WORLDWIDE PDB
PROTEIN DATA BANK

Full wwPDB EM Validation Report (i)

Mar 16, 2025 – 12:42 AM JST

PDB ID	:	8ZGC
EMDB ID	:	EMD-60075
Title	:	Human lysine O-link glycosylation complex, LH3/ColGalT1 with bound UDP-galactose
Authors	:	Peng, J.; Li, W.; Yao, D.; Xia, Y.; Wang, Q.; Cai, Y.; Li, S.; Cao, M.; Shen, Y.; Ma, P.; Liao, R.; Qin, A.; Cao, Y.
Deposited on	:	2024-05-09
Resolution	:	3.58 Å(reported)

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

|		
EMDB validation analysis	:	0.0.1.dev117
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
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)	:	2.41.4
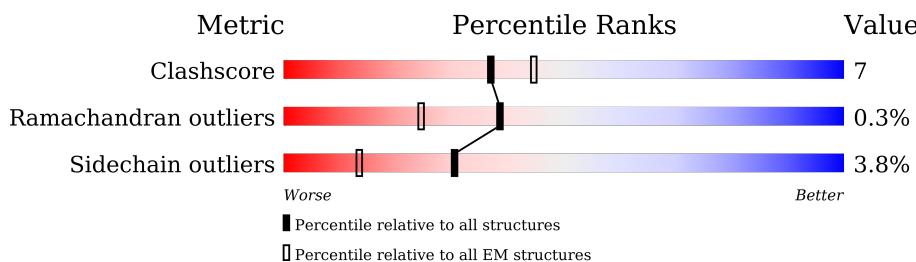
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY
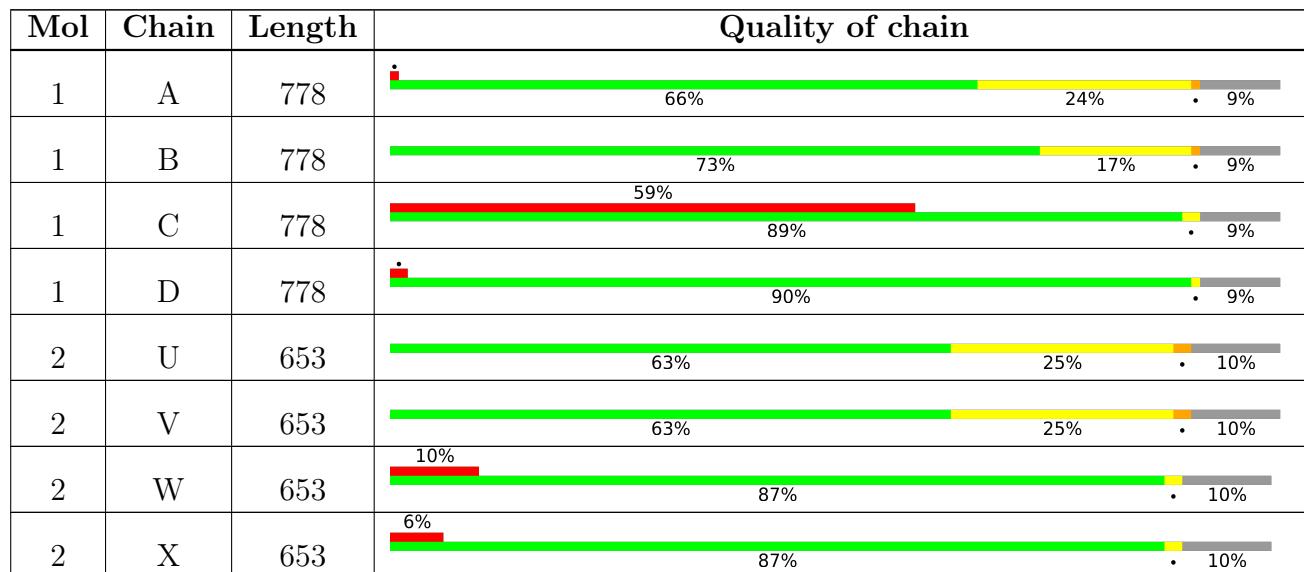
The reported resolution of this entry is 3.58 Å.

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
Clashscore		7
Ramachandran outliers		0.3%
Sidechain outliers		3.8%

Worse   *Better*

▮ Percentile relative to all structures
▯ Percentile relative to all EM structures
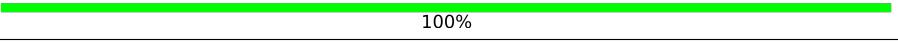
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	A	778	66% 24% • 9%
1	B	778	73% 17% • 9%
1	C	778	59% 89% • 9%
1	D	778	90% • 9%
2	U	653	63% 25% • 10%
2	V	653	63% 25% • 10%
2	W	653	10% 87% • 10%
2	X	653	6% 87% • 10%

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Mol	Chain	Length	Quality of chain
3	E	2	100%
3	F	2	100%

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
5	AKG	A	803	-	X	-	-

2 Entry composition ⓘ

There are 9 unique types of molecules in this entry. The entry contains 34210 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 Multifunctional procollagen lysine hydroxylase and glycosyl-transferase LH3.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	706	Total 5756	C 3680	N 999	O 1053	S 24	0	0
1	B	706	Total 5756	C 3680	N 999	O 1053	S 24	0	0
1	C	706	Total 3476	C 2064	N 706	O 706		0	0
1	D	706	Total 3476	C 2064	N 706	O 706		0	0

There are 160 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	739	ALA	-	expression tag	UNP O60568
A	740	ALA	-	expression tag	UNP O60568
A	741	ALA	-	expression tag	UNP O60568
A	742	GLU	-	expression tag	UNP O60568
A	743	ASN	-	expression tag	UNP O60568
A	744	LEU	-	expression tag	UNP O60568
A	745	TYR	-	expression tag	UNP O60568
A	746	PHE	-	expression tag	UNP O60568
A	747	GLN	-	expression tag	UNP O60568
A	748	GLY	-	expression tag	UNP O60568
A	749	ASP	-	expression tag	UNP O60568
A	750	TYR	-	expression tag	UNP O60568
A	751	LYS	-	expression tag	UNP O60568
A	752	ASP	-	expression tag	UNP O60568
A	753	HIS	-	expression tag	UNP O60568
A	754	ASP	-	expression tag	UNP O60568
A	755	GLY	-	expression tag	UNP O60568
A	756	ASP	-	expression tag	UNP O60568
A	757	TYR	-	expression tag	UNP O60568
A	758	LYS	-	expression tag	UNP O60568
A	759	ASP	-	expression tag	UNP O60568

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Chain	Residue	Modelled	Actual	Comment	Reference
A	760	HIS	-	expression tag	UNP O60568
A	761	ASP	-	expression tag	UNP O60568
A	762	ILE	-	expression tag	UNP O60568
A	763	ASP	-	expression tag	UNP O60568
A	764	TYR	-	expression tag	UNP O60568
A	765	LYS	-	expression tag	UNP O60568
A	766	ASP	-	expression tag	UNP O60568
A	767	ASP	-	expression tag	UNP O60568
A	768	ASP	-	expression tag	UNP O60568
A	769	ASP	-	expression tag	UNP O60568
A	770	LYS	-	expression tag	UNP O60568
A	771	HIS	-	expression tag	UNP O60568
A	772	HIS	-	expression tag	UNP O60568
A	773	HIS	-	expression tag	UNP O60568
A	774	HIS	-	expression tag	UNP O60568
A	775	HIS	-	expression tag	UNP O60568
A	776	HIS	-	expression tag	UNP O60568
A	777	HIS	-	expression tag	UNP O60568
A	778	HIS	-	expression tag	UNP O60568
B	739	ALA	-	expression tag	UNP O60568
B	740	ALA	-	expression tag	UNP O60568
B	741	ALA	-	expression tag	UNP O60568
B	742	GLU	-	expression tag	UNP O60568
B	743	ASN	-	expression tag	UNP O60568
B	744	LEU	-	expression tag	UNP O60568
B	745	TYR	-	expression tag	UNP O60568
B	746	PHE	-	expression tag	UNP O60568
B	747	GLN	-	expression tag	UNP O60568
B	748	GLY	-	expression tag	UNP O60568
B	749	ASP	-	expression tag	UNP O60568
B	750	TYR	-	expression tag	UNP O60568
B	751	LYS	-	expression tag	UNP O60568
B	752	ASP	-	expression tag	UNP O60568
B	753	HIS	-	expression tag	UNP O60568
B	754	ASP	-	expression tag	UNP O60568
B	755	GLY	-	expression tag	UNP O60568
B	756	ASP	-	expression tag	UNP O60568
B	757	TYR	-	expression tag	UNP O60568
B	758	LYS	-	expression tag	UNP O60568
B	759	ASP	-	expression tag	UNP O60568
B	760	HIS	-	expression tag	UNP O60568
B	761	ASP	-	expression tag	UNP O60568

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Chain	Residue	Modelled	Actual	Comment	Reference
B	762	ILE	-	expression tag	UNP O60568
B	763	ASP	-	expression tag	UNP O60568
B	764	TYR	-	expression tag	UNP O60568
B	765	LYS	-	expression tag	UNP O60568
B	766	ASP	-	expression tag	UNP O60568
B	767	ASP	-	expression tag	UNP O60568
B	768	ASP	-	expression tag	UNP O60568
B	769	ASP	-	expression tag	UNP O60568
B	770	LYS	-	expression tag	UNP O60568
B	771	HIS	-	expression tag	UNP O60568
B	772	HIS	-	expression tag	UNP O60568
B	773	HIS	-	expression tag	UNP O60568
B	774	HIS	-	expression tag	UNP O60568
B	775	HIS	-	expression tag	UNP O60568
B	776	HIS	-	expression tag	UNP O60568
B	777	HIS	-	expression tag	UNP O60568
B	778	HIS	-	expression tag	UNP O60568
C	739	ALA	-	expression tag	UNP O60568
C	740	ALA	-	expression tag	UNP O60568
C	741	ALA	-	expression tag	UNP O60568
C	742	GLU	-	expression tag	UNP O60568
C	743	ASN	-	expression tag	UNP O60568
C	744	LEU	-	expression tag	UNP O60568
C	745	TYR	-	expression tag	UNP O60568
C	746	PHE	-	expression tag	UNP O60568
C	747	GLN	-	expression tag	UNP O60568
C	748	GLY	-	expression tag	UNP O60568
C	749	ASP	-	expression tag	UNP O60568
C	750	TYR	-	expression tag	UNP O60568
C	751	LYS	-	expression tag	UNP O60568
C	752	ASP	-	expression tag	UNP O60568
C	753	HIS	-	expression tag	UNP O60568
C	754	ASP	-	expression tag	UNP O60568
C	755	GLY	-	expression tag	UNP O60568
C	756	ASP	-	expression tag	UNP O60568
C	757	TYR	-	expression tag	UNP O60568
C	758	LYS	-	expression tag	UNP O60568
C	759	ASP	-	expression tag	UNP O60568
C	760	HIS	-	expression tag	UNP O60568
C	761	ASP	-	expression tag	UNP O60568
C	762	ILE	-	expression tag	UNP O60568
C	763	ASP	-	expression tag	UNP O60568

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Chain	Residue	Modelled	Actual	Comment	Reference
C	764	TYR	-	expression tag	UNP O60568
C	765	LYS	-	expression tag	UNP O60568
C	766	ASP	-	expression tag	UNP O60568
C	767	ASP	-	expression tag	UNP O60568
C	768	ASP	-	expression tag	UNP O60568
C	769	ASP	-	expression tag	UNP O60568
C	770	LYS	-	expression tag	UNP O60568
C	771	HIS	-	expression tag	UNP O60568
C	772	HIS	-	expression tag	UNP O60568
C	773	HIS	-	expression tag	UNP O60568
C	774	HIS	-	expression tag	UNP O60568
C	775	HIS	-	expression tag	UNP O60568
C	776	HIS	-	expression tag	UNP O60568
C	777	HIS	-	expression tag	UNP O60568
C	778	HIS	-	expression tag	UNP O60568
D	739	ALA	-	expression tag	UNP O60568
D	740	ALA	-	expression tag	UNP O60568
D	741	ALA	-	expression tag	UNP O60568
D	742	GLU	-	expression tag	UNP O60568
D	743	ASN	-	expression tag	UNP O60568
D	744	LEU	-	expression tag	UNP O60568
D	745	TYR	-	expression tag	UNP O60568
D	746	PHE	-	expression tag	UNP O60568
D	747	GLN	-	expression tag	UNP O60568
D	748	GLY	-	expression tag	UNP O60568
D	749	ASP	-	expression tag	UNP O60568
D	750	TYR	-	expression tag	UNP O60568
D	751	LYS	-	expression tag	UNP O60568
D	752	ASP	-	expression tag	UNP O60568
D	753	HIS	-	expression tag	UNP O60568
D	754	ASP	-	expression tag	UNP O60568
D	755	GLY	-	expression tag	UNP O60568
D	756	ASP	-	expression tag	UNP O60568
D	757	TYR	-	expression tag	UNP O60568
D	758	LYS	-	expression tag	UNP O60568
D	759	ASP	-	expression tag	UNP O60568
D	760	HIS	-	expression tag	UNP O60568
D	761	ASP	-	expression tag	UNP O60568
D	762	ILE	-	expression tag	UNP O60568
D	763	ASP	-	expression tag	UNP O60568
D	764	TYR	-	expression tag	UNP O60568
D	765	LYS	-	expression tag	UNP O60568

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Chain	Residue	Modelled	Actual	Comment	Reference
D	766	ASP	-	expression tag	UNP O60568
D	767	ASP	-	expression tag	UNP O60568
D	768	ASP	-	expression tag	UNP O60568
D	769	ASP	-	expression tag	UNP O60568
D	770	LYS	-	expression tag	UNP O60568
D	771	HIS	-	expression tag	UNP O60568
D	772	HIS	-	expression tag	UNP O60568
D	773	HIS	-	expression tag	UNP O60568
D	774	HIS	-	expression tag	UNP O60568
D	775	HIS	-	expression tag	UNP O60568
D	776	HIS	-	expression tag	UNP O60568
D	777	HIS	-	expression tag	UNP O60568
D	778	HIS	-	expression tag	UNP O60568

- Molecule 2 is a protein called Procollagen galactosyltransferase 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	U	587	Total 4801	C 3053	N 850	O 872	S 26	0	0
2	V	587	Total 4801	C 3053	N 850	O 872	S 26	0	0
2	W	587	Total 2916	C 1742	N 587	O 587		0	0
2	X	587	Total 2916	C 1742	N 587	O 587		0	0

There are 240 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
U	-27	MET	-	initiating methionine	UNP Q8NBJ5
U	-26	LYS	-	expression tag	UNP Q8NBJ5
U	-25	THR	-	expression tag	UNP Q8NBJ5
U	-24	ILE	-	expression tag	UNP Q8NBJ5
U	-23	ILE	-	expression tag	UNP Q8NBJ5
U	-22	ALA	-	expression tag	UNP Q8NBJ5
U	-21	LEU	-	expression tag	UNP Q8NBJ5
U	-20	SER	-	expression tag	UNP Q8NBJ5
U	-19	TYR	-	expression tag	UNP Q8NBJ5
U	-18	ILE	-	expression tag	UNP Q8NBJ5
U	-17	PHE	-	expression tag	UNP Q8NBJ5
U	-16	CYS	-	expression tag	UNP Q8NBJ5
U	-15	LEU	-	expression tag	UNP Q8NBJ5

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Chain	Residue	Modelled	Actual	Comment	Reference
U	-14	VAL	-	expression tag	UNP Q8NBJ5
U	-13	PHE	-	expression tag	UNP Q8NBJ5
U	-12	ALA	-	expression tag	UNP Q8NBJ5
U	-11	TRP	-	expression tag	UNP Q8NBJ5
U	-10	SER	-	expression tag	UNP Q8NBJ5
U	-9	HIS	-	expression tag	UNP Q8NBJ5
U	-8	PRO	-	expression tag	UNP Q8NBJ5
U	-7	GLN	-	expression tag	UNP Q8NBJ5
U	-6	PHE	-	expression tag	UNP Q8NBJ5
U	-5	GLU	-	expression tag	UNP Q8NBJ5
U	-4	LYS	-	expression tag	UNP Q8NBJ5
U	-3	GLY	-	expression tag	UNP Q8NBJ5
U	-2	GLY	-	expression tag	UNP Q8NBJ5
U	-1	GLY	-	expression tag	UNP Q8NBJ5
U	0	SER	-	expression tag	UNP Q8NBJ5
U	1	GLY	-	expression tag	UNP Q8NBJ5
U	2	GLY	-	expression tag	UNP Q8NBJ5
U	3	GLY	-	expression tag	UNP Q8NBJ5
U	4	SER	-	expression tag	UNP Q8NBJ5
U	5	GLY	-	expression tag	UNP Q8NBJ5
U	6	GLY	-	expression tag	UNP Q8NBJ5
U	7	SER	-	expression tag	UNP Q8NBJ5
U	8	ALA	-	expression tag	UNP Q8NBJ5
U	9	TRP	-	expression tag	UNP Q8NBJ5
U	10	SER	-	expression tag	UNP Q8NBJ5
U	11	HIS	-	expression tag	UNP Q8NBJ5
U	12	PRO	-	expression tag	UNP Q8NBJ5
U	13	GLN	-	expression tag	UNP Q8NBJ5
U	14	PHE	-	expression tag	UNP Q8NBJ5
U	15	GLU	-	expression tag	UNP Q8NBJ5
U	16	LYS	-	expression tag	UNP Q8NBJ5
U	17	SER	-	expression tag	UNP Q8NBJ5
U	18	ALA	-	expression tag	UNP Q8NBJ5
U	19	LEU	-	expression tag	UNP Q8NBJ5
U	20	GLU	-	expression tag	UNP Q8NBJ5
U	21	VAL	-	expression tag	UNP Q8NBJ5
U	22	LEU	-	expression tag	UNP Q8NBJ5
U	23	PHE	-	expression tag	UNP Q8NBJ5
U	24	GLN	-	expression tag	UNP Q8NBJ5
U	25	GLY	-	expression tag	UNP Q8NBJ5
U	26	PRO	-	expression tag	UNP Q8NBJ5
U	27	GLY	-	expression tag	UNP Q8NBJ5

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Chain	Residue	Modelled	Actual	Comment	Reference
U	28	ARG	-	expression tag	UNP Q8NBJ5
U	29	ALA	-	expression tag	UNP Q8NBJ5
U	623	ALA	-	expression tag	UNP Q8NBJ5
U	624	ALA	-	expression tag	UNP Q8NBJ5
U	625	ALA	-	expression tag	UNP Q8NBJ5
V	-27	MET	-	initiating methionine	UNP Q8NBJ5
V	-26	LYS	-	expression tag	UNP Q8NBJ5
V	-25	THR	-	expression tag	UNP Q8NBJ5
V	-24	ILE	-	expression tag	UNP Q8NBJ5
V	-23	ILE	-	expression tag	UNP Q8NBJ5
V	-22	ALA	-	expression tag	UNP Q8NBJ5
V	-21	LEU	-	expression tag	UNP Q8NBJ5
V	-20	SER	-	expression tag	UNP Q8NBJ5
V	-19	TYR	-	expression tag	UNP Q8NBJ5
V	-18	ILE	-	expression tag	UNP Q8NBJ5
V	-17	PHE	-	expression tag	UNP Q8NBJ5
V	-16	CYS	-	expression tag	UNP Q8NBJ5
V	-15	LEU	-	expression tag	UNP Q8NBJ5
V	-14	VAL	-	expression tag	UNP Q8NBJ5
V	-13	PHE	-	expression tag	UNP Q8NBJ5
V	-12	ALA	-	expression tag	UNP Q8NBJ5
V	-11	TRP	-	expression tag	UNP Q8NBJ5
V	-10	SER	-	expression tag	UNP Q8NBJ5
V	-9	HIS	-	expression tag	UNP Q8NBJ5
V	-8	PRO	-	expression tag	UNP Q8NBJ5
V	-7	GLN	-	expression tag	UNP Q8NBJ5
V	-6	PHE	-	expression tag	UNP Q8NBJ5
V	-5	GLU	-	expression tag	UNP Q8NBJ5
V	-4	LYS	-	expression tag	UNP Q8NBJ5
V	-3	GLY	-	expression tag	UNP Q8NBJ5
V	-2	GLY	-	expression tag	UNP Q8NBJ5
V	-1	GLY	-	expression tag	UNP Q8NBJ5
V	0	SER	-	expression tag	UNP Q8NBJ5
V	1	GLY	-	expression tag	UNP Q8NBJ5
V	2	GLY	-	expression tag	UNP Q8NBJ5
V	3	GLY	-	expression tag	UNP Q8NBJ5
V	4	SER	-	expression tag	UNP Q8NBJ5
V	5	GLY	-	expression tag	UNP Q8NBJ5
V	6	GLY	-	expression tag	UNP Q8NBJ5
V	7	SER	-	expression tag	UNP Q8NBJ5
V	8	ALA	-	expression tag	UNP Q8NBJ5
V	9	TRP	-	expression tag	UNP Q8NBJ5

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Chain	Residue	Modelled	Actual	Comment	Reference
V	10	SER	-	expression tag	UNP Q8NBJ5
V	11	HIS	-	expression tag	UNP Q8NBJ5
V	12	PRO	-	expression tag	UNP Q8NBJ5
V	13	GLN	-	expression tag	UNP Q8NBJ5
V	14	PHE	-	expression tag	UNP Q8NBJ5
V	15	GLU	-	expression tag	UNP Q8NBJ5
V	16	LYS	-	expression tag	UNP Q8NBJ5
V	17	SER	-	expression tag	UNP Q8NBJ5
V	18	ALA	-	expression tag	UNP Q8NBJ5
V	19	LEU	-	expression tag	UNP Q8NBJ5
V	20	GLU	-	expression tag	UNP Q8NBJ5
V	21	VAL	-	expression tag	UNP Q8NBJ5
V	22	LEU	-	expression tag	UNP Q8NBJ5
V	23	PHE	-	expression tag	UNP Q8NBJ5
V	24	GLN	-	expression tag	UNP Q8NBJ5
V	25	GLY	-	expression tag	UNP Q8NBJ5
V	26	PRO	-	expression tag	UNP Q8NBJ5
V	27	GLY	-	expression tag	UNP Q8NBJ5
V	28	ARG	-	expression tag	UNP Q8NBJ5
V	29	ALA	-	expression tag	UNP Q8NBJ5
V	623	ALA	-	expression tag	UNP Q8NBJ5
V	624	ALA	-	expression tag	UNP Q8NBJ5
V	625	ALA	-	expression tag	UNP Q8NBJ5
W	-27	MET	-	initiating methionine	UNP Q8NBJ5
W	-26	LYS	-	expression tag	UNP Q8NBJ5
W	-25	THR	-	expression tag	UNP Q8NBJ5
W	-24	ILE	-	expression tag	UNP Q8NBJ5
W	-23	ILE	-	expression tag	UNP Q8NBJ5
W	-22	ALA	-	expression tag	UNP Q8NBJ5
W	-21	LEU	-	expression tag	UNP Q8NBJ5
W	-20	SER	-	expression tag	UNP Q8NBJ5
W	-19	TYR	-	expression tag	UNP Q8NBJ5
W	-18	ILE	-	expression tag	UNP Q8NBJ5
W	-17	PHE	-	expression tag	UNP Q8NBJ5
W	-16	CYS	-	expression tag	UNP Q8NBJ5
W	-15	LEU	-	expression tag	UNP Q8NBJ5
W	-14	VAL	-	expression tag	UNP Q8NBJ5
W	-13	PHE	-	expression tag	UNP Q8NBJ5
W	-12	ALA	-	expression tag	UNP Q8NBJ5
W	-11	TRP	-	expression tag	UNP Q8NBJ5
W	-10	SER	-	expression tag	UNP Q8NBJ5
W	-9	HIS	-	expression tag	UNP Q8NBJ5

