



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 09:16 PM UTC

PDB ID : 1RA6 / pdb_00001ra6
Title : Poliovirus Polymerase Full Length Apo Structure
Authors : Thompson, A.A.; Peersen, O.B.
Deposited on : 2003-10-31
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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
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

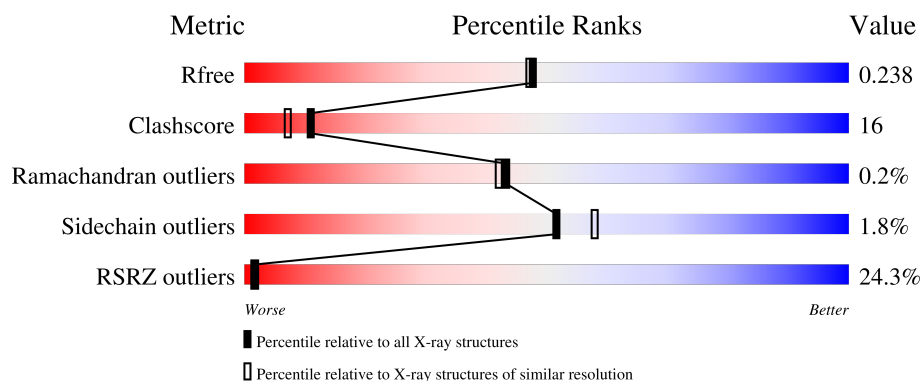
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (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 $\leq 5\%$. 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	461	24% 74% 22% .

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
1	CAS	A	212	-	-	X	-

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
1	CAS	A	290	-	-	X	-

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 4036 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.

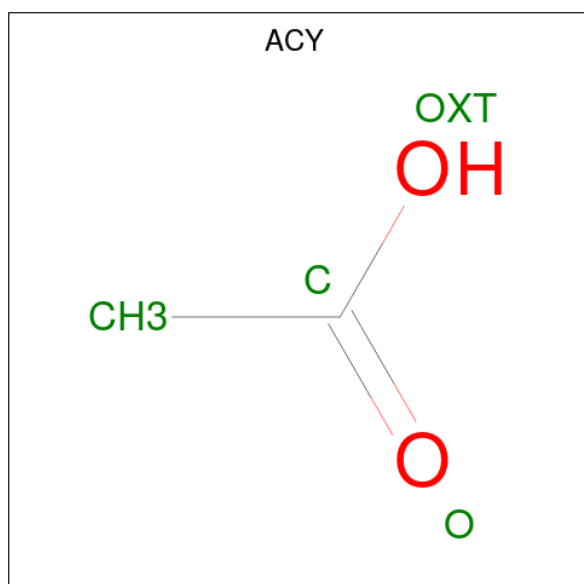
- Molecule 1 is a protein called Genome polyprotein.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	As	C	N	O	S			
1	A	461	3707	4	2376	607	698	22	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	96	CAS	CYS	modified residue	UNP P03300
A	212	CAS	CYS	modified residue	UNP P03300
A	281	CAS	CYS	modified residue	UNP P03300
A	290	CAS	CYS	modified residue	UNP P03300
A	446	ASP	LEU	engineered mutation	UNP P03300
A	455	ASP	ARG	engineered mutation	UNP P03300

- Molecule 2 is ACETIC ACID (CCD ID: ACY) (formula: C₂H₄O₂).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0

