



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 09:29 AM UTC

PDB ID : 4BQ6 / pdb_00004bq6
Title : Crystal structure of the RGMB-NEO1 complex form 1
Authors : Bell, C.H.; Healey, E.; van Erp, S.; Bishop, B.; Tang, C.; Gilbert, R.J.C.; Aricescu, A.R.; Pasterkamp, R.J.; Siebold, C.
Deposited on : 2013-05-30
Resolution : 2.30 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

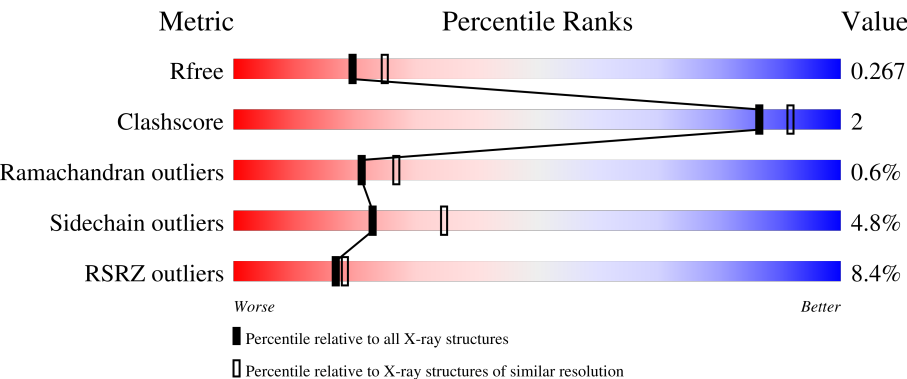
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R _{free}	180053	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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

Mol	Chain	Length	Quality of chain
1	A	264	5% 68% 8% .. 22%
1	B	264	8% 67% 9% . 22%
2	C	122	6% 11% .. 88%
2	E	122	3% 11% .. 87%
3	D	251	3% 52% 5% . 41%

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Mol	Chain	Length	Quality of chain
3	F	251	 A horizontal bar chart showing the quality of chain F. The bar is divided into four segments: a small red segment at the beginning labeled '3%', followed by a long green segment labeled '53%', a small yellow segment labeled '5%', and a long grey segment at the end labeled '41%'. The segments are separated by thin black lines.

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 6132 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 NEOGENIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	205	Total	C	N	O	S	0	0	0
			1611	1027	273	305	6			
1	B	205	Total	C	N	O	S	0	0	0
			1611	1027	273	305	6			

There are 26 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	880	GLU	-	expression tag	UNP P97798
A	881	THR	-	expression tag	UNP P97798
A	882	GLY	-	expression tag	UNP P97798
A	1134	ASN	-	expression tag	UNP P97798
A	1135	GLY	-	expression tag	UNP P97798
A	1136	THR	-	expression tag	UNP P97798
A	1137	LYS	-	expression tag	UNP P97798
A	1138	HIS	-	expression tag	UNP P97798
A	1139	HIS	-	expression tag	UNP P97798
A	1140	HIS	-	expression tag	UNP P97798
A	1141	HIS	-	expression tag	UNP P97798
A	1142	HIS	-	expression tag	UNP P97798
A	1143	HIS	-	expression tag	UNP P97798
B	880	GLU	-	expression tag	UNP P97798
B	881	THR	-	expression tag	UNP P97798
B	882	GLY	-	expression tag	UNP P97798
B	1134	ASN	-	expression tag	UNP P97798
B	1135	GLY	-	expression tag	UNP P97798
B	1136	THR	-	expression tag	UNP P97798
B	1137	LYS	-	expression tag	UNP P97798
B	1138	HIS	-	expression tag	UNP P97798
B	1139	HIS	-	expression tag	UNP P97798
B	1140	HIS	-	expression tag	UNP P97798
B	1141	HIS	-	expression tag	UNP P97798
B	1142	HIS	-	expression tag	UNP P97798

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1143	HIS	-	expression tag	UNP P97798

- Molecule 2 is a protein called RGM DOMAIN FAMILY MEMBER B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	15	Total	C	N	O	S	0	0	0
			118	79	16	21	2			
2	E	16	Total	C	N	O	S	0	0	0
			128	85	19	22	2			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	47	GLU	-	expression tag	UNP Q6NW40
C	48	THR	-	expression tag	UNP Q6NW40
C	49	GLY	-	expression tag	UNP Q6NW40
E	47	GLU	-	expression tag	UNP Q6NW40
E	48	THR	-	expression tag	UNP Q6NW40
E	49	GLY	-	expression tag	UNP Q6NW40

