



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 29, 2023 – 12:05 PM EDT

PDB ID : 8GMF
Title : R153M variant of Citrate Synthase (CitA) in Mycobacterium tuberculosis
Authors : Pathirage, R.; Ronning, D.
Deposited on : 2023-03-25
Resolution : 2.96 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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.36
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) : 2.36

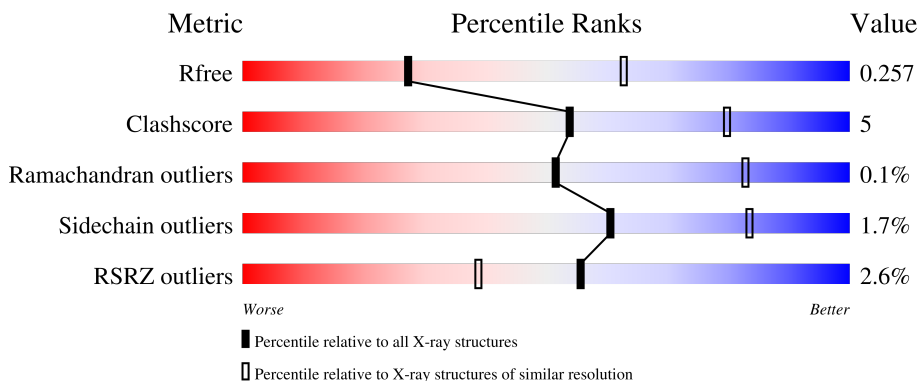
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.96 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.



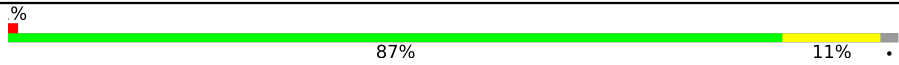

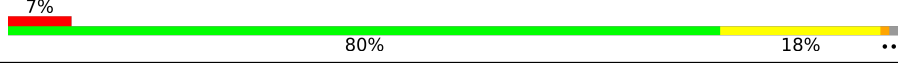
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3104 (3.00-2.92)
Clashscore	141614	3462 (3.00-2.92)
Ramachandran outliers	138981	3340 (3.00-2.92)
Sidechain outliers	138945	3343 (3.00-2.92)
RSRZ outliers	127900	2986 (3.00-2.92)

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	373	 87% 11% ..
1	B	373	 85% 13% .
1	C	373	 2% 84% 15% .
1	D	373	 2% 87% 12% .
1	E	373	 3% 86% 13% .

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Mol	Chain	Length	Quality of chain
1	F	373	 <p>% 87% 11% •</p>
1	G	373	 <p>5% 81% 17% •</p>
1	H	373	 <p>7% 80% 18% ••</p>

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 22313 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 citrate synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	367	2780	1750	502	514	14	0	0	0
1	B	369	2792	1758	504	516	14	0	0	0
1	C	370	2801	1765	505	517	14	0	0	0
1	D	370	2801	1765	505	517	14	0	0	0
1	E	369	2794	1761	504	515	14	0	0	0
1	F	366	2768	1744	500	510	14	0	0	0
1	G	367	2780	1752	502	512	14	0	0	0
1	H	370	2797	1764	502	516	15	0	0	0

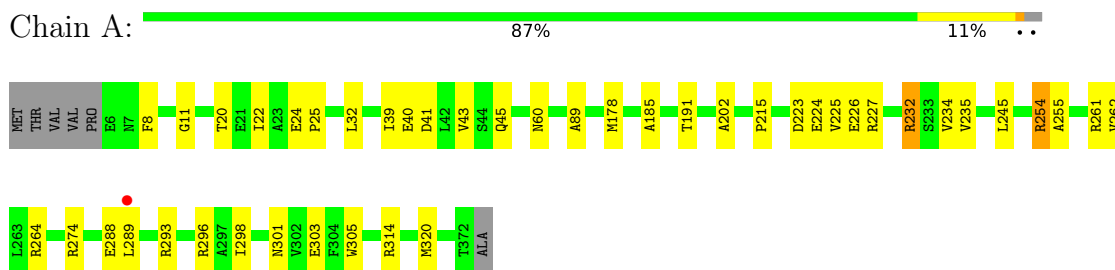
There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	153	MET	ARG	engineered mutation	UNP A0A045JB88
B	153	MET	ARG	engineered mutation	UNP A0A045JB88
C	153	MET	ARG	engineered mutation	UNP A0A045JB88
D	153	MET	ARG	engineered mutation	UNP A0A045JB88
E	153	MET	ARG	engineered mutation	UNP A0A045JB88
F	153	MET	ARG	engineered mutation	UNP A0A045JB88
G	153	MET	ARG	engineered mutation	UNP A0A045JB88
H	153	MET	ARG	engineered mutation	UNP A0A045JB88

