Full wwPDB EM Validation Report ⓘ

Mar 8, 2026 – 01:48 PM UTC

PDB ID	:	9E00 / pdb_00009e00
EMDB ID	:	EMD-47344
Title	:	Cryo-EM structure of human DNMT3A2-DNMT3B3 complex bound to di-nucleosome
Authors	:	Xie, X.; Zhou, X.E.; Worden, E.J.; Jones, P.A.
Deposited on	:	2024-10-17
Resolution	:	3.75 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp
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:

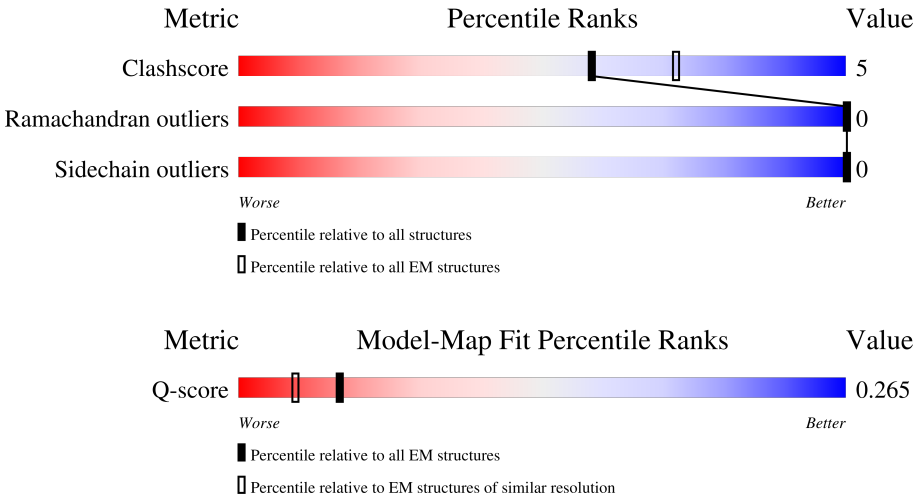
EMDB validation analysis	:	0.0.1.dev132
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
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:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.75 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)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	10301 (3.25 - 4.25)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	135	61% 10% 29%
1	E	135	67% 5% 28%
1	M	135	68% 5% 27%
1	Q	135	61% 10% 30%

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Mol	Chain	Length	Quality of chain
2	B	103	
2	F	103	
2	N	103	
2	R	103	
3	C	129	
3	G	129	
3	O	129	
3	S	129	
4	D	123	
4	H	123	
4	P	123	
4	T	123	
5	I	321	
6	J	321	
7	L	773	
7	V	773	
7	X	773	
7	Z	773	
8	K	689	
8	U	689	
8	W	689	
8	Y	689	

2 Entry composition (i)

There are 10 unique types of molecules in this entry. The entry contains 43873 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Histone H3.2.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	96	Total	C	N	O	S	0	0
			795	501	154	137	3		
1	E	97	Total	C	N	O	S	0	0
			802	506	155	138	3		
1	M	99	Total	C	N	O	S	0	0
			820	518	159	140	3		
1	Q	95	Total	C	N	O	S	0	0
			785	495	151	136	3		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	102	ALA	GLY	conflict	UNP Q71DI3
E	102	ALA	GLY	conflict	UNP Q71DI3
M	102	ALA	GLY	conflict	UNP Q71DI3
Q	102	ALA	GLY	conflict	UNP Q71DI3

- Molecule 2 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	80	Total	C	N	O	S	0	0
			641	405	125	110	1		
2	F	78	Total	C	N	O	S	0	0
			622	393	120	108	1		
2	N	78	Total	C	N	O	S	0	0
			622	393	120	108	1		
2	R	79	Total	C	N	O	S	0	0
			633	399	124	109	1		

- Molecule 3 is a protein called Histone H2A.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	C	102	Total 785	C 493	N 154	O 138	0	0
3	G	98	Total 755	C 474	N 149	O 132	0	0
3	O	98	Total 755	C 474	N 149	O 132	0	0
3	S	98	Total 752	C 473	N 148	O 131	0	0

- Molecule 4 is a protein called Histone H2B.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	93	Total 726	C 457	N 130	O 137	S 2	0	0
4	H	92	Total 719	C 453	N 129	O 135	S 2	0	0
4	P	91	Total 708	C 447	N 125	O 134	S 2	0	0
4	T	92	Total 719	C 453	N 129	O 135	S 2	0	0

- Molecule 5 is a DNA chain called DNA (321-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
5	I	321	Total 6614	C 3127	N 1244	O 1922	P 321	0	0

- Molecule 6 is a DNA chain called DNA (321-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
6	J	321	Total 6547	C 3106	N 1190	O 1930	P 321	0	0

- Molecule 7 is a protein called Isoform 3 of DNA (cytosine-5)-methyltransferase 3B.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	V	349	Total 2793	C 1773	N 493	O 501	S 26	0	0
7	Z	182	Total 1478	C 964	N 255	O 253	S 6	0	0
7	L	348	Total 2777	C 1759	N 489	O 503	S 26	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
7	X	184	Total	C	N	O	S	0	0
			1495	974	262	254	5		

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
V	391	LYS	-	insertion	UNP Q9UBC3
V	392	ASP	-	insertion	UNP Q9UBC3
V	393	TYR	-	insertion	UNP Q9UBC3
Z	391	LYS	-	insertion	UNP Q9UBC3
Z	392	ASP	-	insertion	UNP Q9UBC3
Z	393	TYR	-	insertion	UNP Q9UBC3
L	391	LYS	-	insertion	UNP Q9UBC3
L	392	ASP	-	insertion	UNP Q9UBC3
L	393	TYR	-	insertion	UNP Q9UBC3
X	391	LYS	-	insertion	UNP Q9UBC3
X	392	ASP	-	insertion	UNP Q9UBC3
X	393	TYR	-	insertion	UNP Q9UBC3

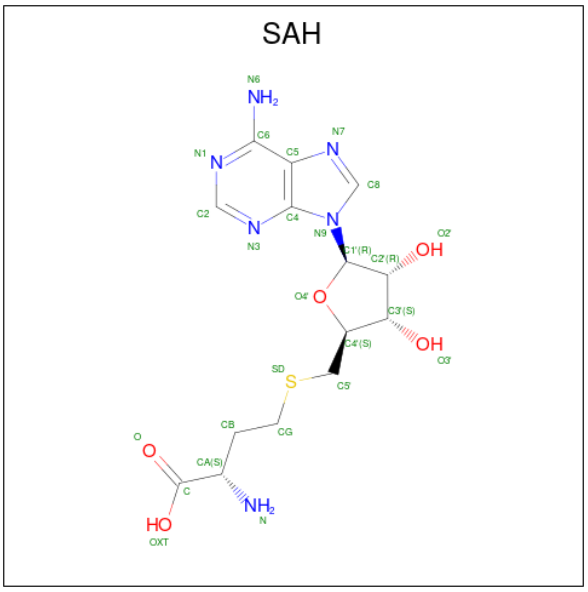
- Molecule 8 is a protein called DNA (cytosine-5)-methyltransferase 3A.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	U	290	Total	C	N	O	S	0	0
			2346	1502	416	415	13		
8	Y	424	Total	C	N	O	S	0	0
			3404	2156	604	609	35		
8	W	290	Total	C	N	O	S	0	0
			2346	1502	416	415	13		
8	K	287	Total	C	N	O	S	0	0
			2321	1487	410	411	13		

- Molecule 9 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
9	V	3	Total	Zn	0
			3	3	
9	Y	3	Total	Zn	0
			3	3	
9	L	3	Total	Zn	0
			3	3	

- Molecule 10 is S-ADENOSYL-L-HOMOCYSTEINE (CCD ID: SAH) (formula: $C_{14}H_{20}N_6O_5S$).



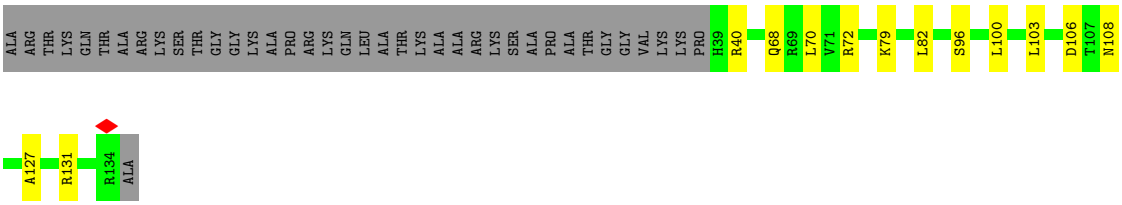
Mol	Chain	Residues	Atoms					AltConf
10	U	1	Total	C	N	O	S	0
			26	14	6	5	1	
10	Y	1	Total	C	N	O	S	0
			26	14	6	5	1	
10	W	1	Total	C	N	O	S	0
			26	14	6	5	1	
10	K	1	Total	C	N	O	S	0
			26	14	6	5	1	

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 atom inclusion in map 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 diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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.

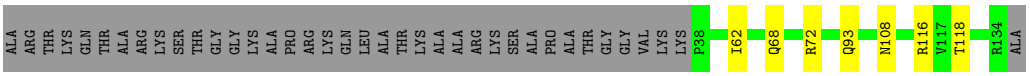
• Molecule 1: Histone H3.2

Chain A:



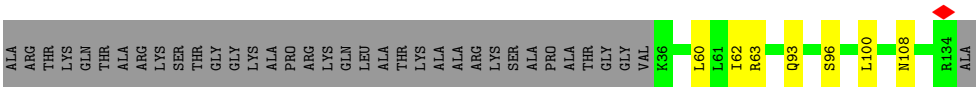
• Molecule 1: Histone H3.2

Chain E:



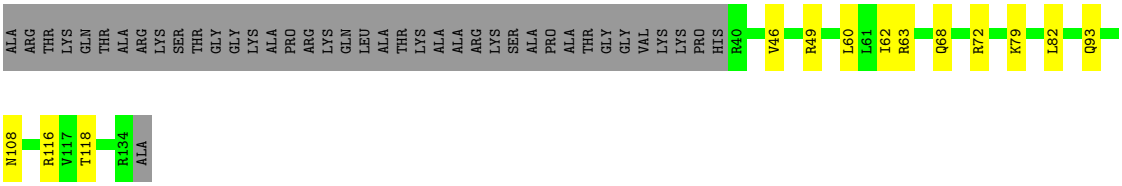
• Molecule 1: Histone H3.2

Chain M:



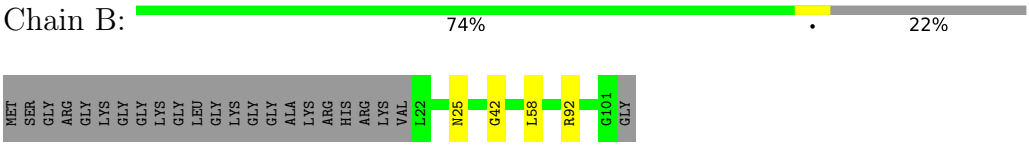
• Molecule 1: Histone H3.2

Chain Q:



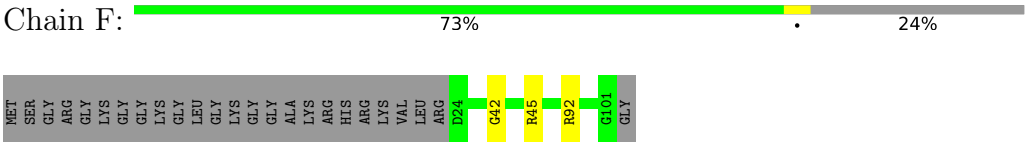
• Molecule 2: Histone H4

Chain B:



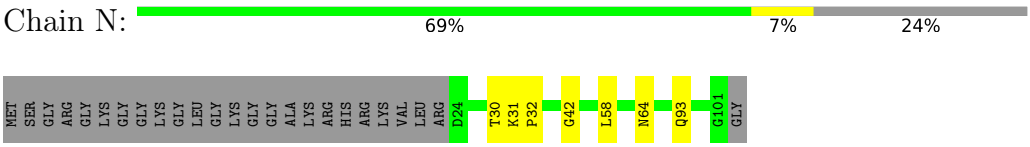
• Molecule 2: Histone H4

Chain F:



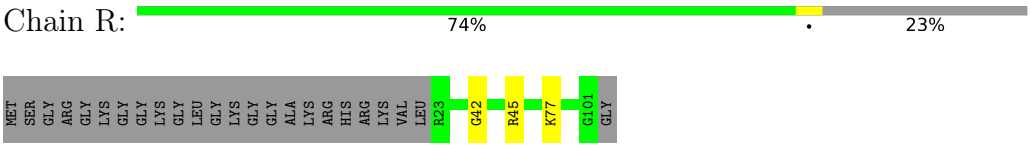
• Molecule 2: Histone H4

Chain N:



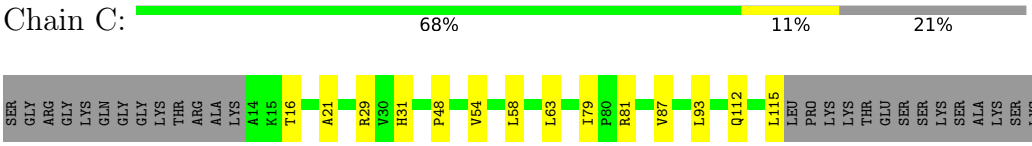
• Molecule 2: Histone H4

Chain R:



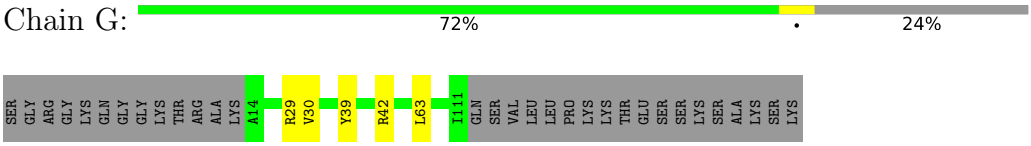
• Molecule 3: Histone H2A

Chain C:



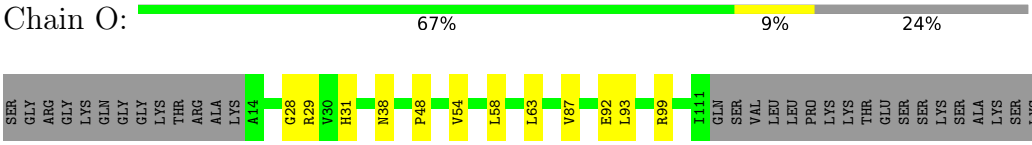
• Molecule 3: Histone H2A

Chain G:



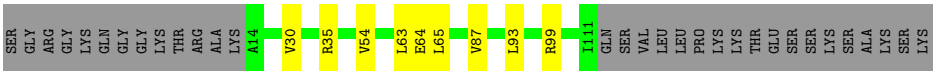
• Molecule 3: Histone H2A

Chain O:



• Molecule 3: Histone H2A

Chain S:



• Molecule 4: Histone H2B

Chain D:

• Molecule 4: Histone H2B

Chain H:

• Molecule 4: Histone H2B

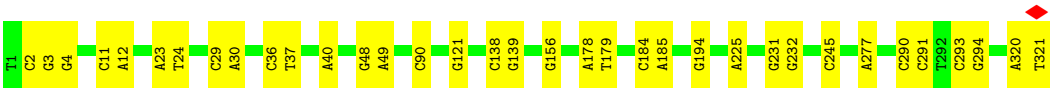
Chain P:

• Molecule 4: Histone H2B

Chain T:

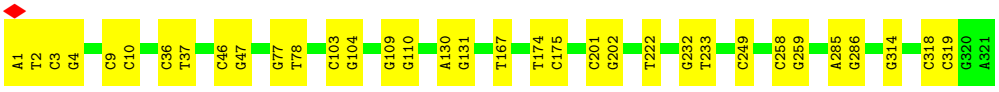
• Molecule 5: DNA (321-MER)

Chain I:



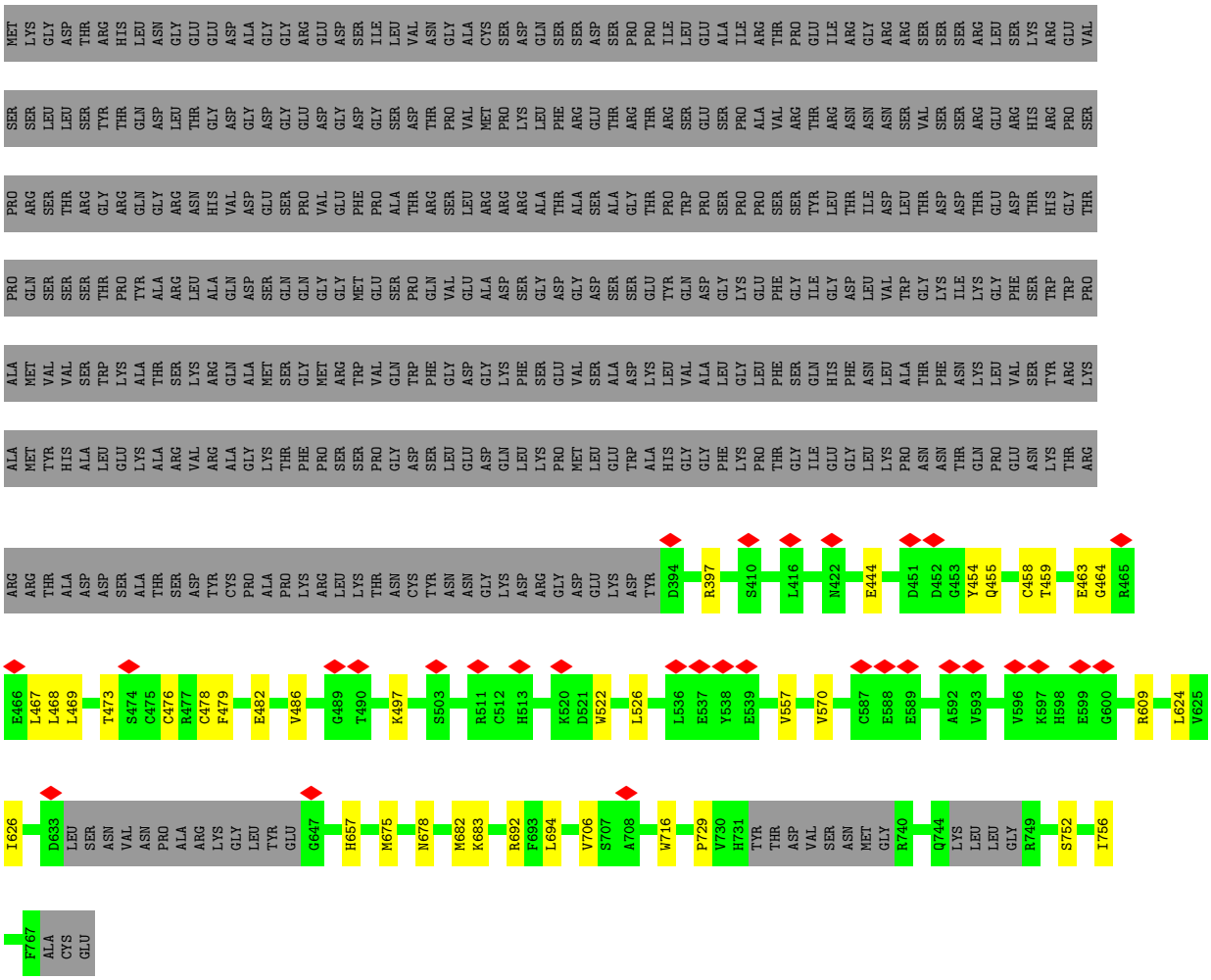
• Molecule 6: DNA (321-MER)

Chain J:



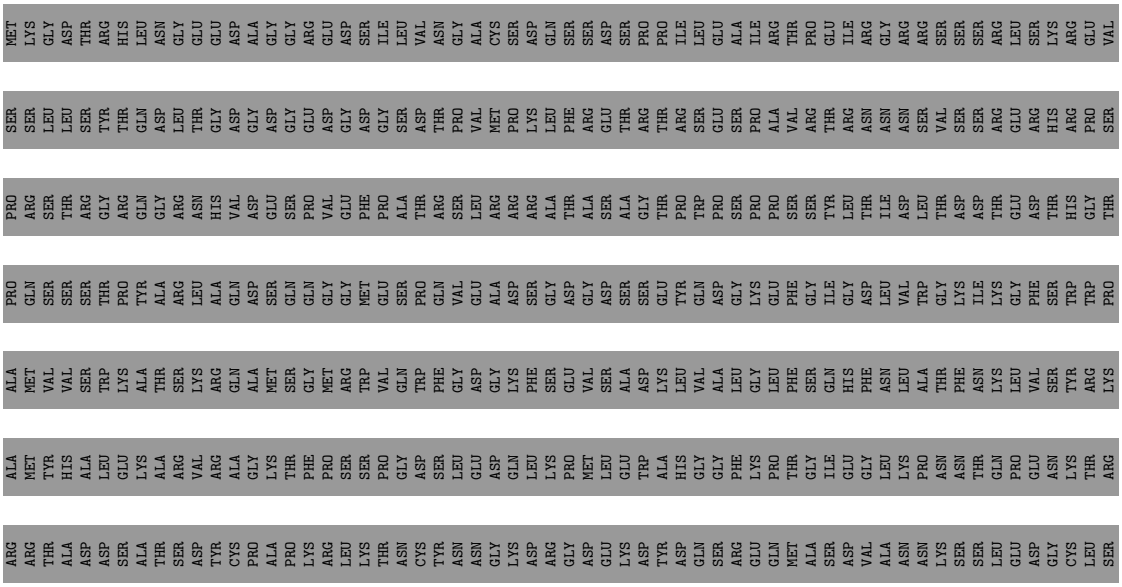
• Molecule 7: Isoform 3 of DNA (cytosine-5)-methyltransferase 3B

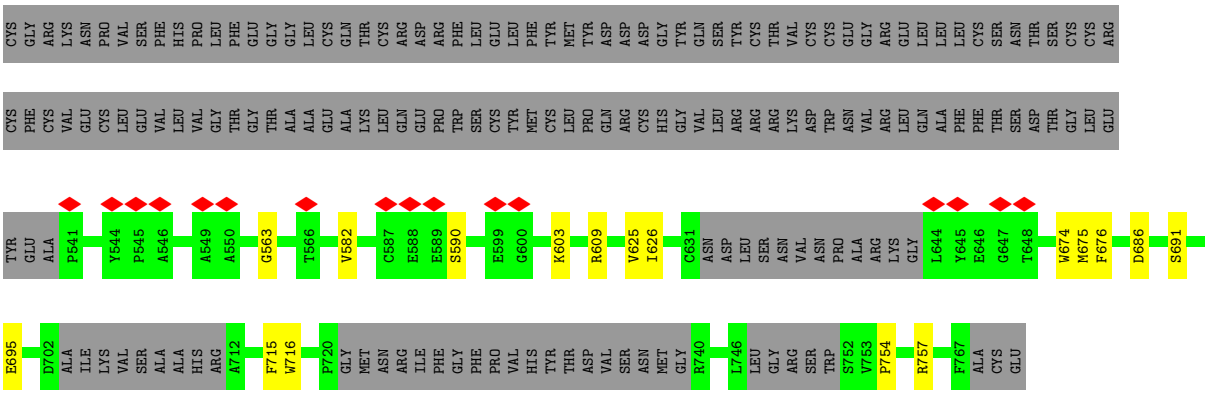
Chain V:



• Molecule 7: Isoform 3 of DNA (cytosine-5)-methyltransferase 3B

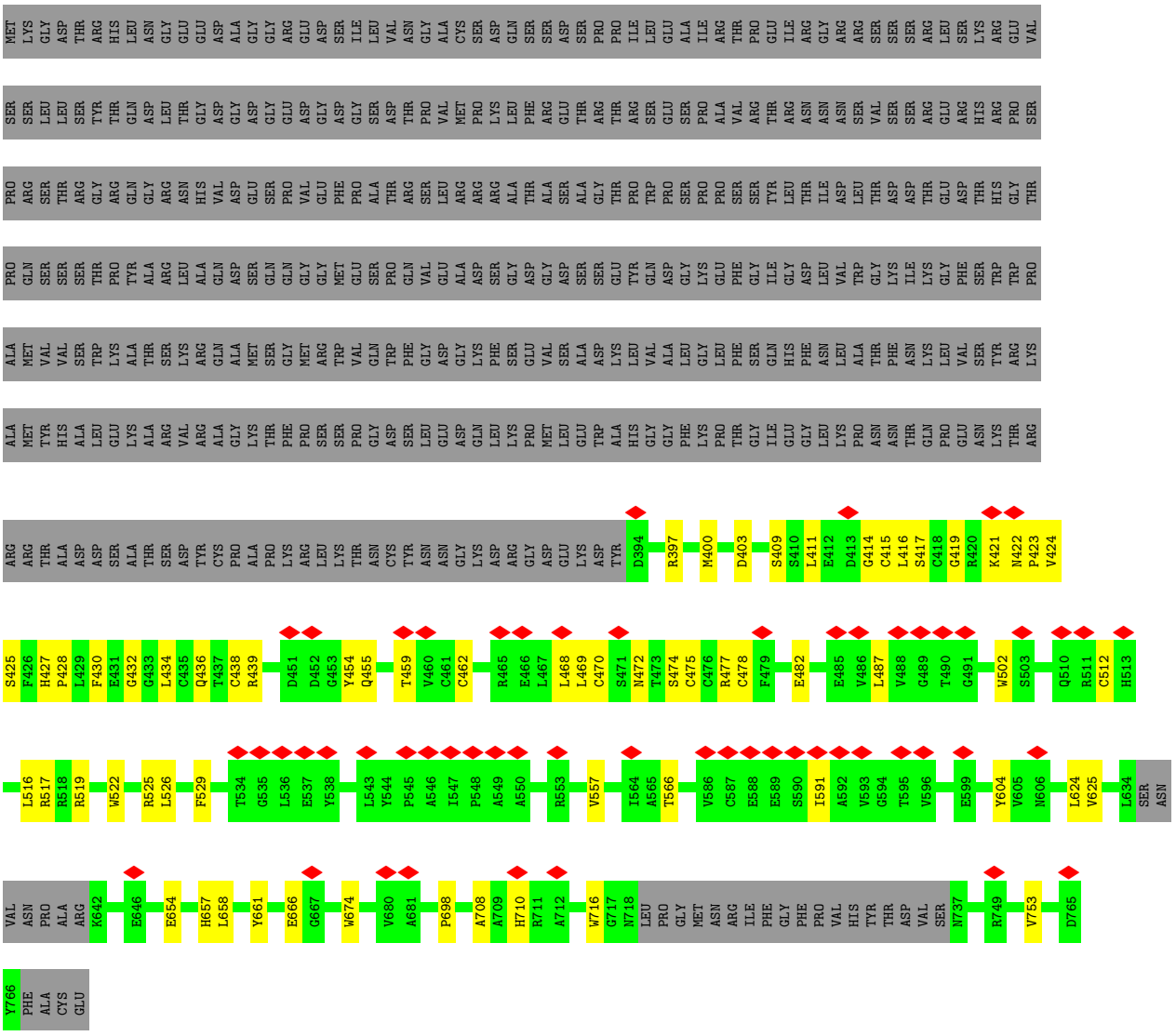
Chain Z:





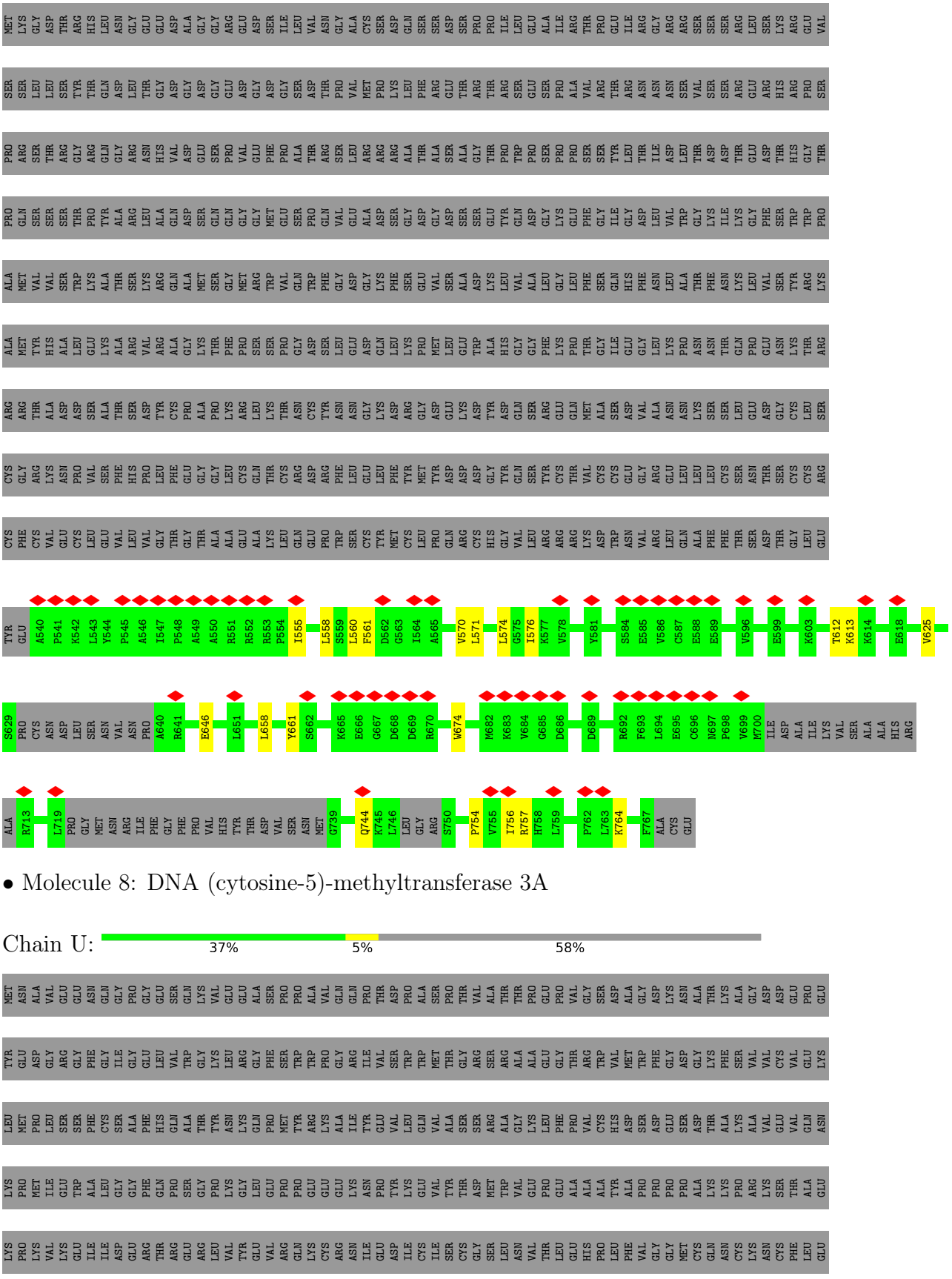
• Molecule 7: Isoform 3 of DNA (cytosine-5)-methyltransferase 3B

