



Full wwPDB EM Validation Report ⓘ

Aug 29, 2023 – 05:55 PM EDT

PDB ID : 8EB7
EMDB ID : EMD-27793
Title : Cryo-EM structure of the in-situ gp4-gp10-gp9N from bacteriophage P22
Authors : Wang, C.; Liu, J.; Molineux, I.J.
Deposited on : 2022-08-30
Resolution : 3.80 Å (reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

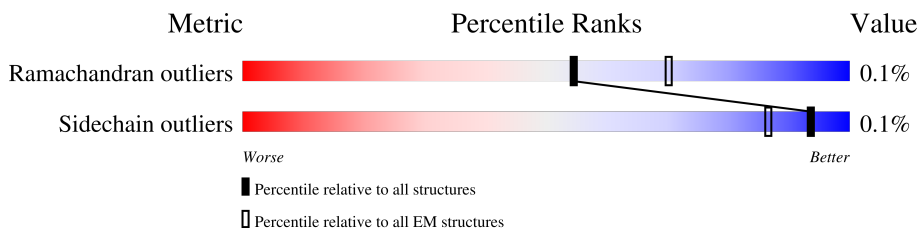
EMDB validation analysis : 0.0.1.dev50
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35

1 Overall quality at a glance

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

The reported resolution of this entry is 3.80 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

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	111	99% 100%
1	A	111	99% 100%
1	B	111	99% 100%
1	C	111	99% 98% .
1	D	111	99% 100%
1	F	111	99% 100%
1	X	111	95% 100%
1	Y	111	95% 100%
1	Z	111	89% 100%

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Mol	Chain	Length	Quality of chain
1	a	111	95%
1	b	111	95%
1	c	111	95%
1	d	111	95%
1	e	111	99%
1	f	111	92%
1	f	111	100%
1	f	111	91%
1	g	111	98%
1	g	111	90%
1	h	111	100%
1	h	111	92%
1	i	111	100%
1	i	111	90%
1	i	111	99%
2	E	150	93%
2	E	150	100%
2	G	150	93%
2	G	150	100%
2	H	150	92%
2	H	150	100%
2	I	150	93%
2	I	150	100%
2	J	150	94%
2	J	150	100%
2	K	150	94%
2	K	150	99%
2	L	150	92%
2	L	150	100%
2	M	150	93%
2	M	150	99%
2	N	150	93%
2	N	150	99%
2	O	150	94%
2	O	150	98%
2	P	150	93%
2	P	150	99%
2	Q	150	93%
2	Q	150	99%
3	R	471	96%
3	R	471	100%
3	S	471	96%
3	S	471	100%
3	T	471	96%
3	T	471	100%
3	U	471	97%
3	U	471	100%

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Mol	Chain	Length	Quality of chain
3	V	471	96%
			100%
3	W	471	97%
			100%

2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 51240 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 Tail spike protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	0	111	855	543	144	167	1	0	0
1	A	111	855	543	144	167	1	0	0
1	B	111	855	543	144	167	1	0	0
1	C	111	855	543	144	167	1	0	0
1	D	111	855	543	144	167	1	0	0
1	F	111	855	543	144	167	1	0	0
1	X	111	855	543	144	167	1	0	0
1	Y	111	855	543	144	167	1	0	0
1	Z	111	855	543	144	167	1	0	0
1	a	111	855	543	144	167	1	0	0
1	b	111	855	543	144	167	1	0	0
1	c	111	855	543	144	167	1	0	0
1	d	111	855	543	144	167	1	0	0
1	e	111	855	543	144	167	1	0	0
1	f	111	855	543	144	167	1	0	0
1	g	111	855	543	144	167	1	0	0
1	h	111	855	543	144	167	1	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	i	111	855	543	144	167	1	0	0

- Molecule 2 is a protein called Peptidoglycan hydrolase gp4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	E	150	1149	721	198	225	5	0	0
2	G	150	1149	721	198	225	5	0	0
2	H	150	1149	721	198	225	5	0	0
2	I	150	1149	721	198	225	5	0	0
2	J	150	1149	721	198	225	5	0	0
2	K	149	1140	716	196	223	5	0	0
2	L	150	1149	721	198	225	5	0	0
2	M	149	1140	716	196	223	5	0	0
2	N	149	1140	716	196	223	5	0	0
2	O	149	1140	716	196	223	5	0	0
2	P	149	1140	716	196	223	5	0	0
2	Q	149	1140	716	196	223	5	0	0

- Molecule 3 is a protein called Packaged DNA stabilization protein gp10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	R	471	3686	2326	631	711	18	0	0
3	S	471	3686	2326	631	711	18	0	0
3	T	471	3686	2326	631	711	18	0	0
3	U	471	3686	2326	631	711	18	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
3	V	471	Total	C	N	O	S	0	0
			3686	2326	631	711	18		
3	W	471	Total	C	N	O	S	0	0
			3686	2326	631	711	18		

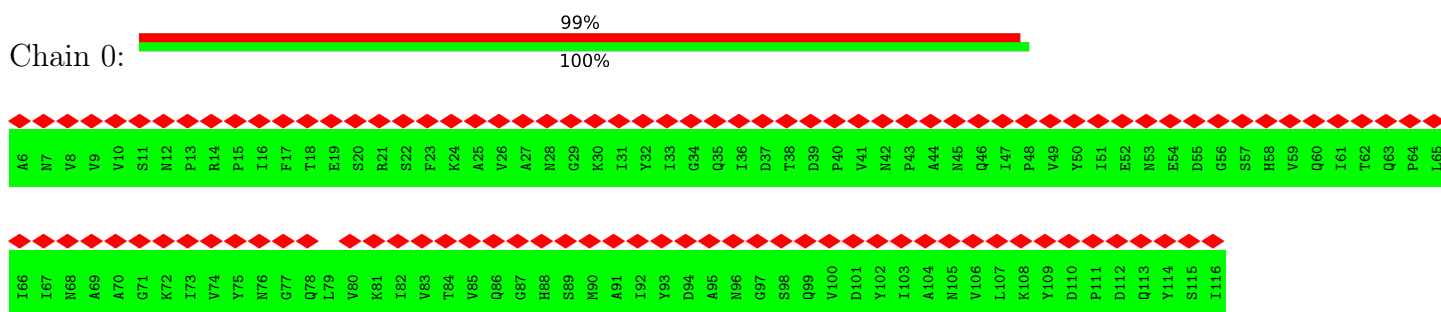
There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
R	233	SER	GLY	conflict	UNP P26749
S	233	SER	GLY	conflict	UNP P26749
T	233	SER	GLY	conflict	UNP P26749
U	233	SER	GLY	conflict	UNP P26749
V	233	SER	GLY	conflict	UNP P26749
W	233	SER	GLY	conflict	UNP P26749

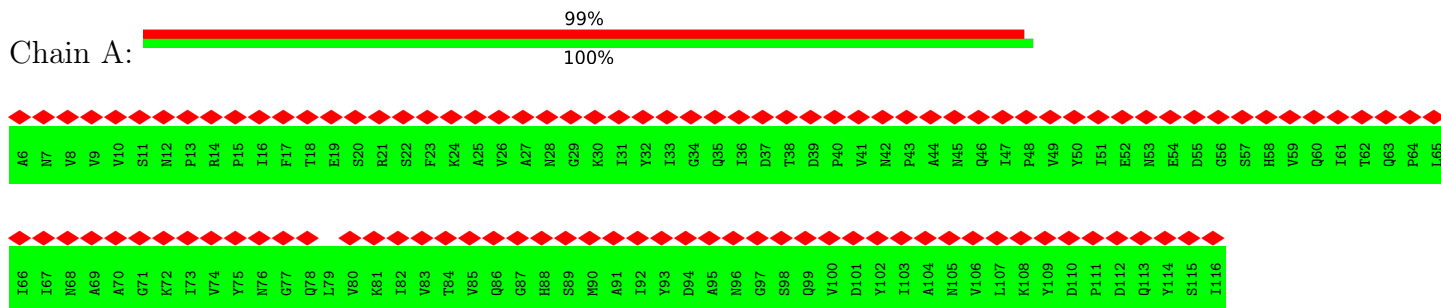
3 Residue-property plots [i](#)

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.

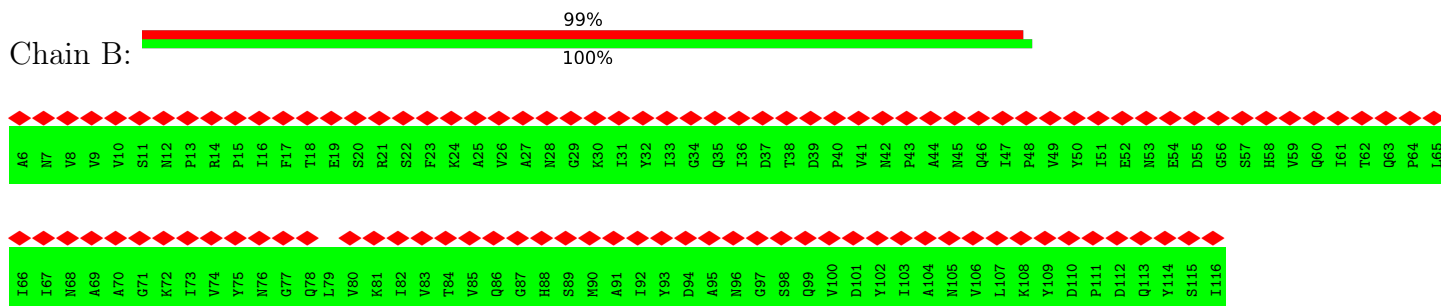
- Molecule 1: Tail spike protein



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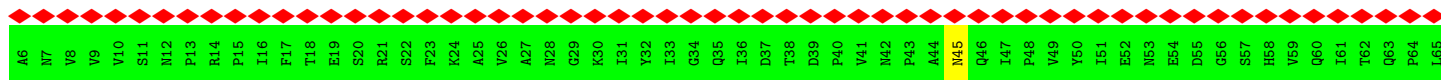


- Molecule 1: Tail spike protein

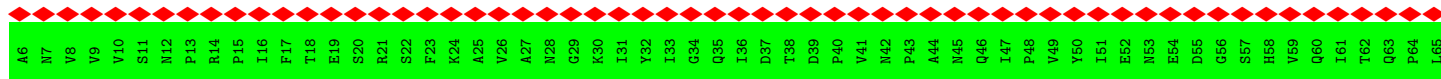


- Molecule 1: Tail spike protein

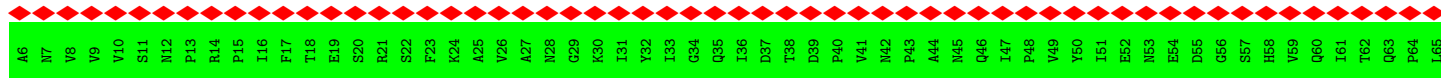




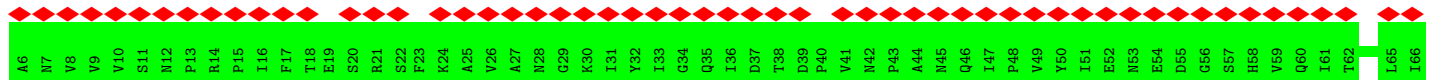
● Molecule 1: Tail spike protein



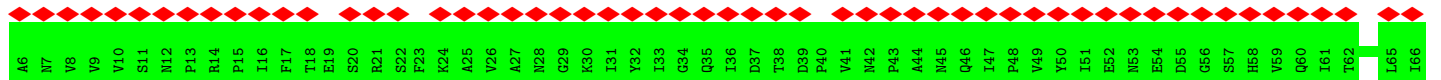
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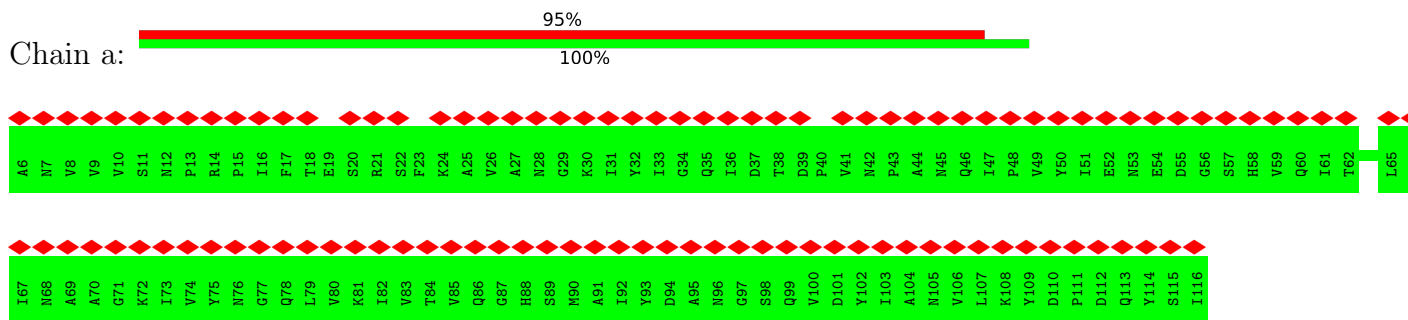
● Molecule 1: Tail spike protein



