



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 3, 2021 – 02:33 AM EDT

PDB ID : 3M1A
Title : The Crystal Structure of a Short-chain Dehydrogenase from *Streptomyces avermitilis* to 2Å
Authors : Stein, A.J.; Evdokimova, E.; Egorova, O.; Savchenko, A.; Joachimiak, A.; Midwest Center for Structural Genomics (MCSG)
Deposited on : 2010-03-04
Resolution : 2.00 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

<https://www.wwpdb.org/validation/2017/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
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.23.2
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) : 2.23.2

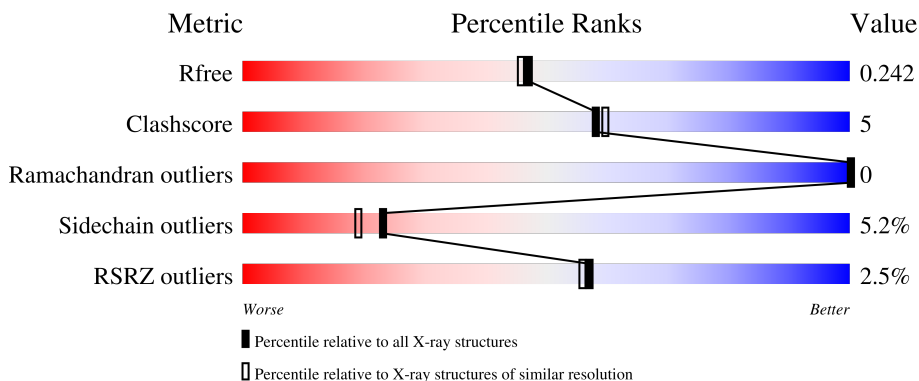
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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.



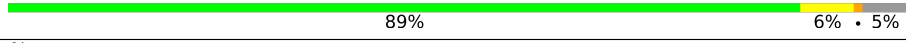




Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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 $\leq 5\%$. 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	281	 85% 10% ..
1	B	281	 85% 10% ..
1	C	281	 2% 86% 10% ..
1	D	281	 85% 12% ..
1	E	281	 85% 10% ..

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Mol	Chain	Length	Quality of chain
1	F	281	 89% 6% • 5%
1	G	281	 % 82% 14% • •
1	H	281	 7% 78% 14% • 5%
1	I	281	 4% 80% 14% • •
1	J	281	 5% 84% 9% • 5%

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 20905 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 Putative dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	Se			
1	A	270	2018	1267	353	397	1	0	4	0
1	B	271	2043	1285	361	396	1	0	6	0
1	C	272	2017	1268	354	394	1	0	5	0
1	D	275	2019	1262	354	401	2	0	1	0
1	E	271	1986	1245	348	392	1	0	0	0
1	F	268	1969	1234	347	387	1	0	0	0
1	G	272	1987	1246	346	393	2	0	0	0
1	H	268	1966	1238	344	383	1	0	2	0
1	I	269	1963	1235	339	388	1	0	0	0
1	J	267	1945	1223	342	379	1	0	1	0

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	238	THR	ALA	engineered mutation	UNP Q82PV2
B	238	THR	ALA	engineered mutation	UNP Q82PV2
C	238	THR	ALA	engineered mutation	UNP Q82PV2
D	238	THR	ALA	engineered mutation	UNP Q82PV2
E	238	THR	ALA	engineered mutation	UNP Q82PV2
F	238	THR	ALA	engineered mutation	UNP Q82PV2
G	238	THR	ALA	engineered mutation	UNP Q82PV2
H	238	THR	ALA	engineered mutation	UNP Q82PV2
I	238	THR	ALA	engineered mutation	UNP Q82PV2

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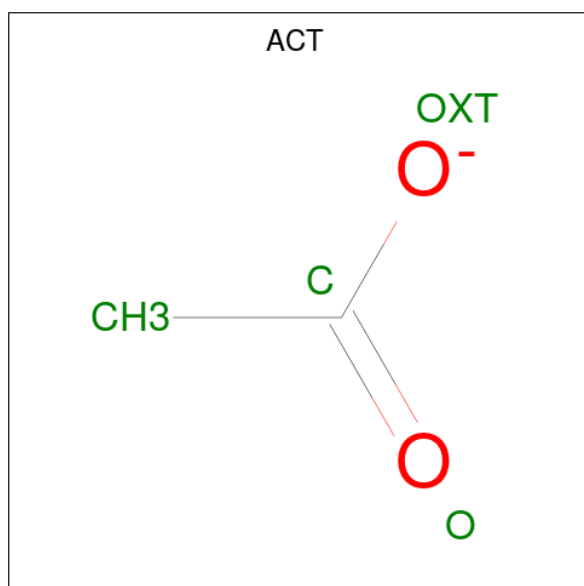
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Chain	Residue	Modelled	Actual	Comment	Reference
J	238	THR	ALA	engineered mutation	UNP Q82PV2

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

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

- Molecule 3 is ACETATE ION (three-letter code: ACT) (formula: C₂H₃O₂).



