



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 19, 2024 – 06:37 PM EDT

PDB ID : 9CQG
Title : CRYSTAL STRUCTURE OF APO C-TERMINAL HIS-TAG DOG
HSP47(36-418) IN A P 1 CRYSTAL FORM
Authors : Sheriff, S.
Deposited on : 2024-07-19
Resolution : 2.47 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.20.1
EDS : 3.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.003 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

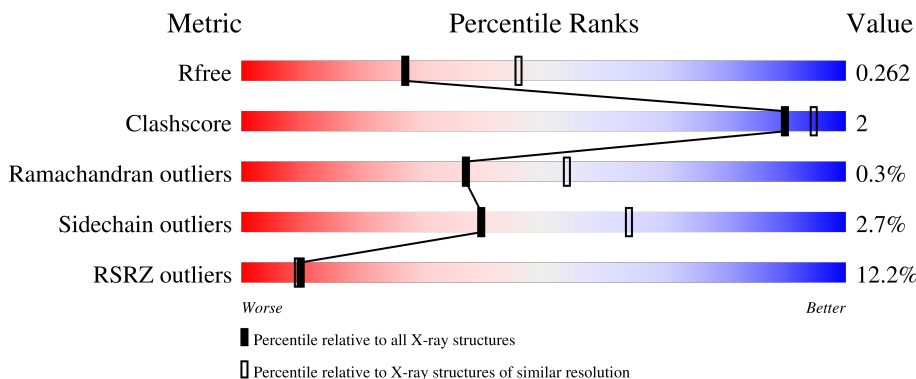
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.47 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.



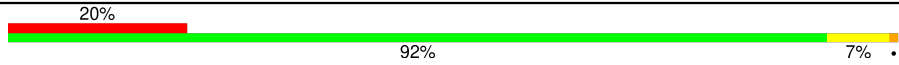
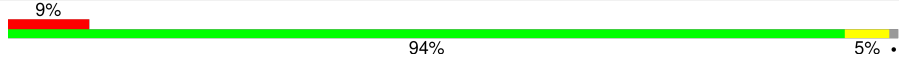
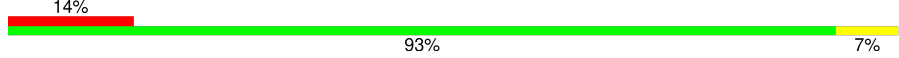
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	7106 (2.50-2.46)
Clashscore	180529	7991 (2.50-2.46)
Ramachandran outliers	177936	7888 (2.50-2.46)
Sidechain outliers	177891	7890 (2.50-2.46)
RSRZ outliers	164620	7106 (2.50-2.46)

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

Mol	Chain	Length	Quality of chain
1	A	392	 8% 94% 5%
1	B	392	 10% 93% 7%
1	D	392	 6% 93% 6%
1	E	392	 23% 93% 7%
1	F	392	 7% 95%

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Mol	Chain	Length	Quality of chain
1	G	392	 20% 92% 7%
1	H	392	 9% 94% 5%
1	I	392	 14% 93% 7%

2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 48565 atoms, of which 24169 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 Serpin H1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	390	6052	1932	3013	531	562	14	3013	0	0
1	B	392	6115	1949	3047	541	564	14	3047	0	0
1	D	387	6008	1915	2999	523	557	14	2999	0	0
1	E	392	6098	1945	3037	538	564	14	3037	0	0
1	F	390	6081	1937	3035	536	559	14	3035	0	0
1	G	391	6027	1925	2991	533	564	14	2991	0	0
1	H	390	6061	1934	3020	530	563	14	3020	0	0
1	I	391	6078	1938	3027	538	561	14	3027	0	0