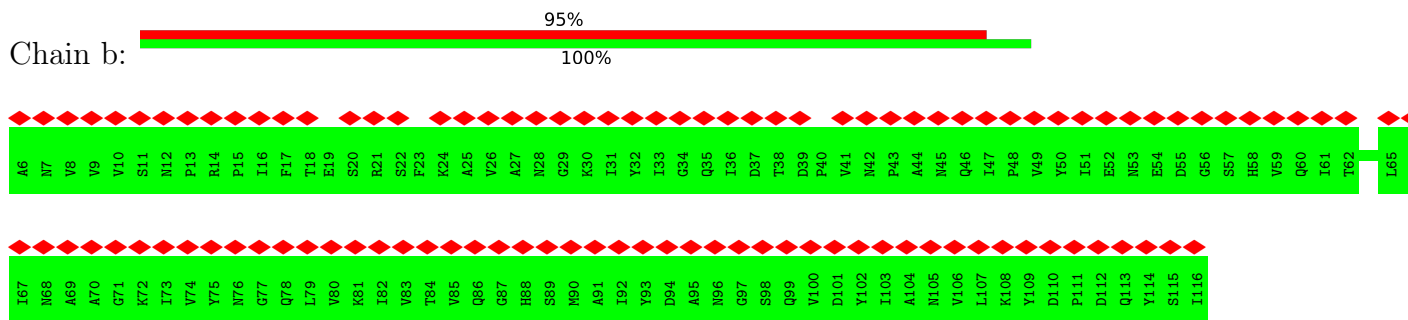
• Molecule 1: Tail spike protein



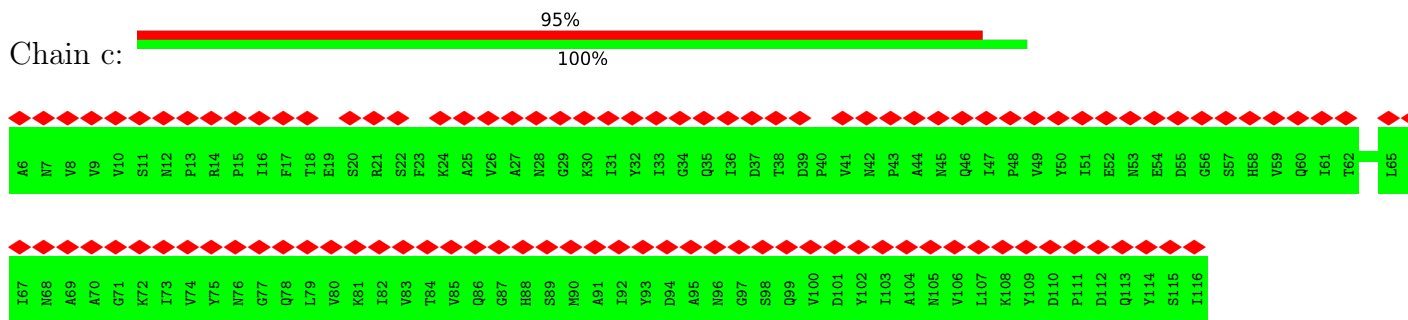
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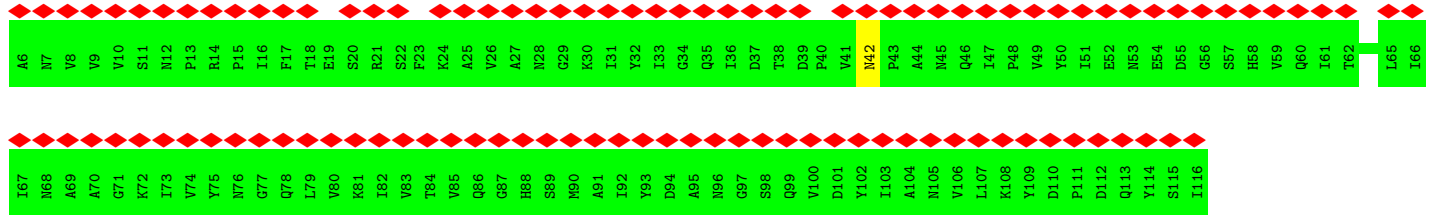


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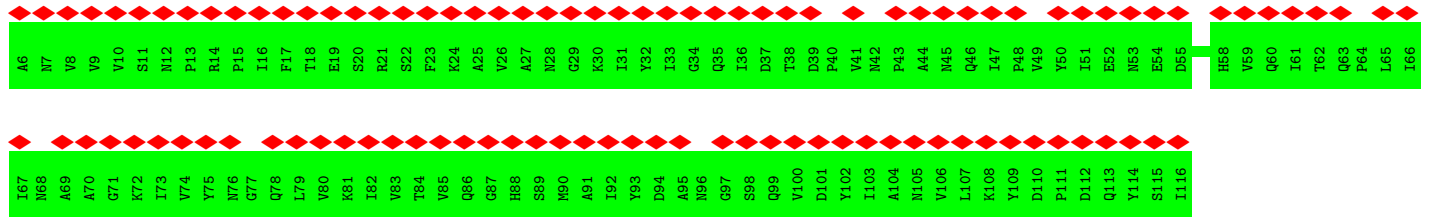
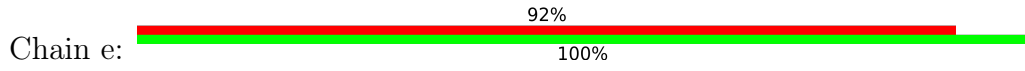


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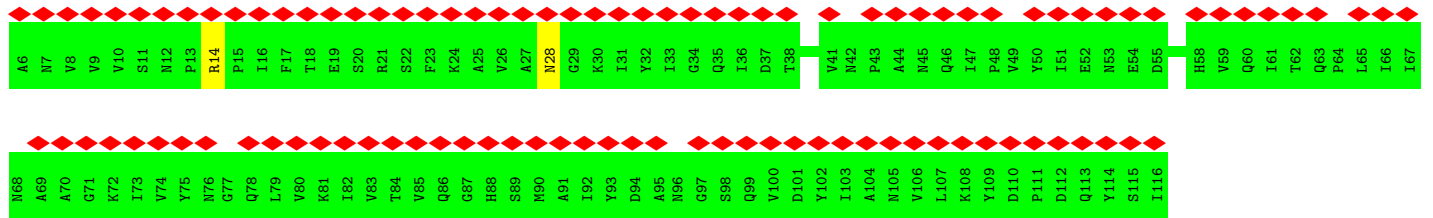




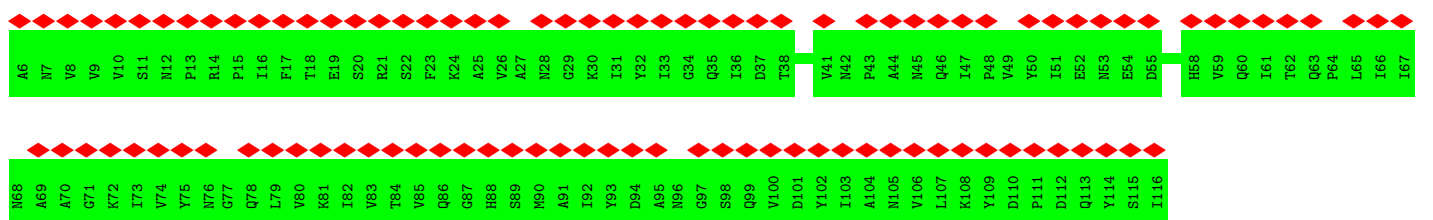
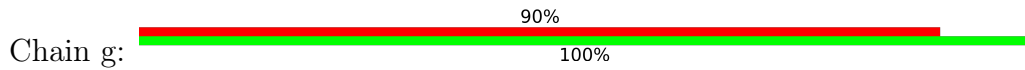
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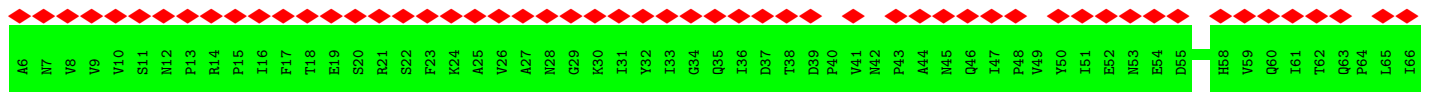
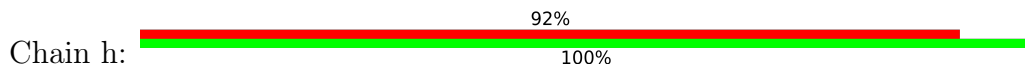
• Molecule 1: Tail spike protein

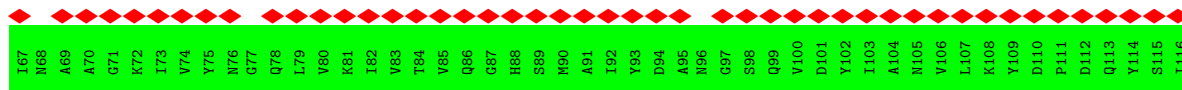


• Molecule 1: Tail spike protein

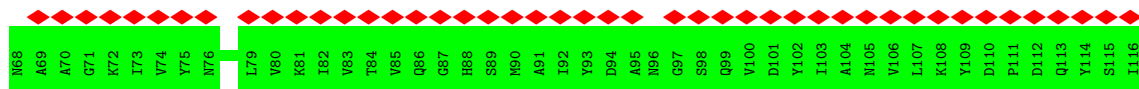
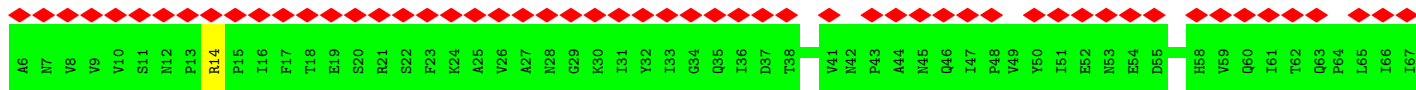
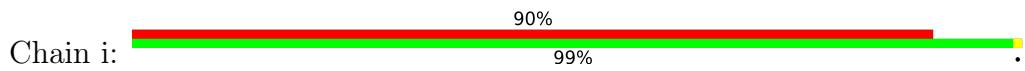


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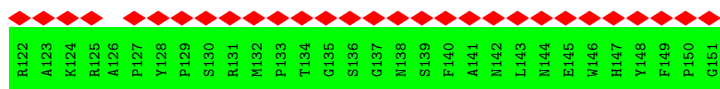
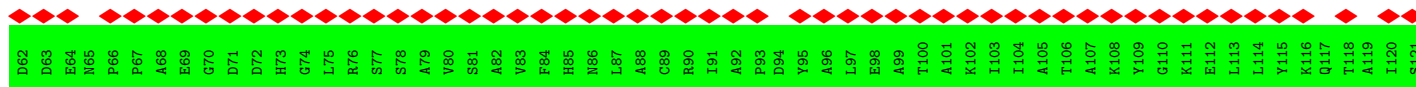
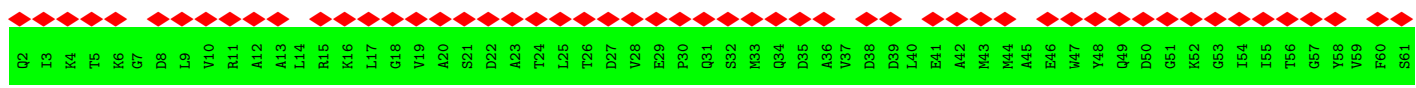




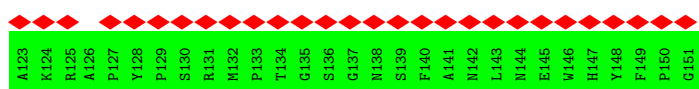
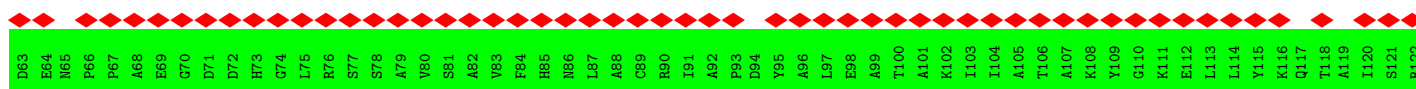
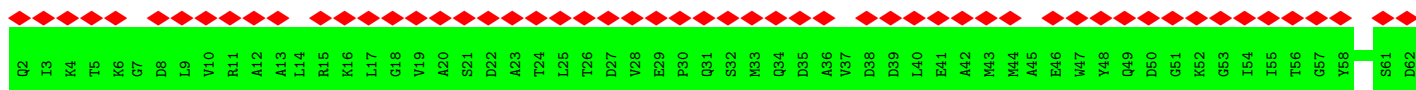
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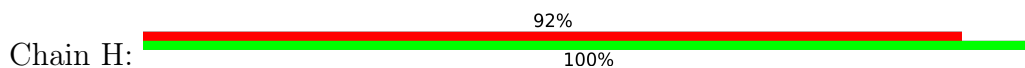
• Molecule 2: Peptidoglycan hydrolase gp4

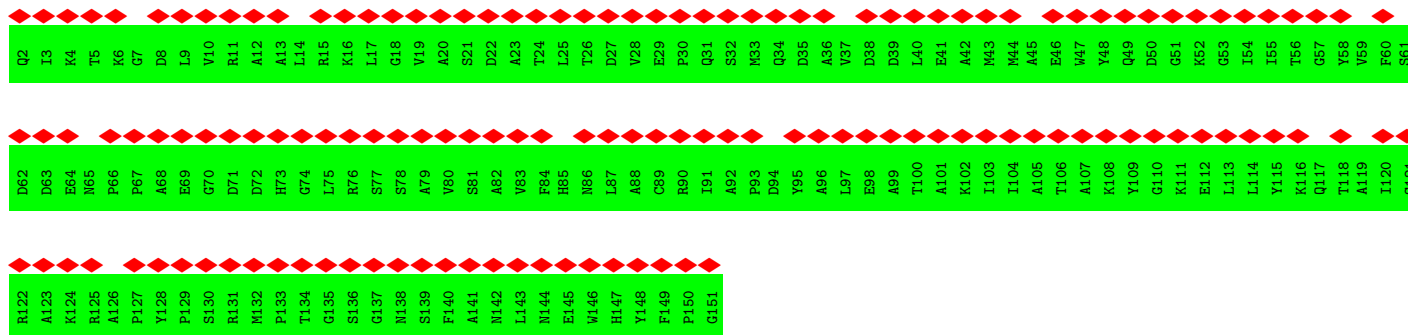


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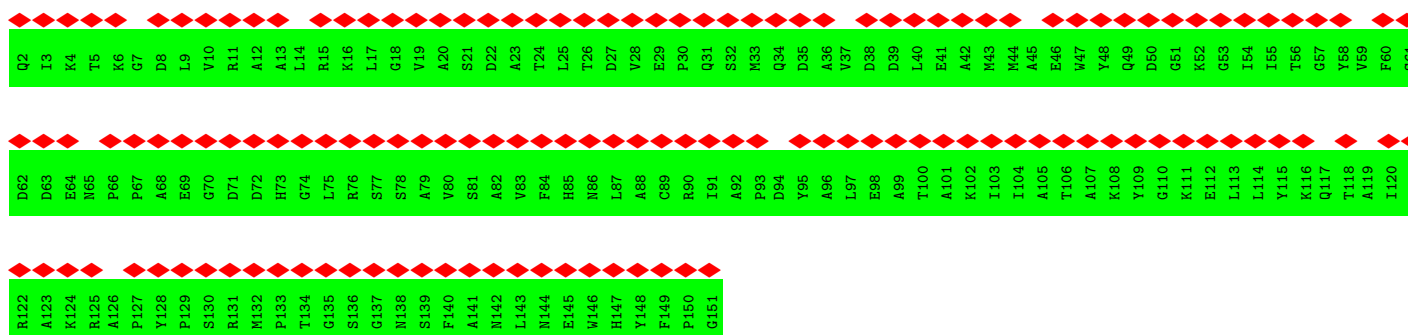
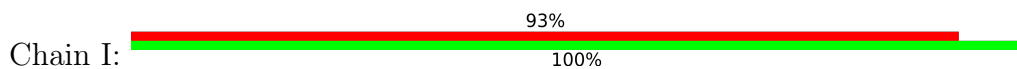


