



wwPDB EM Validation Summary Report ⓘ

Nov 19, 2022 – 09:49 PM EST

PDB ID : 1Q5C
EMDB ID : EMD-1052
Title : S-S-lambda-shaped TRANS and CIS interactions of cadherins model based on fitting C-cadherin (1L3W) to 3D map of desmosomes obtained by electron tomography
Authors : He, W.; Cowin, P.; Stokes, D.L.
Deposited on : 2003-08-06
Resolution : 30.00 Å (reported)
Based on initial model : 1L3W

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev43
Mogul : 1.8.5 (274361), CSD as541be (2020)
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

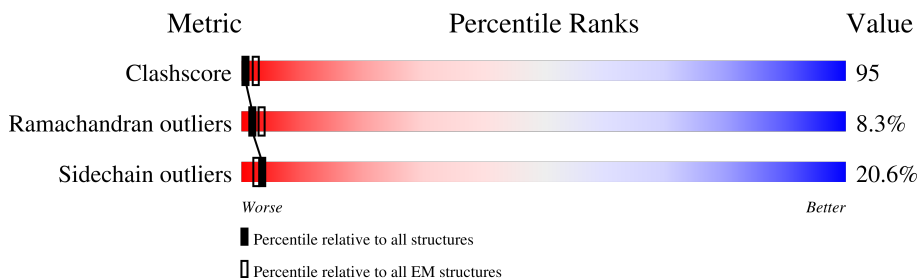
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 30.00 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	880	 61% 16% 30% 11% 11% 39%
1	B	880	 61% 16% 31% 11% 11% 39%
1	C	880	 61% 15% 31% 11% 11% 39%
1	D	880	 61% 15% 32% 11% 11% 39%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	NAG	A	801	-	-	X	-

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	NAG	A	805	X	-	X	-
2	NAG	A	806	X	-	X	-
2	NAG	A	807	-	-	X	-
2	NAG	A	809	-	-	X	-
2	NAG	A	810	-	-	X	-
2	NAG	A	902	X	-	X	-
2	NAG	A	903	X	-	-	-
2	NAG	A	904	-	-	X	-
2	NAG	B	801	-	-	X	-
2	NAG	B	805	X	-	X	-
2	NAG	B	806	X	-	X	-
2	NAG	B	807	-	-	X	-
2	NAG	B	809	-	-	X	-
2	NAG	B	810	-	-	X	-
2	NAG	B	902	X	-	X	-
2	NAG	B	903	X	-	-	-
2	NAG	B	904	-	-	X	-
2	NAG	C	801	-	-	X	-
2	NAG	C	805	X	-	-	-
2	NAG	C	806	X	-	X	-
2	NAG	C	807	-	-	X	-
2	NAG	C	809	-	-	X	-
2	NAG	C	810	-	-	X	-
2	NAG	C	902	X	-	X	-
2	NAG	C	903	X	-	-	-
2	NAG	C	904	-	-	X	-
2	NAG	D	801	-	-	X	-
2	NAG	D	805	X	-	X	-
2	NAG	D	806	X	-	X	-
2	NAG	D	807	-	-	X	-
2	NAG	D	809	-	-	X	-
2	NAG	D	810	-	-	X	-
2	NAG	D	902	X	-	X	-
2	NAG	D	903	X	-	-	-
2	NAG	D	904	-	-	X	-
3	NDG	A	811	-	-	X	-
3	NDG	B	811	-	-	X	-
3	NDG	D	811	-	-	X	-

2 Entry composition [i](#)

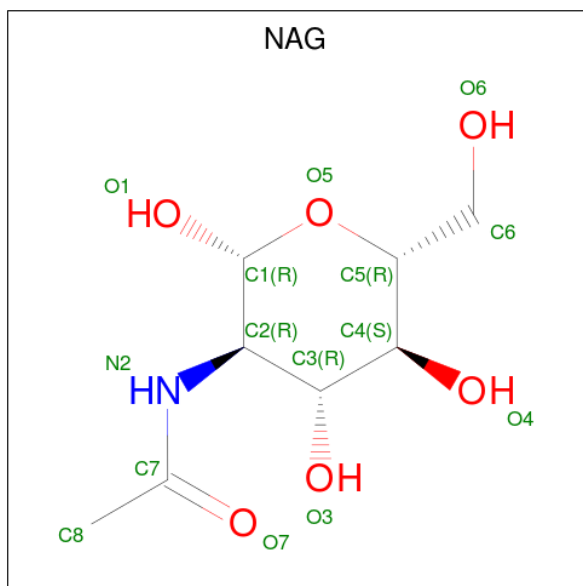
There are 4 unique types of molecules in this entry. The entry contains 17652 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called EP-cadherin.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	540	Total	C	N	O	S	0	0
			4191	2635	695	850	11		
1	B	540	Total	C	N	O	S	0	0
			4191	2635	695	850	11		
1	C	540	Total	C	N	O	S	0	0
			4191	2635	695	850	11		
1	D	540	Total	C	N	O	S	0	0
			4191	2635	695	850	11		

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
2	A	1	Total	C	N	O	0
			182	104	13	65	
2	A	1	Total	C	N	O	0
			182	104	13	65	

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Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
2	A	1	182	104	13	65	0
2	A	1	182	104	13	65	0
2	A	1	182	104	13	65	0
2	A	1	182	104	13	65	0
2	A	1	182	104	13	65	0
2	A	1	182	104	13	65	0
2	A	1	182	104	13	65	0
2	A	1	182	104	13	65	0
2	A	1	182	104	13	65	0
2	A	1	182	104	13	65	0
2	A	1	182	104	13	65	0
2	B	1	182	104	13	65	0
2	B	1	182	104	13	65	0
2	B	1	182	104	13	65	0
2	B	1	182	104	13	65	0
2	B	1	182	104	13	65	0
2	B	1	182	104	13	65	0
2	B	1	182	104	13	65	0
2	B	1	182	104	13	65	0
2	B	1	182	104	13	65	0

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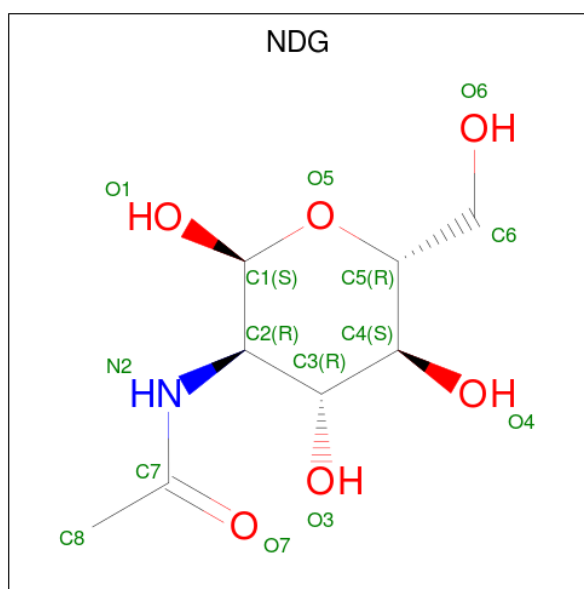
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
2	B	1	182	104	13	65	0
2	B	1	182	104	13	65	0
2	B	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	C	1	182	104	13	65	0
2	D	1	182	104	13	65	0
2	D	1	182	104	13	65	0
2	D	1	182	104	13	65	0
2	D	1	182	104	13	65	0
2	D	1	182	104	13	65	0

