W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

Full wwPDB X-ray Structure Validation Report ⓘ

Jan 27, 2026 – 12:09 pm GMT

PDB ID	:	9Q9V / pdb_00009q9v
Title	:	Crystal structure of Borrelia burgdorferi BB0238-BB0323 complex
Authors	:	Brangulis, K.
Deposited on	:	2025-02-26
Resolution	:	3.60 Å(reported)

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

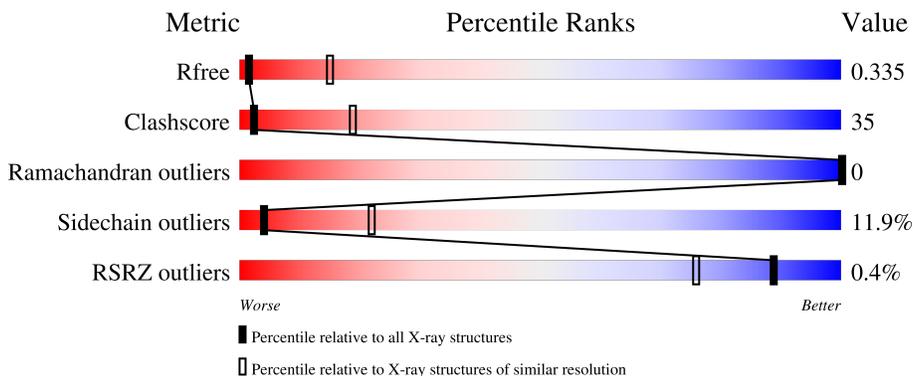|		
MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.47

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 3.60 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 | Percentile Ranks | Value

Rfree | | 0.335
Clashscore | | 35
Ramachandran outliers | | 0
Sidechain outliers | | 11.9%
RSRZ outliers | | 0.4%

Worse *Better*

▮ Percentile relative to all X-ray structures
▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	164625	1563 (3.70-3.50)
Clashscore	180529	1665 (3.70-3.50)
Ramachandran outliers	177936	1641 (3.70-3.50)
Sidechain outliers	177891	1640 (3.70-3.50)
RSRZ outliers	164620	1562 (3.70-3.50)

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 <=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	189	37% 36% 7% • 20%
2	B	129	.% 43% 44% 8% • 5%

2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 2223 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 LysM domain protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	151	Total	C	N	O	S	0	0	0
			1240	778	215	244	3			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	22	GLY	-	expression tag	UNP O51302
A	23	ALA	-	expression tag	UNP O51302
A	24	MET	-	expression tag	UNP O51302
A	25	GLY	-	expression tag	UNP O51302

- Molecule 2 is a protein called BB0238.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	123	Total	C	N	O	S	0	0	0
			983	625	159	198	1			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	128	GLY	-	expression tag	UNP O51254
B	129	ALA	-	expression tag	UNP O51254
B	130	MET	-	expression tag	UNP O51254
B	131	GLY	-	expression tag	UNP O51254

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.
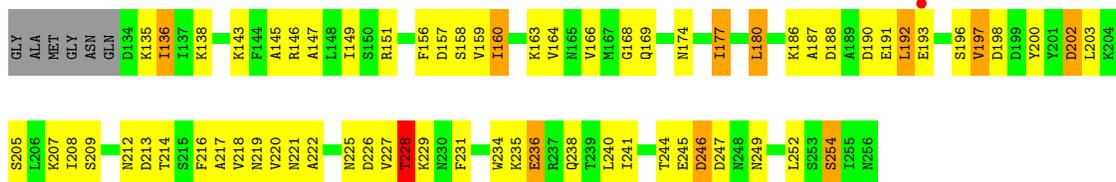
• Molecule 1: LysM domain protein

