



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 21, 2018 – 04:06 pm GMT

PDB ID : 3KTQ
Title : CRYSTAL STRUCTURE OF AN ACTIVE TERNARY COMPLEX OF
THE LARGE FRAGMENT OF DNA POLYMERASE I FROM THERMUS
AQUATICUS
Authors : Li, Y.; Waksman, G.
Deposited on : 1998-07-28
Resolution : 2.30 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.7.3 (157068), CSD as539be (2018)
Xtrriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk30686

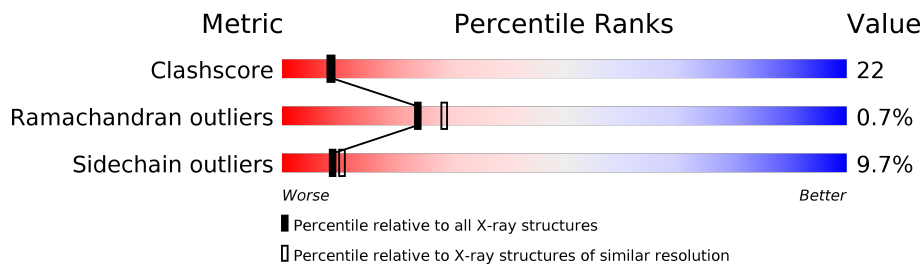
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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))
Clashscore	122078	5071 (2.30-2.30)
Ramachandran outliers	120005	5021 (2.30-2.30)
Sidechain outliers	119972	5020 (2.30-2.30)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	B	12	
2	C	14	
3	A	540	

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 4874 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 DNA chain called DNA (5'-D(*GP*AP*CP*CP*AP*CP*GP*GP*CP*GP*CP*DOC)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	B	12	240	114	48	67	11	0	0	0

- Molecule 2 is a DNA chain called DNA (5'-D(*AP*GP*GP*GP*CP*GP*CP*CP*GP*TP*GP*GP*TP*C)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	C	14	288	136	56	83	13	0	0	0

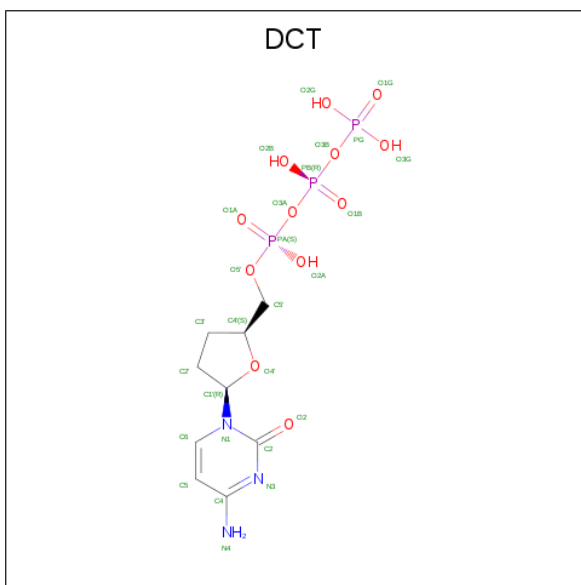
- Molecule 3 is a protein called PROTEIN (LARGE FRAGMENT OF DNA POLYMERASE I).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	A	539	4168	2662	745	748	13	0	0	0

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
4	A	2	2	2	0	0

- Molecule 5 is 2',3'-DIDEOXYCYTIDINE 5'-TRIPHOSPHATE (three-letter code: DCT) (formula: C₉H₁₆N₃O₁₂P₃).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
5	A	1	27	9	3	12	3	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	B	10	Total	O	0	0
			10	10		
6	C	12	Total	O	0	0
			12	12		
6	A	127	Total	O	0	0
			127	127		

4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	108.03Å 108.03Å 90.17Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	30.00 – 2.30	Depositor
% Data completeness (in resolution range)	95.9 (30.00-2.30)	Depositor
R_{merge}	0.06	Depositor
R_{sym}	6.00	Depositor
Refinement program	X-PLOR 3.851	Depositor
R, R_{free}	0.218 , 0.275	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	4874	wwPDB-VP
Average B, all atoms (Å ²)	20.0	wwPDB-VP

