



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2024 – 05:22 PM EDT

PDB ID : 3FPP  
Title : Crystal structure of E.coli MacA  
Authors : Yum, S.; Xu, Y.; Piao, S.; Ha, N.-C.  
Deposited on : 2009-01-06  
Resolution : 2.99 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](mailto: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>.

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

MolProbity : 4.02b-467  
Xtriage (Phenix) : 1.20.1  
EDS : 2.36.2  
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) : 2.36.2

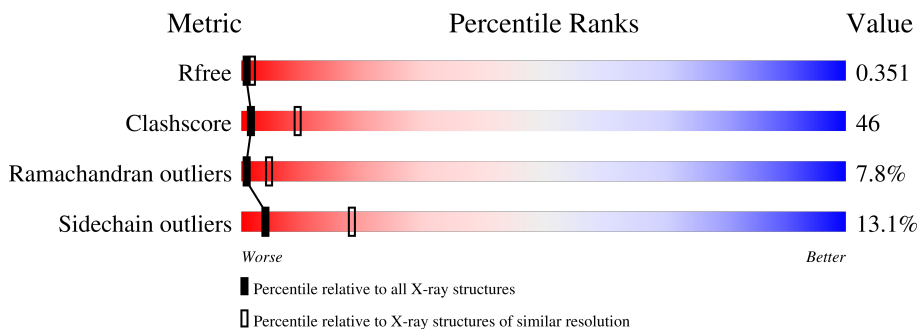
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

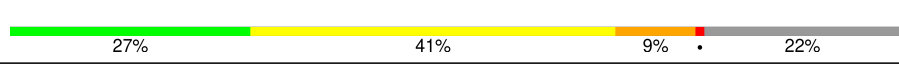
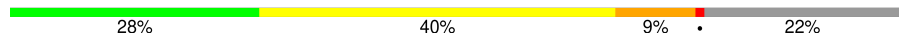
The reported resolution of this entry is 2.99 Å.

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	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)

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  $\geq 3$ , 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  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	A	341	
1	B	341	

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 4097 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 Macrolide-specific efflux protein macA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	266	2043	1274	361	402	6	0	0	0
1	B	267	2054	1280	365	403	6	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	139	GLN	LYS	SEE REMARK 999	UNP P75830
A	148	ASN	THR	SEE REMARK 999	UNP P75830
A	251	GLN	PRO	SEE REMARK 999	UNP P75830
B	139	GLN	LYS	SEE REMARK 999	UNP P75830
B	148	ASN	THR	SEE REMARK 999	UNP P75830
B	251	GLN	PRO	SEE REMARK 999	UNP P75830



T308

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

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 3 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	128.52Å 128.52Å 110.31Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	49.69 – 2.99 49.69 – 3.00	Depositor EDS
% Data completeness (in resolution range)	92.0 (49.69-2.99) 92.1 (49.69-3.00)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	0.12	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.84 (at 3.01Å)	Xtrriage
Refinement program	CNS 1.2	Depositor
R, $R_{free}$	0.283 , 0.349 0.284 , 0.351	Depositor DCC
$R_{free}$ test set	1950 reflections (9.81%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	37.7	Xtrriage
Anisotropy	0.126	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , -6.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.40$ , $\langle L^2 \rangle = 0.22$	Xtrriage
Estimated twinning fraction	0.447 for -h,-k,l	Xtrriage
$F_o, F_c$ correlation	0.86	EDS
Total number of atoms	4097	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	31.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.11% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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	0.45	0/2063	0.74	0/2797
1	B	0.44	0/2074	0.75	1/2812 (0.0%)
All	All	0.44	0/4137	0.74	1/5609 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	76	SER	N-CA-C	5.29	125.30	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	2043	0	2104	199	0
1	B	2054	0	2116	195	0
All	All	4097	0	4220	380	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 46.