Chain A:
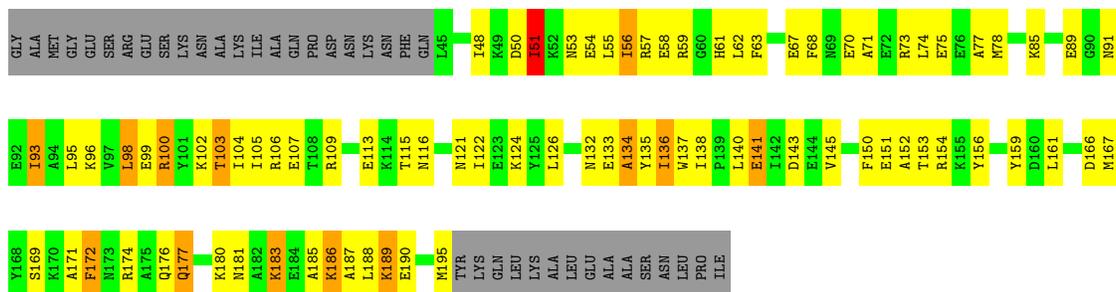
• Molecule 2: BB0238

Chain B:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 65	Depositor
Cell constants a, b, c, α, β, γ	130.76Å 130.76Å 38.94Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	37.78 – 3.60 37.78 – 3.60	Depositor EDS
% Data completeness (in resolution range)	99.9 (37.78-3.60) 99.9 (37.78-3.60)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	4.80 (at 3.56Å)	Xtriage
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.199 , 0.335 0.249 , 0.335	Depositor DCC
R_{free} test set	230 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å^2)	122.2	Xtriage
Anisotropy	0.036	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 93.2	EDS
L-test for twinning[2]	$< |L| > = 0.49, < L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.046 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	2223	wwPDB-VP
Average B, all atoms (Å^2)	122.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.13% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ 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)

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	0.85	0/1256	1.60	14/1682 (0.8%)
2	B	0.84	0/1001	1.30	7/1351 (0.5%)
All	All	0.85	0/2257	1.47	21/3033 (0.7%)

There are no bond length outliers.

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	189	LYS	N-CA-C	-11.75	98.45	111.14
1	A	51	ILE	N-CA-C	-11.34	99.53	110.42
1	A	103	THR	N-CA-C	-11.06	99.24	111.07
1	A	177	GLN	N-CA-C	-9.65	100.75	111.07
1	A	134	ALA	N-CA-C	-8.80	101.64	111.14
1	A	51	ILE	N-CA-CB	7.02	118.76	110.55
1	A	136	ILE	N-CA-C	6.58	117.33	110.62
1	A	98	LEU	N-CA-C	-6.51	103.30	111.11
2	B	246	ASP	N-CA-C	-6.06	104.52	113.61
1	A	75	GLU	N-CA-C	-5.98	104.11	111.40
1	A	189	LYS	N-CA-CB	5.73	118.38	110.07
2	B	197	VAL	N-CA-C	-5.72	104.10	110.62
2	B	202	ASP	N-CA-C	-5.55	106.67	113.50
2	B	245	GLU	N-CA-C	-5.54	106.19	113.17
1	A	136	ILE	N-CA-CB	-5.51	103.05	110.54
2	B	228	THR	N-CA-C	-5.47	105.32	111.28
1	A	141	GLU	N-CA-C	-5.24	104.83	111.11
1	A	177	GLN	N-CA-CB	5.24	117.60	110.01
2	B	254	SER	N-CA-C	5.19	117.27	109.23
2	B	163	LYS	N-CA-CB	-5.05	102.75	111.55
1	A	172	PHE	N-CA-C	-5.04	105.06	111.11

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1240	0	1210	96	0
2	B	983	0	938	65	0
All	All	2223	0	2148	151	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 35.

