



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 6, 2024 – 08:48 AM EST

PDB ID : 2A62  
Title : Crystal structure of mouse cadherin-8 EC1-3  
Authors : Patel, S.D.; Ciatto, C.; Chen, C.P.; Bahna, F.; Arkus, N.; Schieren, I.; Jessell, T.M.; Honig, B.; Price, S.R.; Shapiro, L.  
Deposited on : 2005-07-01  
Resolution : 4.50 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) : 1.13  
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

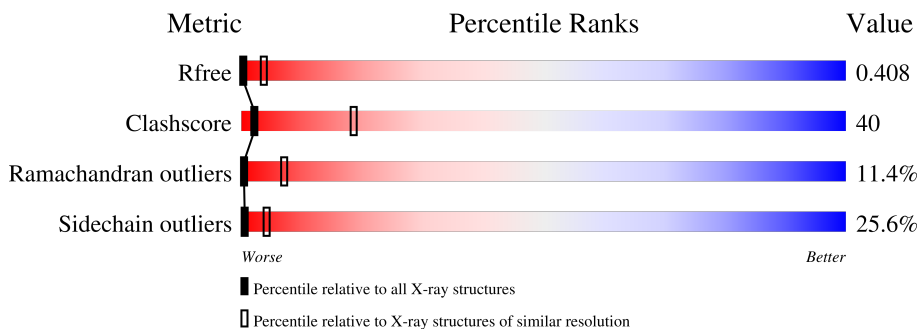
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 4.50 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	1055 (5.20-3.80)
Clashscore	141614	1123 (5.20-3.80)
Ramachandran outliers	138981	1069 (5.20-3.80)
Sidechain outliers	138945	1050 (5.20-3.80)

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	322	 34% 45% 18% ..

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2474 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 Cadherin-8.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	319	2468	1563	404	497	4	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	SER	-	cloning artifact	UNP P97291

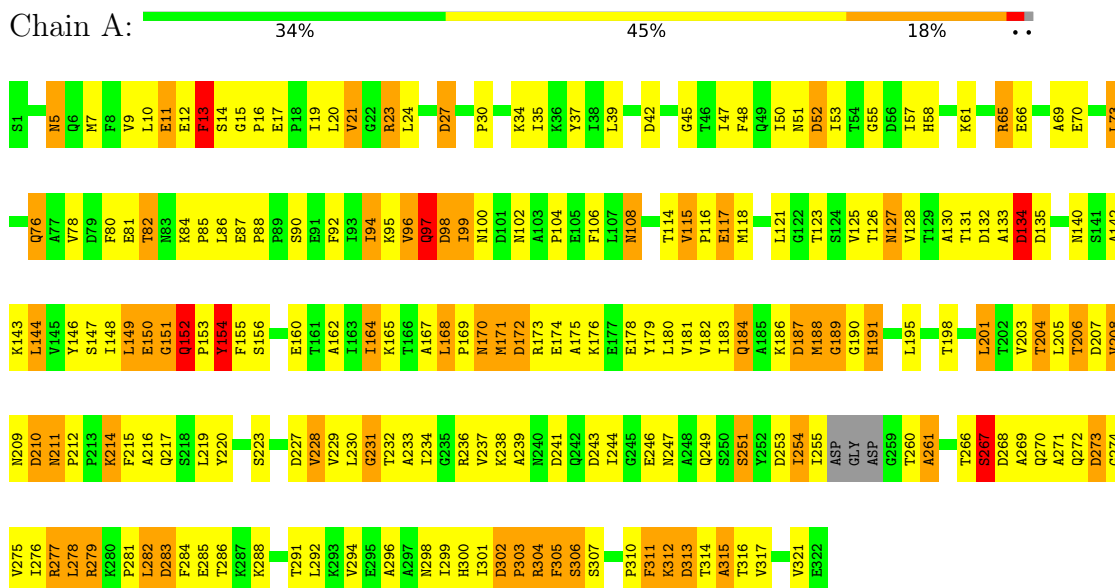
- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	6	Total	Ca	0	0
			6	6		

### 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. 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: Cadherin-8