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

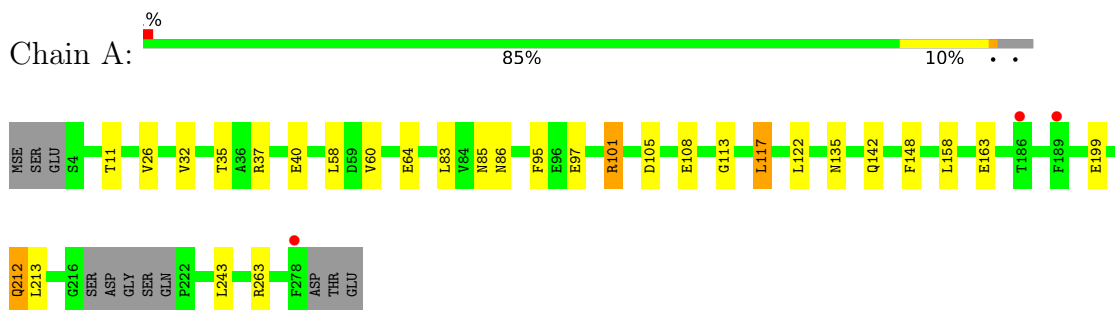
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	165	Total O 165 165	0	0
4	B	172	Total O 172 172	0	0
4	C	106	Total O 106 106	0	0
4	D	137	Total O 137 137	0	0
4	E	111	Total O 111 111	0	0
4	F	79	Total O 79 79	0	0
4	G	64	Total O 64 64	0	0
4	H	51	Total O 51 51	0	0
4	I	66	Total O 66 66	0	0
4	J	29	Total O 29 29	0	0

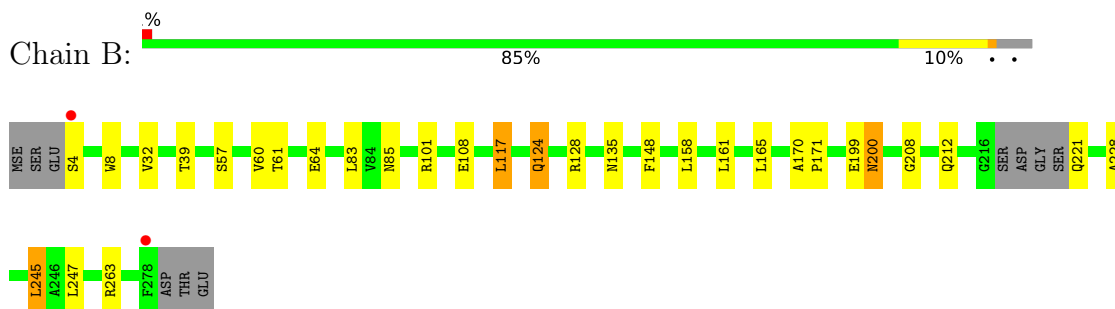
3 Residue-property plots [i](#)

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.

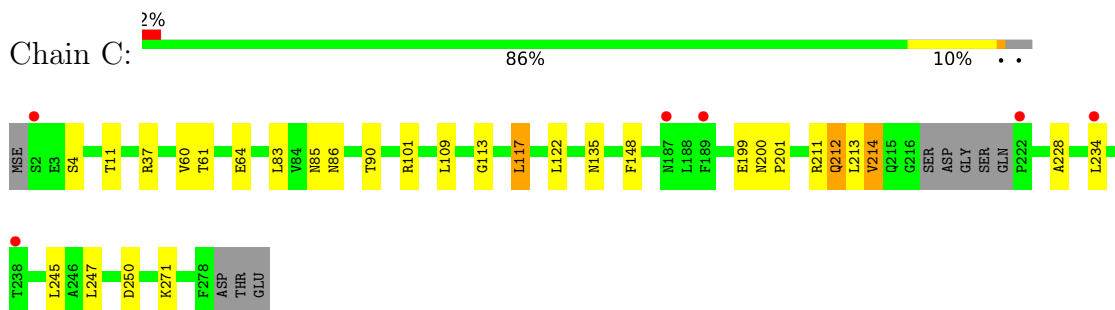
- Molecule 1: Putative dehydrogenase



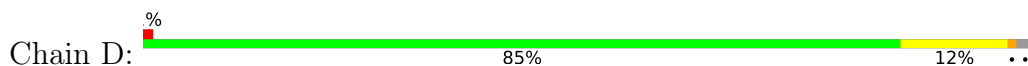
- Molecule 1: Putative dehydrogenase



- Molecule 1: Putative dehydrogenase

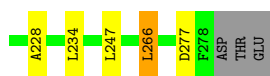
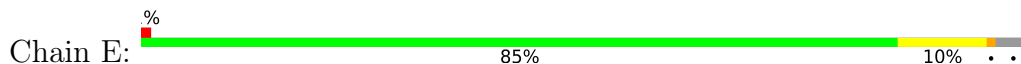


