Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2024 – 12:18 AM EDT

PDB ID	:	1JS1
Title	:	Crystal Structure of a new transcarbamylase from the anaerobic bacterium Bacteroides fragilis at 2.0 A resolution
Authors	:	Shi, D.; Gallegos, R.; DePonte III, J.; Morizono, H.; Yu, X.; Allewell, N.M.; Malamy, M.; Tuchman, M.
Deposited on	:	2001-08-15
Resolution	:	2.00 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*
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.

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

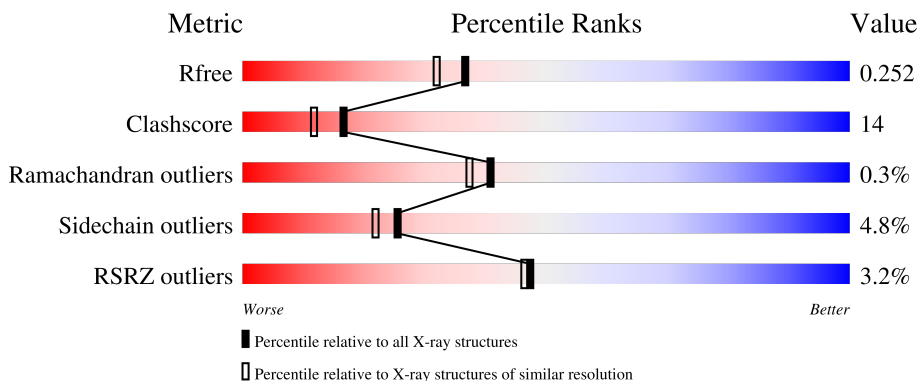|		
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.36.2
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (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:
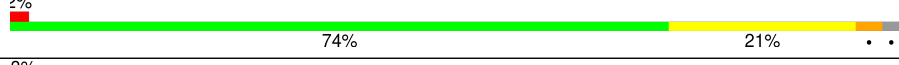*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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		0.252
Clashscore		14
Ramachandran outliers		0.3%
Sidechain outliers		4.8%
RSRZ outliers		3.2%

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	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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 >=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	X	324	4% / 73% / 23% / •
1	Y	324	2% / 74% / 21% / • •
1	Z	324	3% / 75% / 20% / • •

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

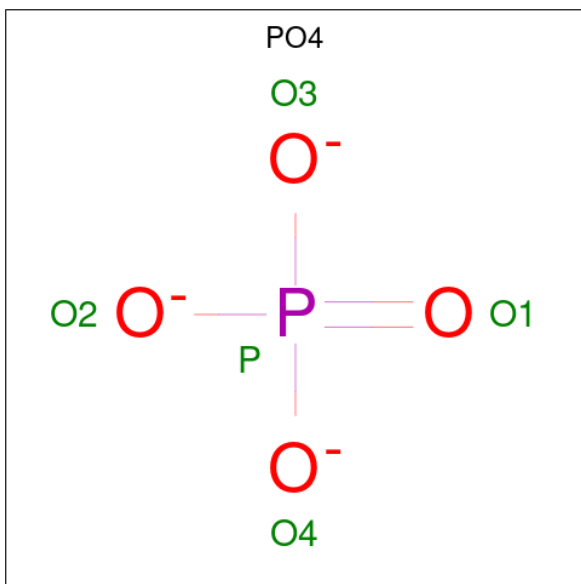| Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	PO4	Z	503	-	-	X	-

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 8177 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 Transcarbamylase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	X	324	Total	C	N	O	S	0	0	0
			2620	1668	457	479	16			
1	Y	318	Total	C	N	O	S	0	0	0
			2560	1632	439	473	16			
1	Z	318	Total	C	N	O	S	0	0	0
			2560	1632	439	473	16			

- Molecule 2 is PHOSPHATE ION (three-letter code: PO4) (formula: O_4P).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	X	1	Total	O	P	0	0
			5	4	1		
2	Y	1	Total	O	P	0	0
			5	4	1		
2	Z	1	Total	O	P	0	0
			5	4	1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	X	125	Total 125	O 125	0	0
3	Y	137	Total 137	O 137	0	0
3	Z	160	Total 160	O 160	0	0

