1:B:54:SER:O	2.04	0.58
1:C:79:ARG:O	1:C:83:ARG:HG2	2.04	0.57
1:C:113:SER:HB2	1:C:158:GLY:HA3	1.86	0.57
1:D:82:GLU:O	1:D:86:MET:HG3	2.04	0.57
1:B:9:GLY:HA3	1:B:120:TYR:OH	2.05	0.56
1:B:159:ASP:HB3	1:B:209:LYS:NZ	2.20	0.56
1:A:180:VAL:HA	1:A:282:TRP:O	2.06	0.56
1:C:23:GLU:O	1:C:27:GLU:HB2	2.06	0.56
1:D:93:GLU:HB3	1:D:108:ARG:HB3	1.88	0.56
1:A:211:ARG:NH1	1:A:306:LEU:HB3	2.20	0.55
1:B:100:LEU:HB2	1:B:106:ARG:NH1	2.21	0.55
1:C:176:LEU:HD21	1:C:187:ARG:HE	1.70	0.55
1:C:246:HIS:NE2	1:C:253:THR:HG21	2.21	0.55
1:C:253:THR:OG1	1:C:265:GLU:HG3	2.06	0.55
1:D:161:LEU:HB2	1:D:162:PRO:HD3	1.88	0.55
1:D:287:LEU:HD12	1:D:298:LEU:HD11	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:43:TYR:HE2	1:C:100:LEU:HD22	1.72	0.55
1:A:180:VAL:HG12	1:A:189:ALA:HB3	1.89	0.55
1:D:25:TYR:O	1:D:31:LEU:HB2	2.07	0.55
1:B:301:ARG:HA	1:B:304:THR:OG1	2.06	0.55
1:D:263:ARG:NH2	1:D:305:VAL:O	2.39	0.54
1:D:301:ARG:HH11	1:D:301:ARG:HB2	1.73	0.54
1:B:219:LEU:HD23	1:B:225:LEU:HD12	1.88	0.54
1:B:92:VAL:CG1	1:B:107:VAL:HG13	2.38	0.54
1:B:109:PHE:HE1	1:B:119:LEU:HD13	1.73	0.54
1:D:99:GLU:HG3	1:D:106:ARG:NH2	2.23	0.54
1:D:182:ASP:HA	1:D:284:THR:OG1	2.08	0.54
1:C:99:GLU:HG3	1:C:106:ARG:HH12	1.73	0.54
1:A:211:ARG:NH1	1:A:211:ARG:HB3	2.23	0.54
1:D:255:TYR:CE1	1:D:265:GLU:HB2	2.43	0.54
1:C:182:ASP:HA	1:C:284:THR:OG1	2.07	0.54
1:C:206:HIS:CD2	1:C:211:ARG:HG3	2.43	0.54
1:C:153:HIS:CD2	1:C:199:HIS:NE2	2.76	0.54
1:A:206:HIS:CD2	1:A:208:GLU:HB2	2.43	0.53
1:D:180:VAL:HG12	1:D:189:ALA:HB3	1.90	0.53
1:C:4:GLY:O	1:C:73:VAL:HG23	2.09	0.52
1:D:219:LEU:HD22	1:D:266:VAL:HG22	1.90	0.52
1:C:79:ARG:HG3	1:C:79:ARG:NH1	2.12	0.52
1:A:23:GLU:O	1:A:27:GLU:HB2	2.10	0.52
1:A:153:HIS:CD2	1:A:199:HIS:NE2	2.77	0.52
1:A:37:ASP:OD2	1:A:41:ARG:HD3	2.09	0.52
1:B:300:GLU:HG3	1:B:301:ARG:HG3	1.90	0.52
1:D:92:VAL:HG13	1:D:107:VAL:HG13	1.91	0.52
1:A:166:ASP:O	1:A:170:LYS:HB2	2.11	0.51
1:C:252:LYS:HD3	1:C:252:LYS:N	2.25	0.51
1:C:5:VAL:HG12	1:C:194:LEU:HD21	1.92	0.51
1:A:299:ASN:HD21	1:A:301:ARG:HB2	1.75	0.51
1:B:180:VAL:CG1	1:B:189:ALA:HB3	2.37	0.51
1:D:178:GLU:HG2	1:D:280:VAL:HG13	1.92	0.51
1:A:284:THR:O	1:A:287:LEU:HB2	2.10	0.51
1:B:22:LEU:O	1:B:26:VAL:HG22	2.10	0.51
1:C:41:ARG:NH2	1:C:100:LEU:HD23	2.26	0.51
1:B:92:VAL:HG13	1:B:107:VAL:HG13	1.93	0.51
