



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 4, 2026 – 06:56 PM UTC

PDB ID : 1KBU / pdb_00001kbu
Title : CRE RECOMBINASE BOUND TO A LOXP HOLLIDAY JUNCTION
Authors : Martin, S.S.; Pulido, E.; Chu, V.C.; Lechner, T.; Baldwin, E.P.
Deposited on : 2001-11-06
Resolution : 2.20 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

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>.

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

MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

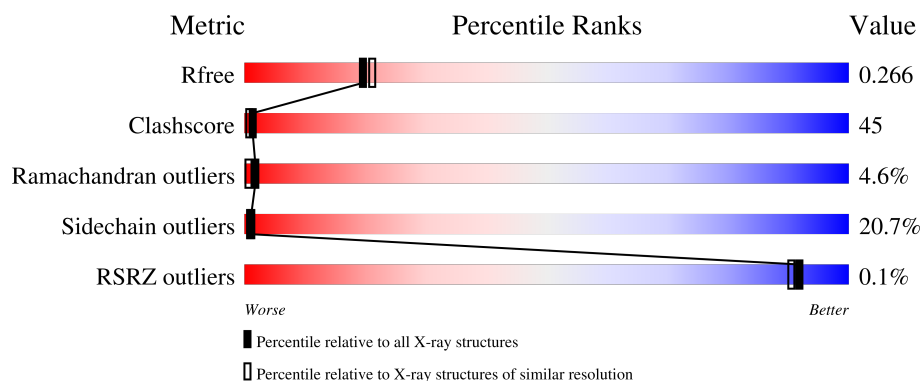
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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}	180053	6164 (2.20-2.20)
Clashscore	190562	6851 (2.20-2.20)
Ramachandran outliers	187476	6768 (2.20-2.20)
Sidechain outliers	187428	6769 (2.20-2.20)
RSRZ outliers	180081	6166 (2.20-2.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	C	34	
2	D	34	
3	A	349	
3	B	349	

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 6837 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 DNA chain called LOXP.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	C	34	Total	C	N	O	P	0	4	0
			740	357	132	216	35			

- Molecule 2 is a DNA chain called LOXP.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	34	Total	C	N	O	P	0	4	0
			771	373	137	224	37			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	30	DC	G	see remark 999	GB 215626

- Molecule 3 is a protein called CRE RECOMBINASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	A	324	Total	C	N	O	S	54	0	0
			2562	1591	488	468	15			
3	B	319	Total	C	N	O	S	12	0	0
			2527	1572	483	457	15			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-4	HIS	-	expression tag	UNP P06956
A	-3	HIS	-	expression tag	UNP P06956
A	-2	HIS	-	expression tag	UNP P06956
A	-1	HIS	-	expression tag	UNP P06956
A	0	HIS	-	expression tag	UNP P06956
A	1	HIS	-	expression tag	UNP P06956
B	-4	HIS	-	expression tag	UNP P06956

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-3	HIS	-	expression tag	UNP P06956
B	-2	HIS	-	expression tag	UNP P06956
B	-1	HIS	-	expression tag	UNP P06956
B	0	HIS	-	expression tag	UNP P06956
B	1	HIS	-	expression tag	UNP P06956

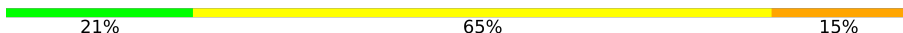
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	C	20	Total	O	0	0
			20	20		
4	D	34	Total	O	0	0
			34	34		
4	A	59	Total	O	0	0
			59	59		
4	B	124	Total	O	0	0
			124	124		

3 Residue-property plots

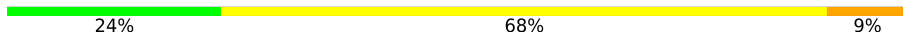
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density.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

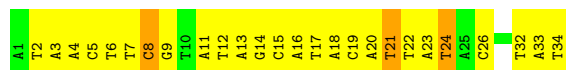
- Molecule 1: LOXP

Chain C: 

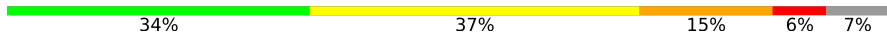


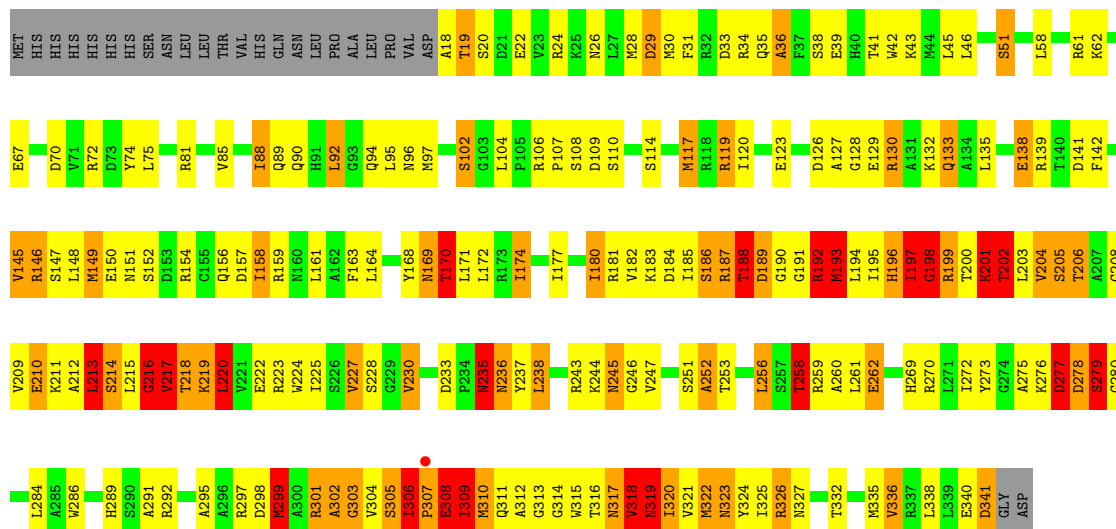
- Molecule 2: LOXP

Chain D: 

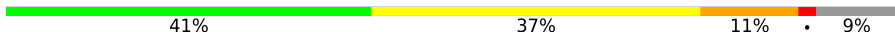


- Molecule 3: CRE RECOMBINASE

Chain A: 



- Molecule 3: CRE RECOMBINASE

Chain B: 



4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	107.17Å 121.60Å 179.31Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	5.00 – 2.20 5.00 – 2.20	Depositor EDS
% Data completeness (in resolution range)	89.0 (5.00-2.20) 80.8 (5.00-2.20)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	0.04	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.47 (at 2.19Å)	Xtriage
Refinement program	TNT	Depositor
R, R_{free}	0.231 , 0.279 0.238 , 0.266	Depositor DCC
R_{free} test set	2682 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	48.0	Xtriage
Anisotropy	0.289	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.42 , 117.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6837	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.07% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

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	C	0.23	0/830	1.31	7/1281 (0.5%)
2	D	0.22	0/864	1.18	4/1330 (0.3%)
3	A	0.58	2/2603 (0.1%)	1.42	45/3510 (1.3%)
3	B	0.58	0/2567	1.32	32/3459 (0.9%)
All	All	0.51	2/6864 (0.0%)	1.34	88/9580 (0.9%)

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
3	A	1	0

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	308	GLU	C-O	-5.89	1.16	1.24
3	A	235	ASN	CA-C	5.07	1.59	1.52

All (88) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	279	SER	N-CA-C	12.21	136.80	110.80
3	B	318	VAL	N-CA-C	11.92	126.42	113.43
3	A	215	LEU	N-CA-C	-11.65	98.78	113.23
1	C	16[A]	DG	P-O3'-C3'	11.63	137.64	120.20
1	C	16[B]	DG	P-O3'-C3'	11.63	137.64	120.20
3	B	325	ILE	N-CA-C	11.41	124.37	112.96
3	A	301	ARG	NE-CZ-NH2	-10.87	109.42	119.20
3	A	318	VAL	N-CA-C	10.26	130.68	109.34
3	B	326	ARG	N-CA-C	9.52	131.08	110.80
3	B	324	TYR	N-CA-C	9.51	124.29	112.87

