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PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Apr 29, 2025 – 11:30 AM EDT

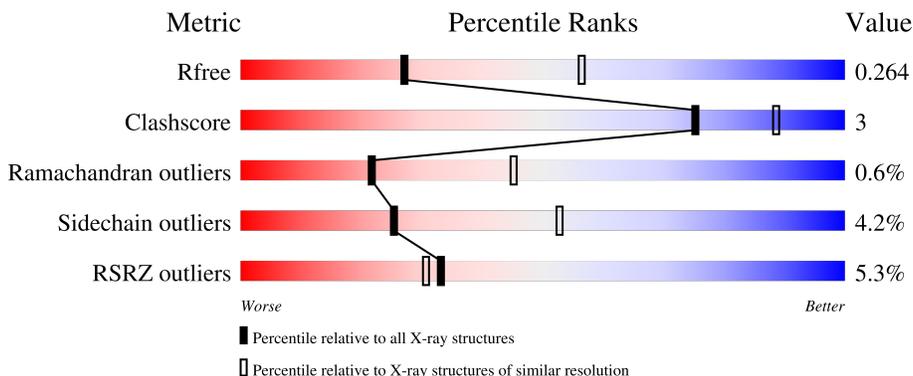|		
PDB ID	:	4HCW / pdb_00004hcw
Title	:	Structure of a eukaryotic thiaminase-I
Authors	:	Kreinbring, C.A.; Hubbard, P.A.; Petsko, G.A.; Ringe, D.
Deposited on	:	2012-10-01
Resolution	:	2.71 Å(reported)

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 2.71 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		0.264
Clashscore		3
Ramachandran outliers		0.6%
Sidechain outliers		4.2%
RSRZ outliers		5.3%

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$_{free}$	164625	3333 (2.70-2.70)
Clashscore	180529	3684 (2.70-2.70)
Ramachandran outliers	177936	3633 (2.70-2.70)
Sidechain outliers	177891	3633 (2.70-2.70)
RSRZ outliers	164620	3333 (2.70-2.70)

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% 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	357	7% 87% 11% ••
1	B	357	10% 88% 8% ••
1	C	357	2% 88% 8% ••
1	D	357	5% 87% 10% ••
1	E	357	4% 88% 10% ••

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Mol	Chain	Length	Quality of chain
1	F	357	

2 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 16370 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 thiaminase-I.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	352	Total	C	N	O	S	79	0	0
			2724	1731	441	545	7			
1	B	352	Total	C	N	O	S	114	0	0
			2724	1731	441	545	7			
1	C	352	Total	C	N	O	S	31	1	0
			2733	1739	441	546	7			
1	D	352	Total	C	N	O	S	44	1	0
			2732	1736	444	545	7			
1	E	352	Total	C	N	O	S	45	1	0
			2733	1739	441	546	7			
1	F	352	Total	C	N	O	S	59	0	0
			2724	1731	441	545	7			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	HIS	-	expression tag	UNP D2V4Z5
B	0	HIS	-	expression tag	UNP D2V4Z5
C	0	HIS	-	expression tag	UNP D2V4Z5
D	0	HIS	-	expression tag	UNP D2V4Z5
E	0	HIS	-	expression tag	UNP D2V4Z5
F	0	HIS	-	expression tag	UNP D2V4Z5

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 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: thiaminase-I

Chain A:

- Molecule 1: thiaminase-I

Chain B:

- Molecule 1: thiaminase-I

Chain C:

- Molecule 1: thiaminase-I

Chain D:

T200 I201 S204 T205 V206 Y213 K221 E236 R242 D243 V248 I251 G252 T253 S254 D262 L266 N267 S268 N269 L270 C271 D272 T300 K305 R336 F355 L356

• Molecule 1: thiaminase-I

Chain E:

4%

88% 10%

HIS MET SER THR GLN P5 K6 T7 F13 P14 N20 E21 N22 G23 N24 T38 Q39 N44 Q59 V64 L75 G79 G80 V81 K82 D85 Y116 L117 C118 Q131 L138 V142 G143 Y144 Y149 A175 S186 G187 D188 V207 I241

