WORLDWIDE PDB

PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Sep 11, 2023 – 05:18 AM EDT

PDB ID	:	4JLY
Title	:	Dodecameric structure of spermidine N-acetyltransferase from Vibrio cholerae
Authors	:	Filippova, E.V.; Minasov, G.; Shuvalova, L.; Kiryukhina, O.; Kuhn, M.L.; Anderson, W.F.; Center for Structural Genomics of Infectious Diseases (CSGID)
Deposited on	:	2013-03-13
Resolution	:	2.88 Å(reported)

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

|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

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 2.88 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.
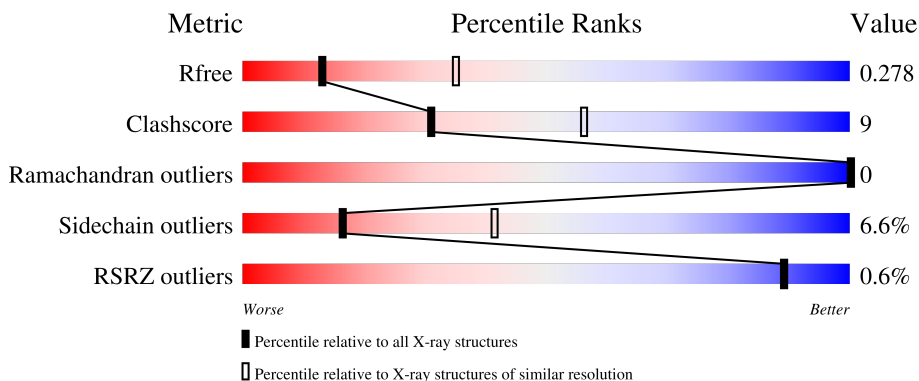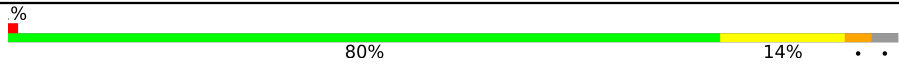

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2691 (2.90-2.86)
Clashscore	141614	2947 (2.90-2.86)
Ramachandran outliers	138981	2868 (2.90-2.86)
Sidechain outliers	138945	2871 (2.90-2.86)
RSRZ outliers	127900	2629 (2.90-2.86)

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	176	2% / 79% / 16% / ··
1	B	176	% / 73% / 23% / ··
1	C	176	73% / 21% / ··
1	D	176	78% / 17% / ··
1	E	176	% / 76% / 19% / ··

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Mol	Chain	Length	Quality of chain
1	F	176	

2 Entity composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 8730 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 Spermidine n1-acetyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	172	Total 1455	C 929	N 255	O 268	S 3	0	0	0
1	B	171	Total 1455	C 930	N 257	O 265	S 3	0	1	0
1	C	171	Total 1457	C 932	N 257	O 264	S 4	0	1	0
1	D	170	Total 1441	C 922	N 252	O 264	S 3	0	0	0
1	E	169	Total 1428	C 915	N 249	O 261	S 3	0	0	0
1	F	170	Total 1439	C 921	N 253	O 262	S 3	0	0	0

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	SER	-	expression tag	UNP Q9KL03
A	-1	ASN	-	expression tag	UNP Q9KL03
A	0	ALA	-	expression tag	UNP Q9KL03
B	-2	SER	-	expression tag	UNP Q9KL03
B	-1	ASN	-	expression tag	UNP Q9KL03
B	0	ALA	-	expression tag	UNP Q9KL03
C	-2	SER	-	expression tag	UNP Q9KL03
C	-1	ASN	-	expression tag	UNP Q9KL03
C	0	ALA	-	expression tag	UNP Q9KL03
D	-2	SER	-	expression tag	UNP Q9KL03
D	-1	ASN	-	expression tag	UNP Q9KL03
D	0	ALA	-	expression tag	UNP Q9KL03
E	-2	SER	-	expression tag	UNP Q9KL03
E	-1	ASN	-	expression tag	UNP Q9KL03
E	0	ALA	-	expression tag	UNP Q9KL03
F	-2	SER	-	expression tag	UNP Q9KL03
F	-1	ASN	-	expression tag	UNP Q9KL03

