



## Full wwPDB EM Validation Report ⓘ

Mar 5, 2024 – 12:55 pm GMT

PDB ID : 8RAS  
EMDB ID : EMD-19023  
Title : Plastid-encoded RNA polymerase transcription elongation complex  
Authors : Webster, M.W.; Pramanick, I.; Vergara-Cruces, A.  
Deposited on : 2023-12-01  
Resolution : 2.62 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](mailto: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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

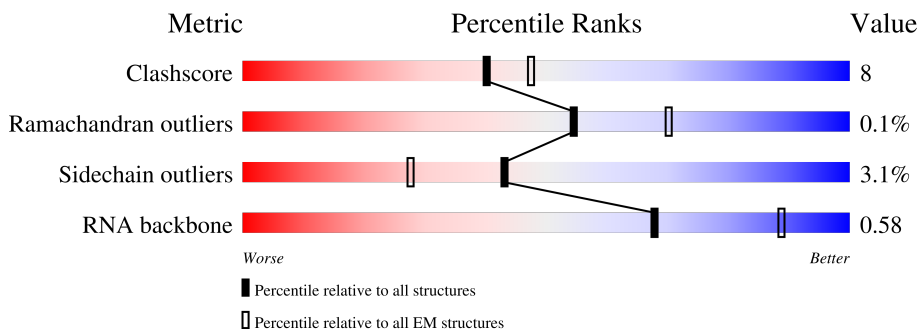
EMDB validation analysis : 0.0.1.dev70  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:  
*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.62 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)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	327	<div style="display: flex; align-items: center;"> <div style="width: 21%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="width: 78%; height: 10px; background: linear-gradient(to right, green, yellow, orange, red);"></div> <div style="width: 13%; height: 10px; background: linear-gradient(to right, orange, red);"></div> <div style="width: 8%; height: 10px; background: linear-gradient(to right, red);"></div> </div>
1	B	327	<div style="display: flex; align-items: center;"> <div style="width: 8%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="width: 57%; height: 10px; background: linear-gradient(to right, green, yellow, orange, red);"></div> <div style="width: 9%; height: 10px; background: linear-gradient(to right, orange, red);"></div> <div style="width: 34%; height: 10px; background: linear-gradient(to right, red);"></div> </div>
2	C	1072	<div style="display: flex; align-items: center;"> <div style="width: 1%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="width: 55%; height: 10px; background: linear-gradient(to right, green, yellow, orange, red);"></div> <div style="width: 12%; height: 10px; background: linear-gradient(to right, orange, red);"></div> <div style="width: 32%; height: 10px; background: linear-gradient(to right, red);"></div> </div>
3	D	680	<div style="display: flex; align-items: center;"> <div style="width: 8%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="width: 68%; height: 10px; background: linear-gradient(to right, green, yellow, orange, red);"></div> <div style="width: 18%; height: 10px; background: linear-gradient(to right, orange, red);"></div> <div style="width: 14%; height: 10px; background: linear-gradient(to right, red);"></div> </div>
4	E	1373	<div style="display: flex; align-items: center;"> <div style="width: 11%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="width: 55%; height: 10px; background: linear-gradient(to right, green, yellow, orange, red);"></div> <div style="width: 11%; height: 10px; background: linear-gradient(to right, orange, red);"></div> <div style="width: 34%; height: 10px; background: linear-gradient(to right, red);"></div> </div>
5	F	911	<div style="display: flex; align-items: center;"> <div style="width: 8%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="width: 48%; height: 10px; background: linear-gradient(to right, green, yellow, orange, red);"></div> <div style="width: 13%; height: 10px; background: linear-gradient(to right, orange, red);"></div> <div style="width: 38%; height: 10px; background: linear-gradient(to right, red);"></div> </div>
6	G	862	<div style="display: flex; align-items: center;"> <div style="width: 39%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="width: 32%; height: 10px; background: linear-gradient(to right, green, yellow, orange, red);"></div> <div style="width: 11%; height: 10px; background: linear-gradient(to right, orange, red);"></div> <div style="width: 55%; height: 10px; background: linear-gradient(to right, red);"></div> </div>

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Mol	Chain	Length	Quality of chain
7	H	675	
8	I	263	
9	J	529	
10	K	460	
11	L	483	
12	M	334	
13	N	297	
14	O	185	
14	P	185	
15	Q	768	
16	R	162	
17	S	611	
18	T	140	
19	X	81	
20	Y	81	
21	Z	40	

## 2 Entry composition [i](#)

There are 26 unique types of molecules in this entry. The entry contains 57315 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 DNA-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	301	Total	C	N	O	S	0	0
			2449	1571	422	446	10		
1	B	216	Total	C	N	O	S	0	0
			1722	1091	302	321	8		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	67	PHE	SER	conflict	UNP A0A6C0M610
B	67	PHE	SER	conflict	UNP A0A6C0M610

- Molecule 2 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	726	Total	C	N	O	S	0	0
			5772	3672	1019	1060	21		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	113	PHE	SER	conflict	UNP A0A6C0M5W1
C	657	VAL	ILE	conflict	UNP A0A6C0M5W1

- Molecule 3 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	D	585	Total	C	N	O	S	0	0
			4787	3078	847	839	23		

- Molecule 4 is a protein called DNA-directed RNA polymerase subunit beta''.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	E	912	7308	4683	1294	1305	26	0	0

- Molecule 5 is a protein called PAP1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	F	568	4593	2907	810	849	27	0	0

- Molecule 6 is a protein called PAP2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	G	385	3040	1918	518	583	21	0	0

- Molecule 7 is a protein called PAP3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	H	440	3701	2369	643	676	13	0	0

- Molecule 8 is a protein called PAP4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	I	215	1771	1141	300	324	6	0	0

- Molecule 9 is a protein called PAP5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	J	234	1970	1247	350	363	10	0	0

- Molecule 10 is a protein called PAP6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	K	374	3022	1933	510	564	15	0	0

- Molecule 11 is a protein called PAP7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	L	408	3348	2153	572	603	20	0	0

- Molecule 12 is a protein called PAP8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	M	204	1714	1085	299	323	7	0	0

- Molecule 13 is a protein called PAP9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	N	215	1759	1132	300	323	4	0	0

- Molecule 14 is a protein called PAP10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	O	114	923	588	148	178	9	0	0
14	P	108	865	550	139	167	9	0	0

- Molecule 15 is a protein called PAP11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	Q	220	1740	1082	307	341	10	0	0

- Molecule 16 is a protein called PAP12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	R	114	944	596	167	178	3	0	0

- Molecule 17 is a protein called FLN2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	S	386	3056	1941	516	578	21	0	0

- Molecule 18 is a protein called PTAC18.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	T	104	Total	C	N	O	S	0	0
			881	572	148	157	4		

- Molecule 19 is a DNA chain called DNA (81-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
19	X	31	Total	C	N	O	P	0	0
			638	304	122	182	30		

- Molecule 20 is a DNA chain called DNA (81-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
20	Y	40	Total	C	N	O	P	0	0
			813	386	145	242	40		

- Molecule 21 is a RNA chain called RNA (40-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
21	Z	10	Total	C	N	O	P	0	0
			215	95	40	70	10		

- Molecule 22 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
22	D	1	Total	Mg	0
			1	1	

- Molecule 23 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
23	E	1	Total	Zn	0
			1	1	

- Molecule 24 is FE (III) ION (three-letter code: FE) (formula: Fe) (labeled as "Ligand of Interest" by depositor).

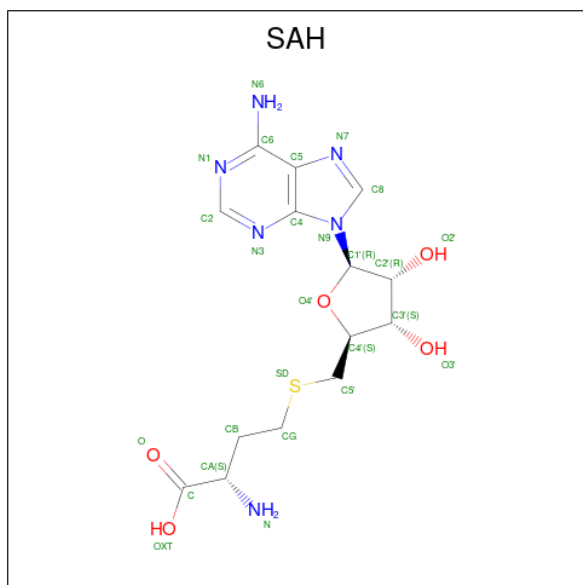
Mol	Chain	Residues	Atoms		AltConf
24	I	1	Total	Fe	0
			1	1	

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Mol	Chain	Residues	Atoms	AltConf
24	N	1	Total Fe 1 1	0

- Molecule 25 is S-ADENOSYL-L-HOMOCYSTEINE (three-letter code: SAH) (formula: C<sub>14</sub>H<sub>20</sub>N<sub>6</sub>O<sub>5</sub>S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	AltConf
25	L	1	Total C N O S 26 14 6 5 1	0

- Molecule 26 is water.

Mol	Chain	Residues	Atoms	AltConf
26	A	18	Total O 18 18	0
26	B	12	Total O 12 12	0
26	C	54	Total O 54 54	0
26	D	18	Total O 18 18	0
26	E	24	Total O 24 24	0
26	F	2	Total O 2 2	0
26	H	6	Total O 6 6	0

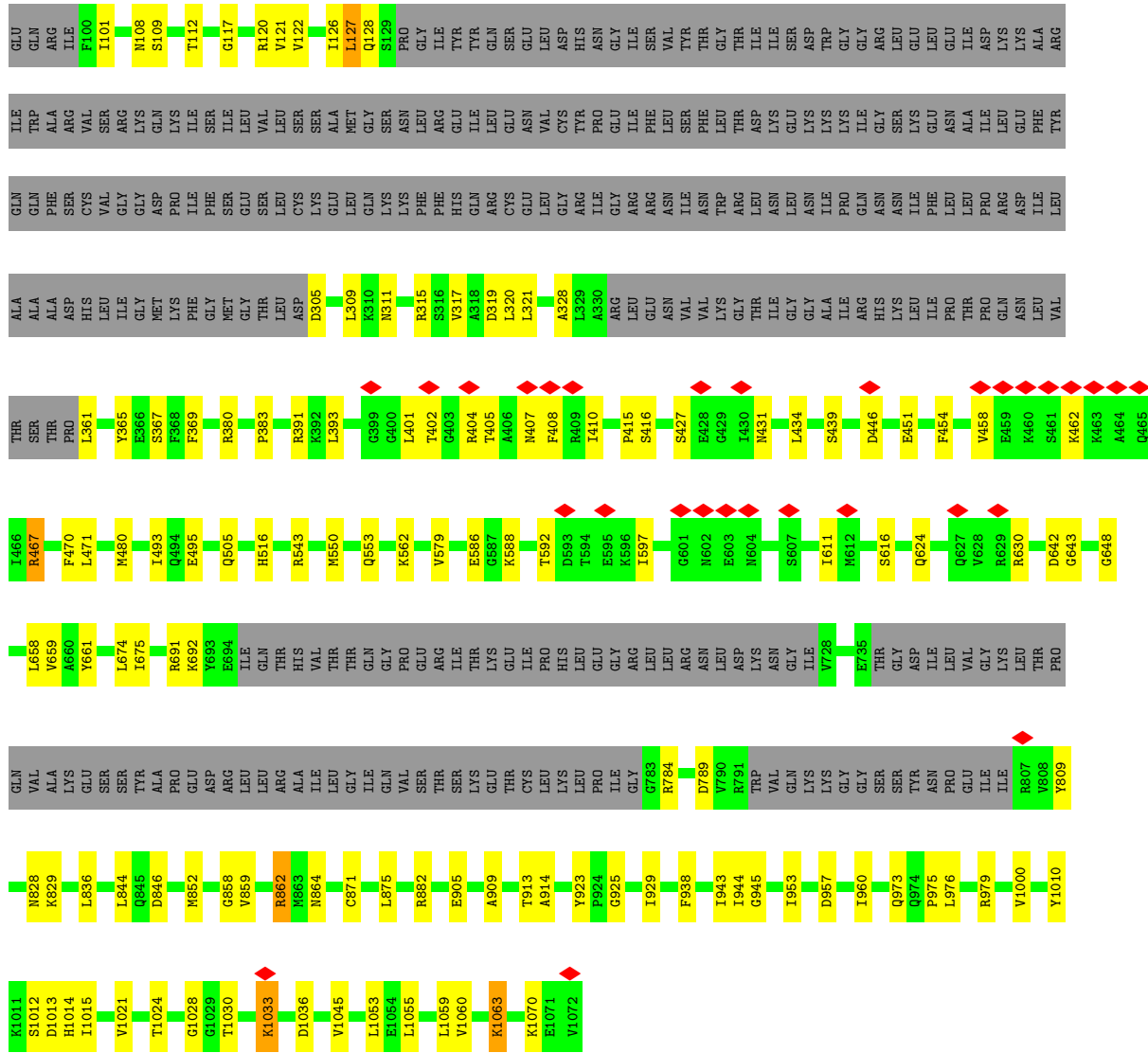
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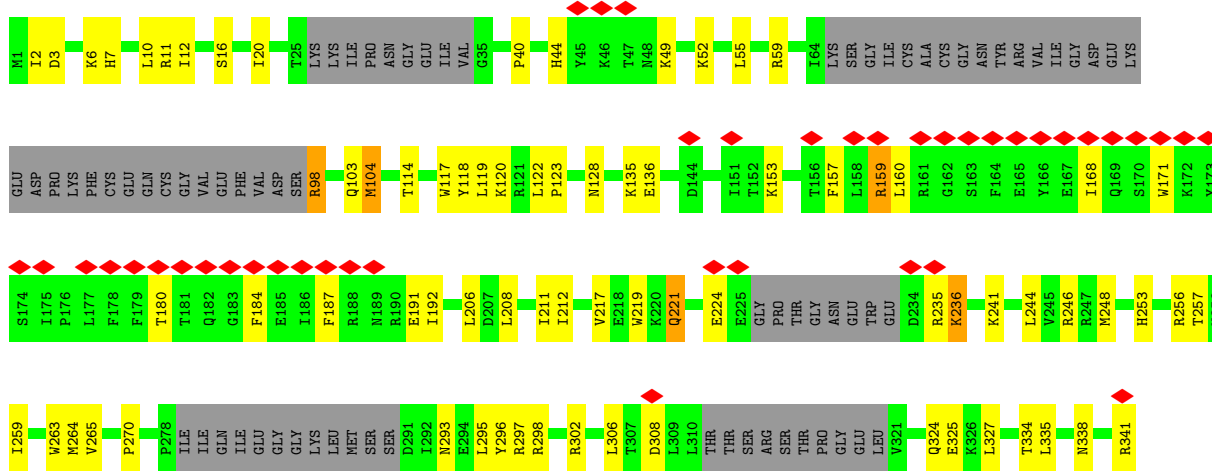
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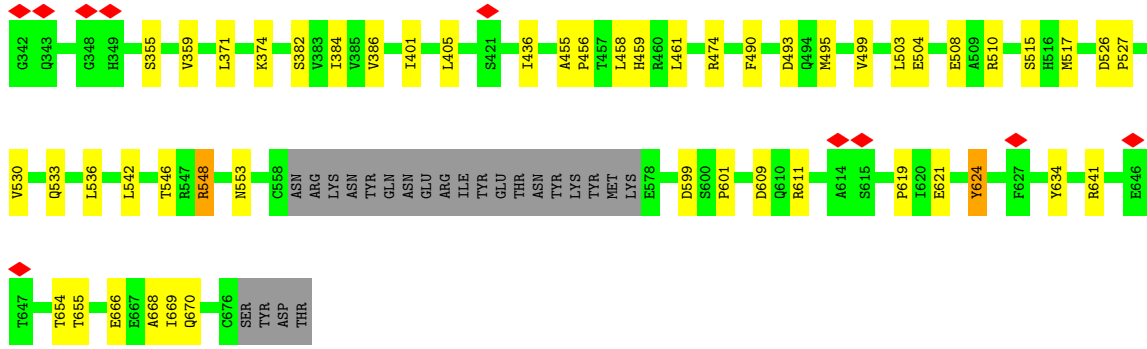
Mol	Chain	Residues	Atoms		AltConf
26	I	3	Total 3	O 3	0
26	J	32	Total 32	O 32	0
26	K	17	Total 17	O 17	0
26	L	19	Total 19	O 19	0
26	M	15	Total 15	O 15	0
26	N	4	Total 4	O 4	0
26	O	2	Total 2	O 2	0
26	P	2	Total 2	O 2	0
26	R	3	Total 3	O 3	0
26	S	23	Total 23	O 23	0



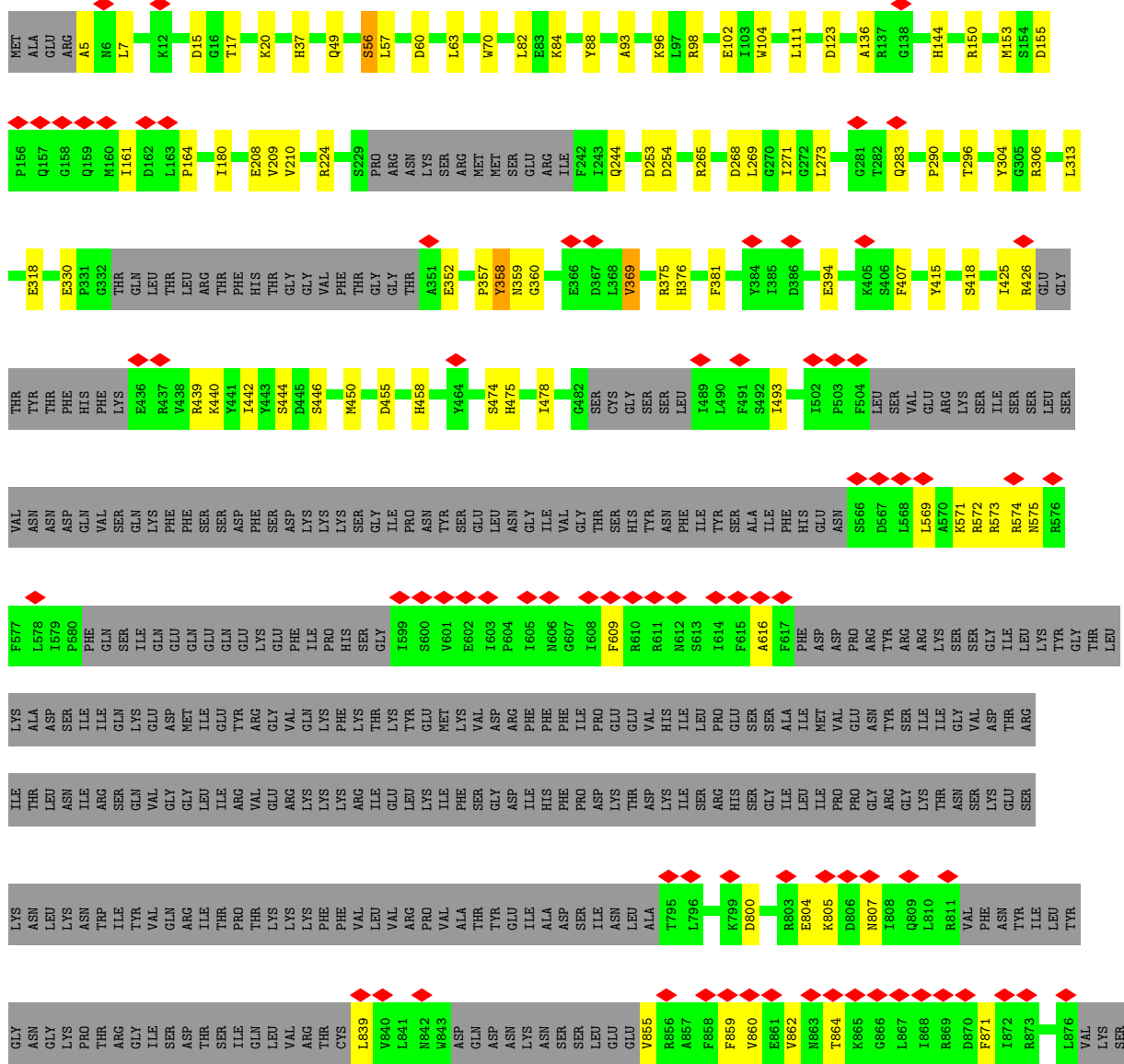


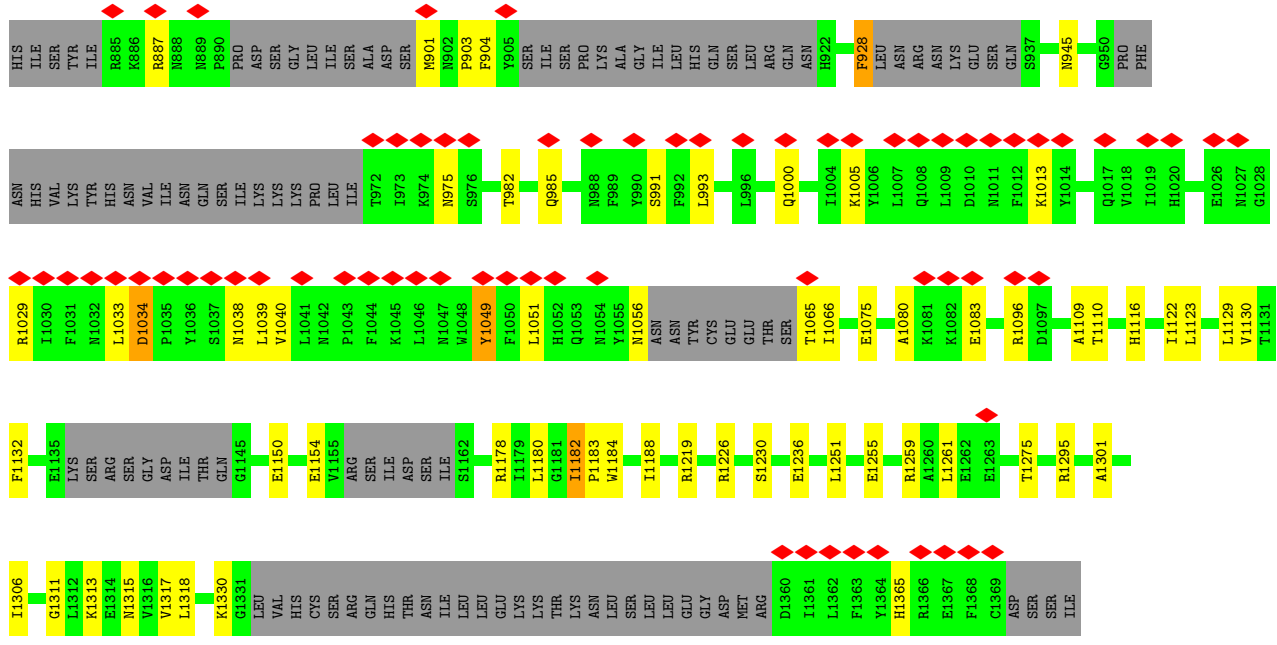
• Molecule 3: DNA-directed RNA polymerase subunit beta'