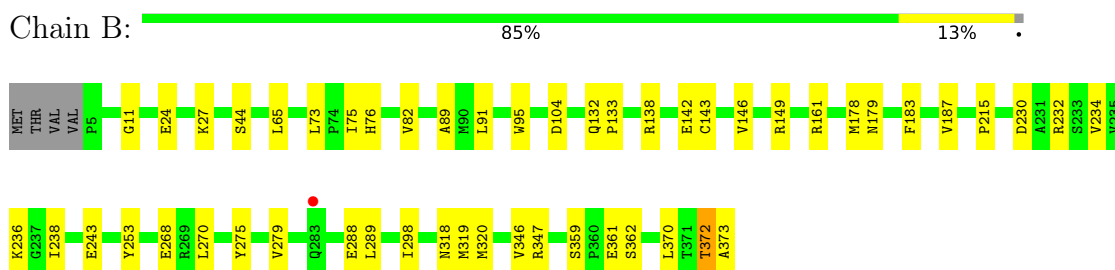
3 Residue-property plots i

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.

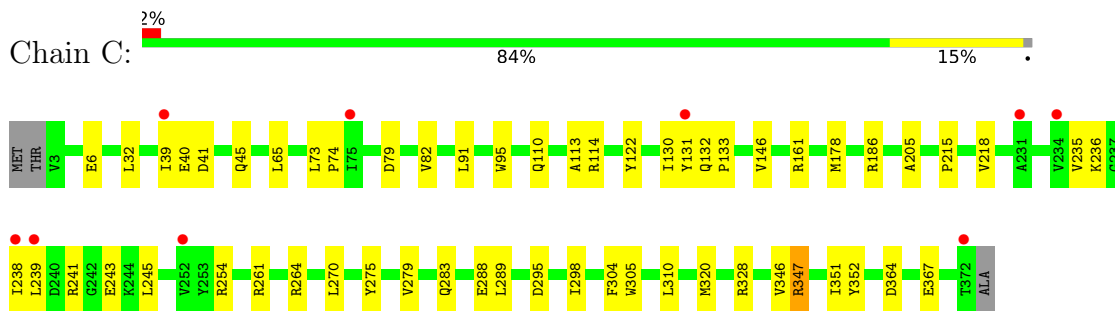
- Molecule 1: citrate synthase



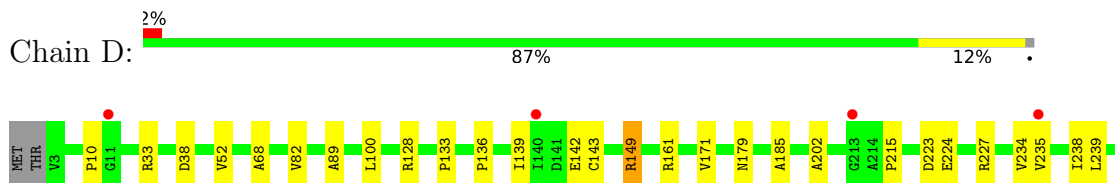
- Molecule 1: citrate synthase

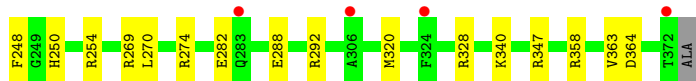


- Molecule 1: citrate synthase

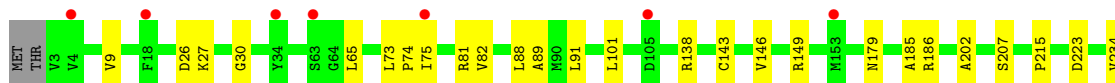
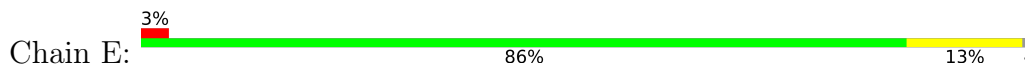


- Molecule 1: citrate synthase

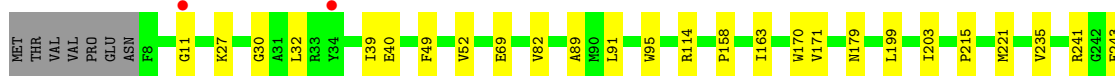
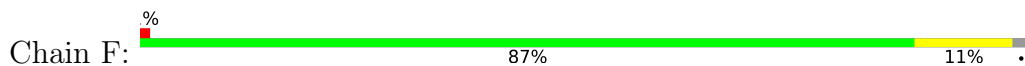




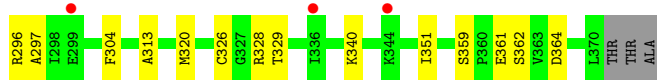
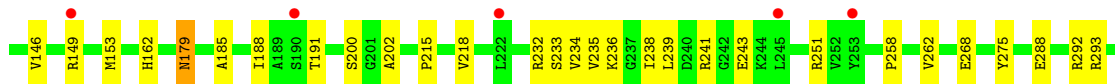
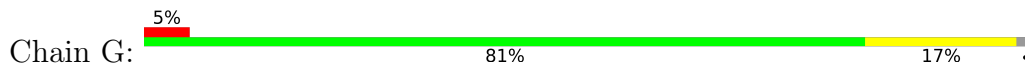
● Molecule 1: citrate synthase



