



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 11:36 AM UTC

PDB ID : 3VCM / pdb\_00003vcm  
Title : Crystal structure of human prorenin  
Authors : Morales, R.; Watier, Y.; Bocskei, Z.  
Deposited on : 2012-01-04  
Resolution : 2.93 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>.

---

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)  
Xtrriage (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

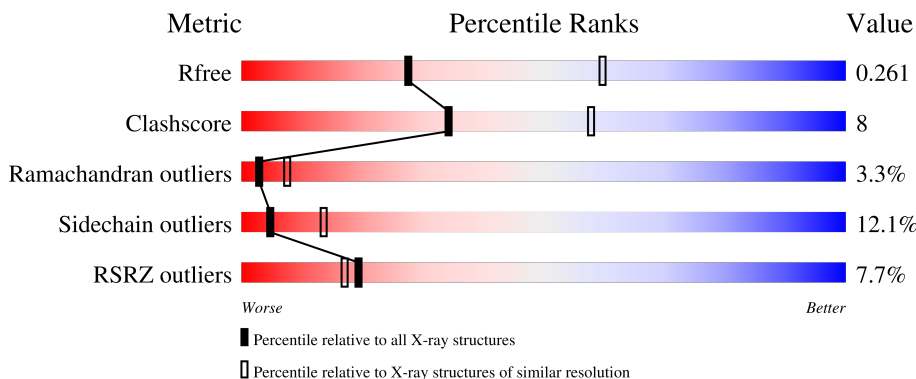
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

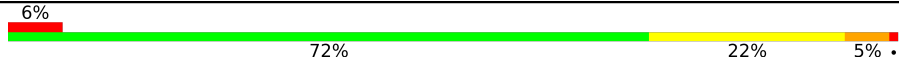


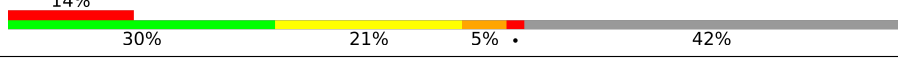
The reported resolution of this entry is 2.93 Å.

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	1159 (2.96-2.92)
Clashscore	190562	1184 (2.96-2.92)
Ramachandran outliers	187476	1131 (2.96-2.92)
Sidechain outliers	187428	1131 (2.96-2.92)
RSRZ outliers	180081	1159 (2.96-2.92)

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	335	
1	B	335	
2	P	43	
2	Q	43	

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 5738 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 prorenin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	335	2583	1652	417	500	14	0	0	0
1	B	325	2514	1610	406	484	14	0	0	0

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	SER	deletion	UNP P00797
A	?	-	GLU	deletion	UNP P00797
A	?	-	ASN	deletion	UNP P00797
A	?	-	SER	deletion	UNP P00797
A	?	-	GLN	deletion	UNP P00797
B	?	-	SER	deletion	UNP P00797
B	?	-	GLU	deletion	UNP P00797
B	?	-	ASN	deletion	UNP P00797
B	?	-	SER	deletion	UNP P00797
B	?	-	GLN	deletion	UNP P00797

- Molecule 2 is a protein called prorenin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	P	38	319	202	62	52	3	0	0	0
2	Q	25	211	134	40	35	2	0	0	0

