



Full wwPDB EM Validation Report ⓘ

Oct 11, 2022 – 08:41 pm BST

PDB ID : 7PH9
EMDB ID : EMD-13410
Title : 70S ribosome with P-site tRNA in chloramphenicol-treated Mycoplasma pneumoniae cells
Authors : Xue, L.; Lenz, S.; Rappsilber, J.; Mahamid, J.
Deposited on : 2021-08-16
Resolution : 8.70 Å (reported)
Based on initial models : 7OOD, 7OOC, 4V7C

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.dev43
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.2

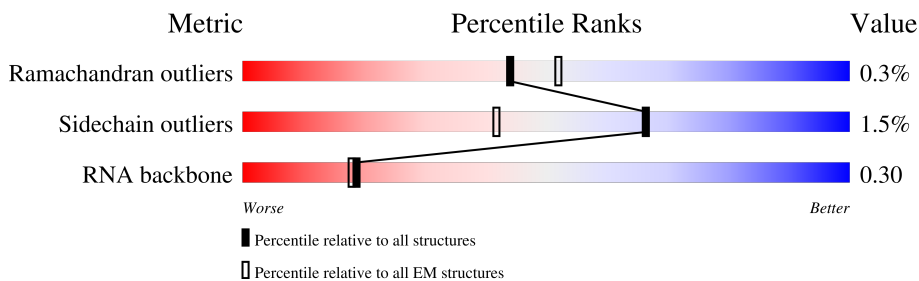
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 8.70 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)
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 ≥ 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	0	48	
2	1	59	
3	2	37	
4	A	294	
5	B	273	
6	C	205	
7	D	219	
8	E	215	

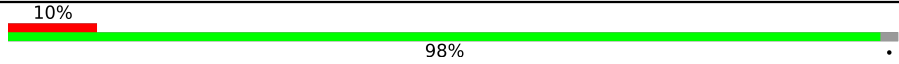
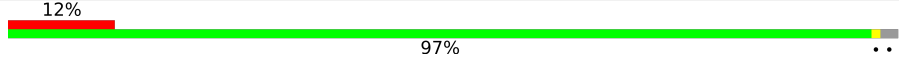
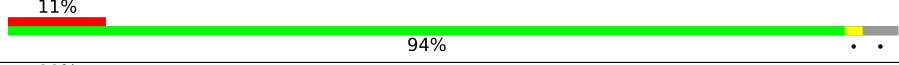
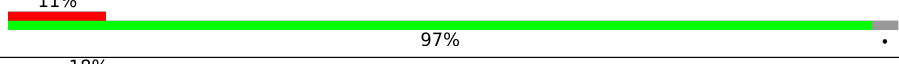
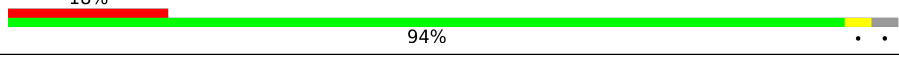
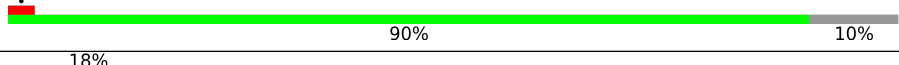
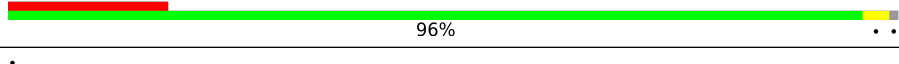


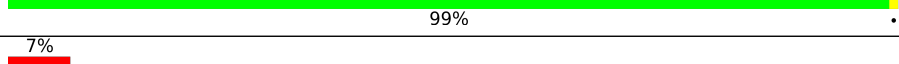

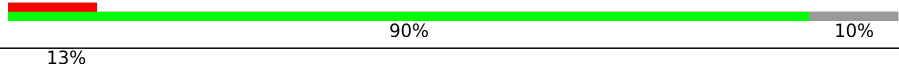
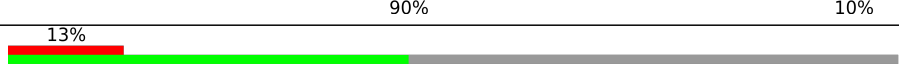
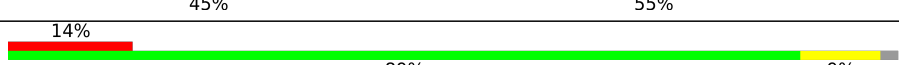
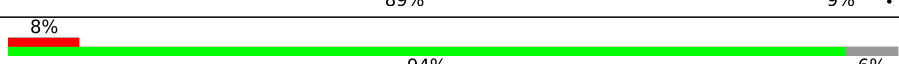
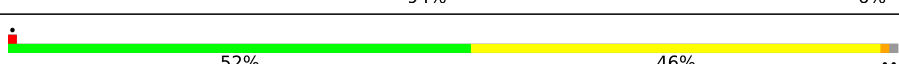

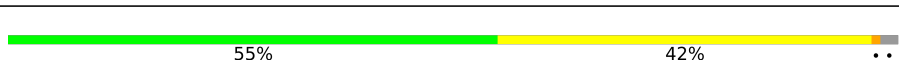
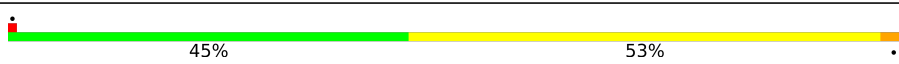

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Mol	Chain	Length	Quality of chain
9	F	155	21% 99%
10	G	142	16% 98%
11	H	132	19% 95%
12	I	108	24% 94% 6%
13	J	121	26% 94% 6%
14	K	139	15% 94%
15	L	124	20% 93% 5%
16	M	61	15% 93% 5%
17	N	86	8% 97%
18	O	94	6% 81% 15%
19	P	85	19% 95%
20	Q	104	9% 58% 38%
21	R	87	21% 97%
22	S	87	89% 11%
23	T	60	7% 88% 12%
24	a	287	8% 99%
25	b	287	14% 79% 20%
26	c	212	12% 97%
27	d	180	15% 95%
28	e	184	25% 95%
29	f	149	68% 95%
30	g	161	40% 73% 5% 22%
31	h	137	69% 92% 7%
32	i	146	9% 96%
33	j	122	19% 99%

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Mol	Chain	Length	Quality of chain
34	k	151	
35	l	139	
36	m	124	
37	n	116	
38	o	119	
39	p	127	
40	q	100	
41	r	159	
42	s	237	
43	t	111	
44	u	104	
45	v	65	
46	w	111	
47	x	97	
48	y	57	
49	z	53	
50	3	2907	
51	4	108	
52	5	1520	
53	7	76	

2 Entry composition

There are 53 unique types of molecules in this entry. The entry contains 144524 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 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	0	47	380	236	81	61	2	0	0

- Molecule 2 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	1	59	477	300	99	77	1	0	0

- Molecule 3 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	2	37	304	189	65	46	4	0	0

- Molecule 4 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	A	240	1921	1226	334	352	9	0	0

- Molecule 5 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	B	215	1698	1073	313	307	5	0	0

- Molecule 6 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	C	203	1660	1051	314	290	5	0	0

- Molecule 7 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	D	153	1173	742	226	202	3	0	0

- Molecule 8 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	E	167	1362	857	240	263	2	0	0

- Molecule 9 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	F	154	1246	785	239	216	6	0	0

- Molecule 10 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	G	141	1110	723	193	192	2	0	0

- Molecule 11 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	H	128	1028	655	191	181	1	0	0

- Molecule 12 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	I	101	809	523	142	143	1	0	0

- Molecule 13 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	J	114	829	514	153	156	6	0	0

- Molecule 14 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	K	136	Total	C	N	O	S	0	0
			1076	680	213	181	2		

- Molecule 15 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	L	118	Total	C	N	O	S	0	0
			951	594	191	166			

- Molecule 16 is a protein called 30S ribosomal protein S14 type Z.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	M	60	Total	C	N	O	S	0	0
			474	302	96	72	4		

- Molecule 17 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	N	83	Total	C	N	O	S	0	0
			673	428	125	120			

- Molecule 18 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	O	80	Total	C	N	O	S	0	0
			646	414	119	111	2		

- Molecule 19 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	P	83	Total	C	N	O	S	0	0
			675	425	135	115			

- Molecule 20 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	Q	65	Total	C	N	O	S	0	0
			535	342	103	86	4		

- Molecule 21 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	R	84	Total	C	N	O	S	0	0
			682	435	127	118	2		

- Molecule 22 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	S	77	Total	C	N	O	S	0	0
			629	383	135	111			

- Molecule 23 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	T	53	Total	C	N	O	S	0	0
			471	295	103	72	1		

- Molecule 24 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	a	285	Total	C	N	O	S	0	0
			2225	1385	437	397	6		

- Molecule 25 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	b	229	Total	C	N	O	S	0	0
			1762	1119	318	318	7		

- Molecule 26 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	c	210	Total	C	N	O	S	0	0
			1644	1047	297	297	3		

- Molecule 27 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	d	175	Total	C	N	O	S	0	0
			1388	893	245	246	4		

- Molecule 28 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms				AltConf	Trace
28	e	176	Total	C	N	O	0	0
			1396	899	247	250		

- Molecule 29 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	f	145	Total	C	N	O	S	0	0
			1182	763	206	210	3		

- Molecule 30 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	g	126	Total	C	N	O	S	0	0
			960	612	167	178	3		

- Molecule 31 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	h	128	Total	C	N	O	S	0	0
			959	616	160	177	6		

- Molecule 32 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	i	144	Total	C	N	O	S	0	0
			1164	737	213	209	5		

- Molecule 33 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	j	122	Total	C	N	O	S	0	0
			944	595	178	167	4		

- Molecule 34 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms				AltConf	Trace
34	k	148	Total	C	N	O	0	0
			1153	731	226	196		

- Molecule 35 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	l	136	1079	694	196	182	7	0	0

- Molecule 36 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	m	119	958	609	175	171	3	0	0

- Molecule 37 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	n	112	889	557	175	155	2	0	0

- Molecule 38 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
38	o	115	938	592	180	165	1	0	0

- Molecule 39 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	p	114	947	603	188	154	2	0	0

- Molecule 40 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	q	99	811	525	148	134	4	0	0

- Molecule 41 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	r	139	1068	663	207	191	7	0	0

- Molecule 42 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	s	92	Total	C	N	O	S	0	0
			720	475	122	122	1		

- Molecule 43 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	t	111	Total	C	N	O	S	0	0
			872	550	166	153	3		

- Molecule 44 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	u	86	Total	C	N	O	S	0	0
			657	409	130	117	1		

- Molecule 45 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	v	63	Total	C	N	O	S	0	0
			513	317	108	87	1		

- Molecule 46 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms				AltConf	Trace
46	w	100	Total	C	N	O	0	0
			818	517	153	148		

- Molecule 47 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	x	44	Total	C	N	O	S	0	0
			344	221	55	64	4		

- Molecule 48 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	y	56	Total	C	N	O	S	0	0
			452	274	98	75	5		

- Molecule 49 is a protein called 50S ribosomal protein L33 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	z	50	Total	C	N	O	S	0	0
			408	255	81	68	4		

- Molecule 50 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	3	2878	Total	C	N	O	P	0	0
			61664	27558	11236	19995	2875		

- Molecule 51 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	4	105	Total	C	N	O	P	0	0
			2239	1003	409	724	103		

- Molecule 52 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	5	1493	Total	C	N	O	P	0	0
			31943	14279	5792	10382	1490		

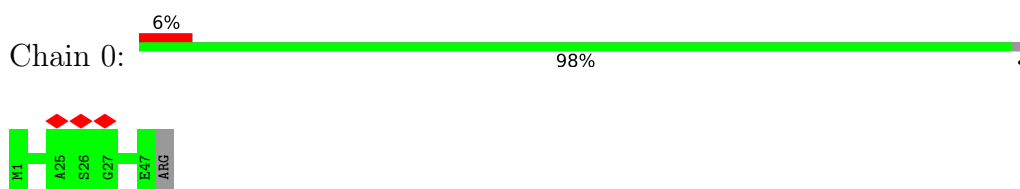
- Molecule 53 is a RNA chain called tRNA-Phe.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	7	76	Total	C	N	O	P	0	0
			1618	723	289	531	75		

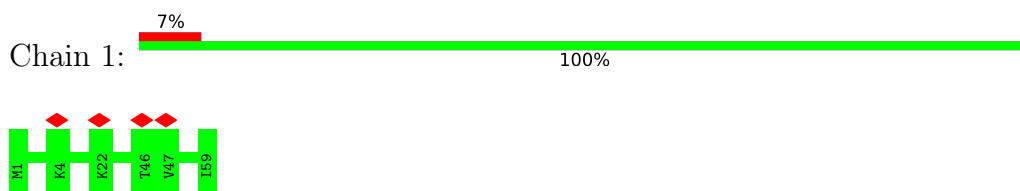
3 Residue-property plots [i](#)

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.

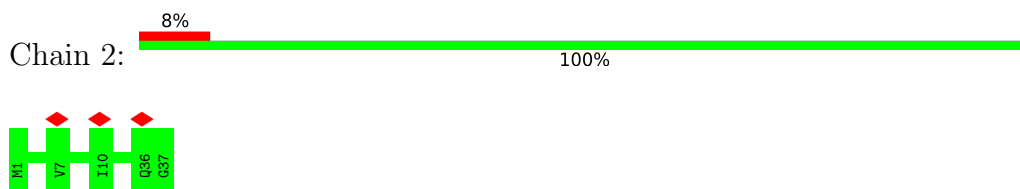
- Molecule 1: 50S ribosomal protein L34



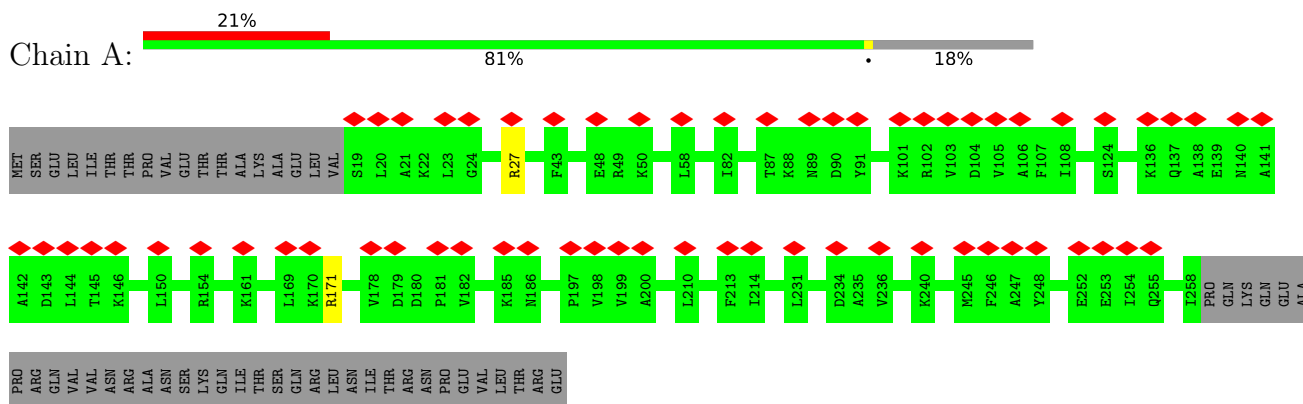
- Molecule 2: 50S ribosomal protein L35



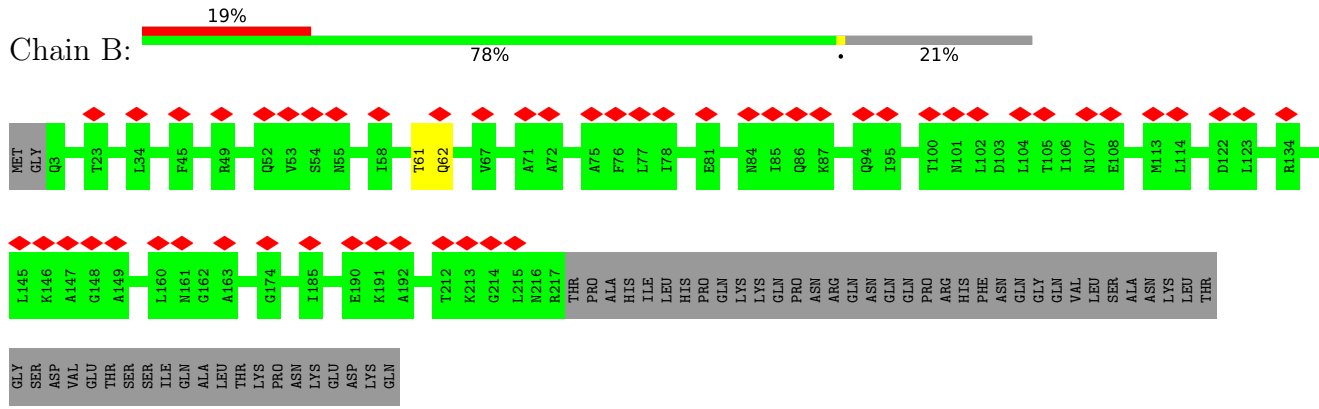
- Molecule 3: 50S ribosomal protein L36



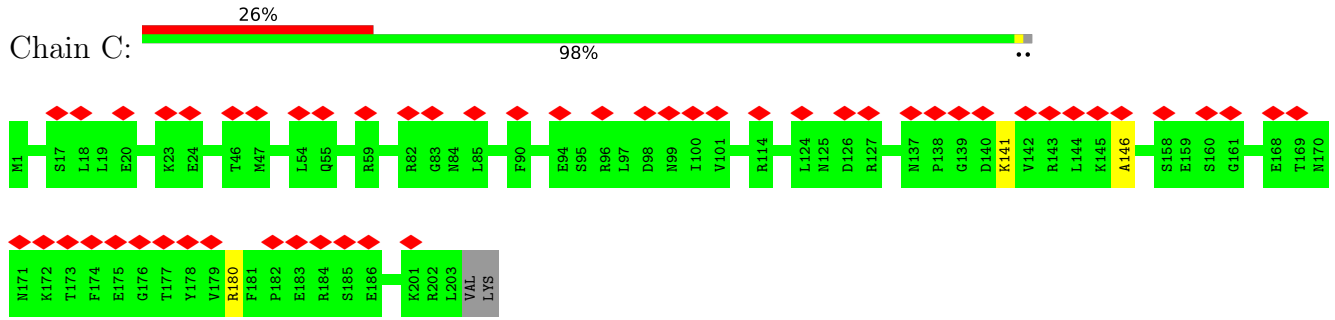
- Molecule 4: 30S ribosomal protein S2



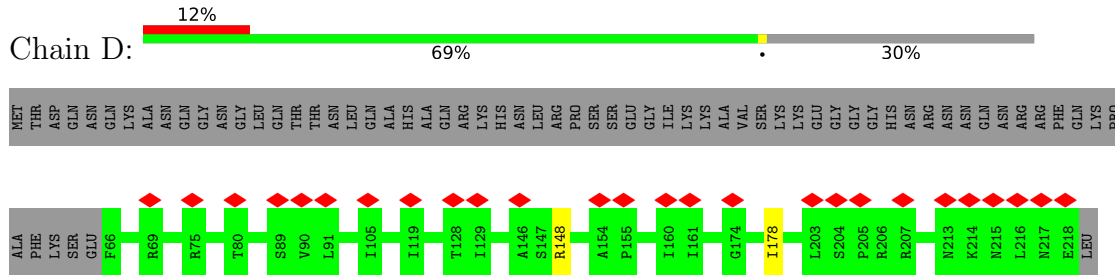
- Molecule 5: 30S ribosomal protein S3



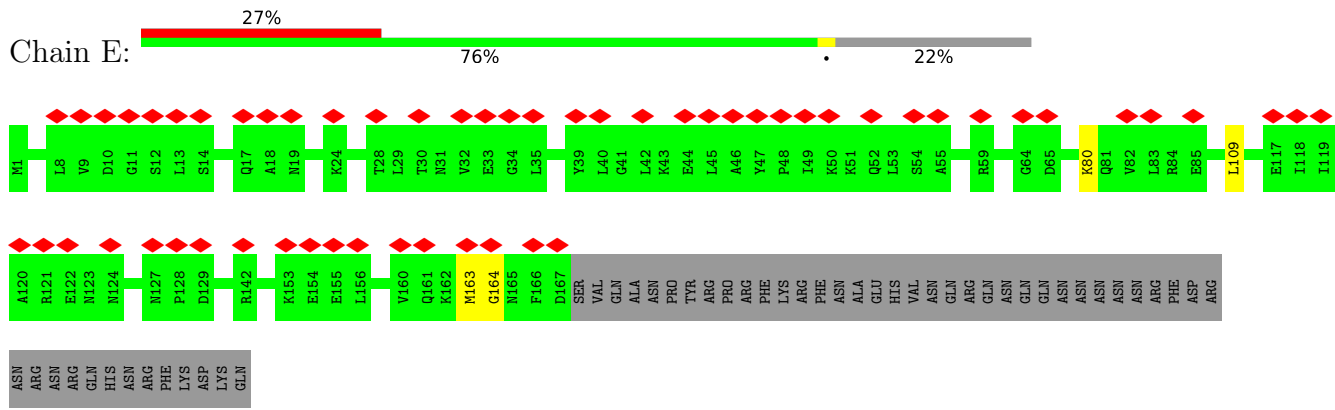
• Molecule 6: 30S ribosomal protein S4



• Molecule 7: 30S ribosomal protein S5

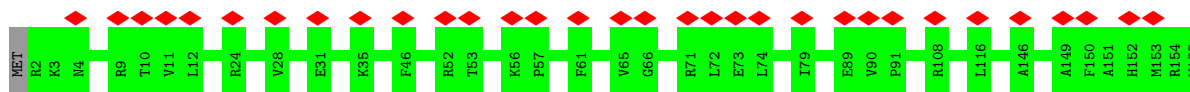


• Molecule 8: 30S ribosomal protein S6

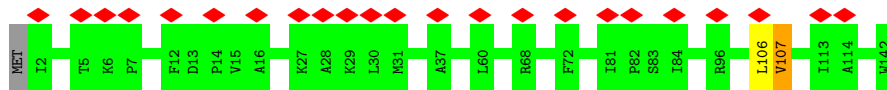


• Molecule 9: 30S ribosomal protein S7

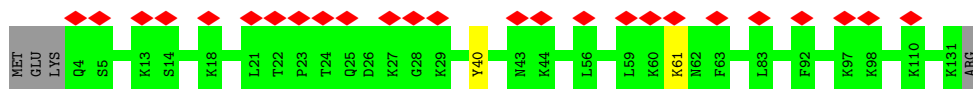




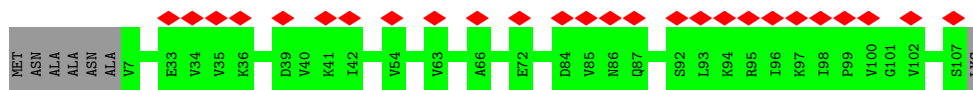
- Molecule 10: 30S ribosomal protein S8



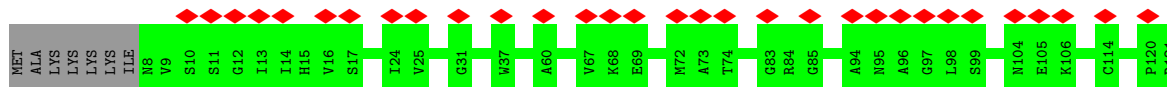
- Molecule 11: 30S ribosomal protein S9



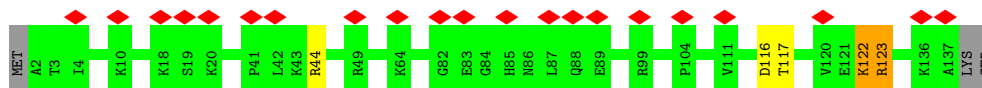
- Molecule 12: 30S ribosomal protein S10