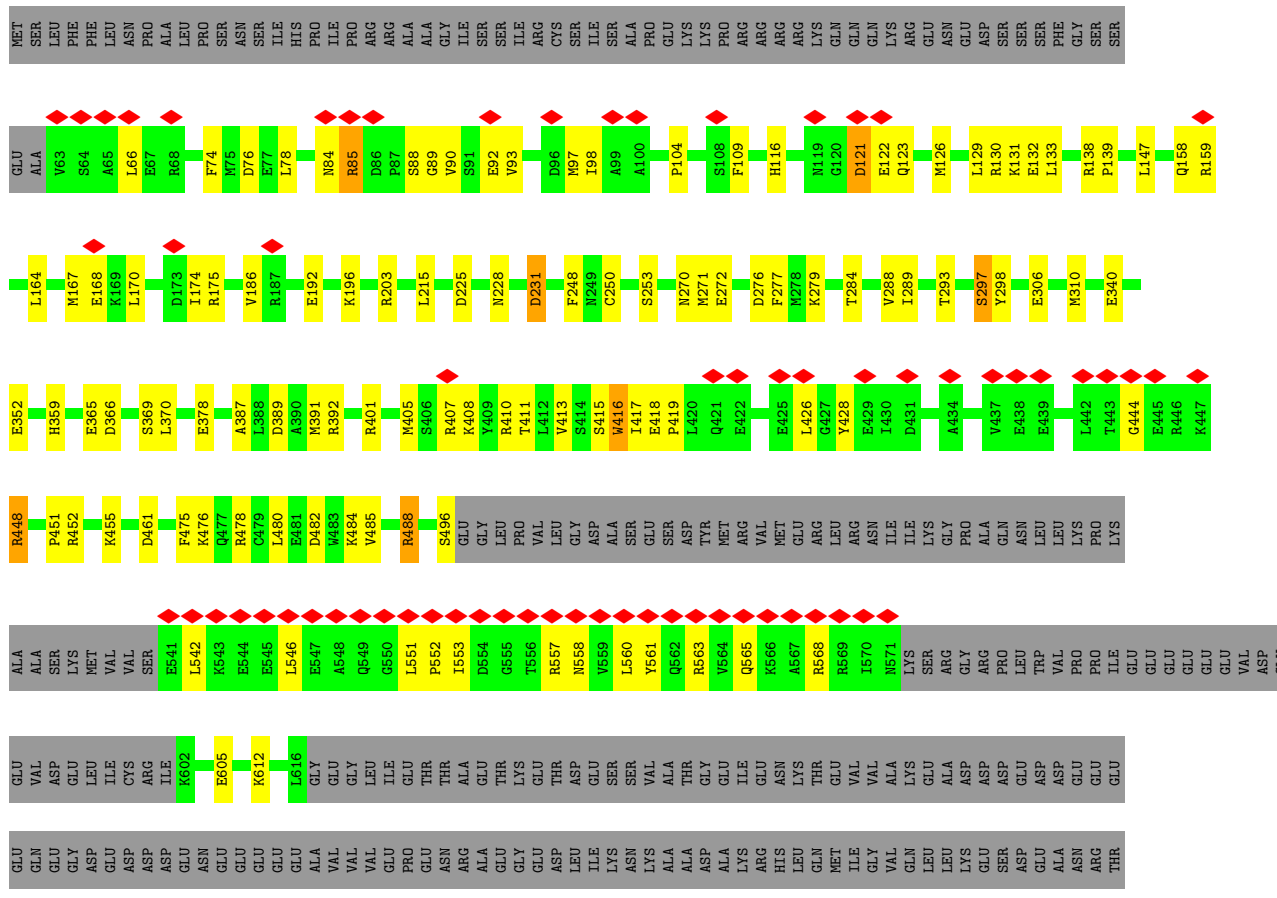


• Molecule 4: DNA-directed RNA polymerase subunit beta''



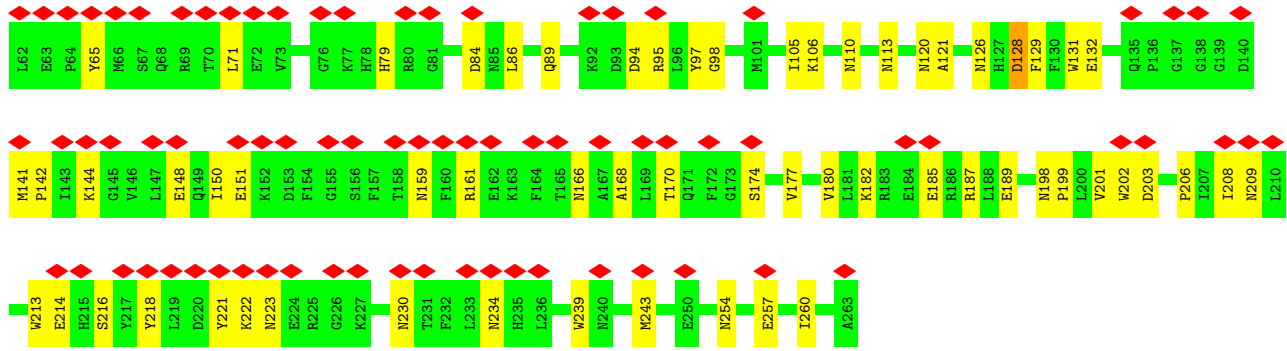


• Molecule 5: PAP1

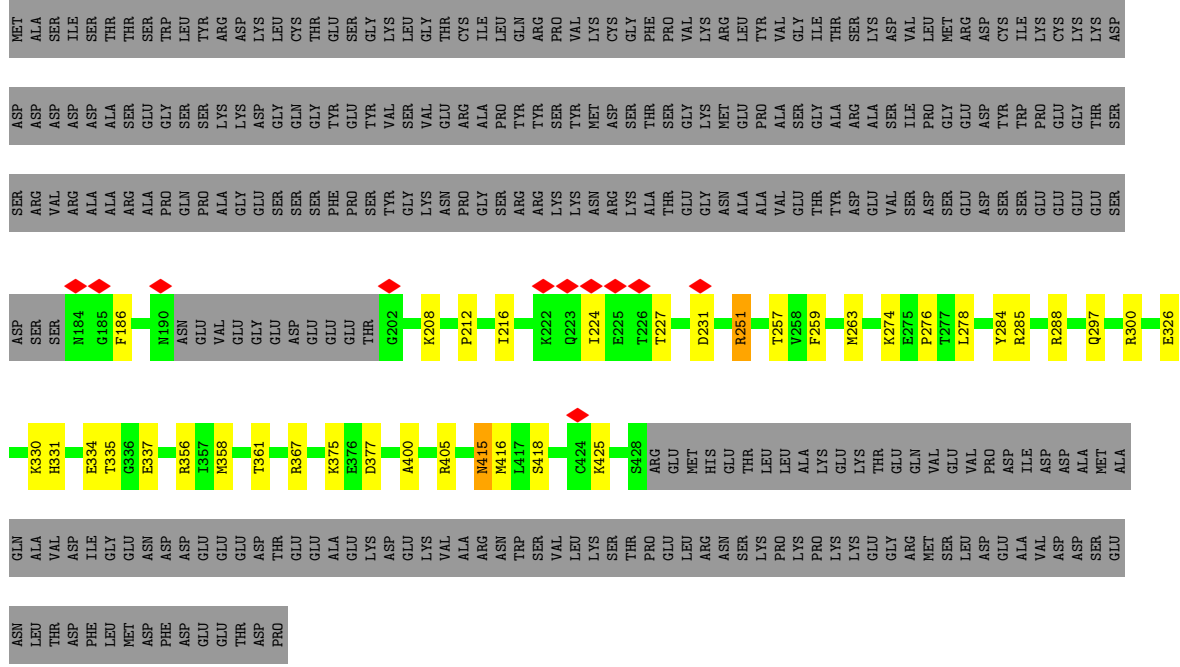
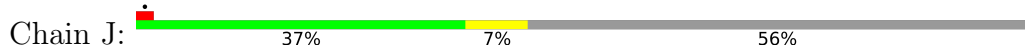




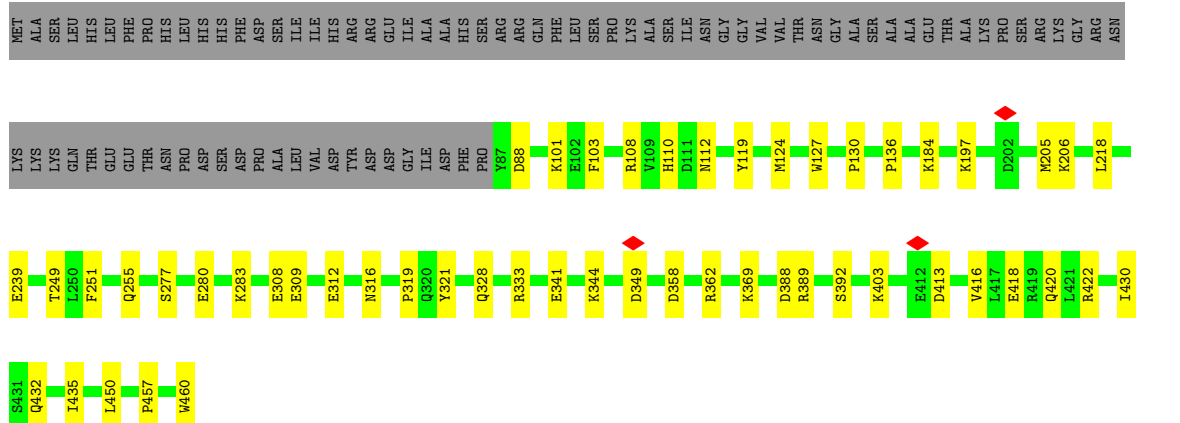




• Molecule 9: PAP5

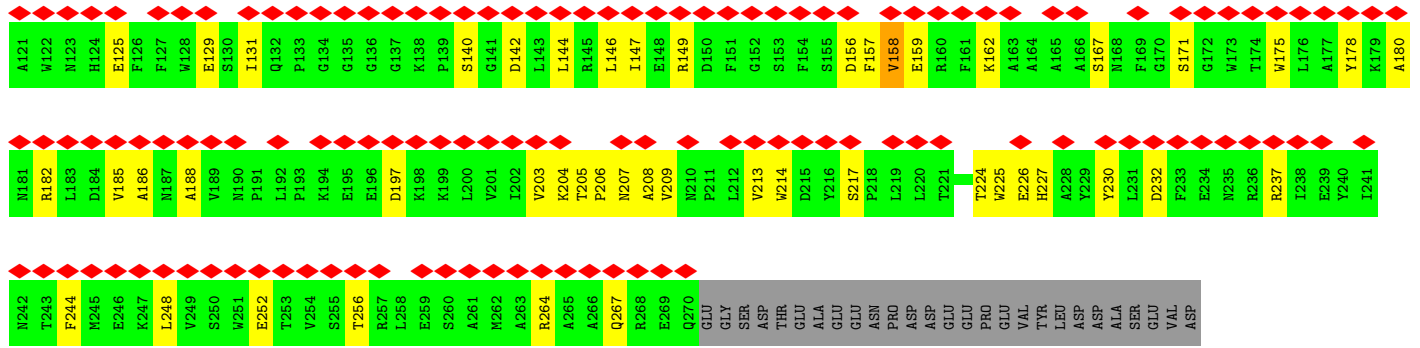


• Molecule 10: PAP6

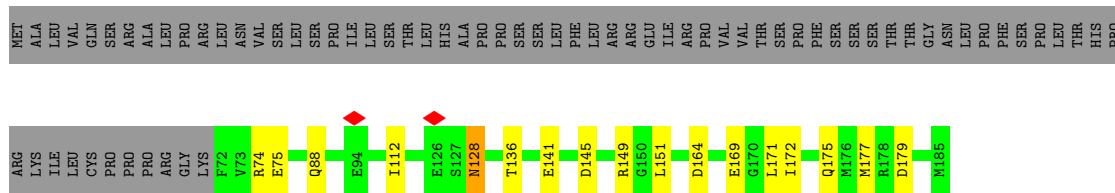




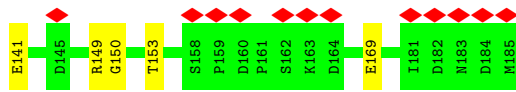
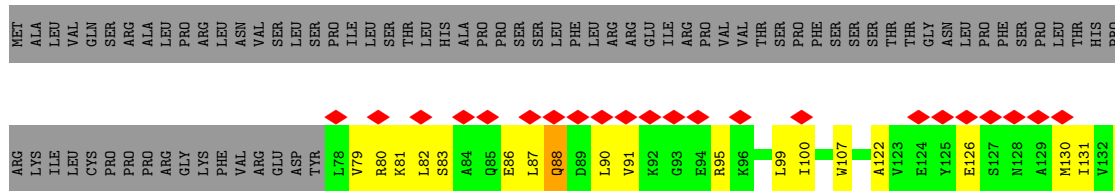




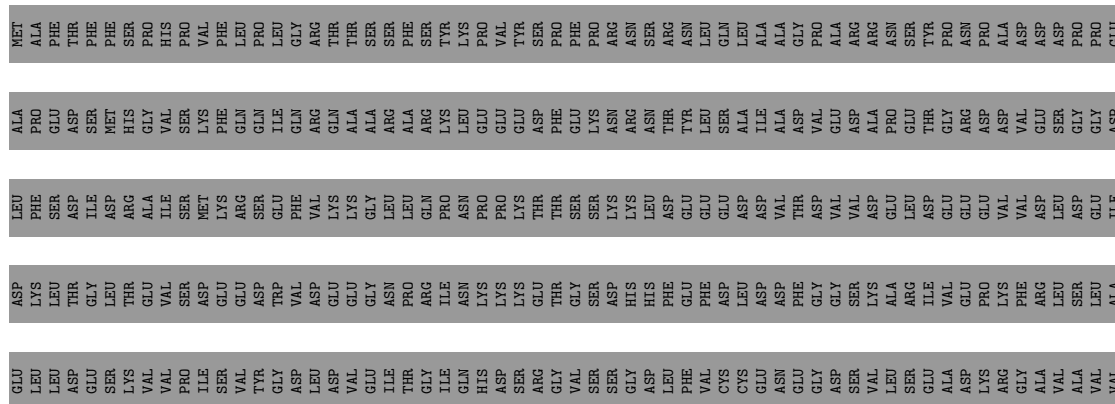
• Molecule 14: PAP10

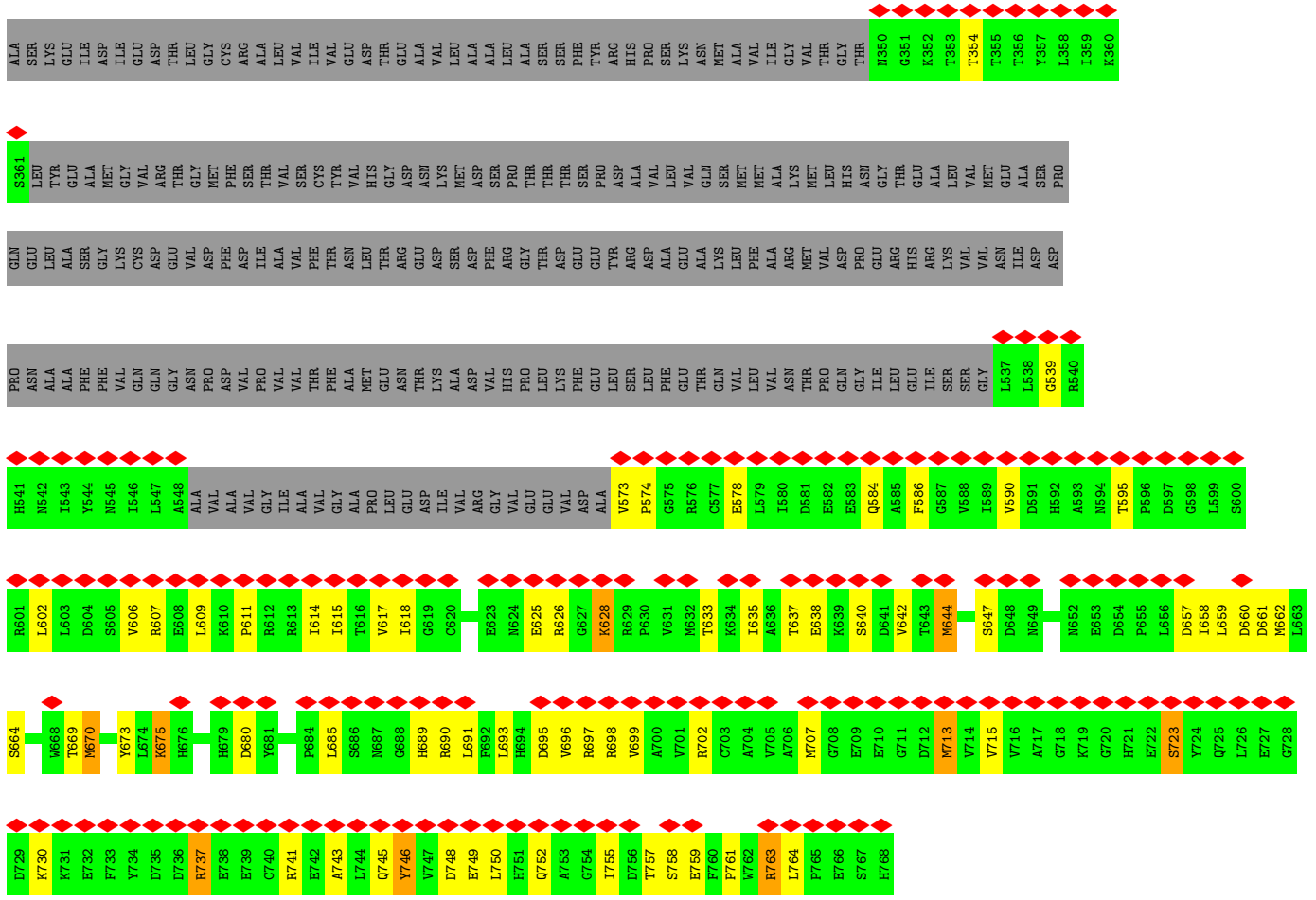


• Molecule 14: PAP10

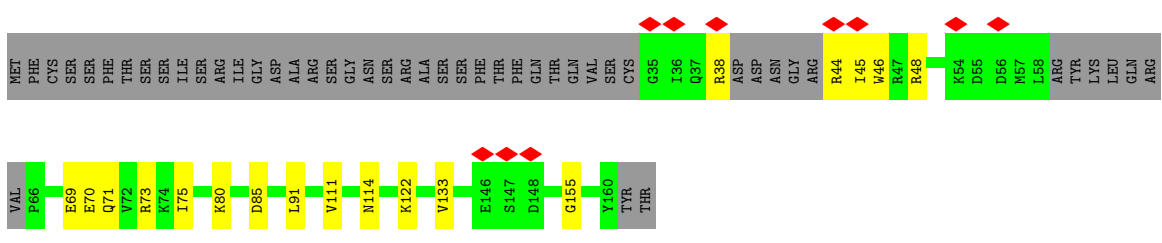


• Molecule 15: PAP11

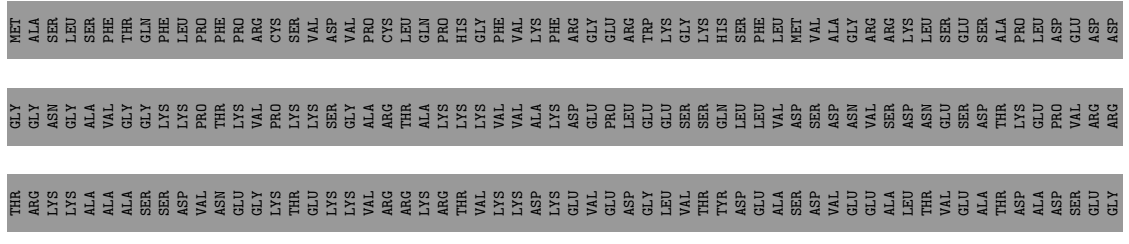




● Molecule 16: PAP12



● Molecule 17: FLN2







## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	417374	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	40.48	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	5.127	Depositor
Minimum map value	-0.951	Depositor
Average map value	0.140	Depositor
Map value standard deviation	0.155	Depositor
Recommended contour level	0.8	Depositor
Map size ( $\text{\AA}$ )	300.0, 300.0, 300.0	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	0.5, 0.5, 0.5	Depositor