Chain	Residue	Modelled	Actual	Comment	Reference
F	0	ALA	-	expression tag	UNP Q9KL03

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O_4S).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total 5	O 4	S 1	0	0
2	D	1	Total 5	O 4	S 1	0	0
2	E	1	Total 5	O 4	S 1	0	0
2	F	1	Total 5	O 4	S 1	0	0
2	F	1	Total 5	O 4	S 1	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	4	Total 4	O 4	0	0
3	B	3	Total 3	O 3	0	0
3	C	5	Total 5	O 5	0	0
3	D	3	Total 3	O 3	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	E	6	Total 6	O 6	0	0
3	F	9	Total 9	O 9	0	0

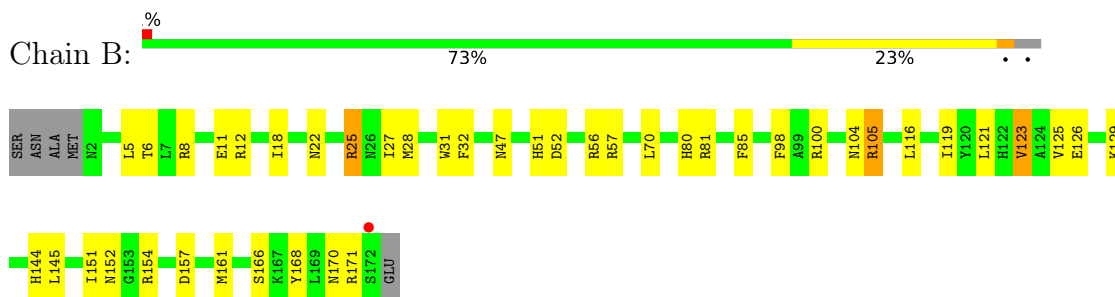# 3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry 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.
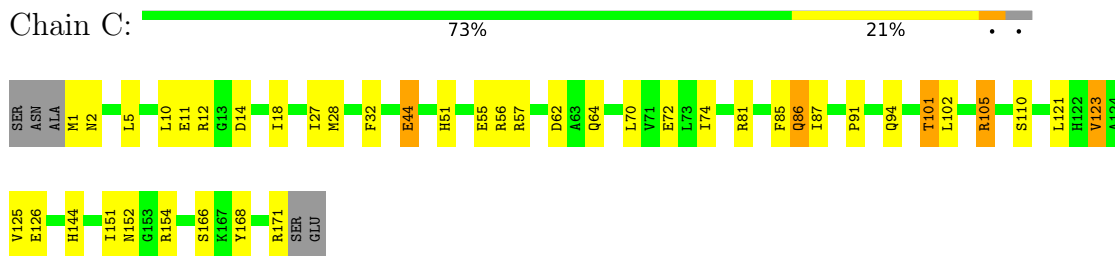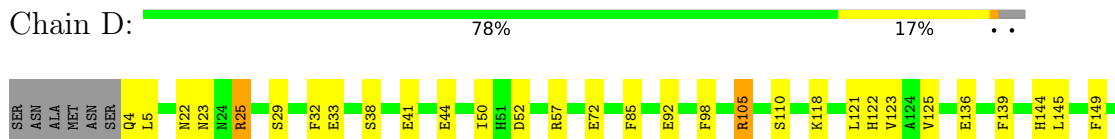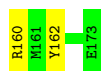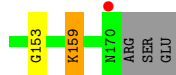
- Molecule 1: Spermidine n1-acetyltransferase
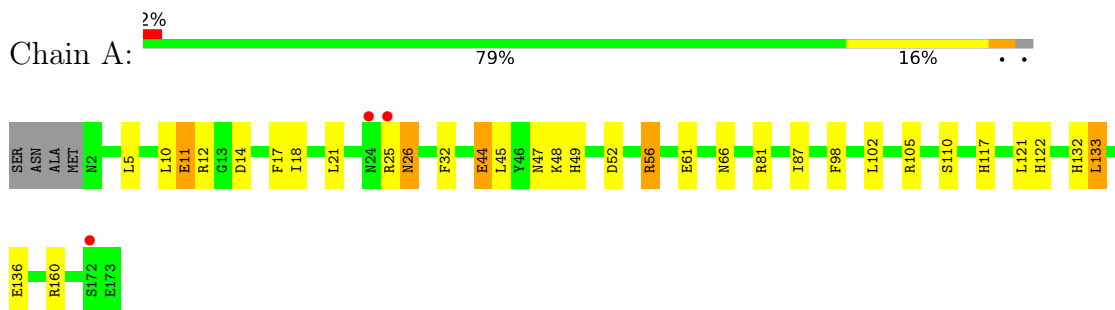
- Molecule 1: Spermidine n1-acetyltransferase

