

# Integrative Structure Validation Report

October 09, 2025 - 04:44 PM PDT

*The following software was used in the production of this report:*

*IHMValidation Version 3.0*

*Python-IHM Version 2.5*

*MolProbity Version 4.5.2*

*ATSAS Version 3.2.1 (r14885)*

*PrISM Version dbe5a41*

*PyMOL Version 2.5.0*

PDB ID	9A45   pdb_00009a45
PDB-Dev ID	PDBDEV_00000226
Structure Title	F1N4 fully-glycosylated model of mouse N-cadherin EC1-EC5
Structure Authors	Tsai, Y.-X.; Chang, H.-T.; Wang, Y.-S.; Hsu, M.-F.; Hanus, C.; Sikora, M.; Hsu, S.-T.D.
Deposited on	2023-12-05

*This is a PDB-IHM Structure Validation Report.*

*We welcome your comments at [helpdesk@pdb-ihm.org](mailto:helpdesk@pdb-ihm.org)*

*A user guide is available at [https://pdb-ihm.org/validation\\_help.html](https://pdb-ihm.org/validation_help.html) with specific help available everywhere you see the  symbol.*

*List of references used to build this report is available [here](#).*

## 1. Overview

### 1.1. Summary

*This entry consists of 20 model(s). A total of 2 dataset(s) were used to build this entry.*

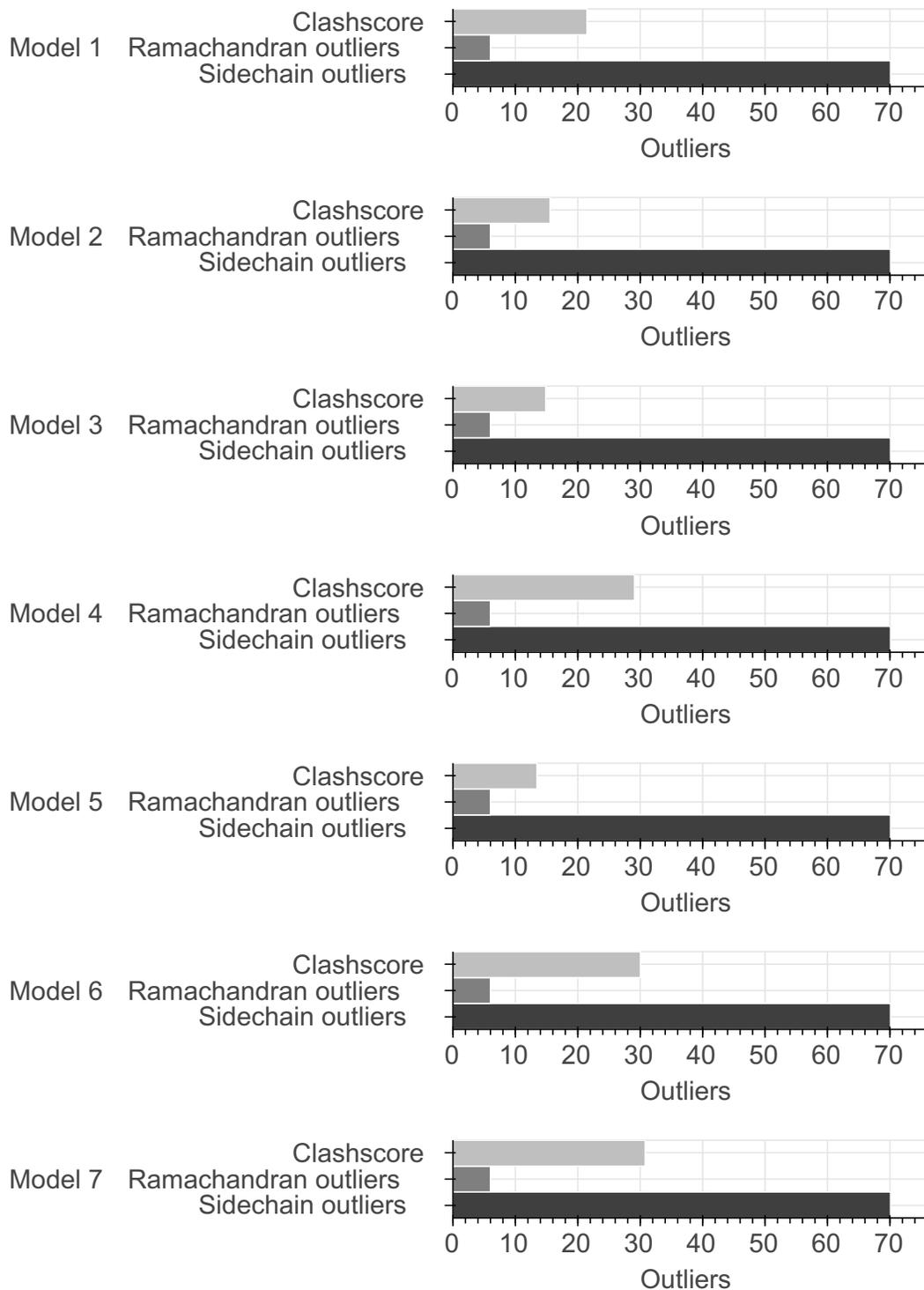
Name	Type	Count
SAS data	Experimental data	1