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	75.82Å 75.82Å 233.76Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 4.50 29.45 – 4.51	Depositor EDS
% Data completeness (in resolution range)	95.8 (20.00-4.50) 95.6 (29.45-4.51)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.66 (at 4.42Å)	Xtrriage
Refinement program	REFMAC 5.2.0005	Depositor
R, $R_{free}$	0.271 , 0.346 0.339 , 0.408	Depositor DCC
$R_{free}$ test set	339 reflections (7.62%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	116.1	Xtrriage
Anisotropy	1.055	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.22 , 142.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.84	EDS
Total number of atoms	2474	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	166.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.35% 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](#)

Bond lengths and bond angles in the following residue types are not validated in this section: CA

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	0.61	1/2518 (0.0%)	0.83	4/3425 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	206	THR	C-N	6.49	1.49	1.34

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	312	LYS	N-CA-C	-6.32	93.94	111.00
1	A	207	ASP	N-CA-C	5.54	125.96	111.00
1	A	152	GLN	N-CA-C	5.06	124.67	111.00
1	A	154	TYR	N-CA-C	5.01	124.53	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	152	GLN	Peptide

## 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.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2468	0	2426	195	0
2	A	6	0	0	0	0
All	All	2474	0	2426	195	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 40.

All (195) 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:267:SER:HB2	1:A:268:ASP:HA	1.37	1.06
1:A:10:LEU:CD2	1:A:97:GLN:HG3	1.89	1.02
1:A:187:ASP:HB2	1:A:195:LEU:HB2	1.39	1.02
1:A:10:LEU:HD22	1:A:97:GLN:CG	1.91	0.99
1:A:304:ARG:HH22	1:A:306:SER:HB2	1.29	0.98
1:A:102:ASN:HB3	1:A:133:ALA:HB3	1.42	0.96
1:A:214:LYS:O	1:A:239:ALA:HA	1.64	0.95
1:A:173:ARG:O	1:A:175:ALA:N	2.01	0.93
1:A:187:ASP:O	1:A:188:MET:HB2	1.68	0.92
1:A:172:ASP:OD2	1:A:210:ASP:OD2	1.88	0.92
1:A:9:VAL:HG22	1:A:21:VAL:HG11	1.51	0.91
1:A:47:ILE:HG12	1:A:61:LYS:HD2	1.56	0.85
1:A:282:LEU:HD23	1:A:283:ASP:H	1.40	0.85
1:A:10:LEU:HD22	1:A:97:GLN:HG3	0.95	0.85
1:A:154:TYR:HB3	1:A:167:ALA:HB3	1.60	0.83
1:A:300:HIS:HB2	1:A:304:ARG:HB2	1.61	0.82
1:A:220:TYR:HB2	1:A:317:VAL:HG22	1.62	0.82
1:A:273:ASP:HB3	1:A:274:GLY:HA3	1.62	0.82
1:A:99:ILE:HD13	1:A:100:ASN:H	1.43	0.81
