



# Full wwPDB X-ray Structure Validation Report ⓘ

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PDB ID : 2WS9 / pdb\_00002ws9  
Title : Equine Rhinitis A Virus at Low pH  
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Deposited on : 2009-09-04  
Resolution : 3.00 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	:	4-5-2 with Phenix2.0
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

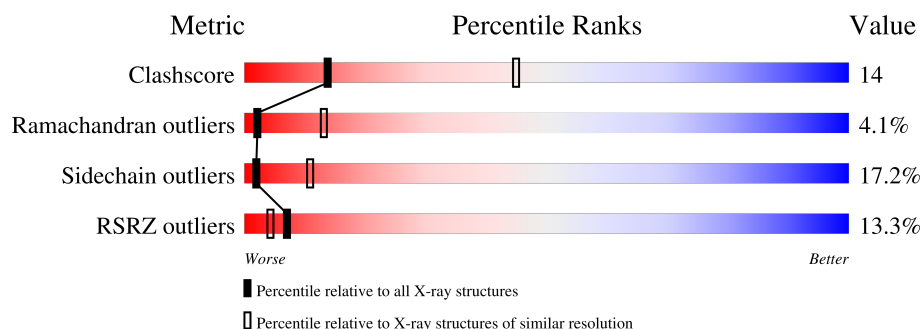
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.00 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	190562	2977 (3.00-3.00)
Ramachandran outliers	187476	2877 (3.00-3.00)
Sidechain outliers	187428	2880 (3.00-3.00)
RSRZ outliers	180081	2671 (3.00-3.00)

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	1	246	<div> <div>11%</div> <div>55%</div> <div>31%</div> <div>10%</div> <div>.</div> </div>
2	2	230	<div> <div>13%</div> <div>54%</div> <div>21%</div> <div>10%</div> <div>.</div> <div>13%</div> </div>
3	3	226	<div> <div>12%</div> <div>58%</div> <div>31%</div> <div>9%</div> <div>.</div> </div>
4	4	80	<div> <div>9%</div> <div>15%</div> <div>5%</div> <div>5%</div> <div>.</div> <div>74%</div> </div>

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 5364 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 P1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	1	246	Total	C	N	O	S	0	0	0
			1928	1240	329	351	8			

- Molecule 2 is a protein called P1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	2	200	Total	C	N	O	S	0	0	0
			1553	997	266	283	7			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
2	85	SER	GLY	conflict	UNP B9VV85

- Molecule 3 is a protein called P1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	3	226	Total	C	N	O	S	0	0	0
			1718	1107	280	325	6			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
3	59	LYS	ARG	conflict	UNP B9VV85

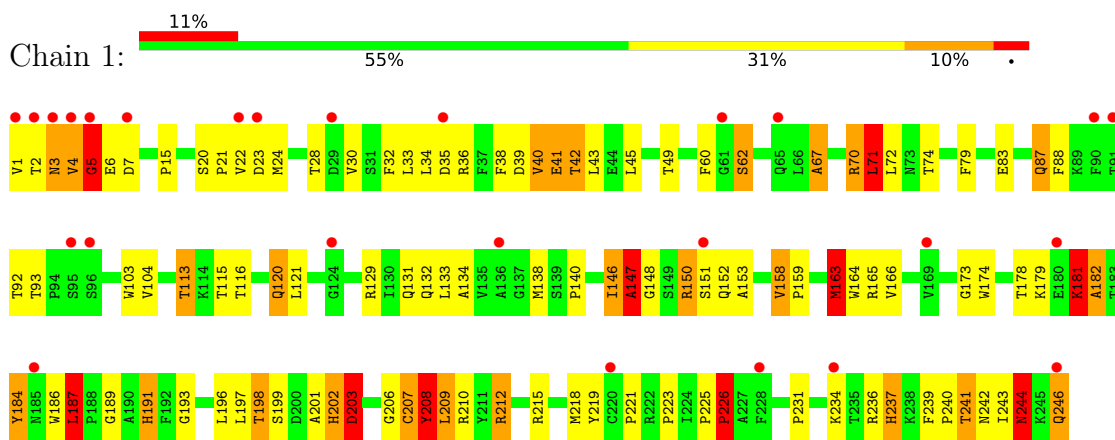
- Molecule 4 is a protein called P1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	4	21	Total	C	N	O	S	0	0	0
			165	101	28	35	1			