Chain L:



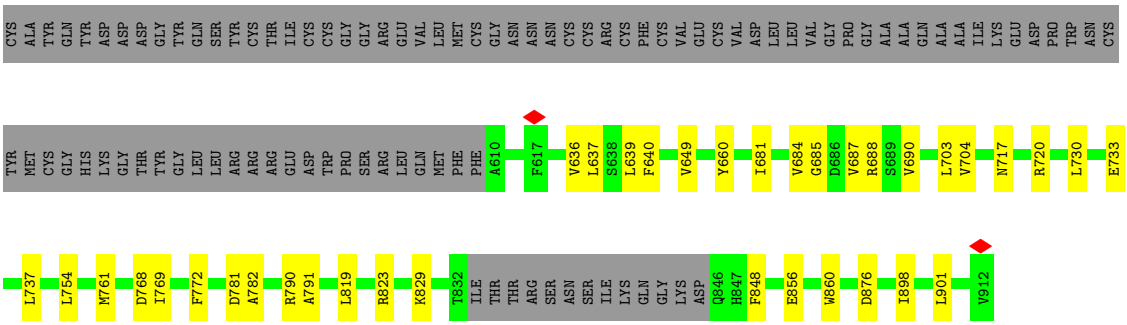
• Molecule 7: Isoform 3 of DNA (cytosine-5)-methyltransferase 3B

Chain X:



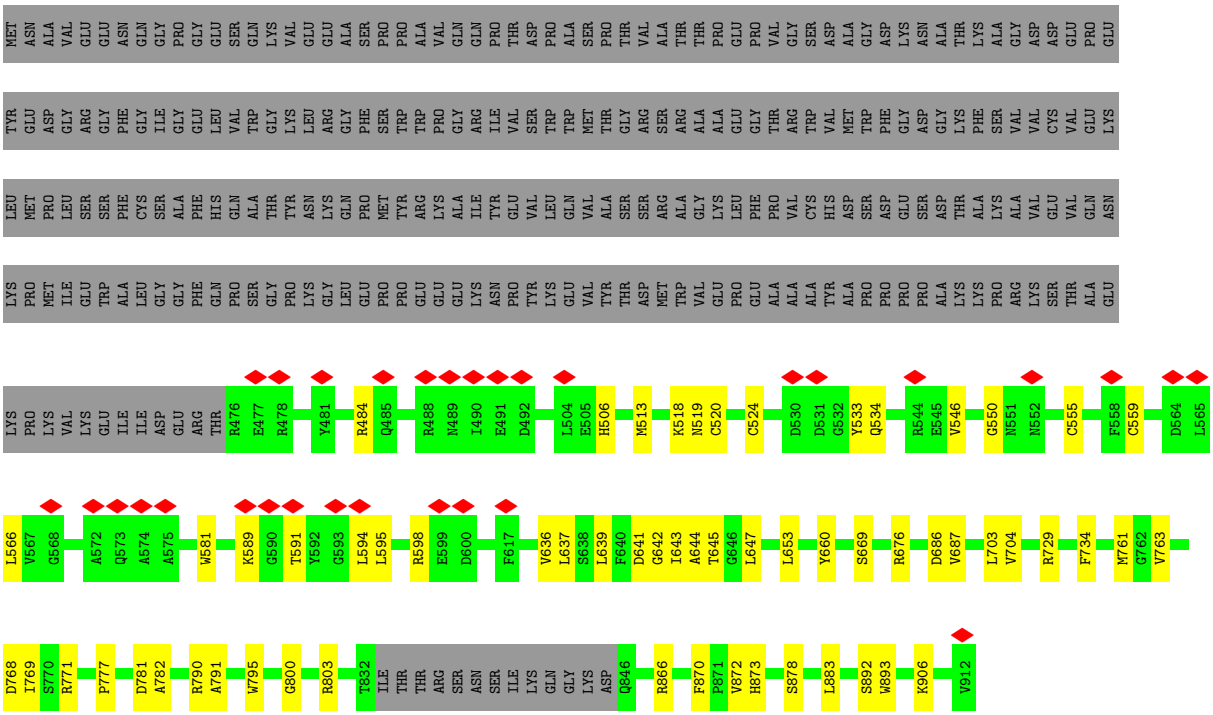
• Molecule 8: DNA (cytosine-5)-methyltransferase 3A

Chain U:



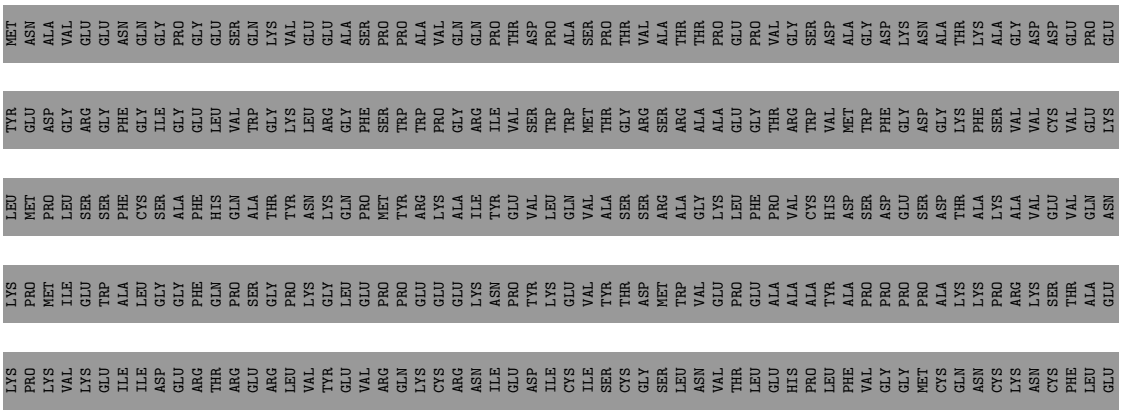
• Molecule 8: DNA (cytosine-5)-methyltransferase 3A

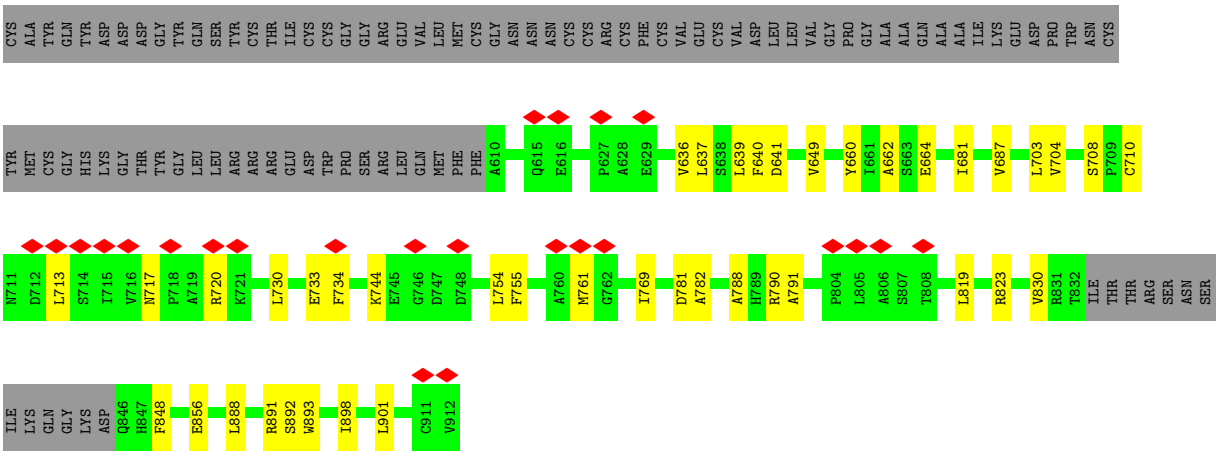
Chain Y:



• Molecule 8: DNA (cytosine-5)-methyltransferase 3A

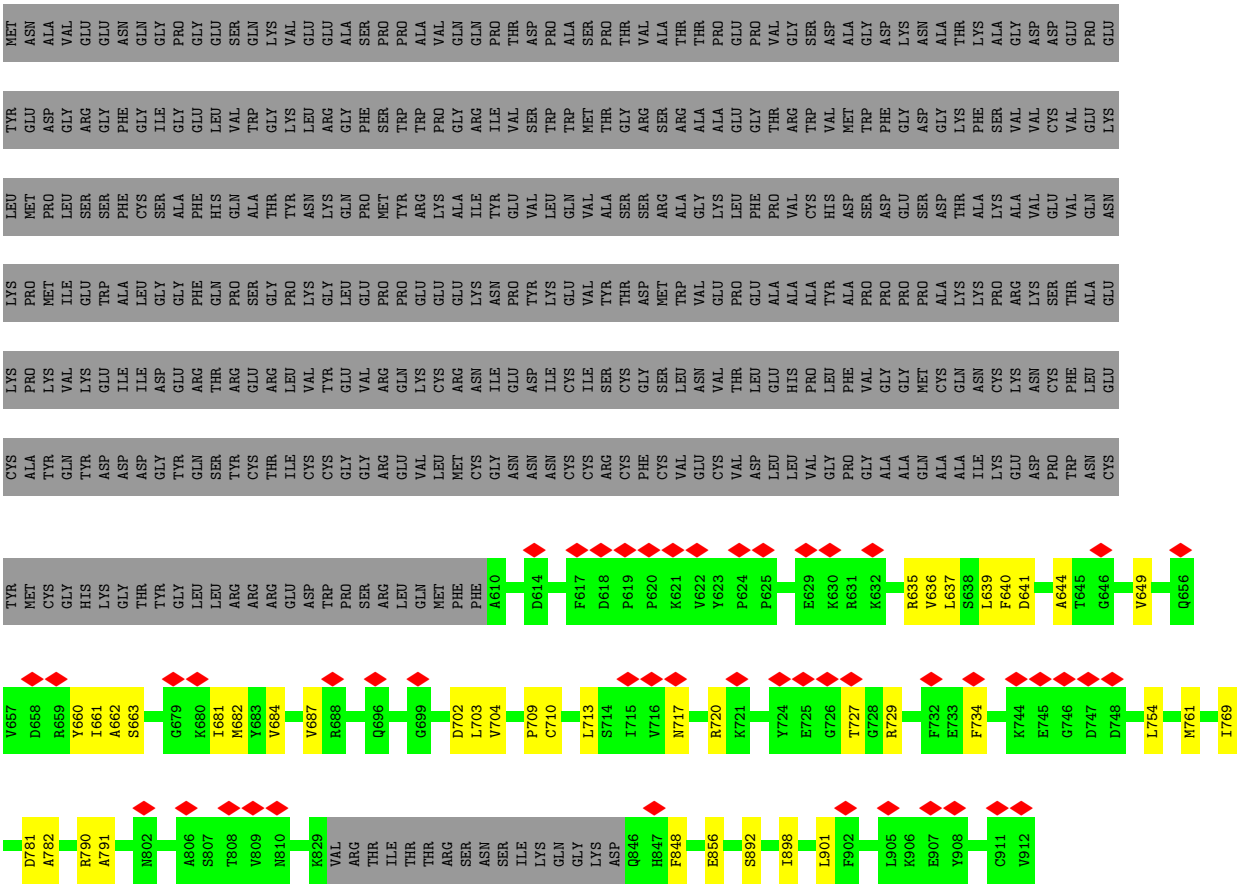
Chain W:





• Molecule 8: DNA (cytosine-5)-methyltransferase 3A

Chain K:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	211221	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	61	Depositor
Minimum defocus (nm)	1100	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.487	Depositor
Minimum map value	-0.000	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.023	Depositor
Recommended contour level	0.039	Depositor
Map size (Å)	397.44, 397.44, 397.44	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.828, 0.828, 0.828	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SAH, 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	0.88	0/806	1.30	0/1081
1	E	0.87	0/814	1.27	0/1092
1	M	0.87	0/832	1.26	0/1115
1	Q	0.88	0/795	1.29	0/1066
2	B	0.86	0/648	1.27	0/868
2	F	0.86	0/629	1.27	0/843
2	N	0.88	0/629	1.29	0/843
2	R	0.88	0/640	1.28	0/857
3	C	0.87	0/794	1.25	0/1072
3	G	0.87	0/764	1.28	0/1031
3	O	0.88	0/764	1.27	0/1031
3	S	0.87	0/761	1.26	0/1027
4	D	0.90	0/737	1.37	0/993
4	H	0.89	0/730	1.35	0/983
4	P	0.91	0/719	1.36	0/969
4	T	0.89	0/730	1.35	0/983
5	I	0.30	0/7428	0.58	0/11471
6	J	0.31	0/7336	0.54	0/11312
7	L	0.91	0/2840	1.20	0/3830
7	V	0.89	0/2860	1.19	2/3859 (0.1%)
7	X	0.89	0/1532	1.15	0/2061
7	Z	0.86	0/1515	1.14	0/2041
8	K	0.89	0/2382	1.15	0/3222
8	U	0.89	1/2407 (0.0%)	1.13	0/3256
8	W	0.87	0/2407	1.15	0/3256
8	Y	0.89	0/3487	1.14	0/4712
All	All	0.75	1/45986 (0.0%)	1.03	2/64874 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	U	829	LYS	C-N	-8.53	1.22	1.33

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	V	752	SER	CA-C-N	6.57	125.59	120.33
7	V	752	SER	C-N-CA	6.57	125.59	120.33

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	795	0	833	11	0
1	E	802	0	841	4	0
1	M	820	0	866	5	0
1	Q	785	0	826	7	0
2	B	641	0	684	5	0
2	F	622	0	660	3	0
2	N	622	0	660	6	0
2	R	633	0	673	3	0
3	C	785	0	833	10	0
3	G	755	0	800	5	0
3	O	755	0	800	13	0
3	S	752	0	796	8	0
4	D	726	0	747	6	0
4	H	719	0	740	6	0
4	P	708	0	727	24	0
4	T	719	0	740	6	0
5	I	6614	0	3597	24	0
6	J	6547	0	3601	21	0
7	L	2777	0	2711	63	0
7	V	2793	0	2714	37	0
7	X	1495	0	1504	18	0
7	Z	1478	0	1487	11	0
8	K	2321	0	2294	32	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	U	2346	0	2323	35	0
8	W	2346	0	2323	33	0
8	Y	3404	0	3317	52	0
9	L	3	0	0	0	0
9	V	3	0	0	0	0
9	Y	3	0	0	0	0
10	K	26	0	19	1	0
10	U	26	0	19	1	0
10	W	26	0	19	5	0
10	Y	26	0	19	1	0
All	All	43873	0	38173	386	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 (386) 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)
4:P:100:PRO:HG2	4:P:103:LEU:CB	1.64	1.26
7:V:468:LEU:HD21	7:V:497:LYS:CG	1.76	1.15
8:K:640:PHE:CE1	8:K:687:VAL:HG21	1.85	1.12
8:K:639:LEU:HD12	8:K:734:PHE:CD1	1.83	1.11
4:P:100:PRO:HG2	4:P:103:LEU:HB3	1.18	1.08
7:L:415:CYS:O	7:L:419:GLY:HA2	1.54	1.08
7:V:468:LEU:HD21	7:V:497:LYS:HG3	1.24	1.07
4:P:100:PRO:CD	4:P:103:LEU:HD23	1.86	1.06
7:L:425:SER:CB	7:L:439:ARG:HD2	1.87	1.05
4:P:100:PRO:CG	4:P:103:LEU:HB3	1.88	1.03
4:P:100:PRO:HD2	4:P:103:LEU:HD23	1.41	1.01
8:K:640:PHE:CZ	8:K:687:VAL:HG21	1.96	1.01
7:L:428:PRO:HB3	7:L:525:ARG:HB3	1.44	1.00
8:U:687:VAL:HG13	8:U:737:LEU:HD12	1.47	0.97
4:P:100:PRO:HG2	4:P:103:LEU:HB2	1.46	0.96
4:P:100:PRO:CG	4:P:103:LEU:CB	2.46	0.94
8:K:639:LEU:HD12	8:K:734:PHE:HD1	1.23	0.94
7:L:411:LEU:HD11	7:L:432:GLY:H	1.32	0.90
7:L:417:SER:HB3	7:L:438:CYS:SG	2.11	0.90
8:K:640:PHE:CE1	8:K:687:VAL:CG2	2.58	0.87
8:U:687:VAL:CG1	8:U:733:GLU:HB3	2.07	0.85
8:Y:639:LEU:HD22	8:Y:734:PHE:CD1	2.13	0.84
7:L:425:SER:HB2	7:L:439:ARG:HD2	1.61	0.83