All (380) 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:159:GLN:HE21	1:A:159:GLN:HA	1.15	1.10
1:B:135:LEU:HD22	1:B:140:ALA:HB2	1.35	1.06
1:B:205:VAL:HG21	1:B:212:PRO:HG3	1.32	1.05
1:B:226:LYS:HZ2	1:B:278:ARG:HD3	1.23	1.04
1:A:285:ASN:ND2	1:A:286:GLY:H	1.55	1.03
1:A:242:LYS:H	1:A:242:LYS:HD2	1.20	1.02
1:B:226:LYS:NZ	1:B:278:ARG:HD3	1.74	1.00
1:A:164:ASP:O	1:A:168:LYS:HD3	1.62	0.99
1:A:124:LEU:HD21	1:B:148:ASN:ND2	1.79	0.98
1:B:109:MET:HA	1:B:112:ARG:HB2	1.50	0.93
1:B:237:LEU:HA	1:B:241:GLN:HE22	1.28	0.93
1:A:44:GLY:H	1:A:307:LEU:HA	1.30	0.93
1:A:50:VAL:HB	1:A:298:ILE:HD11	1.50	0.92
1:A:261:ASP:HB3	1:A:278:ARG:HB2	1.49	0.92
1:B:136:ALA:HB2	1:B:146:LEU:HD21	1.52	0.92
1:A:258:GLN:H	1:A:258:GLN:NE2	1.68	0.92
1:A:243:ALA:HA	1:A:297:HIS:O	1.70	0.91
1:B:224:LEU:HD13	1:B:278:ARG:HD2	1.51	0.91
1:A:285:ASN:CG	1:A:286:GLY:H	1.76	0.88
1:B:215:LEU:O	1:B:215:LEU:HD22	1.75	0.86
1:A:242:LYS:HD3	1:A:299:GLN:HB2	1.58	0.85
1:A:268:LYS:HE2	1:A:271:ASP:HA	1.56	0.85
1:B:251:GLN:HA	1:B:251:GLN:HE21	1.41	0.84
1:A:48:GLN:H	1:A:301:THR:HG23	1.42	0.84
1:B:198:THR:HB	1:B:213:ASN:HD22	1.42	0.83
1:A:242:LYS:H	1:A:242:LYS:CD	1.86	0.83
1:A:124:LEU:HD21	1:B:148:ASN:HD22	1.42	0.82
1:B:205:VAL:HG21	1:B:212:PRO:CG	2.09	0.81
1:A:285:ASN:ND2	1:A:286:GLY:N	2.29	0.81
1:A:159:GLN:HA	1:A:159:GLN:NE2	1.95	0.79
1:B:56:LEU:HD13	1:B:225:VAL:HG12	1.67	0.77
1:B:136:ALA:HB1	1:B:146:LEU:HD11	1.68	0.76
1:B:224:LEU:CD1	1:B:278:ARG:HD2	2.16	0.76
1:A:70:GLY:HA2	1:B:67:GLN:CD	2.06	0.76
1:B:269:VAL:HG23	1:B:269:VAL:O	1.85	0.75
1:B:74:THR:HA	1:B:201:GLN:NE2	2.02	0.75
1:B:59:LEU:HD22	1:B:222:ALA:HB3	1.67	0.75
1:A:105:GLU:HG2	1:A:174:LEU:HD11	1.68	0.74
1:A:159:GLN:HE21	1:A:159:GLN:CA	1.96	0.74
1:B:46:LEU:HD13	1:B:47:GLN:N	2.02	0.74
1:A:288:LEU:HA	1:A:292:MET:SD	2.28	0.74
1:A:43:PRO:HB3	1:A:305:ASN:HD21	1.52	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:46:LEU:HD22	1:B:47:GLN:H	1.51	0.74
1:B:92:ILE:O	1:B:94:PRO:HD3	1.88	0.73
1:A:135:LEU:HB3	1:A:140:ALA:HB3	1.68	0.73
1:A:44:GLY:H	1:A:307:LEU:CA	2.00	0.72
1:A:199:THR:HB	1:A:214:ILE:HA	1.70	0.72
1:B:47:GLN:HB2	1:B:301:THR:O	1.88	0.72
1:A:43:PRO:HB3	1:A:305:ASN:ND2	2.05	0.71
1:A:89:LEU:HD21	1:A:188:ALA:HB2	1.72	0.71
1:B:225:VAL:HG22	1:B:279:PHE:HB2	1.71	0.71
1:B:132:GLN:O	1:B:136:ALA:HB2	1.90	0.71
1:A:111:LEU:HA	1:A:114:GLN:HG3	1.72	0.70
1:A:47:GLN:HB2	1:A:301:THR:O	1.92	0.70
1:B:238:LYS:HG3	1:B:239:PRO:HD2	1.72	0.70
1:A:162:THR:HG22	1:A:166:GLN:NE2	2.07	0.69
1:B:74:THR:CG2	1:B:91:VAL:HB	2.22	0.69
1:A:270:ASN:O	1:A:271:ASP:HB2	1.92	0.68
1:B:48:GLN:HG3	1:B:300:LEU:HD12	1.76	0.67
1:B:100:GLN:O	1:B:104:VAL:HG23	1.93	0.67
1:B:56:LEU:HD21	1:B:288:LEU:HB3	1.76	0.67
1:B:141:VAL:HB	1:B:145:ASP:OD2	1.95	0.67
1:B:237:LEU:HD11	1:B:298:ILE:HG21	1.77	0.67
1:A:285:ASN:CG	1:A:286:GLY:N	2.44	0.67
1:A:229:VAL:HG21	1:A:237:LEU:HD22	1.77	0.67
1:B:198:THR:CB	1:B:213:ASN:HD22	2.08	0.67
1:B:48:GLN:O	1:B:300:LEU:HB2	1.95	0.66
1:A:249:GLY:O	1:A:250:ASP:HB3	1.96	0.66
1:B:247:VAL:CG2	1:B:250:ASP:HB2	2.26	0.66
1:A:238:LYS:O	1:A:241:GLN:HG3	1.96	0.66
1:B:226:LYS:HB3	1:B:276:TYR:CD2	2.31	0.65
1:A:69:SER:OG	1:A:206:ILE:HA	1.96	0.65
1:A:305:ASN:C	1:A:305:ASN:HD22	2.00	0.65
1:B:138:THR:O	1:B:139:GLN:HB2	1.94	0.65
1:A:268:LYS:CE	1:A:271:ASP:HA	2.26	0.65
1:B:56:LEU:CD1	1:B:225:VAL:HG12	2.26	0.65
