



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 12:42 PM UTC

PDB ID : 1N25 / pdb_00001n25
Title : Crystal structure of the SV40 Large T antigen helicase domain
Authors : Li, D.; Zhao, R.; Lilyestrom, W.; Gai, D.; Zhang, R.; DeCaprio, J.A.; Fanning, E.; Jochimiak, A.; Szakonyi, G.; Chen, X.S.
Deposited on : 2002-10-21
Resolution : 2.80 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
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

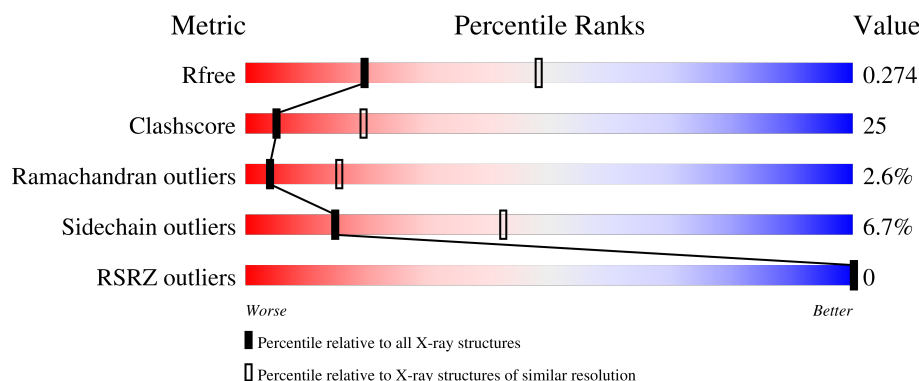
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	3866 (2.80-2.80)
Clashscore	190562	4276 (2.80-2.80)
Ramachandran outliers	187476	4196 (2.80-2.80)
Sidechain outliers	187428	4198 (2.80-2.80)
RSRZ outliers	180081	3869 (2.80-2.80)

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 ≥ 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	368	
1	B	368	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 5868 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 Large T Antigen.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	362	Total	C	N	O	S	0	0	0
			2933	1888	493	531	21			
1	B	362	Total	C	N	O	S	0	0	0
			2933	1888	493	531	21			

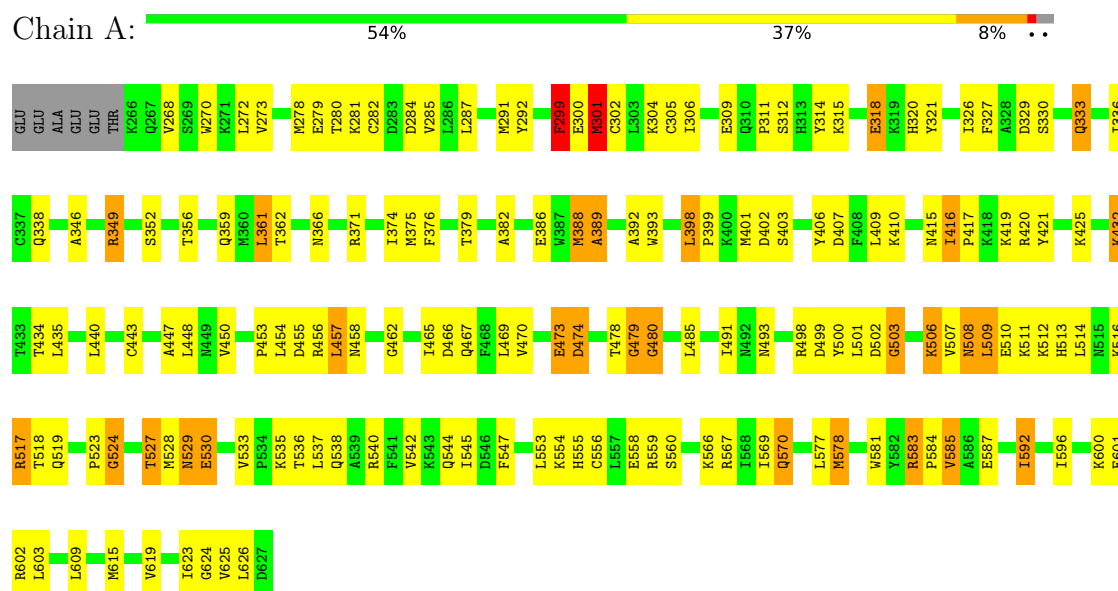
- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Zn	0	0
			1	1		
2	B	1	Total	Zn	0	0
			1	1		

