



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 31, 2016 – 07:56 PM GMT

PDB ID : 1HWK
Title : COMPLEX OF THE CATALYTIC PORTION OF HUMAN HMG-COA REDUCTASE WITH ATORVASTATIN
Authors : Istvan, E.S.; Deisenhofer, J.
Deposited on : 2001-01-09
Resolution : 2.22 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
<http://wwpdb.org/validation/2016/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 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

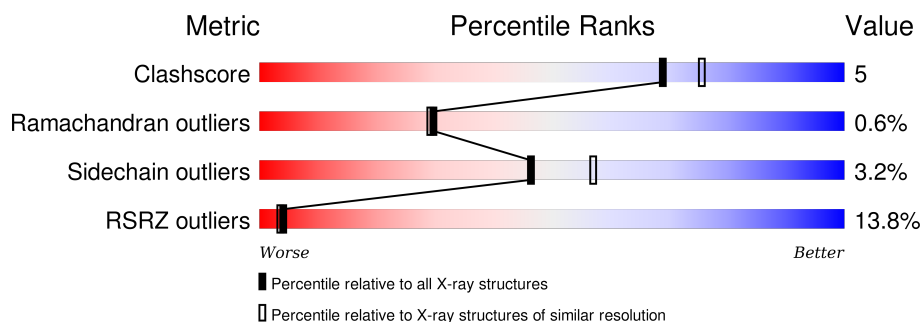
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.22 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	102246	5146 (2.24-2.20)
Ramachandran outliers	100387	5065 (2.24-2.20)
Sidechain outliers	100360	5066 (2.24-2.20)
RSRZ outliers	91569	4414 (2.24-2.20)

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.

Mol	Chain	Length	Quality of chain
1	A	467	
1	B	467	
1	C	467	
1	D	467	

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	ADP	A	103	-	-	-	X
2	ADP	B	104	-	-	-	X

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 12296 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.

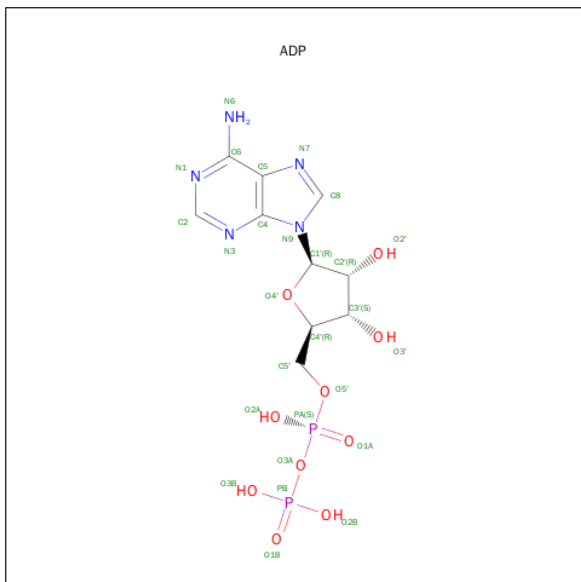
- Molecule 1 is a protein called HMG-COA REDUCTASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	408	Total	C	N	O	S	0	0	0
			3035	1889	534	582	30			
1	B	393	Total	C	N	O	S	0	0	0
			2913	1812	510	562	29			
1	C	399	Total	C	N	O	S	0	0	0
			2960	1844	519	568	29			
1	D	387	Total	C	N	O	S	0	0	0
			2864	1779	502	554	29			

There are 20 discrepancies between the modelled and reference sequences:

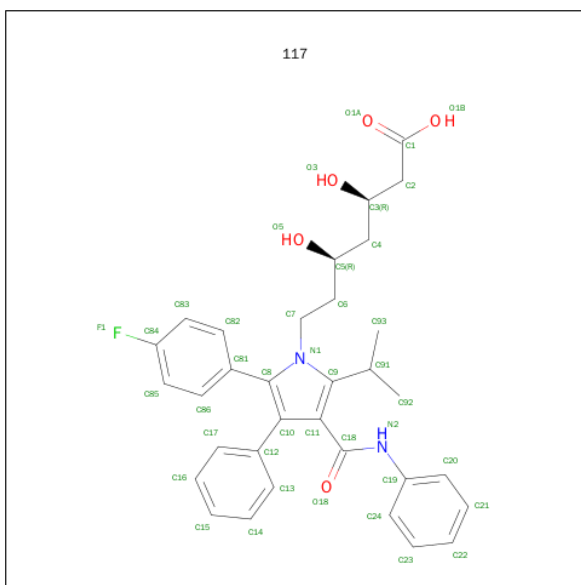
Chain	Residue	Modelled	Actual	Comment	Reference
A	422	GLY	-	INSERTION	UNP P04035
A	423	ALA	-	INSERTION	UNP P04035
A	424	MET	-	INSERTION	UNP P04035
A	425	ALA	-	INSERTION	UNP P04035
A	485	ILE	MET	ENGINEERED	UNP P04035
B	422	GLY	-	INSERTION	UNP P04035
B	423	ALA	-	INSERTION	UNP P04035
B	424	MET	-	INSERTION	UNP P04035
B	425	ALA	-	INSERTION	UNP P04035
B	485	ILE	MET	ENGINEERED	UNP P04035
C	422	GLY	-	INSERTION	UNP P04035
C	423	ALA	-	INSERTION	UNP P04035
C	424	MET	-	INSERTION	UNP P04035
C	425	ALA	-	INSERTION	UNP P04035
C	485	ILE	MET	ENGINEERED	UNP P04035
D	422	GLY	-	INSERTION	UNP P04035
D	423	ALA	-	INSERTION	UNP P04035
D	424	MET	-	INSERTION	UNP P04035
D	425	ALA	-	INSERTION	UNP P04035
D	485	ILE	MET	ENGINEERED	UNP P04035