- Molecule 1: Spermidine n1-acetyltransferase

- Molecule 1: Spermidine n1-acetyltransferase

R160 M161 Y162 E173

• Molecule 1: Spermidine n1-acetyltransferase

Chain E:

SER ASN ALA MET N2 S3 Q4 L10 L15 I18 N24 R25 N26 I27 M28 F32 L45 H51 D52 N53 R57 V60 L70 I74 E84 F85 Q86 L102 I103 N104 L107 D108 Y109 S110 I113 V125 K129 L133 E141 F150

G153 K159 N170 ARG SER GLU

• Molecule 1: Spermidine n1-acetyltransferase

Chain F:

SER ASN ALA MET N2 S3 Q4 L7 R8 D14 L15 I18 R25 N26 I27 E33 E37 L45 V60 L70 Q86 I87 F98 L102 I103 N104 L107 L121 V125 K129 L133 E141 L145 I151 N152 K159 S166

R171 SER GLU
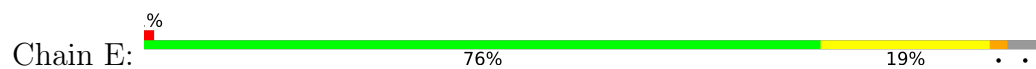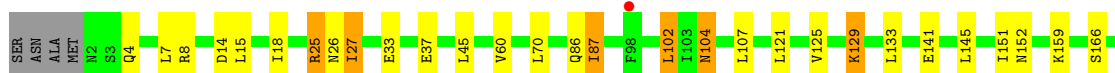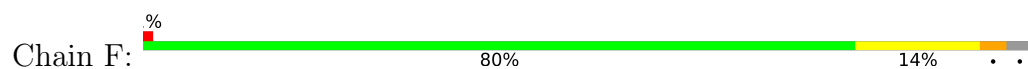
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	194.86Å 71.77Å 136.73Å 90.00° 134.53° 90.00°	Depositor
Resolution (Å)	28.91 – 2.88 28.89 – 2.88	Depositor EDS
% Data completeness (in resolution range)	99.0 (28.91-2.88) 99.2 (28.89-2.88)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.99 (at 2.90Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.185 , 0.277 0.185 , 0.278	Depositor DCC
R_{free} test set	1532 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å^2)	70.1	Xtriage
Anisotropy	0.032	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 25.4	EDS
L-test for twinning[2]	$< |L| > = 0.51, < L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.000 for h+2*l,k,-h-l 0.000 for h,-k,-h-l 0.468 for -h-2*l,-k,l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	8730	wwPDB-VP
Average B, all atoms (Å^2)	84.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.34% 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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: SO4

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	0.67	0/1488	0.83	0/2007
1	B	0.68	0/1489	0.82	1/2010 (0.0%)
1	C	0.65	0/1491	0.83	1/2012 (0.0%)
1	D	0.66	0/1474	0.84	1/1988 (0.1%)
1	E	0.58	0/1461	0.80	2/1973 (0.1%)
1	F	0.61	0/1472	0.81	0/1987
All	All	0.64	0/8875	0.82	5/11977 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	123	VAL	CB-CA-C	-5.89	100.21	111.40
1	D	52	ASP	CB-CG-OD1	5.34	123.11	118.30
1	E	57	ARG	NE-CZ-NH1	5.09	122.84	120.30
1	C	123	VAL	CB-CA-C	-5.06	101.79	111.40
1	E	24	ASN	CB-CA-C	-5.01	100.38	110.40

