



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 12:30 PM UTC

PDB ID : 1H0N / pdb\_00001h0n  
Title : Cobalt substitution of mouse R2 ribonucleotide reductase to model the reactive diferrous state  
Authors : Strand, K.R.; Karlsen, S.; Andersson, K.K.  
Deposited on : 2002-06-26  
Resolution : 2.40 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	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

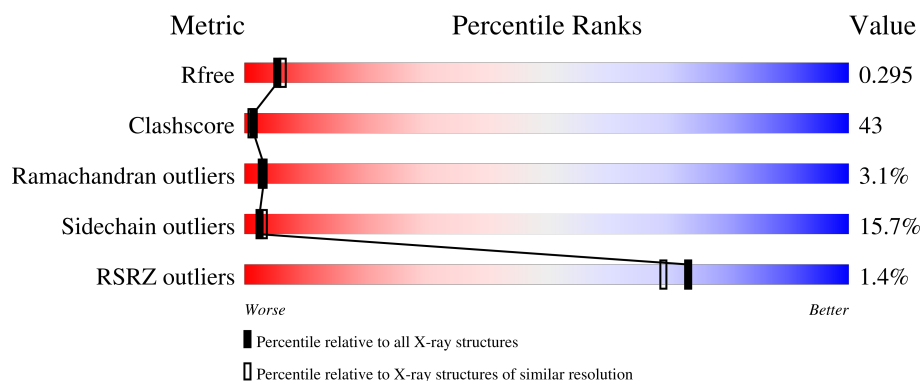
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.40 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))
$R_{free}$	180053	4912 (2.40-2.40)
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (2.40-2.40)

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  $\leq 5\%$ . 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	390	

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 2494 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 RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	288	Total	C	N	O	S	0	0	0
			2380	1542	394	429	15			

- Molecule 2 is COBALT (II) ION (CCD ID: CO) (formula: Co).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	Co	0	0
			2	2		

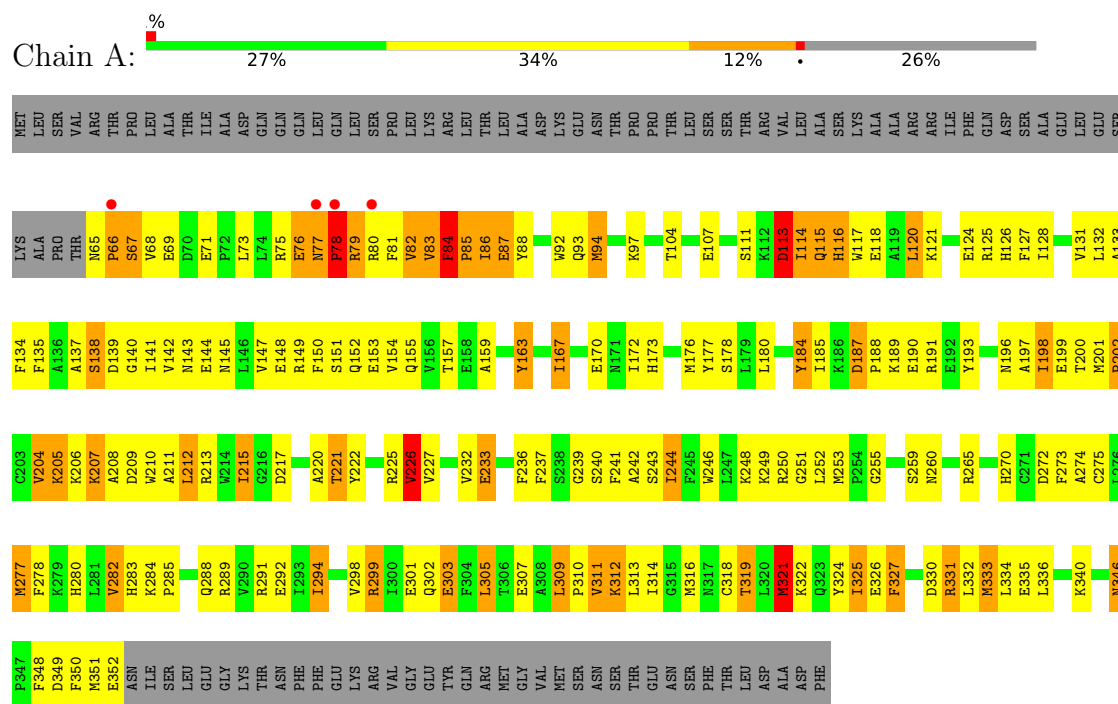
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	112	Total	O	0	0
			112	112		