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Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
2	D	1	Total	C	N	O	0
			182	104	13	65	
2	D	1	Total	C	N	O	0
			182	104	13	65	
2	D	1	Total	C	N	O	0
			182	104	13	65	
2	D	1	Total	C	N	O	0
			182	104	13	65	
2	D	1	Total	C	N	O	0
			182	104	13	65	
2	D	1	Total	C	N	O	0
			182	104	13	65	
2	D	1	Total	C	N	O	0
			182	104	13	65	

- Molecule 3 is 2-acetamido-2-deoxy-alpha-D-glucopyranose (three-letter code: NDG) (formula: C₈H₁₅NO₆).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
3	A	1	Total	C	N	O	0
			28	16	2	10	
3	A	1	Total	C	N	O	0
			28	16	2	10	
3	B	1	Total	C	N	O	0
			28	16	2	10	

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Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
3	B	1	28	16	2	10	0
3	C	1	28	16	2	10	0
3	C	1	28	16	2	10	0
3	D	1	28	16	2	10	0
3	D	1	28	16	2	10	0

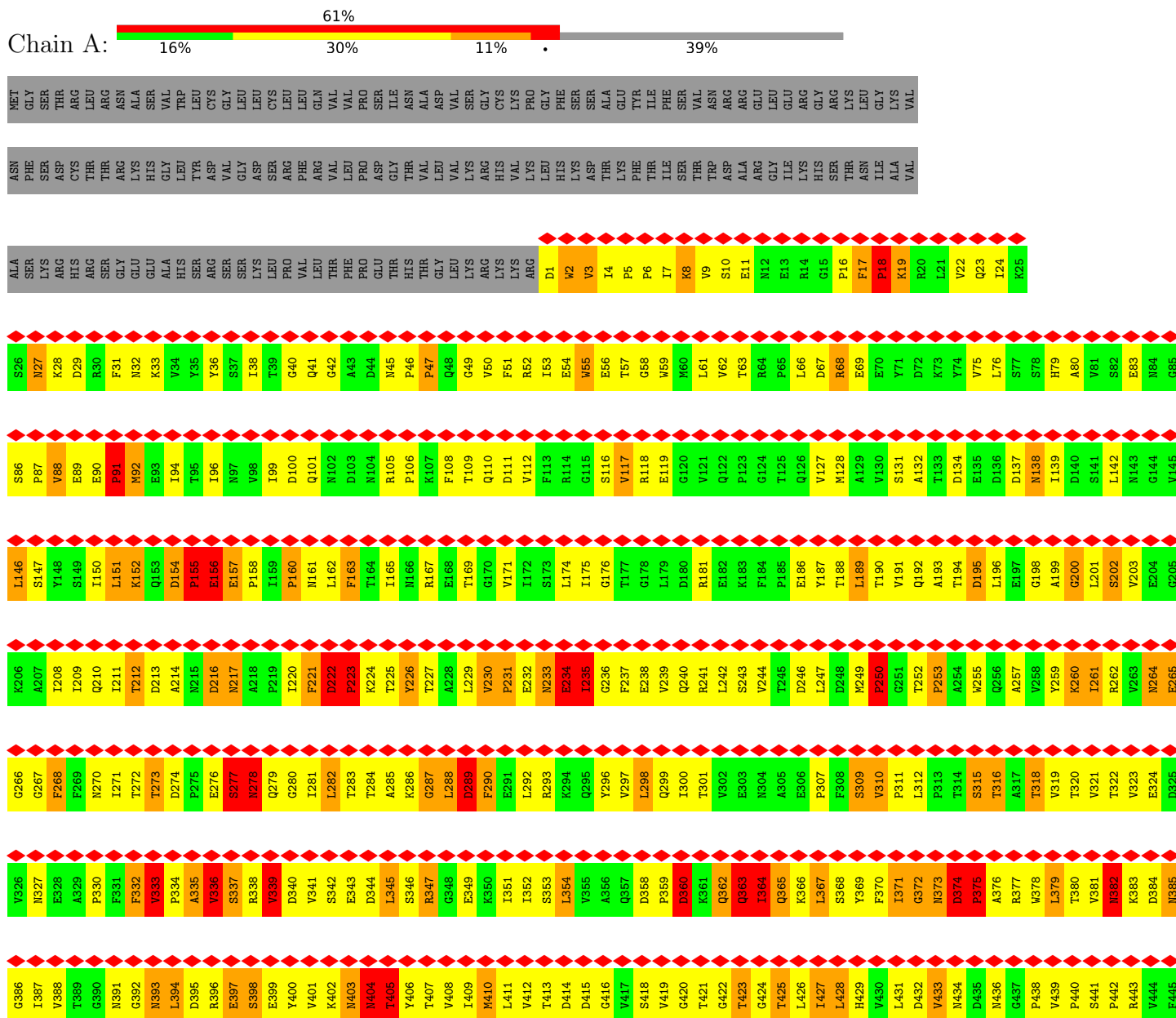
- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		AltConf
4	A	12	Total	Ca	0
			12	12	
4	B	12	Total	Ca	0
			12	12	
4	C	12	Total	Ca	0
			12	12	
4	D	12	Total	Ca	0
			12	12	