1:D:106:ARG:HD2	1:D:118:GLU:OE2	2.11	0.51
1:D:252:LYS:O	1:D:267:PHE:HB2	2.10	0.51
1:D:299:ASN:HD21	1:D:301:ARG:NH1	2.08	0.51
1:A:222:TRP:NE1	1:B:226:LEU:HB2	2.26	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:263:ARG:HH22	1:A:305:VAL:HB	1.75	0.51
1:A:232:ILE:HG23	1:A:237:THR:HB	1.92	0.50
1:C:230:ASP:O	1:C:234:MET:HG3	2.11	0.50
1:A:79:ARG:HG3	1:A:105:ARG:NH2	2.27	0.50
1:A:294:HIS:O	1:A:296:ARG:NH1	2.44	0.50
1:B:14:ARG:HG2	1:B:58:ARG:NH1	2.27	0.50
1:B:246:HIS:CE1	1:B:253:THR:HG21	2.46	0.50
1:B:300:GLU:HG3	1:B:301:ARG:H	1.76	0.50
1:B:191:PHE:CE1	1:B:248:LEU:HD13	2.46	0.50
1:C:146:MET:HA	1:C:227:ARG:NH1	2.27	0.50
1:D:92:VAL:HG11	1:D:107:VAL:HG13	1.92	0.50
1:C:294:HIS:HE1	1:D:230:ASP:OD1	1.93	0.50
1:D:255:TYR:CD1	1:D:265:GLU:HB2	2.47	0.50
1:A:92:VAL:HG13	1:A:107:VAL:HG13	1.93	0.50
1:B:287:LEU:HD12	1:B:298:LEU:HD11	1.94	0.50
1:D:99:GLU:HG3	1:D:106:ARG:HH21	1.75	0.50
1:B:299:ASN:O	1:B:302:PHE:HB3	2.11	0.49
1:C:41:ARG:HH21	1:C:100:LEU:HD23	1.77	0.49
1:C:75:GLU:O	1:C:79:ARG:HG2	2.11	0.49
1:D:291:ILE:HG21	1:D:302:PHE:CE2	2.48	0.49
1:B:241:ILE:HD13	1:B:292:PHE:CE1	2.48	0.49
1:C:32:ILE:N	1:C:32:ILE:HD12	2.27	0.49
1:D:211:ARG:HA	1:D:211:ARG:NE	2.24	0.49
1:B:155:LEU:HD21	1:B:204:ILE:HG13	1.95	0.49
1:B:165:TYR:HE1	1:B:176:LEU:HG	1.77	0.49
1:C:48:THR:HG21	1:C:149:VAL:HG13	1.95	0.49
1:D:99:GLU:CG	1:D:106:ARG:NH2	2.75	0.49
1:D:131:LEU:HD13	1:D:140:PRO:HG3	1.94	0.49
1:C:301:ARG:HG2	1:C:305:VAL:HG21	1.95	0.49
1:D:278:LYS:NZ	1:D:278:LYS:HB3	2.28	0.49
1:C:255:TYR:CE1	1:C:265:GLU:HB2	2.48	0.48
1:A:22:LEU:HD21	1:A:42:VAL:HG11	1.94	0.48
1:B:157:TYR:HB2	1:B:211:ARG:HB2	1.94	0.48
1:B:246:HIS:NE2	1:B:253:THR:HG21	2.28	0.48
1:B:252:LYS:O	1:B:267:PHE:HB2	2.14	0.48
1:D:18:MET:SD	1:D:42:VAL:HG12	2.53	0.48
1:C:114:GLY:HA3	1:C:209:LYS:HB3	1.95	0.48
1:A:161:LEU:HB2	1:A:162:PRO:HD3	1.93	0.48
1:D:246:HIS:O	1:D:250:HIS:HA	2.13	0.48
1:B:298:LEU:HD22	1:B:302:PHE:CD2	2.49	0.48
1:C:299:ASN:O	1:C:302:PHE:HB3	2.12	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:262:ASN:OD1	1:C:307:THR:HG21	2.14	0.48
1:B:37:ASP:OD2	1:B:41:ARG:HD3	2.14	0.48
1:C:9:GLY:HA3	1:C:120:TYR:OH	2.13	0.48
1:C:33:GLU:HA	1:C:44:LEU:HG	1.96	0.48
1:C:181:LEU:HD12	1:C:187:ARG:HA	1.95	0.48
1:D:284:THR:O	1:D:287:LEU:HB2	2.14	0.47