- Molecule 2 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $\text{C}_{10}\text{H}_{15}\text{N}_5\text{O}_{10}\text{P}_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 27	C 10	N 5	O 10	P 2	0	0
2	A	1	Total 27	C 10	N 5	O 10	P 2	0	0
2	A	1	Total 27	C 10	N 5	O 10	P 2	0	0
2	B	1	Total 27	C 10	N 5	O 10	P 2	0	0
2	D	1	Total 27	C 10	N 5	O 10	P 2	0	0

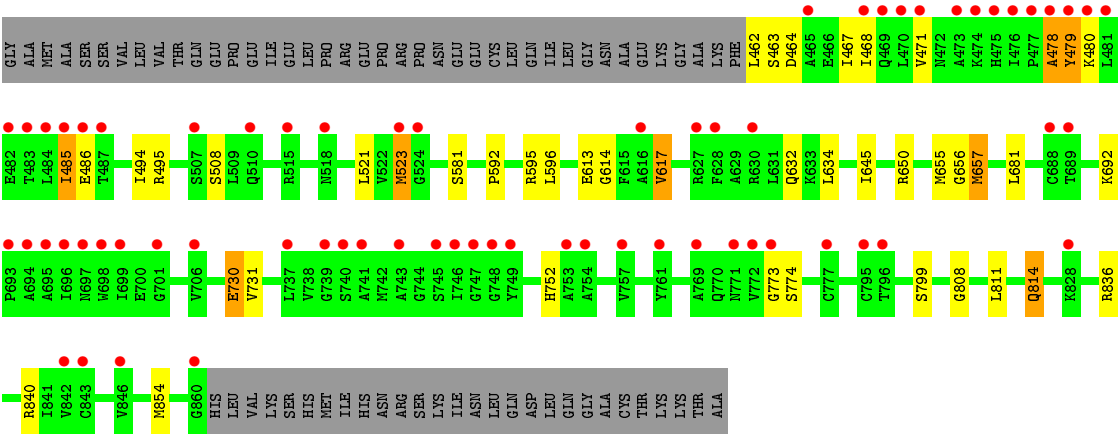
- Molecule 3 is 7-[2-(4-FLUORO-PHENYL)-5-ISOPROPYL-3-PHENYL-4-PHENYLCARBAMOYL-PYRROL-1-YL]- 3,5-DIHYDROXY-HEPTANOIC ACID (three-letter code: 117) (formula: $C_{33}H_{35}FN_2O_5$).



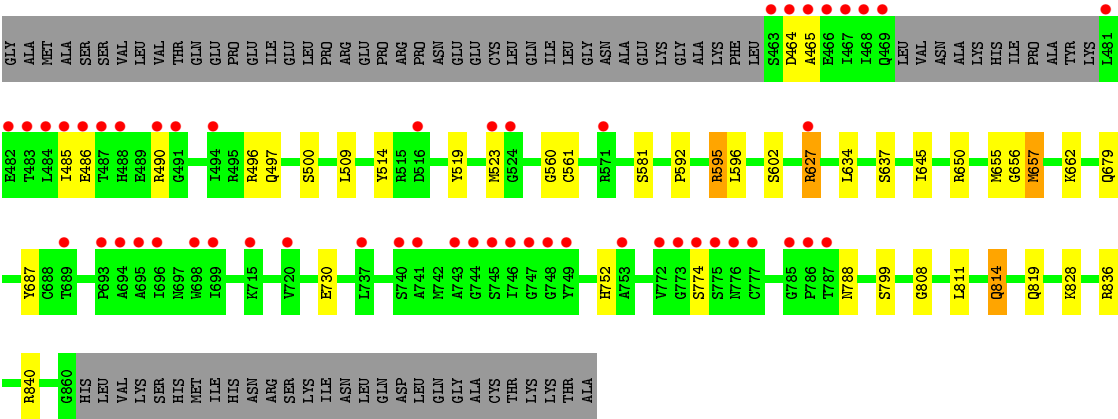
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	B	1	Total 41	C 33	F 1	N 2	O 5	0	0
3	A	1	Total 41	C 33	F 1	N 2	O 5	0	0
3	D	1	Total 41	C 33	F 1	N 2	O 5	0	0
3	C	1	Total 41	C 33	F 1	N 2	O 5	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	59	Total O 59 59	0	0
4	B	48	Total O 48 48	0	0
4	C	57	Total O 57 57	0	0
4	D	61	Total O 61 61	0	0



