



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 14, 2017 – 08:49 pm GMT

PDB ID : 1BAV  
Title : CARBOXYPEPTIDASE A COMPLEXED WITH 2-BENZYL-3-iodo-PROPANOIC ACID (BIP)  
Authors : Martin, P.; Edwards, B.  
Deposited on : 1996-11-14  
Resolution : 1.60 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

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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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 : 1.7.2 (RC1), CSD as538be (2017)  
Xtriage (Phenix) : 1.9-1692  
EDS : trunk28620  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : recalc28949

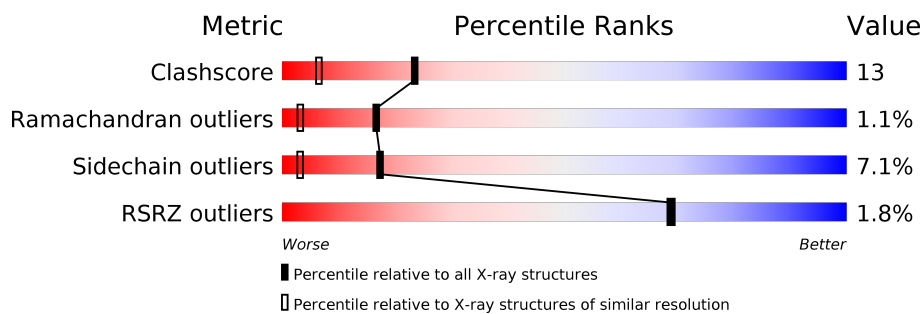
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.60 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	112137	2967 (1.60-1.60)
Ramachandran outliers	110173	2887 (1.60-1.60)
Sidechain outliers	110143	2886 (1.60-1.60)
RSRZ outliers	101464	2714 (1.60-1.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	309	<div> <div>2%</div> <div>79%</div> <div>17%</div> <div>..</div> </div>
1	B	309	<div> <div>%</div> <div>72%</div> <div>22%</div> <div>5% ..</div> </div>
1	C	309	<div> <div>2%</div> <div>77%</div> <div>19%</div> <div>..</div> </div>
1	D	309	<div> <div>2%</div> <div>68%</div> <div>26%</div> <div>6% .</div> </div>

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	BIP	C	311	-	-	-	X

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 10371 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 CARBOXYPEPTIDASE A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	307	Total	C	N	O	S	0	0	0
			2436	1561	406	464	5			
1	B	307	Total	C	N	O	S	0	0	0
			2436	1561	406	464	5			
1	C	307	Total	C	N	O	S	0	0	0
			2436	1561	406	464	5			
1	D	307	Total	C	N	O	S	0	0	0
			2436	1561	406	464	5			

There are 36 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	28	GLN	GLU	CONFLICT	UNP P00730
A	31	GLU	GLN	CONFLICT	UNP P00730
A	89	ASN	ASP	CONFLICT	UNP P00730
A	93	ASN	ASP	CONFLICT	UNP P00730
A	114	ASN	ASP	CONFLICT	UNP P00730
A	122	GLU	GLN	CONFLICT	UNP P00730
A	185	ASN	ASP	CONFLICT	UNP P00730
A	228	ALA	GLU	CONFLICT	UNP P00730
A	305	VAL	LEU	CONFLICT	UNP P00730
B	28	GLN	GLU	CONFLICT	UNP P00730
B	31	GLU	GLN	CONFLICT	UNP P00730
B	89	ASN	ASP	CONFLICT	UNP P00730
B	93	ASN	ASP	CONFLICT	UNP P00730
B	114	ASN	ASP	CONFLICT	UNP P00730
B	122	GLU	GLN	CONFLICT	UNP P00730
B	185	ASN	ASP	CONFLICT	UNP P00730
B	228	ALA	GLU	CONFLICT	UNP P00730
B	305	VAL	LEU	CONFLICT	UNP P00730
C	28	GLN	GLU	CONFLICT	UNP P00730
C	31	GLU	GLN	CONFLICT	UNP P00730
C	89	ASN	ASP	CONFLICT	UNP P00730

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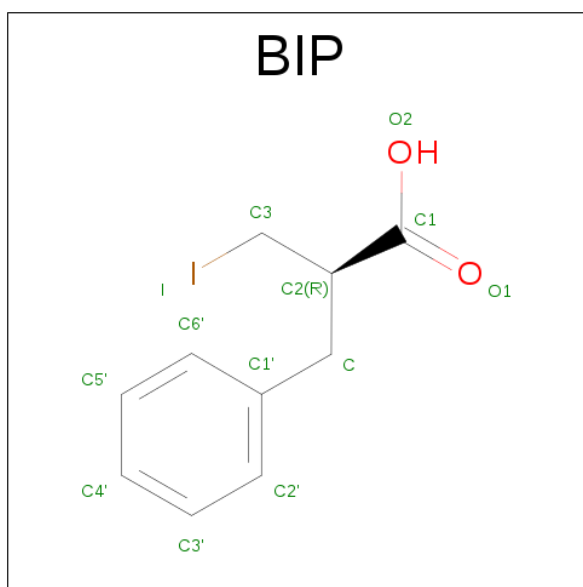
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Chain	Residue	Modelled	Actual	Comment	Reference
C	93	ASN	ASP	CONFLICT	UNP P00730
C	114	ASN	ASP	CONFLICT	UNP P00730
C	122	GLU	GLN	CONFLICT	UNP P00730
C	185	ASN	ASP	CONFLICT	UNP P00730
C	228	ALA	GLU	CONFLICT	UNP P00730
C	305	VAL	LEU	CONFLICT	UNP P00730
D	28	GLN	GLU	CONFLICT	UNP P00730
D	31	GLU	GLN	CONFLICT	UNP P00730
D	89	ASN	ASP	CONFLICT	UNP P00730
D	93	ASN	ASP	CONFLICT	UNP P00730
D	114	ASN	ASP	CONFLICT	UNP P00730
D	122	GLU	GLN	CONFLICT	UNP P00730
D	185	ASN	ASP	CONFLICT	UNP P00730
D	228	ALA	GLU	CONFLICT	UNP P00730
D	305	VAL	LEU	CONFLICT	UNP P00730

