WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB EM Validation Report ⓘ

Dec 31, 2024 – 05:13 AM EST

PDB ID	:	8G4L
EMDB ID	:	EMD-29722
Title	:	Cryo-EM structure of the human cardiac myosin filament
Authors	:	Dutta, D.; Nguyen, V.; Padron, R.; Craig, R.
Deposited on	:	2023-02-10
Resolution	:	6.40 Å(reported)
Based on initial models	:	5N69, ., 2FXO

<div style="border:1px solid red; background:#f8d0d0; padding:1em;">

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.

</div>

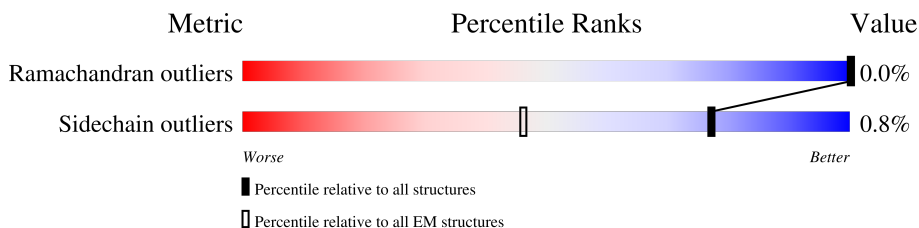The following versions of software and data (see references ⓘ) were used in the production of this report:

EMDB validation analysis	:	0.0.1.dev113
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

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 6.40 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.
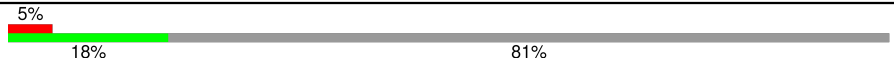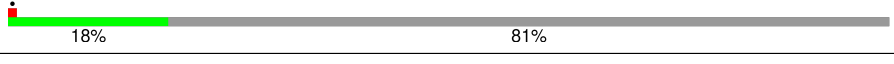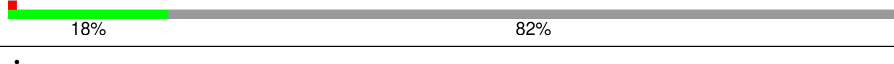
Metric	Percentile Ranks	Value
Ramachandran outliers		0.0%
Sidechain outliers		0.8%

Worse   *Better*

▮ Percentile relative to all structures

▯ Percentile relative to all EM structures
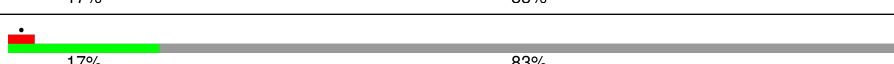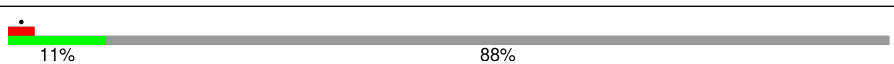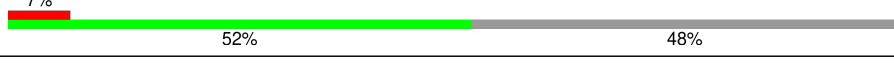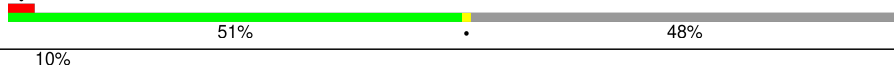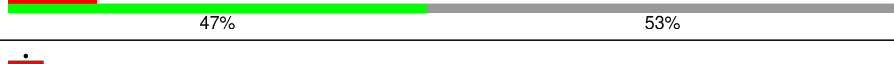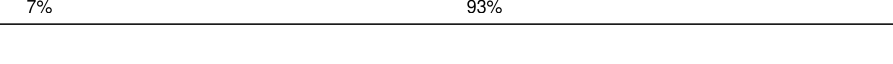
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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

Mol	Chain	Length	Quality of chain
1	BA	1935	43% / 58% / 41%
1	BB	1935	40% / 58% / 41%
1	BG	1935	· / 18% / 82%
1	BH	1935	· / 18% / 82%
1	BI	1935	· / 18% / 82%
1	BJ	1935	18% / 82%
1	BK	1935	· / 18% / 82%
1	BL	1935	· / 18% / 82%
1	BM	1935	5% / 19% / 81%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	BN	1935	5% — 18% — 81%
1	BO	1935	18% — 81%
1	BP	1935	18% — 81%
1	BQ	1935	18% — 82%
1	BR	1935	18% — 82%
1	BS	1935	5% — 19% — 81%
1	BT	1935	18% — 81%
1	BU	1935	17% — 83%
1	BV	1935	17% — 83%
1	BW	1935	11% — 88%
1	BX	1935	12% — 88%
1	BY	1935	7% — 52% — 48%
1	BZ	1935	51% — 48%
1	be	1935	10% — 47% — 53%
1	bf	1935	47% — 53%
1	bk	1935	7% — 93%

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 828952 atoms, of which 415168 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 Myosin-7.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	BB	1133	Total	C	H	N	O	S	0	0
			18432	5800	9251	1582	1753	46		
1	BA	1133	Total	C	H	N	O	S	0	0
			18432	5800	9251	1582	1753	46		
1	BG	355	Total	C	H	N	O	S	0	0
			5809	1751	2928	515	603	12		
1	BH	355	Total	C	H	N	O	S	0	0
			5809	1751	2928	515	603	12		
1	BI	357	Total	C	H	N	O	S	0	0
			5820	1753	2926	528	604	9		
1	BJ	357	Total	C	H	N	O	S	0	0
			5820	1753	2926	528	604	9		
1	BK	350	Total	C	H	N	O	S	0	0
			5683	1723	2843	521	587	9		
1	BL	350	Total	C	H	N	O	S	0	0
			5683	1723	2843	521	587	9		
1	BM	359	Total	C	H	N	O	S	0	0
			5823	1776	2906	522	611	8		
1	BN	359	Total	C	H	N	O	S	0	0
			5823	1776	2906	522	611	8		
1	BO	358	Total	C	H	N	O	S	0	0
			5809	1773	2902	523	603	8		
1	BP	358	Total	C	H	N	O	S	0	0
			5809	1773	2902	523	603	8		
1	BQ	357	Total	C	H	N	O	S	0	0
			5757	1748	2877	519	604	9		
1	BR	357	Total	C	H	N	O	S	0	0
			5757	1748	2877	519	604	9		
1	BS	359	Total	C	H	N	O	S	0	0
			5863	1760	2957	538	596	12		
1	BT	359	Total	C	H	N	O	S	0	0
			5863	1760	2957	538	596	12		
1	BU	325	Total	C	H	N	O	S	0	0
			5317	1592	2682	493	540	10		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms						AltConf	Trace
1	BV	325	Total	C	H	N	O	S	0	0
			5317	1592	2682	493	540	10		
1	BW	224	Total	C	H	N	O	S	0	0
			3689	1107	1857	341	377	7		
1	BX	224	Total	C	H	N	O	S	0	0
			3689	1107	1857	341	377	7		
1	BY	1005	Total	C	H	N	O	S	0	0
			16316	5163	8184	1391	1535	43		
1	BZ	1005	Total	C	H	N	O	S	0	0
			16317	5163	8185	1391	1535	43		
1	be	908	Total	C	H	N	O	S	0	0
			14751	4688	7390	1261	1370	42		
1	bf	908	Total	C	H	N	O	S	0	0
			14751	4688	7390	1261	1370	42		
1	bk	132	Total	C	H	N	O	S	0	0
			2205	664	1111	207	221	2		
1	bl	132	Total	C	H	N	O	S	0	0
			2205	664	1111	207	221	2		
1	AA	1133	Total	C	H	N	O	S	0	0
			18432	5800	9251	1582	1753	46		
1	AB	1133	Total	C	H	N	O	S	0	0
			18432	5800	9251	1582	1753	46		
1	AG	355	Total	C	H	N	O	S	0	0
			5809	1751	2928	515	603	12		
1	AH	355	Total	C	H	N	O	S	0	0
			5809	1751	2928	515	603	12		
1	AI	357	Total	C	H	N	O	S	0	0
			5820	1753	2926	528	604	9		
1	AJ	357	Total	C	H	N	O	S	0	0
			5820	1753	2926	528	604	9		
1	AK	350	Total	C	H	N	O	S	0	0
			5683	1723	2843	521	587	9		
1	AL	350	Total	C	H	N	O	S	0	0
			5683	1723	2843	521	587	9		
1	AM	359	Total	C	H	N	O	S	0	0
			5823	1776	2906	522	611	8		
1	AN	359	Total	C	H	N	O	S	0	0
			5823	1776	2906	522	611	8		
1	AO	358	Total	C	H	N	O	S	0	0
			5809	1773	2902	523	603	8		
1	AP	358	Total	C	H	N	O	S	0	0
			5809	1773	2902	523	603	8		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms						AltConf	Trace
1	AQ	357	Total 5757	C 1748	H 2877	N 519	O 604	S 9	0	0
1	AR	357	Total 5757	C 1748	H 2877	N 519	O 604	S 9	0	0
1	AS	359	Total 5863	C 1760	H 2957	N 538	O 596	S 12	0	0
1	AT	359	Total 5863	C 1760	H 2957	N 538	O 596	S 12	0	0
1	AU	325	Total 5317	C 1592	H 2682	N 493	O 540	S 10	0	0
1	AV	325	Total 5317	C 1592	H 2682	N 493	O 540	S 10	0	0
1	AW	224	Total 3689	C 1107	H 1857	N 341	O 377	S 7	0	0
1	AX	224	Total 3689	C 1107	H 1857	N 341	O 377	S 7	0	0
1	AY	1005	Total 16316	C 5163	H 8184	N 1391	O 1535	S 43	0	0
1	AZ	1005	Total 16316	C 5163	H 8184	N 1391	O 1535	S 43	0	0
1	ae	908	Total 14751	C 4688	H 7390	N 1261	O 1370	S 42	0	0
1	af	908	Total 14751	C 4688	H 7390	N 1261	O 1370	S 42	0	0
1	ak	132	Total 2205	C 664	H 1111	N 207	O 221	S 2	0	0
1	al	132	Total 2205	C 664	H 1111	N 207	O 221	S 2	0	0
1	A	1133	Total 18432	C 5800	H 9251	N 1582	O 1753	S 46	0	0
1	B	1133	Total 18432	C 5800	H 9251	N 1582	O 1753	S 46	0	0
1	G	355	Total 5809	C 1751	H 2928	N 515	O 603	S 12	0	0
1	H	355	Total 5809	C 1751	H 2928	N 515	O 603	S 12	0	0
1	I	357	Total 5820	C 1753	H 2926	N 528	O 604	S 9	0	0
1	J	357	Total 5820	C 1753	H 2926	N 528	O 604	S 9	0	0
1	K	350	Total 5682	C 1723	H 2842	N 521	O 587	S 9	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms						AltConf	Trace
1	L	350	Total	C	H	N	O	S	0	0
			5682	1723	2842	521	587	9		
1	M	359	Total	C	H	N	O	S	0	0
			5823	1776	2906	522	611	8		
1	N	359	Total	C	H	N	O	S	0	0
			5823	1776	2906	522	611	8		
1	O	358	Total	C	H	N	O	S	0	0
			5809	1773	2902	523	603	8		
1	P	358	Total	C	H	N	O	S	0	0
			5809	1773	2902	523	603	8		
1	Q	357	Total	C	H	N	O	S	0	0
			5757	1748	2877	519	604	9		
1	R	357	Total	C	H	N	O	S	0	0
			5757	1748	2877	519	604	9		
1	S	359	Total	C	H	N	O	S	0	0
			5863	1760	2957	538	596	12		
1	T	359	Total	C	H	N	O	S	0	0
			5863	1760	2957	538	596	12		
1	U	325	Total	C	H	N	O	S	0	0
			5316	1592	2681	493	540	10		
1	V	325	Total	C	H	N	O	S	0	0
			5316	1592	2681	493	540	10		
1	W	224	Total	C	H	N	O	S	0	0
			3689	1107	1857	341	377	7		
1	X	224	Total	C	H	N	O	S	0	0
			3689	1107	1857	341	377	7		
1	Y	1005	Total	C	H	N	O	S	0	0
			16316	5163	8184	1391	1535	43		
1	Z	1005	Total	C	H	N	O	S	0	0
			16316	5163	8184	1391	1535	43		
1	e	908	Total	C	H	N	O	S	0	0
			14751	4688	7390	1261	1370	42		
1	f	908	Total	C	H	N	O	S	0	0
			14752	4688	7391	1261	1370	42		
1	k	132	Total	C	H	N	O	S	0	0
			2205	664	1111	207	221	2		
1	l	132	Total	C	H	N	O	S	0	0
			2205	664	1111	207	221	2		

- Molecule 2 is a protein called Myosin light chain 3.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	BE	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	BF	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	ba	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	bb	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	bg	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	bh	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	AE	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	AF	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	aa	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	ab	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	ag	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	ah	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	E	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	F	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	a	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	b	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	g	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		
2	h	161	Total	C	H	N	O	S	0	0
			2544	806	1260	213	254	11		

- Molecule 3 is a protein called Myosin regulatory light chain 2, ventricular/cardiac muscle isoform.