● Molecule 1: HMG-COA REDUCTASE



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	74.60Å 172.72Å 80.01Å 90.00° 117.73° 90.00°	Depositor
Resolution (Å)	43.40 – 2.22 54.76 – 2.21	Depositor EDS
% Data completeness (in resolution range)	98.6 (43.40-2.22) 92.9 (54.76-2.21)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.58 (at 2.22Å)	Xtriage
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.212 , 0.235 0.205 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	DCC
Wilson B-factor (Å ²)	39.8	Xtriage
Anisotropy	0.247	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 45.1	EDS
Estimated twinning fraction	0.016 for h,-k,-h-l	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Outliers	0 of 87319 reflections	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	12296	wwPDB-VP
Average B, all atoms (Å ²)	52.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.55% 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, 0.375 respectively for untwinned datasets, and 0.333, 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: 117, ADP

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	0.49	0/3079	0.67	1/4163 (0.0%)
1	B	0.48	0/2952	0.66	1/3990 (0.0%)
1	C	0.47	0/3002	0.65	2/4060 (0.0%)
1	D	0.51	0/2902	0.66	1/3922 (0.0%)
All	All	0.49	0/11935	0.66	5/16135 (0.0%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	596	LEU	CA-CB-CG	-5.42	102.84	115.30
1	A	656	GLY	N-CA-C	5.28	126.29	113.10
1	D	656	GLY	N-CA-C	5.24	126.21	113.10
1	B	656	GLY	N-CA-C	5.21	126.12	113.10
1	C	656	GLY	N-CA-C	5.04	125.71	113.10

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	A	3035	0	3068	31	0
1	B	2913	0	2945	31	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	2960	0	3000	31	0
1	D	2864	0	2892	23	0
2	A	81	0	36	3	0
2	B	27	0	12	1	0
2	D	27	0	12	0	0
3	A	41	0	34	0	0
3	B	41	0	34	0	0
3	C	41	0	34	0	0
3	D	41	0	34	0	0
4	A	59	0	0	0	0
4	B	48	0	0	1	0
4	C	57	0	0	2	0
4	D	61	0	0	0	0
All	All	12296	0	12101	111	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 5.

