



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 06:15 AM UTC

PDB ID : 1WVI / pdb\_00001wvi  
Title : Crystal structure of putative phosphatase from Streptococcus mutans UA159  
Authors : Fedorov, A.A.; Fedorov, E.V.; Almo, S.C.; Burley, S.K.; New York SGX Research Center for Structural Genomics (NYSGXRC)  
Deposited on : 2004-12-15  
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](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

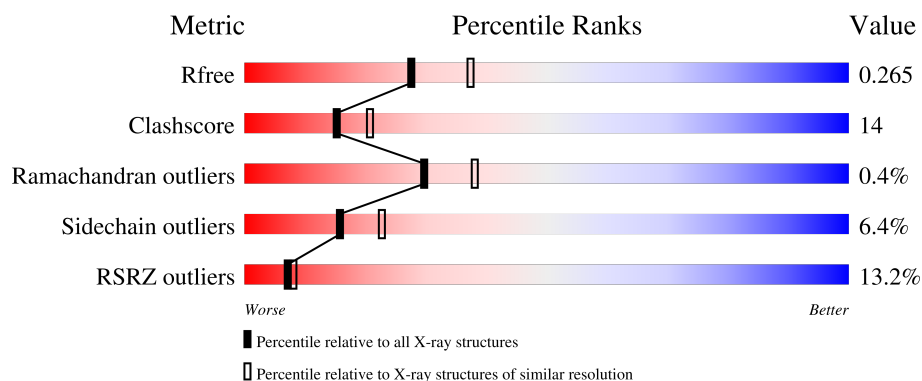
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 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  $\geq 3$ , 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	257	<div> <div>16%</div> <div> <div>69%</div> <div>26%</div> <div>• •</div> </div> </div>
1	B	257	<div> <div>7%</div> <div> <div>69%</div> <div>26%</div> <div>• •</div> </div> </div>
1	C	257	<div> <div>23%</div> <div> <div>68%</div> <div>27%</div> <div>• •</div> </div> </div>
1	D	257	<div> <div>6%</div> <div> <div>69%</div> <div>26%</div> <div>• •</div> </div> </div>

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 7840 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.

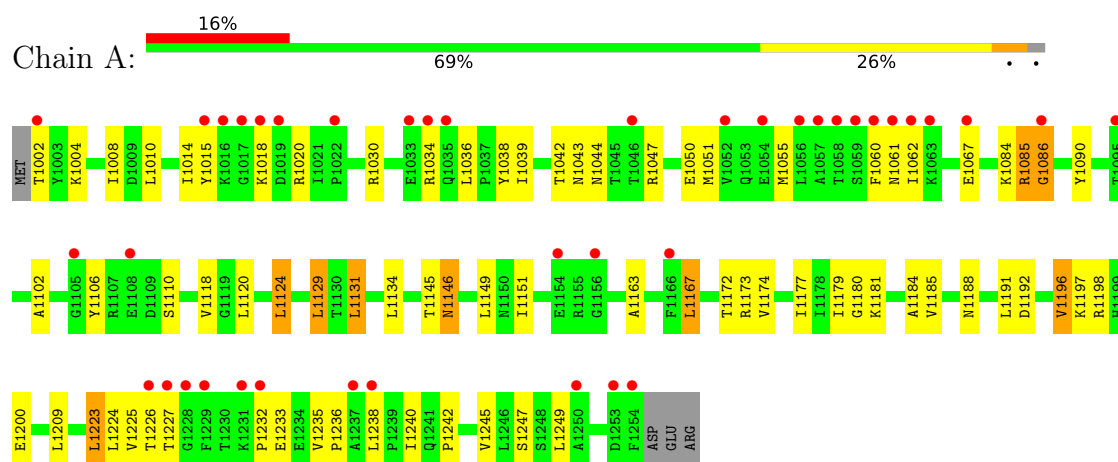
- Molecule 1 is a protein called putative phosphatases involved in N-acetyl-glucosamine catabolism.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	253	Total	C	N	O	S	0	0	0
			1960	1259	320	375	6			
1	B	253	Total	C	N	O	S	0	0	0
			1960	1259	320	375	6			
1	C	253	Total	C	N	O	S	0	0	0
			1960	1259	320	375	6			
1	D	253	Total	C	N	O	S	0	0	0
			1960	1259	320	375	6			

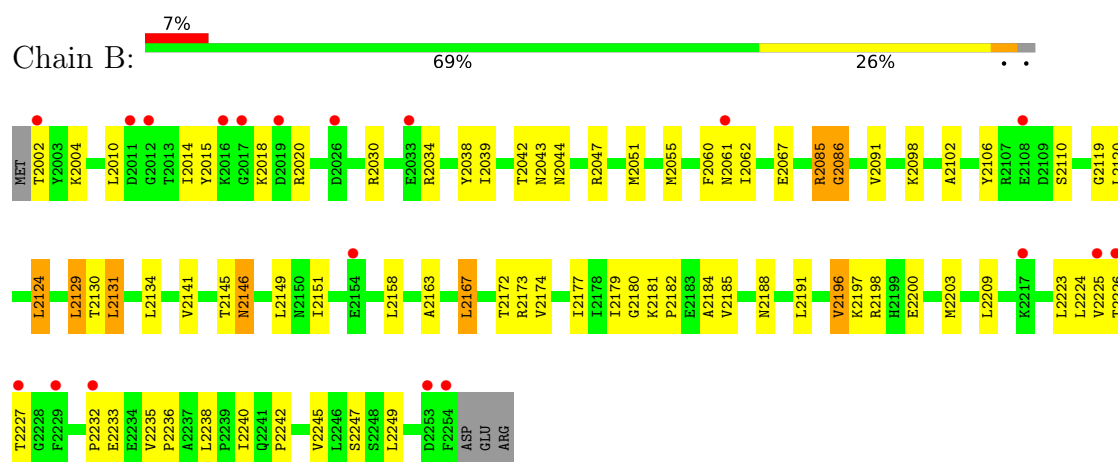
### 3 Residue-property plots

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.