### 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: RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	75.10Å 106.86Å 91.46Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	8.00 – 2.40 8.00 – 2.40	Depositor EDS
% Data completeness (in resolution range)	97.9 (8.00-2.40) 94.9 (8.00-2.40)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.10 (at 2.20Å)	Xtriage
Refinement program	CNS	Depositor
R, $R_{free}$	0.218 , 0.297 0.218 , 0.295	Depositor DCC
$R_{free}$ test set	691 reflections (3.65%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	31.5	Xtriage
Anisotropy	0.129	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.50 , 79.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.43$ , $\langle L^2 \rangle = 0.26$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	2494	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.78% 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

### 5.1 Standard geometry

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

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	1.38	12/2442 (0.5%)	1.41	24/3298 (0.7%)

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 (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	85	PRO	CA-C	8.24	1.60	1.52
1	A	321	MET	SD-CE	-7.20	1.61	1.79
1	A	176	MET	SD-CE	6.63	1.96	1.79
1	A	167	ILE	CA-CB	6.54	1.62	1.54
1	A	215	ILE	CA-CB	6.50	1.63	1.54
1	A	139	ASP	CA-C	6.39	1.61	1.52
1	A	333	MET	SD-CE	6.27	1.95	1.79
1	A	331	ARG	C-O	-5.79	1.17	1.24
1	A	336	LEU	C-O	-5.67	1.16	1.24
1	A	76	GLU	CA-C	-5.41	1.45	1.52
1	A	274	ALA	CA-CB	-5.37	1.45	1.53
1	A	227	VAL	CA-CB	-5.16	1.48	1.54

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	83	VAL	N-CA-C	11.80	121.96	111.81

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	280	HIS	N-CA-C	-8.14	102.38	112.88
1	A	85	PRO	N-CA-C	-7.65	98.02	112.33
1	A	346	ASN	CA-C-N	7.61	127.24	119.56
1	A	346	ASN	C-N-CA	7.61	127.24	119.56
1	A	184	TYR	N-CA-C	7.38	120.77	111.69
1	A	255	GLY	N-CA-C	-7.14	103.85	112.49
1	A	84	PHE	N-CA-C	6.96	125.20	109.81
1	A	116	HIS	N-CA-C	-6.53	103.43	111.33
1	A	144	GLU	N-CA-C	-6.41	104.94	112.89
1	A	327	PHE	N-CA-C	-5.85	105.04	111.82
1	A	84	PHE	CA-C-N	-5.66	105.70	120.25
1	A	84	PHE	C-N-CA	-5.66	105.70	120.25
1	A	305	LEU	N-CA-C	5.49	119.84	113.20
1	A	226	VAL	CB-CA-C	-5.42	104.74	112.22
1	A	126	HIS	N-CA-C	-5.40	105.29	111.07
1	A	259	SER	N-CA-C	-5.40	105.48	111.36
1	A	87	GLU	N-CA-C	5.38	118.31	111.69
1	A	312	LYS	N-CA-C	-5.27	105.53	111.28
1	A	272	ASP	N-CA-C	-5.25	105.45	111.07
1	A	233	GLU	N-CA-C	5.21	118.89	112.54
1	A	294	ILE	CB-CA-C	-5.20	105.21	112.02
1	A	325	ILE	CB-CA-C	-5.09	105.38	112.04
1	A	277	MET	N-CA-C	-5.07	105.66	111.14

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	163	TYR	Sidechain

## 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	2380	0	2328	203	0
2	A	2	0	0	0	0
3	A	112	0	0	27	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	2494	0	2328	203	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 43.