1:A:134:ARG:C	1:A:136:ALA:H	2.00	0.64
1:A:131:ARG:O	1:A:135:LEU:HG	1.96	0.64
1:A:110:GLU:O	1:A:114:GLN:HG2	1.98	0.64
1:B:286:GLY:O	1:B:287:LEU:O	2.16	0.64
1:A:43:PRO:HA	1:A:307:LEU:HB2	1.80	0.64
1:A:259:ILE:HA	1:A:279:PHE:HB3	1.79	0.63
1:A:236:HIS:HB3	1:A:300:LEU:HD13	1.80	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:260:LYS:NZ	1:A:280:GLU:HB2	2.13	0.63
1:B:251:GLN:HE21	1:B:251:GLN:CA	2.08	0.63
1:A:50:VAL:O	1:A:298:ILE:HG12	1.99	0.63
1:B:97:ALA:HA	1:B:100:GLN:NE2	2.13	0.63
1:B:205:VAL:CG2	1:B:212:PRO:HG3	2.20	0.63
1:B:63:ASP:OD1	1:B:216:THR:HB	1.99	0.63
1:B:283:ASN:OD1	1:B:287:LEU:O	2.17	0.62
1:A:242:LYS:CD	1:A:299:GLN:HB2	2.27	0.62
1:A:287:LEU:HD13	1:A:287:LEU:H	1.65	0.62
1:A:122:LEU:O	1:A:126:ARG:HG2	1.99	0.62
1:B:180:ASN:HA	1:B:183:TYR:HD2	1.64	0.62
1:B:226:LYS:HZ3	1:B:278:ARG:HD3	1.64	0.62
1:A:48:GLN:N	1:A:301:THR:HG23	2.13	0.61
1:A:62:VAL:HG11	1:A:189:PRO:HG3	1.82	0.60
1:B:51:LEU:HD22	1:B:297:HIS:CD2	2.36	0.60
1:A:69:SER:HA	1:A:205:VAL:O	2.01	0.60
1:B:107:THR:HG21	1:B:170:ASN:ND2	2.16	0.60
1:B:251:GLN:HA	1:B:251:GLN:NE2	2.15	0.60
1:A:88:LEU:HA	1:A:187:VAL:HG12	1.84	0.60
1:B:142:SER:OG	1:B:143:GLN:N	2.34	0.60
1:B:168:LYS:HD3	1:B:168:LYS:C	2.21	0.60
1:B:74:THR:HG22	1:B:91:VAL:HB	1.83	0.60
1:A:130:SER:O	1:A:133:GLN:HG2	2.00	0.60
1:A:57:ASP:OD1	1:A:58:ALA:N	2.35	0.60
1:B:53:THR:O	1:B:53:THR:HG22	2.01	0.60
1:A:287:LEU:O	1:A:288:LEU:HB2	2.02	0.59
1:A:214:ILE:N	1:A:214:ILE:HD12	2.17	0.59
1:B:78:ALA:O	1:B:80:GLY:N	2.31	0.59
1:A:246:THR:O	1:A:247:VAL:HG13	2.02	0.59
1:A:242:LYS:O	1:A:243:ALA:HB3	2.02	0.59
1:A:258:GLN:NE2	1:A:258:GLN:N	2.45	0.59
1:B:136:ALA:CB	1:B:146:LEU:HD21	2.30	0.59
1:A:59:LEU:HB2	1:A:222:ALA:O	2.03	0.59
1:B:266:PRO:HB3	1:B:275:TYR:CE1	2.38	0.58
1:A:164:ASP:HA	1:A:167:ILE:HD12	1.85	0.58
1:B:45:ASP:CB	1:B:304:LYS:HG3	2.33	0.58
1:A:229:VAL:HG22	1:A:229:VAL:O	2.01	0.58
1:B:95:GLU:HA	1:B:98:GLU:OE1	2.04	0.58
1:B:122:LEU:O	1:B:126:ARG:HB2	2.04	0.58
1:B:238:LYS:H	1:B:241:GLN:NE2	2.01	0.58
1:B:237:LEU:CD1	1:B:298:ILE:HG21	2.32	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:72:LEU:HD12	1:B:199:THR:HG22	1.86	0.58
1:A:85:LYS:O	1:A:86:ASP:HB2	2.04	0.57
1:B:190:MET:HE1	1:B:219:ASP:H	1.68	0.57
1:B:296:VAL:HG12	1:B:298:ILE:HD12	1.87	0.57
1:B:167:ILE:HG22	1:B:171:GLN:HG3	1.87	0.57
1:B:96:GLN:NE2	1:B:96:GLN:HA	2.18	0.56
1:B:132:GLN:O	1:B:146:LEU:HD21	2.05	0.56
1:B:190:MET:HE1	1:B:219:ASP:N	2.19	0.56
1:A:122:LEU:HG	1:A:156:LYS:HB3	1.86	0.56
1:A:286:GLY:O	1:A:287:LEU:O	2.22	0.56
1:B:244:TRP:HZ3	1:B:299:GLN:HG2	1.70	0.56
1:A:138:THR:O	1:A:138:THR:HG22	2.05	0.56
1:A:237:LEU:HD21	1:A:277:ALA:HB2	1.87	0.56
1:B:235:ILE:HD12	1:B:235:ILE:H	1.69	0.56
1:B:266:PRO:HB3	1:B:275:TYR:CD1	2.41	0.56
1:A:180:ASN:O	1:A:183:TYR:HB2	2.05	0.56
1:B:89:LEU:HD11	1:B:188:ALA:HB2	1.88	0.56
1:B:283:ASN:N	1:B:284:PRO:HD3	2.20	0.55
1:B:85:LYS:HG2	1:B:86:ASP:N	2.21	0.55
1:B:109:MET:CA	1:B:112:ARG:HB2	2.30	0.55
1:B:122:LEU:HD23	1:B:123:LYS:HE2	1.88	0.55
1:B:215:LEU:O	1:B:215:LEU:CD2	2.53	0.55
1:B:245:PHE:C	1:B:245:PHE:CD1	2.78	0.55
1:A:251:GLN:O	1:A:252:LEU:HD13	2.07	0.55
1:A:108:LEU:HD13	1:A:108:LEU:O	2.07	0.55
1:A:130:SER:O	1:A:133:GLN:N	2.39	0.55
1:B:168:LYS:HD3	1:B:168:LYS:O	2.07	0.55
1:A:46:LEU:HB2	1:A:308:THR:CG2	2.37	0.55
1:A:83:VAL:HG21	1:A:217:LEU:HD21	1.89	0.55