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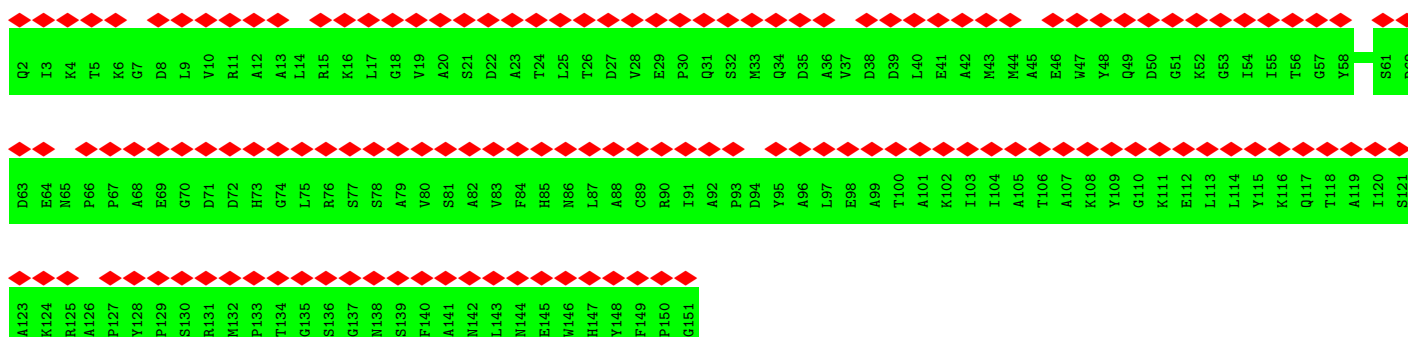
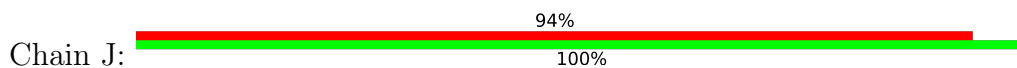




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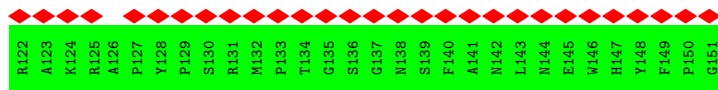


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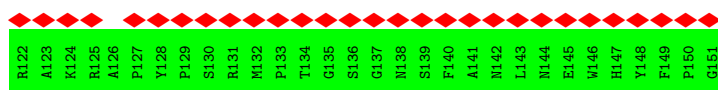
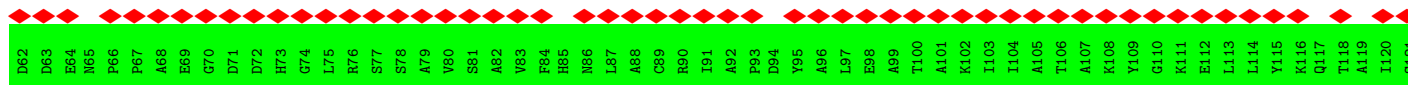
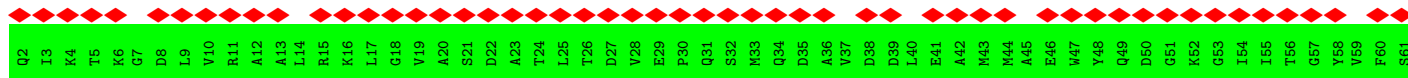
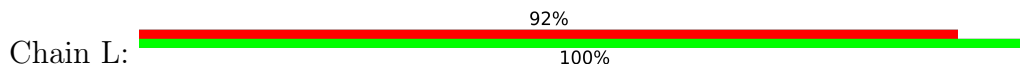


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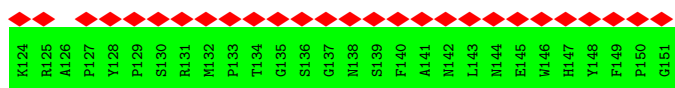
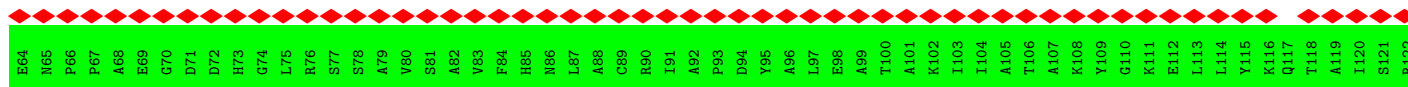
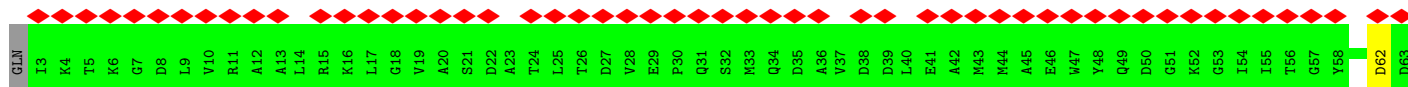
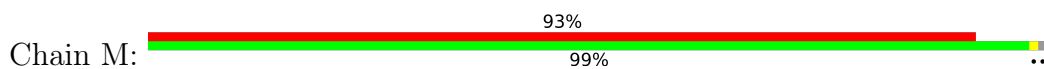




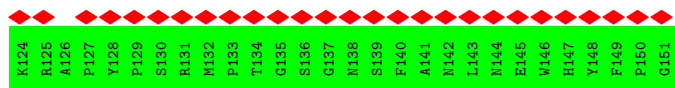
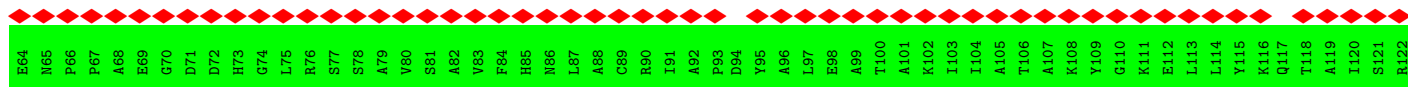
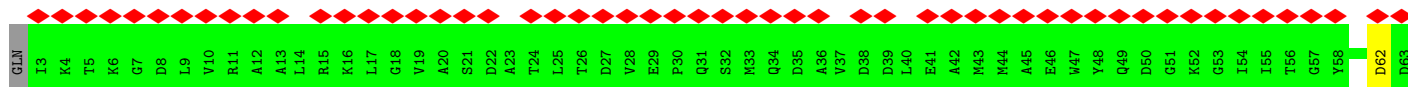
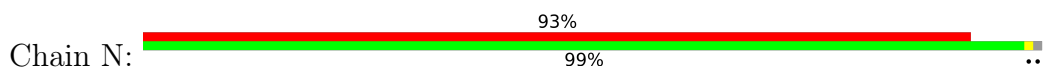
• Molecule 2: Peptidoglycan hydrolase gp4



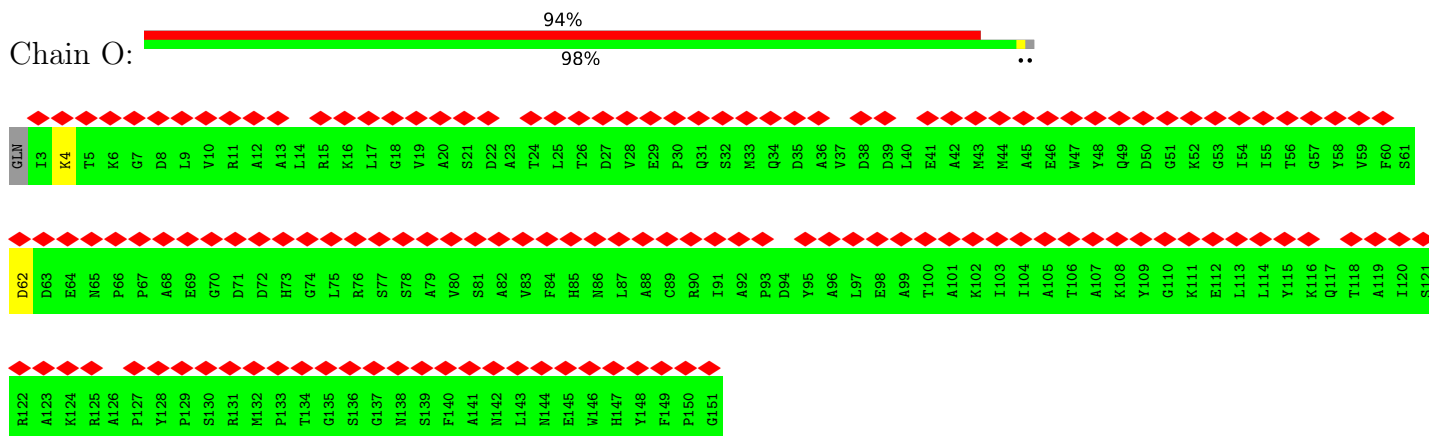
• Molecule 2: Peptidoglycan hydrolase gp4



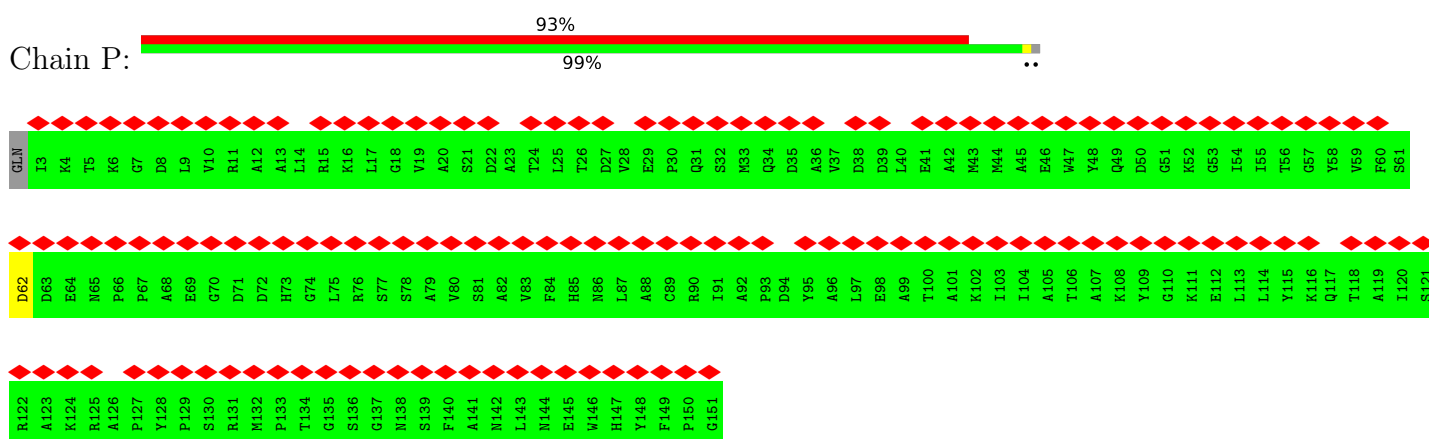
• Molecule 2: Peptidoglycan hydrolase gp4



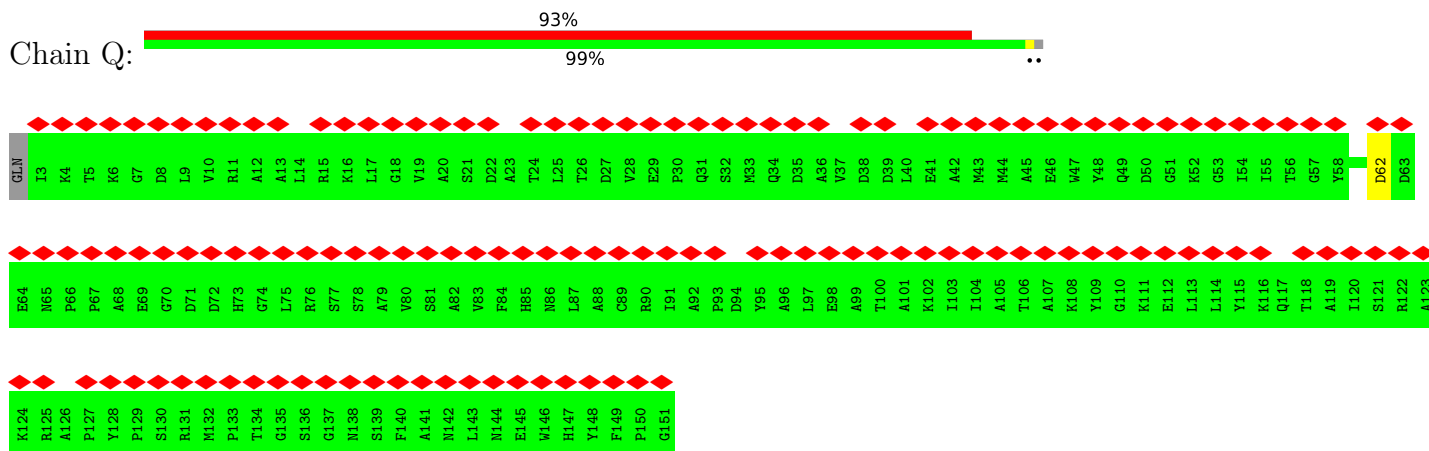
• Molecule 2: Peptidoglycan hydrolase gp4



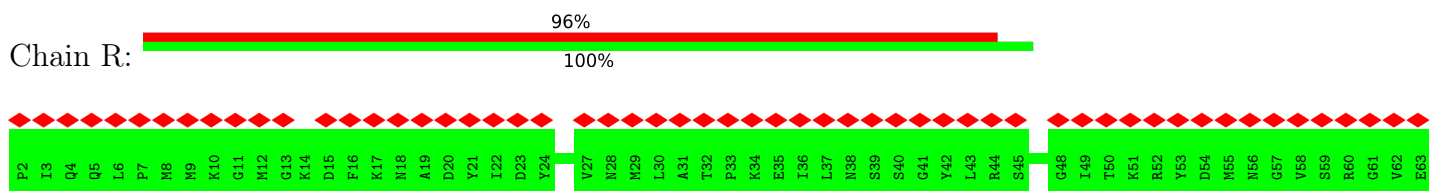
• Molecule 2: Peptidoglycan hydrolase gp4