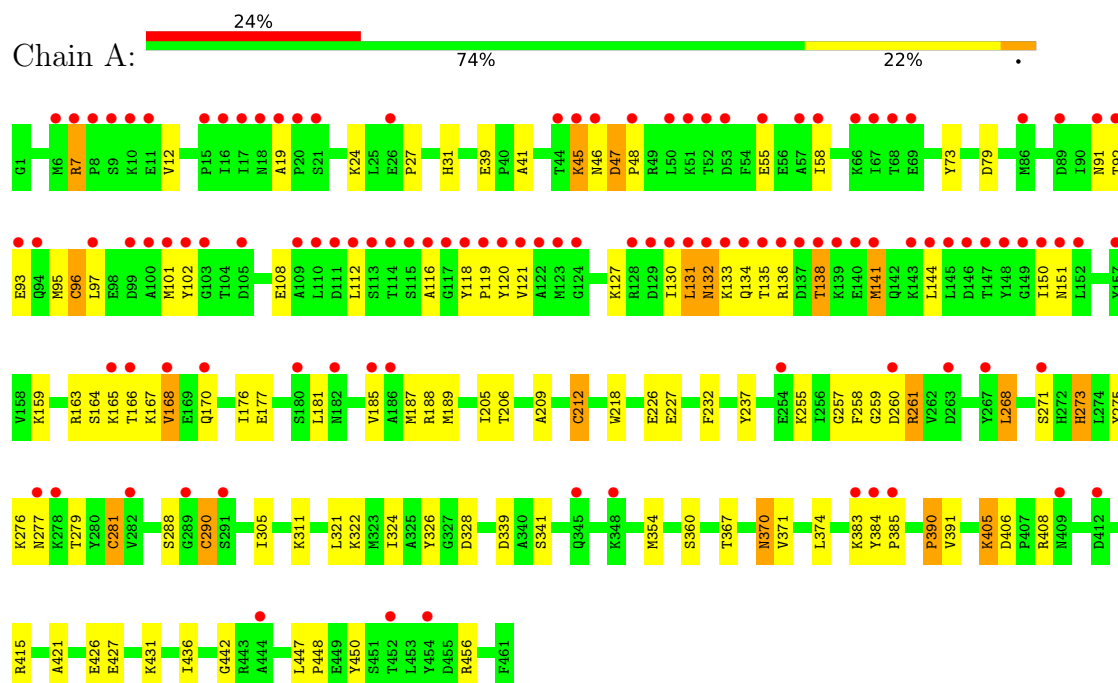
- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	297	Total O 297 297	0	0

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 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: Genome polypeptide



4 Data and refinement statistics

Property	Value	Source
Space group	P 65	Depositor
Cell constants a, b, c, α , β , γ	127.59Å 127.59Å 112.97Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	30.00 – 2.00 30.00 – 2.01	Depositor EDS
% Data completeness (in resolution range)	96.1 (30.00-2.00) 96.2 (30.00-2.01)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.21 (at 2.01Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.231 , 0.247 0.234 , 0.238	Depositor DCC
R_{free} test set	6807 reflections (10.14%)	wwPDB-VP
Wilson B-factor (Å ²)	39.1	Xtriage
Anisotropy	0.314	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 48.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.35$	Xtriage
Estimated twinning fraction	0.029 for h,-h-k,-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	4036	wwPDB-VP
Average B, all atoms (Å ²)	51.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.92% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: CAS, ACY

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	0.44	0/3757	0.95	24/5075 (0.5%)

There are no bond length outliers.

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	421	ALA	N-CA-C	7.92	119.91	111.28
1	A	136	ARG	N-CA-C	-7.76	100.81	111.28
1	A	391	VAL	N-CA-C	6.78	116.47	106.85
1	A	259	GLY	N-CA-C	-6.38	105.83	113.99
1	A	390	PRO	N-CA-C	-6.34	99.42	112.47
1	A	271	SER	N-CA-C	6.00	119.32	109.72
1	A	130	ILE	N-CA-C	5.89	116.53	110.82
1	A	7	ARG	N-CA-C	5.88	113.31	108.07
1	A	206	THR	N-CA-C	-5.85	105.64	112.89
1	A	47	ASP	CA-C-N	5.64	126.89	119.84
1	A	47	ASP	C-N-CA	5.64	126.89	119.84
1	A	268	LEU	N-CA-C	-5.50	105.19	111.07
1	A	116	ALA	N-CA-C	-5.41	106.35	113.17
1	A	384	TYR	CA-C-N	5.31	126.47	119.84
1	A	384	TYR	C-N-CA	5.31	126.47	119.84
1	A	227	GLU	N-CA-C	5.22	116.97	111.28
1	A	321	LEU	N-CA-C	-5.18	100.72	108.96
1	A	205	ILE	N-CA-C	-5.15	106.66	111.45
1	A	447	LEU	CA-C-N	5.13	124.89	119.76
1	A	447	LEU	C-N-CA	5.13	124.89	119.76
1	A	288	SER	N-CA-C	5.11	116.85	111.28
1	A	273	HIS	N-CA-C	5.05	117.80	109.72
1	A	405	LYS	N-CA-C	-5.01	107.82	114.04
1	A	168	VAL	N-CA-C	-5.00	105.97	110.82