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 = 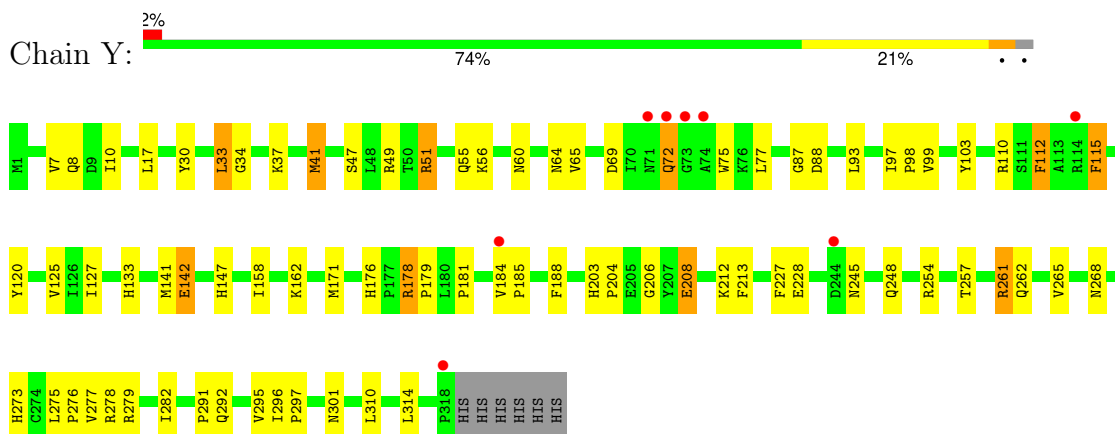0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: Transcarbamylase

Chain X:

• Molecule 1: Transcarbamylase

Chain Y:

• Molecule 1: Transcarbamylase

Chain Z:

F112 A113 R114 Y120 D121 Y122 V125 I126 M141 E142 H147 E159 K162 K163 T164 V169 V170 M171 A174 Q182 N186 S187 F188 M192 Y197 H203 P204 E205 G206 Y207 E208 F213 N216 Q223 A235 K236 N237 G243 D244 N245 Q248

W256 N268 L275 R278 T284 V287 V295 N301 R302 E303 T307 R312 L313 P318 HIS HIS HIS HIS HIS HIS
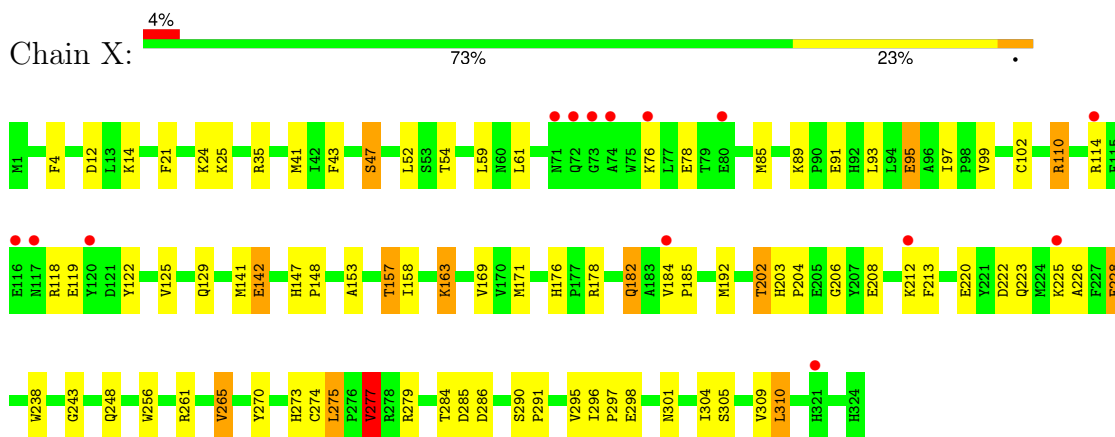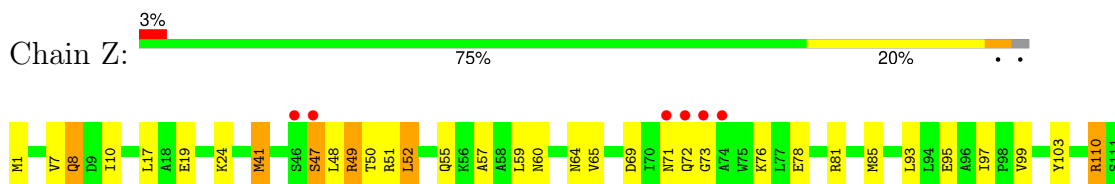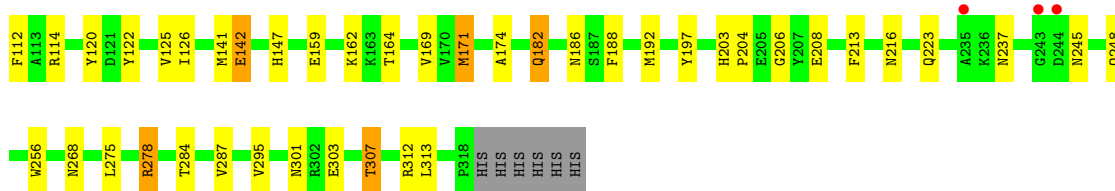
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α, β, γ	153.41Å　　153.41Å　　94.84Å 90.00°　　　90.00°　　　90.00°	Depositor
Resolution (Å)	27.28　–　2.00 27.28　–　2.00	Depositor EDS
% Data completeness (in resolution range)	96.7 (27.28-2.00) 96.8 (27.28-2.00)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.91 (at 1.99Å)	Xtriage
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.206　,　0.252 0.206　,　0.252	Depositor DCC
R_{free} test set	7481 reflections (10.09%)	wwPDB-VP
Wilson B-factor (Å^2)	29.9	Xtriage
Anisotropy	0.059	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 52.7	EDS
L-test for twinning[2]	$< |L| > = 0.51$, $< L^2 > = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	8177	wwPDB-VP
Average B, all atoms (Å^2)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.80% 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)

