



wwPDB EM Validation Summary Report ⓘ

Dec 10, 2022 – 10:54 pm GMT

PDB ID : 6R6H
EMDB ID : EMD-4736
Title : Structural basis of Cullin-2 RING E3 ligase regulation by the COP9 signalosome
Authors : Morris, E.P.; Faull, S.V.; Lau, A.M.C.; Politis, A.; Beuron, F.; Cronin, N.
Deposited on : 2019-03-27
Resolution : 8.40 Å(reported)

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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) : 2.31.3

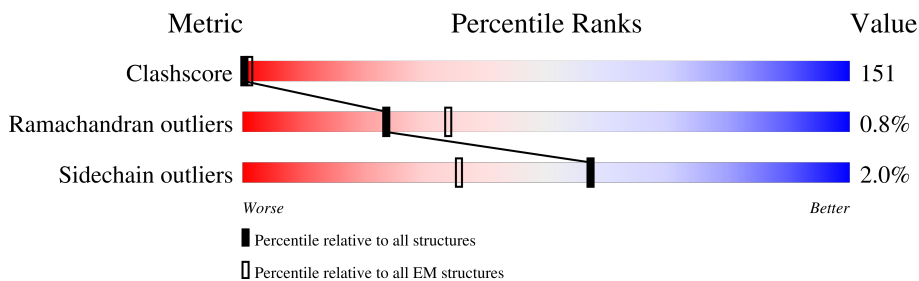
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 8.40 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	A	491	
2	B	443	
3	C	403	
4	D	406	
5	E	334	
6	F	308	
7	H	209	
8	O	745	

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Mol	Chain	Length	Quality of chain
9	P	105	<p>11% 26% 79% 7%</p>
10	Q	99	<p>48% 35% 46% 5%</p>
11	R	86	<p>16% 36% 77% 7%</p>
12	V	150	<p>15% 47% 82%</p>
13	G	206	<p>13% 26% 83%</p>

2 Entry composition [i](#)

There are 14 unique types of molecules in this entry. The entry contains 32026 atoms, of which 1420 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 COP9 signalosome complex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	419	3348	2113	588	625	22	0	0

- Molecule 2 is a protein called COP9 signalosome complex subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	428	3512	2223	593	679	17	0	0

- Molecule 3 is a protein called COP9 signalosome complex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	400	3183	2028	533	596	26	0	0

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	384	ILE	-	expression tag	UNP Q9UNS2
C	385	GLU	-	expression tag	UNP Q9UNS2
C	386	LEU	-	expression tag	UNP Q9UNS2
C	387	ASP	-	expression tag	UNP Q9UNS2
C	388	GLU	-	expression tag	UNP Q9UNS2
C	389	ARG	-	expression tag	UNP Q9UNS2
C	390	LEU	-	expression tag	UNP Q9UNS2
C	391	LYS	-	expression tag	UNP Q9UNS2
C	392	ALA	-	expression tag	UNP Q9UNS2
C	393	MET	-	expression tag	UNP Q9UNS2
C	394	ASP	-	expression tag	UNP Q9UNS2
C	395	GLN	-	expression tag	UNP Q9UNS2
C	396	GLU	-	expression tag	UNP Q9UNS2
C	397	ILE	-	expression tag	UNP Q9UNS2
C	398	THR	-	expression tag	UNP Q9UNS2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	399	VAL	-	expression tag	UNP Q9UNS2
C	400	ASN	-	expression tag	UNP Q9UNS2
C	401	PRO	-	expression tag	UNP Q9UNS2
C	402	GLN	-	expression tag	UNP Q9UNS2
C	403	PHE	-	expression tag	UNP Q9UNS2

- Molecule 4 is a protein called COP9 signalosome complex subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	405	3243	2041	565	621	16	0	0

- Molecule 5 is a protein called COP9 signalosome complex subunit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	310	2452	1562	411	466	13	0	0

- Molecule 6 is a protein called COP9 signalosome complex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F	281	2236	1429	371	421	15	0	0

- Molecule 7 is a protein called COP9 signalosome complex subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	H	172	1379	883	239	253	4	0	0

- Molecule 8 is a protein called Cullin-2.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
8	O	745	6508	3869	415	1032	1146	46	0	0

- Molecule 9 is a protein called Elongin-B.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
9	P	105	903	520	82	136	160	5	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
P	105	ALA	-	expression tag	UNP Q15370

- Molecule 10 is a protein called ELOC_HUMAN.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
10	Q	99	1577	505	782	121	165	4	0	0

- Molecule 11 is a protein called RBX1_HUMAN.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	R	86	690	433	128	120	9	0	0

- Molecule 12 is a protein called von Hippel-Lindau disease tumor suppressor.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
12	V	150	1364	776	141	226	219	2	0	0

There are 2 discrepancies between the modelled and reference sequences:

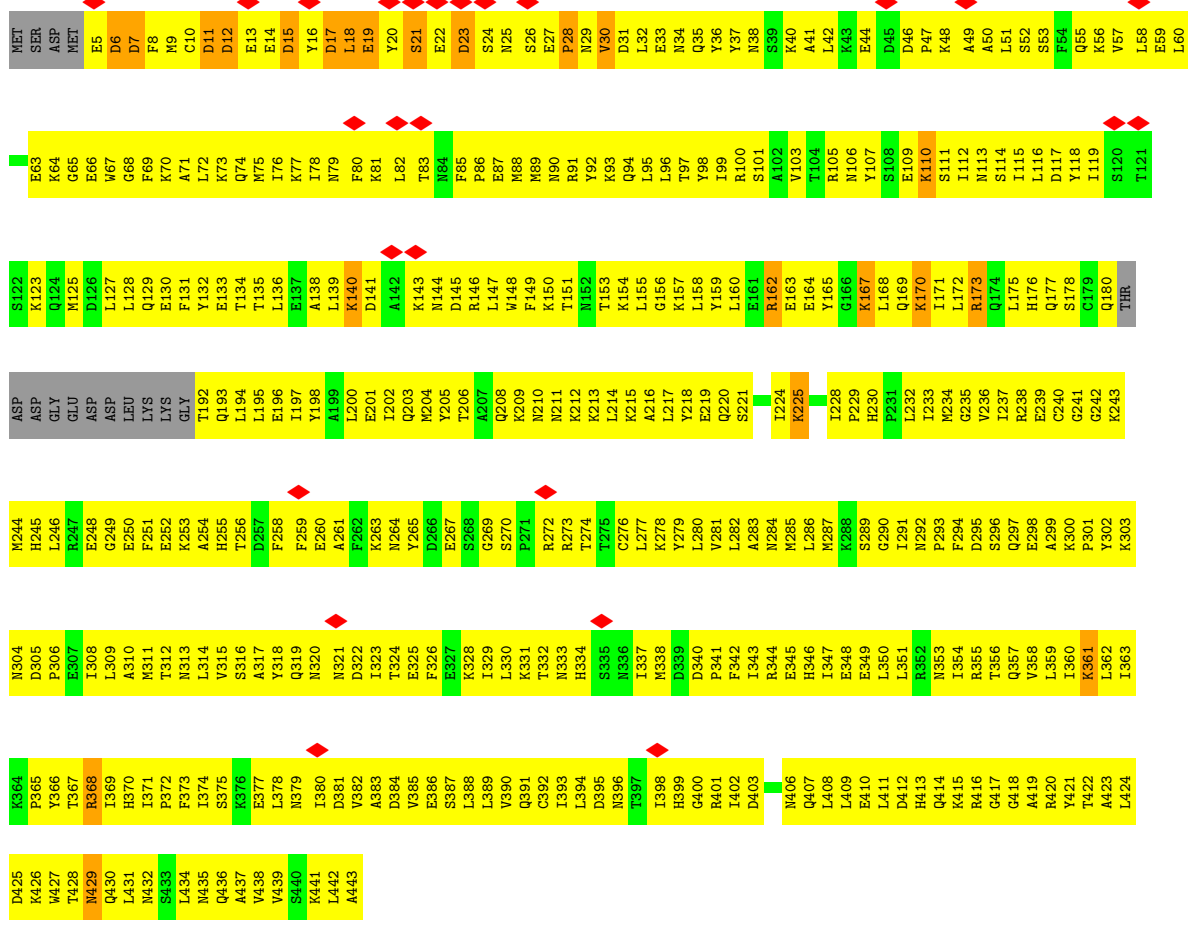
Chain	Residue	Modelled	Actual	Comment	Reference
V	208	ALA	-	expression tag	UNP P40337
V	209	ALA	-	expression tag	UNP P40337

- Molecule 13 is a protein called COP9 signalosome complex subunit 7b.

