Full wwPDB X-ray Structure Validation Report (i)

May 25, 2020 – 01:33 am BST

PDB ID	:	4PLS
Title	:	Crystal Structures of Designed Armadillo Repeat Proteins: Implications of Construct Design and Crystallization Conditions on Overall Structure.
Authors	:	Reichen, C.; Madhurantakam, C.; Plueckthun, A.; Mittl, P.R.
Deposited on	:	2014-05-19
Resolution	:	2.35 Å(reported)

The following versions of software and data (see references (i)) 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	:	2.11
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)	:	2.11

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.35 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.
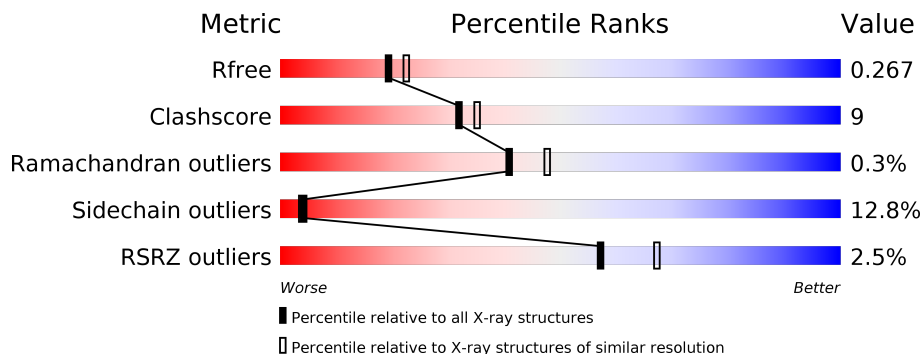
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1164 (2.36-2.36)
Clashscore	141614	1232 (2.36-2.36)
Ramachandran outliers	138981	1211 (2.36-2.36)
Sidechain outliers	138945	1212 (2.36-2.36)
RSRZ outliers	127900	1150 (2.36-2.36)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for >=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	281	2% ... 72% ... 23% ... •
1	B	281	3% ... 75% ... 19% ... 6%
1	C	281	4% ... 81% ... 15% ... •
1	D	281	% ... 77% ... 19% ... •

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 8529 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 Arm00010.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	280	Total 2074	C 1292	N 353	O 428	S 1	0	1	0
1	B	281	Total 2088	C 1300	N 356	O 431	S 1	0	2	0
1	C	280	Total 2074	C 1292	N 353	O 428	S 1	0	1	0
1	D	280	Total 2065	C 1287	N 351	O 426	S 1	0	0	0

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	5	Total 5	Ca 5	0	0
2	A	5	Total 5	Ca 5	0	0

- Molecule 3 is ACETATE ION (three-letter code: ACT) (formula: $C_2H_3O_2$).