Bond lengths and bond angles in the following residue types are not validated in this section: PO4

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	X	0.60	0/2685	0.76	1/3640 (0.0%)
1	Y	0.64	1/2619 (0.0%)	0.78	0/3550
1	Z	0.70	2/2619 (0.1%)	0.79	2/3550 (0.1%)
All	All	0.65	3/7923 (0.0%)	0.78	3/10740 (0.0%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	Z	41	MET	SD-CE	-8.01	1.33	1.77
1	Y	41	MET	SD-CE	-6.03	1.44	1.77
1	Z	171	MET	SD-CE	-5.87	1.45	1.77

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	Z	278	ARG	NE-CZ-NH2	-6.94	116.83	120.30
1	X	277	VAL	CB-CA-C	-5.69	100.59	111.40
1	Z	52	LEU	CA-CB-CG	5.52	128.00	115.30

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	X	2620	0	2574	88	0
1	Y	2560	0	2532	68	0
1	Z	2560	0	2532	74	0
2	X	5	0	0	0	0
2	Y	5	0	0	1	0
2	Z	5	0	0	3	0
3	X	125	0	0	5	0
3	Y	137	0	0	7	0
3	Z	160	0	0	4	0
All	All	8177	0	7638	218	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 14.

All (218) 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:X:169:VAL:HG11	1:X:192:MET:HE3	1.41	1.02
1:Y:171:MET:HE1	1:Y:188:PHE:HB3	1.48	0.92
1:X:202:THR:HG21	1:X:223:GLN:HA	1.51	0.92
1:X:169:VAL:HG11	1:X:192:MET:CE	2.00	0.90
1:Z:73:GLY:HA2	1:Z:76:LYS:HE3	1.54	0.88
1:Z:169:VAL:HG11	1:Z:192:MET:HE2	1.56	0.86
1:Z:171:MET:HE1	1:Z:188:PHE:HB3	1.56	0.85
1:Z:122:TYR:OH	1:Z:182:GLN:HG3	1.81	0.80
1:Y:273:HIS:ND1	1:Y:277:VAL:HG22	1.97	0.80
1:X:228:GLU:HG3	1:X:265:VAL:HG13	1.63	0.80
1:Y:8:GLN:NE2	3:Y:505:HOH:O	2.16	0.79
1:X:275:LEU:HD11	1:X:295:VAL:HG21	1.64	0.78
1:Y:275:LEU:HD23	1:Y:277:VAL:HG23	1.65	0.77
1:X:275:LEU:HD12	1:X:277:VAL:HG22	1.67	0.75
1:Y:184:VAL:HB	1:Y:185:PRO:HD3	1.69	0.74
1:Y:87:GLY:O	1:Z:278:ARG:NH2	2.21	0.74
1:Z:120:TYR:CZ	1:Z:125:VAL:HG21	2.23	0.73
1:X:273:HIS:ND1	1:X:277:VAL:HG13	2.04	0.73
1:X:122:TYR:OH	1:X:182:GLN:HG3	1.88	0.73
1:X:275:LEU:CD1	1:X:295:VAL:HG21	2.18	0.72
1:Y:228:GLU:HA	1:Y:265:VAL:O	1.90	0.72
1:X:157:THR:HG21	1:X:298:GLU:HA	1.73	0.69
1:Z:203:HIS:HD2	1:Z:204:PRO:O	1.75	0.69
1:Y:127:ILE:HG12	3:Y:571:HOH:O	1.93	0.69
1:X:301:ASN:HA	1:X:304:ILE:HD13	1.74	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:Y:206:GLY:N	1:Y:208:GLU:OE2	2.27	0.68