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



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

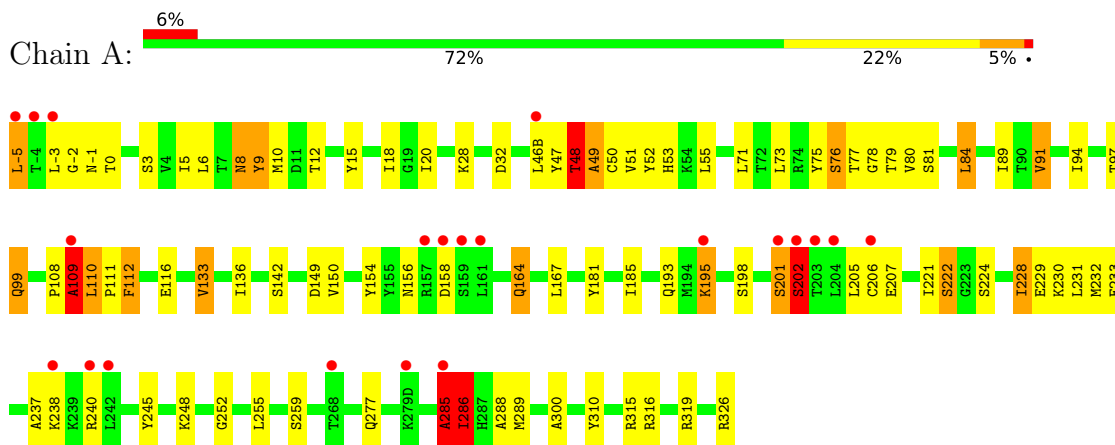
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	36	Total	O	0	0
			36	36		
4	B	49	Total	O	0	0
			49	49		
4	P	8	Total	O	0	0
			8	8		
4	Q	4	Total	O	0	0
			4	4		

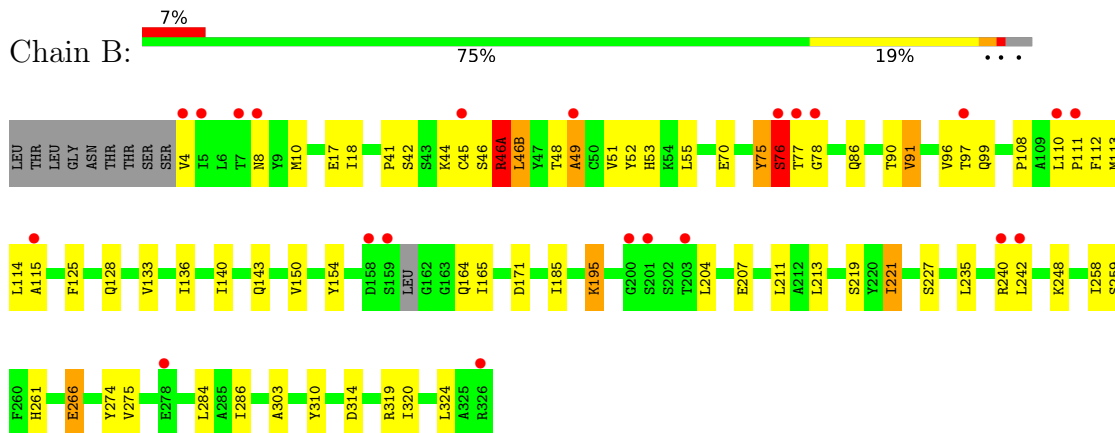
### 3 Residue-property plots [i](#)

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.

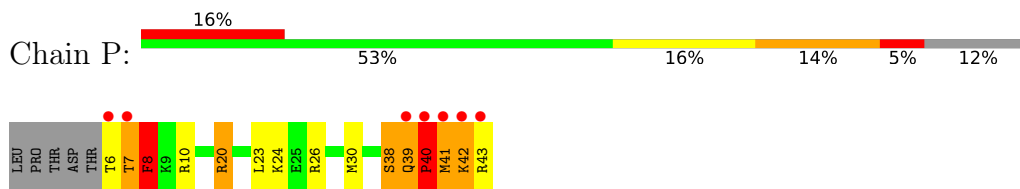
- Molecule 1: prorenin



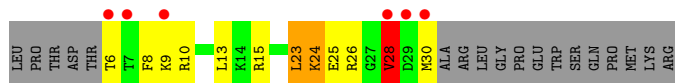
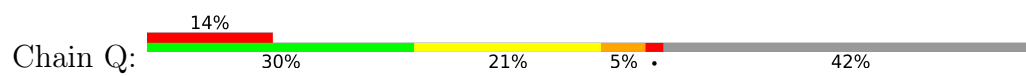
- Molecule 1: prorenin