All (111) 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:625:THR:HG22	1:B:666:LYS:HD2	1.44	1.00
1:B:485:ILE:HG22	1:B:486:GLU:H	1.31	0.96
1:C:485:ILE:HG22	1:C:486:GLU:H	1.30	0.95
1:A:471:VAL:HG11	1:A:498:LEU:HD21	1.58	0.85
1:C:479:TYR:HA	1:C:495:ARG:HH11	1.47	0.80
1:A:542:GLY:H	1:A:567:ASN:ND2	1.78	0.79
1:B:752:HIS:HD2	1:B:755:ASN:HD22	1.30	0.79
1:C:632:GLN:HE21	1:C:650:ARG:HG3	1.52	0.74
1:C:479:TYR:HA	1:C:495:ARG:NH1	2.04	0.73
1:D:485:ILE:HG22	1:D:486:GLU:H	1.55	0.71
1:B:654:ALA:HB1	2:B:104:ADP:O1B	1.93	0.69
1:D:485:ILE:HG22	1:D:486:GLU:N	2.11	0.65
1:D:581:SER:OG	1:D:840:ARG:HD2	1.96	0.65
1:C:581:SER:OG	1:C:840:ARG:HD2	1.96	0.63
1:C:485:ILE:HG22	1:C:486:GLU:N	2.11	0.62
1:C:485:ILE:HD11	1:C:494:ILE:HD12	1.80	0.62
1:B:485:ILE:HG22	1:B:486:GLU:N	2.10	0.61
1:C:523:MET:HE1	4:C:1227:HOH:O	2.01	0.60
1:A:636:THR:HG23	1:A:643:LEU:HD11	1.84	0.60
1:B:817:CYS:HA	1:B:820:MET:HE3	1.84	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:529:ASN:HD21	2:A:101:ADP:H2	1.52	0.58
1:C:613:GLU:O	1:C:617:VAL:HG12	2.04	0.58
1:A:462:LEU:O	1:A:463:SER:HB3	2.04	0.58
1:A:636:THR:CG2	1:A:643:LEU:HD11	2.34	0.57
1:C:467:ILE:O	1:C:471:VAL:HG23	2.05	0.56
1:B:487:THR:HG23	1:B:490:ARG:HB3	1.87	0.56
1:C:730:GLU:HG2	1:D:595:ARG:HH12	1.71	0.56
1:A:629:ALA:O	1:A:630:ARG:HD2	2.06	0.56
1:A:656:GLY:O	1:A:660:ILE:HG12	2.06	0.56
1:B:752:HIS:CD2	1:B:755:ASN:HD22	2.18	0.55
1:A:479:TYR:HB3	1:A:529:ASN:OD1	2.07	0.55
1:D:519:TYR:O	1:D:523:MET:HG2	2.07	0.55
1:C:808:GLY:O	1:C:814:GLN:HG3	2.08	0.54
1:D:808:GLY:O	1:D:814:GLN:HG3	2.07	0.54
1:C:464:ASP:O	1:C:468:ILE:HG12	2.07	0.54
1:C:463:SER:O	1:C:467:ILE:HG12	2.08	0.54
1:A:766:GLN:OE1	1:A:802:ILE:HG13	2.08	0.53
1:A:542:GLY:H	1:A:567:ASN:HD21	1.55	0.53
1:D:595:ARG:HD2	1:D:679:GLN:OE1	2.08	0.53
1:A:819:GLN:HB3	1:B:508:SER:CB	2.38	0.53
1:A:581:SER:OG	1:A:840:ARG:HD2	2.08	0.53
1:A:718:ARG:HG3	1:A:718:ARG:HH11	1.75	0.52
1:D:596:LEU:HD13	1:D:602:SER:HA	1.92	0.51
1:B:498:LEU:O	1:B:501:LYS:HG2	2.10	0.51
1:A:613:GLU:CD	1:A:613:GLU:H	2.14	0.51
1:B:752:HIS:HE1	1:B:849:GLY:O	1.94	0.50
1:A:819:GLN:HB3	1:B:508:SER:HB2	1.92	0.50
1:A:542:GLY:H	1:A:567:ASN:HD22	1.58	0.49
1:D:655:MET:SD	1:D:657:MET:HG2	2.52	0.48
1:A:808:GLY:O	1:A:814:GLN:HG3	2.12	0.48
1:A:492:VAL:O	1:A:496:ARG:HG2	2.14	0.48
1:B:811:LEU:O	1:B:815:GLN:HG3	2.14	0.47
1:B:808:GLY:O	1:B:814:GLN:HG3	2.15	0.47
1:B:481:LEU:HD22	1:B:481:LEU:H	1.78	0.47
1:A:649:SER:HB3	1:A:660:ILE:HD12	1.96	0.47
1:C:655:MET:SD	1:C:657:MET:HG2	2.55	0.46
1:B:828:LYS:HD2	1:B:829:ASP:H	1.81	0.46
1:D:485:ILE:CG2	1:D:486:GLU:H	2.25	0.46
1:B:471:VAL:O	1:B:472:ASN:HB2	2.16	0.45
1:D:485:ILE:CG2	1:D:486:GLU:N	2.80	0.45
1:D:662:LYS:HB3	1:D:662:LYS:HE2	1.77	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:731:VAL:HG12	1:B:854:MET:CE	2.46	0.45
1:B:811:LEU:HB2	1:B:814:GLN:HG2	1.99	0.45
1:B:706:VAL:HG12	1:B:707:VAL:N	2.32	0.45
1:A:817:CYS:HA	1:A:820:MET:HE3	2.00	0.44
1:C:478:ALA:O	1:C:480:LYS:N	2.47	0.44
1:A:586:ASP:O	1:A:632:GLN:NE2	2.45	0.44
1:C:692:LYS:HB2	1:C:692:LYS:HE2	1.86	0.44
1:C:523:MET:CE	1:C:523:MET:HA	2.48	0.44
1:B:595:ARG:HD3	4:B:1036:HOH:O	2.18	0.43
1:A:637:SER:HB2	1:A:687:TYR:OH	2.17	0.43
1:B:850:GLU:O	1:B:854:MET:HG2	2.18	0.43
1:C:462:LEU:HD12	1:C:462:LEU:N	2.33	0.43
1:A:484:LEU:HD23	1:A:484:LEU:O	2.19	0.43
1:D:774:SER:HA	1:D:799:SER:O	2.19	0.43
1:C:508:SER:HB2	1:D:819:GLN:HB3	2.01	0.43
1:C:614:GLY:O	1:C:617:VAL:HG13	2.18	0.43
1:D:650:ARG:NH1	1:D:836:ARG:HH21	2.17	0.43
1:B:463:SER:OG	1:B:466:GLU:HG2	2.17	0.43
1:A:756:ILE:HD12	1:A:756:ILE:N	2.33	0.43
1:D:485:ILE:HG21	1:D:490:ARG:HD3	1.99	0.43
1:D:627:ARG:N	1:D:627:ARG:HD3	2.34	0.43
2:A:102:ADP:H2	1:B:529:ASN:HD21	1.66	0.42
1:C:773:GLY:HA3	4:C:1171:HOH:O	2.19	0.42
1:B:613:GLU:O	1:B:617:VAL:HG23	2.20	0.42
1:A:664:THR:O	1:A:668:LEU:HG	2.20	0.42
1:C:592:PRO:HD2	1:C:645:ILE:O	2.19	0.42
1:C:595:ARG:HD2	1:C:681:LEU:HD22	2.00	0.42
1:B:625:THR:HG21	1:B:663:GLY:HA2	2.00	0.42
1:A:529:ASN:ND2	2:A:101:ADP:H2	2.17	0.42
1:B:774:SER:HA	1:B:799:SER:O	2.20	0.42
1:C:478:ALA:C	1:C:480:LYS:H	2.22	0.41
1:B:592:PRO:HD2	1:B:645:ILE:O	2.19	0.41
1:A:479:TYR:HA	1:A:495:ARG:HH21	1.85	0.41
1:C:811:LEU:HB2	1:C:814:GLN:HG2	2.02	0.41
1:D:637:SER:HB2	1:D:687:TYR:OH	2.20	0.41
1:C:650:ARG:NH1	1:C:836:ARG:HH21	2.18	0.41
1:A:819:GLN:HB3	1:B:508:SER:HB3	2.01	0.41
1:C:731:VAL:HG12	1:C:854:MET:CE	2.51	0.41
1:D:592:PRO:HD2	1:D:645:ILE:O	2.21	0.41
1:D:496:ARG:NH2	1:D:509:LEU:O	2.54	0.41
1:C:774:SER:HA	1:C:799:SER:O	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:487:THR:HG23	1:B:490:ARG:CB	2.50	0.41
1:A:468:ILE:HG23	1:A:498:LEU:CD1	2.51	0.40
1:C:657:MET:HA	1:C:657:MET:CE	2.51	0.40
1:D:497:GLN:O	1:D:500:SER:HB3	2.21	0.40
1:C:467:ILE:HG21	1:C:494:ILE:HD13	2.02	0.40
1:D:811:LEU:HB2	1:D:814:GLN:HG2	2.04	0.40
1:B:731:VAL:HG12	1:B:854:MET:HE3	2.04	0.40
1:A:592:PRO:HD2	1:A:645:ILE:O	2.21	0.40
1:D:560:GLY:O	1:D:561:CYS:HB2	2.22	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	404/467 (86%)	385 (95%)	17 (4%)	2 (0%)	34	34
1	B	389/467 (83%)	372 (96%)	15 (4%)	2 (0%)	34	34
1	C	397/467 (85%)	382 (96%)	12 (3%)	3 (1%)	24	21
1	D	383/467 (82%)	366 (96%)	15 (4%)	2 (0%)	34	34
All	All	1573/1868 (84%)	1505 (96%)	59 (4%)	9 (1%)	30	29