1:C:10:HIS:HA	1:C:54:SER:O	2.14	0.47
1:D:301:ARG:HA	1:D:305:VAL:HG23	1.95	0.47
1:B:37:ASP:HB2	1:B:41:ARG:N	2.27	0.47
1:D:246:HIS:CE1	1:D:253:THR:HG21	2.49	0.47
1:A:193:SER:HB3	1:A:197:LYS:O	2.14	0.47
1:B:174:PHE:CD2	1:B:194:LEU:HD13	2.49	0.47
1:D:75:GLU:HG3	1:D:79:ARG:NH1	2.30	0.47
1:B:178:GLU:HB2	1:B:191:PHE:HB2	1.96	0.47
1:C:157:TYR:HE2	1:C:303:MET:SD	2.37	0.47
1:C:263:ARG:NH2	1:C:305:VAL:O	2.47	0.47
1:A:65:MET:HB2	1:A:212:LEU:HG	1.96	0.47
1:D:22:LEU:HD12	1:D:22:LEU:HA	1.74	0.47
1:D:180:VAL:HA	1:D:282:TRP:O	2.14	0.47
1:D:219:LEU:HD12	1:D:219:LEU:HA	1.70	0.47
1:B:263:ARG:NH2	1:B:305:VAL:O	2.48	0.46
1:C:64:GLY:HA2	1:C:307:THR:CG2	2.37	0.46
1:C:92:VAL:HG13	1:C:107:VAL:HG13	1.97	0.46
1:C:168:PHE:O	1:C:174:PHE:HB2	2.15	0.46
1:D:227:ARG:HD3	4:D:5104:HOH:O	2.13	0.46
1:B:255:TYR:CE1	1:B:265:GLU:HB2	2.51	0.46
1:A:296:ARG:HG3	1:A:296:ARG:HH11	1.80	0.46
1:B:5:VAL:CG1	1:B:194:LEU:HD21	2.45	0.46
1:C:65:MET:SD	1:C:156:MET:HE2	2.55	0.46
1:D:35:ASP:O	1:D:36:ARG:HG3	2.15	0.46
1:B:302:PHE:CD2	1:B:303:MET:HG2	2.51	0.46
1:D:18:MET:SD	1:D:42:VAL:CG1	3.04	0.46
1:A:16:LEU:HD11	1:A:63:PRO:HD3	1.98	0.46
1:A:50:VAL:HG22	1:A:127:GLY:HA2	1.98	0.46
1:B:79:ARG:HG2	1:B:79:ARG:HH11	1.81	0.46
1:D:18:MET:O	1:D:22:LEU:HB2	2.15	0.46
1:A:106:ARG:HD2	1:A:118:GLU:OE1	2.16	0.46
1:C:79:ARG:HD3	1:C:105:ARG:NH2	2.31	0.46
1:C:287:LEU:HD13	1:C:298:LEU:HD11	1.98	0.46
1:A:35:ASP:HB3	1:A:43:TYR:CD1	2.51	0.45
1:B:104:GLY:HA3	1:B:122:ASP:HB2	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:212:LEU:HB3	1:C:307:THR:HG22	1.97	0.45
1:D:291:ILE:HD12	1:D:302:PHE:CZ	2.51	0.45
1:D:135:ASN:N	1:D:136:PRO:CD	2.78	0.45
1:A:221:THR:O	1:A:224:ASP:HB2	2.16	0.45
1:D:232:ILE:HG21	1:D:239:ILE:HB	1.98	0.45
1:B:82:GLU:O	1:B:86:MET:HG3	2.17	0.45
1:B:153:HIS:NE2	1:B:216:SER:OG	2.50	0.45
1:D:252:LYS:HD2	1:D:268:CYS:SG	2.57	0.45
1:A:159:ASP:HB3	1:A:209:LYS:HE2	1.99	0.45
1:B:107:VAL:O	1:B:118:GLU:HA	2.17	0.45
1:B:159:ASP:HB3	1:B:209:LYS:HZ3	1.80	0.45
1:B:300:GLU:HG3	1:B:301:ARG:N	2.31	0.45
1:B:180:VAL:HA	1:B:282:TRP:O	2.16	0.45
1:D:9:GLY:O	1:D:54:SER:HA	2.17	0.45
1:A:177:ALA:O	1:A:279:PRO:HA	2.17	0.45
1:A:294:HIS:HE1	1:B:230:ASP:OD1	2.00	0.45
1:D:17:ASP:OD2	1:D:20:LYS:HG3	2.16	0.45
1:D:99:GLU:CG	1:D:106:ARG:HH21	2.29	0.45