- Molecule 2: prorenin



- Molecule 2: prorenin



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 43 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	104.42Å 104.42Å 237.12Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	36.53 – 2.93 36.53 – 2.93	Depositor EDS
% Data completeness (in resolution range)	100.0 (36.53-2.93) 99.9 (36.53-2.93)	Depositor EDS
$R_{merge}$	0.13	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.54 (at 2.95Å)	Xtrriage
Refinement program	BUSTER 2.9.7	Depositor
R, $R_{free}$	0.212 , 0.248 0.222 , 0.261	Depositor DCC
$R_{free}$ test set	1476 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	47.6	Xtrriage
Anisotropy	0.623	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 46.1	EDS
L-test for twinning <sup>2</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	0.91	EDS
Total number of atoms	5738	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	48.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.40% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</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

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	0.71	0/2640	1.25	15/3576 (0.4%)
1	B	0.69	0/2571	1.25	19/3481 (0.5%)
2	P	0.76	0/325	1.49	6/431 (1.4%)
2	Q	0.80	0/213	1.46	4/280 (1.4%)
All	All	0.71	0/5749	1.27	44/7768 (0.6%)

There are no bond length outliers.

All (44) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	75	TYR	CA-C-N	10.54	140.67	121.70
1	B	75	TYR	C-N-CA	10.54	140.67	121.70
1	A	201	SER	CA-C-N	10.48	140.56	121.70
1	A	201	SER	C-N-CA	10.48	140.56	121.70
1	A	109	ALA	CA-C-N	8.33	136.69	121.70
1	A	109	ALA	C-N-CA	8.33	136.69	121.70
1	B	110	LEU	N-CA-C	6.84	121.47	112.17
1	B	115	ALA	CA-C-N	6.70	133.76	121.70
1	B	115	ALA	C-N-CA	6.70	133.76	121.70
1	B	49	ALA	CA-C-N	6.63	133.64	121.70
1	B	49	ALA	C-N-CA	6.63	133.64	121.70
1	B	78	GLY	CA-C-N	6.44	133.29	121.70
1	B	78	GLY	C-N-CA	6.44	133.29	121.70
1	B	75	TYR	N-CA-C	-6.26	102.45	110.53
2	P	40	PRO	CA-C-N	6.24	133.47	121.54
2	P	40	PRO	C-N-CA	6.24	133.47	121.54
2	Q	25	GLU	N-CA-C	-6.24	104.93	112.54
1	A	201	SER	N-CA-C	6.21	118.59	111.02
1	B	112	PHE	N-CA-C	6.21	120.94	112.68
1	B	44	LYS	CA-C-N	6.14	129.44	120.71

*Continued on next page...*

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	44	LYS	C-N-CA	6.14	129.44	120.71
1	A	112	PHE	N-CA-C	6.07	119.79	112.38
2	P	7	THR	CA-C-N	5.60	132.24	121.54
2	P	7	THR	C-N-CA	5.60	132.24	121.54
2	P	38	SER	CA-C-N	5.59	131.76	121.70
2	P	38	SER	C-N-CA	5.59	131.76	121.70
1	A	0	THR	N-CA-C	5.57	119.05	110.42
2	Q	28	VAL	CA-C-N	5.54	131.67	121.70
2	Q	28	VAL	C-N-CA	5.54	131.67	121.70
1	A	285	ALA	CA-C-N	5.46	131.53	121.70
1	A	285	ALA	C-N-CA	5.46	131.53	121.70
1	A	48	THR	N-CA-C	5.40	119.82	112.04
1	B	46(A)	ARG	N-CA-C	-5.39	102.90	110.50
1	A	50	CYS	CA-C-N	5.36	128.08	120.53
1	A	50	CYS	C-N-CA	5.36	128.08	120.53
2	Q	23	LEU	N-CA-C	-5.31	101.12	109.25
1	A	201	SER	CA-C-O	-5.29	115.25	121.07
1	B	171	ASP	CA-CB-CG	5.29	117.89	112.60
1	B	75	TYR	CA-C-O	-5.26	115.89	121.94
1	B	76	SER	CA-C-N	5.25	131.16	121.70
1	B	76	SER	C-N-CA	5.25	131.16	121.70
1	B	274	TYR	N-CA-C	5.20	119.72	113.17
1	A	164	GLN	N-CA-C	5.15	116.35	108.52
1	A	32	ASP	CA-CB-CG	5.06	117.66	112.60

There are no chirality outliers.