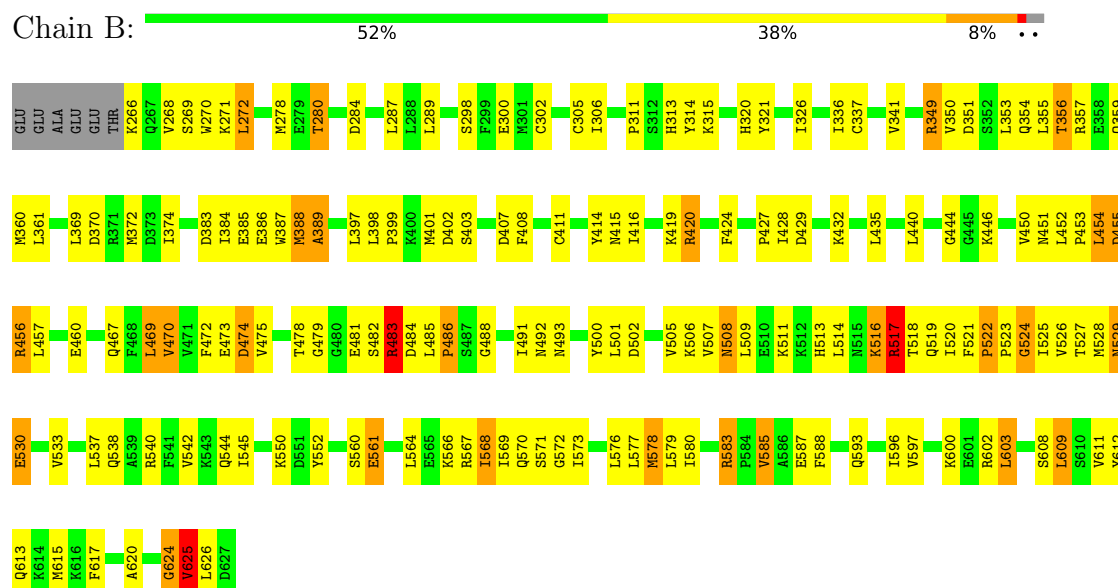
3 Residue-property plots

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: Large T Antigen



• Molecule 1: Large T Antigen



4 Data and refinement statistics

Property	Value	Source
Space group	P 3 2 1	Depositor
Cell constants a, b, c, α , β , γ	120.32Å 120.32Å 132.20Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	30.00 – 2.80 30.00 – 2.80	Depositor EDS
% Data completeness (in resolution range)	96.3 (30.00-2.80) 96.3 (30.00-2.80)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.79 (at 2.51Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.243 , 0.276 0.239 , 0.274	Depositor DCC
R_{free} test set	1848 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å ²)	31.4	Xtriage
Anisotropy	0.953	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 16.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.26$	Xtriage
Estimated twinning fraction	0.329 for -h,-k,l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	5868	wwPDB-VP
Average B, all atoms (Å ²)	43.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.60% 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: ZN

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	0.52	1/2992 (0.0%)	1.01	18/4030 (0.4%)
1	B	0.52	2/2992 (0.1%)	1.04	21/4030 (0.5%)
All	All	0.52	3/5984 (0.1%)	1.02	39/8060 (0.5%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	578	MET	SD-CE	-7.80	1.60	1.79
1	B	578	MET	SD-CE	-7.60	1.60	1.79
1	B	388	MET	SD-CE	-6.79	1.62	1.79

All (39) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	625	VAL	N-CA-C	8.64	120.47	110.62
1	B	389	ALA	N-CA-C	-8.03	102.12	112.23
1	B	444	GLY	N-CA-C	-8.01	102.63	112.33
1	B	572	GLY	N-CA-C	-7.36	105.25	114.16
1	A	623	ILE	N-CA-C	7.25	120.60	113.71
1	B	517	ARG	N-CA-C	7.21	120.44	110.35
1	A	517	ARG	N-CA-C	6.74	119.01	110.24
1	A	480	GLY	N-CA-C	6.64	128.92	113.18
1	B	583	ARG	N-CA-C	6.57	119.36	110.29
1	A	583	ARG	N-CA-C	6.54	119.11	110.08
1	B	522	PRO	CA-C-N	6.54	126.99	120.52
1	B	522	PRO	C-N-CA	6.54	126.99	120.52
1	A	585	VAL	N-CA-C	6.47	118.00	110.62
1	B	529	ASN	N-CA-C	6.30	120.67	112.92
1	B	501	LEU	N-CA-C	6.22	117.94	111.03
1	B	356	THR	N-CA-C	-6.19	102.19	110.55