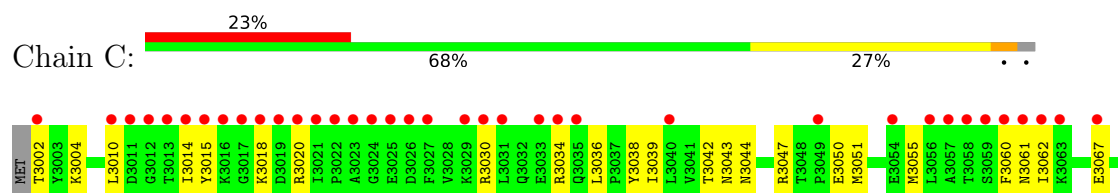
- Molecule 1: putative phosphatases involved in N-acetyl-glucosamine catabolism

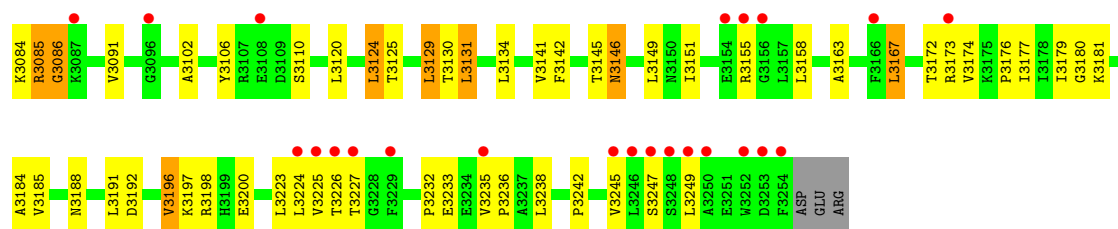


- Molecule 1: putative phosphatases involved in N-acetyl-glucosamine catabolism

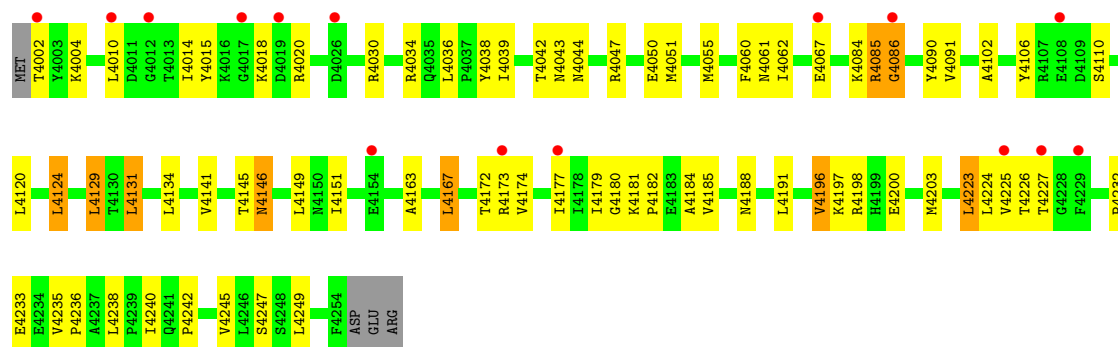


- Molecule 1: putative phosphatases involved in N-acetyl-glucosamine catabolism





- Molecule 1: putative phosphatases involved in N-acetyl-glucosamine catabolism



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	63.64Å 107.42Å 81.94Å 90.00° 97.40° 90.00°	Depositor
Resolution (Å)	25.00 – 2.30 25.00 – 2.30	Depositor EDS
% Data completeness (in resolution range)	98.4 (25.00-2.30) 98.4 (25.00-2.30)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	9.41 (at 2.31Å)	Xtriage
Refinement program	CNS 1.0	Depositor
R, $R_{free}$	0.248 , 0.264 0.248 , 0.265	Depositor DCC
$R_{free}$ test set	2395 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	30.2	Xtriage
Anisotropy	0.243	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 37.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	7840	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.05% 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	A	0.45	0/1994	0.95	10/2711 (0.4%)
1	B	0.49	1/1994 (0.1%)	0.96	8/2711 (0.3%)
1	C	0.45	0/1994	0.96	7/2711 (0.3%)
1	D	0.48	1/1994 (0.1%)	0.96	8/2711 (0.3%)
All	All	0.47	2/7976 (0.0%)	0.96	33/10844 (0.3%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	2203	MET	SD-CE	-6.27	1.63	1.79
1	D	4203	MET	SD-CE	-6.20	1.64	1.79