1:C:255:TYR:CD1	1:C:265:GLU:HB2	2.51	0.44
1:D:4:GLY:O	1:D:73:VAL:HG23	2.17	0.44
1:D:181:LEU:HD23	1:D:187:ARG:HA	1.99	0.44
1:A:128:LYS:HE2	4:A:5012:HOH:O	2.17	0.44
1:C:84:ASP:O	1:C:88:TYR:HB2	2.18	0.44
1:D:206:HIS:ND1	1:D:207:PRO:HD2	2.33	0.44
1:B:48:THR:HG21	1:B:149:VAL:HG13	1.98	0.44
1:C:92:VAL:CG1	1:C:107:VAL:HG13	2.48	0.44
1:A:7:ARG:HD2	1:A:7:ARG:N	2.32	0.44
1:A:294:HIS:HA	1:B:233:SER:OG	2.17	0.44
1:C:65:MET:SD	1:C:156:MET:CE	3.05	0.44
1:A:135:ASN:OD1	1:C:282:TRP:HA	2.17	0.44
1:A:252:LYS:HE2	1:B:226:LEU:HD21	2.00	0.44
1:B:216:SER:OG	1:B:265:GLU:OE1	2.30	0.44
1:A:132:ASN:OD1	1:A:133:ASP:N	2.51	0.44
1:A:252:LYS:N	1:A:252:LYS:CD	2.80	0.44
1:A:272:TYR:CZ	1:C:150:ARG:HD3	2.53	0.44
1:B:158:GLY:O	1:B:206:HIS:N	2.44	0.44
1:C:165:TYR:CE1	1:C:169:THR:HG21	2.54	0.43
1:C:196:THR:HA	1:C:273:ASN:O	2.18	0.43
1:C:222:TRP:CD1	1:D:222:TRP:CD1	3.06	0.43
1:A:198:ALA:O	1:A:199:HIS:HB3	2.17	0.43
1:D:250:HIS:HB2	1:D:271:ASP:OD2	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:254:ILE:HB	1:D:266:VAL:HG12	1.99	0.43
1:C:176:LEU:HD21	1:C:187:ARG:NE	2.32	0.43
1:D:206:HIS:CD2	1:D:208:GLU:HG2	2.53	0.43
1:B:167:LEU:HD23	1:B:171:VAL:HG13	1.99	0.43
1:C:95:LEU:N	1:C:95:LEU:HD22	2.33	0.43
1:D:292:PHE:HD2	1:D:297:ILE:O	2.02	0.43
1:D:47:TRP:HB2	1:D:129:TRP:HB3	2.00	0.43
1:B:37:ASP:HB3	1:B:39:GLN:N	2.33	0.43
1:D:198:ALA:HB1	1:D:249:THR:HG22	2.01	0.43
1:C:214:HIS:HB3	1:C:263:ARG:HG2	2.00	0.43
1:D:206:HIS:CD2	1:D:211:ARG:HG3	2.54	0.43
1:C:140:PRO:HG2	1:C:143:LEU:HD11	2.00	0.43
1:A:165:TYR:HE1	1:A:176:LEU:HG	1.84	0.42
1:A:14:ARG:NH2	1:A:64:GLY:HA3	2.34	0.42
1:D:69:GLY:HA2	1:D:118:GLU:O	2.19	0.42
1:C:214:HIS:CB	1:C:263:ARG:HG2	2.49	0.42
1:C:230:ASP:OD1	1:D:294:HIS:HE1	2.03	0.42
1:B:1:MET:N	1:B:194:LEU:O	2.44	0.42
1:D:9:GLY:HA3	1:D:120:TYR:OH	2.20	0.42
1:A:296:ARG:NH2	1:B:237:THR:O	2.52	0.42
1:D:22:LEU:HD11	1:D:42:VAL:HG11	2.02	0.42
1:D:37:ASP:OD2	1:D:41:ARG:HD3	2.20	0.42
1:D:157:TYR:CE1	1:D:213:HIS:HD2	2.38	0.42
1:A:157:TYR:CE1	1:A:213:HIS:CD2	3.08	0.42
1:C:110:GLN:HB2	1:C:116:HIS:CE1	2.55	0.41
1:A:106:ARG:HG2	1:A:120:TYR:HB3	2.02	0.41
1:C:58:ARG:NH1	1:C:60:ALA:HB2	2.34	0.41
1:B:194:LEU:HD12	1:B:194:LEU:HA	1.86	0.41
1:A:7:ARG:NH1	4:A:5001:HOH:O	2.54	0.41
1:A:196:THR:HA	1:A:273:ASN:O	2.21	0.41