There are no planarity outliers.

## 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	2583	0	2522	45	0
1	B	2514	0	2447	33	0
2	P	319	0	339	12	0
2	Q	211	0	229	5	0
3	A	14	0	13	0	0

Continued on next page...

*Continued from previous page...*

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	36	0	0	0	0
4	B	49	0	0	0	0
4	P	8	0	0	0	0
4	Q	4	0	0	0	0
All	All	5738	0	5550	85	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 8.

All (85) 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:8:ASN:HD21	1:B:10:MET:HG2	1.27	0.97
2:P:20:ARG:HH11	2:P:20:ARG:HG3	1.33	0.94
1:B:75:TYR:HB3	1:B:76:SER:HB2	1.55	0.88
1:B:240:ARG:C	1:B:242:LEU:HA	2.03	0.84
1:B:76:SER:N	1:B:77:THR:HA	1.94	0.82
1:A:109:ALA:HB3	1:A:110:LEU:HB3	1.71	0.73
1:B:49:ALA:HA	1:B:51:VAL:H	1.56	0.71
1:B:42:SER:O	1:B:45:CYS:HB2	1.91	0.70
2:Q:23:LEU:O	2:Q:24:LYS:HB2	1.91	0.70
2:P:20:ARG:HG3	2:P:20:ARG:NH1	2.01	0.69
1:A:18:ILE:HG22	1:A:91:VAL:HG13	1.75	0.69
1:A:185:ILE:HD11	1:A:193:GLN:HB2	1.74	0.68
1:A:201:SER:HB3	1:A:202:SER:HB2	1.76	0.67
1:B:18:ILE:HG22	1:B:91:VAL:HG13	1.80	0.64
1:A:232:MET:HG3	1:A:237:ALA:HB3	1.82	0.60
1:B:18:ILE:HG22	1:B:91:VAL:CG1	2.33	0.59
1:B:150:VAL:HG12	1:B:314:ASP:HA	1.84	0.59
1:A:76:SER:HB2	2:P:39:GLN:HG2	1.85	0.58
1:A:285:ALA:HA	1:A:286:ILE:C	2.28	0.58
1:A:164:GLN:HE22	2:P:10:ARG:HH11	1.49	0.58
1:A:222:SER:HB3	1:A:300:ALA:HB3	1.85	0.56
1:B:76:SER:H	1:B:77:THR:HA	1.68	0.55
2:P:39:GLN:O	2:P:41:MET:N	2.39	0.55
1:A:73:LEU:HB2	1:A:80:VAL:HB	1.90	0.54
1:A:285:ALA:HA	1:A:286:ILE:O	2.07	0.54
1:A:80:VAL:HG22	1:A:108:PRO:HD3	1.89	0.54
1:B:125:PHE:H	1:B:128:GLN:HE21	1.54	0.53
2:P:20:ARG:HH11	2:P:20:ARG:CG	2.13	0.52
1:B:46(A):ARG:O	1:B:46(B):LEU:CB	2.57	0.52