ACT

OXT

O⁻

C

CH3

O

O

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total 4	C 2	O 2	0	0
3	C	1	Total 4	C 2	O 2	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	59	Total 59	O 59	0	0
4	B	61	Total 61	O 61	0	0
4	C	36	Total 36	O 36	0	0
4	D	54	Total 54	O 54	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.
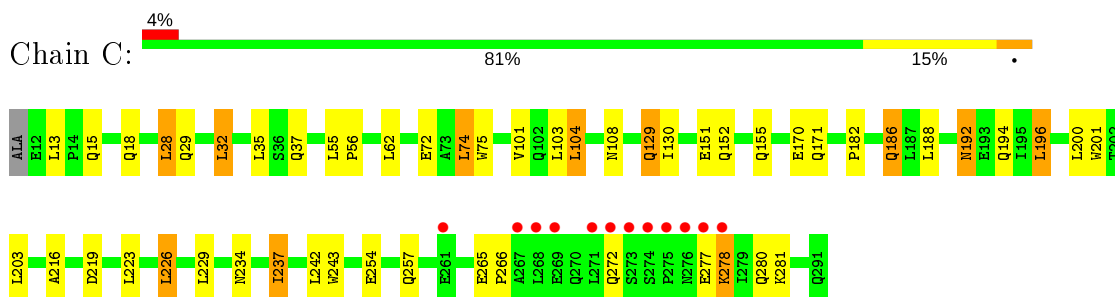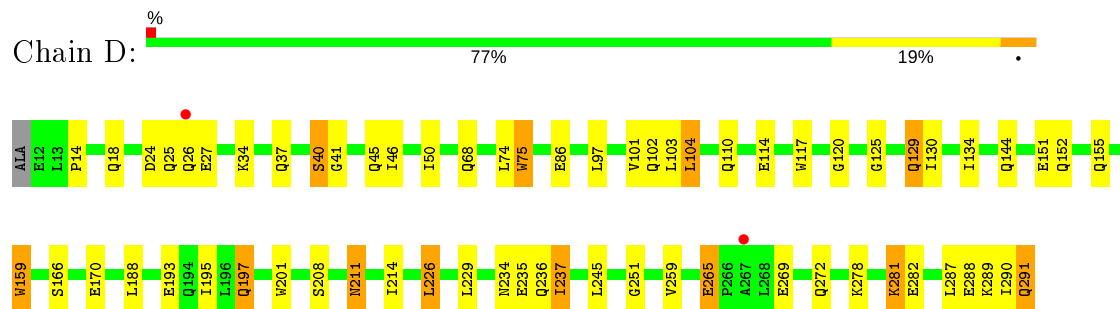
- Molecule 1: Arm00010

- Molecule 1: Arm00010

- Molecule 1: Arm00010

- Molecule 1: Arm00010

Chain D:
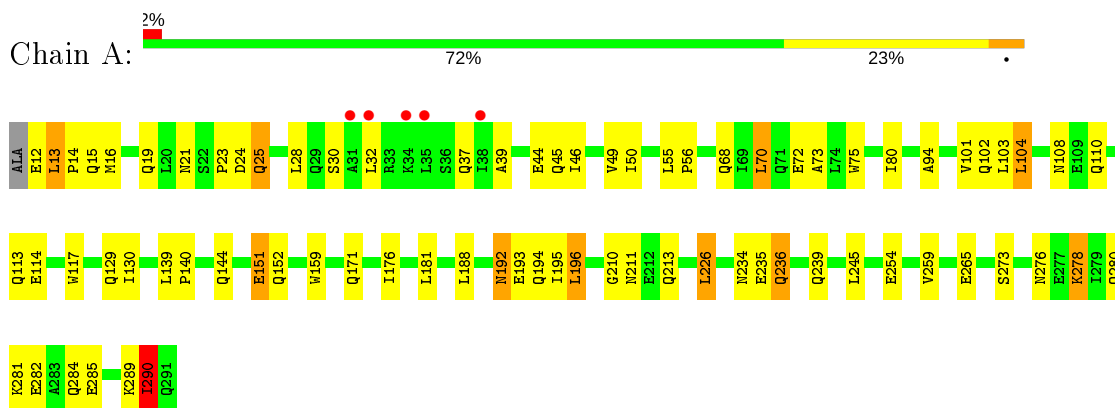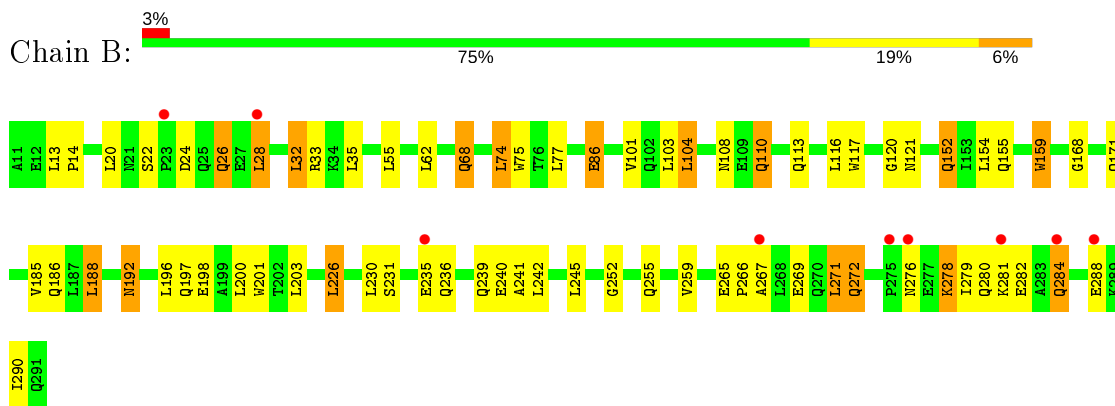
4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	63.87Å 95.86Å 177.07Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.27 – 2.35 46.27 – 2.35	Depositor EDS
% Data completeness (in resolution range)	99.5 (46.27-2.35) 99.5 (46.27-2.35)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	3.10 (at 2.34Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.183 , 0.267 0.182 , 0.267	Depositor DCC
R_{free} test set	2322 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å^2)	35.7	Xtriage
Anisotropy	0.117	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 36.9	EDS
L-test for twinning[2]	$<|L|> = 0.44$, $<L^2> = 0.27$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	8529	wwPDB-VP
Average B, all atoms (Å^2)	47.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 16.09% 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)