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Chain	Residue	Modelled	Actual	Comment	Reference
W	-8	PRO	-	expression tag	UNP Q8NBJ5
W	-7	GLN	-	expression tag	UNP Q8NBJ5
W	-6	PHE	-	expression tag	UNP Q8NBJ5
W	-5	GLU	-	expression tag	UNP Q8NBJ5
W	-4	LYS	-	expression tag	UNP Q8NBJ5
W	-3	GLY	-	expression tag	UNP Q8NBJ5
W	-2	GLY	-	expression tag	UNP Q8NBJ5
W	-1	GLY	-	expression tag	UNP Q8NBJ5
W	0	SER	-	expression tag	UNP Q8NBJ5
W	1	GLY	-	expression tag	UNP Q8NBJ5
W	2	GLY	-	expression tag	UNP Q8NBJ5
W	3	GLY	-	expression tag	UNP Q8NBJ5
W	4	SER	-	expression tag	UNP Q8NBJ5
W	5	GLY	-	expression tag	UNP Q8NBJ5
W	6	GLY	-	expression tag	UNP Q8NBJ5
W	7	SER	-	expression tag	UNP Q8NBJ5
W	8	ALA	-	expression tag	UNP Q8NBJ5
W	9	TRP	-	expression tag	UNP Q8NBJ5
W	10	SER	-	expression tag	UNP Q8NBJ5
W	11	HIS	-	expression tag	UNP Q8NBJ5
W	12	PRO	-	expression tag	UNP Q8NBJ5
W	13	GLN	-	expression tag	UNP Q8NBJ5
W	14	PHE	-	expression tag	UNP Q8NBJ5
W	15	GLU	-	expression tag	UNP Q8NBJ5
W	16	LYS	-	expression tag	UNP Q8NBJ5
W	17	SER	-	expression tag	UNP Q8NBJ5
W	18	ALA	-	expression tag	UNP Q8NBJ5
W	19	LEU	-	expression tag	UNP Q8NBJ5
W	20	GLU	-	expression tag	UNP Q8NBJ5
W	21	VAL	-	expression tag	UNP Q8NBJ5
W	22	LEU	-	expression tag	UNP Q8NBJ5
W	23	PHE	-	expression tag	UNP Q8NBJ5
W	24	GLN	-	expression tag	UNP Q8NBJ5
W	25	GLY	-	expression tag	UNP Q8NBJ5
W	26	PRO	-	expression tag	UNP Q8NBJ5
W	27	GLY	-	expression tag	UNP Q8NBJ5
W	28	ARG	-	expression tag	UNP Q8NBJ5
W	29	ALA	-	expression tag	UNP Q8NBJ5
W	623	ALA	-	expression tag	UNP Q8NBJ5
W	624	ALA	-	expression tag	UNP Q8NBJ5
W	625	ALA	-	expression tag	UNP Q8NBJ5
X	-27	MET	-	initiating methionine	UNP Q8NBJ5

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Chain	Residue	Modelled	Actual	Comment	Reference
X	-26	LYS	-	expression tag	UNP Q8NBJ5
X	-25	THR	-	expression tag	UNP Q8NBJ5
X	-24	ILE	-	expression tag	UNP Q8NBJ5
X	-23	ILE	-	expression tag	UNP Q8NBJ5
X	-22	ALA	-	expression tag	UNP Q8NBJ5
X	-21	LEU	-	expression tag	UNP Q8NBJ5
X	-20	SER	-	expression tag	UNP Q8NBJ5
X	-19	TYR	-	expression tag	UNP Q8NBJ5
X	-18	ILE	-	expression tag	UNP Q8NBJ5
X	-17	PHE	-	expression tag	UNP Q8NBJ5
X	-16	CYS	-	expression tag	UNP Q8NBJ5
X	-15	LEU	-	expression tag	UNP Q8NBJ5
X	-14	VAL	-	expression tag	UNP Q8NBJ5
X	-13	PHE	-	expression tag	UNP Q8NBJ5
X	-12	ALA	-	expression tag	UNP Q8NBJ5
X	-11	TRP	-	expression tag	UNP Q8NBJ5
X	-10	SER	-	expression tag	UNP Q8NBJ5
X	-9	HIS	-	expression tag	UNP Q8NBJ5
X	-8	PRO	-	expression tag	UNP Q8NBJ5
X	-7	GLN	-	expression tag	UNP Q8NBJ5
X	-6	PHE	-	expression tag	UNP Q8NBJ5
X	-5	GLU	-	expression tag	UNP Q8NBJ5
X	-4	LYS	-	expression tag	UNP Q8NBJ5
X	-3	GLY	-	expression tag	UNP Q8NBJ5
X	-2	GLY	-	expression tag	UNP Q8NBJ5
X	-1	GLY	-	expression tag	UNP Q8NBJ5
X	0	SER	-	expression tag	UNP Q8NBJ5
X	1	GLY	-	expression tag	UNP Q8NBJ5
X	2	GLY	-	expression tag	UNP Q8NBJ5
X	3	GLY	-	expression tag	UNP Q8NBJ5
X	4	SER	-	expression tag	UNP Q8NBJ5
X	5	GLY	-	expression tag	UNP Q8NBJ5
X	6	GLY	-	expression tag	UNP Q8NBJ5
X	7	SER	-	expression tag	UNP Q8NBJ5
X	8	ALA	-	expression tag	UNP Q8NBJ5
X	9	TRP	-	expression tag	UNP Q8NBJ5
X	10	SER	-	expression tag	UNP Q8NBJ5
X	11	HIS	-	expression tag	UNP Q8NBJ5
X	12	PRO	-	expression tag	UNP Q8NBJ5
X	13	GLN	-	expression tag	UNP Q8NBJ5
X	14	PHE	-	expression tag	UNP Q8NBJ5
X	15	GLU	-	expression tag	UNP Q8NBJ5

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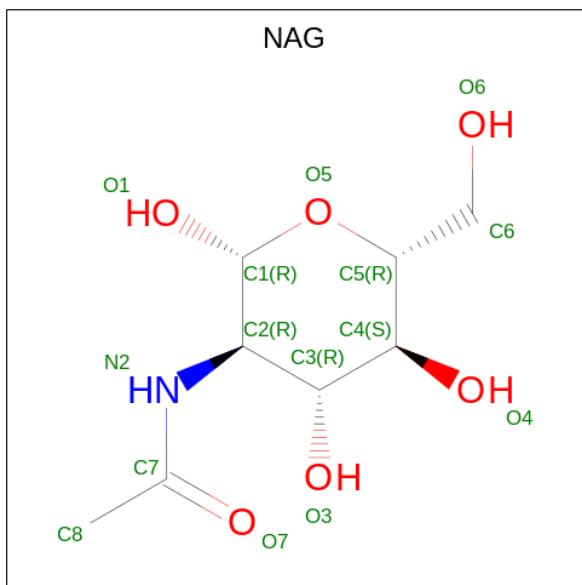
Chain	Residue	Modelled	Actual	Comment	Reference
X	16	LYS	-	expression tag	UNP Q8NBJ5
X	17	SER	-	expression tag	UNP Q8NBJ5
X	18	ALA	-	expression tag	UNP Q8NBJ5
X	19	LEU	-	expression tag	UNP Q8NBJ5
X	20	GLU	-	expression tag	UNP Q8NBJ5
X	21	VAL	-	expression tag	UNP Q8NBJ5
X	22	LEU	-	expression tag	UNP Q8NBJ5
X	23	PHE	-	expression tag	UNP Q8NBJ5
X	24	GLN	-	expression tag	UNP Q8NBJ5
X	25	GLY	-	expression tag	UNP Q8NBJ5
X	26	PRO	-	expression tag	UNP Q8NBJ5
X	27	GLY	-	expression tag	UNP Q8NBJ5
X	28	ARG	-	expression tag	UNP Q8NBJ5
X	29	ALA	-	expression tag	UNP Q8NBJ5
X	623	ALA	-	expression tag	UNP Q8NBJ5
X	624	ALA	-	expression tag	UNP Q8NBJ5
X	625	ALA	-	expression tag	UNP Q8NBJ5

- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-a cetamido-2-deoxy-beta-D-glucopyranose.
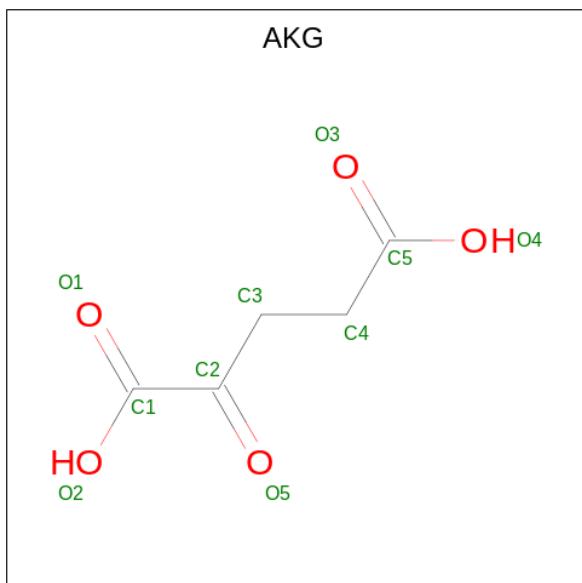
Mol	Chain	Residues	Atoms				AltConf	Trace
3	E	2	Total	C	N	O	0	0
			28	16	2	10		
3	F	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$) (labeled as "Ligand of Interest" by depositor).

NAG

Mol	Chain	Residues	Atoms				AltConf
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	
4	B	1	Total	C	N	O	0
			14	8	1	5	

- Molecule 5 is 2-OXOGLUTARIC ACID (three-letter code: AKG) (formula: $C_5H_6O_5$) (labeled as "Ligand of Interest" by depositor).

AKG

Mol	Chain	Residues	Atoms			AltConf
5	A	1	Total 10	C 5	O 5	0
5	B	1	Total 10	C 5	O 5	0
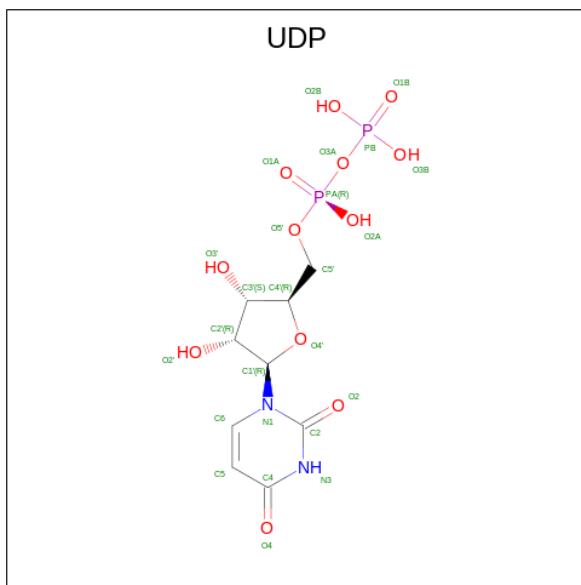
- Molecule 6 is FE (II) ION (three-letter code: FE2) (formula: Fe) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
6	A	1	Total 1	Fe 1	0
6	B	1	Total 1	Fe 1	0

- Molecule 7 is URIDINE-5'-DIPHOSPHATE (three-letter code: UDP) (formula: $C_9H_{14}N_2O_{12}P_2$) (labeled as "Ligand of Interest" by depositor).
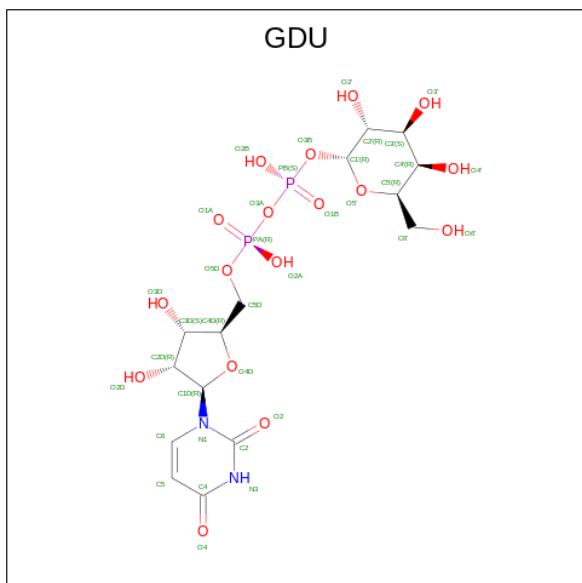
Mol	Chain	Residues	Atoms					AltConf
7	A	1	Total 25	C 9	N 2	O 12	P 2	0
7	B	1	Total 25	C 9	N 2	O 12	P 2	0
7	U	1	Total 25	C 9	N 2	O 12	P 2	0
7	V	1	Total 25	C 9	N 2	O 12	P 2	0

- Molecule 8 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
8	A	1	Total 1	Mn 1	0
8	B	1	Total 1	Mn 1	0
8	U	2	Total 2	Mn 2	0
8	V	2	Total 2	Mn 2	0

- Molecule 9 is GALACTOSE-URIDINE-5'-DIPHOSPHATE (three-letter code: GDU) (formula: $C_{15}H_{24}N_2O_{17}P_2$) (labeled as "Ligand of Interest" by depositor).

GDU
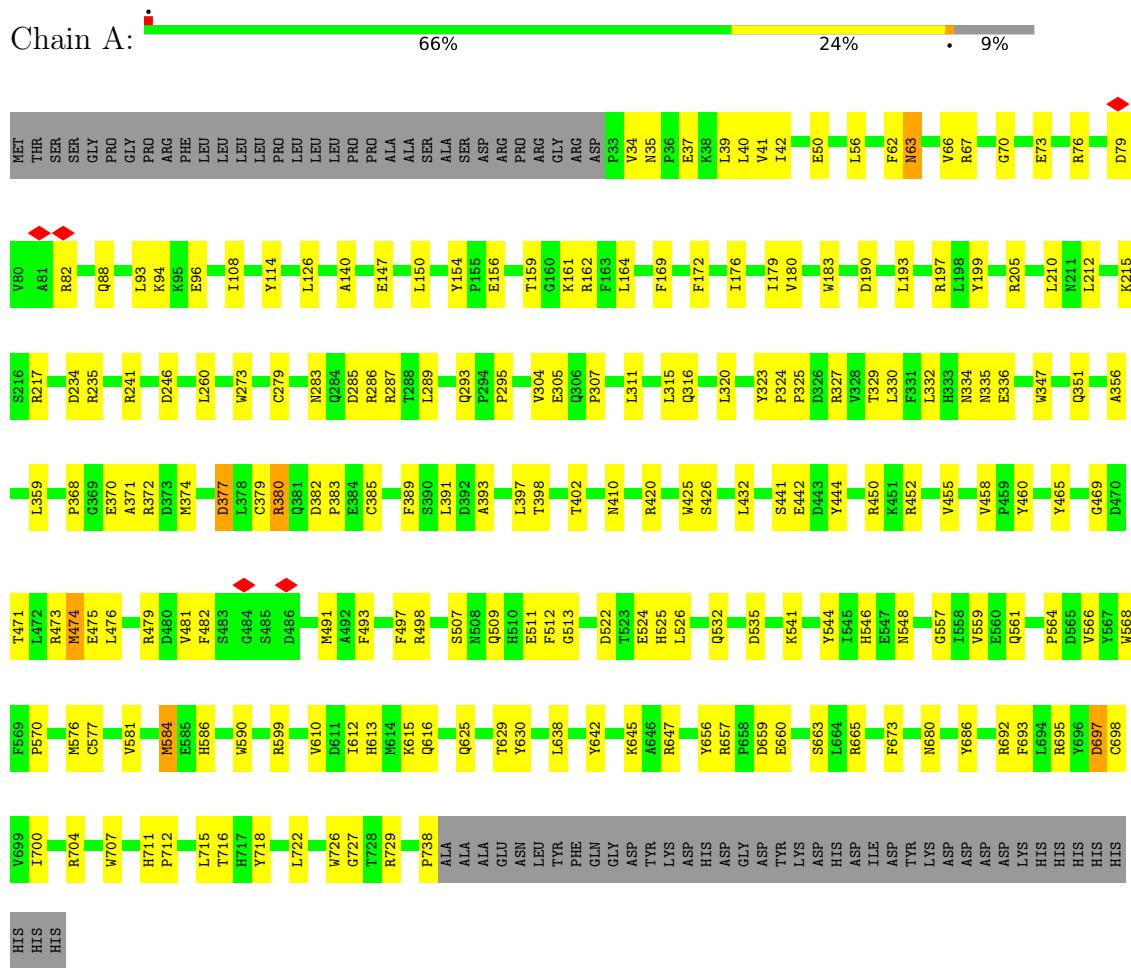
Mol	Chain	Residues	Atoms					AltConf
9	U	1	Total 36	C 15	N 2	O 17	P 2	0
9	V	1	Total 36	C 15	N 2	O 17	P 2	0
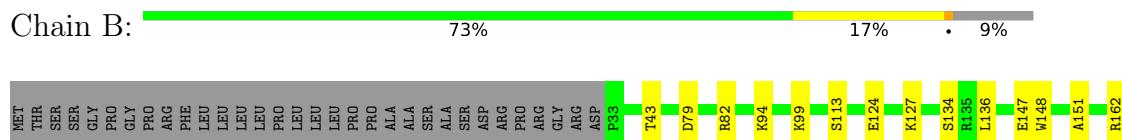
3 Residue-property plots ⓘ
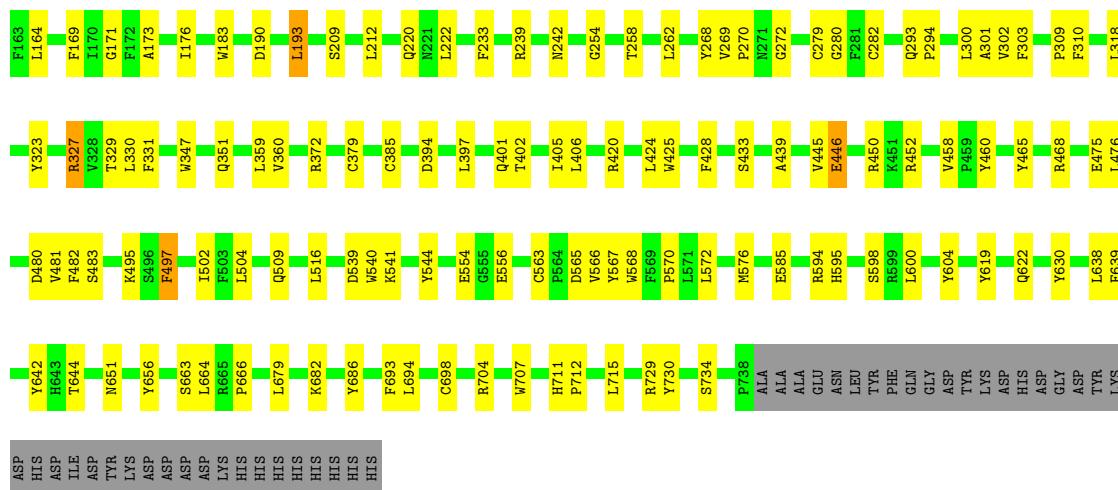
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Multifunctional procollagen lysine hydroxylase and glycosyltransferase LH3

Chain A:

• Molecule 1: Multifunctional procollagen lysine hydroxylase and glycosyltransferase LH3

Chain B:

F163 L164 F169 I170 G171 F172 A173 I176 W183 D190 L193 S209 L212 Q220 N221 L222 F233 R239 N242 G254 T258 L262 Y268 V269 P270 N271 G272 C279 G280 F281 C282 Q293 P294 L300 A301 V302 F303 P309 F310 L318

Y323 R327 V328 T329 L330 F331 W347 Q351 L359 V360 R372 C379 C385 D394 L397 Q401 T402 I405 L406 R420 L424 W425 F428 S433 A439 V445 E446 R450 K451 R452 V458 P459 Y460 Y465 R468 E475 L476

D480 V481 F482 S483 K495 S496 F497 I502 F503 L504 Q509 L516 D539 W540 K541 Y544 E554 G555 E556 C563 P564 D565 V566 Y567 W568 F569 P570 L571 L572 M576 E585 R594 H595 S598 R599 L600 Y604 Y619 Q622 Y630 L638 F639

Y642 H643 T644 N651 Y656 S663 L664 R665 P666 L679 K682 Y686 F693 L694 C698 R704 W707 H711 P712 L715 R729 Y730 S734 P738 ALA ALA GLU ASN LEU TYR PHE GLN GLY ASP TYR LYS ASP HIS ASP GLY ASP TYR LYS

ASP HIS ASP ILE ASP TYR LYS ASP ASP ASP LYS HIS HIS HIS HIS HIS HIS HIS HIS

• Molecule 1: Multifunctional procollagen lysine hydroxylase and glycosyltransferase LH3

Chain C:

59%

89% • 9%

MET THR SER SER GLY PRO GLY PRO ARG PHE LEU LEU LEU LEU PRO LEU LEU LEU PRO PRO ALA ALA SER ALA SER ASP ARG SER ARG PRO ARG GLY GLY ASP P33 V34 N35 P36 E37 K38 L39 L40 V41 I42 T43 V44 A45 T46 A47 E48 T49 E50 G51 Y52 L53 R54 F55 L56 R57 S58 A59 E60

F61 F62 N63 Y64 T65 V66 R67 T68 L69 G70 L71 G72 E73 E74 W75 R76 G77 G78 D79 V80 A81 R82 T83 V84 G85 G86 G87 Q88 K89 V90 R91 W92 L93 K94 K95 E96 M97 E98 K99 Y100 A101 D102 R103 E104 D105 M106 I107 I108 M109 F110 V111 D112 S113 Y114 D115 V116 I117 L118 A119 G120

S121 P122 T123 E124 L125 L126 K127 K128 F129 V130 Q131 S132 G133 S134 R135 L136 L137 F138 S139 A140 E141 S142 F143 C144 W145 P146 E147 W148 G149 L150 A151 E152 Q153 V154 P155 E156 V157 G158 T159 G160 K161 R162 F163 L164 N165 G168 F169 I170 G171 F172 A173 T174 T175 I176 H177 Q178 I179 V180 R181

Q182 W183 K184 Y185 K186 D187 D188 D189 D190 D191 Q192 L193 F194 Y195 T196 R197 L198 Y199 L200 P201 P202 G203 L204 R205 E206 K207 L208 S209 L210 N211 L212 D213 H214 K215 S216 R217 I218 F219 Q220 N221 L222 N223 G224 A225 L226 D227 E228 V229 V230 F233 R237 I240 R241 N242 V243 A244 Y245