- Molecule 1: Putative dehydrogenase

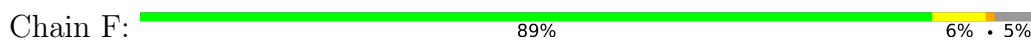




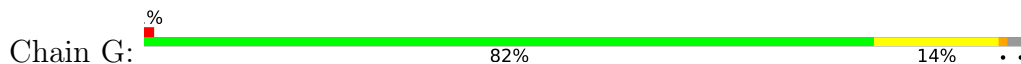
● Molecule 1: Putative dehydrogenase



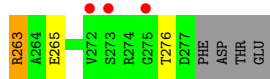
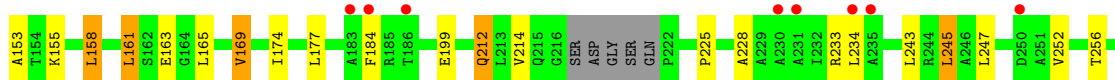
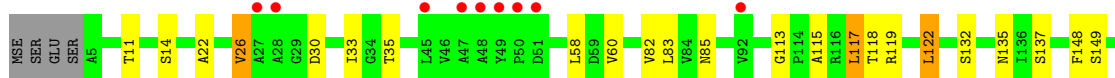
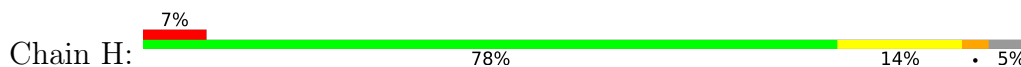
● Molecule 1: Putative dehydrogenase




● Molecule 1: Putative dehydrogenase

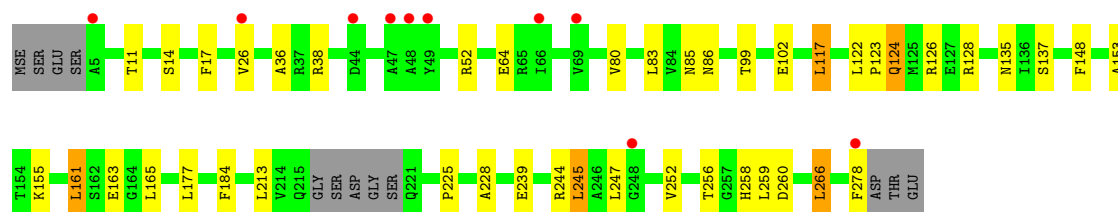


● Molecule 1: Putative dehydrogenase




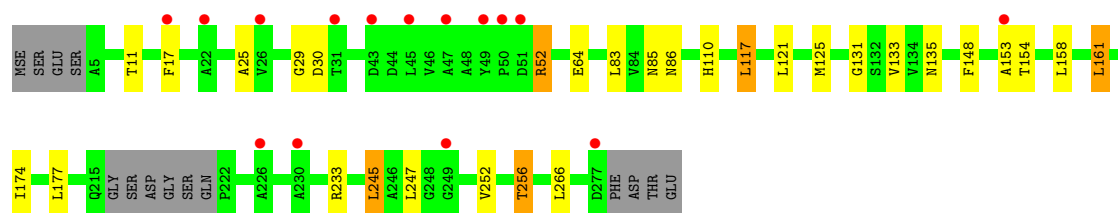
- Molecule 1: Putative dehydrogenase

Chain I: 



- Molecule 1: Putative dehydrogenase

Chain J: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	136.64Å 202.78Å 106.34Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.55 – 2.00 49.55 – 2.00	Depositor EDS
% Data completeness (in resolution range)	98.5 (49.55-2.00) 98.4 (49.55-2.00)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.55 (at 2.00Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.197 , 0.242 0.198 , 0.242	Depositor DCC
R_{free} test set	9845 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	28.9	Xtrriage
Anisotropy	0.177	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 39.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	20905	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 30.99 % 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 1.1917e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ACT, 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	0.66	0/2061	0.68	2/2796 (0.1%)
1	B	0.64	0/2092	0.72	2/2838 (0.1%)
1	C	0.58	0/2063	0.65	0/2802
1	D	0.60	0/2052	0.69	0/2787
1	E	0.61	0/2016	0.65	1/2739 (0.0%)
1	F	0.55	0/1999	0.62	1/2716 (0.0%)
1	G	0.52	0/2017	0.61	0/2741
1	H	0.51	0/2002	0.60	0/2720
1	I	0.52	0/1994	0.63	1/2713 (0.0%)
1	J	0.49	0/1978	0.59	0/2691
All	All	0.57	0/20274	0.65	7/27543 (0.0%)

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	101	ARG	NE-CZ-NH2	-7.42	116.59	120.30
1	A	101	ARG	NE-CZ-NH2	-6.79	116.91	120.30
1	I	266	LEU	CA-CB-CG	5.69	128.40	115.30
1	B	101	ARG	NE-CZ-NH1	5.50	123.05	120.30
1	E	266	LEU	CA-CB-CG	5.39	127.71	115.30
1	A	213	LEU	CA-CB-CG	5.18	127.21	115.30
1	F	245	LEU	CA-CB-CG	5.01	126.83	115.30

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	2018	0	1988	18	0
1	B	2043	0	2037	15	0
1	C	2017	0	1981	17	0
1	D	2019	0	1967	25	0
1	E	1986	0	1933	17	0
1	F	1969	0	1914	8	0
1	G	1987	0	1928	28	0
1	H	1966	0	1929	33	0
1	I	1963	0	1895	27	0
1	J	1945	0	1891	25	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	D	1	0	0	0	0
2	E	1	0	0	0	0
3	E	4	0	3	0	0
3	I	4	0	3	0	0
4	A	165	0	0	5	0
4	B	172	0	0	1	0
4	C	106	0	0	1	0
4	D	137	0	0	0	0
4	E	111	0	0	3	0
4	F	79	0	0	0	0
4	G	64	0	0	1	0
4	H	51	0	0	1	0
4	I	66	0	0	0	0
4	J	29	0	0	1	0
All	All	20905	0	19469	190	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 5.