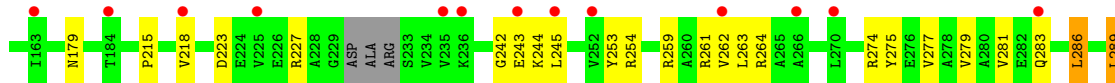
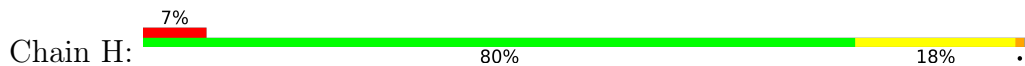
● Molecule 1: citrate synthase



● Molecule 1: citrate synthase



● Molecule 1: citrate synthase





4 Data and refinement statistics i

Property	Value	Source
Space group	P 43	Depositor
Cell constants a, b, c, α , β , γ	129.91Å 129.91Å 256.70Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	91.83 – 2.96 91.86 – 2.80	Depositor EDS
% Data completeness (in resolution range)	99.2 (91.83-2.96) 85.4 (91.86-2.80)	Depositor EDS
R_{merge}	0.23	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.15 (at 2.82Å)	Xtrriage
Refinement program	PHENIX 1.19.2_4158:000	Depositor
R, R_{free}	0.210 , 0.257 0.210 , 0.257	Depositor DCC
R_{free} test set	2005 reflections (1.93%)	wwPDB-VP
Wilson B-factor (Å ²)	54.2	Xtrriage
Anisotropy	0.154	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 68.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	0.185 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	22313	wwPDB-VP
Average B, all atoms (Å ²)	70.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.22% 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](#)

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	0.25	0/2843	0.49	0/3872
1	B	0.24	0/2856	0.49	0/3890
1	C	0.25	0/2865	0.49	0/3904
1	D	0.24	0/2865	0.49	0/3904
1	E	0.24	0/2858	0.49	0/3894
1	F	0.24	0/2831	0.49	0/3856
1	G	0.24	0/2844	0.49	0/3874
1	H	0.25	0/2860	0.51	0/3896
All	All	0.24	0/22822	0.49	0/31090

There are no bond length outliers.

There are no bond angle outliers.