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.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3707	0	3644	122	0
2	A	32	0	24	1	0
3	A	297	0	0	4	0
All	All	4036	0	3668	122	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 16.

All (122) 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:290:CAS:AS	1:A:290:CAS:CE2	2.21	1.49
1:A:281:CAS:AS	1:A:281:CAS:CE2	2.22	1.47
1:A:96:CAS:AS	1:A:96:CAS:CE2	2.22	1.46
1:A:212:CAS:AS	1:A:212:CAS:CE2	2.21	1.46
1:A:281:CAS:AS	1:A:281:CAS:CE1	2.24	1.46
1:A:212:CAS:AS	1:A:212:CAS:CE1	2.22	1.46
1:A:290:CAS:AS	1:A:290:CAS:CE1	2.24	1.46
1:A:96:CAS:AS	1:A:96:CAS:CE1	2.25	1.43
1:A:260:ASP:HB3	1:A:261:ARG:HH11	1.20	1.04
1:A:45:LYS:H	1:A:45:LYS:HD2	1.17	1.02
1:A:260:ASP:HB3	1:A:261:ARG:NH1	1.82	0.94
1:A:367:THR:H	1:A:370:ASN:HD21	1.17	0.93
1:A:7:ARG:HH21	1:A:12:VAL:HG12	1.34	0.92
1:A:45:LYS:H	1:A:45:LYS:CD	1.88	0.83
1:A:101:MET:CE	1:A:141:MET:HG3	2.10	0.82
1:A:132:ASN:HB3	1:A:134:GLN:HE22	1.43	0.81
1:A:97:LEU:O	1:A:101:MET:HG3	1.79	0.81
1:A:132:ASN:CB	1:A:134:GLN:HE22	1.94	0.80
1:A:367:THR:H	1:A:370:ASN:ND2	1.79	0.80
1:A:45:LYS:HD2	1:A:45:LYS:N	1.96	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:132:ASN:HB3	1:A:134:GLN:NE2	1.99	0.77
1:A:101:MET:HE1	1:A:141:MET:HB2	1.70	0.74
1:A:360:SER:OG	2:A:908:ACY:H2	1.89	0.73
1:A:134:GLN:HG2	1:A:135:THR:N	2.03	0.72
1:A:311:LYS:HE2	3:A:765:HOH:O	1.90	0.71
1:A:164:SER:O	1:A:168:VAL:HG23	1.96	0.66
1:A:209:ALA:O	1:A:212:CAS:HB2	1.95	0.66
1:A:7:ARG:NH2	1:A:12:VAL:HG12	2.08	0.64
1:A:141:MET:HE3	1:A:181:LEU:HD23	1.79	0.64
1:A:212:CAS:CE1	1:A:326:TYR:CD2	2.80	0.64
1:A:41:ALA:HB2	1:A:163:ARG:HG3	1.80	0.64
1:A:181:LEU:O	1:A:185:VAL:HG23	1.98	0.64
1:A:101:MET:HE1	1:A:141:MET:CB	2.28	0.64
1:A:7:ARG:HE	1:A:12:VAL:CG1	2.10	0.63
1:A:132:ASN:HB3	1:A:134:GLN:CD	2.24	0.63
1:A:370:ASN:HD22	1:A:371:VAL:N	1.96	0.63
1:A:370:ASN:HD22	1:A:370:ASN:C	2.05	0.62