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	127	ALA	N-CA-C	-9.27	99.24	113.89
3	A	217	VAL	N-CA-C	9.23	128.53	109.34
3	A	191	GLY	N-CA-C	-9.13	102.61	115.30
1	C	20	DG	C4-N9-C1'	-8.60	114.11	127.00
3	A	170	THR	N-CA-C	8.46	124.80	113.97
3	B	319	ASN	N-CA-C	8.31	120.26	111.03
3	A	201	LYS	N-CA-C	-8.27	100.66	110.41
3	A	326	ARG	N-CA-C	7.92	119.54	111.07
3	B	190	GLY	N-CA-C	-7.88	106.00	114.67
3	A	180	ILE	N-CA-C	7.58	119.23	109.30
3	B	203	LEU	N-CA-C	7.33	121.29	108.75
1	C	20	DG	C8-N9-C1'	7.27	137.91	127.00
3	A	149	MET	N-CA-C	7.17	122.72	113.18
3	B	338	LEU	N-CA-C	-6.99	95.90	110.80
3	A	309	ILE	CB-CA-C	6.96	122.70	111.29
2	D	8	DC	P-O5'-C5'	-6.94	109.58	120.00
3	A	252	ALA	N-CA-C	-6.86	104.52	113.17
1	C	32	DT	P-O5'-C5'	-6.83	109.75	120.00
3	B	256	LEU	N-CA-C	-6.62	99.23	109.76
3	B	127	ALA	N-CA-C	-6.54	103.27	113.02
3	B	337	ARG	N-CA-C	-6.50	104.54	113.18
3	B	320	ILE	N-CA-C	-6.49	103.48	110.23
3	A	189	ASP	N-CA-C	6.43	124.49	110.80
3	B	327	ASN	N-CA-CB	6.42	119.28	109.91
1	C	18[B]	DA	P-O3'-C3'	6.41	129.82	120.20
2	D	21	DT	P-O5'-C5'	-6.39	110.42	120.00
3	A	299	MET	CG-SD-CE	-6.34	86.94	100.90
3	A	320	ILE	CB-CA-C	6.28	121.59	111.29
3	B	103	GLY	N-CA-C	-6.26	106.05	115.32
3	A	319	ASN	N-CA-C	-6.25	97.48	110.80
2	D	21	DT	C1'-O4'-C4'	-6.21	100.38	109.70
3	A	192	ARG	N-CA-C	-6.17	97.65	110.80
3	A	216	GLY	N-CA-C	-6.17	98.55	113.18
3	A	280	GLY	N-CA-C	-6.12	98.68	113.18
3	A	238	LEU	N-CA-C	6.07	118.39	111.11
3	B	258	THR	N-CA-C	-6.04	105.17	112.54
3	B	290	SER	N-CA-C	6.03	117.86	111.28
3	B	209	VAL	N-CA-C	6.03	118.45	109.17
3	B	276	LYS	N-CA-C	5.99	119.39	110.52
3	B	325	ILE	CB-CA-C	-5.96	105.81	111.06
3	A	318	VAL	CA-C-N	5.92	132.85	121.54
3	A	318	VAL	C-N-CA	5.92	132.85	121.54

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	126	ASP	CB-CA-C	-5.88	102.18	111.17
3	A	262	GLU	N-CA-C	-5.82	105.07	111.82
3	A	202	THR	CB-CA-C	5.78	119.72	109.72
3	B	45	LEU	N-CA-C	-5.77	103.98	111.02
3	B	60	ASN	N-CA-C	5.75	119.18	111.24
3	B	328	LEU	CD1-CG-CD2	-5.72	98.21	110.80
3	A	145	VAL	N-CA-C	-5.72	105.16	110.53
3	B	318	VAL	CB-CA-C	-5.71	103.70	110.84
3	B	272	ILE	N-CA-C	5.71	117.22	111.00
3	B	326	ARG	CA-C-N	5.67	128.14	120.65
3	B	326	ARG	C-N-CA	5.67	128.14	120.65
3	A	174	ILE	N-CA-CB	5.63	116.77	110.51
3	A	277	ASP	N-CA-C	5.61	122.76	110.80
3	A	220	LEU	N-CA-C	-5.59	104.56	111.33
3	B	303	GLY	N-CA-C	-5.55	107.54	115.64
3	A	102	SER	N-CA-C	-5.53	106.38	114.39
3	B	310	MET	N-CA-C	5.53	117.38	111.36
3	A	319	ASN	N-CA-CB	5.51	119.81	110.49
3	A	198	GLY	N-CA-C	-5.46	100.23	113.18
2	D	24	DT	C6-C5-C7	-5.40	115.91	124.00
3	A	213	LEU	N-CA-C	5.37	117.85	109.52
3	A	302	ALA	N-CA-C	-5.37	106.92	112.93
3	A	29	ASP	N-CA-C	-5.33	105.36	111.07
3	A	258	THR	N-CA-C	-5.29	105.68	111.82
3	A	306	ILE	C-N-CD	-5.27	103.40	125.00
3	A	188	THR	N-CA-C	5.21	121.91	110.80
3	A	201	LYS	CA-C-N	-5.21	115.81	123.00
3	A	201	LYS	C-N-CA	-5.21	115.81	123.00
3	B	243	ARG	N-CA-C	5.20	117.40	110.53
3	B	226	SER	N-CA-C	5.20	116.63	110.97
1	C	5	DG	P-O3'-C3'	-5.18	112.43	120.20
3	B	278	ASP	N-CA-C	-5.12	105.93	113.61
3	A	164	LEU	N-CA-C	-5.11	106.31	112.54
3	A	130	ARG	N-CA-C	5.07	117.00	108.73
3	A	36	ALA	N-CA-C	-5.06	106.61	112.89
3	B	207	ALA	N-CA-C	-5.01	100.12	110.80

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
3	A	217	VAL	CA

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	C	740	0	413	45	0
2	D	771	0	433	69	0
3	A	2562	0	2583	285	0
3	B	2527	0	2555	225	0
4	A	59	0	0	5	0
4	B	124	0	0	11	0
4	C	20	0	0	3	0
4	D	34	0	0	0	0
All	All	6837	0	5984	561	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 45.

All (561) 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:18[B]:DA:H1'	1:C:19[B]:DT:H5''	1.19	1.16
2:D:16[B]:DA:H1'	2:D:17[B]:DT:H5''	1.23	1.15
3:B:193:MET:HE1	3:B:221:VAL:HG11	1.21	1.13
3:A:188:THR:HG21	3:A:194:LEU:HG	1.22	1.07
2:D:33:DA:H2''	2:D:34:DT:H5''	1.33	1.06
3:A:309:ILE:HG22	3:A:321:VAL:HG11	1.35	1.04
3:B:173:ARG:HG2	3:B:289:HIS:HE1	1.24	0.99
1:C:4:DA:H2''	1:C:5:DG:H5''	1.47	0.97
3:A:318:VAL:HG11	3:A:322:MET:HE2	1.43	0.96
2:D:18[A]:DA:C8	2:D:18[A]:DA:H5''	2.03	0.94
2:D:18[A]:DA:H5''	2:D:18[A]:DA:H8	1.30	0.93
3:B:320:ILE:HD13	3:B:320:ILE:H	1.34	0.91
3:B:328:LEU:HD12	3:B:328:LEU:H	1.36	0.90
3:B:299:MET:HE1	3:B:312:ALA:HB2	1.53	0.90
1:C:28:DA:H2''	1:C:29:DA:C8	2.07	0.90
3:A:206:THR:HB	3:B:328:LEU:HD23	1.54	0.90

