



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2024 – 04:52 PM EDT

PDB ID : 1AVD  
Title : THREE-DIMENSIONAL STRUCTURE OF THE TETRAGONAL CRYSTAL FORM OF EGG-WHITE AVIDIN IN ITS FUNCTIONAL COMPLEX WITH BIOTIN AT 2.7 ANGSTROMS RESOLUTION  
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Deposited on : 1993-03-05  
Resolution : 2.70 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](mailto: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>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36.2  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36.2

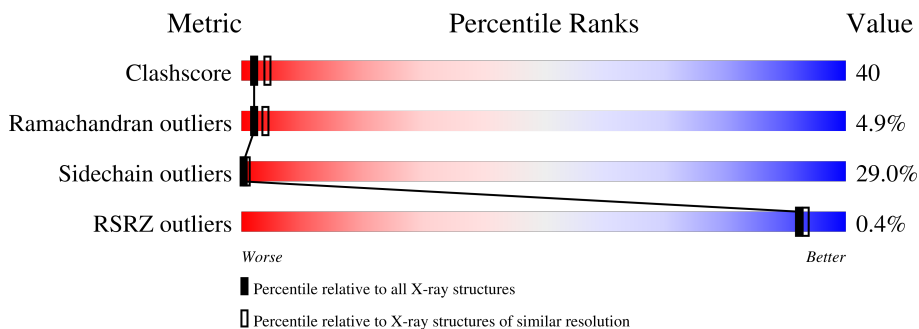
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.70 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))
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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  $\geq 3$ , 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	128	 34% 42% 16% 8%
1	B	128	 31% 40% 18% 8%

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 2022 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.

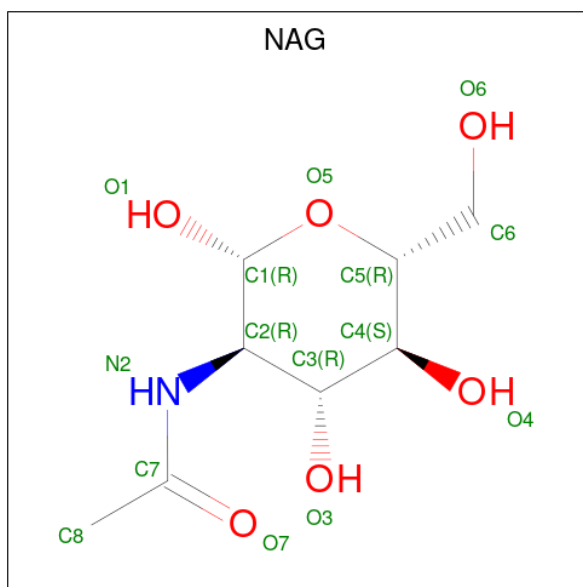
- Molecule 1 is a protein called AVIDIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	123	Total 964	C 602	N 170	O 188	S 4	73	0	0
1	B	124	Total 975	C 608	N 174	O 189	S 4	67	0	0

There are 2 discrepancies between the modelled and reference sequences:

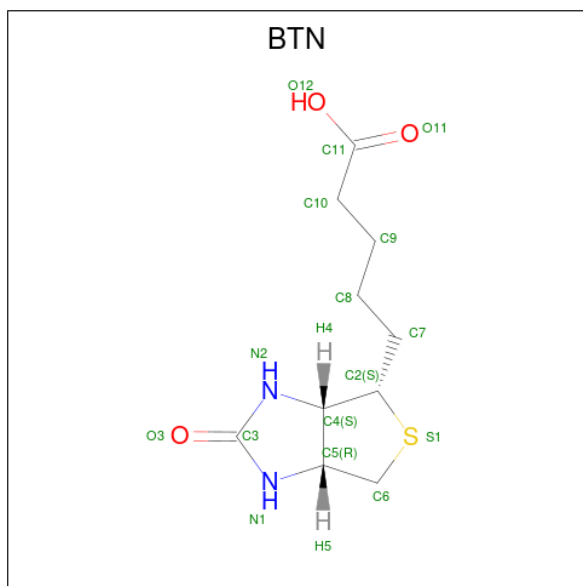
Chain	Residue	Modelled	Actual	Comment	Reference
A	34	THR	ILE	SEE REMARK 999	UNP P02701
B	34	THR	ILE	SEE REMARK 999	UNP P02701

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	Total 14	C 8	N 1	O 5	2	0

- Molecule 3 is BIOTIN (three-letter code: BTN) (formula:  $C_{10}H_{16}N_2O_3S$ ).