1:Y:275:LEU:HD23	1:Y:277:VAL:CG2	2.24	0.68
1:Y:8:GLN:CD	3:Y:505:HOH:O	2.33	0.66
1:Y:292:GLN:HG3	3:Y:553:HOH:O	1.95	0.66
1:X:203:HIS:HD2	1:X:204:PRO:O	1.79	0.65
1:X:43:PHE:CZ	1:X:141:MET:HE1	2.31	0.65
1:Y:275:LEU:HD21	1:Y:295:VAL:CG1	2.27	0.64
1:Z:275:LEU:HD21	1:Z:295:VAL:HG11	1.79	0.64
1:Z:114:ARG:HB2	3:Z:603:HOH:O	1.98	0.64
1:X:304:ILE:HD12	1:X:304:ILE:N	2.12	0.63
1:Z:49:ARG:HG3	2:Z:503:PO4:P	2.39	0.63
1:Z:245:ASN:HA	1:Z:248:GLN:NE2	2.15	0.62
1:X:85:MET:HE3	1:Y:279:ARG:HB2	1.82	0.62
1:X:59:LEU:HD13	1:Z:64:ASN:HB3	1.82	0.61
1:X:118:ARG:NH2	1:X:243:GLY:O	2.33	0.61
1:Z:120:TYR:CE1	1:Z:125:VAL:HG21	2.35	0.61
1:X:284:THR:HG22	1:X:286:ASP:H	1.64	0.61
1:Y:275:LEU:CD2	1:Y:277:VAL:HG23	2.29	0.61
1:X:95:GLU:HG2	3:X:505:HOH:O	1.99	0.61
1:Z:275:LEU:HD21	1:Z:295:VAL:CG1	2.31	0.61
1:X:296:ILE:HB	1:X:297:PRO:HD3	1.82	0.61
1:Y:296:ILE:N	1:Y:296:ILE:HD12	2.16	0.60
1:X:24:LYS:NZ	1:X:301:ASN:HD21	1.99	0.60
1:X:273:HIS:CE1	1:X:277:VAL:HG13	2.37	0.60
1:X:24:LYS:HG2	1:X:304:ILE:HG12	1.84	0.59
1:X:91:GLU:HG3	3:Y:509:HOH:O	2.01	0.59
1:X:273:HIS:CG	1:X:277:VAL:HG13	2.37	0.59
1:Z:24:LYS:NZ	1:Z:301:ASN:HD21	2.01	0.59
1:Y:178:ARG:HH11	1:Y:178:ARG:CB	2.16	0.59
1:Z:17:LEU:HD13	1:Z:159:GLU:HG3	1.85	0.59
1:Y:275:LEU:HD21	1:Y:295:VAL:HG13	1.85	0.58
1:Z:192:MET:HE1	1:Z:197:TYR:CD1	2.38	0.58
1:Y:254:ARG:HB2	1:Y:254:ARG:CZ	2.33	0.58
1:Y:171:MET:HE1	1:Y:188:PHE:CB	2.27	0.58
1:Z:192:MET:HE1	1:Z:197:TYR:HD1	1.68	0.58
1:X:202:THR:HG22	1:X:220:GLU:O	2.04	0.57
1:X:114:ARG:HG3	3:X:520:HOH:O	2.04	0.57
1:Y:64:ASN:HB3	1:Z:59:LEU:HD13	1.87	0.57
1:Y:112:PHE:N	1:Y:112:PHE:CD2	2.70	0.57
1:X:47:SER:HB2	1:X:110:ARG:HH12	1.70	0.57
1:Y:41:MET:HE3	1:Y:65:VAL:HG11	1.87	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:X:279:ARG:HB2	1:Z:85:MET:CE	2.35	0.56
1:Z:192:MET:CE	1:Z:197:TYR:HD1	2.18	0.56
1:Z:171:MET:HE1	1:Z:188:PHE:CB	2.34	0.56
1:X:12:ASP:OD2	1:X:14:LYS:HB3	2.05	0.56
1:X:41:MET:HE3	1:X:54:THR:HB	1.88	0.56
1:X:212:LYS:HE3	1:X:213:PHE:CZ	2.41	0.55
1:Y:254:ARG:HB2	1:Y:254:ARG:NH1	2.21	0.55
1:Z:93:LEU:CD1	1:Z:97:ILE:HD12	2.36	0.55