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:16[A]:DA:H2''	2:D:17[A]:DT:C7	2.03	0.89
3:A:200:THR:HG21	3:A:206:THR:HG23	1.52	0.89
3:A:195:ILE:HG22	3:A:197:ILE:HG22	1.56	0.88
3:A:62:LYS:HE2	3:A:62:LYS:HA	1.54	0.87
3:A:188:THR:HG21	3:A:194:LEU:CG	2.05	0.87
3:A:159:ARG:HB2	3:A:224:TRP:CZ3	2.10	0.86
3:B:320:ILE:HG12	3:B:321:VAL:H	1.40	0.86
3:A:194:LEU:HD13	3:A:210:GLU:HG2	1.56	0.86
3:A:158:ILE:HD11	3:A:224:TRP:HA	1.55	0.85
3:A:163:PHE:CE1	3:A:261:LEU:HD22	2.11	0.85
3:B:313:GLY:HA3	3:B:315:TRP:CZ3	2.12	0.85
3:A:213:LEU:HB3	3:A:217:VAL:CG2	2.08	0.84
3:B:173:ARG:HG2	3:B:289:HIS:CE1	2.12	0.84
3:A:88:ILE:HG22	3:A:117:MET:HE1	1.59	0.83
3:A:200:THR:HG21	3:A:206:THR:CG2	2.08	0.83
1:C:16[B]:DG:H2''	1:C:17[B]:DT:H5''	1.59	0.83
3:A:310:MET:HA	3:A:321:VAL:HG21	1.59	0.83
3:A:213:LEU:HB3	3:A:217:VAL:HG22	1.60	0.83
3:B:315:TRP:NE1	3:B:320:ILE:HG13	1.93	0.83
3:A:236:ASN:HA	3:A:252:ALA:HA	1.61	0.83
1:C:18[B]:DA:H1'	1:C:19[B]:DT:C5'	2.07	0.82
1:C:28:DA:H2''	1:C:29:DA:H8	1.45	0.82
3:A:158:ILE:CD1	3:A:224:TRP:HA	2.10	0.81
3:B:279:SER:HB2	3:B:281:GLN:HG3	1.62	0.81
3:A:90:GLN:NE2	3:A:94:GLN:HE21	1.79	0.80
3:A:203:LEU:HA	3:B:130:ARG:HD2	1.63	0.80
2:D:33:DA:C2'	2:D:34:DT:H5''	2.12	0.80
1:C:18[B]:DA:C1'	1:C:19[B]:DT:H5''	2.08	0.79
3:A:177:ILE:HA	3:A:180:ILE:CD1	2.11	0.79
3:B:193:MET:HE1	3:B:221:VAL:CG1	2.09	0.79
3:B:84:ALA:HB3	3:B:87:THR:CG2	2.12	0.78
1:C:9:DG:N7	3:B:43:LYS:NZ	2.29	0.78
3:B:277:ASP:HB2	3:B:284:LEU:HD13	1.65	0.78
1:C:12:DT:OP2	3:B:87:THR:HG21	1.83	0.78
3:B:217:VAL:O	3:B:221:VAL:HG23	1.84	0.78
3:A:172:LEU:HD21	3:A:197:ILE:HD13	1.64	0.76
2:D:5:DC:H2'	2:D:6:DT:C6	2.20	0.76
3:A:209:VAL:HG22	3:A:210:GLU:H	1.51	0.75
3:A:194:LEU:HD22	3:A:210:GLU:HG2	1.69	0.75
3:A:258:THR:O	3:A:262:GLU:HG3	1.85	0.75
1:C:16[B]:DG:H2''	1:C:17[B]:DT:C5'	2.17	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:206:THR:CB	3:B:328:LEU:HD23	2.17	0.74
3:B:233:ASP:O	3:B:236:ASN:HB2	1.87	0.74
3:B:125:VAL:HG21	4:B:407:HOH:O	1.87	0.74
3:A:245:ASN:ND2	3:A:247:VAL:H	1.86	0.73
3:B:85:VAL:O	3:B:89:GLN:HG3	1.88	0.73
3:A:309:ILE:C	3:A:321:VAL:HG21	2.15	0.72
2:D:17[A]:DT:H3'	3:B:121:ARG:NE	2.04	0.72
3:A:139:ARG:HH12	3:B:339:LEU:HA	1.55	0.72
3:A:309:ILE:HG22	3:A:321:VAL:CG1	2.15	0.72
3:A:318:VAL:HG12	3:A:319:ASN:H	1.55	0.72
3:B:299:MET:HE1	3:B:312:ALA:CB	2.20	0.72
2:D:17[A]:DT:OP2	3:A:202:THR:HA	1.89	0.72
3:A:212:ALA:O	3:A:213:LEU:HD23	1.89	0.72
3:A:177:ILE:HA	3:A:180:ILE:HD12	1.71	0.72
3:A:194:LEU:CD1	3:A:210:GLU:HG2	2.19	0.72
2:D:12:DT:H2''	2:D:13:DA:C8	2.25	0.71
3:A:185:ILE:HG23	3:A:193:MET:HG2	1.72	0.71
3:A:197:ILE:HD11	3:A:199:ARG:CB	2.21	0.71
3:A:301:ARG:NH2	4:A:388:HOH:O	2.15	0.71
1:C:5:DG:H2'	1:C:6:DT:H72	1.73	0.71
3:B:310:MET:SD	3:B:318:VAL:HG12	2.31	0.71
2:D:18[B]:DA:C2'	2:D:19[B]:DC:H5''	2.21	0.70
3:A:197:ILE:HD12	3:A:198:GLY:H	1.55	0.70
3:A:318:VAL:CG1	3:A:322:MET:HE2	2.20	0.70
3:A:197:ILE:CG1	3:A:198:GLY:H	2.05	0.70
3:B:125:VAL:HG23	3:B:126:ASP:N	2.07	0.69
3:A:194:LEU:HD22	3:A:210:GLU:CG	2.22	0.69
3:A:310:MET:HA	3:A:321:VAL:CG2	2.20	0.69
2:D:23:DA:H5'	3:B:201:LYS:CG	2.22	0.69
3:A:195:ILE:HG22	3:A:197:ILE:CG2	2.23	0.68
3:A:141:ASP:O	3:A:145:VAL:HG23	1.93	0.68
3:A:159:ARG:HB2	3:A:224:TRP:CE3	2.28	0.68
3:B:315:TRP:CD1	3:B:320:ILE:HG13	2.28	0.68
3:A:169:ASN:HA	3:B:339:LEU:HD11	1.76	0.68
2:D:16[A]:DA:H2''	2:D:17[A]:DT:H71	1.76	0.68
3:A:158:ILE:HD11	3:A:227:VAL:HG22	1.75	0.68
3:A:310:MET:CA	3:A:321:VAL:HG21	2.24	0.68
3:B:90:GLN:HE21	3:B:94:GLN:HE21	1.42	0.68
3:B:320:ILE:HG12	3:B:321:VAL:N	2.08	0.68
3:A:194:LEU:HD13	3:A:210:GLU:CG	2.24	0.67
3:A:326:ARG:HG3	3:A:327:ASN:N	2.10	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:19:THR:O	3:B:21:ASP:N	2.27	0.67
3:A:158:ILE:HD11	3:A:227:VAL:CG2	2.25	0.67
3:A:199:ARG:HH21	3:A:313:GLY:HA2	1.59	0.67
2:D:32:DT:H2''	2:D:33:DA:C8	2.30	0.67
3:A:202:THR:O	3:B:130:ARG:NE	2.28	0.67
3:A:197:ILE:CD1	3:A:198:GLY:H	2.08	0.67
1:C:15:DT:H4'	3:B:202:THR:CG2	2.25	0.67
2:D:21:DT:OP2	3:B:100:ARG:NH2	2.28	0.66
3:B:276:LYS:NZ	4:B:434:HOH:O	2.28	0.66
3:A:310:MET:HB2	3:A:318:VAL:HG22	1.77	0.66
3:A:18:ALA:HB3	3:A:104:LEU:CD2	2.25	0.66
3:A:212:ALA:C	3:A:213:LEU:HD23	2.20	0.66
1:C:14:DA:N3	3:B:201:LYS:NZ	2.44	0.65
3:A:142:PHE:O	3:A:146:ARG:HB2	1.96	0.65
3:A:307:PRO:O	3:A:309:ILE:N	2.26	0.65
3:B:146:ARG:O	3:B:150:GLU:HB2	1.96	0.65
1:C:27:DG:N3	4:C:53:HOH:O	2.28	0.65
1:C:23:DA:H2'	1:C:24:DT:H71	1.76	0.65
3:A:24:ARG:O	3:A:28:MET:HG3	1.95	0.65
3:A:199:ARG:CB	3:A:199:ARG:HH11	2.08	0.65
3:A:172:LEU:CD2	3:A:197:ILE:HD13	2.26	0.65
3:A:194:LEU:CD2	3:A:210:GLU:HG2	2.27	0.65
3:A:197:ILE:HD11	3:A:199:ARG:HB3	1.79	0.65
3:A:197:ILE:HD11	3:A:199:ARG:HD2	1.79	0.65
3:B:319:ASN:OD1	3:B:319:ASN:N	2.30	0.65
3:A:199:ARG:HH22	3:A:292:ARG:NH1	1.95	0.65
1:C:19[A]:DT:H2''	1:C:20:DG:C8	2.32	0.65
3:A:197:ILE:HD11	3:A:199:ARG:CG	2.27	0.65
3:A:277:ASP:OD1	3:A:277:ASP:N	2.29	0.64
3:B:203:LEU:CD1	3:B:205:SER:HB3	2.27	0.64
3:A:340:GLU:O	3:A:341:ASP:HB2	1.96	0.64
1:C:14:DA:N7	3:B:86:LYS:NZ	2.41	0.64
2:D:23:DA:H5'	3:B:201:LYS:HG3	1.77	0.64
3:B:193:MET:HG3	3:B:218:THR:HG23	1.80	0.64
3:A:318:VAL:HG12	3:A:319:ASN:N	2.12	0.64
3:B:320:ILE:HD13	3:B:320:ILE:N	2.09	0.64
1:C:10:DT:OP2	3:B:50:ARG:NH1	2.30	0.64
1:C:16[B]:DG:C2'	1:C:17[B]:DT:H5''	2.24	0.64
2:D:16[A]:DA:H4'	2:D:17[A]:DT:OP1	1.97	0.64
3:A:203:LEU:O	3:B:130:ARG:HD2	1.97	0.64
1:C:5:DG:H2'	1:C:6:DT:C7	2.28	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:33:DA:H2''	2:D:34:DT:C5'	2.21	0.64
3:A:214:SER:HB2	3:A:216:GLY:H	1.62	0.64
3:B:231:ALA:HB3	4:B:415:HOH:O	1.98	0.64
2:D:14:DG:H2''	2:D:15:DC:H6	1.62	0.63
2:D:16[B]:DA:H2''	2:D:17[B]:DT:OP2	1.98	0.63
3:A:199:ARG:HH22	3:A:292:ARG:HH12	1.45	0.63
3:A:202:THR:OG1	3:A:205:SER:HB2	1.97	0.63
3:A:256:LEU:HD22	3:A:260:ALA:CB	2.27	0.63
3:A:321:VAL:O	3:A:325:ILE:HG12	1.97	0.63
3:B:289:HIS:ND1	4:B:363:HOH:O	2.23	0.63
2:D:18[B]:DA:H2''	2:D:19[B]:DC:C4'	2.29	0.63
3:A:154:ARG:HB2	3:A:157:ASP:HB2	1.79	0.63