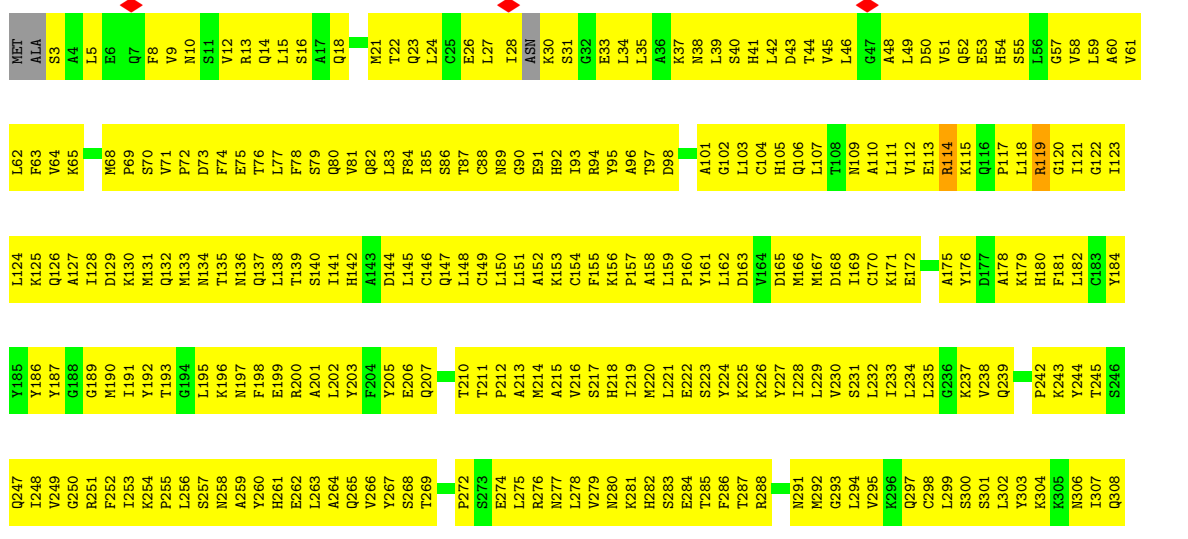
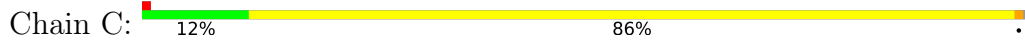
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	G	206	1630	1032	276	316	6	0	0

- Molecule 14 is ZINC ION (three-letter code: ZN) (formula: Zn).

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



• Molecule 3: COP9 signalosome complex subunit 3



R309 L310 T311 K312 T313 F314 L315 T316 T317 L318 S318 L319 Q320 Q321 M322 S323 S324 R325 V326 Q327 L328 S329 G330 P331 Q332 Q333 A334 A335 E336 K336 V337 V338 L339 H340 M341 I342 D343 G344 G345 E346 I347 F348 A349 S350 I351 N352 Q353 K354 D355 G356 M357 V358 S359 F360 H361 D362 P363 P364 E365 K366 Y367 N368

N369 P370 A371 M372 H373 H374 N375 I376 D377 S378 E379 M380 Q381 L381 K382 K383 C384 I385 E386 L386 D387 E388 R389 L390 L391 K391 A392 A393 M393 E394 Q395 E396 I397 T398 V399 M400 P401 F403

● Molecule 4: COP9 signalosome complex subunit 4

Chain D: 11% 88%

M1 A2 V5 R6 D8 L9 A10 Q11 L12 M13 M14 N15 S16 P17 H19 K20 D21 L22 A23 G24 K25 Y26 R27 Q28 T29 I30 L31 E32 K32 K33 A34 I35 Q35 L36 S37 S38 G39 A39 E40 Q41 L42 E43 E44 A45 L46 K46 A47 F48 E49 V50 M51 M52 V53 N54 E55 N56 V57 S58 L59 V60 I61 S62

B63 G64 L65 L66 T67 R68 F69 C70 T71 L72 H73 L74 P74 M75 L76 P77 D78 S79 T80 A81 K82 E83 T84 Y85 H86 R87 T88 E89 L90 E91 K91 I92 Q93 P94 R95 V96 I97 S98 F99 E100 E101 Q102 V103 E104 S105 I106 R107 Q108 F109 H110 A111 S112 I113 Y114 E115 E118 D119 W120 R121 M122 I123

A124 Q125 V126 L127 M128 A129 I130 P131 L132 T133 T134 G135 Q136 Q137 Q138 Q139 M140 V141 D142 L143 K144 E145 L146 T147 Y148 L149 K150 M151 I152 R153 L154 Y155 L156 E157 D159 A164 E165 A166 V167 I168 M169 R170 A171 S172 L173 L174 Q175 E176 E177 S178 T179 E181 Q182 L183 Q184 I185 H186

Y187 K188 V189 Y191 D192 R193 L194 L195 D196 R198 R199 K200 F201 E202 E203 A204 A205 Q206 R207 M208 M209 E210 L211 S212 Y213 T214 T215 T216 I217 H218 E219 S220 R221 R222 L223 E224 A225 K226 K227 H228 A229 L230 H231 C232 T233 I234 L235 A236 S237 A238 G239 Q240 R241 R242 S243 R244 M245 E246 L247

A247 Z248 L249 F250 K251 D252 E253 R254 C255 D256 M258 A259 A260 Y261 E262 I263 L264 A265 E266 K267 M268 L269 M270 R271 L272 T273 R274 G275 M276 Q277 L278 Q279 E280 F281 A282 A283 M284 L285 M286 P287 H288 Q289 K290 A291 T292 T293 A294 D295 G296 S297 S298 V300 L300 R301 A302 A303 A304

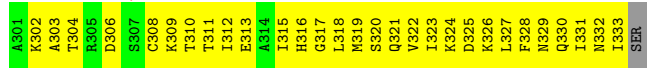
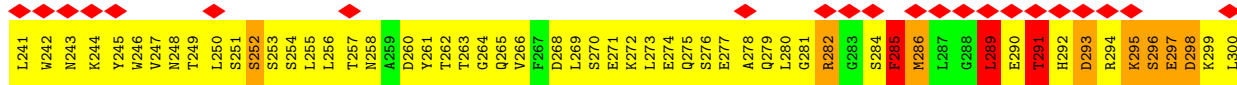
H307 N308 L309 M310 S311 A312 S313 K314 L315 M316 S317 N318 M319 L319 T320 F321 E322 N323 E324 L324 A325 G326 A326 L327 L328 E329 I330 P331 A332 A333 K334 A335 W336 K337 A338 A339 S340 K341 M342 I343 T344 E345 G346 R347 M348 N349 G350 F351 D352 D353 Q354 I355 D356 G357 I358 V359 H360 F361 E362 T363 R364 E365 A366

L367 P368 W370 D371 K372 Q373 I374 Q375 L376 S377 L378 F379 Q380 V381 N382 N383 L384 L385 E386 K387 L388 S389 Q390 T391 A392 P393 E394 W395 T396 A397 Q398 M400 E401 A402 Q403 M404 A405 Q406