Q245 Y246 N247 V248 Q249 L250 D255 Y260 T261 D262 S268 N269 L270 L297 T300 A309 K313 Q320 Q324 R336 N347 L356

• Molecule 1: thiaminase-I

Chain F:

3%

90% 7%

HIS MET SER THR GLN P5 L8 F13 P14 P17 N22 T48 Q59 V64 G79 G80 V81 K82 D85 Y116 S119 L123 L136 Q146 L167 L168 Q169 S186 G187 D188 K197 Y227 E232 V248 Q249 L250 T253 S254 D255

V259 D262 S268 K274 Q275 Q324 V334 L356

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	104.56Å 203.05Å 309.18Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	43.30 – 2.71 43.30 – 2.71	Depositor EDS
% Data completeness (in resolution range)	99.5 (43.30-2.71) 99.5 (43.30-2.71)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	4.21 (at 2.69Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.7.3_928)	Depositor
R, R_{free}	0.229 , 0.265 0.228 , 0.264	Depositor DCC
R_{free} test set	4484 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å^2)	70.7	Xtriage
Anisotropy	0.314	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 52.0	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	16370	wwPDB-VP
Average B, all atoms (Å^2)	80.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.12% 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 ⓘ

5.1 Standard geometry ⓘ

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	0.26	0/2773	0.69	2/3770 (0.1%)
1	B	0.26	0/2773	0.69	2/3770 (0.1%)
1	C	0.26	0/2786	0.68	2/3788 (0.1%)
1	D	0.27	0/2784	0.70	2/3784 (0.1%)
1	E	0.26	0/2786	0.69	2/3788 (0.1%)
1	F	0.26	0/2773	0.68	0/3770
All	All	0.26	0/16675	0.69	10/22670 (0.0%)

There are no bond length outliers.

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	149	TYR	CA-C-N	5.83	125.30	119.24
1	D	149	TYR	C-N-CA	5.83	125.30	119.24
1	E	149	TYR	CA-C-N	5.74	125.21	119.24
1	E	149	TYR	C-N-CA	5.74	125.21	119.24
1	B	125	SER	CA-C-N	5.13	125.43	119.47
1	B	125	SER	C-N-CA	5.13	125.43	119.47
1	A	149	TYR	CA-C-N	5.05	125.08	119.32
1	A	149	TYR	C-N-CA	5.05	125.08	119.32
1	C	149	TYR	CA-C-N	5.05	125.08	119.32
1	C	149	TYR	C-N-CA	5.05	125.08	119.32

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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.

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2724	0	2710	16	0
1	B	2724	0	2710	16	0
1	C	2733	0	2719	16	0
1	D	2732	0	2723	13	0
1	E	2733	0	2719	14	0
1	F	2724	0	2710	16	0
All	All	16370	0	16291	91	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 3.