Mol	Chain	Residues	Atoms						AltConf	Trace
3	bc	153	Total	C	H	N	O	S	0	0
			2418	780	1187	200	245	6		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms						AltConf	Trace
3	bd	166	Total	C	H	N	O	S	0	0
			2617	836	1296	220	258	7		
3	bi	153	Total	C	H	N	O	S	0	0
			2418	780	1187	200	245	6		
3	bj	166	Total	C	H	N	O	S	0	0
			2617	836	1296	220	258	7		
3	bq	166	Total	C	H	N	O	S	0	0
			2617	836	1296	220	258	7		
3	br	166	Total	C	H	N	O	S	0	0
			2617	836	1296	220	258	7		
3	ac	153	Total	C	H	N	O	S	0	0
			2418	780	1187	200	245	6		
3	ad	166	Total	C	H	N	O	S	0	0
			2617	836	1296	220	258	7		
3	ai	153	Total	C	H	N	O	S	0	0
			2418	780	1187	200	245	6		
3	aj	166	Total	C	H	N	O	S	0	0
			2617	836	1296	220	258	7		
3	aq	166	Total	C	H	N	O	S	0	0
			2617	836	1296	220	258	7		
3	ar	166	Total	C	H	N	O	S	0	0
			2617	836	1296	220	258	7		
3	c	153	Total	C	H	N	O	S	0	0
			2418	780	1187	200	245	6		
3	d	166	Total	C	H	N	O	S	0	0
			2617	836	1296	220	258	7		
3	i	153	Total	C	H	N	O	S	0	0
			2418	780	1187	200	245	6		
3	j	166	Total	C	H	N	O	S	0	0
			2617	836	1296	220	258	7		
3	q	166	Total	C	H	N	O	S	0	0
			2617	836	1296	220	258	7		
3	r	166	Total	C	H	N	O	S	0	0
			2617	836	1296	220	258	7		

- Molecule 4 is a protein called Titin.

Mol	Chain	Residues	Atoms						AltConf	Trace
4	bm	1084	Total	C	H	N	O	S	0	0
			16881	5325	8458	1439	1632	27		
4	bn	1084	Total	C	H	N	O	S	0	0
			16881	5325	8458	1439	1632	27		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms							AltConf	Trace
4	am	1084	Total 16881	C 5325	H 8458	N 1439	O 1632	S 27		0	0
4	an	1084	Total 16881	C 5325	H 8458	N 1439	O 1632	S 27		0	0
4	m	1084	Total 16881	C 5325	H 8458	N 1439	O 1632	S 27		0	0
4	n	1084	Total 16881	C 5325	H 8458	N 1439	O 1632	S 27		0	0

- Molecule 5 is a protein called Myosin-binding protein C, cardiac-type.

Mol	Chain	Residues	Atoms							AltConf	Trace
5	bo	598	Total 9440	C 2992	H 4728	N 825	O 873	S 22		0	0
5	ao	598	Total 9440	C 2992	H 4728	N 825	O 873	S 22		0	0
5	o	598	Total 9440	C 2992	H 4728	N 825	O 873	S 22		0	0

SEQUENCE-PLOTS INFOmissingINFO

3 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C3	Depositor
Number of particles used	102581	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 $(e^-/\text{Å}^2)$	61	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.360	Depositor
Minimum map value	-0.016	Depositor
Average map value	0.004	Depositor
Map value standard deviation	0.048	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	869.83997, 869.83997, 869.83997	wwPDB
Map dimensions	800, 800, 800	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.0873, 1.0873, 1.0873	Depositor

4 Model quality ⓘ

4.1 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	A	0.26	0/9326	0.51	1/12520 (0.0%)
1	AA	0.27	0/9326	0.51	1/12520 (0.0%)
1	AB	0.26	0/9326	0.49	0/12520
1	AG	0.29	0/2888	0.53	0/3841
1	AH	0.32	0/2888	0.56	0/3841
1	AI	0.32	0/2903	0.57	0/3868
1	AJ	0.31	0/2903	0.56	0/3868
1	AK	0.31	0/2856	0.60	2/3815 (0.1%)
1	AL	1.16	2/2856 (0.1%)	0.57	2/3815 (0.1%)
1	AM	0.31	0/2936	0.53	0/3922
1	AN	0.35	1/2936 (0.0%)	0.52	0/3922
1	AO	0.38	1/2927 (0.0%)	0.58	0/3911
1	AP	0.33	0/2927	0.57	0/3911
1	AQ	0.31	0/2894	0.53	0/3869
1	AR	0.35	0/2894	0.57	0/3869
1	AS	0.32	0/2915	0.58	0/3883
1	AT	0.31	0/2915	0.54	0/3883
1	AU	0.31	0/2642	0.55	1/3524 (0.0%)
1	AV	0.29	0/2642	0.55	0/3524
1	AW	0.33	0/1838	0.57	0/2445
1	AX	0.31	0/1838	0.52	0/2445
1	AY	0.28	0/8275	0.53	1/11125 (0.0%)
1	AZ	0.30	0/8275	0.52	0/11125
1	B	0.26	0/9326	0.49	0/12520
1	BA	0.26	0/9326	0.48	0/12520
1	BB	0.26	0/9326	0.49	1/12520 (0.0%)
1	BG	0.28	0/2888	0.51	0/3841
1	BH	0.33	0/2888	0.57	1/3841 (0.0%)
1	BI	0.31	0/2903	0.59	0/3868
1	BJ	0.31	0/2903	0.55	0/3868
1	BK	0.32	0/2856	0.60	2/3815 (0.1%)
1	BL	0.32	0/2856	0.55	0/3815
1	BM	0.30	0/2936	0.51	0/3922
1	BN	0.35	1/2936 (0.0%)	0.52	0/3922

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
1	BO	0.41	1/2927 (0.0%)	0.59	0/3911
1	BP	0.33	0/2927	0.58	1/3911 (0.0%)
1	BQ	0.32	0/2894	0.53	0/3869
1	BR	0.34	0/2894	0.56	0/3869
1	BS	0.30	0/2915	0.56	0/3883
1	BT	0.31	0/2915	0.53	0/3883
1	BU	0.29	0/2642	0.52	0/3524
1	BV	0.31	0/2642	0.56	0/3524
1	BW	0.32	0/1838	0.56	0/2445
1	BX	0.31	0/1838	0.53	0/2445
1	BY	0.28	0/8275	0.52	2/11125 (0.0%)
1	BZ	0.28	0/8275	0.51	0/11125
1	G	0.28	0/2888	0.53	0/3841
1	H	0.31	0/2888	0.54	0/3841
1	I	0.32	0/2903	0.58	0/3868
1	J	0.32	0/2903	0.57	0/3868
1	K	0.32	0/2856	0.59	0/3815
1	L	1.16	2/2856 (0.1%)	0.56	2/3815 (0.1%)
1	M	0.30	0/2936	0.53	0/3922
1	N	0.36	1/2936 (0.0%)	0.51	0/3922
1	O	0.42	1/2927 (0.0%)	0.58	1/3911 (0.0%)
1	P	0.33	0/2927	0.56	0/3911
1	Q	0.31	0/2894	0.51	0/3869
1	R	0.35	0/2894	0.56	0/3869
1	S	0.30	0/2915	0.55	0/3883
1	T	0.30	0/2915	0.53	0/3883
1	U	0.30	0/2642	0.55	0/3524
1	V	0.29	0/2642	0.56	1/3524 (0.0%)
1	W	0.33	0/1838	0.57	0/2445
1	X	0.30	0/1838	0.54	0/2445
1	Y	0.28	0/8275	0.52	2/11125 (0.0%)
1	Z	0.28	0/8275	0.52	0/11125
1	ae	0.27	0/7502	0.51	1/10091 (0.0%)
1	af	0.27	0/7502	0.51	0/10091
1	ak	0.32	0/1098	0.55	0/1459
1	al	0.32	0/1098	0.52	0/1459
1	be	0.28	0/7502	0.53	1/10091 (0.0%)
1	bf	0.28	0/7502	0.52	0/10091
1	bk	0.33	0/1098	0.57	0/1459
1	bl	0.34	0/1098	0.58	0/1459
1	e	0.27	0/7502	0.52	1/10091 (0.0%)
1	f	0.29	0/7502	0.53	0/10091
1	k	0.33	0/1098	0.54	0/1459

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
1	l	0.36	0/1098	0.59	0/1459
2	AE	0.25	0/1304	0.49	0/1748
2	AF	0.25	0/1304	0.47	0/1748
2	BE	0.25	0/1304	0.48	0/1748
2	BF	0.25	0/1304	0.46	0/1748
2	E	0.25	0/1304	0.51	0/1748
2	F	0.25	0/1304	0.48	0/1748
2	a	0.27	0/1304	0.52	0/1748
2	aa	0.29	0/1304	0.53	0/1748
2	ab	0.30	0/1304	0.53	0/1748
2	ag	0.27	0/1304	0.50	0/1748
2	ah	0.28	0/1304	0.54	0/1748
2	b	0.30	0/1304	0.56	0/1748
2	ba	0.27	0/1304	0.52	0/1748
2	bb	0.32	0/1304	0.56	0/1748
2	bg	0.27	0/1304	0.48	0/1748
2	bh	0.29	0/1304	0.52	0/1748
2	g	0.29	0/1304	0.52	0/1748
2	h	0.28	0/1304	0.51	0/1748
3	ac	0.27	0/1254	0.48	0/1687
3	ad	0.29	0/1345	0.51	0/1805
3	ai	0.27	0/1254	0.50	0/1687
3	aj	0.28	0/1345	0.50	0/1805
3	aq	0.26	0/1345	0.46	0/1805
3	ar	0.26	0/1345	0.46	0/1805
3	bc	0.27	0/1254	0.50	0/1687
3	bd	0.28	0/1345	0.51	0/1805
3	bi	0.28	0/1254	0.49	0/1687
3	bj	0.28	0/1345	0.50	0/1805
3	bq	0.26	0/1345	0.47	0/1805
3	br	0.26	0/1345	0.46	0/1805
3	c	0.26	0/1254	0.47	0/1687
3	d	0.28	0/1345	0.52	0/1805
3	i	0.27	0/1254	0.48	0/1687
3	j	0.28	0/1345	0.52	0/1805
3	q	0.26	0/1345	0.47	0/1805
3	r	0.26	0/1345	0.46	0/1805
4	am	0.62	6/8610 (0.1%)	0.54	0/11717
4	an	0.30	0/8610	0.55	0/11717
4	bm	0.28	0/8610	0.54	0/11717
4	bn	0.30	0/8610	0.54	0/11717
4	m	0.62	6/8610 (0.1%)	0.54	0/11717
4	n	0.29	0/8610	0.55	0/11717

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
5	ao	0.29	0/4827	0.57	0/6572
5	bo	0.28	0/4827	0.56	0/6572
5	o	0.29	0/4827	0.56	0/6572
All	All	0.34	22/419277 (0.0%)	0.53	24/562902 (0.0%)

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	1
1	AA	0	1
1	AY	0	3
1	BB	0	1
1	BY	0	2
1	O	0	1
1	Y	0	1
1	ae	0	1
1	be	0	2
1	e	0	1
2	aa	0	1
2	ag	0	1
4	n	0	1
5	ao	0	1
All	All	0	18

All (22) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	AL	1176	ARG	CG-CD	59.47	3.00	1.51
1	L	1176	ARG	CG-CD	59.41	3.00	1.51
4	m	298	PHE	CE1-CZ	25.30	1.85	1.37
4	am	298	PHE	CE1-CZ	24.76	1.84	1.37
4	m	298	PHE	CD1-CE1	22.96	1.85	1.39
4	am	298	PHE	CE2-CZ	22.91	1.80	1.37
4	am	298	PHE	CD2-CE2	22.70	1.84	1.39
4	m	298	PHE	CE2-CZ	22.46	1.80	1.37
4	am	298	PHE	CD1-CE1	22.32	1.83	1.39
4	m	298	PHE	CD2-CE2	21.98	1.83	1.39
4	am	298	PHE	CG-CD2	15.34	1.61	1.38
4	m	298	PHE	CG-CD2	15.19	1.61	1.38

Continued on next page...

W O R L D W I D E
wwPDB
PROTEIN DATA BANK

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	am	298	PHE	CG-CD1	14.93	1.61	1.38
4	m	298	PHE	CG-CD1	14.85	1.61	1.38
1	O	1456	TRP	CB-CG	-12.19	1.28	1.50
1	BO	1456	TRP	CB-CG	-8.41	1.35	1.50
1	N	1371	TRP	CB-CG	-8.30	1.35	1.50
1	AO	1456	TRP	CB-CG	-7.93	1.35	1.50
1	AN	1371	TRP	CB-CG	-6.70	1.38	1.50
1	BN	1371	TRP	CB-CG	-6.18	1.39	1.50
1	L	1176	ARG	CB-CG	5.40	1.67	1.52
1	AL	1176	ARG	CB-CG	5.26	1.66	1.52

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	961	LEU	CA-CB-CG	12.33	143.66	115.30
1	BB	961	LEU	CA-CB-CG	12.27	143.52	115.30
1	AA	961	LEU	CA-CB-CG	11.82	142.49	115.30
1	AK	1386	LEU	CA-CB-CG	8.05	133.81	115.30
1	AU	1769	LEU	CA-CB-CG	7.25	131.99	115.30
1	L	1176	ARG	CG-CD-NE	7.16	126.83	111.80
1	AL	1176	ARG	CB-CG-CD	6.78	129.24	111.60
1	AL	1176	ARG	CG-CD-NE	6.67	125.82	111.80
1	BP	1452	ILE	CG1-CB-CG2	-6.55	97.00	111.40
1	BK	1386	LEU	CA-CB-CG	6.52	130.29	115.30
1	Y	387	LEU	CB-CG-CD2	6.51	122.08	111.00
1	L	1176	ARG	CB-CG-CD	6.44	128.34	111.60
1	BY	387	LEU	CB-CG-CD1	6.41	121.90	111.00
1	BY	387	LEU	CB-CG-CD2	6.14	121.44	111.00
1	AY	528	MET	CA-CB-CG	5.71	123.02	113.30
1	be	822	MET	CG-SD-CE	5.71	109.34	100.20
1	e	822	MET	CG-SD-CE	5.66	109.26	100.20
1	BH	1122	LEU	CB-CG-CD1	5.60	120.52	111.00
1	O	1456	TRP	CA-CB-CG	-5.49	103.28	113.70
1	V	1622	LEU	CA-CB-CG	5.46	127.86	115.30
1	ae	387	LEU	CB-CG-CD2	-5.43	101.76	111.00
1	BK	1249	CYS	CA-CB-SG	5.17	123.31	114.00
1	Y	387	LEU	CB-CG-CD1	5.11	119.68	111.00
1	AK	1249	CYS	CA-CB-SG	5.06	123.10	114.00

There are no chirality outliers.