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

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	0.71	3/2097 (0.1%)	0.78	2/2859 (0.1%)
1	B	0.71	3/2111 (0.1%)	0.81	1/2878 (0.0%)
1	C	0.68	3/2097 (0.1%)	0.78	1/2859 (0.0%)
1	D	0.71	4/2088 (0.2%)	0.82	1/2847 (0.0%)
All	All	0.70	13/8393 (0.2%)	0.80	5/11443 (0.0%)

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	201	TRP	CD2-CE2	6.42	1.49	1.41
1	C	75	TRP	CD2-CE2	5.95	1.48	1.41
1	D	75	TRP	CD2-CE2	5.77	1.48	1.41
1	D	117	TRP	CD2-CE2	5.73	1.48	1.41
1	C	201	TRP	CD2-CE2	5.71	1.48	1.41
1	A	117	TRP	CD2-CE2	5.59	1.48	1.41
1	B	75	TRP	CD2-CE2	5.51	1.48	1.41
1	C	243	TRP	CD2-CE2	5.42	1.47	1.41
1	B	117	TRP	CD2-CE2	5.42	1.47	1.41
1	A	75	TRP	CD2-CE2	5.33	1.47	1.41
1	B	159	TRP	CD2-CE2	5.25	1.47	1.41
1	A	159	TRP	CD2-CE2	5.16	1.47	1.41
1	D	159	TRP	CD2-CE2	5.04	1.47	1.41

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	28	LEU	CA-CB-CG	7.52	132.60	115.30
1	A	226	LEU	CA-CB-CG	6.07	129.25	115.30
1	D	226	LEU	CB-CG-CD1	6.00	121.19	111.00
1	A	70	LEU	CA-CB-CG	5.22	127.30	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	55	LEU	CB-CG-CD1	-5.01	102.48	111.00

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	2074	0	2081	53	0
1	B	2088	0	2093	45	0
1	C	2074	0	2081	33	0
1	D	2065	0	2073	41	0
2	A	5	0	0	0	0
2	B	5	0	0	0	0
3	B	4	0	3	0	0
3	C	4	0	3	0	0
4	A	59	0	0	1	0
4	B	61	0	0	4	0
4	C	36	0	0	0	0
4	D	54	0	0	4	0
All	All	8529	0	8334	148	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 (148) 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:13:LEU:H	1:A:14:PRO:HD3	1.15	1.05
1:A:210:GLY:H	1:A:213:GLN:HE21	1.04	0.93
1:A:13:LEU:H	1:A:14:PRO:CD	1.81	0.92
1:A:110:GLN:NE2	1:C:155:GLN:HE22	1.69	0.90
1:A:210:GLY:N	1:A:213:GLN:HE21	1.73	0.86
1:A:210:GLY:H	1:A:213:GLN:NE2	1.74	0.85
1:C:182:PRO:O	1:C:186[B]:GLN:HG2	1.76	0.84