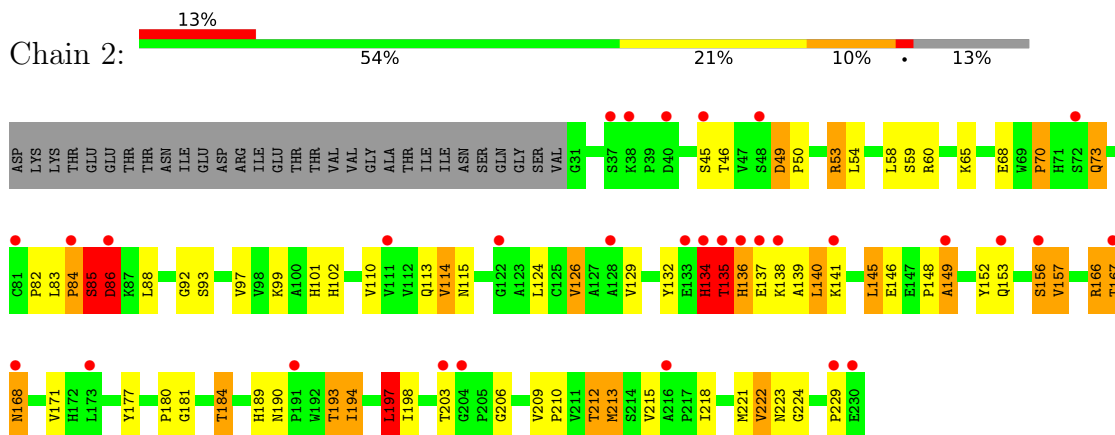
### 3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and 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.

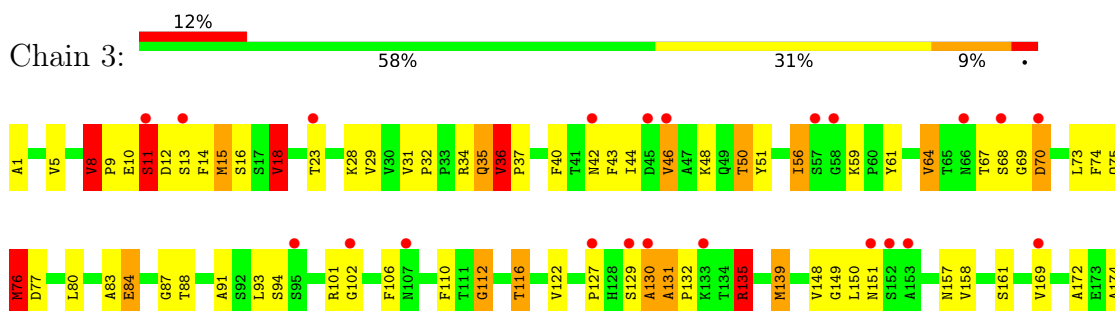
- Molecule 1: P1

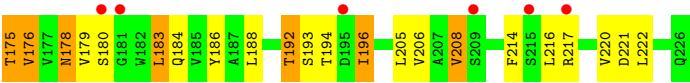


- Molecule 2: P1

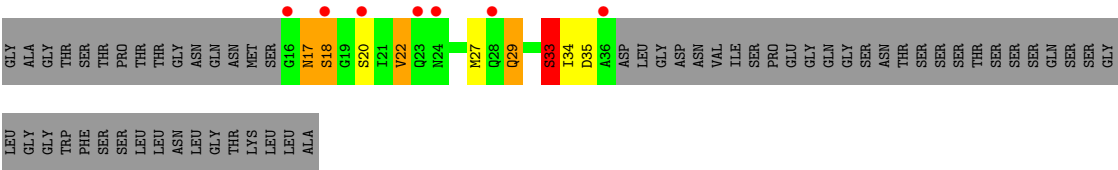


- Molecule 3: P1





● Molecule 4: P1



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	344.80Å 531.40Å 488.30Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 3.00 20.00 – 3.00	Depositor EDS
% Data completeness (in resolution range)	37.1 (20.00-3.00) 41.0 (20.00-3.00)	Depositor EDS
$R_{merge}$	0.28	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.45 (at 3.01Å)	Xtriage
Refinement program	X-PLOR 3.1	Depositor
R, $R_{free}$	0.275 , (Not available) 0.251 , (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	24.4	Xtriage
Anisotropy	0.054	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 41.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.13	EDS
Total number of atoms	5364	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	7.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.10% 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

### 5.1 Standard geometry

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	1	1.00	4/1992 (0.2%)	1.62	54/2721 (2.0%)
2	2	0.96	1/1607 (0.1%)	1.37	22/2208 (1.0%)
3	3	1.03	3/1768 (0.2%)	1.42	35/2420 (1.4%)
4	4	0.80	0/167	1.50	3/224 (1.3%)
All	All	0.99	8/5534 (0.1%)	1.48	114/7573 (1.5%)

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
1	1	0	1
2	2	0	2
All	All	0	3

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	3	76	MET	SD-CE	-9.10	1.56	1.79
1	1	163	MET	SD-CE	-8.86	1.57	1.79
1	1	24	MET	SD-CE	7.32	1.97	1.79
2	2	213	MET	SD-CE	-6.97	1.62	1.79
3	3	11	SER	CA-C	-6.25	1.44	1.52
3	3	15	MET	SD-CE	6.09	1.94	1.79
1	1	138	MET	SD-CE	-5.48	1.65	1.79
1	1	40	VAL	CA-CB	5.12	1.61	1.54

All (114) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	1	207	CYS	N-CA-C	15.41	133.69	111.96
1	1	4	VAL	N-CA-C	13.26	127.35	107.99