1:A:304:ARG:NH2	1:A:306:SER:HB2	1.94	0.81
1:A:232:THR:HG22	1:A:233:ALA:H	1.46	0.80
1:A:96:VAL:O	1:A:97:GLN:HB3	1.81	0.80
1:A:34:LYS:HB3	1:A:80:PHE:HE1	1.47	0.80
1:A:302:ASP:HB2	1:A:303:PRO:HD2	1.62	0.80
1:A:236:ARG:HA	1:A:274:GLY:O	1.82	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:121:LEU:HD12	1:A:169:PRO:HD3	1.64	0.78
1:A:260:THR:OG1	1:A:261:ALA:N	2.17	0.78
1:A:183:ILE:O	1:A:198:THR:HA	1.85	0.77
1:A:186:LYS:HA	1:A:195:LEU:O	1.86	0.76
1:A:127:ASN:HD22	1:A:127:ASN:N	1.85	0.75
1:A:104:PRO:HD3	1:A:195:LEU:HB3	1.66	0.75
1:A:152:GLN:HE21	1:A:152:GLN:HA	1.50	0.75
1:A:34:LYS:HB3	1:A:80:PHE:CE1	2.22	0.74
1:A:152:GLN:C	1:A:154:TYR:H	1.92	0.73
1:A:304:ARG:NE	1:A:304:ARG:HA	2.04	0.73
1:A:170:ASN:O	1:A:171:MET:HB2	1.87	0.73
1:A:268:ASP:O	1:A:272:GLN:HA	1.90	0.71
1:A:260:THR:HG23	1:A:261:ALA:N	2.07	0.70
1:A:5:ASN:O	1:A:92:PHE:HB2	1.92	0.69
1:A:241:ASP:OD2	1:A:247:ASN:O	2.11	0.69
1:A:173:ARG:O	1:A:176:LYS:N	2.26	0.68
1:A:149:LEU:HD22	1:A:184:GLN:HG3	1.76	0.68
1:A:152:GLN:NE2	1:A:154:TYR:CD2	2.63	0.67
1:A:304:ARG:HH22	1:A:306:SER:CB	2.05	0.67
1:A:11:GLU:HB3	1:A:96:VAL:CG1	2.25	0.67
1:A:267:SER:CB	1:A:268:ASP:HA	2.21	0.66
1:A:267:SER:HB2	1:A:268:ASP:CA	2.21	0.66
1:A:314:THR:O	1:A:315:ALA:CB	2.45	0.65
1:A:116:PRO:HA	1:A:206:THR:OG1	1.97	0.64
1:A:154:TYR:HB2	1:A:168:LEU:HD22	1.80	0.64
1:A:282:LEU:CD2	1:A:283:ASP:H	2.11	0.64
1:A:102:ASN:CB	1:A:133:ALA:HB3	2.22	0.63
1:A:169:PRO:O	1:A:170:ASN:ND2	2.32	0.63
1:A:208:VAL:HG13	1:A:209:ASN:N	2.14	0.63
1:A:173:ARG:C	1:A:175:ALA:N	2.52	0.61
1:A:149:LEU:HB3	1:A:182:VAL:HG13	1.81	0.61
1:A:173:ARG:C	1:A:175:ALA:H	2.02	0.61
1:A:228:VAL:C	1:A:230:LEU:H	2.04	0.60
1:A:314:THR:O	1:A:315:ALA:HB2	2.01	0.60
1:A:13:PHE:C	1:A:15:GLY:H	2.05	0.59
1:A:154:TYR:HB2	1:A:168:LEU:CD2	2.32	0.59
1:A:208:VAL:HG12	1:A:210:ASP:H	1.67	0.59
1:A:211:ASN:HB2	1:A:243:ASP:CG	2.23	0.59
1:A:146:TYR:CD1	1:A:162:ALA:HB2	2.38	0.59
1:A:152:GLN:NE2	1:A:154:TYR:CE2	2.71	0.59
1:A:170:ASN:O	1:A:171:MET:CB	2.51	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:268:ASP:OD2	1:A:270:GLN:HB3	2.03	0.58
1:A:167:ALA:O	1:A:168:LEU:HD13	2.02	0.58
1:A:186:LYS:HD3	1:A:189:GLY:HA2	1.85	0.57
1:A:155:PHE:HB3	1:A:165:LYS:O	2.04	0.57
1:A:268:ASP:HB3	1:A:270:GLN:HE21	1.69	0.57
1:A:115:VAL:O	1:A:205:LEU:HA	2.05	0.57
1:A:173:ARG:HH22	1:A:243:ASP:HA	1.69	0.56
1:A:140:ASN:HB3	1:A:188:MET:HA	1.87	0.56
1:A:300:HIS:CB	1:A:304:ARG:HB2	2.34	0.56
1:A:23:ARG:HA	1:A:55:GLY:O	2.06	0.56
1:A:277:ARG:HG3	1:A:278:LEU:N	2.19	0.56
1:A:304:ARG:NH2	1:A:306:SER:CB	2.64	0.56
