Full wwPDB X-ray Structure Validation Report (i)

Jun 24, 2024 – 02:17 PM EDT

PDB ID	:	6XWV
Title	:	Crystal structure of drosophila melanogaster CENP-C bound to CAL1
Authors	:	Jeyaprakash, A.A.; Medina-Pritchard, B.; Lazou, V.; Zou, J.; Byron, O.; Abad, M.A.; Rappsilber, J.; Heun, P.
Deposited on	:	2020-01-24
Resolution	:	2.27 Å(reported)

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

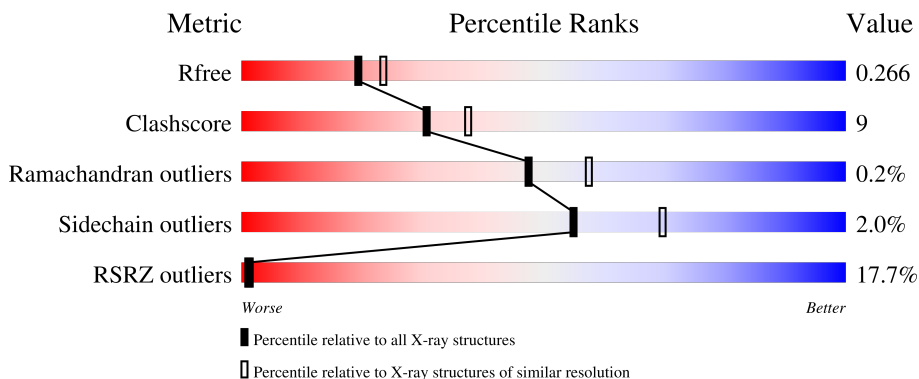|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.20.1
EDS	:	2.37.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 2.27 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		0.266
Clashscore		9
Ramachandran outliers		0.2%
Sidechain outliers		2.0%
RSRZ outliers		17.7%

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$_{free}$	130704	6980 (2.30-2.26)
Clashscore	141614	7711 (2.30-2.26)
Ramachandran outliers	138981	7597 (2.30-2.26)
Sidechain outliers	138945	7598 (2.30-2.26)
RSRZ outliers	127900	6849 (2.30-2.26)

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	1411	2% / 7% • 91%
1	B	1411	% / 7% • 91%
1	C	1411	% / 8% • 91%
1	D	1411	2% / 7% • 91%
2	E	979	% / • • 98%

WORLDWIDE
wwPDB
PROTEIN DATA BANK

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 4229 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 Calmodulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	133	Total 1041	C 659	N 178	O 197	S 7	0	0	0
1	B	125	Total 985	C 625	N 165	O 188	S 7	0	0	0
1	C	131	Total 1025	C 650	N 175	O 193	S 7	0	0	0
1	D	123	Total 969	C 617	N 160	O 185	S 7	0	0	0

- Molecule 2 is a protein called Ryanodine Receptor 2.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	E	24	Total 191	C 126	N 35	O 30	0	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	6	Total 6	O 6	0	0
3	E	1	Total 1	O 1	0	0
3	B	3	Total 3	O 3	0	0
3	C	3	Total 3	O 3	0	0
3	D	5	Total 5	O 5	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: Calmodulin

• Molecule 1: Calmodulin

%

Chain B: 7% · 91%

ASN HIS ARG SER GLU LYS LEU LEU LEU GLU GLU GLU ILE GLN ARG GLU LEU LEU ARG ARG ASN LEU MET ASP GLU ALA GLU GLY LEU PRO LYS GLN SER SER ASP ASP SER ASN GLU ASP TYR ILE PRO VAL PRO LYS THR GLN SER LEU ARG THR LYS SER ASN ASP ARG SER

GLN GLY ARG GLY PRO ARG SER THR ARG ASP LEU PRO MET THR THR GLU LEU VAL ASN TYR LEU GLY LEU SER GLN THR LEU GLU THR ARG ARG LYS SER SER ASP GLY LYS ARG CYS LEU TYR THR LYS SER ASP SER HIS GLU ASP ASP SER LEU SER PRO VAL