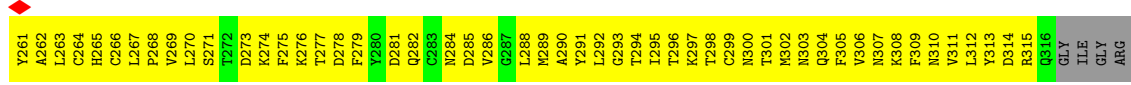
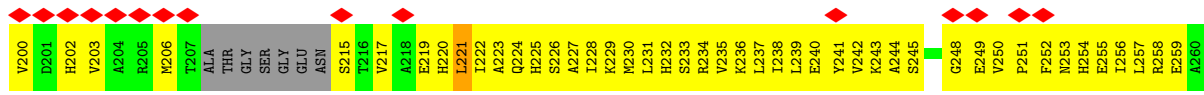
● Molecule 5: COP9 signalosome complex subunit 5

Chain E: 10% 71% 78% 7%

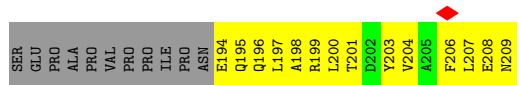
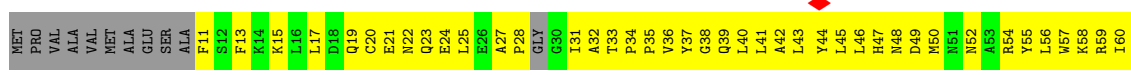
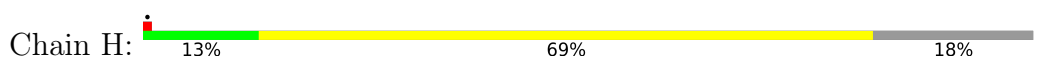
MET ALA SER GLY MET ALA GLN THR TRP GLU LEU ALA ASN MET MET GLN ALA S24 I25 D26 E27 I28 I29 Y30 K30 Y31 D32 K33 K34 Q35 Q36 Q37 E38 I39 S39 A41 A42 K43 P44 W45 T46 K47 D48 H49 H50 Y51 F52 K53 Q54 C55 K56 I57 S58 A59 L60 A61 L62 E63 K64 V65 V66 M67 H68 A69 R70 S71 G72 G73 N74 L75 E76 W77 M78 G79 L80 M81 L82 G83 K84 Y85 V86 D86 G87 E88 T89 I91 I92 M93 S93 D94 S95 A96 F97 L98 P99 V100 E101 G102 T103 E104 H104 F105 R106 V107 M108 Q109 A110 A111 D111 A112 A113 T113 R114 E115 M117 A118 A119 Y120 I121 E122 N123 A124 K125 Q126 M127 G128 R129 L130 E131 N132 A133 A134 G135 V136 Y137 H138 S139 H140 P141 E142 Y143 Y144 Q145 T146 I147 S148 G149 D150 D151 V152 S153 D154 Q155 M156 L157 N158 P159 Q160 F161 Q162 E163 P164 F165 V166 A167 V168 I169 D170 D171 P172 T173 R174 T175 I176 S177 A178 G179 K180 V181 N182 L183 G184 A185 F186 T187 T188 Y189 K191 G192 Y193 K194 P195 P196 D197 E198 G199 P200 S201 E202 Y203 Q204 T205 T206 P207 L208 N209 K210 I211 E212 D213 F214 G215 V216 H217 C218 K219 Q220 Y221 Y222 A223 L224 E225 V226 S227 Y228 F229 K230 S231 S232 L233 D234 R235 K236 L237 R238 E239 L240



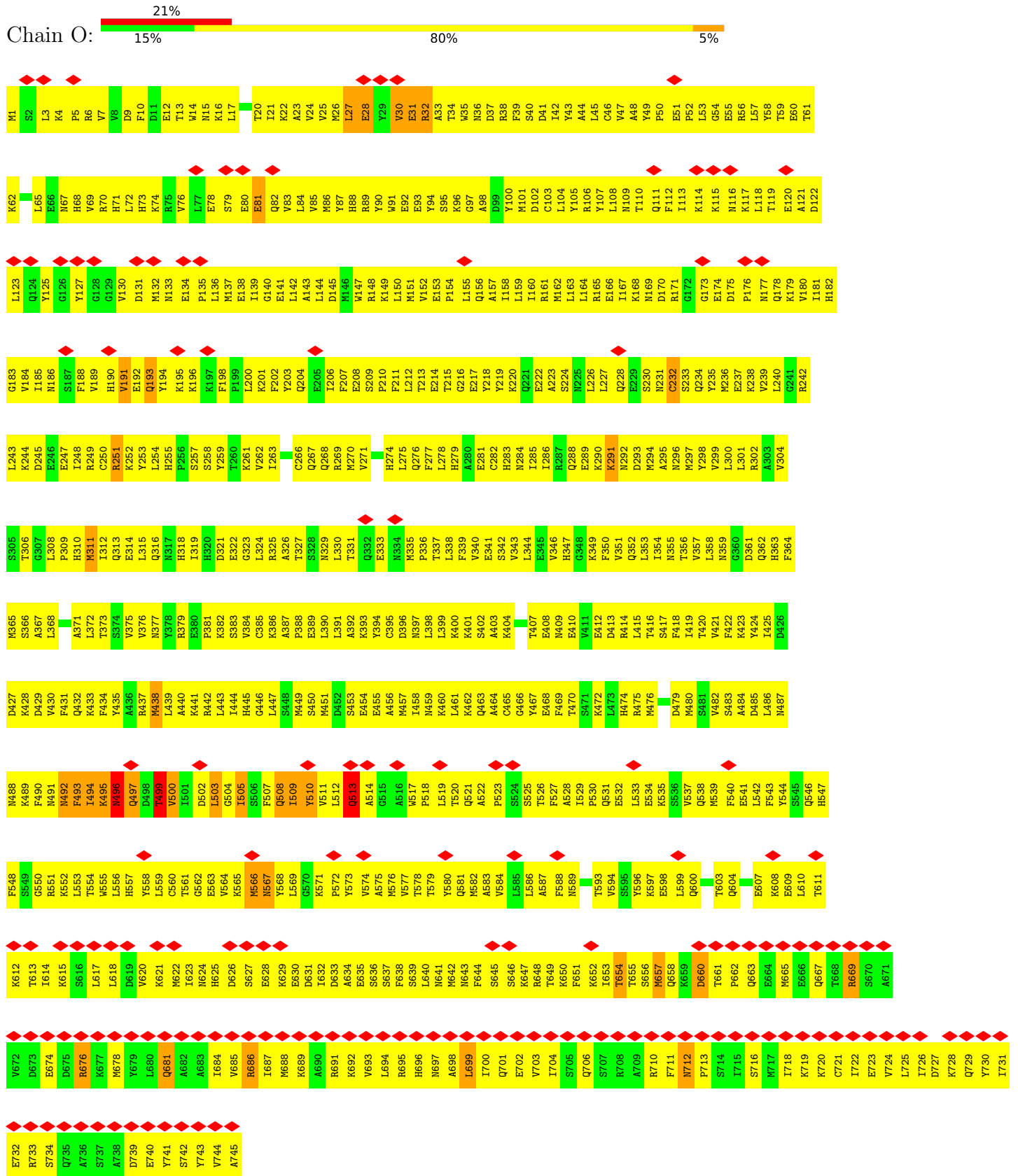
• Molecule 6: COP9 signalosome complex subunit 6