1:A:46:LEU:HB2	1:A:308:THR:HG22	1.89	0.54
1:A:163:ILE:HG22	1:A:167:ILE:HD11	1.89	0.54
1:A:227:ALA:O	1:A:276:TYR:HA	2.07	0.54
1:A:260:LYS:HZ2	1:A:280:GLU:HB2	1.73	0.54
1:A:270:ASN:O	1:A:271:ASP:CB	2.55	0.54
1:B:224:LEU:HA	1:B:279:PHE:O	2.08	0.54
1:A:43:PRO:CB	1:A:305:ASN:HD21	2.21	0.53
1:A:51:LEU:HD21	1:A:297:HIS:ND1	2.23	0.53
1:A:79:ILE:HA	1:A:194:VAL:HG12	1.89	0.53
1:B:175:ASP:O	1:B:179:THR:HB	2.07	0.53
1:B:230:SER:HB3	1:B:233:ASP:OD2	2.09	0.53
1:B:46:LEU:HD22	1:B:47:GLN:N	2.23	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:186:ILE:N	1:B:186:ILE:HD12	2.23	0.53
1:A:305:ASN:ND2	1:A:305:ASN:C	2.60	0.53
1:A:229:VAL:HG11	1:A:237:LEU:CD2	2.38	0.53
1:B:235:ILE:HD12	1:B:235:ILE:N	2.24	0.53
1:A:243:ALA:CA	1:A:297:HIS:O	2.52	0.53
1:B:198:THR:HB	1:B:213:ASN:ND2	2.20	0.53
1:A:279:PHE:CD1	1:A:279:PHE:N	2.78	0.52
1:B:205:VAL:HG23	1:B:212:PRO:HB3	1.92	0.52
1:A:52:ALA:HB1	1:A:228:GLN:O	2.10	0.52
1:A:94:PRO:HA	1:A:184:THR:HG21	1.91	0.52
1:B:69:SER:O	1:B:92:ILE:HG21	2.10	0.52
1:B:50:VAL:HG12	1:B:50:VAL:O	2.10	0.52
1:A:62:VAL:HG12	1:A:63:ASP:N	2.25	0.52
1:A:92:ILE:HD11	1:A:186:ILE:HD11	1.91	0.52
1:A:186:ILE:HD13	1:A:214:ILE:HG12	1.90	0.52
1:B:225:VAL:HG11	1:B:245:PHE:CE2	2.44	0.52
1:B:72:LEU:HD13	1:B:200:LEU:O	2.10	0.52
1:B:163:ILE:O	1:B:166:GLN:N	2.43	0.52
1:A:95:GLU:HA	1:A:98:GLU:HG3	1.92	0.51
1:A:79:ILE:HG23	1:A:194:VAL:O	2.11	0.51
1:A:258:GLN:H	1:A:258:GLN:HE21	1.55	0.51
1:A:246:THR:C	1:A:247:VAL:HG22	2.31	0.51
1:B:235:ILE:H	1:B:235:ILE:CD1	2.23	0.51
1:A:105:GLU:CG	1:A:174:LEU:HD11	2.40	0.50
1:B:128:THR:O	1:B:129:TYR:C	2.49	0.50
1:A:62:VAL:HG11	1:A:189:PRO:CG	2.41	0.50
1:B:56:LEU:HD12	1:B:224:LEU:O	2.11	0.50
1:A:134:ARG:C	1:A:136:ALA:N	2.64	0.50
1:B:283:ASN:CG	1:B:283:ASN:O	2.49	0.50
1:A:203:GLN:HE21	1:B:63:ASP:H	1.60	0.50
1:A:214:ILE:HD12	1:A:214:ILE:H	1.77	0.50
1:B:130:SER:O	1:B:132:GLN:N	2.45	0.50
1:B:306:VAL:HG22	1:B:307:LEU:N	2.27	0.50
1:B:282:PRO:C	1:B:284:PRO:HD3	2.32	0.50
1:A:241:GLN:O	1:A:242:LYS:O	2.31	0.49
1:B:252:LEU:HD12	1:B:254:ARG:HG3	1.93	0.49
1:A:55:LYS:HD2	1:A:291:ASP:OD1	2.12	0.49
1:A:57:ASP:O	1:A:224:LEU:N	2.45	0.49
1:A:56:LEU:HD12	1:A:292:MET:O	2.11	0.49
1:A:108:LEU:O	1:A:108:LEU:CD1	2.60	0.49
1:B:290:LEU:N	1:B:290:LEU:HD12	2.26	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:45:ASP:OD2	1:A:305:ASN:N	2.43	0.49
1:A:51:LEU:CD2	1:A:297:HIS:ND1	2.76	0.49
1:A:94:PRO:HB2	1:A:181:LEU:HD11	1.93	0.49
1:A:175:ASP:O	1:A:179:THR:HG23	2.13	0.49
1:A:209:GLN:O	1:A:210:GLN:HB2	2.12	0.49
1:B:96:GLN:C	1:B:100:GLN:HE22	2.16	0.49
1:B:224:LEU:HD22	1:B:279:PHE:O	2.13	0.49
1:B:231:GLU:CD	1:B:273:ILE:HB	2.33	0.49
1:B:74:THR:HA	1:B:201:GLN:HE21	1.74	0.49
1:B:135:LEU:CD2	1:B:140:ALA:HB2	2.25	0.49
1:B:196:GLN:HB3	1:B:216:THR:CG2	2.43	0.49
1:B:226:LYS:HD3	1:B:278:ARG:HG2	1.95	0.49
1:A:88:LEU:CD1	1:A:185:ARG:HB3	2.43	0.48
1:B:250:ASP:O	1:B:250:ASP:OD1	2.30	0.48
1:B:94:PRO:O	1:B:96:GLN:N	2.45	0.48
1:A:47:GLN:HA	1:A:301:THR:HG23	1.94	0.48
1:B:46:LEU:HD13	1:B:46:LEU:C	2.33	0.48
1:B:293:THR:HG22	1:B:294:ALA:N	2.28	0.48
1:A:78:ALA:HA	1:A:197:ILE:HD11	1.95	0.48
1:A:233:ASP:OD2	1:A:233:ASP:N	2.46	0.48
1:A:306:VAL:O	1:A:306:VAL:HG12	2.14	0.48
1:B:293:THR:CG2	1:B:294:ALA:N	2.77	0.48
1:A:121:GLU:HB3	1:A:156:LYS:HE2	1.96	0.48
1:A:206:ILE:HG22	1:B:211:ALA:HB2	1.95	0.48