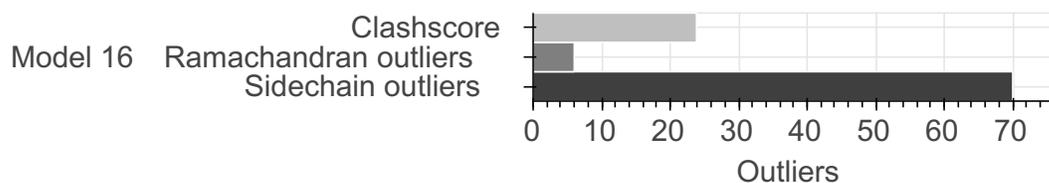
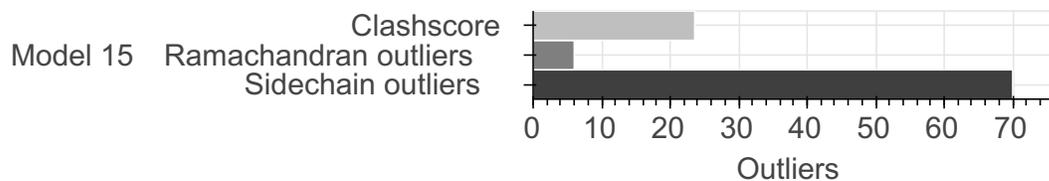
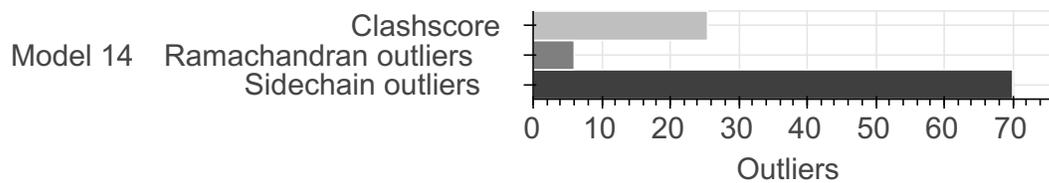
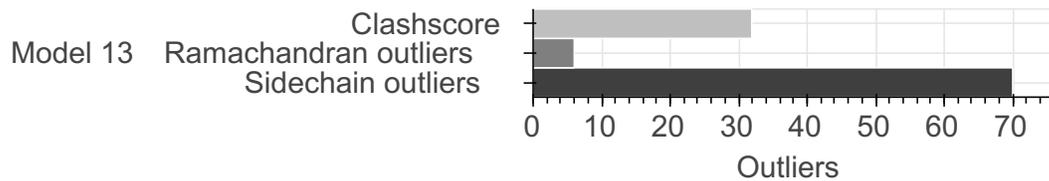
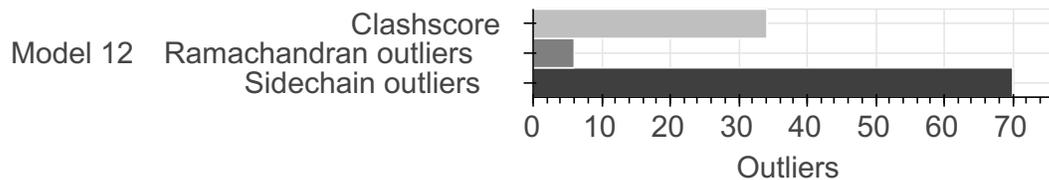
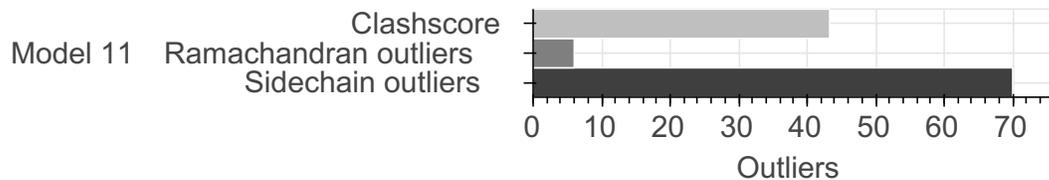
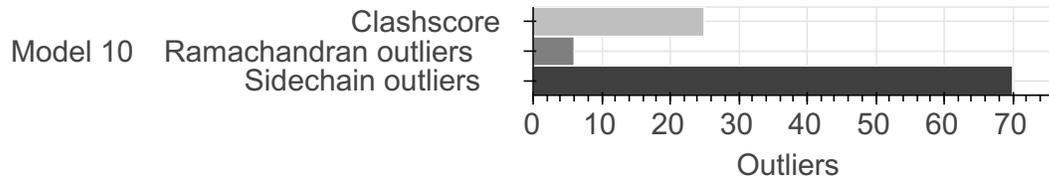
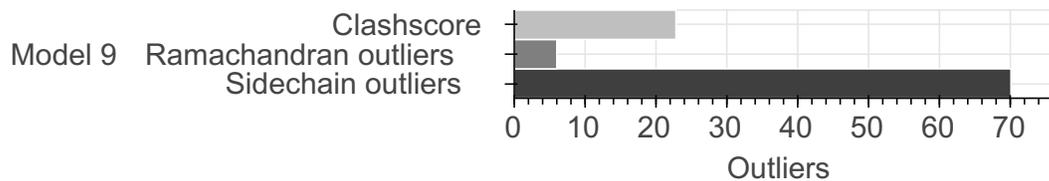
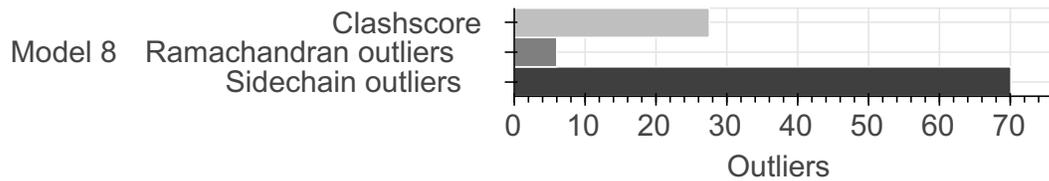
Name	Type	Count
Experimental model	Starting model	1