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

- Molecule 4 is water.

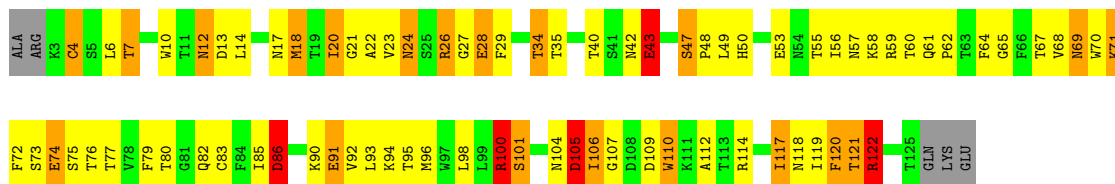
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	A	19	Total	O	0	0
			19	19		
4	B	18	Total	O	0	0
			18	18		

### 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.

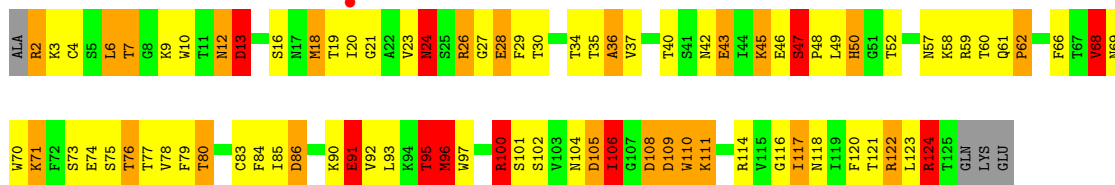
- Molecule 1: AVIDIN

Chain A: 



- Molecule 1: AVIDIN

Chain B: 



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 42 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	80.15Å 80.15Å 85.28Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	(Not available) – 2.70 47.20 – 2.70	Depositor EDS
% Data completeness (in resolution range)	(Not available) ((Not available)-2.70) 89.7 (47.20-2.70)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$	-	Xtrriage
Refinement program	TNT	Depositor
R, $R_{free}$	0.174 , (Not available) (Not available) , (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	38.7	Xtrriage
Anisotropy	0.308	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 216.2	EDS
L-test for twinning <sup>1</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	2022	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	35.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.39% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Theoretical 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 [i](#)

### 5.1 Standard geometry [i](#)

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

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	1.16	4/982 (0.4%)	1.64	13/1330 (1.0%)
1	B	1.16	5/993 (0.5%)	1.69	27/1344 (2.0%)
All	All	1.16	9/1975 (0.5%)	1.66	40/2674 (1.5%)

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	91	GLU	CD-OE2	7.79	1.34	1.25
1	B	43	GLU	CD-OE1	6.93	1.33	1.25
1	B	46	GLU	CD-OE2	6.70	1.33	1.25
1	A	28	GLU	CD-OE2	6.51	1.32	1.25
1	A	91	GLU	CD-OE2	6.49	1.32	1.25
1	A	43	GLU	CD-OE1	5.90	1.32	1.25
1	A	74	GLU	CD-OE1	5.51	1.31	1.25
1	B	28	GLU	CD-OE1	5.36	1.31	1.25
1	B	74	GLU	CD-OE2	5.19	1.31	1.25