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	2780	0	2750	26	0
1	B	2792	0	2763	32	0
1	C	2801	0	2775	37	0
1	D	2801	0	2775	26	0
1	E	2794	0	2768	25	0
1	F	2768	0	2743	27	0
1	G	2780	0	2752	39	0
1	H	2797	0	2776	48	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	22313	0	22102	234	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 (234) 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:20:THR:HG22	1:A:22:ILE:H	1.48	0.78
1:B:179:ASN:HA	1:F:347:ARG:HE	1.48	0.77
1:H:48:THR:HG21	1:H:145:THR:HB	1.69	0.74
1:E:81:ARG:HD2	1:E:207:SER:HB2	1.68	0.73
1:D:100:LEU:HD22	1:D:340:LYS:HD2	1.71	0.71
1:F:241:ARG:HG3	1:F:243:GLU:HG3	1.71	0.71
1:A:232:ARG:NH1	1:A:288:GLU:OE1	2.23	0.71
1:G:232:ARG:HH12	1:G:288:GLU:HB2	1.54	0.71
1:H:223:ASP:OD1	1:H:274:ARG:NH2	2.24	0.71
1:D:68:ALA:H	1:D:149:ARG:HH22	1.37	0.70
1:H:39:ILE:HG13	1:H:262:VAL:HG21	1.72	0.70
1:B:232:ARG:NH1	1:B:288:GLU:OE1	2.25	0.69
1:G:100:LEU:HD22	1:G:340:LYS:HD2	1.77	0.67
1:A:224:GLU:OE2	1:A:227:ARG:NH2	2.27	0.67
1:B:318:ASN:ND2	1:C:131:TYR:O	2.27	0.66
1:A:223:ASP:OD1	1:A:274:ARG:NH2	2.28	0.66
1:E:143:CYS:HB2	1:E:149:ARG:HG2	1.77	0.65
1:C:40:GLU:OE2	1:C:261:ARG:NH1	2.30	0.64
1:D:82:VAL:HG13	1:E:89:ALA:HB1	1.81	0.63
1:A:235:VAL:HG13	1:A:245:LEU:HD21	1.81	0.63
1:D:223:ASP:OD1	1:D:274:ARG:NH2	2.31	0.63
1:G:288:GLU:OE2	1:G:292:ARG:NE	2.28	0.62
1:F:179:ASN:HD21	1:F:328:ARG:HH12	1.49	0.61
1:H:218:VAL:HG11	1:H:304:PHE:HD1	1.66	0.59
1:C:289:LEU:HB3	1:C:298:ILE:HD12	1.83	0.59
1:G:236:LYS:NZ	1:G:288:GLU:OE1	2.27	0.59
1:A:293:ARG:HD3	1:A:296:ARG:HG2	1.83	0.59
1:F:40:GLU:OE2	1:F:261:ARG:NH1	2.37	0.57
1:A:40:GLU:OE2	1:A:261:ARG:NH1	2.37	0.57
1:F:293:ARG:HG2	1:F:296:ARG:HD2	1.85	0.57
1:D:143:CYS:HB2	1:D:149:ARG:HG2	1.87	0.56
1:H:121:SER:O	1:H:125:GLN:HG3	2.05	0.56
1:G:46:ARG:HB3	1:H:372:THR:HG22	1.87	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:65:LEU:HB2	1:H:146:VAL:HG21	1.88	0.56
1:G:89:ALA:HB1	1:H:82:VAL:HG12	1.87	0.56
1:G:326:CYS:O	1:G:329:THR:OG1	2.23	0.56
1:G:149:ARG:O	1:G:153:MET:HG3	2.06	0.56
1:F:244:LYS:N	1:F:244:LYS:HD2	2.21	0.55
1:E:215:PRO:HG2	1:E:320:MET:HB3	1.88	0.55
1:B:24:GLU:HB2	1:F:352:TYR:CG	2.41	0.55
1:C:73:LEU:HD12	1:C:74:PRO:HD2	1.89	0.55
1:D:89:ALA:HB1	1:E:82:VAL:HG13	1.88	0.55
1:H:40:GLU:OE2	1:H:261:ARG:NH1	2.40	0.54
1:B:143:CYS:HB2	1:B:149:ARG:HG2	1.88	0.54
1:F:158:PRO:HG2	1:F:163:ILE:HD11	1.90	0.54
1:E:332:TRP:O	1:E:336:ILE:HG13	2.07	0.54
1:B:215:PRO:HG2	1:B:320:MET:HB3	1.90	0.53
1:C:241:ARG:NH2	1:C:243:GLU:OE2	2.42	0.53
1:G:71:PHE:CE1	1:G:122:TYR:HB2	2.43	0.53
1:H:40:GLU:O	1:H:44:SER:OG	2.16	0.53
1:G:162:HIS:CD2	1:G:313:ALA:HA	2.44	0.53
1:G:218:VAL:HG11	1:G:304:PHE:HD1	1.74	0.53
1:C:161:ARG:NH1	1:C:270:LEU:O	2.42	0.53
1:E:73:LEU:HD12	1:E:74:PRO:HD2	1.91	0.53