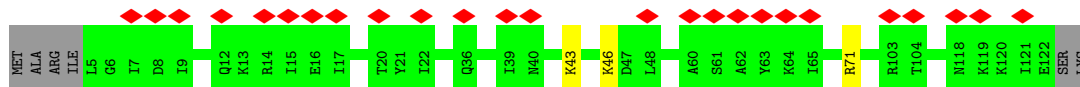
- Molecule 13: 30S ribosomal protein S11



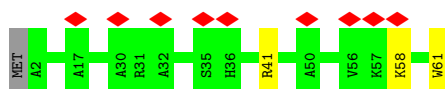
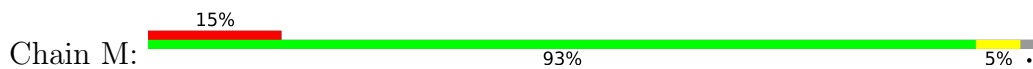
- Molecule 14: 30S ribosomal protein S12



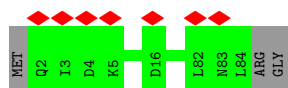
- Molecule 15: 30S ribosomal protein S13



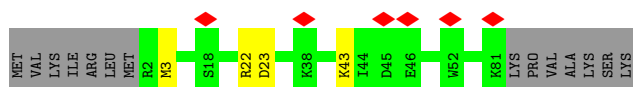
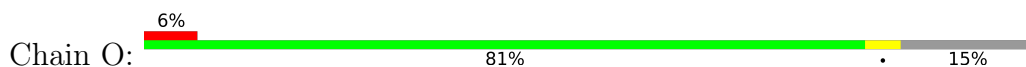
- Molecule 16: 30S ribosomal protein S14 type Z



- Molecule 17: 30S ribosomal protein S15



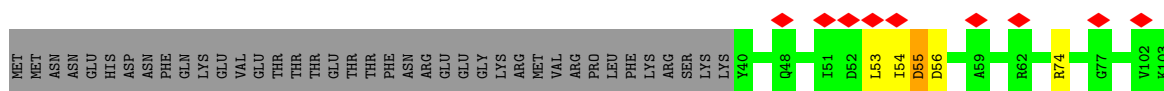
- Molecule 18: 30S ribosomal protein S16



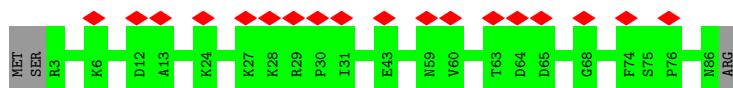
- Molecule 19: 30S ribosomal protein S17



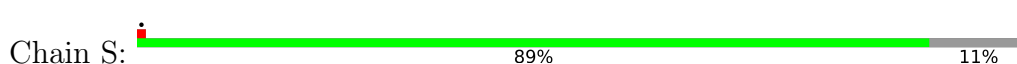
- Molecule 20: 30S ribosomal protein S18

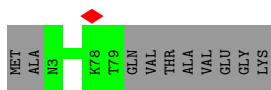


- Molecule 21: 30S ribosomal protein S19

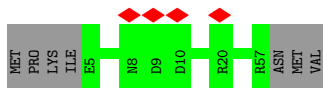
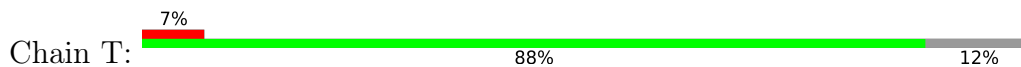


- Molecule 22: 30S ribosomal protein S20

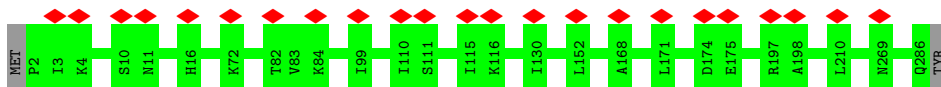




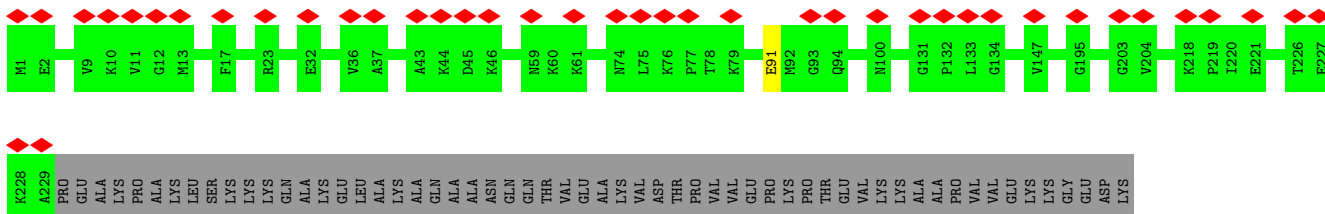
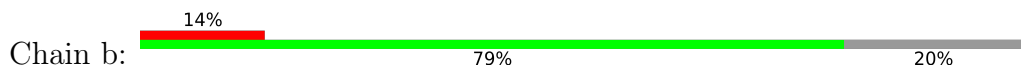
- Molecule 23: 30S ribosomal protein S21



- Molecule 24: 50S ribosomal protein L2



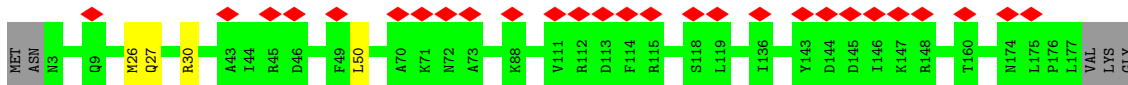
- Molecule 25: 50S ribosomal protein L3



- Molecule 26: 50S ribosomal protein L4

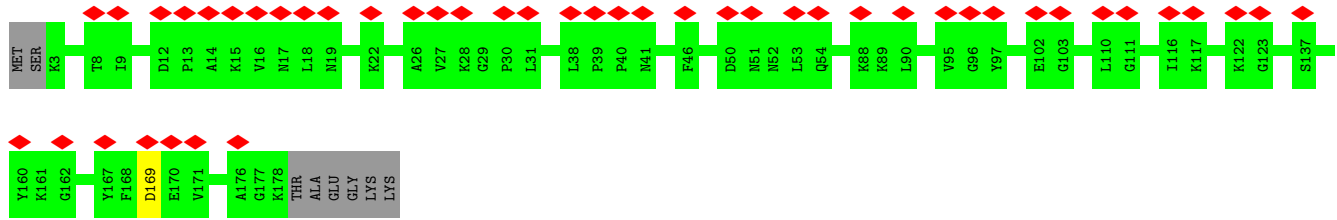


- Molecule 27: 50S ribosomal protein L5

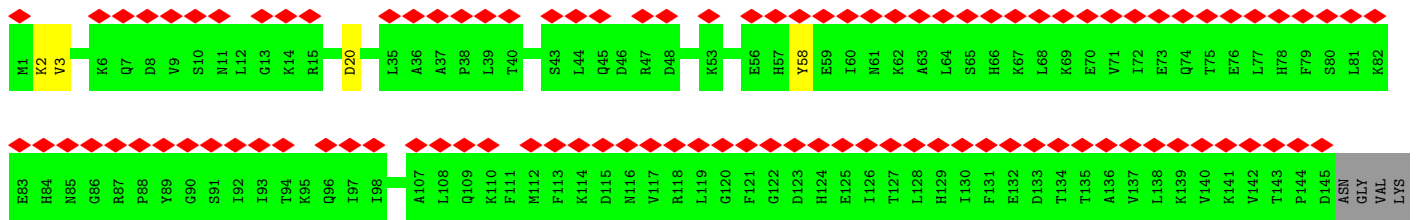


- Molecule 28: 50S ribosomal protein L6

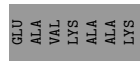
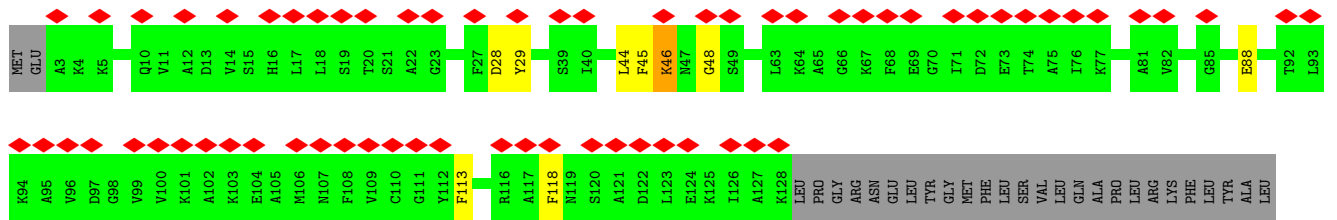
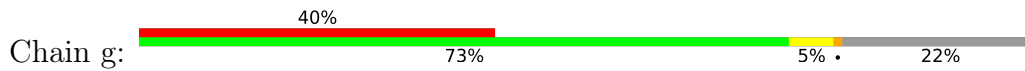




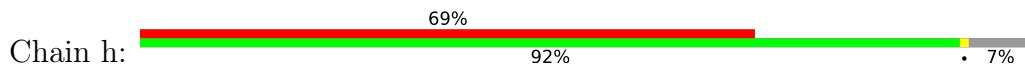
• Molecule 29: 50S ribosomal protein L9



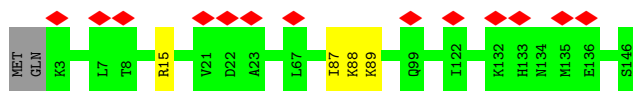
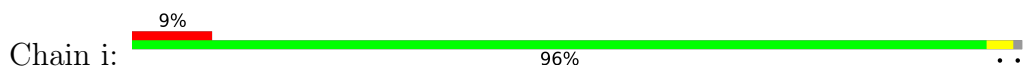
• Molecule 30: 50S ribosomal protein L10



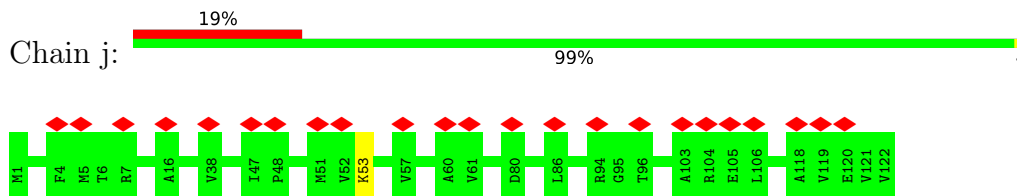
• Molecule 31: 50S ribosomal protein L11



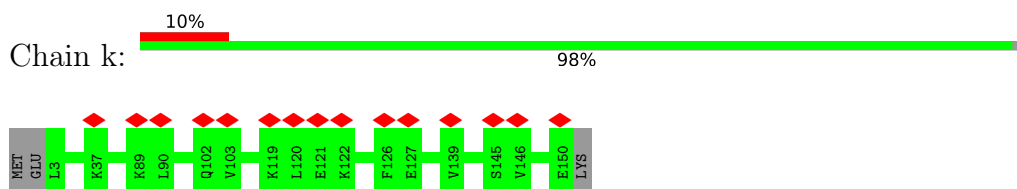
• Molecule 32: 50S ribosomal protein L13



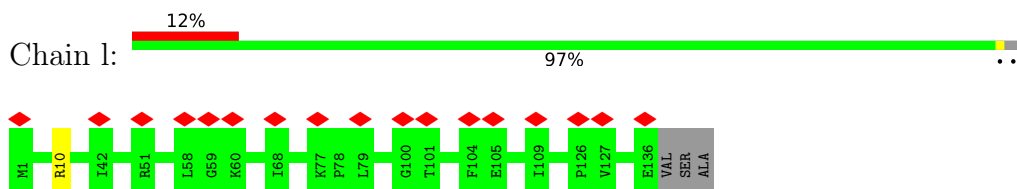
- Molecule 33: 50S ribosomal protein L14



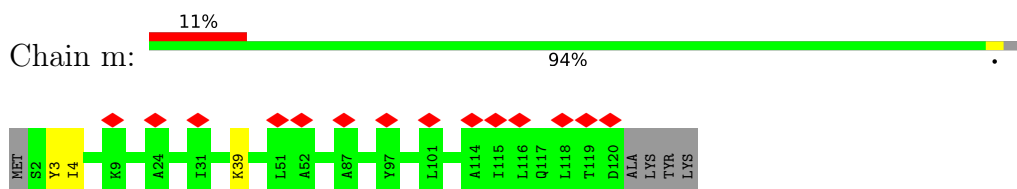
- Molecule 34: 50S ribosomal protein L15



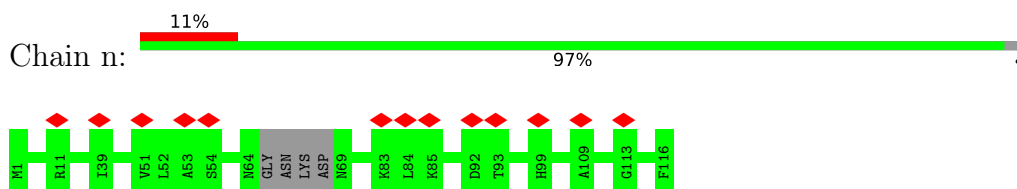
- Molecule 35: 50S ribosomal protein L16



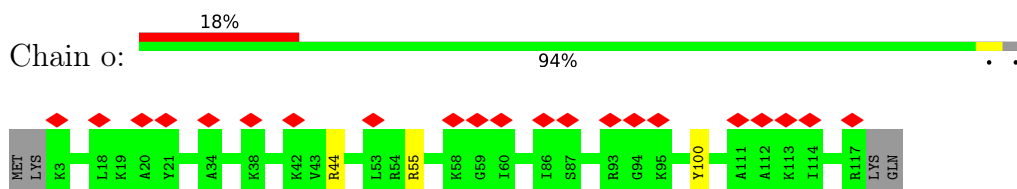
- Molecule 36: 50S ribosomal protein L17



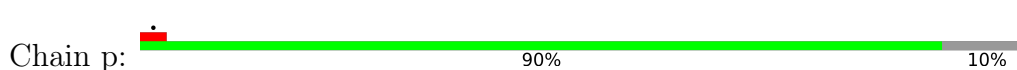
- Molecule 37: 50S ribosomal protein L18

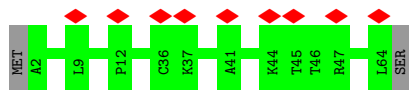


- Molecule 38: 50S ribosomal protein L19

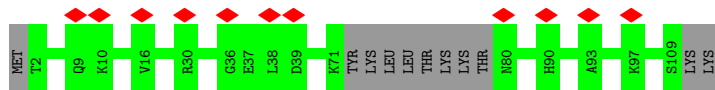
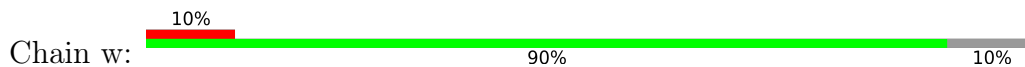


- Molecule 39: 50S ribosomal protein L20

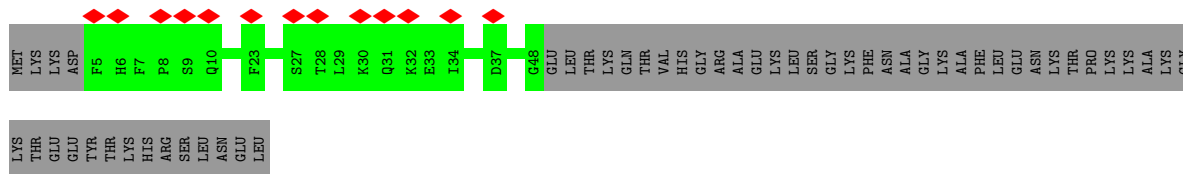
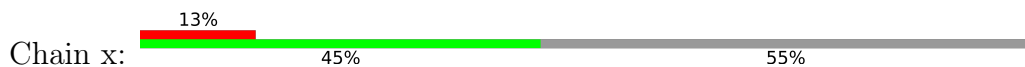




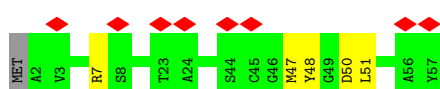
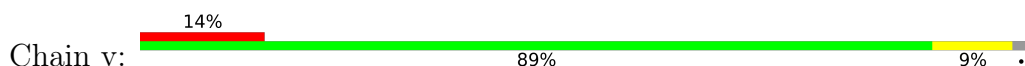
• Molecule 46: 50S ribosomal protein L29



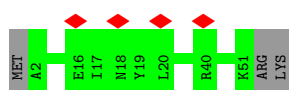
• Molecule 47: 50S ribosomal protein L31



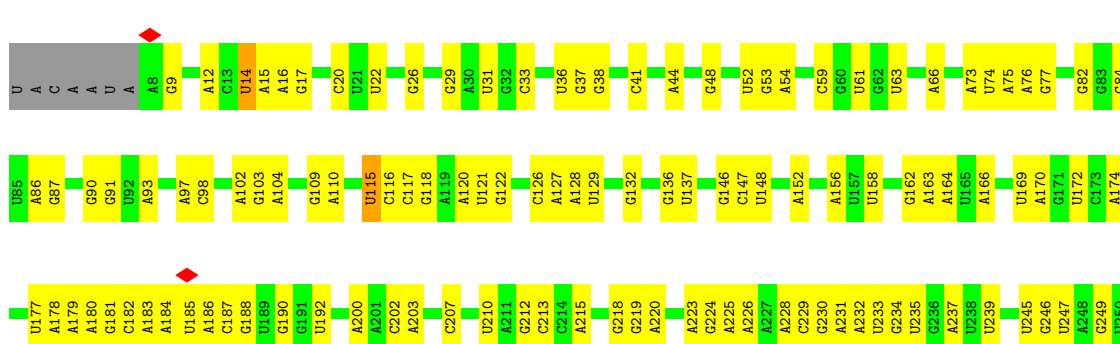
• Molecule 48: 50S ribosomal protein L32