All (91) 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:C:130:GLN:HG2	1:C:141:LYS:HB3	1.65	0.78
1:E:250:LEU:HB2	1:E:324:GLN:HG2	1.65	0.77
1:F:136:LEU:HD11	1:F:197:LYS:HD2	1.76	0.68
1:F:250:LEU:H	1:F:324:GLN:HG2	1.59	0.68
1:C:163:LEU:HD22	1:C:253:THR:HG21	1.77	0.67
1:D:82:LYS:HB2	1:D:268:SER:HA	1.77	0.66
1:B:272:ASP:N	1:B:272:ASP:OD1	2.33	0.61
1:A:82:LYS:HB2	1:A:268:SER:HA	1.83	0.60
1:D:95:ASP:HB3	1:D:305:LYS:HD2	1.85	0.59
1:B:82:LYS:HB2	1:B:268:SER:HA	1.85	0.58
1:B:156:SER:HB2	1:B:159:THR:HG22	1.85	0.58
1:E:7:THR:HG22	1:E:44:ASN:HB2	1.86	0.58
1:A:135:LEU:HB2	1:A:253:THR:HA	1.86	0.57
1:A:199:ARG:NH2	1:A:203:ASP:OD1	2.38	0.57
1:F:82:LYS:HB2	1:F:268:SER:HA	1.86	0.57
1:C:82:LYS:HB2	1:C:268:SER:HA	1.87	0.56
1:D:146:GLN:HB3	1:D:206:VAL:HG22	1.87	0.55
1:A:14:PRO:HB3	1:A:49:GLU:HB3	1.87	0.55
1:F:17:PRO:HG3	1:F:232:GLU:HB3	1.89	0.55
1:B:250:LEU:HB2	1:B:324:GLN:HG2	1.88	0.55
1:B:79:GLY:O	1:B:81:VAL:N	2.38	0.54
1:A:7:THR:HG22	1:A:44:ASN:HB3	1.89	0.54
1:C:127:ASN:N	1:C:127:ASN:OD1	2.39	0.54
1:F:186:SER:OG	1:F:188:ASP:OD1	2.26	0.53
1:B:130:GLN:HG2	1:B:141:LYS:HD3	1.91	0.52
1:E:118:CYS:HB2	1:E:260:TYR:HB2	1.91	0.52
1:D:105:SER:O	1:D:336:ARG:NH2	2.42	0.52
1:D:199:ARG:NH1	1:D:355:PHE:O	2.41	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:241:ILE:HG23	1:B:246:TYR:HB2	1.90	0.52
1:D:79:GLY:O	1:D:81:VAL:N	2.37	0.52
1:A:165:GLN:OE1	1:A:169:GLN:NE2	2.43	0.51
1:F:79:GLY:O	1:F:81:VAL:N	2.40	0.51
1:D:266:LEU:HB3	1:D:270:LEU:HD12	1.92	0.51
1:A:116:TYR:HB2	1:A:262:ASP:HB2	1.93	0.51
1:C:250:LEU:H	1:C:324:GLN:HG2	1.76	0.51
1:A:135:LEU:HG	1:A:251:ILE:HD12	1.92	0.51
1:F:8:LEU:HD23	1:F:274:LYS:HE2	1.93	0.51
1:E:79:GLY:O	1:E:81:VAL:N	2.42	0.50
1:F:119:SER:HB2	1:F:259:VAL:HG23	1.95	0.49
1:E:116:TYR:HB2	1:E:262:ASP:HB2	1.95	0.48
1:A:130:GLN:HG2	1:A:141:LYS:HB3	1.95	0.48
1:B:17:PRO:HD3	1:B:232:GLU:HG2	1.95	0.48
1:E:22:ASN:O	1:E:24:ASN:N	2.47	0.47
1:C:119:SER:HB2	1:C:259:VAL:HG23	1.97	0.47
1:B:135:LEU:HB2	1:B:253:THR:HA	1.97	0.47
1:B:250:LEU:O	1:B:328:LYS:NZ	2.47	0.47
1:F:13:PHE:HA	1:F:14:PRO:HD3	1.81	0.46