All (203) 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:222:TYR:O	1:A:226:VAL:HG23	1.49	1.10
1:A:78:PRO:O	1:A:80:ARG:HG3	1.51	1.07
1:A:237:PHE:HB3	1:A:241:PHE:CE2	1.91	1.04
1:A:141:ILE:HD12	1:A:212:LEU:CD1	1.88	1.04
1:A:81:PHE:HA	3:A:2016:HOH:O	1.57	1.03
1:A:321:MET:HE3	1:A:321:MET:HA	1.36	1.03
1:A:149:ARG:HB2	3:A:2044:HOH:O	1.60	0.99
1:A:242:ALA:HA	1:A:351:MET:HE2	1.44	0.98
1:A:78:PRO:HA	3:A:2012:HOH:O	1.63	0.96
1:A:137:ALA:N	3:A:2037:HOH:O	1.97	0.95
1:A:134:PHE:HE2	1:A:207:LYS:NZ	1.66	0.93
1:A:66:PRO:O	1:A:69:GLU:HG2	1.74	0.88
1:A:141:ILE:HD12	1:A:212:LEU:HD11	1.56	0.86
1:A:65:ASN:HD22	1:A:68:VAL:HB	1.40	0.86
1:A:289:ARG:HD2	1:A:292:GLU:OE2	1.77	0.84
1:A:77:ASN:H	1:A:78:PRO:HD2	1.42	0.83
1:A:78:PRO:O	1:A:80:ARG:N	2.15	0.79
1:A:141:ILE:HD12	1:A:212:LEU:HD13	1.62	0.79
1:A:77:ASN:N	1:A:78:PRO:HD2	1.96	0.79
1:A:121:LYS:HB2	1:A:124:GLU:HG3	1.65	0.79
1:A:78:PRO:O	1:A:80:ARG:CG	2.32	0.77
1:A:127:PHE:HD2	1:A:128:ILE:HD13	1.48	0.77
1:A:149:ARG:O	1:A:153:GLU:HG2	1.85	0.77
1:A:80:ARG:HB2	3:A:2015:HOH:O	1.85	0.76
1:A:65:ASN:HD22	1:A:68:VAL:CB	2.01	0.74
1:A:143:ASN:O	1:A:147:VAL:HG12	1.88	0.74
1:A:198:ILE:HG22	1:A:199:GLU:HG3	1.70	0.73
1:A:80:ARG:NH2	1:A:157:THR:OG1	2.21	0.73
1:A:134:PHE:CE2	1:A:207:LYS:NZ	2.48	0.73
1:A:303:GLU:O	1:A:307:GLU:HB2	1.90	0.71
1:A:116:HIS:O	1:A:120:LEU:HD13	1.89	0.71
1:A:321:MET:HE3	1:A:321:MET:CA	2.16	0.71
1:A:282:VAL:HG12	1:A:283:HIS:CG	2.25	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:311:VAL:HB	1:A:316:MET:HB2	1.71	0.70
1:A:208:ALA:O	1:A:212:LEU:HB2	1.91	0.70
1:A:75:ARG:HG3	1:A:77:ASN:HB2	1.75	0.69
1:A:113:ASP:HB3	1:A:184:TYR:HE1	1.57	0.69
1:A:210:TRP:HA	3:A:2066:HOH:O	1.92	0.69
1:A:278:PHE:CZ	1:A:284:LYS:HD3	2.29	0.68
1:A:331:ARG:NH1	3:A:2105:HOH:O	2.28	0.65
1:A:65:ASN:ND2	1:A:68:VAL:HB	2.12	0.65
1:A:217:ASP:OD2	1:A:220:ALA:HB2	1.97	0.65
1:A:78:PRO:HG2	1:A:155:GLN:HB3	1.77	0.64
1:A:307:GLU:O	1:A:310:PRO:HD3	1.97	0.64
1:A:327:PHE:CE2	1:A:346:ASN:HB2	2.32	0.64
1:A:78:PRO:C	1:A:80:ARG:N	2.54	0.64
1:A:237:PHE:CB	1:A:241:PHE:CE2	2.76	0.64
1:A:80:ARG:NH2	1:A:82:VAL:O	2.30	0.64
1:A:81:PHE:CA	3:A:2016:HOH:O	2.31	0.64
1:A:137:ALA:HB3	3:A:2037:HOH:O	1.98	0.63
1:A:78:PRO:O	1:A:79:ARG:C	2.42	0.62