1:A:187:ASP:O	1:A:188:MET:CB	2.46	0.55
1:A:251:SER:O	1:A:296:ALA:HA	2.06	0.55
1:A:271:ALA:O	1:A:272:GLN:HG2	2.06	0.55
1:A:254:ILE:CG2	1:A:292:LEU:HB3	2.37	0.55
1:A:260:THR:CG2	1:A:261:ALA:N	2.63	0.55
1:A:187:ASP:HB2	1:A:195:LEU:CB	2.26	0.55
1:A:152:GLN:C	1:A:154:TYR:N	2.59	0.54
1:A:142:ALA:O	1:A:144:LEU:HD13	2.07	0.54
1:A:302:ASP:HB2	1:A:303:PRO:CD	2.35	0.54
1:A:42:ASP:HB2	1:A:73:LEU:HD11	1.89	0.54
1:A:150:GLU:O	1:A:181:VAL:HA	2.07	0.54
1:A:23:ARG:HD2	1:A:24:LEU:O	2.08	0.54
1:A:288:LYS:HA	1:A:321:VAL:HB	1.89	0.54
1:A:106:PHE:CE2	1:A:130:ALA:HB2	2.43	0.54
1:A:99:ILE:HD13	1:A:100:ASN:N	2.18	0.53
1:A:234:ILE:HD12	1:A:276:ILE:O	2.08	0.53
1:A:186:LYS:HD3	1:A:189:GLY:CA	2.39	0.52
1:A:70:GLU:HG2	1:A:95:LYS:HG3	1.92	0.52
1:A:116:PRO:O	1:A:117:GLU:O	2.26	0.52
1:A:132:ASP:OD1	1:A:134:ASP:HB2	2.09	0.52
1:A:268:ASP:CB	1:A:270:GLN:HE21	2.21	0.52
1:A:208:VAL:CG1	1:A:210:ASP:H	2.22	0.51
1:A:268:ASP:HB3	1:A:270:GLN:NE2	2.25	0.51
1:A:214:LYS:HG2	1:A:215:PHE:N	2.24	0.51
1:A:232:THR:HG22	1:A:233:ALA:N	2.20	0.51
1:A:220:TYR:CB	1:A:317:VAL:HG22	2.38	0.51
1:A:186:LYS:HB3	1:A:189:GLY:HA3	1.93	0.51
1:A:37:TYR:HB2	1:A:52:ASP:O	2.11	0.51
1:A:214:LYS:O	1:A:215:PHE:HD1	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:305:PHE:O	1:A:307:SER:N	2.44	0.50
1:A:260:THR:O	1:A:261:ALA:CB	2.58	0.50
1:A:179:TYR:HB2	1:A:203:VAL:HB	1.92	0.50
1:A:208:VAL:CG1	1:A:209:ASN:N	2.72	0.50
1:A:102:ASN:HD22	1:A:134:ASP:CG	2.15	0.49
1:A:173:ARG:HH12	1:A:244:ILE:HG13	1.77	0.49
1:A:187:ASP:CB	1:A:195:LEU:HB2	2.27	0.49
1:A:108:ASN:OD1	1:A:108:ASN:N	2.46	0.49
1:A:152:GLN:HB3	1:A:154:TYR:CE2	2.48	0.49
1:A:152:GLN:NE2	1:A:154:TYR:HD2	2.10	0.49
1:A:260:THR:O	1:A:261:ALA:HB3	2.13	0.49
1:A:78:VAL:HG12	1:A:85:PRO:HA	1.96	0.48
1:A:98:ASP:HB3	1:A:135:ASP:HB2	1.95	0.48
1:A:152:GLN:HE21	1:A:152:GLN:CA	2.17	0.48
1:A:178:GLU:C	1:A:179:TYR:CD1	2.86	0.48
1:A:45:GLY:N	1:A:48:PHE:O	2.47	0.48
1:A:273:ASP:CB	1:A:274:GLY:HA3	2.31	0.48
1:A:13:PHE:C	1:A:15:GLY:N	2.68	0.47
1:A:96:VAL:HG12	1:A:97:GLN:OE1	2.14	0.47
1:A:10:LEU:HA	1:A:97:GLN:CD	2.35	0.47
1:A:236:ARG:CG	1:A:275:VAL:HG22	2.43	0.47
1:A:65:ARG:HB2	1:A:96:VAL:HG11	1.96	0.47
1:A:20:LEU:CD1	1:A:57:ILE:H	2.27	0.47
1:A:215:PHE:HA	1:A:238:LYS:O	2.14	0.47
1:A:231:GLY:HA3	1:A:232:THR:HA	1.67	0.47
1:A:73:LEU:HD13	1:A:94:ILE:HD11	1.96	0.47
1:A:273:ASP:N	1:A:273:ASP:OD1	2.44	0.47
1:A:98:ASP:CG	1:A:134:ASP:OD1	2.53	0.47
1:A:35:ILE:HG12	1:A:86:LEU:HD12	1.96	0.47
1:A:150:GLU:O	1:A:181:VAL:HG23	2.15	0.46
1:A:10:LEU:HA	1:A:97:GLN:OE1	2.14	0.46
1:A:7:MET:HB2	1:A:94:ILE:HG23	1.97	0.46