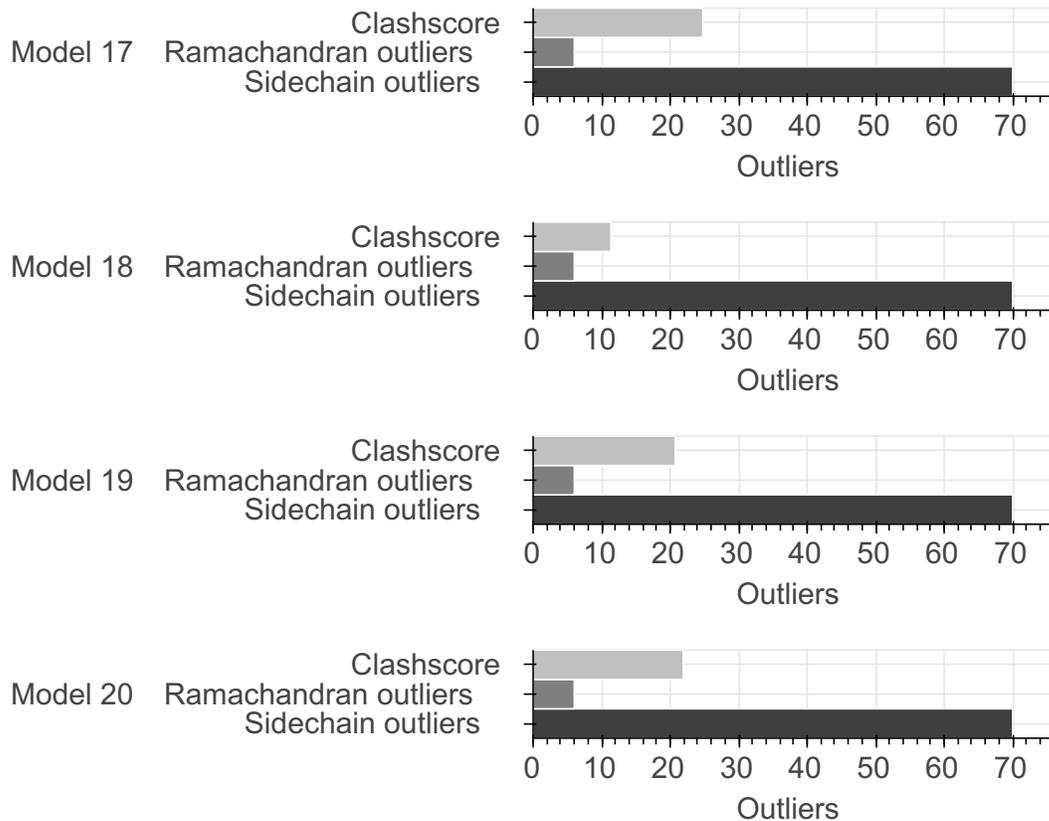
## 1.2. Overall quality ?

This validation report contains model quality assessments for all structures, data quality and fit to model assessments for SAS and crosslinking-MS datasets. Data quality and fit to model assessments for other datasets and model uncertainty are under development. Number of plots is limited to 256.

### Model Quality: MolProbity Analysis ?







## 2. Model Details [?](#)

### 2.1. Ensemble information [?](#)

This entry consists of 1 distinct ensemble(s).

### 2.2. Representation [?](#)

This entry has 1 representation(s).

ID	Model(s)	Entity ID	Molecule name	Chain(s) [auth]	Total residues	Rigid segments	Flexible segments	Model coverage/ Starting model coverage (%)	Scale
1	1-20	1	Cadherin-2	A	541	-	1-541	100.00 / 100.00	Atomic
				B					

ID	Model(s)	Entity ID	Molecule name	Chain(s) [auth]	Total residues	Rigid segments	Flexible segments	Model coverage/ Starting model coverage (%)	Scale
		2	N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose	C	Non-polymeric	-	-	Not available / Not available	Atomic
				D					
				E					
				F					
				G					
				H					
				I					
				J					
				K					
				L					
				M					
				N					
				O					
				P					
			Q						
			R						

### 2.3. Datasets used for modeling

There are 2 unique datasets used to build the models in this entry.

ID	Dataset type	Database name	Data access code
1	SAS data	SASBDB	SASDT35
2	Experimental model	PDB	pdb_00003q2w

### 2.4. Methodology and software

This entry is a result of 1 distinct protocol(s).

Step number	Protocol ID	Method name	Method type	Method description	Number of computed models	Multi state modeling	Multi scale modeling
1	1	Not available	Use GlycoSHIELD, the tool we have developed, to graft MD-simulated glycan ensemble onto the x-ray protein structure (PDB ID: 3Q2W).	Not available	20	False	False

There are 3 software packages reported in this entry.

ID	Software name	Software version	Software classification	Software location
1	<a href="https://github.com/GlycoSHIELD-MD/GlycoSHIELD-MD">GlycoSHIELD</a>	Not available	model building	<a href="https://github.com/GlycoSHIELD-MD/GlycoSHIELD-MD">https://github.com/GlycoSHIELD-MD/GlycoSHIELD-MD</a>
2	<a href="https://www.embl-hamburg.de/biosaxs/gasbor.html">GASBOR</a>	Not available	model building	<a href="https://www.embl-hamburg.de/biosaxs/gasbor.html">https://www.embl-hamburg.de/biosaxs/gasbor.html</a>
3	<a href="https://modbase.compbio.ucsf.edu/foxsdock/">FoXSDock</a>	Not available	data analysis	<a href="https://modbase.compbio.ucsf.edu/foxsdock/">https://modbase.compbio.ucsf.edu/foxsdock/</a>

### 3. Data quality ?

#### 3.1.1. Scattering profile

SAS data used in this integrative model could not be validated as the sasCIF file is currently unavailable or incomplete.

### 4. Model quality ?

For models with atomic structures, MolProbity analysis is performed. For models with coarse-grained or multi-scale structures, excluded volume analysis is performed.

#### 4.1b. MolProbity Analysis ?

Excluded volume satisfaction for the models in the entry are listed below. The Analysed column shows the number of particle-particle or particle-atom pairs for which excluded volume was analysed.

##### Standard geometry: bond outliers ?

There are 1134 bond length outliers in this entry (0.52% of 217350 assessed bonds). A summary is provided below. The output is limited to 100 rows.