3 Residue-property plots i

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: EP-cadherin



V326	N327	E328	A329	F330	F331	F332	V333	P334	A335	V336	R337	R338	V339	D340	V341	S342	E343	D344	L345	S346	R347	R348	G348	E349	K350	I351	I352	S353	L354	V355	A356	Q357	D358	P359	D360	K361	Q362	Q363	I364	Q365	K366	L367	S368	Y369	F370	I371	G372	N373	D374	P375	A376	R377	L378	T380	V381	K382	K383	D384	N385		
G386	I387	V388	T389	Q390	N391	G392	N393	L394	D395	R396	E397	S398	E399	Y400	V401	K402	M403	M404	T405	Y406	T407	V408	Y409	M410	L411	V412	T413	D414	L415	G416	V417	S418	V419	G420	T421	G422	T423	G424	T425	L426	L427	L428	H429	V430	I431	D432	V433	N434	M436	G437	P438	L439	P440	S441	P442	K443	V444	F445			
T446	M447	C448	D449	Q450	N451	P452	F453	P454	Q455	V456	L457	T458	I459	S460	D461	A462	D463	I464	P465	P466	M467	T468	Y469	P470	Y471	K472	V473	S474	L475	S476	H477	G478	S479	D480	L481	T482	W483	K484	A485	E486	L487	D488	S489	K490	G491	T492	S493	M494	L495	L496	S497	P498	T499	Q500	Q501	L502	K503	K504	G505		
D506	Y507	S508	I509	Y510	Y511	L512	L513	S514	D515	A516	Q517	N518	N519	F520	Q521	L522	T523	V524	V525	N526	A527	T528	V529	C530	S531	C532	E533	G534	K535	A536	I537	K538	C539	Q540	GLU	LYS	LEU	VAL	LEU	GLY	PHE	ARG	GLY	PHE	TYR	PRO	ASP	GLU	LEU	ILE	LEU	GLY	SER	VAL	ALA	LEU	LEU	ILE	LEU	MET	
PHE	LEU	LEU	LEU	LEU	PHE	LEU	LEU	ARG	LYS	VAL	LYS	PRO	LEU	LEU	LEU	ASP	GLU	ASP	THR	ASN	PHE	ASN	TYR	LEU	GLY	ALA	GLU	GLY	GLY	GLY	ALA	ASP	GLN	LEU	VAL	PHE	HIS	ARG	GLY	TYR	PHE	GLY	LEU	ARG	GLY	LEU	LEU	ASP	GLY	GLY	ALA	ALA	ALA	ALA	ALA						
ARG	ASN	ASP	VAL	VAL	ARG	THR	ASN	MET	LYS	PRO	ARG	PRO	PRO	LEU	ASN	PRO	GLY	ILE	ASN	PHE	ARG	ASN	TYR	LEU	ASP	TYR	GLY	ALA	ALA	ALA	PRO	PRO	TYR	ASP	LEU	LEU	LEU	VAL	ASP	GLY	ARG	GLY	LEU	ASP	GLY	LEU	LEU	ASP	GLY	GLY	GLY	ALA	ALA	ALA	ALA	ALA					
SER	LEU	SER	SER	LEU	ASN	SER	ASN	ASN	ASN	ASN	ASP	ASP	TYR	TYR	LEU	SER	SER	ARG	PHE	ARG	ARG	LYS	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU

● Molecule 1: EP-cadherin



MET	GLY	THR	THR	ARG	ASN	ASN	ALA	VAL	LEU	CYS	GLY	GLY	LEU	LEU	LEU	GLN	VAL	VAL	PRO	SER	ILE	SER	LEU	CYS	LYS	PRO	PRO	PHE	GLY	ALA	THR	THR	THR	THR	THR	THR	THR	TRP	ASP	ARG	ARG	GLY	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	VAL																														
ASN	PHE	ASP	CYS	THR	THR	ARG	LYS	HIS	GLY	VAL	LEU	TRP	TYR	ASP	ARG	PHE	ARG	VAL	VAL	VAL	LEU	GLY	ARG	HIS	LYS	VAL	VAL	VAL	VAL	HIS	LYS	THR	PHE	ILE	THR	THR	THR	TRP	ASP	ALA	ALA	GLY	GLY	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	VAL																												
ALA	SER	ARG	HIS	ARG	SER	GLY	GLU	GLU	ALA	ALA	HIS	SER	ARG	LEU	PRO	VAL	LEU	THR	THR	THR	HIS	THR	ARG	LYS	LYS	VAL	VAL	VAL	ARG	HIS	LYS	THR	THR	THR	THR	THR	THR	TRP	ASP	ALA	ARG	GLY	GLY	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	VAL																											
D1	W2	V3	I4	P5	P6	I7	K8	V9	S10	E11	N12	E13	R14	G15	P16	F17	P18	K19	R20	L21	V22	Q23	T24	K25	S26	N27	K28	D29	R30	F31	N32	K33	V34	T35	Y36	S37	I38	T39	G40	Q41	G42	A43	D44	N45	P46	P47	Q48	G49	V50	F51	R52	I53	E54	W55	E56	T57	S58	E59	M60	L61	V62	T63	R64	P65	L66	D67	R68	E69	V70	E71	Y71	D72	K73	Y74	V75	L76	S77	S78	H79	A80	V81	S82	N83	R84	G85
S86	P87	V88	E89	E90	P91	M92	E93	I94	T95	I96	N97	P158	V159	D100	Q101	M102	L162	F163	T164	I165	M166	R167	E168	T169	G170	V171	I172	S173	L174	I175	G176	V177	L178	G179	D180	R181	E182	K183	F184	P185	E186	Y187	T188	L189	V190	I191	Q192	A193	T194	D195	L196	E197	G198	I199	G200	I201	S202	V203	E204	G205																									
K206	A207	I208	I209	Q210	I211	T212	D213	A214	N215	D216	N217	A218	P219	I220	F221	D222	P223	K224	T225	Y226	T227	A228	L229	V230	P231	E232	N233	E234	I235	G236	F237	E238	V239	Q240	R241	L242	S243	V244	T245	D246	L247	D248	M249	P250	G251	T252	P253	A254	W255	Q256	A257	V258	Y259	K260	I261	R262	N264	E265																											

G266	G267	F268	F269	N270	I271	T272	T273	D274	P275	E276	S277	N278	Q279	G280	I281	L282	T283	T284	A285	K286	G287	L288	D289	F290	E291	L292	R293	K294	Q295	Y296	V297	L298	Q299	I300	T301	V302	E303	N304	A305	E306	F308	S309	V310	L312	P313	T314	S315	T316	A317	T318	V319	T320	V321	T322	V323	E324	D325		
V326	N327	E328	A329	P330	F331	F332	V333	P334	A335	V336	S337	R338	V339	D340	V341	S342	E343	D344	L345	S346	R347	G348	E349	K350	I351	I352	S353	L354	V355	A356	Q357	D358	P359	D360	K361	Q362	Q363	I364	Q365	K366	L367	S368	Y369	F370	I371	G372	N373	D374	P375	A376	R377	W378	L379	T380	V381	N382	K383	D384	N385
G386	I387	V388	T389	Q390	N391	G392	N393	L394	D395	R396	E397	S398	E399	Y400	V401	K402	M403	M404	T405	Y406	T407	V408	I409	M410	L411	V412	T413	D414	D415	G416	V417	S418	V419	G420	T421	G422	T423	G424	T425	L426	I427	L428	H429	V430	L431	D432	V433	M434	D435	M436	G437	P438	V439	P440	S441	P442	R443	V444	F445
T446	M447	C448	D449	Q450	M451	P452	F453	P454	Q455	V456	L457	T458	I459	S460	D461	D462	D463	I464	P465	P466	M467	T468	Y469	F470	Y471	K472	V473	S474	L475	S476	H477	G478	S479	D480	L481	T482	W483	K484	A485	E486	L487	D488	S489	K490	G491	T492	S493	M494	L495	L496	S497	P498	T499	Q500	Q501	L502	K503	K504	G505
D506	Y507	S508	I509	Y510	V511	L512	L513	S514	D515	A516	Q517	N518	N519	F520	Q521	L522	T523	V524	V525	N526	A527	T528	V529	C530	S531	C532	E533	G534	K535	A536	I537	K538	C539	Q540	GLU	LEU	LEU	VAL	GLY	GLY	PHE	ARG	ASP	PRO	ILE	LEU	LEU	LEU	GLY	SER	PRO	ASP	ALA	ALA	MET				
PHE	LEU	LEU	LEU	LEU	PHE	LEU	LYS	ARG	LYS	VAL	LYS	PRO	LEU	LEU	LEU	PRO	ASP	ASP	THR	ARG	ASP	PHE	ASN	GLY	GLY	GLU	GLU	GLY	GLY	GLY	GLU	ALA	ASP	LEU	LEU	LEU	VAL	HIS	GLY	GLY	ARG	ASP	PRO	ILE	LEU	LEU	LEU	GLY	SER	PRO	ASP	ALA	ALA	MET					
ARG	ASN	ASP	VAL	LEU	PRO	THR	LEU	MET	ASN	PRO	ARG	ASN	PRO	SER	ASN	PRO	GLY	ILE	GLY	ASN	PHE	ARG	LYS	LEU	ALA	ASP	ASN	ASP	PRO	THR	ALA	PRO	PRO	TYR	ASP	SER	LEU	VAL	PHE	ASP	TYR	GLY	LEU	SER	GLY	SER	PRO	ILE	ALA	ALA	LEU								
SER	LEU	SER	SER	LEU	ASN	SER	SER	ASN	ASN	GLU	HIS	TYR	ASP	TYR	ASN	TRP	GLY	SER	ARG	PHE	ARG	ARG	LYS	LEU	ALA	ASP	ASP	ASP	GLU	THR	ALA	PRO	PRO	TYR	ASP	SER	LEU	VAL	PHE	ASP	TYR	GLY	LEU	SER	GLY	SER	PRO	ILE	ALA	ALA	LEU								