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MG, ZN, FE, SAH

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	0.25	0/2498	0.49	0/3377
1	B	0.26	0/1755	0.52	0/2378
2	C	0.26	0/5887	0.50	0/7943
3	D	0.25	0/4894	0.50	0/6612
4	E	0.25	0/7449	0.49	0/10057
5	F	0.25	0/4689	0.49	0/6328
6	G	0.25	0/3095	0.51	0/4175
7	H	0.25	0/3809	0.49	0/5147
8	I	0.25	0/1825	0.47	0/2481
9	J	0.26	0/2021	0.49	0/2724
10	K	0.26	0/3100	0.47	0/4204
11	L	0.25	0/3436	0.46	0/4650
12	M	0.25	0/1756	0.51	0/2378
13	N	0.24	0/1812	0.48	0/2464
14	O	0.25	0/939	0.47	0/1268
14	P	0.25	0/879	0.49	0/1187
15	Q	0.24	0/1771	0.52	0/2392
16	R	0.25	0/960	0.48	0/1285
17	S	0.25	0/3123	0.48	0/4226
18	T	0.27	0/906	0.54	0/1225
19	X	0.50	0/716	0.89	0/1102
20	Y	0.52	0/909	0.92	0/1399
21	Z	0.21	0/239	0.81	0/371
All	All	0.26	0/58468	0.51	0/79373

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
4	E	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	E	1182	ILE	Peptide

## 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	2449	0	2490	34	0
1	B	1722	0	1726	23	0
2	C	5772	0	5790	88	0
3	D	4787	0	4863	96	0
4	E	7308	0	7386	108	0
5	F	4593	0	4529	90	0
6	G	3040	0	2986	58	0
7	H	3701	0	3579	88	0
8	I	1771	0	1696	44	0
9	J	1970	0	1923	28	0
10	K	3022	0	2962	31	0
11	L	3348	0	3304	42	0
12	M	1714	0	1679	22	0
13	N	1759	0	1688	41	0
14	O	923	0	917	13	0
14	P	865	0	867	18	0
15	Q	1740	0	1685	54	0
16	R	944	0	935	18	0
17	S	3056	0	3042	36	0
18	T	881	0	860	33	0
19	X	638	0	351	14	0
20	Y	813	0	450	31	0
21	Z	215	0	110	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
22	D	1	0	0	0	0
23	E	1	0	0	0	0
24	I	1	0	0	0	0
24	N	1	0	0	0	0
25	L	26	0	19	2	0
26	A	18	0	0	0	0
26	B	12	0	0	0	0
26	C	54	0	0	0	0
26	D	18	0	0	1	0
26	E	24	0	0	1	0
26	F	2	0	0	0	0
26	H	6	0	0	0	0
26	I	3	0	0	0	0
26	J	32	0	0	1	0
26	K	17	0	0	0	0
26	L	19	0	0	0	0
26	M	15	0	0	0	0
26	N	4	0	0	0	0
26	O	2	0	0	0	0
26	P	2	0	0	0	0
26	R	3	0	0	0	0
26	S	23	0	0	0	0
All	All	57315	0	55837	861	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 8.