Chain	Res	Type	Atoms	Z	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
E	3	BMA	C3-C4	7.41	1.39	1.54	20	1
M	3	BMA	C3-C4	7.41	1.39	1.54	20	1
I	12	FUC	C1-O5	6.89	1.54	1.40	20	2
Q	12	FUC	C1-O5	6.89	1.54	1.40	20	2
D	3	BMA	C2-C3	6.86	1.41	1.54	12	4
L	3	BMA	C2-C3	6.86	1.41	1.54	12	4
F	3	BMA	C2-C3	6.74	1.41	1.54	9	4
N	3	BMA	C2-C3	6.74	1.41	1.54	9	4
C	3	BMA	C2-C3	6.61	1.41	1.54	13	3
K	3	BMA	C2-C3	6.61	1.41	1.54	13	3
Q	5	NAG	C5-O5	6.51	1.54	1.41	7	2
I	5	NAG	C5-O5	6.51	1.54	1.41	7	2
C	8	MAN	C1-O5	6.35	1.53	1.40	5	2
K	8	MAN	C1-O5	6.35	1.53	1.40	5	2
M	8	MAN	C1-O5	6.33	1.53	1.40	3	1

Chain	Res	Type	Atoms	Z	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
E	8	MAN	C1-O5	6.33	1.53	1.40	3	1
I	8	MAN	C1-O5	6.26	1.52	1.40	3	1
Q	8	MAN	C1-O5	6.26	1.52	1.40	3	1
H	8	MAN	C1-O5	6.17	1.52	1.40	3	1
P	8	MAN	C1-O5	6.17	1.52	1.40	3	1
C	5	NAG	C5-O5	6.16	1.54	1.41	17	1
K	5	NAG	C5-O5	6.16	1.54	1.41	17	1
M	6	GAL	C1-O5	6.13	1.53	1.41	6	2
E	6	GAL	C1-O5	6.13	1.53	1.41	6	2
E	11	SIA	C3-C4	6.11	1.40	1.53	18	2
M	11	SIA	C3-C4	6.11	1.40	1.53	18	2
D	8	MAN	C1-O5	6.10	1.52	1.40	4	2
L	8	MAN	C1-O5	6.10	1.52	1.40	4	2
E	11	SIA	C2-O6	6.09	1.35	1.47	19	3
M	11	SIA	C2-O6	6.09	1.35	1.47	19	3
F	7	SIA	C5-C6	6.07	1.43	1.55	10	2
N	7	SIA	C5-C6	6.07	1.43	1.55	10	2
F	8	MAN	C1-O5	6.06	1.52	1.40	3	1
N	8	MAN	C1-O5	6.06	1.52	1.40	3	1
C	7	SIA	C5-C6	6.06	1.43	1.55	14	1
K	7	SIA	C5-C6	6.06	1.43	1.55	14	1
E	5	NAG	C1-C2	6.05	1.41	1.53	14	2
M	5	NAG	C1-C2	6.05	1.41	1.53	14	2
R	7	SIA	C5-C6	6.01	1.43	1.55	9	2
J	7	SIA	C5-C6	6.01	1.43	1.55	9	2
L	7	SIA	C5-C6	5.96	1.43	1.55	13	2
D	7	SIA	C5-C6	5.96	1.43	1.55	13	2
G	7	SIA	C5-C6	5.93	1.44	1.55	15	2
O	7	SIA	C5-C6	5.93	1.44	1.55	15	2
P	7	SIA	C5-C6	5.89	1.44	1.55	18	3
H	7	SIA	C5-C6	5.89	1.44	1.55	18	3
J	9	NAG	C3-C4	5.88	1.41	1.52	11	1
R	9	NAG	C3-C4	5.88	1.41	1.52	11	1
L	5	NAG	C5-O5	5.88	1.53	1.41	16	1
D	5	NAG	C5-O5	5.88	1.53	1.41	16	1

Chain	Res	Type	Atoms	Z	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
Q	1	NAG	C3-C4	5.84	1.41	1.52	7	2
I	1	NAG	C3-C4	5.84	1.41	1.52	7	2
I	7	SIA	C5-C6	5.75	1.44	1.55	14	1
Q	7	SIA	C5-C6	5.75	1.44	1.55	14	1
E	1	NAG	C1-C2	5.74	1.42	1.53	9	1
M	1	NAG	C1-C2	5.74	1.42	1.53	9	1
E	7	SIA	C5-C6	5.73	1.44	1.55	11	1
M	7	SIA	C5-C6	5.73	1.44	1.55	11	1
J	6	GAL	C1-O5	5.68	1.52	1.41	13	3
R	6	GAL	C1-O5	5.68	1.52	1.41	13	3
P	10	GAL	C4-C5	5.67	1.65	1.53	14	4
H	10	GAL	C4-C5	5.67	1.65	1.53	14	4
M	7	SIA	C6-C7	5.67	1.43	1.55	18	1
E	7	SIA	C6-C7	5.67	1.43	1.55	18	1
G	10	GAL	C4-C5	5.66	1.65	1.53	13	5
O	10	GAL	C4-C5	5.66	1.65	1.53	13	5
L	6	GAL	C1-O5	5.66	1.52	1.41	9	2
D	6	GAL	C1-O5	5.66	1.52	1.41	9	2
I	12	FUC	C5-C6	5.66	1.63	1.51	1	2
Q	12	FUC	C5-C6	5.66	1.63	1.51	1	2
F	10	GAL	C4-C5	5.64	1.64	1.53	18	3
N	10	GAL	C4-C5	5.64	1.64	1.53	18	3
P	6	GAL	C1-O5	5.62	1.52	1.41	7	2
H	6	GAL	C1-O5	5.62	1.52	1.41	7	2
N	6	GAL	C1-O5	5.62	1.52	1.41	6	3
F	6	GAL	C1-O5	5.62	1.52	1.41	6	3
G	4	MAN	C1-C2	5.60	1.41	1.53	8	1
O	4	MAN	C1-C2	5.60	1.41	1.53	8	1
I	6	GAL	C1-O5	5.58	1.52	1.41	4	3
Q	6	GAL	C1-O5	5.58	1.52	1.41	4	3
O	3	BMA	C2-C3	5.56	1.43	1.54	18	5
G	3	BMA	C2-C3	5.56	1.43	1.54	18	5
D	4	MAN	C1-C2	5.53	1.42	1.53	14	1
L	4	MAN	C1-C2	5.53	1.42	1.53	14	1
F	9	NAG	C5-O5	5.52	1.52	1.41	3	1