4 Experimental information

Property	Value	Source
EM reconstruction method	TOMOGRAPHY	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of tilted images used	Not provided	
Resolution determination method	Not provided	
CTF correction method	no CTF correction. Imaging at underfocus 0.4 micron with CM200FEG microscope at 50,000 magnification	Depositor
Microscope	FEI/PHILIPS CM200FEG	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	1200	Depositor
Minimum defocus (nm)	300	Depositor
Maximum defocus (nm)	500	Depositor
Magnification	68276	Depositor
Image detector	GENERIC GATAN	Depositor
Maximum voxel value	2603.000	Depositor
Minimum voxel value	-1866.000	Depositor
Average voxel value	1323.980	Depositor
Voxel value standard deviation	218.755	Depositor
Recommended contour level	1760.0	Depositor
Tomogram size (\AA)	3720.19, 3720.19, 617.61	wwPDB
Tomogram dimensions	512, 512, 85	wwPDB
Tomogram angles ($^\circ$)	90, 90, 90	wwPDB
Grid spacing (\AA)	7.266, 7.266, 7.266	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: CA, NAG, NDG

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	0.70	8/4276 (0.2%)	1.39	77/5839 (1.3%)
1	B	0.70	8/4276 (0.2%)	1.39	78/5839 (1.3%)
1	C	0.70	8/4276 (0.2%)	1.39	78/5839 (1.3%)
1	D	0.70	8/4276 (0.2%)	1.39	78/5839 (1.3%)
All	All	0.70	32/17104 (0.2%)	1.39	311/23356 (1.3%)

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	4
1	B	0	4
1	C	0	4
1	D	0	4
All	All	0	16

The worst 5 of 32 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	335	ALA	CA-CB	-8.37	1.34	1.52
1	A	335	ALA	CA-CB	-8.36	1.34	1.52
1	D	335	ALA	CA-CB	-8.34	1.34	1.52
1	C	335	ALA	CA-CB	-8.29	1.35	1.52
1	B	539	CYS	CB-SG	8.15	1.96	1.82

The worst 5 of 311 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	520	PRO	CA-C-N	-13.29	87.95	117.20
1	B	520	PRO	CA-C-N	-13.27	88.00	117.20
1	C	520	PRO	CA-C-N	-13.27	88.00	117.20
1	A	520	PRO	CA-C-N	-13.25	88.04	117.20
1	D	235	ILE	N-CA-C	12.74	145.39	111.00

There are no chirality outliers.

5 of 16 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	17	PHE	Sidechain
1	A	18	PRO	Mainchain
1	A	222	ASP	Mainchain
1	A	520	PRO	Mainchain
1	B	17	PHE	Sidechain

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	4191	0	4089	795	0
1	B	4191	0	4081	862	0
1	C	4191	0	4078	1115	0
1	D	4191	0	4082	1110	0
2	A	182	0	168	92	0
2	B	182	0	168	89	0
2	C	182	0	169	91	0
2	D	182	0	169	91	0
3	A	28	0	24	9	0
3	B	28	0	24	10	0
3	C	28	0	24	8	0
3	D	28	0	24	9	0
4	A	12	0	0	0	0
4	B	12	0	0	0	0
4	C	12	0	0	0	0
4	D	12	0	0	0	0
All	All	17652	0	17100	3285	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 95.

The worst 5 of 3285 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)
1:A:24:ILE:HB	1:D:2:TRP:CE2	1.18	1.70
1:C:87:PRO:HG3	1:D:43:ALA:CB	1.22	1.65
1:C:87:PRO:CG	1:D:43:ALA:CB	1.77	1.61
1:C:87:PRO:HG3	1:D:43:ALA:CA	1.16	1.58
1:D:464:ILE:HD12	1:D:465:PRO:CD	1.29	1.58

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	538/880 (61%)	402 (75%)	91 (17%)	45 (8%)	1	12
1	B	538/880 (61%)	401 (74%)	93 (17%)	44 (8%)	1	12
1	C	538/880 (61%)	401 (74%)	92 (17%)	45 (8%)	1	12
1	D	538/880 (61%)	401 (74%)	92 (17%)	45 (8%)	1	12
All	All	2152/3520 (61%)	1605 (75%)	368 (17%)	179 (8%)	2	12

5 of 179 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	91	PRO
1	A	155	PRO
1	A	235	ILE
1	A	347	ARG
1	A	363	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	480/779 (62%)	381 (79%)	99 (21%)	1	7
1	B	480/779 (62%)	381 (79%)	99 (21%)	1	7
1	C	480/779 (62%)	381 (79%)	99 (21%)	1	7
1	D	480/779 (62%)	381 (79%)	99 (21%)	1	7
All	All	1920/3116 (62%)	1524 (79%)	396 (21%)	3	7

5 of 396 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	261	ILE
1	C	492	THR
1	C	284	THR
1	C	382	ASN
1	D	27	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 91 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	278	ASN
1	D	79	HIS
1	C	373	ASN
1	C	467	ASN
1	D	138	ASN