LYS LEU PRO ARG LEU SER SER ILE ILE GLN ILE VAL PRO PRO PRO VAL SER LEU ARG TYR SER GLN SER LEU GLN ASN LEU PRO CYS SER GLY LYS ASP PHE ASP ASN VAL VAL MET ALA ALA PRO PRO ASP PHE HIS ASP SER VAL ASN SER ASP ALA ILE GLU ILE ALA PRO

PRO PRO PRO GLU TYR VAL VAL ASN THR ARG GLY ARG THR SER GLY ARG LYS SER ASN LYS ASP LEU LEU PRO PRO GLY GLY TYR GLU GLY GLN GLU GLU HIS ASP GLU ARG PRO ASP SER GLN PRO ARG CYS THR ALA LYS GLU LEU GLN SER SER THR GLN ASN GLY

ARG ARG ALA MET GLU ASN GLU LEU VAL PRO PRO ILE GLU TYR VAL GLU GLU ASN ARG ASN ASN GLU GLU SER ARG SER THR LYS ASN GLY ASN LEU VAL ASP ARG ASN THR HIS ASN ALA VAL GLU TYR CYS GLU PRO GLU PRO GLU TYR ASP ASP SER ASP HIS

GLY GLN ALA SER ILE LEU LEU ARG ARG SER GLY LYS LYS GLN LEU LEU GLN HIS SER LYS LEU GLN SER VAL GLN SER ASN LEU LYS SER ASN LYS GLU GLN ILE ILE ALA PRO SER TYR GLU ASN ASN GLU LEU VAL ASP ARG ASN THR HIS ASN GLU GLU ASP TYR GLY LYS GLU GLU SER GLN GLN ASN LYS ASN

VAL THR ARG ARG LYS SER ASP LYS ASP MET ALA SER HIS THR LEU GLU CYS ILE GLU GLY PRO ASP PRO ASN TRP ASN SER SER CYS ASN LYS GLN ASN ARG ASN HIS GLN ASN ALA SER ASP LYS SER LYS ASN ASP SER LEU ALA ASN ARG SER LYS SER GLN LYS LEU SER

ASN PRO ARG GLN ASN ALA VAL GLY THR GLU GLU LYS SER VAL ALA LEU SER ASN ARG GLY GLU GLU CYS THR GLU LYS SER ASP VAL MET GLU SER LEU ARG VAL ASN THR PRO THR PRO ILE ASP GLN GLN ASN SER ASP ASP VAL PRO SER ARG ASN PRO SER ARG THR LEU

LEU SER ASP ASP VAL PRO SER THR SER ARG ALA ALA LEU GLU PHE LEU GLN GLN ARG SER GLN ASN MET SER LYS SER ARG PRO ASP GLU SER SER ALA ASP VAL VAL PHE LYS LYS PRO LEU ALA PRO ARG ALA LYS SER LYS LYS GLY LYS SER GLU VAL LYS ASP LYS LYS LYS

LEU ALA LYS MET PRO VAL GLU GLU ALA GLU LEU ASN THR THR GLY ILE LEU ARG ARG SER GLN GLY LYS ARG GLY GLY VAL GLN LEU PRO GLN ASN MET SER TRP CYS HIS THR MET ASP PRO LYS SER PHE ASN PHE MET SER GLY PHE ILE GLU PRO ARG SER LYS ASN SER LYS THR LYS LYS GLY LYS ASN LEU

SER LYS ALA LYS LYS ALA SER ALA THR LYS PRO LYS PRO ARG GLY ARG PRO LYS VAL GLU VAL LYS ASN THR ILE VAL GLN LYS LEU PRO ASP ASN TRP THR PRO ILE LEU CYS SER SER THR PRO ARG ILE SER GLU LYS LEU GLY LYS SER GLU VAL ASP VAL LYS THR GLU THR GLU VAL VAL GLN

