WORLDWIDE PDB

PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

Feb 15, 2024 – 01:39 AM EST

PDB ID	:	3NFF
Title	:	Crystal structure of extended Dimerization module of RNA polymerase I sub-complex A49/A34.5
Authors	:	Geiger, S.R.; Lorenzen, K.; Schreieck, A.; Hanecker, P.; Kostrewa, D.; Heck, A.J.R.; Cramer, P.
Deposited on	:	2010-06-10
Resolution	:	3.24 Å(reported)

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

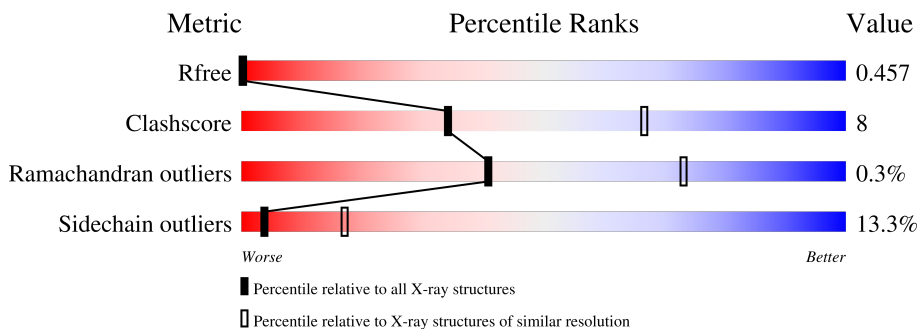|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation 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 3.24 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	Percentile Ranks	Value
Rfree		0.457
Clashscore		8
Ramachandran outliers		0.3%
Sidechain outliers		13.3%

Worse .... *Better*

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1619 (3.28-3.20)
Clashscore	141614	1755 (3.28-3.20)
Ramachandran outliers	138981	1728 (3.28-3.20)
Sidechain outliers	138945	1727 (3.28-3.20)

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 <=5%

Mol	Chain	Length	Quality of chain
1	A	122	57%　22%　•　19%
1	C	122	66%　9%　•　24%
1	E	122	57%　18%　•　24%
1	G	122	62%　13%　•　24%
2	B	121	57%　28%　5%　•　9%
2	D	121	59%　28%　•　9%
2	F	121	68%　21%　•　9%

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Mol	Chain	Length	Quality of chain
2	H	121	45% 37% 8% • 8%

2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 6539 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 RNA polymerase I subunit A49.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	99	Total	C	N	O	S	0	1	0
			805	511	135	158	1			
1	C	93	Total	C	N	O	S	0	1	0
			759	481	127	150	1			
1	E	93	Total	C	N	O	S	0	1	0
			759	481	127	150	1			
1	G	93	Total	C	N	O	S	0	1	0
			759	481	127	150	1			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP Q6FNZ9
A	-1	SER	-	expression tag	UNP Q6FNZ9
A	0	HIS	-	expression tag	UNP Q6FNZ9
A	72	MET	VAL	engineered mutation	UNP Q6FNZ9
C	-2	GLY	-	expression tag	UNP Q6FNZ9
C	-1	SER	-	expression tag	UNP Q6FNZ9
C	0	HIS	-	expression tag	UNP Q6FNZ9
C	72	MET	VAL	engineered mutation	UNP Q6FNZ9
E	-2	GLY	-	expression tag	UNP Q6FNZ9
E	-1	SER	-	expression tag	UNP Q6FNZ9
E	0	HIS	-	expression tag	UNP Q6FNZ9
E	72	MET	VAL	engineered mutation	UNP Q6FNZ9
G	-2	GLY	-	expression tag	UNP Q6FNZ9
G	-1	SER	-	expression tag	UNP Q6FNZ9
G	0	HIS	-	expression tag	UNP Q6FNZ9
G	72	MET	VAL	engineered mutation	UNP Q6FNZ9

- Molecule 2 is a protein called RNA polymerase I subunit A34.5.

