



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 14, 2017 – 05:59 am GMT

PDB ID : 2GVH
Title : Crystal structure of Acyl-CoA hydrolase (15159470) from AGROBACTERIUM TUMEFACIENS at 2.65 Å resolution
Authors : Joint Center for Structural Genomics (JCSG)
Deposited on : 2006-05-02
Resolution : 2.50 Å (reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.9-1692
EDS : trunk28620
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : recalc28949

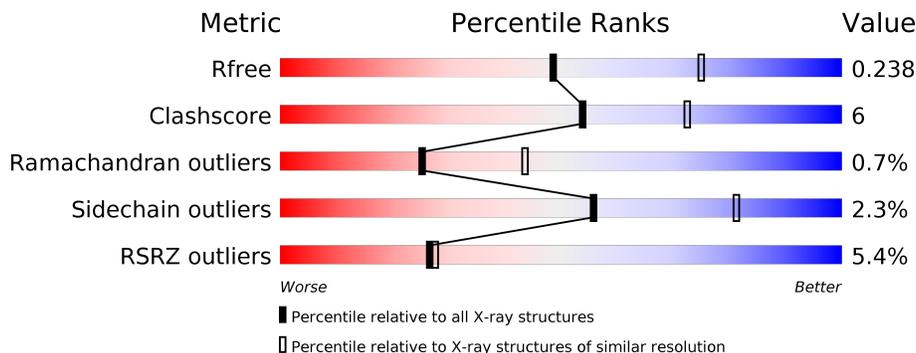
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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}	100719	3846 (2.50-2.50)
Clashscore	112137	4554 (2.50-2.50)
Ramachandran outliers	110173	4463 (2.50-2.50)
Sidechain outliers	110143	4465 (2.50-2.50)
RSRZ outliers	101464	3876 (2.50-2.50)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	288	 5% 77% 9% 14%
1	B	288	 5% 75% 11% 13%
1	C	288	 3% 77% 10% 13%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 5444 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 AGR_L_2016p.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	248	Total 1785	C 1136	N 312	O 326	S 3	Se 8	0	0	0
1	B	250	Total 1828	C 1159	N 327	O 331	S 3	Se 8	0	0	0
1	C	250	Total 1830	C 1158	N 326	O 335	S 3	Se 8	0	0	0

There are 63 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-11	MSE	-	LEADER SEQUENCE	GB 15159470
A	-10	GLY	-	LEADER SEQUENCE	GB 15159470
A	-9	SER	-	LEADER SEQUENCE	GB 15159470
A	-8	ASP	-	LEADER SEQUENCE	GB 15159470
A	-7	LYS	-	LEADER SEQUENCE	GB 15159470
A	-6	ILE	-	LEADER SEQUENCE	GB 15159470
A	-5	HIS	-	LEADER SEQUENCE	GB 15159470
A	-4	HIS	-	LEADER SEQUENCE	GB 15159470
A	-3	HIS	-	LEADER SEQUENCE	GB 15159470
A	-2	HIS	-	LEADER SEQUENCE	GB 15159470
A	-1	HIS	-	LEADER SEQUENCE	GB 15159470
A	0	HIS	-	LEADER SEQUENCE	GB 15159470
A	1	MSE	MET	MODIFIED RESIDUE	GB 15159470
A	43	MSE	MET	MODIFIED RESIDUE	GB 15159470
A	99	MSE	MET	MODIFIED RESIDUE	GB 15159470
A	119	MSE	MET	MODIFIED RESIDUE	GB 15159470
A	150	MSE	MET	MODIFIED RESIDUE	GB 15159470
A	165	MSE	MET	MODIFIED RESIDUE	GB 15159470
A	174	MSE	MET	MODIFIED RESIDUE	GB 15159470
A	224	MSE	MET	MODIFIED RESIDUE	GB 15159470
A	250	MSE	MET	MODIFIED RESIDUE	GB 15159470
B	-11	MSE	-	LEADER SEQUENCE	GB 15159470
B	-10	GLY	-	LEADER SEQUENCE	GB 15159470