Chain	Res	Type	Atoms	Z	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
N	9	NAG	C5-O5	5.52	1.52	1.41	3	1
J	3	BMA	C2-C3	5.51	1.43	1.54	8	3
R	3	BMA	C2-C3	5.51	1.43	1.54	8	3
C	6	GAL	C1-O5	5.46	1.52	1.41	10	2
K	6	GAL	C1-O5	5.46	1.52	1.41	10	2
J	1	NAG	C3-C4	5.46	1.41	1.52	4	2
R	1	NAG	C3-C4	5.46	1.41	1.52	4	2
F	12	FUC	C5-C6	5.44	1.62	1.51	1	3
N	12	FUC	C5-C6	5.44	1.62	1.51	1	3
C	9	NAG	C4-C5	5.44	1.42	1.53	17	1
K	9	NAG	C4-C5	5.44	1.42	1.53	17	1
I	10	GAL	C4-C5	5.43	1.64	1.53	11	2
Q	10	GAL	C4-C5	5.43	1.64	1.53	11	2
D	9	NAG	C4-C5	5.43	1.42	1.53	16	1
L	9	NAG	C4-C5	5.43	1.42	1.53	16	1

### Standard geometry: angle outliers ?

There are 398 bond angle outliers in this entry (0.14% of 291618 assessed bonds). A summary is provided below. The output is limited to 100 rows.

Chain	Res	Type	Atoms	Z	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
A	501	ASP	N-CA-CB	11.69	90.63	110.50	1	20
B	501	ASP	N-CA-CB	11.69	90.63	110.50	1	20
B	501	ASP	N-CA-C	8.19	133.93	111.00	4	20
A	501	ASP	N-CA-C	8.19	133.93	111.00	1	20
J	2	NAG	C5-C4-O4	5.94	93.87	111.70	14	2
R	2	NAG	C5-C4-O4	5.94	93.87	111.70	14	2
I	12	FUC	C2-C3-O3	5.90	125.17	107.47	17	1
Q	12	FUC	C2-C3-O3	5.90	125.17	107.47	17	1
C	5	NAG	C3-C4-O4	5.56	123.97	107.29	20	1
K	5	NAG	C3-C4-O4	5.56	123.97	107.29	20	1
P	5	NAG	C3-C4-O4	5.49	123.77	107.29	11	1
H	5	NAG	C3-C4-O4	5.49	123.77	107.29	11	1
L	5	NAG	C3-C4-O4	5.46	123.68	107.29	19	1
D	5	NAG	C3-C4-O4	5.46	123.68	107.29	19	1
G	5	NAG	C3-C4-O4	5.46	123.66	107.29	9	1

Chain	Res	Type	Atoms	Z	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
O	5	NAG	C3-C4-O4	5.46	123.66	107.29	9	1
F	5	NAG	C3-C4-O4	5.38	123.44	107.29	14	1
N	5	NAG	C3-C4-O4	5.38	123.44	107.29	14	1
H	9	NAG	C3-C4-O4	5.33	123.29	107.29	18	1
P	9	NAG	C3-C4-O4	5.33	123.29	107.29	18	1
E	9	NAG	C3-C4-O4	5.29	123.17	107.29	11	1
M	9	NAG	C3-C4-O4	5.29	123.17	107.29	11	1
I	9	NAG	C3-C4-O4	5.18	122.84	107.29	14	2
Q	9	NAG	C3-C4-O4	5.18	122.84	107.29	14	2
O	9	NAG	C3-C4-O4	5.09	122.56	107.29	15	2
G	9	NAG	C3-C4-O4	5.09	122.56	107.29	15	2
H	6	GAL	C2-C1-O5	4.93	95.24	110.03	10	1
P	6	GAL	C2-C1-O5	4.93	95.24	110.03	10	1
C	6	GAL	C2-C1-O5	4.91	95.29	110.03	19	1
K	6	GAL	C2-C1-O5	4.91	95.29	110.03	19	1
F	6	GAL	C2-C1-O5	4.89	95.36	110.03	13	1
N	6	GAL	C2-C1-O5	4.89	95.36	110.03	13	1
D	3	BMA	C1-O5-C5	4.86	104.23	118.82	15	1
L	3	BMA	C1-O5-C5	4.86	104.23	118.82	15	1
L	6	GAL	C2-C1-O5	4.85	95.47	110.03	18	1
D	6	GAL	C2-C1-O5	4.85	95.47	110.03	18	1
R	3	BMA	C3-C4-O4	4.85	120.33	105.79	5	1
J	3	BMA	C3-C4-O4	4.85	120.33	105.79	5	1
Q	3	BMA	C1-O5-C5	4.82	104.37	118.82	6	1
I	3	BMA	C1-O5-C5	4.82	104.37	118.82	6	1
Q	6	GAL	C2-C1-O5	4.81	95.60	110.03	9	1
I	6	GAL	C2-C1-O5	4.81	95.60	110.03	9	1
C	7	SIA	C5-C4-O4	4.78	121.22	106.87	20	1
K	7	SIA	C5-C4-O4	4.78	121.22	106.87	20	1
C	6	GAL	C4-C3-O3	4.78	98.92	113.26	10	1
K	6	GAL	C4-C3-O3	4.78	98.92	113.26	10	1
D	7	SIA	C5-C4-O4	4.76	121.14	106.87	19	1
L	7	SIA	C5-C4-O4	4.76	121.14	106.87	19	1
M	4	MAN	C3-C4-O4	4.75	121.32	107.06	14	2
E	4	MAN	C3-C4-O4	4.75	121.32	107.06	14	2