1:A:222:TYR:O	1:A:226:VAL:CG2	2.39	0.62
1:A:251:GLY:O	1:A:252:LEU:HD23	1.99	0.62
1:A:327:PHE:CD2	1:A:346:ASN:HB2	2.35	0.62
1:A:127:PHE:CE2	1:A:314:ILE:HD13	2.35	0.62
1:A:117:TRP:HE3	1:A:253:MET:CE	2.12	0.61
1:A:143:ASN:OD1	1:A:170:GLU:HB2	2.00	0.61
1:A:282:VAL:HG12	1:A:283:HIS:N	2.15	0.60
1:A:346:ASN:ND2	1:A:352:GLU:HB3	2.16	0.60
1:A:137:ALA:CB	3:A:2037:HOH:O	2.50	0.60
1:A:330:ASP:HB3	1:A:340:LYS:HD2	1.83	0.59
1:A:77:ASN:N	1:A:78:PRO:CD	2.63	0.59
1:A:148:GLU:O	1:A:149:ARG:HG2	2.02	0.59
1:A:273:PHE:CZ	1:A:277:MET:HE3	2.38	0.59
1:A:187:ASP:HB3	1:A:190:GLU:OE1	2.03	0.59
1:A:127:PHE:CD2	1:A:128:ILE:HD13	2.35	0.58
1:A:137:ALA:O	1:A:140:GLY:N	2.36	0.58
1:A:275:CYS:O	1:A:278:PHE:HB3	2.03	0.58
1:A:77:ASN:H	1:A:78:PRO:CD	2.13	0.58
1:A:190:GLU:O	1:A:193:TYR:HB3	2.03	0.58
1:A:239:GLY:HA3	1:A:301:GLU:OE2	2.04	0.57
1:A:150:PHE:HD1	1:A:153:GLU:OE1	1.87	0.57
1:A:71:GLU:OE1	1:A:282:VAL:HB	2.05	0.56
1:A:185:ILE:CG2	1:A:190:GLU:HB2	2.36	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:289:ARG:O	1:A:292:GLU:HG2	2.06	0.56
1:A:210:TRP:CG	3:A:2066:HOH:O	2.58	0.55
1:A:346:ASN:C	1:A:346:ASN:OD1	2.48	0.55
1:A:135:PHE:HB3	1:A:177:TYR:CE2	2.42	0.55
1:A:184:TYR:C	1:A:185:ILE:HD12	2.32	0.55
1:A:134:PHE:C	1:A:134:PHE:CD1	2.84	0.55
1:A:232:VAL:O	1:A:236:PHE:HB2	2.07	0.54
1:A:150:PHE:CD1	1:A:222:TYR:HE1	2.25	0.54
1:A:196:ASN:ND2	1:A:199:GLU:HB2	2.23	0.54
1:A:282:VAL:HG12	1:A:283:HIS:CD2	2.42	0.54
1:A:243:SER:HB2	1:A:314:ILE:HD11	1.88	0.54
1:A:148:GLU:C	1:A:152:GLN:OE1	2.51	0.53
1:A:242:ALA:HA	1:A:351:MET:CE	2.27	0.53
1:A:299:ARG:N	1:A:299:ARG:HD3	2.24	0.53
1:A:94:MET:HA	1:A:94:MET:HE2	1.91	0.53
1:A:145:ASN:HB3	3:A:2040:HOH:O	2.08	0.53
1:A:80:ARG:CZ	3:A:2013:HOH:O	2.57	0.52
1:A:349:ASP:OD1	1:A:350:PHE:N	2.42	0.51
1:A:321:MET:O	1:A:321:MET:HE2	2.10	0.51
1:A:78:PRO:C	1:A:80:ARG:H	2.19	0.51
1:A:117:TRP:O	1:A:125:ARG:HD3	2.11	0.51
1:A:310:PRO:O	1:A:313:LEU:HD12	2.11	0.51
1:A:117:TRP:HE3	1:A:253:MET:HE2	1.75	0.51
1:A:117:TRP:HA	1:A:120:LEU:HD22	1.93	0.51
1:A:321:MET:HA	1:A:321:MET:CE	2.24	0.51
1:A:283:HIS:CD2	3:A:2002:HOH:O	2.64	0.50
1:A:143:ASN:OD1	1:A:167:ILE:HA	2.11	0.50
1:A:78:PRO:HB3	3:A:2015:HOH:O	2.10	0.50
1:A:206:LYS:NZ	1:A:303:GLU:OE2	2.34	0.50