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-9	SER	-	LEADER SEQUENCE	GB 15159470
B	-8	ASP	-	LEADER SEQUENCE	GB 15159470
B	-7	LYS	-	LEADER SEQUENCE	GB 15159470
B	-6	ILE	-	LEADER SEQUENCE	GB 15159470
B	-5	HIS	-	LEADER SEQUENCE	GB 15159470
B	-4	HIS	-	LEADER SEQUENCE	GB 15159470
B	-3	HIS	-	LEADER SEQUENCE	GB 15159470
B	-2	HIS	-	LEADER SEQUENCE	GB 15159470
B	-1	HIS	-	LEADER SEQUENCE	GB 15159470
B	0	HIS	-	LEADER SEQUENCE	GB 15159470
B	1	MSE	MET	MODIFIED RESIDUE	GB 15159470
B	43	MSE	MET	MODIFIED RESIDUE	GB 15159470
B	99	MSE	MET	MODIFIED RESIDUE	GB 15159470
B	119	MSE	MET	MODIFIED RESIDUE	GB 15159470
B	150	MSE	MET	MODIFIED RESIDUE	GB 15159470
B	165	MSE	MET	MODIFIED RESIDUE	GB 15159470
B	174	MSE	MET	MODIFIED RESIDUE	GB 15159470
B	224	MSE	MET	MODIFIED RESIDUE	GB 15159470
B	250	MSE	MET	MODIFIED RESIDUE	GB 15159470
C	-11	MSE	-	LEADER SEQUENCE	GB 15159470
C	-10	GLY	-	LEADER SEQUENCE	GB 15159470
C	-9	SER	-	LEADER SEQUENCE	GB 15159470
C	-8	ASP	-	LEADER SEQUENCE	GB 15159470
C	-7	LYS	-	LEADER SEQUENCE	GB 15159470
C	-6	ILE	-	LEADER SEQUENCE	GB 15159470
C	-5	HIS	-	LEADER SEQUENCE	GB 15159470
C	-4	HIS	-	LEADER SEQUENCE	GB 15159470
C	-3	HIS	-	LEADER SEQUENCE	GB 15159470
C	-2	HIS	-	LEADER SEQUENCE	GB 15159470
C	-1	HIS	-	LEADER SEQUENCE	GB 15159470
C	0	HIS	-	LEADER SEQUENCE	GB 15159470
C	1	MSE	MET	MODIFIED RESIDUE	GB 15159470
C	43	MSE	MET	MODIFIED RESIDUE	GB 15159470
C	99	MSE	MET	MODIFIED RESIDUE	GB 15159470
C	119	MSE	MET	MODIFIED RESIDUE	GB 15159470
C	150	MSE	MET	MODIFIED RESIDUE	GB 15159470
C	165	MSE	MET	MODIFIED RESIDUE	GB 15159470
C	174	MSE	MET	MODIFIED RESIDUE	GB 15159470
C	224	MSE	MET	MODIFIED RESIDUE	GB 15159470
C	250	MSE	MET	MODIFIED RESIDUE	GB 15159470

- Molecule 2 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	1	Total	Na	0	0
			1	1		

4 Data and refinement statistics

Property	Value	Source
Space group	P 43	Depositor
Cell constants a, b, c, α , β , γ	121.21Å 121.21Å 81.84Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.71 – 2.50 48.71 – 2.50	Depositor EDS
% Data completeness (in resolution range)	86.1 (48.71-2.50) 86.1 (48.71-2.50)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.98 (at 2.51Å)	Xtrriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.226 , 0.244 0.221 , 0.238	Depositor DCC
R_{free} test set	1773 reflections (5.28%)	DCC
Wilson B-factor (Å ²)	58.9	Xtrriage
Anisotropy	0.725	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 63.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.036 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5444	wwPDB-VP
Average B, all atoms (Å ²)	69.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.39% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality i

5.1 Standard geometry i

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

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	0.61	1/1810 (0.1%)	0.66	2/2448 (0.1%)
1	B	0.77	1/1856 (0.1%)	0.78	2/2508 (0.1%)
1	C	0.71	0/1855	0.73	0/2502
All	All	0.70	2/5521 (0.0%)	0.72	4/7458 (0.1%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	150	MSE	SE-CE	-5.53	1.62	1.95
1	A	64	CYS	CB-SG	-5.44	1.73	1.81

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	90	ARG	NE-CZ-NH2	-8.18	116.21	120.30
1	A	157	ASP	CB-CG-OD1	5.94	123.65	118.30
1	B	90	ARG	NE-CZ-NH1	5.62	123.11	120.30
1	A	45	ARG	NE-CZ-NH2	-5.09	117.75	120.30

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	1785	0	1701	23	0
1	B	1828	0	1765	26	0
1	C	1830	0	1760	19	0
2	B	1	0	0	0	0
All	All	5444	0	5226	65	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 6.