1:C:21:DC:H2''	1:C:22:DT:O5'	1.97	0.63
3:A:204:VAL:HG13	3:B:131:ALA:HB3	1.79	0.63
3:B:203:LEU:HD12	3:B:205:SER:HB3	1.80	0.63
1:C:16[B]:DG:H5'	3:B:202:THR:HB	1.81	0.63
3:B:42:TRP:O	3:B:46:LEU:HD22	1.98	0.63
3:A:90:GLN:NE2	3:A:94:GLN:NE2	2.46	0.63
3:B:238:LEU:HD12	3:B:238:LEU:O	1.99	0.63
3:A:206:THR:O	3:B:130:ARG:HG2	1.98	0.63
3:B:320:ILE:H	3:B:320:ILE:CD1	2.11	0.63
2:D:18[B]:DA:H2''	2:D:19[B]:DC:O4'	1.99	0.63
3:A:192:ARG:NH2	3:B:340:GLU:OE2	2.31	0.62
3:A:139:ARG:NH1	3:B:339:LEU:HA	2.14	0.62
3:B:326:ARG:HH11	3:B:326:ARG:HG3	1.64	0.62
3:A:299:MET:C	3:A:309:ILE:HD11	2.24	0.62
3:B:90:GLN:NE2	3:B:94:GLN:HE21	1.98	0.62
2:D:18[A]:DA:H2''	2:D:19[A]:DC:H5''	1.81	0.62
3:B:209:VAL:HG12	3:B:210:GLU:N	2.14	0.62
3:A:225:ILE:HG12	3:A:230:VAL:HG12	1.81	0.62
3:A:228:SER:OG	3:A:230:VAL:HB	1.98	0.62
3:A:133:GLN:NE2	3:A:323:ASN:O	2.31	0.62
3:A:297:ARG:NH1	3:A:327:ASN:OD1	2.31	0.62
3:B:172:LEU:HD11	3:B:197:ILE:HD11	1.82	0.62
3:B:183:LYS:HG3	3:B:234:PRO:O	2.00	0.62
3:A:199:ARG:HH11	3:A:199:ARG:HB3	1.65	0.61
3:B:193:MET:HE2	3:B:213:LEU:HD12	1.81	0.61
3:B:328:LEU:HD12	3:B:328:LEU:N	2.10	0.61
3:A:206:THR:HB	3:B:328:LEU:CD2	2.28	0.61
3:B:79:GLN:HG3	3:B:120:ILE:HG23	1.81	0.61
3:B:129:GLU:O	3:B:130:ARG:HD3	2.01	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:139:ARG:NH2	3:B:339:LEU:HD23	2.15	0.61
3:A:146:ARG:O	3:A:150:GLU:HG2	2.01	0.61
3:A:181:ARG:HA	3:A:237:TYR:HA	1.83	0.61
3:A:219:LYS:O	3:A:222:GLU:N	2.29	0.61
3:A:139:ARG:CZ	3:B:339:LEU:HD23	2.30	0.61
3:B:326:ARG:CB	3:B:328:LEU:HD13	2.31	0.61
3:A:203:LEU:CA	3:B:130:ARG:HD2	2.30	0.61
3:A:319:ASN:HD22	3:A:319:ASN:C	2.09	0.60
2:D:16[A]:DA:H2''	2:D:17[A]:DT:H73	1.82	0.60
3:B:305:SER:O	3:B:308:GLU:N	2.32	0.60
3:A:203:LEU:CD1	3:B:129:GLU:HG2	2.31	0.60
3:B:84:ALA:HB3	3:B:87:THR:HG22	1.83	0.59
2:D:2:DT:O2	3:A:244:LYS:NZ	2.34	0.59
3:A:225:ILE:HD11	3:A:238:LEU:CD1	2.32	0.59
2:D:4:DA:H2''	2:D:5:DC:H5''	1.84	0.59
3:A:209:VAL:HG23	3:B:328:LEU:N	2.17	0.59
3:A:192:ARG:HD2	3:A:213:LEU:O	2.03	0.59
3:A:315:TRP:O	3:A:317:ASN:N	2.34	0.59
3:B:128:GLY:O	3:B:130:ARG:NH1	2.35	0.59
3:A:26:ASN:ND2	3:A:102:SER:O	2.29	0.59
3:A:169:ASN:HD22	3:A:170:THR:HG22	1.66	0.59
3:B:183:LYS:N	3:B:234:PRO:O	2.30	0.58
3:B:81:ARG:NH1	4:B:426:HOH:O	2.35	0.58
1:C:15:DT:H4'	3:B:202:THR:HG21	1.85	0.58
3:A:236:ASN:HA	3:A:252:ALA:CA	2.30	0.58
3:B:322:MET:HE3	3:B:326:ARG:NH2	2.19	0.58
3:A:197:ILE:HD11	3:A:199:ARG:CD	2.33	0.58
3:B:193:MET:CG	3:B:218:THR:HG23	2.34	0.58
1:C:27:DG:H1'	4:C:53:HOH:O	2.04	0.58
3:A:171:LEU:HD11	3:A:295:ALA:HB1	1.85	0.58
3:B:188:THR:O	3:B:189:ASP:HB2	2.03	0.58
3:A:194:LEU:CG	3:A:210:GLU:HG2	2.33	0.58
3:A:224:TRP:CE2	3:A:228:SER:HB3	2.39	0.58
3:B:128:GLY:O	3:B:129:GLU:C	2.47	0.58
3:A:88:ILE:HG22	3:A:117:MET:CE	2.32	0.58
2:D:18[A]:DA:H2''	2:D:19[A]:DC:C5'	2.33	0.57
3:A:185:ILE:CG2	3:A:193:MET:HG2	2.34	0.57
3:B:322:MET:O	3:B:326:ARG:HD2	2.05	0.57
3:A:213:LEU:HB3	3:A:217:VAL:HG23	1.86	0.57
3:A:39:GLU:O	3:A:43:LYS:HG2	2.04	0.57
3:B:19:THR:O	3:B:22:GLU:N	2.37	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:214:SER:O	3:A:218:THR:HG22	2.05	0.57
3:B:179:ARG:HG2	3:B:255:GLN:NE2	2.20	0.57
3:B:318:VAL:O	3:B:322:MET:HG2	2.04	0.57
3:A:195:ILE:O	3:A:197:ILE:HG23	2.04	0.57
3:A:197:ILE:HD12	3:A:198:GLY:C	2.30	0.57
3:A:245:ASN:N	3:A:245:ASN:HD22	2.03	0.57
3:A:307:PRO:C	3:A:309:ILE:H	2.11	0.57
3:B:326:ARG:HB2	3:B:328:LEU:HD13	1.85	0.57
3:A:318:VAL:CG1	3:A:319:ASN:H	2.17	0.56
3:A:158:ILE:HG12	3:A:227:VAL:HG21	1.87	0.56
3:A:199:ARG:HH21	3:A:313:GLY:CA	2.18	0.56
3:B:313:GLY:HA3	3:B:315:TRP:CE3	2.40	0.56
1:C:9:DG:H2''	1:C:10:DT:C6	2.41	0.56
2:D:23:DA:H5'	3:B:201:LYS:CB	2.35	0.56
3:A:269:HIS:HB2	3:A:286:TRP:CE3	2.40	0.56
3:B:84:ALA:O	3:B:87:THR:HG23	2.04	0.56
3:A:209:VAL:HG13	3:A:210:GLU:N	2.19	0.56
1:C:32:DT:H2''	1:C:33:DA:C8	2.41	0.56
3:B:138:GLU:HG3	4:B:377:HOH:O	2.05	0.56
3:B:106:ARG:O	3:B:109:ASP:HB2	2.06	0.56
3:A:181:ARG:HG2	3:A:236:ASN:O	2.06	0.56
3:B:140:THR:O	3:B:144:GLN:HG3	2.05	0.56
3:B:203:LEU:HD23	4:B:445:HOH:O	2.05	0.56
2:D:19[B]:DC:H2''	2:D:20:DA:O5'	2.06	0.55
3:A:119:ARG:O	3:A:123:GLU:HG3	2.06	0.55
3:A:172:LEU:HD21	3:A:197:ILE:CD1	2.33	0.55
3:A:92:LEU:HD12	3:A:117:MET:HG2	1.87	0.55
3:A:194:LEU:HD13	3:A:210:GLU:CD	2.31	0.55
3:A:194:LEU:HB3	3:A:210:GLU:CG	2.36	0.55
3:A:18:ALA:HB3	3:A:104:LEU:HD23	1.88	0.55
3:A:245:ASN:HD22	3:A:246:GLY:N	2.04	0.55
3:A:315:TRP:HZ2	3:A:324:TYR:HE1	1.53	0.55
3:A:315:TRP:HE1	3:A:320:ILE:HG21	1.69	0.55
1:C:10:DT:H73	3:B:43:LYS:HD3	1.89	0.55
3:A:256:LEU:HD22	3:A:260:ALA:HB3	1.88	0.55
3:A:196:HIS:HA	3:A:209:VAL:O	2.06	0.55
3:A:291:ALA:HB3	4:A:356:HOH:O	2.07	0.55
3:A:315:TRP:CZ2	3:A:324:TYR:HE1	2.25	0.55
3:B:279:SER:OG	3:B:281:GLN:NE2	2.33	0.55
2:D:23:DA:H2'	2:D:24:DT:C6	2.41	0.55
3:A:299:MET:O	3:A:309:ILE:HD11	2.07	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:306:ILE:HA	3:A:309:ILE:HB	1.87	0.54
2:D:21:DT:OP2	3:B:97:MET:HG3	2.08	0.54
3:A:309:ILE:C	3:A:311:GLN:H	2.15	0.54
3:B:52:TRP:HZ3	3:B:74:TYR:HB2	1.72	0.54
3:A:213:LEU:HD13	3:A:217:VAL:HG23	1.89	0.54
3:B:125:VAL:HG23	3:B:126:ASP:H	1.73	0.54
3:A:96:ASN:OD1	3:A:107:PRO:HD2	2.08	0.54
3:B:97:MET:HG2	3:B:101:ARG:HG3	1.89	0.54
3:B:279:SER:HB2	3:B:281:GLN:CG	2.35	0.54
3:B:337:ARG:O	3:B:341:ASP:N	2.37	0.54
3:A:72:ARG:HH11	3:A:72:ARG:HG2	1.73	0.54
3:A:192:ARG:O	3:A:193:MET:HB2	2.07	0.54
3:A:186:SER:O	3:A:187:ARG:HD3	2.08	0.53
3:A:211:LYS:HE3	4:A:360:HOH:O	2.08	0.53
3:A:276:LYS:HE3	3:A:284:LEU:HB2	1.90	0.53
3:B:336:VAL:O	3:B:340:GLU:HB2	2.08	0.53
3:B:276:LYS:HE2	4:B:398:HOH:O	2.09	0.53
3:B:305:SER:OG	3:B:308:GLU:HB2	2.09	0.53
3:B:326:ARG:HH11	3:B:326:ARG:CG	2.22	0.53
3:A:235:ASN:HD22	3:A:235:ASN:H	1.54	0.53
3:A:159:ARG:HG3	3:A:224:TRP:CE2	2.44	0.53
3:A:35:GLN:HG3	4:A:382:HOH:O	2.09	0.52
3:B:306:ILE:HG22	3:B:307:PRO:N	2.24	0.52
2:D:15:DC:OP2	3:A:315:TRP:NE1	2.41	0.52
3:A:138:GLU:O	3:A:141:ASP:HB2	2.10	0.52
3:A:177:ILE:HA	3:A:180:ILE:HD11	1.88	0.52