1:A:112:LEU:HD21	1:A:131:LEU:HD12	1.82	0.62
1:A:132:ASN:HB3	1:A:134:GLN:OE1	1.98	0.61
1:A:212:CAS:CE1	1:A:326:TYR:HD2	2.13	0.61
1:A:112:LEU:HD21	1:A:131:LEU:CD1	2.32	0.59
1:A:187:MET:SD	1:A:290:CAS:CE1	2.91	0.58
1:A:141:MET:HE3	1:A:181:LEU:CD2	2.33	0.58
1:A:134:GLN:HG2	1:A:135:THR:H	1.70	0.57
1:A:92:THR:O	1:A:261:ARG:NH2	2.38	0.57
1:A:97:LEU:HD23	1:A:138:THR:HB	1.87	0.56
1:A:163:ARG:NH2	1:A:167:LYS:HD3	2.20	0.56
1:A:134:GLN:CG	1:A:135:THR:N	2.69	0.56
1:A:166:THR:O	1:A:170:GLN:HG3	2.06	0.56
1:A:41:ALA:HB2	1:A:163:ARG:CG	2.35	0.55
1:A:79:ASP:OD1	1:A:255:LYS:HE3	2.05	0.55
1:A:212:CAS:CE1	1:A:374:LEU:HD11	2.36	0.55
1:A:232:PHE:CE1	1:A:354:MET:HE3	2.42	0.55
1:A:275:TYR:O	1:A:276:LYS:HB2	2.07	0.55
1:A:177:GLU:HG2	1:A:273:HIS:CE1	2.42	0.55
1:A:367:THR:N	1:A:370:ASN:HD21	1.97	0.54
1:A:97:LEU:HD11	1:A:185:VAL:HG11	1.89	0.54
1:A:131:LEU:O	1:A:132:ASN:CG	2.51	0.53
1:A:268:LEU:CD2	1:A:290:CAS:AS	3.17	0.53
1:A:268:LEU:HD23	1:A:290:CAS:AS	2.68	0.53
1:A:260:ASP:CB	1:A:261:ARG:NH1	2.66	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:232:PHE:HZ	1:A:305:ILE:CD1	2.23	0.52
1:A:112:LEU:CD2	1:A:131:LEU:HD12	2.39	0.52
1:A:120:TYR:OH	1:A:144:LEU:HB3	2.09	0.51
1:A:132:ASN:HB2	1:A:134:GLN:HE22	1.72	0.51
1:A:19:ALA:HB3	1:A:276:LYS:NZ	2.25	0.51
1:A:226:GLU:HG2	1:A:322:LYS:HG2	1.91	0.51
1:A:456:ARG:NH1	3:A:797:HOH:O	2.43	0.51
1:A:232:PHE:CZ	1:A:354:MET:HE3	2.46	0.51
1:A:92:THR:HG21	1:A:257:GLY:HA3	1.92	0.51
1:A:91:ASN:OD1	1:A:93:GLU:HB2	2.11	0.50
1:A:118:TYR:CG	1:A:119:PRO:HA	2.47	0.50
1:A:101:MET:CE	1:A:141:MET:CG	2.87	0.50
1:A:258:PHE:C	1:A:260:ASP:N	2.68	0.50
1:A:133:LYS:HG3	1:A:134:GLN:N	2.27	0.49
1:A:120:TYR:CD2	1:A:120:TYR:N	2.78	0.49
1:A:121:VAL:CG2	3:A:790:HOH:O	2.61	0.49
1:A:101:MET:HE3	1:A:141:MET:HG3	1.91	0.49
1:A:218:TRP:CD1	1:A:390:PRO:HA	2.48	0.49
1:A:39:GLU:OE2	1:A:165:LYS:HD3	2.13	0.48