All (861) 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)
3:D:668:ALA:HA	16:R:71:GLN:HE22	1.38	0.87
3:D:384:ILE:HD11	3:D:495:MET:HB2	1.64	0.79
1:A:286:CYS:HA	1:A:289:LYS:HZ2	1.48	0.79
13:N:64:MET:HG2	13:N:69:LEU:HG	1.65	0.79
5:F:74:PHE:HD1	5:F:97:MET:HG2	1.50	0.76
18:T:58:LEU:HD22	18:T:63:VAL:HG11	1.68	0.76
4:E:887:ARG:NH2	7:H:523:GLU:OE2	2.19	0.75
17:S:481:THR:HG22	17:S:483:PHE:H	1.52	0.75
7:H:519:ARG:NH2	18:T:130:GLU:OE2	2.21	0.73
4:E:455:ASP:HB2	4:E:474:SER:HB2	1.71	0.73
4:E:1096:ARG:HH21	7:H:283:THR:HG22	1.54	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
17:S:353:LYS:HD2	17:S:354:LYS:H	1.55	0.71
14:P:136:THR:HG21	17:S:381:LEU:HD21	1.73	0.70
3:D:128:ASN:HD21	3:D:246:ARG:HH11	1.40	0.69
20:Y:15:DC:H2''	20:Y:16:DG:C8	2.27	0.69
7:H:196:ARG:NH2	8:I:132:GLU:OE2	2.25	0.69
1:A:60:THR:HG21	1:A:98:SER:HB3	1.73	0.69
4:E:224:ARG:NH2	5:F:762:ASP:OD2	2.25	0.69
7:H:527:LEU:O	7:H:531:ILE:HD12	1.92	0.68
5:F:175:ARG:NH1	11:L:374:GLU:OE2	2.26	0.68
10:K:309:GLU:OE1	10:K:309:GLU:N	2.26	0.68
3:D:455:ALA:HB1	20:Y:38:DG:H1'	1.76	0.68
2:C:108:ASN:OD1	2:C:109:SER:N	2.26	0.67
11:L:461:MET:O	11:L:465:MET:HG3	1.95	0.67
5:F:98:ILE:O	6:G:791:ARG:NH1	2.24	0.67
18:T:80:TRP:O	18:T:117:TRP:N	2.28	0.67
3:D:12:ILE:HD13	4:E:1301:ALA:HA	1.77	0.66
4:E:208:GLU:OE1	4:E:1313:LYS:NZ	2.25	0.66
16:R:70:GLU:OE1	16:R:73:ARG:NH2	2.25	0.66
6:G:503:GLY:HA2	6:G:715:ARG:HG2	1.78	0.65
17:S:273:ASP:OD1	17:S:273:ASP:N	2.24	0.65
13:N:182:ARG:NH1	13:N:188:ALA:O	2.29	0.65
18:T:50:GLU:HB3	18:T:111:LEU:HB3	1.78	0.65
5:F:752:MET:HB3	5:F:757:VAL:HB	1.79	0.65
4:E:1182:ILE:O	4:E:1184:TRP:N	2.30	0.65
5:F:413:VAL:HG21	5:F:809:PRO:HB3	1.79	0.65
4:E:98:ARG:NH2	7:H:103:GLU:OE1	2.30	0.64
5:F:387:ALA:O	5:F:391:MET:HG3	1.98	0.64
18:T:66:TRP:O	18:T:131:ARG:NH2	2.30	0.64
10:K:430:ILE:HG13	10:K:450:LEU:HD22	1.79	0.64
4:E:209:VAL:HG13	4:E:210:VAL:HG13	1.80	0.64
9:J:330:LYS:O	9:J:334:GLU:HG3	1.96	0.64
9:J:415:ASN:HB3	9:J:418:SER:HB2	1.80	0.64
20:Y:20:DC:H2''	20:Y:21:DT:H5'	1.80	0.63
2:C:407:ASN:OD1	2:C:408:PHE:N	2.31	0.63
4:E:985:GLN:OE1	8:I:53:LYS:NZ	2.31	0.63
10:K:205:MET:HB2	14:O:88:GLN:HG2	1.80	0.63
4:E:290:PRO:O	4:E:1226:ARG:NH1	2.32	0.63
7:H:399:SER:HB3	7:H:517:TRP:HD1	1.64	0.62
17:S:291:ARG:NH2	17:S:339:GLU:OE1	2.31	0.62
4:E:1038:ASN:HB2	4:E:1051:LEU:HB2	1.81	0.62
5:F:78:LEU:HB2	5:F:93:VAL:HG11	1.82	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:G:785:THR:OG1	6:G:788:ASN:O	2.18	0.62
4:E:98:ARG:NH1	4:E:375:ARG:O	2.33	0.62
18:T:49:VAL:HG11	18:T:51:ARG:HH21	1.65	0.62
1:A:73:ASP:N	1:A:73:ASP:OD1	2.33	0.62
3:D:302:ARG:HD3	3:D:327:LEU:HB3	1.83	0.61
4:E:102:GLU:OE1	4:E:376:HIS:NE2	2.31	0.61
2:C:659:VAL:HG22	2:C:852:MET:HB2	1.83	0.61
13:N:217:SER:OG	13:N:264:ARG:NH2	2.33	0.61
1:B:202:GLU:OE2	16:R:73:ARG:NH2	2.27	0.61
15:Q:625:GLU:HB2	15:Q:628:LYS:HE3	1.82	0.61
16:R:75:ILE:HG23	16:R:80:LYS:HB2	1.82	0.61
4:E:150:ARG:NH1	26:E:8104:HOH:O	2.34	0.61
15:Q:759:GLU:OE2	15:Q:763:ARG:NH2	2.34	0.61
17:S:284:ASN:ND2	17:S:290:THR:OG1	2.34	0.61
13:N:244:PHE:HA	13:N:248:LEU:HD12	1.83	0.60
4:E:63:LEU:HD11	9:J:285:ARG:HD2	1.83	0.60
15:Q:584:GLN:HG2	15:Q:586:PHE:H	1.66	0.60
1:B:57:ILE:HG12	1:B:217:GLU:HG2	1.84	0.60
2:C:451:GLU:HB3	2:C:470:PHE:HB3	1.83	0.60
2:C:611:ILE:H	2:C:624:GLN:HE21	1.48	0.60
2:C:960:ILE:HG21	3:D:474:ARG:HD3	1.82	0.60
4:E:1034:ASP:HB2	4:E:1039:LEU:HD12	1.84	0.60
5:F:542:LEU:HB3	5:F:560:LEU:HD21	1.83	0.60
7:H:73:ARG:NH2	8:I:257:GLU:OE1	2.34	0.60
5:F:138:ARG:NH2	5:F:170:LEU:O	2.34	0.60
13:N:83:ASN:O	13:N:87:GLN:HG2	2.01	0.60
15:Q:673:TYR:CZ	15:Q:693:LEU:HB3	2.37	0.60
18:T:92:GLU:HG3	18:T:107:LEU:HD13	1.83	0.60
19:X:66:DC:H2'	19:X:67:DG:N7	2.16	0.60
11:L:356:ARG:NH2	11:L:401:THR:O	2.35	0.60
18:T:97:PRO:HA	18:T:120:ALA:HA	1.83	0.60
1:B:194:GLU:OE2	1:B:194:GLU:N	2.34	0.60
19:X:49:DC:H2'	19:X:50:DT:H71	1.84	0.59
1:B:93:GLU:O	1:B:134:GLN:NE2	2.34	0.59
7:H:81:TRP:O	7:H:308:ASN:ND2	2.35	0.59
5:F:116:HIS:ND1	5:F:121:ASP:OD2	2.35	0.59
5:F:352:GLU:OE2	5:F:352:GLU:N	2.35	0.59
15:Q:660:ASP:HB2	15:Q:670:MET:HG3	1.84	0.59
19:X:65:DA:H61	20:Y:17:DT:H3	1.51	0.59
20:Y:49:DG:H2'	20:Y:50:DA:N7	2.18	0.59
13:N:167:SER:OG	13:N:204:LYS:NZ	2.34	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
15:Q:659:LEU:HG	15:Q:693:LEU:HD11	1.85	0.59
1:A:282:ARG:NH1	1:A:311:HIS:O	2.35	0.59
4:E:111:LEU:HB2	4:E:144:HIS:HE1	1.68	0.59
2:C:973:GLN:HG3	2:C:1015:ILE:HD11	1.85	0.59
3:D:10:LEU:HD21	4:E:1318:LEU:HD11	1.85	0.59
5:F:557:ARG:NH1	20:Y:12:DT:OP2	2.36	0.59
11:L:298:ARG:NH1	11:L:301:ASP:OD2	2.36	0.58
1:A:39:LYS:O	1:B:155:ARG:NH2	2.31	0.58
2:C:957:ASP:OD1	3:D:474:ARG:NH1	2.36	0.58
5:F:289:ILE:O	5:F:293:THR:HG23	2.03	0.58
10:K:388:ASP:HB2	10:K:435:ILE:HD13	1.85	0.58
11:L:73:GLU:OE2	16:R:48:ARG:NH2	2.36	0.58
11:L:279:ILE:HD13	11:L:304:LEU:HD22	1.85	0.58
1:A:286:CYS:HA	1:A:289:LYS:NZ	2.18	0.58
11:L:414:GLU:O	11:L:418:VAL:HG13	2.03	0.58
14:O:175:GLN:NE2	14:O:179:ASP:OD1	2.36	0.58
2:C:844:LEU:HD22	2:C:944:ILE:HD13	1.86	0.58
5:F:225:ASP:OD2	5:F:228:ASN:ND2	2.37	0.58
7:H:471:GLU:N	7:H:471:GLU:OE2	2.34	0.58
17:S:380:PRO:HD2	17:S:383:LEU:HD22	1.86	0.58
5:F:552:PRO:HG2	5:F:563:ARG:HD3	1.85	0.58
15:Q:539:GLY:HA2	15:Q:609:LEU:HD21	1.86	0.58
15:Q:673:TYR:OH	15:Q:693:LEU:N	2.37	0.58
3:D:206:LEU:HD22	3:D:211:ILE:HD11	1.84	0.58
10:K:239:GLU:OE2	14:O:149:ARG:NH1	2.37	0.58
5:F:748:ALA:O	5:F:752:MET:HG3	2.04	0.58
3:D:11:ARG:HB3	4:E:1306:ILE:HG12	1.85	0.57
4:E:82:LEU:HD21	4:E:96:LYS:HA	1.85	0.57
9:J:326:GLU:O	9:J:330:LYS:HG3	2.03	0.57
2:C:661:TYR:HB2	2:C:943:ILE:HG23	1.85	0.57
8:I:129:PHE:HD2	8:I:209:ASN:HB2	1.69	0.57
12:M:172:THR:HG22	12:M:179:TYR:HA	1.86	0.57
4:E:415:TYR:HB2	9:J:227:THR:HG21	1.85	0.57
2:C:543:ARG:CZ	2:C:862:ARG:HG3	2.35	0.57
7:H:205:ASP:OD1	7:H:207:LYS:NZ	2.38	0.57
2:C:391:ARG:NH2	2:C:439:SER:O	2.38	0.57
5:F:546:LEU:HB3	5:F:551:LEU:HD23	1.86	0.57
3:D:2:ILE:HA	5:F:270:ASN:HD21	1.70	0.57
8:I:89:GLN:OE1	8:I:120:ASN:ND2	2.32	0.57
13:N:71:TYR:CE1	13:N:75:LYS:HD3	2.40	0.57
15:Q:647:SER:O	15:Q:697:ARG:NH1	2.37	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:236:LYS:HE3	20:Y:24:DA:H2'	1.86	0.57
15:Q:696:VAL:HG22	15:Q:698:ARG:H	1.69	0.57
17:S:353:LYS:HD2	17:S:354:LYS:N	2.20	0.57
6:G:439:ALA:HB1	6:G:461:VAL:HG12	1.86	0.57
6:G:774:LEU:HD13	6:G:792:ILE:HG21	1.87	0.57
2:C:328:ALA:HB1	2:C:361:LEU:HD12	1.87	0.57
4:E:1065:THR:OG1	4:E:1066:ILE:N	2.30	0.57
4:E:569:LEU:HD13	7:H:412:VAL:HG12	1.85	0.56
6:G:637:ILE:O	6:G:684:ARG:NH1	2.38	0.56
17:S:308:ILE:HG21	17:S:314:LEU:HD23	1.87	0.56
2:C:126:ILE:HD11	2:C:393:LEU:HB3	1.87	0.56
20:Y:41:DC:H2'	20:Y:42:DG:H8	1.71	0.56
6:G:597:CYS:SG	6:G:598:TYR:N	2.78	0.56
9:J:367:ARG:NH2	26:J:606:HOH:O	2.37	0.56
15:Q:607:ARG:HH21	15:Q:611:PRO:HD2	1.69	0.56
6:G:633:ILE:HA	6:G:636:MET:HG3	1.87	0.56
13:N:140:SER:HA	13:N:144:LEU:HD12	1.88	0.56
14:P:122:ALA:HB2	14:P:131:ILE:HD12	1.88	0.56
1:A:225:LEU:HD22	1:B:45:ILE:HD11	1.87	0.56
3:D:259:ILE:O	5:F:455:LYS:NZ	2.29	0.56
12:M:210:ILE:HG23	12:M:215:ASP:HB2	1.87	0.56
15:Q:675:LYS:HE3	15:Q:675:LYS:HA	1.88	0.56
2:C:427:SER:OG	2:C:431:ASN:O	2.24	0.56
4:E:609:PHE:HB2	4:E:855:VAL:HB	1.87	0.56
6:G:642:ASP:OD2	6:G:684:ARG:NH2	2.38	0.55
8:I:148:GLU:HA	8:I:151:GLU:HG2	1.87	0.55
19:X:34:DC:H2''	19:X:35:DT:H5'	1.86	0.55
2:C:1013:ASP:OD2	3:D:374:LYS:NZ	2.38	0.55
4:E:161:ILE:HD12	4:E:180:ILE:HG23	1.89	0.55
8:I:180:VAL:HG12	8:I:206:PRO:HA	1.88	0.55
1:B:103:THR:HG21	1:B:150:LYS:HE3	1.87	0.55
2:C:383:PRO:HG3	2:C:579:VAL:HG21	1.88	0.55
8:I:126:ASN:HD21	8:I:198:ASN:HB3	1.71	0.55
7:H:214:VAL:HA	7:H:217:MET:HG2	1.88	0.55
7:H:276:MET:HB2	7:H:327:ILE:HD12	1.89	0.55
2:C:305:ASP:O	2:C:311:ASN:ND2	2.39	0.55
5:F:131:LYS:NZ	6:G:472:GLU:OE1	2.40	0.55
7:H:301:GLY:HA3	7:H:342:LEU:HD11	1.89	0.55
17:S:364:LYS:O	17:S:368:GLN:HG3	2.07	0.55
3:D:510:ARG:O	3:D:510:ARG:NH1	2.38	0.55
3:D:669:ILE:HD12	4:E:7:LEU:HD11	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:1178:ARG:NH1	5:F:496:SER:OG	2.40	0.55
8:I:58:PRO:HG2	8:I:61:ALA:HB2	1.88	0.55
14:P:88:GLN:HE21	17:S:314:LEU:CD1	2.20	0.55
2:C:112:THR:HG22	2:C:121:VAL:HG22	1.88	0.54
2:C:402:THR:H	2:C:405:THR:HB	1.72	0.54
2:C:1013:ASP:OD1	2:C:1013:ASP:N	2.36	0.54
15:Q:680:ASP:HB2	15:Q:761:PRO:HG3	1.89	0.54
4:E:1110:THR:HG22	7:H:99:LEU:HD13	1.89	0.54
3:D:542:LEU:HD13	4:E:49:GLN:HG3	1.89	0.54
2:C:446:ASP:OD1	2:C:446:ASP:N	2.41	0.54
3:D:40:PRO:O	3:D:297:ARG:NH1	2.41	0.54
4:E:982:THR:HB	7:H:166:ILE:HD12	1.89	0.54
5:F:306:GLU:O	5:F:310:MET:HG3	2.07	0.54
6:G:691:GLU:HA	6:G:694:LYS:HE3	1.90	0.54
15:Q:354:THR:HG23	15:Q:573:VAL:HG21	1.88	0.54
15:Q:602:LEU:O	15:Q:606:VAL:HG23	2.07	0.54
5:F:378:GLU:HB3	5:F:478:ARG:HH21	1.70	0.54
6:G:571:SER:O	6:G:607:LYS:NZ	2.34	0.54
18:T:81:GLN:O	18:T:116:LYS:NZ	2.31	0.54
3:D:624:TYR:HB3	12:M:282:LEU:HB3	1.90	0.54
7:H:408:TRP:O	7:H:412:VAL:HG22	2.07	0.54
2:C:480:MET:H	2:C:516:HIS:HD2	1.54	0.54
8:I:59:LEU:HD23	8:I:71:LEU:HB3	1.90	0.54
2:C:493:ILE:HD12	2:C:495:GLU:H	1.73	0.54
7:H:518:ARG:HH12	18:T:69:TRP:HD1	1.54	0.53
13:N:185:VAL:HG23	13:N:188:ALA:HB2	1.89	0.53
8:I:182:LYS:HD3	8:I:189:GLU:HB2	1.90	0.53
8:I:213:TRP:O	8:I:216:SER:OG	2.23	0.53
1:B:167:ASP:OD1	1:B:167:ASP:N	2.41	0.53
4:E:864:THR:HG21	7:H:413:ALA:HB1	1.90	0.53
5:F:74:PHE:CD1	5:F:97:MET:HG2	2.39	0.53
9:J:259:PHE:O	9:J:263:MET:HG3	2.08	0.53
2:C:1063:LYS:NZ	5:F:231:ASP:OD1	2.30	0.53
7:H:399:SER:HB3	7:H:517:TRP:CD1	2.42	0.53
14:O:164:ASP:OD1	14:O:164:ASP:N	2.42	0.53
2:C:70:VAL:HA	2:C:117:GLY:HA2	1.90	0.53
2:C:960:ILE:O	2:C:979:ARG:NH1	2.42	0.53
1:A:282:ARG:HG3	17:S:196:THR:HG21	1.89	0.53
3:D:669:ILE:HG21	4:E:5:ALA:HB2	1.90	0.53
4:E:271:ILE:HG22	12:M:211:ASP:OD1	2.09	0.53
4:E:1033:LEU:HD23	4:E:1039:LEU:HD13	1.89	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:F:407:ARG:NH2	15:Q:669:THR:OG1	2.41	0.53
10:K:251:PHE:O	10:K:255:GLN:HG3	2.08	0.53
2:C:415:PRO:HG2	2:C:505:GLN:HG3	1.91	0.53
5:F:109:PHE:HB3	5:F:132:GLU:OE1	2.09	0.53
5:F:565:GLN:NE2	19:X:65:DA:OP1	2.42	0.53
13:N:175:TRP:HB2	13:N:203:VAL:HG23	1.89	0.53
15:Q:637:THR:O	15:Q:689:HIS:ND1	2.35	0.53
20:Y:31:DC:H2 <sup>7</sup>	20:Y:32:DA:C8	2.44	0.53
2:C:642:ASP:OD2	2:C:648:GLY:N	2.34	0.53
4:E:352:GLU:N	4:E:352:GLU:OE1	2.42	0.53
13:N:147:ILE:HD11	13:N:157:PHE:CD2	2.43	0.53
15:Q:698:ARG:O	15:Q:702:ARG:HG2	2.09	0.53
5:F:89:GLY:O	5:F:93:VAL:HG23	2.09	0.53
5:F:416:TRP:HB2	5:F:475:PHE:H	1.74	0.53
13:N:70:ASP:OD1	13:N:71:TYR:N	2.42	0.53
14:P:150:GLY:O	14:P:153:THR:OG1	2.27	0.53
20:Y:13:DC:H2 <sup>7</sup>	20:Y:14:DG:C8	2.43	0.53
4:E:1311:GLY:O	4:E:1315:ASN:ND2	2.42	0.53
7:H:125:LYS:NZ	9:J:231:ASP:OD2	2.31	0.53
18:T:135:LYS:HE2	18:T:140:ASP:HB2	1.91	0.53
6:G:602:LEU:HB3	6:G:679:LEU:HD11	1.90	0.52
6:G:624:ASN:HD21	6:G:627:SER:HB3	1.74	0.52
1:B:35:SER:HB3	1:B:198:ILE:HG23	1.91	0.52
3:D:20:ILE:HD13	3:D:270:PRO:HD3	1.92	0.52
3:D:244:LEU:O	3:D:248:MET:HG2	2.09	0.52
13:N:51:LYS:NZ	13:N:129:GLU:OE2	2.29	0.52
15:Q:741:ARG:O	15:Q:741:ARG:NH1	2.42	0.52
3:D:599:ASP:OD2	3:D:599:ASP:N	2.42	0.52
5:F:744:GLU:HB3	5:F:747:GLU:HB2	1.90	0.52
18:T:63:VAL:HG22	18:T:131:ARG:HD3	1.91	0.52
2:C:929:ILE:HG13	2:C:938:PHE:HD2	1.74	0.52
3:D:504:GLU:CD	3:D:504:GLU:H	2.13	0.52
7:H:196:ARG:NH1	8:I:54:THR:O	2.40	0.52
2:C:458:VAL:HG21	2:C:462:LYS:HD3	1.90	0.52
5:F:410:ARG:NH2	5:F:419:PRO:O	2.40	0.52
20:Y:31:DC:H2 <sup>7</sup>	20:Y:32:DA:H5 <sup>7</sup>	1.92	0.52
3:D:98:ARG:HD3	3:D:98:ARG:N	2.25	0.52
7:H:534:ARG:O	7:H:538:GLY:N	2.42	0.52
15:Q:658:ILE:HG22	15:Q:662:MET:HE1	1.91	0.52
21:Z:32:C:H2 <sup>7</sup>	21:Z:33:G:C8	2.44	0.52
1:A:48:ALA:HB3	1:B:226:PHE:HZ	1.75	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:H:522:GLU:HG3	18:T:134:PHE:CD2	2.45	0.51
8:I:180:VAL:HG11	8:I:199:PRO:HG2	1.92	0.51
5:F:448:ARG:NH1	15:Q:661:ASP:OD2	2.44	0.51
4:E:573:ARG:NH2	7:H:513:ASP:OD2	2.39	0.51
5:F:93:VAL:O	5:F:97:MET:HG3	2.10	0.51
17:S:352:ASP:HB3	17:S:355:MET:HB2	1.93	0.51
15:Q:750:LEU:HG	15:Q:757:THR:HG21	1.93	0.51
3:D:184:PHE:HA	3:D:187:PHE:CE2	2.45	0.51
4:E:153:MET:HG3	4:E:180:ILE:HG22	1.93	0.51
10:K:277:SER:OG	10:K:280:GLU:OE1	2.16	0.51
4:E:369:VAL:HB	4:E:381:PHE:HB3	1.92	0.51
5:F:76:ASP:HA	11:L:411:PRO:HD2	1.92	0.51
6:G:624:ASN:ND2	6:G:630:HIS:HB2	2.25	0.51
3:D:135:LYS:NZ	19:X:55:DT:H5'	2.25	0.51
11:L:300:LYS:HD2	16:R:91:LEU:HA	1.91	0.51
15:Q:702:ARG:HD2	15:Q:743:ALA:HB2	1.93	0.51
13:N:68:THR:OG1	13:N:232:ASP:OD1	2.29	0.50
3:D:306:LEU:HD13	3:D:324:GLN:HB3	1.92	0.50
3:D:459:HIS:CD2	3:D:461:LEU:HB2	2.46	0.50
5:F:186:VAL:HG11	5:F:215:LEU:HD21	1.93	0.50
13:N:146:LEU:HD11	13:N:149:ARG:HH21	1.77	0.50
3:D:295:LEU:HD13	3:D:335:LEU:HA	1.92	0.50
3:D:619:PRO:HG3	3:D:634:TYR:CZ	2.46	0.50
10:K:341:GLU:HA	10:K:344:LYS:HE2	1.94	0.50
11:L:399:LEU:HD22	11:L:421:LEU:HD13	1.93	0.50
14:P:90:LEU:HD11	14:P:130:MET:HE1	1.93	0.50
5:F:89:GLY:HA2	5:F:92:GLU:HG3	1.93	0.50
14:P:90:LEU:HD12	14:P:99:LEU:HD22	1.93	0.50
20:Y:31:DC:H2'	20:Y:32:DA:H8	1.76	0.50
2:C:828:ASN:OD1	2:C:828:ASN:N	2.43	0.50
3:D:236:LYS:NZ	20:Y:24:DA:OP2	2.45	0.50
3:D:527:PRO:HB2	3:D:530:VAL:HG23	1.93	0.50
5:F:76:ASP:OD2	11:L:412:SER:OG	2.24	0.50
6:G:561:ARG:HH22	6:G:667:ARG:HD3	1.76	0.50
7:H:233:VAL:HG22	7:H:268:GLU:HG3	1.94	0.50
13:N:120:GLN:HG2	13:N:208:ALA:HB2	1.92	0.50
11:L:121:GLU:OE2	11:L:298:ARG:NH2	2.40	0.50
11:L:233:HIS:CD2	11:L:235:GLY:H	2.29	0.50
2:C:562:LYS:NZ	9:J:400:ALA:O	2.45	0.50
2:C:675:ILE:HG22	2:C:852:MET:HG2	1.93	0.50
4:E:268:ASP:OD1	4:E:268:ASP:N	2.45	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
20:Y:41:DC:H2'	20:Y:42:DG:C8	2.46	0.50
7:H:395:GLU:O	7:H:524:ARG:NH1	2.37	0.50
8:I:185:GLU:HG2	8:I:187:ARG:HH21	1.75	0.50
4:E:102:GLU:OE2	4:E:375:ARG:NH2	2.43	0.49
3:D:293:ASN:O	3:D:297:ARG:HG3	2.11	0.49
11:L:267:ARG:NH1	11:L:269:GLY:O	2.46	0.49
4:E:860:VAL:O	4:E:871:PHE:N	2.44	0.49
4:E:1295:ARG:HH21	20:Y:33:DG:H5'	1.76	0.49
9:J:284:TYR:O	9:J:288:ARG:HB3	2.12	0.49
15:Q:723:SER:O	15:Q:723:SER:OG	2.30	0.49
19:X:65:DA:H1'	19:X:66:DC:H5'	1.95	0.49
3:D:334:THR:HG23	3:D:338:ASN:ND2	2.28	0.49
6:G:618:LEU:HA	6:G:621:MET:HB3	1.93	0.49
6:G:649:ILE:HA	6:G:652:TYR:CD2	2.46	0.49
1:A:283:ILE:HG23	1:A:312:PHE:HE1	1.77	0.49
6:G:555:ARG:HG3	6:G:556:CYS:N	2.27	0.49
9:J:415:ASN:HD22	9:J:416:MET:N	2.11	0.49
12:M:199:ASP:OD1	12:M:199:ASP:N	2.42	0.49
15:Q:642:VAL:HG22	15:Q:690:ARG:HB2	1.94	0.49
16:R:85:ASP:HB3	16:R:133:VAL:HG21	1.95	0.49
5:F:365:GLU:OE1	5:F:370:LEU:HG	2.13	0.49
7:H:331:ARG:NH1	7:H:341:GLU:OE1	2.41	0.49
9:J:251:ARG:NH1	9:J:276:PRO:O	2.46	0.49
11:L:446:LEU:O	16:R:38:ARG:NH2	2.46	0.49
21:Z:33:G:H2'	21:Z:34:G:H8	1.77	0.49
2:C:789:ASP:HB3	2:C:809:TYR:HD1	1.76	0.49
3:D:235:ARG:HD2	20:Y:26:DA:C8	2.47	0.49
9:J:186:PHE:CG	12:M:262:ARG:HD3	2.48	0.49
18:T:135:LYS:HB3	18:T:135:LYS:HE3	1.56	0.49
20:Y:13:DC:H2''	20:Y:14:DG:H8	1.78	0.49
7:H:350:ASP:O	8:I:254:ASN:ND2	2.46	0.49
8:I:189:GLU:OE2	8:I:189:GLU:HA	2.13	0.49
8:I:144:LYS:HB2	8:I:243:MET:HE1	1.94	0.49
20:Y:17:DT:H2''	20:Y:18:DC:H5	1.78	0.49
1:A:152:GLU:OE1	1:A:152:GLU:N	2.46	0.48
3:D:503:LEU:HD11	16:R:111:VAL:HG21	1.94	0.48
12:M:200:TYR:HB3	12:M:226:LYS:HB2	1.95	0.48
15:Q:695:ASP:OD2	15:Q:695:ASP:N	2.44	0.48
18:T:80:TRP:CH2	18:T:122:LEU:HD21	2.48	0.48
7:H:67:THR:N	7:H:70:GLU:OE2	2.46	0.48
14:P:126:GLU:OE2	14:P:126:GLU:N	2.24	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:546:THR:HG21	3:D:601:PRO:HB3	1.95	0.48
4:E:37:HIS:HD1	16:R:80:LYS:NZ	2.10	0.48
13:N:171:SER:HB3	13:N:225:TRP:CE2	2.48	0.48
20:Y:36:DC:H2'	20:Y:37:DC:C6	2.48	0.48
2:C:401:LEU:HD11	2:C:434:LEU:HD22	1.95	0.48
7:H:207:LYS:HD2	7:H:211:ASP:HB3	1.96	0.48
7:H:371:PRO:HA	7:H:374:ILE:HD12	1.95	0.48
11:L:163:ASP:OD1	11:L:163:ASP:N	2.45	0.48
1:A:110:VAL:HG12	17:S:596:ARG:HG3	1.94	0.48
3:D:548:ARG:HH22	12:M:313:LYS:HE3	1.77	0.48
4:E:444:SER:OG	4:E:446:SER:O	2.31	0.48
5:F:74:PHE:HZ	6:G:708:VAL:HG23	1.78	0.48
15:Q:614:ILE:HG23	15:Q:713:MET:SD	2.54	0.48
17:S:501:MET:HB2	17:S:518:THR:HG23	1.94	0.48
20:Y:34:DT:H2'	20:Y:35:DC:C6	2.48	0.48
2:C:579:VAL:HG12	2:C:643:GLY:HA3	1.96	0.48
2:C:909:ALA:O	2:C:913:THR:OG1	2.27	0.48
7:H:405:ASP:OD1	7:H:405:ASP:N	2.47	0.48
7:H:515:LEU:O	7:H:518:ARG:HD3	2.13	0.48
20:Y:26:DA:H2''	20:Y:27:DA:C8	2.49	0.48
2:C:1055:LEU:HD11	3:D:10:LEU:HD13	1.95	0.48
5:F:66:LEU:HD21	6:G:793:MET:HE1	1.95	0.48
10:K:392:SER:OG	10:K:432:GLN:HG3	2.14	0.48
15:Q:685:LEU:HD11	15:Q:691:LEU:HB2	1.96	0.48
2:C:60:VAL:HG12	2:C:79:GLU:HB2	1.96	0.48
7:H:480:GLU:OE2	7:H:503:LEU:HD22	2.13	0.48
7:H:516:HIS:O	7:H:519:ARG:HB2	2.14	0.48
11:L:286:ASN:ND2	11:L:319:GLU:OE2	2.32	0.48
2:C:1024:THR:O	2:C:1028:GLY:N	2.45	0.48
3:D:641:ARG:NH1	12:M:199:ASP:OD1	2.39	0.48
7:H:137:GLU:O	7:H:141:LYS:N	2.47	0.48
7:H:508:GLU:O	7:H:511:GLU:HG2	2.13	0.48
11:L:248:GLU:N	11:L:248:GLU:OE1	2.46	0.48
14:O:74:ARG:NH1	14:O:75:GLU:OE2	2.47	0.48
20:Y:47:DA:H2''	20:Y:48:DG:H5'	1.96	0.48
17:S:241:LYS:HB3	17:S:241:LYS:HE2	1.63	0.48
3:D:553:ASN:ND2	26:D:805:HOH:O	2.44	0.47
15:Q:606:VAL:HG11	15:Q:713:MET:HE3	1.96	0.47
4:E:88:TYR:CE1	4:E:1075:GLU:HG2	2.49	0.47
2:C:120:ARG:HD2	2:C:369:PHE:HB3	1.96	0.47
4:E:903:PRO:HB2	18:T:94:ARG:HD3	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:1040:VAL:HG23	4:E:1049:TYR:CE2	2.49	0.47
5:F:78:LEU:HG	5:F:90:VAL:HG13	1.95	0.47
5:F:411:THR:O	5:F:415:SER:OG	2.25	0.47
5:F:426:LEU:HD13	5:F:815:ALA:HB2	1.97	0.47
9:J:216:ILE:HD11	12:M:323:ARG:HH12	1.80	0.47
11:L:233:HIS:HD2	11:L:235:GLY:H	1.63	0.47
3:D:3:ASP:H	5:F:270:ASN:ND2	2.12	0.47
4:E:15:ASP:OD2	4:E:17:THR:OG1	2.33	0.47
4:E:458:HIS:HE1	7:H:81:TRP:CE2	2.32	0.47
5:F:126:MET:HE3	5:F:159:ARG:NH1	2.29	0.47
8:I:230:ASN:OD1	8:I:234:ASN:ND2	2.47	0.47
4:E:1109:ALA:HA	4:E:1132:PHE:HZ	1.80	0.47
5:F:565:GLN:OE1	5:F:568:ARG:NH2	2.47	0.47
9:J:331:HIS:NE2	9:J:337:GLU:OE1	2.40	0.47
20:Y:46:DT:O3'	20:Y:47:DA:H8	1.95	0.47
1:B:124:PRO:HG2	1:B:127:VAL:HG21	1.96	0.47
2:C:586:GLU:OE2	14:O:74:ARG:NH2	2.47	0.47
4:E:975:ASN:HA	4:E:1049:TYR:HD1	1.78	0.47
4:E:1154:GLU:OE2	4:E:1275:THR:OG1	2.32	0.47
6:G:463:GLU:HB3	6:G:495:SER:HB3	1.96	0.47
6:G:641:TYR:HA	6:G:646:ASN:HB3	1.97	0.47
11:L:156:THR:OG1	11:L:165:ARG:NH1	2.46	0.47
11:L:365:VAL:HG13	11:L:480:ARG:HE	1.79	0.47
13:N:149:ARG:O	18:T:65:ARG:NH2	2.47	0.47
18:T:88:ILE:HD13	18:T:128:TYR:CE1	2.49	0.47
1:B:21:ARG:NH2	16:R:69:GLU:OE2	2.46	0.47
5:F:297:SER:OG	5:F:298:TYR:N	2.48	0.47
7:H:217:MET:HB3	7:H:219:LEU:HG	1.97	0.47
7:H:518:ARG:HH22	18:T:69:TRP:HB2	1.80	0.47
17:S:386:SER:O	17:S:389:GLU:HG3	2.15	0.47
4:E:975:ASN:HA	4:E:1049:TYR:CD1	2.50	0.47
6:G:458:TYR:HE2	6:G:484:VAL:HG21	1.80	0.47
8:I:79:HIS:NE2	8:I:128:ASP:OD1	2.47	0.47
10:K:119:TYR:HB2	14:O:112:ILE:HG23	1.95	0.47
10:K:206:LYS:HG2	14:O:145:ASP:HB3	1.97	0.47
14:P:82:LEU:HD13	14:P:86:GLU:OE2	2.14	0.47
1:A:231:HIS:HE1	17:S:536:THR:HG23	1.79	0.47
2:C:864:ASN:OD1	2:C:864:ASN:N	2.48	0.47
3:D:180:THR:OG1	15:Q:698:ARG:NH2	2.47	0.47
4:E:442:ILE:HB	4:E:1130:VAL:HG12	1.96	0.47
10:K:358:ASP:HB3	10:K:362:ARG:HB2	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
15:Q:584:GLN:NE2	15:Q:586:PHE:O	2.40	0.47
7:H:180:ARG:HD2	7:H:180:ARG:HA	1.65	0.46
15:Q:685:LEU:HD22	15:Q:689:HIS:HB2	1.96	0.46
3:D:208:LEU:O	3:D:212:ILE:HG13	2.15	0.46
7:H:519:ARG:HA	7:H:519:ARG:HD3	1.71	0.46
10:K:413:ASP:HB3	10:K:416:VAL:HB	1.97	0.46
13:N:84:LEU:HD22	13:N:118:ALA:HA	1.97	0.46
13:N:213:VAL:HG23	13:N:214:TRP:CD1	2.50	0.46
2:C:317:VAL:HG22	2:C:321:LEU:HG	1.97	0.46
9:J:297:GLN:OE1	9:J:300:ARG:NH1	2.48	0.46
19:X:66:DC:H2 <sup>''</sup>	19:X:67:DG:C8	2.51	0.46
3:D:533:GLN:HA	4:E:136:ALA:HB1	1.97	0.46
11:L:109:ASP:OD1	11:L:316:LYS:N	2.46	0.46
15:Q:696:VAL:HG13	15:Q:699:VAL:HG12	1.97	0.46
17:S:281:TYR:O	17:S:285:VAL:HG22	2.16	0.46
20:Y:26:DA:H2 <sup>''</sup>	20:Y:27:DA:H5 <sup>'</sup>	1.96	0.46
2:C:407:ASN:HB3	2:C:410:ILE:HG13	1.96	0.46
11:L:283:ASP:N	11:L:283:ASP:OD1	2.45	0.46
13:N:146:LEU:HD12	13:N:146:LEU:HA	1.79	0.46
15:Q:661:ASP:O	15:Q:664:SER:OG	2.31	0.46