ALA GLU ALA GLU LYS VAL PRO LYS LYS ARG GLY ARG PRO LYS LYS ALA VAL GLY GLY VAL GLN THR ASP THR GLU GLU PRO GLU GLU GLU PRO MET ILE SER SER VAL ALA PRO LEU THR SER ASP GLU GLN GLU GLU PRO ASP ASP PRO VAL ARG ASP ASP ALA PRO TYR THR GLU

ALA ALA LEU GLY PRO VAL VAL PHE SER THR PRO LEU ARG **D1274** **E1275** **Q1276** **E1277** **E1278** **K1282** **R1288** **G1289** **V1290** **G1291** ASP ALA PRO PRO SER ALA SER MET SER ASP GLU ASN ALA **S1305** **V1306** **N1310** **Y1315** **Q1316** **I1320** **D1321** **Y1322** **A1323** **F1324** **E1329** **K1330** **G1334** **R1337** **K1343**

M1346 **K1347** **Q1348** **A1349** **K1350** **V1351** **H1352** **P1353** **L1356** **L1357** **V1358** **Q1359** **F1360** **G1361** **E1366** **A1369** **E1372** **M1385** **R1390** **Y1394** **D1401** **L1406** **M1407** **C1408** **I1409** **R1410** **S1411**

- Molecule 1: Calmodulin

Chain C: 8% ·   91%

MET SER LYS SER PRO GLN ASN ASN ASP THR LEU GLU LEU ASP ASP ILE LEU SER GLN PRO VAL LYS ASP PHE ALA ALA PHE MET MET ARG LEU ALA LEU ALA GLU LYS PRO ALA GLN ASN ASP SER ASN LEU PHE GLY LYS ASN PHE LYS ASP ASP PHE LEU ASP GLU VAL PRO

LEU ILE LYS LYS SER GLN ALA LYS PRO LYS SER LEU PRO VAL GLN PRO LEU GLY LEU LEU VAL SER ASN SER ALA ALA THR GLU LYS VAL VAL ASP GLU PRO VAL ASP ALA PRO GLN SER ASN GLU GLU LEU PHE GLY LYS ASN PHE LYS ASP ASP PHE PRO PHE GLU VAL PRO GLY VAL LEU PRO LYS ASN GLN ILE SER GLU ALA ALA PRO ASN LEU VAL PRO ARG ARG SER PRO THR LEU SER PRO ASN ASN ARG ARG

SER MET ARG SER GLY ASN VAL ALA VAL PRO GLY SER ASP GLY ARG LEU ARG HIS ALA ILE ARG ARG SER ARG CYS GLY ARG GLN LEU LEU PRO GLU LEU VAL ASN SER ILE SER SER PRO VAL ASN PHE LEU PRO GLU GLU ILE SER SER THR PRO CYS THR

GLU LYS GLN LYS GLU VAL ALA LYS ASN THR THR ARG VAL GLU THR ASP THR LEU LYS PRO MET GLU GLU PRO GLU GLU GLU LEU ASN PRO ASP GLU GLN THR VAL ASN THR SER PRO ALA ARG ASN PRO ILE LEU LEU ALA ALA GLU ILE GLU GLN ILE CYS LYS GLU ARG

• Molecule 1: Calmodulin

Chain D:

2%

7%

91%

• Molecule 2: Ryanodine Receptor 2

Chain E: %

    98%

GLY GLY ASP PRO ASP CYS THR VAL VAL THR SER THR THR GLY CYS GLU PRO PRO ALA SER GLU ARG GLN GLU ILE PRO ALA THR ILE LYS ILE THR LYS ARG GLY ILE LEU LEU HIS SER PRO SER ALA PRO GLU GLY ALA SER PHE **T890 L891 T892 E893 Q894 G895 I899 L909 K910**