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

- Molecule 3 is 2-BENZYL-3-IODOPROPANOIC ACID (three-letter code: BIP) (formula: C<sub>10</sub>H<sub>11</sub>IO<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			12	10	2		
3	B	1	Total	C	O	0	0
			12	10	2		
3	C	1	Total	C	O	0	0
			12	10	2		
3	D	1	Total	C	O	0	0
			12	10	2		

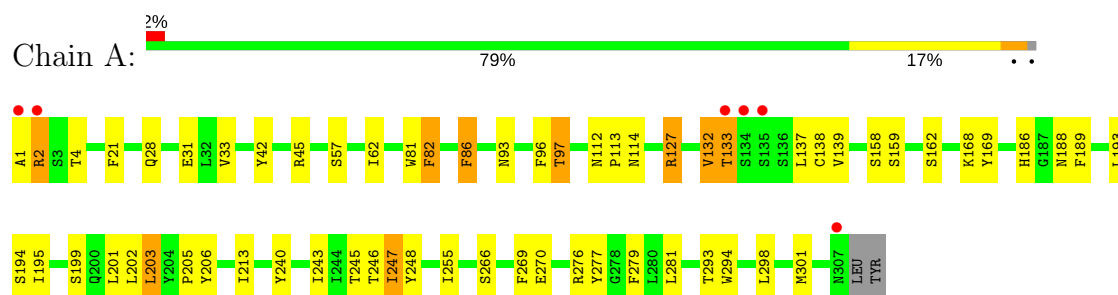
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	154	Total	O	0	0
			154	154		
4	B	155	Total	O	0	0
			155	155		
4	C	129	Total	O	0	0
			129	129		
4	D	137	Total	O	0	0
			137	137		

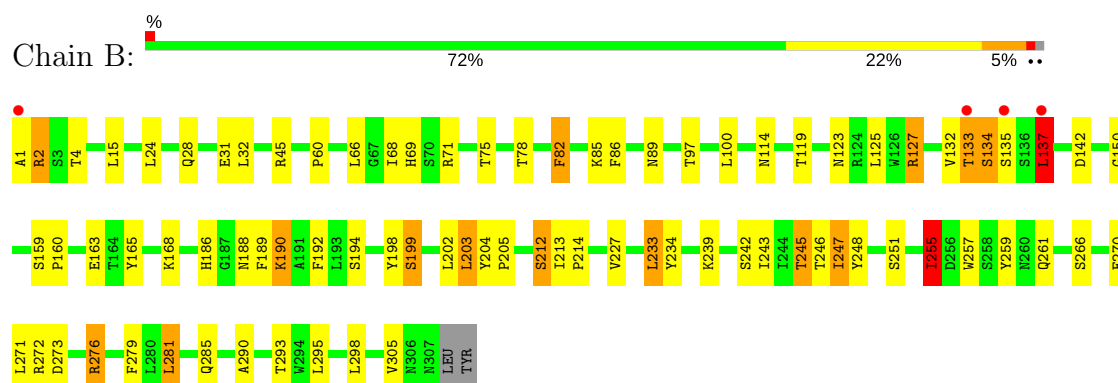
### 3 Residue-property plots [i](#)