1:X:286:ASP:OD1	1:Z:81:ARG:NH2	2.36	0.55
1:Y:37:LYS:HG2	1:Y:314:LEU:CD2	2.37	0.55
1:X:93:LEU:CD1	1:X:97:ILE:HD12	2.37	0.54
1:X:85:MET:CE	1:Y:279:ARG:HB2	2.38	0.54
1:Y:203:HIS:HD2	1:Y:204:PRO:O	1.91	0.54
1:Z:8:GLN:H	1:Z:8:GLN:NE2	2.05	0.54
1:X:274:CYS:O	1:X:275:LEU:HB2	2.06	0.54
1:X:158:ILE:CD1	1:X:192:MET:HE2	2.38	0.54
1:X:284:THR:HG22	1:X:285:ASP:N	2.22	0.54
1:X:304:ILE:HD12	1:X:304:ILE:H	1.73	0.53
1:Z:47:SER:HB2	1:Z:110:ARG:HH12	1.72	0.53
1:X:122:TYR:OH	1:X:182:GLN:CG	2.56	0.53
1:Z:51:ARG:O	1:Z:55:GLN:HG3	2.07	0.53
1:X:275:LEU:CD1	1:X:295:VAL:CG2	2.85	0.53
1:Z:284:THR:HG22	1:Z:287:VAL:HG23	1.91	0.53
1:X:184:VAL:HB	1:X:185:PRO:HD3	1.89	0.53
1:Y:296:ILE:HB	1:Y:297:PRO:HD3	1.90	0.53
1:Z:48:LEU:N	2:Z:503:PO4:O1	2.40	0.52
1:Y:171:MET:CE	1:Y:188:PHE:HB3	2.33	0.52
1:Z:51:ARG:NH2	1:Z:69:ASP:OD2	2.40	0.52
1:Y:51:ARG:NH2	1:Y:69:ASP:OD2	2.42	0.52
1:X:261:ARG:NH2	3:X:589:HOH:O	2.42	0.52
1:Z:303:GLU:O	1:Z:307:THR:HG23	2.10	0.52
1:X:21:PHE:O	1:X:25:LYS:HD3	2.09	0.52
1:Z:19:GLU:OE2	1:Z:312:ARG:NE	2.39	0.52
1:X:153:ALA:O	1:X:157:THR:HG23	2.10	0.51
1:X:206:GLY:N	1:X:208:GLU:OE2	2.44	0.51
1:Z:125:VAL:HG23	1:Z:126:ILE:N	2.25	0.51
1:X:171:MET:CE	1:X:185:PRO:HA	2.40	0.51
1:Y:291:PRO:HG2	1:Y:292:GLN:NE2	2.26	0.51
1:X:153:ALA:O	1:X:157:THR:CG2	2.58	0.51
1:Y:171:MET:HE3	1:Y:188:PHE:CD2	2.45	0.51
1:Y:275:LEU:HD21	1:Y:295:VAL:HG11	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:Z:284:THR:CG2	1:Z:287:VAL:HG23	2.41	0.51
1:Y:56:LYS:NZ	1:Y:60:ASN:HD21	2.09	0.50
1:Y:212:LYS:HE3	1:Y:213:PHE:CZ	2.47	0.50
1:X:95:GLU:CG	3:X:505:HOH:O	2.57	0.50
1:X:275:LEU:HD13	1:X:295:VAL:CG2	2.42	0.50
1:Z:47:SER:CB	1:Z:110:ARG:HH12	2.25	0.50
1:Y:227:PHE:CD2	1:Y:262:GLN:HB3	2.47	0.50
1:Z:112:PHE:HE1	1:Z:114:ARG:HD3	1.77	0.50
1:Y:75:TRP:CZ2	1:Y:77:LEU:HD11	2.47	0.50
1:X:43:PHE:HZ	1:X:141:MET:HE1	1.76	0.49
1:X:203:HIS:CE1	1:X:208:GLU:HA	2.46	0.49
1:X:228:GLU:HA	1:X:265:VAL:HG13	1.94	0.49
1:Z:71:ASN:HB2	3:Z:562:HOH:O	2.11	0.49
1:Z:122:TYR:HH	1:Z:182:GLN:HG3	1.76	0.49
1:Y:49:ARG:NH2	1:Y:276:PRO:HB3	2.27	0.49
1:Y:72:GLN:HG3	1:Y:72:GLN:O	2.11	0.49
1:X:24:LYS:CG	1:X:304:ILE:HG12	2.42	0.49