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:265:GLU:HG2	1:D:290:ILE:HD12	1.63	0.80
1:A:192:ASN:HD22	1:A:192:ASN:C	1.84	0.80
1:A:110:GLN:NE2	1:C:155:GLN:NE2	2.30	0.80
1:A:259:VAL:HG12	1:B:13:LEU:HG	1.66	0.76
1:C:62:LEU:CD2	1:C:74:LEU:HD13	2.17	0.73
1:A:113:GLN:OE1	1:A:152:GLN:HG2	1.89	0.73
1:B:192:ASN:C	1:B:192:ASN:HD22	1.94	0.71
1:B:24:ASP:OD1	1:B:26:GLN:HG3	1.92	0.70
1:C:229:LEU:HD22	1:C:237:ILE:HD11	1.76	0.68
1:C:62:LEU:HD22	1:C:74:LEU:HD13	1.76	0.67
1:A:13:LEU:N	1:A:14:PRO:CD	2.55	0.66
1:A:114:GLU:HG3	4:A:445:HOH:O	1.96	0.66
1:B:185:VAL:O	1:B:188:LEU:HB2	1.96	0.66
1:B:272:GLN:NE2	1:B:272:GLN:HA	2.11	0.65
1:A:39:ALA:HB2	1:A:49:VAL:HG21	1.79	0.65
1:D:24:ASP:HB3	1:D:27:GLU:HB2	1.77	0.65
1:A:13:LEU:N	1:A:14:PRO:HD3	1.96	0.64
1:C:13:LEU:HG	1:D:259:VAL:HG12	1.80	0.64
1:B:198:GLU:HG3	4:B:454:HOH:O	1.98	0.64
1:A:282:GLU:HB2	1:B:32:LEU:HD11	1.80	0.64
1:A:110:GLN:HE22	1:C:155:GLN:HE22	1.42	0.64
1:B:120:GLY:HA3	1:B:159:TRP:CZ3	2.32	0.64
1:C:32:LEU:HD13	1:D:282:GLU:HG2	1.78	0.63
1:B:86:GLU:HB2	4:B:426:HOH:O	1.99	0.63
1:B:201:TRP:CZ3	4:B:424:HOH:O	2.51	0.62
1:B:101:VAL:O	1:B:104:LEU:HB2	1.99	0.62
1:C:277:GLU:HG3	1:C:278:LYS:HD3	1.80	0.62
1:C:277:GLU:O	1:C:280:GLN:HG2	2.02	0.59
1:C:170:GLU:HG2	1:C:171:GLN:NE2	2.19	0.58
1:D:170:GLU:OE1	1:D:170:GLU:N	2.25	0.57
1:A:151:GLU:HG3	1:C:108:ASN:OD1	2.05	0.57
1:A:192:ASN:C	1:A:192:ASN:ND2	2.57	0.56
1:D:102:GLN:HG2	4:D:420:HOH:O	2.05	0.56
1:D:41:GLY:HA3	1:D:45:GLN:HE21	1.71	0.56
1:A:196:LEU:HD23	1:A:196:LEU:C	2.25	0.56
1:A:196:LEU:HD23	1:A:196:LEU:O	2.06	0.56
1:B:168:GLY:H	1:B:171:GLN:HE21	1.53	0.56
1:D:14:PRO:O	1:D:18:GLN:HG2	2.06	0.56
1:C:196:LEU:HD13	1:C:237:ILE:HG13	1.88	0.55
1:D:166:SER:HA	4:D:413:HOH:O	2.06	0.55
1:A:210:GLY:N	1:A:213:GLN:NE2	2.43	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:214:ILE:HD11	1:D:251:GLY:HA3	1.87	0.55
1:B:14:PRO:HG3	1:D:45:GLN:OE1	2.06	0.55
1:B:108:ASN:CG	1:D:151:GLU:HG3	2.26	0.55
1:B:276:ASN:HB3	1:B:279:ILE:HD12	1.88	0.55
1:C:192:ASN:HD22	1:C:192:ASN:C	2.10	0.54
1:A:192:ASN:ND2	1:A:194:GLN:H	2.04	0.54
1:D:75:TRP:HZ3	4:D:446:HOH:O	1.89	0.54