3:B:225:ILE:CG2	3:B:231:ALA:HB2	2.39	0.52
2:D:7:DT:H2''	2:D:8:DC:H5'	1.90	0.52
2:D:7:DT:O4	3:A:259:ARG:HG2	2.10	0.52
3:B:326:ARG:HB3	3:B:328:LEU:CD1	2.40	0.52
2:D:7:DT:H2''	2:D:8:DC:C5'	2.39	0.52
3:B:68:PRO:HB3	3:B:110:SER:OG	2.09	0.52
3:A:181:ARG:NH1	3:A:235:ASN:O	2.38	0.52
3:A:203:LEU:C	3:B:130:ARG:HD2	2.34	0.52
2:D:2:DT:H2''	2:D:3:DA:C8	2.44	0.52
3:A:185:ILE:HG21	3:A:193:MET:SD	2.50	0.52
3:A:194:LEU:HD21	3:A:212:ALA:HB2	1.92	0.52
3:B:278:ASP:OD1	3:B:278:ASP:N	2.43	0.52
3:B:306:ILE:N	3:B:307:PRO:HD2	2.25	0.52
1:C:13:DA:H5''	3:B:132:LYS:O	2.09	0.52
3:A:96:ASN:ND2	3:A:108:SER:OG	2.29	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:25:LYS:O	3:B:25:LYS:HG2	2.09	0.51
3:B:143:ASP:O	3:B:147:SER:HB3	2.10	0.51
3:B:173:ARG:HB2	3:B:176:GLU:OE2	2.11	0.51
3:B:230:VAL:C	3:B:232:ASP:H	2.18	0.51
3:A:309:ILE:O	3:A:321:VAL:HG21	2.10	0.51
2:D:11:DA:OP1	3:A:81:ARG:NH2	2.29	0.51
2:D:12:DT:H2''	2:D:13:DA:H8	1.73	0.51
3:A:128:GLY:O	3:A:130:ARG:HG2	2.09	0.51
3:B:340:GLU:O	3:B:341:ASP:HB2	2.09	0.51
2:D:18[B]:DA:O5'	2:D:18[B]:DA:H8	1.93	0.51
3:A:310:MET:N	3:A:321:VAL:HG21	2.25	0.51
2:D:32:DT:H2''	2:D:33:DA:N7	2.26	0.51
3:A:219:LYS:O	3:A:220:LEU:C	2.51	0.51
3:A:158:ILE:CG1	3:A:227:VAL:HG21	2.41	0.51
3:A:201:LYS:NZ	3:B:130:ARG:HH22	2.09	0.51
3:A:306:ILE:HG22	3:A:306:ILE:O	2.09	0.51
3:A:306:ILE:HG22	3:A:310:MET:CG	2.41	0.51
3:B:320:ILE:HG12	3:B:321:VAL:HG23	1.93	0.51
1:C:4:DA:C2'	1:C:5:DG:H5''	2.29	0.51
3:B:328:LEU:N	3:B:328:LEU:CD1	2.73	0.51
2:D:18[B]:DA:H2''	2:D:19[B]:DC:C5'	2.41	0.51
3:A:51:SER:HG	3:A:74:TYR:HH	1.59	0.50
2:D:15:DC:H2'	2:D:16[B]:DA:N7	2.26	0.50
3:A:299:MET:HG3	3:B:338:LEU:HD12	1.92	0.50
3:B:128:GLY:O	3:B:129:GLU:O	2.29	0.50
2:D:18[B]:DA:H2''	2:D:19[B]:DC:H5''	1.91	0.50
3:A:170:THR:O	3:A:171:LEU:HB2	2.11	0.50
3:B:125:VAL:C	3:B:127:ALA:H	2.18	0.50
3:B:179:ARG:HG2	3:B:255:GLN:HE22	1.76	0.50
3:A:217:VAL:HA	3:A:220:LEU:HD12	1.93	0.50
3:B:183:LYS:NZ	3:B:235:ASN:OD1	2.29	0.50
2:D:23:DA:H2'	2:D:24:DT:C7	2.42	0.50
3:B:39:GLU:HG3	3:B:40:HIS:N	2.26	0.50
3:A:168:TYR:CE2	3:B:339:LEU:HD21	2.47	0.50
2:D:14:DG:C4	2:D:15:DC:C6	3.00	0.50
3:B:179:ARG:NH2	3:B:199:ARG:O	2.41	0.49
3:A:75:LEU:HD11	3:A:92:LEU:HG	1.94	0.49
3:A:306:ILE:O	3:A:310:MET:HG3	2.11	0.49
3:B:154:ARG:O	3:B:158:ILE:HG13	2.12	0.49
3:B:209:VAL:HG12	3:B:210:GLU:H	1.75	0.49
2:D:21:DT:H2'	2:D:22:DT:H71	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:295:ALA:O	3:B:296:ALA:C	2.55	0.49
1:C:1:DA:O5'	1:C:1:DA:H8	1.94	0.49
3:A:34:ARG:C	3:A:36:ALA:H	2.19	0.49
3:A:306:ILE:HD12	3:A:322:MET:HE1	1.94	0.49
3:A:315:TRP:CD1	3:A:320:ILE:HB	2.46	0.49
1:C:16[A]:DG:O5'	3:B:316:THR:OG1	2.31	0.49
2:D:17[B]:DT:H6	2:D:17[B]:DT:H5'	1.76	0.49
3:B:297:ARG:O	3:B:298:ASP:C	2.53	0.49
3:A:201:LYS:HA	3:A:201:LYS:CE	2.43	0.49
3:A:171:LEU:O	3:A:292:ARG:HD2	2.12	0.49
3:A:319:ASN:O	3:A:323:ASN:N	2.39	0.49
3:B:276:LYS:O	3:B:277:ASP:O	2.30	0.49
2:D:15:DC:H2''	2:D:16[B]:DA:C8	2.47	0.49
3:A:62:LYS:HA	3:A:62:LYS:CE	2.31	0.49
3:A:203:LEU:HA	3:B:130:ARG:CD	2.40	0.49
3:A:205:SER:HB3	3:A:206:THR:HG23	1.94	0.49
3:A:306:ILE:HG22	3:A:310:MET:HG2	1.93	0.49
3:B:92:LEU:HD12	3:B:117:MET:HG2	1.95	0.49
3:B:277:ASP:CB	3:B:284:LEU:HD13	2.37	0.49
2:D:17[A]:DT:H2''	2:D:18[A]:DA:N7	2.28	0.48
3:A:158:ILE:HD12	3:A:224:TRP:HA	1.93	0.48
3:A:197:ILE:HG13	3:A:198:GLY:H	1.78	0.48
3:A:277:ASP:HB2	3:A:278:ASP:H	1.31	0.48
3:A:311:GLN:O	3:A:314:GLY:N	2.46	0.48
3:A:158:ILE:HG13	3:A:159:ARG:N	2.29	0.48
3:A:200:THR:HG21	3:A:206:THR:HG21	1.93	0.48
3:B:297:ARG:O	3:B:300:ALA:N	2.47	0.48
3:B:306:ILE:HG22	3:B:307:PRO:HD3	1.95	0.48
1:C:1:DA:H2''	1:C:2:DT:O5'	2.13	0.48
3:A:138:GLU:OE2	3:A:301:ARG:NH2	2.47	0.48
3:A:193:MET:HB2	3:A:218:THR:OG1	2.14	0.48
3:A:200:THR:CG2	3:A:206:THR:HG23	2.33	0.48
3:A:139:ARG:NH2	3:A:146:ARG:HH21	2.11	0.47
3:A:192:ARG:O	3:A:218:THR:OG1	2.33	0.47
3:B:338:LEU:O	3:B:341:ASP:OD1	2.33	0.47
3:A:299:MET:HA	3:B:338:LEU:HD11	1.96	0.47
3:A:310:MET:CB	3:A:318:VAL:HG22	2.43	0.47
1:C:33:DA:H2''	1:C:34:DT:OP2	2.14	0.47
2:D:15:DC:C2'	2:D:16[B]:DA:C8	2.97	0.47
3:B:276:LYS:HD2	3:B:284:LEU:HB2	1.95	0.47
3:B:304:VAL:CG1	3:B:308:GLU:HB3	2.45	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:320:ILE:CG1	3:B:321:VAL:H	2.19	0.47
3:A:197:ILE:CG1	3:A:198:GLY:N	2.77	0.47
3:A:209:VAL:HG21	3:B:327:ASN:CG	2.40	0.47
3:B:134:ALA:HA	3:B:283:TYR:CD2	2.50	0.47
1:C:15:DT:H4'	3:B:202:THR:HG22	1.96	0.47
3:A:88:ILE:CG2	3:A:117:MET:HE1	2.37	0.47
3:A:177:ILE:CA	3:A:180:ILE:HD12	2.43	0.47
3:A:193:MET:HE2	3:A:218:THR:OG1	2.15	0.47
3:A:208:GLY:O	3:B:328:LEU:HA	2.15	0.47
3:A:235:ASN:HD22	3:A:235:ASN:N	2.13	0.47
3:A:269:HIS:HA	3:A:286:TRP:CZ3	2.50	0.47
3:B:199:ARG:HB2	3:B:204:VAL:HG12	1.96	0.47
2:D:19[A]:DC:H2''	2:D:20:DA:O5'	2.14	0.47
3:A:194:LEU:HB3	3:A:210:GLU:CD	2.39	0.46
2:D:23:DA:C4'	3:B:201:LYS:HG3	2.45	0.46
3:B:326:ARG:CG	3:B:326:ARG:NH1	2.78	0.46
1:C:15:DT:H2''	1:C:16[A]:DG:N7	2.31	0.46
3:B:333:GLY:N	3:B:336:VAL:HG23	2.31	0.46
1:C:16[A]:DG:H5'	3:B:202:THR:HB	1.95	0.46
3:A:245:ASN:ND2	3:A:245:ASN:N	2.62	0.46
3:A:299:MET:HB3	3:A:299:MET:HE3	1.54	0.46
3:B:84:ALA:HB3	3:B:87:THR:HG23	1.95	0.46
3:B:282:ARG:O	3:B:283:TYR:HB2	2.14	0.46
3:B:319:ASN:O	3:B:322:MET:HB2	2.16	0.46
3:A:319:ASN:O	3:A:319:ASN:ND2	2.31	0.46
3:A:85:VAL:HG23	3:A:129:GLU:OE2	2.15	0.46
3:B:247:VAL:HG12	3:B:248:ALA:O	2.16	0.46
1:C:25:DA:H5'	1:C:25:DA:H8	1.81	0.46
2:D:17[A]:DT:H3'	3:B:121:ARG:CD	2.45	0.46
3:A:197:ILE:HD12	3:A:198:GLY:N	2.28	0.46
3:A:245:ASN:ND2	3:A:245:ASN:H	2.14	0.46
3:A:320:ILE:O	3:A:321:VAL:C	2.57	0.46
3:B:279:SER:CB	3:B:281:GLN:HG3	2.40	0.46
3:A:92:LEU:HD22	3:A:96:ASN:ND2	2.31	0.46
3:A:223:ARG:O	3:A:227:VAL:HG13	2.15	0.46
3:A:315:TRP:NE1	3:A:320:ILE:CG2	2.79	0.46
3:A:304:VAL:O	3:A:305:SER:C	2.58	0.45
3:B:44:MET:O	3:B:45:LEU:C	2.59	0.45
3:B:279:SER:CB	3:B:281:GLN:NE2	2.79	0.45
3:B:326:ARG:HB3	3:B:328:LEU:HD13	1.98	0.45
2:D:11:DA:H2''	2:D:12:DT:O5'	2.15	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:201:LYS:HA	3:B:130:ARG:NH2	2.31	0.45