• Molecule 49: 50S ribosomal protein L33 1

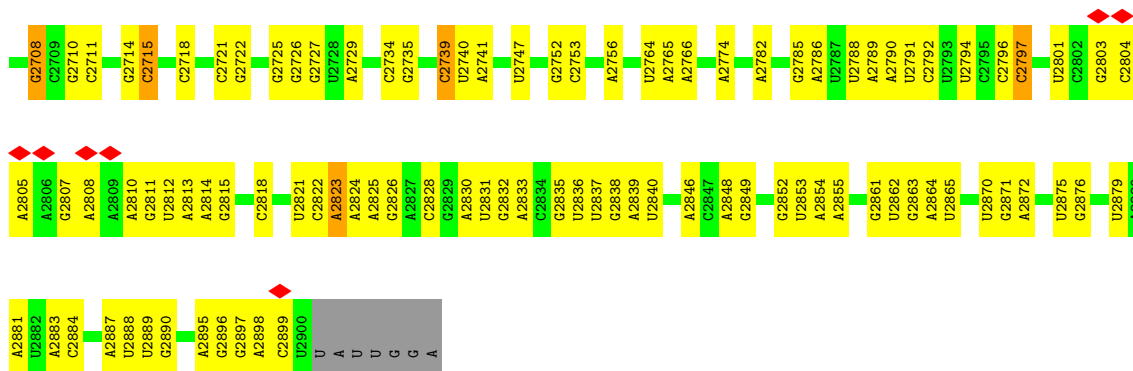


• Molecule 50: 23S ribosomal RNA



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G1451	C1358	C1274	U1193	C1021	U935	A866	G781	A681	U511	A437	G341	G254
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A1462	A1208	U1031	A947	U1031	A947	A878	G793	G610	C520	G447	A358	A276
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A1479	G1215	A1046	U952	A1046	U952	A883	G803	A619	G531	G456	U365	U284
U1480	U1216	A1047	G953	A1047	G953	A884	U804	A620	U534	U457	A366	U285
U1481	G1217	A1048	U956	A1048	U956	A885	G805	A622	U539	A459	C369	A286
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	C1227	U1053	U968	U1053	U968	A889	G810	G625	A541	C461	U376	G294
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G1409	G1242	A1067	G982	A1067	G982	C901	U820	A638	A551	A472	C393	G301
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A1412	G1245	G1070	G986	G1070	G986	U905	U825	A647	U556	U477	C397	
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A1513	U1252	A1080	G997	A1080	G997	U911	A831	A654	A563	G405	U405	G313
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A1515	G1171	A1082	A1002	A1082	A1002	U913	A833	A656	C565	G407	U407	A315
C1518	G1174	A1085	A1005	A1085	A1005	G914	A837	A657	U568	G408	U408	U317
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U1526	U1180	U1096	A1009	U1096	A1009	A	C847	A659	A578	G414	C414	A322
G1528	U1181	G1097	A1009	U1096	A1009	C	G850	A660	A581	G417	G418	G325
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A1441	U1184	U1101	G1014	U1096	G1014	U	G859	A663	G586	C497	C497	G332
A1442	U1185	A1102	G1015	U1096	G1015	A	C860	A664	U587	G501	U501	G333
C1444	A1186	A1104	A1016	U1096	A1016	G928	U861	A664	A589	G501	U501	C336
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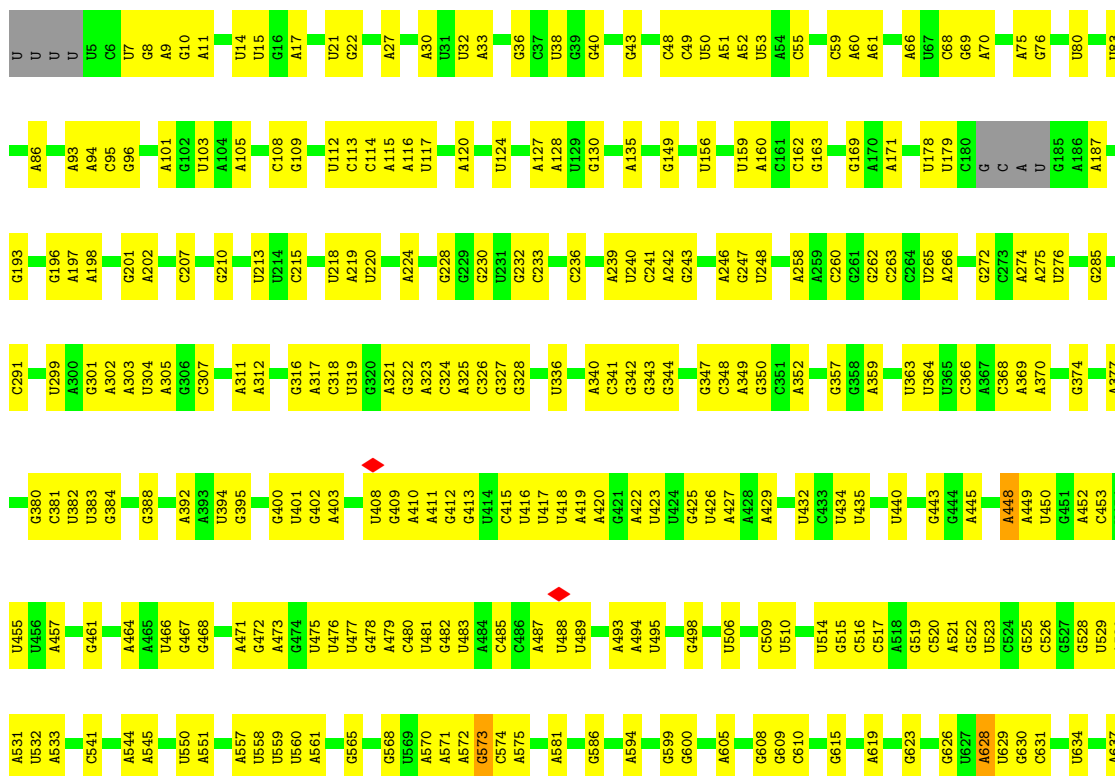
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C2067	G2068	A2069	G2070	A2066	A2067	G2068	A2069	C2070	C2071	C2072	C2073	C2074	U2075	U2076	C2080	U2082	U2083	G2087	G2090	A2095	U2096	U2097	U2098	G2100	A2101	U2102	C2103	G2106	A2107	C2108	A2109	U2110	U2111	A2112	U2113	C2114	G2115	U2116	G2117	U2118	A2119	G2122	A2123	A2124	U2125	A2126	G2127	G2128					
G2131	G2132	A2133	A2136	A2137	U2138	C2139	G2140	A2141	A2145	A2146	G2147	U2148	U2149	C2150	C2151	U2152	U2153	G2156	U2159	U2160	G2161	U2162	A2165	U2166	A2171	A2172	G2173	G2174	U2175	A2178	A2179	U2180	A2181	C2185	U2186	C2187	G2191	U2192	U2193	U2194	U2195	U2196	U2197	U2198	U2199	U2200	G2201	U2202	U2203				
C2204	U2205	A2206	A2207	U2208	G2211	U2212	U2218	U2219	A2220	U2221	C2222	G2225	A2230	A2231	G2232	A2233	G2246	G2247	C2248	U2251	U2252	U2253	G2254	U2257	G2258	G2259	C2262	A2263	G2264	U2265	C2266	G2267	C2271	C2272	U2273	A2274	A2275	A2276	A2277	A2281	A2286	G2290	U2291	A2294	A2295	A2296							
G2297	G2298	U2299	A2300	C2301	G2307	C2310	G2311	G2312	U2313	U2314	G2315	A2316	A2317	A2318	U2320	C2321	G2322	G2329	A2330	G2331	U2332	U2333	U2334	A2335	G2338	C2339	U2340	G2341	U2342	A2343	A2344	C2350	U2351	U2352	G2353	A2354	C2355	U2356	G2357	U2358	G2359	A2362	C2363	A2364	U2365	A2366	U2367	A2368	G2369	C2370	U2371		
A2375	C2376	A2377	G2378	G2379	U2380	G2381	A2382	G2383	G2391	U2392	C2393	A2394	U2395	A2396	C2403	U2406	C2410	C2411	U2414	A2415	U2416	G2417	G2418	C2424	C2425	A2426	U2427	C2430	U2431	G2432	A2433	C2434	U2435	G2436	G2437	U2438	U2439	A2440	A2441	A2442	A2443	A2447	U2448	U2449	G2452	A2453	G2454	U2455	A2456	U2457			
A2458	A2459	A2460	A2461	G2462	G2463	A2469	C2470	U2471	G2472	C2473	G2474	C2475	G2478	A2484	U2485	A2486	U2487	G2488	G2489	A2490	C2491	G2492	A2495	U2496	U2497	U2498	U2499	U2500	U2501	G2502	G2503	C2504	A2505	C2506	U2507	G2508	G2509	U2510	A2511	U2512	G2513	U2518	U2519	C2520	A2521	U2524	G2525	A2526	U2527	G2528	C2529	G2534	
A2538	A2539	G2540	C2541	C2542	G2543	G2544	U2545	G2551	G2552	G2553	G2557	G2561	C2564	G2565	C2566	C2567	G2568	A2569	U2570	U2571	A2572	A2573	A2574	G2575	A2578	C2581	G2582	A2585	G2586	U2587	G2590	G2591	U2592	U2593	C2594	A2595	U2596	G2600	U2601	C2602	U2603	A2604	G2605	A2606	G2607	A2610	U2614						
G2615	G2616	U2617	C2618	C2619	U2621	A2622	U2623	U2627	U2628	G2629	U2630	G2631	C2633	A2637	G2638	G2642	A2643	U2644	U2645	G2646	G2649	A2650	U2654	U2655	A2662	G2663	U2664	A2668	G2669	G2680	G2681	G2684	A2685	C2686	A2689	G2690	U2691	U2692	U2693	A2694	C2697	U2698	C2699	U2703	U2704								

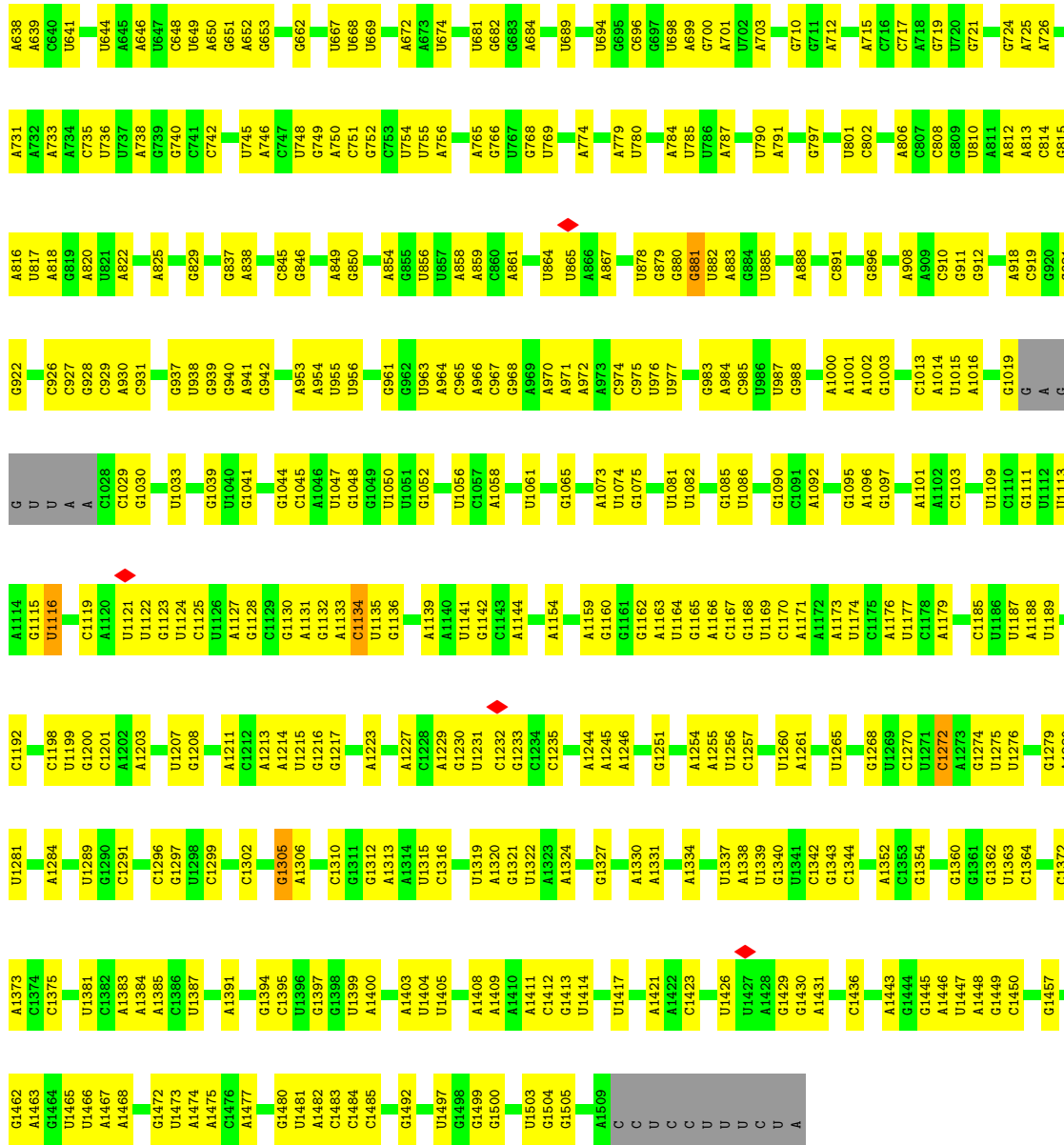


• Molecule 51: 5S ribosomal RNA

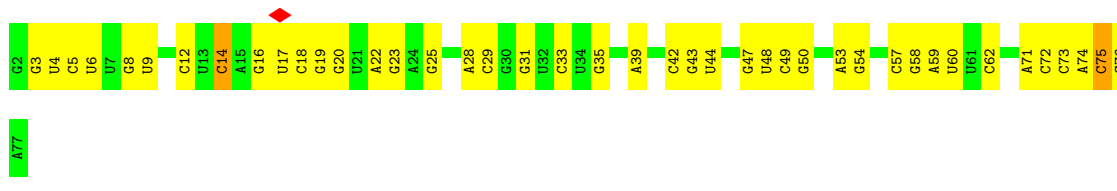


• Molecule 52: 16S ribosomal RNA





• Molecule 53: tRNA-Phe



4 Experimental information

Property	Value	Source
EM reconstruction method	SUBTOMOGRAM AVERAGING	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of subtomograms used	2218	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 ($e^-/\text{\AA}^2$)	3.2	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	3750	Depositor
Magnification	81000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	1.451	Depositor
Minimum map value	-0.444	Depositor
Average map value	0.024	Depositor
Map value standard deviation	0.116	Depositor
Recommended contour level	0.45	Depositor
Map size (Å)	435.328, 435.328, 435.328	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.7005, 1.7005, 1.7005	Depositor

5 Model quality

5.1 Standard geometry

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	0	0.32	0/383	0.52	0/504
2	1	0.27	0/484	0.51	0/637
3	2	0.29	0/306	0.61	0/401
4	A	0.31	0/1954	0.51	0/2642
5	B	0.31	0/1721	0.54	0/2323
6	C	0.30	0/1691	0.50	1/2267 (0.0%)
7	D	0.31	0/1188	0.57	0/1593
8	E	0.32	0/1384	0.53	0/1867
9	F	0.26	0/1266	0.49	0/1700
10	G	0.33	0/1126	0.56	0/1517
11	H	0.30	0/1044	0.55	1/1395 (0.1%)
12	I	0.29	0/820	0.57	0/1103
13	J	0.29	0/844	0.50	0/1136
14	K	0.35	0/1094	0.63	1/1468 (0.1%)
15	L	0.27	0/962	0.48	0/1289
16	M	0.33	0/483	0.51	0/643
17	N	0.29	0/679	0.50	0/907
18	O	0.36	0/659	0.56	1/885 (0.1%)
19	P	0.33	0/684	0.58	0/913
20	Q	0.34	0/545	0.58	0/730
21	R	0.32	0/698	0.52	0/936
22	S	0.26	0/631	0.47	0/838
23	T	0.29	0/475	0.51	0/621
24	a	0.32	0/2267	0.55	0/3044
25	b	0.32	0/1795	0.56	0/2412
26	c	0.31	0/1671	0.53	0/2246
27	d	0.32	0/1409	0.56	0/1894
28	e	0.32	0/1420	0.55	0/1912
29	f	0.28	0/1205	0.53	1/1616 (0.1%)
30	g	0.38	0/969	0.60	0/1295
31	h	0.29	0/968	0.52	0/1298
32	i	0.31	0/1186	0.53	0/1592
33	j	0.29	0/953	0.52	0/1275
34	k	0.29	0/1170	0.50	0/1559

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
35	l	0.33	0/1104	0.53	0/1481
36	m	0.31	0/973	0.53	0/1309
37	n	0.30	0/897	0.52	0/1198
38	o	0.31	0/948	0.53	0/1262
39	p	0.32	0/961	0.47	0/1278
40	q	0.33	0/828	0.61	0/1111
41	r	0.32	0/1077	0.58	0/1441
42	s	0.31	0/732	0.55	0/988
43	t	0.31	0/879	0.51	0/1165
44	u	0.33	0/665	0.59	0/884
45	v	0.30	0/519	0.58	0/695
46	w	0.29	0/826	0.48	0/1104
47	x	0.30	0/353	0.48	0/474
48	y	0.36	0/457	0.61	0/601
49	z	0.30	0/412	0.53	0/547
50	3	0.50	1/69073 (0.0%)	1.04	101/107710 (0.1%)
51	4	0.53	0/2505	1.07	1/3902 (0.0%)
52	5	0.49	0/35768	1.01	31/55764 (0.1%)
53	7	0.43	0/1808	1.03	6/2817 (0.2%)
All	All	0.44	1/156919 (0.0%)	0.92	144/234189 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
50	3	1381	A	N9-C4	-5.01	1.34	1.37