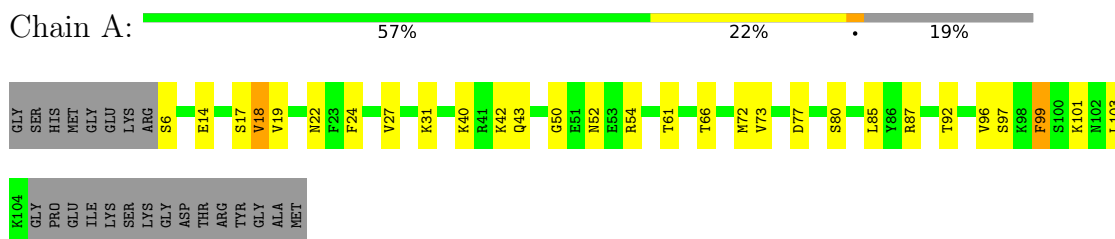| Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	110	Total 863	C 546	N 140	O 175	S 2	0	0	0
2	D	110	Total 863	C 546	N 140	O 175	S 2	0	0	0
2	F	110	Total 863	C 546	N 140	O 175	S 2	0	0	0
2	H	111	Total 868	C 549	N 141	O 176	S 2	0	0	0

There are 12 discrepancies between the modelled and reference sequences:

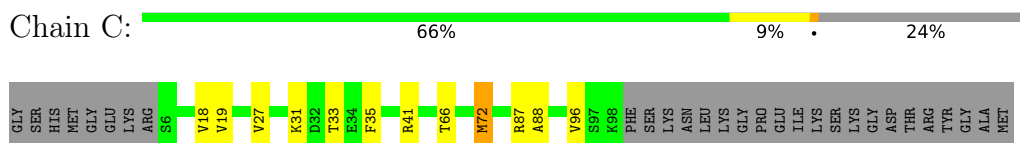| Chain	Residue	Modelled	Actual	Comment	Reference
B	23	MET	-	expression tag	UNP Q6FQI3
B	24	GLY	-	expression tag	UNP Q6FQI3
B	55	MET	LEU	engineered mutation	UNP Q6FQI3
D	23	MET	-	expression tag	UNP Q6FQI3
D	24	GLY	-	expression tag	UNP Q6FQI3
D	55	MET	LEU	engineered mutation	UNP Q6FQI3
F	23	MET	-	expression tag	UNP Q6FQI3
F	24	GLY	-	expression tag	UNP Q6FQI3
F	55	MET	LEU	engineered mutation	UNP Q6FQI3
H	23	MET	-	expression tag	UNP Q6FQI3
H	24	GLY	-	expression tag	UNP Q6FQI3
H	55	MET	LEU	engineered mutation	UNP Q6FQI3

3 Residue-property plots ⓘ

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. 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. 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: RNA polymerase I subunit A49
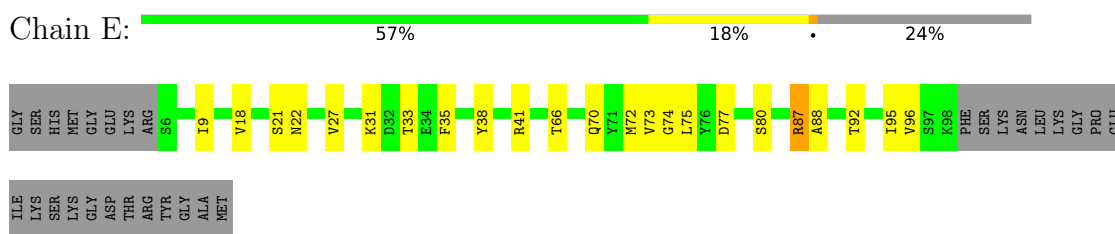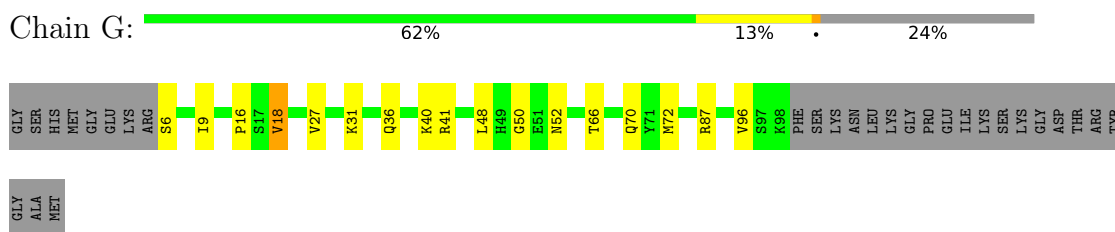
Chain A:

- Molecule 1: RNA polymerase I subunit A49

Chain C:

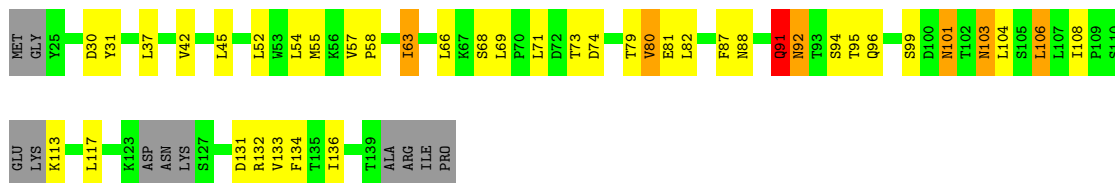- Molecule 1: RNA polymerase I subunit A49
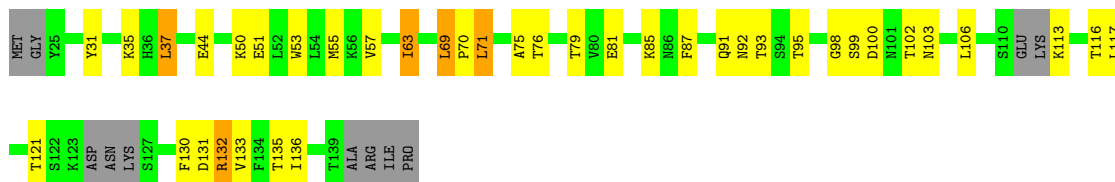
Chain E:

- Molecule 1: RNA polymerase I subunit A49

Chain G:

- Molecule 2: RNA polymerase I subunit A34.5

Chain B:

MET GLY Y25 D30 Y31 L37 V42 L45 L52 W53 L54 M55 K56 V57 P58 I63 L66 K67 S68 L69 P70 L71 D72 T73 D74 T79 V80 E81 L82 F87 N88 Q91 N92 T93 S94 T95 Q96 S99 D100 N101 T102 N103 L104 S105 L106 L107 I108 P109 S110

GLU LYS K113 L117 K123 ASP ASN LYS S127 D131 R132 V133 F134 T135 I136 T139 ALA ARG ILE PRO

• Molecule 2: RNA polymerase I subunit A34.5

Chain D:　　　59%　　　　　28%　　　•　　9%

MET GLY Y25 Y31 K35 H36 L37 E44 K50 E51 L52 W53 L54 M55 K56 V57 I63 L69 P70 L71 A75 T76 T79 V80 E81 K85 N86 F87 Q91 N92 T93 S94 T95 G98 S99 D100 N101 T102 N103 L106 S110 GLU LYS K113 T116 L117

T121 S122 K123 ASP ASN LYS S127 F130 D131 R132 V133 F134 T135 I136 T139 ALA ARG ILE PRO

• Molecule 2: RNA polymerase I subunit A34.5

Chain F:　　　68%　　　　　21%　　•　9%

MET GLY Y25 K35 H36 L37 E44 K50 K56 V57 P58 A59 N60 I61 D62 I63 L69 P70 L71 D72 T73 T76 V77 E81 L82 G83 S84 K85 N86 F87 N88 V89 L90 T93 L106 L107 S110 GLU LYS K113 L117 K123 ASP ASN LYS S127 R132

T135 I136 T139 ALA ARG ILE PRO

• Molecule 2: RNA polymerase I subunit A34.5

Chain H:　　　45%　　　　　37%　　　8%　•　8%

MET GLY Y25 Y31 K32 K35 H36 L37 K38 S39 F40 P41 V42 S43 E44 L45 K46 G47 D48 N49 K50 E51 L52 W53 L54 M55 K56 V57 I63 L66 L69 P70 L71 D72 T73 D74 T79 V80 E81 L82 F87 N88 V89 L90 Q91 N92 T93 S94 T95 Q96 S99 D100

N101 T102 N103 L106 L107 I108 P109 S110 GLU LYS K113 K114 E115 T116 L117 K118 V119 K123 ASP ASN LYS S127 F130 D131 R132 V133 I136 T139 A140 ARG ILE PRO