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	4	17	ASN	N-CA-C	12.52	128.32	111.30
2	2	138	LYS	N-CA-C	-12.06	90.21	109.39
1	1	87	GLN	N-CA-C	12.03	128.71	113.55
3	3	130	ALA	N-CA-C	11.68	129.56	113.21
1	1	5	GLY	N-CA-C	11.28	139.92	113.18
1	1	203	ASP	N-CA-C	-11.18	93.44	109.31
1	1	146	ILE	CB-CA-C	-10.92	98.92	111.59
1	1	62	SER	N-CA-C	10.67	124.86	110.35
1	1	60	PHE	N-CA-C	10.12	123.74	111.40
1	1	6	GLU	N-CA-C	10.04	125.09	112.24
1	1	21	PRO	N-CA-C	9.41	131.86	112.47
1	1	225	PRO	CA-C-N	9.31	131.48	119.84
1	1	225	PRO	C-N-CA	9.31	131.48	119.84
2	2	86	ASP	CB-CA-C	8.94	124.40	109.38
1	1	7	ASP	N-CA-C	-8.92	102.81	114.31
3	3	16	SER	N-CA-C	8.48	120.52	111.28
1	1	153	ALA	N-CA-C	8.30	120.96	109.18
1	1	23	ASP	N-CA-C	8.02	122.50	112.87
3	3	70	ASP	N-CA-C	7.96	127.75	110.80
2	2	85	SER	N-CA-C	7.90	127.62	110.80
2	2	181	GLY	CA-C-N	7.72	127.39	119.82
2	2	181	GLY	C-N-CA	7.72	127.39	119.82
2	2	134	HIS	N-CA-C	-7.72	94.36	110.80
1	1	70	ARG	N-CA-C	-7.49	97.04	109.46
2	2	148	PRO	N-CA-C	7.23	122.67	112.26
1	1	158	VAL	CB-CA-C	7.22	116.41	109.33
1	1	151	SER	N-CA-C	-7.19	95.54	108.48
3	3	28	LYS	N-CA-C	7.12	121.22	111.54
1	1	113	THR	N-CA-C	7.08	124.65	114.39
1	1	186	TRP	N-CA-C	7.07	125.87	110.80
1	1	242	ASN	CB-CA-C	-7.06	99.80	110.88
1	1	181	LYS	N-CA-C	-7.06	95.77	110.80
1	1	148	GLY	N-CA-C	-7.00	106.75	115.08
3	3	12	ASP	N-CA-C	6.93	121.17	113.21
2	2	85	SER	CA-C-N	-6.88	111.43	122.23
2	2	85	SER	C-N-CA	-6.88	111.43	122.23
1	1	226	PRO	N-CA-C	6.84	126.56	112.47
3	3	64	VAL	N-CA-C	-6.53	98.80	108.85
3	3	14	PHE	N-CA-C	6.42	119.52	111.24
1	1	43	LEU	N-CA-C	6.42	118.82	109.07
3	3	88	THR	N-CA-C	6.42	119.00	110.53
3	3	135	ARG	N-CA-C	6.41	119.25	111.82