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: DOC, MG, DCT

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	B	0.50	0/249	0.82	0/382
2	C	0.72	0/323	0.89	0/498
3	A	0.38	0/4258	0.63	1/5786 (0.0%)
All	All	0.42	0/4830	0.67	1/6666 (0.0%)

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	B	0	1
2	C	0	1
All	All	0	2

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	578	ASP	C-N-CD	6.50	142.05	128.40

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	103	DC	Sidechain
2	C	214	DG	Sidechain

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	B	240	0	134	6	0
2	C	288	0	158	19	0
3	A	4168	0	4160	184	0
4	A	2	0	0	0	0
5	A	27	0	12	4	0
6	A	127	0	0	6	1
6	B	10	0	0	1	0
6	C	12	0	0	0	0
All	All	4874	0	4464	199	1

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 22.

All (199) 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)
2:C:215:DT:H2''	2:C:216:DC:H5''	1.29	1.14
3:A:351:LEU:HD13	3:A:373:PRO:HG2	1.33	1.04
2:C:215:DT:C2'	2:C:216:DC:H5''	1.94	0.98
3:A:621:HIS:HD2	3:A:814:ALA:H	1.10	0.97
3:A:631:VAL:HG11	3:A:638:ILE:HD11	1.53	0.91
3:A:565:ASN:HD21	3:A:577:SER:HB2	1.40	0.86
3:A:562:THR:HG21	3:A:576:SER:OG	1.80	0.81
3:A:351:LEU:HD12	3:A:374:MET:HG2	1.63	0.80
3:A:621:HIS:CD2	3:A:814:ALA:H	2.00	0.77
3:A:526:HIS:ND1	3:A:527:PRO:HD2	2.00	0.76
3:A:557:THR:OG1	3:A:561:HIS:HE1	1.67	0.76
3:A:352:LEU:HA	6:A:3074:HOH:O	1.86	0.75
3:A:554:HIS:HE1	3:A:556:ARG:HD2	1.52	0.75
3:A:463:VAL:CG2	3:A:542:LYS:HD3	2.17	0.73
3:A:542:LYS:HA	3:A:546:ILE:HB	1.71	0.73
3:A:625:ASP:O	3:A:629:ILE:HG23	1.89	0.73
3:A:351:LEU:CD1	3:A:373:PRO:HG2	2.16	0.72
3:A:476:ARG:HH11	3:A:476:ARG:HG2	1.53	0.72
3:A:541:LEU:HD12	3:A:590:LEU:HD23	1.70	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:214:DG:H2''	2:C:215:DT:OP2	1.88	0.71
3:A:441:LEU:O	3:A:445:GLU:HG3	1.92	0.70
3:A:708:GLU:HG3	6:A:3147:HOH:O	1.92	0.68
3:A:569:THR:HG21	3:A:573:ARG:H	1.59	0.68
3:A:516:ALA:O	3:A:520:GLU:HG2	1.93	0.68
3:A:822:GLY:HA3	3:A:830:ALA:O	1.94	0.68
3:A:651:ARG:HH11	3:A:651:ARG:HG3	1.58	0.68
3:A:815:VAL:HG13	3:A:816:PRO:HD2	1.76	0.66
3:A:682:LEU:HB2	3:A:684:ILE:HG12	1.77	0.66
6:B:3078:HOH:O	3:A:784:HIS:HE1	1.79	0.66
3:A:786:GLU:OE2	3:A:831:LYS:HE2	1.96	0.65
3:A:376:LEU:HD22	3:A:420:LEU:HD12	1.79	0.64
3:A:578:ASP:O	3:A:579:PRO:C	2.31	0.64
3:A:621:HIS:HD2	3:A:814:ALA:N	1.91	0.63
3:A:476:ARG:NH1	3:A:476:ARG:HG2	2.11	0.63
3:A:625:ASP:HB2	3:A:702:LYS:HB2	1.80	0.62