All (33) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	3184	ALA	N-CA-C	9.53	121.27	111.07
1	A	1184	ALA	N-CA-C	9.36	121.09	111.07
1	B	2184	ALA	N-CA-C	9.10	120.81	111.07
1	D	4184	ALA	N-CA-C	9.01	120.72	111.07
1	A	1179	ILE	N-CA-C	7.36	117.96	110.82
1	B	2179	ILE	N-CA-C	7.04	117.65	110.82
1	A	1185	VAL	N-CA-C	6.81	117.51	110.36
1	D	4180	GLY	N-CA-C	6.70	121.22	112.25
1	C	3180	GLY	N-CA-C	6.66	121.17	112.25
1	B	2180	GLY	N-CA-C	6.65	121.17	112.25
1	C	3179	ILE	N-CA-C	6.62	117.25	110.82
1	C	3185	VAL	N-CA-C	6.60	117.29	110.36
1	D	4179	ILE	N-CA-C	6.42	117.04	110.82
1	A	1180	GLY	N-CA-C	6.33	120.73	112.25
1	D	4185	VAL	N-CA-C	6.09	116.75	110.36
1	B	2185	VAL	N-CA-C	5.97	116.63	110.36
1	A	1085	ARG	N-CA-C	-5.49	102.05	109.95
1	D	4085	ARG	N-CA-C	-5.44	102.11	109.95

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1008	ILE	N-CA-C	5.38	115.87	108.12
1	C	3227	THR	N-CA-C	-5.37	102.94	110.35
1	B	2227	THR	N-CA-C	-5.33	102.99	110.35
1	D	4227	THR	N-CA-C	-5.32	103.01	110.35
1	C	3091	VAL	N-CA-C	5.28	115.50	108.11
1	C	3085	ARG	N-CA-C	-5.26	102.12	109.69
1	A	1227	THR	N-CA-C	-5.24	103.12	110.35
1	A	1118	VAL	N-CA-C	5.23	115.65	108.12
1	B	2085	ARG	N-CA-C	-5.22	102.17	109.69
1	A	1209	LEU	N-CA-C	5.17	116.91	111.28
1	D	4091	VAL	N-CA-C	5.16	115.33	108.11
1	D	4090	TYR	N-CA-C	-5.05	100.94	109.07
1	B	2119	GLY	N-CA-C	-5.03	104.28	111.42
1	A	1090	TYR	N-CA-C	-5.01	101.00	109.07
1	B	2209	LEU	N-CA-C	5.01	116.74	111.28

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	1960	0	2021	56	0
1	B	1960	0	2021	58	0
1	C	1960	0	2021	58	0
1	D	1960	0	2021	57	0
All	All	7840	0	8084	216	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 (216) 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:1043:ASN:HD21	1:A:1181:LYS:H	1.25	0.82