D246 T247 L248 P249 I250 V251 V252 H253 G254 N255 G256 P257 T258 K259 L260 Q261 P270 N271 G272 W273 T274 P275 E276 G277 G278 C279 G280 F281 C282 N283 Q284 D285 R286 R287 T288 L289 P290 G291 G292 Q293 P294 P295 P296 L300 A301 V302 F303 V304 E305 Q306 D307 T308 P309 F310 L311 P312 R313 F314

L315 Q316 R317 L318 L319 L320 L321 D322 Y323 P324 P325 D326 L332 H333 N334 N335 E336 V337 F338 H339 E340 P341 H342 I343 A344 D345 S346 W347 P348 Q349 L350 Q351 D352 H353 F354 S355 A356 V357 K358 L359 V360 G361 P362 E363 E364 A365 L366 S367 P368 G369 E370 A371 R372 D373 M374 A375 M376 D377 L378

C379 R380 Q381 D382 P383 E384 C385 L391 D392 A393 D394 L397 T398 N399 L400 Q401 T402 L403 R404 I405 L406 I407 E408 V413 P416 H421 G422 K423 L424 W425 S426 N427 F428 W429 G430 A431 L432 S433 P434 D435 E436 Y437 Y438 A439 R440 D443 Y444 V445 V448 Q449 R450 K451 R452

V453 G454 V455 W456 N457 V458 P459 S462 Q463 A464 I467 R468 G469 D470 T471 L472 R473 M474 E475 L476 P477 Q478 R479 D480 V481 F482 S483 G484 S485 D486 T487 D488 P489 D490 M491 A492 K495 S496 D499 K500 G501 I502 L506 Q509 H510 E511 F512 G513 R514 L515 L516 A517 T518 S519

R520 Y521 D522 T523 E524 H525 I533 F534 D535 E542 G555 E556 G557 I558 V559 E560 Q561 P562 C563 P564 P570 L571 L572 E579 L580 V581 A582 E583 M584 E585 H586 Y587 G588 Q589 R594 H595 E596 D597 S598 A601 G602 G603 Y604 V607 P608 T609 V610 V631 R647

M650 P658 D659 P662 S663 L664 R665 P666 L684 G688 C698 S701 S702 W707 H719 L722 P723 T724 T725 W726 D737 P738 ALA ALA ALA GLU ASN LEU TYR PHE GLN ASP TYR LYS ASP HIS ASP GLY ASP TYR LYS HIS ASP ILE ASP TYR LYS ASP

ASP ASP ASP LYS HIS HIS HIS HIS HIS HIS HIS

- Molecule 1: Multifunctional procollagen lysine hydroxylase and glycosyltransferase LH3

Chain D: 90% 9%

MET THR SER GLY PRO GLY ARG PHE LEU LEU LEU PRO LEU LEU LEU PRO PRO ALA ALA SER ALA ASP ARG ARG GLY ARG GLY ASP P33 V80 A81 R82 T83 P146 G291 G292 D486 G555 E556 G557 I558 V559 R594 H595 E596 D597 S598 R599 L600 A601

G602 T609 R647 G688 D697 T724 D737 P738 ALA ALA ALA GLU ASN LEU TYR PHE GLN ASP GLY ASP TYR LYS ASP HIS ASP ILE ASP TYR LYS ASP ASP ASP LYS HIS HIS HIS HIS HIS HIS HIS

- Molecule 2: Procollagen galactosyltransferase 1

Chain U: 63% 25% 10%

MET LYS THR ILE ILE ALA LEU SER TYR ILE PHE CYS LEU VAL PHE ALA TRP SER HIS PRO GLN PHE GLU LYS GLY GLY GLY SER GLY GLY SER GLY SER ALA TRP SER HIS PRO GLN PHE GLU LYS SER ALA LEU GLU LEU VAL LEU PHE GLN GLY PRO GLY ARG ALA ALA PRO PRO

GLY ALA ASP A36 Y37 E40 E41 R42 R53 V54 L55 R61 N62 A63 P68 L71 E75 R76 L77 R78 R81 A85 D91 H92 T97 L101 W104 Y112 A120 Y126 E129 R139 M144 K145 L146 R147 Q148 K152 M157

D160 F164 L170 D175 T176 L179 L180 E183 A189 P190 D193 Y198 W202 T206 S207 K212 R213 I218 M233 S236 T237 F238 Y253 P254 D264 D265 I266 I267 S272 K285 Y288 L301 E306 P321 S325 R326 F327

I328 K337 M338 G339 F340 D341 E342 V343 F344 L348 R349 R350 R351 Q352 R355 E356 R357 R360 A361 L362 I367 R370 L371 V372 M380 N381 T382 S383 Q384 M392 L393 P394 G395 Y396 R397 D398 G402 R403 P404 L405 L410 G411 C412 F413 Y417 N418 I419 E422

V423 V424 D425 R426 G427 L428 Q429 K430 S431 L432 D437 F443 F444 K445 M449 M452 V455 D461 W462 D463 L464 I465 Y466 K470 R471 M472 Q473 P477 R485 Y494 W495 Y499 L503 Q504 R507 K508 L509 L510 P514 K517 M518 L519 P520 V521 D522

E523 F524 L525 P526 V527 M528 F529 S535 E536 Y537 K538 A539 H540 F549 S550 V551 E552 P553 T562 D565 G566 Y567 V575 W576 W577 N578 N579 K583 T584 R588 M594 R595 E596 Q597 Q598 S601 K605 L610 Q611 S612 R619 D620 E621 L622 ALA ALA ALA

- Molecule 2: Procollagen galactosyltransferase 1

Chain V: 63% 25% 10%

MET LYS THR ILE ILE ALA LEU SER TYR ILE PHE CYS LEU VAL PHE ALA TRP SER HIS PRO GLN PHE GLU LYS GLY GLY GLY SER GLY GLY SER GLY SER ALA TRP SER HIS PRO GLN PHE GLU LYS SER ALA LEU GLU LEU VAL LEU PHE GLN GLY PRO GLY ARG ALA ALA PRO PRO

• Molecule 2: Procollagen galactosyltransferase 1

Chain W:

10%

87%   10%

• Molecule 2: Procollagen galactosyltransferase 1

Chain X:

6%

87%   10%

• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc opyranose

Chain E:

100%

NAG1 NAG2

• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc opyranose

Chain F:

100%

NAG1 NAG2

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	427054	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2600	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	4.053	Depositor
Minimum map value	-2.169	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.056	Depositor
Recommended contour level	0.21	Depositor
Map size (Å)	422.40002, 422.40002, 422.40002	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.1, 1.1, 1.1	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: FE2, UDP, NAG, AKG, GDU, MN

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	0/5924	0.53	0/8050
1	B	0.27	0/5924	0.52	0/8050
1	C	0.24	0/3475	0.49	0/4831
1	D	0.24	0/3475	0.51	0/4831
2	U	0.26	0/4929	0.53	0/6688
2	V	0.27	0/4929	0.56	0/6688
2	W	0.25	0/2915	0.51	0/4068
2	X	0.25	0/2915	0.51	0/4068
All	All	0.26	0/34486	0.52	0/47274

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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	5756	0	5542	111	0
1	B	5756	0	5542	77	0
1	C	3476	0	1518	8	0
1	D	3476	0	1518	5	0
2	U	4801	0	4717	121	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	V	4801	0	4717	115	0
2	W	2916	0	1305	7	0
2	X	2916	0	1305	7	0
3	E	28	0	25	0	0
3	F	28	0	25	0	0
4	A	28	0	26	0	0
4	B	28	0	26	0	0
5	A	10	0	4	0	0
5	B	10	0	4	0	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
7	A	25	0	11	1	0
7	B	25	0	9	0	0
7	U	25	0	11	0	0
7	V	25	0	11	2	0
8	A	1	0	0	0	0
8	B	1	0	0	0	0
8	U	2	0	0	0	0
8	V	2	0	0	0	0
9	U	36	0	19	0	0
9	V	36	0	18	0	0
All	All	34210	0	26353	446	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 7.