3:A:638:ILE:HG22	3:A:666:ASN:ND2	2.15	0.61
3:A:813:LEU:HD12	3:A:817:LEU:HD21	1.82	0.61
3:A:678:LEU:HD12	3:A:693:ILE:HD11	1.81	0.61
3:A:810:VAL:HG13	3:A:811:TYR:H	1.65	0.61
3:A:589:PRO:O	3:A:593:ARG:HG3	2.01	0.61
3:A:615:GLU:CD	5:A:113:DCT:H2''	2.21	0.60
3:A:569:THR:CG2	3:A:573:ARG:H	2.15	0.60
3:A:431:ARG:HG2	3:A:435:ARG:NH2	2.16	0.60
3:A:741:ARG:O	3:A:745:GLU:HG3	2.01	0.60
3:A:573:ARG:HD3	6:A:3064:HOH:O	2.01	0.60
3:A:315:GLU:HG3	3:A:578:ASP:OD2	2.01	0.60
3:A:492:ARG:O	3:A:496:ASP:HB2	2.02	0.59
3:A:562:THR:HG22	3:A:563:ARG:N	2.17	0.59
2:C:203:DA:H2'	3:A:674:SER:HB3	1.84	0.59
3:A:443:HIS:HE1	6:A:3009:HOH:O	1.84	0.59
3:A:583:ASN:HD22	3:A:583:ASN:H	1.51	0.59
3:A:450:ARG:HB3	3:A:599:ILE:O	2.02	0.58
3:A:780:LEU:HD11	3:A:790:GLU:HB2	1.85	0.58
2:C:212:DT:H2''	2:C:213:DG:H5''	1.85	0.58
3:A:393:ARG:HG2	3:A:394:TYR:CE2	2.39	0.58
3:A:335:ALA:HB1	3:A:341:ALA:HB2	1.85	0.58
3:A:810:VAL:HG13	3:A:811:TYR:N	2.18	0.58
2:C:215:DT:C3'	2:C:216:DC:H5''	2.33	0.58
2:C:213:DG:H2''	2:C:214:DG:O5'	2.04	0.58
3:A:366:GLY:O	3:A:368:PRO:HD3	2.04	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:376:LEU:HD22	3:A:420:LEU:CD1	2.34	0.57
2:C:213:DG:H2''	2:C:214:DG:C5'	2.34	0.57
3:A:562:THR:CG2	3:A:563:ARG:N	2.68	0.57
3:A:627:ASN:O	3:A:631:VAL:HG23	2.05	0.57
2:C:211:DG:H2'	2:C:212:DT:H72	1.87	0.57
3:A:393:ARG:HG3	3:A:393:ARG:O	2.06	0.56
2:C:206:DG:H4'	3:A:754:GLN:HE22	1.71	0.56
3:A:311:LEU:HB3	3:A:319:ALA:HB1	1.88	0.55
3:A:569:THR:HG21	3:A:573:ARG:N	2.21	0.55
3:A:601:GLU:O	3:A:604:TRP:HB2	2.05	0.55
3:A:615:GLU:HG2	3:A:753:VAL:HG12	1.89	0.55
3:A:420:LEU:HB3	3:A:427:LEU:HD21	1.88	0.55
3:A:578:ASP:O	3:A:580:ASN:N	2.40	0.55
3:A:419:ARG:NH1	3:A:419:ARG:HG2	2.21	0.55
1:B:107:DG:H4'	3:A:487:ARG:HD2	1.88	0.55
2:C:210:DC:H5'	3:A:544:THR:HG23	1.90	0.54
3:A:419:ARG:HG2	3:A:419:ARG:HH11	1.72	0.54
3:A:299:TRP:HB3	3:A:300:PRO:HD3	1.89	0.54
3:A:804:LYS:O	3:A:808:GLU:HG3	2.06	0.54
3:A:679:SER:HB2	3:A:684:ILE:O	2.08	0.54
3:A:498:LEU:HD23	3:A:498:LEU:N	2.23	0.54
1:B:111:DC:H2'	1:B:112:DOC:H6	1.90	0.54
3:A:347:GLU:OE2	3:A:349:ARG:HD2	2.08	0.53
3:A:609:LEU:HG	3:A:821:VAL:HG13	1.91	0.53
1:B:104:DC:H2''	1:B:105:DA:C8	2.44	0.53
3:A:569:THR:HG21	3:A:573:ARG:HB2	1.91	0.53
1:B:112:DOC:OP2	3:A:660:ARG:NH1	2.42	0.52
3:A:614:ILE:HG22	5:A:113:DCT:O2B	2.09	0.52
3:A:743:ALA:O	3:A:747:MET:HG3	2.09	0.52
3:A:571:THR:HG21	3:A:754:GLN:NE2	2.25	0.52
3:A:613:GLN:HE22	3:A:638:ILE:H	1.57	0.52