1:A:251:GLN:H	1:A:251:GLN:CD	2.14	0.48
1:A:279:PHE:N	1:A:279:PHE:HD1	2.12	0.48
1:A:238:LYS:H	1:A:241:GLN:CD	2.16	0.48
1:B:115:ARG:HA	1:B:163:ILE:CD1	2.43	0.48
1:B:141:VAL:HG23	1:B:145:ASP:HB2	1.96	0.48
1:B:198:THR:CB	1:B:213:ASN:ND2	2.74	0.48
1:A:69:SER:CB	1:A:206:ILE:HA	2.43	0.47
1:A:237:LEU:HD13	1:A:298:ILE:HD12	1.95	0.47
1:A:142:SER:OG	1:A:143:GLN:N	2.46	0.47
1:B:89:LEU:HD11	1:B:188:ALA:CA	2.45	0.47
1:B:289:ARG:HG3	1:B:292:MET:CE	2.44	0.47
1:A:244:TRP:CE3	1:A:254:ARG:HD3	2.50	0.47
1:B:180:ASN:HA	1:B:183:TYR:CD2	2.46	0.47
1:B:108:LEU:HD11	1:B:170:ASN:HB3	1.97	0.47
1:B:205:VAL:HG21	1:B:212:PRO:CB	2.45	0.47
1:B:209:GLN:HB3	1:B:210:GLN:OE1	2.15	0.47
1:A:72:LEU:HD22	1:A:201:GLN:HA	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:203:GLN:HG2	1:B:63:ASP:O	2.14	0.47
1:A:106:ALA:HB2	1:B:168:LYS:HD2	1.96	0.46
1:B:186:ILE:N	1:B:186:ILE:CD1	2.79	0.46
1:B:229:VAL:HG22	1:B:230:SER:N	2.30	0.46
1:B:205:VAL:CG2	1:B:212:PRO:HB3	2.45	0.46
1:A:72:LEU:CD1	1:A:199:THR:HG22	2.45	0.46
1:A:304:LYS:O	1:A:305:ASN:HB3	2.14	0.46
1:A:133:GLN:O	1:A:136:ALA:HB3	2.14	0.46
1:A:162:THR:HG22	1:A:166:GLN:HE22	1.79	0.46
1:A:207:ALA:O	1:A:208:ALA:C	2.54	0.46
1:A:251:GLN:OE1	1:A:251:GLN:N	2.43	0.46
1:A:242:LYS:CD	1:A:242:LYS:N	2.65	0.46
1:A:124:LEU:HD22	1:B:151:THR:OG1	2.15	0.46
1:B:52:ALA:N	1:B:296:VAL:O	2.47	0.46
1:B:240:GLY:HA2	1:B:258:GLN:HB3	1.97	0.46
1:A:47:GLN:N	1:A:47:GLN:OE1	2.48	0.46
1:B:135:LEU:HD22	1:B:140:ALA:CB	2.25	0.46
1:A:121:GLU:HB3	1:A:156:LYS:CE	2.46	0.46
1:A:163:ILE:O	1:A:167:ILE:HG13	2.16	0.46
1:A:269:VAL:O	1:A:270:ASN:ND2	2.49	0.46
1:A:215:LEU:C	1:A:215:LEU:HD23	2.36	0.46
1:B:149:ALA:O	1:B:152:GLU:HB3	2.15	0.46
1:B:174:LEU:O	1:B:178:LYS:HG3	2.16	0.46
1:A:72:LEU:HD13	1:A:199:THR:HG22	1.98	0.45
1:A:76:SER:O	1:A:77:VAL:HG13	2.16	0.45
1:A:143:GLN:O	1:A:144:GLN:C	2.54	0.45
1:B:108:LEU:CD1	1:B:170:ASN:HB3	2.46	0.45
1:B:128:THR:HG23	1:B:132:GLN:HG2	1.98	0.45
1:B:237:LEU:CA	1:B:241:GLN:HE22	2.14	0.45
1:A:43:PRO:CB	1:A:305:ASN:ND2	2.77	0.45
1:A:119:GLU:O	1:A:123:LYS:HG3	2.16	0.45
1:B:242:LYS:HG3	1:B:258:GLN:OE1	2.16	0.45
1:A:163:ILE:O	1:A:166:GLN:HB2	2.17	0.45
1:A:225:VAL:HB	1:A:279:PHE:CE1	2.52	0.45
1:B:242:LYS:HA	1:B:257:GLY:O	2.15	0.45
1:B:290:LEU:N	1:B:290:LEU:CD1	2.80	0.45
1:A:229:VAL:HG11	1:A:237:LEU:HD22	1.99	0.45
1:A:47:GLN:HA	1:A:301:THR:CG2	2.47	0.45
1:B:51:LEU:HA	1:B:297:HIS:HA	1.99	0.45
1:B:88:LEU:C	1:B:88:LEU:HD23	2.37	0.45
1:B:115:ARG:HB2	1:B:163:ILE:HG21	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:253:THR:HG22	1:B:253:THR:O	2.17	0.45
1:A:70:GLY:HA2	1:B:67:GLN:OE1	2.16	0.45
1:B:136:ALA:HA	1:B:140:ALA:H	1.82	0.45
1:B:244:TRP:CZ3	1:B:299:GLN:HG2	2.52	0.45
1:A:249:GLY:O	1:A:250:ASP:CB	2.65	0.45
1:A:261:ASP:O	1:A:262:VAL:HG23	2.17	0.45
1:A:69:SER:OG	1:A:206:ILE:HD12	2.18	0.44
1:B:85:LYS:HG2	1:B:86:ASP:H	1.82	0.44
1:A:287:LEU:O	1:A:288:LEU:CB	2.66	0.44
1:A:60:ARG:O	1:A:218:ALA:HA	2.16	0.44
1:A:213:ASN:C	1:A:213:ASN:HD22	2.21	0.44
1:B:107:THR:HG21	1:B:170:ASN:HD22	1.79	0.44
1:A:128:THR:O	1:A:132:GLN:HG3	2.18	0.44
1:B:305:ASN:O	1:B:306:VAL:HB	2.17	0.44
1:A:46:LEU:HD23	1:A:308:THR:HG21	1.99	0.44
1:A:138:THR:O	1:A:139:GLN:O	2.36	0.44
1:B:111:LEU:HD13	1:B:166:GLN:HB3	1.99	0.44
1:A:141:VAL:CG2	1:A:145:ASP:HB2	2.48	0.43
1:B:126:ARG:HG3	1:B:153:MET:SD	2.58	0.43