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	26	ASN	Peptide

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	1455	0	1408	23	0
1	B	1455	0	1408	38	0
1	C	1457	0	1415	33	0
1	D	1441	0	1397	21	0
1	E	1428	0	1384	29	0
1	F	1439	0	1397	22	0
2	A	5	0	0	0	0
2	D	5	0	0	0	0
2	E	5	0	0	0	0
2	F	10	0	0	0	0
3	A	4	0	0	0	0
3	B	3	0	0	0	0
3	C	5	0	0	0	0
3	D	3	0	0	0	0
3	E	6	0	0	0	0
3	F	9	0	0	0	0
All	All	8730	0	8409	155	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 9.

All (155) 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:1:MET:HG3	1:C:2:ASN:H	1.11	1.11
1:F:26:ASN:O	1:F:27:ILE:HG22	1.51	1.10
1:B:25:ARG:HH11	1:B:25:ARG:HG3	0.97	1.07
1:E:27:ILE:H	1:E:27:ILE:HD12	1.21	1.02
1:E:25:ARG:HB3	1:E:27:ILE:HD11	1.41	0.99
1:B:25:ARG:HH11	1:B:25:ARG:CG	1.77	0.98
1:E:25:ARG:CB	1:E:27:ILE:HD11	1.99	0.91