3:A:614:ILE:HG23	3:A:615:GLU:N	2.24	0.52
2:C:208:DG:H4'	3:A:576:SER:O	2.10	0.52
3:A:443:HIS:CE1	6:A:3009:HOH:O	2.60	0.52
3:A:294:LEU:HA	3:A:330:GLY:O	2.09	0.51
3:A:420:LEU:HD13	3:A:427:LEU:HD23	1.92	0.51
3:A:576:SER:HB3	3:A:580:ASN:OD1	2.10	0.51
3:A:334:ARG:HG3	3:A:334:ARG:HH11	1.76	0.51
3:A:335:ALA:HB1	3:A:341:ALA:CB	2.41	0.51
3:A:549:LEU:HB2	3:A:550:PRO:HD3	1.92	0.51
3:A:678:LEU:HB3	3:A:689:ALA:HB1	1.91	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:452:ASP:O	3:A:455:TYR:HB3	2.10	0.50
3:A:562:THR:HG22	3:A:563:ARG:O	2.11	0.50
3:A:808:GLU:HG2	3:A:819:VAL:HG23	1.93	0.50
3:A:724:PHE:CD2	3:A:759:ASP:HB3	2.46	0.50
3:A:751:MET:HB3	3:A:752:PRO:HD3	1.93	0.50
3:A:340:LYS:HE2	3:A:341:ALA:N	2.26	0.50
3:A:583:ASN:HD22	3:A:583:ASN:N	2.09	0.50
3:A:463:VAL:HG21	3:A:542:LYS:HD3	1.94	0.50
3:A:354:LYS:NZ	3:A:564:PHE:O	2.45	0.50
3:A:486:SER:OG	3:A:489:GLN:HG3	2.11	0.49
2:C:212:DT:H4'	3:A:486:SER:HA	1.93	0.49
3:A:489:GLN:O	3:A:493:VAL:HG23	2.12	0.49
3:A:626:GLU:HA	3:A:629:ILE:HG12	1.94	0.49
1:B:103:DC:C2	1:B:104:DC:C5	3.01	0.49
3:A:554:HIS:HB3	3:A:557:THR:HG1	1.77	0.49
3:A:625:ASP:CB	3:A:702:LYS:HB2	2.43	0.49
3:A:569:THR:CG2	3:A:573:ARG:N	2.75	0.49
3:A:643:ALA:O	3:A:647:PHE:HD1	1.96	0.48
3:A:307:VAL:HG11	3:A:356:LEU:CD2	2.44	0.48
2:C:213:DG:H2''	2:C:214:DG:H5'	1.94	0.48
3:A:721:GLU:HA	3:A:726:ARG:O	2.13	0.48
3:A:307:VAL:HG11	3:A:356:LEU:HD22	1.95	0.48
3:A:562:THR:OG1	3:A:581:LEU:HG	2.13	0.48
3:A:312:SER:HB3	3:A:320:ASP:HB3	1.96	0.48
3:A:738:LYS:O	3:A:742:GLU:HG3	2.14	0.48
3:A:779:MET:HG3	3:A:789:LEU:CD2	2.44	0.48
3:A:621:HIS:CD2	3:A:813:LEU:HB3	2.49	0.48
3:A:628:LEU:O	3:A:631:VAL:HB	2.14	0.48
3:A:719:TYR:CE2	3:A:727:ARG:HG2	2.50	0.47
3:A:765:MET:SD	3:A:782:GLN:HG3	2.54	0.47
3:A:800:ALA:HB1	3:A:821:VAL:HG11	1.95	0.47
3:A:677:ARG:O	3:A:681:GLU:HB2	2.15	0.47
2:C:206:DG:C4'	3:A:754:GLN:HE22	2.27	0.47
3:A:473:GLU:O	3:A:477:LEU:HD23	2.15	0.47
3:A:620:ALA:HB2	3:A:628:LEU:HG	1.96	0.47
3:A:578:ASP:CB	3:A:579:PRO:CD	2.92	0.46
3:A:631:VAL:HG11	3:A:638:ILE:CD1	2.36	0.46
3:A:637:ASP:O	3:A:641:GLU:HG3	2.16	0.46
3:A:299:TRP:CE2	3:A:341:ALA:HB1	2.51	0.46
3:A:299:TRP:O	3:A:333:HIS:HB3	2.16	0.46
3:A:387:PRO:HG2	3:A:388:GLU:OE1	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:661:ALA:O	3:A:664:THR:HG22	2.15	0.46
3:A:493:VAL:O	3:A:498:LEU:HG	2.16	0.46
3:A:554:HIS:CG	3:A:555:PRO:HD2	2.50	0.46
3:A:717:ARG:HG2	3:A:719:TYR:CE1	2.51	0.46