3:A:299:MET:HG3	3:B:338:LEU:CD1	2.46	0.45
3:A:209:VAL:HG22	3:A:210:GLU:N	2.26	0.45
3:B:269:HIS:HB2	3:B:286:TRP:CE3	2.52	0.45
3:B:306:ILE:HG22	3:B:307:PRO:CD	2.46	0.45
3:A:158:ILE:CD1	3:A:227:VAL:HG21	2.47	0.45
3:A:206:THR:CG2	3:B:328:LEU:HD23	2.47	0.45
3:B:27:LEU:HD12	3:B:27:LEU:HA	1.70	0.45
3:B:322:MET:HE3	3:B:326:ARG:CZ	2.47	0.45
3:A:201:LYS:HA	3:A:201:LYS:HE3	1.99	0.45
3:A:139:ARG:NH2	3:A:146:ARG:NH2	2.65	0.45
3:A:42:TRP:CE3	3:A:45:LEU:HD23	2.52	0.45
3:A:158:ILE:HD11	3:A:227:VAL:HG21	1.98	0.45
3:A:182:VAL:C	3:A:184:ASP:H	2.24	0.45
3:B:169:ASN:C	3:B:169:ASN:HD22	2.24	0.45
3:B:217:VAL:O	3:B:220:LEU:HB2	2.16	0.45
3:B:230:VAL:C	3:B:232:ASP:N	2.75	0.45
2:D:23:DA:C5'	3:B:201:LYS:HG3	2.44	0.44
3:A:218:THR:CG2	3:A:219:LYS:N	2.81	0.44
3:B:333:GLY:N	3:B:336:VAL:CG2	2.79	0.44
3:B:335:MET:HE3	3:B:335:MET:HA	1.98	0.44
3:B:297:ARG:O	3:B:299:MET:N	2.50	0.44
3:A:139:ARG:NH2	3:B:339:LEU:CD2	2.80	0.44
3:B:188:THR:HG1	3:B:192:ARG:HB2	1.83	0.44
3:B:277:ASP:HB2	3:B:284:LEU:CD1	2.42	0.44
3:B:319:ASN:O	3:B:320:ILE:C	2.60	0.44
3:A:194:LEU:CD2	3:A:212:ALA:HB2	2.47	0.44
3:A:174:ILE:HD12	3:A:258:THR:HB	1.98	0.44
3:B:249:ALA:N	3:B:250:PRO:HD3	2.32	0.44
3:B:306:ILE:N	3:B:307:PRO:CD	2.80	0.44
2:D:22:DT:OP2	3:B:37:PHE:HB3	2.17	0.44
3:A:38:SER:OG	3:A:41:THR:OG1	2.30	0.44
1:C:19[B]:DT:H2''	1:C:20:DG:C8	2.53	0.44
1:C:25:DA:H5'	1:C:25:DA:C8	2.53	0.44
2:D:16[B]:DA:H2'	2:D:16[B]:DA:O5'	2.18	0.43
3:A:161:LEU:HD23	3:A:161:LEU:HA	1.64	0.43
3:A:26:ASN:HB3	3:A:102:SER:HA	2.00	0.43
3:A:302:ALA:O	3:A:303:GLY:C	2.61	0.43
3:A:168:TYR:OH	3:A:298:ASP:OD2	2.30	0.43
3:B:110:SER:O	3:B:111:ASN:C	2.59	0.43
3:A:31:PHE:O	3:A:34:ARG:HD3	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:106:ARG:NH1	3:A:109:ASP:OD1	2.51	0.43
3:A:310:MET:O	3:A:315:TRP:O	2.36	0.43
3:B:145:VAL:HG13	3:B:149:MET:SD	2.58	0.43
3:B:150:GLU:HG3	4:B:419:HOH:O	2.18	0.43
3:B:159:ARG:HB2	3:B:224:TRP:CZ3	2.53	0.43
3:A:256:LEU:HD23	3:A:256:LEU:HA	1.72	0.43
1:C:23:DA:H2'	1:C:24:DT:C6	2.54	0.43
2:D:16[A]:DA:H2''	2:D:17[A]:DT:C5	2.54	0.43
3:B:31:PHE:O	3:B:34:ARG:HG3	2.19	0.43
1:C:5:DG:H2''	1:C:6:DT:O5'	2.18	0.43
3:A:33:ASP:OD1	3:B:119:ARG:NH1	2.43	0.43
3:A:315:TRP:C	3:A:317:ASN:N	2.77	0.43
3:B:279:SER:CB	3:B:281:GLN:HE21	2.31	0.43
3:B:289:HIS:CE1	4:B:363:HOH:O	2.69	0.43
3:A:196:HIS:CD2	3:A:196:HIS:C	2.96	0.43
3:A:225:ILE:HD11	3:A:238:LEU:HD11	2.01	0.43
3:A:332:THR:HG21	3:A:336:VAL:HG11	2.00	0.43
3:B:125:VAL:CG2	3:B:126:ASP:N	2.77	0.43
3:B:333:GLY:O	3:B:337:ARG:HD3	2.19	0.43
3:A:183:LYS:HD2	3:A:183:LYS:O	2.18	0.42
3:B:172:LEU:HD21	3:B:197:ILE:HG13	2.01	0.42
1:C:4:DA:H8	4:C:42:HOH:O	2.00	0.42
3:A:181:ARG:HG2	3:A:235:ASN:O	2.20	0.42
3:A:308:GLU:HG3	3:B:334:ALA:HB2	2.01	0.42
3:A:199:ARG:HB2	3:A:199:ARG:NH1	2.34	0.42
3:B:297:ARG:NE	3:B:324:TYR:O	2.51	0.42
3:B:116:VAL:O	3:B:120:ILE:HG13	2.20	0.42
3:B:193:MET:HE2	3:B:213:LEU:CD1	2.49	0.42
3:B:337:ARG:HA	3:B:340:GLU:HB2	2.01	0.42
2:D:15:DC:H2'	2:D:16[A]:DA:N7	2.33	0.42
3:A:36:ALA:O	3:B:118:ARG:NH1	2.52	0.42
3:A:75:LEU:HD22	3:A:88:ILE:HG23	2.01	0.42
3:A:149:MET:O	3:A:152:SER:N	2.46	0.42
3:B:64:PHE:HA	3:B:65:PRO:C	2.44	0.42
2:D:14:DG:C2'	2:D:15:DC:H6	2.28	0.42
3:B:297:ARG:HA	3:B:325:ILE:HG22	2.02	0.42
2:D:5:DC:H2'	2:D:6:DT:C5	2.53	0.42
2:D:5:DC:H2''	2:D:6:DT:H5'	2.00	0.42
3:A:24:ARG:HG3	3:A:24:ARG:HH11	1.84	0.42
3:A:302:ALA:O	3:A:303:GLY:O	2.36	0.42
2:D:8:DC:H2''	2:D:9:DG:C8	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:26:ASN:O	3:A:29:ASP:HB2	2.20	0.42
3:B:188:THR:OG1	3:B:192:ARG:HB2	2.20	0.42
3:B:189:ASP:C	3:B:191:GLY:H	2.27	0.42
3:B:305:SER:O	3:B:306:ILE:C	2.61	0.42
3:B:245:ASN:OD1	3:B:247:VAL:HB	2.20	0.42
2:D:23:DA:H5''	4:B:388:HOH:O	2.20	0.41
3:B:322:MET:CE	3:B:326:ARG:NH2	2.82	0.41
1:C:9:DG:H2'	1:C:10:DT:H71	2.02	0.41
3:B:85:VAL:HG11	3:B:121:ARG:HG3	2.01	0.41
3:B:99:HIS:O	3:B:102:SER:HB2	2.20	0.41
3:A:272:ILE:CG2	3:A:273:TYR:CE1	3.03	0.41
3:A:275:ALA:O	3:A:276:LYS:C	2.63	0.41
3:B:71:VAL:O	3:B:74:TYR:HB3	2.19	0.41
1:C:17[B]:DT:H6	1:C:17[B]:DT:H2'	1.72	0.41
3:A:186:SER:O	3:A:193:MET:HG3	2.20	0.41
3:A:315:TRP:CZ2	3:A:324:TYR:CE1	3.07	0.41
3:B:209:VAL:CG1	3:B:210:GLU:N	2.82	0.41
3:A:61:ARG:NH1	3:A:70:ASP:OD1	2.53	0.41
3:A:258:THR:HA	3:A:261:LEU:HD12	2.03	0.41
3:A:315:TRP:NE1	3:A:320:ILE:HG21	2.34	0.41
3:A:194:LEU:HB3	3:A:210:GLU:OE2	2.20	0.41
3:A:194:LEU:HD23	3:A:194:LEU:HA	1.94	0.41
2:D:14:DG:C4	2:D:15:DC:C5	3.09	0.41
3:A:42:TRP:CZ3	3:A:45:LEU:CD2	3.04	0.41
3:A:107:PRO:O	3:A:110:SER:OG	2.37	0.41
3:A:206:THR:CG2	3:B:328:LEU:CD2	2.99	0.41
3:A:217:VAL:CA	3:A:220:LEU:HD12	2.51	0.41
3:A:220:LEU:C	3:A:222:GLU:H	2.28	0.41
3:B:39:GLU:CG	3:B:40:HIS:N	2.83	0.41
3:B:182:VAL:HG23	3:B:236:ASN:O	2.20	0.41
2:D:17[A]:DT:H2''	2:D:18[A]:DA:C8	2.56	0.41
3:A:58:LEU:HD23	4:A:374:HOH:O	2.21	0.41
3:A:299:MET:HB2	3:A:299:MET:HE2	1.40	0.41
3:B:320:ILE:HG12	3:B:321:VAL:CG2	2.50	0.41
1:C:14:DA:H1'	3:B:201:LYS:HZ1	1.86	0.41
3:A:149:MET:HE2	3:A:161:LEU:HG	2.02	0.41
3:A:310:MET:O	3:A:310:MET:SD	2.79	0.41
3:B:106:ARG:O	3:B:107:PRO:C	2.64	0.41
3:A:199:ARG:HH11	3:A:199:ARG:HB2	1.82	0.40
2:D:23:DA:H2'	2:D:24:DT:H72	2.04	0.40
3:A:42:TRP:CZ3	3:A:45:LEU:HD23	2.56	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:149:MET:C	3:A:151:ASN:N	2.79	0.40
3:A:190:GLY:C	3:A:192:ARG:H	2.29	0.40
2:D:26:DC:H5'	3:B:282:ARG:HG2	2.03	0.40
3:A:199:ARG:NH2	3:A:313:GLY:C	2.79	0.40
3:A:310:MET:SD	3:A:318:VAL:CG2	3.10	0.40
3:B:125:VAL:C	3:B:127:ALA:N	2.78	0.40
3:B:218:THR:O	3:B:219:LYS:C	2.63	0.40
3:B:335:MET:HE3	3:B:335:MET:CA	2.51	0.40
3:A:95:LEU:HD23	3:A:95:LEU:HA	1.87	0.40
3:A:190:GLY:C	3:A:192:ARG:N	2.79	0.40
2:D:17[B]:DT:H5'	2:D:17[B]:DT:H2'	1.88	0.40
3:A:199:ARG:HH21	3:A:313:GLY:C	2.29	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	
3	A	322/349 (92%)	269 (84%)	32 (10%)	21 (6%)	1	0
3	B	315/349 (90%)	288 (91%)	19 (6%)	8 (2%)	4	2
All	All	637/698 (91%)	557 (87%)	51 (8%)	29 (5%)	2	1