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	108.93Å　221.77Å　129.23Å 90.00°　　90.00°　　90.00°	Depositor
Resolution (Å)	29.10　–　3.24 77.97　–　3.24	Depositor EDS
% Data completeness (in resolution range)	(Not available) (29.10-3.24) 95.7 (77.97-3.24)	Depositor EDS
R_{merge}	0.21	Depositor
R_{sym}	0.21	Depositor
$< I/\sigma(I) >$ [1]	1.24 (at 3.26Å)	Xtriage
Refinement program	BUSTER 2.9.2	Depositor
R, R_{free}	0.287　,　0.361 0.362　,　0.457	Depositor DCC
R_{free} test set	1234 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å^2)	103.8	Xtriage
Anisotropy	0.152	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 199.2	EDS
L-test for twinning[2]	$< |L| > = 0.39, < L^2 > = 0.21$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.72	EDS
Total number of atoms	6539	wwPDB-VP
Average B, all atoms (Å^2)	113.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.26% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality (i)

5.1 Standard geometry (i)

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	0.50	0/825	1.00	6/1110 (0.5%)
1	C	0.47	0/778	0.75	1/1048 (0.1%)
1	E	0.47	0/778	0.68	0/1048
1	G	0.41	0/778	0.73	0/1048
2	B	0.56	0/876	0.88	2/1184 (0.2%)
2	D	0.55	0/876	0.83	1/1184 (0.1%)
2	F	0.49	0/876	0.78	1/1184 (0.1%)
2	H	0.59	0/881	1.04	6/1191 (0.5%)
All	All	0.51	0/6668	0.85	17/8997 (0.2%)

There are no bond length outliers.

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	99	PHE	CB-CA-C	-11.41	87.57	110.40
1	A	42	LYS	CB-CA-C	-11.27	87.87	110.40
1	A	97	SER	CB-CA-C	9.53	128.21	110.10
2	H	46	LYS	CB-CA-C	-8.47	93.46	110.40
1	A	42	LYS	N-CA-C	-8.18	88.91	111.00
2	H	96	GLN	N-CA-CB	-7.54	97.02	110.60
2	F	56	LYS	N-CA-C	-7.16	91.68	111.00
2	H	114	LYS	N-CA-C	6.89	129.60	111.00
2	H	71	LEU	CB-CA-C	-6.50	97.84	110.20
1	A	97	SER	N-CA-C	-6.44	93.62	111.00
1	C	72	MET	N-CA-C	6.42	128.32	111.00
1	A	43	GLN	N-CA-CB	-6.01	99.79	110.60
2	B	91	GLN	N-CA-C	-5.66	95.71	111.00
2	H	115	GLU	N-CA-CB	-5.32	101.02	110.60
2	D	121	THR	CB-CA-C	-5.08	97.88	111.60
2	H	139	THR	N-CA-C	5.05	124.63	111.00
2	B	96	GLN	N-CA-CB	-5.02	101.57	110.60

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	805	0	799	17	0
1	C	759	0	754	11	0
1	E	759	0	754	16	0
1	G	759	0	754	16	0
2	B	863	0	871	22	0
2	D	863	0	871	26	0
2	F	863	0	871	16	0
2	H	868	0	876	32	0
All	All	6539	0	6550	110	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 8.