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 108 ligands modelled in this entry, 48 are monoatomic - leaving 60 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NDG	A	804	1	14,14,15	0.64	0	17,19,21	0.77	0
2	NAG	A	805	1	14,14,15	0.71	0	17,19,21	1.04	1 (5%)
2	NAG	A	903	1	14,14,15	0.53	0	17,19,21	0.77	0
2	NAG	C	812	1	14,14,15	0.80	1 (7%)	17,19,21	0.74	1 (5%)
2	NAG	B	807	1	14,14,15	0.64	0	17,19,21	1.15	2 (11%)
2	NAG	B	812	1	14,14,15	0.80	1 (7%)	17,19,21	0.73	1 (5%)
2	NAG	B	810	1	14,14,15	0.67	0	17,19,21	1.34	4 (23%)
3	NDG	A	811	1	14,14,15	0.85	0	17,19,21	1.86	1 (5%)
2	NAG	D	803	1	14,14,15	0.97	1 (7%)	17,19,21	1.13	2 (11%)
2	NAG	A	801	1	14,14,15	0.69	0	17,19,21	0.95	1 (5%)
2	NAG	A	802	1	14,14,15	0.74	0	17,19,21	0.82	0
2	NAG	B	808	1	14,14,15	0.65	0	17,19,21	0.68	0
3	NDG	C	811	1	14,14,15	0.85	0	17,19,21	1.86	1 (5%)
2	NAG	B	802	1	14,14,15	0.74	0	17,19,21	0.82	0
2	NAG	D	903	1	14,14,15	0.53	0	17,19,21	0.76	0
2	NAG	C	805	1	14,14,15	0.72	0	17,19,21	1.04	1 (5%)
2	NAG	D	808	1	14,14,15	0.65	0	17,19,21	0.68	0
2	NAG	D	902	1	14,14,15	1.07	1 (7%)	17,19,21	1.07	1 (5%)
2	NAG	D	809	1	14,14,15	0.74	0	17,19,21	0.93	0
3	NDG	D	804	1	14,14,15	0.64	0	17,19,21	0.77	0
2	NAG	B	904	1	14,14,15	0.72	1 (7%)	17,19,21	0.67	0
2	NAG	D	802	1	14,14,15	0.75	0	17,19,21	0.82	0
2	NAG	A	810	1	14,14,15	0.66	0	17,19,21	1.34	4 (23%)
2	NAG	D	801	1	14,14,15	0.68	0	17,19,21	0.94	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	NAG	D	904	1	14,14,15	0.73	1 (7%)	17,19,21	0.67	0
2	NAG	C	801	1	14,14,15	0.68	0	17,19,21	0.95	1 (5%)
2	NAG	A	803	1	14,14,15	0.98	1 (7%)	17,19,21	1.13	2 (11%)
2	NAG	A	809	1	14,14,15	0.74	0	17,19,21	0.93	0
2	NAG	A	902	1	14,14,15	1.09	1 (7%)	17,19,21	1.07	1 (5%)
2	NAG	B	801	1	14,14,15	0.68	0	17,19,21	0.94	0
2	NAG	C	807	1	14,14,15	0.62	0	17,19,21	1.14	2 (11%)
2	NAG	C	810	1	14,14,15	0.65	0	17,19,21	1.34	4 (23%)
2	NAG	B	803	1	14,14,15	0.97	1 (7%)	17,19,21	1.13	2 (11%)
2	NAG	D	807	1	14,14,15	0.63	0	17,19,21	1.14	1 (5%)
2	NAG	D	810	1	14,14,15	0.66	0	17,19,21	1.34	4 (23%)
2	NAG	B	809	1	14,14,15	0.73	0	17,19,21	0.93	0
2	NAG	A	904	1	14,14,15	0.72	1 (7%)	17,19,21	0.68	0
2	NAG	B	903	1	14,14,15	0.54	0	17,19,21	0.77	0
2	NAG	C	803	1	14,14,15	0.97	1 (7%)	17,19,21	1.13	2 (11%)
2	NAG	C	809	1	14,14,15	0.74	0	17,19,21	0.92	0
2	NAG	C	904	1	14,14,15	0.72	1 (7%)	17,19,21	0.68	0
2	NAG	C	802	1	14,14,15	0.74	0	17,19,21	0.82	0
3	NDG	D	811	1	14,14,15	0.86	0	17,19,21	1.86	1 (5%)
2	NAG	C	902	1	14,14,15	1.08	1 (7%)	17,19,21	1.08	1 (5%)
3	NDG	C	804	1	14,14,15	0.64	0	17,19,21	0.77	0
2	NAG	B	902	1	14,14,15	1.07	1 (7%)	17,19,21	1.08	2 (11%)
3	NDG	B	804	1	14,14,15	0.63	0	17,19,21	0.77	0
2	NAG	A	806	1	14,14,15	0.55	0	17,19,21	1.34	2 (11%)
2	NAG	C	806	1	14,14,15	0.56	0	17,19,21	1.34	2 (11%)
2	NAG	C	903	1	14,14,15	0.54	0	17,19,21	0.76	0
2	NAG	B	805	1	14,14,15	0.72	0	17,19,21	1.03	1 (5%)
2	NAG	C	808	1	14,14,15	0.66	0	17,19,21	0.68	0
3	NDG	B	811	1	14,14,15	0.85	0	17,19,21	1.86	1 (5%)
2	NAG	B	806	1	14,14,15	0.55	0	17,19,21	1.34	2 (11%)
2	NAG	A	807	1	14,14,15	0.63	0	17,19,21	1.15	2 (11%)
2	NAG	A	812	1	14,14,15	0.81	1 (7%)	17,19,21	0.73	1 (5%)
2	NAG	D	805	1	14,14,15	0.71	0	17,19,21	1.03	1 (5%)
2	NAG	D	806	1	14,14,15	0.55	0	17,19,21	1.33	2 (11%)
2	NAG	D	812	1	14,14,15	0.81	1 (7%)	17,19,21	0.72	0
2	NAG	A	808	1	14,14,15	0.66	0	17,19,21	0.68	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NDG	A	804	1	-	0/6/23/26	0/1/1/1
2	NAG	A	805	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	A	903	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	C	812	1	-	4/6/23/26	0/1/1/1
2	NAG	B	807	1	-	5/6/23/26	0/1/1/1
2	NAG	B	812	1	-	4/6/23/26	0/1/1/1
2	NAG	B	810	1	-	3/6/23/26	0/1/1/1
3	NDG	A	811	1	-	2/6/23/26	0/1/1/1
2	NAG	D	803	1	-	2/6/23/26	0/1/1/1
2	NAG	A	801	1	-	3/6/23/26	0/1/1/1
2	NAG	A	802	1	-	2/6/23/26	0/1/1/1
2	NAG	B	808	1	-	3/6/23/26	0/1/1/1
3	NDG	C	811	1	-	2/6/23/26	0/1/1/1
2	NAG	B	802	1	-	2/6/23/26	0/1/1/1
2	NAG	D	903	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	C	805	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	D	808	1	-	3/6/23/26	0/1/1/1
2	NAG	D	902	1	1/1/5/7	1/6/23/26	0/1/1/1
2	NAG	D	809	1	-	2/6/23/26	0/1/1/1
3	NDG	D	804	1	-	0/6/23/26	0/1/1/1
2	NAG	B	904	1	-	3/6/23/26	0/1/1/1
2	NAG	D	802	1	-	2/6/23/26	0/1/1/1
2	NAG	A	810	1	-	3/6/23/26	0/1/1/1
2	NAG	D	801	1	-	3/6/23/26	0/1/1/1
2	NAG	D	904	1	-	3/6/23/26	0/1/1/1
2	NAG	C	801	1	-	3/6/23/26	0/1/1/1
2	NAG	A	803	1	-	2/6/23/26	0/1/1/1
2	NAG	A	902	1	1/1/5/7	1/6/23/26	0/1/1/1
2	NAG	A	809	1	-	2/6/23/26	0/1/1/1
2	NAG	B	801	1	-	3/6/23/26	0/1/1/1
2	NAG	C	807	1	-	5/6/23/26	0/1/1/1
2	NAG	C	810	1	-	3/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	B	803	1	-	2/6/23/26	0/1/1/1
2	NAG	D	807	1	-	5/6/23/26	0/1/1/1
2	NAG	D	810	1	-	3/6/23/26	0/1/1/1
2	NAG	B	809	1	-	2/6/23/26	0/1/1/1
2	NAG	A	904	1	-	3/6/23/26	0/1/1/1
2	NAG	B	903	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	C	803	1	-	2/6/23/26	0/1/1/1
2	NAG	C	809	1	-	2/6/23/26	0/1/1/1
2	NAG	C	904	1	-	3/6/23/26	0/1/1/1
2	NAG	C	802	1	-	2/6/23/26	0/1/1/1
3	NDG	D	811	1	-	2/6/23/26	0/1/1/1
2	NAG	C	902	1	1/1/5/7	1/6/23/26	0/1/1/1
3	NDG	C	804	1	-	0/6/23/26	0/1/1/1
2	NAG	B	902	1	1/1/5/7	1/6/23/26	0/1/1/1
3	NDG	B	804	1	-	0/6/23/26	0/1/1/1
2	NAG	A	806	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	C	806	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	C	903	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	B	805	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	C	808	1	-	3/6/23/26	0/1/1/1
3	NDG	B	811	1	-	2/6/23/26	0/1/1/1
2	NAG	B	806	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	A	807	1	-	5/6/23/26	0/1/1/1
2	NAG	A	812	1	-	4/6/23/26	0/1/1/1
2	NAG	D	805	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	D	806	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	D	812	1	-	4/6/23/26	0/1/1/1
2	NAG	A	808	1	-	3/6/23/26	0/1/1/1