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:2043:ASN:HD21	1:B:2181:LYS:H	1.27	0.82
1:C:3196:VAL:HG13	1:C:3200:GLU:HB2	1.63	0.81
1:D:4043:ASN:HD21	1:D:4181:LYS:H	1.28	0.81
1:D:4044:ASN:HD21	1:D:4047:ARG:H	1.29	0.80
1:A:1196:VAL:HG13	1:A:1200:GLU:HB2	1.62	0.80
1:B:2044:ASN:HD21	1:B:2047:ARG:H	1.28	0.80
1:C:3043:ASN:HD21	1:C:3181:LYS:H	1.29	0.80
1:B:2196:VAL:HG13	1:B:2200:GLU:HB2	1.62	0.79
1:D:4196:VAL:HG13	1:D:4200:GLU:HB2	1.63	0.79
1:A:1044:ASN:HD21	1:A:1047:ARG:H	1.28	0.78
1:C:3044:ASN:HD21	1:C:3047:ARG:H	1.29	0.78
1:C:3196:VAL:CG1	1:C:3200:GLU:HB2	2.15	0.76
1:A:1196:VAL:CG1	1:A:1200:GLU:HB2	2.16	0.75
1:B:2163:ALA:HB1	1:C:3167:LEU:HD13	1.69	0.74
1:B:2196:VAL:CG1	1:B:2200:GLU:HB2	2.18	0.73
1:D:4196:VAL:CG1	1:D:4200:GLU:HB2	2.20	0.71
1:B:2130:THR:HG23	1:C:3158:LEU:HG	1.73	0.70
1:B:2167:LEU:HD13	1:C:3163:ALA:HB1	1.73	0.70
1:C:3188:ASN:ND2	1:C:3198:ARG:HH22	1.92	0.68
1:D:4002:THR:HB	1:D:4004:LYS:NZ	2.09	0.68
1:D:4188:ASN:ND2	1:D:4198:ARG:HH22	1.94	0.65
1:B:2188:ASN:ND2	1:B:2198:ARG:HH22	1.93	0.65
1:A:1002:THR:HB	1:A:1004:LYS:NZ	2.12	0.65
1:A:1188:ASN:ND2	1:A:1198:ARG:HH22	1.95	0.64
1:C:3002:THR:HB	1:C:3004:LYS:NZ	2.12	0.64
1:B:2002:THR:HB	1:B:2004:LYS:NZ	2.13	0.64
1:D:4235:VAL:HG22	1:D:4236:PRO:HD3	1.80	0.64
1:B:2235:VAL:CG2	1:B:2236:PRO:HD3	2.28	0.63
1:D:4235:VAL:CG2	1:D:4236:PRO:HD3	2.28	0.63
1:A:1235:VAL:HG22	1:A:1236:PRO:HD3	1.80	0.63
1:C:3235:VAL:HG22	1:C:3236:PRO:HD3	1.81	0.63
1:D:4225:VAL:HG11	1:D:4249:LEU:HD22	1.81	0.62
1:B:2225:VAL:HG11	1:B:2249:LEU:HD22	1.81	0.62
1:A:1225:VAL:HG11	1:A:1249:LEU:HD22	1.81	0.61
1:B:2141:VAL:HG13	1:D:4240:ILE:HD12	1.81	0.61
1:B:2235:VAL:HG22	1:B:2236:PRO:HD3	1.79	0.61
1:C:3225:VAL:HG11	1:C:3249:LEU:HD22	1.82	0.61
1:B:2158:LEU:HG	1:C:3130:THR:HG23	1.82	0.60
1:A:1235:VAL:CG2	1:A:1236:PRO:HD3	2.31	0.60
1:C:3235:VAL:CG2	1:C:3236:PRO:HD3	2.31	0.60
1:A:1020:ARG:HH12	1:A:1061:ASN:HD22	1.52	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:3030:ARG:O	1:C:3034:ARG:HG2	2.05	0.57
1:A:1030:ARG:O	1:A:1034:ARG:HG2	2.04	0.56
1:B:2240:ILE:HD12	1:D:4141:VAL:HG13	1.87	0.56
1:D:4030:ARG:O	1:D:4034:ARG:HG2	2.05	0.56
1:B:2002:THR:HB	1:B:2004:LYS:HZ2	1.69	0.56
1:C:3020:ARG:HH12	1:C:3061:ASN:HD22	1.54	0.56
1:B:2044:ASN:ND2	1:B:2047:ARG:H	2.03	0.55
1:D:4020:ARG:HH12	1:D:4061:ASN:HD22	1.54	0.55
1:B:2030:ARG:O	1:B:2034:ARG:HG2	2.07	0.55
1:C:3226:THR:OG1	1:C:3247:SER:HA	2.07	0.55
1:A:1067:GLU:H	1:A:1067:GLU:CD	2.15	0.55
1:B:2020:ARG:HH12	1:B:2061:ASN:HD22	1.55	0.54
1:A:1043:ASN:HD21	1:A:1181:LYS:N	2.02	0.54
1:A:1044:ASN:ND2	1:A:1047:ARG:H	2.03	0.54
1:D:4067:GLU:H	1:D:4067:GLU:CD	2.16	0.54
1:A:1226:THR:OG1	1:A:1247:SER:HA	2.08	0.54
1:B:2067:GLU:H	1:B:2067:GLU:CD	2.16	0.54
1:C:3067:GLU:H	1:C:3067:GLU:CD	2.16	0.53
1:A:1002:THR:HB	1:A:1004:LYS:HZ2	1.73	0.53
1:D:4226:THR:OG1	1:D:4247:SER:HA	2.09	0.53
1:B:2226:THR:OG1	1:B:2247:SER:HA	2.09	0.53
1:B:2043:ASN:HD21	1:B:2181:LYS:N	2.03	0.52
1:B:2131:LEU:HD13	1:C:3155:ARG:NH2	2.25	0.51
1:D:4002:THR:HB	1:D:4004:LYS:HZ2	1.76	0.51
1:A:1240:ILE:HD12	1:C:3141:VAL:HG13	1.92	0.50
1:C:3167:LEU:CD1	1:C:3167:LEU:C	2.85	0.50
1:D:4044:ASN:ND2	1:D:4047:ARG:H	2.04	0.50
1:A:1167:LEU:CD1	1:A:1167:LEU:C	2.85	0.50
1:D:4232:PRO:O	1:D:4235:VAL:HG22	2.12	0.50
1:C:3014:ILE:HG13	1:C:3015:TYR:HD1	1.77	0.49