1:A:280:GLN:O	1:A:284:GLN:HB2	2.07	0.53
1:A:236:GLN:OE1	1:D:236:GLN:HG3	2.09	0.53
1:A:46:ILE:O	1:A:50:ILE:HG13	2.08	0.53
1:B:121:ASN:OD1	1:B:159:TRP:HH2	1.92	0.53
1:D:229:LEU:HD22	1:D:237:ILE:HD11	1.90	0.53
1:B:280:GLN:O	1:B:284:GLN:HB2	2.09	0.53
1:D:74:LEU:HG	1:D:114:GLU:HB3	1.90	0.52
1:A:55:LEU:HB2	1:A:56:PRO:HD3	1.91	0.52
1:A:234:ASN:CG	1:D:235:GLU:HG3	2.30	0.52
1:D:130:ILE:O	1:D:134:ILE:HG13	2.10	0.52
1:C:101:VAL:HA	1:C:104:LEU:HD22	1.92	0.51
1:A:45:GLN:O	1:A:49:VAL:HG23	2.10	0.51
1:B:108:ASN:ND2	1:D:151:GLU:HG3	2.26	0.51
1:D:125:GLY:HA3	1:D:129:GLN:HG3	1.93	0.51
1:A:110:GLN:HE22	1:C:155:GLN:NE2	2.02	0.51
1:C:101:VAL:O	1:C:104:LEU:HB2	2.11	0.50
1:A:282:GLU:CB	1:B:32:LEU:HD11	2.42	0.50
1:D:24:ASP:OD1	1:D:26:GLN:N	2.45	0.50
1:A:276:ASN:HD21	1:A:278:LYS:NZ	2.11	0.49
1:C:200:LEU:CD1	1:C:237:ILE:HG12	2.42	0.49
1:B:68:GLN:HE22	1:D:197:GLN:HG2	1.78	0.49
1:A:176:ILE:HG12	1:A:181:LEU:HD11	1.94	0.49
1:B:110:GLN:NE2	1:D:152:GLN:HE21	2.12	0.48
1:C:130:ILE:CG2	1:C:171:GLN:HG2	2.44	0.48
1:A:151:GLU:HB3	1:A:195:ILE:HD11	1.94	0.48
1:D:101:VAL:O	1:D:104:LEU:HB2	2.14	0.48
1:C:216:ALA:HA	1:C:219:ASP:HB2	1.94	0.48
1:D:37:GLN:O	1:D:40:SER:HB3	2.14	0.48
1:A:196:LEU:CD2	1:A:196:LEU:C	2.82	0.48
1:A:192:ASN:HD21	1:A:194:GLN:HB3	1.78	0.47
1:B:252:GLY:N	1:B:255:GLN:HE21	2.12	0.47
1:B:269:GLU:C	1:B:271:LEU:H	2.17	0.47
1:B:152:GLN:OE1	1:D:110:GLN:HG3	2.14	0.47
1:B:197:GLN:HG3	1:B:240:GLU:HG3	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:265:GLU:HB2	1:B:266:PRO:HD3	1.97	0.46
1:A:130:ILE:CG2	1:A:171:GLN:HG2	2.45	0.46
1:B:235:GLU:HG2	1:B:276:ASN:HD22	1.81	0.46
1:B:278:LYS:O	1:B:282:GLU:HG3	2.16	0.46
1:B:252:GLY:H	1:B:255:GLN:HE21	1.63	0.46
1:D:86:GLU:OE1	1:D:86:GLU:HA	2.16	0.46
1:B:168:GLY:N	1:B:171:GLN:HE21	2.14	0.46
1:A:192:ASN:HD22	1:A:194:GLN:H	1.63	0.45
1:D:269:GLU:HG3	1:D:287:LEU:HD21	1.99	0.45
1:B:62:LEU:HD22	1:B:74:LEU:HD13	1.99	0.45
1:B:24:ASP:OD1	1:B:26:GLN:CG	2.62	0.45
1:B:280:GLN:OE1	1:B:280:GLN:N	2.47	0.45
1:C:223:LEU:HD23	1:C:226:LEU:HD23	1.99	0.45
1:A:108:ASN:CG	1:C:151:GLU:HG3	2.37	0.45
1:A:23:PRO:O	1:A:25:GLN:NE2	2.50	0.45
1:C:129:GLN:H	1:C:129:GLN:CD	2.20	0.44