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• Molecule 3: Packaged DNA stabilization protein gp10

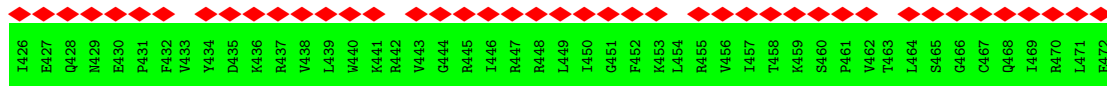
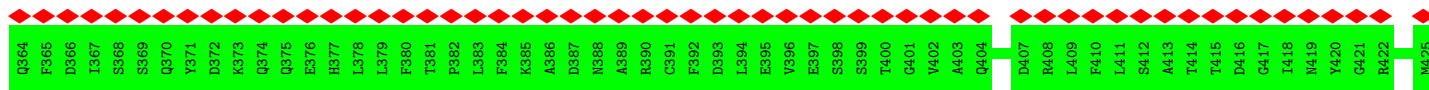


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V124	S125	N126	M127	P128	A129	D130	S131	F132	T133	W134	Q135	Y136	E137	L138	G139	S140	V141	R142	D143	S144	T145	R146	L147	R148	G149	R150	Y151	A152	W153	S154	K155	D156	G157	T158	D159	S160	F162	I163	T164	Q165	L166	E167	D168	M169	S170	H171	P172	D173	R174	Y175	S176	A177	Q178	Y179	R180	V181	E182	S183
Q184	P185	G187	I188	I189	D190	S191	H252	T193	W194	R195	G256	F197	L198	V199	C200	F201	G202	S203	S204	T205	L206	E207	Y208	F209	S210	L211	T212	G213	A214	K215	L216	A217	G218	A219	A220	Y222	Y223	A224	Q225	L226	S227	L228	M229	V230	Q231	P172	S233	I234	A235	G236	T237	Y238	C239	K240	T241	P242	F243	
A244	D245	S246	Y247	A248	L250	S251	H252	T253	W254	R255	G256	A257	P258	S259	V260	Y261	L262	I263	G264	S265	G266	Q267	A268	S269	P270	I271	L272	T273	A274	S275	L276	E277	K278	I279	L280	R281	S282	Y283	T284	A285	E286	E287	M288	A289	T290	G291	V292	M293	E294	T295	R297	F298	D299	S300	H301	E302	L303	
L304	I305	I306	H307	L308	P309	R310	H311	V314	Y315	D316	A317	S318	S319	S320	Q321	N322	G323	P324	Q325	W326	C327	V328	L329	K330	T331	G332	L333	Y334	D335	D336	V337	Y338	R339	G340	V341	D342	F343	M344	Y345	E346	G347	N348	Q349	I350	T351	C352	G353	D354	K355	S356	E357	A358	V359	V360	G361	Q362	L363	Q364
F365	D366	I367	S368	S369	Q370	Y371	D372	K373	Q374	Q375	E376	H377	L378	L379	F380	T381	P382	L383	F384	K385	A386	D387	N388	A389	R390	C391	F392	D393	L394	E395	V396	E397	S398	S399	T400	G401	V402	A403	Q404	D407	R408	L409	F410	L411	S412	A413	T414	T415	D416	G417	I418	M419	Y420	G421	R422	M425	L426	
E427	Q428	M429	E430	P431	F432	V433	Y434	D435	K436	R437	V438	L439	W440	K441	R442	V443	G444	R445	I446	R447	R448	L449	I450	G451	F452	K453	L454	R455	V456	I457	T458	K459	S460	P461	V462	T463	L464	S465	C467	Q468	I469	R470	L471	E472														

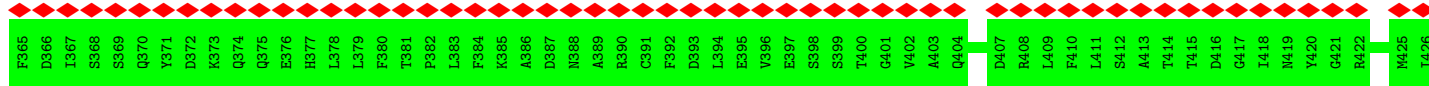
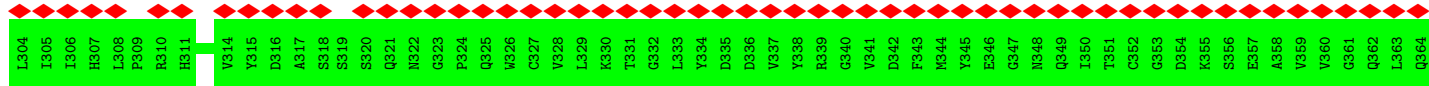
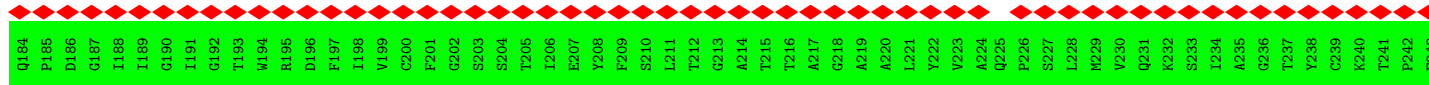
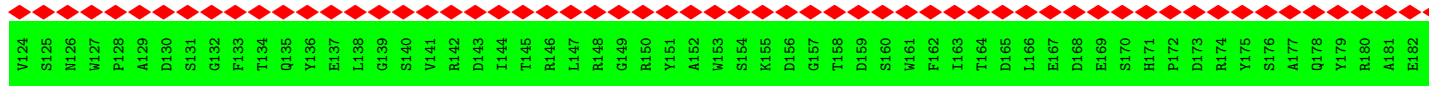
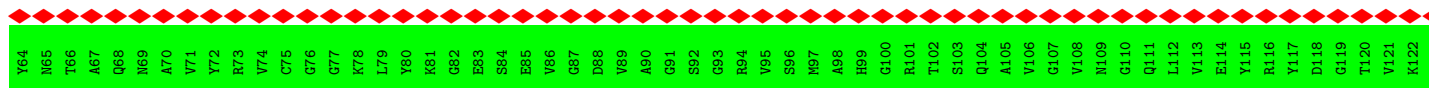
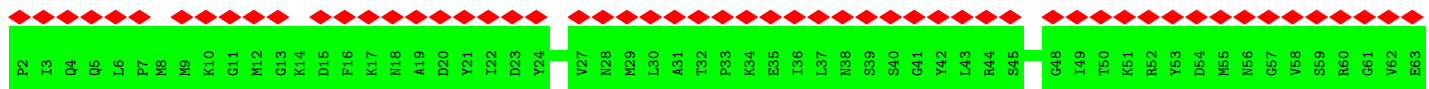
• Molecule 3: Packaged DNA stabilization protein gp10



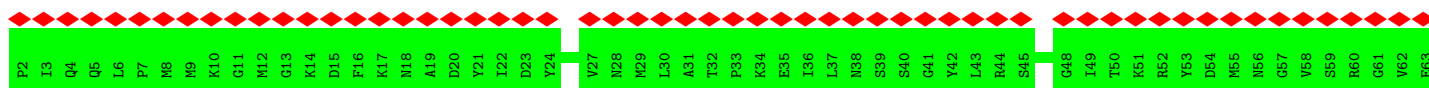
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E63	Y64	N65	T66	A67	Q68	A70	V71	F72	R73	V74	C75	G76	G77	K78	L79	Y80	K81	G82	E83	S84	E85	V86	G87	D88	A89	G90	G91	S92	G93	R94	V95	S96	M97	A98	H99	G100	R101	T102	S103	Q104	A105	V106	G107	V108	N109	G110	Q111	L112	V113	E114	Y115	R116	Y117	D118	G119	T120	V121	K122
T123	V124	S125	N126	M127	P128	A129	D130	S131	F132	T133	W134	Q135	Y136	E137	L138	G139	S140	V141	R142	D143	S144	T145	R146	L147	R148	G149	R150	Y151	A152	W153	S154	K155	D156	G157	T158	D159	S160	F162	I163	T164	Q165	L166	E167	D168	M169	S170	H171	P172	D173	R174	Y175	S176	A177	Q178	Y179	R180	V181	E182
S183	Q184	P185	D186	G187	I188	I189	D190	S191	H192	T193	W194	R195	G196	F197	L198	V199	C200	F201	G202	S203	S204	T205	L206	E207	Y208	F209	S210	L211	T212	G213	A214	K215	L216	A217	G218	A219	A220	Y222	Y223	A224	Q225	L226	S227	L228	M229	V230	Q231	P172	S233	I234	A235	G236	T237	Y238	C239	K240	T241	P242
F243	A244	D245	S246	Y247	A248	L250	S251	H252	T253	W254	R255	G256	A257	P258	S259	V260	Y261	L262	I263	G264	S265	G266	Q267	A268	S269	P270	I271	L272	T273	A274	S275	L276	E277	K278	I279	L280	R281	S282	Y283	T284	A285	E286	E287	M288	A289	T290	G291	V292	M293	E294	T295	R297	F298	D299	S300	H301	E302	
L303	L304	I305	I306	H307	L308	P309	R310	H311	V314	Y315	D316	A317	S318	S319	S320	Q321	N322	G323	P324	Q325	W326	C327	V328	L329	K330	T331	G332	L333	Y334	D335	D336	V337	Y338	R339	G340	V341	D342	F343	M344	Y345	E346	G347	N348	Q349	I350	T351	C352	G353	D354	K355	S356	E357	A358	V359	V360	G361	Q362	L363



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• Molecule 3: Packaged DNA stabilization protein gp10



Y64	N65	T66	A67	Q68	A70	V71	Y72	R73	V74	C75	G76	G77	K78	L79	Y80	K81	G82	E83	S84	E85	V86	G87	D88	V89	A90	G91	S92	G93	R94	V95	S96	M97	A98	H99	G100	R101	T102	S103	Q104	A105	V106	G107	V108	N109	G110	Q111	L112	V113	E114	Y115	R116	Y117	D118	G119	T120	K121	T123		
V124	S125	N126	M127	P128	A129	D130	S131	G132	F133	T134	Q135	Y136	E137	L138	G139	V140	R141	D142	D143	S144	T145	R146	L147	R148	G149	R150	Y151	A152	M153	S154	K155	D156	G157	T158	D159	S160	V161	F162	I163	T164	D165	L166	E167	D168	M169	S170	H171	P172	D173	R174	Y175	S176	A177	Q178	Y179	R180	V181	E182	S183
Q184	P185	D186	G187	I188	T189	G190	I191	T193	M194	R195	D196	F197	I198	V199	C200	F201	G202	S203	S204	T205	I206	E207	Y208	F209	S210	L211	T212	G213	A214	T215	L216	A217	G218	A219	A220	L221	Y222	V223	A224	Q225	P226	S227	L228	M229	V230	K231	K232	S233	I234	A235	G236	T237	Y238	D239	K240	T241	P242	F243	
A244	D245	S246	Y247	A248	F249	L250	S251	H252	P253	A254	T255	G256	A257	P258	S259	V260	Y261	L262	D263	G264	S265	G266	Q267	A268	S269	P270	L271	A272	T273	A274	S275	L276	E277	K278	L279	L280	R281	S282	Y283	T284	A285	E286	E287	M288	A289	T290	G291	V292	M293	E294	T295	L296	R297	F298	D299	S300	H301	E302	L303
L304	I306	H307	L308	P309	R310	H311	V312	L313	V314	Y315	D316	A317	S318	S319	S320	Q321	N322	G323	P324	Q325	K326	C327	V328	L329	K330	T331	G332	L333	Y334	D335	D336	V337	Y338	R339	G340	V341	D342	F343	K344	Y345	E346	G347	N348	Q349	I350	T351	C352	G353	D354	K355	S356	E357	A358	V359	V360	G361	Q362	L363	
Q364	F365	D366	I367	S368	S369	Q370	Y371	D372	K373	Q374	Q375	E376	H377	L378	L379	F380	T381	P382	L383	F384	K385	A386	D387	N388	A389	R390	C391	F392	D393	L394	E395	V396	E397	S398	S399	T400	G401	V402	A403	Q404	D407	R408	L409	F410	L411	S412	A413	T414	T415	D416	G417	I418	M419	Y420	G421	R422	M425		
I426	E427	Q428	M429	E430	P431	F432	V433	Y434	D435	K436	R437	V438	L439	M440	R441	R442	V443	G444	R445	I446	R447	R448	L449	L450	G451	F452	K453	L454	R455	V456	T457	T458	K459	S460	P461	V462	T463	L464	S465	G466	Q467	I469	R470	L471	E472														