All (446) 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)
2:V:228:CYS:HA	2:V:283:CYS:HB3	1.40	1.03
1:A:307:PRO:HG3	1:A:336:GLU:HG2	1.67	0.75
1:B:566:VAL:HG23	1:B:711:HIS:HB3	1.71	0.72
2:V:398:ASP:HB3	2:V:402:GLY:H	1.55	0.72
2:V:75:GLU:OE2	2:V:104:TRP:NE1	2.17	0.72
2:V:214:THR:HG22	2:V:216:ALA:H	1.55	0.72
1:A:693:PHE:HB2	1:A:698:CYS:HB2	1.73	0.71
2:V:228:CYS:CA	2:V:283:CYS:HB3	2.19	0.70
1:A:692:ARG:HH22	1:A:697:ASP:HA	1.56	0.70
2:U:53:ARG:NH1	2:U:160:ASP:OD2	2.25	0.70
2:V:562:THR:HG22	2:V:567:TYR:HE2	1.58	0.69
1:B:450:ARG:NH2	1:B:509:GLN:O	2.25	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:V:393:LEU:HD12	2:V:517:LYS:HB3	1.75	0.69
1:A:41:VAL:HB	1:A:66:VAL:HA	1.74	0.68
2:U:405:LEU:HB3	2:U:577:TRP:HD1	1.57	0.68
2:V:470:LYS:HG3	2:V:596:GLU:HB2	1.75	0.68
2:U:504:GLN:OE1	2:U:504:GLN:N	2.27	0.67
2:U:198:TYR:HA	2:U:621:GLU:HG2	1.77	0.67
2:V:198:TYR:HA	2:V:621:GLU:HG2	1.76	0.67
1:B:190:ASP:HB3	1:B:193:LEU:HD22	1.76	0.67
2:V:407:LYS:HD3	2:V:577:TRP:HA	1.77	0.66
2:U:349:ARG:O	2:U:352:GLN:NE2	2.29	0.66
1:A:680:ASN:HD21	1:A:729:ARG:HA	1.61	0.66
2:U:392:MET:HA	2:U:518:MET:HB3	1.77	0.66
2:U:578:ASN:O	2:U:579:ASN:ND2	2.29	0.66
1:B:572:LEU:HD22	1:B:576:MET:HG2	1.76	0.66
2:U:370:ARG:HH22	2:U:372:VAL:HB	1.60	0.66
1:A:93:LEU:HD11	1:A:180:VAL:HG21	1.78	0.65
1:A:199:TYR:O	1:A:205:ARG:NH1	2.29	0.65
1:A:695:ARG:NH1	1:A:716:THR:O	2.29	0.64
2:V:370:ARG:HH12	2:V:372:VAL:HB	1.60	0.64
1:B:458:VAL:HG12	1:B:460:TYR:H	1.62	0.64
2:U:522:ASP:OD1	2:U:523:GLU:N	2.30	0.64
1:A:426:SER:HG	1:A:444:TYR:HH	1.36	0.64
2:V:485:ARG:NH2	2:V:611:GLN:O	2.31	0.64
2:U:535:SER:HA	2:U:538:LYS:HG3	1.80	0.64
2:U:344:PHE:CD2	2:U:419:ILE:HD12	2.33	0.63
1:A:334:ASN:OD1	1:A:335:ASN:N	2.30	0.63
2:U:75:GLU:OE2	2:U:104:TRP:NE1	2.29	0.63
1:B:329:THR:HG22	1:B:330:LEU:H	1.64	0.63
2:U:471:ARG:NH1	2:U:473:GLN:O	2.32	0.62
1:A:522:ASP:OD2	1:A:525:HIS:NE2	2.33	0.62
2:V:465:ILE:HD13	2:V:549:PHE:HB2	1.79	0.62
1:A:532:GLN:NE2	1:A:535:ASP:OD2	2.33	0.62
2:U:344:PHE:HD2	2:U:419:ILE:HD12	1.64	0.62
2:U:575:VAL:HB	2:U:583:LYS:HZ2	1.64	0.62
1:A:570:PRO:HA	1:A:707:TRP:HA	1.81	0.62
1:A:193:LEU:HG	1:A:197:ARG:HH22	1.64	0.62
1:A:176:ILE:HA	1:A:179:ILE:HG22	1.81	0.62
2:V:486:ASN:HD21	2:V:612:SER:H	1.46	0.61
1:A:190:ASP:HB3	1:A:193:LEU:HD22	1.81	0.61
1:A:385:CYS:SG	1:A:473:ARG:NH2	2.72	0.61
1:A:625:GLN:OE1	1:A:629:THR:OG1	2.19	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:94:LYS:NZ	1:B:183:TRP:O	2.34	0.60
2:U:565:ASP:OD1	2:U:565:ASP:N	2.34	0.60
1:B:220:GLN:OE1	1:B:242:ASN:ND2	2.35	0.60
2:U:392:MET:SD	2:U:577:TRP:NE1	2.75	0.60
2:U:424:VAL:O	2:U:507:ARG:NH2	2.35	0.60
2:U:521:VAL:HA	2:U:524:PHE:HB3	1.83	0.60
1:B:693:PHE:HB2	1:B:698:CYS:HB3	1.83	0.59
2:V:401:HIS:HE1	2:V:590:LYS:HB2	1.65	0.59
2:W:600:LEU:O	2:W:602:ARG:N	2.31	0.59
2:V:588:ARG:O	2:V:588:ARG:NH1	2.34	0.59
2:U:393:LEU:N	2:U:518:MET:H	2.01	0.58
2:U:81:ARG:HG2	2:U:112:TYR:HE1	1.68	0.58
1:A:34:VAL:HB	1:A:126:LEU:HD13	1.84	0.58
1:A:491:MET:HE1	1:A:498:ARG:HH22	1.69	0.58
2:U:206:THR:HG22	2:U:212:LYS:HD3	1.86	0.58
2:U:526:PRO:HA	2:U:529:PHE:CE1	2.39	0.58
2:V:474:VAL:HG21	2:V:602:ARG:HD2	1.86	0.58
2:X:619:ARG:O	2:X:621:GLU:N	2.36	0.57
2:U:398:ASP:HB3	2:U:402:GLY:H	1.69	0.57
2:V:477:PRO:HD3	2:V:605:LYS:HD2	1.85	0.57
2:U:403:ARG:HE	2:U:584:THR:HG21	1.69	0.57
2:U:398:ASP:N	2:U:403:ARG:O	2.38	0.57
1:A:398:THR:HG22	1:A:513:GLY:HA2	1.86	0.57
1:A:159:THR:OG1	1:A:215:LYS:NZ	2.37	0.57
1:A:241:ARG:NH2	1:A:246:ASP:OD1	2.38	0.56
2:U:264:ASP:HB2	2:U:267:ILE:HG13	1.87	0.56
1:B:169:PHE:HE1	1:B:176:ILE:HD11	1.71	0.56
2:U:352:GLN:OE1	2:U:355:ARG:NH1	2.39	0.56
1:A:712:PRO:HG3	1:B:715:LEU:HD23	1.88	0.56
1:A:410:ASN:O	1:A:410:ASN:ND2	2.38	0.56
1:A:42:ILE:HD13	1:A:108:ILE:HG23	1.87	0.56
1:A:94:LYS:NZ	1:A:183:TRP:O	2.38	0.56
2:V:479:LYS:HZ1	2:V:482:PRO:HD3	1.71	0.56
2:U:470:LYS:HG3	2:U:596:GLU:HB3	1.88	0.55
2:V:391:GLN:NE2	2:V:392:MET:SD	2.79	0.55
1:A:260:LEU:HD21	1:A:498:ARG:HD2	1.88	0.55
2:U:148:GLN:O	2:U:148:GLN:NE2	2.39	0.55
2:U:348:LEU:HD21	2:U:350:ARG:HE	1.71	0.55
1:A:199:TYR:HD1	1:A:210:LEU:HD13	1.70	0.55
1:A:402:THR:HG22	1:A:512:PHE:HD1	1.71	0.55
2:U:536:GLU:N	2:U:536:GLU:OE1	2.39	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:V:578:ASN:O	2:V:579:ASN:ND2	2.40	0.55
1:B:600:LEU:HD23	1:B:604:TYR:H	1.71	0.55
2:V:492:TYR:OH	2:V:523:GLU:OE1	2.23	0.55
1:A:695:ARG:NH2	1:B:565:ASP:OD1	2.33	0.55
1:B:293:GLN:HG2	1:B:294:PRO:HD2	1.89	0.55
2:U:397:ARG:HA	2:U:404:PRO:HA	1.89	0.55
1:A:397:LEU:HD22	1:A:402:THR:HG21	1.88	0.55
2:U:321:PRO:HG3	2:U:360:ARG:HH12	1.72	0.54
2:V:494:TYR:HA	2:V:522:ASP:HB2	1.88	0.54
2:W:486:ASN:N	2:W:610:LEU:O	2.40	0.54
1:B:151:ALA:O	1:B:162:ARG:NH2	2.40	0.54
2:V:469:ARG:NH1	2:V:550:SER:OG	2.39	0.54
1:A:285:ASP:OD1	1:A:410:ASN:ND2	2.32	0.54
1:A:316:GLN:HE22	1:A:320:LEU:HD11	1.71	0.54
2:U:306:GLU:HG2	2:U:443:PHE:CD1	2.42	0.54
2:U:588:ARG:O	2:U:588:ARG:NH1	2.40	0.54
2:V:412:CYS:HB3	7:V:702:UDP:H1'	1.89	0.54
2:X:600:LEU:O	2:X:602:ARG:N	2.31	0.54
1:A:380:ARG:NH1	1:A:476:LEU:O	2.40	0.54
1:A:458:VAL:HG12	1:A:460:TYR:H	1.72	0.54
1:B:347:TRP:HE1	1:B:351:GLN:HE21	1.55	0.54
2:V:437:ASP:OD1	2:V:437:ASP:O	2.26	0.54
1:A:577:CYS:O	1:A:581:VAL:HG22	2.07	0.54
1:B:222:LEU:HB2	1:B:254:GLY:HA2	1.90	0.54
1:B:656:TYR:HB2	1:B:729:ARG:HG2	1.90	0.53
2:V:392:MET:HA	2:V:518:MET:HB2	1.88	0.53
2:V:173:ASN:ND2	2:V:286:GLU:OE2	2.40	0.53
1:A:659:ASP:OD1	1:A:660:GLU:N	2.41	0.53
2:U:342:GLU:HB3	2:U:344:PHE:HE1	1.73	0.53
2:U:404:PRO:HB2	2:U:577:TRP:HE1	1.74	0.53
2:U:470:LYS:HD2	2:U:495:TRP:CH2	2.44	0.53
1:B:233:PHE:HE2	2:U:40:GLU:HG2	1.73	0.53
2:V:471:ARG:NH2	2:V:606:ASN:OD1	2.40	0.52
1:A:420:ARG:HD2	1:A:425:TRP:HB3	1.91	0.52
2:V:357:ARG:HH12	2:V:559:THR:HG21	1.75	0.52
2:V:202:TRP:HB2	2:V:233:MET:HB3	1.90	0.52
2:U:437:ASP:OD1	2:U:437:ASP:O	2.27	0.52
2:V:526:PRO:HA	2:V:529:PHE:CZ	2.45	0.52
1:A:154:TYR:O	1:A:162:ARG:NH1	2.42	0.52
1:A:330:LEU:HD21	1:A:332:LEU:HB2	1.91	0.52
2:V:382:THR:HA	2:V:385:VAL:HB	1.90	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:370:GLU:O	1:A:374:MET:HG3	2.09	0.52
1:A:645:LYS:HE2	1:A:647:ARG:HH11	1.75	0.52
2:X:592:GLN:O	2:X:594:MET:N	2.41	0.52
1:A:389:PHE:CZ	1:A:391:LEU:HD12	2.45	0.52
2:W:592:GLN:O	2:W:594:MET:N	2.41	0.52
1:A:715:LEU:HD23	1:B:712:PRO:HG3	1.92	0.52
2:V:354:ARG:NH1	2:V:436:ASP:OD1	2.42	0.52
1:B:666:PRO:HB3	1:B:694:LEU:HD11	1.91	0.51
1:B:663:SER:OG	1:B:664:LEU:N	2.42	0.51
2:V:538:LYS:O	2:V:544:ARG:NH2	2.44	0.51
2:U:342:GLU:HB3	2:U:344:PHE:CE1	2.46	0.51
1:A:584:MET:HG2	1:A:612:ILE:HD12	1.90	0.51
1:B:330:LEU:HD23	1:B:331:PHE:N	2.25	0.51
1:B:570:PRO:HA	1:B:707:TRP:HA	1.91	0.51
2:U:55:LEU:HD13	2:U:157:MET:HE1	1.93	0.51
1:A:347:TRP:CZ2	1:A:359:LEU:HB2	2.46	0.51
2:V:213:ARG:HH11	2:V:213:ARG:HB2	1.76	0.51
1:A:114:TYR:HD2	7:A:805:UDP:H2'	1.75	0.51
1:A:541:LYS:HD2	1:A:630:TYR:HE2	1.75	0.51
2:V:514:PRO:HA	2:V:517:LYS:HE2	1.93	0.51
2:V:575:VAL:HB	2:V:583:LYS:HZ3	1.76	0.51
1:B:134:SER:OG	1:B:209:SER:O	2.28	0.51
1:B:164:LEU:HD12	1:B:212:LEU:HD21	1.92	0.51
2:U:422:GLU:HG2	2:U:426:ARG:HH12	1.76	0.51
1:A:316:GLN:NE2	1:A:320:LEU:HD11	2.26	0.50
1:B:309:PRO:HB2	1:B:310:PHE:HD1	1.76	0.50
2:U:494:TYR:O	2:U:522:ASP:HB2	2.10	0.50
2:V:180:LEU:HD11	2:V:190:PRO:HD3	1.93	0.50
1:B:347:TRP:CZ2	1:B:359:LEU:HB2	2.47	0.50
2:U:464:LEU:HD21	2:U:525:LEU:HD13	1.93	0.50
2:V:397:ARG:HE	2:V:402:GLY:HA2	1.76	0.50
2:V:403:ARG:NH2	2:V:405:LEU:O	2.42	0.50
2:V:423:VAL:HA	2:V:428:LEU:HD23	1.94	0.50
2:V:348:LEU:HD21	7:V:702:UDP:C5	2.46	0.50
1:A:368:PRO:O	1:A:372:ARG:HG3	2.11	0.50
2:U:485:ARG:HH22	2:U:612:SER:HA	1.76	0.50
2:U:425:ASP:OD1	2:U:426:ARG:N	2.44	0.50
1:A:371:ALA:HA	1:A:374:MET:HE3	1.93	0.49
2:V:438:LEU:HD13	2:V:556:ILE:HD13	1.93	0.49
1:D:557:GLY:C	1:D:559:VAL:H	2.15	0.49
2:X:486:ASN:N	2:X:610:LEU:O	2.44	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:294:PRO:HB2	1:B:327:ARG:HD2	1.95	0.49
1:B:480:ASP:OD1	1:B:483:SER:OG	2.19	0.49
2:V:206:THR:HG22	2:V:212:LYS:HB2	1.92	0.49
1:B:424:LEU:HD13	1:B:445:VAL:HG22	1.94	0.49
2:V:66:ALA:O	2:V:70:THR:HG22	2.13	0.49
2:V:94:MET:HE1	2:V:124:ARG:O	2.12	0.49
2:U:213:ARG:NH2	2:U:621:GLU:O	2.45	0.49
1:A:164:LEU:HD12	1:A:212:LEU:HD21	1.93	0.49
2:U:144:MET:HE3	2:U:265:ASP:HA	1.95	0.49
1:B:268:TYR:OH	1:B:452:ARG:NH1	2.46	0.49
2:V:93:ASN:ND2	2:V:97:THR:OG1	2.45	0.49
2:U:68:PRO:HA	2:U:328:ILE:HD11	1.94	0.49
2:U:340:PHE:HE2	2:U:432:LEU:HD13	1.77	0.49
2:U:53:ARG:NH2	2:V:160:ASP:OD1	2.46	0.48
2:U:477:PRO:HD3	2:U:605:LYS:HD2	1.96	0.48
2:V:305:ALA:O	2:V:309:MET:HG2	2.13	0.48
1:A:329:THR:HG23	1:A:356:ALA:HB3	1.94	0.48
1:A:663:SER:OG	1:A:722:LEU:O	2.28	0.48
1:A:455:VAL:HG12	1:A:507:SER:HB2	1.95	0.48
1:B:173:ALA:O	1:B:176:ILE:HG22	2.13	0.48
2:U:552:GLU:HB3	2:U:553:PRO:HD3	1.94	0.48
2:V:206:THR:OG1	2:V:207:SER:N	2.45	0.48
2:U:189:ALA:HB2	2:U:238:PHE:HB3	1.94	0.48
2:V:620:ASP:O	2:V:621:GLU:HB2	2.13	0.48
1:C:557:GLY:C	1:C:559:VAL:H	2.16	0.48
1:A:305:GLU:HA	1:A:336:GLU:OE2	2.14	0.48
1:B:420:ARG:HD2	1:B:425:TRP:HB3	1.96	0.48
2:V:213:ARG:HB2	2:V:213:ARG:NH1	2.28	0.48
2:V:611:GLN:OE1	2:V:611:GLN:N	2.47	0.48
2:U:449:MET:O	2:U:452:MET:HG3	2.13	0.48
1:A:686:TYR:HA	1:A:727:GLY:HA3	1.95	0.47
1:B:43:THR:HB	1:B:113:SER:HB2	1.96	0.47
1:C:228:GLU:O	1:C:242:ASN:HA	2.13	0.47
1:A:511:GLU:OE1	1:A:511:GLU:N	2.40	0.47
1:B:136:LEU:HD12	1:B:171:GLY:HA3	1.96	0.47
2:U:424:VAL:HG21	2:U:510:LEU:HD12	1.95	0.47
1:A:283:ASN:HA	1:A:286:ARG:HH21	1.78	0.47
1:B:476:LEU:HD21	1:B:481:VAL:HG11	1.96	0.47
1:B:682:LYS:HA	1:B:686:TYR:CE1	2.49	0.47
2:U:405:LEU:HB3	2:U:577:TRP:CD1	2.43	0.47
2:U:551:VAL:HG12	2:U:553:PRO:HD2	1.95	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:V:116:GLU:OE2	2:V:117:TRP:N	2.47	0.47
2:V:528:MET:HB2	2:V:546:LEU:HD12	1.96	0.47
2:U:576:VAL:HG12	2:U:577:TRP:H	1.79	0.47
1:A:557:GLY:O	1:A:559:VAL:N	2.47	0.47
2:U:338:MET:O	2:U:338:MET:HG2	2.15	0.47
2:V:424:VAL:HG21	2:V:510:LEU:HD12	1.97	0.47
1:B:79:ASP:HB2	1:B:82:ARG:HB2	1.96	0.47
1:B:446:GLU:OE1	1:B:446:GLU:HA	2.14	0.47
1:A:590:TRP:CE3	1:A:610:VAL:HG22	2.50	0.47
1:A:647:ARG:HE	1:A:738:PRO:HD2	1.80	0.47
1:B:481:VAL:HG23	1:B:482:PHE:CD1	2.49	0.47
2:U:78:ARG:NE	2:U:175:ASP:OD1	2.39	0.47
2:V:105:LEU:HD12	2:V:105:LEU:HA	1.72	0.47
1:B:585:GLU:OE2	1:B:730:TYR:OH	2.24	0.47
1:A:526:LEU:HD11	1:A:586:HIS:HB2	1.97	0.47
1:B:258:THR:O	1:B:258:THR:OG1	2.30	0.47
2:V:437:ASP:O	2:V:438:LEU:HD23	2.15	0.47
1:A:546:HIS:CE1	1:A:548:ASN:HB2	2.50	0.46
2:U:562:THR:HG22	2:U:567:TYR:CZ	2.50	0.46
2:V:333:LYS:H	2:V:333:LYS:HG2	1.58	0.46
1:A:304:VAL:HA	1:A:393:ALA:HB2	1.97	0.46
1:C:688:GLY:HA3	1:C:724:THR:HA	1.97	0.46
2:U:370:ARG:HH12	2:U:372:VAL:HB	1.79	0.46
2:U:381:ASN:H	2:U:384:GLN:NE2	2.14	0.46
2:U:430:LYS:HB3	2:U:462:TRP:HH2	1.80	0.46
1:A:450:ARG:NH2	1:A:509:GLN:O	2.47	0.46
1:A:524:GLU:O	1:A:525:HIS:ND1	2.49	0.46
2:U:61:ARG:NH1	2:U:92:HIS:O	2.49	0.46
1:A:76:ARG:N	1:A:88:GLN:OE1	2.47	0.46
2:U:91:ASP:HB3	2:U:120:ALA:HB3	1.98	0.46
2:U:202:TRP:HB2	2:U:233:MET:HB3	1.97	0.46
1:A:566:VAL:HG22	1:A:711:HIS:HB3	1.98	0.46
1:A:657:ARG:HD2	1:A:660:GLU:HG3	1.98	0.46
2:U:393:LEU:HD12	2:U:517:LYS:HB2	1.99	0.46
2:V:354:ARG:HD3	2:V:436:ASP:OD1	2.16	0.46
1:A:234:ASP:OD1	1:A:235:ARG:N	2.42	0.45
1:B:99:LYS:HB3	1:B:99:LYS:HE2	1.74	0.45
1:B:475:GLU:HG2	1:B:502:ILE:HD11	1.98	0.45
2:U:465:ILE:HD13	2:U:549:PHE:HB2	1.99	0.45
2:V:333:LYS:HB2	2:V:366:GLU:HG2	1.98	0.45
2:V:562:THR:HA	2:V:567:TYR:CD2	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:W:600:LEU:C	2:W:602:ARG:H	2.17	0.45
2:U:383:SER:OG	2:U:384:GLN:OE1	2.35	0.45
2:V:383:SER:OG	2:V:384:GLN:OE1	2.33	0.45
1:D:688:GLY:HA3	1:D:724:THR:HA	1.99	0.45
1:A:79:ASP:HB2	1:A:82:ARG:HB2	1.98	0.45
2:U:396:TYR:CZ	2:U:519:LEU:HB2	2.52	0.45
2:U:426:ARG:HD2	2:U:428:LEU:HD21	1.99	0.45
1:A:473:ARG:HB2	1:A:474:MET:CE	2.47	0.45
1:B:554:GLU:HG3	1:B:556:GLU:OE1	2.16	0.45
1:B:622:GLN:OE1	1:B:622:GLN:N	2.46	0.45
2:W:513:GLU:O	2:W:515:LEU:N	2.45	0.45
2:U:180:LEU:HD11	2:U:190:PRO:HD3	1.99	0.45
2:U:619:ARG:HD2	2:U:619:ARG:HA	1.88	0.45
1:A:383:PRO:HA	1:A:473:ARG:NH1	2.32	0.45
2:U:183:GLU:OE2	2:U:285:LYS:NZ	2.38	0.45
2:U:470:LYS:HB2	2:U:495:TRP:CZ2	2.52	0.45
2:U:472:MET:HG2	2:U:494:TYR:CE1	2.50	0.45
2:U:594:MET:HB3	2:U:595:ARG:NH1	2.31	0.45
2:V:442:ILE:HG12	2:V:443:PHE:CD2	2.52	0.45
1:B:301:ALA:HB1	1:B:303:PHE:HE1	1.82	0.45
2:V:335:PRO:HA	2:V:366:GLU:HB3	1.98	0.45
1:A:524:GLU:N	1:A:524:GLU:OE1	2.50	0.44
2:U:509:LEU:HA	2:U:528:MET:HE3	1.99	0.44
2:V:341:ASP:HB2	2:V:430:LYS:O	2.16	0.44
1:A:347:TRP:HE1	1:A:351:GLN:HE21	1.65	0.44
1:A:377:ASP:OD2	1:A:479:ARG:NE	2.43	0.44
1:A:473:ARG:HB2	1:A:474:MET:HE3	2.00	0.44
1:B:279:CYS:HB3	1:B:282:CYS:HB2	1.56	0.44
2:V:145:LYS:HD2	2:V:253:TYR:CG	2.53	0.44
2:V:576:VAL:HG12	2:V:577:TRP:CE3	2.52	0.44
2:W:469:ARG:HA	2:W:495:TRP:O	2.16	0.44
2:U:620:ASP:O	2:U:621:GLU:HB2	2.18	0.44
2:V:482:PRO:O	2:V:483:ARG:HG2	2.17	0.44
2:V:552:GLU:HB3	2:V:553:PRO:HD3	1.98	0.44
1:A:156:GLU:HA	1:A:162:ARG:HH11	1.83	0.44
1:B:303:PHE:CE2	1:B:372:ARG:HG2	2.51	0.44
2:U:63:ALA:H	2:U:97:THR:HG21	1.81	0.44
2:V:346:ILE:HG23	2:V:374:ALA:HB2	1.99	0.44
2:V:567:TYR:HD1	2:V:568:VAL:N	2.16	0.44
2:V:520:PRO:HB2	2:V:522:ASP:OD1	2.18	0.44
1:A:469:GLY:O	1:A:473:ARG:HG2	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:692:ARG:NH1	1:A:698:CYS:O	2.51	0.44
2:V:562:THR:HG21	2:V:593:LYS:HB2	2.00	0.44
2:W:619:ARG:O	2:W:621:GLU:N	2.48	0.44
1:A:638:LEU:HD12	1:A:638:LEU:HA	1.86	0.44
1:B:679:LEU:HB2	1:B:730:TYR:HB2	2.00	0.44
2:V:351:ARG:HD3	2:V:351:ARG:HA	1.87	0.44
2:V:438:LEU:O	2:V:559:THR:OG1	2.35	0.44
1:B:147:GLU:OE2	1:B:147:GLU:N	2.49	0.43
2:U:540:HIS:O	2:U:540:HIS:ND1	2.48	0.43
2:V:543:LEU:HB3	2:V:545:ASN:OD1	2.17	0.43
1:A:172:PHE:O	1:A:176:ILE:HG12	2.18	0.43
1:A:289:LEU:HD12	1:A:289:LEU:O	2.18	0.43
1:A:544:TYR:HB3	1:A:576:MET:SD	2.58	0.43
2:U:101:LEU:HD23	2:U:101:LEU:HA	1.86	0.43
2:U:393:LEU:H	2:U:518:MET:H	1.63	0.43
2:U:461:ASP:OD1	2:U:461:ASP:N	2.40	0.43
2:V:535:SER:HA	2:V:538:LYS:HD3	1.99	0.43
2:V:551:VAL:HG12	2:V:553:PRO:HD2	1.99	0.43
1:A:471:THR:HA	1:A:475:GLU:HB2	2.00	0.43
1:B:300:LEU:HD21	1:B:302:VAL:HG23	2.01	0.43
2:U:417:TYR:HE1	2:U:514:PRO:HG2	1.82	0.43
2:V:343:VAL:HG23	2:V:343:VAL:O	2.18	0.43
2:V:567:TYR:CE1	2:V:569:SER:HB2	2.53	0.43
1:A:441:SER:OG	1:A:442:GLU:N	2.51	0.43
2:U:341:ASP:HB2	2:U:430:LYS:O	2.17	0.43
2:V:206:THR:HG23	2:V:210:TYR:O	2.19	0.43
2:V:576:VAL:HG12	2:V:577:TRP:HE3	1.83	0.43
1:A:481:VAL:HG23	1:A:482:PHE:HD1	1.84	0.43
1:D:555:GLY:C	1:D:557:GLY:H	2.20	0.43
2:U:337:LYS:HZ1	2:U:342:GLU:HA	1.83	0.43
2:V:58:LEU:O	2:V:59:LEU:HD12	2.18	0.43
2:V:485:ARG:HG2	2:V:610:LEU:HB3	2.00	0.43
2:U:485:ARG:NH2	2:U:612:SER:HA	2.34	0.43
1:C:557:GLY:O	1:C:559:VAL:N	2.50	0.43
1:A:70:GLY:HA2	1:A:73:GLU:HG3	2.00	0.43
1:A:432:LEU:HD23	1:A:432:LEU:HA	1.85	0.43
1:A:642:TYR:HE2	1:A:673:PHE:HE2	1.66	0.43
2:U:218:ILE:HD13	2:U:218:ILE:HA	1.87	0.43
1:C:666:PRO:HA	1:C:719:HIS:O	2.19	0.43
2:U:170:LEU:HD12	2:U:170:LEU:HA	1.88	0.43
2:U:394:PRO:HD2	2:U:540:HIS:NE2	2.34	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:V:400:TYR:HB3	2:V:592:GLN:OE1	2.19	0.43
2:X:469:ARG:HA	2:X:495:TRP:O	2.19	0.43
2:V:550:SER:OG	2:V:551:VAL:N	2.51	0.43
1:A:215:LYS:HB2	1:A:217:ARG:HH22	1.83	0.42
1:B:540:TRP:CE2	1:B:544:TYR:HD2	2.37	0.42
1:B:541:LYS:HB2	1:B:630:TYR:OH	2.19	0.42
2:U:341:ASP:HB3	2:U:428:LEU:HD12	2.01	0.42
2:U:452:MET:HA	2:U:455:VAL:HG12	2.01	0.42
2:V:337:LYS:NZ	2:V:343:VAL:HG13	2.33	0.42
2:V:354:ARG:NH2	2:V:568:VAL:HG23	2.34	0.42
1:C:555:GLY:C	1:C:557:GLY:H	2.22	0.42
1:D:647:ARG:O	1:D:737:ASP:N	2.43	0.42
1:A:311:LEU:O	1:A:315:LEU:HG	2.19	0.42
2:U:348:LEU:HG	2:U:350:ARG:HG3	2.00	0.42
1:A:295:PRO:HB2	1:A:323:TYR:OH	2.20	0.42
2:V:157:MET:O	2:V:157:MET:HG2	2.19	0.42
2:V:403:ARG:CZ	2:V:406:THR:HG22	2.49	0.42
1:A:656:TYR:HB2	1:A:729:ARG:HG2	2.00	0.42
1:B:401:GLN:O	1:B:405:ILE:HG13	2.20	0.42
2:V:470:LYS:HB2	2:V:495:TRP:CE3	2.53	0.42
1:A:147:GLU:HG3	1:A:150:LEU:HG	2.01	0.42
1:A:324:PRO:HA	1:A:325:PRO:HD3	1.95	0.42
1:B:495:LYS:HB2	1:B:495:LYS:HE2	1.79	0.42
1:C:570:PRO:HA	1:C:707:TRP:HA	2.01	0.42
1:A:273:TRP:CH2	1:A:452:ARG:HG2	2.55	0.42
1:B:516:LEU:HD21	1:B:539:ASP:OD2	2.20	0.42
2:U:71:LEU:HD13	2:U:104:TRP:CD2	2.54	0.42
2:V:524:PHE:CD1	2:V:524:PHE:C	2.93	0.42
2:V:595:ARG:NE	2:V:598:GLN:OE1	2.53	0.42
2:V:508:LYS:HD2	2:V:545:ASN:HB2	2.02	0.42
2:U:464:LEU:HD23	2:U:529:PHE:HE2	1.84	0.42
1:C:647:ARG:O	1:C:737:ASP:N	2.42	0.42
1:B:428:PHE:HB2	1:B:458:VAL:HG11	2.01	0.42
2:U:55:LEU:HD12	2:U:85:ALA:HB3	2.02	0.42
2:U:126:TYR:HB2	2:U:129:GLU:OE1	2.20	0.42
2:U:321:PRO:HG3	2:U:360:ARG:NH1	2.35	0.42
2:V:525:LEU:HD23	2:V:525:LEU:HA	1.92	0.42
1:A:67:ARG:NH1	1:A:96:GLU:OE2	2.53	0.41
1:A:382:ASP:O	1:A:473:ARG:NH2	2.53	0.41
1:B:433:SER:HB3	1:B:439:ALA:HB2	2.02	0.41
2:U:253:TYR:HB3	2:U:254:PRO:HD3	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:V:468:GLY:HA2	2:V:554:LEU:HD12	2.02	0.41
1:B:402:THR:O	1:B:406:LEU:HG	2.20	0.41
2:U:176:THR:HG1	2:U:288:TYR:HD2	1.67	0.41
2:X:193:ASP:O	2:X:290:PHE:HA	2.21	0.41
2:X:600:LEU:C	2:X:602:ARG:H	2.18	0.41
1:B:254:GLY:H	1:B:262:LEU:HD12	1.85	0.41
1:B:359:LEU:HD23	1:B:360:VAL:N	2.36	0.41
1:B:642:TYR:CE2	1:B:644:THR:HG22	2.55	0.41
2:U:152:LYS:HE2	2:U:152:LYS:HB2	1.82	0.41
2:U:175:ASP:O	2:U:179:LEU:HD12	2.20	0.41
2:U:326:ARG:HG2	2:U:327:PHE:CD1	2.55	0.41
2:V:510:LEU:HD23	2:V:510:LEU:HA	1.86	0.41
1:A:50:GLU:CD	1:A:50:GLU:H	2.23	0.41
2:V:271:PHE:O	2:V:275:GLN:HG2	2.21	0.41
1:B:497:PHE:HB3	1:B:504:LEU:HD21	2.02	0.41
1:B:567:TYR:HE2	1:B:639:PHE:HE1	1.69	0.41
2:V:259:TYR:CE1	2:V:261:TRP:HB2	2.55	0.41
2:V:351:ARG:HG2	2:V:354:ARG:HD2	2.01	0.41
1:A:39:LEU:HD12	1:A:40:LEU:N	2.35	0.41
1:A:613:HIS:O	1:A:616:GLN:HG2	2.21	0.41
1:B:124:GLU:OE2	1:B:239:ARG:NH2	2.50	0.41
2:U:146:LEU:HA	2:U:146:LEU:HD23	1.80	0.41
2:V:464:LEU:HD23	2:V:464:LEU:O	2.20	0.41
1:D:557:GLY:O	1:D:559:VAL:N	2.52	0.41
1:B:394:ASP:OD1	1:B:516:LEU:HB2	2.21	0.41
2:U:380:MET:HA	2:U:384:GLN:HE21	1.85	0.41
2:V:55:LEU:HD22	2:V:154:ALA:HB2	2.01	0.41
2:U:164:PHE:O	2:U:237:THR:HA	2.20	0.41
2:V:152:LYS:HE2	2:V:152:LYS:HB2	1.89	0.41
1:A:35:ASN:ND2	1:A:37:GLU:OE1	2.53	0.41
1:A:561:GLN:HE21	1:A:564:PRO:HA	1.86	0.41
1:A:613:HIS:HB3	1:A:615:LYS:HE3	2.03	0.41
1:B:397:LEU:HD23	1:B:397:LEU:HA	1.93	0.41
1:B:594:ARG:HE	1:B:594:ARG:HB3	1.71	0.41
2:V:482:PRO:O	2:V:484:VAL:HG23	2.21	0.41
2:V:524:PHE:C	2:V:524:PHE:HD1	2.23	0.41
1:A:140:ALA:HB1	1:A:161:LYS:HB2	2.03	0.41
2:U:77:LEU:HD23	2:U:77:LEU:HA	1.92	0.41
2:V:348:LEU:HD13	2:V:350:ARG:HE	1.86	0.41
2:V:354:ARG:NH2	2:V:568:VAL:O	2.54	0.41
1:A:700:ILE:HD13	1:A:700:ILE:HA	1.85	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:379:CYS:O	1:B:385:CYS:SG	2.80	0.40
1:B:563:CYS:O	1:B:566:VAL:HG12	2.21	0.40
2:V:479:LYS:HZ3	2:V:481:VAL:HA	1.86	0.40
1:B:567:TYR:CD2	1:B:638:LEU:HD13	2.56	0.40
2:U:367:ILE:HD11	2:U:445:LYS:HG3	2.02	0.40
2:U:503:LEU:HD11	2:U:507:ARG:NH2	2.36	0.40
1:A:62:PHE:O	1:A:63:ASN:C	2.59	0.40
1:B:302:VAL:HG21	1:B:318:LEU:HD11	2.02	0.40
2:U:412:CYS:SG	2:U:413:PHE:N	2.95	0.40
1:B:269:VAL:HA	1:B:270:PRO:HA	1.92	0.40
2:U:403:ARG:HH21	2:U:584:THR:HG21	1.86	0.40
2:U:410:LEU:HD23	2:U:410:LEU:HA	1.80	0.40
2:U:428:LEU:HD13	2:U:428:LEU:HA	1.97	0.40
2:U:610:LEU:HD23	2:U:610:LEU:HA	1.93	0.40
2:V:161:TYR:HA	2:V:240:ILE:O	2.21	0.40
2:V:460:LEU:HD13	2:V:483:ARG:HH22	1.86	0.40
2:V:594:MET:HB3	2:V:595:ARG:HG2	2.04	0.40
1:A:56:LEU:HD12	1:A:56:LEU:HA	1.82	0.40
1:B:272:GLY:O	1:B:280:GLY:N	2.54	0.40
1:B:686:TYR:CD2	1:B:729:ARG:HB3	2.56	0.40
2:U:362:LEU:HD13	2:U:362:LEU:HA	1.98	0.40
2:U:510:LEU:HD23	2:U:510:LEU:HA	1.79	0.40
2:V:534:VAL:HG12	2:V:536:GLU:H	1.86	0.40
2:V:562:THR:HA	2:V:567:TYR:HD2	1.87	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 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	704/778 (90%)	672 (96%)	32 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	704/778 (90%)	665 (94%)	39 (6%)	0	100	100
1	C	704/778 (90%)	673 (96%)	29 (4%)	2 (0%)	37	67
1	D	704/778 (90%)	674 (96%)	28 (4%)	2 (0%)	37	67
2	U	585/653 (90%)	528 (90%)	55 (9%)	2 (0%)	37	67
2	V	585/653 (90%)	519 (89%)	65 (11%)	1 (0%)	44	74
2	W	585/653 (90%)	534 (91%)	47 (8%)	4 (1%)	19	53
2	X	585/653 (90%)	536 (92%)	45 (8%)	4 (1%)	19	53
All	All	5156/5724 (90%)	4801 (93%)	340 (7%)	15 (0%)	38	67

All (15) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	U	621	GLU
2	V	621	GLU
1	C	558	ILE
1	D	558	ILE
2	W	459	GLY
2	W	593	LYS
2	W	601	SER
2	X	459	GLY
2	X	593	LYS
2	X	601	SER
2	U	236	SER
1	D	146	PRO
2	W	236	SER
2	X	236	SER
1	C	280	GLY

5.3.2 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	620/681 (91%)	599 (97%)	21 (3%)	32	60

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	620/681 (91%)	604 (97%)	16 (3%)	41	66
2	U	518/563 (92%)	492 (95%)	26 (5%)	20	49
2	V	518/563 (92%)	494 (95%)	24 (5%)	23	51
All	All	2276/2488 (92%)	2189 (96%)	87 (4%)	30	57

All (87) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	63	ASN
1	A	169	PHE
1	A	279	CYS
1	A	287	ARG
1	A	293	GLN
1	A	327	ARG
1	A	377	ASP
1	A	379	CYS
1	A	380	ARG
1	A	465	TYR
1	A	474	MET
1	A	493	PHE
1	A	497	PHE
1	A	568	TRP
1	A	584	MET
1	A	599	ARG
1	A	665	ARG
1	A	697	ASP
1	A	704	ARG
1	A	718	TYR
1	A	726	TRP
1	B	127	LYS
1	B	148	TRP
1	B	193	LEU
1	B	323	TYR
1	B	327	ARG
1	B	446	GLU
1	B	465	TYR
1	B	468	ARG
1	B	497	PHE
1	B	568	TRP
1	B	595	HIS
1	B	598	SER

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Mol	Chain	Res	Type
1	B	619	TYR
1	B	651	ASN
1	B	704	ARG
1	B	734	SER
2	U	37	TYR
2	U	42	ARG
2	U	139	ARG
2	U	157	MET
2	U	193	ASP
2	U	207	SER
2	U	264	ASP
2	U	272	SER
2	U	301	LEU
2	U	325	SER
2	U	326	ARG
2	U	337	LYS
2	U	357	ARG
2	U	360	ARG
2	U	371	LEU
2	U	397	ARG
2	U	412	CYS
2	U	413	PHE
2	U	417	TYR
2	U	425	ASP
2	U	466	TYR
2	U	499	TYR
2	U	517	LYS
2	U	540	HIS
2	U	565	ASP
2	U	595	ARG
2	V	37	TYR
2	V	53	ARG
2	V	168	ASP
2	V	169	ASN
2	V	175	ASP
2	V	241	ASP
2	V	291	LEU
2	V	303	ASP
2	V	345	MET
2	V	360	ARG
2	V	369	CYS
2	V	392	MET

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Mol	Chain	Res	Type
2	V	397	ARG
2	V	409	GLU
2	V	412	CYS
2	V	439	ARG
2	V	466	TYR
2	V	471	ARG
2	V	494	TYR
2	V	524	PHE
2	V	567	TYR
2	V	577	TRP
2	V	579	ASN
2	V	593	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	316	GLN
1	A	613	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

4 monosaccharides are modelled in this entry.