1:A:72:GLU:O	1:A:73:ALA:C	2.54	0.44
1:B:159:TRP:CH2	4:B:416:HOH:O	2.70	0.44
1:C:62:LEU:HD22	1:C:74:LEU:CD1	2.46	0.44
1:B:20:LEU:O	1:B:28:LEU:HD21	2.18	0.44
1:A:285:GLU:HG2	1:A:289:LYS:HE2	1.99	0.44
1:A:15:GLN:O	1:A:19:GLN:HG3	2.18	0.43
1:B:104:LEU:HD11	1:B:116:LEU:HD23	2.00	0.43
1:B:110:GLN:NE2	1:D:152:GLN:NE2	2.65	0.43
1:B:267:ALA:O	1:B:271:LEU:HD22	2.17	0.43
1:B:168:GLY:H	1:B:171:GLN:NE2	2.17	0.43
1:A:278:LYS:HB3	1:A:278:LYS:HE2	1.91	0.43
1:D:208:SER:HA	4:D:414:HOH:O	2.19	0.42
1:B:226:LEU:HD12	1:B:226:LEU:HA	1.85	0.42
1:B:272:GLN:HE21	1:B:272:GLN:HA	1.80	0.42
1:A:108:ASN:OD1	1:C:151:GLU:HG3	2.18	0.42
1:B:230:LEU:HD11	1:B:245:LEU:HD23	2.01	0.42
1:D:278:LYS:HA	1:D:281:LYS:HE2	2.01	0.42
1:A:192:ASN:ND2	1:A:195:ILE:H	2.18	0.42
1:C:37:GLN:HE21	1:D:211:ASN:HD22	1.68	0.42
1:D:234:ASN:HB3	1:D:237:ILE:HG23	2.01	0.42
1:D:46:ILE:O	1:D:50:ILE:HG13	2.20	0.42
1:D:97:LEU:HD23	1:D:97:LEU:HA	1.92	0.41
1:C:234:ASN:HB3	1:C:237:ILE:CG2	2.50	0.41
1:C:265:GLU:N	1:C:266:PRO:HD2	2.35	0.41
1:D:269:GLU:O	1:D:272:GLN:HB2	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:101:VAL:HA	1:A:104:LEU:HD22	2.02	0.41
1:C:37:GLN:HE21	1:D:211:ASN:ND2	2.18	0.41
1:C:55:LEU:N	1:C:56:PRO:CD	2.84	0.41
1:A:46:ILE:HG23	1:A:80:ILE:HG23	2.03	0.41
1:B:77:LEU:HD23	1:B:77:LEU:HA	1.87	0.41
1:D:120:GLY:HA3	1:D:159:TRP:CZ3	2.56	0.41
1:B:192:ASN:C	1:B:192:ASN:ND2	2.67	0.41
1:A:151:GLU:HG3	1:C:108:ASN:CG	2.41	0.41
1:A:55:LEU:HB3	1:A:94:ALA:CB	2.51	0.41
1:A:139:LEU:HB2	1:A:140:PRO:HD3	2.03	0.41
1:C:55:LEU:HA	1:C:55:LEU:HD23	1.87	0.41
1:D:289:LYS:C	1:D:291:GLN:H	2.23	0.41
1:D:290:ILE:O	1:D:291:GLN:C	2.59	0.41
1:A:101:VAL:O	1:A:104:LEU:HB2	2.21	0.40
1:D:193:GLU:O	1:D:197:GLN:HB3	2.20	0.40
1:B:200:LEU:HD22	1:B:241:ALA:HA	2.03	0.40
1:A:192:ASN:HD22	1:A:193:GLU:N	2.20	0.40
1:A:290:ILE:O	1:A:290:ILE:HG23	2.21	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	279/281 (99%)	269 (96%)	7 (2%)	3 (1%)	14	13
1	B	281/281 (100%)	275 (98%)	6 (2%)	0	100	100
1	C	279/281 (99%)	270 (97%)	9 (3%)	0	100	100
1	D	278/281 (99%)	275 (99%)	3 (1%)	0	100	100
All	All	1117/1124 (99%)	1089 (98%)	25 (2%)	3 (0%)	41	47