• Molecule 3: Packaged DNA stabilization protein gp10



P2	I3	Q4	Q5	L6	P7	M8	M9	K10	G11	M12	G13	K14	D15	F16	K17	N18	A19	D20	Y21	I22	D23	Y24	V27	N28	M29	L30	A31	T32	P33	K34	E35	I36	L37	N38	S39	S40	G41	Y42	L43	R44	S45	G48	I49	T50	K51	R52	Y53	D54	M55	N56	G57	V58	S59	R60	G61	V62	E63		
Y64	N65	T66	A67	Q68	A70	V71	Y72	R73	V74	C75	G76	G77	K78	L79	Y80	K81	G82	E83	S84	E85	V86	G87	D88	V89	A90	G91	S92	G93	R94	V95	S96	M97	A98	H99	G100	R101	T102	S103	Q104	A105	V106	G107	V108	N109	G110	Q111	L112	V113	E114	Y115	R116	Y117	D118	G119	T120	K121	T123		
V124	S125	N126	M127	P128	A129	D130	S131	G132	F133	T134	Q135	Y136	E137	L138	G139	V140	R141	D142	D143	S144	T145	R146	L147	R148	G149	R150	Y151	A152	M153	S154	K155	D156	G157	T158	D159	S160	V161	F162	I163	T164	D165	L166	E167	D168	M169	S170	H171	P172	D173	R174	Y175	S176	A177	Q178	Y179	R180	V181	E182	S183
Q184	P185	D186	G187	I188	T189	G190	I191	T193	M194	R195	D196	F197	I198	V199	C200	F201	G202	S203	S204	T205	I206	E207	Y208	F209	S210	L211	T212	G213	A214	T215	L216	A217	G218	A219	A220	L221	Y222	V223	A224	Q225	P226	S227	L228	M229	V230	K231	K232	S233	I234	A235	G236	T237	Y238	D239	K240	T241	P242	F243	
A244	D245	S246	Y247	A248	F249	L250	S251	H252	P253	A254	T255	G256	A257	P258	S259	V260	Y261	L262	D263	G264	S265	G266	Q267	A268	S269	P270	L271	A272	T273	A274	S275	L276	E277	K278	L279	L280	R281	S282	Y283	T284	A285	E286	E287	M288	A289	T290	G291	V292	M293	E294	T295	L296	R297	F298	D299	S300	H301	E302	L303
L304	I306	H307	L308	P309	R310	H311	V312	L313	V314	Y315	D316	A317	S318	S319	S320	Q321	N322	G323	P324	Q325	K326	C327	V328	L329	K330	T331	G332	L333	Y334	D335	D336	V337	Y338	R339	G340	V341	D342	F343	K344	Y345	E346	G347	N348	Q349	I350	T351	C352	G353	D354	K355	S356	E357	A358	V359	V360	G361	Q362	L363	Q364

F365 F366 F367 F368 F369 F370 F371 F372 F373 F374 F375 F376 F377 F378 F379 F380 F381 F382 F383 F384 F385 F386 F387 F388 F389 F390 F391 F392 F393 F394 F395 F396 F397 F398 F399 F400 F401 F402 F403 F404 F407 F408 F409 F410 F411 F412 F413 F414 F415 F416 F417 F418 F419 F420 F421 F422 F425 F426

E427 Q428 M429 E430 F431 F432 V433 Y434 D435 K436 R437 V438 L439 W440 K441 R442 V443 G444 R445 I446 R447 R448 R449 G451 F452 K453 L454 R455 V456 I457 T458 K459 S460 P461 V462 T463 L464 S465 G466 C467 Q468 I469 R470 L471 E472

• Molecule 3: Packaged DNA stabilization protein gp10



P2 I3 Q4 Q5 L6 M7 M8 M9 K10 G11 M12 G13 K14 D15 F16 K17 N18 A19 D20 Y21 I22 D23 Y24 V27 N28 M29 L30 A31 T32 P33 K34 E35 I36 L37 N38 S39 S40 G41 Y42 L43 R44 S45 F46 P47 G48 I49 T50 K51 R52 Y53 D54 M55 N56 G57 V58 S59 R60 G61 V62

E63 Y64 M65 T66 G67 M68 N69 A70 V71 Y72 R73 F74 V75 G76 G77 K78 L79 Y80 K81 G82 E83 S84 E85 V86 G87 D88 V89 A90 G91 S92 G93 R94 V95 I96 M97 N98 A99 H99 G100 R101 T102 S103 Q104 A105 V106 G107 I108 M109 G110 Q111 R112 V113 E114 M115 G116 Y117 D118 S119 R120 V121 K122

T123 V124 S125 M126 G127 P128 A129 D130 W131 G132 F133 T134 Q135 Y136 E137 L138 G139 S140 V141 R142 D143 I144 T145 R146 L147 G148 G149 R150 Y151 A152 M153 S154 K155 T156 G157 T158 A159 H159 G160 R161 F162 I163 A164 D165 V166 E167 S227 M229 V230 H171 Q231 K232 S233 I234 A235 G236 T237 C239 K240 A181 E182

S183 Q184 P185 G186 I188 G189 I191 G192 T193 W194 R195 T255 G256 A257 P258 V260 Y261 I262 G264 S265 G266 Q267 A268 F269 S270 I271 A272 T273 A274 S275 I276 E277 K278 I279 R281 S282 Y283 T284 A285 E286 E287 M288 A289 T290 V292 M293 E294 T295 L296 R297 F298 D299 S300 H301 E302

F243 A244 D245 S246 Y247 A248 F249 I250 S251 H252 P253 A254 T255 G256 A257 P258 V260 Y261 I262 G264 S265 G266 Q267 A268 F269 S270 I271 A272 T273 A274 S275 I276 E277 K278 I279 R281 S282 Y283 T284 A285 E286 E287 M288 A289 T290 V292 M293 E294 T295 L296 R297 F298 D299 S300 H301 E302

L303 L304 I305 I306 H307 P309 R310 H311 V314 Y315 D316 A317 S318 S319 S320 Q321 G322 P324 Q325 W326 C327 V328 L329 K330 T331 G332 L333 Y334 D336 V337 Y338 R339 G340 V341 F342 M344 Y345 E346 G347 N348 Q349 I350 C352 G353 K355 S356 E357 A358 V359 V360 G361 L362 L363

Q364 F365 D366 I367 S368 S369 Q370 Y371 D372 K373 Q374 Q375 E376 H377 L378 L379 F380 T381 P382 L383 F384 K385 A386 D387 N388 R389 C391 F392 D393 L394 E395 V396 V397 S398 S399 T400 G401 V402 A403 Q404 D407 F408 L409 F410 L411 S412 A413 T414 T415 D416 G417 I418 N419 Y420 G421 R422 M425

I426 E427 Q428 M429 E430 F431 F432 V433 Y434 D435 K436 R437 V438 L439 W440 K441 R442 V443 G444 R445 I446 R447 R448 R449 G451 F452 K453 L454 R455 V456 I457 T458 K459 S460 P461 V462 T463 L464 S465 G466 C467 Q468 I469 R470 L471 E472

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	32650	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 ($e^-/\text{\AA}^2$)	30	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	1200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.024	Depositor
Minimum map value	-0.011	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.01	Depositor
Map size (\AA)	512.63995, 512.63995, 512.63995	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.068, 1.068, 1.068	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.34	0/872	0.52	0/1192
1	A	0.27	0/872	0.51	0/1192
1	B	0.31	0/872	0.49	0/1192
1	C	0.38	0/872	0.52	0/1192
1	D	0.28	0/872	0.51	0/1192
1	F	0.27	0/872	0.48	0/1192
1	X	0.29	0/872	0.52	0/1192
1	Y	0.29	0/872	0.52	0/1192
1	Z	0.29	0/872	0.52	0/1192
1	a	0.29	0/872	0.50	0/1192
1	b	0.30	0/872	0.53	0/1192
1	c	0.29	0/872	0.51	0/1192
1	d	0.29	0/872	0.50	0/1192
1	e	0.30	0/872	0.52	0/1192
1	f	0.30	0/872	0.51	0/1192
1	g	0.30	0/872	0.52	0/1192
1	h	0.30	0/872	0.52	0/1192
1	i	0.29	0/872	0.50	0/1192
2	E	0.32	0/1174	0.51	0/1592
2	G	0.30	0/1174	0.52	0/1592
2	H	0.29	0/1174	0.52	0/1592
2	I	0.28	0/1174	0.52	0/1592
2	J	0.32	0/1174	0.52	0/1592
2	K	0.32	0/1165	0.55	0/1580
2	L	0.28	0/1174	0.51	0/1592
2	M	0.29	0/1165	0.56	0/1580
2	N	0.30	0/1165	0.56	0/1580
2	O	0.32	0/1165	0.55	0/1580
2	P	0.29	0/1165	0.54	0/1580
2	Q	0.30	0/1165	0.56	0/1580
3	R	0.29	0/3767	0.53	0/5100
3	S	0.29	0/3767	0.54	0/5100
3	T	0.30	0/3767	0.53	0/5100
3	U	0.31	0/3767	0.54	0/5100

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
3	V	0.30	0/3767	0.52	0/5100
3	W	0.31	0/3767	0.53	0/5100
All	All	0.30	0/52332	0.53	0/71088

There are no bond length outliers.

There are no bond angle outliers.

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	109/111 (98%)	106 (97%)	3 (3%)	0	100	100
1	A	109/111 (98%)	105 (96%)	4 (4%)	0	100	100
1	B	109/111 (98%)	108 (99%)	1 (1%)	0	100	100
1	C	109/111 (98%)	107 (98%)	2 (2%)	0	100	100
1	D	109/111 (98%)	106 (97%)	3 (3%)	0	100	100
1	F	109/111 (98%)	106 (97%)	3 (3%)	0	100	100
1	X	109/111 (98%)	102 (94%)	7 (6%)	0	100	100
1	Y	109/111 (98%)	103 (94%)	6 (6%)	0	100	100
1	Z	109/111 (98%)	97 (89%)	12 (11%)	0	100	100
1	a	109/111 (98%)	103 (94%)	6 (6%)	0	100	100
1	b	109/111 (98%)	102 (94%)	7 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	c	109/111 (98%)	101 (93%)	8 (7%)	0	100	100
1	d	109/111 (98%)	103 (94%)	6 (6%)	0	100	100
1	e	109/111 (98%)	99 (91%)	10 (9%)	0	100	100
1	f	109/111 (98%)	100 (92%)	9 (8%)	0	100	100
1	g	109/111 (98%)	98 (90%)	11 (10%)	0	100	100
1	h	109/111 (98%)	100 (92%)	9 (8%)	0	100	100
1	i	109/111 (98%)	98 (90%)	11 (10%)	0	100	100
2	E	148/150 (99%)	135 (91%)	13 (9%)	0	100	100
2	G	148/150 (99%)	137 (93%)	11 (7%)	0	100	100
2	H	148/150 (99%)	138 (93%)	10 (7%)	0	100	100
2	I	148/150 (99%)	137 (93%)	11 (7%)	0	100	100
2	J	148/150 (99%)	137 (93%)	11 (7%)	0	100	100
2	K	147/150 (98%)	136 (92%)	10 (7%)	1 (1%)	22	60
2	L	148/150 (99%)	138 (93%)	10 (7%)	0	100	100
2	M	147/150 (98%)	135 (92%)	11 (8%)	1 (1%)	22	60
2	N	147/150 (98%)	135 (92%)	11 (8%)	1 (1%)	22	60
2	O	147/150 (98%)	134 (91%)	12 (8%)	1 (1%)	22	60
2	P	147/150 (98%)	135 (92%)	11 (8%)	1 (1%)	22	60
2	Q	147/150 (98%)	135 (92%)	11 (8%)	1 (1%)	22	60
3	R	469/471 (100%)	444 (95%)	25 (5%)	0	100	100
3	S	469/471 (100%)	440 (94%)	29 (6%)	0	100	100
3	T	469/471 (100%)	436 (93%)	33 (7%)	0	100	100
3	U	469/471 (100%)	439 (94%)	29 (6%)	1 (0%)	47	79
3	V	469/471 (100%)	439 (94%)	30 (6%)	0	100	100
3	W	469/471 (100%)	444 (95%)	25 (5%)	0	100	100
All	All	6546/6624 (99%)	6118 (94%)	421 (6%)	7 (0%)	54	83

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	U	402	VAL
2	K	62	ASP
2	M	62	ASP

Continued on next page...

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Mol	Chain	Res	Type
2	N	62	ASP
2	O	62	ASP
2	P	62	ASP
2	Q	62	ASP

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	95/95 (100%)	95 (100%)	0	100	100
1	A	95/95 (100%)	95 (100%)	0	100	100
1	B	95/95 (100%)	95 (100%)	0	100	100
1	C	95/95 (100%)	93 (98%)	2 (2%)	53	74
1	D	95/95 (100%)	95 (100%)	0	100	100
1	F	95/95 (100%)	95 (100%)	0	100	100
1	X	95/95 (100%)	95 (100%)	0	100	100
1	Y	95/95 (100%)	95 (100%)	0	100	100
1	Z	95/95 (100%)	95 (100%)	0	100	100
1	a	95/95 (100%)	95 (100%)	0	100	100
1	b	95/95 (100%)	95 (100%)	0	100	100
1	c	95/95 (100%)	95 (100%)	0	100	100
1	d	95/95 (100%)	94 (99%)	1 (1%)	73	85
1	e	95/95 (100%)	95 (100%)	0	100	100
1	f	95/95 (100%)	93 (98%)	2 (2%)	53	74
1	g	95/95 (100%)	95 (100%)	0	100	100
1	h	95/95 (100%)	95 (100%)	0	100	100
1	i	95/95 (100%)	94 (99%)	1 (1%)	73	85
2	E	118/118 (100%)	118 (100%)	0	100	100
2	G	118/118 (100%)	118 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	H	118/118 (100%)	118 (100%)	0	100	100
2	I	118/118 (100%)	118 (100%)	0	100	100
2	J	118/118 (100%)	118 (100%)	0	100	100
2	K	117/118 (99%)	117 (100%)	0	100	100
2	L	118/118 (100%)	118 (100%)	0	100	100
2	M	117/118 (99%)	117 (100%)	0	100	100
2	N	117/118 (99%)	117 (100%)	0	100	100
2	O	117/118 (99%)	116 (99%)	1 (1%)	78	88
2	P	117/118 (99%)	117 (100%)	0	100	100
2	Q	117/118 (99%)	117 (100%)	0	100	100
3	R	395/395 (100%)	395 (100%)	0	100	100
3	S	395/395 (100%)	395 (100%)	0	100	100
3	T	395/395 (100%)	395 (100%)	0	100	100
3	U	395/395 (100%)	395 (100%)	0	100	100
3	V	395/395 (100%)	395 (100%)	0	100	100
3	W	395/395 (100%)	395 (100%)	0	100	100
All	All	5490/5496 (100%)	5483 (100%)	7 (0%)	93	97

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	45	ASN
1	C	116	ILE
2	O	4	LYS
1	d	42	ASN
1	f	14	ARG
1	f	28	ASN
1	i	14	ARG

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

Mol	Chain	Res	Type
2	G	2	GLN
3	R	374	GLN
3	R	429	ASN

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Mol	Chain	Res	Type
3	S	429	ASN
3	T	429	ASN
3	U	429	ASN
3	V	429	ASN
3	W	429	ASN
1	Y	12	ASN
1	a	12	ASN
1	b	12	ASN
1	c	99	GLN
1	d	63	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no 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.