1:A:178:LYS:C	1:A:180:ASN:H	2.21	0.43
1:B:269:VAL:O	1:B:269:VAL:CG2	2.59	0.43
1:A:101:ILE:O	1:A:102:LYS:C	2.56	0.43
1:A:241:GLN:NE2	1:A:300:LEU:HA	2.33	0.43
1:A:242:LYS:O	1:A:243:ALA:CB	2.66	0.43
1:B:74:THR:HG23	1:B:91:VAL:HB	1.96	0.43
1:A:100:GLN:O	1:A:104:VAL:HG23	2.19	0.43
1:A:229:VAL:O	1:A:229:VAL:CG2	2.66	0.43
1:A:236:HIS:CB	1:A:300:LEU:HD13	2.47	0.43
1:B:169:ARG:O	1:B:172:ALA:HB3	2.18	0.43
1:B:105:GLU:O	1:B:108:LEU:HB2	2.19	0.43
1:B:56:LEU:HD11	1:B:223:MET:HB3	1.99	0.43
1:B:225:VAL:HG13	1:B:279:PHE:HB3	2.00	0.43
1:B:266:PRO:HB2	1:B:274:PHE:O	2.18	0.43
1:B:302:ASP:OD1	1:B:302:ASP:O	2.37	0.43
1:A:56:LEU:HA	1:A:224:LEU:O	2.19	0.43
1:A:181:LEU:HD12	1:A:181:LEU:HA	1.74	0.43
1:B:199:THR:HB	1:B:214:ILE:HA	1.99	0.43
1:B:85:LYS:O	1:B:86:ASP:HB2	2.18	0.43
1:A:110:GLU:O	1:A:114:GLN:CG	2.67	0.42
1:A:43:PRO:N	1:A:307:LEU:HG	2.35	0.42
1:A:193:GLU:O	1:A:217:LEU:HA	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:108:LEU:O	1:B:112:ARG:N	2.52	0.42
1:B:114:GLN:HE21	1:B:114:GLN:HB2	1.66	0.42
1:A:164:ASP:OD2	1:A:167:ILE:HD12	2.19	0.42
1:B:133:GLN:O	1:B:136:ALA:HB3	2.19	0.42
1:A:94:PRO:O	1:A:97:ALA:N	2.51	0.42
1:A:130:SER:O	1:A:131:ARG:C	2.57	0.42
1:A:266:PRO:HB2	1:A:273:ILE:HG13	2.00	0.42
1:B:296:VAL:HG12	1:B:298:ILE:CD1	2.48	0.42
1:A:47:GLN:HB2	1:A:301:THR:C	2.39	0.42
1:A:141:VAL:O	1:A:142:SER:OG	2.25	0.42
1:A:79:ILE:H	1:A:79:ILE:HG13	1.65	0.42
1:A:96:GLN:HE21	1:B:176:THR:HG23	1.85	0.42
1:A:269:VAL:O	1:A:270:ASN:CG	2.58	0.42
1:B:101:ILE:O	1:B:105:GLU:HG3	2.20	0.42
1:B:188:ALA:HB1	1:B:217:LEU:HD11	2.01	0.42
1:B:226:LYS:NZ	1:B:278:ARG:CD	2.65	0.42
1:B:288:LEU:HA	1:B:292:MET:SD	2.60	0.42
1:B:225:VAL:O	1:B:225:VAL:CG2	2.68	0.42
1:A:203:GLN:CG	1:B:63:ASP:O	2.68	0.42
1:A:258:GLN:N	1:A:258:GLN:CD	2.72	0.42
1:B:238:LYS:O	1:B:239:PRO:C	2.58	0.42
1:A:92:ILE:O	1:A:94:PRO:HD3	2.20	0.41
1:B:60:ARG:HH12	1:B:219:ASP:CG	2.23	0.41
1:B:92:ILE:O	1:B:94:PRO:CD	2.62	0.41
1:A:289:ARG:HB2	1:B:275:TYR:OH	2.21	0.41
1:A:50:VAL:HB	1:A:298:ILE:CD1	2.37	0.41
1:A:242:LYS:HD3	1:A:299:GLN:CB	2.39	0.41
1:A:249:GLY:O	1:B:235:ILE:HG12	2.20	0.41
1:A:269:VAL:HB	1:A:274:PHE:CE2	2.56	0.41
1:B:129:TYR:O	1:B:130:SER:C	2.59	0.41
1:B:299:GLN:O	1:B:300:LEU:C	2.59	0.41
1:B:296:VAL:HG12	1:B:297:HIS:N	2.36	0.41
1:B:300:LEU:HD23	1:B:300:LEU:HA	1.84	0.41
1:A:79:ILE:HA	1:A:194:VAL:CG1	2.51	0.41
1:A:49:SER:HA	1:A:298:ILE:O	2.21	0.41
1:A:62:VAL:CG1	1:A:63:ASP:N	2.84	0.41
1:A:96:GLN:NE2	1:B:176:THR:HG23	2.36	0.41
1:A:139:GLN:O	1:A:140:ALA:HB2	2.21	0.41
1:B:42:ARG:HA	1:B:43:PRO:HD3	1.91	0.41
1:B:72:LEU:HD12	1:B:199:THR:CG2	2.51	0.41
1:A:286:GLY:O	1:A:287:LEU:C	2.59	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:289:ARG:HG3	1:B:292:MET:HE3	2.03	0.40
1:A:226:LYS:HG2	1:A:278:ARG:HD3	2.02	0.40
1:A:229:VAL:HG11	1:A:237:LEU:HD21	2.01	0.40
1:B:271:ASP:O	1:B:272:ALA:O	2.40	0.40
1:B:59:LEU:HD23	1:B:219:ASP:OD2	2.21	0.40
1:B:236:HIS:O	1:B:237:LEU:CB	2.69	0.40
1:B:238:LYS:HD2	1:B:238:LYS:HA	1.96	0.40
1:A:127:VAL:O	1:A:128:THR:C	2.60	0.40
1:B:113:ALA:O	1:B:116:GLN:N	2.55	0.40
1:B:298:ILE:HG22	1:B:299:GLN:N	2.36	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	264/341 (77%)	207 (78%)	39 (15%)	18 (7%)	1	6
1	B	265/341 (78%)	203 (77%)	39 (15%)	23 (9%)	1	3
All	All	529/682 (78%)	410 (78%)	78 (15%)	41 (8%)	1	4