All (151) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:135:TYR:CE1	1:A:136:ILE:HG12	1.73	1.23
1:A:135:TYR:CE1	1:A:136:ILE:CG1	2.26	1.19
1:A:135:TYR:CE1	1:A:136:ILE:CD1	2.31	1.13
1:A:135:TYR:CE1	1:A:136:ILE:HD11	1.85	1.10
1:A:135:TYR:HE1	1:A:136:ILE:HD11	1.05	1.10
1:A:135:TYR:CD1	1:A:136:ILE:HG12	2.03	0.94
1:A:188:LEU:HD12	1:A:189:LYS:N	1.81	0.94
2:B:208:ILE:HG12	2:B:218:VAL:HG12	1.52	0.92
1:A:106:ARG:HG3	1:A:107:GLU:N	1.89	0.85
1:A:185:ALA:O	1:A:188:LEU:HG	1.77	0.85
2:B:226:ASP:HA	2:B:229:LYS:HD2	1.56	0.84
1:A:58:GLU:HA	2:B:192:LEU:HD22	1.59	0.84
1:A:102:LYS:O	1:A:105:ILE:HG22	1.79	0.82
1:A:55:LEU:HD12	1:A:105:ILE:HD13	1.59	0.81
1:A:106:ARG:HG3	1:A:107:GLU:H	1.46	0.80
2:B:234:TRP:HA	2:B:238:GLN:HE22	1.46	0.80
1:A:99:GLU:O	1:A:102:LYS:HG2	1.85	0.77
1:A:56:ILE:HA	1:A:61:HIS:CD2	2.20	0.75
1:A:135:TYR:CZ	1:A:136:ILE:HG12	2.22	0.74
1:A:135:TYR:CD1	1:A:136:ILE:CD1	2.72	0.73
1:A:74:LEU:HA	1:A:77:ALA:HB3	1.71	0.72
2:B:241:ILE:HB	2:B:254:SER:HB3	1.72	0.72
1:A:56:ILE:HA	1:A:61:HIS:HD2	1.54	0.71
2:B:226:ASP:O	2:B:229:LYS:HB2	1.91	0.70
1:A:102:LYS:HA	1:A:105:ILE:HG22	1.73	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:244:THR:O	2:B:244:THR:HG23	1.94	0.67
1:A:50:ASP:OD1	1:A:51:ILE:N	2.27	0.67
2:B:244:THR:CG2	2:B:247:ASP:HA	2.24	0.67
1:A:195:MET:N	1:A:195:MET:SD	2.66	0.67
2:B:244:THR:HG21	2:B:247:ASP:HA	1.76	0.66
1:A:135:TYR:CD1	2:B:136:ILE:HD11	2.30	0.66
1:A:188:LEU:HD12	1:A:188:LEU:C	2.20	0.66
1:A:51:ILE:O	1:A:55:LEU:HD13	1.97	0.65
2:B:240:LEU:O	2:B:241:ILE:HD13	1.96	0.65
1:A:48:ILE:HG22	1:A:98:LEU:CD2	2.27	0.64
2:B:222:ALA:HB1	2:B:234:TRP:CE3	2.33	0.64
2:B:213:ASP:OD1	2:B:214:THR:N	2.31	0.64
1:A:150:PHE:O	1:A:153:THR:HG22	1.98	0.63
2:B:166:VAL:O	2:B:166:VAL:HG23	1.99	0.63
1:A:61:HIS:CE1	1:A:62:LEU:HG	2.34	0.63
1:A:106:ARG:CG	1:A:107:GLU:N	2.61	0.63
1:A:59:ARG:HG3	2:B:192:LEU:HD13	1.79	0.63
1:A:135:TYR:CD1	1:A:136:ILE:CG1	2.73	0.62
1:A:140:LEU:HA	1:A:143:ASP:OD2	1.99	0.62
1:A:91:ASN:O	1:A:95:LEU:HG	2.00	0.62
2:B:156:PHE:HB3	2:B:177:ILE:HD13	1.81	0.61
1:A:106:ARG:O	1:A:107:GLU:C	2.43	0.61
2:B:135:LYS:NZ	2:B:138:LYS:NZ	2.50	0.59
1:A:106:ARG:CG	1:A:107:GLU:H	2.12	0.59
2:B:160:ILE:HA	2:B:252:LEU:HB3	1.85	0.59
1:A:95:LEU:O	1:A:98:LEU:N	2.35	0.59
1:A:135:TYR:CD1	2:B:136:ILE:CD1	2.86	0.58
2:B:197:VAL:HG21	2:B:203:LEU:HD11	1.85	0.57
1:A:102:LYS:CA	1:A:105:ILE:HG22	2.35	0.56
1:A:150:PHE:CD1	2:B:197:VAL:HG11	2.40	0.56
1:A:102:LYS:C	1:A:105:ILE:HG22	2.30	0.56
2:B:244:THR:O	2:B:244:THR:CG2	2.53	0.56
1:A:67:GLU:HB3	1:A:104:ILE:HD11	1.88	0.55
2:B:217:ALA:HA	2:B:241:ILE:CD1	2.36	0.55
2:B:159:VAL:HG13	2:B:160:ILE:HG12	1.89	0.55
1:A:63:PHE:CD1	1:A:159:TYR:HA	2.42	0.54
1:A:140:LEU:O	1:A:141:GLU:C	2.49	0.54
2:B:135:LYS:HZ2	2:B:138:LYS:NZ	2.05	0.54
1:A:55:LEU:CD1	1:A:105:ILE:HD13	2.34	0.53
1:A:153:THR:HG23	2:B:196:SER:HA	1.89	0.53
1:A:185:ALA:HA	1:A:188:LEU:CD2	2.39	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:89:GLU:O	1:A:93:ILE:HG22	2.08	0.53
1:A:102:LYS:HA	1:A:105:ILE:CG2	2.39	0.53
1:A:103:THR:O	1:A:106:ARG:HG2	2.09	0.53
2:B:226:ASP:HA	2:B:229:LYS:CD	2.33	0.53
1:A:188:LEU:HD12	1:A:189:LYS:CA	2.39	0.52
1:A:188:LEU:CD1	1:A:189:LYS:N	2.65	0.52
1:A:100:ARG:O	1:A:104:ILE:HG12	2.10	0.52
1:A:59:ARG:HH12	2:B:193:GLU:HB2	1.73	0.52
2:B:208:ILE:CG2	2:B:216:PHE:HD2	2.22	0.52
1:A:187:ALA:O	1:A:190:GLU:HB3	2.09	0.52
1:A:99:GLU:O	1:A:102:LYS:CG	2.58	0.52