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	486	GLU
1	C	478	ALA
1	C	479	TYR
1	D	465	ALA
1	B	525	ALA
1	D	514	TYR

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Mol	Chain	Res	Type
1	A	463	SER
1	C	485	ILE
1	B	485	ILE

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	326/375 (87%)	311 (95%)	15 (5%)	33	39
1	B	312/375 (83%)	305 (98%)	7 (2%)	60	72
1	C	317/375 (84%)	309 (98%)	8 (2%)	55	67
1	D	307/375 (82%)	297 (97%)	10 (3%)	45	55
All	All	1262/1500 (84%)	1222 (97%)	40 (3%)	46	57

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

Mol	Chain	Res	Type
1	A	449	LEU
1	A	482	GLU
1	A	486	GLU
1	A	490	ARG
1	A	492	VAL
1	A	498	LEU
1	A	503	LEU
1	A	512	LEU
1	A	521	LEU
1	A	634	LEU
1	A	666	LYS
1	A	681	LEU
1	A	688	CYS
1	A	752	HIS
1	A	814	GLN
1	B	505	GLU
1	B	630	ARG
1	B	657	MET

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Mol	Chain	Res	Type
1	B	660	ILE
1	B	771	ASN
1	B	814	GLN
1	B	828	LYS
1	C	521	LEU
1	C	523	MET
1	C	617	VAL
1	C	634	LEU
1	C	657	MET
1	C	730	GLU
1	C	752	HIS
1	C	814	GLN
1	D	464	ASP
1	D	595	ARG
1	D	627	ARG
1	D	634	LEU
1	D	657	MET
1	D	730	GLU
1	D	752	HIS
1	D	788	ASN
1	D	814	GLN
1	D	828	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	445	ASN
1	A	469	GLN
1	A	567	ASN
1	A	814	GLN
1	B	632	GLN
1	B	635	HIS
1	B	752	HIS
1	C	469	GLN
1	C	819	GLN
1	D	488	HIS
1	D	788	ASN
1	D	819	GLN

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 carbohydrates in this entry.

5.6 Ligand geometry ⓘ

9 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	ADP	A	101	-	22,29,29	1.30	3 (13%)	27,45,45	0.69	0
2	ADP	A	102	-	22,29,29	1.28	3 (13%)	27,45,45	0.89	1 (3%)
2	ADP	A	103	-	22,29,29	1.57	4 (18%)	27,45,45	1.08	2 (7%)
3	117	A	2	-	39,44,44	1.90	7 (17%)	50,61,61	1.16	5 (10%)
3	117	B	1	-	39,44,44	1.88	8 (20%)	50,61,61	1.07	4 (8%)
2	ADP	B	104	-	22,29,29	1.72	5 (22%)	27,45,45	0.95	2 (7%)
3	117	C	4	-	39,44,44	1.80	8 (20%)	50,61,61	1.12	5 (10%)
2	ADP	D	105	-	22,29,29	1.41	4 (18%)	27,45,45	0.80	1 (3%)
3	117	D	3	-	39,44,44	1.76	8 (20%)	50,61,61	1.10	4 (8%)