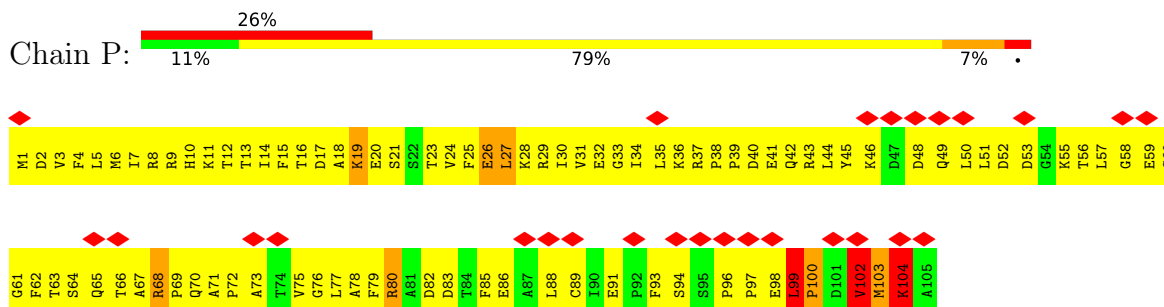
• Molecule 7: COP9 signalosome complex subunit 8



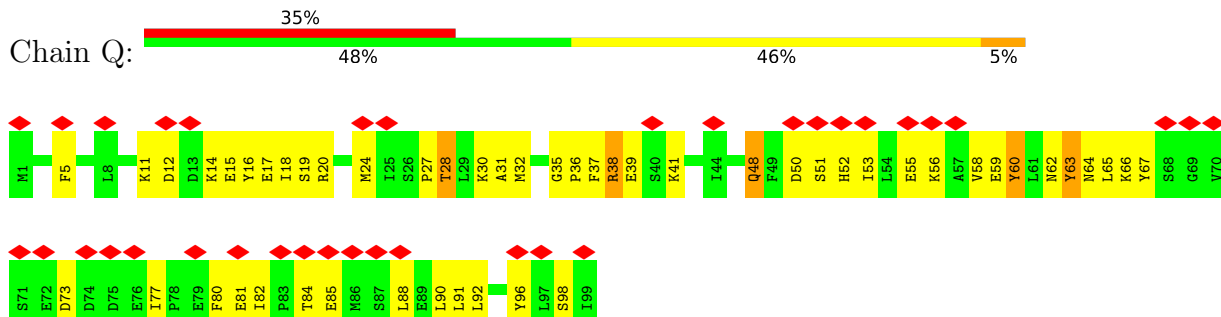
• Molecule 8: Cullin-2



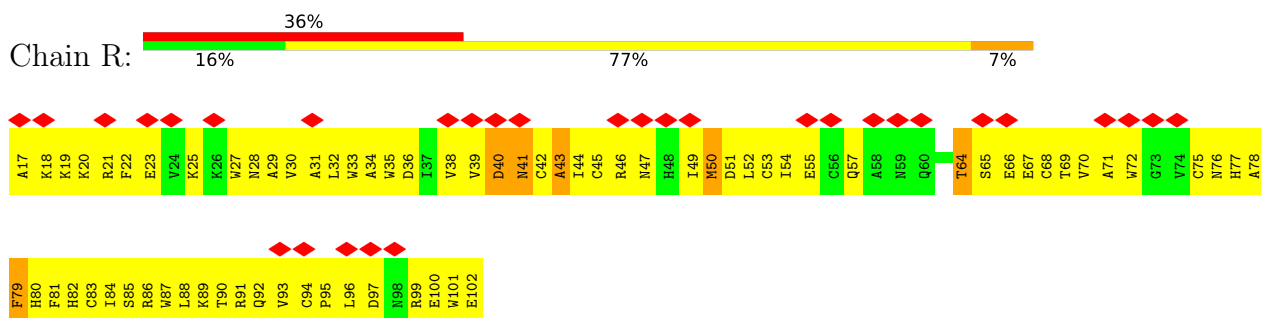
• Molecule 9: Elongin-B



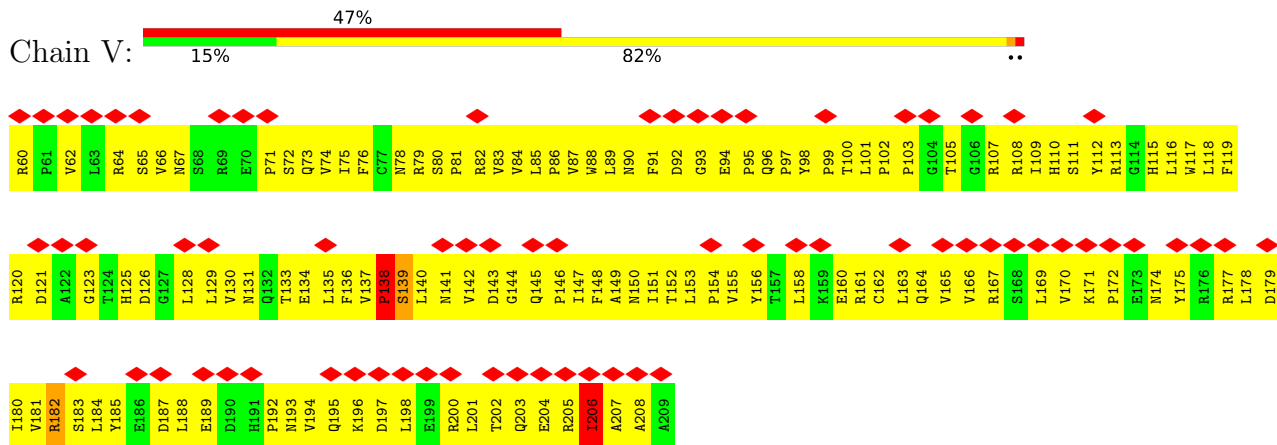
• Molecule 10: ELOC_HUMAN



• Molecule 11: RBX1_HUMAN



• Molecule 12: von Hippel-Lindau disease tumor suppressor



• Molecule 13: COP9 signalosome complex subunit 7b



SS	M10	L11	L12	E13	Q14	F15	I16	L17	L18	A19	K20	G21	T22	S23	G24	S25	A26	L27	L28	A29	L30	I31	S32	Q33	V34	L35	E36	A37	F38	G39	V40	Y41	V42	F43	O44	E45	L46	L47	E48	L49	A50	N51	V52	O53	E54	L55	A56	E57	O58	A59	N60	A61	Y62	Y63	L64	O65	L66	L67	N68
L69	F70	A71	Y72	G73	T74	Y75	F76	D77	Y78	I79	A80	N81	K82	E83	S84	L85	P86	E87	L88	S89	T90	A91	O92	O93	N94	K95	L96	K97	H98	L99	T100	I101	V102	S103	L104	A105	S106	R107	M108	K109	C110	L111	P112	Y113	S114	V115	L116	L117	K118	D119	L120	E121	M122	R123	N124	L125	R126	E127	L128
E129	D130	L131	I132	I133	E134	A135	V136	Y137	T138	D139	I140	I141	Q142	G143	K144	L145	D146	O147	R148	M149	Q150	L151	L152	E153	V154	D155	F156	C157	I158	G159	R160	D161	I162	R163	K164	K165	D166	I167	M168	N169	I170	V171	K172	T173	L174	H175	E176	W177	G178	D179	G180	C181	E182	A183	V184	L185	L186	G187	I188
E189	Q190	Q191	V192	L193	R194	A195	M196	Q197	Y198	K199	E200	N201	H202	R203	R204	T205	Q206	Q207	Q208	V209	E210	A211	E212	V213	T214																																		

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	24040	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 ($e^-/\text{\AA}^2$)	45	Depositor
Minimum defocus (nm)	1800	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	47170	Depositor
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	20.682	Depositor
Minimum map value	-5.749	Depositor
Average map value	0.000	Depositor
Map value standard deviation	1.000	Depositor
Recommended contour level	6.0	Depositor
Map size (Å)	317.99997, 317.99997, 317.99997	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.06, 1.06, 1.06	Depositor