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	3	64	VAL	CB-CA-C	-6.41	100.95	110.82
2	2	65	LYS	N-CA-C	-6.35	98.38	108.73
3	3	36	VAL	N-CA-C	6.30	122.48	108.88
1	1	158	VAL	N-CA-CB	-6.25	104.95	111.64
2	2	206	GLY	N-CA-C	6.24	121.57	113.27
1	1	71	LEU	N-CA-C	-6.22	97.55	110.80
3	3	112	GLY	N-CA-C	-6.17	104.64	112.54
1	1	199	SER	N-CA-C	6.16	117.88	108.52
3	3	174	ALA	N-CA-C	6.13	119.71	110.64
2	2	223	ASN	CB-CA-C	-6.12	97.25	109.79
2	2	86	ASP	N-CA-C	-6.11	105.62	114.12
1	1	151	SER	CA-C-N	-6.08	111.03	122.27
1	1	151	SER	C-N-CA	-6.08	111.03	122.27
2	2	102	HIS	N-CA-C	6.07	117.69	111.14
3	3	208	VAL	CB-CA-C	-6.05	101.01	110.69
1	1	113	THR	N-CA-CB	-5.99	103.08	110.98
1	1	4	VAL	CA-C-N	5.95	133.07	121.41
1	1	4	VAL	C-N-CA	5.95	133.07	121.41
2	2	50	PRO	N-CA-C	5.91	120.13	111.03
2	2	129	VAL	N-CA-C	5.87	114.29	107.89
3	3	178	ASN	CB-CA-C	-5.84	100.49	110.24
1	1	121	LEU	N-CA-C	-5.83	100.19	109.59
3	3	192	THR	N-CA-C	-5.82	100.69	109.95
3	3	158	VAL	N-CA-C	-5.79	101.92	107.76
1	1	240	PRO	N-CA-C	-5.76	102.21	111.38
3	3	36	VAL	CA-C-N	5.75	125.72	120.03
3	3	36	VAL	C-N-CA	5.75	125.72	120.03
1	1	40	VAL	N-CA-C	-5.73	100.22	108.53
3	3	18	VAL	CB-CA-C	-5.69	101.00	111.36
1	1	42	THR	N-CA-C	-5.68	99.03	108.75
1	1	20	SER	CA-C-N	5.64	126.89	119.84
1	1	20	SER	C-N-CA	5.64	126.89	119.84
3	3	13	SER	N-CA-C	5.62	117.33	110.41
2	2	135	THR	N-CA-C	5.60	122.73	110.80
1	1	41	GLU	N-CA-C	5.60	122.73	110.80
1	1	134	ALA	N-CA-C	-5.59	106.81	113.97
1	1	244	ASN	N-CA-C	5.59	122.70	110.80
1	1	24	MET	N-CA-C	5.58	119.67	112.86
2	2	49	ASP	CB-CA-C	5.58	117.61	109.08
2	2	59	SER	N-CA-C	-5.56	97.41	107.75
3	3	1	ALA	CA-C-N	-5.55	114.07	119.90
3	3	1	ALA	C-N-CA	-5.55	114.07	119.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	2	229	PRO	N-CA-C	5.55	119.97	112.48
1	1	147	ALA	N-CA-C	-5.51	99.06	110.80
1	1	241	THR	N-CA-CB	-5.50	102.98	111.46
1	1	178	THR	N-CA-C	-5.49	100.22	108.96
2	2	46	THR	N-CA-C	5.38	119.37	112.26
3	3	106	PHE	CA-C-N	-5.34	114.52	122.74
3	3	106	PHE	C-N-CA	-5.34	114.52	122.74
1	1	30	VAL	N-CA-C	5.33	115.96	110.36
3	3	11	SER	N-CA-C	5.32	122.13	110.80
1	1	67	ALA	N-CA-C	5.29	117.80	111.71
3	3	67	THR	CB-CA-C	-5.29	103.73	111.77
4	4	18	SER	N-CA-C	-5.27	98.68	107.80
3	3	150	LEU	N-CA-C	-5.26	99.61	110.80
3	3	169	VAL	N-CA-C	-5.24	105.73	110.82
3	3	69	GLY	N-CA-C	5.22	120.61	111.78
1	1	140	PRO	N-CA-C	5.20	119.73	111.26
1	1	178	THR	CA-C-N	-5.14	114.44	122.05
1	1	178	THR	C-N-CA	-5.14	114.44	122.05
1	1	191	HIS	N-CA-C	5.13	115.01	108.24
3	3	8	VAL	N-CA-CB	-5.12	104.04	111.21
1	1	212	ARG	N-CA-C	-5.07	100.77	109.24
4	4	33	SER	N-CA-C	-5.07	103.24	110.59
3	3	68	SER	N-CA-C	5.06	121.57	110.80
2	2	197	LEU	N-CA-C	5.05	117.64	109.40
1	1	32	PHE	N-CA-C	-5.02	105.72	111.14
3	3	102	GLY	N-CA-C	5.01	118.11	111.70
3	3	76	MET	CA-C-N	-5.01	114.26	121.42
3	3	76	MET	C-N-CA	-5.01	114.26	121.42

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	1	208	TYR	Sidechain
2	2	177	TYR	Sidechain
2	2	86	ASP	Mainchain

## 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	1	1928	0	1864	73	0
2	2	1553	0	1523	51	0
3	3	1718	0	1677	52	0
4	4	165	0	146	5	0
All	All	5364	0	5210	153	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 14.