1:C:3044:ASN:ND2	1:C:3047:ARG:H	2.05	0.49
1:D:4149:LEU:HD22	1:D:4149:LEU:N	2.26	0.49
1:A:1235:VAL:HA	1:A:1238:LEU:HG	1.95	0.49
1:D:4038:TYR:C	1:D:4039:ILE:HD12	2.37	0.49
1:B:2167:LEU:CD1	1:B:2167:LEU:C	2.85	0.49
1:C:3018:LYS:N	1:C:3018:LYS:HD2	2.27	0.49
1:B:2149:LEU:HD22	1:B:2149:LEU:N	2.27	0.49
1:B:2038:TYR:C	1:B:2039:ILE:HD12	2.36	0.48
1:A:1149:LEU:HD22	1:A:1149:LEU:N	2.29	0.48
1:B:2151:ILE:O	1:B:2151:ILE:HG23	2.13	0.48
1:D:4124:LEU:HD21	1:D:4129:LEU:HD13	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1014:ILE:HG13	1:A:1015:TYR:HD1	1.79	0.48
1:A:1085:ARG:O	1:A:1086:GLY:C	2.56	0.48
1:C:3047:ARG:NH1	1:C:3055:MET:SD	2.86	0.48
1:C:3151:ILE:O	1:C:3151:ILE:HG23	2.12	0.48
1:C:3232:PRO:O	1:C:3235:VAL:HG22	2.13	0.48
1:D:4014:ILE:HG13	1:D:4015:TYR:HD1	1.79	0.48
1:C:3235:VAL:HA	1:C:3238:LEU:HG	1.94	0.48
1:D:4018:LYS:N	1:D:4018:LYS:HD2	2.29	0.48
1:C:3010:LEU:HD12	1:C:3042:THR:HB	1.95	0.48
1:B:2014:ILE:HG13	1:B:2015:TYR:HD1	1.79	0.48
1:B:2232:PRO:O	1:B:2235:VAL:HG22	2.14	0.48
1:D:4085:ARG:O	1:D:4086:GLY:C	2.56	0.47
1:D:4167:LEU:CD1	1:D:4167:LEU:C	2.87	0.47
1:A:1020:ARG:HB3	1:A:1060:PHE:HD1	1.79	0.47
1:B:2235:VAL:HA	1:B:2238:LEU:HG	1.96	0.47
1:A:1232:PRO:O	1:A:1235:VAL:HG22	2.14	0.47
1:D:4043:ASN:HD21	1:D:4181:LYS:N	2.05	0.47
1:C:3038:TYR:C	1:C:3039:ILE:HD12	2.39	0.47
1:A:1223:LEU:C	1:A:1223:LEU:HD23	2.39	0.47
1:A:1242:PRO:HG2	1:A:1245:VAL:HG22	1.97	0.47
1:C:3085:ARG:O	1:C:3086:GLY:C	2.57	0.47
1:A:1167:LEU:C	1:A:1167:LEU:HD12	2.39	0.47
1:C:3196:VAL:CG1	1:C:3197:LYS:N	2.78	0.47
1:D:4151:ILE:O	1:D:4151:ILE:HG23	2.15	0.47
1:A:1124:LEU:HD21	1:A:1129:LEU:HD13	1.96	0.47
1:A:1151:ILE:O	1:A:1151:ILE:HG23	2.15	0.47
1:B:2223:LEU:C	1:B:2223:LEU:HD23	2.40	0.47
1:B:2242:PRO:HG2	1:B:2245:VAL:HG22	1.96	0.47
1:D:4020:ARG:HB3	1:D:4060:PHE:HD1	1.80	0.47
1:D:4110:SER:HB2	1:D:4131:LEU:HG	1.97	0.47
1:A:1047:ARG:HG2	1:A:1051:MET:HE2	1.97	0.47
1:C:3242:PRO:HG2	1:C:3245:VAL:HG22	1.96	0.47
1:D:4235:VAL:HA	1:D:4238:LEU:HG	1.96	0.47
1:B:2020:ARG:HB3	1:B:2060:PHE:HD1	1.79	0.47
1:A:1018:LYS:N	1:A:1018:LYS:HD2	2.29	0.47
1:C:3020:ARG:HB3	1:C:3060:PHE:HD1	1.80	0.47
1:C:3002:THR:HB	1:C:3004:LYS:HZ2	1.78	0.46
1:C:3167:LEU:C	1:C:3167:LEU:HD12	2.41	0.46
1:A:1010:LEU:HD12	1:A:1042:THR:HB	1.96	0.46
1:B:2018:LYS:N	1:B:2018:LYS:HD2	2.29	0.46
1:C:3145:THR:OG1	1:C:3146:ASN:ND2	2.48	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:4002:THR:HB	1:D:4004:LYS:HZ1	1.78	0.46
1:A:1047:ARG:NH1	1:A:1055:MET:SD	2.88	0.46
1:A:1038:TYR:C	1:A:1039:ILE:HD12	2.40	0.46
1:A:1110:SER:HB2	1:A:1131:LEU:HG	1.97	0.46
1:B:2149:LEU:HD22	1:B:2149:LEU:H	1.81	0.46
1:B:2233:GLU:O	1:B:2236:PRO:HD2	2.16	0.46
1:C:3110:SER:HB2	1:C:3131:LEU:HG	1.97	0.46
1:A:1233:GLU:O	1:A:1236:PRO:HD2	2.16	0.46
1:B:2167:LEU:C	1:B:2167:LEU:HD12	2.39	0.46
1:C:3223:LEU:C	1:C:3223:LEU:HD23	2.41	0.46
1:D:4047:ARG:HG2	1:D:4051:MET:HE2	1.97	0.46
1:B:2085:ARG:O	1:B:2086:GLY:C	2.56	0.46
1:C:3043:ASN:HD21	1:C:3181:LYS:N	2.05	0.46
1:D:4233:GLU:O	1:D:4236:PRO:HD2	2.16	0.46
1:C:3047:ARG:HG2	1:C:3051:MET:HE2	1.97	0.46
1:D:4223:LEU:C	1:D:4223:LEU:HD23	2.41	0.45
1:B:2124:LEU:HD21	1:B:2129:LEU:HD13	1.98	0.45
1:D:4060:PHE:O	1:D:4062:ILE:HG13	2.16	0.45
1:C:3149:LEU:N	1:C:3149:LEU:HD22	2.30	0.45
1:D:4149:LEU:HD22	1:D:4149:LEU:H	1.81	0.45
1:C:3233:GLU:O	1:C:3236:PRO:HD2	2.16	0.45