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	501	LEU	N-CA-C	6.07	118.42	111.02
1	B	280	THR	N-CA-C	-5.84	106.01	114.12
1	B	388	MET	N-CA-C	-5.83	106.00	113.23
1	B	456	ARG	N-CA-C	-5.83	106.79	112.97
1	B	403	SER	N-CA-C	-5.72	105.02	112.23
1	A	416	ILE	N-CA-C	5.67	114.74	108.05
1	A	524	GLY	N-CA-C	5.63	119.92	111.42
1	A	299	PHE	N-CA-C	-5.60	105.94	112.89
1	A	388	MET	N-CA-C	-5.58	105.20	112.23
1	B	416	ILE	N-CA-C	5.55	114.60	108.05
1	B	524	GLY	N-CA-C	5.43	117.90	110.58
1	B	585	VAL	N-CA-C	5.42	116.80	110.62
1	B	520	ILE	N-CA-C	-5.42	101.74	108.89
1	B	568	ILE	N-CA-C	5.39	116.88	111.00
1	A	389	ALA	N-CA-C	-5.38	105.58	111.82
1	A	516	LYS	CB-CA-C	-5.14	108.97	116.53
1	B	626	LEU	N-CA-C	5.11	118.65	112.93
1	A	529	ASN	N-CA-C	5.10	119.20	112.92
1	A	485	LEU	CA-C-N	5.08	125.31	119.83
1	A	485	LEU	C-N-CA	5.08	125.31	119.83
1	A	282	CYS	N-CA-C	5.07	116.53	108.67
1	A	626	LEU	N-CA-C	5.07	119.18	113.15
1	A	473	GLU	N-CA-C	5.03	116.98	109.59

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	2933	0	2982	149	0
1	B	2933	0	2982	149	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
All	All	5868	0	5964	293	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 25.