All (153) 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)
1:1:115:THR:HG21	1:1:131:GLN:HB3	1.44	0.97
2:2:134:HIS:HD2	2:2:145:LEU:HD13	1.43	0.82
2:2:53:ARG:HG2	2:2:221:MET:HE3	1.62	0.81
1:1:70:ARG:O	1:1:71:LEU:HB2	1.81	0.79
1:1:181:LYS:HE3	2:2:137:GLU:HB2	1.67	0.75
1:1:191:HIS:HD2	1:1:193:GLY:H	1.33	0.74
1:1:207:CYS:O	1:1:208:TYR:HB2	1.86	0.74
3:3:46:VAL:O	3:3:50:THR:HB	1.86	0.74
2:2:184:THR:HG21	2:2:189:HIS:ND1	2.03	0.74
2:2:157:VAL:HG23	3:3:50:THR:HG21	1.69	0.73
1:1:115:THR:CG2	1:1:131:GLN:HB3	2.19	0.72
1:1:150:ARG:HE	1:1:150:ARG:H	1.40	0.70
1:1:163:MET:HE1	1:1:189:GLY:HA3	1.73	0.70
1:1:74:THR:HG21	3:3:43:PHE:HE2	1.57	0.69
2:2:134:HIS:CD2	2:2:145:LEU:HD13	2.26	0.69
1:1:92:THR:HG22	1:1:93:THR:H	1.57	0.68
1:1:87:GLN:HE21	1:1:210:ARG:HH22	1.39	0.68
2:2:82:PRO:HA	2:2:193:THR:HB	1.75	0.68
1:1:83:GLU:HB2	1:1:212:ARG:HB3	1.78	0.66
1:1:150:ARG:H	1:1:150:ARG:NE	1.93	0.66
1:1:103:TRP:HB2	1:1:198:THR:HG22	1.78	0.66
1:1:231:PRO:HG2	3:3:83:ALA:HB2	1.77	0.65
2:2:149:ALA:HA	2:2:152:TYR:CE2	2.33	0.63
2:2:132:TYR:HB3	2:2:193:THR:HG21	1.79	0.63
2:2:114:VAL:HG22	2:2:209:VAL:CG1	2.29	0.62
1:1:120:GLN:HG3	1:1:129:ARG:HG2	1.82	0.62
1:1:146:ILE:O	1:1:147:ALA:HB2	1.99	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:115:THR:HG22	1:1:131:GLN:OE1	2.01	0.61
2:2:137:GLU:C	2:2:139:ALA:N	2.55	0.61
1:1:115:THR:HG23	1:1:132:GLN:HB3	1.82	0.61
1:1:74:THR:O	1:1:74:THR:HG22	1.99	0.61
1:1:163:MET:CE	1:1:189:GLY:HA3	2.31	0.61
1:1:159:PRO:HB2	3:3:29:VAL:HG21	1.84	0.60
1:1:181:LYS:O	1:1:182:ALA:HB2	2.01	0.60
1:1:201:ALA:O	1:1:203:ASP:N	2.34	0.60
1:1:181:LYS:HE3	2:2:137:GLU:CB	2.31	0.60
1:1:159:PRO:CB	3:3:29:VAL:HG21	2.33	0.58
2:2:85:SER:HB2	2:2:190:ASN:HD21	1.67	0.58
1:1:5:GLY:HA3	1:1:15:PRO:HD3	1.85	0.58
2:2:114:VAL:HG22	2:2:209:VAL:HG12	1.86	0.58
2:2:97:VAL:O	2:2:101:HIS:HD2	1.87	0.57
1:1:34:LEU:HD11	1:1:218:MET:HE3	1.86	0.57
2:2:132:TYR:HB3	2:2:193:THR:CG2	2.34	0.57
3:3:44:ILE:O	3:3:48:LYS:HG3	2.05	0.57
1:1:87:GLN:NE2	1:1:210:ARG:HH12	2.02	0.57
2:2:126:VAL:HG13	2:2:171:VAL:HG21	1.86	0.57
2:2:54:LEU:HD21	2:2:97:VAL:HG11	1.87	0.56
3:3:42:ASN:HD22	3:3:44:ILE:H	1.50	0.56
1:1:87:GLN:NE2	1:1:210:ARG:HH22	2.03	0.55
2:2:113:GLN:HB2	2:2:212:THR:HG22	1.88	0.55
2:2:126:VAL:HG22	2:2:171:VAL:HG11	1.89	0.54
2:2:134:HIS:O	2:2:136:HIS:N	2.36	0.54
1:1:159:PRO:CG	3:3:29:VAL:HG21	2.38	0.54
3:3:139:MET:HG2	3:3:139:MET:O	2.07	0.54
2:2:137:GLU:O	2:2:139:ALA:N	2.41	0.53
3:3:220:VAL:HG12	3:3:221:ASP:N	2.23	0.53
1:1:33:LEU:O	1:1:36:ARG:HD2	2.08	0.53
2:2:83:LEU:HD11	2:2:194:ILE:HD12	1.91	0.53
3:3:56:ILE:HD12	3:3:74:PHE:CE1	2.43	0.53
3:3:135:ARG:HB3	3:3:186:TYR:CG	2.44	0.53
3:3:148:VAL:HG12	3:3:149:GLY:N	2.24	0.53
3:3:193:SER:HB3	3:3:196:ILE:HD12	1.90	0.52
1:1:45:LEU:HB2	1:1:202:HIS:HA	1.90	0.52
2:2:73:GLN:NE2	2:2:73:GLN:HA	2.25	0.52
2:2:167:THR:HB	2:2:168:ASN:ND2	2.25	0.52
1:1:173:GLY:O	1:1:184:TYR:O	2.28	0.51
2:2:101:HIS:CG	2:2:222:VAL:CG1	2.93	0.51
1:1:70:ARG:HH11	3:3:222:LEU:HD21	1.76	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:104:VAL:HG22	1:1:197:LEU:HD23	1.92	0.51
2:2:157:VAL:HG23	3:3:50:THR:CG2	2.39	0.51
3:3:132:PRO:HG2	3:3:184:GLN:HE22	1.76	0.51
1:1:237:HIS:HB3	1:1:239:PHE:CE1	2.45	0.51
1:1:115:THR:HG22	1:1:116:THR:N	2.24	0.50
2:2:84:PRO:CG	2:2:85:SER:H	2.24	0.50
1:1:191:HIS:CD2	1:1:193:GLY:H	2.21	0.50
1:1:236:ARG:NH1	3:3:172:ALA:O	2.45	0.49
4:4:22:VAL:HG13	4:4:22:VAL:O	2.12	0.49
1:1:38:PHE:O	1:1:210:ARG:HA	2.12	0.49