1:C:295:ASP:OD1	1:C:295:ASP:N	2.40	0.52
1:D:347:ARG:HE	1:E:179:ASN:HA	1.75	0.52
1:B:346:VAL:HG22	1:F:11:GLY:HA2	1.92	0.52
1:B:234:VAL:O	1:B:238:ILE:HG13	2.09	0.52
1:B:76:HIS:CE1	1:C:130:ILE:HG21	2.44	0.52
1:B:268:GLU:HB2	1:B:275:TYR:CZ	2.45	0.52
1:C:41:ASP:O	1:C:45:GLN:HG3	2.10	0.52
1:C:236:LYS:NZ	1:C:288:GLU:OE1	2.43	0.52
1:G:235:VAL:O	1:G:239:LEU:HD12	2.10	0.52
1:G:65:LEU:HD12	1:G:146:VAL:HG21	1.92	0.51
1:C:238:ILE:HG23	1:C:243:GLU:HG3	1.93	0.51
1:H:25:PRO:O	1:H:27:LYS:N	2.44	0.51
1:E:223:ASP:OD1	1:E:274:ARG:NH2	2.44	0.51
1:G:11:GLY:HA2	1:H:346:VAL:HG22	1.93	0.51
1:G:20:THR:HG22	1:H:352:TYR:HA	1.92	0.51
1:G:359:SER:OG	1:G:361:GLU:OE1	2.27	0.51
1:B:138:ARG:O	1:B:142:GLU:HG3	2.10	0.51
1:A:225:VAL:HG22	1:A:234:VAL:HG21	1.93	0.51
1:G:85:GLN:NE2	1:G:200:SER:O	2.43	0.51
1:B:359:SER:OG	1:B:361:GLU:OE1	2.29	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:251:ARG:HD3	1:E:297:ALA:HB3	1.94	0.50
1:C:235:VAL:O	1:C:239:LEU:HD12	2.11	0.50
1:D:128:ARG:NH1	1:D:133:PRO:O	2.45	0.50
1:G:215:PRO:HG2	1:G:320:MET:HB3	1.94	0.50
1:D:161:ARG:NH1	1:D:270:LEU:O	2.45	0.50
1:B:289:LEU:HB3	1:B:298:ILE:HD13	1.93	0.50
1:F:275:TYR:O	1:F:279:VAL:HG23	2.12	0.50
1:H:277:VAL:O	1:H:281:VAL:HG23	2.12	0.50
1:A:32:LEU:HD23	1:A:39:ILE:HG21	1.93	0.49
1:D:234:VAL:O	1:D:238:ILE:HG13	2.12	0.49
1:D:68:ALA:H	1:D:149:ARG:NH2	2.10	0.49
1:F:235:VAL:HG11	1:F:285:ALA:HA	1.93	0.49
1:F:245:LEU:HD23	1:F:289:LEU:HD11	1.95	0.49
1:H:275:TYR:O	1:H:279:VAL:HG23	2.12	0.49
1:G:188:ILE:O	1:G:191:THR:OG1	2.30	0.49
1:E:259:ARG:HG3	1:E:302:VAL:HG21	1.95	0.48
1:G:24:GLU:HB2	1:H:352:TYR:CG	2.48	0.48
1:H:264:ARG:HA	1:H:305:TRP:CZ3	2.48	0.48
1:A:89:ALA:HB1	1:C:82:VAL:HG13	1.95	0.48
1:A:41:ASP:O	1:A:45:GLN:HG3	2.13	0.48
1:B:82:VAL:HG13	1:F:89:ALA:HB1	1.95	0.48
1:B:236:LYS:NZ	1:B:288:GLU:OE2	2.47	0.48
1:H:218:VAL:HG11	1:H:304:PHE:CD1	2.46	0.48
1:D:215:PRO:HG2	1:D:320:MET:HB3	1.95	0.48
1:H:26:ASP:OD2	1:H:33:ARG:NH2	2.47	0.48
1:H:347:ARG:HH12	1:H:349:SER:HA	1.79	0.48
1:H:310:LEU:HD22	1:H:320:MET:HG2	1.95	0.47
1:H:245:LEU:HD22	1:H:289:LEU:HD11	1.95	0.47
1:H:259:ARG:HB2	1:H:302:VAL:HG11	1.95	0.47
1:C:279:VAL:O	1:C:283:GLN:HG2	2.14	0.47
1:E:326:CYS:O	1:E:329:THR:OG1	2.27	0.47
1:G:359:SER:O	1:G:362:SER:OG	2.32	0.47
1:A:25:PRO:HA	1:A:32:LEU:HD12	1.97	0.47
1:B:11:GLY:HA2	1:F:346:VAL:HG22	1.97	0.47
1:G:4:VAL:N	1:G:351:ILE:HD13	2.30	0.47
1:H:128:ARG:HB2	1:H:154:TRP:HA	1.97	0.47
1:B:132:GLN:HG2	1:B:133:PRO:HD2	1.97	0.47
1:H:286:LEU:O	1:H:290:ARG:HD3	2.15	0.47
1:A:43:VAL:HG21	1:A:262:VAL:HG13	1.97	0.47
1:C:218:VAL:HG11	1:C:304:PHE:HD1	1.80	0.46
1:H:263:LEU:HG	1:H:309:VAL:HG21	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:32:LEU:HD23	1:C:39:ILE:HD13	1.97	0.46
1:D:224:GLU:OE2	1:D:227:ARG:NH2	2.44	0.46