1:A:43:ASP:HB2	1:B:51:ARG:HH21	1.81	0.46
1:B:64:ARG:HB3	1:B:150:LYS:HB2	1.98	0.46
3:D:153:LYS:HG2	5:F:451:PRO:HB2	1.98	0.46
3:D:191:GLU:OE1	3:D:191:GLU:N	2.49	0.46
3:D:621:GLU:OE1	12:M:285:ARG:NH1	2.47	0.46
4:E:493:ILE:O	7:H:380:ARG:NH1	2.49	0.46
14:P:79:VAL:HG12	14:P:133:LYS:HG2	1.97	0.46
1:B:110:VAL:HG21	1:B:116:ILE:HG12	1.97	0.46
2:C:882:ARG:NH1	2:C:905:GLU:OE1	2.47	0.46
2:C:1033:LYS:HB2	2:C:1033:LYS:HE2	1.79	0.46
3:D:306:LEU:HD21	3:D:325:GLU:HG2	1.97	0.46
14:P:99:LEU:HD13	14:P:130:MET:HE3	1.98	0.46
3:D:298:ARG:HH11	3:D:298:ARG:HB3	1.81	0.46
4:E:804:GLU:OE2	7:H:399:SER:N	2.41	0.46
9:J:375:LYS:NZ	9:J:377:ASP:OD2	2.34	0.46
2:C:58:GLN:N	2:C:58:GLN:OE1	2.49	0.46
4:E:407:PHE:HE2	4:E:426:ARG:HD3	1.81	0.46
8:I:86:LEU:HD22	8:I:121:ALA:HA	1.98	0.46
9:J:405:ARG:O	10:K:119:TYR:OH	2.27	0.46
1:A:58:GLU:HG2	1:A:155:ARG:HB3	1.98	0.45
2:C:1060:VAL:HB	3:D:7:HIS:HB2	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:298:ARG:HB3	3:D:298:ARG:NH1	2.31	0.45
7:H:170:ASP:OD1	7:H:170:ASP:N	2.42	0.45
7:H:518:ARG:HA	7:H:521:LEU:CD2	2.46	0.45
2:C:1014:HIS:CE1	2:C:1036:ASP:HB2	2.51	0.45
3:D:371:LEU:HD13	4:E:1317:VAL:HG13	1.97	0.45
4:E:458:HIS:N	7:H:68:GLU:OE2	2.31	0.45
5:F:401:ARG:NH2	5:F:461:ASP:O	2.49	0.45
6:G:515:ARG:HA	6:G:518:ASN:HD21	1.81	0.45
6:G:712:ASP:OD1	6:G:714:HIS:ND1	2.33	0.45
7:H:531:ILE:HG23	7:H:535:GLN:OE1	2.16	0.45
4:E:394:GLU:HG2	9:J:224:ILE:HD11	1.98	0.45
5:F:129:LEU:HD22	5:F:147:LEU:HD13	1.97	0.45
5:F:448:ARG:CZ	15:Q:657:ASP:HB3	2.46	0.45
5:F:488:ARG:HA	5:F:488:ARG:HD3	1.75	0.45
17:S:459:SER:OG	17:S:476:GLU:OE1	2.27	0.45
19:X:52:DC:H2'	19:X:53:DA:C8	2.51	0.45
20:Y:33:DG:H2'	20:Y:34:DT:C6	2.51	0.45
4:E:93:ALA:HB1	4:E:440:LYS:HE2	1.98	0.45
6:G:467:GLN:O	6:G:715:ARG:NH1	2.46	0.45
7:H:164:ARG:HG2	7:H:166:ILE:HG13	1.98	0.45
9:J:257:THR:HG23	9:J:276:PRO:HG2	1.96	0.45
10:K:416:VAL:O	10:K:420:GLN:HG2	2.16	0.45
11:L:372:PRO:HA	11:L:375:TYR:CZ	2.52	0.45
3:D:103:GLN:NE2	3:D:104:MET:O	2.46	0.45
6:G:529:ASN:OD1	6:G:530:ALA:N	2.50	0.45
6:G:560:GLU:OE1	6:G:591:ILE:HD12	2.16	0.45
8:I:65:TYR:O	8:I:221:TYR:OH	2.29	0.45
10:K:101:LYS:HB3	10:K:101:LYS:HE2	1.82	0.45
10:K:312:GLU:OE1	10:K:316:ASN:ND2	2.49	0.45
20:Y:36:DC:H2'	20:Y:37:DC:H6	1.81	0.45
2:C:128:GLN:NE2	2:C:311:ASN:O	2.49	0.45
2:C:1010:TYR:CD1	2:C:1021:VAL:HG21	2.51	0.45
8:I:105:ILE:HD13	8:I:198:ASN:HD21	1.82	0.45
13:N:226:GLU:O	13:N:230:TYR:HB2	2.16	0.45
17:S:354:LYS:HD2	17:S:354:LYS:HA	1.81	0.45
3:D:55:LEU:HD21	3:D:296:TYR:HB3	1.97	0.45
3:D:458:LEU:HB3	4:E:330:GLU:HG2	1.99	0.45
5:F:250:CYS:O	5:F:253:SER:OG	2.30	0.45
6:G:598:TYR:O	6:G:602:LEU:HG	2.16	0.45
7:H:133:ILE:HB	7:H:137:GLU:OE2	2.17	0.45
9:J:208:LYS:HD3	9:J:208:LYS:C	2.37	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:L:114:ARG:HH21	11:L:115:ARG:NH1	2.14	0.45
11:L:427:LYS:HE3	11:L:427:LYS:HB3	1.63	0.45
2:C:454:PHE:CD2	2:C:471:LEU:HD22	2.52	0.45
2:C:480:MET:H	2:C:516:HIS:CD2	2.34	0.45
2:C:1053:LEU:HD11	3:D:117:TRP:HZ3	1.81	0.45
5:F:167:MET:HB3	5:F:174:ILE:HG22	1.99	0.45
6:G:533:GLU:HA	6:G:536:LYS:HB3	1.97	0.45
11:L:410:ILE:HD12	11:L:413:ALA:H	1.82	0.45
14:P:149:ARG:NH2	14:P:169:GLU:OE1	2.42	0.45
18:T:80:TRP:CZ3	18:T:120:ALA:HB3	2.52	0.45
1:A:273:PHE:HA	1:A:294:THR:HA	1.98	0.45
3:D:52:LYS:NZ	3:D:59:ARG:HE	2.15	0.45
4:E:104:TRP:CD1	4:E:164:PRO:HG3	2.51	0.45
6:G:514:SER:O	6:G:517:VAL:HG12	2.17	0.45
7:H:134:THR:HG22	7:H:137:GLU:HG3	1.99	0.45
2:C:28:ASP:OD1	9:J:425:LYS:HE2	2.17	0.45
2:C:975:PRO:HD3	2:C:1012:SER:O	2.16	0.45
4:E:1226:ARG:O	4:E:1230:SER:HB3	2.16	0.45
11:L:149:ILE:HD11	11:L:168:CYS:HB3	1.97	0.45
11:L:260:ARG:NH1	25:L:8001:SAH:SD	2.90	0.45
17:S:360:LEU:HD12	17:S:364:LYS:HE2	1.98	0.45
17:S:581:PRO:HA	17:S:586:VAL:HG11	1.99	0.45
2:C:875:LEU:HB2	2:C:945:GLY:HA2	1.99	0.44
2:C:1055:LEU:HD13	3:D:12:ILE:HG23	1.99	0.44
3:D:526:ASP:HB3	4:E:20:LYS:HE2	1.99	0.44
4:E:296:THR:HG21	4:E:1230:SER:HB2	1.98	0.44
6:G:563:LEU:HA	6:G:566:VAL:HG12	1.98	0.44
11:L:450:ARG:H	11:L:450:ARG:HG3	1.63	0.44
12:M:236:ARG:NH1	12:M:242:GLU:O	2.49	0.44
3:D:334:THR:HG23	3:D:338:ASN:HD21	1.83	0.44
4:E:304:TYR:O	4:E:1219:ARG:HD3	2.17	0.44
5:F:452:ARG:HA	5:F:452:ARG:HD3	1.66	0.44
5:F:768:ASP:OD1	5:F:768:ASP:N	2.40	0.44
17:S:446:HIS:ND1	17:S:448:ASN:OD1	2.49	0.44
4:E:450:MET:HE2	4:E:450:MET:HB2	1.84	0.44
5:F:88:SER:O	5:F:92:GLU:HG3	2.16	0.44
7:H:519:ARG:HH21	18:T:69:TRP:HB2	1.82	0.44
18:T:96:VAL:HB	18:T:123:PHE:HE2	1.82	0.44
1:B:64:ARG:NH1	1:B:169:SER:OG	2.40	0.44
8:I:208:ILE:HD13	8:I:208:ILE:HA	1.84	0.44
9:J:212:PRO:HA	12:M:333:TRP:O	2.16	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:J:358:MET:O	9:J:361:THR:OG1	2.36	0.44
11:L:325:MET:HA	11:L:326:PRO:HD3	1.85	0.44
19:X:57:DT:H2'	19:X:58:DT:C6	2.51	0.44
3:D:16:SER:HB3	3:D:263:TRP:CZ2	2.53	0.44
4:E:575:ASN:HD21	4:E:807:ASN:HB2	1.81	0.44
4:E:616:ALA:HB3	4:E:839:LEU:HD12	1.99	0.44
5:F:123:GLN:CD	5:F:123:GLN:H	2.21	0.44
6:G:755:LEU:HB3	6:G:761:ALA:HB2	2.00	0.44
7:H:167:PRO:HG2	7:H:186:ILE:HG23	2.00	0.44
7:H:414:GLU:HG3	7:H:472:LEU:HD22	2.00	0.44
8:I:79:HIS:CD2	8:I:131:TRP:HE1	2.36	0.44
8:I:218:TYR:HA	8:I:222:LYS:HA	2.00	0.44
15:Q:617:VAL:HG22	15:Q:644:MET:HB2	1.99	0.44
17:S:307:LYS:O	17:S:317:THR:OG1	2.29	0.44
6:G:516:LEU:HD13	6:G:521:ILE:HD12	1.99	0.44
10:K:136:PRO:HD2	10:K:389:ARG:O	2.18	0.44
11:L:204:ASP:OD2	11:L:452:THR:OG1	2.36	0.44
7:H:247:TYR:HB3	7:H:365:ARG:HH12	1.82	0.44
15:Q:713:MET:CE	15:Q:715:VAL:HG23	2.48	0.44
1:A:34:LEU:HD23	1:A:37:LEU:HD11	1.99	0.44
1:A:39:LYS:HB2	1:A:195:LYS:HG3	1.99	0.44
1:A:123:LEU:HD11	1:A:129:ILE:HG12	2.00	0.44
1:A:150:LYS:HD3	1:A:150:LYS:HA	1.87	0.44
6:G:523:ARG:H	6:G:523:ARG:HD2	1.81	0.44
6:G:648:GLN:O	6:G:651:GLU:HG2	2.18	0.44
8:I:150:ILE:HD13	8:I:150:ILE:HA	1.91	0.44
10:K:333:ARG:NH1	10:K:358:ASP:OD2	2.38	0.44
14:O:172:ILE:HD11	14:O:177:MET:HG2	2.00	0.44
2:C:404:ARG:HD3	2:C:404:ARG:HA	1.78	0.44
2:C:550:MET:SD	2:C:829:LYS:HB3	2.58	0.44
2:C:858:GLY:O	2:C:862:ARG:HB2	2.18	0.44
3:D:122:LEU:HD13	3:D:123:PRO:HA	2.00	0.44
13:N:144:LEU:O	13:N:147:ILE:HG22	2.17	0.44
16:R:46:TRP:O	16:R:48:ARG:NH1	2.51	0.44
4:E:269:LEU:HD23	4:E:269:LEU:HA	1.87	0.43
5:F:359:HIS:ND1	5:F:366:ASP:OD1	2.51	0.43
14:P:87:LEU:HD22	14:P:134:VAL:HG21	2.00	0.43
2:C:692:LYS:HB3	2:C:692:LYS:HE2	1.64	0.43
5:F:276:ASP:OD2	5:F:277:PHE:N	2.51	0.43
5:F:417:ILE:HG22	5:F:418:GLU:H	1.83	0.43
7:H:519:ARG:NH1	18:T:132:TYR:CD1	2.85	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
12:M:143:LYS:NZ	12:M:145:SER:OG	2.51	0.43
12:M:189:PRO:HG3	12:M:251:TYR:OH	2.17	0.43
14:P:81:LYS:HB2	14:P:133:LYS:HE2	2.00	0.43
18:T:84:GLN:HB2	18:T:134:PHE:CD1	2.52	0.43
1:A:280:PRO:HG2	1:A:283:ILE:HG12	2.00	0.43
1:A:309:MET:HE3	1:A:310:GLU:O	2.19	0.43
2:C:1059:LEU:HG	2:C:1070:LYS:HD3	2.01	0.43
3:D:44:HIS:HB2	3:D:49:LYS:H	1.83	0.43
3:D:455:ALA:HB3	3:D:456:PRO:HD3	2.00	0.43
4:E:360:GLY:HA2	9:J:224:ILE:HD13	2.00	0.43
4:E:475:HIS:ND1	7:H:96:ARG:HD2	2.33	0.43
4:E:1000:GLN:HB3	7:H:154:ASP:OD1	2.19	0.43
10:K:457:PRO:HA	10:K:460:TRP:CE2	2.53	0.43
13:N:205:THR:HB	13:N:209:VAL:HB	1.99	0.43
13:N:224:THR:HB	13:N:237:ARG:HH21	1.83	0.43
15:Q:659:LEU:HD12	15:Q:659:LEU:HA	1.89	0.43
1:A:316:ASP:HA	1:A:319:LYS:HG2	1.99	0.43
2:C:674:LEU:HD11	2:C:836:LEU:HG	2.00	0.43
3:D:666:GLU:O	3:D:670:GLN:HG2	2.18	0.43
4:E:1365:HIS:O	5:F:133:LEU:HB3	2.18	0.43
5:F:104:PRO:HB2	5:F:109:PHE:CE1	2.53	0.43
6:G:424:GLU:HG2	6:G:456:LYS:HD2	2.00	0.43
14:P:107:TRP:HZ3	17:S:214:VAL:HG11	1.82	0.43
15:Q:713:MET:HE1	15:Q:715:VAL:HG23	2.01	0.43
6:G:674:ASP:HA	6:G:719:GLY:HA3	2.00	0.43
7:H:372:ASP:O	7:H:375:ARG:HG3	2.18	0.43
8:I:148:GLU:OE1	8:I:148:GLU:N	2.42	0.43
12:M:159:PRO:HG2	12:M:237:ARG:HH22	1.83	0.43
1:A:191:ASN:OD1	1:A:191:ASN:N	2.49	0.43
1:A:194:GLU:O	1:A:195:LYS:HG2	2.18	0.43
2:C:925:GLY:O	2:C:943:ILE:HD12	2.19	0.43
3:D:114:THR:HG21	3:D:119:LEU:HD22	2.01	0.43
6:G:603:SER:HB3	6:G:678:TRP:HE3	1.84	0.43
18:T:80:TRP:HH2	18:T:122:LEU:HD21	1.84	0.43
3:D:355:SER:O	3:D:359:VAL:HG13	2.19	0.43
4:E:571:LYS:NZ	4:E:800:ASP:OD1	2.51	0.43
4:E:928:PHE:HZ	4:E:1122:ILE:HD11	1.83	0.43
4:E:1180:LEU:HD13	4:E:1188:ILE:HD12	2.01	0.43
5:F:476:LYS:HG3	5:F:786:TRP:CD2	2.54	0.43
6:G:546:LYS:O	6:G:549:VAL:HG12	2.18	0.43
7:H:188:GLU:HB3	7:H:221:ARG:HE	1.83	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:K:283:LYS:HD3	10:K:283:LYS:N	2.32	0.43
2:C:859:VAL:HB	4:E:57:LEU:HD23	2.01	0.43
3:D:253:HIS:O	3:D:257:THR:OG1	2.32	0.43
4:E:439:ARG:HE	4:E:439:ARG:HB2	1.58	0.43
4:E:991:SER:OG	4:E:993:LEU:O	2.30	0.43
7:H:315:HIS:O	7:H:318:ARG:NH2	2.51	0.43
7:H:353:ILE:O	8:I:254:ASN:ND2	2.52	0.43
11:L:278:MET:HE2	11:L:278:MET:HB3	1.91	0.43
14:P:100:ILE:HD12	14:P:131:ILE:HG12	2.01	0.43
15:Q:659:LEU:HA	15:Q:662:MET:HG2	2.01	0.43
20:Y:49:DG:H2''	20:Y:50:DA:C5	2.54	0.43
1:A:19:GLU:OE1	1:A:31:ARG:NH1	2.46	0.43
2:C:122:VAL:HG13	2:C:320:LEU:HD12	2.00	0.43
13:N:252:GLU:O	13:N:256:THR:HG23	2.18	0.43
14:P:88:GLN:HE21	17:S:314:LEU:HD12	1.83	0.43
15:Q:749:GLU:HA	15:Q:752:GLN:HG3	2.01	0.43
18:T:85:LEU:HD12	18:T:85:LEU:H	1.84	0.43
2:C:101:ILE:HG22	2:C:361:LEU:HD22	2.01	0.43
2:C:914:ALA:HB3	9:J:356:ARG:HH21	1.83	0.43
2:C:1000:VAL:HG12	3:D:508:GLU:HB3	2.00	0.43
6:G:745:LEU:HD13	6:G:793:MET:SD	2.59	0.43
7:H:76:TRP:CZ2	7:H:308:ASN:HB3	2.54	0.43
10:K:110:HIS:CD2	10:K:130:PRO:HB3	2.54	0.43
10:K:124:MET:HA	10:K:127:TRP:CE2	2.53	0.43
1:A:220:ARG:NH2	17:S:477:ASP:O	2.35	0.42
20:Y:44:DC:H2''	20:Y:45:DG:O4'	2.19	0.42
21:Z:33:G:H2'	21:Z:34:G:C8	2.53	0.42
3:D:114:THR:HA	3:D:265:VAL:HA	2.01	0.42
3:D:219:TRP:CD1	3:D:241:LYS:HG2	2.53	0.42
3:D:256:ARG:HA	3:D:256:ARG:HD2	1.83	0.42
3:D:668:ALA:HA	16:R:71:GLN:NE2	2.18	0.42
4:E:70:TRP:CZ2	9:J:278:LEU:HD12	2.54	0.42
4:E:859:PHE:HB2	7:H:462:LYS:HA	2.00	0.42
5:F:98:ILE:HD13	5:F:98:ILE:HA	1.86	0.42
7:H:284:THR:HB	7:H:292:PHE:HB2	2.01	0.42
7:H:532:SER:HB3	13:N:214:TRP:HE1	1.83	0.42
12:M:193:ILE:HA	12:M:235:ASN:HD21	1.83	0.42
13:N:85:ASN:HA	13:N:88:ILE:HG12	2.01	0.42
18:T:85:LEU:HA	18:T:113:ARG:HA	2.00	0.42
1:A:43:ASP:OD1	1:A:43:ASP:N	2.52	0.42
1:B:55:GLY:HA3	1:B:157:TYR:CE2	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:6:LYS:HB2	4:E:1330:LYS:HD2	2.01	0.42
4:E:1236:GLU:H	4:E:1236:GLU:HG2	1.55	0.42
5:F:192:GLU:OE2	5:F:192:GLU:N	2.51	0.42
7:H:535:GLN:NE2	7:H:541:LEU:HD11	2.34	0.42
8:I:142:PRO:HB3	8:I:239:TRP:CG	2.54	0.42
8:I:174:SER:HB2	8:I:213:TRP:CD2	2.54	0.42
10:K:218:LEU:O	10:K:249:THR:OG1	2.32	0.42
10:K:403:LYS:HA	10:K:403:LYS:HD3	1.73	0.42
11:L:78:ASP:HA	11:L:81:LYS:HB2	2.01	0.42
17:S:240:GLU:H	17:S:240:GLU:CD	2.22	0.42
2:C:592:THR:HG22	2:C:597:ILE:HG12	2.01	0.42
5:F:444:GLY:HA2	15:Q:626:ARG:NH2	2.34	0.42
5:F:558:ASN:HA	5:F:561:TYR:CD2	2.54	0.42
6:G:617:LEU:HD23	6:G:617:LEU:HA	1.88	0.42
11:L:114:ARG:HH21	11:L:115:ARG:HH12	1.66	0.42
11:L:345:PRO:HA	11:L:394:ALA:HB2	2.01	0.42
12:M:193:ILE:HG22	12:M:231:LYS:HZ3	1.84	0.42
15:Q:614:ILE:O	15:Q:640:SER:OG	2.31	0.42
17:S:438:PRO:HA	17:S:441:VAL:HG22	2.01	0.42
18:T:63:VAL:HG21	18:T:87:TYR:HD2	1.83	0.42
2:C:458:VAL:HG12	2:C:467:ARG:NH2	2.34	0.42
3:D:160:LEU:HD13	3:D:192:ILE:HD11	2.01	0.42
3:D:168:ILE:HG22	3:D:171:TRP:H	1.84	0.42
7:H:370:ASN:HD22	7:H:373:GLU:HG3	1.83	0.42
14:O:136:THR:HG21	14:O:151:LEU:HD21	2.00	0.42
1:A:64:ARG:HB3	1:A:150:LYS:HB2	2.01	0.42
3:D:221:GLN:O	3:D:224:GLU:HG2	2.20	0.42
4:E:254:ASP:OD1	4:E:265:ARG:N	2.48	0.42
4:E:273:LEU:HD23	4:E:273:LEU:HA	1.88	0.42
4:E:904:PHE:CE1	18:T:94:ARG:HD2	2.55	0.42
5:F:480:LEU:HD11	5:F:484:LYS:HE3	2.02	0.42
6:G:478:PHE:O	6:G:481:MET:HB2	2.20	0.42
7:H:137:GLU:HA	7:H:140:ALA:HB3	2.01	0.42
9:J:415:ASN:HD22	9:J:416:MET:H	1.66	0.42
15:Q:755:ILE:HG23	15:Q:764:LEU:HD22	2.01	0.42
2:C:127:LEU:HD21	2:C:315:ARG:HD2	2.02	0.42
2:C:553:GLN:HB3	2:C:953:ILE:HG12	2.02	0.42
3:D:386:VAL:HB	3:D:490:PHE:CE2	2.55	0.42
5:F:158:GLN:OE1	5:F:158:GLN:HA	2.20	0.42
6:G:463:GLU:O	6:G:467:GLN:HG2	2.19	0.42
6:G:688:VAL:HA	6:G:691:GLU:HG3	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:I:161:ARG:NH1	8:I:234:ASN:OD1	2.49	0.42
8:I:214:GLU:O	8:I:218:TYR:HB2	2.20	0.42
11:L:100:ASP:OD1	11:L:100:ASP:N	2.52	0.42
1:A:141:GLU:O	1:A:143:ILE:HD12	2.20	0.42
2:C:73:SER:HA	2:C:117:GLY:HA3	2.02	0.42
3:D:128:ASN:HD21	3:D:246:ARG:NH1	2.10	0.42
5:F:122:GLU:HG2	5:F:159:ARG:HH12	1.85	0.42
5:F:164:LEU:HD22	5:F:174:ILE:HB	2.01	0.42
6:G:420:MET:SD	6:G:456:LYS:NZ	2.91	0.42
6:G:650:VAL:HA	6:G:653:VAL:HG12	2.01	0.42
8:I:223:ASN:HB3	13:N:76:HIS:NE2	2.35	0.42
15:Q:635:ILE:HA	15:Q:638:GLU:HG2	2.01	0.42
16:R:38:ARG:HG2	16:R:44:ARG:HA	2.01	0.42
1:A:131:ASP:HB3	1:A:134:GLN:HG3	2.02	0.42
2:C:943:ILE:HG22	4:E:56:SER:OG	2.20	0.42
4:E:1080:ALA:HB3	4:E:1083:GLU:HG3	2.01	0.42
5:F:284:THR:O	5:F:288:VAL:HG23	2.20	0.42
7:H:252:TYR:HB2	10:K:321:TYR:CE2	2.55	0.42
7:H:536:ALA:HB3	13:N:206:PRO:HG2	2.02	0.42
10:K:103:PHE:CE1	14:O:169:GLU:HB3	2.55	0.42
10:K:108:ARG:NH2	10:K:308:GLU:OE2	2.48	0.42
10:K:319:PRO:HG3	10:K:328:GLN:NE2	2.34	0.42
1:B:194:GLU:C	1:B:195:LYS:HD2	2.39	0.42
2:C:380:ARG:HB2	2:C:616:SER:HB2	2.01	0.42
2:C:789:ASP:HB3	2:C:809:TYR:CD1	2.55	0.42
7:H:70:GLU:H	7:H:70:GLU:HG3	1.74	0.42
7:H:74:ARG:NH1	7:H:74:ARG:HB2	2.35	0.42
8:I:128:ASP:OD1	8:I:128:ASP:N	2.52	0.42
1:B:132:ASN:OD1	1:B:132:ASN:N	2.46	0.41
1:B:191:ASN:HB3	16:R:155:GLY:O	2.19	0.41
5:F:132:GLU:HG2	5:F:139:PRO:HB3	2.00	0.41
5:F:196:LYS:HE3	5:F:196:LYS:HB3	1.69	0.41
5:F:366:ASP:OD2	5:F:369:SER:OG	2.35	0.41
6:G:618:LEU:HD13	6:G:638:LYS:HE2	2.01	0.41
11:L:148:PRO:HG2	11:L:240:ILE:HD11	2.02	0.41
12:M:134:TYR:OH	12:M:170:TYR:OH	2.28	0.41
13:N:156:ASP:O	13:N:159:GLU:HG3	2.20	0.41
17:S:429:ASP:N	17:S:429:ASP:OD1	2.53	0.41
7:H:519:ARG:HH21	18:T:69:TRP:CB	2.32	0.41
13:N:77:HIS:CE1	13:N:125:GLU:HG2	2.56	0.41
13:N:158:VAL:HG22	13:N:162:LYS:HE2	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
14:P:88:GLN:HE21	17:S:314:LEU:HD13	1.85	0.41
15:Q:746:TYR:CE2	15:Q:749:GLU:HG2	2.55	0.41
19:X:63:DA:H2''	19:X:64:DG:N7	2.36	0.41
1:A:119:ARG:HH11	1:A:119:ARG:HG2	1.84	0.41
4:E:574:ARG:NH2	7:H:398:LEU:HD13	2.35	0.41
5:F:389:ASP:OD1	5:F:392:ARG:NH2	2.53	0.41
6:G:576:VAL:O	6:G:580:ARG:HG2	2.20	0.41
6:G:700:GLU:OE1	6:G:715:ARG:NH2	2.50	0.41
7:H:397:LEU:HB3	7:H:520:SER:HB3	2.02	0.41
8:I:168:ALA:HB2	8:I:177:VAL:HG21	2.02	0.41
11:L:79:PHE:O	11:L:281:TYR:OH	2.20	0.41
1:A:275:ASP:OD2	1:A:284:TYR:OH	2.36	0.41
1:A:282:ARG:HB2	17:S:193:ILE:HG21	2.02	0.41
2:C:1045:VAL:HG22	2:C:1055:LEU:HD23	2.02	0.41
5:F:612:LYS:HE3	5:F:760:VAL:HB	2.02	0.41
6:G:528:PHE:O	6:G:532:ILE:HG12	2.20	0.41
12:M:200:TYR:N	12:M:226:LYS:O	2.52	0.41
15:Q:573:VAL:HA	15:Q:574:PRO:HD3	1.91	0.41
15:Q:618:ILE:HD12	15:Q:618:ILE:N	2.36	0.41
1:B:55:GLY:HA3	1:B:157:TYR:CZ	2.56	0.41
2:C:309:LEU:HB2	2:C:416:SER:HB2	2.01	0.41
4:E:37:HIS:NE2	16:R:75:ILE:HD11	2.34	0.41
7:H:188:GLU:HG2	7:H:221:ARG:HH21	1.85	0.41
7:H:260:LYS:HB2	7:H:260:LYS:HE2	1.80	0.41
13:N:131:ILE:HG22	13:N:248:LEU:HB3	2.02	0.41
17:S:195:HIS:CD2	17:S:195:HIS:H	2.38	0.41
17:S:481:THR:HG21	17:S:538:GLY:O	2.21	0.41
1:B:25:LYS:HD2	1:B:25:LYS:N	2.35	0.41
3:D:382:SER:OG	3:D:474:ARG:O	2.37	0.41
3:D:536:LEU:HD12	3:D:536:LEU:HA	1.88	0.41
4:E:450:MET:HE2	4:E:1123:LEU:HD11	2.02	0.41
4:E:1261:LEU:HD22	5:F:340:GLU:HG3	2.03	0.41
5:F:272:GLU:O	5:F:279:LYS:NZ	2.41	0.41
6:G:798:GLN:O	6:G:801:GLN:NE2	2.54	0.41
13:N:131:ILE:HA	13:N:248:LEU:O	2.20	0.41
14:O:171:LEU:HD23	14:O:171:LEU:HA	1.95	0.41
15:Q:707:MET:HE3	15:Q:758:SER:HA	2.03	0.41
18:T:115:PRO:HD2	18:T:118:LEU:HD22	2.02	0.41
1:B:21:ARG:HH12	16:R:69:GLU:HG2	1.86	0.41
3:D:157:PHE:CE2	15:Q:699:VAL:HG21	2.55	0.41
3:D:654:THR:OG1	3:D:655:THR:N	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:805:LYS:NZ	13:N:186:ALA:O	2.50	0.41
4:E:1259:ARG:NH1	5:F:762:ASP:O	2.51	0.41
5:F:444:GLY:HA2	15:Q:626:ARG:HH21	1.86	0.41
6:G:521:ILE:H	6:G:521:ILE:HG13	1.62	0.41
6:G:742:LEU:HD12	6:G:743:PRO:HD2	2.03	0.41
7:H:504:ARG:HD2	7:H:504:ARG:O	2.21	0.41
11:L:153:ILE:HG23	11:L:165:ARG:HG2	2.03	0.41
19:X:69:DG:H2 <sup>7</sup>	19:X:70:DA:C8	2.55	0.41
3:D:405:LEU:HD23	3:D:499:VAL:HG23	2.02	0.41
3:D:436:ILE:HD12	3:D:436:ILE:HA	1.92	0.41
3:D:493:ASP:OD1	3:D:493:ASP:N	2.54	0.41
4:E:1051:LEU:HD23	4:E:1051:LEU:HA	1.89	0.41
2:C:844:LEU:HB2	2:C:846:ASP:OD1	2.20	0.41
3:D:206:LEU:HD23	3:D:206:LEU:HA	1.89	0.41
3:D:609:ASP:OD1	3:D:611:ARG:NH2	2.42	0.41
4:E:862:VAL:HG21	7:H:412:VAL:HG21	2.02	0.41
4:E:1365:HIS:CE1	5:F:130:ARG:HG2	2.55	0.41
5:F:248:PHE:HB3	5:F:271:MET:SD	2.60	0.41
6:G:618:LEU:O	6:G:622:LEU:HG	2.21	0.41
8:I:166:ASN:O	8:I:170:THR:OG1	2.32	0.41
10:K:110:HIS:CE1	10:K:112:ASN:HB3	2.56	0.41
10:K:418:GLU:O	10:K:422:ARG:HG3	2.21	0.41
12:M:142:HIS:CE1	12:M:155:LYS:HD3	2.56	0.41
13:N:178:TYR:CE2	13:N:180:ALA:HB2	2.56	0.41
20:Y:20:DC:H2 <sup>7</sup>	20:Y:21:DT:H71	2.03	0.41
4:E:357:PRO:HG2	4:E:358:TYR:CE1	2.56	0.41
4:E:359:ASN:OD1	4:E:418:SER:N	2.54	0.41
7:H:536:ALA:O	13:N:207:ASN:ND2	2.53	0.41
13:N:264:ARG:O	13:N:267:GLN:HG2	2.21	0.41
3:D:118:TYR:HB3	3:D:264:MET:HE2	2.02	0.40
4:E:478:ILE:HD11	4:E:1129:LEU:HD13	2.03	0.40
5:F:605:GLU:HG3	5:F:779:LYS:HZ1	1.86	0.40
6:G:555:ARG:HE	6:G:556:CYS:H	1.69	0.40
8:I:218:TYR:O	8:I:222:LYS:HG3	2.20	0.40
8:I:218:TYR:CZ	13:N:227:HIS:HB2	2.56	0.40
16:R:45:ILE:O	16:R:45:ILE:HG13	2.21	0.40
19:X:47:DG:OP1	19:X:47:DG:H8	2.04	0.40
2:C:74:LEU:O	2:C:117:GLY:N	2.50	0.40
2:C:658:LEU:HD21	2:C:844:LEU:HD11	2.04	0.40
4:E:574:ARG:HH21	7:H:398:LEU:HD13	1.87	0.40
4:E:1251:LEU:O	4:E:1255:GLU:HG3	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:F:84:ASN:HA	5:F:85:ARG:HH21	1.86	0.40
7:H:137:GLU:HG3	7:H:137:GLU:H	1.69	0.40
8:I:110:ASN:HB3	8:I:113:ASN:O	2.21	0.40
13:N:204:LYS:HE2	18:T:139:ASP:HA	2.02	0.40
15:Q:590:VAL:HG21	15:Q:737:ARG:HG3	2.03	0.40
19:X:62:DG:H2 <sup>''</sup>	19:X:63:DA:C8	2.56	0.40
20:Y:37:DC:H2 <sup>''</sup>	20:Y:38:DG:C8	2.56	0.40
3:D:159:ARG:HD3	15:Q:763:ARG:HD3	2.03	0.40
4:E:306:ARG:HA	4:E:313:LEU:HA	2.03	0.40
5:F:482:ASP:HA	5:F:485:VAL:HG22	2.03	0.40
7:H:189:ALA:HB2	7:H:221:ARG:HD3	2.04	0.40
7:H:273:TYR:OH	8:I:98:GLY:O	2.31	0.40
8:I:106:LYS:HG2	8:I:201:VAL:HA	2.03	0.40
11:L:102:PHE:N	25:L:8001:SAH:OXT	2.38	0.40
18:T:116:LYS:HE3	18:T:117:TRP:CE2	2.57	0.40
2:C:309:LEU:HD23	2:C:309:LEU:HA	1.85	0.40
3:D:548:ARG:HH21	12:M:310:GLU:HG2	1.86	0.40
6:G:506:PHE:O	6:G:510:GLU:HG3	2.22	0.40
8:I:201:VAL:HG23	8:I:202:TRP:CD2	2.56	0.40
14:O:128:ASN:OD1	14:O:128:ASN:N	2.54	0.40
14:P:91:VAL:HG11	17:S:314:LEU:HD21	2.03	0.40
2:C:60:VAL:O	2:C:78:SER:HB2	2.22	0.40
2:C:976:LEU:HD11	21:Z:31:C:N3	2.35	0.40
3:D:120:LYS:HE2	3:D:341:ARG:HA	2.02	0.40
3:D:382:SER:HB2	3:D:401:ILE:HD11	2.04	0.40
5:F:407:ARG:HG3	5:F:408:LYS:HD3	2.03	0.40
7:H:73:ARG:HA	8:I:260:ILE:HD13	2.04	0.40
11:L:411:PRO:O	11:L:415:ARG:HG2	2.21	0.40
15:Q:615:ILE:HA	15:Q:642:VAL:O	2.21	0.40
20:Y:48:DG:H2 <sup>''</sup>	20:Y:49:DG:C8	2.56	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	295/327 (90%)	287 (97%)	8 (3%)	0	100	100
1	B	212/327 (65%)	206 (97%)	6 (3%)	0	100	100
2	C	710/1072 (66%)	689 (97%)	20 (3%)	1 (0%)	51	74
3	D	571/680 (84%)	554 (97%)	17 (3%)	0	100	100
4	E	874/1373 (64%)	842 (96%)	31 (4%)	1 (0%)	51	74
5	F	558/911 (61%)	535 (96%)	22 (4%)	1 (0%)	47	69
6	G	379/862 (44%)	367 (97%)	12 (3%)	0	100	100
7	H	432/675 (64%)	423 (98%)	9 (2%)	0	100	100
8	I	213/263 (81%)	204 (96%)	9 (4%)	0	100	100
9	J	230/529 (44%)	225 (98%)	5 (2%)	0	100	100
10	K	372/460 (81%)	363 (98%)	9 (2%)	0	100	100
11	L	402/483 (83%)	392 (98%)	9 (2%)	1 (0%)	47	69
12	M	202/334 (60%)	199 (98%)	3 (2%)	0	100	100
13	N	211/297 (71%)	204 (97%)	7 (3%)	0	100	100
14	O	112/185 (60%)	110 (98%)	2 (2%)	0	100	100
14	P	106/185 (57%)	105 (99%)	1 (1%)	0	100	100
15	Q	214/768 (28%)	202 (94%)	12 (6%)	0	100	100
16	R	108/162 (67%)	107 (99%)	1 (1%)	0	100	100
17	S	382/611 (62%)	367 (96%)	15 (4%)	0	100	100
18	T	102/140 (73%)	96 (94%)	6 (6%)	0	100	100
All	All	6685/10644 (63%)	6477 (97%)	204 (3%)	4 (0%)	54	74