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:232:MET:HG2	1:A:245:TYR:CD1	2.46	0.51
2:P:7:THR:O	2:P:8:PHE:HB2	2.11	0.51
1:A:154:TYR:HB2	1:A:310:TYR:CE2	2.46	0.51
1:B:164:GLN:HE22	2:Q:10:ARG:HH11	1.60	0.50
1:B:41:PRO:HB2	1:B:55:LEU:HD23	1.94	0.49
1:A:9:TYR:HA	1:A:12:THR:OG1	2.13	0.49
1:A:97:THR:O	1:A:99:GLN:HA	2.12	0.48
2:Q:6:THR:HA	2:Q:8:PHE:H	1.78	0.48
1:A:77:THR:HA	1:A:78:GLY:HA2	1.59	0.47
1:A:110:LEU:HD22	1:B:51:VAL:HG21	1.96	0.47
1:A:110:LEU:HA	1:B:52:TYR:OH	2.14	0.47
2:P:39:GLN:O	2:P:40:PRO:C	2.57	0.47
1:B:8:ASN:ND2	1:B:10:MET:HG2	2.11	0.47
1:A:8:ASN:HA	2:P:42:LYS:HB2	1.97	0.47
1:A:49:ALA:HA	1:A:52:TYR:CD2	2.50	0.47
1:B:275:VAL:HG22	1:B:284:LEU:HD22	1.96	0.46
1:A:48:THR:O	1:A:49:ALA:HB3	2.15	0.46
1:A:71:LEU:HD22	1:A:84:LEU:HD13	1.96	0.46
1:B:108:PRO:HB2	1:B:111:PRO:HD2	1.96	0.46
1:A:84:LEU:HD21	1:A:133:VAL:HG11	1.97	0.46
1:A:99:GLN:HG3	1:A:136:ILE:HD12	1.97	0.45
2:P:23:LEU:HD13	2:P:30:MET:HE1	1.97	0.45
1:A:53:HIS:HE1	1:A:112:PHE:O	1.99	0.45
1:A:20:ILE:HG12	1:A:89:ILE:HG12	1.97	0.45
1:A:221:ILE:O	1:A:286:ILE:HA	2.16	0.45
1:A:47:TYR:CD2	1:B:48:THR:HG22	2.52	0.45
1:B:154:TYR:HB2	1:B:310:TYR:HE2	1.82	0.45
1:A:201:SER:CA	1:A:202:SER:HB2	2.47	0.44
1:A:252:GLY:HA3	1:A:277:GLN:HE22	1.82	0.44
1:A:181:TYR:HB3	1:A:319:ARG:HD2	1.98	0.44
1:B:259:SER:HB2	1:B:266:GLU:HG2	1.99	0.44
1:A:195:LYS:HB2	1:A:195:LYS:HZ3	1.83	0.44
1:A:201:SER:CB	1:A:202:SER:HB2	2.45	0.44
2:Q:23:LEU:HD22	2:Q:28:VAL:HG21	1.99	0.43
1:A:109:ALA:CB	1:A:110:LEU:HB3	2.46	0.43
1:A:164:GLN:HE22	2:P:10:ARG:HD3	1.84	0.43
1:A:149:ASP:HB2	1:A:316:ARG:HB2	2.01	0.43
1:B:195:LYS:HB2	1:B:261:HIS:HD2	1.84	0.43
1:A:75:TYR:CG	2:P:41:MET:HG3	2.53	0.43
1:B:195:LYS:HB2	1:B:261:HIS:CD2	2.54	0.42
1:B:136:ILE:O	1:B:140:ILE:HG13	2.20	0.42

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:110:LEU:HA	1:A:111:PRO:HA	1.86	0.42
1:A:15:TYR:CE2	1:A:28:LYS:HD3	2.55	0.42
1:B:154:TYR:HB2	1:B:310:TYR:CE2	2.55	0.42
1:A:94:ILE:HD12	1:A:167:LEU:HD13	2.01	0.42
1:A:-5:LEU:N	1:A:5:ILE:O	2.54	0.41
1:A:228:ILE:O	1:A:232:MET:HB2	2.20	0.41
1:B:314:ASP:HB3	1:B:319:ARG:HG2	2.01	0.41
1:A:198:SER:HB2	1:A:259:SER:HB2	2.03	0.41
1:B:46(A):ARG:HB3	1:B:51:VAL:HG12	2.02	0.41
1:B:219:SER:HA	1:B:303:ALA:HB3	2.02	0.41
1:B:235:LEU:HD11	1:B:258:ILE:HD11	2.02	0.41
1:B:221:ILE:HG22	1:B:286:ILE:HG23	2.03	0.40
1:B:53:HIS:HE1	1:B:113:MET:O	2.04	0.40
1:A:154:TYR:HB2	1:A:310:TYR:HE2	1.84	0.40
1:B:165:ILE:HD11	2:Q:13:LEU:HD21	2.04	0.40