1:A:415:ARG:NH1	1:A:448:PRO:HD3	2.28	0.48
1:A:436:ILE:O	1:A:442:GLY:HA3	2.12	0.48
1:A:134:GLN:CG	1:A:135:THR:H	2.26	0.48
1:A:121:VAL:HG21	3:A:790:HOH:O	2.13	0.47
1:A:7:ARG:HH21	1:A:12:VAL:CG1	2.16	0.47
1:A:7:ARG:HE	1:A:12:VAL:HG13	1.78	0.47
1:A:131:LEU:O	1:A:132:ASN:ND2	2.48	0.47
1:A:406:ASP:OD1	1:A:408:ARG:HB2	2.15	0.46
1:A:19:ALA:CB	1:A:276:LYS:HZ2	2.29	0.46
1:A:73:TYR:CE1	1:A:311:LYS:HD2	2.51	0.46
1:A:159:LYS:HG3	1:A:176:ILE:HD11	1.98	0.45
1:A:209:ALA:HB1	1:A:212:CAS:CE1	2.47	0.45
1:A:102:TYR:OH	1:A:131:LEU:HB3	2.17	0.45
1:A:134:GLN:HG2	1:A:135:THR:OG1	2.16	0.45
1:A:212:CAS:CE2	1:A:212:CAS:N	2.80	0.45
1:A:268:LEU:HD21	1:A:290:CAS:AS	2.77	0.45
1:A:108:GLU:O	1:A:188:ARG:NH2	2.47	0.45
1:A:12:VAL:HG21	1:A:279:THR:HG21	1.98	0.44
1:A:95:MET:HB3	1:A:189:MET:HA	1.99	0.44
1:A:7:ARG:O	1:A:279:THR:HG22	2.18	0.44
1:A:237:TYR:CG	1:A:328:ASP:HB3	2.53	0.43
1:A:112:LEU:CD2	1:A:131:LEU:CD1	2.96	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:370:ASN:ND2	1:A:370:ASN:C	2.74	0.43
1:A:19:ALA:CB	1:A:276:LYS:NZ	2.82	0.42
1:A:46:ASN:O	1:A:47:ASP:C	2.61	0.42
1:A:209:ALA:HB2	1:A:324:ILE:HG22	2.00	0.42
1:A:426:GLU:HB2	1:A:450:TYR:CE2	2.55	0.42
1:A:427:GLU:HG2	1:A:431:LYS:HE3	2.01	0.42
1:A:276:LYS:HB3	1:A:277:ASN:H	1.45	0.42
1:A:55:GLU:OE1	1:A:58:ILE:HD11	2.19	0.42
1:A:101:MET:CE	1:A:141:MET:CB	2.96	0.41
1:A:101:MET:HE1	1:A:141:MET:HG3	1.97	0.41
1:A:258:PHE:C	1:A:260:ASP:H	2.28	0.41
1:A:339:ASP:OD1	1:A:341:SER:HB3	2.21	0.41
1:A:47:ASP:HA	1:A:48:PRO:HD3	1.84	0.41
1:A:24:LYS:O	1:A:405:LYS:HA	2.21	0.41
1:A:383:LYS:C	1:A:385:PRO:HD3	2.46	0.41
1:A:27:PRO:HB3	1:A:31:HIS:CG	2.57	0.40
1:A:121:VAL:HG22	1:A:121:VAL:O	2.21	0.40
1:A:101:MET:HE1	1:A:141:MET:CG	2.51	0.40
1:A:150:ILE:O	1:A:151:ASN:HB2	2.22	0.40
1:A:55:GLU:OE1	1:A:55:GLU:HA	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	A	455/461 (99%)	434 (95%)	20 (4%)	1 (0%)	43 42