1:A:222:TRP:CD1	1:B:222:TRP:CD1	3.09	0.41
1:A:157:TYR:OH	1:A:303:MET:HG3	2.20	0.41
1:C:79:ARG:NH1	1:C:79:ARG:CG	2.82	0.41
1:B:37:ASP:OD2	1:B:41:ARG:HB2	2.20	0.41
1:B:182:ASP:HA	1:B:284:THR:HB	2.01	0.41
1:B:198:ALA:O	1:B:199:HIS:HB3	2.21	0.41
1:B:206:HIS:CD2	1:B:208:GLU:CG	3.02	0.41
1:B:206:HIS:HA	1:B:207:PRO:HD3	1.93	0.41
1:C:65:MET:HB2	1:C:212:LEU:HG	2.02	0.41
1:C:100:LEU:HB2	1:C:106:ARG:NH1	2.36	0.41
1:C:115:HIS:CD2	1:C:156:MET:HG3	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:227:ARG:HH11	1:C:227:ARG:CG	2.34	0.41
1:D:43:TYR:CD1	1:D:43:TYR:N	2.87	0.41
1:D:100:LEU:HD23	1:D:100:LEU:HA	1.89	0.41
1:A:299:ASN:ND2	1:A:299:ASN:C	2.74	0.41
1:A:100:LEU:HD23	1:A:100:LEU:HA	1.91	0.40
1:B:291:ILE:HG13	1:B:298:LEU:HD21	2.03	0.40
1:B:221:THR:O	1:B:224:ASP:HB2	2.20	0.40
1:B:240:ASP:HB3	1:B:255:TYR:HB3	2.02	0.40
1:B:246:HIS:O	1:B:250:HIS:HA	2.20	0.40
1:C:181:LEU:HD22	1:C:281:THR:CG2	2.51	0.40
1:C:181:LEU:HD22	1:C:281:THR:HG23	2.04	0.40
1:C:222:TRP:O	1:C:225:LEU:HB2	2.21	0.40
1:B:14:ARG:HG2	1:B:58:ARG:HH12	1.86	0.40
1:C:45:LYS:HB3	1:C:53:PHE:HA	2.03	0.40
1:C:182:ASP:HB3	1:C:188:VAL:HG21	2.03	0.40
1:A:239:ILE:HD11	1:A:242:GLY:HA2	2.04	0.40
1:C:186:THR:O	1:C:188:VAL:HG23	2.21	0.40
1:D:47:TRP:CZ3	1:D:140:PRO:HD3	2.57	0.40
1:B:73:VAL:HG23	1:B:74:ASP:H	1.86	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	305/307 (99%)	281 (92%)	23 (8%)	1 (0%)	41 72
1	B	305/307 (99%)	290 (95%)	13 (4%)	2 (1%)	22 53
1	C	305/307 (99%)	286 (94%)	18 (6%)	1 (0%)	41 72
1	D	305/307 (99%)	288 (94%)	14 (5%)	3 (1%)	15 44
All	All	1220/1228 (99%)	1145 (94%)	68 (6%)	7 (1%)	25 56

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	300	GLU
1	B	242	GLY
1	B	269	GLY
1	D	250	HIS
1	A	73	VAL
1	D	243	PRO
1	D	269	GLY

### 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	262/262 (100%)	227 (87%)	35 (13%)	4	12
1	B	262/262 (100%)	231 (88%)	31 (12%)	5	16
1	C	262/262 (100%)	232 (88%)	30 (12%)	5	17
1	D	262/262 (100%)	234 (89%)	28 (11%)	6	20
All	All	1048/1048 (100%)	924 (88%)	124 (12%)	5	16

All (124) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	ASN
1	A	7	ARG
1	A	16	LEU
1	A	22	LEU
1	A	28	LEU
1	A	41	ARG
1	A	50	VAL
1	A	56	VAL
1	A	57	LEU
1	A	73	VAL
1	A	80	GLN
1	A	81	LEU
1	A	83	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	99	GLU