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	13	LEU
1	A	24	ASP
1	A	290	ILE

5.3.2 Protein sidechains (i)

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	220/219 (100%)	188 (86%)	32 (14%)	3	3
1	B	221/219 (101%)	186 (84%)	35 (16%)	2	2
1	C	220/219 (100%)	193 (88%)	27 (12%)	4	4
1	D	219/219 (100%)	199 (91%)	20 (9%)	9	8
All	All	880/876 (100%)	766 (87%)	114 (13%)	4	4

All (114) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	12	GLU
1	A	16	MET
1	A	21	ASN
1	A	25	GLN
1	A	28	LEU
1	A	30	SER
1	A	32	LEU
1	A	37	GLN
1	A	44	GLU
1	A	68	GLN
1	A	70	LEU
1	A	102	GLN
1	A	103	LEU
1	A	104	LEU
1	A	129	GLN
1	A	144	GLN
1	A	151	GLU
1	A	188	LEU
1	A	192	ASN

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Mol	Chain	Res	Type
1	A	196	LEU
1	A	211	ASN
1	A	226	LEU
1	A	235	GLU
1	A	236	GLN
1	A	239	GLN
1	A	245	LEU
1	A	254	GLU
1	A	265	GLU
1	A	273	SER
1	A	278	LYS
1	A	281	LYS
1	A	290	ILE
1	B	22	SER
1	B	26	GLN
1	B	28	LEU
1	B	32	LEU
1	B	33	ARG
1	B	35	LEU
1	B	68	GLN
1	B	74	LEU
1	B	86	GLU
1	B	103	LEU
1	B	104	LEU
1	B	110	GLN
1	B	113	GLN
1	B	152	GLN
1	B	154	LEU
1	B	155	GLN
1	B	186[A]	GLN
1	B	186[B]	GLN
1	B	188	LEU
1	B	192	ASN
1	B	196	LEU
1	B	203	LEU
1	B	226	LEU
1	B	231	SER
1	B	236	GLN
1	B	239	GLN
1	B	242	LEU
1	B	259	VAL
1	B	271	LEU

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Mol	Chain	Res	Type
1	B	272	GLN
1	B	278	LYS
1	B	281	LYS
1	B	284	GLN
1	B	288	GLU
1	B	290	ILE
1	C	15	GLN
1	C	18	GLN
1	C	28	LEU
1	C	29	GLN
1	C	32	LEU
1	C	35	LEU
1	C	72	GLU
1	C	74	LEU
1	C	103	LEU
1	C	104	LEU
1	C	129	GLN
1	C	152	GLN
1	C	186[A]	GLN
1	C	186[B]	GLN
1	C	188	LEU
1	C	192	ASN
1	C	194	GLN
1	C	196	LEU
1	C	203	LEU
1	C	226	LEU
1	C	237	ILE
1	C	242	LEU
1	C	254	GLU
1	C	257	GLN
1	C	272	GLN
1	C	278	LYS
1	C	281	LYS
1	D	25	GLN
1	D	34	LYS
1	D	40	SER
1	D	68	GLN
1	D	103	LEU
1	D	104	LEU
1	D	129	GLN
1	D	144	GLN
1	D	155	GLN

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Mol	Chain	Res	Type
1	D	188	LEU
1	D	195	ILE
1	D	197	GLN
1	D	211	ASN
1	D	226	LEU
1	D	237	ILE
1	D	245	LEU
1	D	265	GLU
1	D	281	LYS
1	D	288	GLU
1	D	291	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (46) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	25	GLN
1	A	68	GLN
1	A	110	GLN
1	A	152	GLN
1	A	192	ASN
1	A	194	GLN
1	A	211	ASN
1	A	213	GLN
1	A	239	GLN
1	A	257	GLN
1	B	19	GLN
1	B	29	GLN
1	B	45	GLN
1	B	68	GLN
1	B	110	GLN
1	B	131	GLN
1	B	155	GLN
1	B	169	ASN
1	B	171	GLN
1	B	192	ASN
1	B	211	ASN
1	B	236	GLN
1	B	239	GLN
1	B	255	GLN
1	B	272	GLN
1	B	284	GLN
1	B	291	GLN