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	132	ASN

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	399/399 (100%)	392 (98%)	7 (2%)	51 58

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	45	LYS
1	A	127	LYS
1	A	131	LEU
1	A	138	THR
1	A	141	MET
1	A	261	ARG
1	A	370	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	132	ASN
1	A	320	HIS
1	A	370	ASN
1	A	409	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

4 non-standard protein/DNA/RNA residues 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	$\# Z > 2$
1	CAS	A	281	1	5,8,9	6.60	2 (40%)	1,9,11	0.02	0
1	CAS	A	290	1	5,8,9	6.48	2 (40%)	1,9,11	0.89	0
1	CAS	A	96	1	5,8,9	6.71	2 (40%)	1,9,11	0.18	0
1	CAS	A	212	1	5,8,9	6.33	2 (40%)	1,9,11	0.49	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	CAS	A	281	1	-	0/0/7/9	-
1	CAS	A	290	1	-	0/0/7/9	-
1	CAS	A	96	1	-	0/0/7/9	-
1	CAS	A	212	1	-	0/0/7/9	-

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	96	CAS	AS-CE1	11.04	2.25	1.96
1	A	290	CAS	AS-CE1	10.78	2.24	1.96
1	A	281	CAS	AS-CE1	10.62	2.24	1.96
1	A	281	CAS	AS-CE2	10.16	2.22	1.96
1	A	96	CAS	AS-CE2	10.10	2.22	1.96
1	A	212	CAS	AS-CE1	10.10	2.22	1.96
1	A	212	CAS	AS-CE2	9.84	2.21	1.96
1	A	290	CAS	AS-CE2	9.63	2.21	1.96

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 18 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	281	CAS	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	290	CAS	6	0
1	A	96	CAS	2	0
1	A	212	CAS	8	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

8 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	ACY	A	908	-	3,3,3	1.25	0	3,3,3	1.57	1 (33%)
2	ACY	A	905	-	3,3,3	1.28	0	3,3,3	1.62	1 (33%)
2	ACY	A	903	-	3,3,3	1.27	0	3,3,3	1.66	1 (33%)
2	ACY	A	901	-	3,3,3	1.22	0	3,3,3	1.57	1 (33%)
2	ACY	A	904	-	3,3,3	1.22	0	3,3,3	1.60	1 (33%)
2	ACY	A	907	-	3,3,3	1.30	1 (33%)	3,3,3	1.64	1 (33%)
2	ACY	A	906	-	3,3,3	1.24	0	3,3,3	1.67	1 (33%)
2	ACY	A	902	-	3,3,3	1.21	0	3,3,3	1.65	1 (33%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	907	ACY	O-C	2.03	1.31	1.22

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	906	ACY	O-C-CH3	-2.27	113.21	122.53
2	A	903	ACY	O-C-CH3	-2.26	113.28	122.53
2	A	902	ACY	O-C-CH3	-2.25	113.30	122.53
2	A	907	ACY	O-C-CH3	-2.23	113.37	122.53
2	A	905	ACY	O-C-CH3	-2.21	113.49	122.53
2	A	904	ACY	O-C-CH3	-2.19	113.56	122.53
2	A	908	ACY	O-C-CH3	-2.14	113.76	122.53
2	A	901	ACY	O-C-CH3	-2.14	113.76	122.53

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	908	ACY	1	0

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 ⓘ

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	A	457/461 (99%)	1.21	111 (24%) 2 1	28, 47, 80, 93	0

All (111) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	267	TYR	7.7
1	A	68	THR	5.8
1	A	135	THR	5.7
1	A	132	ASN	5.4
1	A	55	GLU	5.1
1	A	121	VAL	5.0
1	A	138	THR	4.8
1	A	123	MET	4.5
1	A	145	LEU	4.5
1	A	131	LEU	4.3
1	A	151	ASN	4.3
1	A	144	LEU	4.2
1	A	53	ASP	4.2
1	A	140	GLU	4.1
1	A	149	GLY	4.1
1	A	20	PRO	4.1
1	A	130	ILE	4.0
1	A	147	THR	4.0
1	A	150	ILE	3.9
1	A	124	GLY	3.8
1	A	122	ALA	3.7
1	A	69	GLU	3.7
1	A	141	MET	3.7
1	A	112	LEU	3.7
1	A	260	ASP	3.6
1	A	139	LYS	3.5
1	A	67	ILE	3.5