Chain	Res	Type	Atoms	Z	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
C	3	BMA	C1-O5-C5	4.74	104.59	118.82	16	1
K	3	BMA	C1-O5-C5	4.74	104.59	118.82	16	1
E	4	MAN	C1-O5-C5	4.71	101.69	115.81	1	1
M	4	MAN	C1-O5-C5	4.71	101.69	115.81	1	1
R	12	FUC	C2-C3-O3	4.69	121.54	107.47	19	1
J	12	FUC	C2-C3-O3	4.69	121.54	107.47	19	1
D	6	GAL	C4-C3-O3	4.68	99.22	113.26	9	1
L	6	GAL	C4-C3-O3	4.68	99.22	113.26	9	1
J	1	NAG	C5-C6-O6	4.68	95.74	109.77	6	1
R	1	NAG	C5-C6-O6	4.68	95.74	109.77	6	1
F	6	GAL	C4-C3-O3	4.67	99.26	113.26	6	1
N	6	GAL	C4-C3-O3	4.67	99.26	113.26	6	1
O	4	MAN	C1-O5-C5	4.67	101.81	115.81	1	1
G	4	MAN	C1-O5-C5	4.67	101.81	115.81	1	1
H	7	SIA	C5-C4-O4	4.66	120.86	106.87	11	1
P	7	SIA	C5-C4-O4	4.66	120.86	106.87	11	1
R	3	BMA	C1-C2-O2	4.65	122.36	108.40	16	2
J	3	BMA	C1-C2-O2	4.65	122.36	108.40	16	2
M	6	GAL	C4-C3-O3	4.65	99.31	113.26	6	1
E	6	GAL	C4-C3-O3	4.65	99.31	113.26	6	1
H	6	GAL	C4-C3-O3	4.63	99.37	113.26	7	1
P	6	GAL	C4-C3-O3	4.63	99.37	113.26	7	1
Q	6	GAL	C4-C3-O3	4.62	99.40	113.26	4	1
I	6	GAL	C4-C3-O3	4.62	99.40	113.26	4	1
E	3	BMA	C2-C3-O3	4.62	120.53	106.67	17	1
M	3	BMA	C2-C3-O3	4.62	120.53	106.67	17	1
G	7	SIA	C5-C4-O4	4.62	120.72	106.87	9	1
O	7	SIA	C5-C4-O4	4.62	120.72	106.87	9	1
F	7	SIA	C5-C4-O4	4.61	120.70	106.87	14	1
N	7	SIA	C5-C4-O4	4.61	120.70	106.87	14	1
J	6	GAL	C2-C3-O3	4.61	121.32	107.49	18	1
R	6	GAL	C2-C3-O3	4.61	121.32	107.49	18	1
I	4	MAN	C1-O5-C5	4.60	102.02	115.81	1	1
Q	4	MAN	C1-O5-C5	4.60	102.02	115.81	1	1
P	11	SIA	C1-C2-O6	4.59	122.77	109.00	13	1

Chain	Res	Type	Atoms	Z	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
H	11	SIA	C1-C2-O6	4.59	122.77	109.00	13	1
N	4	MAN	C1-O5-C5	4.59	102.05	115.81	1	1
F	4	MAN	C1-O5-C5	4.59	102.05	115.81	1	1
F	10	GAL	C2-C1-O5	4.58	96.29	110.03	9	1
N	10	GAL	C2-C1-O5	4.58	96.29	110.03	9	1
H	4	MAN	C1-O5-C5	4.56	102.13	115.81	1	1
P	4	MAN	C1-O5-C5	4.56	102.13	115.81	1	1
Q	11	SIA	C1-C2-O6	4.55	122.64	109.00	11	1
I	11	SIA	C1-C2-O6	4.55	122.64	109.00	11	1
E	3	BMA	C3-C4-O4	4.54	119.41	105.79	19	1
M	3	BMA	C3-C4-O4	4.54	119.41	105.79	19	1
J	10	GAL	C3-C4-O4	4.54	122.22	108.61	20	1
R	10	GAL	C3-C4-O4	4.54	122.22	108.61	20	1
C	4	MAN	C1-O5-C5	4.54	102.20	115.81	1	1
K	4	MAN	C1-O5-C5	4.54	102.20	115.81	1	1

#### Too-close contacts

The following all-atom clashscore is based on a MolProbity analysis. All-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The table below contains clashscores for all atomic models in this entry.

Model ID	Clash score	Number of clashes
1	21.44	260
2	15.52	188
3	14.84	180
4	29.05	352
5	13.45	163
6	29.99	364
7	30.76	373
8	27.51	334
9	22.79	276
10	24.96	303
11	43.28	524
12	34.13	414
13	31.91	387
14	25.47	309
15	23.58	286
16	23.84	290

Model ID	Clash score	Number of clashes
17	24.76	301
18	11.35	138
19	20.74	252
20	21.90	266

There are 5960 clashes. The table below contains the detailed list of all clashes based on a MolProbity analysis. Bad clashes are  $\geq 0.4$  Angstrom. The output is limited to 100 rows.