All (40) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	105	ASP	CB-CG-OD1	-9.37	109.86	118.30
1	A	122	ARG	NE-CZ-NH1	8.64	124.62	120.30
1	B	59	ARG	NE-CZ-NH1	8.59	124.60	120.30
1	A	50	HIS	CA-CB-CG	8.30	127.70	113.60
1	B	68	VAL	CA-CB-CG1	-7.52	99.62	110.90
1	B	114	ARG	NE-CZ-NH1	7.38	123.99	120.30
1	A	105	ASP	CB-CG-OD2	-7.29	111.74	118.30
1	A	100	ARG	NE-CZ-NH1	7.01	123.80	120.30
1	B	42	ASN	N-CA-CB	7.01	123.21	110.60
1	B	47	SER	N-CA-CB	6.82	120.73	110.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	80	THR	N-CA-CB	6.78	123.19	110.30
1	B	114	ARG	NE-CZ-NH2	-6.73	116.94	120.30
1	B	24	ASN	CB-CA-C	-6.60	97.20	110.40
1	B	42	ASN	CB-CA-C	6.54	123.49	110.40
1	B	95	THR	N-CA-CB	-6.43	98.08	110.30
1	A	12	ASN	CB-CA-C	-6.22	97.95	110.40
1	B	100	ARG	NE-CZ-NH1	6.14	123.37	120.30
1	A	104	ASN	N-CA-CB	6.13	121.63	110.60
1	B	109	ASP	CB-CG-OD1	6.11	123.80	118.30
1	A	86	ASP	CB-CG-OD1	-6.11	112.80	118.30
1	A	96	MET	CG-SD-CE	6.03	109.85	100.20
1	B	13	ASP	CB-CG-OD1	-5.91	112.98	118.30
1	B	80	THR	CA-CB-OG1	5.90	121.38	109.00
1	B	108	ASP	CB-CG-OD1	-5.78	113.10	118.30
1	B	7	THR	CA-CB-CG2	-5.76	104.34	112.40
1	B	104	ASN	CB-CA-C	-5.75	98.89	110.40
1	B	68	VAL	N-CA-CB	5.70	124.04	111.50
1	A	98	LEU	N-CA-CB	5.62	121.65	110.40
1	B	80	THR	CB-CA-C	-5.61	96.46	111.60
1	B	105	ASP	CB-CG-OD2	5.49	123.24	118.30
1	B	59	ARG	NE-CZ-NH2	-5.49	117.56	120.30
1	B	62	PRO	CB-CA-C	-5.46	98.36	112.00
1	B	124	ARG	NE-CZ-NH1	5.30	122.95	120.30
1	A	13	ASP	CB-CG-OD2	-5.26	113.56	118.30
1	A	24	ASN	CB-CA-C	-5.25	99.89	110.40
1	A	100	ARG	CB-CA-C	5.25	120.91	110.40
1	B	36	ALA	N-CA-CB	-5.22	102.78	110.10
1	B	96	MET	CB-CA-C	5.12	120.65	110.40
1	A	80	THR	N-CA-CB	5.12	120.03	110.30
1	B	84	PHE	CB-CG-CD1	-5.05	117.26	120.80

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	964	0	946	72	0
1	B	975	0	960	72	0
2	A	14	0	13	0	0
3	A	16	0	15	4	0
3	B	16	0	15	5	0
4	A	19	0	0	3	1
4	B	18	0	0	1	0
All	All	2022	0	1949	144	1

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 40.