- Molecule 3 is a protein called RGM DOMAIN FAMILY MEMBER B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	D	148	Total 1148	C 721	N 197	O 223	S 7	0	0	0
3	F	149	Total 1159	C 727	N 201	O 224	S 7	0	0	0

There are 20 discrepancies between the modelled and reference sequences:

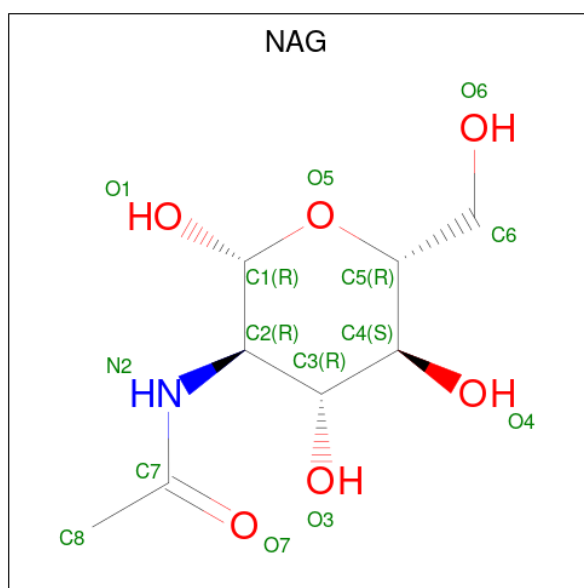
Chain	Residue	Modelled	Actual	Comment	Reference
D	411	GLY	-	expression tag	UNP Q6NW40
D	412	THR	-	expression tag	UNP Q6NW40
D	413	LYS	-	expression tag	UNP Q6NW40
D	414	HIS	-	expression tag	UNP Q6NW40
D	415	HIS	-	expression tag	UNP Q6NW40
D	416	HIS	-	expression tag	UNP Q6NW40
D	417	HIS	-	expression tag	UNP Q6NW40
D	418	HIS	-	expression tag	UNP Q6NW40
D	419	HIS	-	expression tag	UNP Q6NW40
D	225	GLY	GLU	conflict	UNP Q6NW40
F	411	GLY	-	expression tag	UNP Q6NW40

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Chain	Residue	Modelled	Actual	Comment	Reference
F	412	THR	-	expression tag	UNP Q6NW40
F	413	LYS	-	expression tag	UNP Q6NW40
F	414	HIS	-	expression tag	UNP Q6NW40
F	415	HIS	-	expression tag	UNP Q6NW40
F	416	HIS	-	expression tag	UNP Q6NW40
F	417	HIS	-	expression tag	UNP Q6NW40
F	418	HIS	-	expression tag	UNP Q6NW40
F	419	HIS	-	expression tag	UNP Q6NW40
F	225	GLY	GLU	conflict	UNP Q6NW40

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	119	Total	O	0	0
			119	119		
5	B	98	Total	O	0	0
			98	98		

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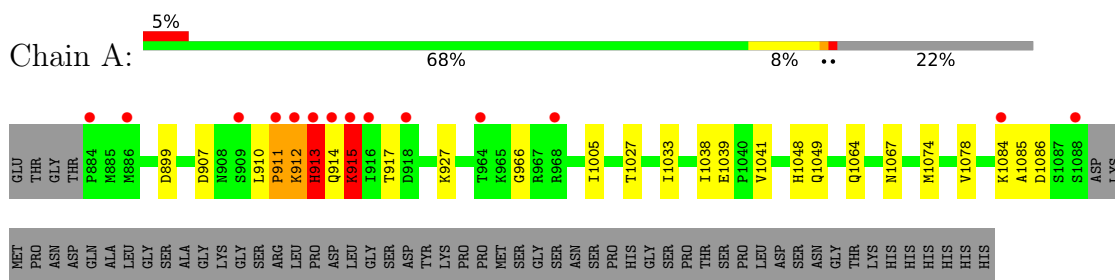
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	C	45	Total 45	O 45	0	0
5	D	67	Total 67	O 67	0	0