3:A:522:LEU:HB3	3:A:529:VAL:HG21	1.97	0.46
3:A:669:VAL:HG22	3:A:693:ILE:HD13	1.98	0.46
3:A:435:ARG:N	3:A:436:PRO:HD2	2.31	0.46
3:A:451:LEU:HD21	3:A:456:LEU:HD12	1.97	0.45
3:A:581:LEU:HD23	3:A:584:ILE:HD11	1.96	0.45
3:A:503:ILE:CD1	3:A:522:LEU:HD13	2.45	0.45
3:A:557:THR:OG1	3:A:561:HIS:CE1	2.58	0.45
3:A:310:VAL:HG23	3:A:402:ALA:HB2	1.97	0.45
3:A:435:ARG:HB3	3:A:436:PRO:HD3	1.96	0.45
3:A:663:LYS:HE2	5:A:113:DCT:O3G	2.16	0.45
3:A:455:TYR:OH	3:A:596:ARG:NH2	2.50	0.45
3:A:615:GLU:OE2	5:A:113:DCT:H2''	2.16	0.45
3:A:486:SER:HG	3:A:489:GLN:HG3	1.82	0.44
3:A:588:THR:HB	3:A:589:PRO:HD2	2.00	0.44
3:A:612:SER:O	3:A:613:GLN:C	2.55	0.44
2:C:204:DG:C4	3:A:668:GLY:HA2	2.52	0.44
3:A:626:GLU:O	3:A:629:ILE:HG12	2.18	0.44
2:C:203:DA:C2'	3:A:674:SER:HB3	2.45	0.44
3:A:423:GLU:OE1	3:A:727:ARG:NH2	2.51	0.43
3:A:395:GLY:O	3:A:411:ARG:HD2	2.18	0.43
3:A:526:HIS:CE1	3:A:527:PRO:HD2	2.53	0.43
3:A:562:THR:HG23	3:A:579:PRO:O	2.18	0.43
3:A:450:ARG:HB2	3:A:559:ARG:NH1	2.34	0.42
3:A:530:GLU:O	3:A:534:GLN:HG3	2.19	0.42
3:A:519:LEU:O	3:A:529:VAL:HG11	2.19	0.42
3:A:578:ASP:HB3	3:A:579:PRO:CD	2.50	0.42
3:A:315:GLU:CG	3:A:578:ASP:OD2	2.67	0.42
3:A:299:TRP:CZ2	3:A:341:ALA:HB1	2.55	0.42
3:A:678:LEU:HD12	3:A:693:ILE:CD1	2.48	0.42
3:A:762:LYS:O	3:A:766:VAL:HG23	2.19	0.41
3:A:572:GLY:O	3:A:762:LYS:HE3	2.20	0.41
3:A:305:ALA:HA	3:A:328:ARG:HG2	2.01	0.41
3:A:738:LYS:HD3	3:A:742:GLU:CD	2.41	0.41
2:C:211:DG:H2'	2:C:212:DT:C7	2.49	0.41
3:A:307:VAL:CG1	3:A:308:GLY:N	2.83	0.41
3:A:651:ARG:CG	3:A:651:ARG:NH1	2.83	0.41
3:A:314:LYS:H	3:A:314:LYS:CE	2.33	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:357:SER:O	3:A:361:LEU:HG	2.21	0.41
3:A:491:GLU:OE2	3:A:512:ARG:NE	2.46	0.41
3:A:609:LEU:O	3:A:786:GLU:HA	2.21	0.41
3:A:736:ARG:HD2	3:A:736:ARG:HA	1.68	0.41
3:A:333:HIS:ND1	3:A:333:HIS:N	2.68	0.41
3:A:655:ASP:OD1	3:A:658:MET:HG3	2.21	0.41
3:A:582:GLN:NE2	6:A:3071:HOH:O	2.53	0.41
3:A:665:ILE:CD1	3:A:682:LEU:HD21	2.51	0.41
3:A:670:LEU:HD13	3:A:671:TYR:CZ	2.55	0.41
3:A:638:ILE:HG22	3:A:666:ASN:HD21	1.85	0.41
3:A:605:LEU:HD12	3:A:796:ALA:CB	2.50	0.41
3:A:479:GLY:O	3:A:480:HIS:HB3	2.20	0.40
3:A:420:LEU:HB3	3:A:427:LEU:CD2	2.52	0.40
3:A:339:TYR:O	3:A:342:LEU:HB2	2.21	0.40
1:B:103:DC:H2''	1:B:104:DC:OP2	2.21	0.40
2:C:214:DG:C2'	2:C:215:DT:OP2	2.63	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:A:3095:HOH:O	6:A:3095:HOH:O[6_555]	1.64	0.56