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	NAG	E	1	2,3	14,14,15	0.21	0	17,19,21	0.38	0
3	NAG	E	2	3	14,14,15	0.23	0	17,19,21	0.41	0
3	NAG	F	1	2,3	14,14,15	0.27	0	17,19,21	0.39	0
3	NAG	F	2	3	14,14,15	0.24	0	17,19,21	0.43	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	NAG	E	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	E	2	3	-	1/6/23/26	0/1/1/1
3	NAG	F	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	F	2	3	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.
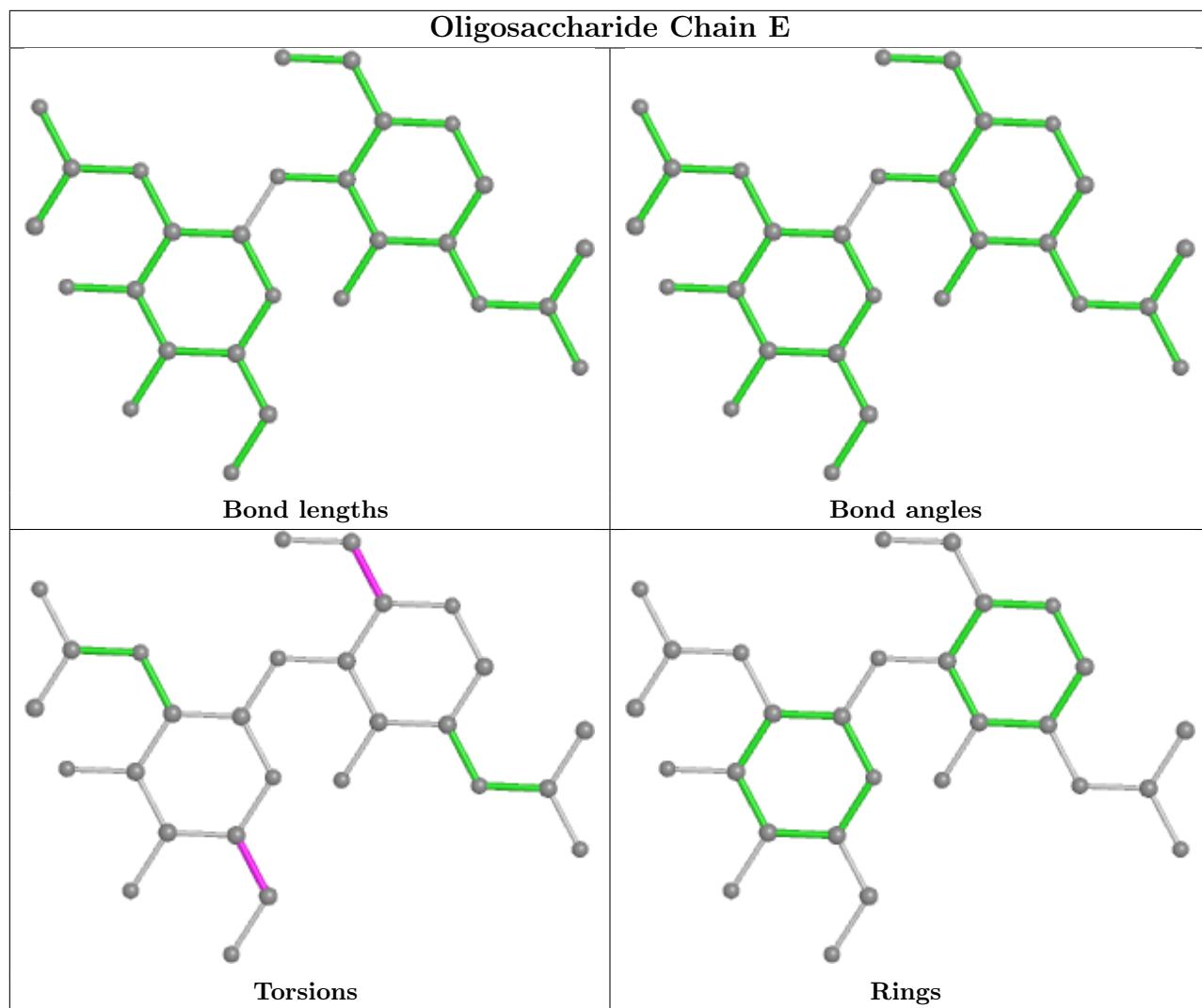
All (7) torsion outliers are listed below:
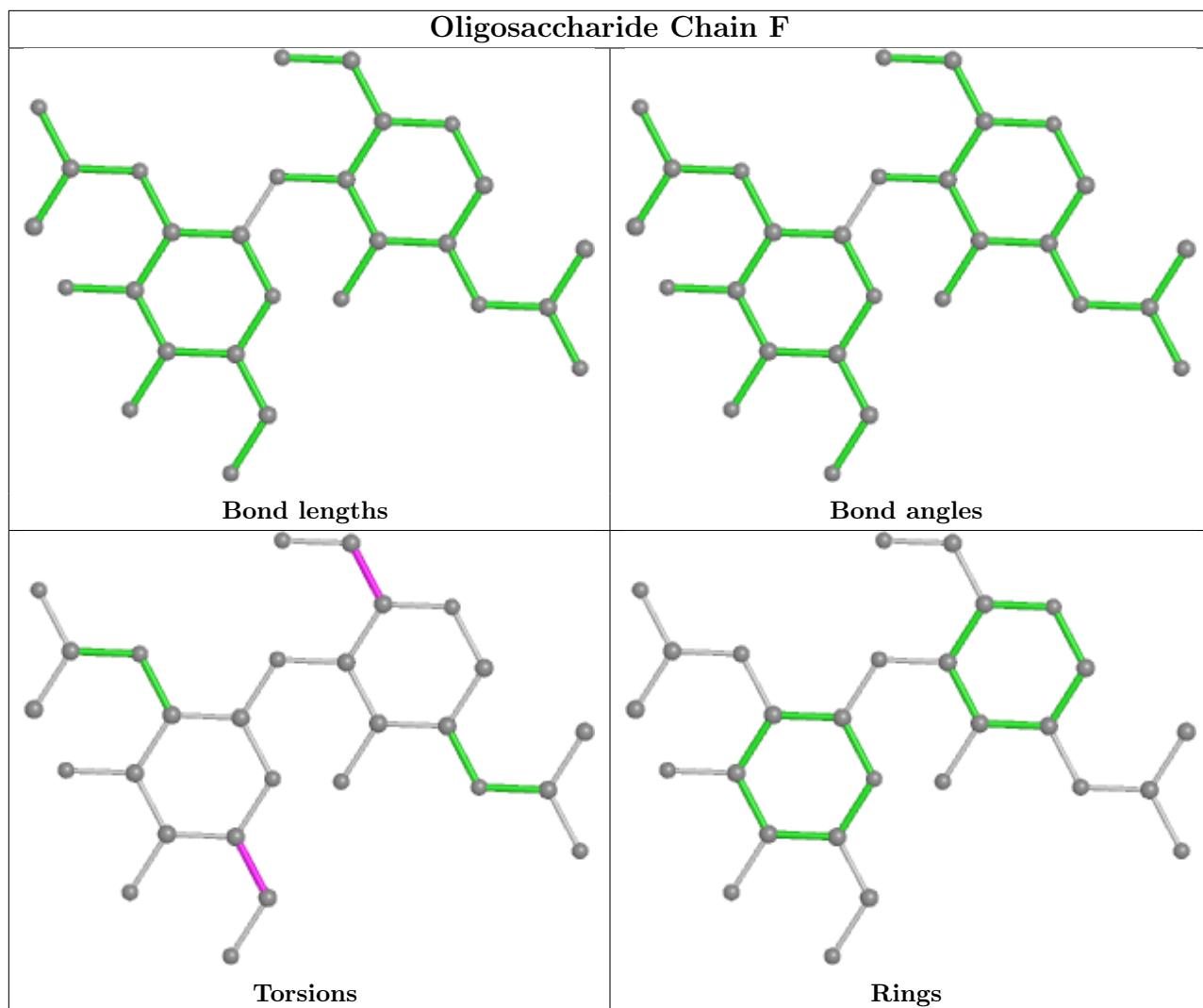
| Mol	Chain	Res	Type	Atoms
3	F	1	NAG	O5-C5-C6-O6
3	F	2	NAG	C4-C5-C6-O6
3	F	1	NAG	C4-C5-C6-O6
3	E	1	NAG	O5-C5-C6-O6
3	F	2	NAG	O5-C5-C6-O6
3	E	1	NAG	C4-C5-C6-O6
3	E	2	NAG	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

Oligosaccharide Chain E

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain F

Bond lengths · Bond angles · Torsions · Rings

5.6 Ligand geometry ⓘ

Of 20 ligands modelled in this entry, 8 are monoatomic - leaving 12 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	$\#|Z| > 2$
4	NAG	B	802	1	14,14,15	0.27	0	17,19,21	0.39	0
4	NAG	A	802	1	14,14,15	0.22	0	17,19,21	0.46	0
9	GDU	U	701	-	35,38,38	1.51	7 (20%)	53,58,58	2.00	15 (28%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
7	UDP	A	805	8	24,26,26	1.42	3 (12%)	37,40,40	1.63	8 (21%)
4	NAG	A	801	1	14,14,15	0.38	0	17,19,21	0.83	1 (5%)
4	NAG	B	801	1	14,14,15	0.25	0	17,19,21	0.41	0
5	AKG	B	803	6	9,9,9	2.10	2 (22%)	11,11,11	4.21	5 (45%)
9	GDU	V	701	8	35,38,38	1.67	9 (25%)	53,58,58	1.94	10 (18%)
7	UDP	U	702	8	24,26,26	1.39	2 (8%)	37,40,40	1.58	5 (13%)
7	UDP	B	805	8	24,26,26	1.53	4 (16%)	37,40,40	1.99	11 (29%)
7	UDP	V	702	8	24,26,26	1.42	4 (16%)	37,40,40	1.86	9 (24%)
5	AKG	A	803	6	9,9,9	2.28	3 (33%)	11,11,11	4.24	5 (45%)

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
4	NAG	B	802	1	-	4/6/23/26	0/1/1/1
4	NAG	A	802	1	-	3/6/23/26	0/1/1/1
9	GDU	U	701	-	-	4/23/59/59	0/3/3/3
7	UDP	A	805	8	-	7/16/32/32	0/2/2/2
4	NAG	A	801	1	-	4/6/23/26	0/1/1/1
4	NAG	B	801	1	-	1/6/23/26	0/1/1/1
5	AKG	B	803	6	-	3/9/9/9	-
9	GDU	V	701	8	-	8/23/59/59	0/3/3/3
7	UDP	U	702	8	-	8/16/32/32	0/2/2/2
7	UDP	B	805	8	-	4/16/32/32	0/2/2/2
7	UDP	V	702	8	-	4/16/32/32	0/2/2/2
5	AKG	A	803	6		-	4/9/9/9	-

All (34) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	803	AKG	C3-C2	-4.72	1.45	1.51
7	U	702	UDP	PA-O5'	4.71	1.78	1.59
5	B	803	AKG	C3-C2	-4.44	1.45	1.51
7	A	805	UDP	PA-O5'	4.08	1.75	1.59
9	V	701	GDU	O4'-C4'	-4.01	1.33	1.43
9	U	701	GDU	O4'-C4'	-3.66	1.34	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	803	AKG	C2-C1	-3.65	1.48	1.53
7	V	702	UDP	O4'-C4'	-3.60	1.37	1.45
7	B	805	UDP	PA-O5'	3.57	1.73	1.59
7	V	702	UDP	PA-O5'	3.47	1.73	1.59
7	B	805	UDP	O2'-C2'	-3.44	1.34	1.43
9	U	701	GDU	O3D-C3D	-3.30	1.35	1.43
9	V	701	GDU	O3D-C3D	-3.12	1.35	1.43
7	V	702	UDP	O5'-C5'	-3.01	1.33	1.44
5	B	803	AKG	C2-C1	-2.99	1.49	1.53
9	V	701	GDU	O2'-C2'	-2.97	1.36	1.43
9	V	701	GDU	O2D-C2D	-2.96	1.36	1.43
7	B	805	UDP	O5'-C5'	-2.94	1.33	1.44
7	B	805	UDP	O3'-C3'	-2.93	1.36	1.43
9	V	701	GDU	C1D-N1	2.81	1.55	1.47
9	U	701	GDU	O2'-C2'	-2.63	1.36	1.43
9	V	701	GDU	PB-O3B	2.46	1.66	1.60
9	U	701	GDU	C1D-N1	2.44	1.54	1.47
9	V	701	GDU	O5'-C5'	-2.38	1.38	1.44
9	U	701	GDU	PB-O3B	2.35	1.66	1.60
7	A	805	UDP	O5'-C5'	-2.33	1.35	1.44
9	U	701	GDU	O5D-C5D	-2.29	1.35	1.44
7	V	702	UDP	O2'-C2'	-2.27	1.37	1.43
5	A	803	AKG	O2-C1	-2.21	1.24	1.30
7	U	702	UDP	O5'-C5'	-2.12	1.36	1.44
9	V	701	GDU	C3D-C2D	-2.07	1.47	1.53
9	U	701	GDU	O2D-C2D	-2.04	1.38	1.43
9	V	701	GDU	PA-O5D	2.02	1.67	1.59
7	A	805	UDP	C4-N3	2.00	1.42	1.38

All (69) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	803	AKG	O1-C1-C2	-11.53	106.33	121.72
5	A	803	AKG	O1-C1-C2	-11.20	106.76	121.72
9	V	701	GDU	PB-O3A-PA	8.83	163.12	132.83
9	U	701	GDU	PB-O3A-PA	7.91	159.96	132.83
5	A	803	AKG	O2-C1-O1	5.31	135.75	123.61
5	B	803	AKG	O2-C1-O1	5.04	135.14	123.61
7	B	805	UDP	N3-C2-N1	4.86	121.35	114.89
5	A	803	AKG	O5-C2-C3	4.32	130.76	121.20
7	B	805	UDP	O2-C2-N3	-4.15	113.77	121.50
9	U	701	GDU	O5'-C1'-C2'	-4.08	101.70	110.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	V	702	UDP	N3-C2-N1	3.85	120.00	114.89
7	V	702	UDP	O2-C2-N3	-3.82	114.39	121.50
7	B	805	UDP	C4-N3-C2	-3.79	121.58	126.58
9	V	701	GDU	O5'-C1'-C2'	-3.73	102.46	110.35
7	U	702	UDP	C4-N3-C2	-3.68	121.72	126.58
7	U	702	UDP	N3-C2-N1	3.65	119.74	114.89
5	B	803	AKG	O5-C2-C3	3.63	129.25	121.20
5	B	803	AKG	C4-C3-C2	-3.60	106.24	113.03
7	B	805	UDP	O5'-PA-O1A	-3.56	95.17	109.07
5	A	803	AKG	C4-C3-C2	-3.55	106.35	113.03
9	V	701	GDU	C1D-N1-C2	3.54	123.98	117.57
7	A	805	UDP	C4-N3-C2	-3.54	121.91	126.58
9	U	701	GDU	C1'-C2'-C3'	-3.45	102.81	110.00
7	B	805	UDP	C6-C5-C4	3.40	124.17	119.52
7	V	702	UDP	C4-N3-C2	-3.39	122.11	126.58
7	U	702	UDP	O2-C2-N3	-3.37	115.22	121.50
7	V	702	UDP	O4-C4-N3	-3.36	114.38	119.31
9	U	701	GDU	C4'-C3'-C2'	-3.26	105.14	110.82
7	U	702	UDP	O4-C4-N3	-3.26	114.53	119.31
9	U	701	GDU	C1D-N1-C2	3.22	123.40	117.57
7	A	805	UDP	O2-C2-N3	-3.13	115.67	121.50
7	A	805	UDP	N3-C2-N1	3.12	119.04	114.89
9	U	701	GDU	O3'-C3'-C2'	-3.12	103.13	110.35
9	U	701	GDU	O5'-C5'-C4'	3.07	115.27	109.69
9	V	701	GDU	O3'-C3'-C2'	-3.03	103.35	110.35
9	V	701	GDU	O3D-C3D-C2D	-3.00	102.11	111.82
9	U	701	GDU	PB-O3B-C1'	2.93	131.08	119.74
9	V	701	GDU	PB-O3B-C1'	2.90	130.94	119.74
9	U	701	GDU	O4'-C4'-C3'	-2.85	103.75	110.35
9	V	701	GDU	C3D-C2D-C1D	-2.84	96.04	101.43
7	B	805	UDP	O4-C4-N3	-2.82	115.17	119.31
7	V	702	UDP	C1'-N1-C2	2.81	122.65	117.57
7	V	702	UDP	O4'-C1'-N1	2.80	114.76	108.36
7	B	805	UDP	C1'-N1-C2	2.75	122.55	117.57
9	U	701	GDU	O3D-C3D-C2D	-2.72	103.03	111.82
7	A	805	UDP	O5'-PA-O1A	-2.57	99.02	109.07
7	B	805	UDP	O4-C4-C5	2.53	129.62	125.16
5	A	803	AKG	C3-C2-C1	-2.53	111.28	115.97
7	A	805	UDP	O4-C4-N3	-2.52	115.60	119.31
7	B	805	UDP	C6-N1-C2	-2.45	117.86	120.99
9	V	701	GDU	O2A-PA-O1A	2.42	124.22	112.24
9	U	701	GDU	C3D-C2D-C1D	-2.40	96.86	101.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	B	805	UDP	O2B-PB-O3A	-2.37	96.69	104.64
5	B	803	AKG	C3-C2-C1	-2.35	111.61	115.97
9	U	701	GDU	O2A-PA-O1A	2.35	123.84	112.24
9	U	701	GDU	C1'-O5'-C5'	2.30	118.20	113.69
7	V	702	UDP	O4-C4-C5	2.30	129.21	125.16
9	V	701	GDU	O3A-PB-O3B	2.29	107.10	102.48
7	B	805	UDP	O2B-PB-O1B	2.24	119.46	110.68
9	V	701	GDU	O4'-C4'-C3'	-2.23	105.19	110.35
7	A	805	UDP	PA-O3A-PB	2.20	140.38	132.83
7	A	805	UDP	C6-C5-C4	2.17	122.48	119.52
7	A	805	UDP	C1'-N1-C2	2.14	121.44	117.57
7	V	702	UDP	O2-C2-N1	2.12	125.60	122.79
7	U	702	UDP	O2B-PB-O1B	2.10	118.89	110.68
7	V	702	UDP	O2B-PB-O1B	2.10	118.89	110.68
4	A	801	NAG	O5-C5-C4	-2.08	105.77	110.83
9	U	701	GDU	O2-C2-N3	-2.00	117.77	121.50
9	U	701	GDU	O2-C2-N1	2.00	125.45	122.79

There are no chirality outliers.