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
2	ADP	A	101	-	-	0/12/32/32	0/3/3/3
2	ADP	A	102	-	-	0/12/32/32	0/3/3/3
2	ADP	A	103	-	-	0/12/32/32	0/3/3/3
3	117	A	2	-	-	0/27/33/33	0/4/4/4
3	117	B	1	-	-	0/27/33/33	0/4/4/4
2	ADP	B	104	-	-	0/12/32/32	0/3/3/3
3	117	C	4	-	-	0/27/33/33	0/4/4/4
2	ADP	D	105	-	-	0/12/32/32	0/3/3/3
3	117	D	3	-	-	0/27/33/33	0/4/4/4

All (50) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	2	117	C19-N2	-7.38	1.27	1.41
3	B	1	117	C19-N2	-6.88	1.28	1.41
3	C	4	117	C19-N2	-6.66	1.28	1.41
3	D	3	117	C19-N2	-5.54	1.31	1.41
3	B	1	117	C10-C12	-4.15	1.42	1.50
3	D	3	117	C10-C12	-4.07	1.42	1.50
3	C	4	117	C10-C12	-3.34	1.43	1.50
2	A	103	ADP	C8-N7	-3.18	1.28	1.34
2	D	105	ADP	C8-N7	-3.17	1.28	1.34
2	A	101	ADP	C8-N7	-3.15	1.28	1.34
3	A	2	117	C10-C12	-3.15	1.44	1.50
2	B	104	ADP	C8-N7	-3.13	1.28	1.34
2	A	102	ADP	C8-N7	-2.97	1.28	1.34
3	C	4	117	C81-C8	-2.46	1.41	1.48
3	A	2	117	C81-C8	-2.32	1.42	1.48
2	B	104	ADP	C5-C4	-2.15	1.35	1.40
3	D	3	117	C81-C8	-2.13	1.42	1.48
3	C	4	117	C10-C8	2.02	1.42	1.40
2	A	101	ADP	O4'-C1'	2.05	1.43	1.41
2	D	105	ADP	C2'-C3'	2.06	1.59	1.53
3	D	3	117	C24-C19	2.10	1.42	1.39
3	B	1	117	C82-C83	2.15	1.42	1.38
2	A	102	ADP	O4'-C4'	2.16	1.50	1.45
2	A	102	ADP	C2'-C3'	2.20	1.59	1.53
3	A	2	117	C10-C8	2.23	1.43	1.40
3	B	1	117	C11-C18	2.33	1.54	1.51
2	A	101	ADP	O4'-C4'	2.39	1.50	1.45
3	C	4	117	C24-C19	2.39	1.43	1.39
2	A	103	ADP	C2'-C3'	2.42	1.60	1.53
3	C	4	117	C83-C84	2.49	1.42	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	105	ADP	O4'-C4'	2.51	1.50	1.45
2	B	104	ADP	C2'-C3'	2.54	1.60	1.53
3	A	2	117	C13-C12	2.55	1.44	1.39
3	B	1	117	C83-C84	2.56	1.42	1.37
3	D	3	117	C10-C8	2.58	1.43	1.40
2	D	105	ADP	O4'-C1'	2.59	1.44	1.41
3	A	2	117	C18-N2	2.76	1.42	1.35
3	B	1	117	C10-C8	2.86	1.44	1.40
3	B	1	117	C9-C91	2.86	1.56	1.51
2	A	103	ADP	O4'-C1'	3.03	1.45	1.41
2	B	104	ADP	O4'-C4'	3.03	1.52	1.45
3	D	3	117	C11-C18	3.14	1.55	1.51
2	A	103	ADP	O4'-C4'	3.18	1.52	1.45
3	C	4	117	C18-N2	3.25	1.44	1.35
3	C	4	117	C9-C91	3.33	1.57	1.51
3	D	3	117	C18-N2	3.34	1.44	1.35
3	D	3	117	C9-C91	3.43	1.57	1.51
3	B	1	117	C18-N2	3.45	1.44	1.35
3	A	2	117	C9-C91	3.81	1.58	1.51
2	B	104	ADP	O4'-C1'	4.18	1.46	1.41

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1	117	C5-C4-C3	-2.90	110.15	114.18
3	A	2	117	O18-C18-C11	-2.82	116.71	120.80
3	D	3	117	O18-C18-C11	-2.33	117.42	120.80
3	C	4	117	O18-C18-C11	-2.23	117.57	120.80
2	B	104	ADP	N3-C2-N1	-2.17	127.23	128.89
2	D	105	ADP	N3-C2-N1	-2.07	127.31	128.89
3	A	2	117	C7-N1-C8	2.03	128.28	124.87
2	A	103	ADP	C4'-O4'-C1'	2.03	111.95	109.72
3	D	3	117	C10-C11-C18	2.18	131.21	126.01
3	B	1	117	C10-C8-N1	2.20	110.41	108.24
2	B	104	ADP	O3A-PA-O5'	2.24	108.89	102.94
3	C	4	117	C7-N1-C8	2.26	128.66	124.87
3	C	4	117	C82-C81-C8	2.33	124.57	120.43
3	B	1	117	C82-C81-C8	2.37	124.65	120.43
3	A	2	117	C82-C81-C8	2.41	124.71	120.43
3	B	1	117	C11-C18-N2	2.47	119.69	114.88
2	A	102	ADP	C4'-O4'-C1'	2.69	112.68	109.72
3	A	2	117	C10-C8-N1	2.72	110.91	108.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	3	117	C10-C8-N1	2.72	110.92	108.24
3	C	4	117	C10-C8-N1	2.82	111.01	108.24
3	C	4	117	C11-C18-N2	2.93	120.60	114.88
2	A	103	ADP	O4'-C1'-N9	3.25	114.90	108.10
3	A	2	117	C11-C18-N2	3.36	121.42	114.88
3	D	3	117	C11-C18-N2	3.46	121.63	114.88