All (18) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	961	LEU	Peptide
1	AA	961	LEU	Peptide
1	AY	409	GLU	Peptide
1	AY	410	TYR	Peptide
1	AY	527	PRO	Peptide
1	BB	961	LEU	Peptide
1	BY	406	VAL	Peptide
1	BY	410	TYR	Peptide
1	O	1317	ARG	Sidechain
1	Y	410	TYR	Peptide
2	aa	154	ARG	Sidechain
1	ae	593	TRP	Peptide
2	ag	193	MET	Peptide
5	ao	1119	TYR	Peptide
1	be	593	TRP	Peptide
1	be	793	ARG	Sidechain
1	e	272	ARG	Peptide
4	n	67	ARG	Sidechain

4.2 Too-close contacts ⓘ

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

4.3 Torsion angles ⓘ

4.3.1 Protein backbone ⓘ

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	1127/1935 (58%)	1073 (95%)	53 (5%)	1 (0%)	48	83
1	AA	1127/1935 (58%)	1065 (94%)	62 (6%)	0	100	100
1	AB	1127/1935 (58%)	1067 (95%)	60 (5%)	0	100	100
1	AG	353/1935 (18%)	351 (99%)	2 (1%)	0	100	100
1	AH	353/1935 (18%)	348 (99%)	5 (1%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	AI	355/1935 (18%)	351 (99%)	4 (1%)	0	100	100
1	AJ	355/1935 (18%)	348 (98%)	7 (2%)	0	100	100
1	AK	348/1935 (18%)	345 (99%)	3 (1%)	0	100	100
1	AL	348/1935 (18%)	339 (97%)	9 (3%)	0	100	100
1	AM	357/1935 (18%)	350 (98%)	7 (2%)	0	100	100
1	AN	357/1935 (18%)	351 (98%)	6 (2%)	0	100	100
1	AO	356/1935 (18%)	349 (98%)	7 (2%)	0	100	100
1	AP	356/1935 (18%)	345 (97%)	11 (3%)	0	100	100
1	AQ	355/1935 (18%)	352 (99%)	3 (1%)	0	100	100
1	AR	355/1935 (18%)	343 (97%)	11 (3%)	1 (0%)	37	72
1	AS	357/1935 (18%)	347 (97%)	10 (3%)	0	100	100
1	AT	357/1935 (18%)	354 (99%)	3 (1%)	0	100	100
1	AU	323/1935 (17%)	317 (98%)	6 (2%)	0	100	100
1	AV	323/1935 (17%)	317 (98%)	6 (2%)	0	100	100
1	AW	222/1935 (12%)	216 (97%)	6 (3%)	0	100	100
1	AX	222/1935 (12%)	219 (99%)	3 (1%)	0	100	100
1	AY	999/1935 (52%)	925 (93%)	74 (7%)	0	100	100
1	AZ	999/1935 (52%)	920 (92%)	79 (8%)	0	100	100
1	B	1127/1935 (58%)	1059 (94%)	68 (6%)	0	100	100
1	BA	1127/1935 (58%)	1059 (94%)	68 (6%)	0	100	100
1	BB	1127/1935 (58%)	1067 (95%)	60 (5%)	0	100	100
1	BG	353/1935 (18%)	351 (99%)	2 (1%)	0	100	100
1	BH	353/1935 (18%)	350 (99%)	3 (1%)	0	100	100
1	BI	355/1935 (18%)	351 (99%)	4 (1%)	0	100	100
1	BJ	355/1935 (18%)	352 (99%)	3 (1%)	0	100	100
1	BK	348/1935 (18%)	346 (99%)	2 (1%)	0	100	100
1	BL	348/1935 (18%)	340 (98%)	8 (2%)	0	100	100
1	BM	357/1935 (18%)	353 (99%)	4 (1%)	0	100	100
1	BN	357/1935 (18%)	353 (99%)	4 (1%)	0	100	100
1	BO	356/1935 (18%)	346 (97%)	10 (3%)	0	100	100
1	BP	356/1935 (18%)	344 (97%)	12 (3%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	BQ	355/1935 (18%)	353 (99%)	2 (1%)	0	100	100
1	BR	355/1935 (18%)	345 (97%)	10 (3%)	0	100	100
1	BS	357/1935 (18%)	346 (97%)	11 (3%)	0	100	100
1	BT	357/1935 (18%)	351 (98%)	6 (2%)	0	100	100
1	BU	323/1935 (17%)	321 (99%)	2 (1%)	0	100	100
1	BV	323/1935 (17%)	317 (98%)	6 (2%)	0	100	100
1	BW	222/1935 (12%)	218 (98%)	4 (2%)	0	100	100
1	BX	222/1935 (12%)	218 (98%)	4 (2%)	0	100	100
1	BY	999/1935 (52%)	920 (92%)	79 (8%)	0	100	100
1	BZ	999/1935 (52%)	912 (91%)	87 (9%)	0	100	100
1	G	353/1935 (18%)	352 (100%)	1 (0%)	0	100	100
1	H	353/1935 (18%)	349 (99%)	4 (1%)	0	100	100
1	I	355/1935 (18%)	350 (99%)	5 (1%)	0	100	100
1	J	355/1935 (18%)	350 (99%)	5 (1%)	0	100	100
1	K	348/1935 (18%)	345 (99%)	3 (1%)	0	100	100
1	L	348/1935 (18%)	341 (98%)	7 (2%)	0	100	100
1	M	357/1935 (18%)	352 (99%)	5 (1%)	0	100	100
1	N	357/1935 (18%)	352 (99%)	5 (1%)	0	100	100
1	O	356/1935 (18%)	349 (98%)	7 (2%)	0	100	100
1	P	356/1935 (18%)	350 (98%)	6 (2%)	0	100	100
1	Q	355/1935 (18%)	353 (99%)	2 (1%)	0	100	100
1	R	355/1935 (18%)	346 (98%)	9 (2%)	0	100	100
1	S	357/1935 (18%)	347 (97%)	10 (3%)	0	100	100
1	T	357/1935 (18%)	352 (99%)	5 (1%)	0	100	100
1	U	323/1935 (17%)	318 (98%)	5 (2%)	0	100	100
1	V	323/1935 (17%)	317 (98%)	6 (2%)	0	100	100
1	W	222/1935 (12%)	218 (98%)	4 (2%)	0	100	100
1	X	222/1935 (12%)	220 (99%)	2 (1%)	0	100	100
1	Y	999/1935 (52%)	930 (93%)	69 (7%)	0	100	100
1	Z	999/1935 (52%)	913 (91%)	86 (9%)	0	100	100
1	ae	902/1935 (47%)	826 (92%)	75 (8%)	1 (0%)	48	83

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	af	902/1935 (47%)	818 (91%)	83 (9%)	1 (0%)	48	83
1	ak	130/1935 (7%)	128 (98%)	2 (2%)	0	100	100
1	al	130/1935 (7%)	128 (98%)	2 (2%)	0	100	100
1	be	902/1935 (47%)	826 (92%)	75 (8%)	1 (0%)	48	83
1	bf	902/1935 (47%)	821 (91%)	80 (9%)	1 (0%)	48	83
1	bk	130/1935 (7%)	128 (98%)	2 (2%)	0	100	100
1	bl	130/1935 (7%)	129 (99%)	1 (1%)	0	100	100
1	e	902/1935 (47%)	826 (92%)	75 (8%)	1 (0%)	48	83
1	f	902/1935 (47%)	828 (92%)	72 (8%)	2 (0%)	44	78
1	k	130/1935 (7%)	127 (98%)	3 (2%)	0	100	100
1	l	130/1935 (7%)	128 (98%)	2 (2%)	0	100	100
2	AE	159/195 (82%)	146 (92%)	13 (8%)	0	100	100
2	AF	159/195 (82%)	151 (95%)	8 (5%)	0	100	100
2	BE	159/195 (82%)	150 (94%)	9 (6%)	0	100	100
2	BF	159/195 (82%)	150 (94%)	9 (6%)	0	100	100
2	E	159/195 (82%)	145 (91%)	14 (9%)	0	100	100
2	F	159/195 (82%)	151 (95%)	8 (5%)	0	100	100
2	a	159/195 (82%)	144 (91%)	15 (9%)	0	100	100
2	aa	159/195 (82%)	145 (91%)	14 (9%)	0	100	100
2	ab	159/195 (82%)	150 (94%)	9 (6%)	0	100	100
2	ag	159/195 (82%)	149 (94%)	10 (6%)	0	100	100
2	ah	159/195 (82%)	141 (89%)	18 (11%)	0	100	100
2	b	159/195 (82%)	148 (93%)	11 (7%)	0	100	100
2	ba	159/195 (82%)	145 (91%)	14 (9%)	0	100	100
2	bb	159/195 (82%)	147 (92%)	12 (8%)	0	100	100
2	bg	159/195 (82%)	144 (91%)	15 (9%)	0	100	100
2	bh	159/195 (82%)	145 (91%)	14 (9%)	0	100	100
2	g	159/195 (82%)	144 (91%)	15 (9%)	0	100	100
2	h	159/195 (82%)	145 (91%)	14 (9%)	0	100	100
3	ac	151/166 (91%)	137 (91%)	14 (9%)	0	100	100
3	ad	164/166 (99%)	147 (90%)	17 (10%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	ai	151/166 (91%)	140 (93%)	11 (7%)	0	100	100
3	aj	164/166 (99%)	147 (90%)	17 (10%)	0	100	100
3	aq	164/166 (99%)	159 (97%)	5 (3%)	0	100	100
3	ar	164/166 (99%)	151 (92%)	13 (8%)	0	100	100
3	bc	151/166 (91%)	141 (93%)	10 (7%)	0	100	100
3	bd	164/166 (99%)	146 (89%)	18 (11%)	0	100	100
3	bi	151/166 (91%)	138 (91%)	13 (9%)	0	100	100
3	bj	164/166 (99%)	147 (90%)	16 (10%)	1 (1%)	22	60
3	bq	164/166 (99%)	159 (97%)	5 (3%)	0	100	100
3	br	164/166 (99%)	152 (93%)	12 (7%)	0	100	100
3	c	151/166 (91%)	139 (92%)	12 (8%)	0	100	100
3	d	164/166 (99%)	148 (90%)	16 (10%)	0	100	100
3	i	151/166 (91%)	139 (92%)	12 (8%)	0	100	100
3	j	164/166 (99%)	143 (87%)	21 (13%)	0	100	100
3	q	164/166 (99%)	158 (96%)	6 (4%)	0	100	100
3	r	164/166 (99%)	151 (92%)	13 (8%)	0	100	100
4	am	1082/1084 (100%)	988 (91%)	94 (9%)	0	100	100
4	an	1082/1084 (100%)	972 (90%)	110 (10%)	0	100	100
4	bm	1082/1084 (100%)	984 (91%)	98 (9%)	0	100	100
4	bn	1082/1084 (100%)	982 (91%)	100 (9%)	0	100	100
4	m	1082/1084 (100%)	987 (91%)	95 (9%)	0	100	100
4	n	1082/1084 (100%)	987 (91%)	95 (9%)	0	100	100
5	ao	594/1274 (47%)	540 (91%)	52 (9%)	2 (0%)	37	72
5	bo	594/1274 (47%)	545 (92%)	47 (8%)	2 (0%)	37	72
5	o	594/1274 (47%)	546 (92%)	46 (8%)	2 (0%)	37	72
All	All	51114/167754 (30%)	48294 (94%)	2804 (6%)	16 (0%)	100	100

All (16) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	ae	411	VAL
1	bf	737	ASP
5	bo	1050	GLU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	f	737	ASP
1	be	411	VAL
3	bj	3	PRO
1	e	411	VAL
1	f	738	SER
1	AR	1692	VAL
1	af	737	ASP
5	ao	1050	GLU
5	o	1050	GLU
5	o	971	PRO
5	bo	971	PRO
5	ao	971	PRO
1	A	406	VAL

4.3.2 Protein sidechains ⓘ

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	995/1695 (59%)	989 (99%)	6 (1%)	84	88
1	AA	995/1695 (59%)	989 (99%)	6 (1%)	84	88
1	AB	995/1695 (59%)	984 (99%)	11 (1%)	70	80
1	AG	315/1695 (19%)	311 (99%)	4 (1%)	65	77
1	AH	315/1695 (19%)	310 (98%)	5 (2%)	58	73
1	AI	316/1695 (19%)	313 (99%)	3 (1%)	75	83
1	AJ	316/1695 (19%)	309 (98%)	7 (2%)	47	65
1	AK	304/1695 (18%)	299 (98%)	5 (2%)	58	73
1	AL	304/1695 (18%)	300 (99%)	4 (1%)	65	77
1	AM	319/1695 (19%)	318 (100%)	1 (0%)	91	92
1	AN	319/1695 (19%)	318 (100%)	1 (0%)	91	92
1	AO	315/1695 (19%)	314 (100%)	1 (0%)	91	92
1	AP	315/1695 (19%)	314 (100%)	1 (0%)	91	92
1	AQ	317/1695 (19%)	315 (99%)	2 (1%)	84	88