All (190) 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:G:101:ARG:NH1	1:G:105:ASP:OD1	1.99	0.95

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:90:THR:HG21	1:D:214:VAL:CG1	2.00	0.92
1:A:101:ARG:NH2	1:A:105:ASP:OD1	2.08	0.87
1:H:252:VAL:O	1:H:256:THR:HG23	1.80	0.81
1:D:14:SER:HB3	4:H:871:HOH:O	1.85	0.76
1:D:90:THR:CG2	1:D:214:VAL:HG11	2.16	0.75
1:A:97:GLU:HG2	4:A:293:HOH:O	1.89	0.72
1:H:163:GLU:HG2	1:H:243:LEU:HD21	1.73	0.71
1:D:90:THR:HG21	1:D:214:VAL:HG11	1.72	0.70
1:F:59:ASP:OD1	1:F:61:THR:HB	1.91	0.70
1:D:19:ARG:HH12	1:D:44:ASP:CG	1.94	0.70
1:D:135:ASN:HB3	1:D:158:LEU:HD11	1.73	0.69
1:D:90:THR:CG2	1:D:214:VAL:CG1	2.71	0.69
1:J:125:MSE:CE	1:J:174:ILE:HG23	2.23	0.68
1:G:90:THR:HG21	1:G:214:VAL:CG1	2.24	0.68
1:D:26:VAL:HG11	1:D:49:TYR:CG	2.29	0.68
1:C:200:ASN:HB3	4:C:282:HOH:O	1.93	0.67
1:H:30:ASP:OD1	1:H:233:ARG:NH1	2.27	0.67
1:A:142[B]:GLN:OE1	4:A:950:HOH:O	2.11	0.67
1:C:90:THR:HG21	1:C:214:VAL:CG1	2.26	0.65
1:J:125:MSE:HE1	1:J:133:VAL:HG23	1.78	0.65
1:G:83:LEU:HD11	1:G:117:LEU:HD13	1.79	0.65
1:G:59:ASP:OD1	1:G:61:THR:HB	1.97	0.65
1:D:175:LYS:HE3	1:D:236:LEU:O	1.97	0.64
1:A:263:ARG:HH21	1:B:263:ARG:HE	1.44	0.64
1:J:177:LEU:HD11	1:J:245:LEU:HB2	1.81	0.63
1:G:163:GLU:OE2	1:I:258:HIS:HE1	1.81	0.63
1:J:125:MSE:HE2	1:J:174:ILE:HG23	1.81	0.62
1:J:29:GLY:HA2	1:J:52:ARG:HE	1.62	0.62
1:J:125:MSE:HE2	1:J:174:ILE:CG2	2.31	0.61
1:B:124:GLN:NE2	1:B:128:ARG:HH22	1.99	0.60
1:A:11:THR:HA	1:A:35:THR:OG1	2.01	0.60
1:J:252:VAL:O	1:J:256:THR:HG23	2.02	0.60
1:C:11:THR:O	1:C:86:ASN:HB3	2.02	0.60
1:H:153:ALA:HB2	1:J:161:LEU:HD13	1.84	0.59
1:G:163:GLU:HG2	1:G:243:LEU:HD21	1.83	0.59
1:I:245:LEU:HD13	1:I:247:LEU:HD21	1.84	0.59
1:C:90:THR:HG21	1:C:214:VAL:HG13	1.84	0.58
1:G:153:ALA:HB2	1:I:161:LEU:HD13	1.83	0.58
1:H:256:THR:HG22	1:J:266:LEU:HD21	1.86	0.58
1:J:30:ASP:OD1	1:J:233:ARG:NH1	2.33	0.57
1:E:83:LEU:HD11	1:E:117:LEU:HD13	1.86	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:26:VAL:HG21	1:E:45:LEU:HD11	1.86	0.57
1:G:175:LYS:NZ	1:G:236:LEU:O	2.35	0.57
1:I:80:VAL:H	1:I:124:GLN:NE2	2.03	0.56
1:D:124:GLN:NE2	1:D:128:ARG:HH22	2.03	0.56
1:F:163:GLU:HG2	1:F:243:LEU:HD21	1.87	0.56
1:C:83:LEU:HD11	1:C:117[A]:LEU:HD13	1.86	0.56
1:A:212:GLN:HE21	1:A:212:GLN:HA	1.71	0.56
1:D:228:ALA:HB1	1:D:247:LEU:HD13	1.88	0.56
1:J:25:ALA:HA	1:J:233:ARG:HH11	1.69	0.56
1:I:83:LEU:HD11	1:I:117:LEU:HD13	1.88	0.56
1:G:161:LEU:HD13	1:I:153:ALA:HB2	1.88	0.55
1:G:90:THR:HG21	1:G:214:VAL:HG13	1.89	0.55
1:E:85:ASN:HB2	1:E:135:ASN:HD22	1.72	0.54
1:A:199:GLU:OE1	4:A:627:HOH:O	2.18	0.54
1:I:85:ASN:HB2	1:I:135:ASN:HD22	1.72	0.54
1:H:184:PHE:HB3	1:H:225:PRO:HG3	1.90	0.54
1:I:137:SER:HA	1:I:155:LYS:HD2	1.89	0.53
1:A:158:LEU:HD22	4:A:393:HOH:O	2.07	0.53
1:E:277:ASP:OD1	4:E:859:HOH:O	2.18	0.53
1:E:11:THR:O	1:E:86:ASN:HB3	2.08	0.52
1:E:14:SER:HB2	1:E:36:ALA:CB	2.40	0.52
1:I:228:ALA:HB1	1:I:247:LEU:HD13	1.91	0.52
1:I:252:VAL:O	1:I:256:THR:HG23	2.09	0.52
1:B:158:LEU:HD22	4:B:671:HOH:O	2.09	0.52