All (54) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	803	AKG	O2-C1-C2-C3
5	B	803	AKG	O2-C1-C2-C3
7	A	805	UDP	O4'-C1'-N1-C2
7	A	805	UDP	PA-O3A-PB-O2B
7	B	805	UDP	O4'-C1'-N1-C2
7	B	805	UDP	O4'-C1'-N1-C6
7	U	702	UDP	C2'-C1'-N1-C2
7	U	702	UDP	C2'-C1'-N1-C6
7	U	702	UDP	C5'-O5'-PA-O1A
7	U	702	UDP	C5'-O5'-PA-O2A
7	V	702	UDP	O4'-C1'-N1-C2
7	V	702	UDP	O4'-C1'-N1-C6
9	U	701	GDU	O4D-C1D-N1-C2
9	U	701	GDU	O4D-C1D-N1-C6
9	V	701	GDU	O4D-C1D-N1-C2
9	V	701	GDU	O4D-C1D-N1-C6
4	A	801	NAG	O5-C5-C6-O6
4	A	801	NAG	C8-C7-N2-C2
4	A	801	NAG	C4-C5-C6-O6
9	V	701	GDU	O4D-C4D-C5D-O5D

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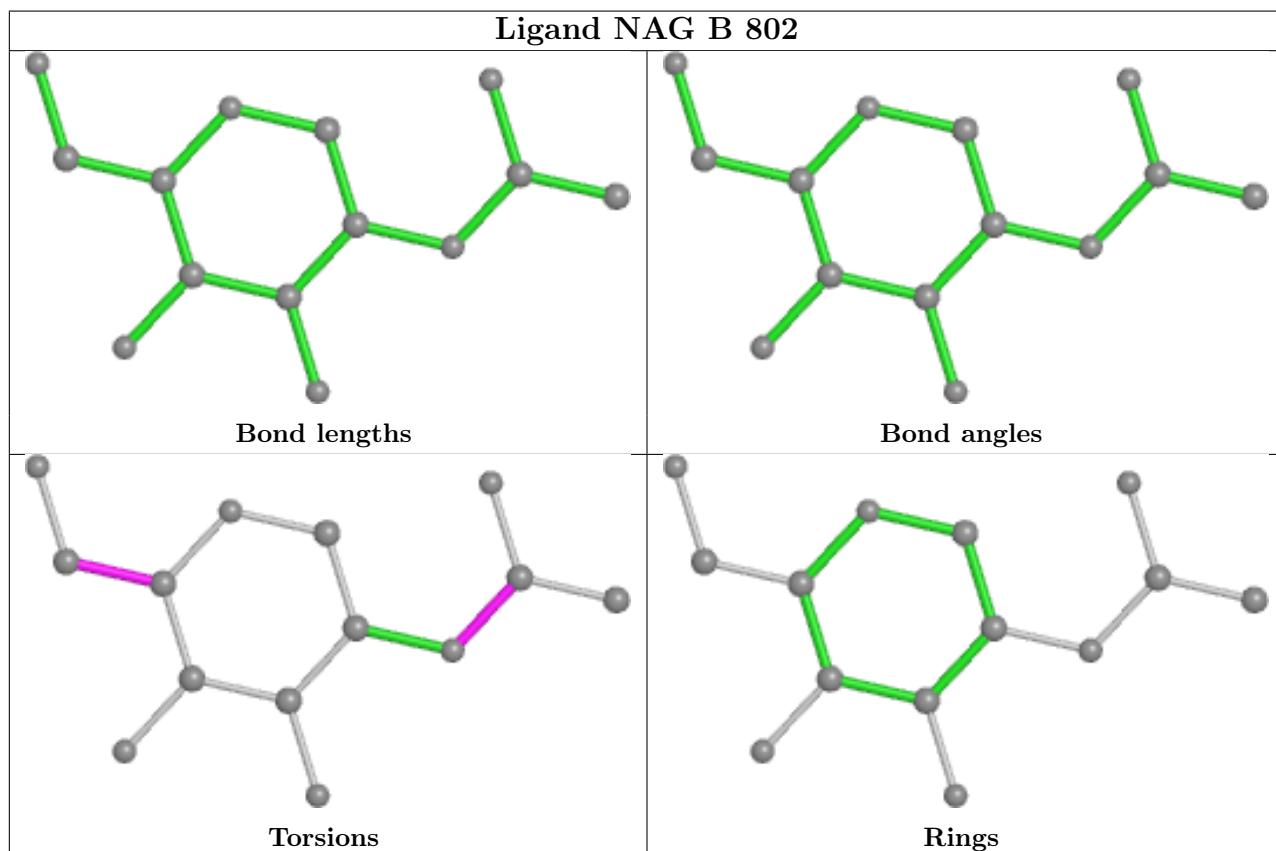
Mol	Chain	Res	Type	Atoms
7	U	702	UDP	C4'-C5'-O5'-PA
4	A	801	NAG	O7-C7-N2-C2
7	A	805	UDP	O4'-C1'-N1-C6
4	A	802	NAG	C8-C7-N2-C2
4	A	802	NAG	O7-C7-N2-C2
4	B	802	NAG	C8-C7-N2-C2
4	B	802	NAG	O7-C7-N2-C2
7	B	805	UDP	C3'-C4'-C5'-O5'
7	B	805	UDP	O4'-C4'-C5'-O5'
4	B	802	NAG	O5-C5-C6-O6
7	A	805	UDP	O4'-C4'-C5'-O5'
9	V	701	GDU	O5'-C5'-C6'-O6'
9	V	701	GDU	C4'-C5'-C6'-O6'
7	U	702	UDP	O4'-C1'-N1-C2
7	U	702	UDP	O4'-C1'-N1-C6
7	V	702	UDP	C2'-C1'-N1-C6
7	A	805	UDP	C3'-C4'-C5'-O5'
4	A	802	NAG	O5-C5-C6-O6
9	U	701	GDU	O4D-C4D-C5D-O5D
9	U	701	GDU	O5'-C5'-C6'-O6'
5	A	803	AKG	C2-C3-C4-C5
9	V	701	GDU	PA-O3A-PB-O1B
9	V	701	GDU	C2'-C1'-O3B-PB
7	V	702	UDP	C2'-C1'-N1-C2
7	A	805	UDP	PB-O3A-PA-O2A
5	A	803	AKG	C3-C4-C5-O3
4	B	801	NAG	O5-C5-C6-O6
5	B	803	AKG	C3-C4-C5-O3
9	V	701	GDU	C3D-C4D-C5D-O5D
7	A	805	UDP	PA-O3A-PB-O1B
5	A	803	AKG	C3-C4-C5-O4
5	B	803	AKG	C3-C4-C5-O4
7	U	702	UDP	C5'-O5'-PA-O3A
4	B	802	NAG	C4-C5-C6-O6
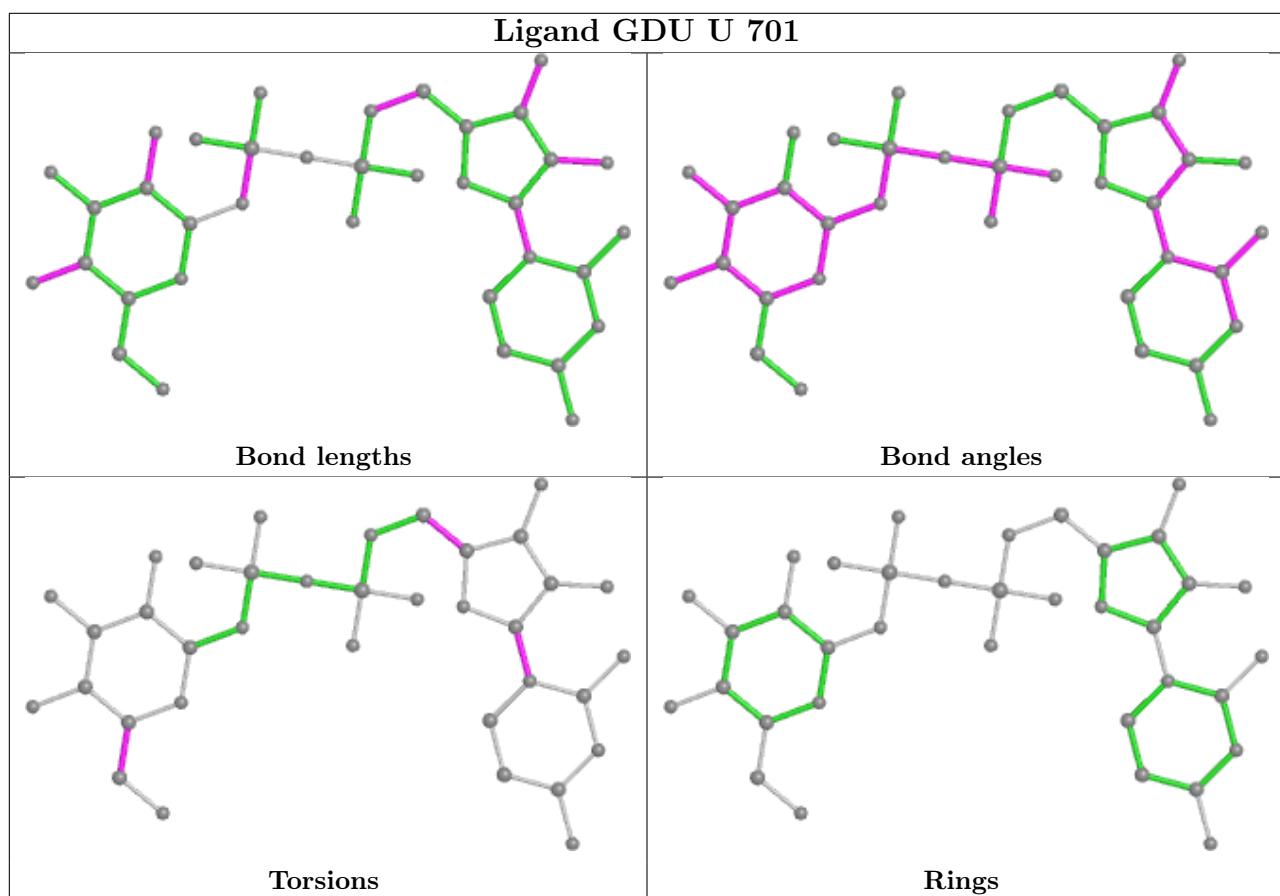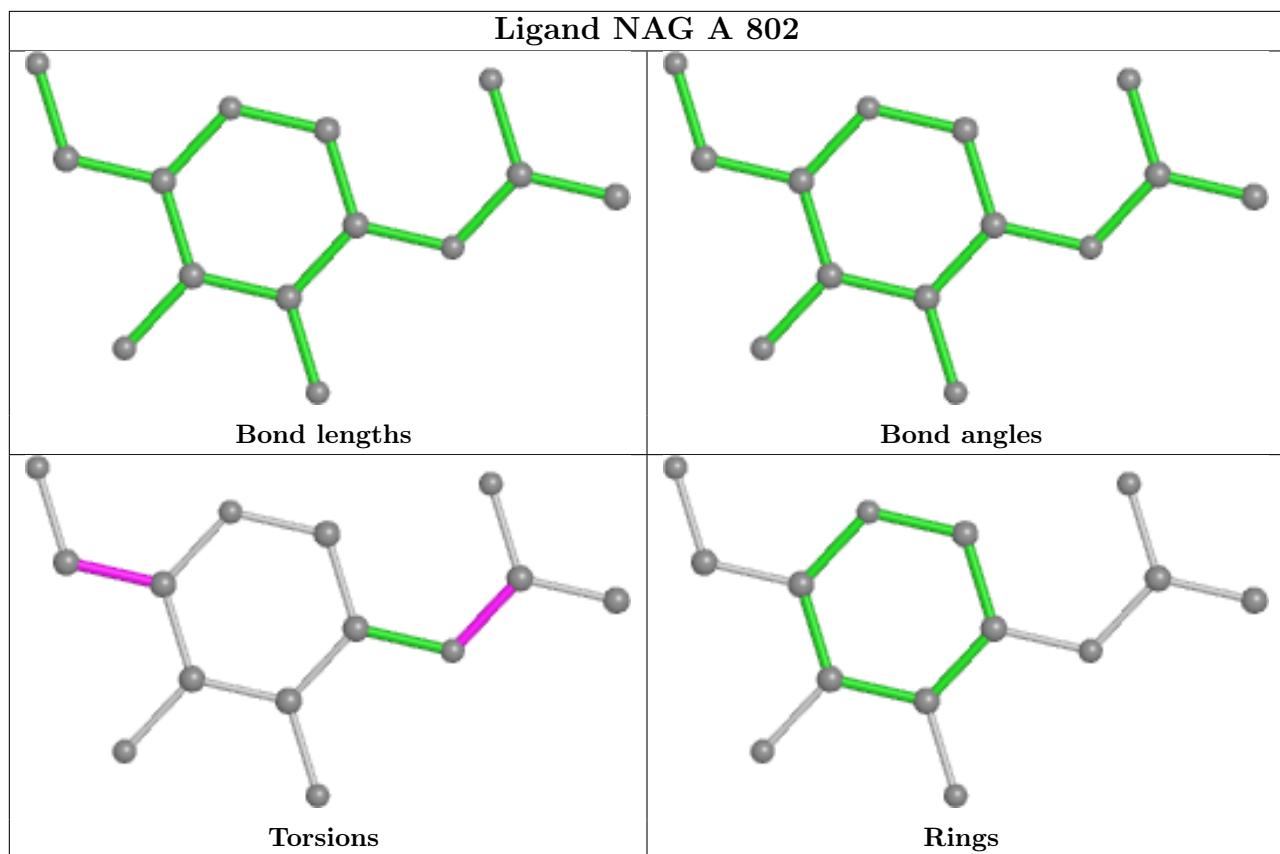
There are no ring outliers.
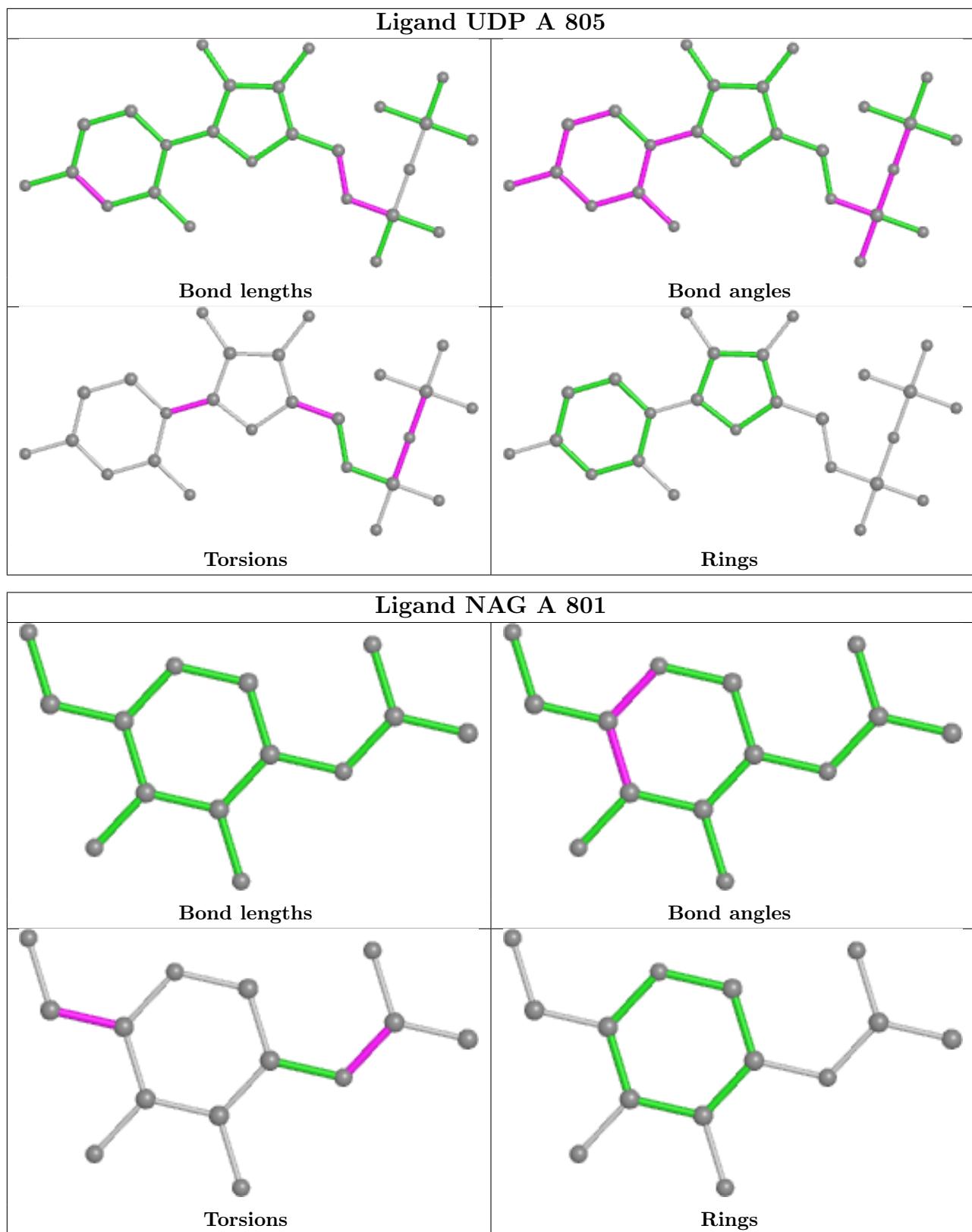
2 monomers are involved in 3 short contacts:
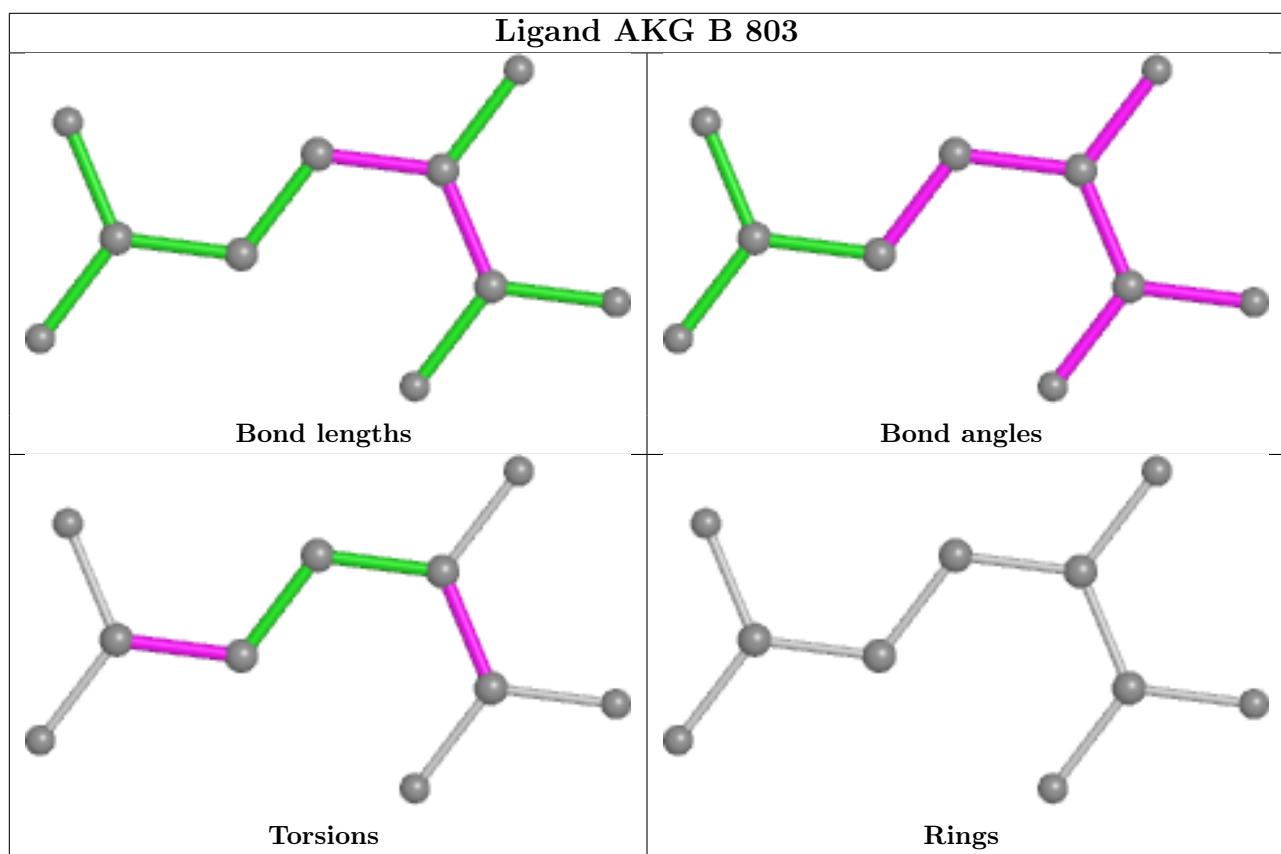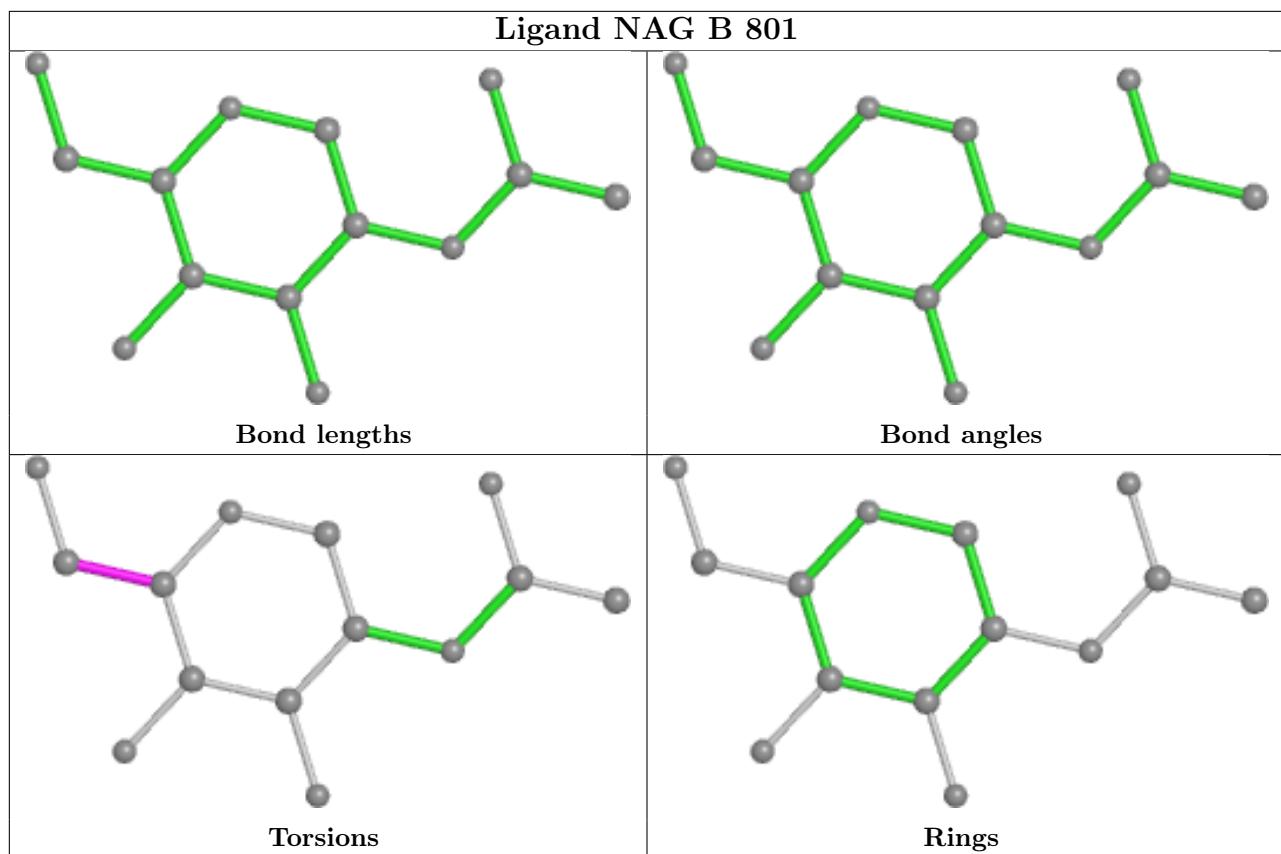
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	805	UDP	1	0
7	V	702	UDP	2	0
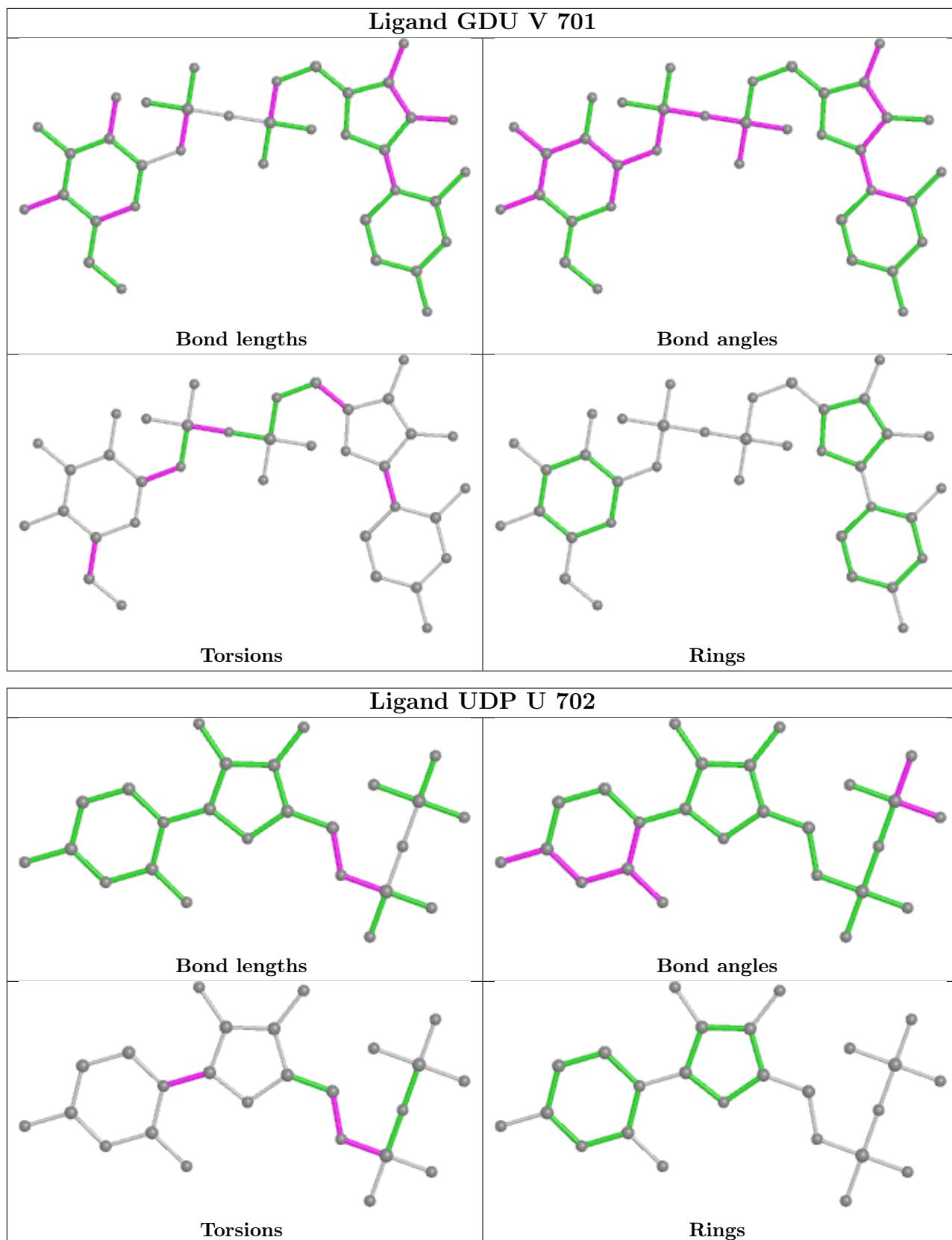
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand NAG B 802