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	AR	317/1695 (19%)	317 (100%)	0	100	100
1	AS	318/1695 (19%)	318 (100%)	0	100	100
1	AT	318/1695 (19%)	316 (99%)	2 (1%)	84	88
1	AU	288/1695 (17%)	285 (99%)	3 (1%)	73	82
1	AV	288/1695 (17%)	285 (99%)	3 (1%)	73	82
1	AW	199/1695 (12%)	199 (100%)	0	100	100
1	AX	199/1695 (12%)	198 (100%)	1 (0%)	86	89
1	AY	882/1695 (52%)	873 (99%)	9 (1%)	73	82
1	AZ	882/1695 (52%)	869 (98%)	13 (2%)	60	75
1	B	995/1695 (59%)	985 (99%)	10 (1%)	73	82
1	BA	995/1695 (59%)	987 (99%)	8 (1%)	79	85
1	BB	995/1695 (59%)	991 (100%)	4 (0%)	89	91
1	BG	315/1695 (19%)	314 (100%)	1 (0%)	91	92
1	BH	315/1695 (19%)	310 (98%)	5 (2%)	58	73
1	BI	316/1695 (19%)	314 (99%)	2 (1%)	84	88
1	BJ	316/1695 (19%)	312 (99%)	4 (1%)	65	77
1	BK	304/1695 (18%)	300 (99%)	4 (1%)	65	77
1	BL	304/1695 (18%)	300 (99%)	4 (1%)	65	77
1	BM	319/1695 (19%)	319 (100%)	0	100	100
1	BN	319/1695 (19%)	317 (99%)	2 (1%)	84	88
1	BO	315/1695 (19%)	314 (100%)	1 (0%)	91	92
1	BP	315/1695 (19%)	315 (100%)	0	100	100
1	BQ	317/1695 (19%)	316 (100%)	1 (0%)	91	92
1	BR	317/1695 (19%)	316 (100%)	1 (0%)	91	92
1	BS	318/1695 (19%)	318 (100%)	0	100	100
1	BT	318/1695 (19%)	316 (99%)	2 (1%)	84	88
1	BU	288/1695 (17%)	288 (100%)	0	100	100
1	BV	288/1695 (17%)	286 (99%)	2 (1%)	81	87
1	BW	199/1695 (12%)	196 (98%)	3 (2%)	60	75
1	BX	199/1695 (12%)	199 (100%)	0	100	100
1	BY	882/1695 (52%)	878 (100%)	4 (0%)	86	89

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	BZ	882/1695 (52%)	869 (98%)	13 (2%)	60	75
1	G	315/1695 (19%)	314 (100%)	1 (0%)	91	92
1	H	315/1695 (19%)	308 (98%)	7 (2%)	47	65
1	I	316/1695 (19%)	313 (99%)	3 (1%)	75	83
1	J	316/1695 (19%)	314 (99%)	2 (1%)	84	88
1	K	304/1695 (18%)	301 (99%)	3 (1%)	73	82
1	L	304/1695 (18%)	299 (98%)	5 (2%)	58	73
1	M	319/1695 (19%)	318 (100%)	1 (0%)	91	92
1	N	319/1695 (19%)	318 (100%)	1 (0%)	91	92
1	O	315/1695 (19%)	313 (99%)	2 (1%)	84	88
1	P	315/1695 (19%)	313 (99%)	2 (1%)	84	88
1	Q	317/1695 (19%)	315 (99%)	2 (1%)	84	88
1	R	317/1695 (19%)	316 (100%)	1 (0%)	91	92
1	S	318/1695 (19%)	318 (100%)	0	100	100
1	T	318/1695 (19%)	316 (99%)	2 (1%)	84	88
1	U	288/1695 (17%)	286 (99%)	2 (1%)	81	87
1	V	288/1695 (17%)	286 (99%)	2 (1%)	81	87
1	W	199/1695 (12%)	197 (99%)	2 (1%)	73	82
1	X	199/1695 (12%)	198 (100%)	1 (0%)	86	89
1	Y	882/1695 (52%)	878 (100%)	4 (0%)	86	89
1	Z	882/1695 (52%)	869 (98%)	13 (2%)	60	75
1	ae	796/1695 (47%)	791 (99%)	5 (1%)	84	88
1	af	796/1695 (47%)	790 (99%)	6 (1%)	79	85
1	ak	117/1695 (7%)	116 (99%)	1 (1%)	75	83
1	al	117/1695 (7%)	115 (98%)	2 (2%)	56	72
1	be	796/1695 (47%)	791 (99%)	5 (1%)	84	88
1	bf	796/1695 (47%)	792 (100%)	4 (0%)	86	89
1	bk	117/1695 (7%)	116 (99%)	1 (1%)	75	83
1	bl	117/1695 (7%)	116 (99%)	1 (1%)	75	83
1	e	796/1695 (47%)	792 (100%)	4 (0%)	86	89
1	f	796/1695 (47%)	790 (99%)	6 (1%)	79	85

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	k	117/1695 (7%)	117 (100%)	0	100	100
1	l	117/1695 (7%)	113 (97%)	4 (3%)	32	51
2	AE	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	AF	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	BE	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	BF	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	E	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	F	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	a	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	aa	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	ab	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	ag	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	ah	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	b	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	ba	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	bb	141/167 (84%)	139 (99%)	2 (1%)	62	75
2	bg	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	bh	141/167 (84%)	139 (99%)	2 (1%)	62	75
2	g	141/167 (84%)	140 (99%)	1 (1%)	81	87
2	h	141/167 (84%)	139 (99%)	2 (1%)	62	75
3	ac	134/141 (95%)	134 (100%)	0	100	100
3	ad	141/141 (100%)	141 (100%)	0	100	100
3	ai	134/141 (95%)	134 (100%)	0	100	100
3	aj	141/141 (100%)	140 (99%)	1 (1%)	81	87
3	aq	141/141 (100%)	141 (100%)	0	100	100
3	ar	141/141 (100%)	141 (100%)	0	100	100
3	bc	134/141 (95%)	134 (100%)	0	100	100
3	bd	141/141 (100%)	141 (100%)	0	100	100
3	bi	134/141 (95%)	134 (100%)	0	100	100
3	bj	141/141 (100%)	141 (100%)	0	100	100
3	bq	141/141 (100%)	141 (100%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	br	141/141 (100%)	141 (100%)	0	100	100
3	c	134/141 (95%)	133 (99%)	1 (1%)	81	87
3	d	141/141 (100%)	141 (100%)	0	100	100
3	i	134/141 (95%)	134 (100%)	0	100	100
3	j	141/141 (100%)	141 (100%)	0	100	100
3	q	141/141 (100%)	141 (100%)	0	100	100
3	r	141/141 (100%)	141 (100%)	0	100	100
4	am	944/944 (100%)	934 (99%)	10 (1%)	70	80
4	an	944/944 (100%)	933 (99%)	11 (1%)	67	78
4	bm	944/944 (100%)	935 (99%)	9 (1%)	73	82
4	bn	944/944 (100%)	934 (99%)	10 (1%)	70	80
4	m	944/944 (100%)	937 (99%)	7 (1%)	81	87
4	n	944/944 (100%)	934 (99%)	10 (1%)	70	80
5	ao	519/1076 (48%)	516 (99%)	3 (1%)	84	88
5	bo	519/1076 (48%)	516 (99%)	3 (1%)	84	88
5	o	519/1076 (48%)	516 (99%)	3 (1%)	84	88
All	All	45141/146646 (31%)	44798 (99%)	343 (1%)	77	85

All (343) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	BB	234	LYS
1	BB	453	ARG
1	BB	876	LYS
1	BB	1026	LYS
1	BA	34	LYS
1	BA	246	LYS
1	BA	369	ARG
1	BA	567	ARG
1	BA	611	LYS
1	BA	657	LYS
1	BA	1026	LYS
1	BA	1149	ARG
2	BE	123	LYS
2	BF	163	ARG
1	BG	1242	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	BH	925	ARG
1	BH	951	LYS
1	BH	1079	ARG
1	BH	1129	ARG
1	BH	1141	ARG
1	BI	1022	LYS
1	BI	1212	ARG
1	BJ	1024	LYS
1	BJ	1026	LYS
1	BJ	1194	LYS
1	BJ	1250	ARG
1	BK	1114	ARG
1	BK	1149	ARG
1	BK	1175	ARG
1	BK	1363	LYS
1	BL	1149	ARG
1	BL	1167	ARG
1	BL	1173	LYS
1	BL	1359	ARG
1	BN	1451	LYS
1	BN	1499	LYS
1	BO	1418	LYS
1	BQ	1676	ARG
1	BR	1613	ARG
1	BT	1771	LYS
1	BT	1810	LYS
1	BV	1617	LYS
1	BV	1897	ARG
1	BW	1697	ARG
1	BW	1757	LYS
1	BW	1833	ASN
1	BY	129	LYS
1	BY	453	ARG
1	BY	565	LYS
1	BY	780	ARG
1	BZ	21	LYS
1	BZ	147	ARG
1	BZ	249	ARG
1	BZ	369	ARG
1	BZ	453	ARG
1	BZ	652	ARG
1	BZ	657	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	BZ	712	ARG
1	BZ	721	ARG
1	BZ	783	ARG
1	BZ	876	LYS
1	BZ	904	ARG
1	BZ	925	ARG
2	ba	100	ARG
2	bb	43	LYS
2	bb	98	LYS
1	be	169	ARG
1	be	442	ARG
1	be	793	ARG
1	be	865	LYS
1	be	940	LYS
1	bf	246	LYS
1	bf	369	ARG
1	bf	453	ARG
1	bf	652	ARG
2	bg	123	LYS
2	bh	63	ARG
2	bh	100	ARG
1	bk	1898	LYS
1	bl	1810	LYS
4	bm	12	LYS
4	bm	17	ARG
4	bm	238	LYS
4	bm	384	LYS
4	bm	467	LYS
4	bm	498	ARG
4	bm	692	LYS
4	bm	995	ARG
4	bm	1020	LYS
4	bn	12	LYS
4	bn	206	ARG
4	bn	223	ARG
4	bn	238	LYS
4	bn	467	LYS
4	bn	483	LYS
4	bn	523	ARG
4	bn	933	ARG
4	bn	995	ARG
4	bn	1004	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
5	bo	943	ARG
5	bo	1150	ARG
5	bo	1271	ARG
1	AA	234	LYS
1	AA	453	ARG
1	AA	515	MET
1	AA	803	LYS
1	AA	876	LYS
1	AA	991	LYS
1	AB	34	LYS
1	AB	246	LYS
1	AB	249	ARG
1	AB	369	ARG
1	AB	453	ARG
1	AB	567	ARG
1	AB	611	LYS
1	AB	657	LYS
1	AB	884	LYS
1	AB	951	LYS
1	AB	1026	LYS
2	AE	123	LYS
2	AF	163	ARG
1	AG	939	LYS
1	AG	1053	ARG
1	AG	1060	LYS
1	AG	1242	LYS
1	AH	925	ARG
1	AH	951	LYS
1	AH	1079	ARG
1	AH	1141	ARG
1	AH	1193	ARG
1	AI	1011	GLN
1	AI	1212	ARG
1	AI	1324	LYS
1	AJ	1026	LYS
1	AJ	1060	LYS
1	AJ	1167	ARG
1	AJ	1172	GLN
1	AJ	1194	LYS
1	AJ	1195	LYS
1	AJ	1250	ARG
1	AK	1149	ARG

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	AK	1175	ARG
1	AK	1216	LYS
1	AK	1267	GLN
1	AK	1363	LYS
1	AL	1149	ARG
1	AL	1173	LYS
1	AL	1214	LYS
1	AL	1359	ARG
1	AM	1260	ARG
1	AN	1451	LYS
1	AO	1418	LYS
1	AP	1499	LYS
1	AQ	1606	ARG
1	AQ	1676	ARG
1	AT	1728	LYS
1	AT	1771	LYS
1	AU	1644	LYS
1	AU	1757	LYS
1	AU	1771	LYS
1	AV	1592	ARG
1	AV	1728	LYS
1	AV	1841	ARG
1	AX	1771	LYS
1	AY	129	LYS
1	AY	257	LYS
1	AY	453	ARG
1	AY	565	LYS
1	AY	570	LYS
1	AY	597	ASN
1	AY	657	LYS
1	AY	780	ARG
1	AY	1043	LYS
1	AZ	21	LYS
1	AZ	147	ARG
1	AZ	249	ARG
1	AZ	369	ARG
1	AZ	453	ARG
1	AZ	542	LYS
1	AZ	652	ARG
1	AZ	657	LYS
1	AZ	712	ARG
1	AZ	783	ARG

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	AZ	904	ARG
1	AZ	925	ARG
1	AZ	968	LYS
2	aa	100	ARG
2	ab	98	LYS
1	ae	169	ARG
1	ae	442	ARG
1	ae	865	LYS
1	ae	920	LYS
1	ae	940	LYS
1	af	246	LYS
1	af	369	ARG
1	af	453	ARG
1	af	567	ARG
1	af	652	ARG
1	af	657	LYS
2	ag	123	LYS
2	ah	100	ARG
3	aj	120	ARG
1	ak	1898	LYS
1	al	1810	LYS
1	al	1863	ARG
4	am	17	ARG
4	am	91	ARG
4	am	105	LYS
4	am	238	LYS
4	am	424	LYS
4	am	498	ARG
4	am	903	ARG
4	am	989	LYS
4	am	995	ARG
4	am	1020	LYS
4	an	12	LYS
4	an	206	ARG
4	an	223	ARG
4	an	238	LYS
4	an	467	LYS
4	an	483	LYS
4	an	523	ARG
4	an	572	LYS
4	an	797	LYS
4	an	929	ARG

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
4	an	995	ARG
5	ao	943	ARG
5	ao	977	ARG
5	ao	1271	ARG
1	A	234	LYS
1	A	453	ARG
1	A	484	LYS
1	A	803	LYS
1	A	876	LYS
1	A	1026	LYS
1	B	34	LYS
1	B	246	LYS
1	B	369	ARG
1	B	453	ARG
1	B	567	ARG
1	B	611	LYS
1	B	657	LYS
1	B	941	ARG
1	B	1026	LYS
1	B	1149	ARG
2	E	123	LYS
2	F	163	ARG
1	G	939	LYS
1	H	925	ARG
1	H	976	LYS
1	H	1053	ARG
1	H	1129	ARG
1	H	1141	ARG
1	H	1149	ARG
1	H	1193	ARG
1	I	1011	GLN
1	I	1134	LYS
1	I	1337	ARG
1	J	1026	LYS
1	J	1060	LYS
1	K	1175	ARG
1	K	1267	GLN
1	K	1363	LYS
1	L	1129	ARG
1	L	1149	ARG
1	L	1173	LYS
1	L	1212	ARG