1:X:228:GLU:HA	1:X:265:VAL:CG1	2.43	0.49
1:Z:182:GLN:HG2	3:Z:599:HOH:O	2.13	0.49
1:Y:51:ARG:HH22	1:Y:69:ASP:CG	2.16	0.49
1:Y:133:HIS:HE1	3:Y:518:HOH:O	1.96	0.48
1:X:290:SER:HB2	1:X:291:PRO:HD2	1.95	0.48
1:X:202:THR:CG2	1:X:220:GLU:O	2.61	0.48
1:Z:169:VAL:HG21	1:Z:192:MET:CE	2.43	0.48
1:Z:174:ALA:O	1:Z:237:ASN:HB2	2.13	0.48
1:Z:49:ARG:HG3	2:Z:503:PO4:O4	2.14	0.48
1:Z:171:MET:HE3	1:Z:188:PHE:CD2	2.48	0.48
1:Z:120:TYR:OH	1:Z:125:VAL:HG21	2.14	0.48
1:X:222:ASP:HB3	1:X:225:LYS:HB2	1.96	0.47
1:Z:78:GLU:HB3	1:Z:85:MET:HE2	1.96	0.47
1:X:125:VAL:O	1:X:129:GLN:HG3	2.14	0.47
1:Z:208:GLU:CD	1:Z:208:GLU:H	2.17	0.47
1:X:275:LEU:CD1	1:X:277:VAL:HG22	2.40	0.47
1:Y:99:VAL:HG11	1:Z:49:ARG:HH12	1.79	0.47
1:X:78:GLU:HG2	1:X:85:MET:CE	2.45	0.47
1:Y:176:HIS:CD2	1:Y:278:ARG:HD2	2.50	0.46
1:Z:112:PHE:CE1	1:Z:114:ARG:HD3	2.50	0.46
1:X:78:GLU:CG	1:X:85:MET:HE1	2.46	0.46
1:X:275:LEU:HD13	1:X:295:VAL:HG21	1.97	0.46
1:Y:93:LEU:HD12	1:Y:97:ILE:HG12	1.96	0.46
1:X:206:GLY:CA	1:X:208:GLU:OE2	2.63	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:X:163:LYS:HE3	1:X:270:TYR:OH	2.16	0.46
1:Y:49:ARG:NH1	2:Y:502:PO4:O1	2.49	0.46
1:Y:261:ARG:H	1:Y:261:ARG:NE	2.13	0.46
1:Z:19:GLU:OE2	1:Z:312:ARG:NH2	2.47	0.46
1:Z:51:ARG:HG2	1:Z:55:GLN:HE21	1.81	0.45
1:X:169:VAL:CG1	1:X:192:MET:HE3	2.28	0.45
1:X:52:LEU:HG	1:Z:103:TYR:CD1	2.52	0.45
1:Y:115:PHE:CZ	1:Y:181:PRO:HA	2.52	0.45
1:Y:178:ARG:HB2	1:Y:179:PRO:HD2	1.98	0.45
1:Z:57:ALA:CB	1:Z:307:THR:HG22	2.46	0.45
1:X:78:GLU:HB3	1:X:85:MET:HE1	1.98	0.45
1:X:99:VAL:O	1:X:102:CYS:HB2	2.17	0.45
1:X:141:MET:O	1:X:142:GLU:CB	2.64	0.45
1:X:176:HIS:HE1	1:X:178:ARG:HD3	1.82	0.45
1:Y:34:GLY:O	1:Y:37:LYS:HB2	2.17	0.45
1:X:212:LYS:HE3	1:X:213:PHE:CE1	2.52	0.45
1:Z:303:GLU:O	1:Z:307:THR:CG2	2.65	0.45
1:X:78:GLU:HA	1:X:89:LYS:HD3	1.99	0.45
1:X:202:THR:HA	1:X:220:GLU:O	2.17	0.45
1:Y:41:MET:HE3	1:Y:55:GLN:HG2	1.98	0.45
1:Z:284:THR:HG23	1:Z:287:VAL:H	1.82	0.45
1:Y:103:TYR:CD1	1:Z:52:LEU:HG	2.52	0.44
1:X:202:THR:HG23	1:X:226:ALA:HB2	1.99	0.44
1:X:202:THR:HB	1:X:256:TRP:HZ3	1.81	0.44
1:X:185:PRO:HG2	1:X:238:TRP:HB3	1.99	0.44
1:Y:262:GLN:O	1:Y:265:VAL:HG22	2.18	0.44