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:25:ARG:HG3	1:B:25:ARG:NH1	1.79	0.89
1:A:44:GLU:HG2	1:B:51[A]:HIS:NE2	1.91	0.85
1:F:25:ARG:NH2	1:F:86:GLN:NE2	2.26	0.84
1:E:25:ARG:CB	1:E:27:ILE:CD1	2.57	0.83
1:E:27:ILE:HD12	1:E:27:ILE:N	1.95	0.81
1:B:27:ILE:HG12	1:B:151:ILE:HG12	1.61	0.81
1:C:1:MET:HG3	1:C:2:ASN:N	1.92	0.80
1:F:18:ILE:HD11	1:F:70:LEU:HD13	1.63	0.80
1:F:26:ASN:O	1:F:27:ILE:CG2	2.30	0.79
1:E:25:ARG:HB2	1:E:27:ILE:CD1	2.13	0.78
1:E:25:ARG:HB3	1:E:27:ILE:CD1	2.14	0.77
1:C:126:GLU:CD	1:C:154:ARG:HH12	1.91	0.74
1:B:27:ILE:HG22	1:B:28:MET:N	2.03	0.73
1:F:25:ARG:HH22	1:F:86:GLN:NE2	1.85	0.72
1:B:123:VAL:HG21	1:B:161:MET:HE2	1.70	0.72
1:B:27:ILE:HG22	1:B:28:MET:O	1.90	0.72
1:E:25:ARG:HB2	1:E:27:ILE:HD12	1.73	0.70
1:B:5:LEU:O	1:B:105:ARG:NH2	2.25	0.69
1:E:25:ARG:O	1:E:26:ASN:HB2	1.93	0.68
1:B:123:VAL:HG21	1:B:161:MET:CE	2.24	0.67
1:F:60:VAL:HG21	1:F:102:LEU:HD11	1.75	0.67
1:C:1:MET:CG	1:C:2:ASN:H	1.97	0.67
1:C:51[A]:HIS:NE2	1:D:44:GLU:CG	2.58	0.67
1:B:85:PHE:HD2	1:B:121:LEU:HD23	1.60	0.66
1:D:38:SER:OG	1:D:41:GLU:HG3	1.97	0.65
1:C:5:LEU:O	1:C:105:ARG:NH2	2.30	0.65
1:C:91:PRO:HA	1:C:94:GLN:HE21	1.62	0.65
1:D:5:LEU:HD11	1:D:98:PHE:CD2	2.32	0.64
1:F:25:ARG:O	1:F:26:ASN:HB2	1.96	0.64
1:F:26:ASN:C	1:F:27:ILE:CG2	2.66	0.63
1:B:123:VAL:CG2	1:B:161:MET:HE2	2.28	0.63
1:B:25:ARG:CG	1:B:25:ARG:NH1	2.45	0.62
1:C:44:GLU:HG2	1:E:51:HIS:NE2	2.15	0.62
1:B:27:ILE:CG2	1:B:28:MET:N	2.63	0.61
1:F:60:VAL:HG21	1:F:102:LEU:CD1	2.30	0.61
1:C:51[A]:HIS:NE2	1:D:44:GLU:HG2	2.15	0.61
1:C:27:ILE:HG22	1:C:151:ILE:HG12	1.82	0.60
1:C:51[A]:HIS:NE2	1:D:44:GLU:HG3	2.15	0.60
1:F:25:ARG:NH2	1:F:86:GLN:HE22	2.00	0.60
1:F:125:VAL:HG22	1:F:159:LYS:HD3	1.82	0.60
1:A:32:PHE:CE2	1:A:52:ASP:HB3	2.36	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:168:TYR:O	1:B:171:ARG:HB2	2.03	0.59
1:C:91:PRO:HA	1:C:94:GLN:NE2	2.19	0.58
1:A:121:LEU:C	1:A:121:LEU:HD12	2.24	0.57
1:B:12:ARG:NH1	1:B:47:ASN:OD1	2.39	0.56
1:A:44:GLU:HG2	1:B:51[A]:HIS:CE1	2.39	0.56
1:D:4:GLN:HG2	1:D:5:LEU:HG	1.87	0.56
1:A:87:ILE:HD11	1:A:102:LEU:HD12	1.87	0.56
1:A:25:ARG:HB2	1:A:25:ARG:NH1	2.21	0.55
1:A:5:LEU:HD11	1:A:98:PHE:CD2	2.42	0.55
1:B:5:LEU:HD11	1:B:98:PHE:CD2	2.43	0.54
1:B:116:LEU:HD12	1:B:119:ILE:HD11	1.90	0.54
1:C:126:GLU:OE2	1:C:154:ARG:NH1	2.39	0.54
1:A:5:LEU:O	1:A:105:ARG:NH2	2.41	0.54
1:E:18:ILE:HD12	1:E:70:LEU:HD22	1.90	0.54