1:C:14:PRO:HB3	1:C:49:GLU:HB3	1.98	0.46
1:B:123:LEU:HD11	1:B:246:TYR:HB3	1.98	0.46
1:B:89:VAL:HG21	1:B:110:VAL:HG11	1.97	0.46
1:F:259:VAL:HG12	1:F:334:VAL:HG22	1.98	0.45
1:D:201:ILE:O	1:D:205:THR:HG23	2.16	0.45
1:D:242:ARG:NE	1:D:243:ASP:OD1	2.39	0.45
1:F:80:GLY:O	1:F:268:SER:N	2.46	0.45
1:A:127:ASN:N	1:A:127:ASN:OD1	2.49	0.45
1:B:195:THR:O	1:B:199:ARG:HB2	2.16	0.45
1:D:80:GLY:O	1:D:268:SER:N	2.42	0.45
1:C:195:THR:HG21	1:C:355:PHE:HB3	1.99	0.45
1:A:96:LEU:HD13	1:A:114:PRO:HG2	1.98	0.45
1:C:7:THR:HG22	1:C:44:ASN:HB3	1.98	0.45
1:C:10:VAL:HG13	1:C:64:VAL:HG22	1.99	0.45
1:E:82:LYS:HB2	1:E:268:SER:HA	1.98	0.45
1:F:123:LEU:HB3	1:F:227:TYR:HB3	1.99	0.45
1:B:151:ASP:HB3	1:B:159:THR:HG21	1.98	0.44
1:D:13:PHE:CE2	1:D:15:TYR:HB2	2.53	0.44
1:A:230:TYR:O	1:A:233:SER:OG	2.33	0.44
1:A:128:ALA:O	1:A:130:GLN:N	2.46	0.43
1:E:309:ALA:O	1:E:313:LYS:HG3	2.18	0.43
1:E:175:ALA:HB1	1:E:336:ARG:HH11	1.83	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:123:LEU:HD23	1:F:248:VAL:HG13	2.01	0.43
1:B:119:SER:HB2	1:B:259:VAL:HG22	2.01	0.42
1:C:118:CYS:HB3	1:C:260:TYR:HB2	2.01	0.42
1:E:241:ILE:HA	1:E:246:TYR:HB2	2.00	0.42
1:A:27:LYS:HB3	1:A:29:ILE:HG22	2.01	0.42
1:C:80:GLY:O	1:C:268:SER:N	2.50	0.41
1:E:13:PHE:HA	1:E:14:PRO:HD3	1.79	0.41
1:F:116:TYR:HB2	1:F:262:ASP:HB2	2.03	0.41
1:C:61:LEU:HA	1:C:62:PRO:HD3	1.85	0.41
1:C:79:GLY:O	1:C:81:VAL:N	2.42	0.41
1:D:116:TYR:HB2	1:D:262:ASP:HB2	2.02	0.41
1:E:80:GLY:O	1:E:268:SER:N	2.44	0.41
1:C:5:PRO:HB2	1:C:6:LYS:H	1.76	0.41
1:A:198:TYR:CE1	1:A:356:LEU:HD13	2.56	0.41
1:E:75:LEU:HD12	1:E:75:LEU:HA	1.94	0.41
1:C:122:LEU:HB2	1:C:251:ILE:HG21	2.03	0.40
1:D:61:LEU:HA	1:D:62:PRO:HD3	1.90	0.40
1:F:167:LEU:HD13	1:F:197:LYS:HB2	2.02	0.40
1:F:188:ASP:OD1	1:F:188:ASP:N	2.54	0.40
1:A:113:PHE:HE1	1:A:266:LEU:HD21	1.86	0.40
1:B:223:ILE:H	1:B:223:ILE:HG12	1.63	0.40
1:E:138:LEU:O	1:E:142:VAL:HG22	2.22	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	350/357 (98%)	334 (95%)	14 (4%)	2 (1%)	22	45
1	B	350/357 (98%)	327 (93%)	20 (6%)	3 (1%)	14	35
1	C	351/357 (98%)	338 (96%)	11 (3%)	2 (1%)	22	45