2:B:217:ALA:HA	2:B:241:ILE:HD13	1.92	0.51
1:A:73:ARG:HG2	1:A:74:LEU:HD12	1.92	0.51
1:A:48:ILE:HG22	1:A:98:LEU:HG	1.93	0.51
1:A:63:PHE:CE1	1:A:159:TYR:HA	2.46	0.51
1:A:152:ALA:HB2	1:A:167:MET:HB2	1.92	0.51
1:A:53:ASN:OD1	1:A:54:GLU:N	2.44	0.51
2:B:135:LYS:NZ	2:B:138:LYS:HZ2	2.09	0.51
1:A:134:ALA:O	1:A:135:TYR:C	2.53	0.51
2:B:222:ALA:HB1	2:B:234:TRP:CZ3	2.47	0.50
1:A:151:GLU:HA	1:A:154:ARG:NE	2.26	0.50
2:B:135:LYS:HZ2	2:B:138:LYS:HZ1	1.60	0.50
1:A:59:ARG:NH1	2:B:193:GLU:HB2	2.26	0.50
1:A:56:ILE:HG13	1:A:57:ARG:N	2.28	0.49
1:A:153:THR:HG21	2:B:197:VAL:HG13	1.95	0.48
1:A:48:ILE:HG22	1:A:98:LEU:HD21	1.95	0.48
1:A:102:LYS:O	1:A:105:ILE:CG2	2.55	0.48
1:A:115:THR:OG1	1:A:116:ASN:N	2.45	0.48
2:B:197:VAL:CG2	2:B:203:LEU:HD11	2.43	0.48
1:A:150:PHE:O	1:A:154:ARG:HG3	2.12	0.48
1:A:171:ALA:O	1:A:172:PHE:C	2.57	0.48
2:B:177:ILE:HA	2:B:180:LEU:HD12	1.95	0.48
2:B:135:LYS:HZ1	2:B:138:LYS:HZ2	1.61	0.48
1:A:135:TYR:CZ	1:A:136:ILE:CG1	2.86	0.47
2:B:145:ALA:O	2:B:146:ARG:C	2.57	0.47
1:A:55:LEU:HD11	1:A:105:ILE:HB	1.96	0.47
2:B:218:VAL:HG23	2:B:240:LEU:HB2	1.98	0.46
2:B:180:LEU:HA	2:B:231:PHE:CE1	2.51	0.46
2:B:147:ALA:O	2:B:151:ARG:N	2.49	0.46
1:A:145:VAL:HG22	1:A:174:ARG:HB3	1.98	0.46
2:B:187:ALA:O	2:B:188:ASP:C	2.58	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:106:ARG:O	1:A:109:ARG:N	2.49	0.46
2:B:209:SER:OG	2:B:217:ALA:HB3	2.16	0.46
1:A:132:ASN:O	1:A:133:GLU:C	2.58	0.45
1:A:183:LYS:O	1:A:186:LYS:HB3	2.16	0.45
2:B:225:ASN:O	2:B:229:LYS:N	2.42	0.45
2:B:228:THR:HG23	2:B:234:TRP:HB3	1.98	0.45
2:B:228:THR:HG23	2:B:234:TRP:CB	2.47	0.45
1:A:85:LYS:O	1:A:85:LYS:HG2	2.17	0.45
1:A:121:ASN:O	1:A:122:ILE:C	2.60	0.45
2:B:213:ASP:OD1	2:B:214:THR:HG22	2.16	0.45
1:A:78:MET:HG3	1:A:93:ILE:HG23	1.99	0.45
2:B:225:ASN:O	2:B:226:ASP:C	2.60	0.44
2:B:246:ASP:CG	2:B:249:ASN:H	2.24	0.44
1:A:135:TYR:CD1	1:A:136:ILE:HD13	2.50	0.44
1:A:113:GLU:O	1:A:116:ASN:N	2.51	0.44
2:B:168:GLY:O	2:B:169:GLN:C	2.60	0.44
2:B:218:VAL:HG23	2:B:218:VAL:O	2.18	0.44
1:A:180:LYS:O	1:A:181:ASN:C	2.61	0.43
2:B:218:VAL:CG2	2:B:240:LEU:HB2	2.48	0.43
1:A:176:GLN:HG3	1:A:177:GLN:N	2.34	0.43
2:B:143:LYS:HD3	2:B:158:SER:OG	2.18	0.43
1:A:68:PHE:O	1:A:71:ALA:HB3	2.19	0.43
1:A:137:TRP:CZ3	1:A:186:LYS:HB2	2.54	0.43
2:B:202:ASP:HB2	2:B:205:SER:OG	2.19	0.42
1:A:151:GLU:HA	1:A:154:ARG:HE	1.83	0.42
1:A:156:TYR:HE2	2:B:191:GLU:O	2.02	0.42
2:B:244:THR:HG23	2:B:247:ASP:HA	1.99	0.42
1:A:48:ILE:HG22	1:A:98:LEU:CG	2.48	0.42
1:A:53:ASN:O	1:A:57:ARG:HG3	2.18	0.42
1:A:63:PHE:HA	1:A:159:TYR:HB3	2.01	0.42
2:B:207:LYS:N	2:B:219:ASN:O	2.51	0.42
1:A:50:ASP:OD1	1:A:51:ILE:HG12	2.19	0.42
1:A:188:LEU:C	1:A:188:LEU:CD1	2.90	0.42
1:A:185:ALA:HA	1:A:188:LEU:HD21	2.02	0.41
2:B:166:VAL:O	2:B:166:VAL:CG2	2.68	0.41
1:A:180:LYS:HE2	1:A:180:LYS:HB2	1.84	0.41
2:B:235:LYS:HG2	2:B:238:GLN:OE1	2.21	0.41
2:B:221:ASN:HA	2:B:236:GLU:O	2.21	0.40
1:A:145:VAL:HG13	1:A:171:ALA:HB1	2.03	0.40
2:B:196:SER:OG	2:B:198:ASP:HB2	2.21	0.40
2:B:200:TYR:HA	2:B:225:ASN:ND2	2.37	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:212:ASN:O	2:B:213:ASP:C	2.64	0.40
2:B:156:PHE:C	2:B:158:SER:H	2.30	0.40
1:A:166:ASP:O	1:A:167:MET:C	2.64	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	149/189 (79%)	128 (86%)	21 (14%)	0	100	100
2	B	121/129 (94%)	104 (86%)	17 (14%)	0	100	100
All	All	270/318 (85%)	232 (86%)	38 (14%)	0	100	100