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	F	553	ILE
2	C	1030	THR
11	L	405	ILE
4	E	1183	PRO

### 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	275/301 (91%)	268 (98%)	7 (2%)	47	71
1	B	191/301 (64%)	188 (98%)	3 (2%)	62	81
2	C	626/931 (67%)	611 (98%)	15 (2%)	49	72
3	D	524/608 (86%)	512 (98%)	12 (2%)	50	73
4	E	805/1230 (65%)	781 (97%)	24 (3%)	41	66
5	F	484/782 (62%)	472 (98%)	12 (2%)	47	71
6	G	331/740 (45%)	310 (94%)	21 (6%)	18	35
7	H	394/609 (65%)	388 (98%)	6 (2%)	65	82
8	I	187/230 (81%)	179 (96%)	8 (4%)	29	53
9	J	212/469 (45%)	208 (98%)	4 (2%)	57	78
10	K	329/401 (82%)	324 (98%)	5 (2%)	65	82
11	L	362/431 (84%)	351 (97%)	11 (3%)	41	66
12	M	195/299 (65%)	188 (96%)	7 (4%)	35	59
13	N	185/259 (71%)	179 (97%)	6 (3%)	39	63
14	O	103/169 (61%)	101 (98%)	2 (2%)	57	78
14	P	97/169 (57%)	92 (95%)	5 (5%)	23	44
15	Q	190/661 (29%)	175 (92%)	15 (8%)	12	23
16	R	101/144 (70%)	99 (98%)	2 (2%)	55	77
17	S	336/532 (63%)	323 (96%)	13 (4%)	32	56
18	T	93/126 (74%)	86 (92%)	7 (8%)	13	25
All	All	6020/9392 (64%)	5835 (97%)	185 (3%)	43	65