All (144) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
50	3	1518	C	N1-C2-O2	10.03	124.92	118.90
50	3	1518	C	C2-N1-C1'	8.76	128.44	118.80
50	3	1518	C	N3-C2-O2	-8.53	115.93	121.90
50	3	426	U	C2-N1-C1'	8.27	127.62	117.70
53	7	75	C	N1-C2-O2	8.22	123.83	118.90
50	3	1507	G	C4-N9-C1'	-8.20	115.84	126.50
52	5	628	A	O4'-C1'-N9	7.71	114.37	108.20
50	3	1507	G	C8-N9-C1'	7.71	137.02	127.00
53	7	75	C	C2-N1-C1'	7.41	126.95	118.80
52	5	881	G	N3-C4-N9	-7.08	121.75	126.00
52	5	974	C	C2-N1-C1'	7.05	126.55	118.80
11	H	40	TYR	C-N-CA	-7.00	104.19	121.70
50	3	1507	G	O4'-C1'-N9	6.89	113.71	108.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
50	3	2797	C	C2-N1-C1'	-6.82	111.30	118.80
50	3	904	C	C2-N1-C1'	6.81	126.30	118.80
50	3	426	U	C6-N1-C1'	-6.78	111.72	121.20
52	5	751	C	N1-C2-O2	6.74	122.95	118.90
52	5	974	C	N1-C2-O2	6.73	122.94	118.90
50	3	2591	G	N3-C4-N9	-6.69	121.99	126.00
50	3	1507	G	C6-C5-N7	6.63	134.38	130.40
52	5	751	C	C2-N1-C1'	6.57	126.03	118.80
50	3	426	U	N1-C2-O2	6.36	127.25	122.80
52	5	881	G	C4-N9-C1'	-6.29	118.32	126.50
50	3	2301	C	C2-N1-C1'	-6.26	111.91	118.80
50	3	14	U	C2-N1-C1'	6.24	125.19	117.70
50	3	441	U	N1-C2-O2	6.21	127.15	122.80
50	3	1507	G	N3-C4-N9	-6.19	122.29	126.00
50	3	1997	C	N3-C2-O2	-6.17	117.58	121.90
50	3	1341	U	C2-N1-C1'	6.16	125.10	117.70
50	3	1781	C	C2-N1-C1'	6.16	125.58	118.80
50	3	1868	A	N1-C2-N3	6.16	132.38	129.30
50	3	1518	C	C6-N1-C1'	-6.13	113.44	120.80
53	7	75	C	N3-C2-O2	-6.13	117.61	121.90
50	3	2797	C	N1-C2-O2	-6.11	115.24	118.90
50	3	443	C	C6-N1-C2	-6.07	117.87	120.30
50	3	1446	G	N3-C4-N9	-6.03	122.38	126.00
50	3	1054	U	OP1-P-O3'	6.02	118.44	105.20
52	5	881	G	C8-N9-C1'	6.00	134.80	127.00
50	3	739	G	O4'-C1'-N9	5.97	112.97	108.20
50	3	1446	G	N3-C2-N2	-5.96	115.73	119.90
52	5	1134	C	C2-N1-C1'	5.96	125.36	118.80
50	3	1781	C	N1-C2-O2	5.94	122.46	118.90
50	3	1531	C	N3-C4-N4	-5.92	113.85	118.00
51	4	10	C	P-O3'-C3'	5.88	126.76	119.70
52	5	881	G	C6-C5-N7	5.86	133.91	130.40
52	5	1305	G	N3-C4-N9	-5.85	122.49	126.00
50	3	2187	C	C6-N1-C1'	5.85	127.82	120.80
50	3	2187	C	C2-N1-C1'	-5.85	112.37	118.80
50	3	441	U	N3-C2-O2	-5.81	118.13	122.20
50	3	904	C	N1-C2-O2	5.78	122.37	118.90
50	3	1970	C	N1-C2-O2	5.78	122.37	118.90
50	3	441	U	C2-N1-C1'	5.73	124.58	117.70
52	5	1272	C	N1-C2-O2	5.73	122.34	118.90
50	3	1970	C	C2-N1-C1'	5.73	125.10	118.80
52	5	751	C	N3-C2-O2	-5.72	117.89	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
50	3	481	C	C2-N1-C1'	5.71	125.08	118.80
50	3	14	U	N1-C2-O2	5.71	126.79	122.80
50	3	2708	G	N9-C4-C5	-5.70	103.12	105.40
50	3	2582	G	N9-C4-C5	-5.67	103.13	105.40
52	5	1119	C	C2-N1-C1'	5.66	125.03	118.80
50	3	722	C	N1-C2-O2	5.65	122.29	118.90
50	3	1906	G	N3-C4-N9	-5.63	122.62	126.00
50	3	2715	C	N1-C2-O2	5.63	122.28	118.90
50	3	654	G	C4-N9-C1'	-5.62	119.19	126.50
52	5	1119	C	N1-C2-O2	5.60	122.26	118.90
50	3	2071	C	C2-N1-C1'	5.58	124.94	118.80
50	3	654	G	C8-N9-C1'	5.55	134.22	127.00
50	3	443	C	C5-C6-N1	5.55	123.78	121.00
50	3	2009	U	C2-N1-C1'	5.54	124.34	117.70
50	3	2739	C	C2-N1-C1'	-5.54	112.71	118.80
50	3	1837	C	C5-C6-N1	5.53	123.77	121.00
50	3	1518	C	C6-N1-C2	-5.51	118.09	120.30
50	3	2591	G	C2-N3-C4	-5.45	109.17	111.90
50	3	282	C	N1-C2-O2	5.43	122.16	118.90
52	5	1134	C	C6-N1-C2	-5.43	118.13	120.30
50	3	810	G	N3-C4-N9	-5.43	122.75	126.00
50	3	763	G	C4-N9-C1'	5.40	133.52	126.50
53	7	75	C	C6-N1-C1'	-5.40	114.32	120.80
50	3	2684	G	N3-C4-N9	-5.40	122.76	126.00
50	3	14	U	N3-C2-O2	-5.39	118.42	122.20
52	5	573	G	N3-C4-N9	-5.38	122.77	126.00
50	3	115	U	C2-N1-C1'	5.37	124.15	117.70
50	3	2005	G	O4'-C1'-N9	5.37	112.50	108.20
50	3	763	G	C8-N9-C1'	-5.35	120.04	127.00
52	5	1101	A	N7-C8-N9	5.35	116.48	113.80
52	5	455	U	N1-C2-O2	5.34	126.54	122.80
52	5	347	G	N1-C6-O6	5.34	123.11	119.90
50	3	2591	G	N3-C4-C5	5.33	131.27	128.60
50	3	2193	U	C2-N1-C1'	5.30	124.06	117.70
18	O	23	ASP	CB-CG-OD1	5.30	123.07	118.30
50	3	1315	A	O4'-C1'-N9	5.29	112.43	108.20
50	3	577	C	N1-C2-O2	5.29	122.07	118.90
52	5	1116	U	C5-C6-N1	5.28	125.34	122.70
6	C	180	ARG	C-N-CA	-5.28	108.50	121.70
53	7	14	C	N1-C2-O2	5.26	122.06	118.90
52	5	974	C	C6-N1-C1'	-5.26	114.49	120.80
52	5	631	C	C5-C6-N1	5.25	123.63	121.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
50	3	2193	U	N1-C2-O2	5.25	126.48	122.80
50	3	1970	C	N3-C2-O2	-5.25	118.23	121.90
50	3	2600	G	C6-C5-N7	-5.24	127.25	130.40
50	3	1531	C	C5-C4-N4	5.21	123.85	120.20
50	3	2152	C	C2-N1-C1'	5.21	124.53	118.80
50	3	2148	U	C2-N1-C1'	5.20	123.94	117.70
52	5	631	C	N1-C2-O2	5.19	122.02	118.90
50	3	763	G	C6-C5-N7	-5.19	127.28	130.40
29	f	20	ASP	CB-CG-OD2	5.18	122.96	118.30
50	3	224	G	N3-C4-N9	-5.17	122.90	126.00
50	3	1987	C	N1-C2-O2	5.17	122.00	118.90
50	3	2797	C	C2-N3-C4	-5.15	117.32	119.90
50	3	1507	G	N3-C2-N2	-5.15	116.30	119.90
50	3	2582	G	C4-C5-N7	5.13	112.85	110.80
53	7	23	G	N9-C4-C5	-5.13	103.35	105.40
52	5	634	U	N1-C2-O2	5.13	126.39	122.80
50	3	1095	U	N3-C4-O4	5.12	122.98	119.40
50	3	2082	U	N3-C4-O4	5.12	122.98	119.40
50	3	2600	G	N9-C4-C5	-5.12	103.35	105.40
50	3	664	G	C6-C5-N7	-5.12	127.33	130.40
50	3	2797	C	C6-N1-C1'	5.11	126.94	120.80
50	3	481	C	C5-C6-N1	5.11	123.56	121.00
52	5	881	G	N3-C4-C5	5.10	131.15	128.60
52	5	59	C	N3-C2-O2	-5.10	118.33	121.90
50	3	904	C	C6-N1-C1'	-5.09	114.69	120.80
50	3	1342	C	N1-C2-O2	5.07	121.94	118.90
50	3	1783	G	C4-N9-C1'	5.07	133.08	126.50
50	3	1970	C	C6-N1-C2	-5.07	118.27	120.30
52	5	59	C	N1-C2-O2	5.06	121.94	118.90
50	3	2582	G	N3-C4-N9	5.05	129.03	126.00
50	3	2600	G	C4-C5-N7	5.05	112.82	110.80
50	3	1736	G	C4-N9-C1'	-5.05	119.94	126.50
50	3	2491	C	OP1-P-O3'	5.05	116.30	105.20
50	3	2187	C	O4'-C1'-N1	5.04	112.23	108.20
52	5	1274	G	C4-N9-C1'	-5.03	119.96	126.50
50	3	1906	G	N3-C2-N2	-5.03	116.38	119.90
50	3	2823	A	P-O3'-C3'	5.03	125.73	119.70
52	5	1305	G	C8-N9-C1'	5.02	133.53	127.00
50	3	2032	G	N9-C4-C5	-5.02	103.39	105.40
50	3	2739	C	C6-N1-C1'	5.02	126.82	120.80
52	5	448	A	P-O3'-C3'	5.01	125.72	119.70
14	K	123	ARG	CB-CG-CD	-5.01	98.57	111.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
50	3	2016	G	N3-C4-N9	-5.01	122.99	126.00
50	3	2708	G	C4-C5-N7	5.01	112.80	110.80
50	3	349	G	N9-C4-C5	-5.01	103.40	105.40
50	3	775	C	C2-N1-C1'	5.00	124.31	118.80
50	3	341	G	N3-C4-N9	-5.00	123.00	126.00

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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	0	45/48 (94%)	39 (87%)	6 (13%)	0	100	100
2	1	57/59 (97%)	48 (84%)	9 (16%)	0	100	100
3	2	35/37 (95%)	33 (94%)	2 (6%)	0	100	100
4	A	238/294 (81%)	204 (86%)	34 (14%)	0	100	100
5	B	213/273 (78%)	183 (86%)	29 (14%)	1 (0%)	29	69
6	C	201/205 (98%)	177 (88%)	23 (11%)	1 (0%)	29	69
7	D	151/219 (69%)	132 (87%)	19 (13%)	0	100	100
8	E	165/215 (77%)	126 (76%)	37 (22%)	2 (1%)	13	50
9	F	152/155 (98%)	132 (87%)	20 (13%)	0	100	100
10	G	139/142 (98%)	110 (79%)	28 (20%)	1 (1%)	22	63
11	H	126/132 (96%)	109 (86%)	17 (14%)	0	100	100
12	I	99/108 (92%)	82 (83%)	17 (17%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
13	J	112/121 (93%)	99 (88%)	13 (12%)	0	100	100
14	K	134/139 (96%)	110 (82%)	23 (17%)	1 (1%)	22	63
15	L	116/124 (94%)	99 (85%)	17 (15%)	0	100	100
16	M	58/61 (95%)	47 (81%)	11 (19%)	0	100	100
17	N	81/86 (94%)	74 (91%)	7 (9%)	0	100	100
18	O	78/94 (83%)	73 (94%)	5 (6%)	0	100	100
19	P	81/85 (95%)	67 (83%)	14 (17%)	0	100	100
20	Q	63/104 (61%)	52 (82%)	9 (14%)	2 (3%)	4	26
21	R	82/87 (94%)	74 (90%)	8 (10%)	0	100	100
22	S	75/87 (86%)	72 (96%)	3 (4%)	0	100	100
23	T	51/60 (85%)	43 (84%)	8 (16%)	0	100	100
24	a	283/287 (99%)	242 (86%)	41 (14%)	0	100	100
25	b	227/287 (79%)	195 (86%)	32 (14%)	0	100	100
26	c	208/212 (98%)	180 (86%)	27 (13%)	1 (0%)	29	69
27	d	173/180 (96%)	144 (83%)	29 (17%)	0	100	100
28	e	174/184 (95%)	155 (89%)	18 (10%)	1 (1%)	25	66
29	f	143/149 (96%)	121 (85%)	21 (15%)	1 (1%)	22	63
30	g	124/161 (77%)	103 (83%)	19 (15%)	2 (2%)	9	44
31	h	126/137 (92%)	108 (86%)	18 (14%)	0	100	100
32	i	142/146 (97%)	124 (87%)	18 (13%)	0	100	100
33	j	120/122 (98%)	111 (92%)	9 (8%)	0	100	100
34	k	146/151 (97%)	123 (84%)	23 (16%)	0	100	100
35	l	134/139 (96%)	117 (87%)	17 (13%)	0	100	100
36	m	117/124 (94%)	103 (88%)	14 (12%)	0	100	100
37	n	108/116 (93%)	91 (84%)	17 (16%)	0	100	100
38	o	113/119 (95%)	96 (85%)	17 (15%)	0	100	100
39	p	112/127 (88%)	95 (85%)	17 (15%)	0	100	100
40	q	97/100 (97%)	82 (84%)	14 (14%)	1 (1%)	15	55
41	r	137/159 (86%)	122 (89%)	14 (10%)	1 (1%)	22	63
42	s	90/237 (38%)	77 (86%)	13 (14%)	0	100	100
43	t	109/111 (98%)	94 (86%)	15 (14%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
44	u	84/104 (81%)	78 (93%)	6 (7%)	0	100	100
45	v	61/65 (94%)	55 (90%)	6 (10%)	0	100	100
46	w	96/111 (86%)	87 (91%)	9 (9%)	0	100	100
47	x	42/97 (43%)	33 (79%)	9 (21%)	0	100	100
48	y	54/57 (95%)	44 (82%)	10 (18%)	0	100	100
49	z	48/53 (91%)	42 (88%)	6 (12%)	0	100	100
All	All	5820/6670 (87%)	5007 (86%)	798 (14%)	15 (0%)	44	77

All (15) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	B	62	GLN
14	K	122	LYS
20	Q	55	ASP
26	c	123	ASP
6	C	146	ALA
8	E	163	MET
30	g	46	LYS
41	r	11	ARG
40	q	28	PRO
28	e	169	ASP
29	f	3	VAL
20	Q	54	ILE
30	g	48	GLY
8	E	164	GLY
10	G	107	VAL

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	0	40/41 (98%)	40 (100%)	0	100	100
2	1	51/51 (100%)	51 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	2	35/35 (100%)	35 (100%)	0	100	100
4	A	212/262 (81%)	210 (99%)	2 (1%)	78	87
5	B	180/232 (78%)	179 (99%)	1 (1%)	86	92
6	C	181/183 (99%)	180 (99%)	1 (1%)	86	92
7	D	123/178 (69%)	121 (98%)	2 (2%)	62	79
8	E	150/196 (76%)	148 (99%)	2 (1%)	69	81
9	F	131/132 (99%)	131 (100%)	0	100	100
10	G	123/124 (99%)	121 (98%)	2 (2%)	62	79
11	H	111/115 (96%)	110 (99%)	1 (1%)	78	87
12	I	95/99 (96%)	95 (100%)	0	100	100
13	J	91/97 (94%)	91 (100%)	0	100	100
14	K	117/120 (98%)	112 (96%)	5 (4%)	29	53
15	L	100/105 (95%)	97 (97%)	3 (3%)	41	63
16	M	47/48 (98%)	44 (94%)	3 (6%)	17	42
17	N	76/78 (97%)	76 (100%)	0	100	100
18	O	69/82 (84%)	66 (96%)	3 (4%)	29	53
19	P	73/75 (97%)	71 (97%)	2 (3%)	44	65
20	Q	56/94 (60%)	52 (93%)	4 (7%)	14	39
21	R	74/77 (96%)	74 (100%)	0	100	100
22	S	70/77 (91%)	70 (100%)	0	100	100
23	T	49/56 (88%)	49 (100%)	0	100	100
24	a	241/243 (99%)	241 (100%)	0	100	100
25	b	186/233 (80%)	185 (100%)	1 (0%)	88	93
26	c	182/184 (99%)	178 (98%)	4 (2%)	52	71
27	d	150/154 (97%)	146 (97%)	4 (3%)	44	65
28	e	153/159 (96%)	153 (100%)	0	100	100
29	f	131/134 (98%)	129 (98%)	2 (2%)	65	80
30	g	101/129 (78%)	93 (92%)	8 (8%)	12	35
31	h	102/110 (93%)	100 (98%)	2 (2%)	55	74
32	i	126/128 (98%)	122 (97%)	4 (3%)	39	61
33	j	103/103 (100%)	102 (99%)	1 (1%)	76	86

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
34	k	123/126 (98%)	123 (100%)	0	100	100
35	l	113/115 (98%)	112 (99%)	1 (1%)	78	87
36	m	105/109 (96%)	102 (97%)	3 (3%)	42	64
37	n	96/99 (97%)	96 (100%)	0	100	100
38	o	101/105 (96%)	98 (97%)	3 (3%)	41	63
39	p	100/108 (93%)	100 (100%)	0	100	100
40	q	90/91 (99%)	88 (98%)	2 (2%)	52	71
41	r	116/132 (88%)	113 (97%)	3 (3%)	46	66
42	s	82/208 (39%)	82 (100%)	0	100	100
43	t	96/96 (100%)	95 (99%)	1 (1%)	76	86
44	u	69/85 (81%)	69 (100%)	0	100	100
45	v	58/60 (97%)	58 (100%)	0	100	100
46	w	87/98 (89%)	87 (100%)	0	100	100
47	x	41/86 (48%)	41 (100%)	0	100	100
48	y	48/49 (98%)	43 (90%)	5 (10%)	7	24
49	z	47/50 (94%)	47 (100%)	0	100	100
All	All	5101/5751 (89%)	5026 (98%)	75 (2%)	66	80

All (75) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	A	27	ARG
4	A	171	ARG
5	B	61	THR
6	C	141	LYS
7	D	148	ARG
7	D	178	ILE
8	E	80	LYS
8	E	109	LEU
10	G	106	LEU
10	G	107	VAL
11	H	61	LYS
14	K	44	ARG
14	K	116	ASP
14	K	117	THR
14	K	122	LYS

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Mol	Chain	Res	Type
14	K	123	ARG
15	L	43	LYS
15	L	46	LYS
15	L	71	ARG
16	M	41	ARG
16	M	58	LYS
16	M	61	TRP
18	O	3	MET
18	O	22	ARG
18	O	43	LYS
19	P	67	ARG
19	P	79	LYS
20	Q	53	LEU
20	Q	55	ASP
20	Q	56	ASP
20	Q	74	ARG
25	b	91	GLU
26	c	123	ASP
26	c	125	THR
26	c	151	LYS
26	c	167	ASN
27	d	26	MET
27	d	27	GLN
27	d	30	ARG
27	d	50	LEU
29	f	2	LYS
29	f	58	TYR
30	g	28	ASP
30	g	29	TYR
30	g	44	LEU
30	g	45	PHE
30	g	46	LYS
30	g	88	GLU
30	g	113	PHE
30	g	118	PHE
31	h	37	LYS
31	h	77	LYS
32	i	15	ARG
32	i	87	ILE
32	i	88	LYS
32	i	89	LYS
33	j	53	LYS

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Mol	Chain	Res	Type
35	l	10	ARG
36	m	3	TYR
36	m	4	ILE
36	m	39	LYS
38	o	44	ARG
38	o	55	ARG
38	o	100	TYR
40	q	25	LEU
40	q	26	GLU
41	r	9	ARG
41	r	10	VAL
41	r	11	ARG
43	t	91	TYR
48	y	7	ARG
48	y	47	MET
48	y	48	TYR
48	y	50	ASP
48	y	51	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (160) such sidechains are listed below:

Mol	Chain	Res	Type
1	0	6	GLN
1	0	41	GLN
2	1	44	GLN
2	1	57	ASN
3	2	30	GLN
4	A	52	ASN
4	A	53	ASN
4	A	70	ASN
4	A	81	GLN
4	A	149	ASN
4	A	174	ASN
4	A	186	ASN
4	A	192	ASN
4	A	220	HIS
4	A	223	GLN
4	A	230	ASN
5	B	25	ASN
5	B	73	GLN
5	B	82	ASN
5	B	94	GLN

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Mol	Chain	Res	Type
5	B	139	GLN
5	B	161	ASN
6	C	53	GLN
6	C	58	GLN
6	C	81	GLN
6	C	115	GLN
6	C	118	ASN
6	C	170	ASN
6	C	171	ASN
7	D	138	HIS
7	D	190	ASN
8	E	22	ASN
8	E	25	GLN
8	E	26	GLN
8	E	52	GLN
9	F	51	GLN
9	F	67	ASN
9	F	129	ASN
9	F	141	HIS
10	G	89	GLN
11	H	33	ASN
11	H	52	GLN
11	H	128	GLN
12	I	70	GLN
12	I	74	ASN
12	I	87	GLN
13	J	15	HIS
13	J	33	ASN
13	J	112	ASN
14	K	27	ASN
14	K	37	ASN
14	K	86	ASN
15	L	31	GLN
15	L	58	ASN
17	N	2	GLN
17	N	39	HIS
17	N	43	ASN
18	O	7	HIS
19	P	25	GLN
19	P	36	HIS
19	P	46	GLN
21	R	14	HIS

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Mol	Chain	Res	Type
21	R	23	ASN
22	S	18	ASN
22	S	21	ASN
22	S	24	GLN
22	S	36	HIS
24	a	11	ASN
24	a	15	HIS
24	a	31	ASN
24	a	75	HIS
24	a	91	ASN
24	a	148	HIS
24	a	149	ASN
24	a	153	HIS
24	a	159	GLN
24	a	208	HIS
24	a	219	ASN
24	a	238	HIS
24	a	276	ASN
24	a	286	GLN
25	b	21	ASN
25	b	66	GLN
25	b	74	ASN
25	b	135	HIS
25	b	144	GLN
25	b	177	GLN
25	b	188	ASN
26	c	31	GLN
26	c	50	HIS
26	c	81	ASN
26	c	124	ASN
26	c	130	GLN
26	c	156	ASN
26	c	167	ASN
26	c	174	ASN
26	c	177	ASN
27	d	55	ASN
27	d	63	GLN
28	e	19	ASN
28	e	21	GLN
28	e	33	GLN
28	e	109	GLN
29	f	28	HIS

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Mol	Chain	Res	Type
29	f	55	GLN
29	f	61	ASN
29	f	85	ASN
29	f	96	GLN
32	i	11	GLN
32	i	51	GLN
32	i	70	ASN
32	i	99	GLN
32	i	133	HIS
34	k	5	GLN
34	k	39	GLN
34	k	81	ASN
34	k	117	HIS
34	k	134	GLN
34	k	141	ASN
35	l	13	HIS
35	l	24	ASN
35	l	71	HIS
35	l	108	ASN
36	m	21	GLN
36	m	42	GLN
36	m	59	ASN
37	n	7	GLN
37	n	37	ASN
37	n	38	HIS
37	n	88	ASN
38	o	15	GLN
38	o	17	GLN
38	o	47	ASN
38	o	82	HIS
38	o	85	ASN
39	p	8	GLN
40	q	11	GLN
40	q	79	HIS
41	r	38	ASN
41	r	52	ASN
41	r	60	ASN
41	r	65	ASN
41	r	121	GLN
43	t	2	GLN
43	t	64	GLN
43	t	108	ASN

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Mol	Chain	Res	Type
43	t	109	ASN
44	u	54	GLN
44	u	84	GLN
45	v	6	GLN
45	v	16	ASN
45	v	34	GLN
46	w	46	GLN
46	w	66	GLN
46	w	90	HIS
46	w	94	ASN
48	y	5	GLN
49	z	12	ASN
49	z	18	ASN
49	z	47	HIS

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
50	3	2875/2907 (98%)	1322 (45%)	52 (1%)
51	4	103/108 (95%)	48 (46%)	4 (3%)
52	5	1490/1520 (98%)	634 (42%)	18 (1%)
53	7	75/76 (98%)	40 (53%)	2 (2%)
All	All	4543/4611 (98%)	2044 (44%)	76 (1%)

All (2044) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
50	3	9	G
50	3	12	A
50	3	14	U
50	3	15	A
50	3	16	A
50	3	17	G
50	3	20	C
50	3	22	U
50	3	26	G
50	3	29	G
50	3	31	U
50	3	33	C
50	3	36	U
50	3	37	G