There are no Ramachandran outliers to report.

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	126/163 (77%)	113 (90%)	13 (10%)	6	27
2	B	110/116 (95%)	95 (86%)	15 (14%)	3	18
All	All	236/279 (85%)	208 (88%)	28 (12%)	4	22

All (28) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	51	ILE
1	A	56	ILE
1	A	70	GLU
1	A	93	ILE
1	A	96	LYS
1	A	100	ARG
1	A	124	LYS
1	A	126	LEU
1	A	138	ILE
1	A	161	LEU
1	A	169	SER
1	A	183	LYS
1	A	186	LYS
2	B	136	ILE
2	B	149	ILE
2	B	157	ASP
2	B	160	ILE
2	B	164	VAL
2	B	174	ASN
2	B	177	ILE
2	B	180	LEU
2	B	186	LYS
2	B	190	ASP
2	B	192	LEU
2	B	220	VAL
2	B	227	VAL
2	B	228	THR
2	B	236	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	61	HIS
1	A	132	ASN
1	A	158	ASN
1	A	163	ASN
2	B	249	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 oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

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, 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	A	151/189 (79%)	-0.25	0	100	100	74, 112, 178, 205	0
2	B	123/129 (95%)	0.01	1 (0%)	82	64	71, 122, 169, 200	0
All	All	274/318 (86%)	-0.14	1 (0%)	89	76	71, 116, 176, 205	0

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	193	GLU	2.0

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

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

6.3 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.