Y911 H912 I913 GLY SER ARG SER PHE ASP SER ARG HIS SER VAL TYR TYR GLN PRO THR PRO GLN LEU ALA ALA ALA LEU SER ALA PRO GLN ASP ALA GLN ASN ILE GLY ASN ILE SER GLY SER SER ALA SER ASP ASP ASP ILE PHE GLU GLN ILE ASN ARG TYR GLY THR VAL TYR SER

ILE LEU GLU ASN ASN SER GLY ASP LYS

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	86.27Å 86.44Å 88.46Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.08 – 2.27 29.10 – 2.27	Depositor EDS
% Data completeness (in resolution range)	98.4 (29.08-2.27) 92.1 (29.10-2.27)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.57 (at 2.26Å)	Xtriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.237 , 0.266 0.240 , 0.266	Depositor DCC
R_{free} test set	1961 reflections (6.33%)	wwPDB-VP
Wilson B-factor (Å^2)	40.5	Xtriage
Anisotropy	1.016	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 49.6	EDS
L-test for twinning[2]	$< |L| > = 0.47, < L^2 > = 0.30$	Xtriage
Estimated twinning fraction	0.000 for -h,l,k 0.000 for -l,-k,-h 0.000 for k,h,-l 0.000 for k,l,h 0.000 for l,h,k	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	4229	wwPDB-VP
Average B, all atoms (Å^2)	71.0	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 42.84 % 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 1.9248e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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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	0.36	0/1058	0.71	4/1425 (0.3%)
1	B	0.48	1/1000 (0.1%)	0.82	6/1345 (0.4%)
1	C	0.36	0/1042	0.56	1/1403 (0.1%)
1	D	0.36	0/984	0.67	1/1325 (0.1%)
2	E	0.24	0/195	0.42	0/262
All	All	0.39	1/4279 (0.0%)	0.69	12/5760 (0.2%)

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	B	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	1390	ARG	CZ-NH1	5.92	1.40	1.33

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	1390	ARG	NE-CZ-NH2	-11.31	114.64	120.30
1	A	1381	ARG	CG-CD-NE	9.18	131.08	111.80
1	A	1339	LYS	CA-CB-CG	8.01	131.02	113.40
1	B	1278	GLU	CB-CA-C	6.60	123.60	110.40
1	B	1315	TYR	CA-CB-CG	6.33	125.42	113.40
1	B	1352	HIS	N-CA-C	5.93	127.02	111.00
1	D	1277	GLU	CA-CB-CG	5.64	125.80	113.40
1	B	1390	ARG	CD-NE-CZ	5.54	131.36	123.60
1	C	1277	GLU	CA-CB-CG	-5.44	101.43	113.40
1	A	1381	ARG	CA-CB-CG	5.37	125.22	113.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	1406	LEU	CA-CB-CG	5.21	127.28	115.30
1	A	1381	ARG	CB-CG-CD	-5.14	98.25	111.60