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

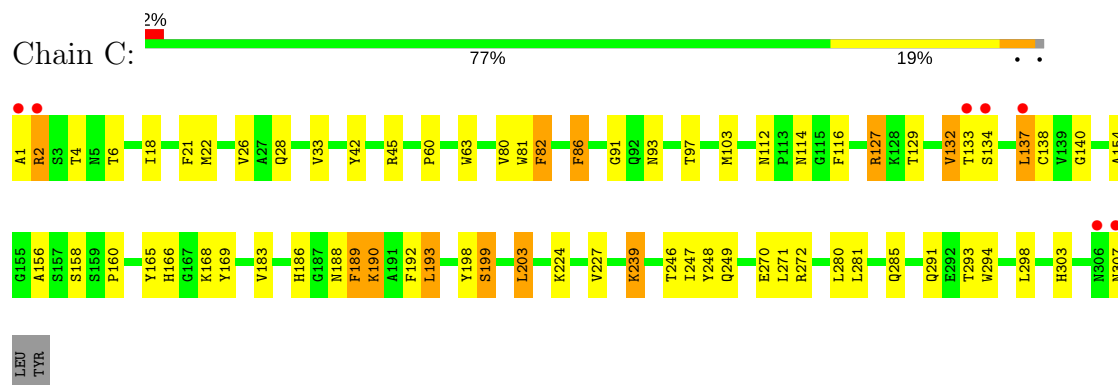
#### • Molecule 1: CARBOXYPEPTIDASE A



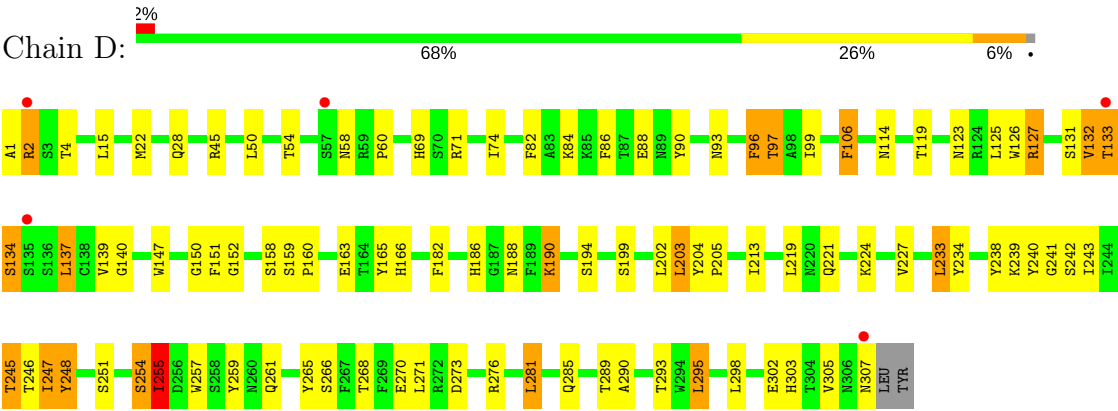
#### • Molecule 1: CARBOXYPEPTIDASE A



#### • Molecule 1: CARBOXYPEPTIDASE A



#### • Molecule 1: CARBOXYPEPTIDASE A





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	105.70Å 60.50Å 91.80Å 90.00° 97.20° 90.00°	Depositor
Resolution (Å)	(Not available) – 1.60 44.24 – 1.62	Depositor EDS
% Data completeness (in resolution range)	(Not available) ((Not available)-1.60) 44.6 (44.24-1.62)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	6.16 (at 1.62Å)	Xtriage
Refinement program	X-PLOR	Depositor
R, $R_{free}$	0.172 , 0.213 (Not available) , (Not available)	Depositor DCC
$R_{free}$ test set	NotAvailable	DCC
Wilson B-factor (Å <sup>2</sup> )	10.5	Xtriage
Anisotropy	0.018	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 51.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	10371	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	12.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 98.48 % of the origin peak, indicating pseudo translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo translational symmetry is equal to 2.4415e-11. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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: ZN, BIP

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	0.54	1/2502 (0.0%)	0.87	7/3402 (0.2%)
1	B	0.51	1/2502 (0.0%)	0.96	10/3402 (0.3%)
1	C	0.51	1/2502 (0.0%)	0.83	6/3402 (0.2%)
1	D	0.51	1/2502 (0.0%)	0.87	9/3402 (0.3%)
All	All	0.52	4/10008 (0.0%)	0.88	32/13608 (0.2%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	270	GLU	CD-OE2	6.75	1.33	1.25
1	C	270	GLU	CD-OE2	6.05	1.32	1.25
1	B	270	GLU	CD-OE2	5.56	1.31	1.25
1	D	270	GLU	CD-OE2	5.50	1.31	1.25

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	82	PHE	CB-CG-CD2	-19.02	107.48	120.80
1	B	82	PHE	CB-CG-CD1	15.80	131.86	120.80
1	D	82	PHE	CB-CG-CD2	-12.33	112.17	120.80
1	A	86	PHE	CB-CG-CD1	12.21	129.35	120.80
1	B	189	PHE	CB-CG-CD1	-11.20	112.96	120.80
1	B	86	PHE	CB-CG-CD1	11.10	128.57	120.80
1	A	279	PHE	CB-CG-CD1	-10.85	113.20	120.80
1	D	82	PHE	CB-CG-CD1	10.61	128.23	120.80
1	B	86	PHE	CB-CG-CD2	-10.36	113.55	120.80
1	A	86	PHE	CB-CG-CD2	-10.10	113.73	120.80
1	D	86	PHE	CB-CG-CD2	-9.17	114.38	120.80
1	C	86	PHE	CB-CG-CD2	-8.87	114.59	120.80
1	C	82	PHE	CB-CG-CD2	-8.27	115.01	120.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	86	PHE	CB-CG-CD1	7.45	126.01	120.80
1	B	273	ASP	CB-CG-OD1	6.49	124.14	118.30
1	D	86	PHE	CB-CG-CD1	6.42	125.30	120.80
1	A	82	PHE	CB-CG-CD2	-6.33	116.37	120.80
1	D	151	PHE	CB-CG-CD1	-6.27	116.41	120.80
1	C	192	PHE	CB-CG-CD2	-6.14	116.50	120.80
1	D	96	PHE	CB-CG-CD1	-6.07	116.55	120.80
1	C	189	PHE	CB-CG-CD1	-5.80	116.74	120.80
1	B	192	PHE	CB-CG-CD2	-5.59	116.89	120.80
1	A	96	PHE	CB-CG-CD1	-5.56	116.91	120.80
1	D	106	PHE	CB-CG-CD2	-5.51	116.94	120.80
1	D	273	ASP	CB-CG-OD1	5.48	123.23	118.30
1	B	137	LEU	CA-CB-CG	5.28	127.45	115.30
1	C	193	LEU	CA-CB-CG	5.28	127.43	115.30
1	D	255	ILE	CG1-CB-CG2	5.15	122.73	111.40
1	B	255	ILE	CG1-CB-CG2	5.05	122.52	111.40
1	B	279	PHE	CB-CG-CD2	-5.05	117.27	120.80
1	A	189	PHE	CB-CG-CD1	-5.03	117.28	120.80
1	A	21	PHE	CB-CG-CD2	-5.01	117.29	120.80

There are no chirality outliers.

There are no planarity outliers.