5 Model quality i

5.1 Standard geometry i

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

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.34	0/3404	0.53	1/4588 (0.0%)
2	B	0.32	0/3572	0.57	8/4807 (0.2%)
3	C	0.33	0/3241	0.52	0/4376
4	D	0.33	0/3291	0.50	1/4437 (0.0%)
5	E	0.46	3/2503 (0.1%)	1.21	10/3378 (0.3%)
6	F	0.34	0/2279	0.61	1/3083 (0.0%)
7	H	0.31	0/1411	0.48	0/1916
8	O	0.75	6/6206 (0.1%)	0.96	11/8350 (0.1%)
9	P	1.00	3/836 (0.4%)	1.84	8/1129 (0.7%)
10	Q	0.55	0/808	0.87	1/1087 (0.1%)
11	R	0.40	0/706	0.66	0/955
12	V	0.39	1/1252 (0.1%)	1.33	5/1705 (0.3%)
13	G	0.95	1/1650 (0.1%)	1.31	4/2234 (0.2%)
All	All	0.53	14/31159 (0.0%)	0.86	50/42045 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
2	B	0	1
3	C	0	1
4	D	0	1
5	E	0	4
6	F	0	1
8	O	0	9
9	P	0	4
10	Q	0	2
11	R	0	6

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Mol	Chain	#Chirality outliers	#Planarity outliers
12	V	0	4
13	G	0	2
All	All	0	37

The worst 5 of 14 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	O	499	THR	C-N	-37.18	0.48	1.34
9	P	102	VAL	C-N	-21.83	0.83	1.34
9	P	99	LEU	C-N	14.17	1.61	1.34
5	E	252	SER	C-N	10.99	1.59	1.34
13	G	172	LYS	C-N	-10.44	1.10	1.34

The worst 5 of 50 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	O	499	THR	O-C-N	-52.98	37.93	122.70
12	V	138	PRO	CA-C-N	-42.65	23.38	117.20
5	E	252	SER	C-N-CA	-39.14	23.84	121.70
9	P	104	LYS	O-C-N	-35.51	65.89	122.70
9	P	102	VAL	CA-C-N	-31.27	48.40	117.20

There are no chirality outliers.

5 of 37 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	110	LEU	Peptide
1	A	91	TYR	Peptide
2	B	83	THR	Peptide
3	C	114	ARG	Peptide
4	D	309	LEU	Peptide

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3348	0	3381	866	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	3512	0	3490	1227	0
3	C	3183	0	3201	848	0
4	D	3243	0	3231	992	0
5	E	2452	0	2389	1178	0
6	F	2236	0	2216	1002	0
7	H	1379	0	1362	380	0
8	O	6093	415	6048	2116	0
9	P	821	82	807	469	0
10	Q	795	782	776	444	0
11	R	690	0	648	560	0
12	V	1223	141	1221	427	0
13	G	1630	0	1650	712	0
14	E	1	0	0	0	0
All	All	30606	1420	30420	9193	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 151.

The worst 5 of 9193 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:P:15:PHE:CD2	10:Q:16:TYR:HB3	1.15	1.66
2:B:14:GLU:HB3	2:B:18:LEU:CD1	1.20	1.65
10:Q:91:LEU:HD23	12:V:184:LEU:CD1	1.19	1.65
8:O:49:TYR:CE1	10:Q:92:LEU:HD11	1.26	1.64
9:P:93:PHE:CE1	10:Q:16:TYR:HE2	1.10	1.63

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	415/491 (84%)	340 (82%)	75 (18%)	0	100	100
2	B	423/443 (96%)	367 (87%)	52 (12%)	4 (1%)	17	57
3	C	396/403 (98%)	328 (83%)	68 (17%)	0	100	100
4	D	395/406 (97%)	337 (85%)	58 (15%)	0	100	100
5	E	302/334 (90%)	240 (80%)	56 (18%)	6 (2%)	7	38
6	F	271/308 (88%)	224 (83%)	47 (17%)	0	100	100
7	H	166/209 (79%)	147 (89%)	19 (11%)	0	100	100
8	O	733/745 (98%)	588 (80%)	135 (18%)	10 (1%)	11	46
9	P	101/105 (96%)	76 (75%)	21 (21%)	4 (4%)	3	23
10	Q	97/99 (98%)	81 (84%)	14 (14%)	2 (2%)	7	36
11	R	82/86 (95%)	59 (72%)	22 (27%)	1 (1%)	13	50
12	V	144/150 (96%)	118 (82%)	25 (17%)	1 (1%)	22	63
13	G	204/206 (99%)	190 (93%)	11 (5%)	3 (2%)	10	46
All	All	3729/3985 (94%)	3095 (83%)	603 (16%)	31 (1%)	24	60

5 of 31 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	30	VAL
5	E	290	GLU
5	E	297	GLU
8	O	500	VAL
8	O	513	GLN

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	365/429 (85%)	363 (100%)	2 (0%)	88	93
2	B	392/405 (97%)	381 (97%)	11 (3%)	43	65
3	C	357/359 (99%)	354 (99%)	3 (1%)	81	89

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	D	346/347 (100%)	342 (99%)	4 (1%)	71	83
5	E	262/283 (93%)	256 (98%)	6 (2%)	50	70
6	F	251/270 (93%)	251 (100%)	0	100	100
7	H	144/173 (83%)	143 (99%)	1 (1%)	84	90
8	O	679/681 (100%)	654 (96%)	25 (4%)	34	58
9	P	91/92 (99%)	88 (97%)	3 (3%)	38	61
10	Q	90/90 (100%)	84 (93%)	6 (7%)	16	41
11	R	73/75 (97%)	73 (100%)	0	100	100
12	V	138/138 (100%)	136 (99%)	2 (1%)	67	80
13	G	179/179 (100%)	174 (97%)	5 (3%)	43	65
All	All	3367/3521 (96%)	3299 (98%)	68 (2%)	57	74

5 of 68 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
10	Q	38	ARG
10	Q	64	ASN
13	G	140	ILE
5	E	296	SER
5	E	295	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 119 such sidechains are listed below:

Mol	Chain	Res	Type
5	E	49	HIS
11	R	76	ASN
6	F	232	HIS
10	Q	62	ASN
13	G	206	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](#)

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
8	O	6
5	E	4
4	D	3
9	P	3
6	F	3
12	V	3
2	B	1
11	R	1
13	G	1

The worst 5 of 25 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	D	315:LEU	C	316:TYR	N	14.37
1	B	192:THR	C	193:GLN	N	11.96
1	O	693:VAL	C	694:LEU	N	4.82
1	P	29:ARG	C	30:ILE	N	4.76
1	D	389:SER	C	390:GLN	N	3.72

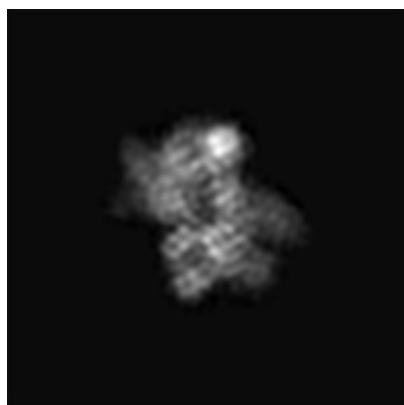
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-4736. These allow visual inspection of the internal detail of the map and identification of artifacts.