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	1390	ARG	Sidechain

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	1041	0	1021	18	0
1	B	985	0	962	24	0
1	C	1025	0	1009	12	0
1	D	969	0	943	22	0
2	E	191	0	192	5	0
3	A	6	0	0	0	0
3	B	3	0	0	0	0
3	C	3	0	0	0	0
3	D	5	0	0	0	0
3	E	1	0	0	0	0
All	All	4229	0	4127	77	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 (77) 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:B:1352:HIS:HE1	1:B:1411:SER:N	1.74	0.86
1:B:1352:HIS:HE1	1:B:1411:SER:H	1.27	0.80
1:D:1352:HIS:CD2	1:D:1353:PRO:HD2	2.22	0.75
1:D:1352:HIS:ND1	1:D:1410:ARG:HB3	2.04	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1352:HIS:CE1	1:B:1411:SER:N	2.57	0.73
1:D:1354:LEU:HB3	1:D:1388:ILE:HB	1.73	0.71
1:B:1343:LYS:HD3	1:B:1343:LYS:H	1.58	0.67
1:D:1352:HIS:CE1	1:D:1411:SER:O	2.48	0.67
1:B:1352:HIS:CE1	1:B:1411:SER:H	2.09	0.66
1:B:1369:ALA:HB3	1:B:1372:GLU:HG3	1.80	0.63
2:E:892:THR:HG23	2:E:895:GLY:H	1.64	0.63
1:D:1352:HIS:NE2	1:D:1411:SER:O	2.32	0.63
1:A:1390:ARG:HH11	1:A:1390:ARG:HG3	1.63	0.62
1:D:1356:LEU:HD22	1:D:1406:LEU:HD21	1.80	0.61
1:D:1349:ALA:HB1	1:D:1352:HIS:O	2.01	0.60
1:C:1346:MET:O	1:C:1347:LYS:HD3	2.02	0.60
1:C:1370:VAL:HG23	1:C:1371:GLY:H	1.66	0.60
1:D:1281:THR:O	1:D:1285:GLN:HG3	2.03	0.57
1:C:1352:HIS:ND1	1:C:1411:SER:O	2.37	0.57
1:A:1274:ASP:O	1:A:1278:GLU:HG3	2.05	0.56
1:D:1319:GLY:O	1:D:1342:GLN:NE2	2.33	0.55
1:D:1352:HIS:HE1	1:D:1411:SER:N	2.05	0.55
1:B:1352:HIS:ND1	1:B:1353:PRO:O	2.40	0.54
1:B:1353:PRO:HD3	1:B:1390:ARG:HH21	1.74	0.53
1:B:1401:ASP:OD2	1:B:1401:ASP:N	2.35	0.53
1:B:1278:GLU:O	1:B:1282:LYS:HG2	2.09	0.53
1:A:1321:ASP:HB2	1:A:1337:ARG:HB3	1.91	0.53
1:B:1288:ARG:HD3	1:B:1360:PHE:CE2	2.45	0.52
1:A:1390:ARG:HH11	1:A:1390:ARG:CG	2.23	0.52
1:D:1329:GLU:HG2	1:D:1332:MET:SD	2.51	0.50
1:A:1402:LYS:NZ	1:B:1276:GLN:HB2	2.27	0.49
1:C:1295:PRO:O	1:C:1310:ASN:HB3	2.12	0.49
1:C:1346:MET:HG2	1:C:1393:ARG:HB3	1.94	0.49
1:C:1362:GLU:HB3	1:C:1399:ALA:HB3	1.95	0.49
1:C:1362:GLU:HG3	1:C:1381:ARG:HG2	1.94	0.48
1:C:1346:MET:HA	1:C:1394:TYR:O	2.12	0.48
1:D:1321:ASP:HB2	1:D:1337:ARG:HB3	1.95	0.48
1:A:1344:ARG:NH2	1:A:1394:TYR:OH	2.46	0.48
2:E:912:HIS:O	1:C:1410:ARG:NH2	2.47	0.48
1:B:1343:LYS:HD3	1:B:1343:LYS:N	2.25	0.48
1:D:1341:TYR:HA	1:D:1398:ASN:O	2.14	0.48
1:B:1316:GLN:HA	1:B:1320:ILE:O	2.14	0.47
1:D:1329:GLU:CG	1:D:1332:MET:SD	3.02	0.47
1:D:1324:PHE:CD1	1:D:1334:GLY:HA3	2.50	0.47
1:B:1321:ASP:HB2	1:B:1337:ARG:HB3	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1343:LYS:HA	1:A:1397:GLN:HA	1.96	0.47
1:B:1315:TYR:N	1:B:1322:TYR:O	2.46	0.46
1:A:1378:SER:HB3	1:B:1306:VAL:HG21	1.98	0.46
1:A:1295:PRO:HG2	1:A:1309:ALA:HB1	1.98	0.45
1:C:1286:TRP:CD1	1:C:1287:LEU:HD23	2.52	0.45
1:A:1346:MET:HA	1:A:1394:TYR:O	2.18	0.44
1:A:1358:VAL:HA	1:A:1406:LEU:HD12	1.99	0.44
1:A:1341:TYR:HA	1:A:1398:ASN:O	2.17	0.44
1:D:1352:HIS:CE1	1:D:1411:SER:N	2.85	0.44
1:B:1349:ALA:HB1	1:B:1352:HIS:O	2.18	0.44
1:D:1364:ASN:OD1	1:D:1379:VAL:HG12	2.17	0.44
1:D:1354:LEU:HD23	1:D:1355:LYS:N	2.34	0.43
1:B:1346:MET:O	1:B:1347:LYS:HG2	2.19	0.43
1:D:1356:LEU:CD2	1:D:1406:LEU:HD21	2.45	0.43
1:A:1276:GLN:HG2	1:B:1361:GLY:HA2	1.99	0.43
1:A:1303:ASN:HD21	1:A:1305:SER:HB2	1.84	0.43
1:A:1290:VAL:HG13	1:A:1290:VAL:O	2.18	0.43
1:A:1303:ASN:ND2	1:A:1305:SER:HB2	2.34	0.43
1:C:1341:TYR:HA	1:C:1398:ASN:O	2.18	0.42
1:D:1366:GLU:O	1:D:1394:TYR:HA	2.20	0.42
1:B:1352:HIS:HA	1:B:1353:PRO:HD3	1.76	0.42
1:B:1366:GLU:O	1:B:1394:TYR:HA	2.20	0.42
1:D:1352:HIS:HE1	1:D:1410:ARG:C	2.23	0.42
2:E:895:GLY:O	2:E:899:ILE:HG12	2.21	0.41
2:E:909:LEU:HD23	2:E:909:LEU:HA	1.77	0.41
1:B:1324:PHE:CD1	1:B:1334:GLY:HA3	2.56	0.41
2:E:892:THR:HG23	2:E:895:GLY:N	2.33	0.41
1:C:1407:MET:HE3	1:C:1407:MET:HB2	1.86	0.41
1:D:1329:GLU:CD	1:D:1332:MET:SD	2.99	0.41
1:A:1402:LYS:HB2	1:A:1402:LYS:HE2	1.69	0.40
1:A:1380:LEU:HD22	1:A:1384:ASP:HB3	2.03	0.40
1:B:1352:HIS:HE1	1:B:1410:ARG:C	2.24	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	129/1411 (9%)	124 (96%)	4 (3%)	1 (1%)	19	22
1	B	121/1411 (9%)	119 (98%)	2 (2%)	0	100	100
1	C	127/1411 (9%)	121 (95%)	6 (5%)	0	100	100
1	D	119/1411 (8%)	117 (98%)	2 (2%)	0	100	100
2	E	22/979 (2%)	22 (100%)	0	0	100	100
All	All	518/6623 (8%)	503 (97%)	14 (3%)	1 (0%)	47	57