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	327/335 (98%)	293 (90%)	19 (6%)	15 (5%)	2	4
1	B	317/335 (95%)	295 (93%)	21 (7%)	1 (0%)	36	59
2	P	36/43 (84%)	30 (83%)	1 (3%)	5 (14%)	0	0
2	Q	23/43 (54%)	20 (87%)	1 (4%)	2 (9%)	0	1
All	All	703/756 (93%)	638 (91%)	42 (6%)	23 (3%)	3	7

All (23) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	-3	LEU
1	A	-2	GLY
1	A	-1	ASN
1	A	8	ASN
1	A	202	SER
1	A	285	ALA
1	A	288	ALA
1	B	76	SER
2	P	40	PRO
2	P	41	MET
1	A	286	ILE
2	P	8	PHE
2	P	38	SER
2	Q	24	LYS
1	A	49	ALA
1	A	109	ALA
2	P	42	LYS
1	A	110	LEU
1	A	224	SER
1	A	46(B)	LEU
1	A	289	MET
2	Q	28	VAL
1	A	156	ASN

### 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	285/285 (100%)	248 (87%)	37 (13%)	4	11
1	B	276/285 (97%)	249 (90%)	27 (10%)	7	20
2	P	35/40 (88%)	28 (80%)	7 (20%)	1	3
2	Q	24/40 (60%)	20 (83%)	4 (17%)	2	6
All	All	620/650 (95%)	545 (88%)	75 (12%)	5	13

All (75) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	-5	LEU
1	A	3	SER
1	A	6	LEU
1	A	9	TYR
1	A	10	MET
1	A	48	THR
1	A	51	VAL
1	A	55	LEU
1	A	76	SER
1	A	79	THR
1	A	81	SER
1	A	84	LEU
1	A	91	VAL
1	A	99	GLN
1	A	116	GLU
1	A	133	VAL
1	A	142	SER
1	A	150	VAL
1	A	158	ASP
1	A	195	LYS
1	A	202	SER
1	A	205	LEU
1	A	206	CYS
1	A	207	GLU
1	A	222	SER
1	A	228	ILE
1	A	229	GLU
1	A	230	LYS
1	A	231	LEU
1	A	233	GLU
1	A	238	LYS
1	A	240	ARG
1	A	248	LYS
1	A	255	LEU
1	A	286	ILE
1	A	315	ARG
1	A	326	ARG
1	B	4	VAL
1	B	17	GLU
1	B	46	SER
1	B	46(A)	ARG
1	B	46(B)	LEU
1	B	70	GLU

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	B	86	GLN
1	B	90	THR
1	B	91	VAL
1	B	96	VAL
1	B	97	THR
1	B	99	GLN
1	B	114	LEU
1	B	133	VAL
1	B	143	GLN
1	B	185	ILE
1	B	195	LYS
1	B	204	LEU
1	B	207	GLU
1	B	211	LEU
1	B	213	LEU
1	B	221	ILE
1	B	227	SER
1	B	248	LYS
1	B	266	GLU
1	B	320	ILE
1	B	324	LEU
2	P	6	THR
2	P	8	PHE
2	P	20	ARG
2	P	24	LYS
2	P	26	ARG
2	P	39	GLN
2	P	43	ARG
2	Q	9	LYS
2	Q	15	ARG
2	Q	26	ARG
2	Q	30	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	66	HIS
1	A	164	GLN
1	A	277	GLN
1	A	317	ASN
1	B	8	ASN
1	B	13	GLN