The worst 5 of 16 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	902	NAG	C1-C2	3.13	1.57	1.52
2	C	902	NAG	C1-C2	3.08	1.56	1.52
2	B	902	NAG	C1-C2	3.05	1.56	1.52
2	D	902	NAG	C1-C2	3.05	1.56	1.52
2	C	803	NAG	O5-C5	2.54	1.48	1.43

The worst 5 of 58 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	811	NDG	C2-N2-C7	-6.99	112.94	122.90
3	A	811	NDG	C2-N2-C7	-6.99	112.95	122.90
3	B	811	NDG	C2-N2-C7	-6.99	112.95	122.90
3	C	811	NDG	C2-N2-C7	-6.98	112.97	122.90
2	B	806	NAG	C2-N2-C7	-3.44	118.01	122.90

5 of 16 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	A	805	NAG	C1
2	A	806	NAG	C1
2	A	902	NAG	C1
2	A	903	NAG	C1
2	B	805	NAG	C1

5 of 144 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	807	NAG	C3-C2-N2-C7
2	A	902	NAG	C3-C2-N2-C7
2	A	904	NAG	C3-C2-N2-C7
2	B	807	NAG	C3-C2-N2-C7
2	B	902	NAG	C3-C2-N2-C7

There are no ring outliers.

52 monomers are involved in 399 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	804	NDG	2	0
2	A	805	NAG	7	0
2	C	812	NAG	3	0
2	B	807	NAG	16	0
2	B	812	NAG	3	0
2	B	810	NAG	12	0
3	A	811	NDG	7	0
2	D	803	NAG	4	0
2	A	801	NAG	20	0
2	B	808	NAG	2	0
3	C	811	NDG	6	0
2	C	805	NAG	6	0
2	D	808	NAG	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	902	NAG	8	0
2	D	809	NAG	8	0
3	D	804	NDG	2	0
2	B	904	NAG	8	0
2	A	810	NAG	13	0
2	D	801	NAG	20	0
2	D	904	NAG	8	0
2	C	801	NAG	21	0
2	A	803	NAG	4	0
2	A	809	NAG	8	0
2	A	902	NAG	8	0
2	B	801	NAG	19	0
2	C	807	NAG	17	0
2	C	810	NAG	13	0
2	B	803	NAG	4	0
2	D	807	NAG	17	0
2	D	810	NAG	12	0
2	B	809	NAG	8	0
2	A	904	NAG	8	0
2	C	803	NAG	4	0
2	C	809	NAG	8	0
2	C	904	NAG	8	0
3	D	811	NDG	7	0
2	C	902	NAG	8	0
3	C	804	NDG	2	0
2	B	902	NAG	8	0
3	B	804	NDG	2	0
2	A	806	NAG	12	0
2	C	806	NAG	10	0
2	B	805	NAG	7	0
2	C	808	NAG	2	0
3	B	811	NDG	8	0
2	B	806	NAG	12	0
2	A	807	NAG	17	0
2	A	812	NAG	3	0
2	D	805	NAG	7	0
2	D	806	NAG	12	0
2	D	812	NAG	3	0
2	A	808	NAG	2	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

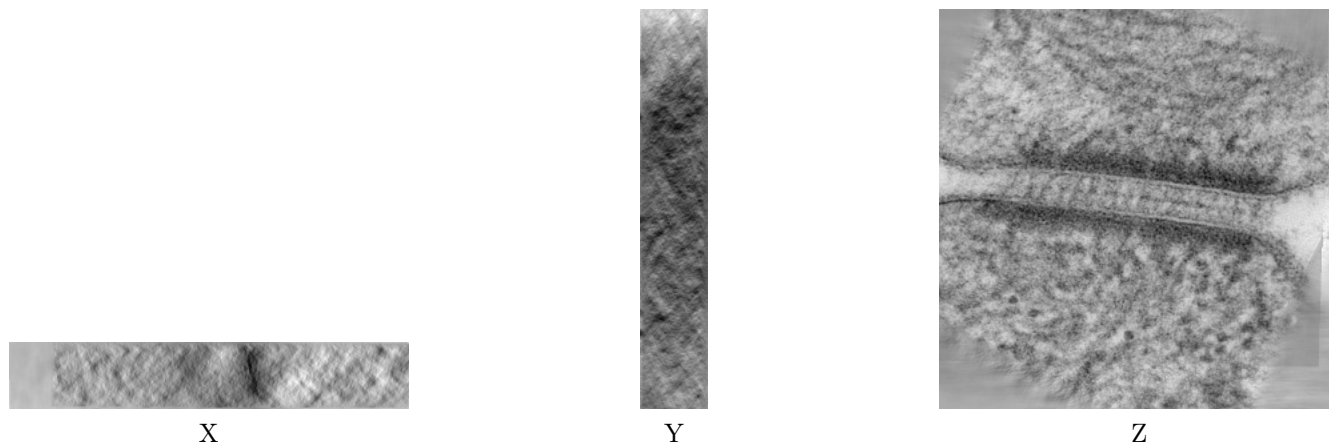
5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Tomogram visualisation [i](#)