1:E:185:ALA:HB2	1:E:202:ALA:HB2	1.96	0.46
1:F:52:VAL:HG21	1:F:171:VAL:HG22	1.97	0.46
1:G:22:ILE:HG22	1:G:56:LEU:HD23	1.98	0.46
1:D:33:ARG:HG2	1:D:38:ASP:HA	1.97	0.46
1:E:293:ARG:HG2	1:E:295:ASP:OD1	2.16	0.46
1:G:185:ALA:HB2	1:G:202:ALA:HB2	1.97	0.46
1:G:268:GLU:HB2	1:G:275:TYR:CZ	2.51	0.46
1:A:215:PRO:HG2	1:A:320:MET:HB3	1.97	0.46
1:G:128:ARG:NH1	1:G:133:PRO:O	2.49	0.46
1:G:179:ASN:HD21	1:G:328:ARG:NH1	2.13	0.46
1:G:241:ARG:NH1	1:G:243:GLU:OE2	2.49	0.46
1:F:69:GLU:OE2	1:F:114:ARG:NE	2.47	0.46
1:B:275:TYR:O	1:B:279:VAL:HG23	2.15	0.46
1:G:258:PRO:O	1:G:262:VAL:HG23	2.16	0.46
1:A:264:ARG:HG3	1:A:305:TRP:CZ2	2.51	0.46
1:C:91:LEU:HD22	1:C:95:TRP:CE3	2.51	0.46
1:C:178:MET:HE1	1:C:186:ARG:HD3	1.98	0.46
1:G:268:GLU:HB2	1:G:275:TYR:CE2	2.51	0.46
1:C:65:LEU:HD12	1:C:146:VAL:HG21	1.98	0.45
1:H:179:ASN:HD21	1:H:328:ARG:NH1	2.15	0.45
1:B:73:LEU:HG	1:B:75:ILE:HB	1.98	0.45
1:F:49:PHE:CD1	1:F:170:TRP:HB3	2.52	0.45
1:G:17:ALA:HB2	1:H:348:PRO:HB2	1.98	0.45
1:F:179:ASN:HD21	1:F:328:ARG:NH1	2.14	0.45
1:G:251:ARG:HD3	1:G:297:ALA:HB1	1.99	0.45
1:B:238:ILE:HG22	1:B:243:GLU:HB2	1.99	0.45
1:E:186:ARG:HD2	1:E:335:HIS:HB3	1.99	0.45
1:F:27:LYS:HA	1:F:253:TYR:CD2	2.52	0.45
1:A:191:THR:HG21	1:C:205:ALA:O	2.17	0.45
1:D:185:ALA:HB2	1:D:202:ALA:HB2	1.99	0.45
1:C:310:LEU:HD13	1:C:320:MET:HG2	1.99	0.45
1:E:88:LEU:HA	1:E:91:LEU:HG	1.98	0.45
1:H:5:PRO:HD3	1:H:351:ILE:HG21	1.99	0.45
1:H:68:ALA:H	1:H:149:ARG:HH22	1.65	0.45
1:H:352:TYR:OH	1:H:355:PRO:O	2.28	0.45
1:A:11:GLY:HA2	1:C:346:VAL:HG22	1.99	0.44
1:H:264:ARG:HA	1:H:305:TRP:HZ3	1.80	0.44
1:A:245:LEU:HD12	1:A:245:LEU:HA	1.75	0.44
1:E:234:VAL:O	1:E:238:ILE:HG13	2.18	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:185:ALA:HB2	1:A:202:ALA:HB2	1.99	0.44
1:E:295:ASP:OD1	1:E:295:ASP:N	2.48	0.44
1:B:230:ASP:C	1:B:232:ARG:H	2.20	0.44
1:H:279:VAL:O	1:H:283:GLN:HG2	2.18	0.44
1:F:264:ARG:NH2	1:F:282:GLU:OE2	2.51	0.44
1:H:347:ARG:HH12	1:H:348:PRO:C	2.21	0.44
1:H:215:PRO:HG2	1:H:320:MET:HB3	2.00	0.44
1:H:358:ARG:CZ	1:H:363:VAL:HG22	2.47	0.44
1:E:73:LEU:HG	1:E:75:ILE:HB	2.00	0.44
1:E:259:ARG:O	1:E:263:LEU:HG	2.17	0.44
1:F:30:GLY:HA2	1:F:253:TYR:HD2	1.83	0.44
1:F:32:LEU:HD23	1:F:39:ILE:HG21	2.00	0.44
1:H:261:ARG:O	1:H:264:ARG:HB3	2.18	0.44
1:E:27:LYS:HE2	1:E:252:VAL:HG12	1.99	0.43
1:A:24:GLU:HB2	1:C:352:TYR:CG	2.53	0.43
1:D:52:VAL:HG21	1:D:171:VAL:HG13	1.99	0.43
1:H:304:PHE:CD2	1:H:305:TRP:CD1	3.06	0.43
1:B:91:LEU:HD22	1:B:95:TRP:CE3	2.53	0.43
1:D:235:VAL:O	1:D:239:LEU:HD12	2.18	0.43
1:H:143:CYS:HB2	1:H:149:ARG:HD2	2.00	0.43
1:A:254:ARG:HH11	1:A:255:ALA:HB2	1.83	0.43
1:C:215:PRO:HG2	1:C:320:MET:HB3	2.01	0.43
1:E:65:LEU:HB2	1:E:146:VAL:HG21	2.00	0.43
1:G:140:ILE:HA	1:G:143:CYS:SG	2.59	0.43
1:B:27:LYS:HA	1:B:253:TYR:CD2	2.54	0.43