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1372	GLU

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	110/1275 (9%)	107 (97%)	3 (3%)	44	59
1	B	105/1275 (8%)	102 (97%)	3 (3%)	42	56
1	C	109/1275 (8%)	106 (97%)	3 (3%)	43	57
1	D	103/1275 (8%)	103 (100%)	0	100	100
2	E	17/861 (2%)	17 (100%)	0	100	100
All	All	444/5961 (7%)	435 (98%)	9 (2%)	55	70

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1308	SER
1	A	1381	ARG
1	A	1389	ASP

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Mol	Chain	Res	Type
1	B	1310	ASN
1	B	1315	TYR
1	B	1343	LYS
1	C	1282	LYS
1	C	1346	MET
1	C	1389	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	1352	HIS
1	C	1316	GLN
1	D	1397	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 ⓘ

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(Å²)	Q<0.9
1	A	133/1411 (9%)	1.00	24 (18%)	1	1	39, 62, 111, 152	0
1	B	125/1411 (8%)	0.99	21 (16%)	1	2	41, 67, 114, 141	0
1	C	131/1411 (9%)	1.03	21 (16%)	1	2	41, 64, 126, 147	0
1	D	123/1411 (8%)	1.07	22 (17%)	1	1	43, 74, 123, 154	0
2	E	24/979 (2%)	1.10	7 (29%)	0	0	48, 61, 83, 114	0
All	All	536/6623 (8%)	1.03	95 (17%)	1	1	39, 67, 118, 154	0