1	A	131	LEU
1	A	150	ARG
1	A	155	LEU
1	A	156	MET
1	A	176	LEU
1	A	181	LEU
1	A	183	GLU
1	A	188	VAL
1	A	194	LEU
1	A	211	ARG
1	A	212	LEU
1	A	236	ASP
1	A	252	LYS
1	A	273	ASN
1	A	278	LYS
1	A	280	VAL
1	A	287	LEU
1	A	298	LEU
1	A	299	ASN
1	A	300	GLU
1	A	307	THR
1	B	16	LEU
1	B	28	LEU
1	B	29	LEU
1	B	50	VAL
1	B	59	GLU
1	B	80	GLN
1	B	83	ARG
1	B	99	GLU
1	B	106	ARG
1	B	119	LEU
1	B	131	LEU
1	B	133	ASP
1	B	142	ASP
1	B	150	ARG
1	B	155	LEU
1	B	156	MET
1	B	171	VAL
1	B	176	LEU
1	B	180	VAL
1	B	181	LEU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	B	194	LEU
1	B	211	ARG
1	B	212	LEU
1	B	236	ASP
1	B	266	VAL
1	B	273	ASN
1	B	280	VAL
1	B	284	THR
1	B	287	LEU
1	B	302	PHE
1	B	306	LEU
1	C	7	ARG
1	C	22	LEU
1	C	28	LEU
1	C	50	VAL
1	C	56	VAL
1	C	57	LEU
1	C	81	LEU
1	C	94	GLN
1	C	99	GLU
1	C	119	LEU
1	C	131	LEU
1	C	133	ASP
1	C	141	ARG
1	C	155	LEU
1	C	156	MET
1	C	167	LEU
1	C	180	VAL
1	C	181	LEU
1	C	184	ASN
1	C	194	LEU
1	C	212	LEU
1	C	225	LEU
1	C	236	ASP
1	C	245	ARG
1	C	264	ASN
1	C	266	VAL
1	C	273	ASN
1	C	287	LEU
1	C	299	ASN
1	C	307	THR
1	D	7	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	D	22	LEU
1	D	28	LEU
1	D	31	LEU
1	D	42	VAL
1	D	50	VAL
1	D	56	VAL
1	D	57	LEU
1	D	80	GLN
1	D	90	CYS
1	D	95	LEU
1	D	99	GLU
1	D	119	LEU
1	D	133	ASP
1	D	136	PRO
1	D	150	ARG
1	D	156	MET
1	D	171	VAL
1	D	176	LEU
1	D	194	LEU
1	D	236	ASP
1	D	267	PHE
1	D	273	ASN
1	D	280	VAL
1	D	287	LEU
1	D	300	GLU
1	D	301	ARG
1	D	306	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	110	GLN
1	A	206	HIS
1	A	218	HIS
1	A	286	GLN
1	A	294	HIS
1	A	299	ASN
1	B	110	GLN
1	B	184	ASN
1	B	206	HIS
1	B	294	HIS
1	C	94	GLN

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Mol	Chain	Res	Type
1	C	206	HIS
1	C	294	HIS
1	D	294	HIS

### 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 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 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	$\# Z  > 2$
3	ACN	B	309	2	3,3,3	0.50	0	3,3,3	0.64	0
3	ACN	D	309	2	3,3,3	1.20	0	3,3,3	0.91	0
3	ACN	C	309	2	3,3,3	0.46	0	3,3,3	0.51	0
3	ACN	A	309	2	3,3,3	0.86	0	3,3,3	0.68	0

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

There are no such residues in this entry.

## 5.8 Polymer linkage issues

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.