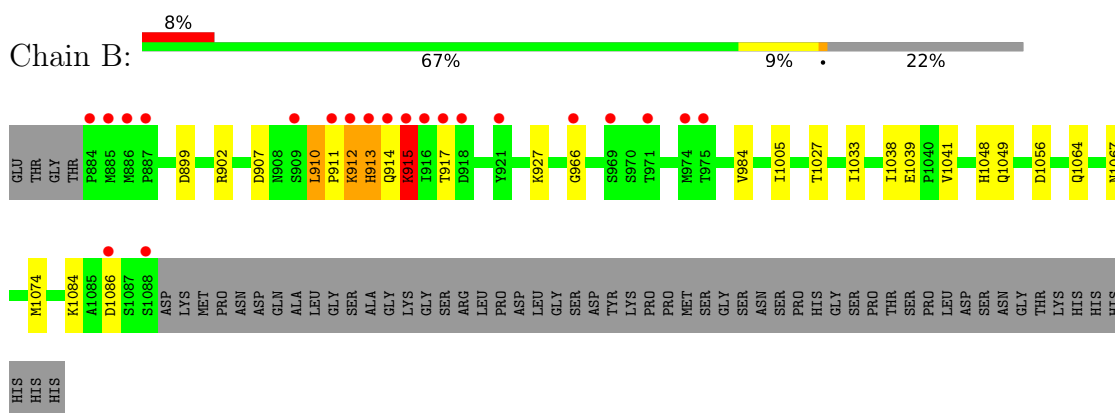
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron 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 dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). 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.

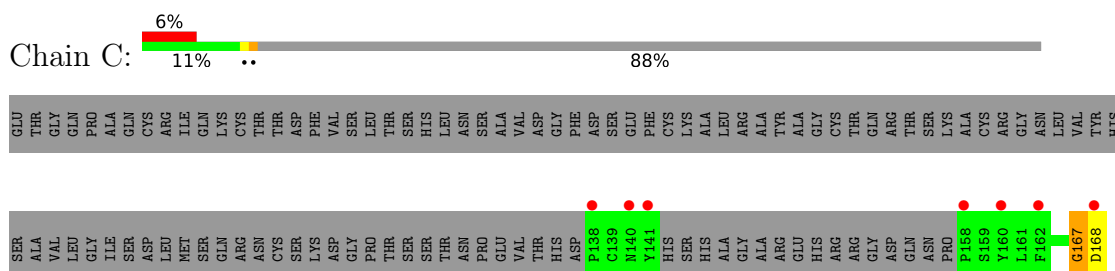
• Molecule 1: NEOGENIN



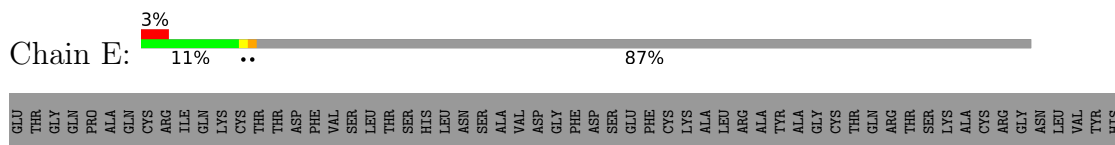
• Molecule 1: NEOGENIN

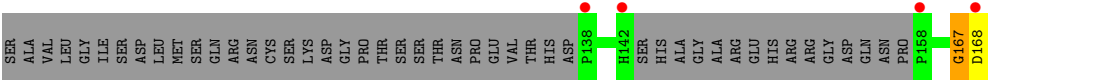


• Molecule 2: RGM DOMAIN FAMILY MEMBER B

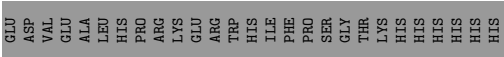
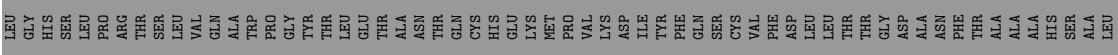