1:D:4047:ARG:NH1	1:D:4055:MET:SD	2.89	0.44
1:D:4102:ALA:HA	1:D:4106:TYR:O	2.17	0.44
1:B:2010:LEU:HD12	1:B:2042:THR:HB	1.98	0.44
1:B:2047:ARG:HG2	1:B:2051:MET:HE2	2.00	0.44
1:B:2047:ARG:NH1	1:B:2055:MET:SD	2.90	0.44
1:C:3124:LEU:HD21	1:C:3129:LEU:HD13	1.99	0.44
1:D:4085:ARG:O	1:D:4086:GLY:O	2.35	0.44
1:C:3050:GLU:H	1:C:3050:GLU:CD	2.26	0.44
1:C:3142:PHE:CE1	1:C:3176:PRO:HB3	2.53	0.44
1:D:4167:LEU:C	1:D:4167:LEU:HD12	2.43	0.44
1:C:3196:VAL:HG12	1:C:3197:LYS:O	2.18	0.43
1:D:4196:VAL:CG1	1:D:4197:LYS:N	2.81	0.43
1:A:1149:LEU:HD22	1:A:1149:LEU:H	1.83	0.43
1:B:2145:THR:OG1	1:B:2146:ASN:ND2	2.51	0.43
1:A:1167:LEU:HB2	1:D:4167:LEU:HB2	2.00	0.43
1:B:2196:VAL:HG12	1:B:2197:LYS:O	2.18	0.43
1:B:2110:SER:HB2	1:B:2131:LEU:HG	2.00	0.43
1:D:4196:VAL:HG12	1:D:4197:LYS:O	2.17	0.43
1:A:1196:VAL:CG1	1:A:1197:LYS:N	2.80	0.43
1:A:1167:LEU:HD13	1:D:4163:ALA:HB1	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:2196:VAL:CG1	1:B:2197:LYS:N	2.81	0.43
1:C:3002:THR:HB	1:C:3004:LYS:HZ1	1.82	0.43
1:A:1085:ARG:O	1:A:1086:GLY:O	2.37	0.43
1:B:2060:PHE:O	1:B:2062:ILE:HG13	2.19	0.43
1:B:2163:ALA:C	1:C:3167:LEU:HD22	2.44	0.43
1:D:4010:LEU:HD12	1:D:4042:THR:HB	2.00	0.43
1:D:4010:LEU:HD23	1:D:4014:ILE:HD11	2.01	0.43
1:D:4020:ARG:NH1	1:D:4061:ASN:HD22	2.17	0.43
1:A:1020:ARG:NH1	1:A:1061:ASN:HD22	2.15	0.42
1:A:1223:LEU:C	1:A:1223:LEU:CD2	2.92	0.42
1:D:4242:PRO:HG2	1:D:4245:VAL:HG22	2.00	0.42
1:A:1102:ALA:HA	1:A:1106:TYR:O	2.20	0.42
1:A:1172:THR:O	1:A:1173:ARG:HB2	2.20	0.42
1:D:4010:LEU:CD2	1:D:4014:ILE:HD11	2.50	0.42
1:B:2085:ARG:O	1:B:2086:GLY:O	2.38	0.42
1:A:1010:LEU:CD2	1:A:1014:ILE:HD11	2.50	0.42
1:B:2223:LEU:C	1:B:2223:LEU:CD2	2.92	0.42
1:C:3085:ARG:O	1:C:3086:GLY:O	2.37	0.42
1:A:1163:ALA:HB1	1:D:4167:LEU:HD13	2.02	0.42
1:B:2124:LEU:O	1:C:3125:THR:HA	2.20	0.42
1:C:3060:PHE:O	1:C:3062:ILE:HG13	2.20	0.42
1:C:3146:ASN:N	1:C:3146:ASN:HD22	2.17	0.42
1:B:2172:THR:O	1:B:2173:ARG:HB2	2.20	0.42
1:D:4145:THR:OG1	1:D:4146:ASN:ND2	2.51	0.42
1:B:2010:LEU:CD2	1:B:2014:ILE:HD11	2.50	0.42
1:D:4172:THR:O	1:D:4173:ARG:HB2	2.20	0.42
1:A:1145:THR:OG1	1:A:1146:ASN:ND2	2.53	0.41
1:A:1050:GLU:H	1:A:1050:GLU:CD	2.28	0.41
1:C:3034:ARG:HB2	1:C:3036:LEU:HG	2.02	0.41
1:A:1060:PHE:O	1:A:1062:ILE:HG13	2.20	0.41
1:D:4223:LEU:C	1:D:4223:LEU:CD2	2.93	0.41
1:A:1225:VAL:HG11	1:A:1249:LEU:CD2	2.50	0.41
1:B:2146:ASN:N	1:B:2146:ASN:HD22	2.19	0.41
1:D:4034:ARG:HB2	1:D:4036:LEU:HG	2.02	0.41
1:A:1084:LYS:O	1:A:1084:LYS:HG3	2.20	0.41
1:A:1146:ASN:N	1:A:1146:ASN:HD22	2.19	0.41
1:B:2010:LEU:HD23	1:B:2014:ILE:HD11	2.03	0.41
1:D:4084:LYS:O	1:D:4084:LYS:HG3	2.20	0.41
1:D:4181:LYS:HE3	1:D:4181:LYS:HB2	1.89	0.41
1:C:3102:ALA:HA	1:C:3106:TYR:O	2.21	0.41
1:B:2102:ALA:HA	1:B:2106:TYR:O	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:4050:GLU:H	1:D:4050:GLU:CD	2.29	0.41
1:C:3149:LEU:HD22	1:C:3149:LEU:H	1.86	0.41
1:C:3172:THR:O	1:C:3173:ARG:HB2	2.21	0.41
1:C:3084:LYS:O	1:C:3084:LYS:HG3	2.21	0.40
1:A:1010:LEU:HD23	1:A:1014:ILE:HD11	2.02	0.40
1:A:1085:ARG:HG2	1:A:1085:ARG:HH11	1.86	0.40
1:A:1034:ARG:HB2	1:A:1036:LEU:HG	2.03	0.40
1:B:2091:VAL:HB	1:B:2098:LYS:HG2	2.03	0.40
1:B:2225:VAL:HG11	1:B:2249:LEU:CD2	2.51	0.40
1:C:3181:LYS:HE3	1:C:3181:LYS:HB2	1.91	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles ⓘ