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Mol	Chain	Res	Type	RSRZ
1	A	99	ASP	3.5
1	A	45	LYS	3.5
1	A	134	GLN	3.4
1	A	102	TYR	3.3
1	A	143	LYS	3.2
1	A	86	MET	3.2
1	A	89	ASP	3.2
1	A	170	GLN	3.2
1	A	97	LEU	3.2
1	A	146	ASP	3.2
1	A	101	MET	3.1
1	A	409	ASN	3.1
1	A	136	ARG	3.1
1	A	21	SER	3.1
1	A	7	ARG	3.1
1	A	113	SER	3.1
1	A	278	LYS	3.0
1	A	94	GLN	3.0
1	A	17	ILE	3.0
1	A	8	PRO	3.0
1	A	383	LYS	3.0
1	A	152	LEU	2.9
1	A	185	VAL	2.9
1	A	48	PRO	2.8
1	A	133	LYS	2.8
1	A	9	SER	2.8
1	A	118	TYR	2.8
1	A	11	GLU	2.8
1	A	114	THR	2.8
1	A	115	SER	2.8
1	A	271	SER	2.8
1	A	119	PRO	2.8
1	A	137	ASP	2.7
1	A	16	ILE	2.7
1	A	129	ASP	2.7
1	A	452	THR	2.7
1	A	157	TYR	2.7
1	A	180	SER	2.7
1	A	100	ALA	2.6
1	A	50	LEU	2.6
1	A	10	LYS	2.6
1	A	44	THR	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	66	LYS	2.6
1	A	19	ALA	2.5
1	A	116	ALA	2.5
1	A	91	ASN	2.5
1	A	57	ALA	2.5
1	A	51	LYS	2.5
1	A	148	TYR	2.4
1	A	18	ASN	2.4
1	A	412	ASP	2.4
1	A	120	TYR	2.4
1	A	384	TYR	2.4
1	A	26	GLU	2.4
1	A	186	ALA	2.3
1	A	165	LYS	2.3
1	A	348	LYS	2.3
1	A	93	GLU	2.3
1	A	254	GLU	2.3
1	A	46	ASN	2.3
1	A	105	ASP	2.3
1	A	109	ALA	2.3
1	A	117	GLY	2.3
1	A	52	THR	2.2
1	A	277	ASN	2.2
1	A	289	GLY	2.2
1	A	92	THR	2.2
1	A	166	THR	2.2
1	A	263	ASP	2.2
1	A	454	TYR	2.2
1	A	182	ASN	2.2
1	A	15	PRO	2.2
1	A	58	ILE	2.2
1	A	444	ALA	2.2
1	A	111	ASP	2.1
1	A	282	VAL	2.1
1	A	128	ARG	2.1
1	A	291	SER	2.1
1	A	345	GLN	2.1
1	A	385	PRO	2.1
1	A	103	GLY	2.1
1	A	168	VAL	2.1
1	A	6	MET	2.0
1	A	110	LEU	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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, 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
1	CAS	A	96	9/10	0.84	0.25	81,84,97,99	0
1	CAS	A	212	9/10	0.89	0.18	36,37,67,75	0
1	CAS	A	290	9/10	0.90	0.17	50,53,70,72	0
1	CAS	A	281	9/10	0.93	0.15	44,50,57,60	0

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, 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	ACY	A	902	4/4	0.57	0.32	69,70,71,71	0
2	ACY	A	907	4/4	0.76	0.18	72,72,72,73	0
2	ACY	A	905	4/4	0.77	0.21	72,72,73,73	0
2	ACY	A	901	4/4	0.83	0.23	48,50,50,52	0
2	ACY	A	906	4/4	0.84	0.15	72,73,73,74	0
2	ACY	A	903	4/4	0.86	0.21	71,72,72,73	0
2	ACY	A	908	4/4	0.87	0.17	82,82,82,83	0
2	ACY	A	904	4/4	0.88	0.14	38,40,42,43	0

6.5 Other polymers [i](#)

There are no such residues in this entry.