2:2:213:MET:HE3	2:2:215:VAL:HG22	1.93	0.49
1:1:88:PHE:HA	1:1:206:GLY:O	2.13	0.49
2:2:82:PRO:HB2	2:2:190:ASN:HD22	1.77	0.49
3:3:9:PRO:C	3:3:11:SER:H	2.20	0.49
3:3:130:ALA:O	3:3:131:ALA:HB3	2.13	0.49
1:1:181:LYS:O	1:1:182:ALA:CB	2.61	0.48
2:2:86:ASP:HB3	2:2:141:LYS:HA	1.96	0.48
1:1:87:GLN:O	1:1:152:GLN:O	2.31	0.48
3:3:76:MET:HB2	3:3:84:GLU:HG2	1.96	0.48
1:1:174:TRP:CZ2	2:2:139:ALA:HB3	2.49	0.48
1:1:234:LYS:HD2	3:3:75:GLN:HB3	1.96	0.47
1:1:165:ARG:HG2	2:2:180:PRO:O	2.14	0.47
1:1:243:ILE:HG22	1:1:244:ASN:N	2.28	0.47
1:1:104:VAL:HG22	1:1:197:LEU:CD2	2.44	0.47
1:1:184:TYR:CE1	2:2:139:ALA:HB2	2.50	0.47
2:2:140:LEU:HD23	2:2:140:LEU:N	2.30	0.47
3:3:42:ASN:ND2	3:3:44:ILE:H	2.12	0.47
3:3:110:PHE:HE2	3:3:116:THR:HG22	1.80	0.47
4:4:29:GLN:HB3	4:4:34:ILE:HD11	1.98	0.46
1:1:191:HIS:HD2	1:1:193:GLY:N	2.08	0.46
4:4:20:SER:OG	4:4:22:VAL:HG12	2.15	0.46
1:1:207:CYS:O	1:1:208:TYR:CB	2.57	0.46
2:2:157:VAL:CG2	3:3:50:THR:HG21	2.43	0.46
3:3:36:VAL:HA	3:3:37:PRO:HD3	1.64	0.45
3:3:84:GLU:H	3:3:84:GLU:CD	2.23	0.45
2:2:85:SER:HB2	2:2:190:ASN:ND2	2.31	0.45
1:1:164:TRP:CE2	1:1:187:LEU:HD13	2.51	0.45
1:1:115:THR:OG1	1:1:133:LEU:HB2	2.16	0.45
1:1:174:TRP:CE2	1:1:179:LYS:HB3	2.51	0.45
3:3:61:TYR:HB3	3:3:205:LEU:HD23	1.97	0.45
1:1:35:ASP:OD2	1:1:212:ARG:HD3	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:209:LEU:HD22	1:1:209:LEU:HA	1.74	0.45
3:3:127:PRO:HD3	3:3:180:SER:C	2.42	0.45
1:1:87:GLN:HE21	1:1:210:ARG:NH2	2.12	0.44
2:2:83:LEU:HA	2:2:84:PRO:HA	1.60	0.44
2:2:84:PRO:CD	2:2:85:SER:H	2.31	0.44
2:2:156:SER:HB2	3:3:51:TYR:O	2.18	0.44
1:1:67:ALA:O	1:1:70:ARG:O	2.35	0.44
1:1:165:ARG:HA	3:3:32:PRO:HG2	2.00	0.43
1:1:246:GLN:H	1:1:246:GLN:CD	2.26	0.43
2:2:124:LEU:HD23	2:2:198:ILE:HA	2.00	0.43
1:1:1:VAL:C	1:1:3:ASN:H	2.24	0.43
1:1:79:PHE:CD1	1:1:79:PHE:C	2.96	0.43
1:1:219:TYR:CD1	3:3:36:VAL:HG22	2.53	0.43
1:1:74:THR:HG21	3:3:43:PHE:CE2	2.45	0.43
2:2:166:ARG:HB3	3:3:112:GLY:O	2.19	0.43
3:3:74:PHE:HE2	3:3:183:LEU:HD13	1.84	0.43
1:1:215:ARG:NH1	4:4:33:SER:OG	2.52	0.42
2:2:86:ASP:CB	2:2:141:LYS:HA	2.49	0.42
1:1:202:HIS:C	1:1:203:ASP:O	2.62	0.42
1:1:231:PRO:HG2	3:3:83:ALA:CB	2.48	0.42
3:3:34:ARG:NH2	4:4:35:ASP:OD1	2.52	0.42
2:2:152:TYR:HB3	2:2:197:LEU:HD11	2.02	0.42
2:2:70:PRO:HG2	2:2:73:GLN:HB2	2.02	0.42
3:3:61:TYR:CD1	3:3:61:TYR:C	2.98	0.42
3:3:175:THR:HG23	3:3:176:VAL:N	2.34	0.42
2:2:152:TYR:CB	2:2:197:LEU:HD11	2.49	0.42
3:3:44:ILE:HD12	3:3:44:ILE:HA	1.88	0.42
1:1:72:LEU:HD23	1:1:72:LEU:HA	1.82	0.42
1:1:221:PRO:HD3	3:3:40:PHE:CD2	2.54	0.42
2:2:149:ALA:O	2:2:153:GLN:HG3	2.20	0.42
1:1:212:ARG:NH2	3:3:18:VAL:O	2.46	0.41
3:3:76:MET:O	3:3:76:MET:HG3	2.18	0.41
3:3:110:PHE:CD2	3:3:148:VAL:HG11	2.55	0.41
3:3:148:VAL:CG1	3:3:149:GLY:N	2.83	0.41
3:3:127:PRO:HD3	3:3:180:SER:O	2.21	0.41
1:1:74:THR:O	1:1:74:THR:CG2	2.68	0.41
2:2:115:ASN:HB3	2:2:210:PRO:HG2	2.02	0.41
3:3:101:ARG:O	3:3:214:PHE:HA	2.21	0.41
2:2:153:GLN:CD	3:3:87:GLY:HA3	2.46	0.41
3:3:8:VAL:CG1	3:3:10:GLU:CD	2.94	0.41
3:3:91:ALA:O	3:3:94:SER:HB2	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:174:TRP:CH2	2:2:139:ALA:HB3	2.55	0.40
2:2:68:GLU:O	2:2:70:PRO:HD3	2.21	0.40
3:3:29:VAL:O	3:3:29:VAL:HG23	2.21	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	1	244/246 (99%)	206 (84%)	24 (10%)	14 (6%)	1	8
2	2	198/230 (86%)	183 (92%)	7 (4%)	8 (4%)	2	14
3	3	224/226 (99%)	204 (91%)	14 (6%)	6 (3%)	4	22
4	4	19/80 (24%)	19 (100%)	0	0	100	100
All	All	685/782 (88%)	612 (89%)	45 (7%)	28 (4%)	2	13