### 5.3.1 Protein backbone ⓘ

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	251/257 (98%)	243 (97%)	7 (3%)	1 (0%)	30	38
1	B	251/257 (98%)	243 (97%)	7 (3%)	1 (0%)	30	38
1	C	251/257 (98%)	243 (97%)	7 (3%)	1 (0%)	30	38
1	D	251/257 (98%)	243 (97%)	7 (3%)	1 (0%)	30	38
All	All	1004/1028 (98%)	972 (97%)	28 (3%)	4 (0%)	30	38

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	4086	GLY
1	A	1086	GLY
1	B	2086	GLY
1	C	3086	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	212/216 (98%)	198 (93%)	14 (7%)	15	21
1	B	212/216 (98%)	199 (94%)	13 (6%)	17	24
1	C	212/216 (98%)	199 (94%)	13 (6%)	17	24
1	D	212/216 (98%)	198 (93%)	14 (7%)	15	21
All	All	848/864 (98%)	794 (94%)	54 (6%)	16	23

All (54) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1120	LEU
1	A	1124	LEU
1	A	1129	LEU
1	A	1131	LEU
1	A	1134	LEU
1	A	1146	ASN
1	A	1167	LEU
1	A	1174	VAL
1	A	1177	ILE
1	A	1191	LEU
1	A	1192	ASP
1	A	1196	VAL
1	A	1223	LEU
1	A	1224	LEU
1	B	2120	LEU
1	B	2124	LEU
1	B	2129	LEU
1	B	2131	LEU
1	B	2134	LEU
1	B	2146	ASN
1	B	2167	LEU
1	B	2174	VAL
1	B	2177	ILE
1	B	2182	PRO

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Mol	Chain	Res	Type
1	B	2191	LEU
1	B	2196	VAL
1	B	2224	LEU
1	C	3120	LEU
1	C	3124	LEU
1	C	3129	LEU
1	C	3131	LEU
1	C	3134	LEU
1	C	3146	ASN
1	C	3167	LEU
1	C	3174	VAL
1	C	3177	ILE
1	C	3191	LEU
1	C	3192	ASP
1	C	3196	VAL
1	C	3224	LEU
1	D	4120	LEU
1	D	4124	LEU
1	D	4129	LEU
1	D	4131	LEU
1	D	4134	LEU
1	D	4146	ASN
1	D	4167	LEU
1	D	4174	VAL
1	D	4177	ILE
1	D	4182	PRO
1	D	4191	LEU
1	D	4196	VAL
1	D	4223	LEU
1	D	4224	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (32) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1032	GLN
1	A	1043	ASN
1	A	1044	ASN
1	A	1061	ASN
1	A	1137	GLN
1	A	1146	ASN
1	A	1150	ASN
1	A	1188	ASN

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Mol	Chain	Res	Type
1	B	2032	GLN
1	B	2043	ASN
1	B	2044	ASN
1	B	2061	ASN
1	B	2137	GLN
1	B	2146	ASN
1	B	2150	ASN
1	B	2188	ASN
1	C	3032	GLN
1	C	3043	ASN
1	C	3044	ASN
1	C	3061	ASN
1	C	3137	GLN
1	C	3146	ASN
1	C	3150	ASN
1	C	3188	ASN
1	D	4032	GLN
1	D	4043	ASN
1	D	4044	ASN
1	D	4061	ASN
1	D	4137	GLN
1	D	4146	ASN
1	D	4150	ASN
1	D	4188	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 ⓘ

There are no ligands in this entry.