1:A:114:ILE:HD12	1:A:114:ILE:O	2.12	0.50
1:A:210:TRP:CD1	3:A:2066:HOH:O	2.65	0.50
1:A:217:ASP:OD2	1:A:220:ALA:CB	2.59	0.50
1:A:251:GLY:C	3:A:2075:HOH:O	2.55	0.49
1:A:135:PHE:HB3	1:A:177:TYR:CD2	2.47	0.49
1:A:321:MET:CE	1:A:324:TYR:HB3	2.42	0.49
1:A:69:GLU:HB2	3:A:2004:HOH:O	2.11	0.49
1:A:201:MET:HB2	1:A:204:VAL:HG13	1.94	0.49
1:A:346:ASN:HD22	1:A:352:GLU:HB3	1.78	0.49
1:A:322:LYS:O	1:A:326:GLU:HG3	2.12	0.49
1:A:138:SER:N	3:A:2038:HOH:O	2.45	0.49
1:A:348:PHE:HA	3:A:2112:HOH:O	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:185:ILE:CD1	1:A:185:ILE:N	2.76	0.48
1:A:237:PHE:HB3	1:A:241:PHE:CZ	2.46	0.48
1:A:243:SER:HB2	1:A:314:ILE:CD1	2.42	0.48
1:A:283:HIS:HD2	3:A:2002:HOH:O	1.97	0.48
1:A:132:LEU:O	1:A:133:ALA:C	2.57	0.48
1:A:289:ARG:CD	1:A:292:GLU:OE2	2.57	0.48
1:A:197:ALA:HA	1:A:200:THR:OG1	2.14	0.48
1:A:148:GLU:HA	1:A:152:GLN:OE1	2.13	0.47
1:A:113:ASP:HB3	1:A:184:TYR:CE1	2.43	0.47
1:A:211:ALA:HB2	1:A:232:VAL:HG21	1.96	0.47
1:A:134:PHE:HE2	1:A:207:LYS:HZ3	0.79	0.47
1:A:321:MET:CA	1:A:321:MET:CE	2.89	0.47
1:A:334:LEU:HA	1:A:334:LEU:HD23	1.64	0.47
1:A:291:ARG:HG2	1:A:333:MET:HE2	1.96	0.47
1:A:233:GLU:HA	1:A:237:PHE:CD2	2.50	0.47
1:A:289:ARG:HH11	1:A:292:GLU:HG3	1.81	0.46
1:A:69:GLU:HA	3:A:2004:HOH:O	2.15	0.46
1:A:185:ILE:HD12	1:A:185:ILE:N	2.30	0.46
1:A:187:ASP:OD1	1:A:188:PRO:HD2	2.16	0.46
1:A:244:ILE:HG21	1:A:260:ASN:CB	2.46	0.46
1:A:145:ASN:ND2	3:A:2044:HOH:O	2.48	0.46
1:A:265:ARG:O	1:A:265:ARG:HG2	2.14	0.46
1:A:80:ARG:NH2	3:A:2014:HOH:O	2.48	0.46
1:A:78:PRO:CA	3:A:2012:HOH:O	2.40	0.46
1:A:284:LYS:HB2	1:A:285:PRO:HD2	1.97	0.46
1:A:138:SER:C	1:A:140:GLY:N	2.74	0.45
1:A:150:PHE:O	1:A:152:GLN:N	2.49	0.45
1:A:150:PHE:C	1:A:152:GLN:N	2.74	0.45
1:A:148:GLU:C	1:A:149:ARG:HG2	2.41	0.45
1:A:204:VAL:HG22	1:A:205:LYS:N	2.32	0.45
1:A:82:VAL:HG23	1:A:85:PRO:CD	2.47	0.45
1:A:84:PHE:C	1:A:86:ILE:N	2.75	0.45
1:A:185:ILE:HG21	1:A:190:GLU:HB2	1.97	0.45
1:A:318:CYS:O	1:A:319:THR:C	2.59	0.44
1:A:113:ASP:HA	1:A:116:HIS:CD2	2.52	0.44
1:A:282:VAL:CG1	1:A:283:HIS:CD2	3.00	0.44
1:A:198:ILE:O	1:A:205:LYS:HG2	2.18	0.44
1:A:77:ASN:O	1:A:78:PRO:C	2.61	0.44
1:A:294:ILE:HD12	1:A:332:LEU:HD23	2.00	0.44
1:A:222:TYR:HA	1:A:225:ARG:NH1	2.33	0.44