1:F:60:VAL:HG11	1:F:102:LEU:HD21	1.90	0.54
1:D:25:ARG:CZ	1:D:25:ARG:HB2	2.38	0.53
1:C:51[A]:HIS:CE1	1:D:44:GLU:CG	2.91	0.53
1:C:85:PHE:HD2	1:C:121:LEU:HD23	1.72	0.53
1:B:27:ILE:CG1	1:B:151:ILE:HG12	2.35	0.53
1:B:32:PHE:HD2	1:B:52:ASP:OD2	1.91	0.52
1:A:25:ARG:HB2	1:A:25:ARG:HH11	1.74	0.52
1:B:126:GLU:CD	1:B:154:ARG:HH12	2.14	0.52
1:E:104:ASN:HA	1:E:107:LEU:HD12	1.92	0.52
1:F:26:ASN:C	1:F:27:ILE:HG22	2.25	0.51
1:E:60:VAL:HG11	1:E:102:LEU:HD21	1.91	0.51
1:E:32:PHE:CE2	1:E:52:ASP:HB3	2.46	0.50
1:B:152:ASN:CG	1:B:152:ASN:O	2.50	0.50
1:E:109:TYR:HD1	1:E:113:ILE:HD12	1.77	0.50
1:F:86:GLN:HG2	1:F:87:ILE:N	2.26	0.50
1:A:12:ARG:NH1	1:A:47:ASN:OD1	2.43	0.49
1:A:81:ARG:HB2	1:A:117:HIS:HB3	1.93	0.49
1:B:166:SER:O	1:B:170:ASN:ND2	2.45	0.49
1:B:85:PHE:CD2	1:B:121:LEU:HD23	2.43	0.49
1:D:121:LEU:HD12	1:D:122:HIS:N	2.27	0.49
1:B:32:PHE:CD2	1:B:52:ASP:OD2	2.65	0.49
1:E:18:ILE:HD11	1:E:70:LEU:HD13	1.94	0.48
1:C:57:ARG:HG2	1:C:72:GLU:HG3	1.96	0.48
1:B:8:ARG:HH11	1:B:8:ARG:HG2	1.79	0.48
1:A:132:HIS:O	1:A:136:GLU:CG	2.62	0.48
1:B:125:VAL:HG21	1:B:144:HIS:CE1	2.49	0.48
1:F:141:GLU:OE2	1:F:159:LYS:NZ	2.40	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:22:ASN:HA	1:B:25:ARG:HG2	1.96	0.48
1:D:121:LEU:HD12	1:D:121:LEU:C	2.35	0.47
1:D:121:LEU:HD23	1:D:139:PHE:CE1	2.50	0.47
1:E:27:ILE:CD1	1:E:27:ILE:C	2.83	0.47
1:E:25:ARG:CB	1:E:27:ILE:HD12	2.34	0.46
1:B:18:ILE:CD1	1:B:70:LEU:HD13	2.46	0.46
1:C:55:GLU:HG2	1:C:74:ILE:HA	1.97	0.46
1:E:125:VAL:HG22	1:E:159:LYS:HD3	1.97	0.46
1:F:8:ARG:NH2	1:F:14:ASP:OD1	2.39	0.46
1:B:11:GLU:O	1:B:12:ARG:C	2.53	0.46
1:A:56:ARG:NH1	1:A:56:ARG:HB3	2.31	0.46
1:C:87:ILE:HD11	1:C:102:LEU:HD12	1.98	0.46
1:D:4:GLN:HG2	1:D:5:LEU:N	2.31	0.45
1:A:56:ARG:NH1	1:F:37:GLU:HG3	2.32	0.45
1:F:129:LYS:HD3	1:F:129:LYS:N	2.31	0.45
1:F:151:ILE:HG22	1:F:152:ASN:OD1	2.16	0.45
1:C:11:GLU:O	1:C:12:ARG:C	2.55	0.45
1:E:109:TYR:CD1	1:E:113:ILE:HD12	2.52	0.45
1:C:27:ILE:HG13	1:C:28:MET:O	2.16	0.45
1:D:5:LEU:O	1:D:105:ARG:NH2	2.48	0.45
1:D:22:ASN:HB3	1:D:29:SER:OG	2.17	0.45
1:C:51[A]:HIS:CE1	1:D:44:GLU:HG2	2.51	0.44
1:E:103:ILE:HG22	1:E:107:LEU:HD11	1.98	0.44
1:C:11:GLU:N	1:C:14:ASP:OD2	2.51	0.44
1:C:72:GLU:OE2	1:C:86:GLN:OE1	2.35	0.44
1:F:104:ASN:HA	1:F:107:LEU:HD12	1.98	0.44
1:E:27:ILE:HD13	1:E:27:ILE:O	2.18	0.44
1:C:125:VAL:HG21	1:C:144:HIS:CE1	2.53	0.44