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	L	1359	ARG
1	M	1420	ARG
1	N	1279	LYS
1	O	1418	LYS
1	O	1528	LYS
1	P	1499	LYS
1	P	1537	LYS
1	Q	1606	ARG
1	Q	1634	ARG
1	R	1613	ARG
1	T	1728	LYS
1	T	1771	LYS
1	U	1770	LYS
1	U	1771	LYS
1	V	1592	ARG
1	V	1617	LYS
1	W	1697	ARG
1	W	1712	ARG
1	X	1771	LYS
1	Y	453	ARG
1	Y	565	LYS
1	Y	659	MET
1	Y	1043	LYS
1	Z	21	LYS
1	Z	147	ARG
1	Z	249	ARG
1	Z	453	ARG
1	Z	542	LYS
1	Z	652	ARG
1	Z	657	LYS
1	Z	712	ARG
1	Z	876	LYS
1	Z	904	ARG
1	Z	925	ARG
1	Z	941	ARG
1	Z	968	LYS
2	a	109	MET
2	b	98	LYS
3	c	50	ARG
1	e	442	ARG
1	e	671	ARG
1	e	865	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	e	940	LYS
1	f	246	LYS
1	f	249	ARG
1	f	369	ARG
1	f	453	ARG
1	f	567	ARG
1	f	652	ARG
2	g	123	LYS
2	h	63	ARG
2	h	100	ARG
1	l	1810	LYS
1	l	1838	LYS
1	l	1842	LYS
1	l	1848	LYS
4	m	12	LYS
4	m	238	LYS
4	m	384	LYS
4	m	692	LYS
4	m	903	ARG
4	m	995	ARG
4	m	1020	LYS
4	n	12	LYS
4	n	206	ARG
4	n	223	ARG
4	n	238	LYS
4	n	467	LYS
4	n	483	LYS
4	n	523	ARG
4	n	580	ARG
4	n	613	LYS
4	n	995	ARG
5	o	943	ARG
5	o	1002	ARG
5	o	1271	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (388) such sidechains are listed below:

Mol	Chain	Res	Type
1	BB	80	ASN
1	BB	251	HIS
1	BB	288	GLN
1	BB	292	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	BB	315	GLN
1	BB	815	GLN
1	BB	882	GLN
1	BB	1003	HIS
1	BB	1004	GLN
1	BB	1040	GLN
1	BB	1160	GLN
1	BA	911	ASN
1	BA	933	ASN
1	BA	1030	GLN
1	BA	1160	GLN
2	BE	120	HIS
1	BG	969	HIS
1	BG	973	ASN
1	BG	1004	GLN
1	BG	1074	GLN
1	BG	1160	GLN
1	BI	1071	ASN
1	BI	1160	GLN
1	BI	1255	GLN
1	BI	1290	GLN
1	BI	1310	GLN
1	BI	1331	HIS
1	BJ	1105	GLN
1	BJ	1164	ASN
1	BJ	1184	GLN
1	BJ	1196	HIS
1	BK	1160	GLN
1	BK	1408	ASN
1	BL	1160	GLN
1	BL	1196	HIS
1	BL	1237	GLN
1	BL	1276	GLN
1	BL	1284	ASN
1	BL	1318	GLN
1	BL	1346	GLN
1	BL	1370	GLN
1	BL	1446	GLN
1	BM	1471	GLN
1	BM	1541	GLN
1	BN	1346	GLN
1	BO	1458	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	BO	1486	ASN
1	BO	1562	GLN
1	BO	1642	GLN
1	BP	1346	GLN
1	BQ	1502	ASN
1	BQ	1506	GLN
1	BQ	1590	HIS
1	BR	1446	GLN
1	BR	1562	GLN
1	BR	1726	GLN
1	BS	1598	GLN
1	BS	1647	GLN
1	BS	1664	ASN
1	BS	1788	GLN
1	BS	1794	GLN
1	BT	1506	GLN
1	BT	1524	HIS
1	BT	1590	HIS
1	BT	1738	GLN
1	BU	1694	GLN
1	BV	1631	HIS
1	BV	1678	ASN
1	BW	1773	GLN
1	BW	1795	HIS
1	BW	1888	GLN
1	BW	1892	ASN
1	BW	1900	GLN
1	BX	1736	GLN
1	BX	1778	HIS
1	BX	1811	GLN
1	BY	451	GLN
1	BY	564	GLN
1	BY	581	HIS
1	BY	656	ASN
1	BY	686	ASN
1	BY	692	GLN
1	BY	711	ASN
1	BY	789	GLN
1	BY	890	GLN
1	BZ	187	ASN
1	BZ	238	ASN
1	BZ	240	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	BZ	482	ASN
1	BZ	576	HIS
1	BZ	666	HIS
1	BZ	907	GLN
3	bc	126	GLN
1	be	80	ASN
1	be	163	GLN
1	be	238	ASN
1	be	556	HIS
1	bf	126	ASN
1	bf	163	GLN
1	bf	171	ASN
1	bf	240	ASN
1	bf	358	HIS
1	bf	361	ASN
1	bf	479	ASN
1	bf	576	HIS
1	bf	666	HIS
1	bf	692	GLN
1	bf	696	ASN
1	bf	890	GLN
1	bf	892	GLN
2	bg	85	GLN
2	bg	86	ASN
2	bg	105	ASN
2	bg	120	HIS
2	bh	50	GLN
3	bi	38	GLN
3	bi	157	HIS
1	bk	1794	GLN
1	bk	1865	GLN
1	bk	1872	GLN
4	bm	278	GLN
4	bm	563	ASN
4	bm	849	ASN
4	bm	948	ASN
4	bm	1014	GLN
4	bn	100	GLN
4	bn	232	GLN
4	bn	278	GLN
4	bn	329	ASN
4	bn	651	HIS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
4	bn	949	HIS
5	bo	1133	ASN
5	bo	1217	ASN
1	AA	80	ASN
1	AA	160	ASN
1	AA	222	GLN
1	AA	292	ASN
1	AA	305	ASN
1	AA	444	ASN
1	AA	486	GLN
1	AA	1004	GLN
1	AA	1103	GLN
1	AA	1160	GLN
1	AB	79	GLN
1	AB	651	HIS
1	AB	911	ASN
1	AB	1003	HIS
1	AB	1030	GLN
1	AB	1160	GLN
2	AE	120	HIS
2	AE	191	HIS
1	AG	973	ASN
1	AG	1004	GLN
1	AH	1160	GLN
1	AH	1185	HIS
1	AH	1196	HIS
1	AI	1164	ASN
1	AI	1255	GLN
1	AI	1290	GLN
1	AI	1338	HIS
1	AJ	1088	ASN
1	AJ	1160	GLN
1	AJ	1185	HIS
1	AJ	1211	GLN
1	AJ	1358	GLN
1	AK	1160	GLN
1	AK	1164	ASN
1	AK	1255	GLN
1	AK	1284	ASN
1	AK	1358	GLN
1	AK	1408	ASN
1	AK	1422	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	AL	1172	GLN
1	AL	1237	GLN
1	AL	1276	GLN
1	AL	1318	GLN
1	AL	1334	GLN
1	AL	1446	GLN
1	AM	1255	GLN
1	AM	1259	HIS
1	AM	1446	GLN
1	AM	1471	GLN
1	AM	1541	GLN
1	AN	1365	ASN
1	AN	1458	GLN
1	AO	1310	GLN
1	AO	1334	GLN
1	AO	1458	GLN
1	AO	1541	GLN
1	AO	1562	GLN
1	AP	1446	GLN
1	AP	1504	ASN
1	AQ	1502	ASN
1	AQ	1506	GLN
1	AQ	1567	GLN
1	AQ	1590	HIS
1	AQ	1628	GLN
1	AQ	1631	HIS
1	AQ	1682	GLN
1	AR	1642	GLN
1	AR	1726	GLN
1	AS	1598	GLN
1	AS	1647	GLN
1	AS	1654	GLN
1	AS	1664	ASN
1	AS	1682	GLN
1	AS	1794	GLN
1	AS	1830	GLN
1	AT	1590	HIS
1	AT	1654	GLN
1	AU	1654	GLN
1	AU	1694	GLN
1	AU	1778	HIS
1	AU	1788	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	AU	1901	HIS
1	AV	1631	HIS
1	AV	1664	ASN
1	AV	1678	ASN
1	AW	1773	GLN
1	AW	1795	HIS
1	AW	1872	GLN
1	AW	1888	GLN
1	AW	1892	ASN
1	AX	1892	ASN
1	AX	1900	GLN
1	AX	1901	HIS
1	AY	562	ASN
1	AY	564	GLN
1	AY	581	HIS
1	AY	656	ASN
1	AY	661	ASN
1	AY	686	ASN
1	AZ	238	ASN
1	AZ	240	ASN
1	AZ	284	HIS
1	AZ	305	ASN
1	AZ	315	GLN
1	AZ	666	HIS
1	AZ	1030	GLN
3	ad	78	ASN
1	ae	415	GLN
1	ae	576	HIS
1	ae	589	ASN
1	ae	597	ASN
1	ae	892	GLN
1	af	126	ASN
1	af	163	GLN
1	af	240	ASN
1	af	479	ASN
1	af	482	ASN
1	af	666	HIS
1	af	890	GLN
2	ag	191	HIS
2	ah	120	HIS
3	ai	38	GLN
3	aj	126	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	ak	1794	GLN
1	ak	1872	GLN
1	al	1872	GLN
4	am	563	ASN
4	am	948	ASN
4	am	1014	GLN
4	an	232	GLN
4	an	278	GLN
4	an	931	HIS
4	an	949	HIS
4	an	973	GLN
5	ao	1061	GLN
1	A	160	ASN
1	A	479	ASN
1	A	815	GLN
1	A	1091	ASN
1	A	1160	GLN
1	A	1164	ASN
1	B	686	ASN
1	B	789	GLN
1	B	911	ASN
1	B	1030	GLN
2	E	120	HIS
2	E	191	HIS
1	G	969	HIS
1	G	973	ASN
1	G	1004	GLN
1	H	1000	GLN
1	H	1160	GLN
1	I	1160	GLN
1	I	1185	HIS
1	I	1255	GLN
1	I	1290	GLN
1	J	1105	GLN
1	J	1160	GLN
1	J	1257	ASN
1	J	1334	GLN
1	K	1255	GLN
1	K	1408	ASN
1	L	1160	GLN
1	L	1164	ASN
1	L	1276	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	L	1334	GLN
1	L	1446	GLN
1	M	1471	GLN
1	N	1365	ASN
1	O	1458	GLN
1	O	1562	GLN
1	P	1446	GLN
1	Q	1506	GLN
1	R	1446	GLN
1	R	1562	GLN
1	R	1609	ASN
1	R	1642	GLN
1	R	1726	GLN
1	S	1598	GLN
1	S	1640	GLN
1	S	1647	GLN
1	S	1654	GLN
1	S	1664	ASN
1	S	1794	GLN
1	S	1830	GLN
1	T	1590	HIS
1	T	1631	HIS
1	T	1654	GLN
1	T	1719	GLN
1	T	1746	GLN
1	T	1788	GLN
1	T	1794	GLN
1	U	1694	GLN
1	V	1631	HIS
1	V	1714	GLN
1	V	1785	ASN
1	V	1813	GLN
1	W	1773	GLN
1	W	1795	HIS
1	X	1726	GLN
1	X	1865	GLN
1	Y	153	HIS
1	Y	451	GLN
1	Y	492	HIS
1	Y	564	GLN
1	Y	656	ASN
1	Y	666	HIS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	Y	686	ASN
1	Y	890	GLN
1	Y	907	GLN
1	Y	1000	GLN
1	Z	97	HIS
1	Z	238	ASN
1	Z	315	GLN
1	Z	555	ASN
1	Z	576	HIS
1	Z	668	HIS
2	b	50	GLN
2	b	120	HIS
3	d	78	ASN
1	e	163	GLN
1	e	238	ASN
1	e	315	GLN
1	e	491	HIS
1	e	589	ASN
1	e	720	GLN
1	e	815	GLN
1	f	126	ASN
1	f	163	GLN
1	f	240	ASN
1	f	358	HIS
1	f	479	ASN
1	f	576	HIS
1	f	645	GLN
1	f	666	HIS
1	f	890	GLN
2	g	191	HIS
2	h	50	GLN
3	i	38	GLN
3	j	25	GLN
1	k	1794	GLN
1	k	1872	GLN
1	l	1900	GLN
4	m	563	ASN
4	m	948	ASN
4	n	232	GLN
4	n	278	GLN
4	n	326	HIS
4	n	339	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
4	n	602	GLN
4	n	836	GLN
4	n	1068	HIS
5	o	926	HIS
5	o	1061	GLN
5	o	1233	GLN

4.3.3 RNA ⓘ

There are no RNA molecules in this entry.

4.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

4.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

4.6 Ligand geometry ⓘ

There are no ligands in this entry.

4.7 Other polymers ⓘ

There are no such residues in this entry.

4.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

5 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-29722. 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.