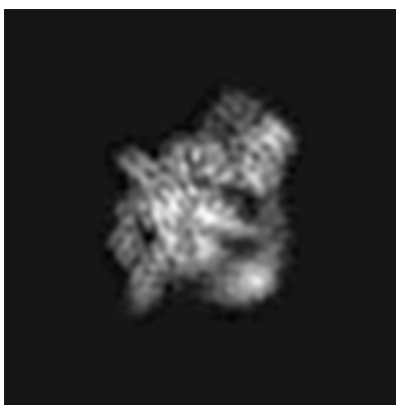
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

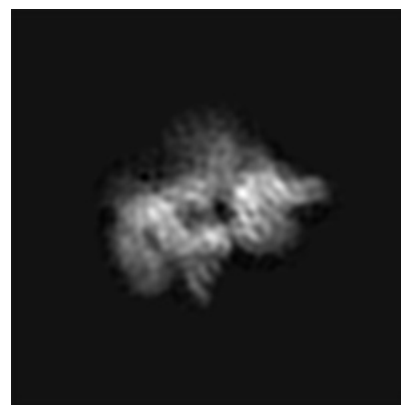
6.1.1 Primary map



X



Y



Z

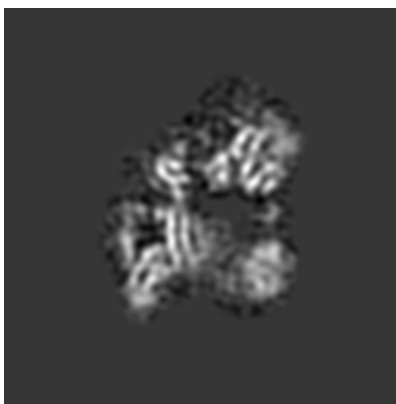
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 150



Y Index: 150



Z Index: 150

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: 179



Y Index: 159

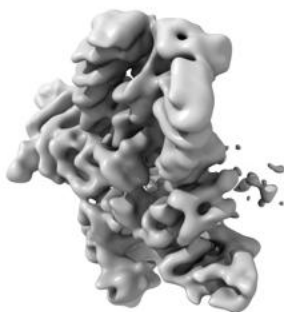


Z Index: 191

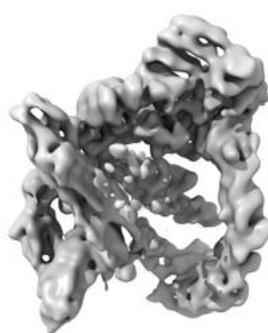
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

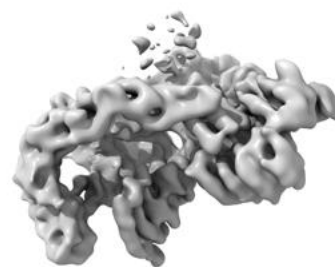
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 6.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

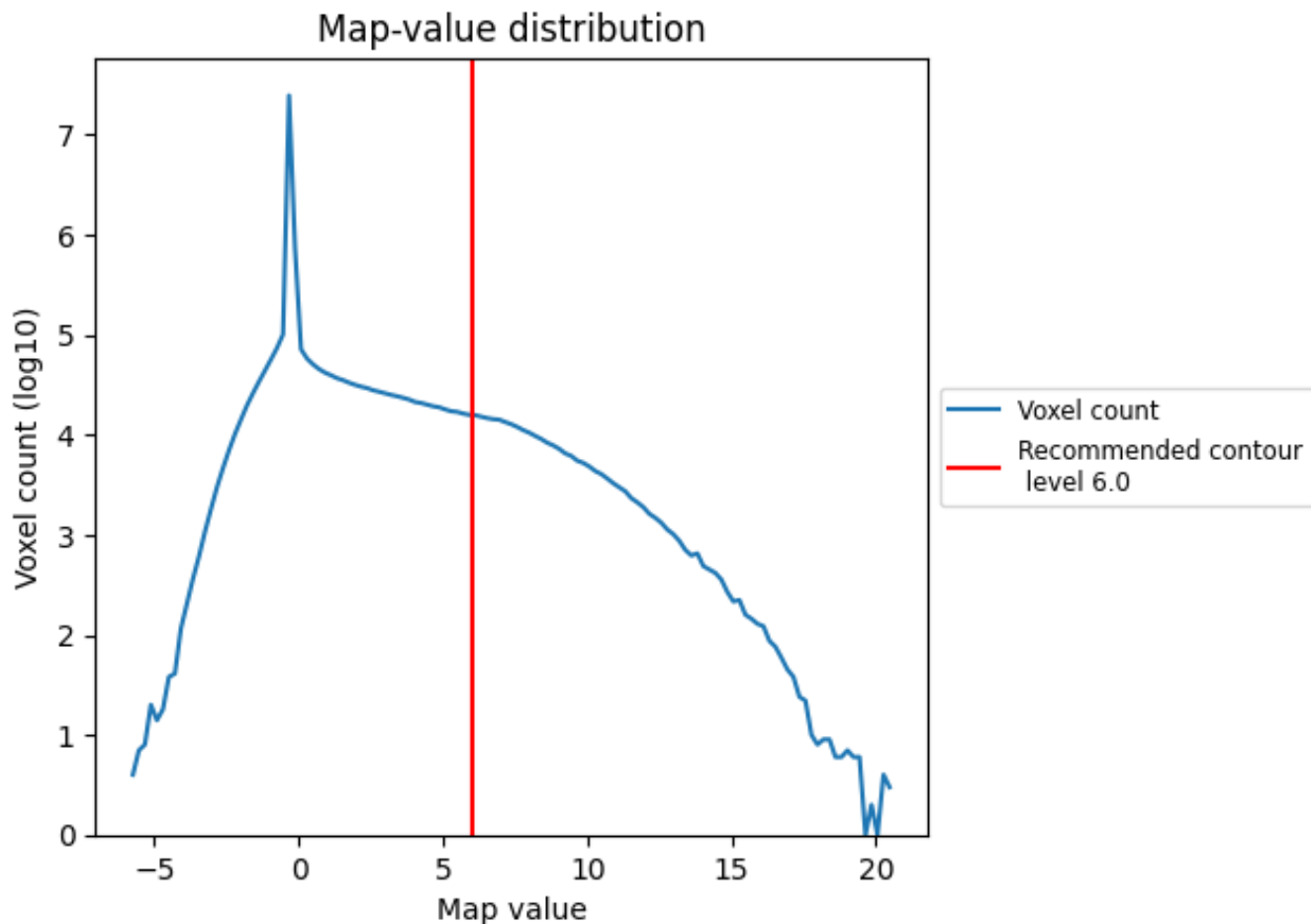
6.5 Mask visualisation

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

7 Map analysis [i](#)

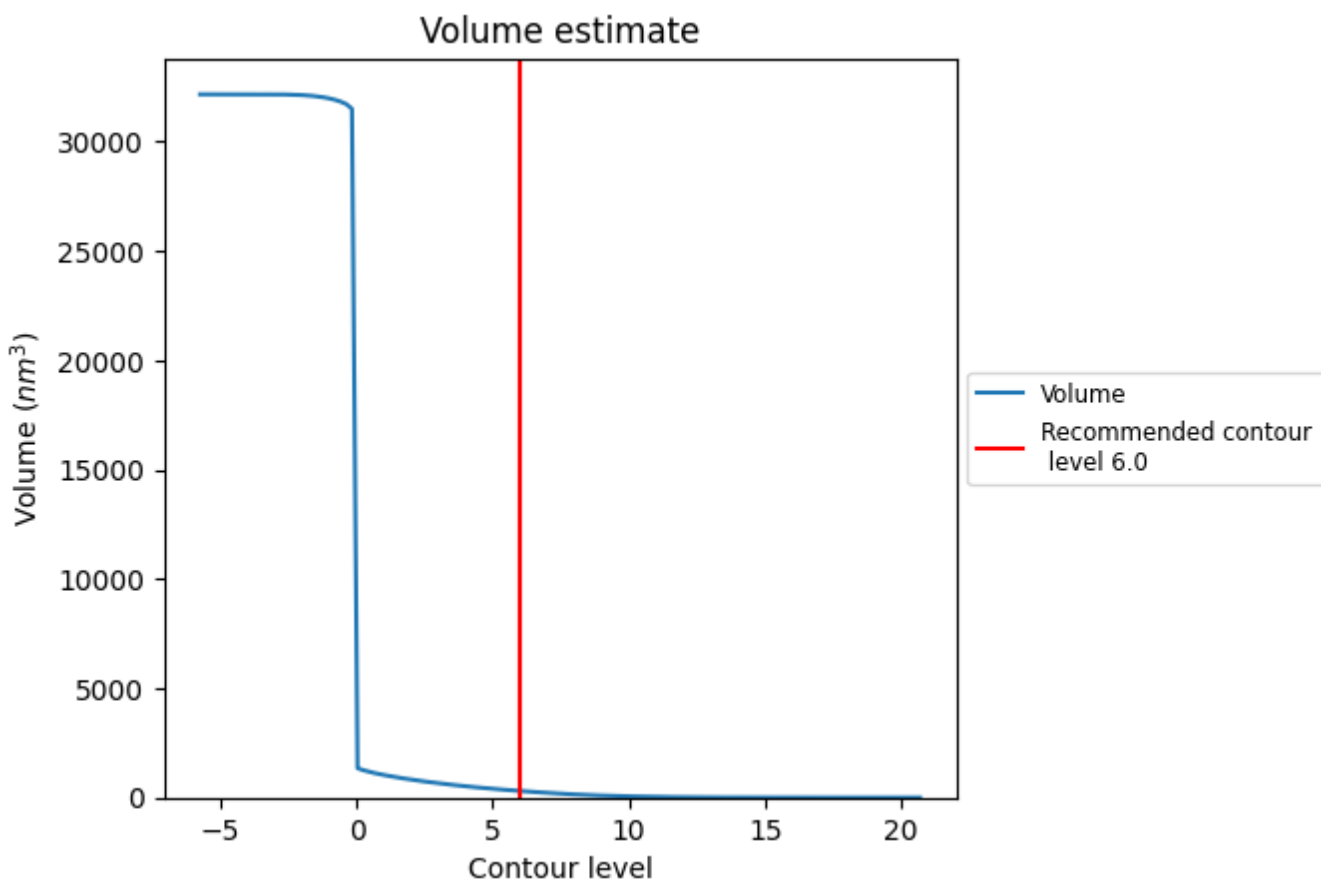
This section contains the results of statistical analysis of the map.