1:B:161:ARG:NH1	1:B:270:LEU:O	2.51	0.43
1:A:178:MET:O	1:C:347:ARG:NH1	2.52	0.43
1:D:288:GLU:O	1:D:292:ARG:HG3	2.19	0.43
1:E:26:ASP:O	1:E:30:GLY:N	2.52	0.43
1:C:264:ARG:HG3	1:C:305:TRP:CZ2	2.54	0.43
1:H:295:ASP:OD1	1:H:295:ASP:N	2.45	0.42
1:C:328:ARG:HD3	1:C:328:ARG:HA	1.74	0.42
1:F:91:LEU:HD22	1:F:95:TRP:CE3	2.54	0.42
1:F:199:LEU:O	1:F:203:ILE:HG12	2.19	0.42
1:C:351:ILE:HD13	1:C:351:ILE:HA	1.77	0.42
1:H:347:ARG:HH12	1:H:349:SER:CA	2.32	0.42
1:A:60:ASN:HB2	1:C:364:ASP:O	2.19	0.42
1:B:319:MET:HB2	1:B:319:MET:HE3	1.83	0.42
1:H:27:LYS:HA	1:H:253:TYR:CD2	2.55	0.42
1:C:289:LEU:HD23	1:C:289:LEU:HA	1.78	0.42
1:D:139:ILE:O	1:D:142:GLU:HG2	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:301:ASN:HB3	1:A:303:GLU:OE1	2.19	0.42
1:C:110:GLN:O	1:C:113:ALA:N	2.52	0.42
1:D:52:VAL:HG11	1:D:171:VAL:HG13	2.01	0.42
1:D:179:ASN:HD21	1:D:328:ARG:NH1	2.17	0.42
1:B:65:LEU:HB2	1:B:146:VAL:HG21	2.01	0.42
1:B:178:MET:HE3	1:B:178:MET:HB2	1.91	0.42
1:F:215:PRO:HG2	1:F:320:MET:HB3	2.01	0.42
1:A:224:GLU:HG3	1:A:234:VAL:HG11	2.01	0.42
1:B:24:GLU:HB2	1:F:352:TYR:CD1	2.55	0.42
1:C:275:TYR:O	1:C:279:VAL:HG13	2.20	0.42
1:B:89:ALA:HB1	1:F:82:VAL:HG13	2.03	0.41
1:H:121:SER:HA	1:H:153:MET:HE1	2.02	0.41
1:A:289:LEU:HB3	1:A:298:ILE:HD13	2.01	0.41
1:G:137:GLN:NE2	1:G:140:ILE:HD11	2.34	0.41
1:B:104:ASP:OD1	1:B:104:ASP:N	2.49	0.41
1:B:183:PHE:O	1:B:187:VAL:HG23	2.21	0.41
1:D:248:PHE:CZ	1:D:282:GLU:HA	2.55	0.41
1:C:6:GLU:O	1:C:6:GLU:HG2	2.21	0.41
1:C:110:GLN:OE1	1:C:114:ARG:HB2	2.21	0.41
1:D:136:PRO:HD2	1:D:139:ILE:HD12	2.03	0.41
1:D:358:ARG:NH1	1:D:363:VAL:HG13	2.35	0.41
1:E:275:TYR:O	1:E:279:VAL:HG13	2.19	0.41
1:G:73:LEU:HG	1:G:75:ILE:HB	2.03	0.41
1:G:234:VAL:O	1:G:238:ILE:HG13	2.20	0.41
1:H:242:GLY:O	1:H:244:LYS:N	2.53	0.41
1:B:372:THR:OG1	1:B:373:ALA:N	2.53	0.41
1:H:65:LEU:HD23	1:H:117:VAL:HG22	2.02	0.41
1:D:10:PRO:O	1:E:344:LYS:NZ	2.52	0.41
1:G:364:ASP:O	1:H:60:ASN:HB2	2.21	0.41
1:H:306:ALA:O	1:H:310:LEU:HD12	2.20	0.41
1:C:79:ASP:HB3	1:C:82:VAL:HB	2.04	0.40
1:C:132:GLN:OE1	1:C:133:PRO:HD2	2.21	0.40
1:G:233:SER:HA	1:G:236:LYS:HB2	2.02	0.40
1:C:239:LEU:HD11	1:C:245:LEU:HD22	2.02	0.40
1:D:269:ARG:HG3	1:D:270:LEU:N	2.36	0.40
1:G:153:MET:HE3	1:G:153:MET:HB3	1.98	0.40
1:H:43:VAL:HG21	1:H:262:VAL:HG11	2.03	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	365/373 (98%)	349 (96%)	16 (4%)	0	100	100
1	B	367/373 (98%)	351 (96%)	16 (4%)	0	100	100
1	C	368/373 (99%)	350 (95%)	18 (5%)	0	100	100
1	D	368/373 (99%)	350 (95%)	18 (5%)	0	100	100
1	E	367/373 (98%)	352 (96%)	15 (4%)	0	100	100
1	F	364/373 (98%)	352 (97%)	12 (3%)	0	100	100
1	G	365/373 (98%)	349 (96%)	16 (4%)	0	100	100
1	H	366/373 (98%)	349 (95%)	14 (4%)	3 (1%)	19	53
All	All	2930/2984 (98%)	2802 (96%)	125 (4%)	3 (0%)	51	83