All (28) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	1	2	THR
1	1	5	GLY
1	1	41	GLU
1	1	202	HIS
1	1	244	ASN
2	2	84	PRO
2	2	85	SER
2	2	134	HIS
2	2	135	THR
3	3	11	SER
3	3	36	VAL
1	1	22	VAL

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Mol	Chain	Res	Type
1	1	71	LEU
1	1	147	ALA
1	1	182	ALA
1	1	184	TYR
2	2	92	GLY
2	2	224	GLY
3	3	15	MET
3	3	35	GLN
3	3	70	ASP
1	1	3	ASN
1	1	187	LEU
1	1	208	TYR
2	2	149	ALA
3	3	131	ALA
2	2	60	ARG
1	1	226	PRO

### 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	1	208/208 (100%)	183 (88%)	25 (12%)	5	22
2	2	176/203 (87%)	145 (82%)	31 (18%)	2	10
3	3	190/190 (100%)	150 (79%)	40 (21%)	1	6
4	4	18/65 (28%)	12 (67%)	6 (33%)	0	1
All	All	592/666 (89%)	490 (83%)	102 (17%)	2	11

All (102) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	1	4	VAL
1	1	28	THR
1	1	39	ASP
1	1	40	VAL
1	1	42	THR

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Mol	Chain	Res	Type
1	1	49	THR
1	1	62	SER
1	1	71	LEU
1	1	113	THR
1	1	120	GLN
1	1	150	ARG
1	1	158	VAL
1	1	163	MET
1	1	166	VAL
1	1	181	LYS
1	1	187	LEU
1	1	196	LEU
1	1	198	THR
1	1	203	ASP
1	1	209	LEU
1	1	223	PRO
1	1	226	PRO
1	1	237	HIS
1	1	241	THR
1	1	246	GLN
2	2	45	SER
2	2	49	ASP
2	2	53	ARG
2	2	58	LEU
2	2	70	PRO
2	2	73	GLN
2	2	86	ASP
2	2	88	LEU
2	2	93	SER
2	2	99	LYS
2	2	110	VAL
2	2	114	VAL
2	2	126	VAL
2	2	135	THR
2	2	136	HIS
2	2	140	LEU
2	2	145	LEU
2	2	146	GLU
2	2	156	SER
2	2	157	VAL
2	2	166	ARG
2	2	167	THR

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Mol	Chain	Res	Type
2	2	168	ASN
2	2	184	THR
2	2	193	THR
2	2	194	ILE
2	2	197	LEU
2	2	203	THR
2	2	212	THR
2	2	218	ILE
2	2	222	VAL
3	3	5	VAL
3	3	8	VAL
3	3	11	SER
3	3	18	VAL
3	3	23	THR
3	3	31	VAL
3	3	35	GLN
3	3	36	VAL
3	3	46	VAL
3	3	50	THR
3	3	56	ILE
3	3	59	LYS
3	3	64	VAL
3	3	73	LEU
3	3	76	MET
3	3	77	ASP
3	3	80	LEU
3	3	84	GLU
3	3	93	LEU
3	3	116	THR
3	3	122	VAL
3	3	129	SER
3	3	135	ARG
3	3	139	MET
3	3	151	ASN
3	3	157	ASN
3	3	161	SER
3	3	175	THR
3	3	176	VAL
3	3	178	ASN
3	3	179	VAL
3	3	183	LEU
3	3	188	LEU