5.1 Orthogonal projections ⓘ
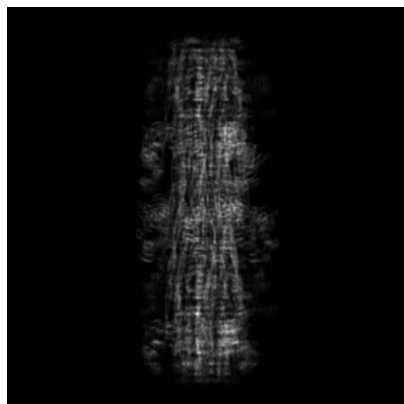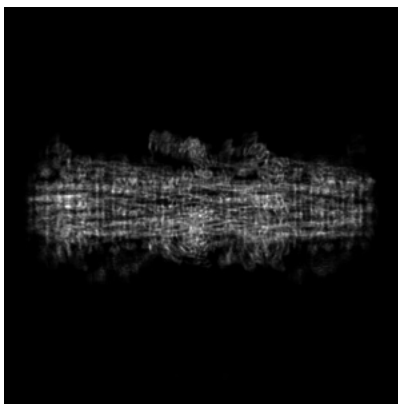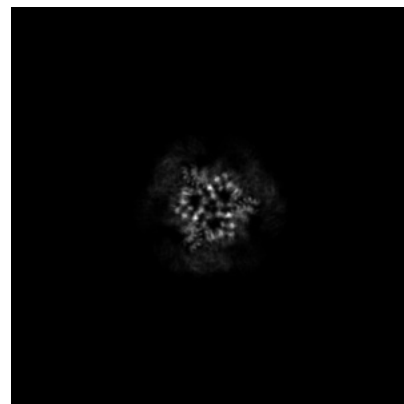
5.1.1 Primary map

X Y Z

5.1.2 Raw map

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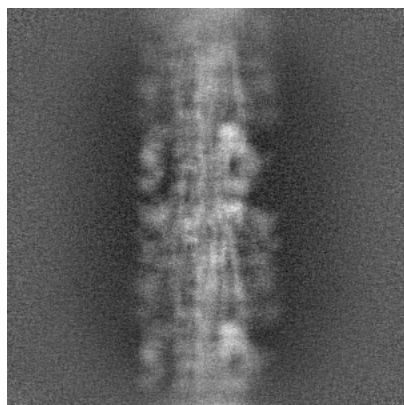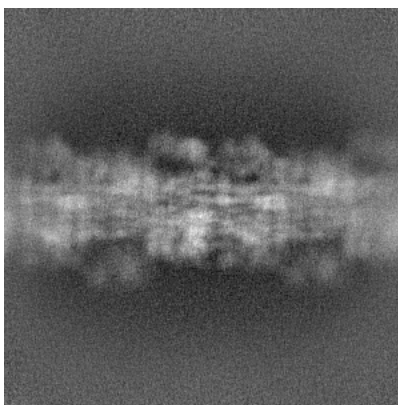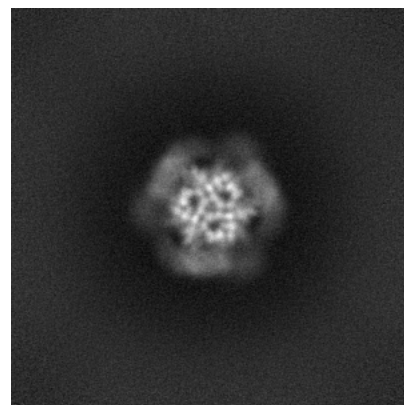
The images above show the map projected in three orthogonal directions.

5.2 Central slices ⓘ

5.2.1 Primary map
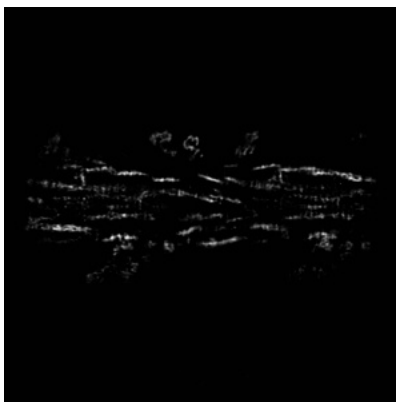
| X Index: 400 | Y Index: 400 | Z Index: 400 |

5.2.2 Raw map
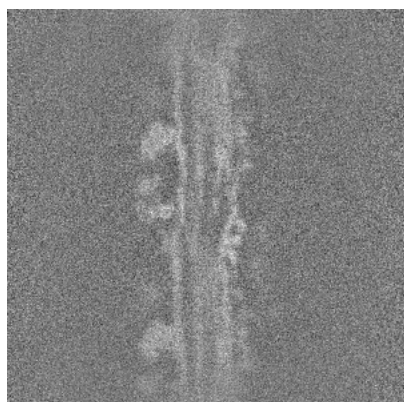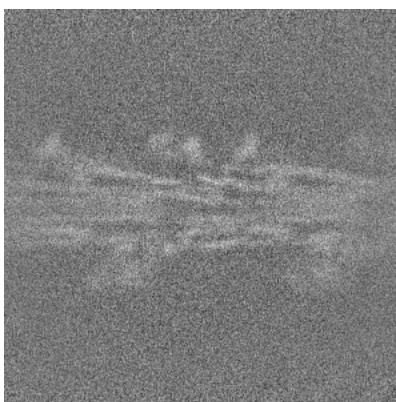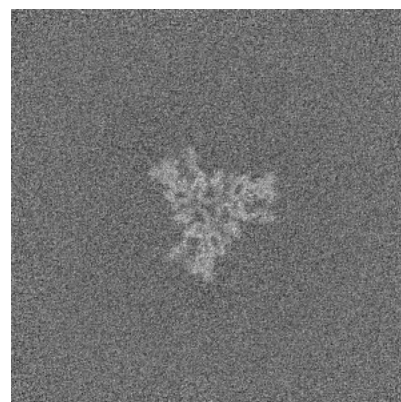
| X Index: 400 | Y Index: 400 | Z Index: 400 |

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

5.3 Largest variance slices ⓘ

5.3.1 Primary map

X Index: 368	Y Index: 381	Z Index: 129
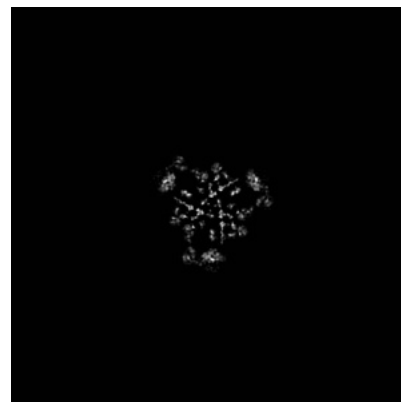
5.3.2 Raw map
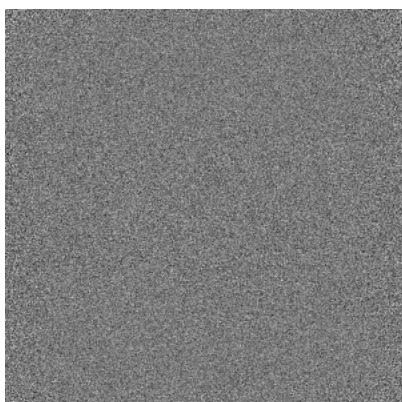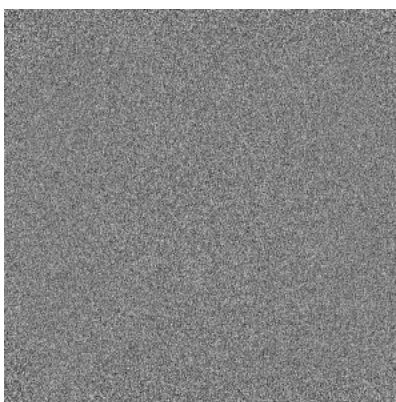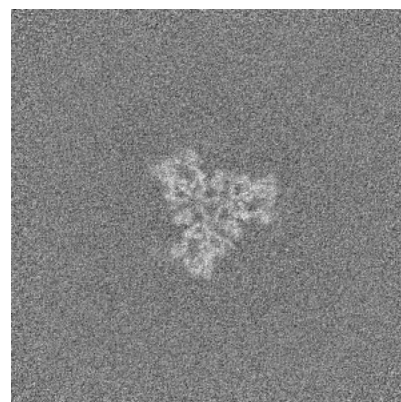
X Index: 0	Y Index: 0	Z Index: 396

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

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

5.4.1 Primary map
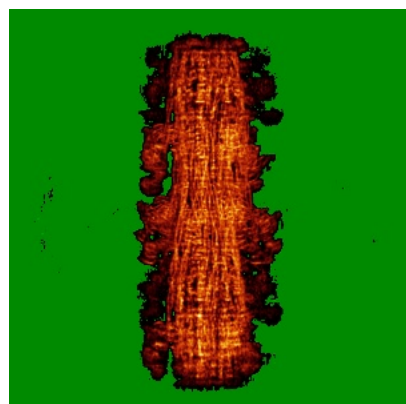
X
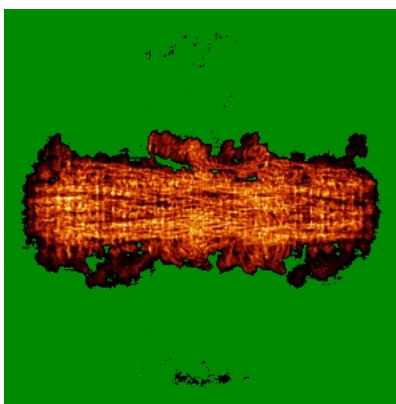
Y
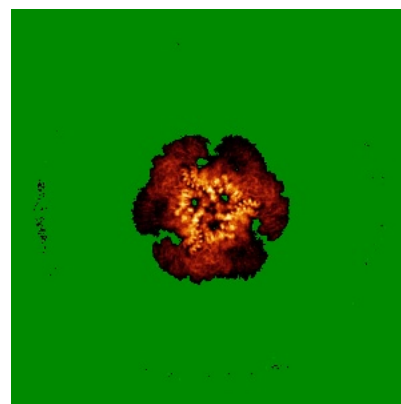
Z

5.4.2 Raw map

X

Y

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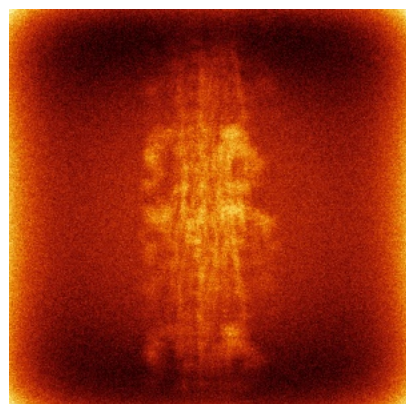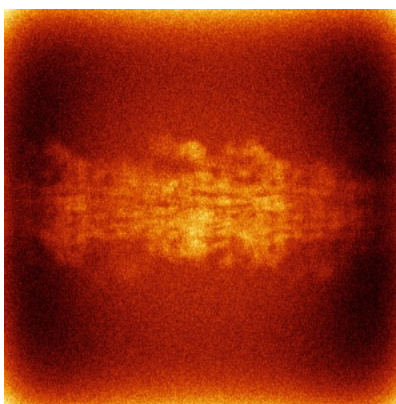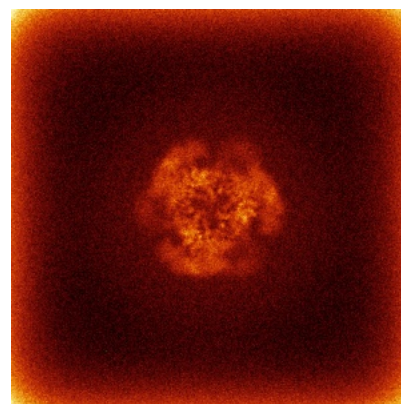
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

5.5 Orthogonal surface views ⓘ

5.5.1 Primary map

| X | Y | Z |
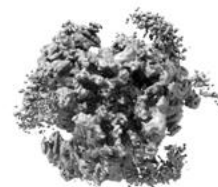
The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

5.5.2 Raw map
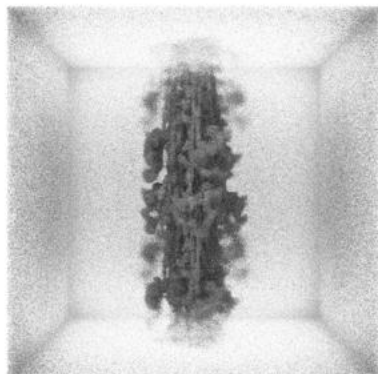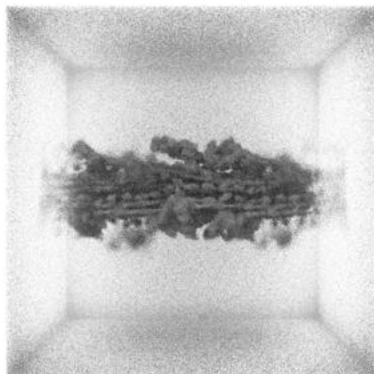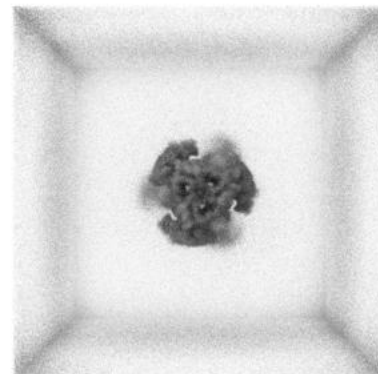
| X | Y | Z |

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.