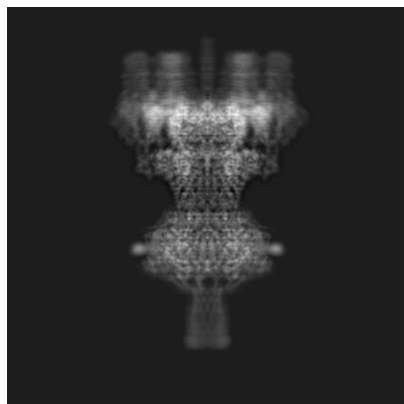
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-27793. These allow visual inspection of the internal detail of the map and identification of artifacts.

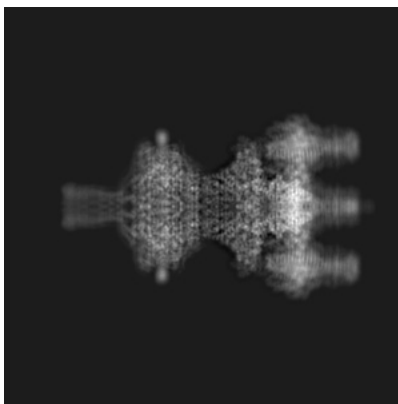
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

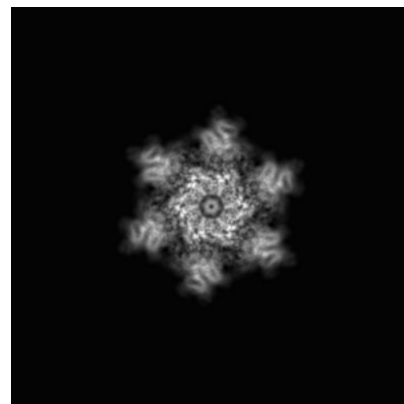
6.1.1 Primary map



X

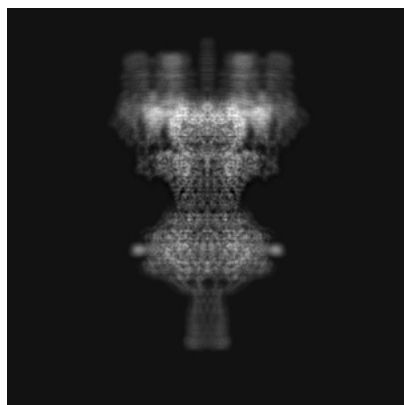


Y

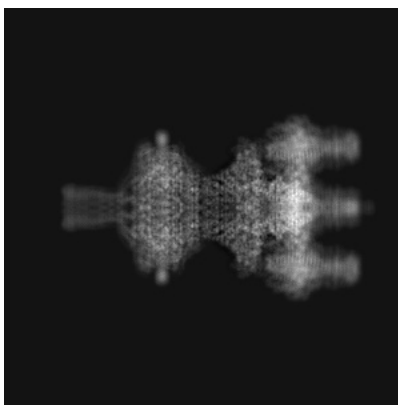


Z

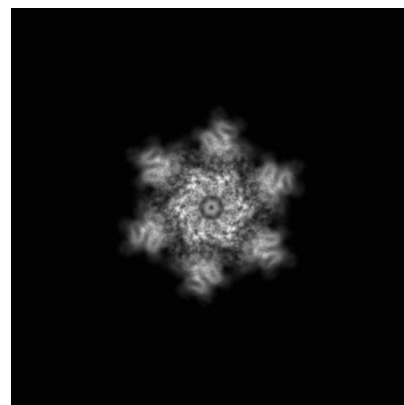
6.1.2 Raw map



X



Y

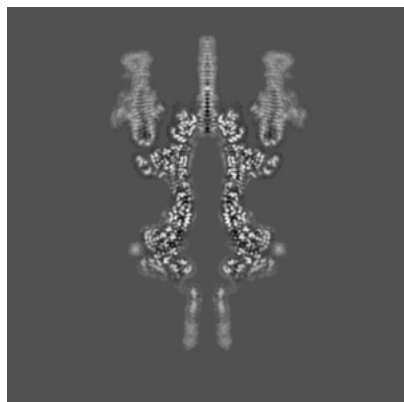


Z

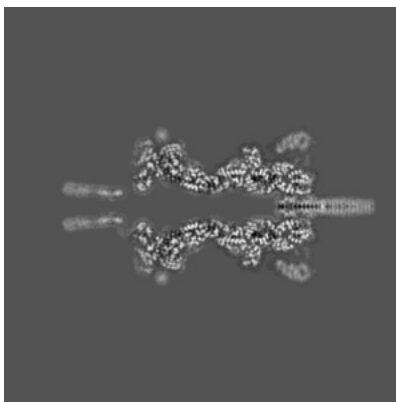
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

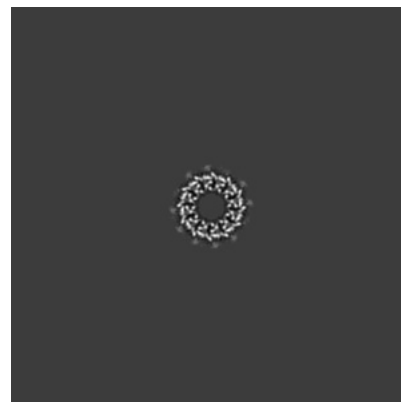
6.2.1 Primary map



X Index: 240

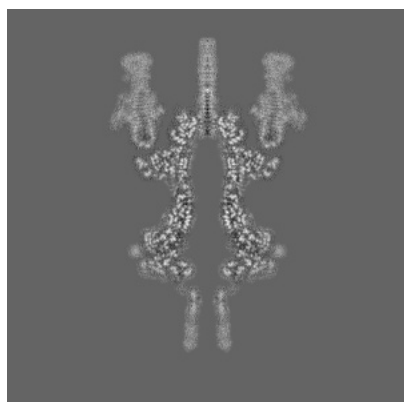


Y Index: 240

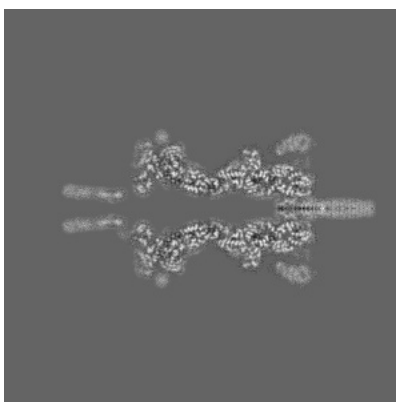


Z Index: 240

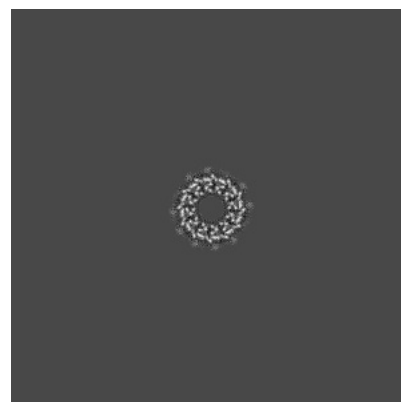
6.2.2 Raw map



X Index: 240



Y Index: 240

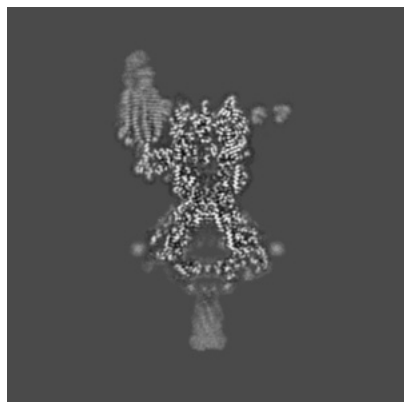


Z Index: 240

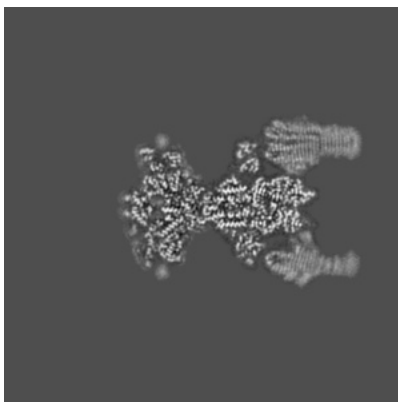
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

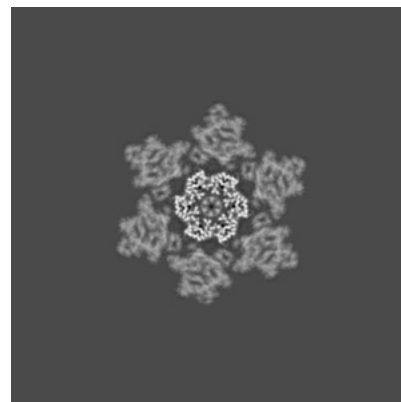
6.3.1 Primary map



X Index: 219

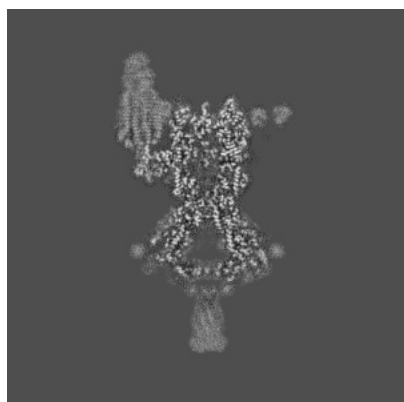


Y Index: 275

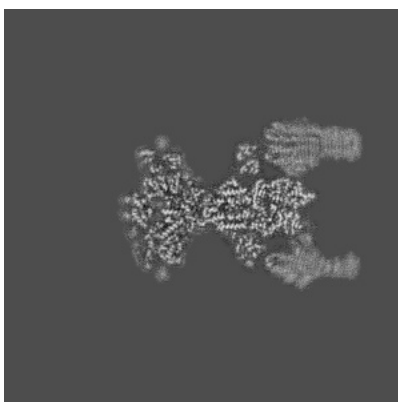


Z Index: 350

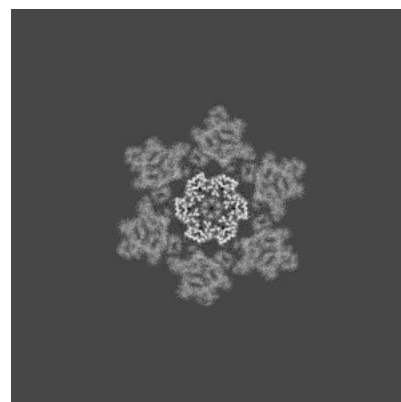
6.3.2 Raw map



X Index: 220



Y Index: 275

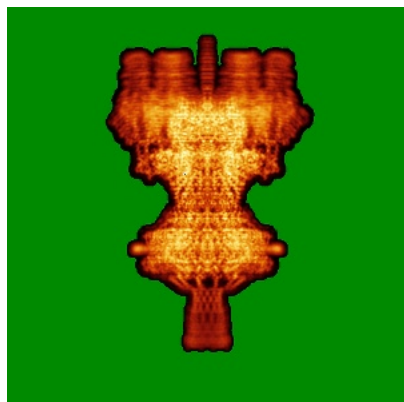


Z Index: 350

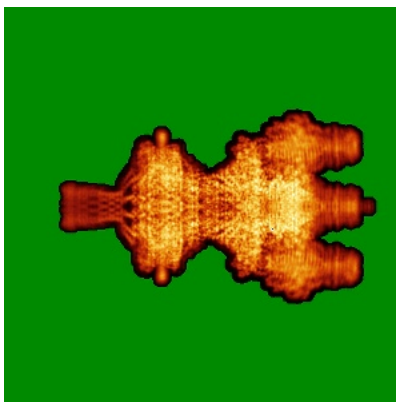
The images above show the largest variance slices of the map in three orthogonal directions.