All (29) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	A	188	THR
3	A	189	ASP
3	A	192	ARG
3	A	193	MET
3	A	236	ASN
3	A	278	ASP

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Mol	Chain	Res	Type
3	A	279	SER
3	A	305	SER
3	A	306	ILE
3	A	308	GLU
3	A	317	ASN
3	B	20	SER
3	B	129	GLU
3	B	277	ASP
3	A	19	THR
3	A	197	ILE
3	A	303	GLY
3	A	307	PRO
3	A	318	VAL
3	A	319	ASN
3	B	189	ASP
3	B	326	ARG
3	B	298	ASP
3	A	198	GLY
3	A	216	GLY
3	A	312	ALA
3	B	126	ASP
3	B	297	ARG
3	A	217	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	
3	A	270/293 (92%)	198 (73%)	72 (27%)	0	0
3	B	266/293 (91%)	227 (85%)	39 (15%)	3	2
All	All	536/586 (92%)	425 (79%)	111 (21%)	1	1

All (111) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	A	19	THR
3	A	20	SER
3	A	22	GLU
3	A	30	MET
3	A	46	LEU
3	A	51	SER
3	A	67	GLU
3	A	88	ILE
3	A	89	GLN
3	A	92	LEU
3	A	97	MET
3	A	114	SER
3	A	117	MET
3	A	119	ARG
3	A	120	ILE
3	A	132	LYS
3	A	133	GLN
3	A	135	LEU
3	A	138	GLU
3	A	146	ARG
3	A	147	SER
3	A	148	LEU
3	A	156	GLN
3	A	158	ILE
3	A	169	ASN
3	A	170	THR
3	A	186	SER
3	A	187	ARG
3	A	192	ARG
3	A	193	MET
3	A	196	HIS
3	A	197	ILE
3	A	199	ARG
3	A	201	LYS
3	A	202	THR
3	A	204	VAL
3	A	205	SER
3	A	206	THR
3	A	210	GLU
3	A	213	LEU
3	A	214	SER
3	A	217	VAL
3	A	218	THR