Bond lengths

Bond angles

Torsions

Rings

Ligand NAG A 802

Bond lengths

Bond angles

Torsions

Rings

Ligand GDU U 701

Bond lengths

Bond angles

Torsions

Rings

Ligand UDP A 805

Bond lengths

Bond angles

Torsions

Rings

Ligand NAG A 801

Bond lengths

Bond angles

Torsions

Rings

Ligand NAG B 801

Bond lengths

Bond angles

Torsions

Rings

Ligand AKG B 803

Bond lengths

Bond angles

Torsions

Rings

Ligand GDU V 701

Bond lengths

Bond angles

Torsions

Rings

Ligand UDP U 702

Bond lengths

Bond angles

Torsions

Rings

Ligand UDP B 805

Bond lengths

Bond angles

Torsions

Rings

Ligand UDP V 702

Bond lengths

Bond angles

Torsions

Rings

Ligand AKG A 803

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.
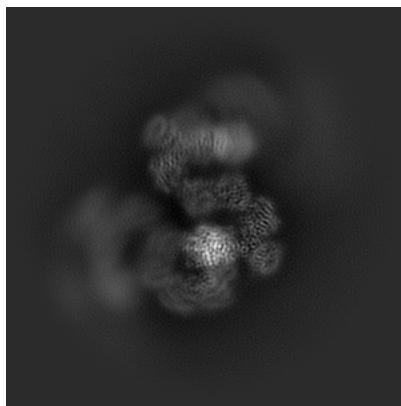
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-60075. These allow visual inspection of the internal detail of the map and identification of artifacts.
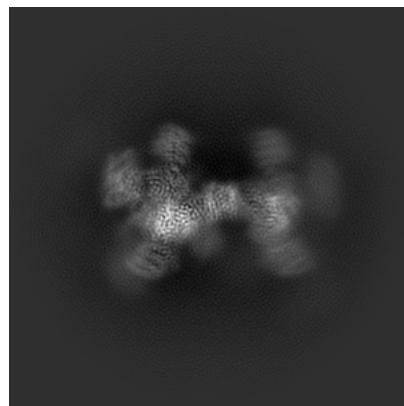
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections (i)
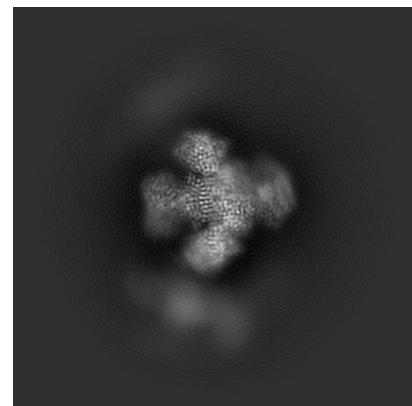
6.1.1 Primary map
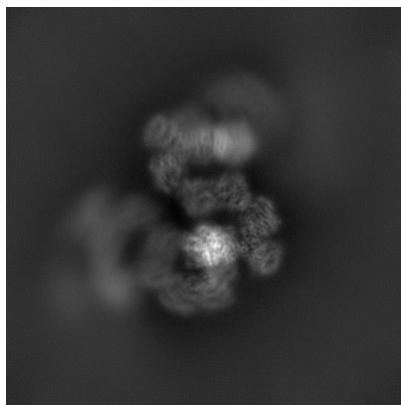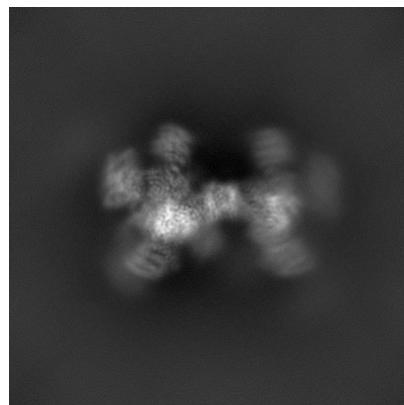
X	Y	Z
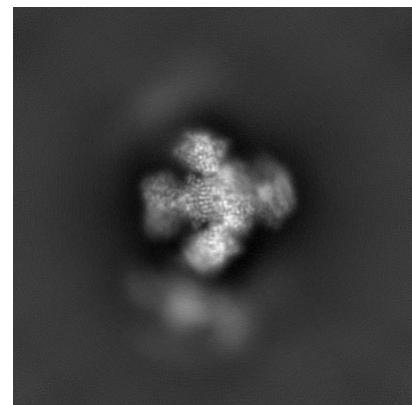
6.1.2 Raw map

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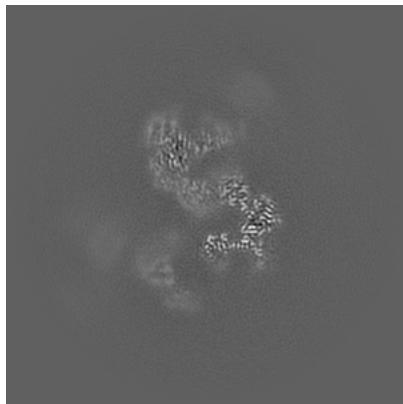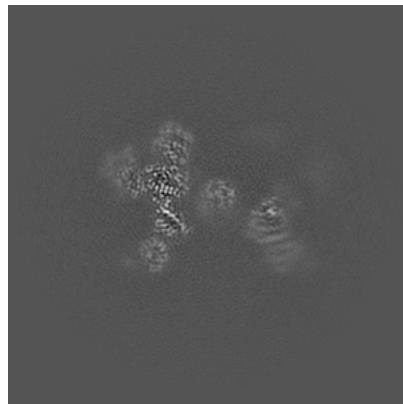
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
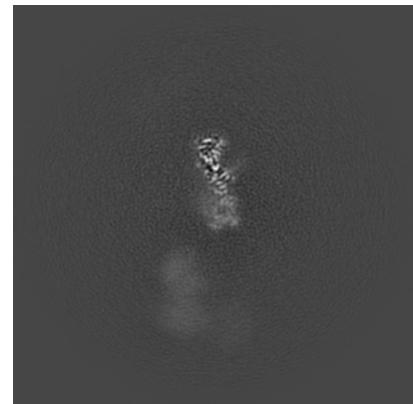
6.2.1 Primary map

X Index: 192
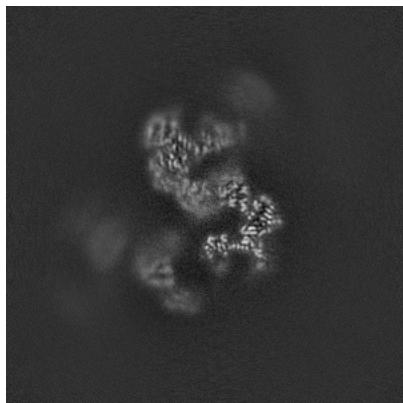
Y Index: 192
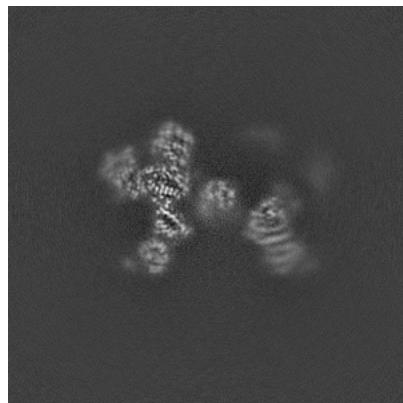
Z Index: 192

6.2.2 Raw map

X Index: 192

Y Index: 192
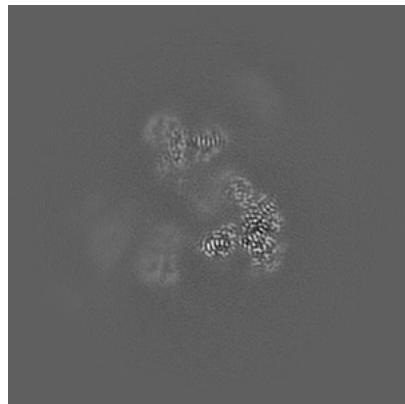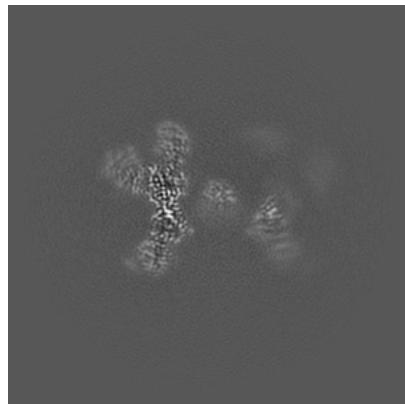
Z Index: 192

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

6.3 Largest variance slices ⓘ
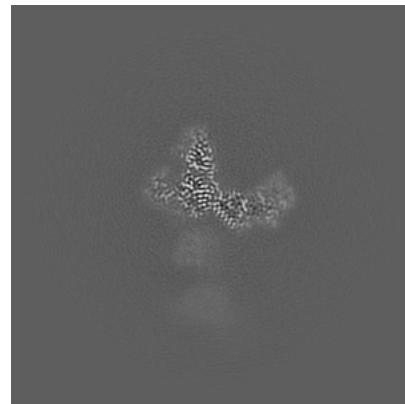
6.3.1 Primary map

X Index: 185
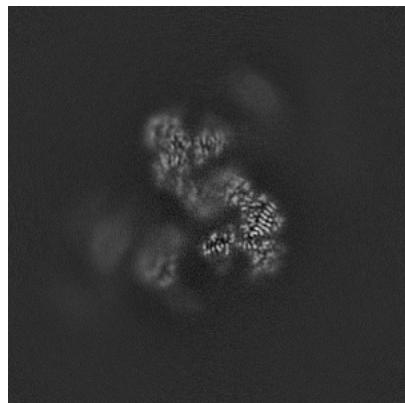
Y Index: 196
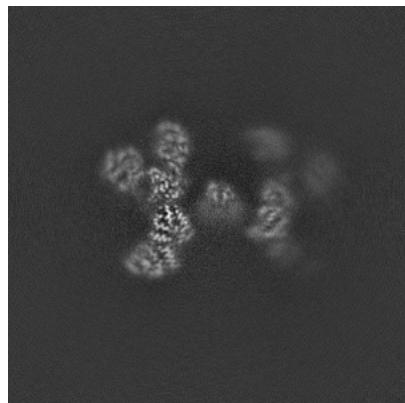
Z Index: 153
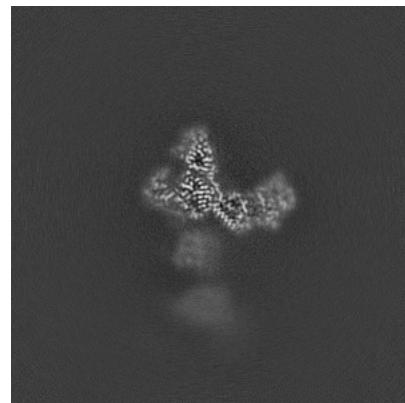
6.3.2 Raw map

X Index: 188

Y Index: 200
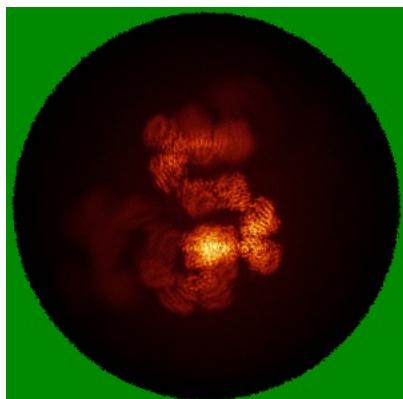
Z Index: 153
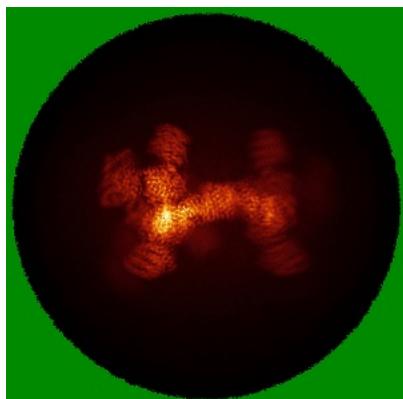
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) ⓘ
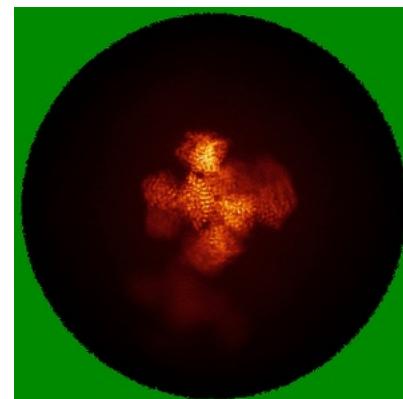
6.4.1 Primary map
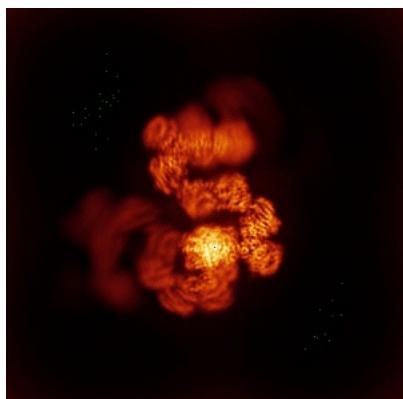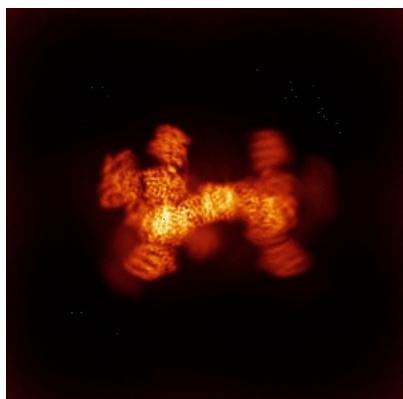
| X | Y | Z |
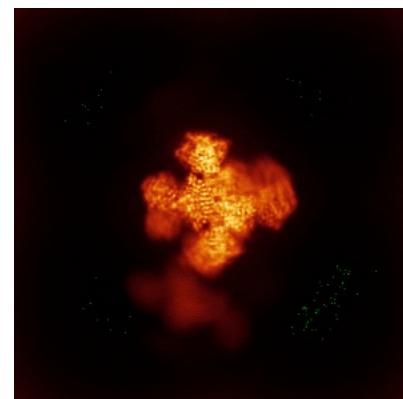
6.4.2 Raw map

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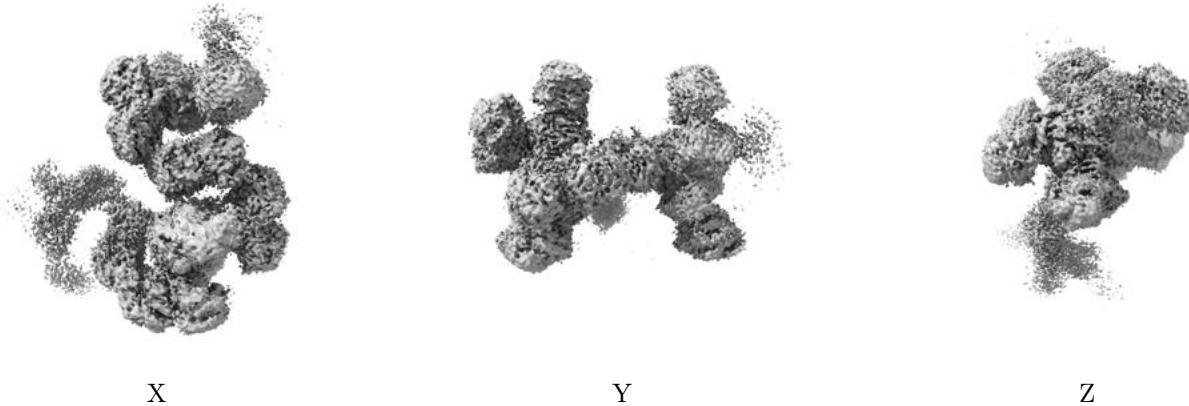
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.
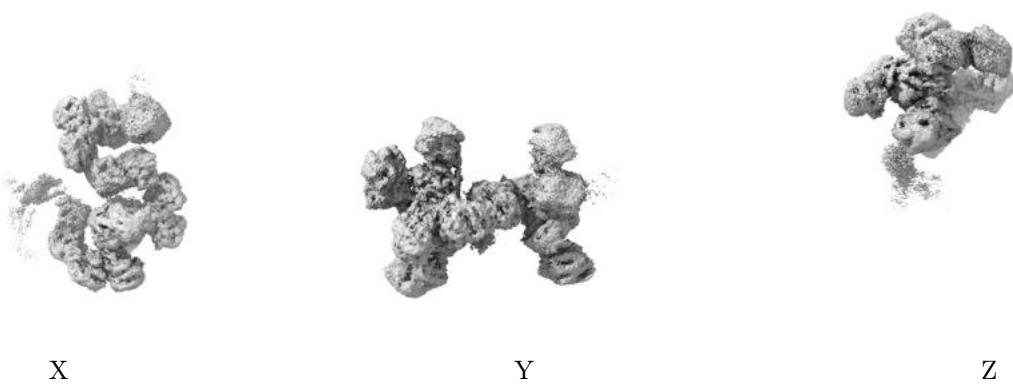
6.5 Orthogonal surface views ⓘ

6.5.1 Primary map

| X | Y | Z |

The images above show the 3D surface view of the map at the recommended contour level 0.21. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

| X | Y | Z |

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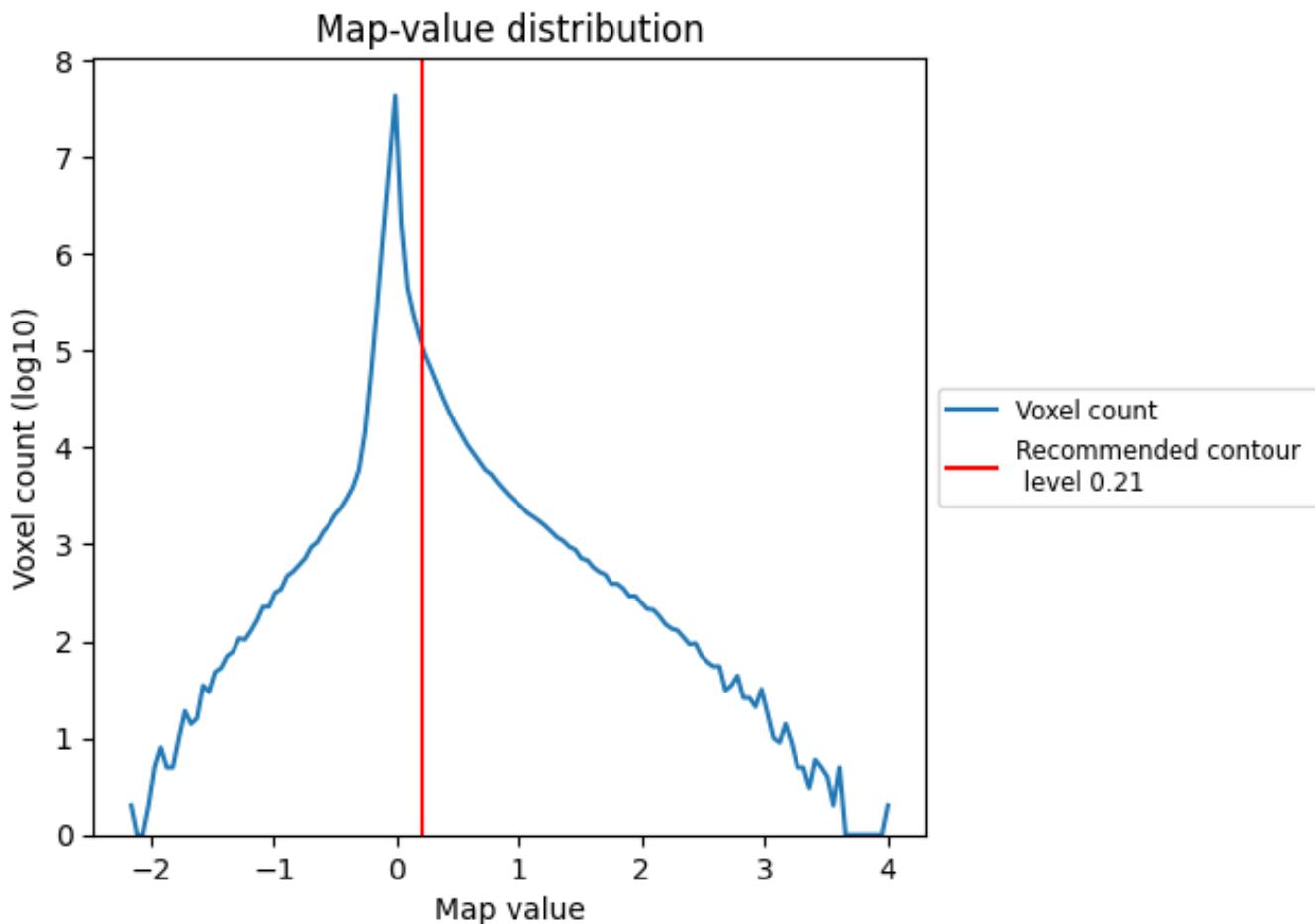
6.6 Mask visualisation ⓘ