All (185) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	43	ASP
1	A	61	CYS
1	A	104	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	119	ARG
1	A	195	LYS
1	A	217	GLU
1	A	275	ASP
1	B	21	ARG
1	B	22	ARG
1	B	126	SER
2	C	28	ASP
2	C	127	LEU
2	C	319	ASP
2	C	365	TYR
2	C	367	SER
2	C	467	ARG
2	C	588	LYS
2	C	630	ARG
2	C	691	ARG
2	C	784	ARG
2	C	862	ARG
2	C	871	CYS
2	C	923	TYR
2	C	1033	LYS
2	C	1063	LYS
3	D	98	ARG
3	D	104	MET
3	D	136	GLU
3	D	159	ARG
3	D	217	VAL
3	D	221	GLN
3	D	236	LYS
3	D	308	ASP
3	D	515	SER
3	D	517	MET
3	D	548	ARG
3	D	624	TYR
4	E	56	SER
4	E	60	ASP
4	E	84	LYS
4	E	123	ASP
4	E	155	ASP
4	E	244	GLN
4	E	253	ASP
4	E	283	GLN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
4	E	318	GLU
4	E	358	TYR
4	E	369	VAL
4	E	425	ILE
4	E	572	ARG
4	E	901	MET
4	E	928	PHE
4	E	945	ASN
4	E	1005	LYS
4	E	1013	LYS
4	E	1029	ARG
4	E	1034	ASP
4	E	1049	TYR
4	E	1056	ASN
4	E	1116	HIS
4	E	1150	GLU
5	F	85	ARG
5	F	121	ASP
5	F	168	GLU
5	F	203	ARG
5	F	231	ASP
5	F	297	SER
5	F	405	MET
5	F	416	TRP
5	F	428	TYR
5	F	448	ARG
5	F	488	ARG
5	F	804	GLU
6	G	428	PHE
6	G	446	MET
6	G	458	TYR
6	G	472	GLU
6	G	510	GLU
6	G	515	ARG
6	G	523	ARG
6	G	548	TYR
6	G	551	MET
6	G	579	CYS
6	G	586	MET
6	G	596	MET
6	G	600	MET
6	G	601	MET

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
6	G	611	TRP
6	G	621	MET
6	G	636	MET
6	G	652	TYR
6	G	691	GLU
6	G	754	GLN
6	G	763	GLU
7	H	131	MET
7	H	405	ASP
7	H	474	LEU
7	H	483	TYR
7	H	504	ARG
7	H	518	ARG
8	I	84	ASP
8	I	94	ASP
8	I	95	ARG
8	I	97	TYR
8	I	128	ASP
8	I	141	MET
8	I	159	ASN
8	I	203	ASP
9	J	251	ARG
9	J	274	LYS
9	J	335	THR
9	J	415	ASN
10	K	88	ASP
10	K	184	LYS
10	K	197	LYS
10	K	349	ASP
10	K	369	LYS
11	L	102	PHE
11	L	192	ASP
11	L	218	ARG
11	L	232	TRP
11	L	315	LYS
11	L	320	MET
11	L	414	GLU
11	L	427	LYS
11	L	438	GLN
11	L	444	ASP
11	L	450	ARG
12	M	133	ASP

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
12	M	145	SER
12	M	183	ARG
12	M	191	LYS
12	M	256	LYS
12	M	264	ARG
12	M	301	ASP
13	N	51	LYS
13	N	63	HIS
13	N	71	TYR
13	N	142	ASP
13	N	158	VAL
13	N	197	ASP
14	O	128	ASN
14	O	141	GLU
14	P	80	ARG
14	P	83	SER
14	P	88	GLN
14	P	95	ARG
14	P	141	GLU
15	Q	578	GLU
15	Q	595	THR
15	Q	628	LYS
15	Q	633	THR
15	Q	644	MET
15	Q	670	MET
15	Q	675	LYS
15	Q	713	MET
15	Q	723	SER
15	Q	730	LYS
15	Q	737	ARG
15	Q	745	GLN
15	Q	746	TYR
15	Q	748	ASP
15	Q	763	ARG
16	R	114	ASN
16	R	122	LYS
17	S	228	ARG
17	S	230	GLU
17	S	240	GLU
17	S	272	ASP
17	S	273	ASP
17	S	315	LYS

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Mol	Chain	Res	Type
17	S	353	LYS
17	S	355	MET
17	S	389	GLU
17	S	418	GLU
17	S	510	ASN
17	S	517	ARG
17	S	570	ARG
18	T	52	LYS
18	T	57	ARG
18	T	67	SER
18	T	85	LEU
18	T	101	LYS
18	T	132	TYR
18	T	133	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (68) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	132	ASN
1	A	193	ASN
1	A	276	GLN
1	A	303	GLN
1	B	14	GLN
1	B	76	ASN
1	B	196	GLN
2	C	58	GLN
2	C	124	ASN
2	C	128	GLN
2	C	307	ASN
2	C	322	GLN
2	C	516	HIS
2	C	542	ASN
2	C	551	GLN
2	C	623	HIS
2	C	624	GLN
2	C	867	GLN
2	C	883	HIS
2	C	974	GLN
2	C	1014	HIS
2	C	1057	HIS
2	C	1068	ASN
3	D	128	ASN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	D	338	ASN
3	D	464	GLN
3	D	518	ASN
4	E	87	HIS
4	E	144	HIS
4	E	310	HIS
4	E	378	HIS
4	E	575	ASN
4	E	863	ASN
4	E	1011	ASN
4	E	1038	ASN
4	E	1053	GLN
4	E	1206	GLN
4	E	1291	GLN
5	F	270	ASN
5	F	363	ASN
5	F	788	GLN
6	G	624	ASN
6	G	628	ASN
6	G	630	HIS
6	G	640	ASN
8	I	126	ASN
8	I	149	GLN
8	I	254	ASN
9	J	329	GLN
9	J	415	ASN
10	K	110	HIS
10	K	112	ASN
10	K	328	GLN
10	K	414	GLN
11	L	220	GLN
11	L	233	HIS
12	M	142	HIS
12	M	190	GLN
14	O	183	ASN
14	P	88	GLN
15	Q	745	GLN
16	R	71	GLN
17	S	195	HIS
17	S	284	ASN
17	S	371	ASN
17	S	510	ASN

*Continued on next page...*

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Mol	Chain	Res	Type
17	S	562	ASN
18	T	55	GLN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
21	Z	10/40 (25%)	2 (20%)	1 (10%)

All (2) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
21	Z	32	C
21	Z	34	G

All (1) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
21	Z	31	C

## 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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 5 ligands modelled in this entry, 4 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
25	SAH	L	8001	-	24,28,28	1.21	3 (12%)	25,40,40	1.79	5 (20%)

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
25	SAH	L	8001	-	-	3/11/31/31	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
25	L	8001	SAH	C2-N3	3.93	1.38	1.32
25	L	8001	SAH	C2-N1	2.41	1.38	1.33
25	L	8001	SAH	OXT-C	-2.20	1.23	1.30

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
25	L	8001	SAH	N3-C2-N1	-5.38	120.27	128.68
25	L	8001	SAH	C5'-SD-CG	-3.85	90.72	102.27
25	L	8001	SAH	C3'-C2'-C1'	3.25	105.86	100.98
25	L	8001	SAH	OXT-C-O	-2.69	117.99	124.09
25	L	8001	SAH	OXT-C-CA	2.27	121.12	113.38

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
25	L	8001	SAH	O4'-C4'-C5'-SD
25	L	8001	SAH	C3'-C4'-C5'-SD
25	L	8001	SAH	CB-CG-SD-C5'

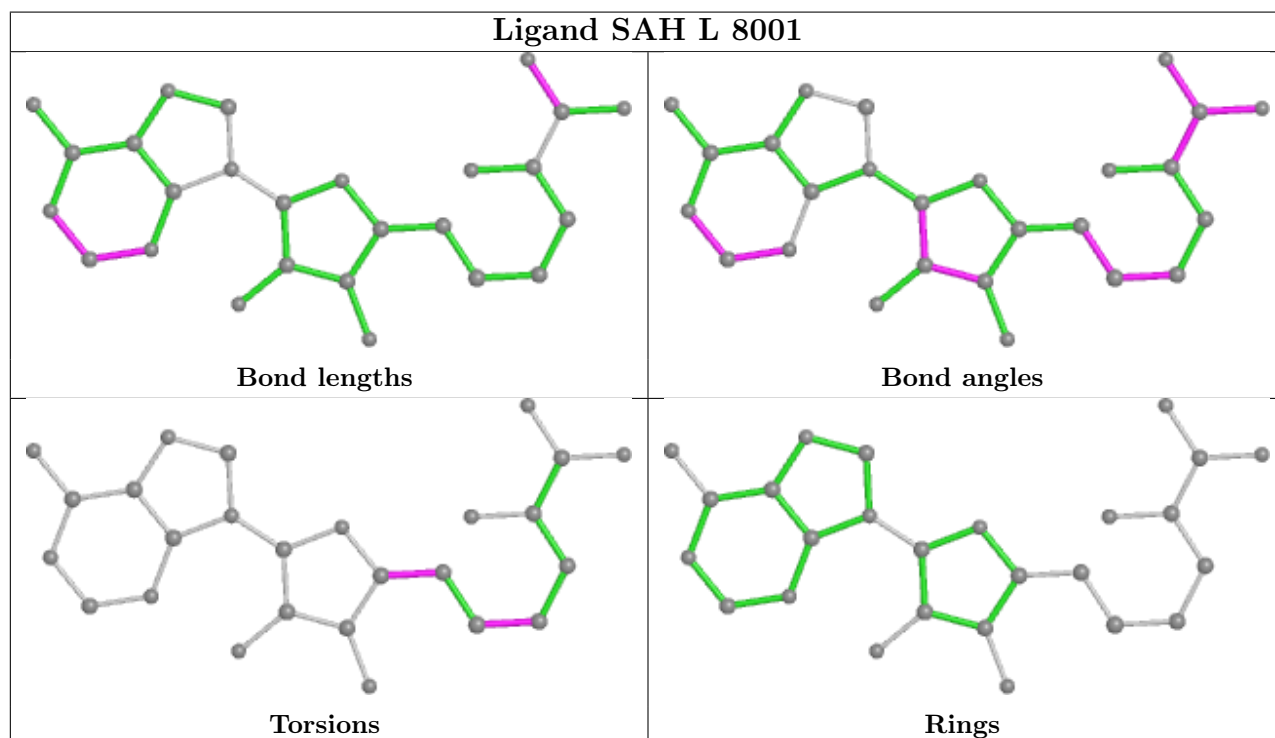
There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
25	L	8001	SAH	2	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 than 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.



## 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.

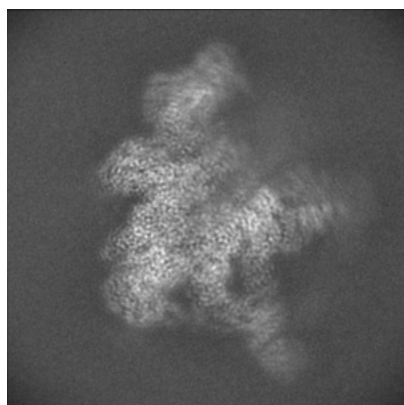
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-19023. These allow visual inspection of the internal detail of the map and identification of artifacts.

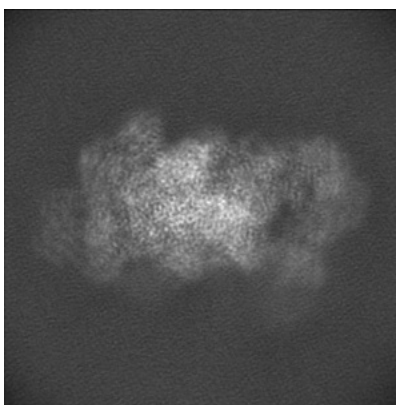
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

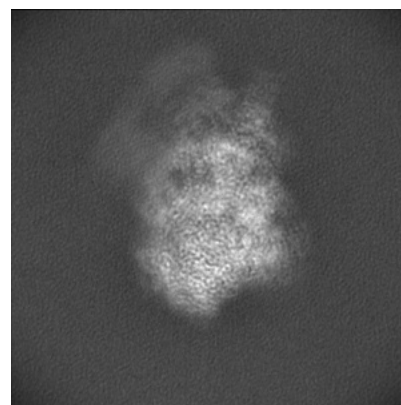
#### 6.1.1 Primary map



X



Y

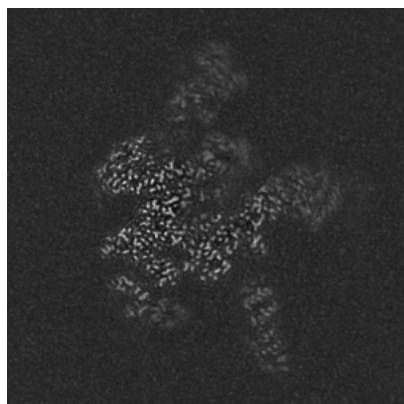


Z

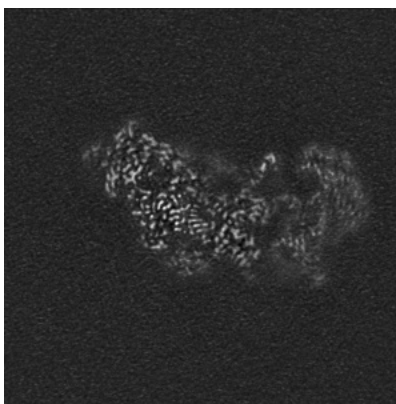
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

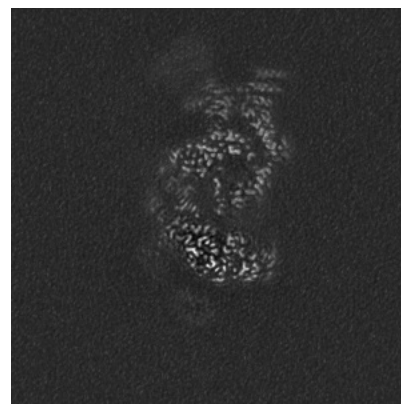
#### 6.2.1 Primary map



X Index: 300



Y Index: 300

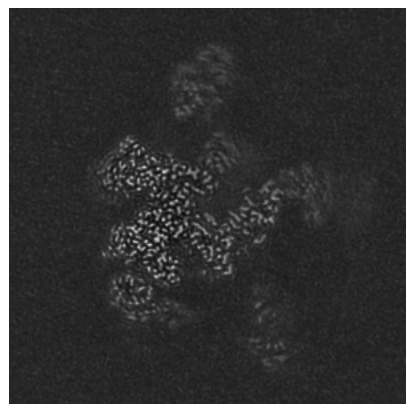


Z Index: 300

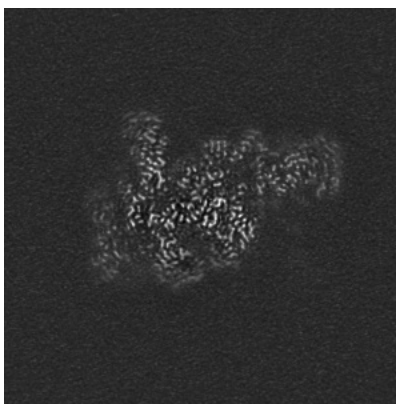
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

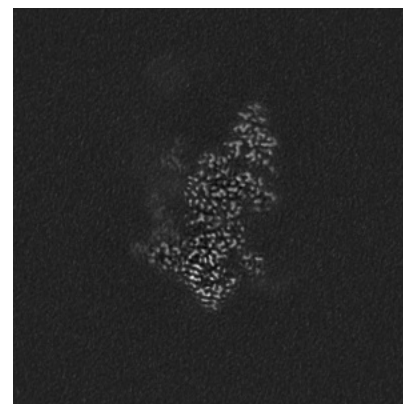
### 6.3.1 Primary map



X Index: 288



Y Index: 233

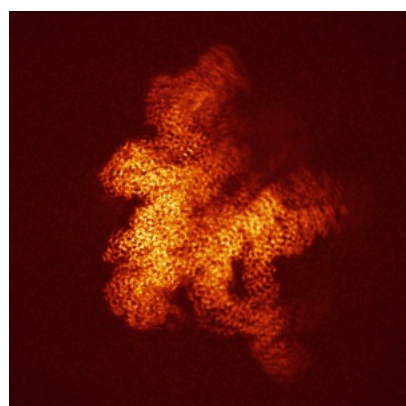


Z Index: 253

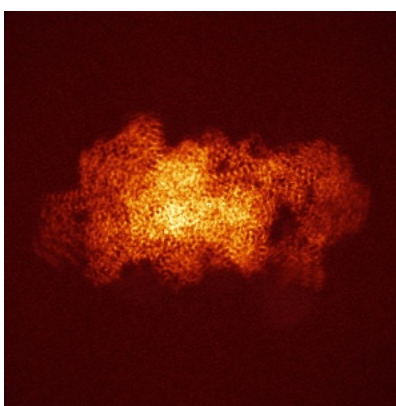
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

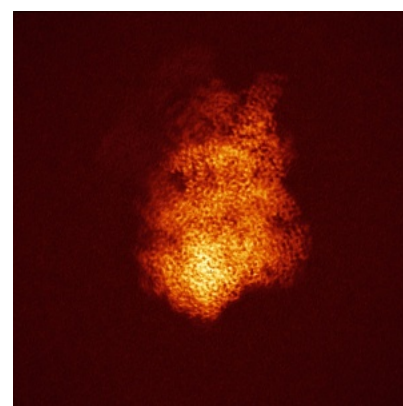
### 6.4.1 Primary map



X



Y

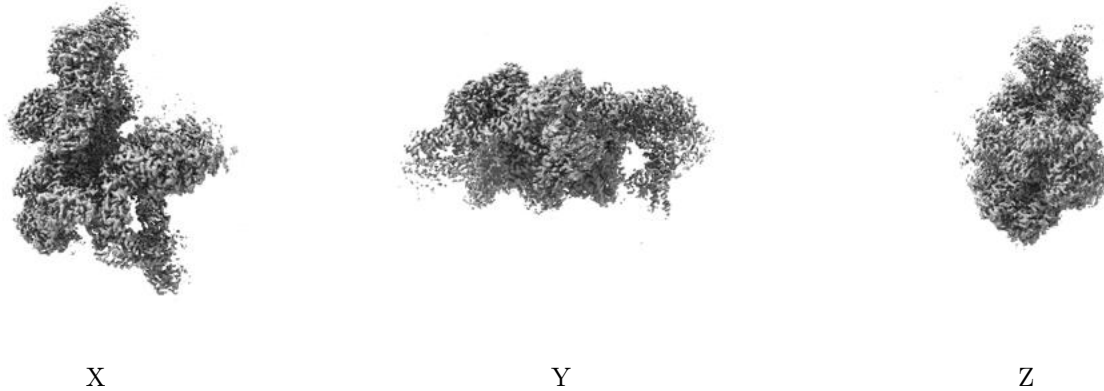


Z

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



The images above show the 3D surface view of the map at the recommended contour level 0.8. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