1:B:18:ILE:HD11	1:B:70:LEU:HD13	2.00	0.43
1:B:81:ARG:NH1	1:C:81:ARG:NH1	2.66	0.43
1:E:2:ASN:N	1:E:4:GLN:HE21	2.17	0.43
1:A:133:LEU:HA	1:A:136:GLU:HG3	1.99	0.43
1:B:125:VAL:HG21	1:B:144:HIS:NE2	2.34	0.43
1:C:2:ASN:HB3	1:C:101:THR:HG21	1.99	0.43
1:C:18:ILE:CD1	1:C:70:LEU:HD13	2.48	0.43
1:A:132:HIS:O	1:A:136:GLU:HG2	2.18	0.43
1:C:168:TYR:HA	1:C:171:ARG:HG3	1.99	0.43
1:A:48:LYS:HG2	1:A:49:HIS:CD2	2.53	0.43
1:D:32:PHE:O	1:D:33:GLU:HB2	2.19	0.43
1:D:57:ARG:HG2	1:D:72:GLU:HG2	2.00	0.43
1:D:118:LYS:HE3	1:D:162:TYR:HB2	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:145:LEU:O	1:B:157:ASP:HA	2.19	0.42
1:E:25:ARG:O	1:E:26:ASN:CB	2.63	0.42
1:A:61:GLU:HA	1:A:66:ASN:O	2.19	0.42
1:B:126:GLU:OE2	1:B:154:ARG:NH1	2.47	0.42
1:A:132:HIS:O	1:A:136:GLU:HG3	2.19	0.42
1:E:150:PHE:CZ	1:E:153:GLY:HA2	2.55	0.42
1:E:27:ILE:C	1:E:27:ILE:HD13	2.40	0.41
1:C:10:LEU:HG	1:C:11:GLU:N	2.36	0.41
1:E:141:GLU:OE2	1:E:159:LYS:NZ	2.49	0.41
1:A:10:LEU:CD1	1:A:18:ILE:HD11	2.51	0.41
1:C:32:PHE:HA	1:C:55:GLU:OE1	2.19	0.41
1:C:152:ASN:O	1:C:152:ASN:CG	2.58	0.41
1:A:121:LEU:HD12	1:A:122:HIS:N	2.35	0.41
1:F:86:GLN:HG2	1:F:87:ILE:H	1.84	0.41
1:D:125:VAL:HG21	1:D:144:HIS:CE1	2.56	0.41
1:C:62:ASP:OD1	1:C:64:GLN:N	2.54	0.40
1:E:74:ILE:HG13	1:E:84:GLU:HB3	2.03	0.40
1:A:11:GLU:O	1:A:14:ASP:HB2	2.21	0.40
1:A:17:PHE:CE2	1:A:21:LEU:HD11	2.56	0.40
1:B:80:HIS:CD2	1:D:149:PHE:HD1	2.39	0.40
1:B:31:TRP:CH2	1:B:57:ARG:HD2	2.56	0.40
1:C:85:PHE:HD2	1:C:121:LEU:CD2	2.34	0.40
1:D:121:LEU:CD1	1:D:123:VAL:HG23	2.51	0.40
1:E:27:ILE:CD1	1:E:27:ILE:O	2.69	0.40
1:F:171:ARG:O	1:F:171:ARG:HG2	2.22	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	170/176 (97%)	162 (95%)	8 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	170/176 (97%)	158 (93%)	12 (7%)	0	100	100
1	C	170/176 (97%)	159 (94%)	11 (6%)	0	100	100
1	D	168/176 (96%)	155 (92%)	13 (8%)	0	100	100
1	E	167/176 (95%)	153 (92%)	14 (8%)	0	100	100
1	F	168/176 (96%)	158 (94%)	10 (6%)	0	100	100
All	All	1013/1056 (96%)	945 (93%)	68 (7%)	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	156/159 (98%)	148 (95%)	8 (5%)	24	53
1	B	156/159 (98%)	149 (96%)	7 (4%)	27	59
1	C	156/159 (98%)	148 (95%)	8 (5%)	24	53
1	D	154/159 (97%)	144 (94%)	10 (6%)	17	42
1	E	153/159 (96%)	140 (92%)	13 (8%)	10	29
1	F	154/159 (97%)	139 (90%)	15 (10%)	8	23
All	All	929/954 (97%)	868 (93%)	61 (7%)	16	41