• Molecule 2: RGM DOMAIN FAMILY MEMBER B

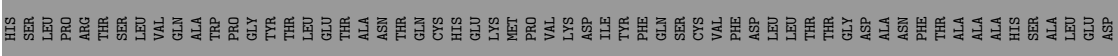




● Molecule 3: RGM DOMAIN FAMILY MEMBER B



● Molecule 3: RGM DOMAIN FAMILY MEMBER B



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	91.32Å 100.39Å 103.69Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.30 30.00 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.4 (30.00-2.30) 99.3 (30.00-2.30)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.50 (at 2.25Å)	Xtriage
Refinement program	BUSTER 2.11.2	Depositor
R, R_{free}	0.218 , 0.267 0.221 , 0.267	Depositor DCC
R_{free} test set	2287 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	43.6	Xtriage
Anisotropy	0.030	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 58.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.024 for -h,l,k	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6132	wwPDB-VP
Average B, all atoms (Å ²)	52.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 54.22 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 3.7690e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

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

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	0.85	0/1655	1.19	13/2261 (0.6%)
1	B	0.82	1/1655 (0.1%)	1.19	10/2261 (0.4%)
2	C	0.67	0/122	1.84	3/162 (1.9%)
2	E	0.71	0/133	2.00	3/177 (1.7%)
3	D	0.86	0/1170	1.27	6/1590 (0.4%)
3	F	0.87	0/1181	1.28	6/1604 (0.4%)
All	All	0.84	1/5916 (0.0%)	1.26	41/8055 (0.5%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	C	0	1
2	E	0	2
All	All	0	3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	984	VAL	CA-C	5.08	1.58	1.52

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	167	GLY	CA-C-N	12.74	144.63	121.70
2	E	167	GLY	C-N-CA	12.74	144.63	121.70
2	C	167	GLY	CA-C-N	12.04	143.37	121.70
2	C	167	GLY	C-N-CA	12.04	143.37	121.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	168	ASP	CA-CB-CG	8.77	121.37	112.60
1	A	912	LYS	CA-C-N	8.37	137.53	121.54
1	A	912	LYS	C-N-CA	8.37	137.53	121.54
1	B	912	LYS	CA-C-N	7.82	135.77	121.70
1	B	912	LYS	C-N-CA	7.82	135.77	121.70
3	D	228	ASP	N-CA-C	-6.68	100.90	110.59
1	B	915	LYS	N-CA-C	6.52	119.22	109.25
1	A	915	LYS	N-CA-C	6.47	119.16	109.25
3	D	252	ASP	CA-CB-CG	6.42	119.02	112.60
1	B	1027	THR	N-CA-C	-6.37	105.33	113.23
3	F	228	ASP	N-CA-C	-6.34	101.40	110.59
3	F	252	ASP	CA-CB-CG	6.24	118.84	112.60
1	B	1086	ASP	CA-CB-CG	6.14	118.74	112.60
1	A	1086	ASP	CA-CB-CG	6.02	118.62	112.60
1	A	1027	THR	N-CA-C	-6.01	105.78	113.23
1	A	913	HIS	CA-C-N	5.78	132.11	121.70
1	A	913	HIS	C-N-CA	5.78	132.11	121.70
3	D	205	VAL	N-CA-C	-5.68	104.53	109.19
1	A	899	ASP	CA-CB-CG	5.65	118.25	112.60
1	B	899	ASP	CA-CB-CG	5.56	118.16	112.60
1	B	1033	ILE	N-CA-C	5.55	116.95	110.62
1	B	913	HIS	CA-C-N	5.51	131.62	121.70
1	B	913	HIS	C-N-CA	5.51	131.62	121.70
1	A	1033	ILE	N-CA-C	5.44	116.82	110.62
3	F	205	VAL	N-CA-C	-5.43	104.74	109.19
1	A	1067	ASN	CA-CB-CG	5.41	118.00	112.60
3	D	177	ASN	CA-CB-CG	5.35	117.95	112.60
3	F	177	ASN	CA-CB-CG	5.32	117.92	112.60
1	B	1067	ASN	CA-CB-CG	5.29	117.89	112.60
3	F	213	THR	N-CA-C	5.29	117.34	109.25
2	C	167	GLY	O-C-N	-5.23	115.94	122.84
1	A	913	HIS	N-CA-C	5.20	121.88	110.80
3	F	180	THR	CB-CA-C	5.13	119.14	110.79
1	A	911	PRO	CA-C-N	5.03	131.15	121.54
1	A	911	PRO	C-N-CA	5.03	131.15	121.54
3	D	180	THR	CB-CA-C	5.00	118.95	110.79
3	D	213	THR	N-CA-C	5.00	116.91	109.25

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	C	167	GLY	Peptide
2	E	167	GLY	Peptide,Mainchain

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1611	0	1599	7	0
1	B	1611	0	1599	9	0
2	C	118	0	101	0	0
2	E	128	0	108	0	0
3	D	1148	0	1122	4	0
3	F	1159	0	1135	4	0
4	A	14	0	13	0	0
4	B	14	0	13	0	0
5	A	119	0	0	0	0
5	B	98	0	0	0	0
5	C	45	0	0	0	0
5	D	67	0	0	0	0
All	All	6132	0	5690	24	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 2.