All (293) 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:B:473:GLU:HA	1:B:527:THR:CG2	1.80	1.09
1:B:446:LYS:HG2	1:B:467:GLN:NE2	1.69	1.07
1:B:446:LYS:HG2	1:B:467:GLN:HE21	1.18	1.03
1:B:474:ASP:H	1:B:527:THR:HG23	1.25	1.00
1:A:402:ASP:HA	1:A:578:MET:HE3	1.49	0.95
1:A:491:ILE:HD11	1:A:528:MET:HE2	1.50	0.93
1:B:415:ASN:HD21	1:B:420:ARG:HH11	1.16	0.93
1:A:474:ASP:H	1:A:527:THR:HG23	1.31	0.91
1:B:560:SER:OG	1:B:624:GLY:HA2	1.69	0.91
1:A:473:GLU:HA	1:A:527:THR:CG2	2.03	0.88
1:B:474:ASP:N	1:B:527:THR:HG23	1.91	0.86
1:B:415:ASN:ND2	1:B:420:ARG:HD2	1.91	0.86
1:A:415:ASN:HD21	1:A:420:ARG:HH11	1.24	0.85
1:A:398:LEU:HB2	1:A:401:MET:HE2	1.61	0.82
1:B:402:ASP:HA	1:B:578:MET:HE3	1.59	0.82
1:A:474:ASP:N	1:A:527:THR:HG23	1.95	0.81
1:A:491:ILE:CD1	1:A:528:MET:HE2	2.09	0.81
1:B:529:ASN:O	1:B:530:GLU:HB2	1.79	0.81
1:B:483:ARG:H	1:B:483:ARG:HD2	1.45	0.80
1:B:473:GLU:HA	1:B:527:THR:HG21	1.62	0.80
1:A:529:ASN:O	1:A:530:GLU:HB2	1.82	0.79
1:A:415:ASN:ND2	1:A:420:ARG:HD2	1.96	0.79
1:B:284:ASP:HB3	1:B:287:LEU:HB3	1.63	0.79
1:B:473:GLU:CD	1:B:527:THR:HG21	2.08	0.78
1:B:473:GLU:OE2	1:B:527:THR:HG21	1.82	0.78
1:B:389:ALA:HB1	1:B:625:VAL:HG21	1.65	0.78
1:B:508:ASN:ND2	1:B:518:THR:HG23	1.99	0.78
1:B:473:GLU:HA	1:B:527:THR:HG22	1.64	0.77
1:A:447:ALA:O	1:A:448:LEU:HD23	1.85	0.76
1:B:612:TYR:HA	1:B:615:MET:HE3	1.66	0.76
1:B:474:ASP:H	1:B:527:THR:CG2	1.99	0.76
1:A:583:ARG:HD2	1:A:587:GLU:OE1	1.87	0.75
1:B:469:LEU:C	1:B:469:LEU:HD12	2.12	0.74
1:A:311:PRO:HG2	1:A:374:ILE:HD13	1.68	0.73
1:B:356:THR:OG1	1:B:359:GLN:HG3	1.87	0.73
1:A:450:VAL:HG13	1:A:457:LEU:HD11	1.68	0.73
1:A:407:ASP:O	1:A:410:LYS:HG2	1.88	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:356:THR:OG1	1:A:359:GLN:HG3	1.88	0.73
1:B:538:GLN:HE22	1:B:544:GLN:NE2	1.87	0.72
1:B:353:LEU:HD21	1:B:517:ARG:NH2	2.06	0.70
1:B:415:ASN:ND2	1:B:523:PRO:HG3	2.07	0.70
1:A:356:THR:H	1:A:359:GLN:HE21	1.39	0.69
1:A:474:ASP:H	1:A:527:THR:CG2	2.05	0.69
1:B:453:PRO:HG2	1:B:456:ARG:HD2	1.75	0.69
1:A:415:ASN:HD21	1:A:420:ARG:HD2	1.59	0.68
1:B:402:ASP:HA	1:B:578:MET:CE	2.24	0.67
1:B:560:SER:HG	1:B:624:GLY:HA2	1.57	0.67
1:B:508:ASN:N	1:B:508:ASN:HD22	1.92	0.66
1:B:415:ASN:HD21	1:B:420:ARG:NH1	1.90	0.66
1:B:583:ARG:HD2	1:B:587:GLU:OE1	1.96	0.66
1:A:453:PRO:HG2	1:A:456:ARG:NH1	2.12	0.65
1:B:311:PRO:HG2	1:B:374:ILE:HD13	1.78	0.65
1:B:350:VAL:O	1:B:354:GLN:HG3	1.97	0.65
1:B:415:ASN:HD21	1:B:420:ARG:HD2	1.62	0.64
1:A:401:MET:HE1	1:A:435:LEU:HD22	1.79	0.63
1:B:585:VAL:HG21	1:B:597:VAL:HG22	1.80	0.63
1:A:299:PHE:C	1:A:301:MET:H	2.05	0.63
1:A:473:GLU:HA	1:A:527:THR:HG21	1.79	0.63
1:A:555:HIS:HB3	1:A:559:ARG:NH1	2.14	0.62
1:A:450:VAL:O	1:A:450:VAL:HG12	2.00	0.62
1:A:508:ASN:N	1:A:508:ASN:HD22	1.95	0.62
1:A:615:MET:HB3	1:A:625:VAL:CG1	2.29	0.62
1:B:384:ILE:HD11	1:B:603:LEU:CD1	2.30	0.61
1:A:513:HIS:O	1:A:514:LEU:HG	2.00	0.61
1:A:500:TYR:CE2	1:A:507:VAL:HG11	2.36	0.61
1:A:270:TRP:CE2	1:A:336:ILE:HG12	2.36	0.60
1:A:299:PHE:CE1	1:A:318:GLU:HG2	2.36	0.60
1:A:434:THR:HG23	1:A:570:GLN:HG3	1.83	0.60
1:A:465:ILE:HG13	1:A:509:LEU:HD23	1.84	0.60
1:A:285:VAL:HG21	1:A:338:GLN:NE2	2.16	0.60
1:A:453:PRO:O	1:A:455:ASP:N	2.34	0.60
1:B:472:PHE:O	1:B:527:THR:HG22	2.00	0.60
1:B:402:ASP:CA	1:B:578:MET:HE3	2.31	0.59