5.6 Mask visualisation ⓘ

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

6　Map analysis ⓘ

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

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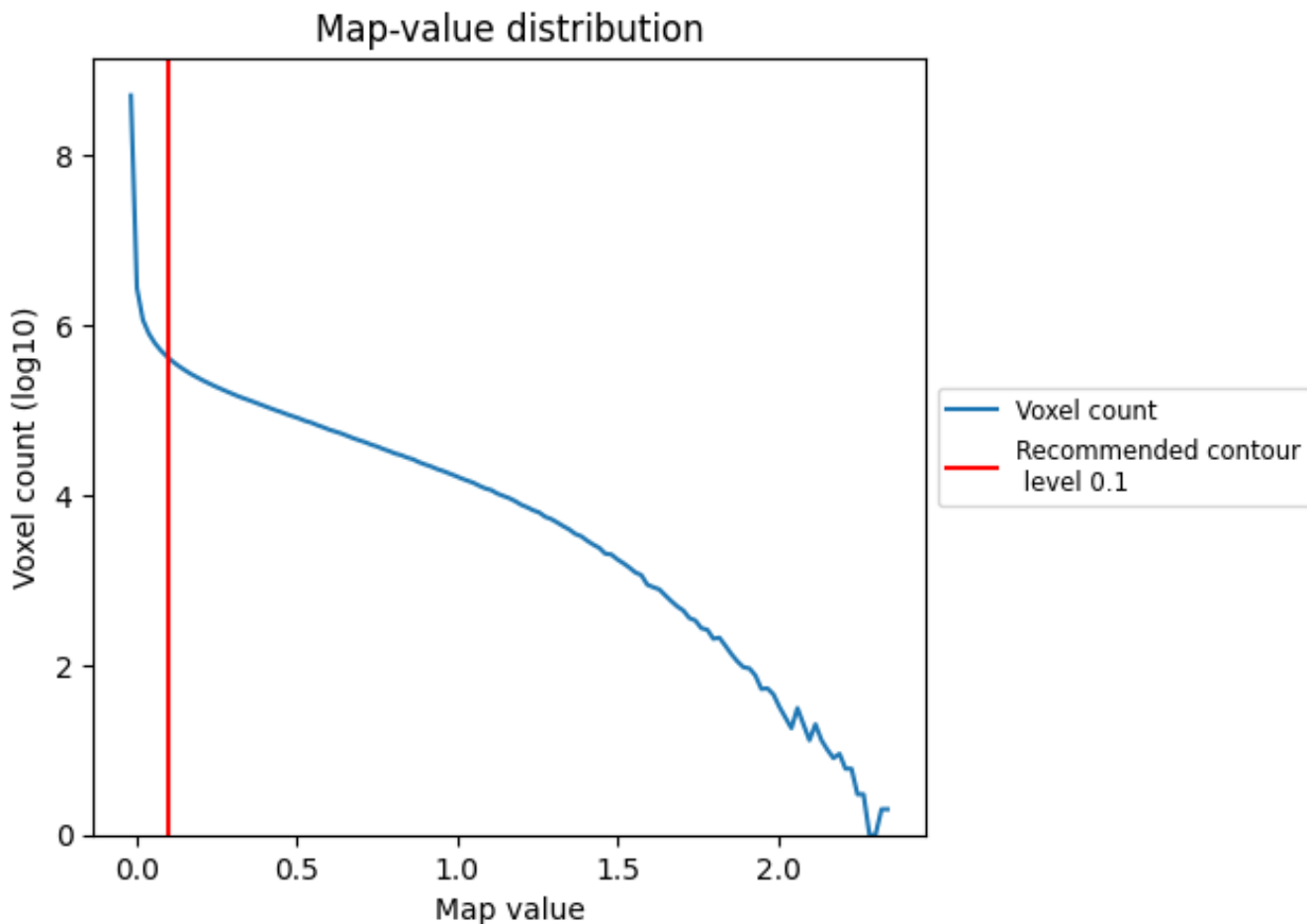
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

6.2   Volume estimate ⓘ
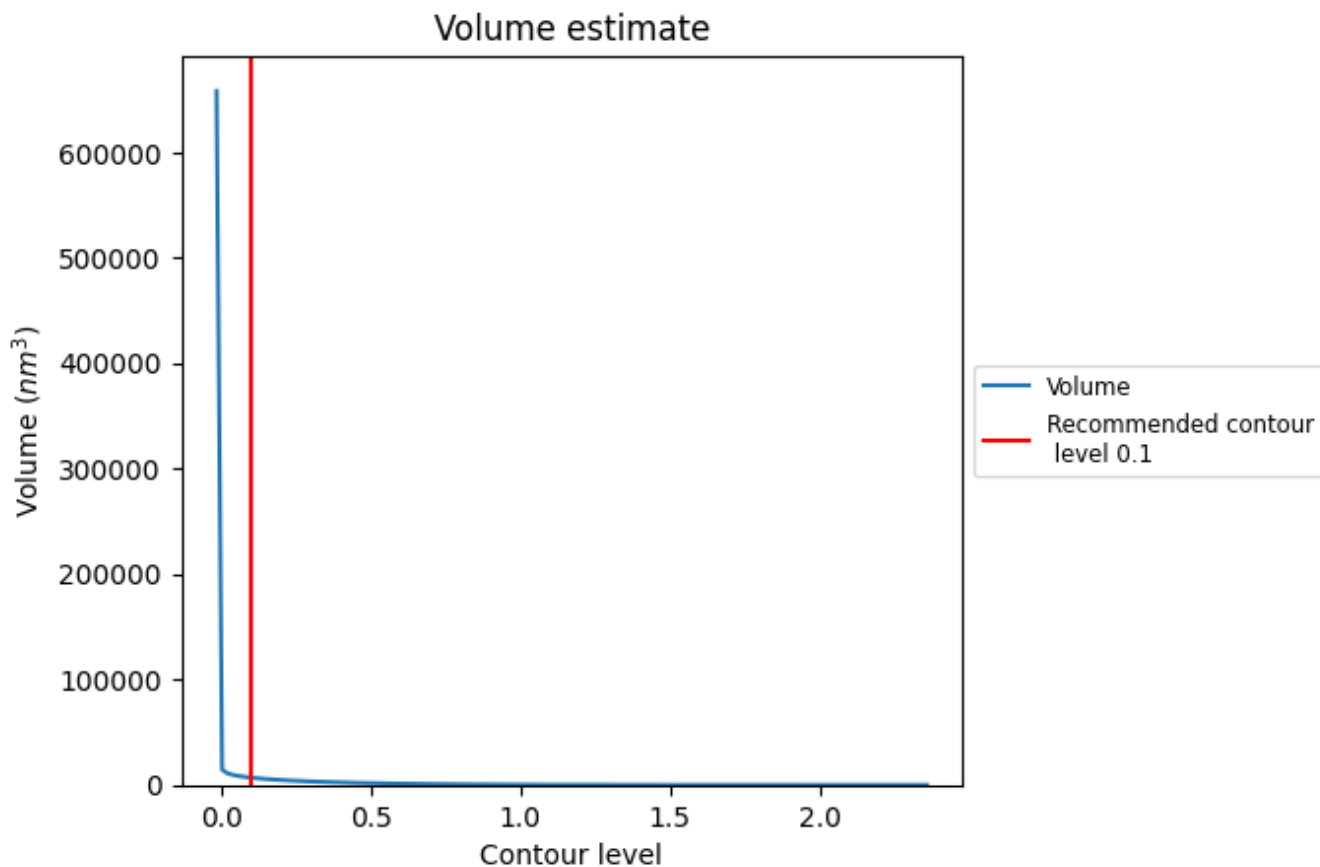
The volume at the recommended contour level is 6910 nm^3; this corresponds to an approximate mass of 6242 kDa.

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.

6.3　Rotationally averaged power spectrum ⓘ
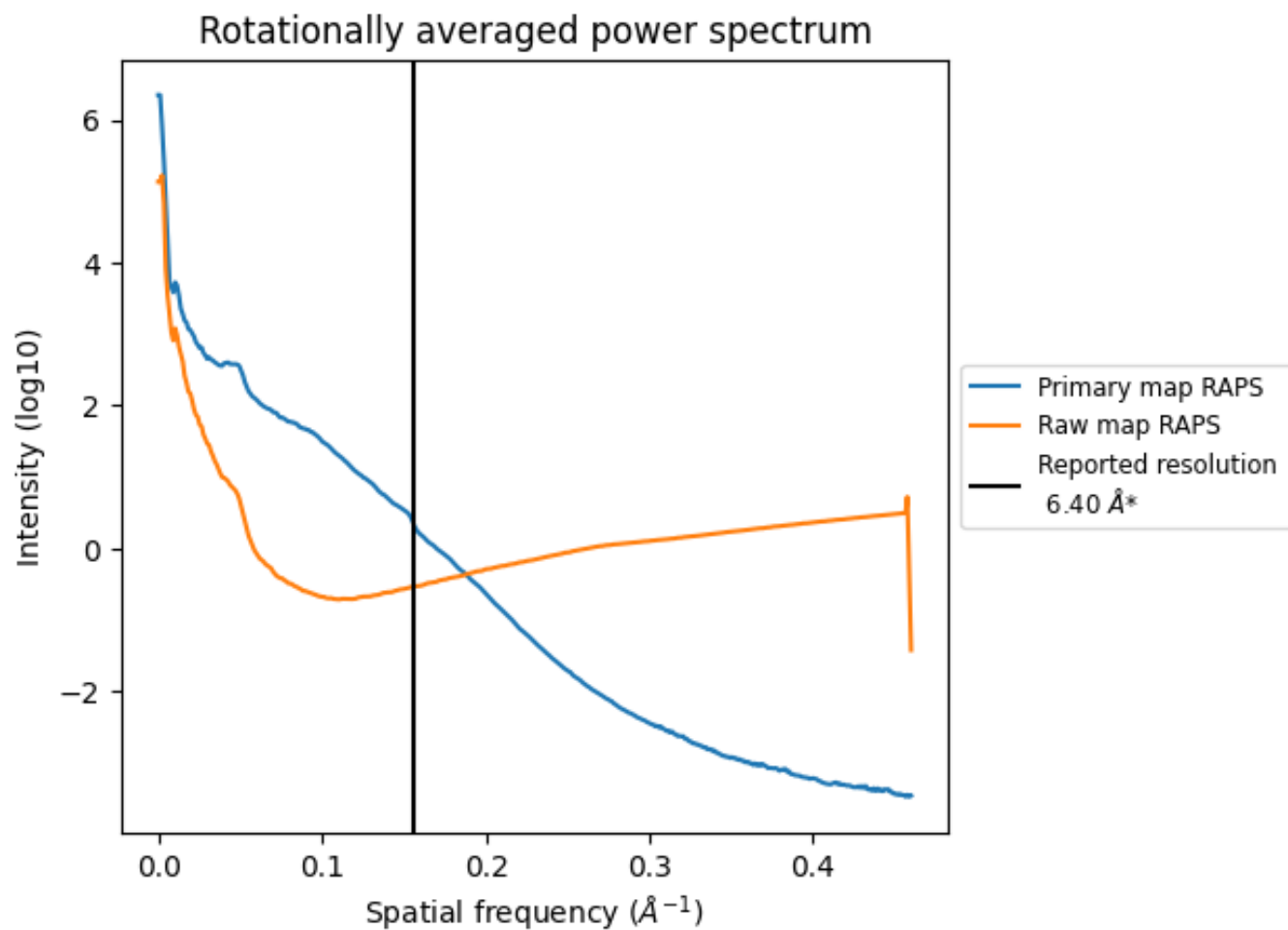
*Reported resolution corresponds to spatial frequency of 0.156 Å^{-1}

7 Fourier-Shell correlation ⓘ

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.

7.1 FSC ⓘ
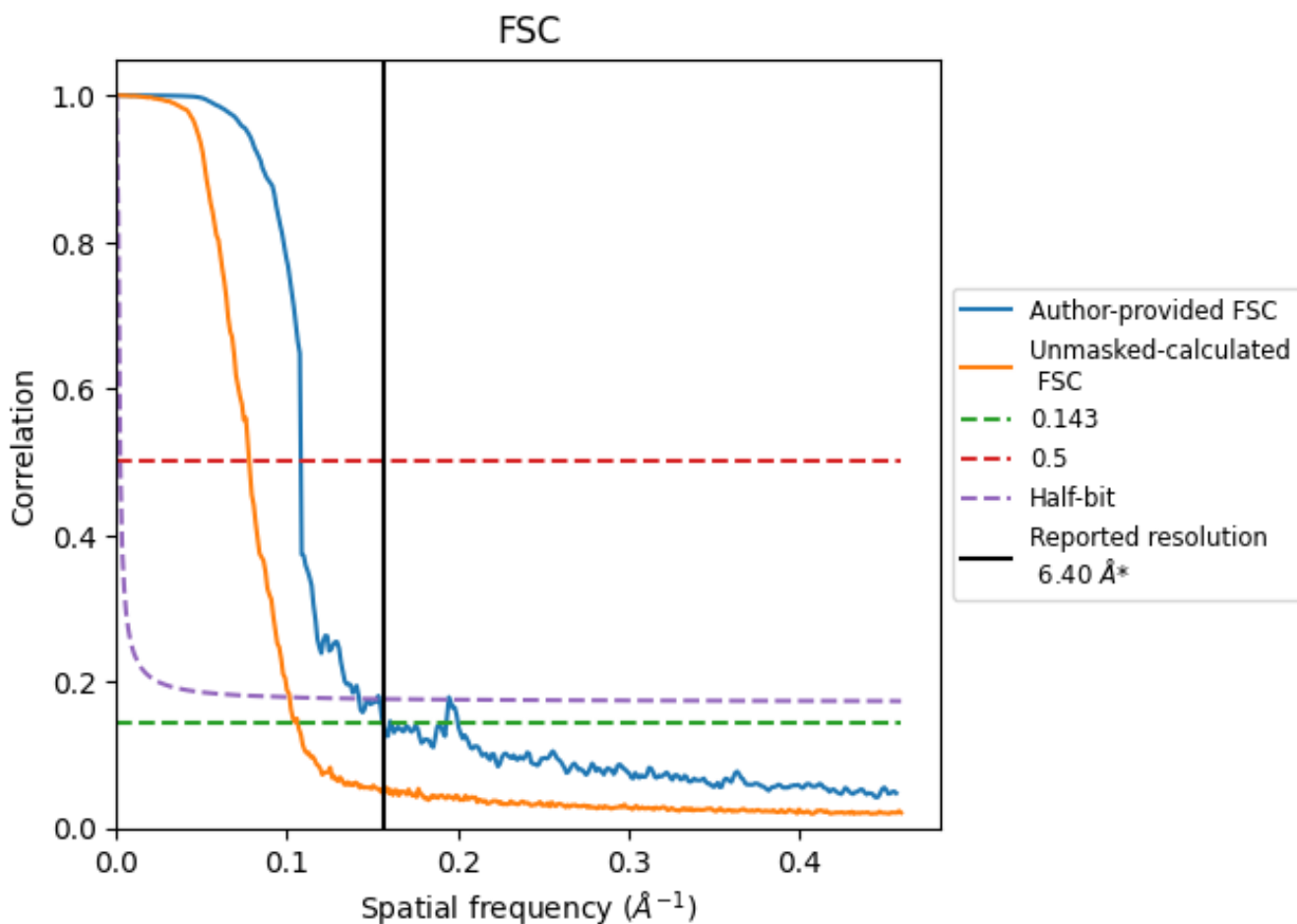
*Reported resolution corresponds to spatial frequency of 0.156 Å^{-1}

7.2 Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	6.40	-	-
Author-provided FSC curve	6.41	9.25	7.03
Unmasked-calculated*	9.41	12.84	9.86

*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 9.41 differs from the reported value 6.4 by more than 10 %

8　Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-29722 and PDB model 8G4L. Per-residue inclusion information can be found in section **??** on page **??**.