## 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, 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	253/257 (98%)	0.87	40 (15%) <b>5</b> <b>5</b>	16, 37, 59, 70	0
1	B	253/257 (98%)	0.39	19 (7%) <b>20</b> <b>22</b>	12, 26, 55, 63	0
1	C	253/257 (98%)	1.20	60 (23%) <b>2</b> <b>2</b>	16, 41, 62, 70	0
1	D	253/257 (98%)	0.41	15 (5%) <b>28</b> <b>30</b>	12, 26, 54, 62	0
All	All	1012/1028 (98%)	0.72	134 (13%) <b>7</b> <b>8</b>	12, 34, 58, 70	0

All (134) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	3057	ALA	5.2
1	C	3254	PHE	4.9
1	C	3061	ASN	4.5
1	D	4002	THR	4.4
1	D	4012	GLY	4.4
1	C	3108	GLU	4.3
1	A	1019	ASP	4.1
1	B	2108	GLU	4.1
1	C	3017	GLY	4.0
1	A	1108	GLU	4.0
1	A	1254	PHE	4.0
1	B	2227	THR	3.9
1	C	3029	LYS	3.9
1	C	3022	PRO	3.9
1	D	4108	GLU	3.9
1	B	2154	GLU	3.9
1	C	3250	ALA	3.8
1	A	1227	THR	3.8
1	D	4227	THR	3.8
1	D	4154	GLU	3.7
1	C	3021	ILE	3.7

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Mol	Chain	Res	Type	RSRZ
1	C	3014	ILE	3.6
1	C	3026	ASP	3.6
1	A	1056	LEU	3.5
1	A	1156	GLY	3.4
1	A	1015	TYR	3.4
1	A	1250	ALA	3.4
1	B	2002	THR	3.4
1	C	3058	THR	3.3
1	C	3024	GLY	3.3
1	C	3019	ASP	3.2
1	C	3247	SER	3.2
1	B	2226	THR	3.1
1	C	3229	PHE	3.1
1	B	2012	GLY	3.1
1	A	1002	THR	3.1
1	A	1229	PHE	3.1
1	C	3056	LEU	3.1
1	C	3063	LYS	3.1
1	C	3166	PHE	3.1
1	C	3015	TYR	3.0
1	A	1054	GLU	3.0
1	C	3035	GLN	3.0
1	C	3224	LEU	2.9
1	C	3016	LYS	2.9
1	C	3023	ALA	2.9
1	C	3020	ARG	2.9
1	D	4225	VAL	2.9
1	C	3049	PRO	2.9
1	C	3010	LEU	2.9
1	A	1059	SER	2.8
1	C	3235	VAL	2.8
1	A	1017	GLY	2.8
1	C	3034	ARG	2.8
1	B	2011	ASP	2.8
1	A	1046	THR	2.8
1	C	3225	VAL	2.8
1	C	3253	ASP	2.7
1	C	3018	LYS	2.7
1	A	1237	ALA	2.7
1	C	3012	GLY	2.7
1	B	2019	ASP	2.7
1	B	2017	GLY	2.7

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Mol	Chain	Res	Type	RSRZ
1	D	4086	GLY	2.6
1	A	1060	PHE	2.6
1	C	3027	PHE	2.6
1	A	1231	LYS	2.6
1	A	1154	GLU	2.6
1	C	3226	THR	2.6
1	A	1062	ILE	2.6
1	A	1018	LYS	2.6
1	A	1238	LEU	2.6
1	C	3154	GLU	2.6
1	D	4229	PHE	2.6
1	C	3031	LEU	2.5
1	B	2232	PRO	2.5
1	B	2254	PHE	2.5
1	A	1035	GLN	2.4
1	B	2033	GLU	2.4
1	C	3030	ARG	2.4
1	A	1033	GLU	2.4
1	A	1105	GLY	2.4
1	C	3248	SER	2.4
1	A	1057	ALA	2.4
1	C	3227	THR	2.4
1	D	4173	ARG	2.4
1	A	1067	GLU	2.4
1	A	1063	LYS	2.3
1	D	4017	GLY	2.3
1	A	1166	PHE	2.3
1	C	3249	LEU	2.3
1	C	3156	GLY	2.3
1	C	3002	THR	2.3
1	C	3054	GLU	2.3
1	D	4010	LEU	2.3
1	B	2061	ASN	2.3
1	C	3252	TRP	2.3
1	C	3173	ARG	2.3
1	A	1022	PRO	2.3
1	A	1226	THR	2.3
1	C	3062	ILE	2.2
1	A	1061	ASN	2.2
1	A	1232	PRO	2.2
1	B	2225	VAL	2.2
1	B	2229	PHE	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	1086	GLY	2.2
1	C	3033	GLU	2.2
1	A	1058	THR	2.2
1	C	3013	THR	2.2
1	B	2253	ASP	2.2
1	C	3245	VAL	2.2
1	A	1095	THR	2.2
1	A	1052	VAL	2.1
1	B	2016	LYS	2.1
1	C	3096	GLY	2.1
1	C	3059	SER	2.1
1	A	1016	LYS	2.1
1	C	3040	LEU	2.1
1	A	1253	ASP	2.1
1	C	3060	PHE	2.1
1	A	1228	GLY	2.1
1	C	3025	GLU	2.1
1	D	4067	GLU	2.1
1	C	3011	ASP	2.1
1	B	2217	LYS	2.1
1	C	3246	LEU	2.1
1	B	2026	ASP	2.1
1	D	4026	ASP	2.0
1	A	1034	ARG	2.0
1	C	3155	ARG	2.0
1	C	3067	GLU	2.0
1	D	4019	ASP	2.0
1	D	4177	ILE	2.0
1	C	3087	LYS	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](#)

There are no ligands in this entry.

## 6.5 Other polymers [i](#)

There are no such residues in this entry.