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:V:454:TYR:CD2	7:V:469:LEU:HD22	2.14	0.83
8:Y:642:GLY:O	8:Y:669:SER:HB2	1.78	0.82
7:V:468:LEU:HD21	7:V:497:LYS:HG2	1.61	0.82
8:W:640:PHE:CZ	8:W:687:VAL:HG21	2.15	0.81
7:L:415:CYS:O	7:L:419:GLY:CA	2.29	0.81
8:U:687:VAL:HG13	8:U:737:LEU:CD1	2.13	0.79
7:L:427:HIS:HB3	7:L:434:LEU:HD22	1.62	0.79
6:J:1:DA:H4'	8:W:710:CYS:SG	2.23	0.79
8:W:640:PHE:CE1	8:W:687:VAL:HG21	2.18	0.79
7:X:560:LEU:HD11	7:X:658:LEU:HD22	1.66	0.78
7:L:425:SER:HB3	7:L:439:ARG:HD2	1.66	0.77
8:Y:643:ILE:HD11	8:Y:892:SER:HB2	1.65	0.77
8:K:636:VAL:HA	8:K:703:LEU:O	1.85	0.75
8:Y:643:ILE:HD11	8:Y:892:SER:CB	2.17	0.75
4:P:100:PRO:CD	4:P:103:LEU:HB3	2.18	0.73
1:A:103:LEU:HA	1:A:131:ARG:HH22	1.52	0.73
7:L:472:ASN:HB3	7:L:475:CYS:HB3	1.71	0.73
7:L:430:PHE:O	7:L:519:ARG:NE	2.22	0.72
7:L:411:LEU:HD11	7:L:432:GLY:N	2.03	0.72
7:L:454:TYR:CG	7:L:469:LEU:HD23	2.25	0.71
8:Y:641:ASP:CG	8:Y:644:ALA:HA	2.16	0.71
7:L:454:TYR:CD2	7:L:469:LEU:HD23	2.26	0.71
8:Y:641:ASP:OD1	8:Y:644:ALA:CA	2.39	0.71
4:P:99:LEU:HB3	4:P:100:PRO:HD2	1.73	0.70
8:U:687:VAL:HG11	8:U:733:GLU:HB3	1.73	0.70
7:L:428:PRO:CB	7:L:525:ARG:HB3	2.20	0.70
7:V:455:GLN:O	7:V:478:CYS:SG	2.49	0.70
8:Y:534:GLN:HG3	8:Y:555:CYS:O	1.92	0.69
8:U:684:VAL:HG12	8:U:685:GLY:N	2.07	0.69
8:Y:641:ASP:OD1	8:Y:644:ALA:N	2.26	0.69
7:L:417:SER:CB	7:L:438:CYS:SG	2.82	0.67
3:O:92:GLU:HB2	4:P:100:PRO:HG3	1.77	0.66
8:U:687:VAL:HG12	8:U:733:GLU:HB3	1.77	0.66
8:K:639:LEU:CD1	8:K:734:PHE:HD1	2.04	0.66
4:P:100:PRO:CD	4:P:103:LEU:CD2	2.69	0.66
7:V:397:ARG:HH22	7:V:482:GLU:HG2	1.61	0.66
8:K:641:ASP:OD1	8:K:644:ALA:HA	1.94	0.65
7:X:625:VAL:O	7:X:674:TRP:HA	1.97	0.65
8:K:636:VAL:HG22	8:K:703:LEU:HB3	1.77	0.65
7:L:512:CYS:SG	7:L:517:ARG:HG2	2.37	0.65
8:W:708:SER:HG	8:W:755:PHE:HZ	1.40	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:L:428:PRO:HB3	7:L:525:ARG:CB	2.25	0.65
3:O:92:GLU:HB2	4:P:100:PRO:CB	2.26	0.65
1:E:108:ASN:ND2	2:F:42:GLY:O	2.30	0.65
8:U:684:VAL:HG12	8:U:685:GLY:H	1.62	0.65
8:W:708:SER:H	8:W:755:PHE:HE1	1.44	0.64
7:V:464:GLY:HA2	7:V:467:LEU:HD11	1.79	0.64
7:L:469:LEU:HG	7:L:478:CYS:SG	2.37	0.64
8:Y:641:ASP:OD2	8:Y:644:ALA:HA	1.98	0.64
8:K:639:LEU:CD1	8:K:734:PHE:CD1	2.73	0.64
1:Q:108:ASN:ND2	2:R:42:GLY:O	2.31	0.63
8:K:637:LEU:HB3	8:K:704:VAL:HG22	1.81	0.63
2:R:77:LYS:HD3	4:T:89:ARG:HH12	1.64	0.63
8:W:891:ARG:HD3	10:W:1001:SAH:H3'	1.81	0.63
7:L:474:SER:HB3	7:L:708:ALA:HB1	1.80	0.63
7:X:646:GLU:HB3	8:K:729:ARG:HH22	1.63	0.62
1:Q:68:GLN:HE21	1:Q:72:ARG:HH21	1.46	0.62
8:Y:643:ILE:CD1	8:Y:892:SER:CB	2.78	0.62
1:A:68:GLN:HE21	1:A:72:ARG:HH21	1.48	0.62
4:P:100:PRO:HD2	4:P:103:LEU:CD2	2.22	0.61
8:Y:639:LEU:HD12	8:Y:639:LEU:N	2.15	0.61
7:L:428:PRO:CB	7:L:525:ARG:CB	2.78	0.61
1:M:108:ASN:ND2	2:N:42:GLY:O	2.35	0.60
8:K:663:SER:HA	8:K:684:VAL:HB	1.84	0.60
7:L:403:ASP:HB3	7:L:409:SER:HB3	1.83	0.60
7:L:428:PRO:HG3	7:L:525:ARG:O	2.02	0.60
7:V:459:THR:HB	7:V:479:PHE:CE1	2.37	0.59
8:W:636:VAL:HG22	8:W:703:LEU:HB3	1.84	0.59
7:L:487:LEU:HD13	7:L:516:LEU:HB2	1.83	0.59
3:O:92:GLU:HB2	4:P:100:PRO:CG	2.33	0.58
7:V:692:ARG:HG3	8:U:688:ARG:HG3	1.85	0.58
3:O:29:ARG:NH1	4:P:33:SER:O	2.36	0.58
1:A:103:LEU:HA	1:A:131:ARG:NH2	2.18	0.58
7:X:754:PRO:HA	7:X:757:ARG:HG2	1.85	0.58
4:P:100:PRO:HD3	4:P:103:LEU:HD23	1.84	0.58
7:V:692:ARG:HG3	8:U:688:ARG:HD2	1.86	0.58
7:X:558:LEU:HD21	7:X:658:LEU:HD23	1.85	0.58
8:W:636:VAL:HA	8:W:703:LEU:O	2.04	0.57
8:Y:550:GLY:N	8:Y:581:TRP:O	2.35	0.57
7:L:397:ARG:HG3	7:L:416:LEU:HD23	1.86	0.57
8:W:892:SER:HA	10:W:1001:SAH:C	2.34	0.57
7:V:468:LEU:CD2	7:V:497:LYS:HG2	2.32	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:108:ASN:ND2	2:B:42:GLY:O	2.36	0.57
7:L:428:PRO:HA	7:L:519:ARG:HD2	1.86	0.57
8:W:708:SER:OG	8:W:755:PHE:HZ	1.88	0.57
7:V:609:ARG:NH2	8:U:768:ASP:OD1	2.37	0.57
8:Y:782:ALA:HB3	8:Y:790:ARG:HB3	1.87	0.57
7:L:422:ASN:N	7:L:423:PRO:HD3	2.19	0.57
4:P:100:PRO:HD2	4:P:103:LEU:HB3	1.86	0.57
8:K:662:ALA:O	8:K:684:VAL:HG23	2.04	0.57
5:I:290:DC:H4'	5:I:291:DC:OP1	2.04	0.56
8:Y:589:LYS:NZ	8:Y:591:THR:OG1	2.38	0.56
5:I:320:DA:H2"	5:I:321:DT:C5	2.40	0.56
7:Z:563:GLY:HA3	7:Z:590:SER:HB3	1.88	0.56
8:U:684:VAL:CG1	8:U:685:GLY:H	2.18	0.56
7:L:424:VAL:HB	7:L:436:GLN:HB2	1.87	0.56
7:L:462:CYS:O	7:L:462:CYS:SG	2.64	0.55
7:L:625:VAL:O	7:L:674:TRP:HA	2.05	0.55
3:C:16:THR:HA	5:I:40:DA:H5"	1.88	0.55
3:O:63:LEU:HD22	4:P:42:LEU:HD13	1.89	0.55
8:U:684:VAL:HG11	8:U:690:VAL:HG22	1.89	0.55
8:K:637:LEU:O	8:K:704:VAL:HA	2.06	0.55
8:U:687:VAL:CG1	8:U:737:LEU:HD12	2.29	0.55
3:S:63:LEU:HD22	4:T:42:LEU:HD12	1.89	0.55
8:Y:513:MET:HE2	8:Y:518:LYS:HA	1.89	0.55
7:L:411:LEU:HD23	7:L:411:LEU:C	2.31	0.55
4:P:100:PRO:CG	4:P:103:LEU:HB2	2.25	0.54
8:Y:533:TYR:HA	8:Y:555:CYS:HB3	1.88	0.54
7:L:591:ILE:HD13	7:L:604:TYR:HB2	1.88	0.54
8:U:636:VAL:HG22	8:U:703:LEU:HB3	1.89	0.54
8:Y:781:ASP:HA	8:Y:791:ALA:HA	1.89	0.54
8:K:754:LEU:HD11	8:K:901:LEU:HD13	1.88	0.54
7:L:526:LEU:O	7:L:529:PHE:HB3	2.07	0.54
8:W:637:LEU:HB3	8:W:704:VAL:HG22	1.88	0.54
8:U:684:VAL:CG1	8:U:685:GLY:N	2.71	0.54
7:L:666:GLU:HB2	8:W:744:LYS:HD3	1.90	0.54
4:P:100:PRO:CG	4:P:103:LEU:CD2	2.86	0.53
8:W:754:LEU:HD11	8:W:901:LEU:HD13	1.90	0.53
7:V:626:ILE:HA	7:V:675:MET:O	2.09	0.53
7:L:522:TRP:O	7:L:526:LEU:HB2	2.07	0.53
7:L:428:PRO:HB2	7:L:525:ARG:HB2	1.90	0.53
7:L:468:LEU:O	7:L:502:TRP:CZ3	2.61	0.53
7:L:455:GLN:OE1	7:L:477:ARG:HG2	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:Q:62:ILE:O	1:Q:93:GLN:NE2	2.42	0.53
7:V:467:LEU:HD23	7:V:479:PHE:C	2.34	0.53
8:U:754:LEU:HD11	8:U:901:LEU:HD13	1.90	0.53
8:Y:639:LEU:HD22	8:Y:734:PHE:HD1	1.68	0.52
8:Y:761:MET:HE1	8:Y:769:ILE:HD12	1.90	0.52
3:O:31:HIS:HD2	3:O:48:PRO:HG3	1.74	0.52
5:I:231:DG:H2"	5:I:232:DG:C8	2.45	0.52
8:U:637:LEU:HB3	8:U:704:VAL:HG22	1.90	0.52
5:I:293:DC:H2"	5:I:294:DG:C8	2.45	0.52
8:Y:676:ARG:NH2	8:Y:873:HIS:O	2.43	0.52
8:K:661:ILE:HG13	8:K:682:MET:HB2	1.91	0.52
8:Y:636:VAL:HG22	8:Y:703:LEU:HB3	1.92	0.52
2:N:64:ASN:HB3	2:N:93:GLN:HE22	1.74	0.51
7:V:657:HIS:CE1	8:U:772:PHE:HD1	2.28	0.51
8:U:636:VAL:HA	8:U:703:LEU:O	2.10	0.51
7:L:425:SER:HB3	7:L:439:ARG:CD	2.39	0.51
7:L:397:ARG:HH22	7:L:482:GLU:HB3	1.75	0.51
7:L:427:HIS:HB3	7:L:434:LEU:CD2	2.37	0.51
4:P:95:VAL:HG13	4:P:99:LEU:HD12	1.92	0.51
3:S:64:GLU:HA	4:T:46:HIS:HE1	1.75	0.51
1:E:62:ILE:O	1:E:93:GLN:NE2	2.44	0.51
3:O:58:LEU:HD11	4:P:99:LEU:HD11	1.92	0.51
7:V:444:GLU:HG2	7:V:683:LYS:HA	1.93	0.51
6:J:285:DA:H2"	6:J:286:DG:C8	2.46	0.51
7:V:458:CYS:HB3	7:V:463:GLU:H	1.75	0.51
7:Z:676:PHE:HB3	7:Z:716:TRP:HB2	1.93	0.50
3:O:99:ARG:HH12	3:S:99:ARG:HH22	1.59	0.50
1:A:100:LEU:HD11	2:B:58:LEU:HD22	1.92	0.50
7:V:694:LEU:HD22	7:V:716:TRP:HB3	1.93	0.50
8:U:717:ASN:HB3	8:U:720:ARG:HB3	1.93	0.50
8:U:781:ASP:HA	8:U:791:ALA:HA	1.94	0.50
7:V:454:TYR:CG	7:V:469:LEU:HD22	2.47	0.50
8:W:710:CYS:HA	8:W:713:LEU:HB2	1.94	0.50
2:R:45:ARG:HE	5:I:245:DC:H4'	1.76	0.50
7:V:467:LEU:HD23	7:V:479:PHE:O	2.12	0.50
8:W:717:ASN:HB3	8:W:720:ARG:HB3	1.93	0.50
2:F:45:ARG:HE	5:I:90:DC:H4'	1.77	0.50
7:L:397:ARG:HG3	7:L:416:LEU:CD2	2.41	0.50
3:G:29:ARG:NH1	4:H:33:SER:O	2.44	0.50
7:Z:582:VAL:HG22	7:Z:603:LYS:HB2	1.93	0.49
7:Z:626:ILE:HB	7:Z:675:MET:HE3	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:J:103:DC:H2"	6:J:104:DG:H5"	1.94	0.49
1:A:106:ASP:HB2	1:A:131:ARG:HH21	1.78	0.49
3:C:29:ARG:NH1	4:D:33:SER:O	2.46	0.49
8:Y:643:ILE:CD1	8:Y:892:SER:HB3	2.43	0.49
7:X:571:LEU:HD22	7:X:576:ILE:HD11	1.95	0.49
3:C:31:HIS:HD2	3:C:48:PRO:HG3	1.75	0.49
3:C:112:GLN:HB2	3:C:115:LEU:HD13	1.93	0.49
1:E:68:GLN:HE21	1:E:72:ARG:HH21	1.60	0.49
7:V:522:TRP:O	7:V:526:LEU:HB2	2.12	0.49
7:X:658:LEU:HA	7:X:661:TYR:HD2	1.78	0.49
8:Y:639:LEU:N	8:Y:639:LEU:CD1	2.75	0.49
3:G:39:TYR:O	4:H:75:SER:OG	2.28	0.49
7:X:612:THR:HG22	7:X:613:LYS:N	2.28	0.49
8:K:717:ASN:HB3	8:K:720:ARG:HB3	1.94	0.49
8:Y:637:LEU:O	8:Y:704:VAL:HA	2.13	0.48
7:L:427:HIS:CB	7:L:434:LEU:HD22	2.40	0.48