All (65) 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:213:GLN:HG3	1:B:231:TRP:HZ3	1.36	0.91
1:C:190:VAL:HG23	1:C:250:MSE:CE	2.10	0.82
1:A:20:ILE:HD12	1:A:150:MSE:CE	2.14	0.76
1:B:150:MSE:HG3	1:B:173:TYR:OH	1.86	0.76
1:B:213:GLN:HG3	1:B:231:TRP:CZ3	2.21	0.75
1:B:213:GLN:CG	1:B:231:TRP:HZ3	2.00	0.73
1:A:190:VAL:HG23	1:A:250:MSE:CE	2.21	0.70
1:B:190:VAL:HG23	1:B:250:MSE:CE	2.22	0.69
1:A:20:ILE:HB	1:A:150:MSE:HE2	1.78	0.65
1:C:190:VAL:HG23	1:C:250:MSE:HE3	1.78	0.63
1:A:20:ILE:HD12	1:A:150:MSE:HE2	1.78	0.63
1:A:148:VAL:HG11	1:A:150:MSE:HE3	1.87	0.56
1:B:190:VAL:HG23	1:B:250:MSE:HE2	1.86	0.56
1:A:20:ILE:HB	1:A:150:MSE:CE	2.36	0.56
1:A:158:GLN:HB3	1:A:169:GLU:HG2	1.89	0.54
1:C:190:VAL:CG2	1:C:250:MSE:CE	2.83	0.54
1:B:222:SER:HB2	1:B:260:ALA:O	2.06	0.53
1:A:190:VAL:HG23	1:A:250:MSE:HE2	1.91	0.53
1:B:204:ILE:HD11	1:B:243:THR:HG21	1.92	0.51
1:A:20:ILE:CD1	1:A:150:MSE:CE	2.89	0.51
1:C:190:VAL:HG23	1:C:250:MSE:HE2	1.90	0.51
1:C:190:VAL:CG2	1:C:250:MSE:HE2	2.42	0.50
1:C:158:GLN:HB3	1:C:169:GLU:HG2	1.95	0.49
1:B:148:VAL:HG11	1:B:150:MSE:CE	2.42	0.49
1:B:190:VAL:CG2	1:B:250:MSE:HE2	2.43	0.48
1:B:213:GLN:CD	1:B:231:TRP:CZ3	2.88	0.47
1:A:204:ILE:HD11	1:A:243:THR:HG21	1.97	0.47
1:B:213:GLN:CG	1:B:231:TRP:CZ3	2.88	0.46
1:B:70:ARG:HG3	1:B:111:THR:HG22	1.97	0.45
1:A:148:VAL:CG1	1:A:150:MSE:HE3	2.45	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:190:VAL:HG23	1:A:250:MSE:HE3	1.98	0.45
1:A:40:LEU:HA	1:A:40:LEU:HD23	1.75	0.45
1:C:204:ILE:HD11	1:C:243:THR:HG21	1.98	0.45
1:C:179:PHE:HA	1:C:250:MSE:HE2	1.97	0.45
1:A:148:VAL:O	1:A:213:GLN:HA	2.18	0.44
1:B:72:PRO:HB3	1:B:110:HIS:HB3	2.00	0.44
1:B:148:VAL:O	1:B:213:GLN:HA	2.17	0.44
1:B:179:PHE:CD1	1:B:179:PHE:C	2.90	0.44
1:A:27:ASP:OD2	1:A:30:HIS:HB2	2.17	0.43
1:C:19:LEU:HD23	1:C:19:LEU:C	2.38	0.43
1:A:190:VAL:CG2	1:A:250:MSE:HE2	2.48	0.43
1:C:213:GLN:HG3	1:C:231:TRP:HZ3	1.82	0.43
1:B:132:VAL:HG23	1:B:133:LEU:O	2.17	0.43
1:A:44:ASP:HB3	1:C:168:GLY:HA3	2.01	0.42
1:B:54:PHE:CE2	1:B:134:PRO:HG2	2.55	0.42
1:C:18:ARG:HG2	1:C:82:THR:HG22	2.01	0.42
1:B:190:VAL:CG2	1:B:250:MSE:CE	2.96	0.42
1:B:213:GLN:O	1:B:228:THR:HA	2.20	0.42
1:B:168:GLY:HA3	1:C:44:ASP:HB3	2.02	0.42
1:B:42:LEU:O	1:B:46:VAL:HG12	2.20	0.41
1:A:29:ASN:CB	1:C:27:ASP:OD2	2.68	0.41
1:C:235:LEU:HA	1:C:235:LEU:HD23	1.92	0.41
1:A:141:THR:HA	1:A:142:PRO:HD3	1.79	0.41
1:B:158:GLN:HB3	1:B:169:GLU:HG2	2.03	0.41
1:C:190:VAL:CG2	1:C:250:MSE:HE3	2.47	0.41
1:A:150:MSE:HE2	1:A:150:MSE:HB3	1.90	0.41
1:A:190:VAL:CG2	1:A:250:MSE:CE	2.96	0.41
1:B:56:ARG:HB3	1:B:236:LEU:O	2.21	0.41
1:C:40:LEU:HA	1:C:40:LEU:HD23	1.92	0.41
1:C:150:MSE:HG3	1:C:173:TYR:OH	2.21	0.41
1:A:179:PHE:C	1:A:179:PHE:CD1	2.94	0.40
1:C:148:VAL:CG1	1:C:150:MSE:HE2	2.51	0.40
1:A:68:ASP:O	1:A:113:THR:HG23	2.21	0.40
1:B:46:VAL:HG11	1:B:81:PHE:HB3	2.03	0.40
1:B:226:ILE:HD13	1:B:250:MSE:CG	2.51	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	242/288 (84%)	236 (98%)	5 (2%)	1 (0%)	38	59
1	B	246/288 (85%)	237 (96%)	7 (3%)	2 (1%)	22	39
1	C	244/288 (85%)	239 (98%)	3 (1%)	2 (1%)	22	39
All	All	732/864 (85%)	712 (97%)	15 (2%)	5 (1%)	25	43