## 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	2436	0	2352	47	0
1	B	2436	0	2352	67	0
1	C	2436	0	2352	59	0
1	D	2436	0	2352	72	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	12	0	8	2	0
3	B	12	0	8	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	12	0	8	1	0
3	D	12	0	8	1	0
4	A	154	0	0	14	0
4	B	155	0	0	16	0
4	C	129	0	0	6	0
4	D	137	0	0	12	0
All	All	10371	0	9440	245	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 13.

All (245) 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:293:THR:HB	4:C:380:HOH:O	1.45	1.17
1:B:97:THR:HB	4:B:423:HOH:O	1.48	1.11
1:D:246:THR:HB	4:D:396:HOH:O	1.55	1.04
1:B:293:THR:HB	4:B:378:HOH:O	1.55	1.03
1:A:293:THR:HB	4:A:397:HOH:O	1.59	1.01
1:A:132:VAL:HG23	1:A:133:THR:H	1.28	0.97
1:D:255:ILE:HG21	4:D:409:HOH:O	1.65	0.95
1:C:132:VAL:HG23	1:C:133:THR:H	1.36	0.90
1:D:243:ILE:HG23	1:D:247:ILE:HD11	1.53	0.89
1:D:221:GLN:HB2	4:D:432:HOH:O	1.73	0.89
1:B:255:ILE:HG21	4:B:419:HOH:O	1.75	0.87
1:C:186:HIS:HD2	1:C:188:ASN:H	1.22	0.86
1:C:60:PRO:HB3	1:C:190:LYS:HD2	1.57	0.86
1:C:203:LEU:HG	1:C:247:ILE:HD11	1.60	0.84
1:B:242:SER:O	1:B:246:THR:HG23	1.78	0.83
1:A:186:HIS:HD2	1:A:188:ASN:H	1.27	0.83
1:D:22:MET:HE3	1:D:50:LEU:HG	1.62	0.82
1:D:4:THR:H	1:D:28:GLN:HE22	1.28	0.81
1:C:93:ASN:O	1:C:97:THR:HG23	1.83	0.79
1:A:93:ASN:O	1:A:97:THR:HG22	1.82	0.78
1:C:42:TYR:OH	1:C:132:VAL:HG22	1.85	0.77
1:B:85:LYS:HD2	1:B:89:ASN:ND2	2.00	0.77
1:A:86:PHE:HE1	1:A:294:TRP:HZ3	1.34	0.76
1:C:137:LEU:H	1:C:137:LEU:HD13	1.50	0.75
1:A:1:ALA:HB1	1:A:2:ARG:HH21	1.50	0.75
1:A:168:LYS:HG2	4:A:370:HOH:O	1.87	0.74
1:C:246:THR:HB	4:C:362:HOH:O	1.86	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:255:ILE:HG12	4:B:419:HOH:O	1.86	0.74
1:A:42:TYR:OH	1:A:132:VAL:HG22	1.87	0.73
1:A:243:ILE:HG23	1:A:247:ILE:HD12	1.70	0.72
1:C:186:HIS:CD2	1:C:188:ASN:H	2.07	0.72
1:B:186:HIS:HD2	1:B:188:ASN:H	1.36	0.72
1:D:190:LYS:HA	1:D:190:LYS:HE3	1.71	0.72
1:A:31:GLU:HB2	4:A:362:HOH:O	1.89	0.71
1:C:132:VAL:HG23	1:C:133:THR:N	2.03	0.71
1:B:45:ARG:HH11	1:B:114:ASN:ND2	1.89	0.71
1:C:91:GLY:H	1:C:97:THR:HG22	1.56	0.71
1:C:4:THR:H	1:C:28:GLN:HE22	1.37	0.70
1:B:160:PRO:HA	1:B:165:TYR:CD2	2.26	0.70
1:A:4:THR:H	1:A:28:GLN:HE22	1.40	0.70
1:A:82:PHE:HZ	1:A:293:THR:HG23	1.57	0.70
1:A:82:PHE:CZ	1:A:293:THR:HG23	2.28	0.69
1:C:82:PHE:HZ	1:C:293:THR:HG23	1.59	0.67
1:A:205:PRO:HG3	1:A:255:ILE:HG22	1.77	0.67
1:D:119:THR:HA	1:D:123:ASN:O	1.96	0.66
1:D:247:ILE:HD12	1:D:248:TYR:H	1.60	0.66
1:B:150:GLY:O	1:B:251:SER:HB2	1.96	0.66
1:B:4:THR:H	1:B:28:GLN:HE22	1.42	0.66
1:C:82:PHE:CZ	1:C:293:THR:HG23	2.31	0.66
1:B:203:LEU:HD12	1:B:246:THR:HG21	1.77	0.65
1:C:272:ARG:HH11	1:C:285:GLN:HE21	1.43	0.65
1:D:281:LEU:HD13	1:D:285:GLN:HB2	1.79	0.64
1:A:132:VAL:HG23	1:A:133:THR:N	2.09	0.63
1:B:272:ARG:HH11	1:B:285:GLN:HE21	1.46	0.63