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.

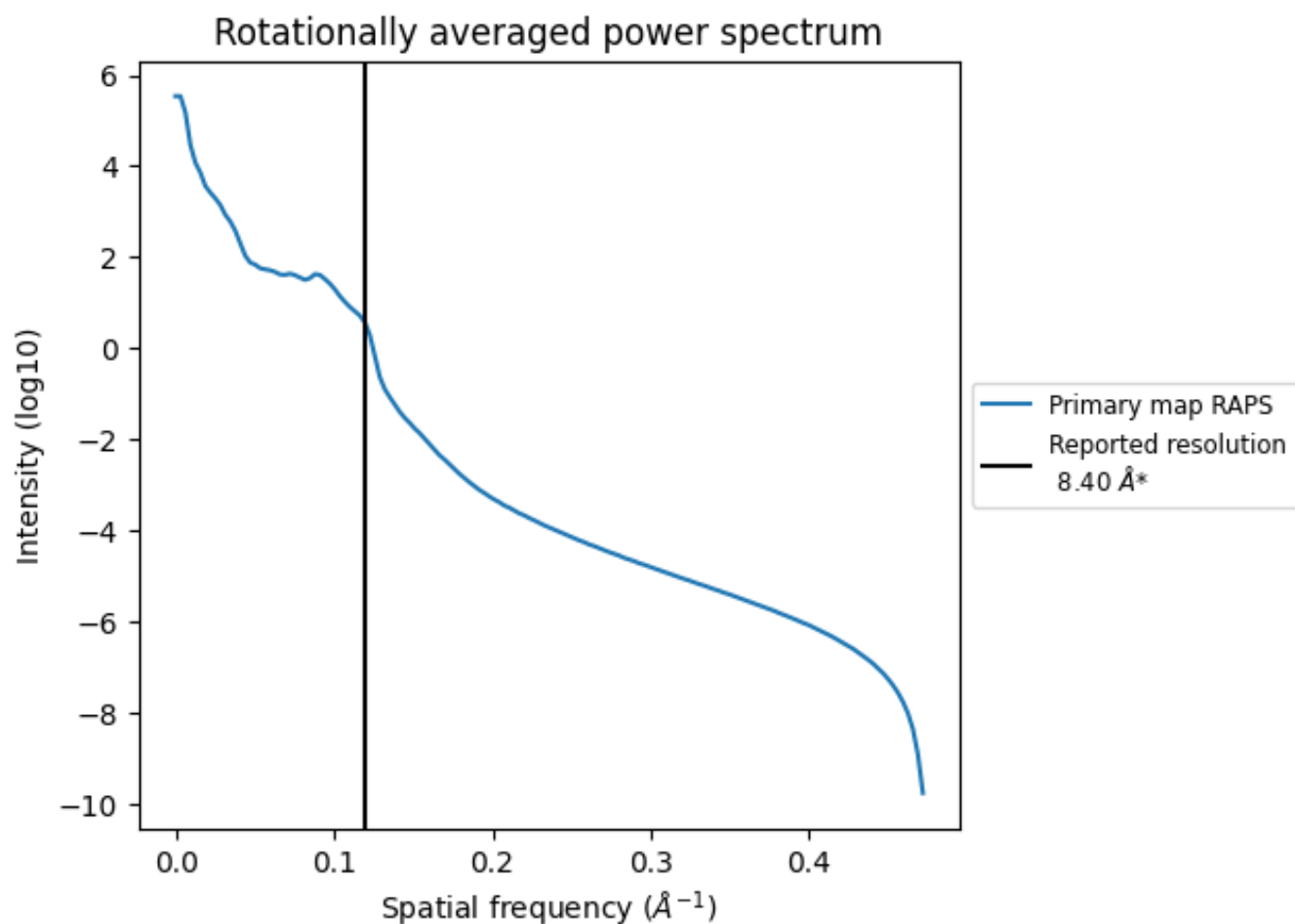
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 302 nm³; this corresponds to an approximate mass of 273 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 0.119 Å⁻¹

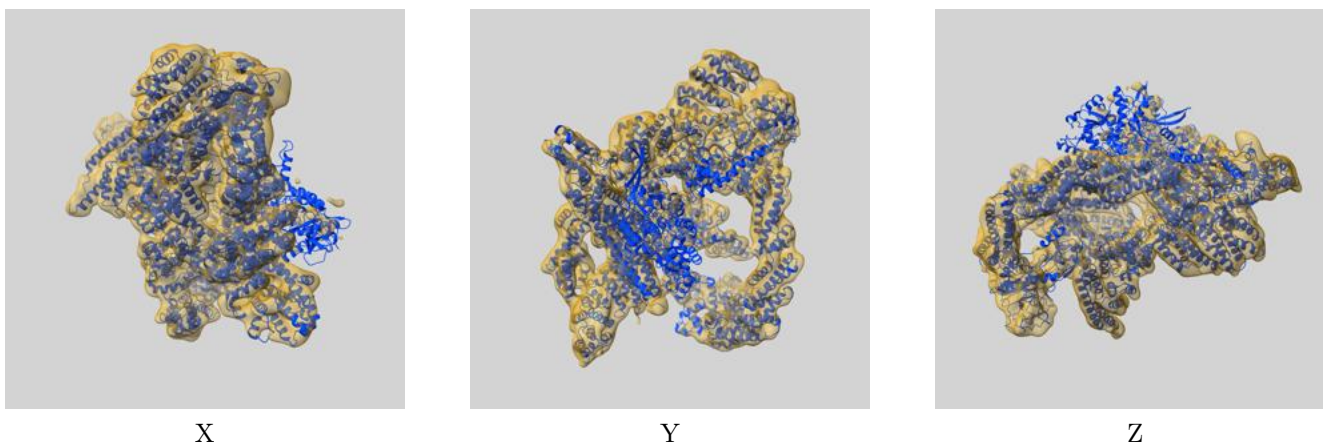
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