All (24) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:913:HIS:HA	1:A:914:GLN:HG2	1.72	0.71
3:F:261:VAL:HG23	3:F:270:GLU:HG3	1.73	0.71
3:D:261:VAL:HG23	3:D:270:GLU:HG3	1.73	0.68
1:B:1039:GLU:HG2	1:B:1048:HIS:NE2	2.15	0.62
1:A:1039:GLU:HG2	1:A:1048:HIS:NE2	2.18	0.58
1:A:1084:LYS:HG2	1:A:1085:ALA:H	1.69	0.57
1:B:1064:GLN:HB3	1:B:1074:MET:HG3	1.88	0.55
1:A:1064:GLN:HB3	1:A:1074:MET:HG3	1.88	0.55
1:B:911:PRO:HB2	1:B:915:LYS:HZ2	1.75	0.52
3:D:196:SER:HB2	3:D:219:ILE:HB	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:196:SER:HB2	3:F:219:ILE:HB	1.93	0.51
1:B:911:PRO:HB2	1:B:915:LYS:NZ	2.28	0.49
3:D:248:THR:HA	3:D:260:ILE:HD12	1.95	0.48
3:F:248:THR:HA	3:F:260:ILE:HD12	1.94	0.48
1:B:913:HIS:HA	1:B:914:GLN:HG2	1.96	0.47
1:B:1005:ILE:HG12	1:B:1049:GLN:HG2	1.97	0.47
1:A:1005:ILE:HG12	1:A:1049:GLN:HG2	1.98	0.46
1:A:911:PRO:HB2	1:A:915:LYS:NZ	2.31	0.45
1:A:907:ASP:H	1:A:914:GLN:HE22	1.65	0.45
3:F:239:LEU:HD11	3:F:289:LEU:HD22	1.98	0.44
3:D:239:LEU:HD11	3:D:289:LEU:HD22	2.00	0.44
1:B:907:ASP:H	1:B:914:GLN:HE22	1.67	0.42
1:B:1056:ASP:HB2	1:B:1084:LYS:HB2	2.01	0.42
1:B:907:ASP:HB3	1:B:910:LEU:HB2	2.01	0.42

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	203/264 (77%)	190 (94%)	10 (5%)	3 (2%)	8	8
1	B	203/264 (77%)	192 (95%)	10 (5%)	1 (0%)	24	31
2	C	11/122 (9%)	11 (100%)	0	0	100	100
2	E	12/122 (10%)	12 (100%)	0	0	100	100
3	D	144/251 (57%)	133 (92%)	11 (8%)	0	100	100
3	F	145/251 (58%)	134 (92%)	11 (8%)	0	100	100
All	All	718/1274 (56%)	672 (94%)	42 (6%)	4 (1%)	21	27

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	912	LYS
1	A	913	HIS
1	A	966	GLY
1	B	966	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 X-ray entries followed by that with respect to entries of similar resolution.

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	181/232 (78%)	173 (96%)	8 (4%)	25	38
1	B	181/232 (78%)	173 (96%)	8 (4%)	25	38
2	C	13/103 (13%)	12 (92%)	1 (8%)	12	16
2	E	14/103 (14%)	14 (100%)	0	100	100
3	D	128/215 (60%)	121 (94%)	7 (6%)	19	28
3	F	129/215 (60%)	122 (95%)	7 (5%)	20	29
All	All	646/1100 (59%)	615 (95%)	31 (5%)	23	35

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	910	LEU
1	A	913	HIS
1	A	915	LYS
1	A	917	THR
1	A	927	LYS
1	A	1038	ILE
1	A	1041	VAL
1	A	1078	VAL
1	B	902	ARG
1	B	910	LEU
1	B	912	LYS
1	B	915	LYS
1	B	917	THR
1	B	927	LYS
1	B	1038	ILE