1:D:245:THR:HB	4:D:410:HOH:O	1.98	0.62
1:C:280:LEU:HD12	1:C:280:LEU:N	2.15	0.61
1:D:137:LEU:H	1:D:137:LEU:HD13	1.65	0.61
1:A:186:HIS:HD2	1:A:188:ASN:N	1.96	0.60
1:B:194:SER:HB3	4:B:403:HOH:O	2.02	0.60
1:D:194:SER:CB	4:D:395:HOH:O	2.49	0.60
1:B:190:LYS:HE3	1:B:190:LYS:HA	1.84	0.60
1:D:257:TRP:O	1:D:261:GLN:HG2	2.01	0.60
1:A:245:THR:HG22	1:A:246:THR:HG23	1.84	0.59
1:D:152:GLY:HA2	1:D:166:HIS:CD2	2.38	0.59
1:B:186:HIS:CD2	1:B:188:ASN:H	2.20	0.59
1:C:186:HIS:HD2	1:C:188:ASN:N	1.98	0.59
1:B:32:LEU:HD11	1:B:100:LEU:HD13	1.85	0.58
1:A:45:ARG:HH11	1:A:114:ASN:ND2	2.02	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:214:PRO:HD3	4:B:459:HOH:O	2.04	0.57
1:D:2:ARG:N	1:D:2:ARG:NE	2.52	0.57
1:A:246:THR:HB	4:A:371:HOH:O	2.03	0.57
1:D:255:ILE:HG12	4:D:409:HOH:O	2.04	0.57
1:C:45:ARG:HH11	1:C:114:ASN:ND2	2.03	0.57
1:D:255:ILE:HG13	1:D:266:SER:HB3	1.86	0.57
1:D:302:GLU:O	1:D:305:VAL:HG12	2.05	0.57
1:D:204:TYR:O	1:D:242:SER:HA	2.04	0.57
1:D:303:HIS:HB2	4:D:426:HOH:O	2.04	0.57
1:A:86:PHE:CE1	1:A:294:TRP:HZ3	2.20	0.56
1:A:243:ILE:HG23	1:A:247:ILE:CD1	2.35	0.56
1:D:194:SER:HB3	4:D:395:HOH:O	2.05	0.56
1:A:132:VAL:CG2	1:A:133:THR:H	2.09	0.56
1:B:246:THR:HB	4:B:402:HOH:O	2.05	0.56
1:B:255:ILE:HG13	1:B:266:SER:HB3	1.87	0.56
1:D:289:THR:O	1:D:293:THR:HG22	2.06	0.56
1:C:198:TYR:O	1:C:199:SER:CB	2.55	0.55
1:A:247:ILE:HD13	3:A:311:BIP:H2A	1.88	0.55
1:C:272:ARG:HH11	1:C:285:GLN:NE2	2.05	0.54
1:A:62:ILE:HD13	1:A:301:MET:HG2	1.89	0.54
1:B:233:LEU:HD13	1:B:234:TYR:CE2	2.42	0.54
1:D:71:ARG:HD3	1:D:125:LEU:O	2.08	0.54
1:B:132:VAL:O	1:B:133:THR:HB	2.08	0.54
1:B:257:TRP:O	1:B:261:GLN:HG2	2.07	0.54
1:D:2:ARG:N	1:D:2:ARG:HE	2.05	0.54
1:B:194:SER:CB	4:B:403:HOH:O	2.56	0.53
1:B:205:PRO:HB2	1:B:213:ILE:HG21	1.90	0.53
1:A:194:SER:HB3	4:A:366:HOH:O	2.08	0.53
1:D:233:LEU:HD13	1:D:234:TYR:CE2	2.43	0.53
1:A:276:ARG:HD3	1:A:277:TYR:CZ	2.42	0.53
1:C:137:LEU:CD1	1:C:137:LEU:H	2.20	0.53
1:D:241:GLY:HA3	1:D:246:THR:HG21	1.91	0.53
1:D:290:ALA:HA	1:D:293:THR:HG22	1.91	0.53
1:C:127:ARG:NH2	4:C:385:HOH:O	2.42	0.52
1:D:186:HIS:HD2	1:D:188:ASN:H	1.57	0.52
1:C:291:GLN:O	1:C:294:TRP:HB3	2.09	0.52
1:B:45:ARG:HH11	1:B:114:ASN:HD22	1.53	0.52
1:C:203:LEU:CG	1:C:247:ILE:HD11	2.37	0.52
1:D:45:ARG:HH11	1:D:114:ASN:ND2	2.07	0.52
1:B:119:THR:HA	1:B:123:ASN:O	2.10	0.52
1:D:127:ARG:HD2	1:D:163:GLU:HB3	1.92	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:22:MET:O	1:C:26:VAL:HG23	2.10	0.52
1:D:133:THR:O	1:D:134:SER:CB	2.58	0.52
1:A:168:LYS:HG3	1:A:169:TYR:CD2	2.46	0.51
1:A:159:SER:O	1:A:162:SER:HB3	2.10	0.51
1:A:194:SER:CB	4:A:366:HOH:O	2.58	0.51
1:C:45:ARG:HD2	1:C:114:ASN:HD22	1.75	0.51
1:B:243:ILE:HA	1:B:246:THR:OG1	2.11	0.51
1:C:203:LEU:HD22	1:C:203:LEU:N	2.25	0.51
1:A:205:PRO:HG3	1:A:255:ILE:CG2	2.39	0.51
1:C:2:ARG:NE	1:C:2:ARG:N	2.59	0.51
1:D:241:GLY:CA	1:D:246:THR:HG21	2.41	0.50