1:Z:7:VAL:O	1:Z:10:ILE:HG22	2.18	0.44
1:Y:120:TYR:CE1	1:Y:125:VAL:HG21	2.52	0.43
1:Z:8:GLN:NE2	3:Z:529:HOH:O	2.51	0.43
1:X:203:HIS:HE1	3:X:593:HOH:O	2.01	0.43
1:Z:141:MET:O	1:Z:142:GLU:CB	2.66	0.43
1:X:76:LYS:HB2	1:X:89:LYS:HA	2.00	0.43
1:Y:273:HIS:CG	1:Y:277:VAL:HG22	2.53	0.43
1:Z:47:SER:O	1:Z:48:LEU:HD23	2.19	0.43
1:Z:223:GLN:HB2	1:Z:256:TRP:CZ3	2.54	0.43
1:Z:47:SER:OG	1:Z:48:LEU:N	2.49	0.43
1:Z:162:LYS:HD2	1:Z:164:THR:O	2.18	0.43
1:Z:206:GLY:CA	1:Z:208:GLU:OE2	2.66	0.43
1:X:279:ARG:HD2	1:Z:85:MET:HE1	2.01	0.42
1:Z:57:ALA:O	1:Z:60:ASN:HB2	2.19	0.42
1:X:305:SER:O	1:X:309:VAL:HG23	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:Z:284:THR:HG22	1:Z:287:VAL:CG2	2.48	0.42
1:Y:37:LYS:HG2	1:Y:314:LEU:HD22	2.00	0.42
1:Y:245:ASN:HA	1:Y:248:GLN:OE1	2.20	0.42
1:Z:51:ARG:HH22	1:Z:69:ASP:CG	2.23	0.42
1:X:24:LYS:HZ2	1:X:301:ASN:HD21	1.66	0.42
1:Y:97:ILE:HB	1:Y:98:PRO:HD3	2.02	0.42
1:X:279:ARG:HB2	1:Z:85:MET:HE1	2.01	0.42
1:Y:112:PHE:N	1:Y:112:PHE:HD2	2.17	0.42
1:Y:254:ARG:HG3	1:Y:257:THR:OG1	2.19	0.42
1:Z:50:THR:HG22	1:Z:141:MET:CE	2.49	0.42
1:X:284:THR:CG2	1:X:285:ASP:N	2.82	0.41
1:Y:301:ASN:HD22	1:Y:301:ASN:HA	1.74	0.41
1:Z:41:MET:CE	1:Z:65:VAL:HG13	2.51	0.41
1:Y:7:VAL:O	1:Y:10:ILE:HG22	2.20	0.41
1:Y:141:MET:O	1:Y:142:GLU:CB	2.67	0.41
1:X:24:LYS:HZ3	1:X:301:ASN:HD21	1.67	0.41
1:X:61:LEU:CD1	1:X:310:LEU:HB3	2.51	0.41
1:X:122:TYR:HH	1:X:182:GLN:HG3	1.85	0.41
1:Y:273:HIS:CD2	1:Y:282:ILE:HG21	2.55	0.41
1:Z:186:ASN:HB3	1:Z:213:PHE:CG	2.56	0.41
1:X:4:PHE:CE2	1:X:148:PRO:HB2	2.56	0.41
1:Y:261:ARG:H	1:Y:261:ARG:HE	1.69	0.40
1:Y:158:ILE:O	1:Y:162:LYS:HB3	2.22	0.40
1:Y:273:HIS:CE1	1:Y:277:VAL:HG22	2.53	0.40
1:Z:1:MET:CE	1:Z:313:LEU:HG	2.51	0.40
1:Z:72:GLN:HG2	1:Z:114:ARG:HH12	1.86	0.40
1:Y:7:VAL:HG12	3:Y:505:HOH:O	2.21	0.40
1:Y:30:TYR:O	1:Y:33:LEU:HB2	2.22	0.40
1:Z:95:GLU:O	1:Z:99:VAL:HG23	2.21	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	X	322/324 (99%)	309 (96%)	12 (4%)	1 (0%)	41	37
1	Y	316/324 (98%)	307 (97%)	8 (2%)	1 (0%)	41	37
1	Z	316/324 (98%)	304 (96%)	11 (4%)	1 (0%)	41	37
All	All	954/972 (98%)	920 (96%)	31 (3%)	3 (0%)	41	37