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Mol	Chain	Res	Type
50	3	38	G
50	3	41	C
50	3	44	A
50	3	48	G
50	3	52	U
50	3	53	G
50	3	54	A
50	3	59	C
50	3	61	U
50	3	63	U
50	3	66	A
50	3	73	A
50	3	74	U
50	3	75	A
50	3	76	A
50	3	77	G
50	3	82	G
50	3	84	G
50	3	86	A
50	3	87	G
50	3	90	G
50	3	91	G
50	3	93	A
50	3	97	A
50	3	98	C
50	3	102	A
50	3	103	G
50	3	104	A
50	3	109	G
50	3	110	A
50	3	115	U
50	3	116	C
50	3	117	C
50	3	118	G
50	3	120	A
50	3	121	U
50	3	122	G
50	3	126	C
50	3	127	A
50	3	128	A
50	3	129	U
50	3	132	G

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Mol	Chain	Res	Type
50	3	136	G
50	3	137	U
50	3	146	G
50	3	147	C
50	3	148	U
50	3	152	A
50	3	156	A
50	3	158	U
50	3	162	G
50	3	163	A
50	3	164	A
50	3	166	A
50	3	169	U
50	3	170	A
50	3	172	U
50	3	174	A
50	3	177	U
50	3	178	A
50	3	179	A
50	3	180	A
50	3	181	G
50	3	182	C
50	3	183	A
50	3	184	A
50	3	185	U
50	3	186	A
50	3	187	C
50	3	188	G
50	3	190	G
50	3	192	U
50	3	200	A
50	3	202	C
50	3	203	A
50	3	207	C
50	3	210	U
50	3	212	G
50	3	213	C
50	3	215	A
50	3	218	G
50	3	219	G
50	3	220	A
50	3	223	A

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Mol	Chain	Res	Type
50	3	225	A
50	3	226	A
50	3	228	A
50	3	229	C
50	3	230	G
50	3	231	A
50	3	232	A
50	3	233	U
50	3	234	G
50	3	235	U
50	3	237	A
50	3	239	U
50	3	245	U
50	3	246	G
50	3	247	U
50	3	249	G
50	3	251	G
50	3	252	G
50	3	254	G
50	3	256	G
50	3	269	A
50	3	270	G
50	3	273	C
50	3	275	A
50	3	276	A
50	3	277	C
50	3	282	C
50	3	283	A
50	3	284	U
50	3	285	U
50	3	286	A
50	3	287	G
50	3	293	G
50	3	295	U
50	3	296	U
50	3	297	G
50	3	298	U
50	3	299	A
50	3	301	G
50	3	302	G
50	3	306	G
50	3	309	A

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Mol	Chain	Res	Type
50	3	310	U
50	3	312	U
50	3	314	G
50	3	315	A
50	3	316	C
50	3	318	U
50	3	319	G
50	3	320	A
50	3	322	A
50	3	325	G
50	3	328	A
50	3	332	G
50	3	333	A
50	3	336	C
50	3	337	U
50	3	339	U
50	3	340	U
50	3	342	G
50	3	345	A
50	3	346	G
50	3	347	C
50	3	355	A
50	3	358	A
50	3	363	G
50	3	364	A
50	3	366	A
50	3	369	C
50	3	375	U
50	3	376	U
50	3	377	U
50	3	384	G
50	3	388	U
50	3	393	C
50	3	396	A
50	3	397	G
50	3	398	C
50	3	401	G
50	3	402	A
50	3	403	U
50	3	404	C
50	3	406	C
50	3	408	G

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Mol	Chain	Res	Type
50	3	409	A
50	3	410	G
50	3	411	U
50	3	414	C
50	3	417	G
50	3	418	G
50	3	422	A
50	3	423	C
50	3	424	G
50	3	425	U
50	3	426	U
50	3	431	U
50	3	432	G
50	3	433	A
50	3	437	A
50	3	438	A
50	3	440	C
50	3	441	U
50	3	442	G
50	3	444	C
50	3	447	G
50	3	448	A
50	3	454	G
50	3	456	G
50	3	457	U
50	3	458	A
50	3	460	G
50	3	461	C
50	3	464	A
50	3	465	A
50	3	467	U
50	3	468	A
50	3	471	A
50	3	473	U
50	3	477	U
50	3	478	G
50	3	479	A
50	3	483	A
50	3	484	U
50	3	485	A
50	3	487	C
50	3	488	G

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Mol	Chain	Res	Type
50	3	489	A
50	3	491	A
50	3	492	C
50	3	493	A
50	3	494	G
50	3	495	U
50	3	497	C
50	3	501	G
50	3	509	G
50	3	511	U
50	3	513	A
50	3	514	A
50	3	515	A
50	3	517	G
50	3	519	A
50	3	520	C
50	3	523	A
50	3	524	G
50	3	525	A
50	3	531	G
50	3	534	U
50	3	539	U
50	3	540	A
50	3	542	A
50	3	543	U
50	3	544	U
50	3	549	A
50	3	551	C
50	3	553	A
50	3	554	U
50	3	556	U
50	3	560	U
50	3	562	C
50	3	564	A
50	3	565	C
50	3	566	G
50	3	567	U
50	3	568	G
50	3	577	C
50	3	578	A
50	3	581	A
50	3	582	A

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Mol	Chain	Res	Type
50	3	583	U
50	3	586	G
50	3	587	U
50	3	589	A
50	3	595	U
50	3	596	G
50	3	597	C
50	3	600	U
50	3	601	U
50	3	605	A
50	3	606	G
50	3	607	U
50	3	608	A
50	3	610	G
50	3	612	G
50	3	616	G
50	3	619	A
50	3	620	G
50	3	622	U
50	3	624	U
50	3	626	A
50	3	627	U
50	3	628	A
50	3	629	G
50	3	630	C
50	3	633	G
50	3	638	A
50	3	645	C
50	3	646	A
50	3	647	G
50	3	648	G
50	3	649	A
50	3	653	G
50	3	654	G
50	3	656	G
50	3	657	A
50	3	658	G
50	3	661	G
50	3	663	A
50	3	664	G
50	3	669	A
50	3	670	G

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Mol	Chain	Res	Type
50	3	673	A
50	3	676	U
50	3	677	U
50	3	679	A
50	3	681	A
50	3	682	A
50	3	683	G
50	3	686	C
50	3	689	U
50	3	691	G
50	3	692	U
50	3	693	U
50	3	699	U
50	3	702	U
50	3	706	C
50	3	712	A
50	3	720	A
50	3	721	G
50	3	722	C
50	3	723	U
50	3	725	G
50	3	728	A
50	3	730	G
50	3	734	A
50	3	735	G
50	3	737	U
50	3	739	G
50	3	740	A
50	3	746	G
50	3	750	A
50	3	752	C
50	3	760	G
50	3	761	G
50	3	765	A
50	3	766	C
50	3	767	C
50	3	769	A
50	3	772	C
50	3	780	G
50	3	781	U
50	3	782	U
50	3	783	G

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Mol	Chain	Res	Type
50	3	785	A
50	3	788	G
50	3	792	G
50	3	799	A
50	3	800	C
50	3	803	G
50	3	804	U
50	3	806	A
50	3	807	U
50	3	810	G
50	3	811	G
50	3	812	G
50	3	816	A
50	3	817	A
50	3	819	U
50	3	820	U
50	3	821	C
50	3	824	A
50	3	825	U
50	3	827	G
50	3	828	A
50	3	830	A
50	3	837	A
50	3	840	G
50	3	841	C
50	3	842	U
50	3	847	C
50	3	850	G
50	3	854	A
50	3	858	A
50	3	860	C
50	3	861	U
50	3	862	U
50	3	864	A
50	3	865	A
50	3	866	G
50	3	867	G
50	3	868	C
50	3	873	G
50	3	874	U
50	3	876	A
50	3	878	A

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Mol	Chain	Res	Type
50	3	880	C
50	3	882	C
50	3	883	A
50	3	885	A
50	3	887	A
50	3	889	G
50	3	892	G
50	3	894	G
50	3	895	G
50	3	896	U
50	3	897	A
50	3	902	U
50	3	903	A
50	3	904	C
50	3	905	U
50	3	907	A
50	3	909	U
50	3	911	U
50	3	912	A
50	3	913	U
50	3	914	G
50	3	917	G
50	3	930	C
50	3	932	U
50	3	933	A
50	3	935	U
50	3	936	G
50	3	937	A
50	3	941	C
50	3	943	A
50	3	944	U
50	3	947	A
50	3	949	C
50	3	950	U
50	3	951	C
50	3	952	U
50	3	953	G
50	3	956	U
50	3	958	C
50	3	968	U
50	3	970	U
50	3	977	A

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Mol	Chain	Res	Type
50	3	980	C
50	3	981	A
50	3	982	G
50	3	983	A
50	3	986	G
50	3	989	G
50	3	993	A
50	3	994	U
50	3	995	A
50	3	997	G
50	3	1001	C
50	3	1002	A
50	3	1005	G
50	3	1006	U
50	3	1008	A
50	3	1009	A
50	3	1010	G
50	3	1013	G
50	3	1015	G
50	3	1016	A
50	3	1017	A
50	3	1019	A
50	3	1021	C
50	3	1023	C
50	3	1024	A
50	3	1025	G
50	3	1026	A
50	3	1027	U
50	3	1028	C
50	3	1031	U
50	3	1032	A
50	3	1036	A
50	3	1045	A
50	3	1046	A
50	3	1047	A
50	3	1048	A
50	3	1049	U
50	3	1053	C
50	3	1055	A
50	3	1057	G
50	3	1061	A
50	3	1065	G

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Mol	Chain	Res	Type
50	3	1066	G
50	3	1068	U
50	3	1070	U
50	3	1072	A
50	3	1074	A
50	3	1075	G
50	3	1080	A
50	3	1081	A
50	3	1082	A
50	3	1085	A
50	3	1088	A
50	3	1089	A
50	3	1095	U
50	3	1096	U
50	3	1097	G
50	3	1102	A
50	3	1104	A
50	3	1105	A
50	3	1106	G
50	3	1107	C
50	3	1112	A
50	3	1113	U
50	3	1115	G
50	3	1119	A
50	3	1123	A
50	3	1124	G
50	3	1125	U
50	3	1126	G
50	3	1129	U
50	3	1130	A
50	3	1132	C
50	3	1133	A
50	3	1141	U
50	3	1144	C
50	3	1145	G
50	3	1147	G
50	3	1149	G
50	3	1151	U
50	3	1154	U
50	3	1159	C
50	3	1163	G
50	3	1164	A

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Mol	Chain	Res	Type
50	3	1165	U
50	3	1166	G
50	3	1167	U
50	3	1168	A
50	3	1170	C
50	3	1171	G
50	3	1174	G
50	3	1177	A
50	3	1179	G
50	3	1180	U
50	3	1182	U
50	3	1183	A
50	3	1184	U
50	3	1186	A
50	3	1191	A
50	3	1193	U
50	3	1195	A
50	3	1200	U
50	3	1201	A
50	3	1203	G
50	3	1204	A
50	3	1208	A
50	3	1209	U
50	3	1210	A
50	3	1212	C
50	3	1215	G
50	3	1216	U
50	3	1217	G
50	3	1221	G
50	3	1227	C
50	3	1234	U
50	3	1235	U
50	3	1236	G
50	3	1237	G
50	3	1240	U
50	3	1241	U
50	3	1242	G
50	3	1243	A
50	3	1245	G
50	3	1247	C
50	3	1248	A
50	3	1250	A

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Mol	Chain	Res	Type
50	3	1251	G
50	3	1253	G
50	3	1257	G
50	3	1259	A
50	3	1260	U
50	3	1262	G
50	3	1263	G
50	3	1265	G
50	3	1266	G
50	3	1267	A
50	3	1268	U
50	3	1271	A
50	3	1272	A
50	3	1274	A
50	3	1276	A
50	3	1277	A
50	3	1278	G
50	3	1279	U
50	3	1281	A
50	3	1282	G
50	3	1283	A
50	3	1285	U
50	3	1286	G
50	3	1287	C
50	3	1292	A
50	3	1296	G
50	3	1297	U
50	3	1298	A
50	3	1300	C
50	3	1301	G
50	3	1302	C
50	3	1303	U
50	3	1304	U
50	3	1312	A
50	3	1314	A
50	3	1315	A
50	3	1320	C
50	3	1321	C
50	3	1323	A
50	3	1324	A
50	3	1326	C
50	3	1327	G

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Mol	Chain	Res	Type
50	3	1328	A
50	3	1329	U
50	3	1330	U
50	3	1332	A
50	3	1334	U
50	3	1342	C
50	3	1347	A
50	3	1348	C
50	3	1349	C
50	3	1350	A
50	3	1352	G
50	3	1353	G
50	3	1356	G
50	3	1357	U
50	3	1358	C
50	3	1360	U
50	3	1368	U
50	3	1369	U
50	3	1370	A
50	3	1371	G
50	3	1373	C
50	3	1375	G
50	3	1380	U
50	3	1387	A
50	3	1388	G
50	3	1389	G
50	3	1393	A
50	3	1402	G
50	3	1403	G
50	3	1404	C
50	3	1405	G
50	3	1406	A
50	3	1407	U
50	3	1408	G
50	3	1410	A
50	3	1411	C
50	3	1412	A
50	3	1413	A
50	3	1414	C
50	3	1419	U
50	3	1421	A
50	3	1422	U

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Mol	Chain	Res	Type
50	3	1423	A
50	3	1424	U
50	3	1425	U
50	3	1426	C
50	3	1431	A
50	3	1434	U
50	3	1435	A
50	3	1436	C
50	3	1438	G
50	3	1439	U
50	3	1441	A
50	3	1444	C
50	3	1445	U
50	3	1447	A
50	3	1451	A
50	3	1453	U
50	3	1455	A
50	3	1456	C
50	3	1457	A
50	3	1462	A
50	3	1463	G
50	3	1466	U
50	3	1467	U
50	3	1475	C
50	3	1479	A
50	3	1480	A
50	3	1481	U
50	3	1482	U
50	3	1483	G
50	3	1487	U
50	3	1489	G
50	3	1495	A
50	3	1497	A
50	3	1502	A
50	3	1506	U
50	3	1507	G
50	3	1508	G
50	3	1509	U
50	3	1513	A
50	3	1515	A
50	3	1518	C
50	3	1521	A

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Mol	Chain	Res	Type
50	3	1523	C
50	3	1526	U
50	3	1527	U
50	3	1528	G
50	3	1530	G
50	3	1533	U
50	3	1534	A
50	3	1535	A
50	3	1541	A
50	3	1542	G
50	3	1546	U
50	3	1549	U
50	3	1550	G
50	3	1554	A
50	3	1555	G
50	3	1556	U
50	3	1557	G
50	3	1559	A
50	3	1571	G
50	3	1572	U
50	3	1579	G
50	3	1580	G
50	3	1582	G
50	3	1584	U
50	3	1585	A
50	3	1586	U
50	3	1587	U
50	3	1588	A
50	3	1589	A
50	3	1592	A
50	3	1593	U
50	3	1594	G
50	3	1599	C
50	3	1600	A
50	3	1603	A
50	3	1605	A
50	3	1608	C
50	3	1609	U
50	3	1611	C
50	3	1612	U
50	3	1615	G
50	3	1616	G

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Mol	Chain	Res	Type
50	3	1618	U
50	3	1619	A
50	3	1629	U
50	3	1631	A
50	3	1633	C
50	3	1637	A
50	3	1640	G
50	3	1641	A
50	3	1642	G
50	3	1643	A
50	3	1644	A
50	3	1650	A
50	3	1651	C
50	3	1663	G
50	3	1664	A
50	3	1665	G
50	3	1668	G
50	3	1669	A
50	3	1672	C
50	3	1678	U
50	3	1680	A
50	3	1681	G
50	3	1682	C
50	3	1683	G
50	3	1685	G
50	3	1686	U
50	3	1688	A
50	3	1689	A
50	3	1694	A
50	3	1695	G
50	3	1698	A
50	3	1699	A
50	3	1701	G
50	3	1702	A
50	3	1704	C
50	3	1706	C
50	3	1707	U
50	3	1708	G
50	3	1711	A
50	3	1716	A
50	3	1717	C
50	3	1718	C

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Mol	Chain	Res	Type
50	3	1726	U
50	3	1727	U
50	3	1728	A
50	3	1729	G
50	3	1732	A
50	3	1733	G
50	3	1734	A
50	3	1735	A
50	3	1739	G
50	3	1740	U
50	3	1743	U
50	3	1745	A
50	3	1747	G
50	3	1748	U
50	3	1749	A
50	3	1752	A
50	3	1759	C
50	3	1761	C
50	3	1762	A
50	3	1763	G
50	3	1764	U
50	3	1765	G
50	3	1766	A
50	3	1767	A
50	3	1769	A
50	3	1770	A
50	3	1771	C
50	3	1773	A
50	3	1777	G
50	3	1780	A
50	3	1784	U
50	3	1785	U
50	3	1786	U
50	3	1787	A
50	3	1788	A
50	3	1789	C
50	3	1791	A
50	3	1793	A
50	3	1807	C
50	3	1808	C
50	3	1809	A
50	3	1810	A

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Mol	Chain	Res	Type
50	3	1815	U
50	3	1816	A
50	3	1820	U
50	3	1821	G
50	3	1822	A
50	3	1823	U
50	3	1824	G
50	3	1826	A
50	3	1828	A
50	3	1831	G
50	3	1836	A
50	3	1839	C
50	3	1842	G
50	3	1843	C
50	3	1846	A
50	3	1849	G
50	3	1850	C
50	3	1851	U
50	3	1852	G
50	3	1853	G
50	3	1854	A
50	3	1856	G
50	3	1858	U
50	3	1859	U
50	3	1862	A
50	3	1864	A
50	3	1865	A
50	3	1868	A
50	3	1869	G
50	3	1871	U
50	3	1872	U
50	3	1873	A
50	3	1874	G
50	3	1875	C
50	3	1876	G
50	3	1877	C
50	3	1878	A
50	3	1883	A
50	3	1888	U
50	3	1889	U
50	3	1890	U
50	3	1891	A

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Mol	Chain	Res	Type
50	3	1892	A
50	3	1895	G
50	3	1896	A
50	3	1899	C
50	3	1906	G
50	3	1907	A
50	3	1908	A
50	3	1910	G
50	3	1912	C
50	3	1913	G
50	3	1917	G
50	3	1920	A
50	3	1921	C
50	3	1930	U
50	3	1934	A
50	3	1936	G
50	3	1938	U
50	3	1944	A
50	3	1945	A
50	3	1946	U
50	3	1950	U
50	3	1952	G
50	3	1953	U
50	3	1954	C
50	3	1956	G
50	3	1957	G
50	3	1959	A
50	3	1962	U
50	3	1963	U
50	3	1965	C
50	3	1969	C
50	3	1970	C
50	3	1971	G
50	3	1972	C
50	3	1973	U
50	3	1974	U
50	3	1977	A
50	3	1978	U
50	3	1979	G
50	3	1981	U
50	3	1984	A
50	3	1988	A

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Mol	Chain	Res	Type
50	3	1990	C
50	3	1993	U
50	3	1998	U
50	3	2000	U
50	3	2009	U
50	3	2011	G
50	3	2016	G
50	3	2020	A
50	3	2021	A
50	3	2023	U
50	3	2025	C
50	3	2028	G
50	3	2030	A
50	3	2032	G
50	3	2036	G
50	3	2037	A
50	3	2038	A
50	3	2040	A
50	3	2041	C
50	3	2043	C
50	3	2050	G
50	3	2053	G
50	3	2055	A
50	3	2056	A
50	3	2057	C
50	3	2060	G
50	3	2061	A
50	3	2062	C
50	3	2063	G
50	3	2066	A
50	3	2067	A
50	3	2068	G
50	3	2069	A
50	3	2070	C
50	3	2071	C
50	3	2072	C
50	3	2074	G
50	3	2076	G
50	3	2080	C
50	3	2083	U
50	3	2087	G
50	3	2090	G

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Mol	Chain	Res	Type
50	3	2095	A
50	3	2097	A
50	3	2099	U
50	3	2100	G
50	3	2101	A
50	3	2103	C
50	3	2106	G
50	3	2107	A
50	3	2108	C
50	3	2109	A
50	3	2110	U
50	3	2111	U
50	3	2112	A
50	3	2114	C
50	3	2115	A
50	3	2117	G
50	3	2118	U
50	3	2119	A
50	3	2123	A
50	3	2124	A
50	3	2126	A
50	3	2127	G
50	3	2128	G
50	3	2131	G
50	3	2133	A
50	3	2136	A
50	3	2138	U
50	3	2139	C
50	3	2140	G
50	3	2141	A
50	3	2145	A
50	3	2147	G
50	3	2149	U
50	3	2151	G
50	3	2152	C
50	3	2153	U
50	3	2156	G
50	3	2159	U
50	3	2162	U
50	3	2165	A
50	3	2166	U
50	3	2171	A

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Mol	Chain	Res	Type
50	3	2173	G
50	3	2175	U
50	3	2178	A
50	3	2180	U
50	3	2181	A
50	3	2185	C
50	3	2187	C
50	3	2191	G
50	3	2193	U
50	3	2195	U
50	3	2196	G
50	3	2198	G
50	3	2200	U
50	3	2201	G
50	3	2202	U
50	3	2203	U
50	3	2205	U
50	3	2206	A
50	3	2208	U
50	3	2211	G
50	3	2212	U
50	3	2218	U
50	3	2219	U
50	3	2220	A
50	3	2221	U
50	3	2222	C
50	3	2225	G
50	3	2230	A
50	3	2231	A
50	3	2232	G
50	3	2233	A
50	3	2246	G
50	3	2247	G
50	3	2248	C
50	3	2251	U
50	3	2252	U
50	3	2254	G
50	3	2257	U
50	3	2258	G
50	3	2259	G
50	3	2262	C
50	3	2263	G