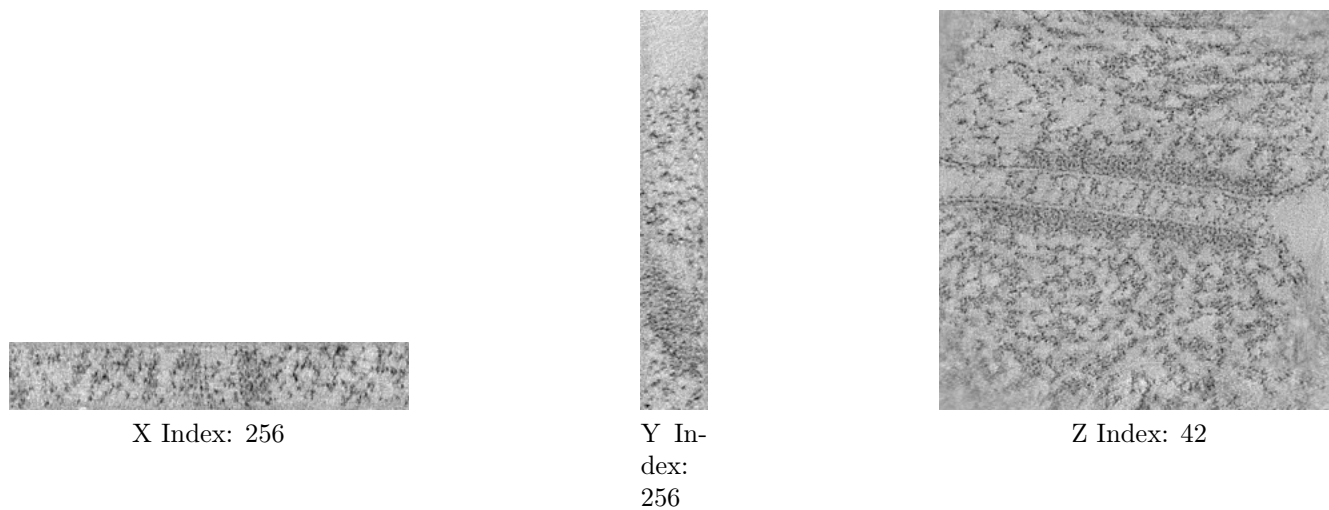
This section contains visualisations of the EMDB entry EMD-1052. These allow visual inspection of the internal detail of the tomogram and identification of artifacts.

6.1 Orthogonal projections [i](#)



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

6.2 Central slices [i](#)

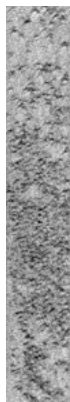
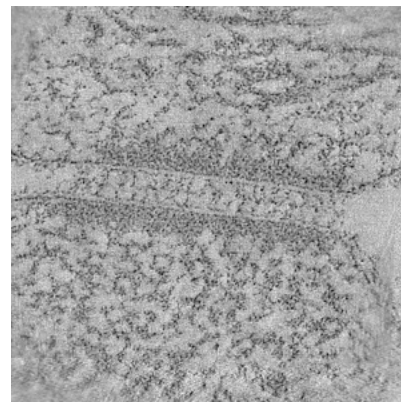


The images above show central slices of the tomogram in three orthogonal directions.

6.3 Largest variance slices [i](#)



X Index: 243

Y Index:
315

Z Index: 39

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

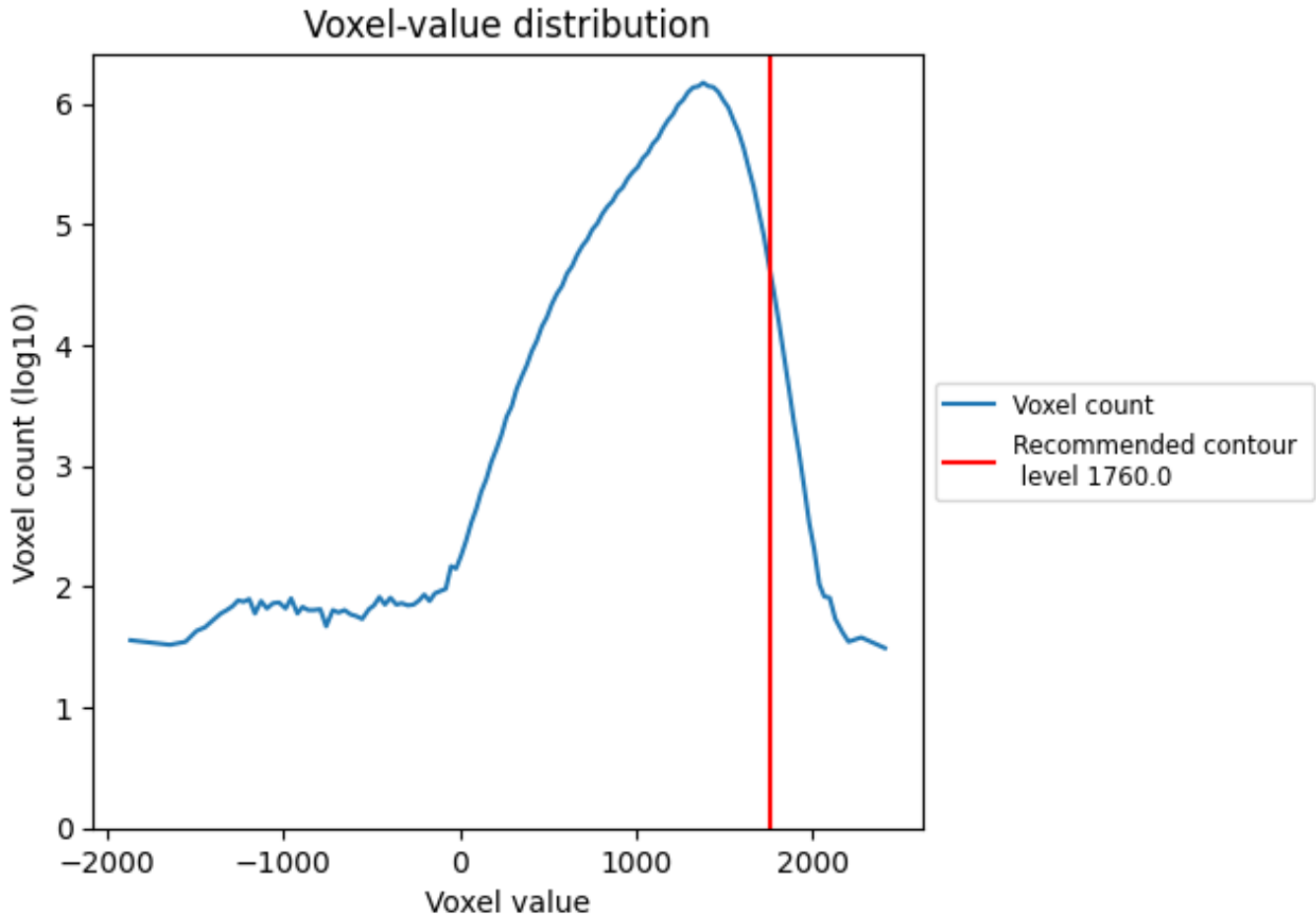
6.4 Mask visualisation [i](#)

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

7 Tomogram analysis [i](#)

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

7.1 Voxel-value distribution [i](#)



The voxel-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic.