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

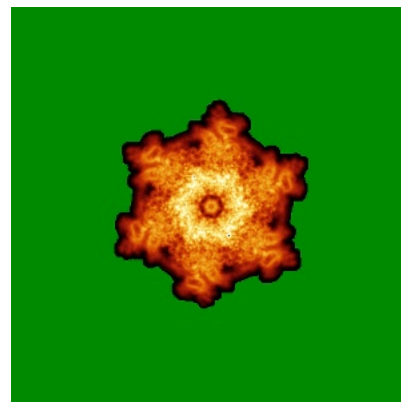
6.4.1 Primary map



X

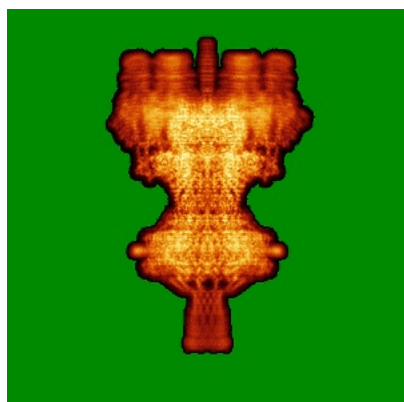


Y

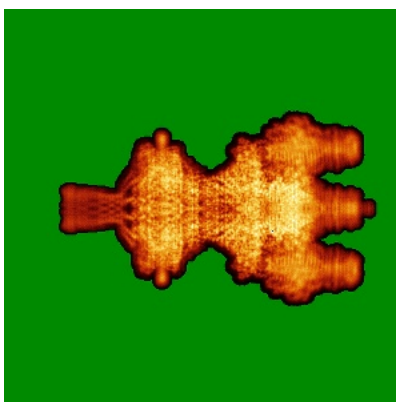


Z

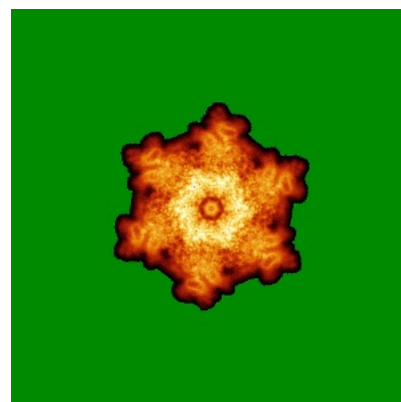
6.4.2 Raw map



X



Y

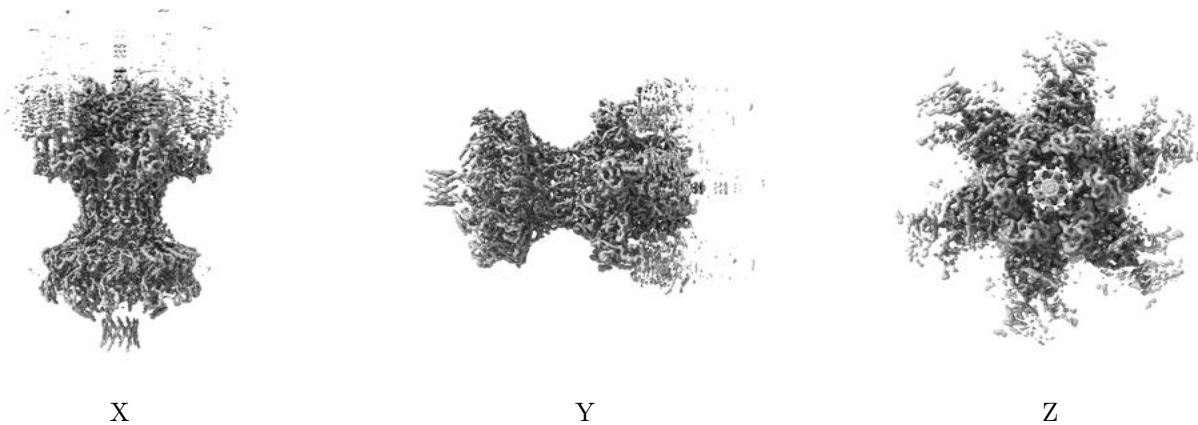


Z

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

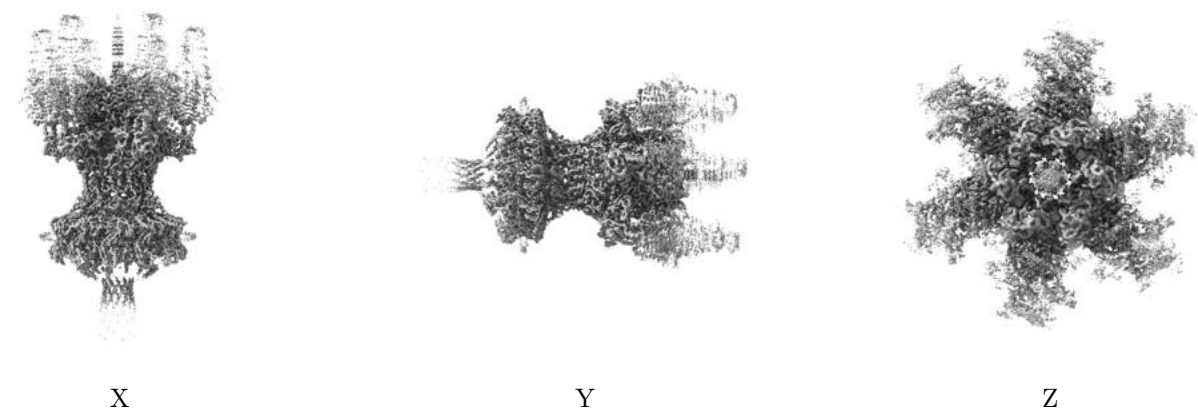
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.01. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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.

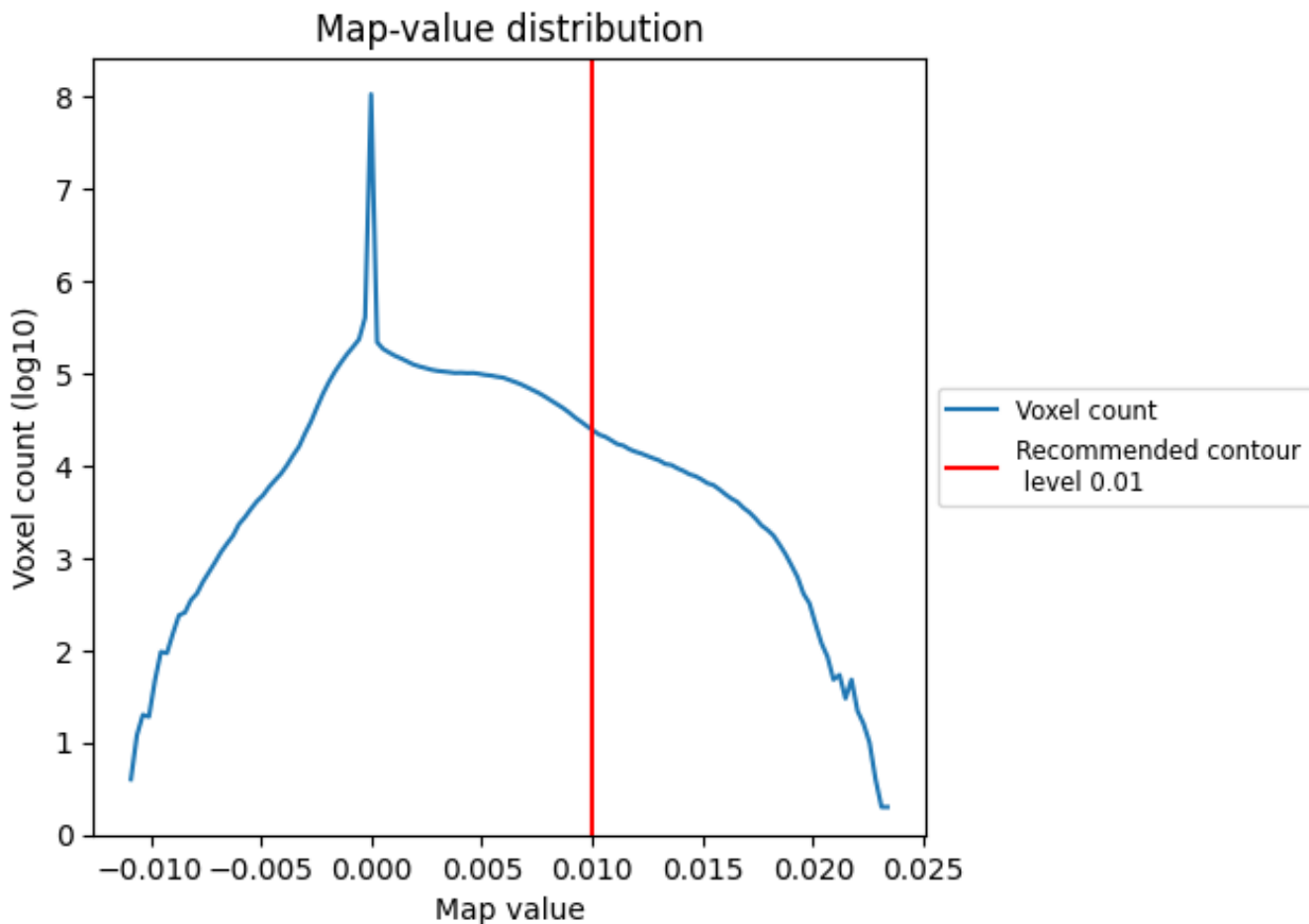
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

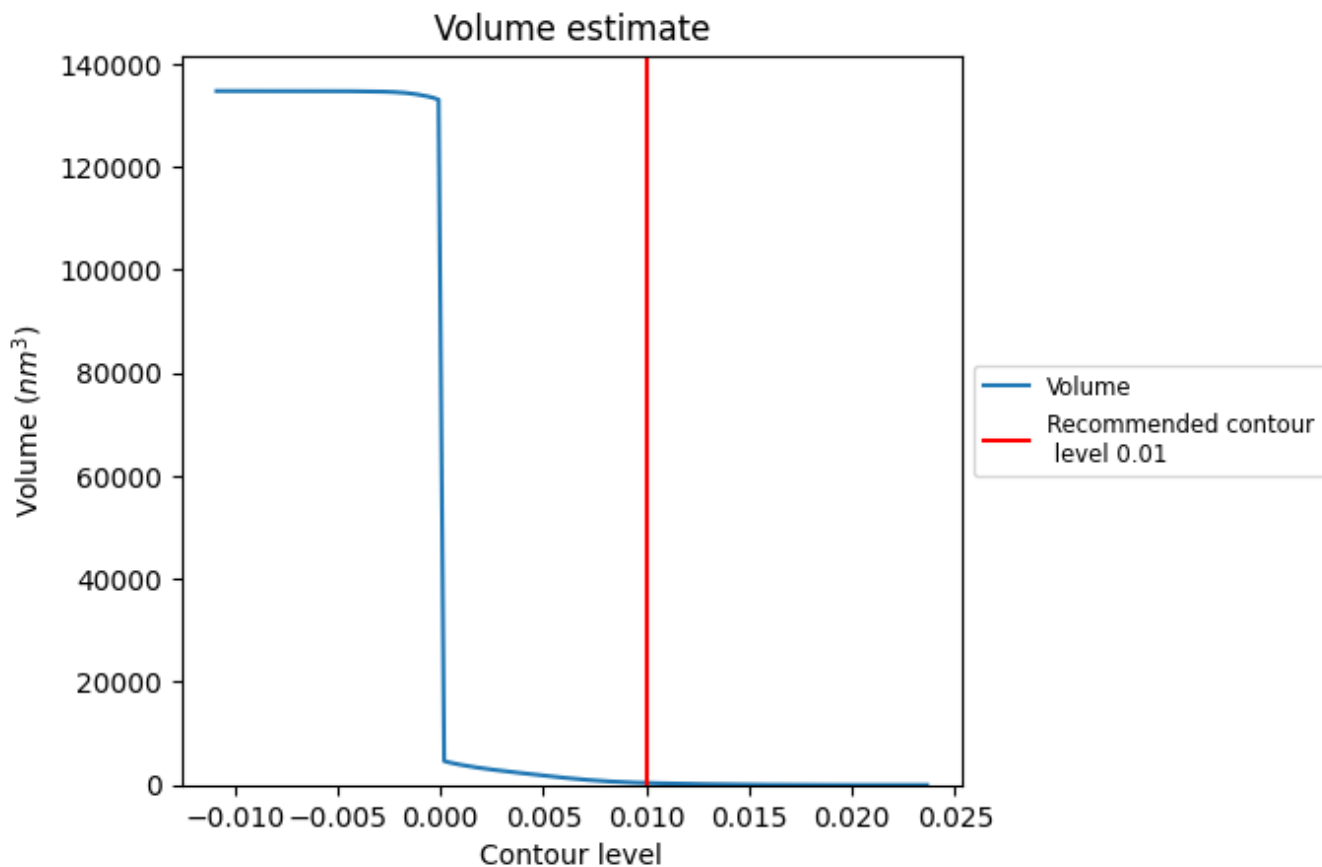
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

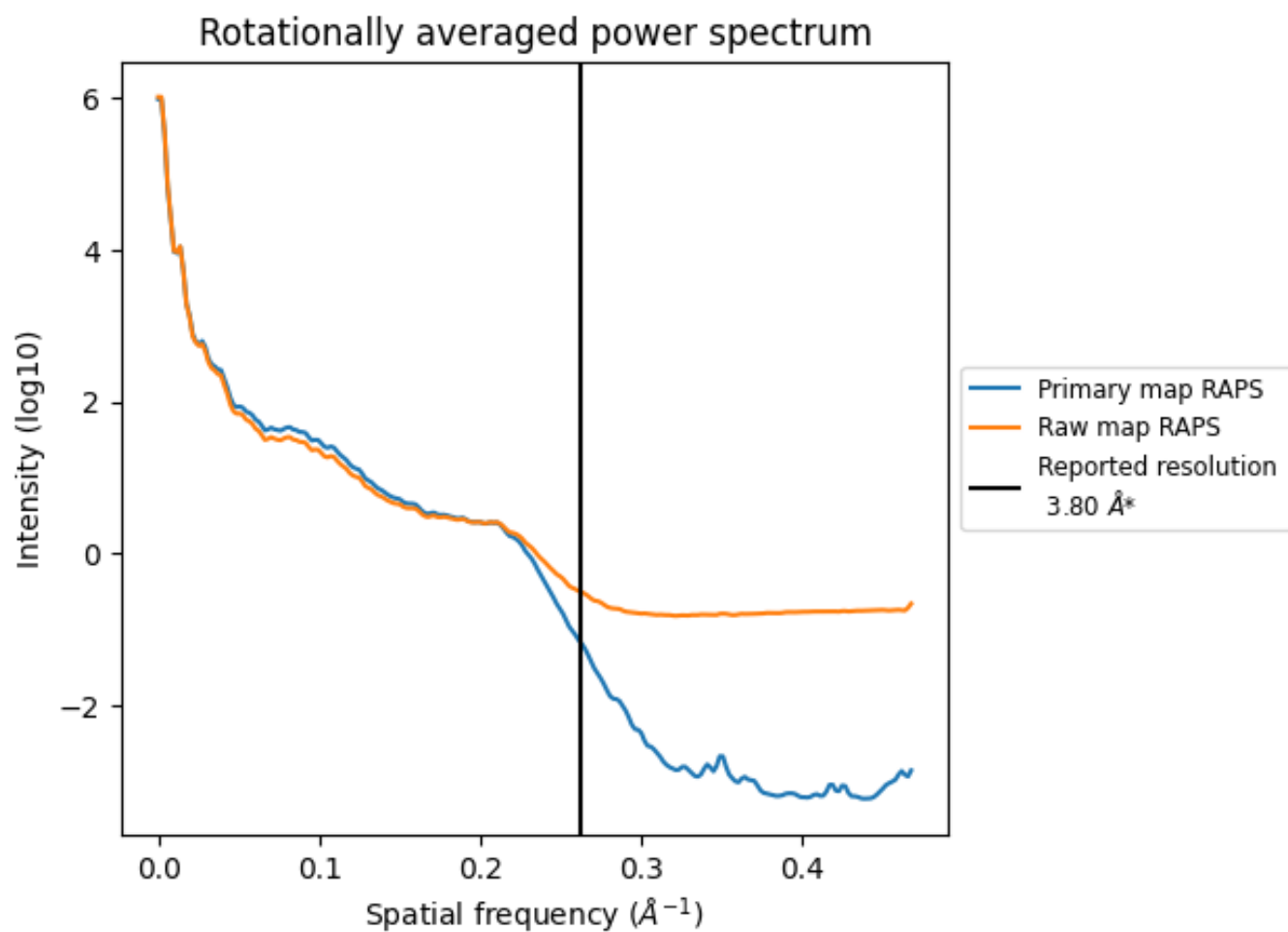
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 385 nm³; this corresponds to an approximate mass of 347 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](#)