All (41) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	140	ALA
1	A	221	SER
1	A	242	LYS
1	A	247	VAL
1	A	252	LEU
1	A	254	ARG
1	A	271	ASP
1	A	287	LEU

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Mol	Chain	Res	Type
1	B	79	ILE
1	B	139	GLN
1	B	254	ARG
1	B	287	LEU
1	A	95	GLU
1	A	144	GLN
1	A	208	ALA
1	A	250	ASP
1	A	306	VAL
1	B	50	VAL
1	B	95	GLU
1	B	130	SER
1	B	131	ARG
1	B	242	LYS
1	B	272	ALA
1	A	139	GLN
1	A	210	GLN
1	B	80	GLY
1	B	194	VAL
1	B	251	GLN
1	B	305	ASN
1	B	306	VAL
1	A	86	ASP
1	A	142	SER
1	A	243	ALA
1	B	239	PRO
1	B	261	ASP
1	B	288	LEU
1	B	212	PRO
1	B	237	LEU
1	B	240	GLY
1	B	284	PRO
1	B	141	VAL

### 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	221/281 (79%)	189 (86%)	32 (14%)	3	15
1	B	222/281 (79%)	196 (88%)	26 (12%)	5	22
All	All	443/562 (79%)	385 (87%)	58 (13%)	4	18