7:V:464:GLY:CA	7:V:467:LEU:HD11	2.43	0.48
7:L:459:THR:O	7:L:459:THR:HG22	2.13	0.48
8:K:761:MET:HE1	8:K:769:ILE:HD12	1.95	0.48
6:J:130:DA:H2"	6:J:131:DG:C8	2.49	0.48
1:E:116:ARG:NH1	1:E:118:THR:O	2.47	0.48
7:L:415:CYS:O	7:L:419:GLY:N	2.46	0.48
8:W:761:MET:HE1	8:W:769:ILE:HD12	1.95	0.48
7:V:467:LEU:HA	7:V:479:PHE:O	2.13	0.48
8:U:761:MET:HE1	8:U:769:ILE:HD12	1.96	0.47
7:Z:609:ARG:HD2	8:Y:771:ARG:HG3	1.95	0.47
7:X:574:LEU:HD21	7:X:757:ARG:HB2	1.95	0.47
3:C:63:LEU:HD22	4:D:42:LEU:HD13	1.96	0.47
8:W:788:ALA:HA	8:W:830:VAL:H	1.79	0.47
8:K:639:LEU:HD12	8:K:734:PHE:CE1	2.44	0.47
8:Y:484:ARG:HB3	8:Y:594:LEU:HD11	1.97	0.47
8:Y:643:ILE:HD11	8:Y:870:PHE:CZ	2.49	0.47
7:L:468:LEU:O	7:L:502:TRP:HZ3	1.98	0.47
2:B:92:ARG:HH11	4:D:98:LEU:HD23	1.79	0.47
7:Z:754:PRO:HA	7:Z:757:ARG:HG2	1.97	0.47
8:K:710:CYS:HA	8:K:713:LEU:HB2	1.97	0.47
7:X:612:THR:HG22	7:X:613:LYS:H	1.80	0.47
8:Y:546:VAL:HA	8:Y:559:CYS:HA	1.97	0.47
8:Y:777:PRO:HB3	8:Y:795:TRP:CE2	2.50	0.47
8:Y:800:GLY:O	8:Y:803:ARG:HG2	2.15	0.47
8:W:640:PHE:CE1	8:W:687:VAL:CG2	2.94	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:L:411:LEU:HG	7:L:432:GLY:HA2	1.97	0.46
8:K:640:PHE:CZ	8:K:687:VAL:CG2	2.83	0.46
5:I:36:DC:H2"	5:I:37:DT:C5	2.51	0.46
8:K:781:ASP:HA	8:K:791:ALA:HA	1.96	0.46
8:U:860:TRP:CE2	8:Y:878:SER:HA	2.50	0.46
8:Y:893:TRP:NE1	10:Y:1004:SAH:N	2.63	0.46
8:W:641:ASP:CG	8:W:662:ALA:HB1	2.40	0.46
3:G:30:VAL:HG13	4:H:67:PHE:HE1	1.80	0.46
3:O:54:VAL:HG21	4:P:95:VAL:HG21	1.96	0.46
6:J:258:DC:H2"	6:J:259:DG:H5"	1.98	0.46
6:J:314:DG:H5"	8:Y:883:LEU:HD11	1.97	0.46
8:K:709:PRO:HG2	8:K:727:THR:HB	1.97	0.46
1:M:62:ILE:O	1:M:93:GLN:NE2	2.49	0.46
3:S:65:LEU:HD21	7:X:744:GLN:HE22	1.80	0.46
8:U:639:LEU:HD22	8:U:687:VAL:HG22	1.96	0.46
5:I:23:DA:H2"	5:I:24:DT:H5"	1.97	0.46
6:J:36:DC:H2"	6:J:37:DT:C5	2.51	0.46
7:L:557:VAL:HG22	7:L:624:LEU:HB3	1.97	0.46
8:Y:641:ASP:OD1	8:Y:644:ALA:HB2	2.15	0.46
7:V:626:ILE:HG22	7:V:675:MET:HB3	1.98	0.46
7:L:414:GLY:HA2	7:L:421:LYS:HA	1.98	0.46
7:L:455:GLN:CD	7:L:477:ARG:HG2	2.41	0.46
7:L:698:PRO:HA	7:L:716:TRP:HE1	1.80	0.46
8:W:782:ALA:HB3	8:W:790:ARG:HB3	1.98	0.46
5:I:156:DG:N2	6:J:167:DT:O2	2.49	0.46
3:C:79:ILE:HG22	3:C:81:ARG:H	1.81	0.46
8:U:640:PHE:CZ	8:U:730:LEU:HB3	2.51	0.46
7:L:654:GLU:O	7:L:657:HIS:HB3	2.16	0.46
1:M:100:LEU:HD11	2:N:58:LEU:HD22	1.97	0.45
3:O:92:GLU:HB2	4:P:100:PRO:HB3	1.96	0.45
5:I:48:DG:H2"	5:I:49:DA:C8	2.51	0.45
8:Y:520:CYS:O	8:Y:524:CYS:HB2	2.17	0.45
6:J:77:DG:H2"	6:J:78:DT:C5	2.51	0.45
8:W:639:LEU:HD12	8:W:734:PHE:HD1	1.80	0.45
8:W:639:LEU:HD12	8:W:734:PHE:CD1	2.50	0.45
3:S:87:VAL:HG13	3:S:93:LEU:HB3	1.98	0.45
7:L:428:PRO:HB2	7:L:525:ARG:CB	2.45	0.45
7:V:473:THR:HA	7:V:476:CYS:SG	2.56	0.45
8:K:641:ASP:CG	8:K:644:ALA:HA	2.42	0.45
6:J:232:DG:H2"	6:J:233:DT:C5	2.52	0.45
8:Y:506:HIS:O	8:Y:598:ARG:NE	2.50	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:Y:641:ASP:CG	8:Y:644:ALA:CA	2.85	0.45
7:X:570:VAL:HG21	7:X:756:ILE:HB	1.99	0.45
2:F:92:ARG:NH1	4:H:97:LEU:O	2.50	0.45
8:K:782:ALA:HB3	8:K:790:ARG:HB3	1.98	0.45
7:V:454:TYR:CE1	7:V:469:LEU:HD13	2.52	0.45
8:K:660:TYR:HB3	8:K:681:ILE:HD12	1.99	0.45
7:V:706:VAL:HA	7:V:729:PRO:HG2	1.99	0.44
7:Z:625:VAL:O	7:Z:674:TRP:HA	2.17	0.44
7:X:555:ILE:HG13	7:X:576:ILE:HD12	2.00	0.44
8:W:640:PHE:HD1	10:W:1001:SAH:N3	2.15	0.44
1:A:79:LYS:HB3	1:A:82:LEU:HD11	1.99	0.44
3:C:87:VAL:HG13	3:C:93:LEU:HB3	1.99	0.44
5:I:4:DG:N2	6:J:319:DC:O2	2.50	0.44
6:J:2:DT:H2"	6:J:3:DC:H2'	1.99	0.44
7:V:692:ARG:HG3	8:U:688:ARG:CG	2.46	0.44
8:Y:639:LEU:CD2	8:Y:734:PHE:HD1	2.30	0.44
7:L:400:MET:HE1	7:L:414:GLY:C	2.42	0.44
7:V:463:GLU:O	7:V:467:LEU:HD21	2.18	0.44
8:Y:866:ARG:HE	8:Y:872:VAL:HG12	1.82	0.44
8:K:649:VAL:HG11	8:K:898:ILE:HG22	1.99	0.44
3:C:54:VAL:HG21	4:D:95:VAL:HG21	1.99	0.44
7:V:557:VAL:HA	7:V:624:LEU:O	2.17	0.44
8:Y:686:ASP:OD1	8:Y:687:VAL:N	2.51	0.44
7:L:428:PRO:HA	7:L:519:ARG:CD	2.46	0.44
5:I:138:DC:H2"	5:I:139:DG:C8	2.53	0.44
7:L:658:LEU:HA	7:L:661:TYR:HD2	1.83	0.44
7:V:570:VAL:HG11	7:V:756:ILE:HG22	2.00	0.44
7:L:428:PRO:O	7:L:519:ARG:HD2	2.18	0.44
7:X:561:PHE:CG	7:X:561:PHE:O	2.71	0.44
6:J:3:DC:H2"	6:J:4:DG:C8	2.52	0.43
7:L:469:LEU:N	7:L:469:LEU:HD12	2.33	0.43
1:M:60:LEU:O	1:M:63:ARG:NH2	2.51	0.43
8:U:660:TYR:HB3	8:U:681:ILE:HD12	2.00	0.43
3:G:63:LEU:HD22	4:H:42:LEU:HD13	2.00	0.43
1:Q:46:VAL:HA	1:Q:49:ARG:HG2	2.00	0.43
5:I:29:DC:H2"	5:I:30:DA:C8	2.54	0.43
7:X:574:LEU:HD22	7:X:764:LYS:HD2	2.00	0.43
7:Z:686:ASP:OD1	8:Y:729:ARG:NH1	2.50	0.43
8:Y:637:LEU:HB3	8:Y:704:VAL:HG22	2.00	0.43
8:K:635:ARG:O	8:K:702:ASP:N	2.39	0.43
8:U:640:PHE:HE1	10:U:1001:SAH:C5	2.32	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:58:LEU:HD11	4:D:99:LEU:HD11	2.01	0.43
3:O:38:ASN:HD22	4:T:79:HIS:HE1	1.66	0.43
3:O:87:VAL:HG13	3:O:93:LEU:HB3	1.99	0.43
1:Q:79:LYS:HB3	1:Q:82:LEU:HD11	2.01	0.43
5:I:184:DC:H2"	5:I:185:DA:C8	2.54	0.43
7:L:454:TYR:CE1	7:L:470:CYS:O	2.72	0.43
6:J:109:DG:H2"	6:J:110:DG:N7	2.34	0.43
6:J:174:DT:H2"	6:J:175:DC:H5"	2.01	0.43
7:Z:609:ARG:NH2	8:Y:768:ASP:OD1	2.52	0.43
7:Z:675:MET:HG2	7:Z:715:PHE:HE1	1.84	0.43
1:A:40:ARG:HG3	6:J:249:DC:H5'	2.00	0.42
8:U:819:LEU:HB3	8:U:823:ARG:HB2	2.01	0.42
1:A:70:LEU:HA	2:B:25:ASN:HB3	2.01	0.42
2:N:31:LYS:HB3	2:N:32:PRO:HD3	2.01	0.42
8:U:876:ASP:HB3	8:Y:873:HIS:CE1	2.53	0.42
7:V:397:ARG:HH21	7:V:486:VAL:HG21	1.84	0.42
7:L:455:GLN:NE2	7:L:477:ARG:HG3	2.34	0.42
8:W:781:ASP:HA	8:W:791:ALA:HA	2.01	0.42
8:U:782:ALA:HB3	8:U:790:ARG:HB3	2.01	0.42
8:Y:645:THR:OG1	8:Y:870:PHE:CE1	2.69	0.42
1:M:96:SER:HB3	2:N:58:LEU:HD11	2.02	0.42
3:S:30:VAL:HG13	4:T:67:PHE:HE1	1.84	0.42
3:S:35:ARG:NH2	5:I:277:DA:OP2	2.52	0.42
5:I:3:DG:H4'	5:I:4:DG:OP1	2.18	0.42
8:U:640:PHE:HZ	8:U:730:LEU:HB3	1.85	0.42
7:L:454:TYR:HE1	7:L:470:CYS:O	2.03	0.42
7:L:474:SER:O	7:L:710:HIS:NE2	2.53	0.42
7:X:560:LEU:HD11	7:X:658:LEU:CD2	2.42	0.42
8:W:641:ASP:OD2	8:W:662:ALA:HB1	2.20	0.42
6:J:9:DC:H2'	6:J:10:DC:C6	2.54	0.42
8:U:848:PHE:HB2	8:U:856:GLU:HB3	2.02	0.42
8:Y:653:LEU:O	8:Y:906:LYS:NZ	2.50	0.42
1:Q:60:LEU:O	1:Q:63:ARG:NH2	2.53	0.42
7:X:646:GLU:HB3	8:K:729:ARG:NH2	2.31	0.42
8:W:848:PHE:HB2	8:W:856:GLU:HB3	2.02	0.42
5:I:178:DA:H2"	5:I:179:DT:H5"	2.01	0.42
1:A:127:ALA:O	1:A:131:ARG:HG3	2.19	0.41
5:I:2:DC:H2"	5:I:3:DG:C8	2.55	0.41
6:J:46:DC:H2"	6:J:47:DG:C8	2.54	0.41
6:J:201:DC:H2"	6:J:202:DG:C8	2.56	0.41
8:U:649:VAL:HG11	8:U:898:ILE:HG22	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:Y:550:GLY:CA	8:Y:581:TRP:O	2.68	0.41
3:O:28:GLY:HA3	5:I:194:DG:H5"	2.01	0.41
5:I:11:DC:H2"	5:I:12:DA:C8	2.56	0.41
5:I:320:DA:H2"	5:I:321:DT:C4	2.56	0.41
7:V:678:ASN:HD21	7:V:682:MET:HE3	1.84	0.41
7:Z:691:SER:O	7:Z:695:GLU:N	2.53	0.41
8:Y:566:LEU:HD13	8:Y:595:LEU:HD13	2.01	0.41
3:C:21:ALA:HB2	4:D:118:TYR:HB2	2.01	0.41
6:J:222:DT:H6	6:J:222:DT:H2'	1.77	0.41
6:J:318:DC:H2"	6:J:319:DC:H5"	2.02	0.41
7:L:566:THR:HG21	7:L:753:VAL:HA	2.02	0.41
4:H:48:ASP:OD1	4:H:48:ASP:N	2.53	0.41
7:V:454:TYR:CZ	7:V:469:LEU:HD13	2.56	0.41
8:W:819:LEU:HB3	8:W:823:ARG:HB2	2.03	0.41
1:A:96:SER:HB3	2:B:58:LEU:HD11	2.02	0.41
8:Y:643:ILE:CD1	8:Y:870:PHE:CZ	3.04	0.41
8:W:660:TYR:HB3	8:W:681:ILE:HD12	2.02	0.41
8:W:664:GLU:OE2	10:W:1001:SAH:H1'	2.21	0.41
8:W:893:TRP:NE1	10:W:1001:SAH:N	2.69	0.41
8:K:848:PHE:HB2	8:K:856:GLU:HB3	2.03	0.41
2:N:30:THR:HG21	5:I:225:DA:H5"	2.03	0.40
1:Q:116:ARG:NH1	1:Q:118:THR:O	2.53	0.40
8:Y:647:LEU:HB2	8:Y:660:TYR:CZ	2.56	0.40
7:X:612:THR:CG2	7:X:613:LYS:H	2.34	0.40
3:G:42:ARG:HE	5:I:121:DG:H4'	1.85	0.40
7:V:469:LEU:HD12	7:V:469:LEU:C	2.46	0.40
7:V:692:ARG:HG3	8:U:688:ARG:CD	2.50	0.40
8:Y:519:ASN:HB3	8:Y:763:VAL:HG21	2.03	0.40
8:Y:641:ASP:OD1	8:Y:644:ALA:CB	2.69	0.40
8:W:649:VAL:HG11	8:W:898:ILE:HG22	2.03	0.40
8:W:730:LEU:O	8:W:733:GLU:HB2	2.21	0.40
8:W:888:LEU:O	8:W:891:ARG:HG2	2.21	0.40
8:K:892:SER:HA	10:K:1001:SAH:C	2.52	0.40
3:S:54:VAL:HG21	4:T:95:VAL:HG21	2.03	0.40
7:V:464:GLY:C	7:V:467:LEU:HD11	2.46	0.40