All (144) 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:B:24:ASN:HB3	1:B:26:ARG:H	1.29	0.94
1:B:45:LYS:HE2	1:B:45:LYS:HA	1.49	0.92
1:B:75:SER:HB2	1:B:100:ARG:O	1.81	0.80
1:A:70:TRP:CZ2	3:A:400:BTN:H81	2.22	0.75
1:B:93:LEU:HB2	1:B:120:PHE:HB2	1.67	0.74
1:B:100:ARG:HD2	1:B:101:SER:O	1.89	0.72
1:A:12:ASN:HB3	1:A:14:LEU:H	1.55	0.71
1:A:29:PHE:HE2	1:A:53:GLU:HB2	1.53	0.71
1:B:2:ARG:HG3	1:B:3:LYS:H	1.57	0.70
1:B:70:TRP:CZ2	3:B:401:BTN:H81	2.29	0.67
1:B:122:ARG:HD2	1:B:124:ARG:CD	2.25	0.65
1:A:70:TRP:HE1	1:A:77:THR:HG1	1.44	0.65
1:B:10:TRP:CZ3	1:B:93:LEU:HD13	2.33	0.64
1:B:97:TRP:CZ2	1:B:116:GLY:HA3	2.33	0.63
1:A:7:THR:OG1	1:A:22:ALA:HA	1.99	0.62
1:B:66:PHE:CE1	1:B:79:PHE:CD1	2.87	0.62
1:B:95:THR:CG2	1:B:118:ASN:HB2	2.29	0.62
1:B:70:TRP:CE2	3:B:401:BTN:H81	2.36	0.61
1:A:49:LEU:HD12	1:A:49:LEU:O	2.01	0.60
1:B:110:TRP:CZ2	1:B:111:LYS:HE3	2.37	0.59
1:A:73:SER:C	1:A:75:SER:H	2.05	0.59
1:A:29:PHE:CE2	1:A:53:GLU:HB2	2.36	0.59
1:B:24:ASN:CB	1:B:26:ARG:H	2.10	0.59
1:B:122:ARG:CD	1:B:124:ARG:HD2	2.33	0.58
1:B:70:TRP:CH2	3:B:401:BTN:H81	2.39	0.58
1:A:86:ASP:HB2	1:A:90:LYS:O	2.04	0.58
1:B:48:PRO:HD2	1:B:69:ASN:O	2.04	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:61:GLN:HB3	1:B:83:CYS:O	2.04	0.57
1:A:65:GLY:HA2	1:A:79:PHE:O	2.04	0.57
1:A:61:GLN:HB2	4:A:521:HOH:O	2.03	0.57
1:B:122:ARG:HD2	1:B:124:ARG:HD3	1.86	0.57
1:B:18:MET:HG2	1:B:120:PHE:HE2	1.70	0.56
1:A:7:THR:HG1	1:A:21:GLY:C	2.09	0.56
1:A:49:LEU:HA	1:A:67:THR:O	2.06	0.55
1:B:47:SER:HB3	1:B:48:PRO:HD2	1.88	0.55
1:B:4:CYS:SG	1:B:91:GLU:HG2	2.47	0.54
1:A:26:ARG:HB2	1:A:28:GLU:OE2	2.07	0.54
1:A:24:ASN:HB3	1:A:26:ARG:H	1.72	0.54
1:B:47:SER:CB	1:B:48:PRO:HD2	2.37	0.54
1:B:12:ASN:OD1	1:B:12:ASN:C	2.45	0.54
1:B:77:THR:HG22	1:B:78:VAL:N	2.22	0.53
1:B:105:ASP:O	1:B:108:ASP:N	2.34	0.53
1:B:2:ARG:HG3	1:B:3:LYS:N	2.22	0.53
1:A:64:PHE:CZ	1:A:95:THR:HG22	2.44	0.53
1:A:67:THR:HG22	1:A:68:VAL:N	2.24	0.53
1:B:122:ARG:CD	1:B:124:ARG:CD	2.86	0.53
1:B:27:GLY:O	1:B:29:PHE:HD1	1.91	0.53
1:B:47:SER:CB	1:B:48:PRO:CD	2.88	0.52
1:B:86:ASP:HB2	1:B:90:LYS:O	2.10	0.52
1:A:49:LEU:HD12	1:A:49:LEU:C	2.30	0.52
1:A:47:SER:HB3	1:A:48:PRO:HD2	1.92	0.51
1:B:18:MET:HG2	1:B:120:PHE:CE2	2.45	0.51
1:A:7:THR:HG1	1:A:22:ALA:HA	1.74	0.51
1:B:109:ASP:O	1:B:111:LYS:N	2.44	0.51
1:B:95:THR:HG23	1:B:96:MET:N	2.26	0.51
1:A:35:THR:HG23	1:A:35:THR:O	2.12	0.50
1:B:95:THR:HG22	1:B:118:ASN:O	2.11	0.50
1:A:10:TRP:HB3	1:A:121:THR:O	2.11	0.50
1:A:64:PHE:CZ	1:A:93:LEU:HG	2.46	0.50
1:B:86:ASP:OD1	1:B:92:VAL:HG21	2.12	0.50
1:A:6:LEU:HD12	1:A:29:PHE:CE2	2.47	0.49
1:A:120:PHE:N	1:A:120:PHE:CD1	2.81	0.49
1:B:49:LEU:C	1:B:49:LEU:HD12	2.34	0.49
1:B:2:ARG:CG	1:B:3:LYS:N	2.77	0.48
1:B:30:THR:HG22	1:B:50:HIS:CB	2.44	0.48
1:A:70:TRP:HZ2	3:A:400:BTN:S1	2.37	0.48
1:A:70:TRP:CE2	3:A:400:BTN:H81	2.49	0.48
1:A:49:LEU:HB3	1:A:68:VAL:HG22	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:107:GLY:HA3	4:A:542:HOH:O	2.14	0.48
1:B:68:VAL:O	1:B:76:THR:HG22	2.14	0.47
1:A:64:PHE:CZ	1:A:95:THR:CG2	2.98	0.47
1:A:117:ILE:HD12	1:A:117:ILE:HG21	1.43	0.47