Atom 1	Atom 2	Clash(Å)	Model ID (Worst)	Models (Total)
A:240:ILE:HB	F:10:GAL:C4	1.63	16	2
B:240:ILE:HB	N:10:GAL:C4	1.63	16	2
B:498:LEU:CD2	P:1:NAG:C	1.63	7	1
A:498:LEU:CD2	H:1:NAG:C	1.62	7	1
B:382:ALA:HA	R:7:SIA:CT	1.62	17	1
A:382:ALA:HA	J:7:SIA:CT	1.62	17	1
A:431:THR:HG23	G:11:SIA:C4	1.62	8	2
A:498:LEU:HD21	H:1:NAG:C6	1.62	8	1
A:148:ARG:CB	E:1:NAG:H3	1.61	4	1
B:498:LEU:HD21	P:1:NAG:C6	1.61	8	1
A:413:ASN:HD21	G:1:NAG:C	1.61	18	5
B:148:ARG:CB	M:1:NAG:H3	1.61	4	1
A:533:ILE:HD12	J:11:SIA:C4	1.60	12	1
B:533:ILE:HD12	R:11:SIA:C4	1.60	12	1
B:379:SER:HB3	O:12:FUC:C2	1.59	6	1
A:431:THR:CG2	G:11:SIA:H4	1.59	8	2
A:379:SER:HB3	G:12:FUC:C2	1.59	6	1
B:498:LEU:CD2	P:1:NAG:H61	1.58	8	1
A:148:ARG:HB3	E:1:NAG:C5	1.58	4	1
B:148:ARG:HB3	M:1:NAG:C5	1.58	4	1
A:148:ARG:HB2	E:1:NAG:C3	1.58	4	1
A:498:LEU:CD2	H:1:NAG:H61	1.58	8	1
A:433:GLN:CD	G:12:FUC:C5	1.57	7	1
B:433:GLN:CD	O:12:FUC:C5	1.57	7	1
A:491:ARG:CD	I:10:GAL:H2	1.57	6	1
A:445:GLN:HG2	J:11:SIA:C5	1.57	17	1
B:148:ARG:HB2	M:1:NAG:C3	1.57	4	1
B:491:ARG:HD2	Q:10:GAL:C2	1.57	6	2

Atom 1	Atom 2	Clash(Å)	Model ID (Worst)	Models (Total)
A:110:HIS:CB	D:12:FUC:H2	1.57	12	1
B:110:HIS:CB	L:12:FUC:H2	1.57	12	1
B:445:GLN:CG	R:1:NAG:C6	1.57	13	2
A:491:ARG:HD2	I:10:GAL:C2	1.57	6	2
B:491:ARG:CD	Q:10:GAL:H2	1.57	6	1
B:445:GLN:HG2	R:11:SIA:C5	1.57	17	1
A:445:GLN:CG	J:1:NAG:C6	1.56	13	2
A:445:GLN:HG2	J:1:NAG:C3	1.56	14	1
B:240:ILE:CD1	N:11:SIA:H6	1.56	12	1
B:445:GLN:HG2	R:1:NAG:C3	1.56	14	1
A:445:GLN:HB3	J:12:FUC:C3	1.56	1	1
A:240:ILE:CD1	F:11:SIA:H6	1.56	12	1
B:239:VAL:CG1	N:11:SIA:CT	1.55	10	1
B:445:GLN:HB3	R:12:FUC:C3	1.55	1	1
A:460:ASN:ND2	H:1:NAG:CT	1.55	17	4
A:240:ILE:HG22	F:1:NAG:C	1.55	14	2
B:460:ASN:ND2	P:1:NAG:CT	1.55	17	4
A:163:THR:HG22	E:11:SIA:CT	1.55	20	1
B:240:ILE:HG22	N:1:NAG:C	1.54	14	2
B:166:ASN:HD22	M:1:NAG:C1	1.54	1	9
A:166:ASN:HD22	E:1:NAG:C1	1.54	1	9
A:433:GLN:CG	G:12:FUC:C3	1.53	7	1
B:433:GLN:CG	O:12:FUC:C3	1.53	7	1
B:112:VAL:CG1	L:1:NAG:H4	1.53	12	1
A:112:VAL:CG1	D:1:NAG:H4	1.53	12	1
B:491:ARG:HD2	Q:10:GAL:C3	1.52	6	2
A:491:ARG:HD2	I:10:GAL:C3	1.52	6	2
A:461:SER:CA	H:1:NAG:CT	1.52	12	1
A:379:SER:HB3	G:12:FUC:C1	1.51	6	1
B:379:SER:HB3	O:12:FUC:C1	1.51	6	1
B:433:GLN:CG	O:12:FUC:H3	1.51	7	1
A:240:ILE:HD13	F:11:SIA:C6	1.51	12	1
B:517:GLU:C	R:11:SIA:CT	1.50	1	1
A:433:GLN:CG	G:12:FUC:H3	1.50	7	1
A:517:GLU:C	J:11:SIA:CT	1.50	1	1

Atom 1	Atom 2	Clash(Å)	Model ID (Worst)	Models (Total)
B:240:ILE:HD13	N:11:SIA:C6	1.50	12	1
B:243:ASN:ND2	N:1:NAG:C1	1.50	3	10
A:445:GLN:HG3	J:12:FUC:C2	1.50	1	1
B:184:GLN:HA	L:11:SIA:C	1.50	2	1
A:243:ASN:ND2	F:1:NAG:C1	1.50	3	10
A:184:GLN:HA	D:11:SIA:C	1.50	2	1
B:445:GLN:HG3	R:12:FUC:C2	1.49	1	1
B:148:ARG:CB	M:1:NAG:C3	1.49	4	1
A:445:GLN:CG	J:12:FUC:C3	1.49	1	1
B:445:GLN:CG	R:12:FUC:C3	1.49	1	1
A:148:ARG:CB	E:1:NAG:C3	1.49	4	1
A:459:PRO:CG	H:9:NAG:CT	1.48	11	1
B:459:PRO:CG	P:9:NAG:CT	1.48	11	1
A:433:GLN:HG3	G:12:FUC:C3	1.48	7	1
A:445:GLN:HE22	J:1:NAG:C1	1.48	12	2
B:445:GLN:HE22	R:1:NAG:C1	1.48	12	2
A:445:GLN:CG	J:1:NAG:H4	1.48	14	1
B:433:GLN:HG3	O:12:FUC:C3	1.47	7	1
B:445:GLN:CG	R:1:NAG:H4	1.47	14	1
B:185:GLN:NE2	L:12:FUC:C2	1.47	11	1
A:185:GLN:NE2	D:12:FUC:C2	1.47	11	1
B:112:VAL:HG11	L:1:NAG:C4	1.45	12	1
B:240:ILE:CG2	N:10:GAL:O3	1.45	16	1
A:435:TYR:CZ	G:2:NAG:H61	1.45	16	1
A:240:ILE:CG2	F:10:GAL:O3	1.45	16	1
B:435:TYR:CZ	O:2:NAG:H61	1.45	16	1
A:530:LYS:NZ	J:2:NAG:C1	1.45	7	1
B:463:ASN:HD22	P:1:NAG:C1	1.45	13	5
A:112:VAL:HG11	D:1:NAG:C4	1.45	12	1
A:504:GLN:CA	H:1:NAG:CT	1.45	18	1
A:463:ASN:HD22	H:1:NAG:C1	1.45	13	5
B:530:LYS:NZ	R:2:NAG:C1	1.45	7	1
A:459:PRO:HG2	H:9:NAG:CT	1.45	11	1
A:148:ARG:CB	E:1:NAG:C4	1.45	4	2
B:148:ARG:CB	M:1:NAG:C4	1.45	4	2