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	B	53	HIS
1	B	66	HIS
1	B	67	ASN
1	B	128	GLN
1	B	143	GLN
1	B	164	GLN
1	B	183	ASN
1	B	261	HIS
1	B	317	ASN
1	B	318	ASN
2	P	39	GLN

### 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 oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

1 ligand is 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	A	401	1	14,14,15	1.25	1 (7%)	17,19,21	1.24	2 (11%)

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	A	401	1	-	2/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	401	NAG	C1-C2	2.68	1.56	1.52

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	401	NAG	C1-O5-C5	2.77	115.90	112.19
3	A	401	NAG	O5-C1-C2	-2.38	107.61	111.29

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	401	NAG	C4-C5-C6-O6
3	A	401	NAG	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	3
1	B	2

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	159:SER	C	161:LEU	N	6.45
1	B	240:ARG	C	242:LEU	N	3.46
1	B	97:THR	C	99:GLN	N	2.98
1	A	97:THR	C	99:GLN	N	2.95
1	A	240:ARG	C	242:LEU	N	2.92

## 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, 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	335/335 (100%)	0.45	21 (6%) 26 22	23, 47, 87, 103	0
1	B	325/335 (97%)	0.32	22 (6%) 23 20	24, 42, 63, 98	0
2	P	38/43 (88%)	0.79	7 (18%) 3 3	31, 50, 75, 80	0
2	Q	25/43 (58%)	1.00	6 (24%) 2 2	33, 47, 73, 83	0
All	All	723/756 (95%)	0.43	56 (7%) 19 17	23, 45, 79, 103	0

All (56) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	159	SER	6.0
1	A	159	SER	5.6
1	A	-3	LEU	5.2
2	P	6	THR	4.9
2	Q	30	MET	4.9
2	P	43	ARG	4.8
1	B	78	GLY	4.7
1	B	4	VAL	4.7
1	B	5	ILE	4.4
1	B	7	THR	4.2
1	B	110	LEU	4.1
1	B	97	THR	3.9
2	P	40	PRO	3.9
1	A	279(D)	LYS	3.9
1	A	-4	THR	3.7
1	A	204	LEU	3.7
1	A	202	SER	3.6
1	A	203	THR	3.6
1	B	115	ALA	3.5
1	A	242	LEU	3.5
1	A	46(B)	LEU	3.4

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	B	158	ASP	3.3
2	Q	29	ASP	3.3
1	B	49	ALA	3.3
1	B	77	THR	3.3
1	A	240	ARG	3.2
1	A	206	CYS	3.2
1	A	-5	LEU	3.2
1	A	109	ALA	3.1
2	P	39	GLN	3.1
1	A	157	ARG	3.0
2	Q	6	THR	3.0
1	B	200	GLY	2.9
1	B	242	LEU	2.9
1	A	238	LYS	2.8
1	B	111	PRO	2.7
1	B	240	ARG	2.7
2	Q	7	THR	2.7
1	B	45	CYS	2.6
2	P	41	MET	2.6
1	B	326	ARG	2.4
1	B	76	SER	2.4
2	Q	28	VAL	2.4
1	A	195	LYS	2.4
1	A	161	LEU	2.3
2	P	7	THR	2.3
2	P	42	LYS	2.3
1	A	285	ALA	2.2
1	B	278	GLU	2.2
1	A	268	THR	2.1
1	B	8	ASN	2.1
1	A	201	SER	2.1
1	B	203	THR	2.1
1	B	201	SER	2.0
1	A	158	ASP	2.0
2	Q	9	LYS	2.0

## 6.2 Non-standard residues in protein, DNA, RNA chains

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, 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
3	NAG	A	401	14/15	0.79	0.14	50,55,58,59	0

### 6.5 Other polymers [i](#)

There are no such residues in this entry.