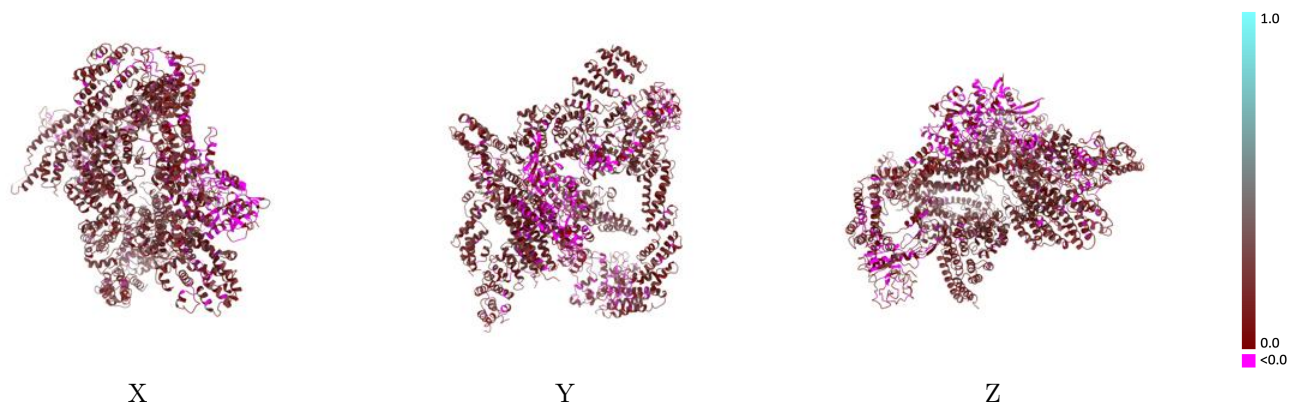
This section contains information regarding the fit between EMDB map EMD-4736 and PDB model 6R6H. Per-residue inclusion information can be found in section 3 on page 7.

9.1 Map-model overlay [i](#)



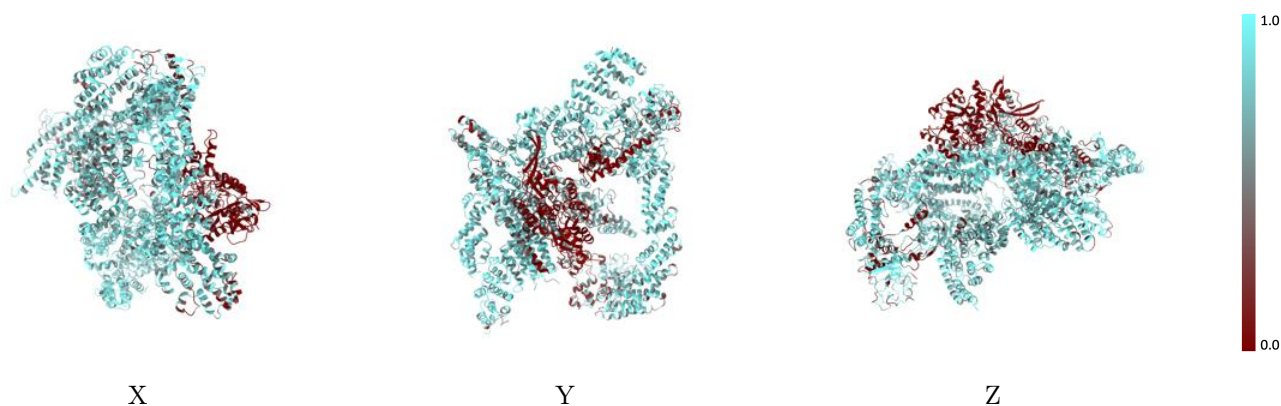
The images above show the 3D surface view of the map at the recommended contour level 6.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



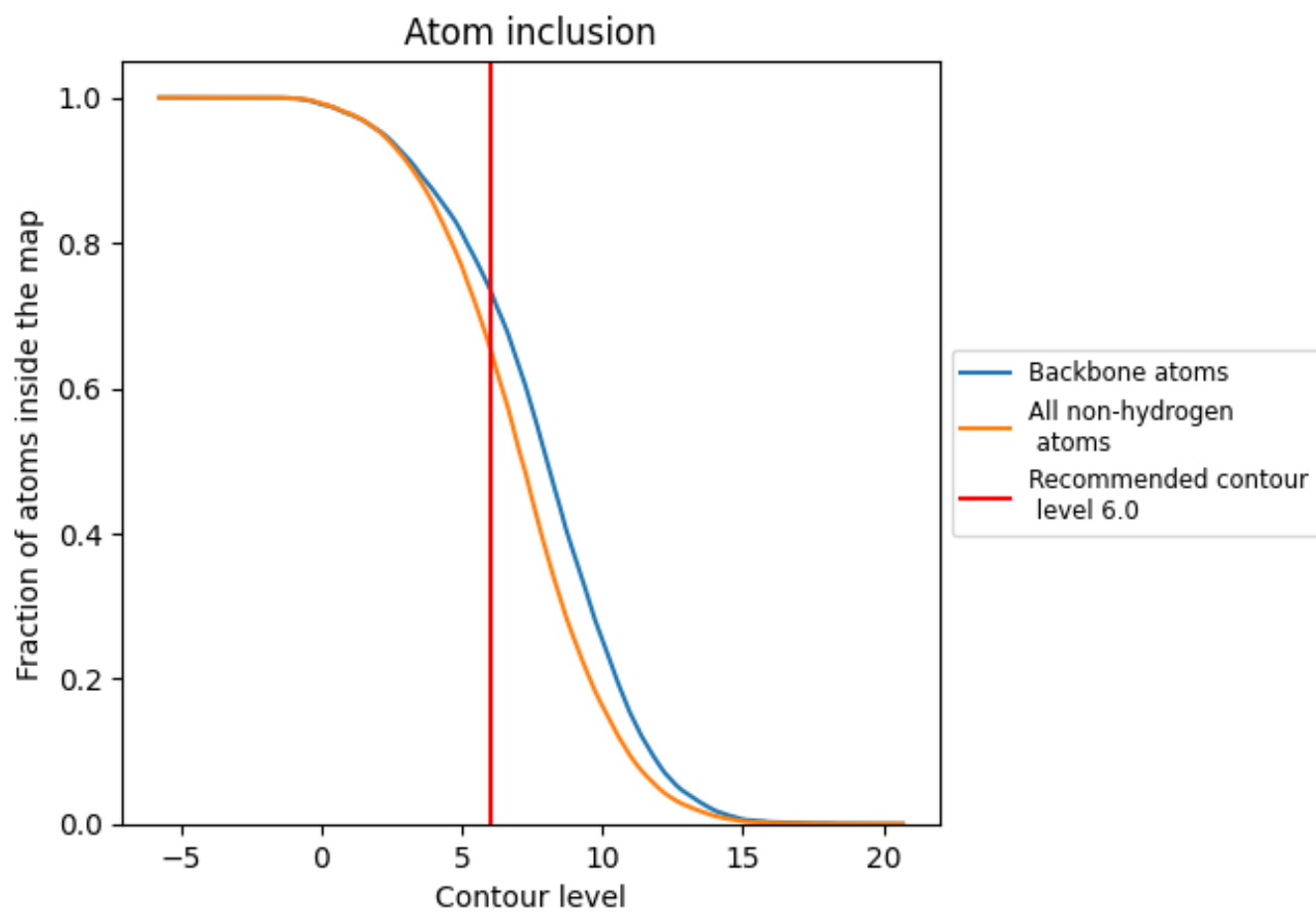
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (6.0).





























9.4 Atom inclusion [i](#)



At the recommended contour level, 74% of all backbone atoms, 66% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (6.0) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6565	 0.1460
A	 0.7589	 0.1950
B	 0.7650	 0.1810
C	 0.8517	 0.1870
D	 0.8294	 0.1940
E	 0.1977	 0.0600
F	 0.3110	 0.0510
G	 0.6106	 0.1550
H	 0.8722	 0.1880
O	 0.6744	 0.1360
P	 0.6708	 0.1300
Q	 0.5676	 0.0640
R	 0.6133	 0.0940
V	 0.4747	 0.1140