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Mol	Chain	Res	Type
50	3	2265	U
50	3	2267	G
50	3	2271	C
50	3	2272	C
50	3	2274	A
50	3	2275	A
50	3	2276	A
50	3	2277	A
50	3	2281	A
50	3	2286	A
50	3	2290	G
50	3	2291	U
50	3	2294	A
50	3	2295	A
50	3	2296	A
50	3	2298	G
50	3	2299	U
50	3	2301	C
50	3	2307	G
50	3	2310	C
50	3	2312	G
50	3	2313	U
50	3	2315	G
50	3	2316	G
50	3	2317	A
50	3	2318	A
50	3	2320	U
50	3	2322	G
50	3	2329	G
50	3	2330	A
50	3	2332	U
50	3	2333	G
50	3	2335	A
50	3	2338	G
50	3	2340	U
50	3	2341	G
50	3	2342	U
50	3	2343	A
50	3	2344	A
50	3	2350	C
50	3	2352	U
50	3	2353	G

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Mol	Chain	Res	Type
50	3	2355	C
50	3	2356	U
50	3	2358	U
50	3	2359	G
50	3	2362	A
50	3	2363	C
50	3	2365	U
50	3	2367	C
50	3	2369	G
50	3	2370	G
50	3	2371	U
50	3	2375	A
50	3	2377	A
50	3	2378	G
50	3	2380	U
50	3	2382	A
50	3	2383	G
50	3	2391	G
50	3	2393	C
50	3	2395	U
50	3	2396	A
50	3	2403	C
50	3	2406	U
50	3	2410	C
50	3	2411	C
50	3	2414	U
50	3	2415	A
50	3	2416	U
50	3	2418	G
50	3	2424	C
50	3	2425	C
50	3	2427	U
50	3	2430	C
50	3	2431	U
50	3	2433	A
50	3	2434	A
50	3	2435	C
50	3	2436	G
50	3	2437	G
50	3	2438	A
50	3	2439	U
50	3	2440	A

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Mol	Chain	Res	Type
50	3	2442	A
50	3	2443	A
50	3	2447	A
50	3	2448	C
50	3	2449	U
50	3	2452	G
50	3	2453	G
50	3	2455	G
50	3	2456	A
50	3	2457	U
50	3	2458	A
50	3	2459	A
50	3	2460	C
50	3	2461	A
50	3	2462	G
50	3	2463	G
50	3	2469	A
50	3	2471	U
50	3	2473	C
50	3	2475	C
50	3	2478	G
50	3	2484	A
50	3	2485	U
50	3	2486	A
50	3	2488	C
50	3	2490	A
50	3	2491	C
50	3	2492	G
50	3	2495	A
50	3	2497	U
50	3	2498	G
50	3	2499	U
50	3	2500	U
50	3	2502	G
50	3	2503	G
50	3	2505	A
50	3	2506	C
50	3	2507	C
50	3	2509	C
50	3	2511	A
50	3	2512	U
50	3	2513	G

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Mol	Chain	Res	Type
50	3	2518	C
50	3	2520	C
50	3	2521	A
50	3	2524	U
50	3	2526	A
50	3	2527	U
50	3	2529	C
50	3	2534	G
50	3	2538	A
50	3	2539	A
50	3	2541	C
50	3	2543	G
50	3	2544	G
50	3	2545	U
50	3	2551	G
50	3	2553	G
50	3	2557	G
50	3	2561	G
50	3	2564	C
50	3	2566	C
50	3	2568	G
50	3	2570	U
50	3	2572	A
50	3	2573	A
50	3	2574	A
50	3	2575	G
50	3	2578	A
50	3	2581	C
50	3	2585	A
50	3	2586	G
50	3	2587	U
50	3	2590	G
50	3	2593	U
50	3	2594	C
50	3	2596	A
50	3	2602	C
50	3	2603	G
50	3	2604	U
50	3	2605	G
50	3	2606	A
50	3	2607	G
50	3	2610	A

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Mol	Chain	Res	Type
50	3	2614	U
50	3	2615	G
50	3	2617	U
50	3	2618	C
50	3	2619	C
50	3	2621	U
50	3	2623	U
50	3	2627	U
50	3	2629	G
50	3	2631	G
50	3	2633	C
50	3	2637	A
50	3	2638	G
50	3	2642	G
50	3	2643	A
50	3	2644	U
50	3	2646	G
50	3	2649	G
50	3	2650	A
50	3	2654	U
50	3	2655	U
50	3	2662	A
50	3	2663	G
50	3	2664	U
50	3	2668	A
50	3	2669	G
50	3	2680	C
50	3	2681	G
50	3	2684	G
50	3	2686	C
50	3	2689	C
50	3	2690	U
50	3	2692	U
50	3	2693	U
50	3	2694	A
50	3	2697	C
50	3	2698	U
50	3	2699	C
50	3	2703	U
50	3	2704	U
50	3	2708	G
50	3	2710	G

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Mol	Chain	Res	Type
50	3	2711	C
50	3	2714	G
50	3	2715	C
50	3	2718	C
50	3	2721	C
50	3	2722	G
50	3	2725	G
50	3	2726	G
50	3	2727	G
50	3	2729	A
50	3	2734	C
50	3	2735	G
50	3	2739	C
50	3	2740	U
50	3	2741	A
50	3	2747	U
50	3	2752	G
50	3	2753	C
50	3	2756	A
50	3	2765	A
50	3	2766	A
50	3	2774	A
50	3	2782	A
50	3	2785	G
50	3	2786	A
50	3	2788	U
50	3	2789	A
50	3	2790	A
50	3	2791	U
50	3	2792	C
50	3	2794	U
50	3	2796	C
50	3	2797	C
50	3	2801	U
50	3	2803	G
50	3	2804	C
50	3	2805	A
50	3	2807	G
50	3	2808	A
50	3	2810	A
50	3	2811	G
50	3	2812	U

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Mol	Chain	Res	Type
50	3	2813	A
50	3	2814	A
50	3	2815	G
50	3	2818	C
50	3	2821	U
50	3	2822	C
50	3	2824	A
50	3	2825	A
50	3	2826	G
50	3	2828	C
50	3	2830	A
50	3	2831	U
50	3	2832	G
50	3	2833	A
50	3	2835	G
50	3	2836	U
50	3	2837	U
50	3	2838	G
50	3	2839	A
50	3	2840	U
50	3	2846	A
50	3	2848	A
50	3	2849	G
50	3	2852	G
50	3	2853	U
50	3	2854	A
50	3	2855	A
50	3	2861	G
50	3	2863	G
50	3	2864	A
50	3	2865	U
50	3	2870	U
50	3	2871	G
50	3	2872	A
50	3	2876	G
50	3	2879	U
50	3	2881	A
50	3	2883	A
50	3	2884	C
50	3	2887	A
50	3	2888	U
50	3	2889	U

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Mol	Chain	Res	Type
50	3	2890	G
50	3	2895	A
50	3	2896	G
50	3	2897	G
50	3	2898	A
50	3	2899	C
51	4	5	G
51	4	8	C
51	4	9	C
51	4	10	C
51	4	11	A
51	4	12	U
51	4	19	G
51	4	20	U
51	4	22	G
51	4	23	A
51	4	24	A
51	4	25	A
51	4	26	C
51	4	28	C
51	4	30	U
51	4	32	G
51	4	33	U
51	4	35	C
51	4	39	U
51	4	40	U
51	4	42	G
51	4	43	A
51	4	46	C
51	4	49	G
51	4	50	C
51	4	51	A
51	4	55	A
51	4	56	A
51	4	60	C
51	4	66	A
51	4	67	G
51	4	70	G
51	4	73	U
51	4	74	G
51	4	77	G
51	4	78	C

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Mol	Chain	Res	Type
51	4	80	G
51	4	85	A
51	4	87	U
51	4	88	G
51	4	89	A
51	4	99	A
51	4	100	G
51	4	102	A
51	4	103	C
51	4	105	A
51	4	107	G
51	4	108	C
52	5	7	U
52	5	8	G
52	5	9	A
52	5	10	G
52	5	11	A
52	5	14	U
52	5	15	U
52	5	17	A
52	5	21	U
52	5	22	G
52	5	27	A
52	5	30	A
52	5	32	U
52	5	33	A
52	5	36	G
52	5	38	U
52	5	40	G
52	5	43	G
52	5	48	C
52	5	49	C
52	5	50	U
52	5	51	A
52	5	52	A
52	5	53	U
52	5	55	C
52	5	60	A
52	5	61	A
52	5	66	A
52	5	68	C
52	5	69	G

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Mol	Chain	Res	Type
52	5	70	A
52	5	75	A
52	5	76	G
52	5	80	U
52	5	83	U
52	5	86	A
52	5	93	A
52	5	94	A
52	5	95	C
52	5	96	G
52	5	101	A
52	5	103	U
52	5	105	A
52	5	108	C
52	5	109	G
52	5	112	U
52	5	113	C
52	5	114	C
52	5	115	A
52	5	116	A
52	5	117	U
52	5	120	A
52	5	124	U
52	5	127	A
52	5	128	A
52	5	130	G
52	5	135	A
52	5	149	G
52	5	156	U
52	5	159	U
52	5	160	A
52	5	162	C
52	5	163	G
52	5	169	G
52	5	171	A
52	5	178	U
52	5	179	U
52	5	187	A
52	5	193	G
52	5	196	G
52	5	197	A
52	5	198	A

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Mol	Chain	Res	Type
52	5	201	G
52	5	202	A
52	5	207	C
52	5	210	G
52	5	213	U
52	5	215	C
52	5	218	U
52	5	220	U
52	5	224	A
52	5	228	G
52	5	230	G
52	5	232	G
52	5	233	C
52	5	236	C
52	5	239	A
52	5	240	U
52	5	241	C
52	5	242	A
52	5	243	G
52	5	247	G
52	5	248	U
52	5	258	A
52	5	260	C
52	5	262	G
52	5	263	C
52	5	265	U
52	5	266	A
52	5	272	G
52	5	274	A
52	5	275	A
52	5	276	U
52	5	285	G
52	5	291	C
52	5	299	U
52	5	301	G
52	5	302	A
52	5	303	A
52	5	304	U
52	5	305	A
52	5	307	C
52	5	311	A
52	5	312	A

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Mol	Chain	Res	Type
52	5	316	G
52	5	317	A
52	5	318	C
52	5	319	U
52	5	321	A
52	5	322	G
52	5	323	A
52	5	324	C
52	5	325	A
52	5	326	C
52	5	327	G
52	5	328	G
52	5	336	U
52	5	340	A
52	5	341	C
52	5	342	G
52	5	343	G
52	5	344	G
52	5	348	C
52	5	349	A
52	5	350	G
52	5	352	A
52	5	357	G
52	5	359	A
52	5	363	U
52	5	364	U
52	5	366	C
52	5	368	C
52	5	369	A
52	5	370	A
52	5	374	G
52	5	377	A
52	5	380	G
52	5	381	C
52	5	382	U
52	5	383	U
52	5	384	G
52	5	388	G
52	5	392	A
52	5	394	U
52	5	395	G
52	5	400	G

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Mol	Chain	Res	Type
52	5	401	U
52	5	402	G
52	5	403	A
52	5	408	U
52	5	409	G
52	5	410	A
52	5	411	A
52	5	412	G
52	5	413	G
52	5	415	C
52	5	416	U
52	5	417	U
52	5	418	U
52	5	419	A
52	5	420	A
52	5	422	A
52	5	423	U
52	5	425	G
52	5	426	U
52	5	427	A
52	5	429	A
52	5	432	U
52	5	434	U
52	5	435	U
52	5	440	U
52	5	443	G
52	5	445	A
52	5	448	A
52	5	449	A
52	5	450	U
52	5	452	A
52	5	453	C
52	5	457	A
52	5	461	G
52	5	464	A
52	5	466	U
52	5	467	G
52	5	468	G
52	5	471	A
52	5	472	G
52	5	473	A
52	5	475	U

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Mol	Chain	Res	Type
52	5	476	U
52	5	477	U
52	5	478	G
52	5	479	A
52	5	480	C
52	5	481	U
52	5	482	G
52	5	483	U
52	5	485	C
52	5	487	A
52	5	488	U
52	5	489	U
52	5	493	A
52	5	494	A
52	5	495	U
52	5	498	G
52	5	506	U
52	5	509	C
52	5	510	U
52	5	514	U
52	5	515	G
52	5	516	C
52	5	517	C
52	5	519	G
52	5	520	C
52	5	521	A
52	5	522	G
52	5	523	U
52	5	525	G
52	5	526	C
52	5	528	G
52	5	529	U
52	5	530	A
52	5	531	A
52	5	532	U
52	5	533	A
52	5	541	C
52	5	544	A
52	5	545	A
52	5	550	U
52	5	551	A
52	5	557	A

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Mol	Chain	Res	Type
52	5	558	U
52	5	559	U
52	5	560	U
52	5	561	A
52	5	565	G
52	5	568	G
52	5	570	A
52	5	571	A
52	5	572	A
52	5	573	G
52	5	574	C
52	5	575	A
52	5	581	A
52	5	586	G
52	5	594	A
52	5	599	G
52	5	600	G
52	5	605	A
52	5	608	G
52	5	609	G
52	5	610	C
52	5	615	G
52	5	619	A
52	5	623	G
52	5	626	G
52	5	628	A
52	5	629	U
52	5	630	G
52	5	637	A
52	5	638	A
52	5	639	A
52	5	641	U
52	5	644	U
52	5	646	A
52	5	648	C
52	5	649	U
52	5	650	A
52	5	651	G
52	5	652	A
52	5	653	G
52	5	662	G
52	5	667	U

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Mol	Chain	Res	Type
52	5	668	U
52	5	669	U
52	5	672	A
52	5	674	U
52	5	681	U
52	5	682	G
52	5	684	A
52	5	689	U
52	5	694	U
52	5	696	C
52	5	698	U
52	5	699	A
52	5	700	G
52	5	701	A
52	5	703	A
52	5	710	G
52	5	712	A
52	5	715	A
52	5	717	C
52	5	719	G
52	5	721	G
52	5	724	G
52	5	725	A
52	5	726	A
52	5	731	A
52	5	733	A
52	5	735	C
52	5	736	U
52	5	738	A
52	5	740	G
52	5	742	C
52	5	745	U
52	5	746	A
52	5	748	U
52	5	749	G
52	5	750	A
52	5	752	G
52	5	754	U
52	5	755	U
52	5	756	A
52	5	765	A
52	5	766	G

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Mol	Chain	Res	Type
52	5	768	G
52	5	769	U
52	5	774	A
52	5	779	A
52	5	780	U
52	5	784	A
52	5	785	U
52	5	787	A
52	5	790	U
52	5	791	A
52	5	797	G
52	5	801	U
52	5	802	C
52	5	806	A
52	5	808	C
52	5	810	U
52	5	812	A
52	5	813	A
52	5	814	C
52	5	815	G
52	5	816	A
52	5	817	U
52	5	818	A
52	5	820	A
52	5	822	A
52	5	825	A
52	5	829	G
52	5	837	G
52	5	838	A
52	5	845	C
52	5	846	G
52	5	849	A
52	5	850	G
52	5	854	A
52	5	856	U
52	5	858	A
52	5	859	A
52	5	861	A
52	5	864	U
52	5	865	U
52	5	867	A
52	5	878	U

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Mol	Chain	Res	Type
52	5	879	G
52	5	880	G
52	5	881	G
52	5	882	U
52	5	883	A
52	5	885	U
52	5	888	A
52	5	891	C
52	5	896	G
52	5	908	A
52	5	910	C
52	5	911	G
52	5	912	G
52	5	918	A
52	5	919	C
52	5	921	G
52	5	922	G
52	5	926	C
52	5	927	C
52	5	928	G
52	5	929	C
52	5	930	A
52	5	931	C
52	5	937	G
52	5	938	U
52	5	939	G
52	5	940	G
52	5	941	A
52	5	942	G
52	5	953	A
52	5	954	A
52	5	955	U
52	5	956	U
52	5	961	G
52	5	963	U
52	5	964	A
52	5	965	C
52	5	966	A
52	5	967	C
52	5	968	G
52	5	970	A
52	5	971	A

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Mol	Chain	Res	Type
52	5	972	A
52	5	976	U
52	5	977	U
52	5	983	G
52	5	984	A
52	5	985	C
52	5	987	U
52	5	988	G
52	5	1000	A
52	5	1001	A
52	5	1002	A
52	5	1003	G
52	5	1013	C
52	5	1014	A
52	5	1015	U
52	5	1016	A
52	5	1019	G
52	5	1029	C
52	5	1030	G
52	5	1033	U
52	5	1039	G
52	5	1041	G
52	5	1044	G
52	5	1045	C
52	5	1047	U
52	5	1048	G
52	5	1050	U
52	5	1052	G
52	5	1056	U
52	5	1058	A
52	5	1061	U
52	5	1065	G
52	5	1073	A
52	5	1075	G
52	5	1081	U
52	5	1082	U
52	5	1085	G
52	5	1086	U
52	5	1090	G
52	5	1092	A
52	5	1095	G
52	5	1096	A

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Mol	Chain	Res	Type
52	5	1097	G
52	5	1103	C
52	5	1109	U
52	5	1111	G
52	5	1113	U
52	5	1116	U
52	5	1121	U
52	5	1122	U
52	5	1123	G
52	5	1124	U
52	5	1125	C
52	5	1127	A
52	5	1128	G
52	5	1130	G
52	5	1131	A
52	5	1132	G
52	5	1133	A
52	5	1134	C
52	5	1135	U
52	5	1136	G
52	5	1139	A
52	5	1141	U
52	5	1142	G
52	5	1144	A
52	5	1154	A
52	5	1159	A
52	5	1160	G
52	5	1162	G
52	5	1163	A
52	5	1164	U
52	5	1165	G
52	5	1166	A
52	5	1167	C
52	5	1168	G
52	5	1169	U
52	5	1171	A
52	5	1173	A
52	5	1174	U
52	5	1176	A
52	5	1177	U
52	5	1179	A
52	5	1185	C

Continued on next page...

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Mol	Chain	Res	Type
52	5	1187	U
52	5	1188	A
52	5	1189	U
52	5	1192	C
52	5	1198	C
52	5	1199	U
52	5	1200	G
52	5	1201	C
52	5	1203	A
52	5	1207	U
52	5	1208	G
52	5	1211	A
52	5	1213	A
52	5	1214	A
52	5	1215	U
52	5	1216	G
52	5	1217	G
52	5	1223	A
52	5	1227	A
52	5	1229	A
52	5	1230	G
52	5	1231	U
52	5	1232	C
52	5	1233	G
52	5	1235	C
52	5	1244	A
52	5	1245	A
52	5	1246	A
52	5	1251	G
52	5	1254	A
52	5	1255	A
52	5	1256	U
52	5	1257	C
52	5	1260	U
52	5	1261	A
52	5	1265	U
52	5	1268	G
52	5	1270	C
52	5	1272	C
52	5	1275	U
52	5	1276	U
52	5	1279	G

Continued on next page...

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Mol	Chain	Res	Type
52	5	1280	A
52	5	1281	U
52	5	1284	A
52	5	1289	U
52	5	1291	C
52	5	1296	C
52	5	1297	G
52	5	1299	C
52	5	1302	C
52	5	1305	G
52	5	1306	A
52	5	1310	C
52	5	1312	G
52	5	1313	A
52	5	1315	U
52	5	1316	C
52	5	1319	U
52	5	1320	A
52	5	1321	G
52	5	1322	U
52	5	1324	A
52	5	1327	G
52	5	1330	A
52	5	1331	A
52	5	1334	A
52	5	1337	U
52	5	1338	A
52	5	1339	U
52	5	1340	G
52	5	1342	C
52	5	1343	G
52	5	1344	C
52	5	1352	A
52	5	1354	G
52	5	1360	G
52	5	1362	G
52	5	1363	U
52	5	1364	C
52	5	1372	C
52	5	1373	A
52	5	1375	C
52	5	1381	U

Continued on next page...

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Mol	Chain	Res	Type
52	5	1383	A
52	5	1384	A
52	5	1385	A
52	5	1387	U
52	5	1391	A
52	5	1394	G
52	5	1395	C
52	5	1397	G
52	5	1399	U
52	5	1400	A
52	5	1403	A
52	5	1404	U
52	5	1405	U
52	5	1408	A
52	5	1409	A
52	5	1411	A
52	5	1412	C
52	5	1413	G
52	5	1414	U
52	5	1417	U
52	5	1421	A
52	5	1423	C
52	5	1426	U
52	5	1429	G
52	5	1430	G
52	5	1431	A
52	5	1436	C
52	5	1443	A
52	5	1445	G
52	5	1446	A
52	5	1447	U
52	5	1448	A
52	5	1449	G
52	5	1450	C
52	5	1457	G
52	5	1462	G
52	5	1463	A
52	5	1465	U
52	5	1467	A
52	5	1468	A
52	5	1472	G
52	5	1473	U

Continued on next page...