8.1　Map-model overlay ⓘ

X　　　　　　　　　　　　　　Y　　　　　　　　　　　　　　Z
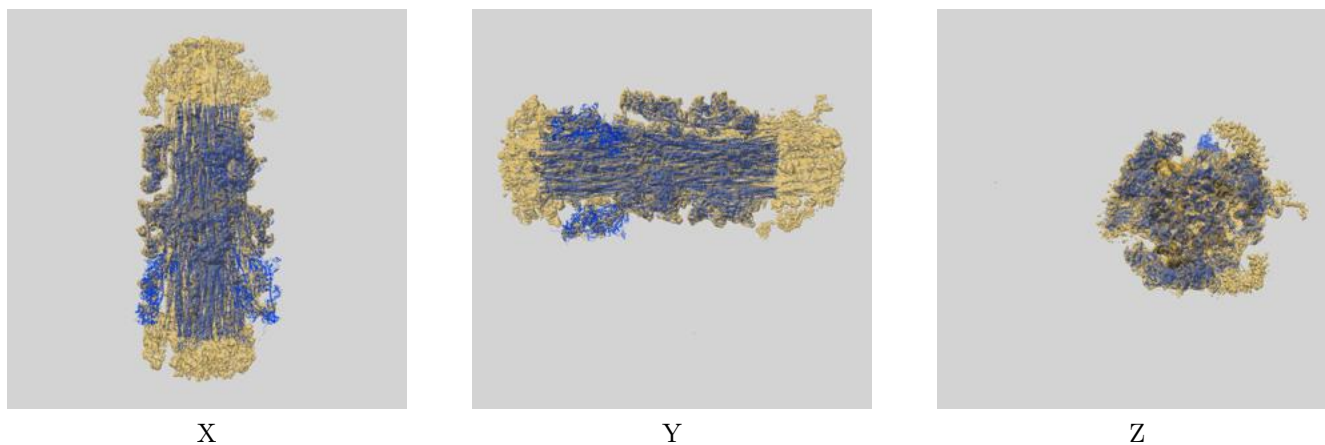
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

8.2 Q-score mapped to coordinate model ⓘ

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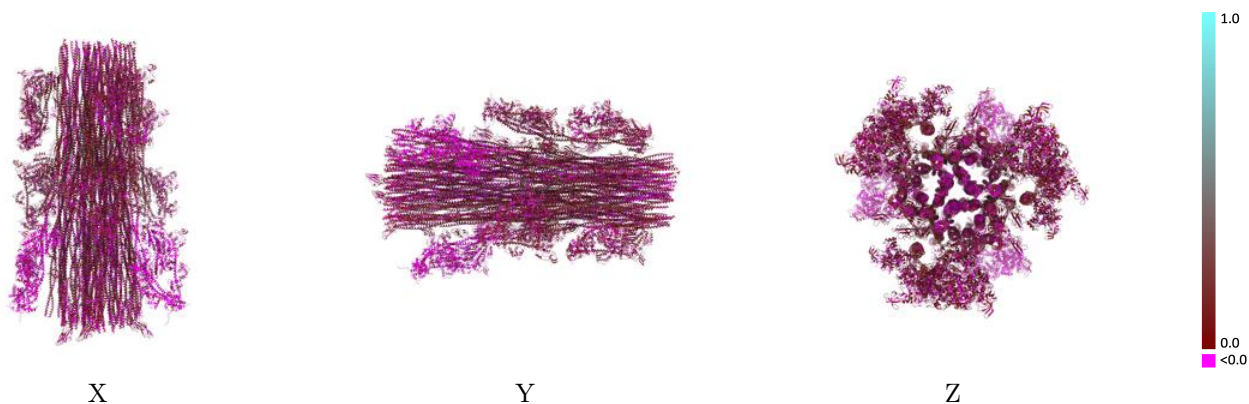
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

8.3 Atom inclusion mapped to coordinate model ⓘ

X   Y   Z
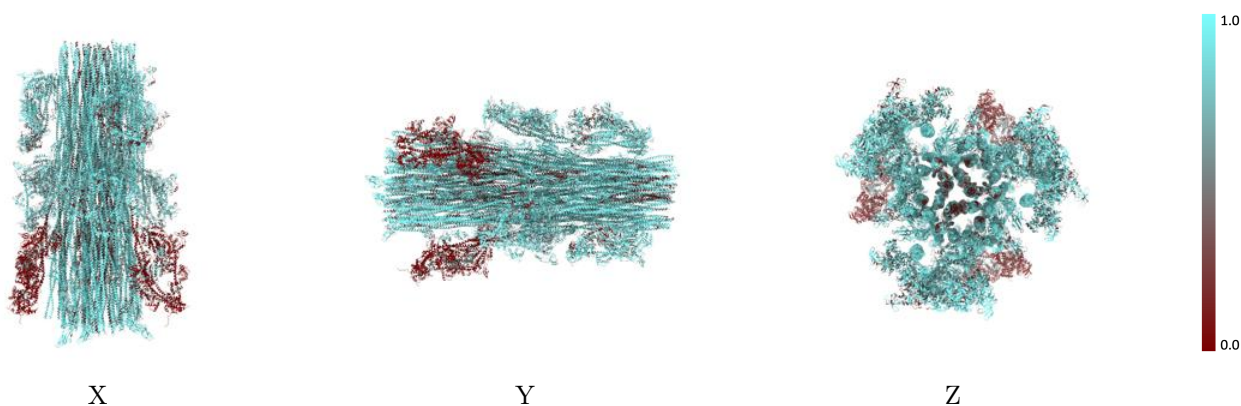
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.1).

8.4 Atom inclusion ⓘ
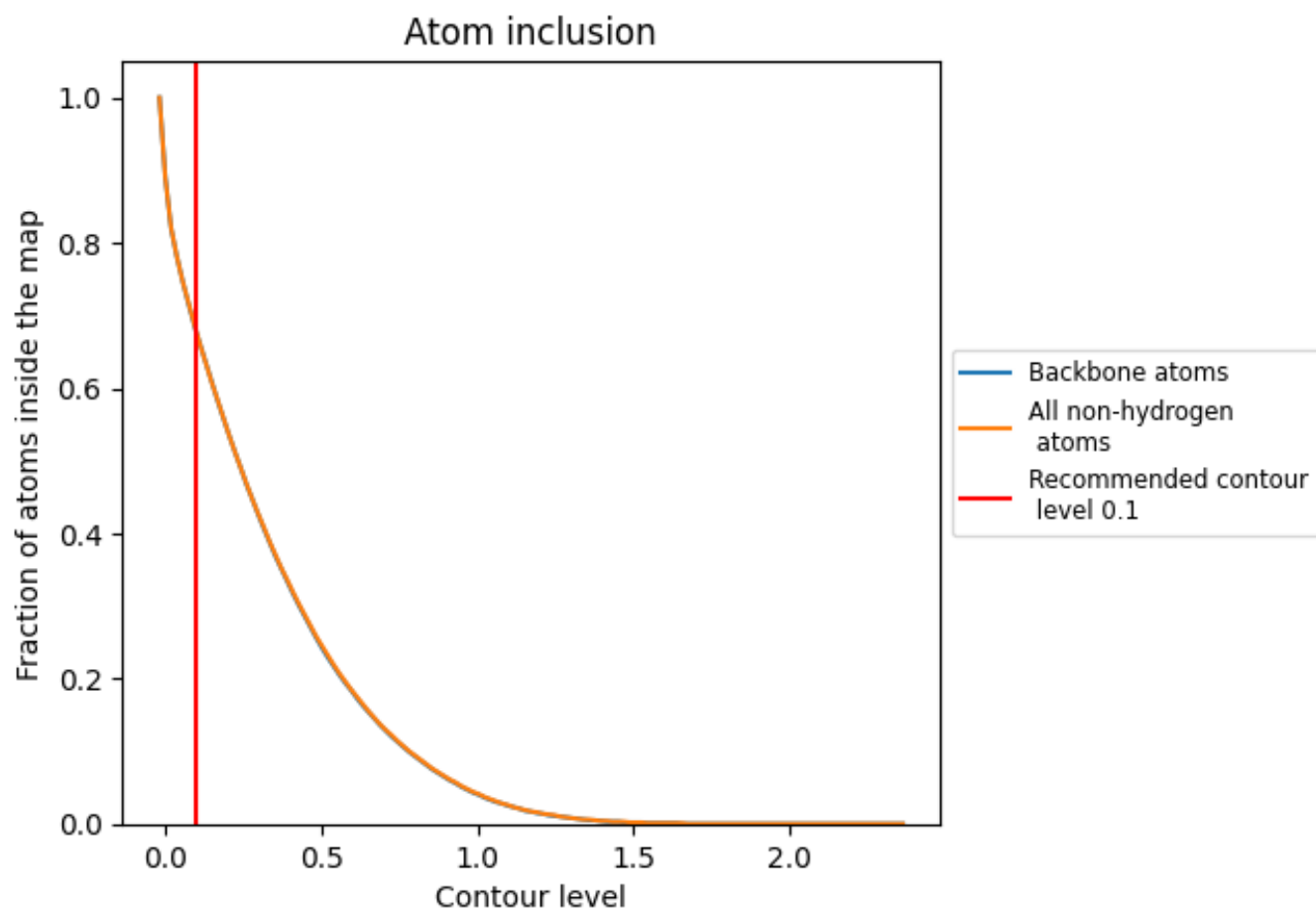
At the recommended contour level, 68% of all backbone atoms, 68% of all non-hydrogen atoms, are inside the map.

8.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6810	0.0790
A	0.2650	-0.0250
AA	0.3430	-0.0170
AB	0.2210	-0.0370
AE	0.1360	-0.0560
AF	0.0470	-0.0230
AG	0.8700	0.1190
AH	0.8280	0.1130
AI	0.9140	0.1360
AJ	0.9200	0.1450
AK	0.8660	0.1180
AL	0.8090	0.0960
AM	0.5970	0.0480
AN	0.5480	0.0270
AO	0.8540	0.1170
AP	0.8470	0.1070
AQ	0.8280	0.1020
AR	0.8060	0.1010
AS	0.6000	0.0520
AT	0.6740	0.0720
AU	0.7840	0.0970
AV	0.7500	0.0830
AW	0.6910	0.0580
AX	0.7710	0.0920
AY	0.7880	0.1070
AZ	0.7950	0.1310
B	0.2460	-0.0360
BA	0.2410	-0.0350
BB	0.2940	-0.0170
BE	0.0480	-0.0570
BF	0.1030	-0.0320
BG	0.8580	0.1180
BH	0.8210	0.1100
BI	0.9000	0.1350
BJ	0.9150	0.1440

1.0

0.0
<0.0
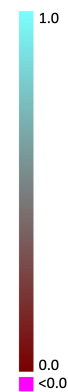
Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
BK	0.8730	0.1170
BL	0.8090	0.0940
BM	0.6520	0.0510
BN	0.6230	0.0340
BO	0.8630	0.1130
BP	0.8610	0.1140
BQ	0.8260	0.0970
BR	0.8100	0.1020
BS	0.6620	0.0540
BT	0.7050	0.0770
BU	0.7720	0.0900
BV	0.7530	0.0830
BW	0.6920	0.0600
BX	0.7870	0.0940
BY	0.7550	0.1010
BZ	0.7730	0.1250
E	0.0840	-0.0520
F	0.0780	-0.0230
G	0.8420	0.1140
H	0.8320	0.1150
I	0.9020	0.1370
J	0.9260	0.1440
K	0.8740	0.1230
L	0.8080	0.0920
M	0.6410	0.0510
N	0.5670	0.0180
O	0.8680	0.1230
P	0.8520	0.1060
Q	0.8310	0.1010
R	0.8030	0.0990
S	0.5610	0.0520
T	0.6430	0.0730
U	0.8290	0.1000
V	0.7780	0.0870
W	0.7190	0.0660
X	0.7940	0.0950
Y	0.7630	0.1030
Z	0.7840	0.1280
a	0.6540	0.0680
aa	0.6300	0.0580
ab	0.7810	0.1180
ac	0.7780	0.0770

Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
ad	0.7960	0.1070
ae	0.7370	0.0900
af	0.7700	0.1050
ag	0.4740	0.0350
ah	0.8570	0.1060
ai	0.6190	0.0530
aj	0.6560	0.0620
ak	0.5980	0.0130
al	0.6600	0.0560
am	0.7840	0.1050
an	0.9080	0.1470
ao	0.8150	0.1500
aq	0.0860	-0.0700
ar	0.0370	-0.0590
b	0.7620	0.1120
ba	0.6380	0.0550
bb	0.8040	0.1230
bc	0.7290	0.0750
bd	0.7790	0.1030
be	0.7170	0.0870
bf	0.8090	0.1110
bg	0.6160	0.0500
bh	0.8780	0.1170
bi	0.7290	0.0460
bj	0.7150	0.0740
bk	0.6390	0.0250
bl	0.7100	0.0590
bm	0.7780	0.1020
bn	0.9050	0.1440
bo	0.7900	0.1420
bq	0.1160	-0.0660
br	0.1350	-0.0600
c	0.7080	0.0660
d	0.7870	0.1030
e	0.7280	0.0910
f	0.8130	0.1110
g	0.5370	0.0360
h	0.8800	0.1170
i	0.5490	0.0400
j	0.6630	0.0610
k	0.5490	0.0130
l	0.6400	0.0490

Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
m	▦ 0.7930	▦ 0.1050
n	▦ 0.9000	▦ 0.1450
o	▦ 0.7960	▦ 0.1470
q	▦ 0.0340	▦ -0.0740
r	▦ 0.0680	▦ -0.0630