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	75	ILE
1	C	75	ILE
1	B	74	ARG
1	B	75	ILE
1	C	74	ARG

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	166/220 (76%)	163 (98%)	3 (2%)	64	86
1	B	174/220 (79%)	171 (98%)	3 (2%)	66	87
1	C	175/220 (80%)	169 (97%)	6 (3%)	42	69
All	All	515/660 (78%)	503 (98%)	12 (2%)	56	81

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	34	LEU
1	A	107	ARG
1	A	149	THR
1	B	34	LEU
1	B	107	ARG
1	B	133	LEU
1	C	29	ASN
1	C	34	LEU
1	C	71	GLN
1	C	107	ARG
1	C	110	HIS
1	C	114	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	241	HIS

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 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

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(Å ²)	Q<0.9
1	A	240/288 (83%)	0.40	14 (5%) 24 24	51, 68, 81, 89	0
1	B	242/288 (84%)	0.55	15 (6%) 21 22	44, 69, 84, 101	0
1	C	242/288 (84%)	0.34	10 (4%) 38 40	49, 69, 83, 101	0
All	All	724/864 (83%)	0.43	39 (5%) 26 27	44, 69, 83, 101	0

All (39) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	10	PRO	4.8
1	B	11	ALA	4.1
1	C	147	ALA	3.9
1	B	13	HIS	3.7
1	A	69	PHE	3.5
1	A	131	TYR	3.3
1	A	110	HIS	3.2
1	A	10	PRO	3.2
1	A	26	GLY	3.1
1	A	185	TYR	2.9
1	B	219	VAL	2.8
1	A	13	HIS	2.8
1	B	15	ALA	2.7
1	A	54	PHE	2.7
1	B	113	THR	2.6
1	A	125	GLY	2.6
1	A	11	ALA	2.5
1	C	262	ILE	2.5
1	B	112	CYS	2.5
1	A	9	LYS	2.4
1	C	153	ILE	2.4
1	A	220	GLY	2.4
1	B	97	VAL	2.4

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Mol	Chain	Res	Type	RSRZ
1	C	148	VAL	2.4
1	C	46	VAL	2.3
1	C	151	VAL	2.3
1	B	20	ILE	2.3
1	A	261	THR	2.3
1	C	195	SER	2.2
1	A	88	ALA	2.2
1	B	54	PHE	2.2
1	B	133	LEU	2.1
1	C	19	LEU	2.1
1	B	135	GLU	2.1
1	C	251	VAL	2.1
1	B	81	PHE	2.1
1	B	19	LEU	2.0
1	B	131	TYR	2.0
1	C	155	PHE	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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
2	NA	B	277	1/1	0.94	0.22	-	81,81,81,81	0

6.5 Other polymers [i](#)

There are no such residues in this entry.