1:B:9:LYS:HB3	1:B:123:LEU:HD12	1.97	0.47
1:B:16:SER:OG	1:B:36:ALA:N	2.47	0.47
1:B:62:PRO:HD2	1:B:83:CYS:HB3	1.96	0.47
1:A:7:THR:O	1:A:122:ARG:NH2	2.48	0.47
1:A:47:SER:HB3	1:A:69:ASN:O	2.15	0.47
1:A:73:SER:OG	1:A:75:SER:HB3	2.15	0.47
1:B:117:ILE:HG23	1:B:118:ASN:N	2.30	0.47
1:A:73:SER:C	1:A:75:SER:N	2.68	0.46
1:A:117:ILE:HB	1:A:118:ASN:H	1.50	0.46
1:B:48:PRO:HG2	1:B:69:ASN:HB3	1.98	0.46
1:A:48:PRO:HD2	1:A:69:ASN:O	2.15	0.46
1:B:2:ARG:NH2	4:B:545:HOH:O	2.47	0.46
1:B:95:THR:HG22	1:B:118:ASN:HB2	1.97	0.46
1:B:13:ASP:OD1	1:B:13:ASP:N	2.49	0.46
1:B:47:SER:HB3	1:B:48:PRO:CD	2.46	0.45
1:B:71:LYS:HD3	1:B:71:LYS:HA	1.59	0.45
1:A:12:ASN:OD1	1:A:120:PHE:CE2	2.69	0.45
1:B:95:THR:CG2	1:B:118:ASN:CB	2.94	0.45
1:A:24:ASN:HD22	1:A:24:ASN:HA	1.20	0.45
1:A:47:SER:HA	1:A:48:PRO:HD3	1.67	0.45
1:B:7:THR:HG23	1:B:21:GLY:O	2.17	0.45
1:B:75:SER:HB2	1:B:101:SER:HA	1.99	0.44
1:A:12:ASN:HA	1:A:119:ILE:O	2.16	0.44
1:A:91:GLU:CD	1:A:122:ARG:NH1	2.71	0.44
1:B:28:GLU:HG3	1:B:52:THR:CG2	2.48	0.44
1:B:45:LYS:HA	1:B:45:LYS:CE	2.22	0.44
1:A:71:LYS:HA	1:A:71:LYS:HD3	1.36	0.44
1:B:28:GLU:HG3	1:B:52:THR:HG22	1.99	0.43
1:A:91:GLU:OE1	1:A:122:ARG:NH1	2.45	0.43
1:A:10:TRP:CE3	1:A:122:ARG:HG2	2.53	0.43
1:A:64:PHE:HZ	1:A:95:THR:CG2	2.32	0.43
1:B:93:LEU:CB	1:B:120:PHE:HB2	2.42	0.43
1:A:70:TRP:HB2	1:A:75:SER:O	2.19	0.43
1:A:110:TRP:O	1:A:110:TRP:HE3	2.02	0.43
1:B:30:THR:HG22	1:B:50:HIS:HB3	2.00	0.43
1:B:95:THR:HG22	1:B:118:ASN:CB	2.49	0.43
1:A:27:GLY:O	1:A:53:GLU:N	2.46	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:100:ARG:CZ	1:A:112:ALA:HB1	2.49	0.42
1:B:68:VAL:O	1:B:76:THR:CG2	2.67	0.42
1:A:100:ARG:CZ	1:A:112:ALA:CB	2.96	0.42
1:A:100:ARG:HD3	1:A:101:SER:O	2.19	0.42
1:B:106:ILE:C	1:B:108:ASP:H	2.22	0.42
1:A:17:ASN:O	1:A:34:THR:N	2.48	0.42
1:A:100:ARG:NH2	1:A:109:ASP:OD1	2.39	0.42
1:B:36:ALA:C	1:B:37:VAL:HG13	2.40	0.42
1:B:6:LEU:HD12	1:B:6:LEU:HA	1.23	0.42
1:B:30:THR:HG22	1:B:50:HIS:CG	2.54	0.42
1:A:35:THR:O	1:A:35:THR:CG2	2.68	0.42
1:A:4:CYS:SG	1:A:83:CYS:C	2.98	0.42
1:A:20:ILE:HD12	1:A:20:ILE:HG21	1.67	0.42
1:A:62:PRO:O	1:A:82:GLN:HG3	2.20	0.41
1:A:62:PRO:HD2	1:A:83:CYS:HB3	2.02	0.41
1:A:106:ILE:H	1:A:106:ILE:HG12	1.48	0.41
1:B:35:THR:OG1	1:B:36:ALA:N	2.53	0.41
1:A:20:ILE:HG23	1:A:20:ILE:HD13	1.77	0.41
1:A:118:ASN:HB3	1:A:120:PHE:CE1	2.56	0.41
1:A:107:GLY:CA	4:A:542:HOH:O	2.67	0.41
1:A:70:TRP:CZ2	3:A:400:BTN:C8	2.98	0.41
1:A:110:TRP:O	1:A:110:TRP:CE3	2.74	0.41
1:B:30:THR:HA	1:B:49:LEU:O	2.20	0.41
1:B:70:TRP:CZ2	3:B:401:BTN:C8	3.03	0.41
1:B:77:THR:CG2	1:B:78:VAL:N	2.81	0.41
1:A:18:MET:CE	1:A:20:ILE:HD11	2.50	0.41
1:A:43:GLU:O	1:A:43:GLU:HG3	2.20	0.41
1:A:105:ASP:C	1:A:107:GLY:N	2.74	0.41
1:A:91:GLU:OE2	1:A:122:ARG:NH1	2.54	0.40
1:A:23:VAL:HA	1:A:28:GLU:O	2.21	0.40
1:A:72:PHE:CD1	1:A:72:PHE:N	2.89	0.40
1:B:91:GLU:C	1:B:92:VAL:HG23	2.40	0.40
1:B:109:ASP:O	1:B:110:TRP:C	2.59	0.40
1:A:47:SER:CB	1:A:48:PRO:CD	2.99	0.40
1:B:70:TRP:CH2	3:B:401:BTN:H71	2.56	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:505:HOH:O	4:A:505:HOH:O[2_655]	1.61	0.59