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

7 Map analysis ⓘ
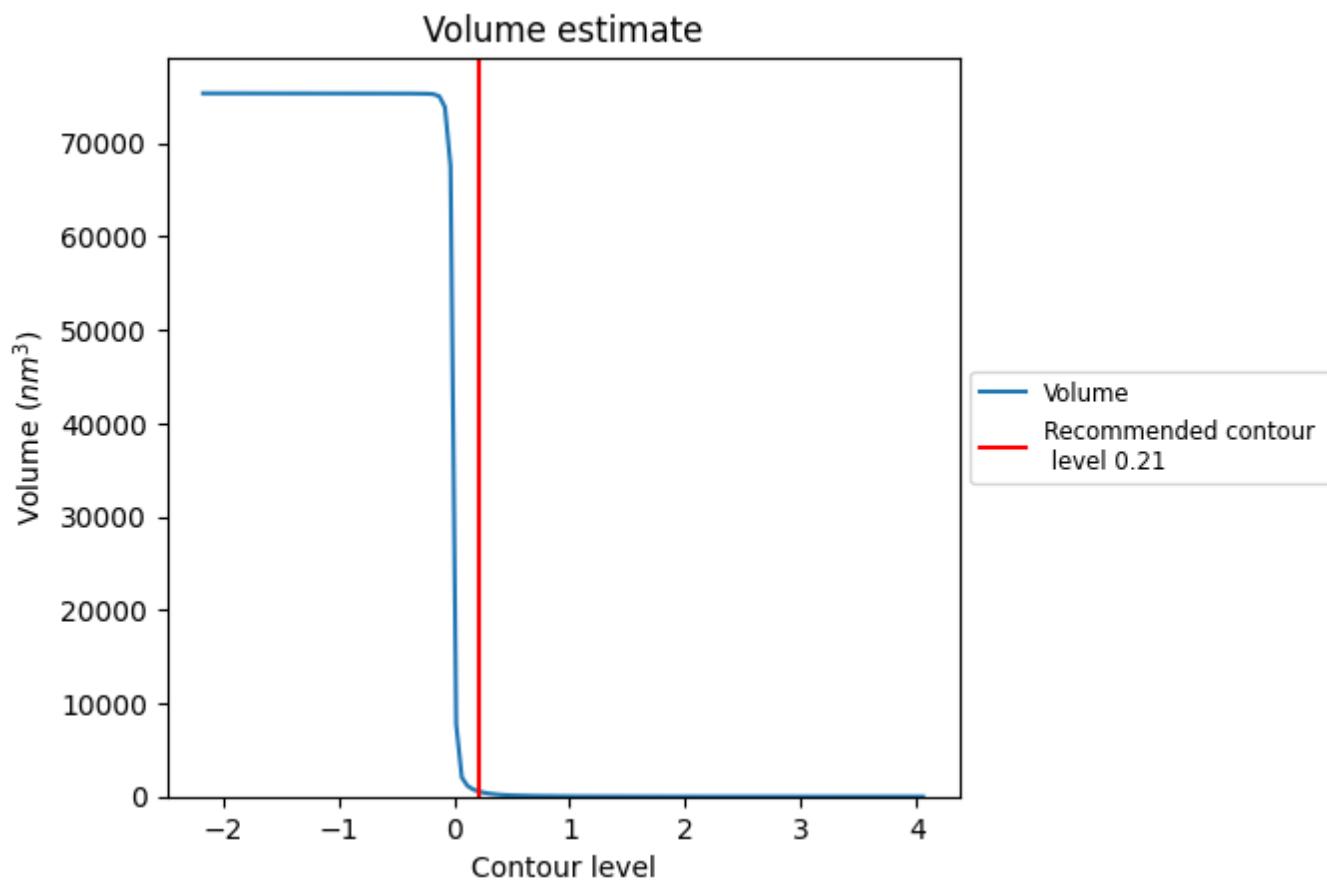
This section contains the results of statistical analysis of the map.

7.1 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.
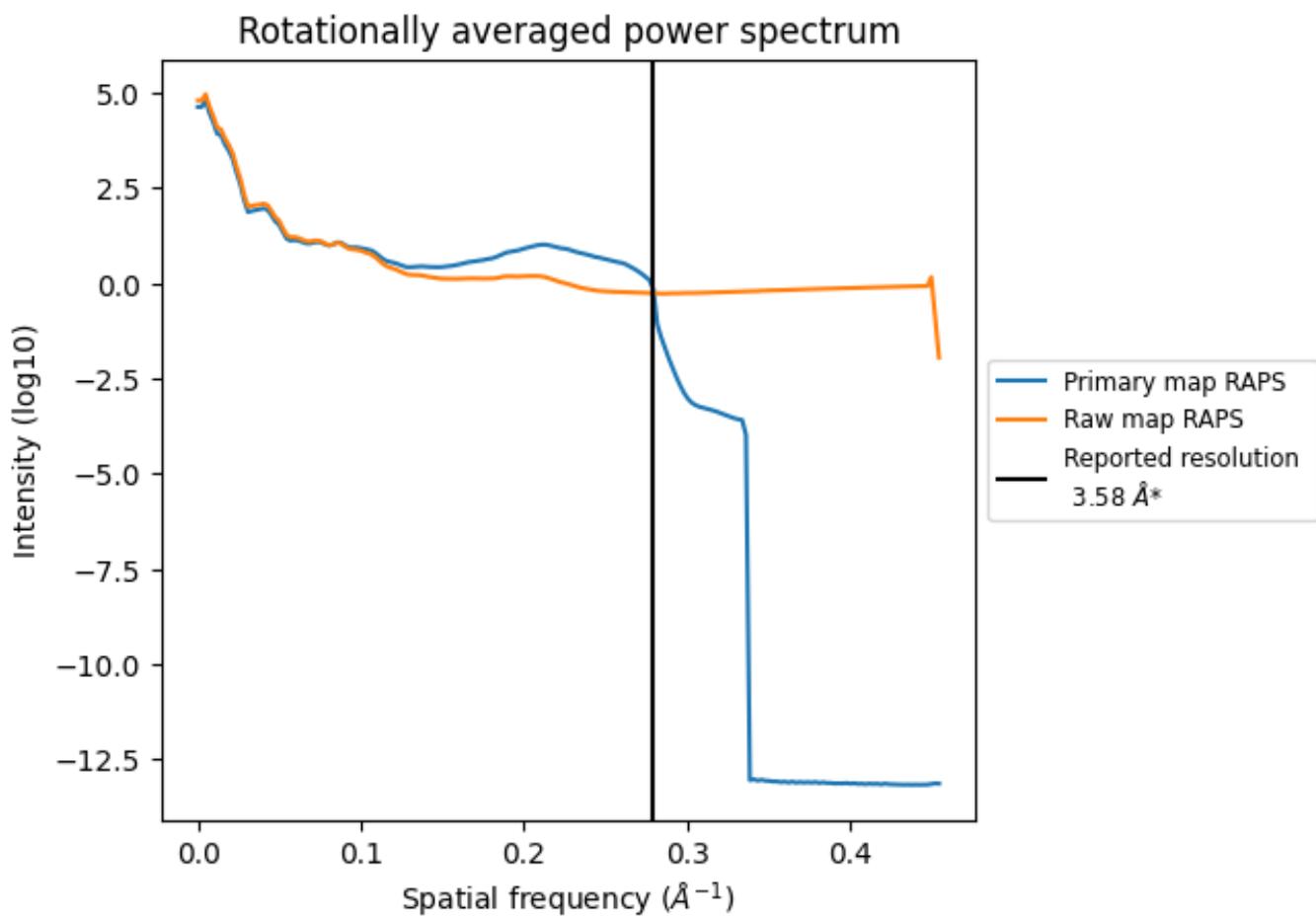
7.2 Volume estimate ⓘ

The volume at the recommended contour level is 562 nm^3; this corresponds to an approximate mass of 508 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum (i)
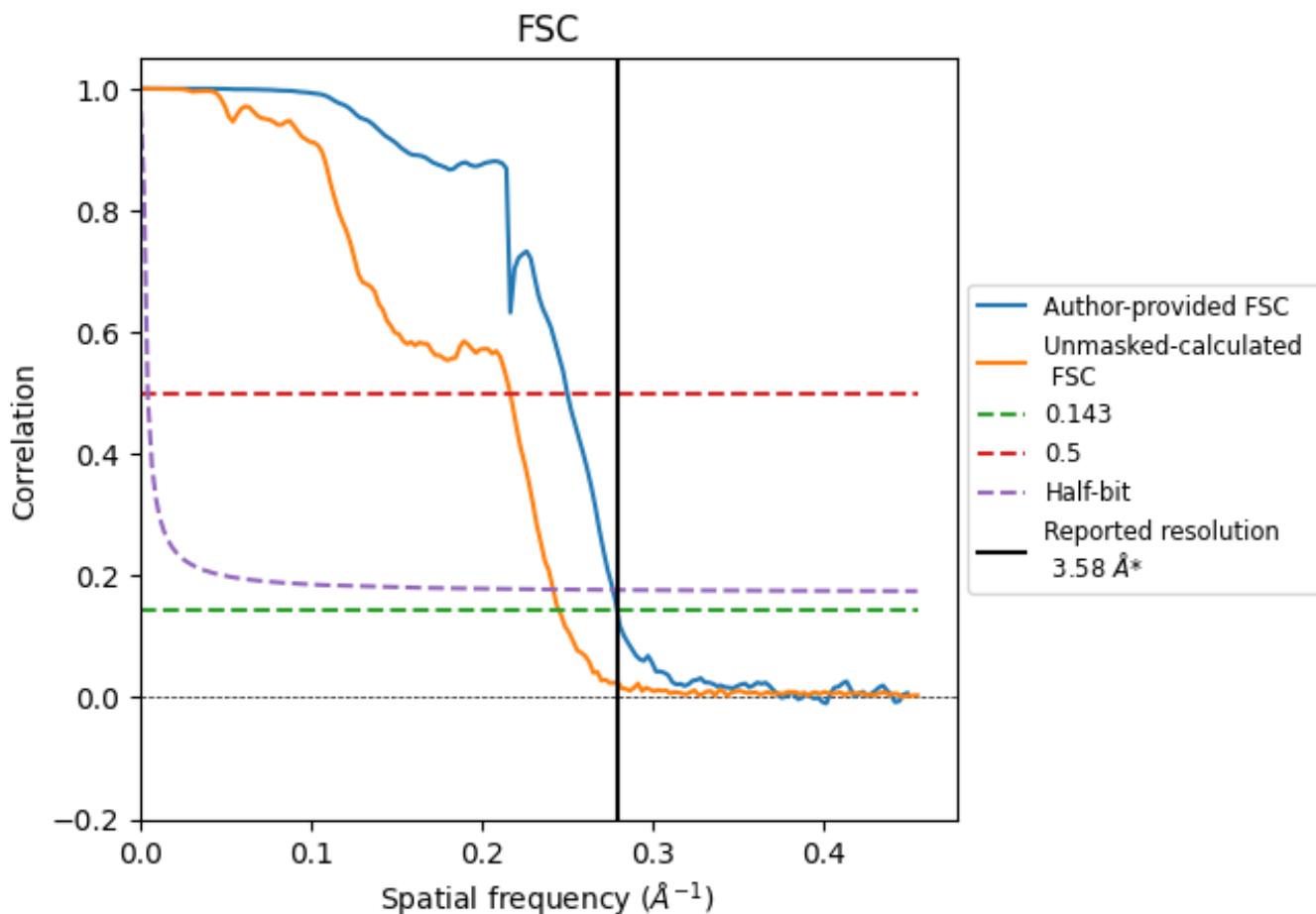
*Reported resolution corresponds to spatial frequency of 0.279 Å^{-1}

8   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.

8.1   FSC ⓘ

*Reported resolution corresponds to spatial frequency of 0.279 Å^{-1}

8.2 Resolution estimates (i)
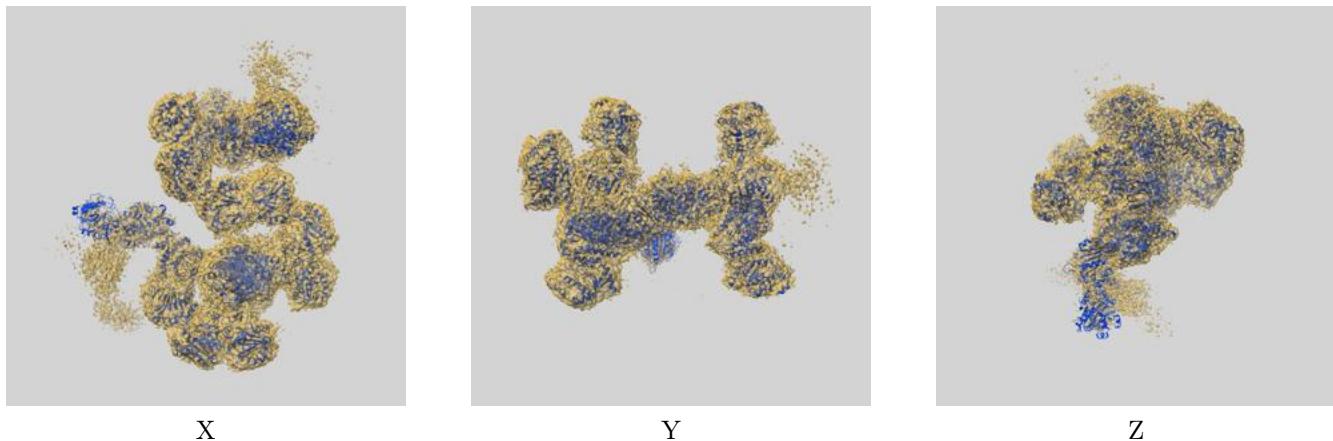
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.58	-	-
Author-provided FSC curve	3.58	4.00	3.62
Unmasked-calculated*	4.08	4.62	4.14

*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 4.08 differs from the reported value 3.58 by more than 10 %

9 Map-model fit ⓘ
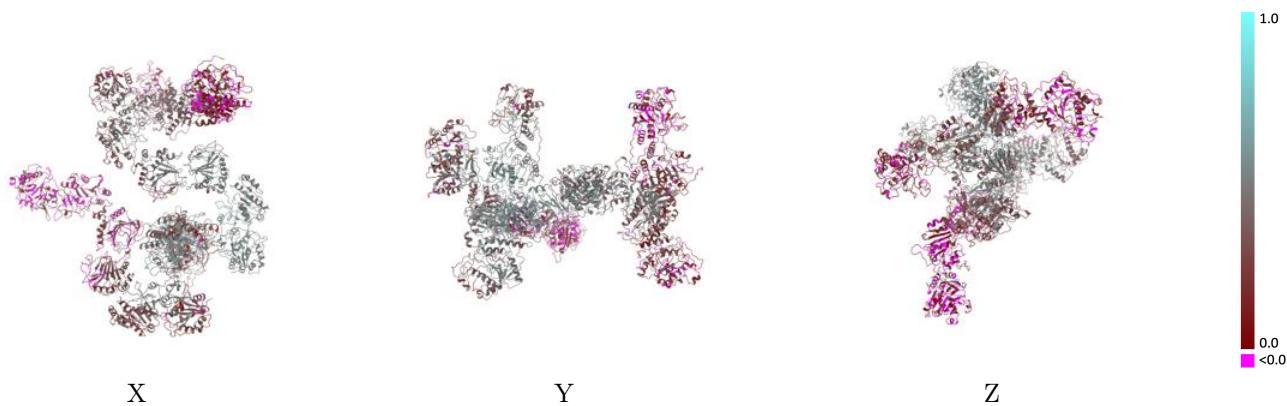
This section contains information regarding the fit between EMDB map EMD-60075 and PDB model 8ZGC. Per-residue inclusion information can be found in section 3 on page 18.

9.1 Map-model overlay ⓘ

X   Y   Z
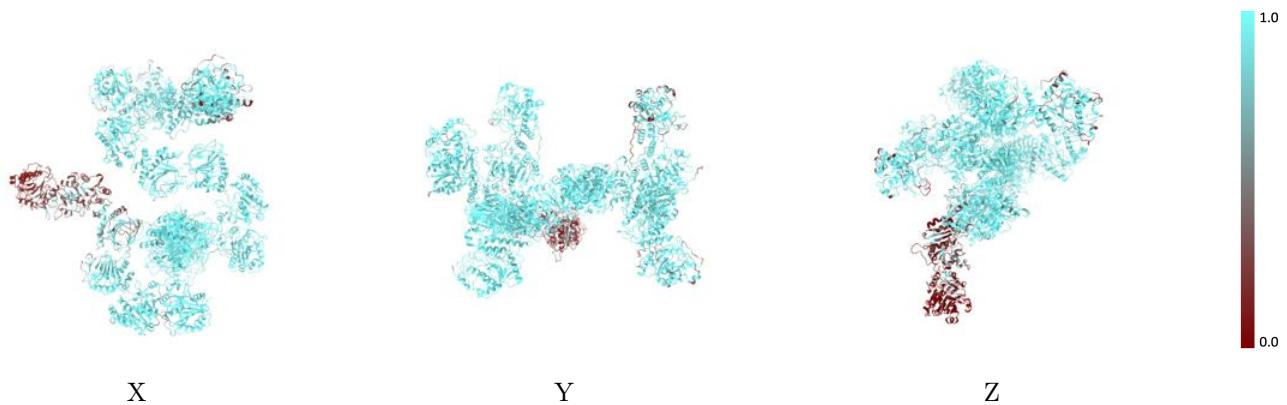
The images above show the 3D surface view of the map at the recommended contour level 0.21 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model ⓘ

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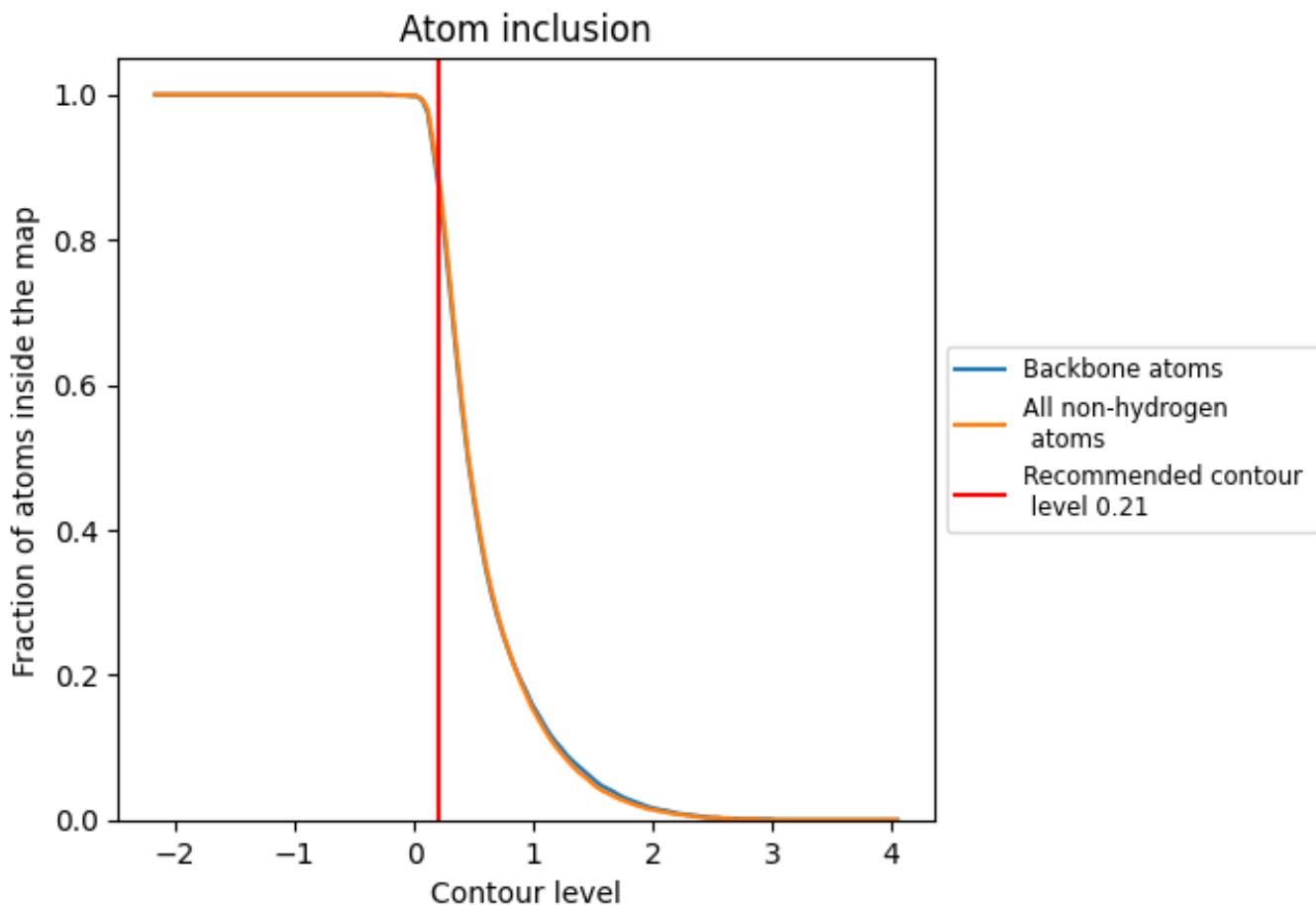
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

9.3 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 (0.21).

9.4 Atom inclusion ⓘ

At the recommended contour level, 87% of all backbone atoms, 88% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.21) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8840	0.3620
A	0.9510	0.3870
B	0.9770	0.5030
C	0.3620	0.0930
D	0.9470	0.3230
E	1.0000	0.5070
F	1.0000	0.5060
U	0.9640	0.4490
V	0.9670	0.4700
W	0.8530	0.1700
X	0.8910	0.2610

1.0

0.0
<0.0