1:A:11:GLU:HB3	1:A:96:VAL:HG13	1.95	0.46
1:A:210:ASP:N	1:A:243:ASP:OD2	2.48	0.46
1:A:102:ASN:ND2	1:A:134:ASP:OD2	2.43	0.46
1:A:65:ARG:HH11	1:A:98:ASP:HB2	1.80	0.45
1:A:66:GLU:H	1:A:66:GLU:CD	2.20	0.45
1:A:96:VAL:HG12	1:A:97:GLN:N	2.31	0.45
1:A:65:ARG:HD3	1:A:98:ASP:HB2	1.98	0.45
1:A:187:ASP:HB3	1:A:195:LEU:HD13	1.98	0.45
1:A:76:GLN:HE21	1:A:76:GLN:HB2	1.63	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:127:ASN:N	1:A:127:ASN:ND2	2.55	0.45
1:A:212:PRO:HA	1:A:305:PHE:HZ	1.82	0.45
1:A:220:TYR:HB2	1:A:317:VAL:CG2	2.42	0.44
1:A:211:ASN:HD22	1:A:211:ASN:HA	1.61	0.44
1:A:216:ALA:HB3	1:A:220:TYR:OH	2.18	0.44
1:A:305:PHE:C	1:A:307:SER:H	2.21	0.43
1:A:11:GLU:O	1:A:12:GLU:HB2	2.18	0.43
1:A:69:ALA:O	1:A:96:VAL:HG23	2.18	0.43
1:A:254:ILE:HG21	1:A:292:LEU:HB3	1.99	0.43
1:A:268:ASP:N	1:A:273:ASP:O	2.51	0.43
1:A:152:GLN:HA	1:A:154:TYR:H	1.82	0.43
1:A:261:ALA:HA	1:A:279:ARG:HH12	1.83	0.43
1:A:53:ILE:HG12	1:A:80:PHE:HE2	1.82	0.43
1:A:238:LYS:HG2	1:A:239:ALA:O	2.19	0.43
1:A:17:GLU:N	1:A:17:GLU:OE1	2.52	0.43
1:A:234:ILE:HD12	1:A:234:ILE:N	2.33	0.43
1:A:180:LEU:HD23	1:A:180:LEU:HA	1.80	0.43
1:A:209:ASN:O	1:A:211:ASN:N	2.44	0.42
1:A:215:PHE:HD2	1:A:315:ALA:HB3	1.83	0.42
1:A:283:ASP:OD2	1:A:284:PHE:HD2	2.01	0.42
1:A:39:LEU:HD22	1:A:50:ILE:HB	2.01	0.42
1:A:134:ASP:HB3	1:A:135:ASP:H	1.60	0.42
1:A:148:ILE:HD12	1:A:181:VAL:HG21	2.00	0.42
1:A:211:ASN:HB3	1:A:241:ASP:OD1	2.20	0.42
1:A:268:ASP:OD1	1:A:269:ALA:N	2.53	0.42
1:A:311:PHE:HB3	1:A:313:ASP:H	1.85	0.42
1:A:220:TYR:CD1	1:A:237:VAL:HG12	2.55	0.42
1:A:132:ASP:OD2	1:A:187:ASP:OD2	2.38	0.42
1:A:152:GLN:HA	1:A:152:GLN:NE2	2.28	0.42
1:A:178:GLU:HG2	1:A:204:THR:HG23	2.01	0.42
1:A:125:VAL:HB	1:A:164:ILE:HB	2.01	0.42
1:A:87:GLU:HA	1:A:88:PRO:HD2	1.86	0.42
1:A:267:SER:CB	1:A:268:ASP:CA	2.90	0.41
1:A:150:GLU:HG2	1:A:151:GLY:N	2.34	0.41
1:A:186:LYS:CD	1:A:189:GLY:HA2	2.49	0.41
1:A:53:ILE:H	1:A:53:ILE:HG13	1.58	0.41
1:A:104:PRO:HB3	1:A:144:LEU:HD21	2.03	0.41
1:A:188:MET:O	1:A:189:GLY:O	2.37	0.41
1:A:173:ARG:HE	1:A:173:ARG:HB3	1.59	0.41
1:A:190:GLY:C	1:A:191:HIS:CG	2.93	0.41
1:A:27:ASP:OD2	1:A:27:ASP:N	2.54	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:20:LEU:HA	1:A:58:HIS:HA	2.02	0.41
1:A:164:ILE:CD1	1:A:201:LEU:HD11	2.51	0.41
1:A:117:GLU:HG2	1:A:118:MET:HG3	2.03	0.41
1:A:20:LEU:HD13	1:A:57:ILE:H	1.84	0.40
1:A:82:THR:C	1:A:84:LYS:H	2.24	0.40
1:A:184:GLN:HE21	1:A:184:GLN:HB3	1.52	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	315/322 (98%)	227 (72%)	52 (16%)	36 (11%)	<b>0</b> <b>7</b>