1:D:254:SER:CB	4:D:402:HOH:O	2.60	0.50
1:D:74:ILE:HD13	1:D:281:LEU:HD12	1.93	0.50
1:A:203:LEU:CD2	1:A:247:ILE:HD11	2.40	0.50
1:C:60:PRO:HB3	1:C:190:LYS:CD	2.36	0.50
1:B:168:LYS:HG2	4:B:401:HOH:O	2.12	0.50
1:B:246:THR:CB	4:B:402:HOH:O	2.60	0.50
1:B:281:LEU:HD11	1:B:285:GLN:HB2	1.93	0.50
1:C:91:GLY:H	1:C:97:THR:CG2	2.24	0.50
1:B:78:THR:HG21	1:B:293:THR:HG21	1.93	0.49
1:B:66:LEU:HD22	1:B:75:THR:O	2.11	0.49
1:A:255:ILE:HG23	1:A:266:SER:HB3	1.93	0.49
1:B:137:LEU:HD13	1:B:137:LEU:H	1.77	0.49
1:B:290:ALA:HA	1:B:293:THR:HG22	1.93	0.49
1:B:2:ARG:NH1	1:B:2:ARG:HB2	2.27	0.49
1:B:160:PRO:HA	1:B:165:TYR:CG	2.48	0.48
1:D:54:THR:HG21	1:D:90:TYR:CZ	2.48	0.48
1:A:243:ILE:O	1:A:247:ILE:HG13	2.13	0.48
1:A:113:PRO:HD2	4:A:394:HOH:O	2.12	0.48
1:A:127:ARG:NH2	4:A:399:HOH:O	2.46	0.48
1:D:303:HIS:O	1:D:307:ASN:ND2	2.46	0.48
1:C:183:VAL:HG13	1:C:189:PHE:CD2	2.48	0.48
1:D:150:GLY:O	1:D:251:SER:HB2	2.13	0.48
1:B:186:HIS:HD2	1:B:188:ASN:N	2.09	0.48
1:C:247:ILE:CD1	3:C:311:BIP:H2A	2.44	0.48
1:D:268:THR:HG21	3:D:311:BIP:H6'	1.96	0.48
1:D:227:VAL:HG13	1:D:238:TYR:HB2	1.96	0.47
1:D:126:TRP:CH2	1:D:139:VAL:HG13	2.49	0.47
1:C:224:LYS:HE2	4:C:351:HOH:O	2.15	0.47
1:D:245:THR:CB	4:D:410:HOH:O	2.58	0.47
1:A:138:CYS:HB3	4:A:421:HOH:O	2.15	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:160:PRO:HA	1:C:165:TYR:CD2	2.50	0.47
1:D:265:TYR:CE1	1:D:303:HIS:HD2	2.33	0.46
1:B:127:ARG:HD2	1:B:163:GLU:HB3	1.97	0.46
1:C:2:ARG:HB2	1:C:2:ARG:CZ	2.46	0.46
1:D:133:THR:O	1:D:134:SER:HB2	2.16	0.46
1:B:212:SER:HB3	4:B:460:HOH:O	2.16	0.46
1:A:203:LEU:HD21	1:A:247:ILE:HD11	1.96	0.46
1:B:276:ARG:HD3	1:B:276:ARG:O	2.16	0.46
1:D:132:VAL:O	1:D:133:THR:HB	2.15	0.46
1:A:294:TRP:HZ2	4:A:363:HOH:O	1.98	0.45
1:C:138:CYS:HB3	4:C:412:HOH:O	2.15	0.45
1:C:154:ALA:HB3	1:C:249:GLN:NE2	2.30	0.45
1:D:160:PRO:HA	1:D:165:TYR:CD2	2.51	0.45
1:B:127:ARG:CD	1:B:163:GLU:HB3	2.47	0.45
1:B:2:ARG:CZ	1:B:2:ARG:HB2	2.45	0.45
1:B:281:LEU:CD1	1:B:285:GLN:HB2	2.46	0.45
1:D:69:HIS:CE1	4:D:372:HOH:O	2.70	0.45
1:B:186:HIS:CE1	4:B:451:HOH:O	2.69	0.45
1:D:84:LYS:O	1:D:88:GLU:HG2	2.17	0.45
1:B:127:ARG:HD3	1:B:163:GLU:O	2.16	0.45
1:C:132:VAL:CG2	1:C:133:THR:N	2.74	0.45
1:C:63:TRP:HB2	1:C:189:PHE:CE1	2.52	0.45
1:D:303:HIS:O	1:D:307:ASN:HB2	2.17	0.45
1:B:32:LEU:HD11	1:B:100:LEU:CD1	2.46	0.44
1:B:242:SER:O	1:B:246:THR:CG2	2.59	0.44
1:D:213:ILE:HB	1:D:259:TYR:CZ	2.52	0.44
1:C:198:TYR:O	1:C:199:SER:HB3	2.17	0.44
1:B:243:ILE:HG23	1:B:247:ILE:HD11	1.97	0.44
1:C:303:HIS:O	1:C:307:ASN:N	2.51	0.44
1:D:106:PHE:CE2	1:D:182:PHE:HZ	2.35	0.44
1:C:129:THR:O	1:C:140:GLY:HA3	2.17	0.44
1:D:127:ARG:HG2	1:D:163:GLU:OE1	2.17	0.44
1:D:4:THR:N	1:D:28:GLN:HE22	2.06	0.44
1:C:21:PHE:CE2	1:C:80:VAL:HG13	2.53	0.44
1:C:168:LYS:HE3	1:C:169:TYR:CE2	2.53	0.44
1:A:247:ILE:HD13	3:A:311:BIP:C	2.48	0.44