1:I:80:VAL:H	1:I:124:GLN:HE22	1.57	0.52
1:G:90:THR:CG2	1:G:214:VAL:CG1	2.88	0.52
1:H:85:ASN:HB2	1:H:135:ASN:HD22	1.74	0.52
1:B:245:LEU:HD13	1:B:247:LEU:HD21	1.92	0.52
1:B:83:LEU:HD11	1:B:117:LEU:HD13	1.92	0.52
1:I:177:LEU:HD11	1:I:245:LEU:HB2	1.90	0.52
1:B:61[A]:THR:HG23	1:B:108:GLU:HG2	1.92	0.51
1:H:82:VAL:HG22	1:H:132:SER:HB2	1.93	0.51
1:B:124:GLN:HE22	1:B:128:ARG:HH22	1.57	0.51
1:H:228:ALA:HB1	1:H:247:LEU:HD13	1.91	0.51
1:G:263:ARG:NH1	1:I:260:ASP:OD1	2.37	0.51
1:H:263:ARG:HH12	1:J:256:THR:HB	1.76	0.51
1:H:22:ALA:O	1:H:26:VAL:HG22	2.11	0.50
1:G:163:GLU:OE2	1:I:258:HIS:CE1	2.62	0.50
1:C:199:GLU:OE1	1:C:211[A]:ARG:HD3	2.12	0.50
1:A:40:GLU:HG2	1:F:123:PRO:HB3	1.94	0.50
1:J:83:LEU:HD22	1:J:121:LEU:HD12	1.92	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:83:LEU:HD11	1:A:117:LEU:HD13	1.94	0.49
1:B:228:ALA:HB1	1:B:247:LEU:HD13	1.93	0.49
1:D:191:LYS:H	1:H:199:GLU:HB3	1.76	0.49
1:G:169:VAL:HG22	1:G:174:ILE:HD12	1.94	0.49
1:B:199:GLU:OE2	1:B:208:GLY:HA2	2.12	0.49
1:J:25:ALA:HA	1:J:233:ARG:NH1	2.27	0.49
1:H:135:ASN:HB3	1:H:158:LEU:HD11	1.94	0.48
1:J:110:HIS:HB2	1:J:154:THR:HB	1.94	0.48
1:D:11:THR:O	1:D:86:ASN:HB3	2.14	0.48
1:I:184:PHE:HB3	1:I:225:PRO:HG3	1.96	0.48
1:J:83:LEU:HD11	1:J:117:LEU:HD13	1.94	0.48
1:I:26:VAL:O	1:I:52:ARG:NH1	2.46	0.48
1:A:85:ASN:HB2	1:A:135:ASN:HD22	1.79	0.48
1:E:14:SER:HB2	1:E:36:ALA:HB1	1.96	0.48
1:J:85:ASN:HB2	1:J:135:ASN:HD22	1.79	0.48
1:F:221:GLN:HB3	1:F:222:PRO:HD3	1.95	0.48
1:D:190:GLY:HA3	1:H:199:GLU:O	2.14	0.47
1:A:26:VAL:HG13	1:A:32:VAL:CG2	2.44	0.47
1:C:60:VAL:HG12	1:C:113:GLY:HA3	1.97	0.47
1:D:153:ALA:HB2	1:E:161:LEU:HD13	1.96	0.47
1:E:61:THR:CG2	1:E:61:THR:O	2.62	0.47
1:H:169:VAL:HG22	1:H:174:ILE:HD12	1.96	0.47
1:H:276:THR:HG21	1:J:247:LEU:HD22	1.97	0.47
1:D:124:GLN:HE22	1:D:128:ARG:HH22	1.61	0.47
1:G:85:ASN:HB2	1:G:135:ASN:HD22	1.80	0.47
1:J:125:MSE:HE3	1:J:131:GLY:C	2.35	0.47
1:G:169:VAL:CG2	1:G:174:ILE:HD12	2.45	0.47
1:G:170:ALA:N	1:G:171:PRO:CD	2.78	0.46
1:D:135:ASN:HB3	1:D:158:LEU:CD1	2.42	0.46
1:C:37:ARG:HH21	1:C:109:LEU:HD21	1.80	0.46
1:C:90:THR:CG2	1:C:214:VAL:HG11	2.45	0.46
1:I:14:SER:HB2	1:I:36:ALA:HB2	1.97	0.46
1:H:153:ALA:CB	1:J:161:LEU:HD13	2.44	0.46
1:A:163:GLU:HG2	1:A:243:LEU:HD21	1.98	0.46
1:H:263:ARG:NH1	1:J:256:THR:HB	2.31	0.46
1:E:61:THR:O	1:E:61:THR:HG22	2.15	0.46
1:G:11:THR:O	1:G:86:ASN:HB3	2.15	0.46
1:I:163:GLU:OE2	1:I:244:ARG:NH2	2.43	0.46
1:G:228:ALA:HB1	1:G:247:LEU:HD13	1.98	0.46
1:J:11:THR:O	1:J:86:ASN:HB3	2.16	0.46
1:A:60:VAL:HG13	1:A:113:GLY:HA3	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:37:ARG:NH2	1:C:109:LEU:HD21	2.30	0.45
1:D:85:ASN:HB2	1:D:135:ASN:HD22	1.81	0.45
1:C:228:ALA:HB1	1:C:247:LEU:HD13	1.99	0.45
1:I:122:LEU:HD21	1:I:165:LEU:HD11	1.97	0.45
1:H:11:THR:HA	1:H:35:THR:OG1	2.16	0.45
1:E:114:PRO:HG3	4:E:319:HOH:O	2.16	0.45
1:H:265:GLU:HG2	4:J:288:HOH:O	2.16	0.45
1:E:137:SER:HA	1:E:155:LYS:HD2	1.99	0.45
1:G:90:THR:CG2	1:G:214:VAL:HG11	2.47	0.45