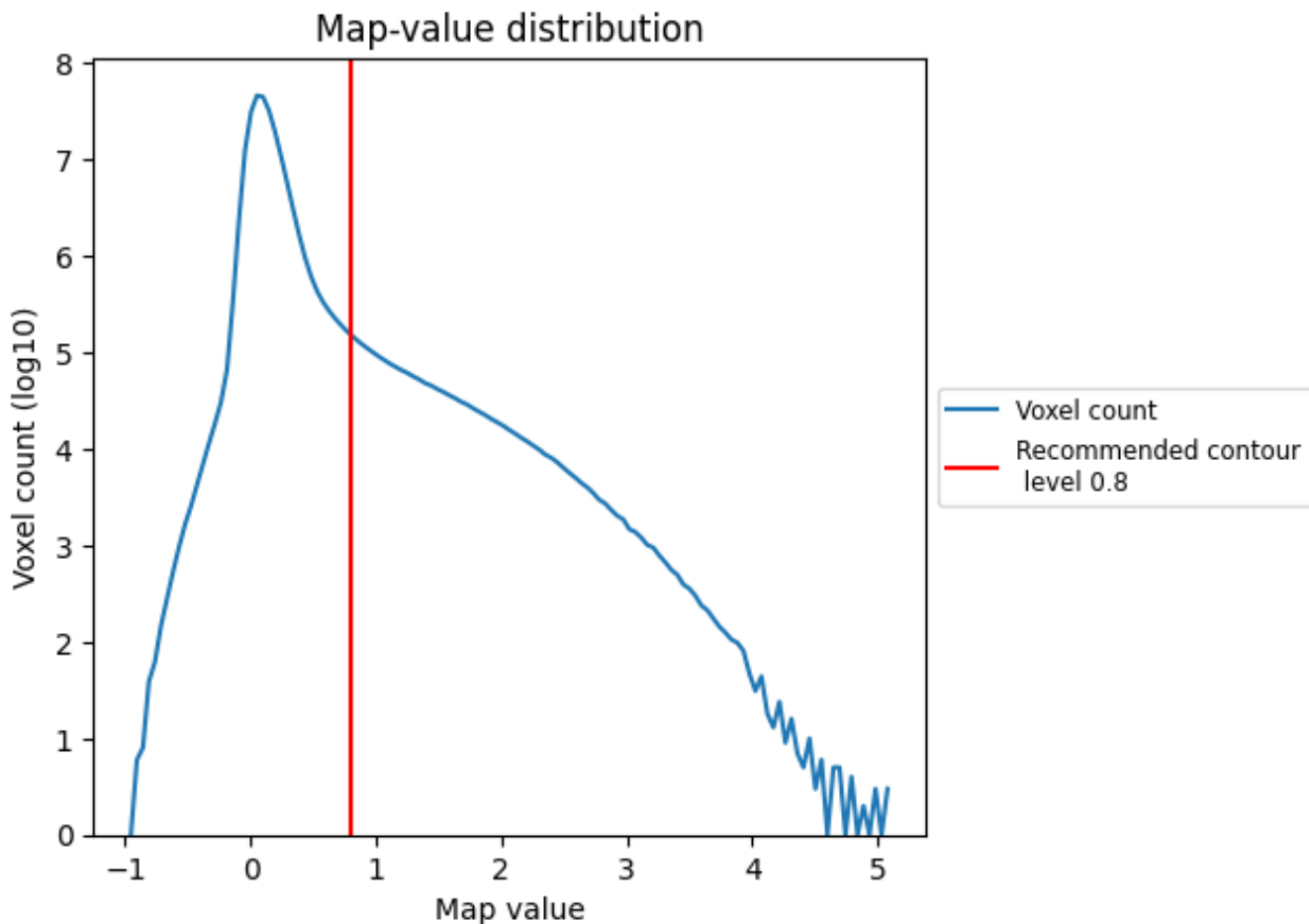
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

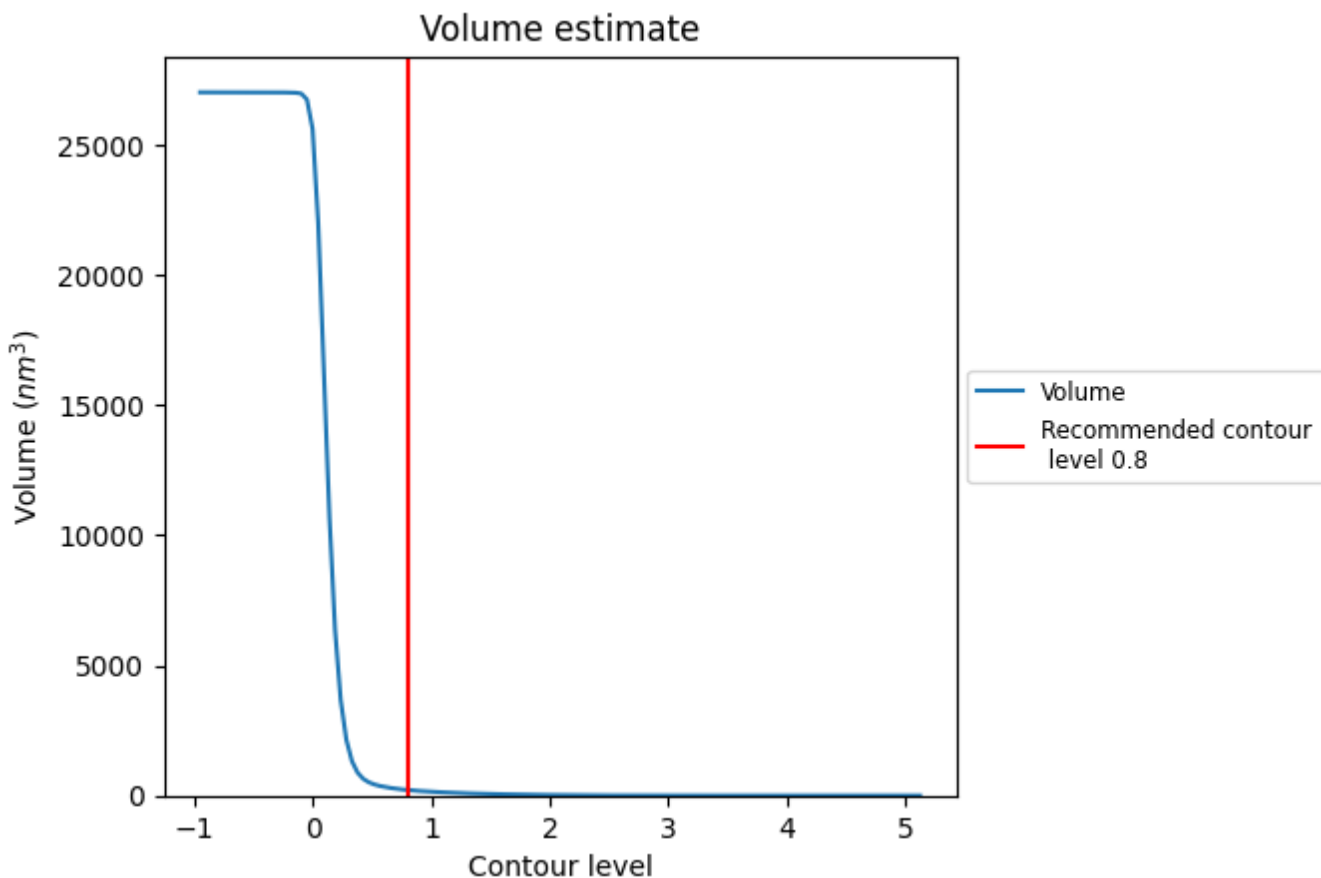
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



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.

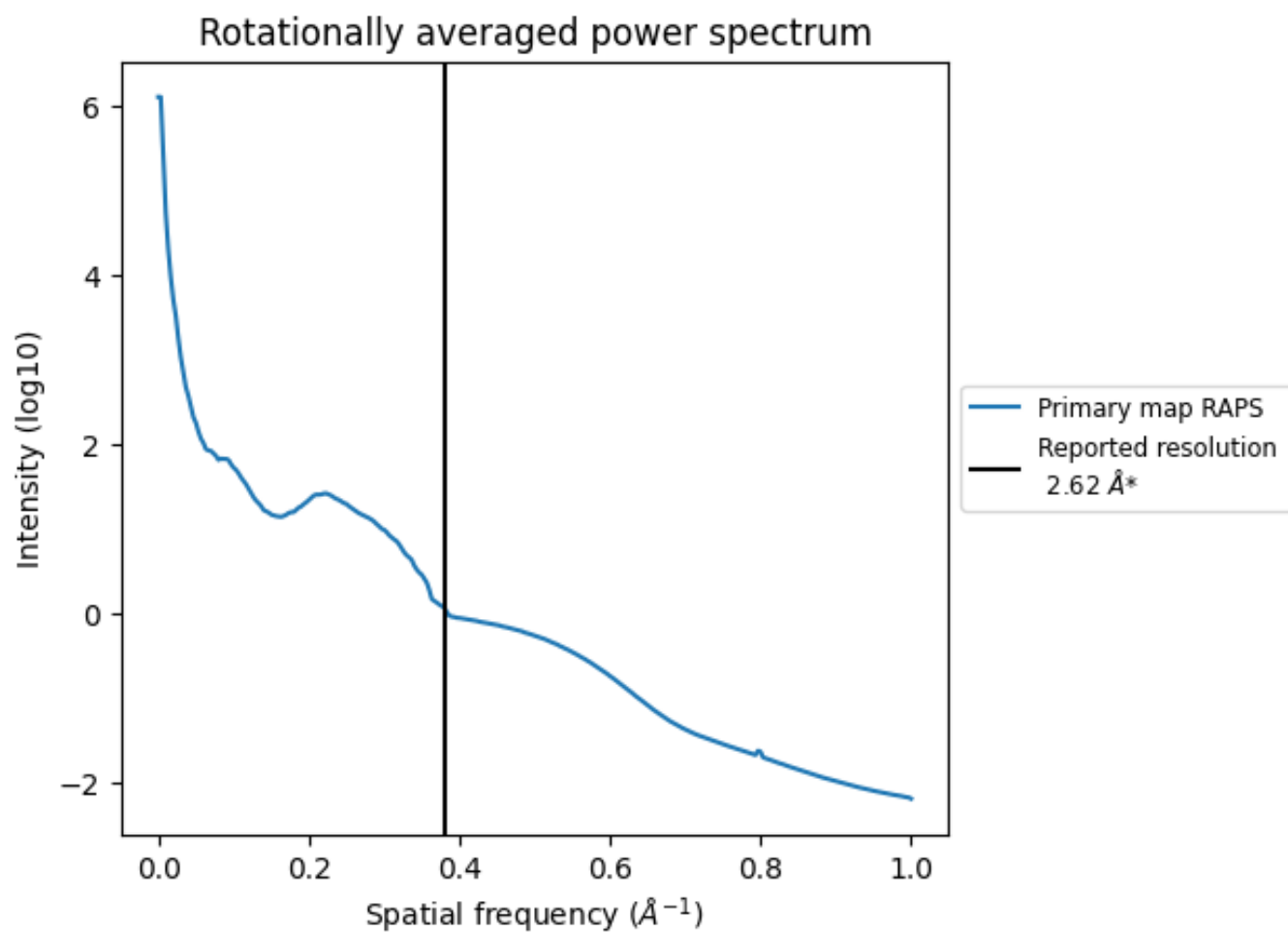
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 214 nm<sup>3</sup>; this corresponds to an approximate mass of 193 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 0.382 Å<sup>-1</sup>

## 8 Fourier-Shell correlation

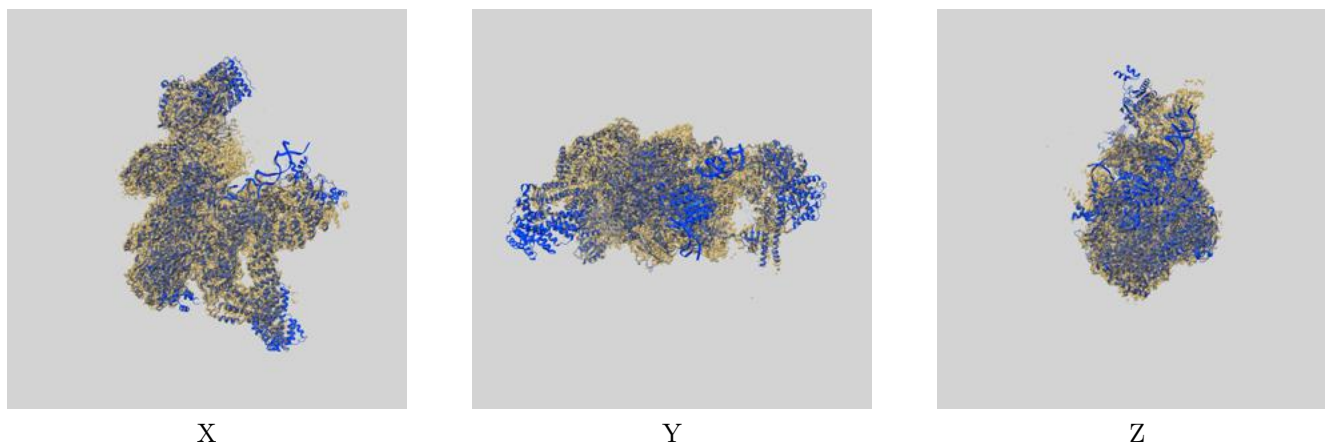
This section was not generated. No FSC curve or half-maps provided.



## 9 Map-model fit [i](#)

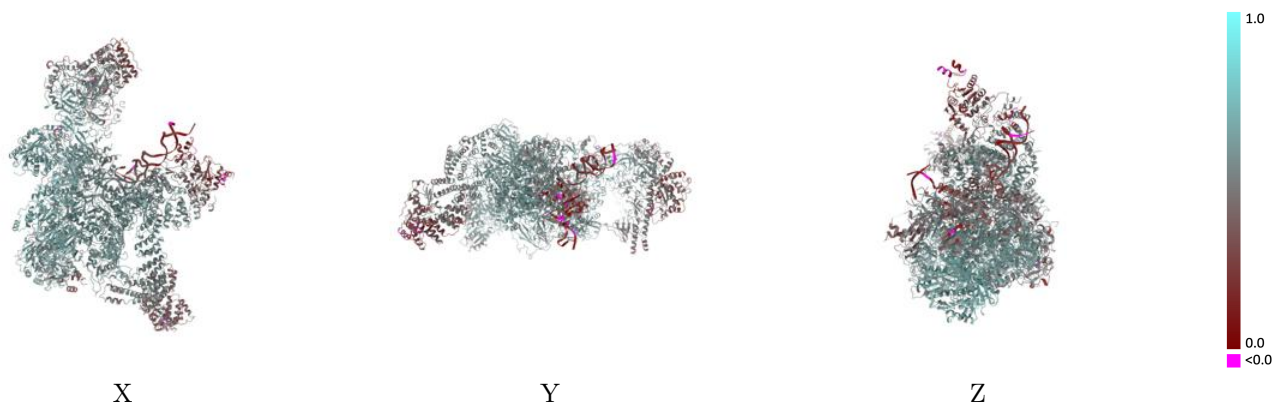
This section contains information regarding the fit between EMDB map EMD-19023 and PDB model 8RAS. Per-residue inclusion information can be found in section 3 on page 10.

### 9.1 Map-model overlay [i](#)



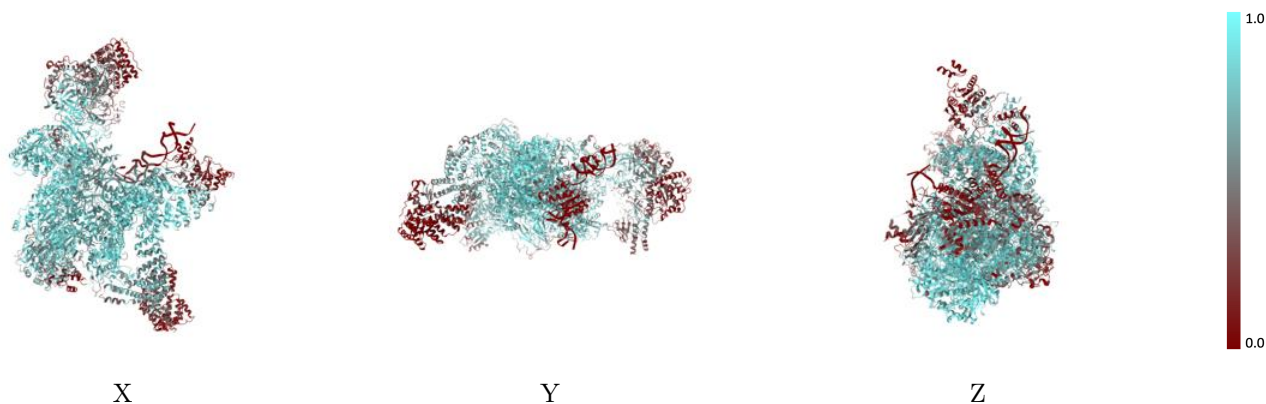
The images above show the 3D surface view of the map at the recommended contour level 0.8 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model [i](#)



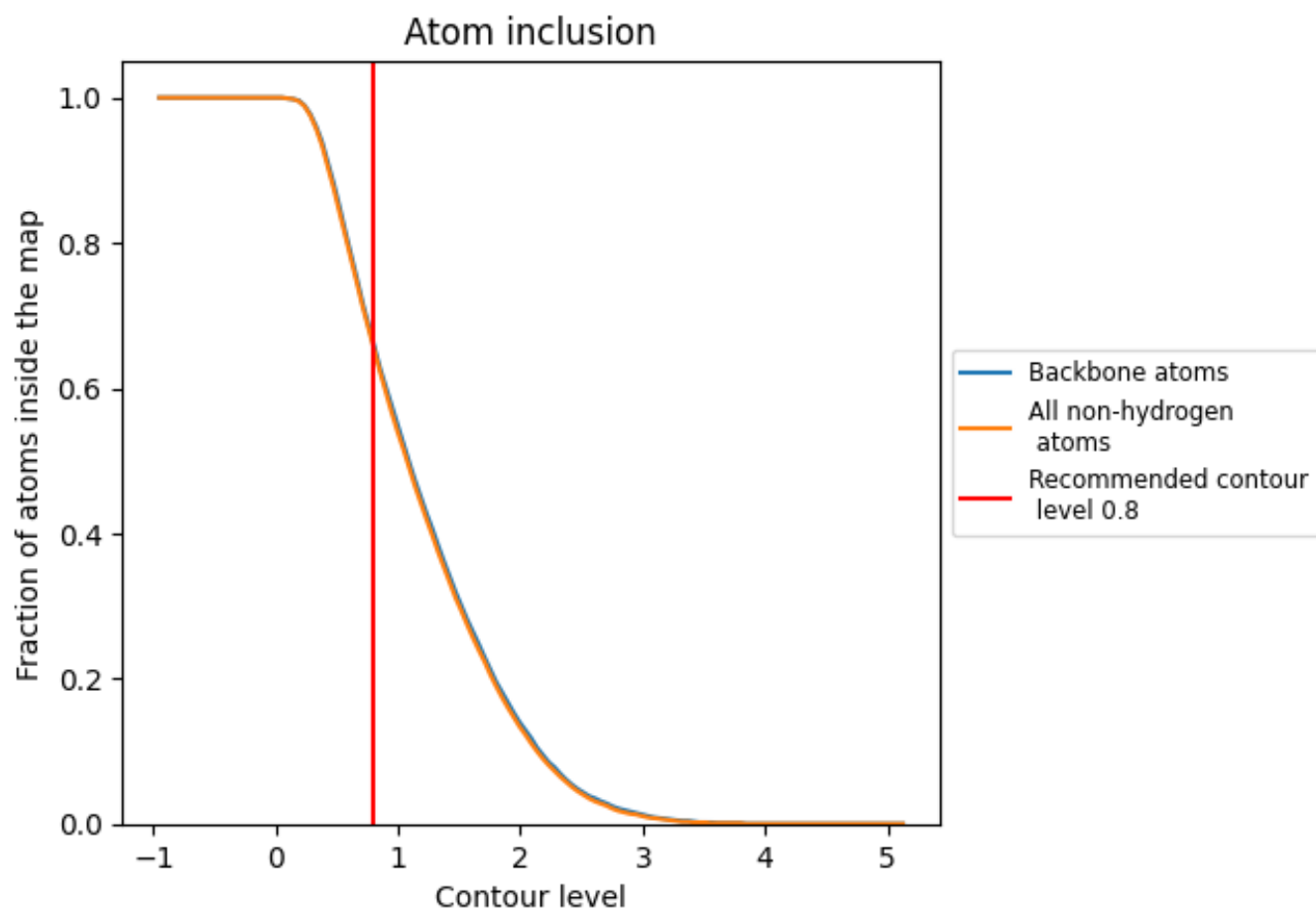
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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](#)



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 (0.8).

















































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 66% of all backbone atoms, 66% 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 (0.8) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6550	 0.5390
A	 0.6730	 0.5750
B	 0.7620	 0.6040
C	 0.8390	 0.6080
D	 0.7920	 0.5650
E	 0.7150	 0.5640
F	 0.7320	 0.5230
G	 0.1440	 0.3750
H	 0.5770	 0.5250
I	 0.4930	 0.5020
J	 0.8690	 0.6380
K	 0.8930	 0.6430
L	 0.7520	 0.5560
M	 0.7220	 0.5800
N	 0.1500	 0.3750
O	 0.8670	 0.6220
P	 0.5610	 0.5510
Q	 0.1670	 0.2750
R	 0.7820	 0.5880
S	 0.7650	 0.6100
T	 0.4640	 0.4750
X	 0.1720	 0.2430
Y	 0.3460	 0.3310
Z	 0.6330	 0.4900