All (36) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	16	PRO
1	A	27	ASP
1	A	96	VAL
1	A	97	GLN
1	A	117	GLU
1	A	154	TYR
1	A	171	MET
1	A	174	GLU
1	A	208	VAL
1	A	228	VAL
1	A	229	VAL
1	A	267	SER
1	A	281	PRO
1	A	310	PRO
1	A	313	ASP

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Mol	Chain	Res	Type
1	A	315	ALA
1	A	13	PHE
1	A	14	SER
1	A	98	ASP
1	A	134	ASP
1	A	172	ASP
1	A	188	MET
1	A	189	GLY
1	A	227	ASP
1	A	261	ALA
1	A	306	SER
1	A	30	PRO
1	A	52	ASP
1	A	279	ARG
1	A	286	THR
1	A	298	ASN
1	A	210	ASP
1	A	303	PRO
1	A	153	PRO
1	A	231	GLY
1	A	151	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	273/275 (99%)	203 (74%)	70 (26%)	<b>0</b>   <b>4</b>

All (70) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	ASN
1	A	11	GLU
1	A	13	PHE
1	A	19	ILE
1	A	21	VAL

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	23	ARG
1	A	51	ASN
1	A	65	ARG
1	A	73	LEU
1	A	76	GLN
1	A	81	GLU
1	A	82	THR
1	A	90	SER
1	A	94	ILE
1	A	97	GLN
1	A	99	ILE
1	A	108	ASN
1	A	114	THR
1	A	115	VAL
1	A	123	THR
1	A	126	THR
1	A	127	ASN
1	A	128	VAL
1	A	131	THR
1	A	134	ASP
1	A	143	LYS
1	A	144	LEU
1	A	147	SER
1	A	149	LEU
1	A	150	GLU
1	A	152	GLN
1	A	156	SER
1	A	160	GLU
1	A	164	ILE
1	A	168	LEU
1	A	170	ASN
1	A	184	GLN
1	A	187	ASP
1	A	191	HIS
1	A	201	LEU
1	A	204	THR
1	A	211	ASN
1	A	214	LYS
1	A	217	GLN
1	A	219	LEU
1	A	223	SER
1	A	246	GLU

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Mol	Chain	Res	Type
1	A	249	GLN
1	A	251	SER
1	A	253	ASP
1	A	254	ILE
1	A	255	ILE
1	A	266	THR
1	A	267	SER
1	A	273	ASP
1	A	277	ARG
1	A	278	LEU
1	A	282	LEU
1	A	283	ASP
1	A	285	GLU
1	A	291	THR
1	A	294	VAL
1	A	299	ILE
1	A	301	ILE
1	A	302	ASP
1	A	304	ARG
1	A	305	PHE
1	A	311	PHE
1	A	312	LYS
1	A	316	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	58	HIS
1	A	76	GLN
1	A	112	HIS
1	A	127	ASN
1	A	152	GLN
1	A	184	GLN
1	A	211	ASN
1	A	242	GLN

### 5.3.3 RNA

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 6 ligands modelled in this entry, 6 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [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.