1:B:450:VAL:HG13	1:B:457:LEU:HD11	1.83	0.59
1:A:529:ASN:O	1:A:530:GLU:CB	2.51	0.59
1:B:507:VAL:C	1:B:508:ASN:HD22	2.10	0.59
1:A:554:LYS:O	1:A:558:GLU:HG3	2.03	0.58
1:B:397:LEU:O	1:B:398:LEU:HD12	2.03	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:513:HIS:O	1:B:514:LEU:HG	2.04	0.58
1:A:420:ARG:HB3	1:A:523:PRO:HB3	1.85	0.58
1:B:349:ARG:HH11	1:B:349:ARG:HB2	1.68	0.58
1:B:500:TYR:CE2	1:B:507:VAL:HG11	2.39	0.57
1:B:580:ILE:O	1:B:600:LYS:NZ	2.38	0.57
1:A:362:THR:HG23	1:A:592:ILE:HD12	1.87	0.57
1:B:452:LEU:HB3	1:B:453:PRO:CD	2.35	0.57
1:A:506:LYS:HG2	1:A:519:GLN:HA	1.87	0.57
1:B:608:SER:OG	1:B:611:VAL:HG23	2.03	0.57
1:A:465:ILE:HD11	1:A:509:LEU:HB3	1.87	0.56
1:A:371:ARG:O	1:A:375:MET:HG3	2.04	0.56
1:B:609:LEU:HD13	1:B:613:GLN:HG2	1.85	0.56
1:A:416:ILE:O	1:A:420:ARG:HG2	2.06	0.56
1:A:448:LEU:HG	1:A:470:VAL:HG13	1.88	0.56
1:A:473:GLU:HA	1:A:527:THR:HG23	1.86	0.56
1:A:356:THR:H	1:A:359:GLN:NE2	2.02	0.56
1:B:453:PRO:O	1:B:455:ASP:N	2.39	0.56
1:A:268:VAL:HG22	1:A:326:ILE:HG22	1.86	0.56
1:B:272:LEU:HD22	1:B:320:HIS:CE1	2.41	0.55
1:B:469:LEU:HD12	1:B:470:VAL:N	2.20	0.55
1:A:432:LYS:HE3	1:A:528:MET:O	2.05	0.55
1:B:415:ASN:ND2	1:B:420:ARG:HH11	1.97	0.55
1:B:576:LEU:O	1:B:580:ILE:HG13	2.06	0.55
1:B:602:ARG:HG3	1:B:602:ARG:HH11	1.72	0.55
1:A:304:LYS:HG2	1:A:309:GLU:OE1	2.07	0.54
1:B:454:LEU:O	1:B:454:LEU:HG	2.07	0.54
1:B:491:ILE:CD1	1:B:528:MET:HE2	2.38	0.54
1:B:386:GLU:OE1	1:B:566:LYS:NZ	2.40	0.54
1:B:453:PRO:HD2	1:B:456:ARG:HB2	1.90	0.54
1:A:268:VAL:HG21	1:A:330:SER:HB2	1.90	0.53
1:A:469:LEU:HD12	1:A:469:LEU:C	2.34	0.53
1:A:506:LYS:NZ	1:A:506:LYS:HB2	2.24	0.53
1:A:533:VAL:HG13	1:A:537:LEU:HD23	1.90	0.53
1:B:505:VAL:HG12	1:B:506:LYS:N	2.23	0.53
1:A:327:PHE:CZ	1:A:333:GLN:HB3	2.44	0.53
1:A:273:VAL:HG22	1:A:292:TYR:CE2	2.44	0.53
1:B:450:VAL:HG12	1:B:450:VAL:O	2.08	0.53
1:A:361:LEU:HD11	1:A:409:LEU:HD22	1.91	0.52
1:A:478:THR:HG22	1:A:479:GLY:N	2.25	0.52
1:B:311:PRO:HG2	1:B:374:ILE:CD1	2.40	0.52
1:A:299:PHE:CZ	1:A:318:GLU:HG2	2.45	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:320:HIS:O	1:B:321:TYR:C	2.52	0.52
1:B:609:LEU:HD13	1:B:609:LEU:O	2.09	0.52
1:A:375:MET:O	1:A:382:ALA:HB3	2.09	0.52
1:A:466:ASP:OD1	1:A:517:ARG:HD3	2.10	0.52
1:A:615:MET:HB3	1:A:625:VAL:HG12	1.90	0.52
1:B:388:MET:HE3	1:B:577:LEU:HD22	1.91	0.52
1:A:376:PHE:CE1	1:A:382:ALA:HB1	2.45	0.51
1:B:302:CYS:O	1:B:306:ILE:HG13	2.10	0.51
1:B:533:VAL:HG13	1:B:537:LEU:HD23	1.92	0.51
1:A:478:THR:O	1:A:479:GLY:C	2.54	0.51
1:A:560:SER:OG	1:A:624:GLY:HA2	2.11	0.51
1:A:346:ALA:HB2	1:B:289:LEU:HD23	1.92	0.51
1:A:393:TRP:CE2	1:A:553:LEU:HD22	2.46	0.51
1:B:387:TRP:CE3	1:B:568:ILE:HG23	2.46	0.51
1:B:469:LEU:C	1:B:469:LEU:CD1	2.83	0.51
1:B:473:GLU:CA	1:B:527:THR:CG2	2.73	0.51
1:B:384:ILE:HD11	1:B:603:LEU:HD11	1.93	0.51
1:A:284:ASP:HB3	1:A:287:LEU:HB3	1.93	0.50
1:A:511:LYS:HG2	1:A:512:LYS:N	2.27	0.50
1:B:415:ASN:HD22	1:B:420:ARG:HD2	1.75	0.50
1:A:291:MET:HE1	1:A:312:SER:OG	2.10	0.50
1:B:298:SER:HA	1:B:321:TYR:CE1	2.46	0.50
1:A:508:ASN:ND2	1:A:518:THR:HG23	2.27	0.50
1:A:447:ALA:C	1:A:448:LEU:HD23	2.36	0.50
1:B:268:VAL:HG22	1:B:326:ILE:HG22	1.94	0.50
1:A:498:ARG:HG3	1:A:499:ASP:N	2.26	0.50
1:B:389:ALA:HB1	1:B:625:VAL:CG2	2.40	0.49
1:B:508:ASN:ND2	1:B:508:ASN:N	2.60	0.49