Atom 1	Atom 2	Clash(Å)	Model ID (Worst)	Models (Total)
B:239:VAL:HG12	N:11:SIA:CT	1.45	10	1
B:459:PRO:HG2	P:9:NAG:CT	1.44	11	1

### Torsion angles: Protein backbone ?

In the following table, Ramachandran outliers are listed. The Analysed column shows the number of residues for which the backbone conformation was analysed.

Model ID	Analysed	Favored	Allowed	Outliers
1	1074	982	86	6
2	1074	982	86	6
3	1074	982	86	6
4	1074	982	86	6
5	1074	982	86	6
6	1074	982	86	6
7	1074	982	86	6
8	1074	982	86	6
9	1074	982	86	6
10	1074	982	86	6
11	1074	982	86	6
12	1074	982	86	6
13	1074	982	86	6
14	1074	982	86	6
15	1074	982	86	6
16	1074	982	86	6
17	1074	982	86	6
18	1074	982	86	6
19	1074	982	86	6
20	1074	982	86	6

There are 6 unique backbone outliers. Detailed list of outliers are tabulated below.

Chain	Res	Type	Models (Total)
A	342	PRO	20
A	500	GLY	20
A	501	ASP	20
B	342	PRO	20
B	500	GLY	20
B	501	ASP	20

### Torsion angles : Protein sidechains

In the following table, sidechain rotameric outliers are listed. The Analysed column shows the number of residues for which the sidechain conformation was analysed.

Model ID	Analysed	Favored	Allowed	Outliers
1	942	750	122	70
2	942	750	122	70
3	942	750	122	70
4	942	750	122	70
5	942	750	122	70
6	942	750	122	70
7	942	750	122	70
8	942	750	122	70
9	942	750	122	70
10	942	750	122	70
11	942	750	122	70
12	942	750	122	70
13	942	750	122	70
14	942	750	122	70
15	942	750	122	70
16	942	750	122	70
17	942	750	122	70
18	942	750	122	70
19	942	750	122	70
20	942	750	122	70

There are 70 unique sidechain outliers. Detailed list of outliers are tabulated below.

Chain	Res	Type	Models (Total)
A	4	ILE	20
A	22	VAL	20
A	24	ILE	20
A	28	ARG	20
A	31	ASN	20
A	38	VAL	20
A	60	LEU	20
A	62	VAL	20
A	81	VAL	20
A	83	ILE	20

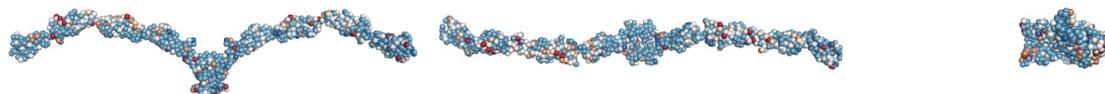
Chain	Res	Type	Models (Total)
A	94	ILE	20
A	98	VAL	20
A	131	THR	20
A	145	LEU	20
A	180	ARG	20
A	208	THR	20
A	227	THR	20
A	234	GLU	20
A	237	VAL	20
A	269	THR	20
A	271	ARG	20
A	286	THR	20
A	291	ILE	20
A	301	LEU	20
A	325	VAL	20
A	338	PHE	20
A	348	GLU	20
A	373	ILE	20
A	403	GLU	20
A	409	ASN	20
A	465	THR	20
A	482	LEU	20
A	499	ASN	20
A	507	LEU	20
A	515	ILE	20
B	4	ILE	20
B	22	VAL	20
B	24	ILE	20
B	28	ARG	20
B	31	ASN	20
B	38	VAL	20
B	60	LEU	20
B	62	VAL	20
B	81	VAL	20
B	83	ILE	20

Chain	Res	Type	Models (Total)
B	94	ILE	20
B	98	VAL	20
B	131	THR	20
B	145	LEU	20
B	180	ARG	20
B	208	THR	20
B	227	THR	20
B	234	GLU	20
B	237	VAL	20
B	269	THR	20
B	271	ARG	20
B	286	THR	20
B	291	ILE	20
B	301	LEU	20
B	325	VAL	20
B	338	PHE	20
B	348	GLU	20
B	373	ILE	20
B	403	GLU	20
B	409	ASN	20
B	465	THR	20
B	482	LEU	20
B	499	ASN	20
B	507	LEU	20
B	515	ILE	20

## 4.2. PrISM Precision Analysis

Regions of **low**  **high** precision, defined as the variability among the models that satisfy the input data and calculated as the density-weighted root mean-square fluctuation (RMSF) from the bead/atom center of density, annotated and visualized using PrISM. The per-bead precision is computed from the deposited ensemble of superposed integrative models. High- and low-precision regions are then determined by clustering beads of similar precision based on their proximity in the structure. Only coarse-grained beads (or CA atoms for atomic models) of deposited models are used for assessment and visualization, and three projections for each representative model are generated.

PrISM analysis for Ensemble 1 (models deposited/total: 20/20).



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## 5. Fit to Data Used for Modeling Assessment ?

SAS data used in this integrative model could not be validated as the sasCIF file is currently unavailable or incomplete.

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## 6. Fit to Data Used for Validation Assessment ?

Validation for this section is under development.

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