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Mol	Chain	Res	Type
1	C	18	GLN
1	C	19	GLN
1	C	25	GLN
1	C	37	GLN
1	C	45	GLN
1	C	68	GLN
1	C	110	GLN
1	C	169	ASN
1	C	192	ASN
1	C	236	GLN
1	C	239	GLN
1	C	280	GLN
1	D	18	GLN
1	D	26	GLN
1	D	110	GLN
1	D	152	GLN
1	D	194	GLN
1	D	211	ASN
1	D	280	GLN

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 carbohydrates in this entry.

5.6 Ligand geometry (i)

Of 12 ligands modelled in this entry, 10 are monoatomic - leaving 2 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the

expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
3	ACT	B	305	-	1,3,3	2.94	1 (100%)	0,3,3	0.00	-
3	ACT	C	301	-	1,3,3	3.33	1 (100%)	0,3,3	0.00	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	301	ACT	CH3-C	3.33	1.53	1.48
3	B	305	ACT	CH3-C	2.94	1.52	1.48

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 (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(Å²)	Q<0.9
1	A	280/281 (99%)	-0.03	5 (1%)	68	77	23, 41, 86, 113	0
1	B	281/281 (100%)	-0.16	9 (3%)	47	59	21, 34, 90, 112	0
1	C	280/281 (99%)	-0.05	12 (4%)	35	47	24, 40, 100, 121	0
1	D	280/281 (99%)	-0.19	2 (0%)	87	92	26, 40, 88, 112	0
All	All	1121/1124 (99%)	-0.11	28 (2%)	57	67	21, 39, 92, 121	0

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	267	ALA	5.9
1	C	271	LEU	5.2
1	B	276	ASN	5.0
1	C	275	PRO	4.4
1	D	26	GLN	3.8
1	B	28	LEU	3.7
1	C	278	LYS	3.4
1	C	274	SER	3.4
1	C	276	ASN	3.1
1	A	31	ALA	2.8
1	B	275	PRO	2.7
1	A	35	LEU	2.7
1	B	288	GLU	2.7
1	C	277	GLU	2.6
1	B	284	GLN	2.6
1	B	23	PRO	2.5
1	C	268	LEU	2.5
1	B	267	ALA	2.4
1	C	261	GLU	2.3
1	C	272	GLN	2.2
1	A	34	LYS	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	281	LYS	2.1
1	C	273	SER	2.1
1	B	235	GLU	2.1
1	D	267	ALA	2.0
1	A	32	LEU	2.0
1	A	38	ILE	2.0
1	C	269	GLU	2.0

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 carbohydrates in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. 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($\mathring{A}^2$)	Q<0.9
3	ACT	B	305	4/4	0.68	0.22	47,56,62,65	0
3	ACT	C	301	4/4	0.86	0.11	50,52,56,58	0
2	CA	B	304	1/1	0.97	0.05	77,77,77,77	0
2	CA	A	305	1/1	0.98	0.13	37,37,37,37	0
2	CA	B	302	1/1	0.98	0.08	35,35,35,35	0
2	CA	A	303	1/1	0.99	0.10	34,34,34,34	0
2	CA	B	303	1/1	0.99	0.10	40,40,40,40	0
2	CA	A	304	1/1	0.99	0.07	49,49,49,49	0
2	CA	B	306	1/1	0.99	0.12	34,34,34,34	0
2	CA	B	301	1/1	0.99	0.07	32,32,32,32	0
2	CA	A	302	1/1	1.00	0.09	29,29,29,29	0
2	CA	A	301	1/1	1.00	0.10	26,26,26,26	0

6.5 Other polymers (i)

There are no such residues in this entry.