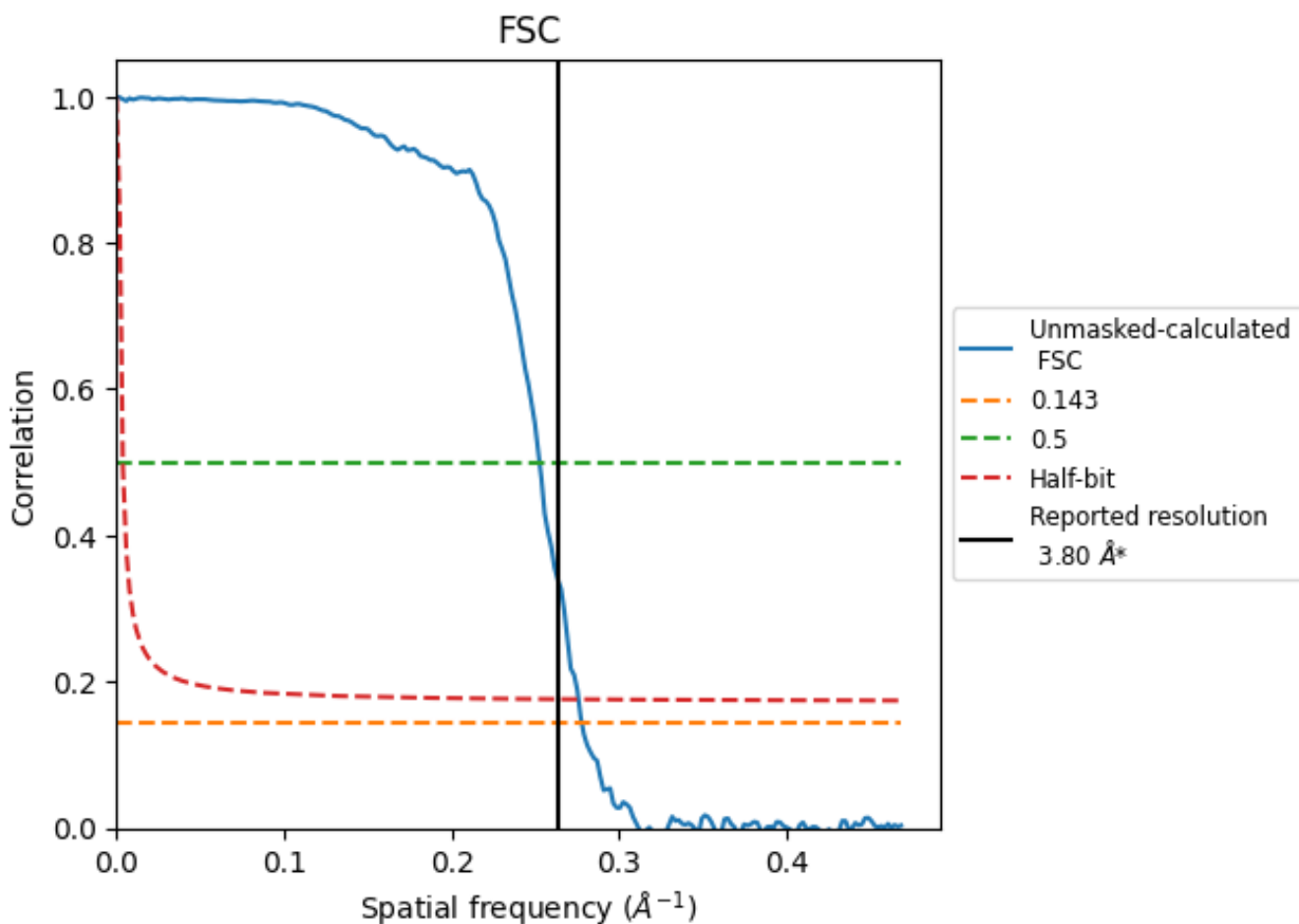


*Reported resolution corresponds to spatial frequency of 0.263 Å⁻¹

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 0.263\AA^{-1}

8.2 Resolution estimates [i](#)

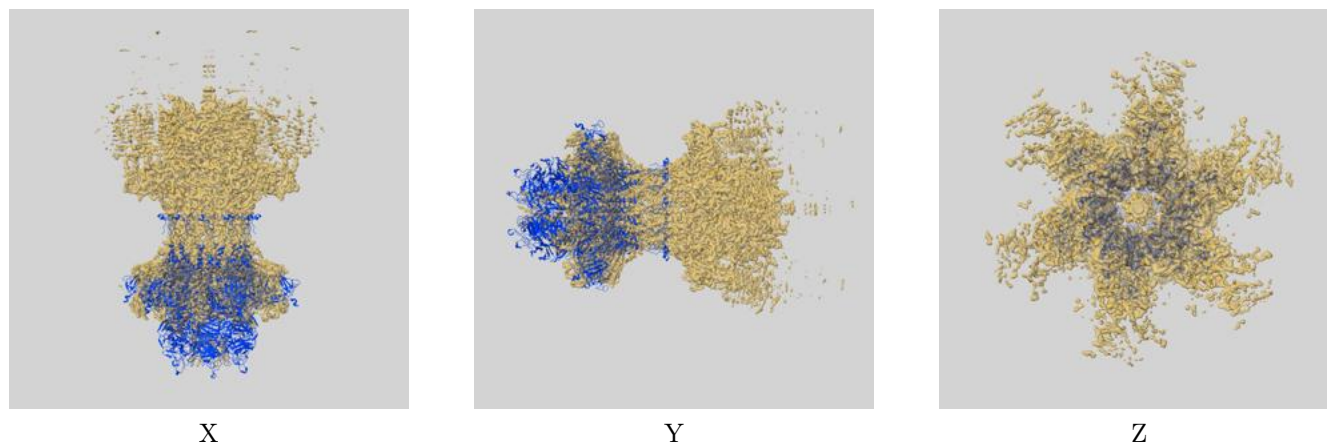
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.80	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.60	3.96	3.63

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

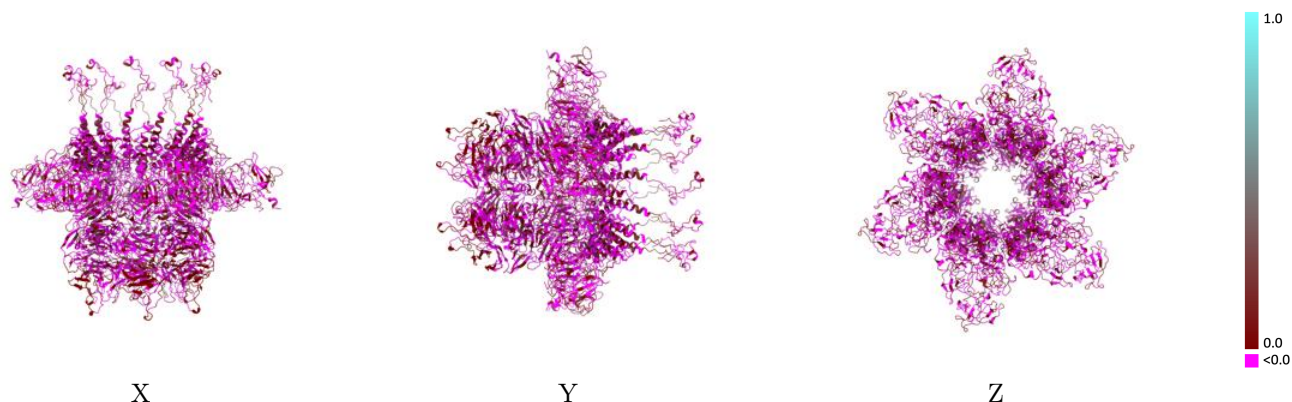
This section contains information regarding the fit between EMDB map EMD-27793 and PDB model 8EB7. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay [i](#)



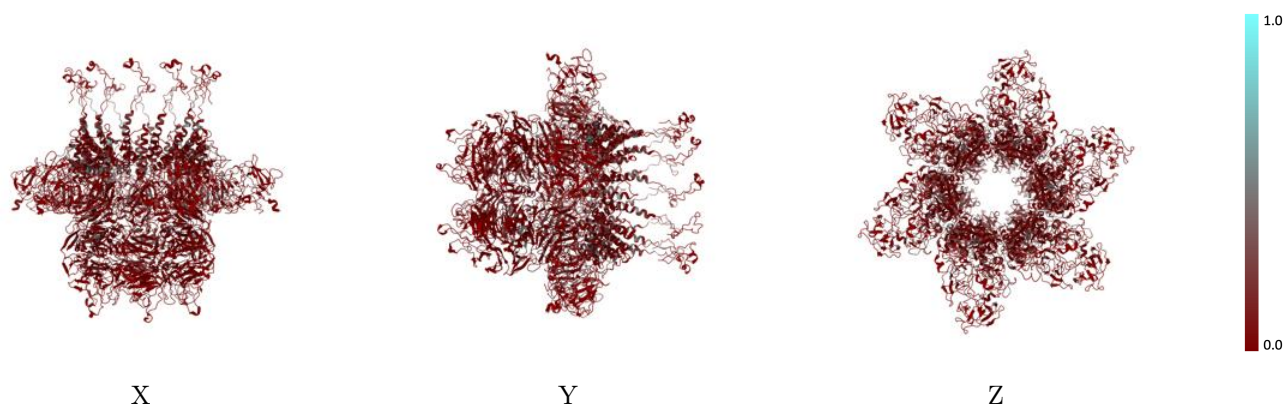
The images above show the 3D surface view of the map at the recommended contour level 0.01 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



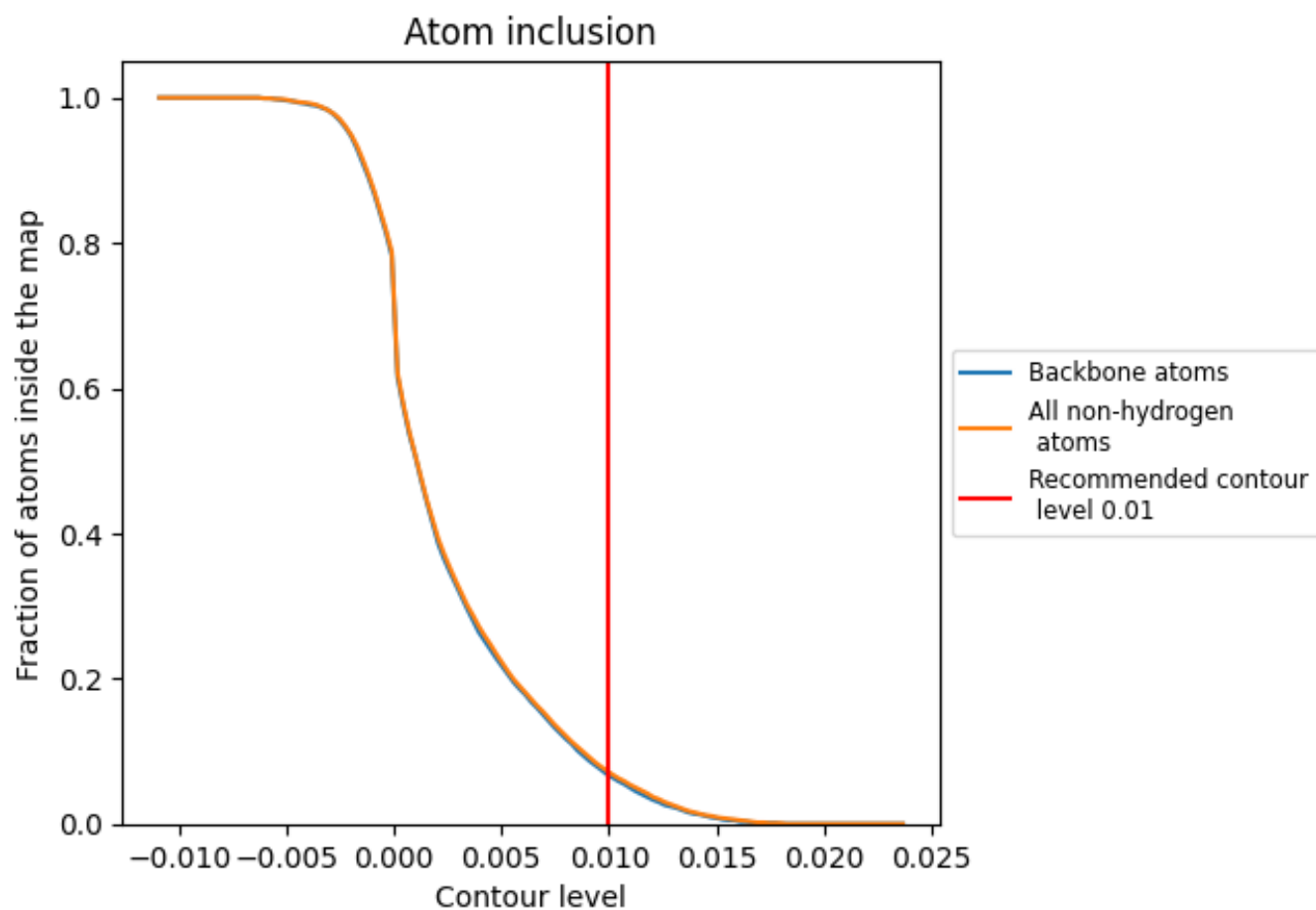
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.01).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 7% of all backbone atoms, 7% 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 (0.01) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.0710	 -0.0240
0	 0.0340	 -0.0200
A	 0.0310	 -0.0170
B	 0.0340	 -0.0130
C	 0.0310	 -0.0190
D	 0.0300	 -0.0130
E	 0.0990	 -0.0350
F	 0.0340	 -0.0100
G	 0.1010	 -0.0390
H	 0.1050	 -0.0290
I	 0.0960	 -0.0340
J	 0.0910	 -0.0390
K	 0.0990	 -0.0350
L	 0.1000	 -0.0330
M	 0.1000	 -0.0350
N	 0.1030	 -0.0380
O	 0.0990	 -0.0360
P	 0.1000	 -0.0360
Q	 0.1030	 -0.0410
R	 0.0460	 -0.0240
S	 0.0450	 -0.0240
T	 0.0460	 -0.0250
U	 0.0350	 -0.0240
V	 0.0480	 -0.0220
W	 0.0330	 -0.0190
X	 0.0900	 -0.0270
Y	 0.0890	 -0.0280
Z	 0.1340	 -0.0070
a	 0.0890	 -0.0270
b	 0.0900	 -0.0260
c	 0.0900	 -0.0280
d	 0.0880	 -0.0290
e	 0.1360	 -0.0040
f	 0.1340	 -0.0070
g	 0.1350	 -0.0080



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Chain	Atom inclusion	Q-score
h	 0.1340	 -0.0060
i	 0.1340	 -0.0080