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Mol	Chain	Res	Type
3	A	219	LYS
3	A	220	LEU
3	A	227	VAL
3	A	230	VAL
3	A	233	ASP
3	A	235	ASN
3	A	243	ARG
3	A	245	ASN
3	A	251	SER
3	A	253	THR
3	A	256	LEU
3	A	258	THR
3	A	270	ARG
3	A	277	ASP
3	A	279	SER
3	A	289	HIS
3	A	299	MET
3	A	306	ILE
3	A	309	ILE
3	A	310	MET
3	A	316	THR
3	A	318	VAL
3	A	319	ASN
3	A	322	MET
3	A	323	ASN
3	A	335	MET
3	A	336	VAL
3	A	338	LEU
3	A	341	ASP
3	B	24	ARG
3	B	27	LEU
3	B	28	MET
3	B	37	PHE
3	B	43	LYS
3	B	45	LEU
3	B	46	LEU
3	B	57	LYS
3	B	60	ASN
3	B	87	THR
3	B	92	LEU
3	B	102	SER
3	B	121	ARG

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Mol	Chain	Res	Type
3	B	122	LYS
3	B	130	ARG
3	B	138	GLU
3	B	183	LYS
3	B	199	ARG
3	B	201	LYS
3	B	203	LEU
3	B	204	VAL
3	B	205	SER
3	B	219	LYS
3	B	226	SER
3	B	230	VAL
3	B	244	LYS
3	B	245	ASN
3	B	277	ASP
3	B	289	HIS
3	B	292	ARG
3	B	306	ILE
3	B	309	ILE
3	B	319	ASN
3	B	320	ILE
3	B	322	MET
3	B	325	ILE
3	B	326	ARG
3	B	328	LEU
3	B	336	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
3	A	79	GLN
3	A	90	GLN
3	A	124	ASN
3	A	144	GLN
3	A	196	HIS
3	A	235	ASN
3	A	245	ASN
3	A	269	HIS
3	B	26	ASN
3	B	35	GLN
3	B	40	HIS
3	B	94	GLN

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Mol	Chain	Res	Type
3	B	269	HIS
3	B	281	GLN
3	B	289	HIS
3	B	323	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	C	34/34 (100%)	-1.10	0 100 100	22, 45, 66, 71	4 (11%)
2	D	34/34 (100%)	-1.12	0 100 100	33, 47, 64, 77	4 (11%)
3	A	320/349 (91%)	-0.46	1 (0%) 90 88	30, 63, 96, 99	9 (2%)
3	B	319/349 (91%)	-0.84	0 100 100	26, 46, 84, 98	3 (0%)
All	All	707/766 (92%)	-0.70	1 (0%) 92 90	22, 53, 93, 99	20 (2%)

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	A	307	PRO	3.0

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 oligosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.