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Mol	Chain	Res	Type
52	5	1474	A
52	5	1475	A
52	5	1477	A
52	5	1480	G
52	5	1481	U
52	5	1482	A
52	5	1483	C
52	5	1484	C
52	5	1485	C
52	5	1492	G
52	5	1497	U
52	5	1499	G
52	5	1500	G
52	5	1503	U
52	5	1504	G
52	5	1505	G
53	7	3	G
53	7	4	U
53	7	5	C
53	7	6	U
53	7	8	G
53	7	9	U
53	7	12	C
53	7	14	C
53	7	16	G
53	7	17	U
53	7	18	C
53	7	19	G
53	7	20	G
53	7	22	A
53	7	25	G
53	7	28	A
53	7	29	C
53	7	31	G
53	7	33	C
53	7	35	G
53	7	39	A
53	7	42	C
53	7	43	G
53	7	44	U
53	7	48	U
53	7	49	C

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
53	7	50	G
53	7	53	A
53	7	54	G
53	7	57	C
53	7	58	G
53	7	59	A
53	7	60	U
53	7	62	C
53	7	71	A
53	7	72	C
53	7	73	C
53	7	74	A
53	7	75	C
53	7	76	C

All (76) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
50	3	184	A
50	3	296	U
50	3	311	G
50	3	314	G
50	3	315	A
50	3	410	G
50	3	425	U
50	3	456	G
50	3	500	U
50	3	508	A
50	3	513	A
50	3	605	A
50	3	611	A
50	3	782	U
50	3	802	U
50	3	881	A
50	3	901	C
50	3	903	A
50	3	936	G
50	3	952	U
50	3	1048	A
50	3	1054	U
50	3	1209	U
50	3	1211	U

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Mol	Chain	Res	Type
50	3	1216	U
50	3	1234	U
50	3	1297	U
50	3	1314	A
50	3	1486	U
50	3	1507	G
50	3	1583	G
50	3	1585	A
50	3	1587	U
50	3	1588	A
50	3	1618	U
50	3	1747	G
50	3	1820	U
50	3	1978	U
50	3	2116	U
50	3	2125	U
50	3	2151	G
50	3	2220	A
50	3	2491	C
50	3	2504	C
50	3	2506	C
50	3	2604	U
50	3	2668	A
50	3	2764	U
50	3	2823	A
50	3	2862	U
50	3	2875	U
50	3	2897	G
51	4	8	C
51	4	10	C
51	4	54	U
51	4	59	A
52	5	197	A
52	5	219	A
52	5	246	A
52	5	348	C
52	5	417	U
52	5	419	A
52	5	425	G
52	5	448	A
52	5	529	U
52	5	975	C

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
52	5	1044	G
52	5	1074	U
52	5	1115	G
52	5	1123	G
52	5	1133	A
52	5	1170	C
52	5	1338	A
52	5	1466	U
53	7	16	G
53	7	47	G

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](#)

There are no ligands in this entry.

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.

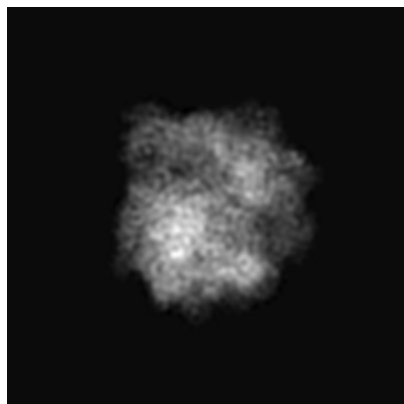
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-13410. These allow visual inspection of the internal detail of the map and identification of artifacts.

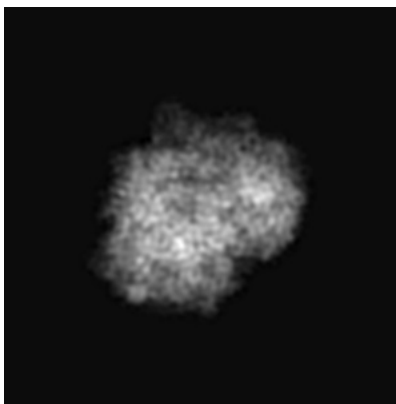
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

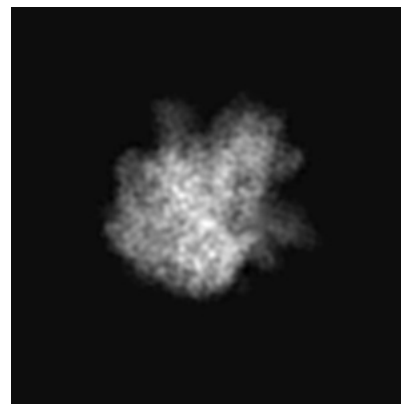
6.1.1 Primary map



X

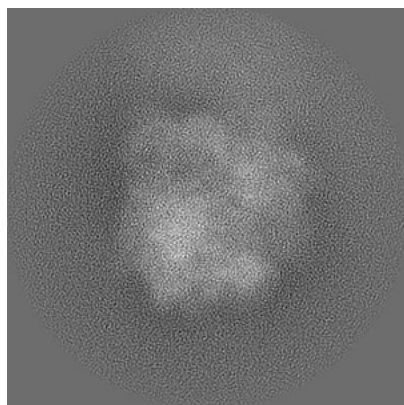


Y

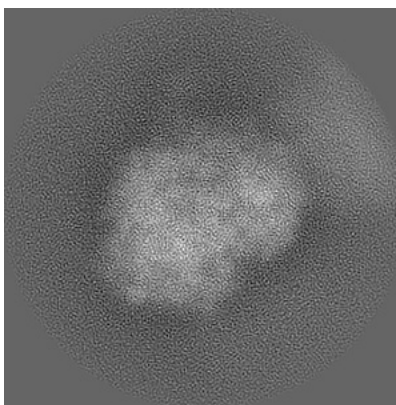


Z

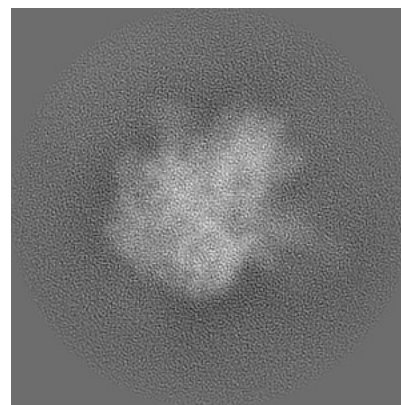
6.1.2 Raw map



X



Y

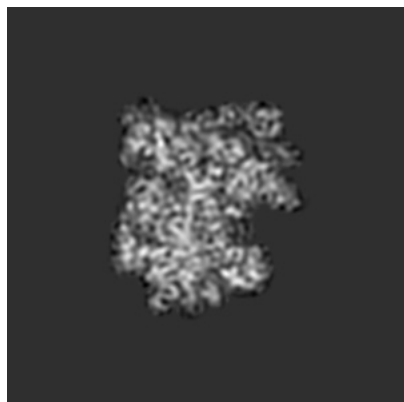


Z

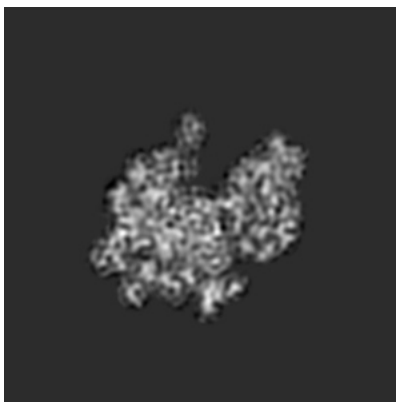
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 128

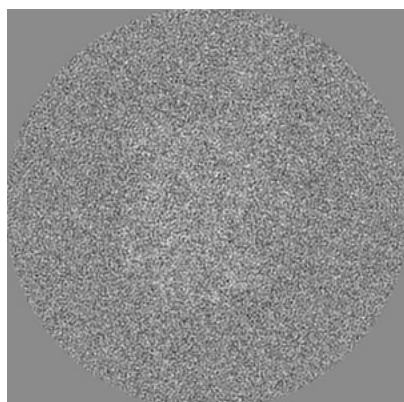


Y Index: 128

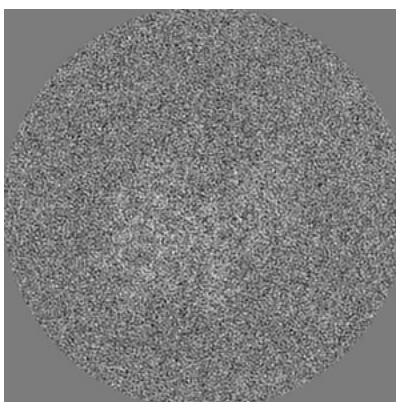


Z Index: 128

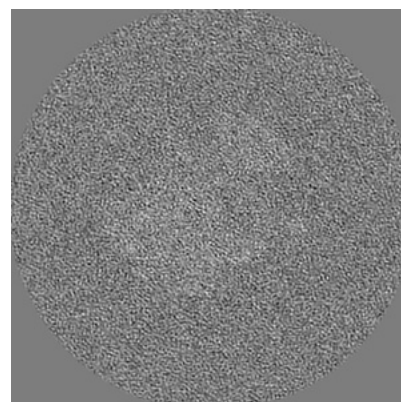
6.2.2 Raw map



X Index: 128



Y Index: 128

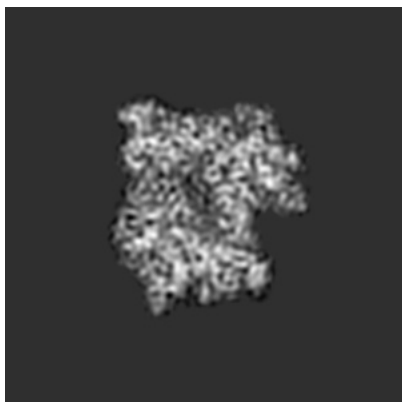


Z Index: 128

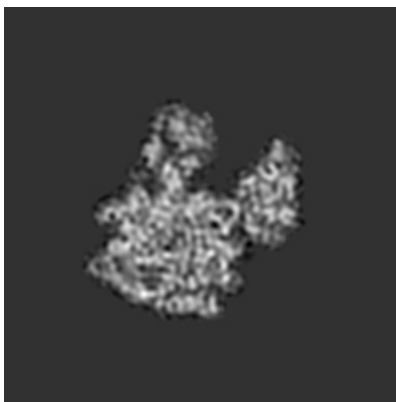
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

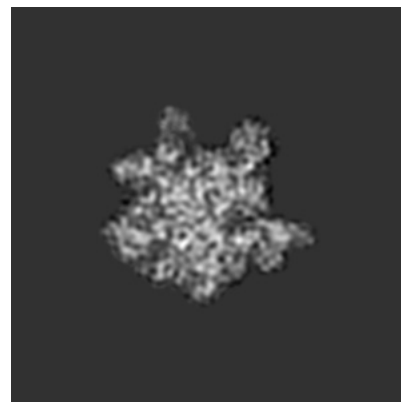
6.3.1 Primary map



X Index: 135

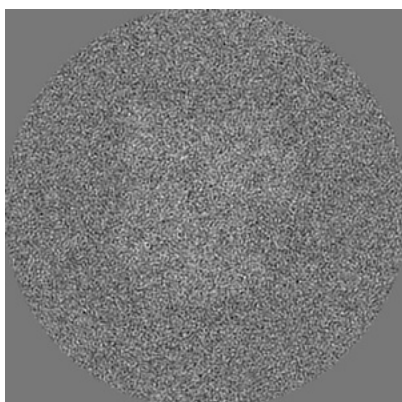


Y Index: 116

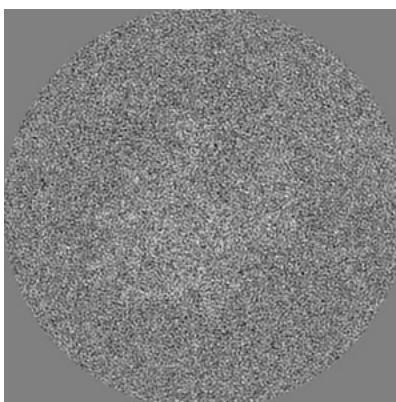


Z Index: 97

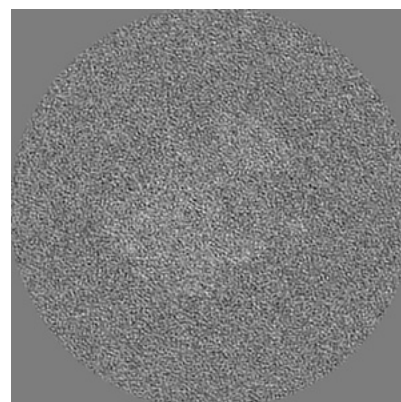
6.3.2 Raw map



X Index: 133



Y Index: 120

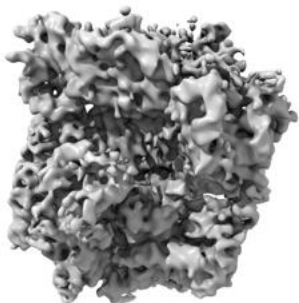


Z Index: 128

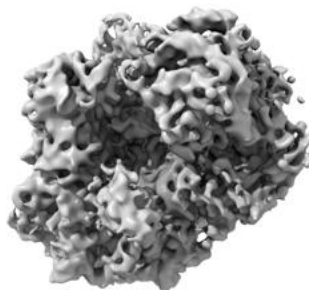
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

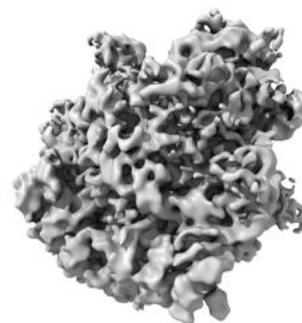
6.4.1 Primary map



X



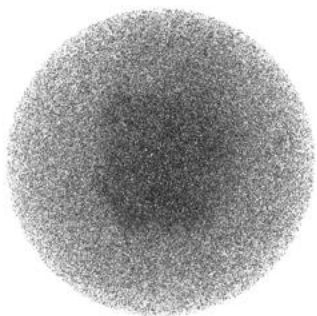
Y



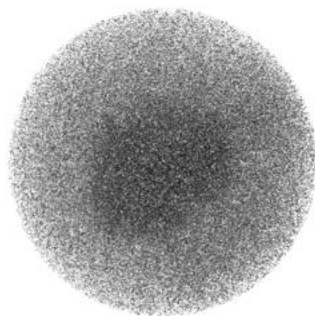
Z

The images above show the 3D surface view of the map at the recommended contour level 0.45. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

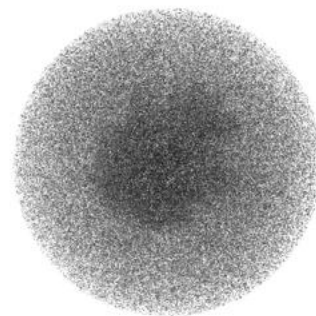
6.4.2 Raw map



X



Y



Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

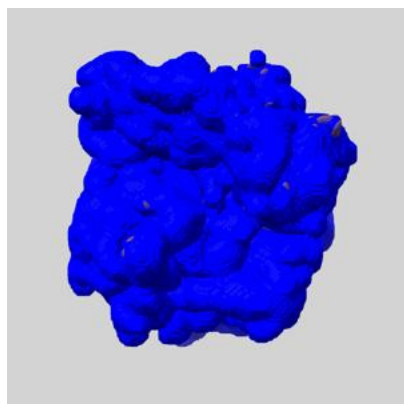
6.5 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

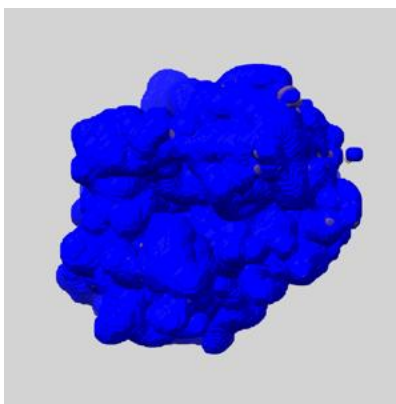
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

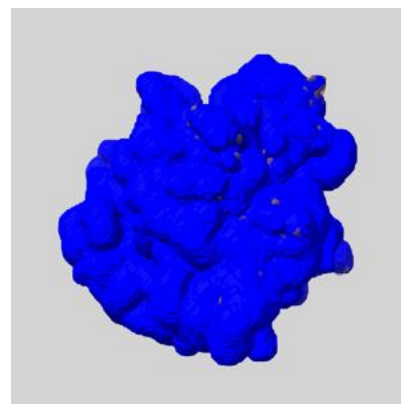
6.5.1 emd_13410_msk_1.map [i](#)



X



Y

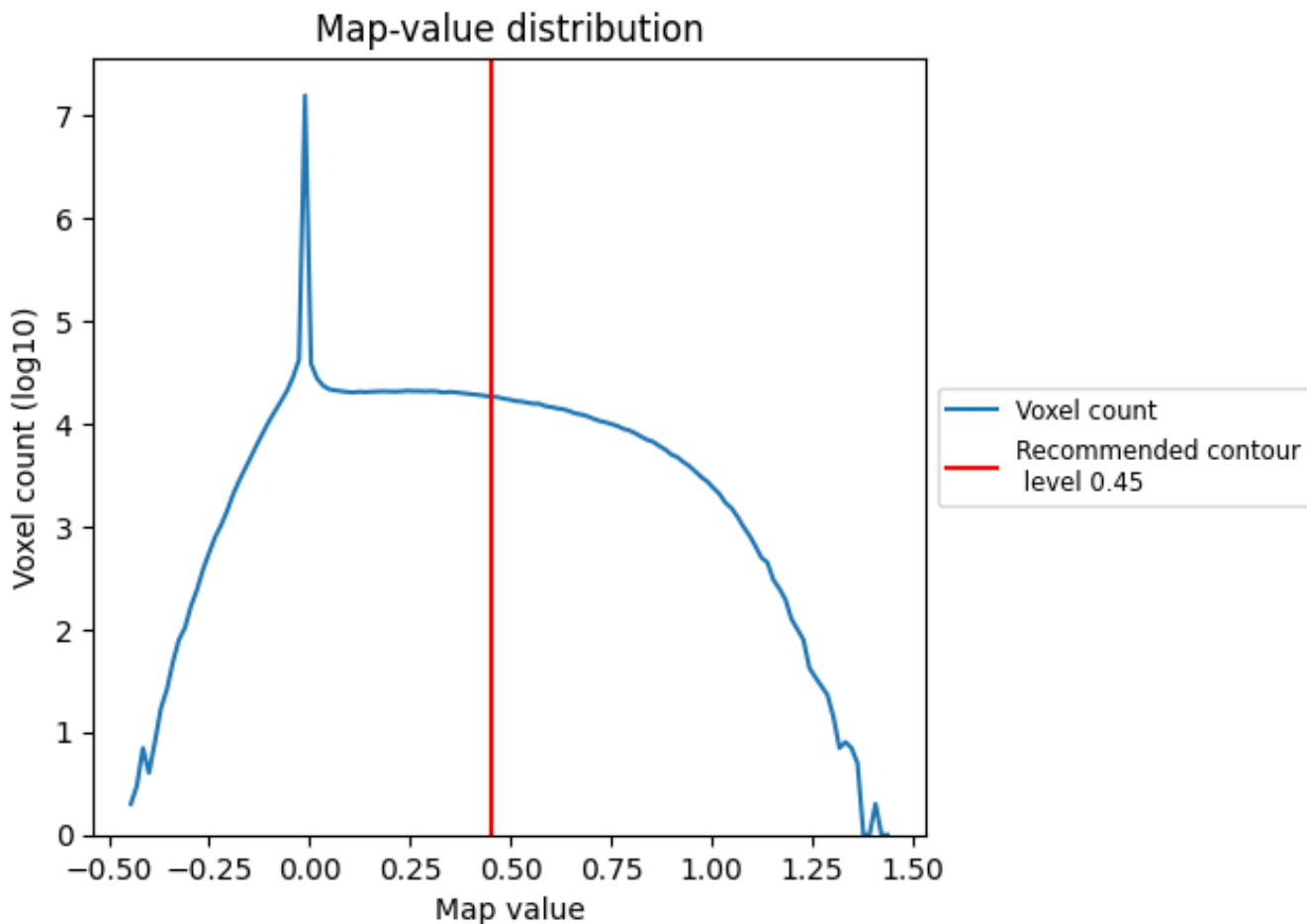


Z

7 Map analysis [i](#)

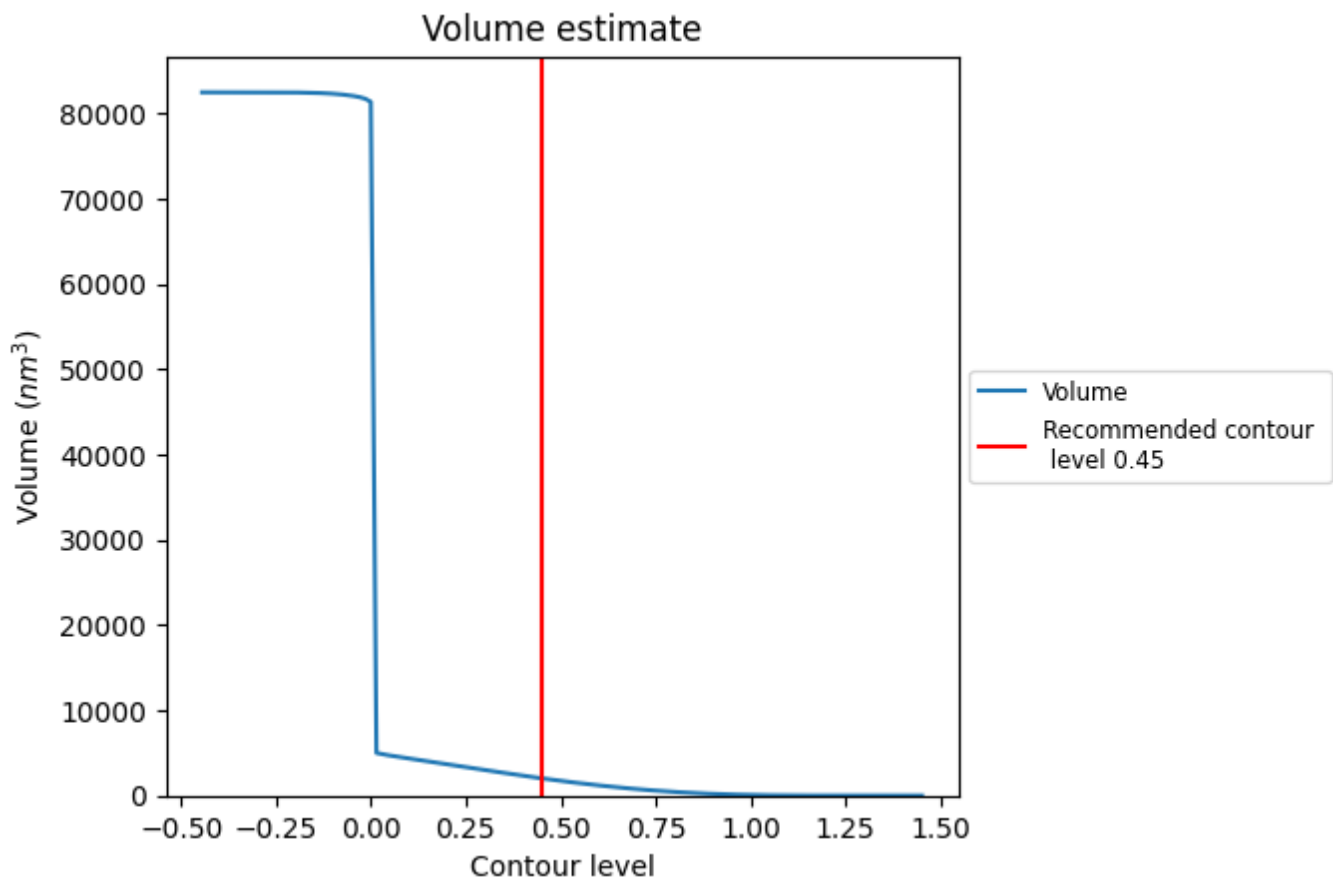
This section contains the results of statistical analysis of the map.