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	H	26	ASP
1	H	243	GLU
1	H	286	LEU

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	280/285 (98%)	275 (98%)	5 (2%)	59	82
1	B	281/285 (99%)	276 (98%)	5 (2%)	59	82

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	283/285 (99%)	279 (99%)	4 (1%)	67	86
1	D	283/285 (99%)	279 (99%)	4 (1%)	67	86
1	E	282/285 (99%)	277 (98%)	5 (2%)	59	82
1	F	278/285 (98%)	276 (99%)	2 (1%)	84	93
1	G	280/285 (98%)	275 (98%)	5 (2%)	59	82
1	H	283/285 (99%)	275 (97%)	8 (3%)	43	74
All	All	2250/2280 (99%)	2212 (98%)	38 (2%)	60	83

All (38) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	8	PHE
1	A	226	GLU
1	A	232	ARG
1	A	254	ARG
1	A	314	ARG
1	B	44	SER
1	B	347	ARG
1	B	362	SER
1	B	370	LEU
1	B	372	THR
1	C	122	TYR
1	C	254	ARG
1	C	347	ARG
1	C	367	GLU
1	D	149	ARG
1	D	250	HIS
1	D	254	ARG
1	D	364	ASP
1	E	9	VAL
1	E	101	LEU
1	E	138	ARG
1	E	296	ARG
1	E	342	LEU
1	F	221	MET
1	F	244	LYS
1	G	8	PHE
1	G	16	VAL
1	G	179	ASN
1	G	293	ARG

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Mol	Chain	Res	Type
1	G	296	ARG
1	H	73	LEU
1	H	138	ARG
1	H	227	ARG
1	H	254	ARG
1	H	289	LEU
1	H	319	MET
1	H	347	ARG
1	H	362	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	D	179	ASN
1	F	45	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](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

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	367/373 (98%)	-0.09	1 (0%) 94 87	40, 55, 73, 109	103 (28%)
1	B	369/373 (98%)	-0.09	1 (0%) 94 87	41, 58, 82, 143	96 (26%)
1	C	370/373 (99%)	0.02	9 (2%) 59 42	42, 62, 94, 115	110 (29%)
1	D	370/373 (99%)	0.08	8 (2%) 62 45	53, 66, 89, 121	157 (42%)
1	E	369/373 (98%)	0.13	13 (3%) 44 29	52, 73, 98, 129	160 (43%)
1	F	366/373 (98%)	-0.07	2 (0%) 91 81	39, 59, 86, 103	98 (26%)
1	G	367/373 (98%)	0.24	18 (4%) 29 18	56, 77, 107, 124	155 (42%)
1	H	370/373 (99%)	0.36	25 (6%) 17 10	56, 83, 128, 139	178 (48%)
All	All	2948/2984 (98%)	0.07	77 (2%) 56 39	39, 67, 105, 143	1057 (35%)

All (77) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	32	LEU	4.9
1	H	235	VAL	4.8
1	D	372	THR	4.6
1	H	63	SER	4.4
1	D	140	ILE	4.3
1	H	270	LEU	4.3
1	C	372	THR	4.0
1	H	262	VAL	4.0
1	H	266	ALA	3.9
1	H	130	ILE	3.8
1	G	5	PRO	3.7
1	E	252	VAL	3.6
1	H	355	PRO	3.6
1	F	11	GLY	3.3
1	H	46	ARG	3.2
1	F	34	TYR	3.2

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Mol	Chain	Res	Type	RSRZ
1	G	245	LEU	3.1
1	H	225	VAL	3.1
1	H	298	ILE	3.1
1	D	11	GLY	3.1
1	E	4	VAL	3.0
1	H	252	VAL	3.0
1	G	149	ARG	3.0
1	C	234	VAL	3.0
1	H	42	LEU	2.9
1	D	324	PHE	2.9
1	E	363	VAL	2.9
1	G	75	ILE	2.8
1	C	238	ILE	2.8
1	C	231	ALA	2.8
1	E	75	ILE	2.8
1	E	275	TYR	2.7
1	E	367	GLU	2.7
1	D	283	GLN	2.7
1	H	49	PHE	2.6
1	G	61	PHE	2.6
1	G	190	SER	2.6
1	G	344	LYS	2.6
1	H	243	GLU	2.6
1	H	245	LEU	2.6
1	H	354	GLY	2.6
1	G	31	ALA	2.6
1	E	105	ASP	2.6
1	D	235	VAL	2.5
1	H	369	VAL	2.5
1	E	153	MET	2.5
1	H	59	GLY	2.5
1	H	218	VAL	2.4
1	H	236	LYS	2.4
1	G	39	ILE	2.4
1	G	336	ILE	2.4
1	H	18	PHE	2.3
1	G	34	TYR	2.3
1	G	299	GLU	2.3
1	E	250	HIS	2.3
1	E	18	PHE	2.3
1	G	222	LEU	2.3
1	E	63	SER	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	289	LEU	2.3
1	C	131	TYR	2.3
1	C	239	LEU	2.3
1	E	276	GLU	2.3
1	H	163	ILE	2.3
1	G	125	GLN	2.2
1	G	253	TYR	2.2
1	D	213	GLY	2.2
1	C	39	ILE	2.2
1	C	252	VAL	2.2
1	D	306	ALA	2.2
1	C	75	ILE	2.1
1	G	139	ILE	2.1
1	H	9	VAL	2.1
1	E	34	TYR	2.1
1	B	283	GLN	2.1
1	H	184	THR	2.1
1	G	74	PRO	2.1
1	H	283	GLN	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](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.