1:A:66:PRO:HG2	1:A:67:SER:N	2.34	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:86:ILE:HD11	1:A:92:TRP:CE2	2.54	0.43
1:A:327:PHE:CZ	1:A:346:ASN:HB2	2.53	0.43
1:A:153:GLU:CD	1:A:225:ARG:HH22	2.26	0.43
1:A:117:TRP:CE2	1:A:125:ARG:HG2	2.54	0.43
1:A:117:TRP:CE3	1:A:253:MET:HE2	2.53	0.43
1:A:246:TRP:O	1:A:249:LYS:HB3	2.18	0.43
1:A:66:PRO:HG2	1:A:67:SER:H	1.84	0.43
1:A:87:GLU:HG2	1:A:88:TYR:CE2	2.54	0.43
1:A:135:PHE:CZ	1:A:240:SER:HB2	2.54	0.43
1:A:188:PRO:HG2	1:A:189:LYS:H	1.84	0.43
1:A:113:ASP:HA	1:A:116:HIS:HD2	1.84	0.43
1:A:149:ARG:O	1:A:152:GLN:HB2	2.18	0.43
1:A:221:THR:O	1:A:222:TYR:C	2.60	0.43
1:A:127:PHE:HD2	1:A:128:ILE:CD1	2.26	0.42
1:A:153:GLU:OE1	1:A:225:ARG:NH2	2.50	0.42
1:A:225:ARG:HD2	3:A:2045:HOH:O	2.19	0.42
1:A:104:THR:O	1:A:107:GLU:HB2	2.18	0.42
1:A:172:ILE:O	1:A:173:HIS:C	2.59	0.42
1:A:346:ASN:HD21	1:A:351:MET:HB2	1.85	0.42
1:A:321:MET:HE1	1:A:324:TYR:CD2	2.55	0.42
1:A:291:ARG:HH11	1:A:291:ARG:HD2	1.71	0.42
1:A:82:VAL:HG23	1:A:85:PRO:HD2	2.02	0.42
1:A:115:GLN:HA	1:A:118:GLU:HG3	2.01	0.42
1:A:150:PHE:O	1:A:151:SER:C	2.61	0.42
1:A:201:MET:HA	1:A:202:PRO:HD2	1.92	0.42
1:A:117:TRP:HE3	1:A:253:MET:HE1	1.81	0.42
1:A:233:GLU:OE1	1:A:270:HIS:HB3	2.19	0.42
1:A:305:LEU:HD23	1:A:305:LEU:HA	1.75	0.42
1:A:117:TRP:CZ2	1:A:125:ARG:HG2	2.55	0.41
1:A:163:TYR:O	1:A:167:ILE:HD12	2.20	0.41
1:A:80:ARG:HB2	1:A:80:ARG:HE	1.56	0.41
1:A:143:ASN:ND2	1:A:167:ILE:HG23	2.35	0.41
1:A:115:GLN:O	1:A:118:GLU:N	2.52	0.41
1:A:150:PHE:C	1:A:152:GLN:H	2.28	0.41
1:A:154:VAL:HG11	1:A:159:ALA:HB3	2.01	0.41
1:A:309:LEU:N	1:A:310:PRO:HD3	2.36	0.41
1:A:298:VAL:O	1:A:302:GLN:HG3	2.20	0.41
1:A:134:PHE:CE2	1:A:207:LYS:HG2	2.56	0.41
1:A:302:GLN:O	1:A:303:GLU:C	2.62	0.41
1:A:310:PRO:C	1:A:312:LYS:H	2.29	0.41
1:A:76:GLU:HG2	3:A:2008:HOH:O	2.19	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:265:ARG:O	1:A:265:ARG:CG	2.68	0.41
1:A:185:ILE:HG23	1:A:190:GLU:HB2	2.02	0.41
1:A:205:LYS:HE2	1:A:209:ASP:OD2	2.21	0.41
1:A:327:PHE:CG	1:A:346:ASN:HB2	2.56	0.40
1:A:66:PRO:O	1:A:69:GLU:N	2.55	0.40
1:A:248:LYS:O	1:A:249:LYS:C	2.61	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	286/390 (73%)	248 (87%)	29 (10%)	9 (3%)	<b>3</b> <b>3</b>