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	351/357 (98%)	338 (96%)	11 (3%)	2 (1%)	22	45
1	E	351/357 (98%)	334 (95%)	14 (4%)	3 (1%)	14	35
1	F	350/357 (98%)	333 (95%)	16 (5%)	1 (0%)	37	61
All	All	2103/2142 (98%)	2004 (95%)	86 (4%)	13 (1%)	22	45

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	145	GLU
1	A	271	CYS
1	B	80	GLY
1	D	80	GLY
1	E	23	GLY
1	C	255	ASP
1	D	24	ASN
1	E	255	ASP
1	F	80	GLY
1	E	80	GLY
1	A	255	ASP
1	B	22	ASN
1	C	80	GLY

5.3.2   Protein sidechains ⓘ

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	314/319 (98%)	300 (96%)	14 (4%)	23	50
1	B	314/319 (98%)	299 (95%)	15 (5%)	21	48
1	C	315/319 (99%)	302 (96%)	13 (4%)	26	54
1	D	315/319 (99%)	299 (95%)	16 (5%)	20	45
1	E	315/319 (99%)	304 (96%)	11 (4%)	31	60
1	F	314/319 (98%)	302 (96%)	12 (4%)	28	56

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	1887/1914 (99%)	1806 (96%)	81 (4%)	25	52

All (81) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	LYS
1	A	27	LYS
1	A	59	GLN
1	A	64	VAL
1	A	117	LEU
1	A	127	ASN
1	A	169	GLN
1	A	195	THR
1	A	210	GLN
1	A	211	ARG
1	A	236	GLU
1	A	266	LEU
1	A	275	GLN
1	A	324	GLN
1	B	59	GLN
1	B	64	VAL
1	B	81	VAL
1	B	96	LEU
1	B	125	SER
1	B	145	GLU
1	B	169	GLN
1	B	195	THR
1	B	223	ILE
1	B	248	VAL
1	B	259	VAL
1	B	272	ASP
1	B	275	GLN
1	B	300	THR
1	B	324	GLN
1	C	59	GLN
1	C	64	VAL
1	C	81	VAL
1	C	127	ASN
1	C	129	THR
1	C	130	GLN
1	C	169	GLN
1	C	188	ASP

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Mol	Chain	Res	Type
1	C	195	THR
1	C	248	VAL
1	C	259	VAL
1	C	324	GLN
1	C	333	ARG
1	D	28	LEU
1	D	59	GLN
1	D	64	VAL
1	D	81	VAL
1	D	90[A]	ARG
1	D	90[B]	ARG
1	D	131	GLN
1	D	136	LEU
1	D	169	GLN
1	D	195	THR
1	D	206	VAL
1	D	221	LYS
1	D	236	GLU
1	D	248	VAL
1	D	251	ILE
1	D	300	THR
1	E	38	THR
1	E	39	GLN
1	E	59	GLN
1	E	64	VAL
1	E	188	ASP
1	E	248	VAL
1	E	250	LEU
1	E	270	LEU
1	E	297	LEU
1	E	300	THR
1	E	324	GLN
1	F	8	LEU
1	F	59	GLN
1	F	64	VAL
1	F	81	VAL
1	F	85	ASP
1	F	123	LEU
1	F	136	LEU
1	F	146	GLN
1	F	169	GLN
1	F	259	VAL

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Mol	Chain	Res	Type
1	F	275	GLN
1	F	324	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (21) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	169	GLN
1	A	249	GLN
1	A	324	GLN
1	B	24	ASN
1	B	30	ASN
1	C	120	ASN
1	C	169	GLN
1	C	249	GLN
1	D	24	ASN
1	D	97	HIS
1	D	120	ASN
1	D	146	GLN
1	D	169	GLN
1	D	275	GLN
1	E	59	GLN
1	E	120	ASN
1	E	247	ASN
1	F	97	HIS
1	F	247	ASN
1	F	316	ASN
1	F	320	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 oligosaccharides 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 ⓘ

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(Å²)	Q<0.9
1	A	352/357 (98%)	0.66	24 (6%)	25	23	43, 82, 125, 207	23 (6%)
1	B	352/357 (98%)	0.89	35 (9%)	14	13	56, 94, 141, 182	32 (9%)
1	C	352/357 (98%)	0.07	8 (2%)	61	60	30, 65, 101, 183	10 (2%)
1	D	352/357 (98%)	0.22	17 (4%)	36	35	35, 67, 103, 183	19 (5%)
1	E	351/357 (98%)	0.22	16 (4%)	38	36	30, 67, 106, 148	14 (3%)
1	F	352/357 (98%)	0.34	11 (3%)	51	49	40, 76, 115, 157	18 (5%)
All	All	2111/2142 (98%)	0.40	111 (5%)	33	31	30, 74, 119, 207	116 (5%)