1:A:349:ARG:HD2	1:A:349:ARG:O	2.13	0.49
1:B:585:VAL:HG13	1:B:593:GLN:HB3	1.94	0.49
1:B:602:ARG:HG3	1:B:602:ARG:NH1	2.27	0.49
1:A:507:VAL:O	1:A:518:THR:HA	2.12	0.49
1:B:388:MET:CE	1:B:577:LEU:HD22	2.43	0.49
1:B:311:PRO:C	1:B:313:HIS:H	2.20	0.49
1:B:453:PRO:C	1:B:455:ASP:H	2.20	0.49
1:A:624:GLY:O	1:A:625:VAL:C	2.54	0.49
1:B:505:VAL:HG12	1:B:506:LYS:H	1.78	0.48
1:B:511:LYS:HB3	1:B:516:LYS:HG3	1.95	0.48
1:B:585:VAL:HG21	1:B:597:VAL:CG2	2.42	0.48
1:B:537:LEU:O	1:B:540:ARG:HB2	2.12	0.48
1:A:450:VAL:CG1	1:A:493:ASN:HB2	2.44	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:500:TYR:O	1:B:521:PHE:HB3	2.14	0.48
1:B:571:SER:OG	1:B:573:ILE:HB	2.14	0.48
1:A:299:PHE:O	1:A:301:MET:N	2.47	0.48
1:A:450:VAL:HG12	1:A:493:ASN:HB2	1.95	0.48
1:A:392:ALA:HB2	1:A:615:MET:HE3	1.96	0.47
1:A:315:LYS:NZ	1:A:315:LYS:HB3	2.29	0.47
1:A:375:MET:HB3	1:A:382:ALA:CB	2.44	0.47
1:B:483:ARG:O	1:B:484:ASP:HB2	2.15	0.47
1:A:299:PHE:C	1:A:301:MET:N	2.71	0.47
1:A:507:VAL:C	1:A:508:ASN:HD22	2.22	0.47
1:B:564:LEU:CD2	1:B:569:ILE:HD11	2.44	0.47
1:A:583:ARG:CD	1:A:587:GLU:OE1	2.61	0.47
1:B:337:CYS:O	1:B:341:VAL:HG23	2.14	0.47
1:B:612:TYR:HA	1:B:615:MET:CE	2.42	0.47
1:A:375:MET:C	1:A:382:ALA:HB3	2.40	0.47
1:A:434:THR:HG22	1:A:569:ILE:O	2.15	0.47
1:B:353:LEU:CD2	1:B:517:ARG:HH22	2.27	0.47
1:B:500:TYR:CD2	1:B:507:VAL:HG11	2.50	0.47
1:A:529:ASN:O	1:A:529:ASN:OD1	2.33	0.46
1:A:280:THR:O	1:A:281:LYS:HB2	2.15	0.46
1:A:508:ASN:N	1:A:508:ASN:ND2	2.61	0.46
1:A:304:LYS:HA	1:A:309:GLU:CD	2.40	0.46
1:A:425:LYS:HE2	1:A:530:GLU:HA	1.97	0.46
1:B:314:TYR:CE1	1:B:315:LYS:HG3	2.50	0.46
1:B:401:MET:HE1	1:B:435:LEU:HD22	1.96	0.46
1:B:617:PHE:O	1:B:620:ALA:HB3	2.15	0.46
1:A:467:GLN:HA	1:A:467:GLN:NE2	2.31	0.46
1:A:314:TYR:CD1	1:A:314:TYR:C	2.93	0.46
1:A:406:TYR:CE1	1:A:587:GLU:HG2	2.51	0.46
1:B:588:PHE:CD2	1:B:596:ILE:HG13	2.51	0.46
1:A:389:ALA:HA	1:A:625:VAL:HG11	1.98	0.45
1:A:506:LYS:HG2	1:A:519:GLN:C	2.41	0.45
1:A:602:ARG:HG3	1:A:602:ARG:HH11	1.81	0.45
1:B:408:PHE:O	1:B:411:CYS:HB3	2.16	0.45
1:A:506:LYS:HG2	1:A:519:GLN:CA	2.46	0.45
1:A:535:LYS:HG3	1:A:536:THR:N	2.30	0.45
1:B:268:VAL:HG12	1:B:269:SER:N	2.30	0.45
1:B:453:PRO:C	1:B:455:ASP:N	2.73	0.45
1:A:470:VAL:O	1:A:524:GLY:HA3	2.17	0.45
1:B:508:ASN:HD21	1:B:518:THR:HG23	1.80	0.45
1:A:403:SER:HA	1:A:583:ARG:NH2	2.32	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:353:LEU:CD2	1:B:517:ARG:NH2	2.77	0.45
1:B:419:LYS:HA	1:B:542:VAL:HB	1.98	0.45
1:A:388:MET:HE1	1:A:581:TRP:CD2	2.52	0.45
1:A:375:MET:HB3	1:A:382:ALA:HB2	1.99	0.45
1:B:424:PHE:CE1	1:B:545:ILE:HD12	2.52	0.45
1:B:451:ASN:O	1:B:452:LEU:HD23	2.17	0.45
1:B:506:LYS:HD3	1:B:519:GLN:HA	1.99	0.45
1:B:579:LEU:O	1:B:583:ARG:HB2	2.17	0.45
1:A:453:PRO:C	1:A:455:ASP:H	2.25	0.45
1:B:603:LEU:HD12	1:B:603:LEU:HA	1.89	0.45
1:B:383:ASP:OD1	1:B:385:GLU:HB2	2.16	0.44
1:B:478:THR:O	1:B:479:GLY:C	2.61	0.44
1:A:302:CYS:O	1:A:306:ILE:HG13	2.17	0.44
1:A:432:LYS:HB3	1:A:547:PHE:CD1	2.52	0.44
1:B:407:ASP:O	1:B:408:PHE:C	2.57	0.44
1:B:538:GLN:NE2	1:B:544:GLN:NE2	2.60	0.44
1:A:443:CYS:HB2	1:A:469:LEU:HD21	1.99	0.44
1:A:583:ARG:HD3	1:A:584:PRO:HD2	1.99	0.44
1:A:402:ASP:CA	1:A:578:MET:HE3	2.34	0.44
1:A:507:VAL:N	1:A:519:GLN:O	2.49	0.44
1:A:592:ILE:HG23	1:A:596:ILE:HG12	1.98	0.44