1:E:165:LEU:O	1:E:169:VAL:HG22	2.18	0.44
1:G:13:ALA:O	1:G:19:ARG:HD3	2.16	0.44
1:H:212:GLN:HE21	1:H:212:GLN:HA	1.83	0.44
1:G:266:LEU:HD12	4:G:286:HOH:O	2.17	0.44
1:C:212:GLN:HE21	1:C:212:GLN:HB3	1.67	0.44
1:I:245:LEU:CD1	1:I:247:LEU:HD21	2.47	0.44
1:H:118:THR:HG22	1:H:122:LEU:HD22	1.99	0.43
1:F:35:THR:HB	1:F:58:LEU:HB3	2.00	0.43
1:H:161:LEU:HD13	1:J:153:ALA:HB2	2.00	0.43
1:D:83:LEU:HD11	1:D:117:LEU:HD13	2.00	0.43
1:H:122:LEU:HD21	1:H:165:LEU:HD11	2.01	0.43
1:B:170:ALA:HB3	1:B:171:PRO:HD3	2.01	0.43
1:F:37:ARG:HH21	1:I:99:THR:HG21	1.84	0.43
1:H:83:LEU:HD11	1:H:117:LEU:HD13	2.01	0.43
1:I:14:SER:HB2	1:I:36:ALA:CB	2.49	0.43
1:A:11:THR:O	1:A:86:ASN:HB3	2.18	0.42
1:C:247:LEU:HD22	1:F:276:THR:HG21	2.01	0.42
1:D:163:GLU:HG2	1:D:243:LEU:HD21	1.99	0.42
1:F:85:ASN:HB2	1:F:135:ASN:HD22	1.84	0.42
1:I:124:GLN:NE2	1:I:128:ARG:HH22	2.16	0.42
1:H:149:SER:HB2	1:J:161:LEU:HA	2.02	0.42
1:B:39:THR:HG23	1:B:57:SER:HB2	2.01	0.42
1:C:200:ASN:HB2	1:C:201:PRO:HD3	2.02	0.42
1:B:8:TRP:HB2	1:B:32:VAL:HG22	2.01	0.42
1:D:187:ASN:HD22	1:D:187:ASN:H	1.67	0.42
1:G:19:ARG:NH1	1:G:23:GLU:OE1	2.53	0.42
1:D:26:VAL:HG11	1:D:49:TYR:CD2	2.55	0.41
1:A:199:GLU:HG3	4:A:627:HOH:O	2.18	0.41
1:C:90:THR:CG2	1:C:214:VAL:CG1	2.97	0.41
1:E:211:ARG:HD2	4:E:683:HOH:O	2.18	0.41
1:E:221:GLN:HA	1:E:222:PRO:HD3	1.90	0.41
1:H:137:SER:HA	1:H:155:LYS:HD2	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:256:THR:HG22	1:J:266:LEU:CD2	2.50	0.41
1:E:170:ALA:HB3	1:E:171:PRO:HD3	2.03	0.41
1:G:123:PRO:HA	1:G:126:ARG:NH1	2.36	0.41
1:I:123:PRO:HA	1:I:126:ARG:NH1	2.35	0.41
1:G:184:PHE:HB3	1:G:225:PRO:HG3	2.02	0.41
1:G:259:LEU:HG	1:I:259:LEU:HD22	2.02	0.41
1:B:85:ASN:HB2	1:B:135:ASN:HD22	1.85	0.41
1:E:228:ALA:HB1	1:E:247:LEU:HD13	2.03	0.41
1:H:33:ILE:N	1:H:33:ILE:HD12	2.35	0.41
1:A:95:PHE:CD1	1:B:165:LEU:HD13	2.56	0.41
1:G:1:MSE:HE2	1:G:5:ALA:HB3	2.03	0.41
1:G:40:GLU:CD	1:G:40:GLU:H	2.22	0.41
1:H:60:VAL:CG1	1:H:113:GLY:HA3	2.50	0.41
1:H:115:ALA:O	1:H:119[B]:ARG:HG3	2.21	0.41
1:H:177:LEU:HD11	1:H:245:LEU:HB2	2.03	0.41
1:I:11:THR:O	1:I:86:ASN:HB3	2.21	0.41
1:D:23:GLU:HG2	1:D:45:LEU:HD13	2.02	0.41
1:A:35:THR:HB	1:A:58:LEU:HB3	2.04	0.40
1:C:85:ASN:HB2	1:C:135:ASN:HD22	1.86	0.40
1:I:99:THR:OG1	1:I:102:GLU:HG3	2.20	0.40
1:D:11:THR:HA	1:D:35:THR:OG1	2.21	0.40
1:H:35:THR:HB	1:H:58:LEU:HB3	2.04	0.40
1:D:35:THR:HA	1:D:56:ILE:O	2.22	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	270/281 (96%)	268 (99%)	2 (1%)	0	100 100
1	B	273/281 (97%)	270 (99%)	3 (1%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	273/281 (97%)	270 (99%)	3 (1%)	0	100	100
1	D	272/281 (97%)	270 (99%)	2 (1%)	0	100	100
1	E	267/281 (95%)	265 (99%)	2 (1%)	0	100	100
1	F	264/281 (94%)	260 (98%)	4 (2%)	0	100	100
1	G	268/281 (95%)	266 (99%)	2 (1%)	0	100	100
1	H	266/281 (95%)	263 (99%)	3 (1%)	0	100	100
1	I	265/281 (94%)	260 (98%)	5 (2%)	0	100	100
1	J	264/281 (94%)	261 (99%)	3 (1%)	0	100	100
All	All	2682/2810 (95%)	2653 (99%)	29 (1%)	0	100	100