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	X	142	GLU
1	Y	142	GLU
1	Z	142	GLU

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	X	283/283 (100%)	267 (94%)	16 (6%)	20	16
1	Y	277/283 (98%)	262 (95%)	15 (5%)	22	18
1	Z	277/283 (98%)	268 (97%)	9 (3%)	39	38
All	All	837/849 (99%)	797 (95%)	40 (5%)	25	22

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

Mol	Chain	Res	Type
1	X	35	ARG
1	X	47	SER
1	X	95	GLU
1	X	110	ARG
1	X	119	GLU
1	X	147	HIS
1	X	157	THR
1	X	163	LYS
1	X	182	GLN
1	X	202	THR

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Mol	Chain	Res	Type
1	X	228	GLU
1	X	248	GLN
1	X	265	VAL
1	X	275	LEU
1	X	277	VAL
1	X	310	LEU
1	Y	17	LEU
1	Y	33	LEU
1	Y	47	SER
1	Y	51	ARG
1	Y	72	GLN
1	Y	88	ASP
1	Y	110	ARG
1	Y	112	PHE
1	Y	115	PHE
1	Y	147	HIS
1	Y	178	ARG
1	Y	208	GLU
1	Y	261	ARG
1	Y	268	ASN
1	Y	310	LEU
1	Z	8	GLN
1	Z	47	SER
1	Z	49	ARG
1	Z	110	ARG
1	Z	147	HIS
1	Z	182	GLN
1	Z	216	ASN
1	Z	268	ASN
1	Z	307	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (29) such sidechains are listed below:

Mol	Chain	Res	Type
1	X	55	GLN
1	X	64	ASN
1	X	71	ASN
1	X	182	GLN
1	X	203	HIS
1	X	248	GLN
1	X	267	ASN
1	X	268	ASN

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Mol	Chain	Res	Type
1	X	301	ASN
1	X	320	HIS
1	Y	8	GLN
1	Y	55	GLN
1	Y	60	ASN
1	Y	64	ASN
1	Y	72	GLN
1	Y	203	HIS
1	Y	268	ASN
1	Y	301	ASN
1	Z	8	GLN
1	Z	55	GLN
1	Z	60	ASN
1	Z	203	HIS
1	Z	216	ASN
1	Z	245	ASN
1	Z	248	GLN
1	Z	267	ASN
1	Z	268	ASN
1	Z	292	GLN
1	Z	301	ASN

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 ⓘ

3 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The

Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z| > 2$	Counts	RMSZ	#$|Z| > 2$
2	PO4	Z	503	-	4,4,4	1.26	0	6,6,6	0.53	0
2	PO4	X	501	-	4,4,4	1.59	1 (25%)	6,6,6	0.43	0
2	PO4	Y	502	-	4,4,4	1.50	0	6,6,6	0.46	0

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	X	501	PO4	P-O4	-2.02	1.48	1.54

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	Z	503	PO4	3	0
2	Y	502	PO4	1	0

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(Å^2)	Q<0.9
1	X	324/324 (100%)	0.06	14 (4%)	35	34	20, 31, 53, 73	0
1	Y	318/324 (98%)	0.10	8 (2%)	57	56	20, 31, 49, 72	0
1	Z	318/324 (98%)	-0.03	9 (2%)	53	51	18, 28, 45, 67	0
All	All	960/972 (98%)	0.04	31 (3%)	47	46	18, 30, 50, 73	0

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	X	73	GLY	4.9
1	Y	72	GLN	4.3
1	Z	73	GLY	3.9
1	X	74	ALA	3.8
1	X	71	ASN	3.3
1	Z	72	GLN	3.2
1	Z	74	ALA	3.2
1	Y	318	PRO	3.0
1	Y	184	VAL	2.8
1	Y	71	ASN	2.8
1	Y	114	ARG	2.7
1	X	72	GLN	2.6
1	Y	244	ASP	2.6
1	Z	244	ASP	2.5
1	X	321	HIS	2.5
1	X	114	ARG	2.5
1	X	116	GLU	2.5
1	X	225	LYS	2.4
1	Y	73	GLY	2.4
1	X	80	GLU	2.3
1	Z	47	SER	2.3
1	Y	74	ALA	2.2
1	X	212	LYS	2.2

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Mol	Chain	Res	Type	RSRZ
1	X	184	VAL	2.2
1	Z	46	SER	2.2
1	Z	243	GLY	2.1
1	Z	235	ALA	2.1
1	X	120	TYR	2.1
1	Z	71	ASN	2.0
1	X	76	LYS	2.0
1	X	117	ASN	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 ⓘ

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, 95th 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^2)	Q<0.9
2	PO4	Z	503	5/5	0.71	0.24	64,64,66,67	0
2	PO4	Y	502	5/5	0.88	0.15	69,70,70,71	0
2	PO4	X	501	5/5	0.88	0.17	59,59,60,60	0

6.5 Other polymers ⓘ

There are no such residues in this entry.