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.

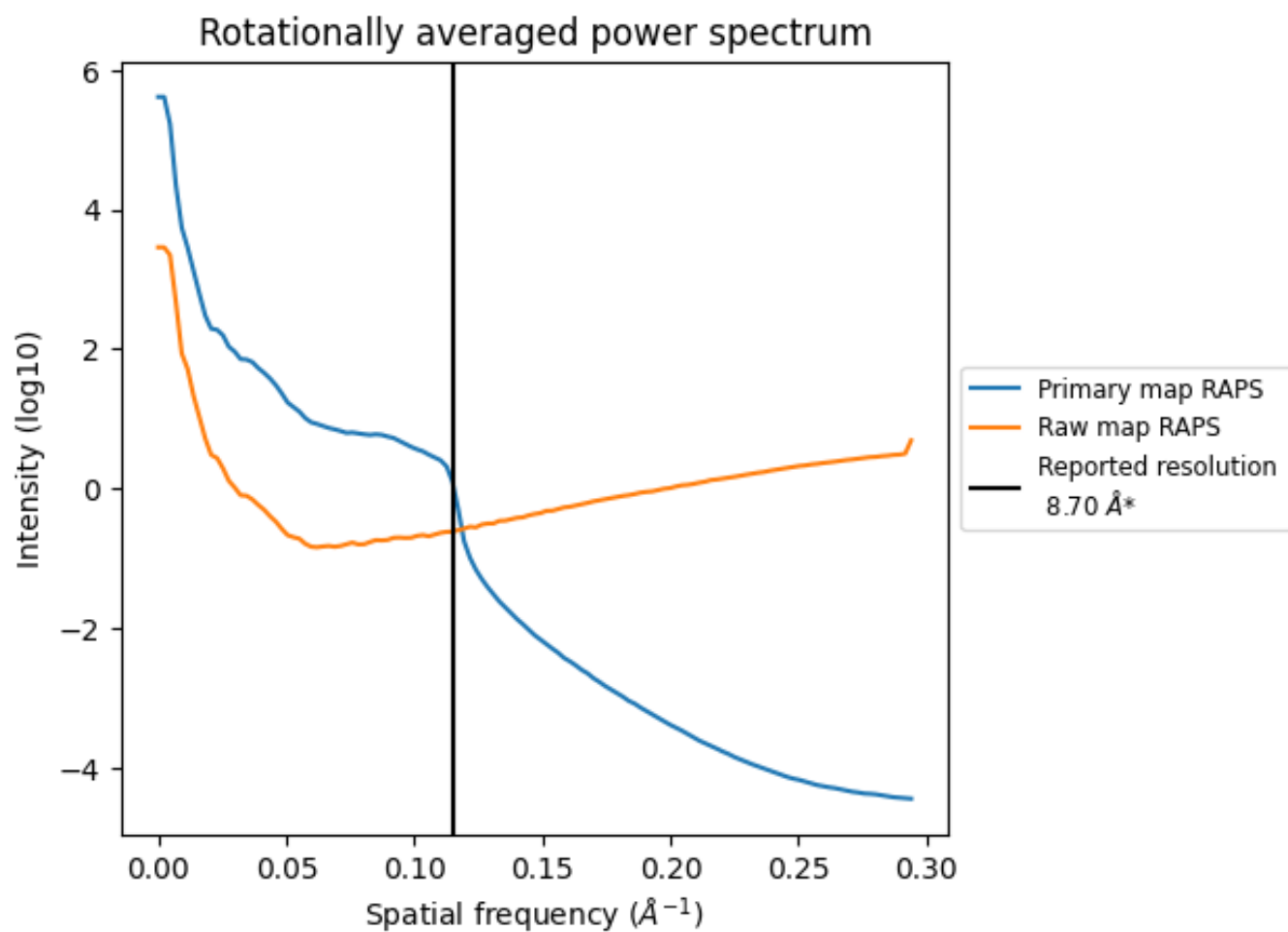
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 2019 nm³; this corresponds to an approximate mass of 1824 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](#)

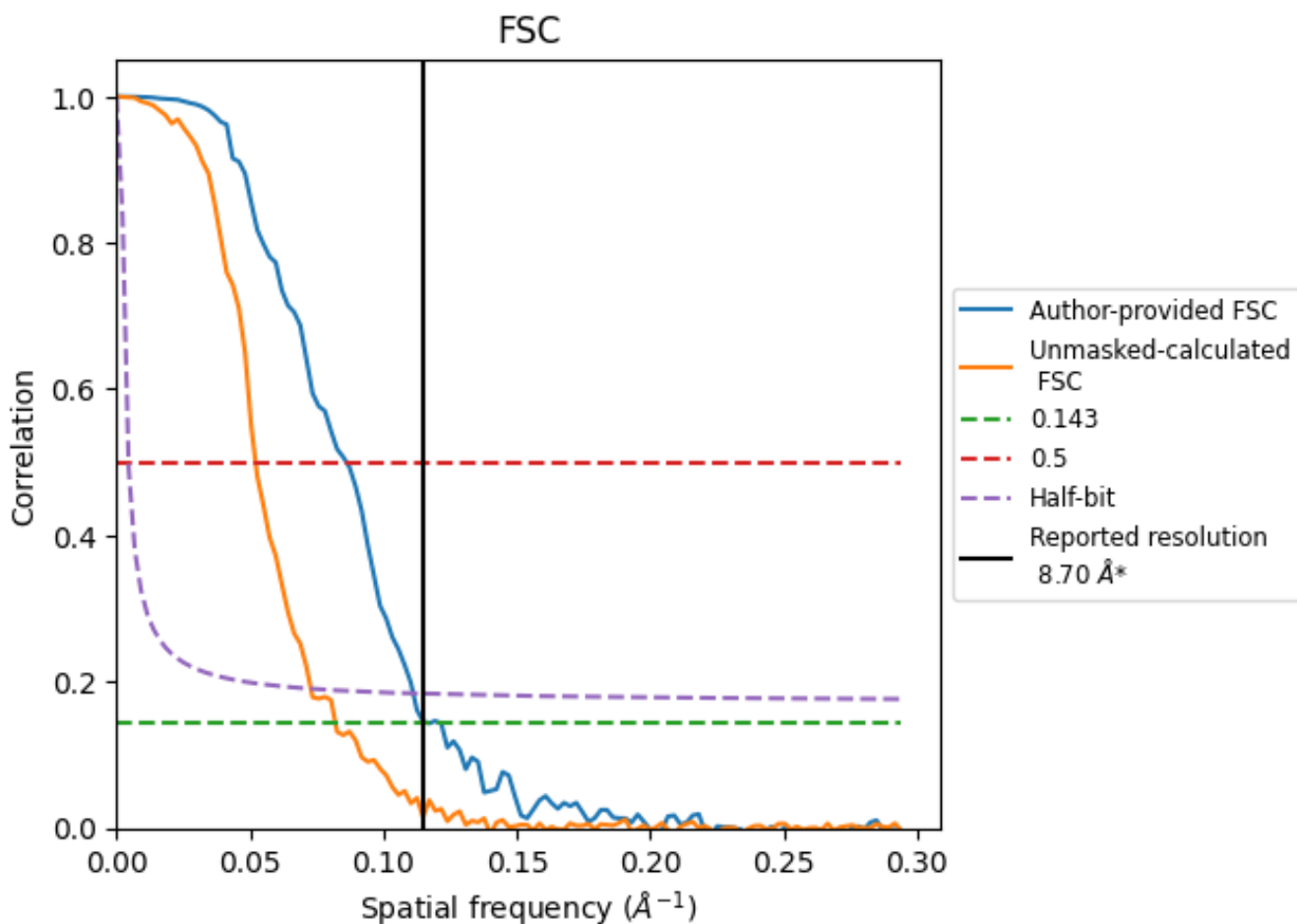


*Reported resolution corresponds to spatial frequency of 0.115 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.115\AA^{-1}

8.2 Resolution estimates [i](#)

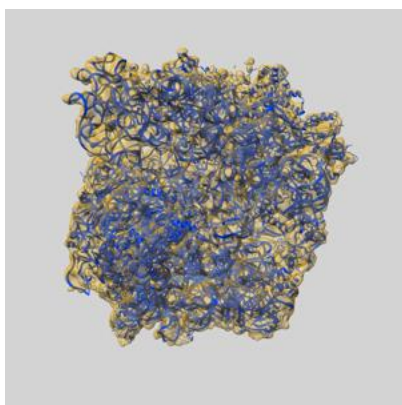
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	8.70	-	-
Author-provided FSC curve	8.55	11.60	8.99
Unmasked-calculated*	12.18	19.16	13.72

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 12.18 differs from the reported value 8.7 by more than 10 %

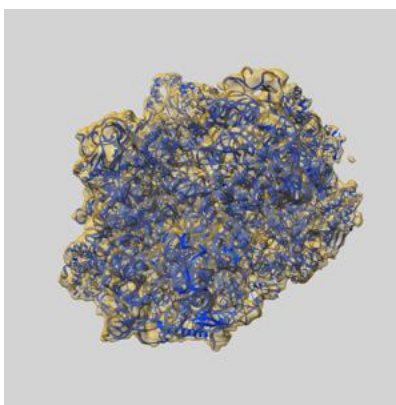
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-13410 and PDB model 7PH9. Per-residue inclusion information can be found in section 3 on page 13.

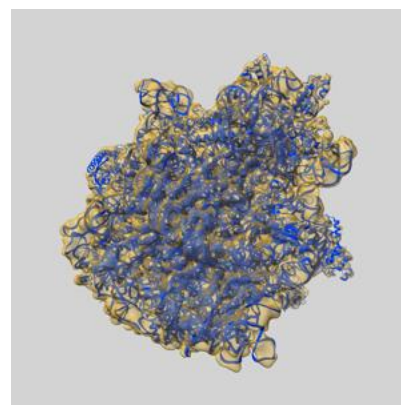
9.1 Map-model overlay [i](#)



X



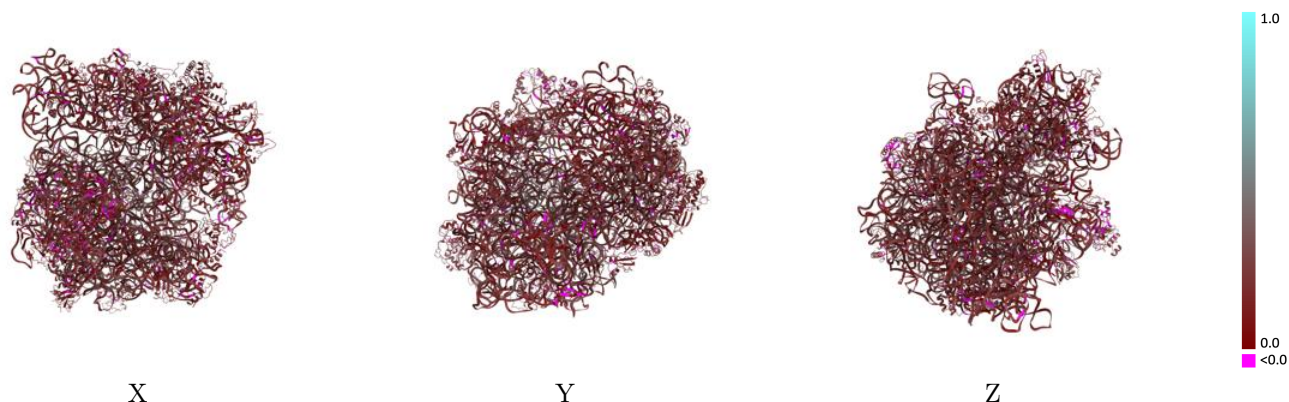
Y



Z

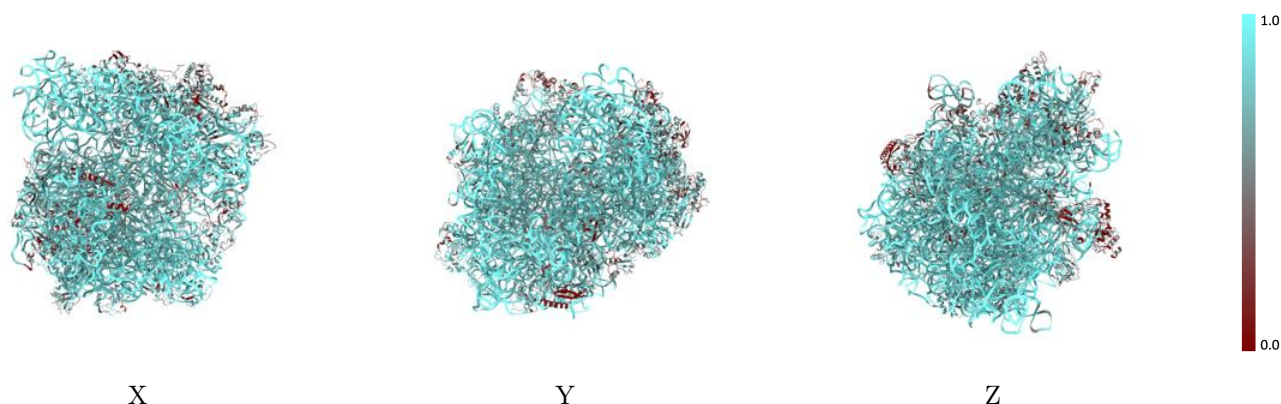
The images above show the 3D surface view of the map at the recommended contour level 0.45 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



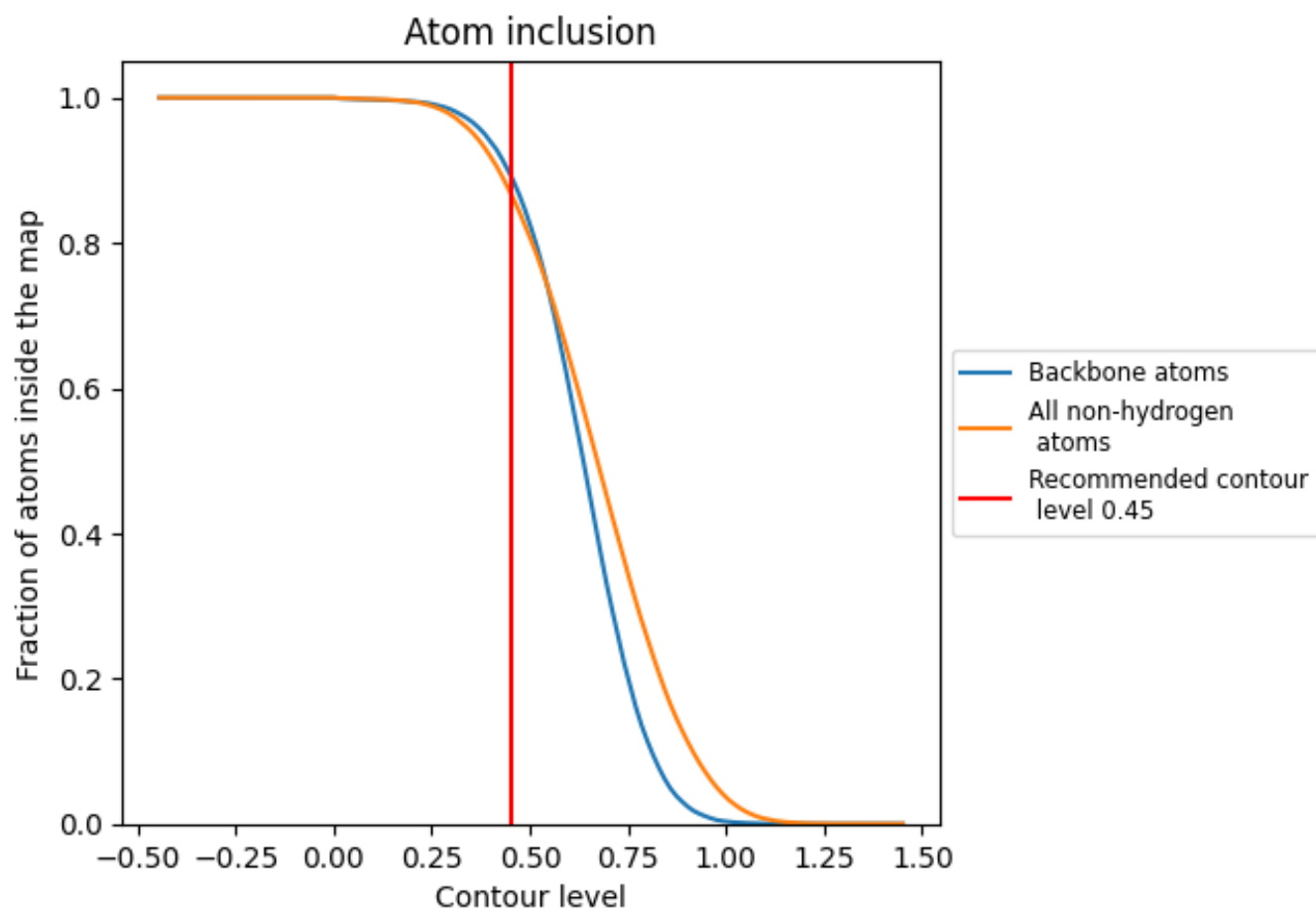
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.45).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 89% of all backbone atoms, 87% 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 (0.45) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8699	 0.1850
0	 0.8767	 0.1650
1	 0.7983	 0.1470
2	 0.7872	 0.1410
3	 0.9661	 0.1970
4	 0.9745	 0.1960
5	 0.9657	 0.1930
7	 0.9413	 0.1970
A	 0.5758	 0.1900
B	 0.6117	 0.1820
C	 0.5993	 0.1570
D	 0.6760	 0.1710
E	 0.5494	 0.1860
F	 0.6273	 0.1670
G	 0.6480	 0.1710
H	 0.6364	 0.1500
I	 0.5736	 0.1700
J	 0.6071	 0.1580
K	 0.6964	 0.1550
L	 0.6373	 0.1760
M	 0.7231	 0.1370
N	 0.6888	 0.1820
O	 0.7870	 0.1680
P	 0.6560	 0.1560
Q	 0.7209	 0.1670
R	 0.6985	 0.1370
S	 0.8230	 0.1840
T	 0.7433	 0.2190
a	 0.7920	 0.1520
b	 0.6976	 0.1390
c	 0.7586	 0.1810
d	 0.6605	 0.1690
e	 0.5974	 0.1770
f	 0.2588	 0.1090
g	 0.4200	 0.1510



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Chain	Atom inclusion	Q-score
h	 0.2738	 0.1120
i	 0.7748	 0.1700
j	 0.6402	 0.1580
k	 0.7741	 0.1540
l	 0.7801	 0.1570
m	 0.7511	 0.1570
n	 0.7220	 0.1800
o	 0.6718	 0.1770
p	 0.7934	 0.1670
q	 0.6859	 0.1580
r	 0.8255	 0.1720
s	 0.7391	 0.1790
t	 0.6411	 0.1740
u	 0.7781	 0.1430
v	 0.7576	 0.1460
w	 0.7179	 0.1980
x	 0.5364	 0.1720
y	 0.7880	 0.1470
z	 0.7683	 0.1700