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	101	ADP	2	0
2	A	102	ADP	1	0
2	B	104	ADP	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	408/467 (87%)	0.68	58 (14%) 4 3	30, 48, 93, 100	0
1	B	393/467 (84%)	0.56	42 (10%) 8 7	30, 48, 77, 100	0
1	C	399/467 (85%)	0.87	67 (16%) 2 2	32, 50, 94, 100	0
1	D	387/467 (82%)	0.56	52 (13%) 4 4	30, 45, 75, 100	0
All	All	1587/1868 (84%)	0.67	219 (13%) 4 3	30, 48, 91, 100	0

All (219) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	476	ILE	11.4
1	D	483	THR	9.4
1	C	475	HIS	9.3
1	D	467	ILE	8.6
1	A	484	LEU	8.6
1	C	476	ILE	8.0
1	C	477	PRO	7.7
1	A	475	HIS	7.7
1	A	473	ALA	7.7
1	D	484	LEU	7.3
1	C	483	THR	7.3
1	D	485	ILE	7.2
1	C	627	ARG	6.7
1	B	479	TYR	6.6
1	C	478	ALA	6.2
1	C	484	LEU	6.1
1	A	470	LEU	6.0
1	C	479	TYR	6.0
1	C	486	GLU	5.9
1	B	486	GLU	5.8
1	B	478	ALA	5.6

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Mol	Chain	Res	Type	RSRZ
1	D	466	GLU	5.6
1	A	448	CYS	5.6
1	D	494	ILE	5.6
1	B	485	ILE	5.5
1	D	486	GLU	5.5
1	A	479	TYR	5.4
1	A	471	VAL	5.2
1	C	628	PHE	5.2
1	A	449	LEU	5.1
1	C	473	ALA	5.0
1	D	463	SER	5.0
1	C	480	LYS	5.0
1	B	483	THR	4.8
1	D	481	LEU	4.8
1	D	490	ARG	4.7
1	A	483	THR	4.7
1	A	861	HIS	4.6
1	A	480	LYS	4.6
1	D	487	THR	4.5
1	B	487	THR	4.5
1	B	746	ILE	4.5
1	D	464	ASP	4.4
1	A	477	PRO	4.2
1	D	694	ALA	4.2
1	C	470	LEU	4.2
1	B	523	MET	4.1
1	A	497	GLN	4.1
1	C	465	ALA	4.1
1	B	613	GLU	4.0
1	D	524	GLY	4.0
1	A	746	ILE	4.0
1	D	693	PRO	4.0
1	A	446	GLU	3.9
1	C	828	LYS	3.9
1	B	694	ALA	3.9
1	C	694	ALA	3.8
1	A	447	GLU	3.8
1	B	470	LEU	3.8
1	C	740	SER	3.8
1	B	630	ARG	3.8
1	A	860	GLY	3.8
1	C	699	ILE	3.8

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Mol	Chain	Res	Type	RSRZ
1	A	445	ASN	3.7
1	C	485	ILE	3.7
1	D	523	MET	3.7
1	D	482	GLU	3.6
1	D	743	ALA	3.5
1	C	524	GLY	3.5
1	D	772	VAL	3.5
1	B	469	GLN	3.5
1	D	786	PRO	3.5
1	C	748	GLY	3.5
1	C	746	ILE	3.5
1	D	695	ALA	3.5
1	B	747	GLY	3.4
1	B	695	ALA	3.4
1	C	698	TRP	3.4
1	B	481	LEU	3.4
1	C	471	VAL	3.4
1	C	757	VAL	3.4
1	D	745	SER	3.3
1	A	498	LEU	3.3
1	C	482	GLU	3.3
1	C	772	VAL	3.3
1	A	472	ASN	3.3
1	A	829	ASP	3.3
1	C	469	GLN	3.2
1	A	772	VAL	3.2
1	B	698	TRP	3.2
1	D	746	ILE	3.2
1	B	741	ALA	3.1
1	B	471	VAL	3.1
1	C	689	THR	3.1
1	A	748	GLY	3.1
1	A	501	LYS	3.1
1	C	630	ARG	3.1
1	A	481	LEU	3.1
1	C	747	GLY	3.0
1	C	749	TYR	3.0
1	C	741	ALA	3.0
1	B	482	GLU	3.0
1	C	773	GLY	3.0
1	D	465	ALA	3.0
1	C	696	ILE	3.0