All (110) 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)
2:D:63:ILE:HG13	1:C:72:MET:CE	1.63	1.28
2:B:95:THR:O	2:B:99:SER:HB2	1.58	1.01
2:D:63:ILE:HG13	1:C:72:MET:HE1	1.01	1.00
2:F:57:VAL:HG21	1:G:72:MET:CE	1.92	0.98
2:D:63:ILE:CG1	1:C:72:MET:HE1	1.95	0.97
2:H:42:VAL:HG13	2:H:45:LEU:HD12	1.46	0.94
1:A:73:VAL:HG11	2:B:106:LEU:HD11	1.54	0.89
2:D:93:THR:HG21	2:D:132:ARG:HA	1.59	0.83
2:F:57:VAL:CG2	1:G:72:MET:CE	2.57	0.82
2:H:93:THR:HG21	2:H:132:ARG:HA	1.60	0.81
2:B:95:THR:O	2:B:99:SER:CB	2.30	0.78
2:D:57:VAL:HG22	2:D:136:ILE:HD13	1.65	0.78
2:D:63:ILE:HG13	1:C:72:MET:HE3	1.65	0.76
2:H:91:GLN:O	2:H:95:THR:HG23	1.87	0.75
2:H:37:LEU:HB2	2:H:114:LYS:O	1.90	0.71
2:F:57:VAL:HG21	1:G:72:MET:HE1	1.72	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:92:ASN:HD21	2:B:133:VAL:HB	1.61	0.66
2:D:63:ILE:CG1	1:C:72:MET:CE	2.58	0.66
2:B:54:LEU:HB3	2:B:133:VAL:HG13	1.79	0.65
1:A:19:VAL:HB	2:H:107:LEU:HD12	1.80	0.64
2:D:92:ASN:HB3	2:D:98:GLY:HA3	1.82	0.62
1:A:52:ASN:HB3	1:E:33:THR:HA	1.82	0.61
2:F:57:VAL:HG21	1:G:72:MET:HE3	1.76	0.61
2:D:57:VAL:CG2	2:D:136:ILE:HD13	2.31	0.60
1:A:72:MET:HG2	1:A:85:LEU:HD22	1.83	0.60
2:F:57:VAL:CG2	1:G:72:MET:HE2	2.31	0.60
1:A:40:LYS:HB2	2:H:31:TYR:CE1	2.37	0.59
2:B:101:ASN:HB3	2:B:104:LEU:HD12	1.85	0.57
2:B:92:ASN:ND2	2:B:133:VAL:HB	2.19	0.57
2:B:55:MET:HB3	2:B:57:VAL:HG23	1.85	0.57
2:H:42:VAL:HG21	2:H:108:ILE:HD13	1.87	0.57
2:B:66:LEU:HD21	2:B:82:LEU:HB3	1.85	0.57
1:C:35:PHE:HA	1:G:50:GLY:HA2	1.87	0.56
1:C:88:ALA:HB2	1:G:18:VAL:HG13	1.88	0.56
2:F:135:THR:HG21	2:H:140:ALA:O	2.05	0.56
1:C:33:THR:HA	1:G:52:ASN:HB3	1.86	0.56
2:D:116:THR:HG22	1:G:36:GLN:HG3	1.89	0.55
2:H:113:LYS:HD2	2:H:116:THR:HG21	1.88	0.55
2:B:80:VAL:O	2:B:87:PHE:HB2	2.07	0.54
1:A:24:PHE:O	2:H:103:ASN:HA	2.08	0.54
2:B:91:GLN:HG2	2:B:134:PHE:CE1	2.43	0.54
2:B:91:GLN:HG2	2:B:134:PHE:HE1	1.71	0.54
1:E:73:VAL:HG11	2:H:106:LEU:HD11	1.90	0.53
1:A:22:ASN:HD22	1:E:92:THR:HG22	1.74	0.52
2:D:31:TYR:CE1	1:G:40:LYS:HB2	2.45	0.52
1:A:73:VAL:HG11	2:B:106:LEU:CD1	2.33	0.51
2:D:70:PRO:HG3	1:G:6:SER:HB2	1.93	0.51
2:F:61:ILE:HD11	2:F:87:PHE:CE1	2.45	0.51
1:A:72:MET:HE1	2:B:63:ILE:HG13	1.92	0.50
2:D:136:ILE:H	2:D:136:ILE:HD12	1.76	0.50
2:D:55:MET:HB2	1:C:72:MET:HB2	1.94	0.50
1:E:73:VAL:HG11	2:H:106:LEU:CD1	2.41	0.49
2:H:106:LEU:O	2:H:119:VAL:HA	2.12	0.49
2:D:53:TRP:HZ3	2:D:71:LEU:HD13	1.77	0.49
1:A:17:SER:HB3	2:H:38:LYS:HB2	1.95	0.49
2:B:55:MET:HG2	2:B:134:PHE:HB2	1.94	0.49
2:D:37:LEU:HD23	1:G:16:PRO:O	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:99:PHE:HB3	1:A:103:LEU:HD13	1.94	0.49
2:B:103:ASN:O	1:E:21:SER:O	2.31	0.48