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
3	A	537/540 (99%)	511 (95%)	22 (4%)	4 (1%)	24 29

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	A	578	ASP
3	A	299	TRP
3	A	300	PRO
3	A	586	VAL

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
3	A	414/441 (94%)	374 (90%)	40 (10%)	9 10

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

Mol	Chain	Res	Type
3	A	314	LYS
3	A	321	LEU
3	A	324	LEU
3	A	328	ARG
3	A	340	LYS
3	A	347	GLU
3	A	351	LEU
3	A	362	ARG
3	A	365	LEU
3	A	401	GLU
3	A	438	SER
3	A	457	ARG
3	A	459	LEU
3	A	484	LEU
3	A	487	ARG
3	A	508	LYS
3	A	515	SER
3	A	522	LEU
3	A	524	GLU
3	A	543	SER
3	A	552	LEU
3	A	569	THR
3	A	575	SER

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Mol	Chain	Res	Type
3	A	576	SER
3	A	583	ASN
3	A	651	ARG
3	A	652	GLU
3	A	670	LEU
3	A	678	LEU
3	A	684	ILE
3	A	690	GLN
3	A	693	ILE
3	A	711	LEU
3	A	730	VAL
3	A	736	ARG
3	A	738	LYS
3	A	747	MET
3	A	750	ASN
3	A	760	LEU
3	A	763	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
3	A	443	HIS
3	A	554	HIS
3	A	561	HIS
3	A	565	ASN
3	A	566	GLN
3	A	582	GLN
3	A	583	ASN
3	A	613	GLN
3	A	621	HIS
3	A	633	GLN
3	A	690	GLN
3	A	754	GLN
3	A	784	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is 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	DOC	B	112	1,2	13,19,20	0.83	0	12,26,29	0.60	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	DOC	B	112	1,2	-	0/3/18/19	0/2/2/2

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.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	B	112	DOC	2	0

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 3 ligands modelled in this entry, 2 are monoatomic - leaving 1 for Mogul analysis.

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
5	DCT	A	113	4	22,28,28	0.99	0	23,43,43	1.32	3 (13%)

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
5	DCT	A	113	4	-	0/18/31/31	0/2/2/2

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	113	DCT	O2G-PG-O1G	2.34	119.73	110.60
5	A	113	DCT	PB-O3A-PA	3.18	143.31	132.63
5	A	113	DCT	PB-O3B-PG	3.81	145.43	132.63

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	113	DCT	4	0

5.7 Other polymers [i](#)

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 [i](#)

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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.