There are no Ramachandran outliers to report.

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	201/209 (96%)	194 (96%)	7 (4%)	36	35
1	B	205/209 (98%)	193 (94%)	12 (6%)	19	15
1	C	199/209 (95%)	185 (93%)	14 (7%)	15	10
1	D	199/209 (95%)	188 (94%)	11 (6%)	21	17
1	E	194/209 (93%)	185 (95%)	9 (5%)	27	23
1	F	191/209 (91%)	184 (96%)	7 (4%)	34	32
1	G	193/209 (92%)	184 (95%)	9 (5%)	26	22
1	H	191/209 (91%)	178 (93%)	13 (7%)	16	11
1	I	190/209 (91%)	178 (94%)	12 (6%)	18	13
1	J	187/209 (90%)	178 (95%)	9 (5%)	25	22
All	All	1950/2090 (93%)	1847 (95%)	103 (5%)	23	18

All (103) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	37	ARG
1	A	64	GLU
1	A	108	GLU
1	A	117	LEU
1	A	122	LEU
1	A	148	PHE
1	A	212	GLN
1	B	4	SER
1	B	60	VAL
1	B	64	GLU
1	B	117	LEU
1	B	124	GLN
1	B	148	PHE
1	B	161	LEU
1	B	200[A]	ASN
1	B	200[B]	ASN
1	B	212	GLN
1	B	221	GLN
1	B	245	LEU
1	C	4	SER
1	C	64	GLU
1	C	101	ARG
1	C	117[A]	LEU
1	C	117[B]	LEU
1	C	122	LEU
1	C	148	PHE
1	C	212	GLN
1	C	213	LEU
1	C	214	VAL
1	C	234	LEU
1	C	245	LEU
1	C	250	ASP
1	C	271	LYS
1	D	109	LEU
1	D	117	LEU
1	D	122	LEU
1	D	124	GLN
1	D	148	PHE
1	D	158	LEU
1	D	161	LEU
1	D	187	ASN
1	D	212	GLN
1	D	234	LEU

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Mol	Chain	Res	Type
1	D	268	GLU
1	E	4	SER
1	E	17	PHE
1	E	64	GLU
1	E	117	LEU
1	E	148	PHE
1	E	161	LEU
1	E	213	LEU
1	E	234	LEU
1	E	266	LEU
1	F	44	ASP
1	F	61	THR
1	F	64	GLU
1	F	148	PHE
1	F	158	LEU
1	F	185	ARG
1	F	245	LEU
1	G	19	ARG
1	G	61	THR
1	G	64	GLU
1	G	117	LEU
1	G	122	LEU
1	G	148	PHE
1	G	158	LEU
1	G	161	LEU
1	G	234	LEU
1	H	14	SER
1	H	26	VAL
1	H	117	LEU
1	H	122	LEU
1	H	148	PHE
1	H	158	LEU
1	H	161	LEU
1	H	169	VAL
1	H	212	GLN
1	H	214	VAL
1	H	234	LEU
1	H	245	LEU
1	H	263	ARG
1	I	17	PHE
1	I	38	ARG
1	I	64	GLU