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	66	PRO
1	A	78	PRO
1	A	79	ARG
1	A	250	ARG
1	A	113	ASP
1	A	202	PRO
1	A	86	ILE
1	A	142	VAL
1	A	77	ASN

### 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	255/345 (74%)	215 (84%)	40 (16%)	<b>2</b> <b>3</b>

All (40) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	67	SER
1	A	73	LEU
1	A	78	PRO
1	A	82	VAL
1	A	83	VAL
1	A	84	PHE
1	A	93	GLN
1	A	94	MET
1	A	97	LYS
1	A	111	SER
1	A	113	ASP
1	A	114	ILE
1	A	115	GLN
1	A	120	LEU
1	A	131	VAL
1	A	138	SER
1	A	178	SER
1	A	180	LEU
1	A	187	ASP
1	A	191	ARG
1	A	198	ILE
1	A	204	VAL
1	A	205	LYS
1	A	207	LYS
1	A	212	LEU
1	A	213	ARG
1	A	215	ILE
1	A	221	THR
1	A	226	VAL
1	A	244	ILE
1	A	282	VAL
1	A	288	GLN
1	A	299	ARG
1	A	303	GLU

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Mol	Chain	Res	Type
1	A	309	LEU
1	A	311	VAL
1	A	319	THR
1	A	321	MET
1	A	325	ILE
1	A	335	GLU

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	65	ASN
1	A	77	ASN
1	A	115	GLN
1	A	116	HIS
1	A	126	HIS
1	A	171	ASN
1	A	196	ASN
1	A	283	HIS

### 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 ⓘ

Of 2 ligands modelled in this entry, 2 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 [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

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, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	288/390 (73%)	-0.46	4 (1%) 73 69	18, 37, 60, 72	0

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	80	ARG	3.1
1	A	66	PRO	2.5
1	A	78	PRO	2.5
1	A	77	ASN	2.3

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

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

### 6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

### 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q < 0.9’ lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	CO	A	1354	1/1	0.99	0.02	30,30,30,30	0
2	CO	A	1353	1/1	1.00	0.02	38,38,38,38	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.