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Mol	Chain	Res	Type
3	3	192	THR
3	3	194	THR
3	3	196	ILE
3	3	206	VAL
3	3	208	VAL
3	3	216	LEU
3	3	217	ARG
4	4	17	ASN
4	4	18	SER
4	4	22	VAL
4	4	27	MET
4	4	29	GLN
4	4	33	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	1	25	HIS
1	1	47	ASN
1	1	87	GLN
1	1	191	HIS
1	1	217	ASN
2	2	101	HIS
2	2	134	HIS
2	2	136	HIS
2	2	168	ASN
2	2	190	ASN
2	2	207	GLN
3	3	35	GLN
3	3	42	ASN
3	3	75	GLN
3	3	157	ASN
3	3	178	ASN
3	3	184	GLN
3	3	218	HIS
3	3	226	GLN
4	4	17	ASN
4	4	23	GLN
4	4	24	ASN
4	4	31	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](#)

There are no ligands in this entry.

### 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

### 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	1	246/246 (100%)	0.99	26 (10%) 11 6	2, 3, 29, 91	0
2	2	200/230 (86%)	1.07	31 (15%) 5 3	2, 3, 32, 86	0
3	3	226/226 (100%)	1.09	28 (12%) 8 5	2, 3, 16, 31	0
4	4	21/80 (26%)	1.73	7 (33%) 1 1	7, 23, 31, 41	0
All	All	693/782 (88%)	1.07	92 (13%) 7 4	2, 3, 28, 91	0

All (92) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	1	246	GLN	5.8
3	3	180	SER	5.6
2	2	230	GLU	5.5
2	2	136	HIS	5.1
2	2	137	GLU	5.0
3	3	11	SER	4.8
3	3	215	SER	4.7
2	2	133	GLU	4.5
1	1	185	ASN	4.4
2	2	134	HIS	4.0
2	2	229	PRO	3.9
2	2	138	LYS	3.9
4	4	16	GLY	3.8
3	3	42	ASN	3.7
1	1	2	THR	3.7
4	4	18	SER	3.6
3	3	58	GLY	3.6
4	4	24	ASN	3.4
4	4	23	GLN	3.4
1	1	65	GLN	3.2
3	3	130	ALA	3.2

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Mol	Chain	Res	Type	RSRZ
2	2	40	ASP	3.0
2	2	141	LYS	3.0
2	2	168	ASN	3.0
3	3	129	SER	3.0
1	1	1	VAL	3.0
3	3	68	SER	2.9
3	3	209	SER	2.9
2	2	135	THR	2.9
3	3	46	VAL	2.9
3	3	152	SER	2.8
3	3	66	ASN	2.8
2	2	216	ALA	2.8
3	3	195	ASP	2.8
1	1	3	ASN	2.8
4	4	28	GLN	2.8
2	2	84	PRO	2.8
2	2	81	CYS	2.7
2	2	203	THR	2.7
3	3	107	ASN	2.7
1	1	136	ALA	2.7
1	1	23	ASP	2.7
1	1	91	THR	2.6
2	2	86	ASP	2.6
3	3	70	ASP	2.6
3	3	151	ASN	2.6
3	3	57	SER	2.6
1	1	169	VAL	2.6
2	2	122	GLY	2.5
2	2	48	SER	2.5
3	3	23	THR	2.5
1	1	61	GLY	2.5
1	1	220	CYS	2.5
1	1	95	SER	2.5
2	2	191	PRO	2.4
1	1	90	PHE	2.4
1	1	29	ASP	2.4
3	3	127	PRO	2.4
4	4	20	SER	2.3
2	2	128	ALA	2.3
3	3	13	SER	2.3
2	2	153	GLN	2.3
2	2	173	LEU	2.3

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Mol	Chain	Res	Type	RSRZ
2	2	149	ALA	2.3
1	1	234	LYS	2.3
2	2	111	VAL	2.3
1	1	124	GLY	2.2
2	2	167	THR	2.2
1	1	96	SER	2.2
2	2	156	SER	2.2
1	1	4	VAL	2.2
3	3	181	GLY	2.2
2	2	45	SER	2.2
1	1	180	GLU	2.2
2	2	38	LYS	2.2
2	2	204	GLY	2.2
1	1	35	ASP	2.2
3	3	169	VAL	2.1
1	1	5	GLY	2.1
1	1	151	SER	2.1
3	3	95	SER	2.1
1	1	7	ASP	2.1
3	3	133	LYS	2.1
3	3	153	ALA	2.1
3	3	102	GLY	2.1
3	3	45	ASP	2.1
3	3	217	ARG	2.1
1	1	228	PHE	2.1
1	1	22	VAL	2.1
2	2	37	SER	2.0
2	2	72	SER	2.0
4	4	36	ALA	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 ⓘ

There are no oligosaccharides in this entry.

## 6.4 Ligands ⓘ

There are no ligands in this entry.

## 6.5 Other polymers [i](#)

There are no such residues in this entry.