1:C:186:HIS:HE1	4:C:324:HOH:O	2.01	0.44
1:B:272:ARG:HH11	1:B:285:GLN:NE2	2.14	0.43
1:B:4:THR:N	1:B:28:GLN:HE22	2.14	0.43
1:D:22:MET:HE3	1:D:50:LEU:CG	2.41	0.43
1:D:96:PHE:HA	1:D:99:ILE:HD12	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:81:TRP:HE3	1:C:82:PHE:HD1	1.66	0.43
1:B:204:TYR:O	1:B:242:SER:HA	2.18	0.43
1:D:159:SER:HA	1:D:160:PRO:HD3	1.90	0.43
1:B:82:PHE:CE1	1:B:293:THR:HG23	2.54	0.43
1:A:201:LEU:HD22	4:A:371:HOH:O	2.17	0.43
1:A:293:THR:CB	4:A:397:HOH:O	2.40	0.43
1:B:243:ILE:HD11	1:B:255:ILE:HG21	1.99	0.43
1:C:18:ILE:HD12	1:C:116:PHE:CE2	2.54	0.43
1:B:68:ILE:HG22	4:B:393:HOH:O	2.19	0.43
1:B:82:PHE:HE1	1:B:293:THR:HG23	1.83	0.43
1:D:1:ALA:C	1:D:2:ARG:HE	2.21	0.43
1:B:198:TYR:O	1:B:199:SER:CB	2.67	0.43
1:C:60:PRO:O	1:C:103:MET:HB3	2.18	0.43
1:B:71:ARG:HD3	1:B:125:LEU:O	2.19	0.43
1:B:245:THR:CB	4:B:421:HOH:O	2.67	0.42
1:A:81:TRP:HE3	1:A:82:PHE:HD1	1.67	0.42
1:D:205:PRO:HG3	1:D:255:ILE:HG23	2.01	0.42
1:B:255:ILE:CG2	4:B:419:HOH:O	2.51	0.42
1:B:160:PRO:HA	1:B:165:TYR:CE2	2.54	0.42
1:B:60:PRO:HB3	1:B:190:LYS:HG3	2.00	0.42
1:C:239:LYS:HD2	1:C:239:LYS:N	2.35	0.42
1:D:60:PRO:HA	1:D:188:ASN:O	2.20	0.42
1:D:147:TRP:CE2	1:D:254:SER:HB3	2.55	0.42
1:D:203:LEU:HG	1:D:243:ILE:HA	2.01	0.42
1:D:213:ILE:CD1	1:D:219:LEU:HD22	2.50	0.42
1:C:168:LYS:HG3	1:C:169:TYR:CD2	2.55	0.42
1:D:93:ASN:O	1:D:97:THR:CG2	2.68	0.42
1:B:214:PRO:HD2	1:B:259:TYR:OH	2.19	0.42
1:C:160:PRO:HA	1:C:165:TYR:CG	2.54	0.42
1:D:45:ARG:HH11	1:D:114:ASN:HD22	1.67	0.41
1:A:206:TYR:CE2	1:A:213:ILE:HG22	2.54	0.41
1:B:186:HIS:HE1	4:B:451:HOH:O	2.04	0.41
1:D:147:TRP:CD2	1:D:254:SER:HB3	2.55	0.41
1:A:195:ILE:HD12	1:A:269:PHE:HB2	2.01	0.41
1:A:186:HIS:HE1	4:A:324:HOH:O	2.02	0.41
1:C:280:LEU:CD1	1:C:280:LEU:N	2.83	0.41
1:A:246:THR:CB	4:A:371:HOH:O	2.64	0.41
1:B:69:HIS:HE2	1:B:142:ASP:CG	2.23	0.41
1:C:137:LEU:HD22	1:C:138:CYS:SG	2.61	0.41
1:C:1:ALA:HB1	1:C:6:THR:HB	2.01	0.41
1:C:91:GLY:N	1:C:97:THR:HG22	2.28	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:139:VAL:HG22	1:D:140:GLY:N	2.36	0.41
1:D:243:ILE:HG23	1:D:247:ILE:CD1	2.38	0.41
1:B:134:SER:OG	1:B:135:SER:N	2.53	0.41
1:D:295:LEU:HD12	1:D:295:LEU:HA	1.87	0.41
1:C:2:ARG:HE	1:C:2:ARG:N	2.19	0.41
1:D:224:LYS:HE2	1:D:240:TYR:OH	2.21	0.41
1:A:202:LEU:O	1:A:240:TYR:HA	2.21	0.41
1:D:254:SER:HB2	4:D:402:HOH:O	2.21	0.41
1:B:1:ALA:O	1:B:24:LEU:HD11	2.22	0.40
1:C:156:ALA:HB1	1:C:166:HIS:HB3	2.02	0.40
1:D:290:ALA:HA	1:D:293:THR:CG2	2.51	0.40
1:C:86:PHE:HE1	1:C:294:TRP:HZ3	1.68	0.40
1:D:131:SER:O	1:D:139:VAL:HG23	2.20	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	305/309 (99%)	283 (93%)	19 (6%)	3 (1%)	18	4
1	B	305/309 (99%)	284 (93%)	18 (6%)	3 (1%)	18	4
1	C	305/309 (99%)	289 (95%)	14 (5%)	2 (1%)	25	7
1	D	305/309 (99%)	280 (92%)	20 (7%)	5 (2%)	11	2
All	All	1220/1236 (99%)	1136 (93%)	71 (6%)	13 (1%)	17	3