All (61) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	GLU
1	A	26	ASN
1	A	44	GLU
1	A	45	LEU
1	A	56	ARG
1	A	110	SER
1	A	133	LEU
1	A	160	ARG

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Mol	Chain	Res	Type
1	B	6	THR
1	B	25	ARG
1	B	56	ARG
1	B	100	ARG
1	B	104	ASN
1	B	105	ARG
1	B	129	LYS
1	C	44	GLU
1	C	56	ARG
1	C	86	GLN
1	C	101	THR
1	C	105	ARG
1	C	110	SER
1	C	123	VAL
1	C	166	SER
1	D	23	ASN
1	D	25	ARG
1	D	50	ILE
1	D	85	PHE
1	D	92	GLU
1	D	105	ARG
1	D	110	SER
1	D	136	GLU
1	D	145	LEU
1	D	160	ARG
1	E	4	GLN
1	E	10	LEU
1	E	15	LEU
1	E	27	ILE
1	E	28	MET
1	E	45	LEU
1	E	53	ASN
1	E	85	PHE
1	E	86	GLN
1	E	110	SER
1	E	129	LYS
1	E	133	LEU
1	E	159	LYS
1	F	4	GLN
1	F	7	LEU
1	F	15	LEU
1	F	25	ARG

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Mol	Chain	Res	Type
1	F	27	ILE
1	F	33	GLU
1	F	45	LEU
1	F	87	ILE
1	F	102	LEU
1	F	104	ASN
1	F	121	LEU
1	F	129	LYS
1	F	133	LEU
1	F	145	LEU
1	F	166	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	2	ASN
1	A	22	ASN
1	A	26	ASN
1	A	51	HIS
1	A	117	HIS
1	A	156	GLN
1	B	4	GLN
1	B	53	ASN
1	B	94	GLN
1	B	170	ASN
1	C	53	ASN
1	C	86	GLN
1	C	94	GLN
1	D	22	ASN
1	D	23	ASN
1	D	26	ASN
1	D	53	ASN
1	D	93	HIS
1	E	26	ASN
1	E	94	GLN
1	E	104	ASN
1	F	4	GLN
1	F	86	GLN
1	F	94	GLN

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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

5 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
2	SO4	F	202	-	4,4,4	0.54	0	6,6,6	0.61	0
2	SO4	A	201	-	4,4,4	0.48	0	6,6,6	0.29	0
2	SO4	E	201	-	4,4,4	0.58	0	6,6,6	0.59	0
2	SO4	F	201	-	4,4,4	0.46	0	6,6,6	0.30	0
2	SO4	D	201	-	4,4,4	0.65	0	6,6,6	0.42	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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(Å²)	Q<0.9
1	A	172/176 (97%)	-0.17	3 (1%)	70	70	53, 80, 114, 166	0
1	B	171/176 (97%)	-0.27	1 (0%)	89	89	59, 77, 118, 141	0
1	C	171/176 (97%)	-0.26	0	100	100	61, 77, 112, 131	0
1	D	170/176 (96%)	-0.20	0	100	100	54, 79, 113, 156	0
1	E	169/176 (96%)	-0.18	1 (0%)	89	89	57, 85, 128, 171	0
1	F	170/176 (96%)	-0.23	1 (0%)	89	89	61, 84, 126, 144	0
All	All	1023/1056 (96%)	-0.22	6 (0%)	89	89	53, 80, 120, 171	0

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	24	ASN	6.2
1	E	170	ASN	3.1
1	A	25	ARG	2.7
1	A	172	SER	2.4
1	F	98	PHE	2.3
1	B	172	SER	2.1

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 monosaccharides in this entry.

6.4 Ligands ⓘ

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. The B-factors column lists the minimum, median, 95th 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	B-factors(Å^2)	Q<0.9
2	SO4	F	201	5/5	0.90	0.12	118,132,139,156	0
2	SO4	D	201	5/5	0.91	0.13	82,83,102,111	0
2	SO4	E	201	5/5	0.92	0.13	91,93,99,116	0
2	SO4	F	202	5/5	0.92	0.12	99,100,109,126	0
2	SO4	A	201	5/5	0.95	0.08	92,98,115,121	0

6.5 Other polymers ⓘ

There are no such residues in this entry.