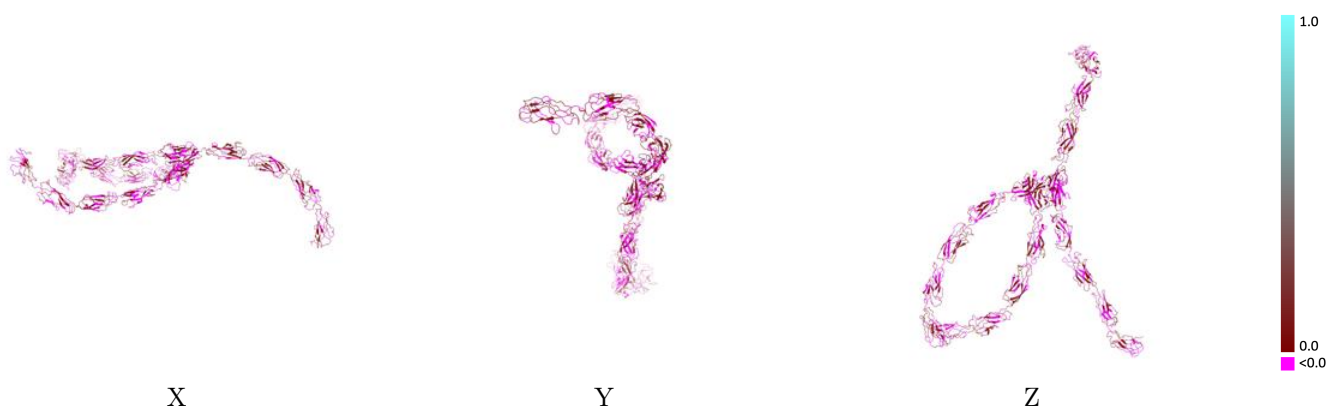
8 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-1052 and PDB model 1Q5C. Per-residue inclusion information can be found in section 3 on page 9.

8.1 Map-model overlay [i](#)

This section was not generated.

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

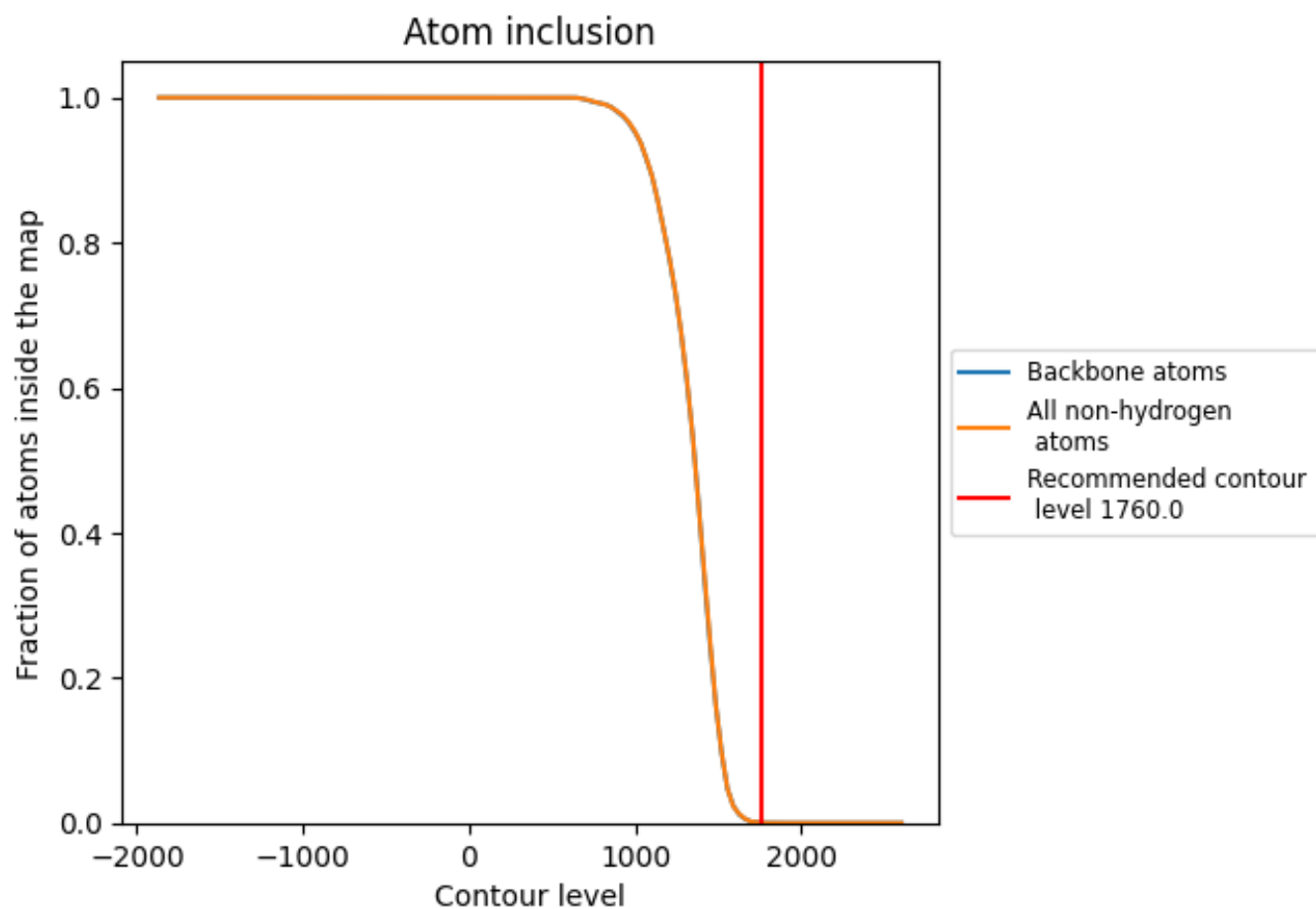


The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

This section was not generated.

8.4 Atom inclusion [i](#)



At the recommended contour level, 0% of all backbone atoms, 0% of all non-hydrogen atoms, are inside the map.

8.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (1760.0) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.0003	0.0110
A	0.0000	0.0100
B	0.0011	0.0100
C	0.0000	-0.0080
D	0.0000	0.0310