## 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	121/128 (94%)	109 (90%)	8 (7%)	4 (3%)	4	8
1	B	122/128 (95%)	103 (84%)	11 (9%)	8 (7%)	1	2
All	All	243/256 (95%)	212 (87%)	19 (8%)	12 (5%)	2	4

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	56	ILE
1	B	24	ASN
1	B	57	ASN
1	A	58	LYS
1	B	23	VAL
1	B	58	LYS
1	B	110	TRP
1	B	124	ARG
1	A	110	TRP
1	B	13	ASP
1	A	86	ASP
1	B	106	ILE

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	108/112 (96%)	78 (72%)	30 (28%)	0	1

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	109/112 (97%)	76 (70%)	33 (30%)	0	0
All	All	217/224 (97%)	154 (71%)	63 (29%)	0	1

All (63) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	CYS
1	A	7	THR
1	A	18	MET
1	A	20	ILE
1	A	26	ARG
1	A	34	THR
1	A	40	THR
1	A	42	ASN
1	A	43	GLU
1	A	47	SER
1	A	55	THR
1	A	57	ASN
1	A	59	ARG
1	A	60	THR
1	A	69	ASN
1	A	71	LYS
1	A	74	GLU
1	A	76	THR
1	A	85	ILE
1	A	92	VAL
1	A	94	LYS
1	A	100	ARG
1	A	101	SER
1	A	105	ASP
1	A	106	ILE
1	A	114	ARG
1	A	117	ILE
1	A	120	PHE
1	A	121	THR
1	A	122	ARG
1	B	2	ARG
1	B	6	LEU
1	B	12	ASN
1	B	18	MET
1	B	19	THR
1	B	20	ILE