2:H:91:GLN:O	2:H:95:THR:CG2	2.59	0.48
2:F:89:VAL:HG22	2:F:136:ILE:HG13	1.95	0.48
2:H:49:ASN:HB3	2:H:50:LYS:HZ2	1.79	0.48
2:H:40:PHE:HB3	2:H:108:ILE:HG22	1.96	0.47
2:D:75:ALA:O	2:D:91:GLN:NE2	2.47	0.47
2:H:39:SER:HB3	2:H:114:LYS:HE2	1.97	0.47
2:H:100:ASP:OD1	2:H:102:THR:HG23	2.14	0.47
2:F:73:THR:HB	2:F:132:ARG:HH11	1.80	0.47
2:H:52:LEU:HD23	2:H:130:PHE:HA	1.96	0.46
2:B:52:LEU:HB3	2:B:131:ASP:H	1.80	0.46
2:F:44:GLU:HB3	2:F:50:LYS:HG3	1.98	0.46
2:F:107:LEU:HB3	2:F:117:LEU:HD22	1.98	0.46
2:F:59:ALA:HA	1:G:70:GLN:HE21	1.81	0.45
2:H:69:LEU:HD22	2:H:71:LEU:HD11	1.98	0.45
1:A:50:GLY:HA2	1:E:35:PHE:HA	1.99	0.45
2:B:31:TYR:HD1	1:E:38:TYR:O	1.99	0.45
2:D:55:MET:HB3	2:D:57:VAL:HG23	1.97	0.45
2:F:57:VAL:HG23	1:G:72:MET:HE2	1.98	0.45
2:D:92:ASN:O	2:D:98:GLY:HA3	2.17	0.45
2:H:108:ILE:N	2:H:118:LYS:O	2.47	0.44
2:F:87:PHE:HB3	2:F:136:ILE:HG23	1.98	0.44
2:D:85:LYS:HD2	2:D:87:PHE:CZ	2.53	0.44
1:E:75:LEU:HD13	2:H:44:GLU:HG3	2.00	0.43
2:B:58:PRO:HD3	2:B:136:ILE:O	2.18	0.43
1:E:70:GLN:N	2:H:57:VAL:O	2.52	0.43
1:C:19:VAL:HG11	1:G:48:LEU:HD13	2.00	0.43
1:E:72:MET:HG2	1:E:87:ARG:HA	2.00	0.43
2:D:69:LEU:HB2	1:G:9:ILE:HD11	1.99	0.43
2:H:89:VAL:HA	2:H:136:ILE:HG23	2.01	0.43
2:F:77:VAL:HG22	2:F:90:LEU:HA	2.00	0.43
2:H:87:PHE:HB3	2:H:136:ILE:HG22	2.00	0.43
2:D:136:ILE:HD12	2:D:136:ILE:N	2.35	0.42
1:A:6:SER:HB2	2:H:70:PRO:HB3	2.01	0.42
2:B:42:VAL:HA	2:B:45:LEU:HD12	2.02	0.42
2:D:44:GLU:HB3	2:D:50:LYS:HG3	2.02	0.42
1:A:92:THR:HG22	1:E:22:ASN:HD22	1.84	0.41
2:B:73:THR:HA	2:B:91:GLN:HE21	1.85	0.41
2:H:45:LEU:HD21	2:H:52:LEU:HD13	2.03	0.41
2:D:92:ASN:HB2	2:D:133:VAL:HB	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:66:LEU:HD21	2:H:82:LEU:HB3	2.03	0.41
2:D:63:ILE:CG1	1:C:72:MET:HE3	2.42	0.41
2:B:68:SER:HA	1:E:9:ILE:H	1.85	0.41
1:A:24:PHE:HE2	1:E:95:ILE:HD12	1.86	0.41
1:A:77:ASP:HB3	1:A:80:SER:OG	2.21	0.41
2:D:51:GLU:OE1	2:D:131:ASP:HB2	2.21	0.40
1:E:74:GLY:O	2:H:53:TRP:N	2.50	0.40
1:E:77:ASP:HB3	1:E:80:SER:OG	2.21	0.40
2:F:93:THR:HG21	2:F:132:ARG:HA	2.02	0.40
2:H:80:VAL:HG12	2:H:87:PHE:HB2	2.03	0.40
1:A:18:VAL:HG13	1:E:88:ALA:HB2	2.03	0.40
2:H:54:LEU:HB3	2:H:133:VAL:HG13	2.02	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	98/122 (80%)	87 (89%)	11 (11%)	0	100	100
1	C	92/122 (75%)	83 (90%)	9 (10%)	0	100	100
1	E	92/122 (75%)	86 (94%)	6 (6%)	0	100	100
1	G	92/122 (75%)	85 (92%)	7 (8%)	0	100	100
2	B	104/121 (86%)	89 (86%)	15 (14%)	0	100	100
2	D	104/121 (86%)	83 (80%)	21 (20%)	0	100	100
2	F	104/121 (86%)	89 (86%)	14 (14%)	1 (1%)	15	50
2	H	105/121 (87%)	86 (82%)	18 (17%)	1 (1%)	15	50
All	All	791/972 (81%)	688 (87%)	101 (13%)	2 (0%)	41	73