1:B:450:VAL:HG12	1:B:493:ASN:HB2	1.99	0.44
1:A:474:ASP:HA	1:A:527:THR:O	2.17	0.44
1:A:462:GLY:HA3	1:A:510:GLU:O	2.17	0.44
1:A:567:ARG:HG3	1:A:567:ARG:HH11	1.83	0.44
1:B:414:TYR:O	1:B:415:ASN:C	2.61	0.44
1:A:455:ASP:CG	1:B:456:ARG:HH12	2.24	0.44
1:B:357:ARG:O	1:B:360:MET:HB2	2.18	0.44
1:A:356:THR:HG23	1:A:359:GLN:HE21	1.83	0.43
1:A:302:CYS:SG	1:A:305:CYS:N	2.90	0.43
1:A:398:LEU:HB2	1:A:401:MET:CE	2.42	0.43
1:A:465:ILE:CG1	1:A:509:LEU:HD23	2.47	0.43
1:B:529:ASN:O	1:B:530:GLU:CB	2.54	0.43
1:A:419:LYS:HA	1:A:542:VAL:HB	1.99	0.43
1:B:311:PRO:C	1:B:313:HIS:N	2.75	0.43
1:A:465:ILE:CD1	1:A:509:LEU:HB3	2.47	0.43
1:B:349:ARG:HA	1:B:349:ARG:HD3	1.90	0.43
1:B:372:MET:HE3	1:B:577:LEU:HG	2.01	0.43
1:A:272:LEU:HD22	1:A:320:HIS:CE1	2.54	0.43
1:A:503:GLY:O	1:B:567:ARG:NH2	2.47	0.43
1:B:428:ILE:HG23	1:B:429:ASP:OD1	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:349:ARG:NH2	1:B:284:ASP:OD2	2.52	0.43
1:A:502:ASP:OD2	1:A:540:ARG:NH1	2.50	0.43
1:A:417:PRO:HD3	1:B:567:ARG:NH1	2.33	0.43
1:A:556:CYS:SG	1:A:619:VAL:HG22	2.59	0.43
1:B:450:VAL:HG13	1:B:457:LEU:CD1	2.47	0.43
1:B:455:ASP:C	1:B:457:LEU:H	2.27	0.43
1:B:561:GLU:CD	1:B:561:GLU:N	2.76	0.43
1:A:609:LEU:HD23	1:A:609:LEU:HA	1.89	0.42
1:B:452:LEU:HB3	1:B:453:PRO:HD2	2.01	0.42
1:B:564:LEU:HD21	1:B:569:ILE:HD11	2.00	0.42
1:A:538:GLN:HE22	1:A:544:GLN:NE2	2.17	0.42
1:A:601:GLU:O	1:A:602:ARG:C	2.60	0.42
1:A:453:PRO:C	1:A:455:ASP:N	2.77	0.42
1:A:393:TRP:NE1	1:A:553:LEU:HD22	2.35	0.42
1:B:369:LEU:O	1:B:370:ASP:C	2.63	0.42
1:B:420:ARG:HB2	1:B:523:PRO:HB3	2.02	0.42
1:B:525:ILE:HG22	1:B:526:VAL:N	2.35	0.42
1:A:421:TYR:CE1	1:A:523:PRO:HA	2.54	0.42
1:B:475:VAL:HG21	1:B:526:VAL:HG13	2.02	0.41
1:A:320:HIS:O	1:A:321:TYR:C	2.61	0.41
1:A:555:HIS:HB3	1:A:559:ARG:HH11	1.85	0.41
1:B:278:MET:HE3	1:B:278:MET:HA	2.02	0.41
1:B:432:LYS:HE3	1:B:528:MET:O	2.21	0.41
1:B:482:SER:C	1:B:484:ASP:H	2.28	0.41
1:A:592:ILE:HG23	1:A:592:ILE:O	2.21	0.41
1:B:302:CYS:SG	1:B:305:CYS:N	2.84	0.41
1:B:485:LEU:HA	1:B:486:PRO:HD3	1.94	0.41
1:A:349:ARG:NH1	1:A:349:ARG:HG2	2.35	0.41
1:A:386:GLU:OE1	1:A:566:LYS:NZ	2.37	0.41
1:A:398:LEU:HD21	1:A:545:ILE:HG21	2.03	0.41
1:A:585:VAL:CG2	1:A:600:LYS:HE3	2.51	0.41
1:B:513:HIS:O	1:B:513:HIS:ND1	2.53	0.41
1:B:280:THR:O	1:B:280:THR:HG22	2.21	0.41
1:A:465:ILE:CG1	1:A:509:LEU:HB3	2.50	0.41
1:B:522:PRO:HA	1:B:523:PRO:HD3	1.78	0.41
1:B:266:LYS:HD3	1:B:266:LYS:HA	1.92	0.41
1:B:398:LEU:HA	1:B:399:PRO:HD3	1.88	0.41
1:B:397:LEU:O	1:B:398:LEU:CD1	2.68	0.41
1:A:398:LEU:HA	1:A:399:PRO:HD3	1.91	0.40
1:A:511:LYS:HG2	1:A:512:LYS:H	1.85	0.40
1:A:615:MET:HB3	1:A:625:VAL:HG13	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:550:LYS:HD3	1:B:552:TYR:OH	2.21	0.40
1:A:272:LEU:HD23	1:A:272:LEU:HA	1.95	0.40
1:A:379:THR:O	1:A:379:THR:OG1	2.39	0.40
1:B:270:TRP:CE2	1:B:336:ILE:HG12	2.56	0.40
1:B:351:ASP:HB3	1:B:355:LEU:HD12	2.03	0.40
1:A:349:ARG:O	1:A:352:SER:HB3	2.22	0.40
1:B:470:VAL:O	1:B:524:GLY:HA3	2.21	0.40
1:B:511:LYS:O	1:B:516:LYS:HD3	2.21	0.40
1:A:366:ASN:CG	1:A:592:ILE:HD11	2.46	0.40
1:A:416:ILE:O	1:A:417:PRO:C	2.64	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	360/368 (98%)	325 (90%)	25 (7%)	10 (3%)	4	14
1	B	360/368 (98%)	329 (91%)	22 (6%)	9 (2%)	4	16
All	All	720/736 (98%)	654 (91%)	47 (6%)	19 (3%)	4	15