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Mol	Chain	Res	Type
1	I	117	LEU
1	I	124	GLN
1	I	148	PHE
1	I	161	LEU
1	I	213	LEU
1	I	239	GLU
1	I	245	LEU
1	I	266	LEU
1	I	278	PHE
1	J	17	PHE
1	J	52	ARG
1	J	64	GLU
1	J	117	LEU
1	J	148	PHE
1	J	158	LEU
1	J	161	LEU
1	J	245	LEU
1	J	256	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (34) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	135	ASN
1	A	212	GLN
1	B	85	ASN
1	B	124	GLN
1	B	135	ASN
1	C	85	ASN
1	C	135	ASN
1	C	212	GLN
1	D	85	ASN
1	D	124	GLN
1	D	135	ASN
1	D	187	ASN
1	D	200	ASN
1	E	85	ASN
1	E	135	ASN
1	E	142	GLN
1	F	85	ASN
1	F	135	ASN
1	G	85	ASN
1	G	135	ASN

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Mol	Chain	Res	Type
1	G	212	GLN
1	H	85	ASN
1	H	135	ASN
1	H	142	GLN
1	H	160	GLN
1	H	212	GLN
1	H	258	HIS
1	I	85	ASN
1	I	124	GLN
1	I	135	ASN
1	I	258	HIS
1	J	85	ASN
1	J	135	ASN
1	J	142	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 6 ligands modelled in this entry, 4 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	I	282	-	1,3,3	1.33	0	0,3,3	-	-
3	ACT	E	283	-	1,3,3	1.83	0	0,3,3	-	-

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	269/281 (95%)	-0.20	3 (1%) 80 79	15, 25, 44, 59	0
1	B	270/281 (96%)	-0.34	2 (0%) 87 87	16, 26, 44, 62	0
1	C	271/281 (96%)	-0.08	6 (2%) 62 60	18, 29, 53, 83	0
1	D	273/281 (97%)	-0.13	2 (0%) 87 87	18, 29, 53, 70	0
1	E	270/281 (96%)	-0.28	4 (1%) 73 72	17, 27, 46, 64	0
1	F	267/281 (95%)	-0.17	1 (0%) 92 92	20, 34, 62, 86	0
1	G	270/281 (96%)	-0.04	4 (1%) 73 72	23, 38, 58, 86	0
1	H	267/281 (95%)	0.39	20 (7%) 14 13	27, 40, 65, 83	0
1	I	268/281 (95%)	-0.00	10 (3%) 41 41	23, 39, 68, 82	0
1	J	266/281 (94%)	0.40	15 (5%) 24 23	29, 43, 71, 120	0
All	All	2691/2810 (95%)	-0.05	67 (2%) 57 56	15, 33, 57, 120	0

All (67) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	49	TYR	4.7
1	B	278	PHE	4.4
1	H	48	ALA	4.3
1	I	47	ALA	4.3
1	H	47	ALA	3.8
1	I	48	ALA	3.7
1	J	50	PRO	3.7
1	J	49	TYR	3.6
1	G	48	ALA	3.6
1	D	216	GLY	3.5
1	J	47	ALA	3.3
1	H	273	SER	3.3
1	J	230	ALA	3.3

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Mol	Chain	Res	Type	RSRZ
1	H	45	LEU	3.2
1	C	187	ASN	3.1
1	I	278	PHE	3.1
1	H	27	ALA	3.1
1	G	277	ASP	3.0
1	J	51	ASP	3.0
1	H	234	LEU	3.0
1	D	220	SER	3.0
1	G	47	ALA	2.9
1	H	275	GLY	2.8
1	J	226	ALA	2.8
1	J	22	ALA	2.7
1	G	64	GLU	2.7
1	H	235	ALA	2.7
1	A	189	PHE	2.7
1	C	234	LEU	2.7
1	I	44	ASP	2.7
1	C	189	PHE	2.7
1	I	66	ILE	2.7
1	H	272	VAL	2.6
1	E	47	ALA	2.6
1	I	26	VAL	2.6
1	H	50	PRO	2.6
1	H	28	ALA	2.5
1	J	26	VAL	2.4
1	F	5	ALA	2.4
1	E	4	SER	2.4
1	C	222	PRO	2.4
1	H	92	VAL	2.3
1	J	153	ALA	2.3
1	E	222	PRO	2.3
1	C	2	SER	2.3
1	I	5	ALA	2.2
1	B	4	SER	2.2
1	J	249	GLY	2.2
1	J	45	LEU	2.2
1	A	278	PHE	2.2
1	H	184	PHE	2.2
1	H	230	ALA	2.1
1	J	17	PHE	2.1
1	I	248	GLY	2.1
1	E	220	SER	2.1

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Mol	Chain	Res	Type	RSRZ
1	H	231	ALA	2.1
1	H	183	ALA	2.1
1	H	250	ASP	2.1
1	J	43	ASP	2.1
1	A	186	THR	2.1
1	J	31	THR	2.1
1	J	277	ASP	2.1
1	C	238	THR	2.1
1	I	49	TYR	2.1
1	I	69	VAL	2.0
1	H	51	ASP	2.0
1	H	186	THR	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 monosaccharides 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(Å ²)	Q<0.9
3	ACT	I	282	4/4	0.92	0.11	36,36,36,37	0
3	ACT	E	283	4/4	0.93	0.17	40,40,40,40	0
2	NA	D	282	1/1	0.93	0.24	28,28,28,28	0
2	NA	A	282	1/1	0.96	0.06	28,28,28,28	0
2	NA	B	282	1/1	0.99	0.11	20,20,20,20	0
2	NA	E	282	1/1	0.99	0.07	25,25,25,25	0

6.5 Other polymers [i](#)

There are no such residues in this entry.