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Mol	Chain	Res	Type
1	B	24	ASN
1	B	26	ARG
1	B	34	THR
1	B	40	THR
1	B	43	GLU
1	B	45	LYS
1	B	47	SER
1	B	50	HIS
1	B	60	THR
1	B	68	VAL
1	B	71	LYS
1	B	73	SER
1	B	76	THR
1	B	80	THR
1	B	85	ILE
1	B	86	ASP
1	B	91	GLU
1	B	95	THR
1	B	96	MET
1	B	100	ARG
1	B	102	SER
1	B	106	ILE
1	B	111	LYS
1	B	117	ILE
1	B	121	THR
1	B	122	ARG
1	B	124	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	12	ASN
1	A	24	ASN
1	A	69	ASN
1	B	24	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

3 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
3	BTN	B	401	-	17,17,17	1.12	0	23,23,23	3.67	8 (34%)
2	NAG	A	600	1	14,14,15	0.97	1 (7%)	17,19,21	1.49	4 (23%)
3	BTN	A	400	-	17,17,17	0.77	0	23,23,23	3.70	7 (30%)

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	BTN	B	401	-	-	5/7/28/28	0/2/2/2
2	NAG	A	600	1	-	4/6/23/26	0/1/1/1
3	BTN	A	400	-	-	2/7/28/28	0/2/2/2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	600	NAG	C8-C7	2.86	1.56	1.50

All (19) bond angle outliers are listed below:



Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	400	BTN	C2-C4-N2	-15.36	99.36	113.13
3	B	401	BTN	C4-C2-S1	-10.74	94.97	105.20
3	B	401	BTN	C2-C4-N2	-7.68	106.24	113.13
3	B	401	BTN	C2-C4-C5	6.33	116.28	108.94
3	A	400	BTN	C5-C6-S1	-6.06	101.12	106.31
3	B	401	BTN	C5-C6-S1	-5.44	101.65	106.31
3	B	401	BTN	C7-C2-C4	-4.23	102.42	114.73
3	B	401	BTN	C8-C7-C2	3.88	121.74	113.86
3	A	400	BTN	C6-C5-N1	-3.49	108.60	113.03
3	B	401	BTN	N2-C3-N1	-2.74	106.19	108.76
3	B	401	BTN	C6-C5-C4	-2.58	106.42	108.66
2	A	600	NAG	O5-C5-C4	-2.57	104.57	110.83
2	A	600	NAG	O5-C5-C6	-2.53	103.23	107.20
3	A	400	BTN	C5-N1-C3	2.37	115.54	112.46
3	A	400	BTN	C2-C4-C5	-2.31	106.26	108.94
3	A	400	BTN	C6-C5-C4	2.22	110.59	108.66
3	A	400	BTN	C7-C2-C4	-2.22	108.28	114.73
2	A	600	NAG	C2-N2-C7	-2.05	119.98	122.90
2	A	600	NAG	C6-C5-C4	2.04	117.78	113.00

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	600	NAG	C8-C7-N2-C2
2	A	600	NAG	O7-C7-N2-C2
3	B	401	BTN	C2-C7-C8-C9
3	B	401	BTN	S1-C2-C7-C8
2	A	600	NAG	C4-C5-C6-O6
2	A	600	NAG	O5-C5-C6-O6
3	B	401	BTN	C11-C10-C9-C8
3	A	400	BTN	C2-C7-C8-C9
3	B	401	BTN	C9-C10-C11-O11
3	B	401	BTN	C9-C10-C11-O12
3	A	400	BTN	C9-C10-C11-O12

There are no ring outliers.

2 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	401	BTN	5	0
3	A	400	BTN	4	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	122/128 (95%)	-0.66	0 <a href="#">100</a>   <a href="#">100</a>	10, 32, 58, 80	23 (18%)
1	B	123/128 (96%)	-0.60	1 (0%) <a href="#">86</a>   <a href="#">87</a>	9, 33, 63, 76	26 (21%)
All	All	245/256 (95%)	-0.63	1 (0%) <a href="#">92</a>   <a href="#">93</a>	9, 33, 64, 80	49 (20%)

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	20	ILE	2.3

### 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 monosaccharides 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, 95<sup>th</sup> 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(Å <sup>2</sup> )	Q<0.9
2	NAG	A	600	14/15	0.85	0.19	27,74,90,90	2
3	BTN	A	400	16/16	0.98	0.10	4,26,60,90	0
3	BTN	B	401	16/16	0.98	0.13	4,20,45,46	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.