All (95) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	1293	ALA	8.8
1	B	1315	TYR	8.6
1	D	1352	HIS	8.0
1	C	1292	ASP	7.9
1	A	1373	GLU	6.4
1	C	1370	VAL	6.1
1	A	1370	VAL	6.0
1	B	1305	SER	5.9
1	B	1352	HIS	5.7
1	B	1291	GLY	5.2
1	C	1351	VAL	5.2
1	D	1328	LYS	5.1
1	C	1291	GLY	5.1
1	C	1304	ALA	5.0
1	C	1289	GLY	4.9
1	D	1315	TYR	4.8
1	D	1351	VAL	4.6
1	A	1406	LEU	4.4
2	E	890	THR	4.4
1	A	1407	MET	4.4

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Mol	Chain	Res	Type	RSRZ
1	A	1371	GLY	4.3
1	D	1289	GLY	4.1
1	B	1411	SER	4.1
2	E	895	GLY	3.8
2	E	892	THR	3.8
1	C	1371	GLY	3.7
1	B	1351	VAL	3.6
1	A	1408	CYS	3.6
1	A	1293	ALA	3.5
1	B	1357	LEU	3.5
1	A	1390	ARG	3.4
1	A	1302	GLU	3.4
1	D	1411	SER	3.4
2	E	894	GLN	3.3
1	D	1357	LEU	3.3
1	C	1376	VAL	3.3
1	A	1294	PRO	3.2
1	C	1407	MET	3.2
1	A	1333	LEU	3.2
1	B	1290	VAL	3.1
1	D	1286	TRP	3.1
1	A	1359	GLN	3.1
1	A	1381	ARG	3.0
1	C	1294	PRO	3.0
1	A	1374	LYS	2.9
1	B	1409	ILE	2.8
1	B	1408	CYS	2.8
1	D	1322	TYR	2.8
1	A	1296	SER	2.8
1	A	1357	LEU	2.8
2	E	893	GLU	2.8
1	B	1385	MET	2.8
1	C	1357	LEU	2.8
1	D	1280	SER	2.8
1	B	1278	GLU	2.8
1	D	1358	VAL	2.7
1	D	1317	VAL	2.7
1	A	1334	GLY	2.7
1	B	1289	GLY	2.7
1	D	1329	GLU	2.6
1	D	1370	VAL	2.6
1	A	1329	GLU	2.6

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Mol	Chain	Res	Type	RSRZ
1	B	1390	ARG	2.6
1	A	1372	GLU	2.6
1	A	1358	VAL	2.6
1	B	1406	LEU	2.5
1	C	1334	GLY	2.4
1	D	1409	ILE	2.4
1	D	1407	MET	2.4
2	E	891	LEU	2.4
1	C	1377	HIS	2.3
1	B	1330	LYS	2.3
1	B	1275	GLU	2.3
1	B	1356	LEU	2.3
1	C	1290	VAL	2.3
1	D	1278	GLU	2.3
1	A	1291	GLY	2.3
1	D	1313	ILE	2.3
1	A	1282	LYS	2.2
1	C	1295	PRO	2.2
1	B	1329	GLU	2.2
1	B	1359	GLN	2.2
1	D	1408	CYS	2.2
1	D	1353	PRO	2.2
1	D	1410	ARG	2.2
1	C	1333	LEU	2.2
1	C	1336	MET	2.2
1	C	1373	GLU	2.1
1	C	1374	LYS	2.1
1	A	1287	LEU	2.0
1	A	1368	LEU	2.0
1	C	1406	LEU	2.0
1	B	1407	MET	2.0
1	D	1290	VAL	2.0
2	E	911	TYR	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 monosaccharides 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.