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Mol	Chain	Res	Type
1	B	1041	VAL
2	C	168	ASP
3	D	172	ARG
3	D	177	ASN
3	D	252	ASP
3	D	257	SER
3	D	260	ILE
3	D	261	VAL
3	D	269	VAL
3	F	172	ARG
3	F	177	ASN
3	F	252	ASP
3	F	257	SER
3	F	260	ILE
3	F	261	VAL
3	F	269	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1030	ASN
1	A	1079	GLN
1	B	913	HIS
1	B	933	ASN
1	B	1030	ASN
1	B	1079	GLN
3	D	214	ASN
3	F	214	ASN

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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

2 ligands 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	$\# Z > 2$
4	NAG	A	2089	1	14,14,15	0.30	0	17,19,21	0.74	1 (5%)
4	NAG	B	2089	1	14,14,15	0.28	0	17,19,21	0.76	1 (5%)

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	A	2089	1	-	0/6/23/26	0/1/1/1
4	NAG	B	2089	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	2089	NAG	C1-O5-C5	2.75	115.87	112.19
4	B	2089	NAG	C1-O5-C5	2.26	115.21	112.19

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2		OWAB(Å ²)	Q<0.9
1	A	205/264 (77%)	0.21	14 (6%)	23 25	28, 45, 92, 136	0
1	B	205/264 (77%)	0.34	21 (10%)	12 13	28, 46, 94, 130	0
2	C	15/122 (12%)	2.10	7 (46%)	0 0	39, 66, 104, 111	0
2	E	16/122 (13%)	1.72	4 (25%)	2 2	35, 55, 92, 108	0
3	D	148/251 (58%)	0.43	8 (5%)	31 33	28, 48, 90, 110	0
3	F	149/251 (59%)	0.22	8 (5%)	31 33	28, 42, 75, 105	0
All	All	738/1274 (57%)	0.36	62 (8%)	17 18	28, 46, 93, 136	0

All (62) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	E	158	PRO	5.9
2	E	168	ASP	5.8
1	B	886	MET	4.8
1	B	1088	SER	4.6
2	E	142	HIS	4.3
2	C	138	PRO	4.2
3	D	251	GLY	4.1
1	B	915	LYS	3.9
1	A	1088	SER	3.9
1	A	886	MET	3.8
1	B	1086	ASP	3.8
2	C	158	PRO	3.8
1	B	913	HIS	3.8
1	B	912	LYS	3.7
2	C	168	ASP	3.5
3	F	178	PHE	3.3
1	B	917	THR	3.3
3	F	268	TYR	3.3
2	C	141	TYR	3.2

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Mol	Chain	Res	Type	RSRZ
1	B	916	ILE	3.2
1	A	1084	LYS	3.2
1	B	885	MET	3.1
3	D	256	LYS	3.1
1	B	884	PRO	3.1
3	D	178	PHE	3.0
1	A	884	PRO	2.9
1	A	913	HIS	2.9
2	C	140	ASN	2.9
1	B	966	GLY	2.8
1	A	911	PRO	2.8
3	D	268	TYR	2.7
3	F	263	ARG	2.7
3	F	176	ASP	2.7
1	B	887	PRO	2.6
3	D	176	ASP	2.6
1	B	975	THR	2.6
1	B	909	SER	2.6
3	F	256	LYS	2.6
1	A	912	LYS	2.5
3	F	252	ASP	2.5
1	A	914	GLN	2.5
2	C	160	TYR	2.5
1	B	969	SER	2.5
1	A	909	SER	2.4
1	A	916	ILE	2.4
1	B	971	THR	2.4
1	B	974	MET	2.4
3	D	298	ASP	2.3
3	F	255	ALA	2.3
1	A	915	LYS	2.3
1	A	968	ARG	2.2
1	B	921	TYR	2.1
3	F	318	LEU	2.1
3	D	252	ASP	2.1
3	D	209	SER	2.1
1	A	918	ASP	2.1
1	B	914	GLN	2.1
2	E	138	PRO	2.1
2	C	162	PHE	2.1
1	A	964	THR	2.0
1	B	918	ASP	2.0

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Mol	Chain	Res	Type	RSRZ
1	B	911	PRO	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	NAG	A	2089	14/15	0.81	0.13	77,81,84,85	0
4	NAG	B	2089	14/15	0.81	0.13	76,79,82,83	0

6.5 Other polymers [i](#)

There are no such residues in this entry.