There are no symmetry-related clashes.

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 PDB entries followed by that with respect to all EM entries.

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	94/135 (70%)	94 (100%)	0	0	100	100
1	E	95/135 (70%)	93 (98%)	2 (2%)	0	100	100
1	M	97/135 (72%)	95 (98%)	2 (2%)	0	100	100
1	Q	93/135 (69%)	90 (97%)	3 (3%)	0	100	100
2	B	78/103 (76%)	77 (99%)	1 (1%)	0	100	100
2	F	76/103 (74%)	74 (97%)	2 (3%)	0	100	100
2	N	76/103 (74%)	74 (97%)	2 (3%)	0	100	100
2	R	77/103 (75%)	76 (99%)	1 (1%)	0	100	100
3	C	100/129 (78%)	98 (98%)	2 (2%)	0	100	100
3	G	96/129 (74%)	92 (96%)	4 (4%)	0	100	100
3	O	96/129 (74%)	94 (98%)	2 (2%)	0	100	100
3	S	96/129 (74%)	93 (97%)	3 (3%)	0	100	100
4	D	91/123 (74%)	90 (99%)	1 (1%)	0	100	100
4	H	90/123 (73%)	89 (99%)	1 (1%)	0	100	100
4	P	89/123 (72%)	89 (100%)	0	0	100	100
4	T	90/123 (73%)	88 (98%)	2 (2%)	0	100	100
7	L	342/773 (44%)	326 (95%)	16 (5%)	0	100	100
7	V	341/773 (44%)	329 (96%)	12 (4%)	0	100	100
7	X	174/773 (22%)	165 (95%)	9 (5%)	0	100	100
7	Z	172/773 (22%)	168 (98%)	4 (2%)	0	100	100
8	K	283/689 (41%)	274 (97%)	9 (3%)	0	100	100
8	U	286/689 (42%)	274 (96%)	12 (4%)	0	100	100
8	W	286/689 (42%)	276 (96%)	10 (4%)	0	100	100
8	Y	420/689 (61%)	406 (97%)	14 (3%)	0	100	100
All	All	3738/7808 (48%)	3624 (97%)	114 (3%)	0	100	100

There are no Ramachandran outliers to report.

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 PDB entries followed by that with respect to all EM entries.

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	84/110 (76%)	84 (100%)	0	100	100
1	E	85/110 (77%)	85 (100%)	0	100	100
1	M	87/110 (79%)	87 (100%)	0	100	100
1	Q	83/110 (76%)	83 (100%)	0	100	100
2	B	66/79 (84%)	66 (100%)	0	100	100
2	F	64/79 (81%)	64 (100%)	0	100	100
2	N	64/79 (81%)	64 (100%)	0	100	100
2	R	65/79 (82%)	65 (100%)	0	100	100
3	C	80/101 (79%)	80 (100%)	0	100	100
3	G	76/101 (75%)	76 (100%)	0	100	100
3	O	76/101 (75%)	76 (100%)	0	100	100
3	S	75/101 (74%)	75 (100%)	0	100	100
4	D	79/103 (77%)	79 (100%)	0	100	100
4	H	78/103 (76%)	78 (100%)	0	100	100
4	P	77/103 (75%)	77 (100%)	0	100	100
4	T	78/103 (76%)	78 (100%)	0	100	100
7	L	300/660 (46%)	300 (100%)	0	100	100
7	V	302/660 (46%)	302 (100%)	0	100	100
7	X	156/660 (24%)	156 (100%)	0	100	100
7	Z	157/660 (24%)	157 (100%)	0	100	100
8	K	252/591 (43%)	252 (100%)	0	100	100
8	U	255/591 (43%)	255 (100%)	0	100	100
8	W	255/591 (43%)	255 (100%)	0	100	100
8	Y	372/591 (63%)	372 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	3266/6576 (50%)	3266 (100%)	0	100 100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (45) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	68	GLN
3	C	31	HIS
3	C	73	ASN
3	C	82	HIS
1	E	68	GLN
2	F	25	ASN
3	G	31	HIS
3	G	38	ASN
3	G	73	ASN
3	G	82	HIS
4	H	46	HIS
2	N	27	GLN
2	N	93	GLN
3	O	31	HIS
3	O	38	ASN
3	O	73	ASN
3	O	82	HIS
4	P	106	HIS
1	Q	68	GLN
3	S	31	HIS
4	T	46	HIS
4	T	106	HIS
7	Z	598	HIS
7	Z	601	ASN
7	Z	744	GLN
8	U	739	HIS
8	U	873	HIS
8	U	900	HIS
8	Y	534	GLN
8	Y	677	HIS
8	Y	816	GLN
8	Y	847	HIS
8	Y	900	HIS
7	L	399	GLN
7	L	678	ASN

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Mol	Chain	Res	Type
7	X	601	ASN
7	X	615	ASN
7	X	744	GLN
8	W	739	HIS
8	W	816	GLN
8	W	821	HIS
8	W	886	GLN
8	W	900	HIS
8	K	694	HIS
8	K	900	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)

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 13 ligands modelled in this entry, 9 are monoatomic - leaving 4 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	$\#\|Z\| > 2$
10	SAH	Y	1004	-	27,28,28	0.44	0	36,40,40	0.30	0
10	SAH	K	1001	-	27,28,28	0.44	0	36,40,40	0.29	0
10	SAH	U	1001	-	27,28,28	0.44	0	36,40,40	0.30	0
10	SAH	W	1001	-	27,28,28	0.43	0	36,40,40	0.29	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
10	SAH	Y	1004	-	-	6/15/31/31	0/3/3/3
10	SAH	K	1001	-	-	6/15/31/31	0/3/3/3
10	SAH	U	1001	-	-	7/15/31/31	0/3/3/3
10	SAH	W	1001	-	-	7/15/31/31	0/3/3/3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (26) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	U	1001	SAH	N-CA-CB-CG
10	Y	1004	SAH	N-CA-CB-CG
10	W	1001	SAH	N-CA-CB-CG
10	K	1001	SAH	N-CA-CB-CG
10	U	1001	SAH	C2'-C1'-N9-C8
10	Y	1004	SAH	C2'-C1'-N9-C8
10	W	1001	SAH	C2'-C1'-N9-C8
10	K	1001	SAH	C2'-C1'-N9-C8
10	U	1001	SAH	C-CA-CB-CG
10	Y	1004	SAH	C-CA-CB-CG
10	W	1001	SAH	C-CA-CB-CG
10	K	1001	SAH	C-CA-CB-CG
10	U	1001	SAH	C2'-C1'-N9-C4
10	Y	1004	SAH	C2'-C1'-N9-C4
10	W	1001	SAH	C2'-C1'-N9-C4
10	K	1001	SAH	C2'-C1'-N9-C4
10	U	1001	SAH	OXT-C-CA-CB
10	Y	1004	SAH	OXT-C-CA-CB
10	W	1001	SAH	OXT-C-CA-CB
10	K	1001	SAH	OXT-C-CA-CB
10	U	1001	SAH	O4'-C1'-N9-C8
10	Y	1004	SAH	O4'-C1'-N9-C8
10	W	1001	SAH	O4'-C1'-N9-C8
10	K	1001	SAH	O4'-C1'-N9-C8
10	U	1001	SAH	O-C-CA-CB
10	W	1001	SAH	O-C-CA-CB

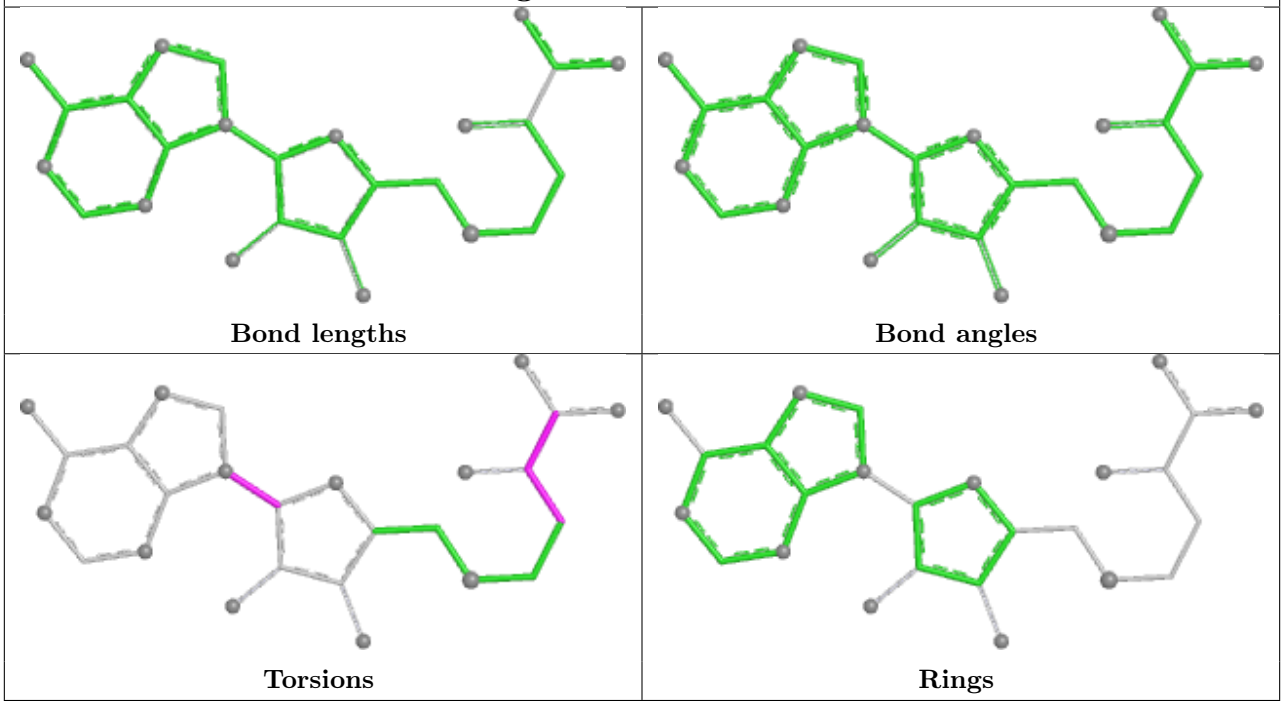
There are no ring outliers.

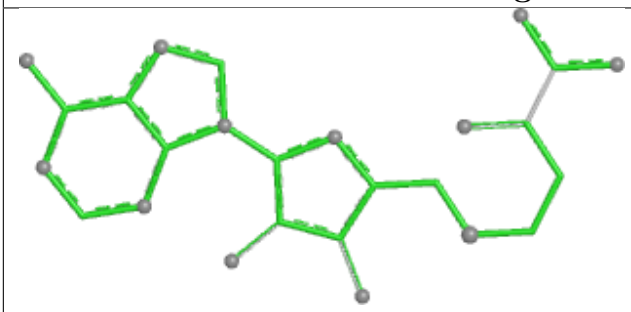
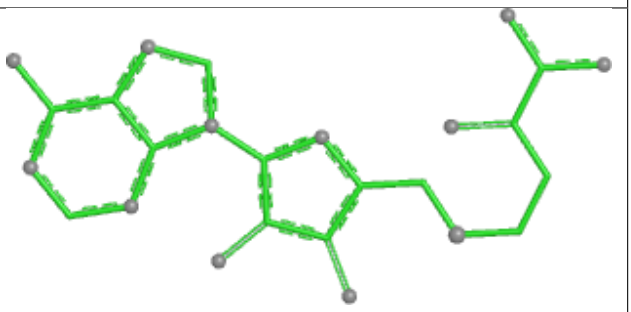
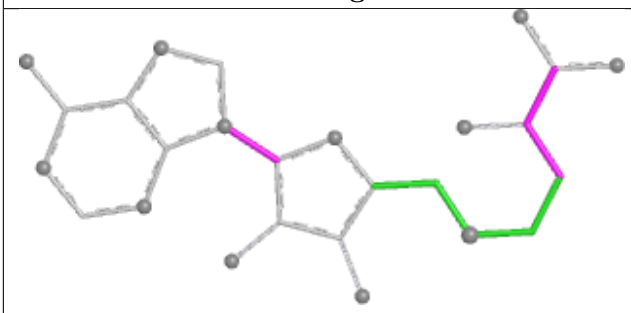
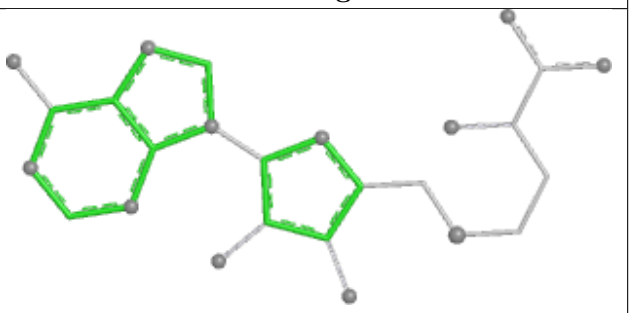
4 monomers are involved in 8 short contacts:

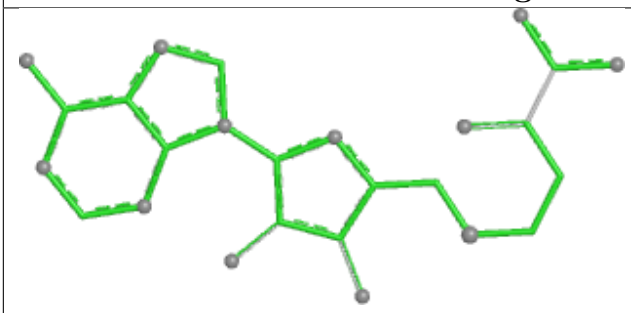
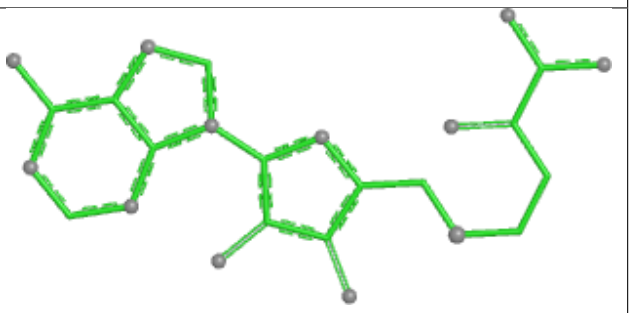
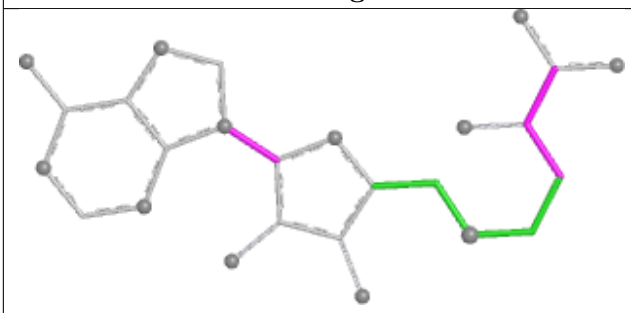
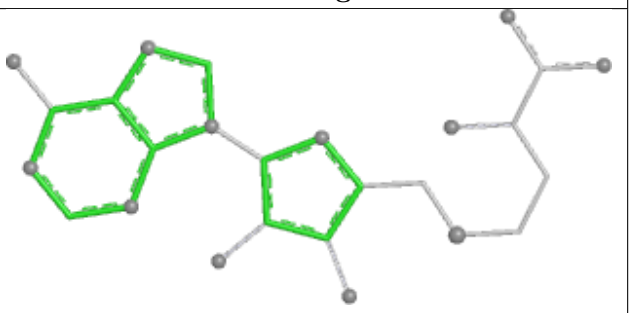
Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	Y	1004	SAH	1	0
10	K	1001	SAH	1	0
10	U	1001	SAH	1	0
10	W	1001	SAH	5	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

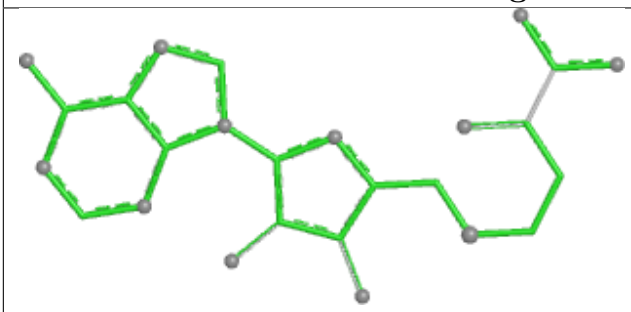
Ligand SAH Y 1004



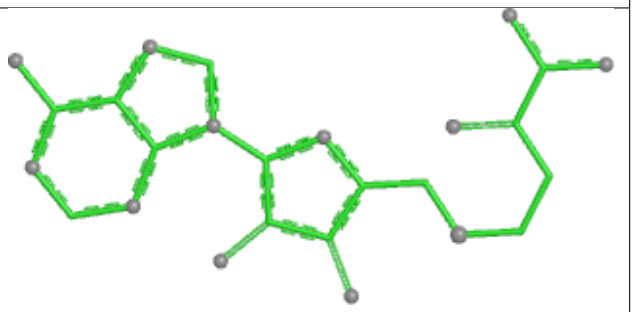
Ligand SAH K 1001	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand SAH U 1001	
 Bond lengths	 Bond angles
 Torsions	 Rings

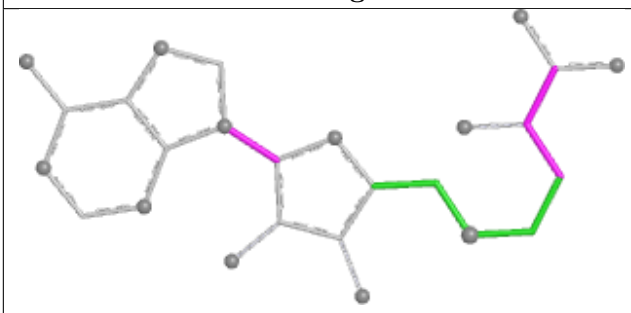
Ligand SAH W 1001



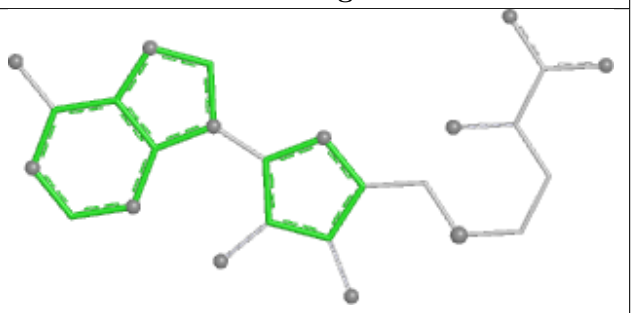
Bond lengths



Bond angles



Torsions



Rings

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.

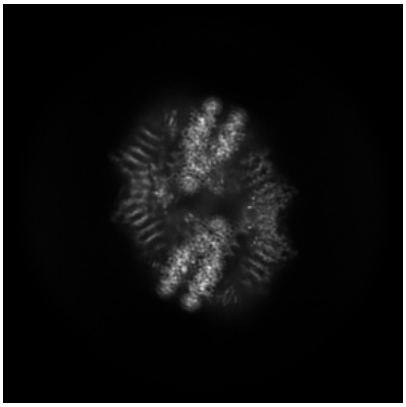
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-47344. These allow visual inspection of the internal detail of the map and identification of artifacts.

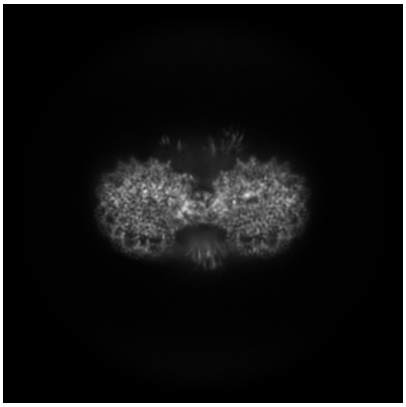
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

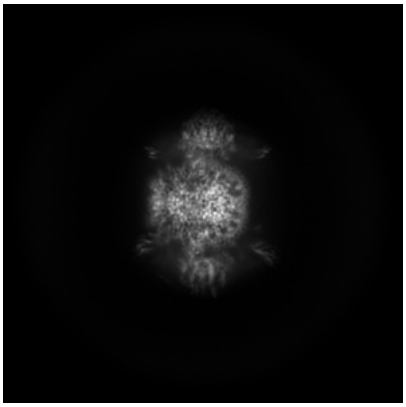
6.1.1 Primary map



X



Y



Z

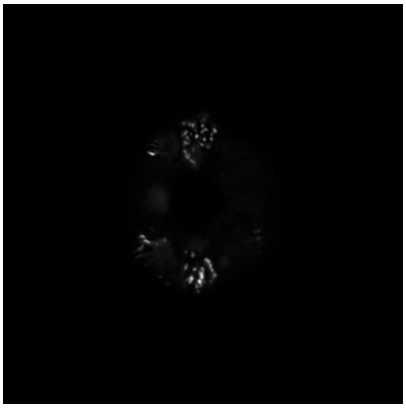
The images above show the map projected in three orthogonal directions.

6.2 Central slices

6.2.1 Primary map

X Index: 240

Y Index: 240

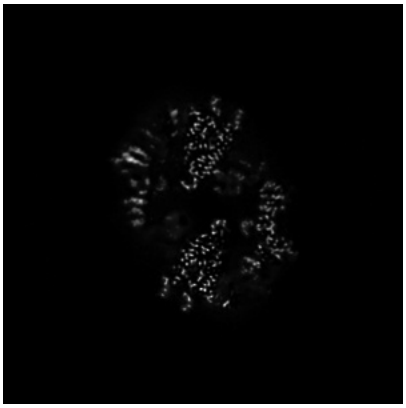


Z Index: 240

The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

6.3.1 Primary map



X Index: 249

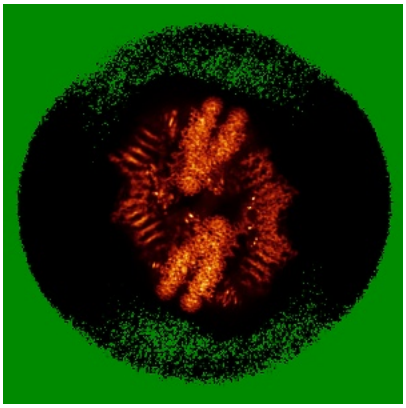
Y Index: 239

Z Index: 163

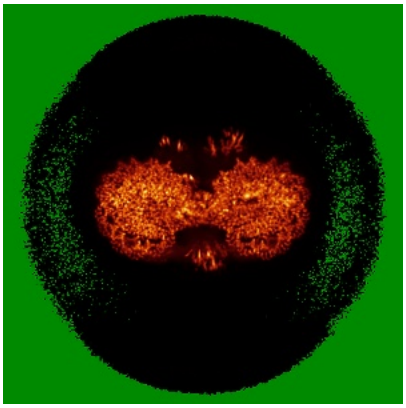
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

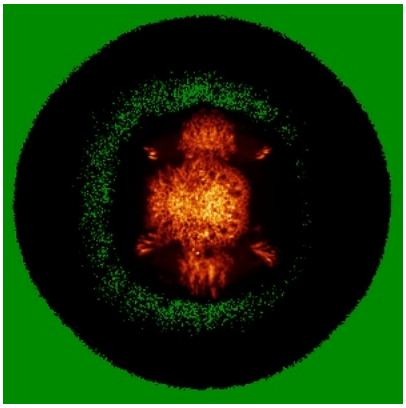
6.4.1 Primary map



X



Y



Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.039. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

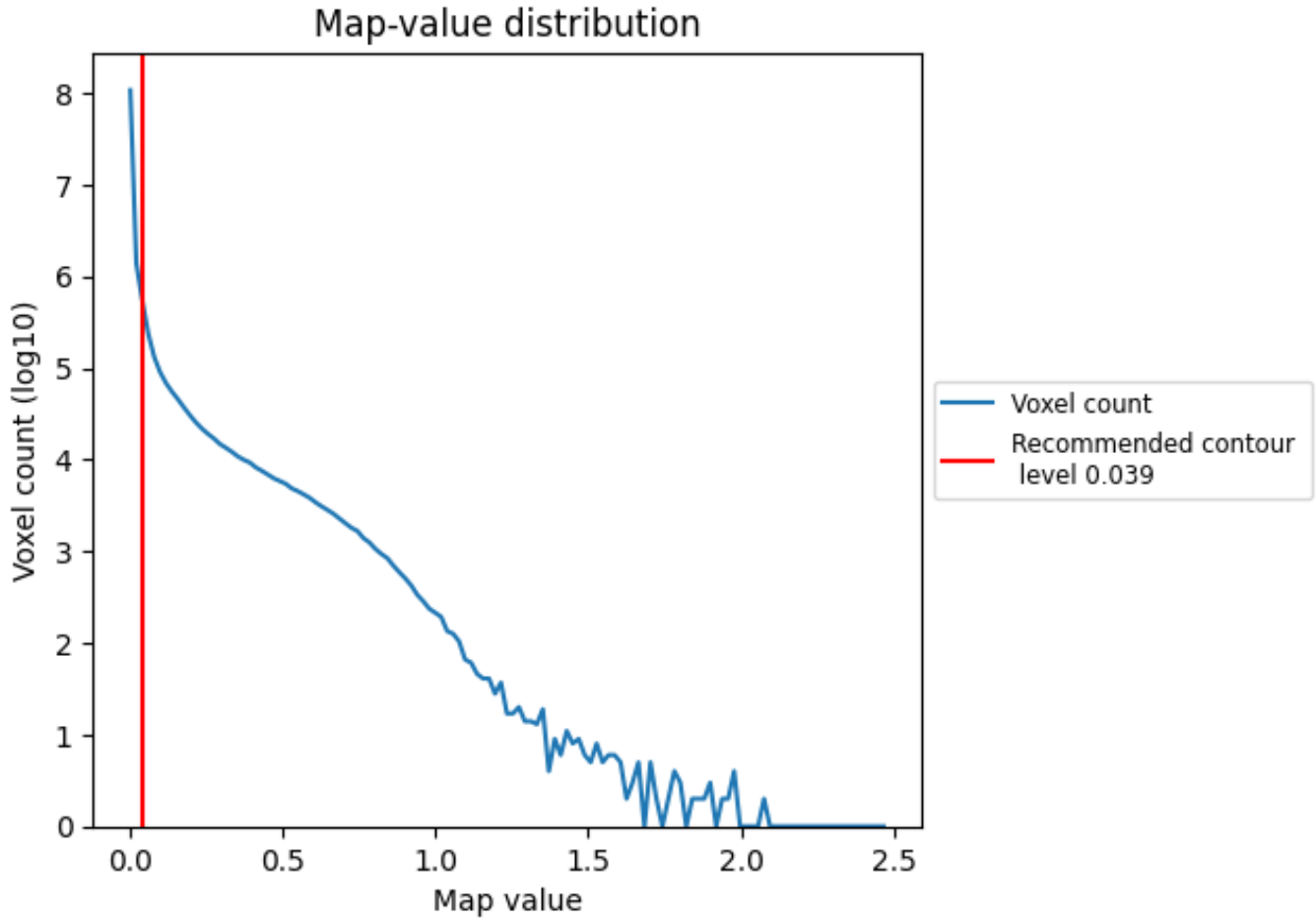
6.6 Mask visualisation (i)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis

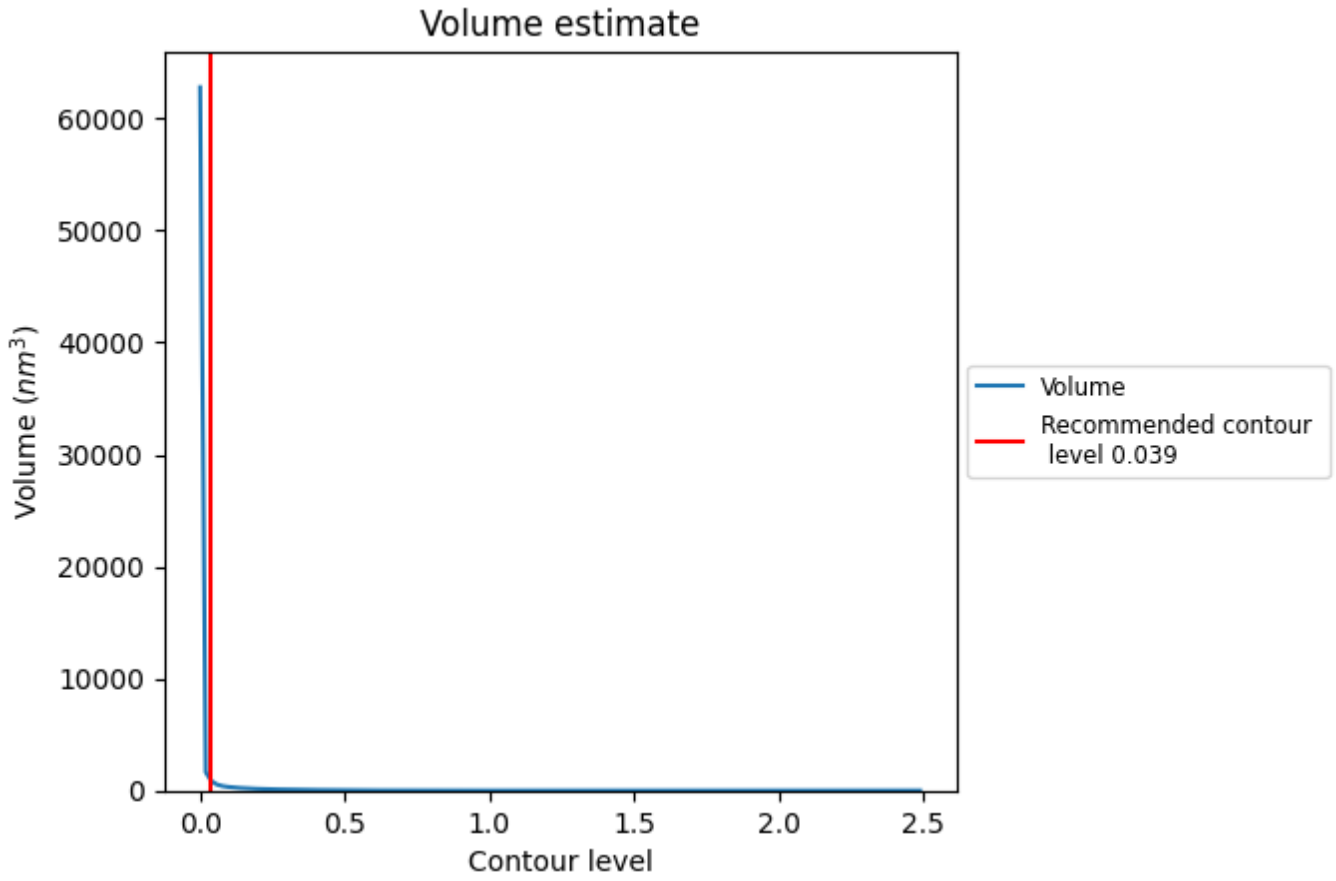
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

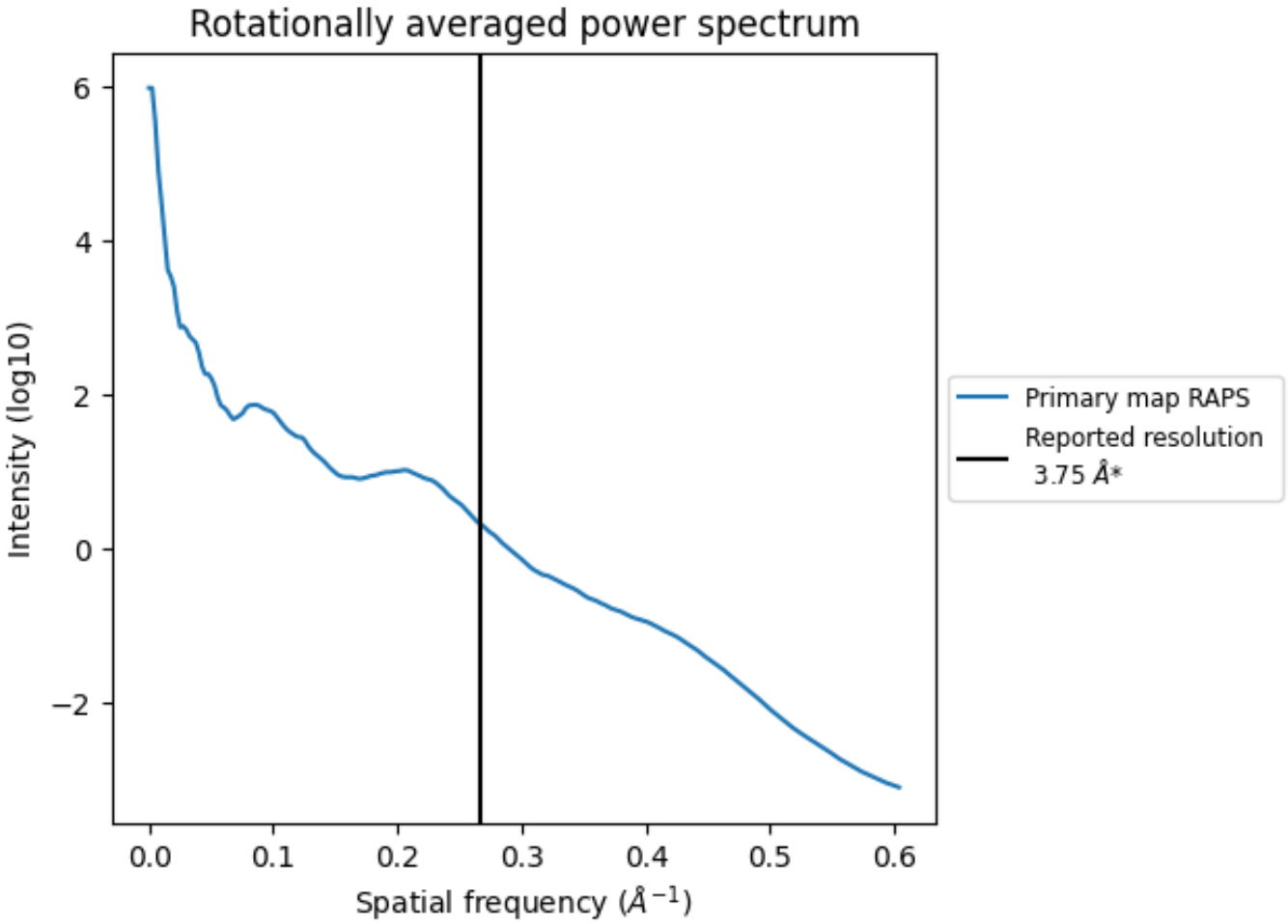
7.2 Volume estimate



The volume at the recommended contour level is 845 nm^3; this corresponds to an approximate mass of 763 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum (i)



*Reported resolution corresponds to spatial frequency of 0.267 Å^{-1}

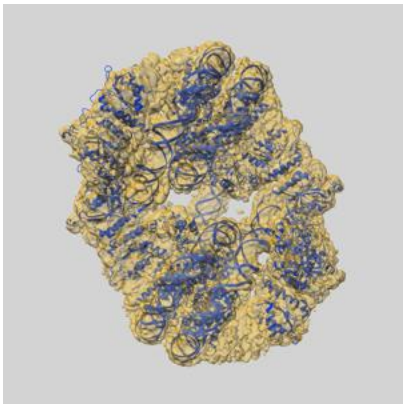
8 Fourier-Shell correlation (i)

This section was not generated. No FSC curve or half-maps provided.

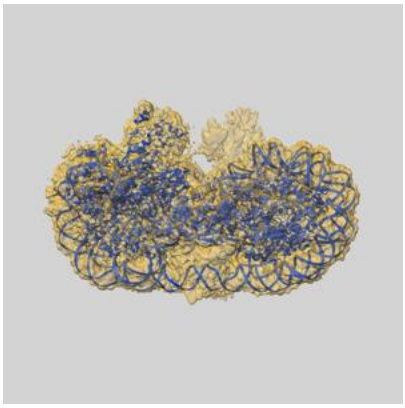
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-47344 and PDB model 9E00. Per-residue inclusion information can be found in section 3 on page 8.

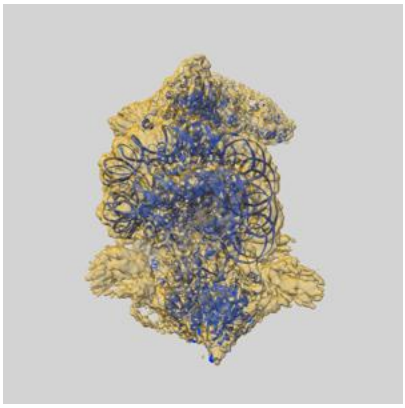
9.1 Map-model overlay



X



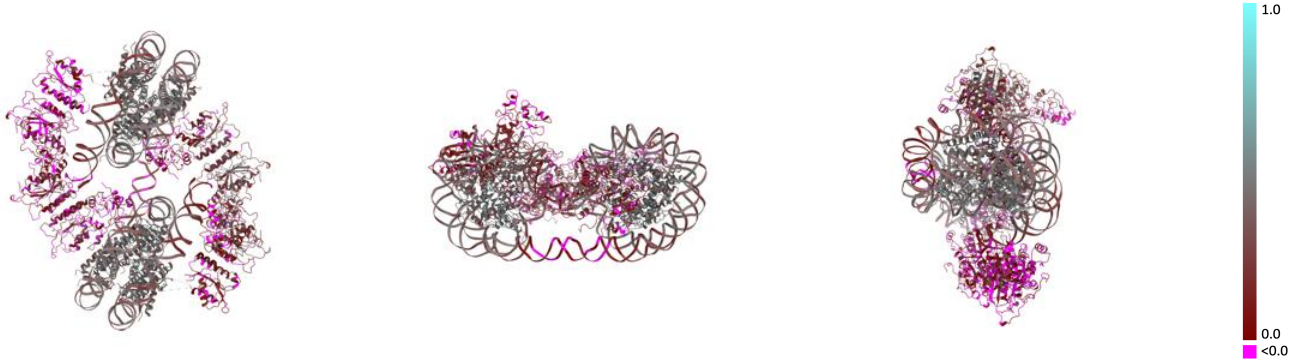
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.039 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

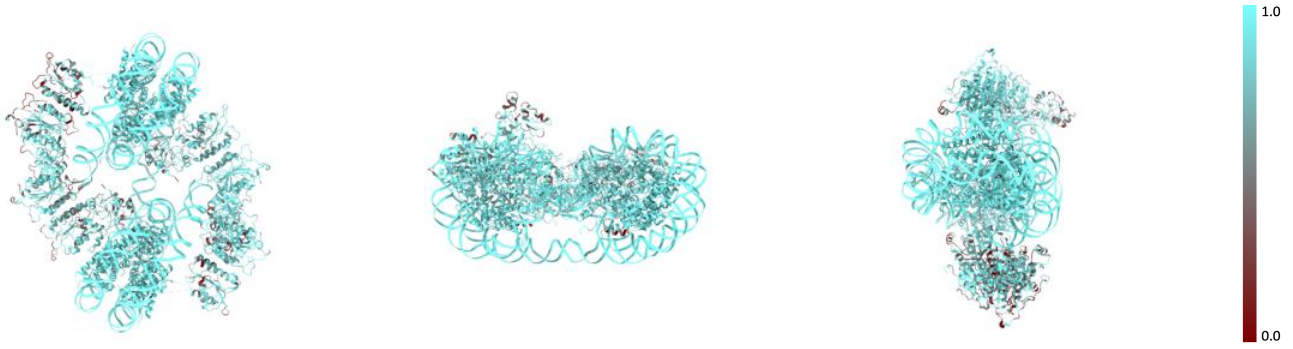
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

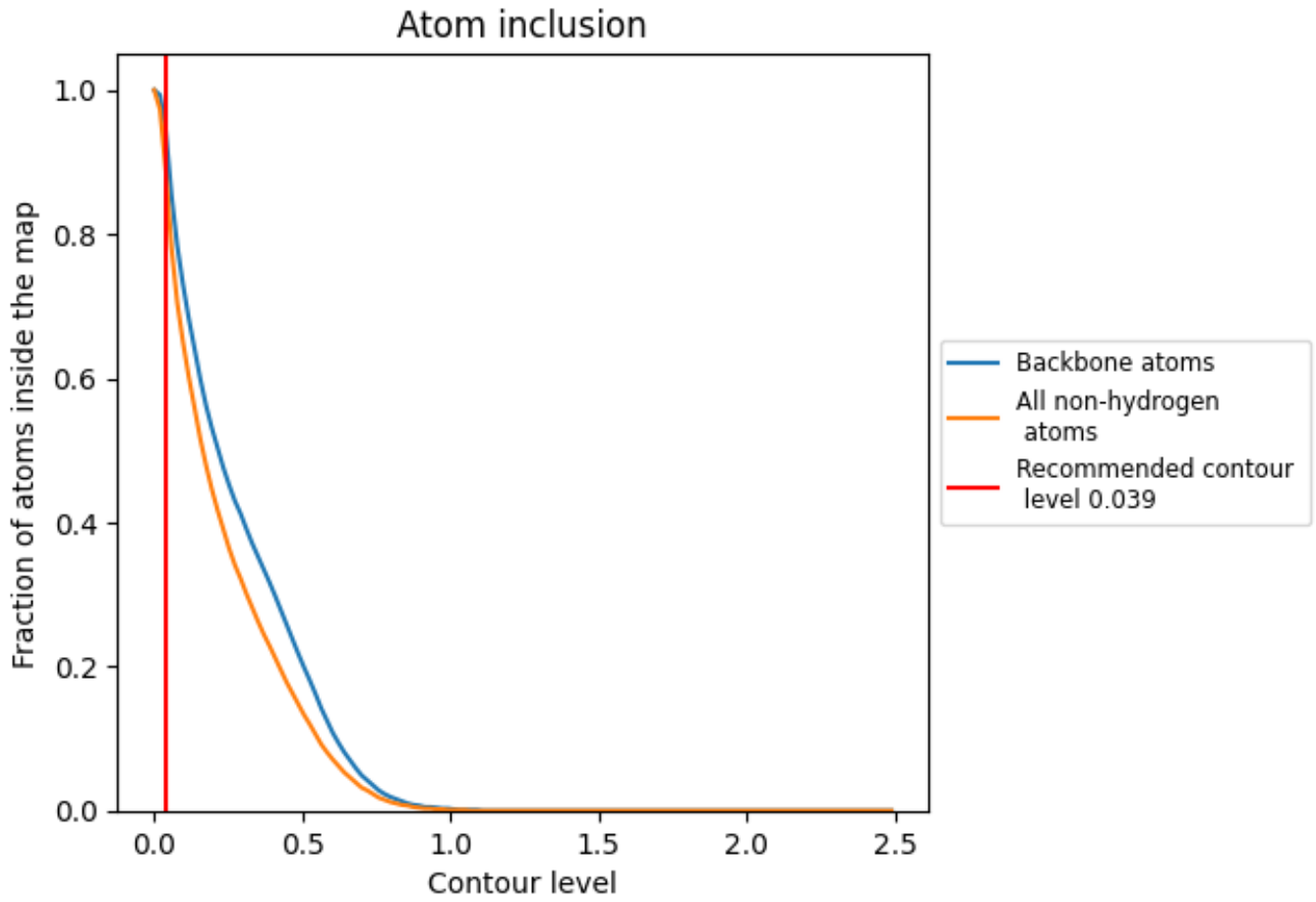
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.039).

9.4 Atom inclusion (i)



At the recommended contour level, 94% of all backbone atoms, 89% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.039) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8880	0.2650
A	0.9610	0.4320
B	0.9720	0.4550
C	0.9670	0.4400
D	0.9690	0.4380
E	0.9550	0.4400
F	0.9670	0.4600
G	0.9710	0.4390
H	0.9770	0.4280
I	0.9890	0.3190
J	0.9840	0.3250
K	0.7280	0.0410
L	0.7220	0.0450
M	0.9530	0.4250
N	0.9530	0.4340
O	0.9730	0.4300
P	0.9780	0.4350
Q	0.9700	0.4370
R	0.9840	0.4540
S	0.9660	0.4230
T	0.9630	0.4290
U	0.8970	0.2710
V	0.7780	0.1210
W	0.7770	0.0740
X	0.5850	0.0330
Y	0.8200	0.1980
Z	0.7640	0.1230