All (19) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	454	LEU
1	A	480	GLY
1	A	530	GLU
1	B	427	PRO
1	B	530	GLU
1	A	300	GLU
1	A	479	GLY
1	B	454	LEU

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Mol	Chain	Res	Type
1	B	483	ARG
1	B	486	PRO
1	B	488	GLY
1	A	301	MET
1	A	457	LEU
1	A	474	ASP
1	B	481	GLU
1	A	503	GLY
1	B	516	LYS
1	A	458	ASN
1	B	624	GLY

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	323/328 (98%)	303 (94%)	20 (6%)	16	45
1	B	323/328 (98%)	300 (93%)	23 (7%)	13	39
All	All	646/656 (98%)	603 (93%)	43 (7%)	15	42

All (43) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	278	MET
1	A	279	GLU
1	A	299	PHE
1	A	301	MET
1	A	318	GLU
1	A	329	ASP
1	A	333	GLN
1	A	349	ARG
1	A	361	LEU
1	A	398	LEU
1	A	432	LYS
1	A	440	LEU

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Mol	Chain	Res	Type
1	A	506	LYS
1	A	508	ASN
1	A	509	LEU
1	A	527	THR
1	A	570	GLN
1	A	577	LEU
1	A	592	ILE
1	A	603	LEU
1	B	271	LYS
1	B	272	LEU
1	B	300	GLU
1	B	349	ARG
1	B	361	LEU
1	B	420	ARG
1	B	440	LEU
1	B	455	ASP
1	B	460	GLU
1	B	469	LEU
1	B	470	VAL
1	B	474	ASP
1	B	483	ARG
1	B	492	ASN
1	B	502	ASP
1	B	508	ASN
1	B	509	LEU
1	B	517	ARG
1	B	561	GLU
1	B	570	GLN
1	B	603	LEU
1	B	609	LEU
1	B	625	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	333	GLN
1	A	338	GLN
1	A	339	GLN
1	A	354	GLN
1	A	359	GLN
1	A	366	ASN
1	A	415	ASN

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Mol	Chain	Res	Type
1	A	467	GLN
1	A	496	ASN
1	A	508	ASN
1	A	529	ASN
1	A	538	GLN
1	A	544	GLN
1	B	320	HIS
1	B	333	GLN
1	B	415	ASN
1	B	489	GLN
1	B	508	ASN
1	B	529	ASN
1	B	544	GLN

5.3.3 RNA [i](#)

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

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, 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	362/368 (98%)	-1.68	0 100 100	14, 38, 79, 147	0
1	B	362/368 (98%)	-1.66	0 100 100	17, 39, 83, 145	0
All	All	724/736 (98%)	-1.67	0 100 100	14, 38, 83, 147	0

There are no RSRZ outliers to report.

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, 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	ZN	A	700	1/1	1.00	0.01	56,56,56,56	0
2	ZN	B	700	1/1	1.00	0.02	53,53,53,53	0

6.5 Other polymers [i](#)

There are no such residues in this entry.