All (58) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	46	LEU
1	A	81	ASP
1	A	91	VAL
1	A	108	LEU
1	A	111	LEU
1	A	122	LEU
1	A	139	GLN
1	A	152	GLU
1	A	153	MET
1	A	159	GLN
1	A	168	LYS
1	A	173	SER
1	A	180	ASN
1	A	198	THR
1	A	213	ASN
1	A	215	LEU
1	A	216	THR
1	A	229	VAL
1	A	244	TRP
1	A	247	VAL
1	A	251	GLN
1	A	256	GLU
1	A	258	GLN
1	A	265	THR
1	A	270	ASN
1	A	279	PHE
1	A	283	ASN
1	A	287	LEU
1	A	293	THR
1	A	301	THR
1	A	305	ASN
1	A	307	LEU
1	B	50	VAL
1	B	57	ASP
1	B	64	VAL

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	B	112	ARG
1	B	115	ARG
1	B	130	SER
1	B	148	ASN
1	B	152	GLU
1	B	166	GLN
1	B	174	LEU
1	B	179	THR
1	B	195	THR
1	B	200	LEU
1	B	210	GLN
1	B	215	LEU
1	B	216	THR
1	B	220	MET
1	B	225	VAL
1	B	245	PHE
1	B	251	GLN
1	B	265	THR
1	B	279	PHE
1	B	280	GLU
1	B	299	GLN
1	B	303	VAL
1	B	305	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (30) such sidechains are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	67	GLN
1	A	96	GLN
1	A	99	ASN
1	A	116	GLN
1	A	133	GLN
1	A	148	ASN
1	A	159	GLN
1	A	166	GLN
1	A	180	ASN
1	A	203	GLN
1	A	213	ASN
1	A	258	GLN
1	A	283	ASN
1	A	299	GLN
1	A	305	ASN

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Mol	Chain	Res	Type
1	B	96	GLN
1	B	100	GLN
1	B	114	GLN
1	B	116	GLN
1	B	133	GLN
1	B	144	GLN
1	B	148	ASN
1	B	170	ASN
1	B	201	GLN
1	B	209	GLN
1	B	213	ASN
1	B	241	GLN
1	B	251	GLN
1	B	299	GLN
1	B	305	ASN

### 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 [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.