All (111) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	271	CYS	5.3
1	B	5	PRO	5.2
1	F	255	ASP	5.0
1	B	186	SER	4.7
1	B	95	ASP	4.4
1	A	186	SER	4.3
1	C	129	THR	4.2
1	E	5	PRO	4.2
1	D	23	GLY	3.7
1	B	130	GLN	3.7
1	B	118	CYS	3.7
1	C	24	ASN	3.6
1	D	5	PRO	3.6
1	A	129	THR	3.6
1	B	164	TYR	3.5
1	B	249	GLN	3.5
1	A	253	THR	3.3
1	B	253	THR	3.2
1	C	5	PRO	3.2

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Mol	Chain	Res	Type	RSRZ
1	B	195	THR	3.2
1	D	86	GLU	3.2
1	A	174	ALA	3.2
1	A	126	PRO	3.2
1	B	196	GLN	3.1
1	E	320	GLN	3.0
1	A	128	ALA	3.0
1	E	347	ASN	3.0
1	A	5	PRO	3.0
1	C	271	CYS	3.0
1	D	90[A]	ARG	2.9
1	E	144[A]	TYR	2.9
1	B	174	ALA	2.9
1	D	272	ASP	2.9
1	D	173	SER	2.9
1	A	107	ASN	2.9
1	E	85	ASP	2.8
1	E	24	ASN	2.8
1	D	253	THR	2.8
1	A	7	THR	2.8
1	A	187	GLY	2.8
1	E	207	VAL	2.7
1	C	79	GLY	2.7
1	B	84	LEU	2.7
1	E	20	ASN	2.7
1	B	140	GLN	2.7
1	B	144	TYR	2.6
1	D	213	TYR	2.6
1	F	5	PRO	2.6
1	A	46	GLU	2.6
1	E	23	GLY	2.5
1	A	246	TYR	2.5
1	B	226	TYR	2.5
1	D	22	ASN	2.5
1	A	79	GLY	2.5
1	A	80	GLY	2.5
1	E	186	SER	2.5
1	B	227	TYR	2.5
1	B	128	ALA	2.5
1	A	218	LYS	2.4
1	B	157	SER	2.4
1	C	22	ASN	2.4

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Mol	Chain	Res	Type	RSRZ
1	F	82	LYS	2.4
1	B	131	GLN	2.4
1	F	22	ASN	2.4
1	B	349	ALA	2.4
1	A	74	TYR	2.4
1	F	187	GLY	2.4
1	E	82	LYS	2.3
1	B	179	LYS	2.3
1	B	334	VAL	2.3
1	B	251	ILE	2.3
1	C	186	SER	2.3
1	D	186	SER	2.3
1	A	226	TYR	2.3
1	B	129	THR	2.3
1	E	245	GLN	2.3
1	F	254	SER	2.3
1	F	253	THR	2.2
1	B	168	LEU	2.2
1	A	111	TYR	2.2
1	C	20	ASN	2.2
1	A	312	ALA	2.2
1	D	204	SER	2.2
1	A	254	SER	2.2
1	F	79	GLY	2.2
1	B	250	LEU	2.1
1	B	271	CYS	2.1
1	B	112	GLY	2.1
1	A	251	ILE	2.1
1	B	238	LYS	2.1
1	B	315	SER	2.1
1	D	254	SER	2.1
1	F	186	SER	2.1
1	E	260	TYR	2.1
1	F	48	THR	2.1
1	A	133	SER	2.1
1	D	251	ILE	2.1
1	B	158	PHE	2.1
1	F	248	VAL	2.1
1	B	239	ASP	2.1
1	E	79	GLY	2.1
1	D	48	THR	2.0
1	B	148	VAL	2.0

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Mol	Chain	Res	Type	RSRZ
1	E	131	GLN	2.0
1	D	20	ASN	2.0
1	E	22	ASN	2.0
1	D	21	GLU	2.0
1	A	271	CYS	2.0
1	B	356	LEU	2.0
1	A	95	ASP	2.0
1	B	198	TYR	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.