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	133	THR
1	B	134	SER

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Mol	Chain	Res	Type
1	B	199	SER
1	C	199	SER
1	D	134	SER
1	D	199	SER
1	A	199	SER
1	C	132	VAL
1	D	58	ASN
1	A	57	SER
1	D	133	THR
1	A	132	VAL
1	D	132	VAL

### 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	263/265 (99%)	248 (94%)	15 (6%)	24	5
1	B	263/265 (99%)	240 (91%)	23 (9%)	12	1
1	C	263/265 (99%)	247 (94%)	16 (6%)	22	4
1	D	263/265 (99%)	242 (92%)	21 (8%)	14	2
All	All	1052/1060 (99%)	977 (93%)	75 (7%)	17	3

All (75) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	ARG
1	A	33	VAL
1	A	97	THR
1	A	112	ASN
1	A	127	ARG
1	A	133	THR
1	A	137	LEU
1	A	139	VAL
1	A	158	SER
1	A	193	LEU

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Mol	Chain	Res	Type
1	A	203	LEU
1	A	247	ILE
1	A	248	TYR
1	A	281	LEU
1	A	298	LEU
1	B	2	ARG
1	B	15	LEU
1	B	31	GLU
1	B	127	ARG
1	B	137	LEU
1	B	159	SER
1	B	190	LYS
1	B	202	LEU
1	B	203	LEU
1	B	212	SER
1	B	227	VAL
1	B	233	LEU
1	B	239	LYS
1	B	245	THR
1	B	247	ILE
1	B	248	TYR
1	B	255	ILE
1	B	271	LEU
1	B	276	ARG
1	B	281	LEU
1	B	295	LEU
1	B	298	LEU
1	B	305	VAL
1	C	2	ARG
1	C	33	VAL
1	C	112	ASN
1	C	127	ARG
1	C	134	SER
1	C	137	LEU
1	C	158	SER
1	C	190	LYS
1	C	193	LEU
1	C	203	LEU
1	C	227	VAL
1	C	239	LYS
1	C	248	TYR
1	C	271	LEU

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Mol	Chain	Res	Type
1	C	281	LEU
1	C	298	LEU
1	D	2	ARG
1	D	15	LEU
1	D	97	THR
1	D	127	ARG
1	D	137	LEU
1	D	158	SER
1	D	190	LYS
1	D	202	LEU
1	D	203	LEU
1	D	233	LEU
1	D	239	LYS
1	D	245	THR
1	D	247	ILE
1	D	248	TYR
1	D	254	SER
1	D	255	ILE
1	D	271	LEU
1	D	276	ARG
1	D	281	LEU
1	D	295	LEU
1	D	298	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (39) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	5	ASN
1	A	28	GLN
1	A	112	ASN
1	A	114	ASN
1	A	171	ASN
1	A	186	HIS
1	A	211	GLN
1	A	285	GLN
1	B	5	ASN
1	B	28	GLN
1	B	89	ASN
1	B	112	ASN
1	B	114	ASN
1	B	186	HIS
1	B	220	ASN

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Mol	Chain	Res	Type
1	B	249	GLN
1	B	285	GLN
1	C	5	ASN
1	C	28	GLN
1	C	37	GLN
1	C	92	GLN
1	C	112	ASN
1	C	114	ASN
1	C	171	ASN
1	C	186	HIS
1	C	249	GLN
1	C	285	GLN
1	C	307	ASN
1	D	5	ASN
1	D	28	GLN
1	D	29	HIS
1	D	112	ASN
1	D	114	ASN
1	D	171	ASN
1	D	186	HIS
1	D	220	ASN
1	D	249	GLN
1	D	285	GLN
1	D	307	ASN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

### 5.6 Ligand geometry ⓘ

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	BIP	A	311	1	9,12,13	0.74	0	10,15,16	0.19	0
3	BIP	B	311	1	9,12,13	0.90	1 (11%)	10,15,16	0.37	0
3	BIP	C	311	1	9,12,13	0.97	0	10,15,16	0.45	0
3	BIP	D	311	1	9,12,13	0.74	0	10,15,16	0.28	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	BIP	A	311	1	-	0/4/8/10	0/1/1/1
3	BIP	B	311	1	-	0/4/8/10	0/1/1/1
3	BIP	C	311	1	-	0/4/8/10	0/1/1/1
3	BIP	D	311	1	-	0/4/8/10	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	311	BIP	C-C2	2.18	1.55	1.51

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	311	BIP	2	0
3	C	311	BIP	1	0
3	D	311	BIP	1	0

## 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 ⓘ

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	307/309 (99%)	-0.53	6 (1%) 65 66	3, 10, 23, 49	0
1	B	307/309 (99%)	-0.54	4 (1%) 77 78	4, 10, 21, 47	0
1	C	307/309 (99%)	-0.49	7 (2%) 61 61	2, 11, 25, 47	0
1	D	307/309 (99%)	-0.46	5 (1%) 72 73	3, 11, 26, 50	0
All	All	1228/1236 (99%)	-0.51	22 (1%) 69 69	2, 10, 25, 50	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	133	THR	8.4
1	C	133	THR	7.2
1	D	133	THR	6.9
1	B	1	ALA	4.4
1	B	133	THR	4.3
1	A	2	ARG	3.9
1	D	2	ARG	3.5
1	D	57	SER	3.1
1	A	134	SER	3.0
1	C	306	ASN	2.8
1	A	1	ALA	2.8
1	B	137	LEU	2.6
1	A	307	ASN	2.6
1	C	307	ASN	2.5
1	D	307	ASN	2.5
1	C	134	SER	2.5
1	B	135	SER	2.3
1	C	1	ALA	2.2
1	A	135	SER	2.2
1	D	135	SER	2.2
1	C	2	ARG	2.1
1	C	137	LEU	2.1

## 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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
3	BIP	C	311	12/13	0.87	0.15	2.61	25,29,36,37	0
3	BIP	B	311	12/13	0.96	0.10	0.92	12,14,15,22	0
3	BIP	D	311	12/13	0.96	0.08	0.36	6,8,11,12	0
3	BIP	A	311	12/13	0.97	0.07	-0.24	6,9,11,11	0
2	ZN	D	310	1/1	1.00	0.05	-0.85	12,12,12,12	0
2	ZN	A	310	1/1	1.00	0.06	-0.93	8,8,8,8	0
2	ZN	B	310	1/1	1.00	0.06	-1.29	12,12,12,12	0
2	ZN	C	310	1/1	1.00	0.04	-1.47	6,6,6,6	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.