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	F	83	GLY
2	H	47	GLY

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	92/109 (84%)	82 (89%)	10 (11%)	6	25
1	C	87/109 (80%)	80 (92%)	7 (8%)	12	40
1	E	87/109 (80%)	80 (92%)	7 (8%)	12	40
1	G	87/109 (80%)	80 (92%)	7 (8%)	12	40
2	B	104/113 (92%)	84 (81%)	20 (19%)	1	7
2	D	104/113 (92%)	85 (82%)	19 (18%)	1	7
2	F	104/113 (92%)	92 (88%)	12 (12%)	5	23
2	H	104/113 (92%)	84 (81%)	20 (19%)	1	7
All	All	769/888 (87%)	667 (87%)	102 (13%)	4	17

All (102) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	14	GLU
1	A	18	VAL
1	A	27	VAL
1	A	31	LYS
1	A	54	ARG
1	A	61	THR
1	A	66	THR
1	A	87	ARG
1	A	96	VAL
1	A	101	LYS
2	B	30	ASP
2	B	37	LEU
2	B	63	ILE
2	B	69	LEU

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Mol	Chain	Res	Type
2	B	71	LEU
2	B	74	ASP
2	B	79	THR
2	B	80	VAL
2	B	81	GLU
2	B	88	ASN
2	B	91	GLN
2	B	92	ASN
2	B	94	SER
2	B	101	ASN
2	B	103	ASN
2	B	106	LEU
2	B	108	ILE
2	B	113	LYS
2	B	117	LEU
2	B	132	ARG
2	D	35	LYS
2	D	37	LEU
2	D	63	ILE
2	D	69	LEU
2	D	71	LEU
2	D	76	THR
2	D	79	THR
2	D	81	GLU
2	D	95	THR
2	D	99	SER
2	D	100	ASP
2	D	102	THR
2	D	103	ASN
2	D	106	LEU
2	D	113	LYS
2	D	117	LEU
2	D	130	PHE
2	D	132	ARG
2	D	135	THR
1	C	18	VAL
1	C	27	VAL
1	C	31	LYS
1	C	41	ARG
1	C	66	THR
1	C	87	ARG
1	C	96	VAL

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Mol	Chain	Res	Type
2	F	35	LYS
2	F	37	LEU
2	F	63	ILE
2	F	69	LEU
2	F	71	LEU
2	F	76	THR
2	F	81	GLU
2	F	85	LYS
2	F	90	LEU
2	F	106	LEU
2	F	113	LYS
2	F	117	LEU
1	E	18	VAL
1	E	27	VAL
1	E	31	LYS
1	E	41	ARG
1	E	66	THR
1	E	87	ARG
1	E	96	VAL
2	H	32	LYS
2	H	35	LYS
2	H	37	LEU
2	H	45	LEU
2	H	50	LYS
2	H	55	MET
2	H	63	ILE
2	H	69	LEU
2	H	71	LEU
2	H	72	ASP
2	H	74	ASP
2	H	79	THR
2	H	81	GLU
2	H	91	GLN
2	H	92	ASN
2	H	99	SER
2	H	100	ASP
2	H	103	ASN
2	H	106	LEU
2	H	136	ILE
1	G	18	VAL
1	G	27	VAL
1	G	31	LYS

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Mol	Chain	Res	Type
1	G	41	ARG
1	G	66	THR
1	G	87	ARG
1	G	96	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	22	ASN
1	A	84	ASN
2	B	91	GLN
2	B	92	ASN
2	D	88	ASN
2	D	91	GLN
2	D	92	ASN
2	D	101	ASN
1	C	43	GLN
1	E	43	GLN
1	E	84	ASN
2	H	91	GLN
1	G	43	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

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 ⓘ

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.