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Mol	Chain	Res	Type	RSRZ
1	C	693	PRO	2.9
1	D	748	GLY	2.9
1	C	695	ALA	2.9
1	B	484	LEU	2.9
1	A	468	ILE	2.9
1	A	699	ILE	2.9
1	D	696	ILE	2.9
1	B	743	ALA	2.9
1	A	478	ALA	2.8
1	A	741	ALA	2.8
1	D	740	SER	2.8
1	D	516	ASP	2.8
1	D	747	GLY	2.8
1	C	510	GLN	2.8
1	B	696	ILE	2.8
1	B	688	CYS	2.8
1	A	694	ALA	2.8
1	A	630	ARG	2.8
1	D	741	ALA	2.8
1	D	469	GLN	2.8
1	C	523	MET	2.8
1	D	698	TRP	2.8
1	B	693	PRO	2.7
1	B	748	GLY	2.7
1	B	749	TYR	2.7
1	C	474	LYS	2.7
1	A	467	ILE	2.7
1	D	773	GLY	2.7
1	C	515	ARG	2.6
1	B	677	GLU	2.6
1	C	468	ILE	2.6
1	C	754	ALA	2.6
1	B	740	SER	2.6
1	D	699	ILE	2.6
1	A	469	GLN	2.6
1	C	843	CYS	2.6
1	A	744	GLY	2.6
1	B	773	GLY	2.6
1	D	744	GLY	2.6
1	A	523	MET	2.6
1	A	628	PHE	2.6
1	A	444	PRO	2.6

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Mol	Chain	Res	Type	RSRZ
1	B	501	LYS	2.6
1	A	745	SER	2.5
1	C	481	LEU	2.5
1	C	701	GLY	2.5
1	D	777	CYS	2.5
1	D	689	THR	2.5
1	C	745	SER	2.5
1	C	777	CYS	2.5
1	A	689	THR	2.5
1	D	775	SER	2.5
1	A	828	LYS	2.5
1	B	777	CYS	2.5
1	C	743	ALA	2.5
1	B	737	LEU	2.5
1	D	737	LEU	2.5
1	C	753	ALA	2.4
1	C	771	ASN	2.4
1	C	761	TYR	2.4
1	C	616	ALA	2.4
1	D	627	ARG	2.4
1	A	830	ASN	2.4
1	D	749	TYR	2.4
1	A	620	GLU	2.4
1	B	608	TRP	2.4
1	A	738	VAL	2.4
1	B	745	SER	2.4
1	A	789	GLU	2.3
1	B	778	ILE	2.3
1	B	754	ALA	2.3
1	D	468	ILE	2.3
1	A	474	LYS	2.3
1	A	742	MET	2.3
1	A	502	LYS	2.3
1	D	776	ASN	2.3
1	B	744	GLY	2.3
1	D	720	VAL	2.2
1	C	796	THR	2.2
1	B	771	ASN	2.2
1	C	697	ASN	2.2
1	D	753	ALA	2.2
1	C	842	VAL	2.2
1	C	795	CYS	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	739	GLY	2.2
1	A	715	LYS	2.2
1	C	706	VAL	2.1
1	A	510	GLN	2.1
1	A	739	GLY	2.1
1	D	785	GLY	2.1
1	A	740	SER	2.1
1	B	699	ILE	2.1
1	D	774	SER	2.1
1	A	749	TYR	2.1
1	B	674	TYR	2.1
1	C	487	THR	2.1
1	A	490	ARG	2.1
1	A	693	PRO	2.1
1	D	488	HIS	2.1
1	C	737	LEU	2.1
1	D	491	GLY	2.1
1	C	518	ASN	2.1
1	D	571	ARG	2.1
1	C	846	VAL	2.1
1	C	688	CYS	2.1
1	D	787	THR	2.1
1	A	662	LYS	2.1
1	D	715	LYS	2.1
1	A	466	GLU	2.0
1	A	743	ALA	2.0
1	B	616	ALA	2.0
1	C	507	SER	2.0
1	C	860	GLY	2.0
1	C	769	ALA	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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
2	ADP	B	104	27/27	0.52	0.37	7.56	99,101,101,101	0
2	ADP	A	103	27/27	0.71	0.33	3.60	93,98,100,100	0
2	ADP	D	105	27/27	0.81	0.24	1.87	86,94,100,100	0
2	ADP	A	101	27/27	0.75	0.32	1.54	93,96,100,100	0
2	ADP	A	102	27/27	0.75	0.32	1.07	94,98,100,100	0
3	117	C	4	41/41	0.91	0.15	0.23	37,46,52,53	0
3	117	D	3	41/41	0.93	0.15	-0.17	34,44,49,49	0
3	117	A	2	41/41	0.95	0.14	-0.31	34,41,45,47	0
3	117	B	1	41/41	0.94	0.12	-0.38	40,47,50,51	0

6.5 Other polymers [i](#)

There are no such residues in this entry.