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	35	MET	-	initiating methionine	UNP C7C419
A	419	LEU	-	expression tag	UNP C7C419
A	420	GLU	-	expression tag	UNP C7C419
A	421	HIS	-	expression tag	UNP C7C419
A	422	HIS	-	expression tag	UNP C7C419
A	423	HIS	-	expression tag	UNP C7C419
A	424	HIS	-	expression tag	UNP C7C419
A	425	HIS	-	expression tag	UNP C7C419
A	426	HIS	-	expression tag	UNP C7C419
B	35	MET	-	initiating methionine	UNP C7C419
B	419	LEU	-	expression tag	UNP C7C419
B	420	GLU	-	expression tag	UNP C7C419
B	421	HIS	-	expression tag	UNP C7C419

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Chain	Residue	Modelled	Actual	Comment	Reference
B	422	HIS	-	expression tag	UNP C7C419
B	423	HIS	-	expression tag	UNP C7C419
B	424	HIS	-	expression tag	UNP C7C419
B	425	HIS	-	expression tag	UNP C7C419
B	426	HIS	-	expression tag	UNP C7C419
D	35	MET	-	initiating methionine	UNP C7C419
D	419	LEU	-	expression tag	UNP C7C419
D	420	GLU	-	expression tag	UNP C7C419
D	421	HIS	-	expression tag	UNP C7C419
D	422	HIS	-	expression tag	UNP C7C419
D	423	HIS	-	expression tag	UNP C7C419
D	424	HIS	-	expression tag	UNP C7C419
D	425	HIS	-	expression tag	UNP C7C419
D	426	HIS	-	expression tag	UNP C7C419
E	35	MET	-	initiating methionine	UNP C7C419
E	419	LEU	-	expression tag	UNP C7C419
E	420	GLU	-	expression tag	UNP C7C419
E	421	HIS	-	expression tag	UNP C7C419
E	422	HIS	-	expression tag	UNP C7C419
E	423	HIS	-	expression tag	UNP C7C419
E	424	HIS	-	expression tag	UNP C7C419
E	425	HIS	-	expression tag	UNP C7C419
E	426	HIS	-	expression tag	UNP C7C419
F	35	MET	-	initiating methionine	UNP C7C419
F	419	LEU	-	expression tag	UNP C7C419
F	420	GLU	-	expression tag	UNP C7C419
F	421	HIS	-	expression tag	UNP C7C419
F	422	HIS	-	expression tag	UNP C7C419
F	423	HIS	-	expression tag	UNP C7C419
F	424	HIS	-	expression tag	UNP C7C419
F	425	HIS	-	expression tag	UNP C7C419
F	426	HIS	-	expression tag	UNP C7C419
G	35	MET	-	initiating methionine	UNP C7C419
G	419	LEU	-	expression tag	UNP C7C419
G	420	GLU	-	expression tag	UNP C7C419
G	421	HIS	-	expression tag	UNP C7C419
G	422	HIS	-	expression tag	UNP C7C419
G	423	HIS	-	expression tag	UNP C7C419
G	424	HIS	-	expression tag	UNP C7C419
G	425	HIS	-	expression tag	UNP C7C419
G	426	HIS	-	expression tag	UNP C7C419
H	35	MET	-	initiating methionine	UNP C7C419

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Chain	Residue	Modelled	Actual	Comment	Reference
H	419	LEU	-	expression tag	UNP C7C419
H	420	GLU	-	expression tag	UNP C7C419
H	421	HIS	-	expression tag	UNP C7C419
H	422	HIS	-	expression tag	UNP C7C419
H	423	HIS	-	expression tag	UNP C7C419
H	424	HIS	-	expression tag	UNP C7C419
H	425	HIS	-	expression tag	UNP C7C419
H	426	HIS	-	expression tag	UNP C7C419
I	35	MET	-	initiating methionine	UNP C7C419
I	419	LEU	-	expression tag	UNP C7C419
I	420	GLU	-	expression tag	UNP C7C419
I	421	HIS	-	expression tag	UNP C7C419
I	422	HIS	-	expression tag	UNP C7C419
I	423	HIS	-	expression tag	UNP C7C419
I	424	HIS	-	expression tag	UNP C7C419
I	425	HIS	-	expression tag	UNP C7C419
I	426	HIS	-	expression tag	UNP C7C419

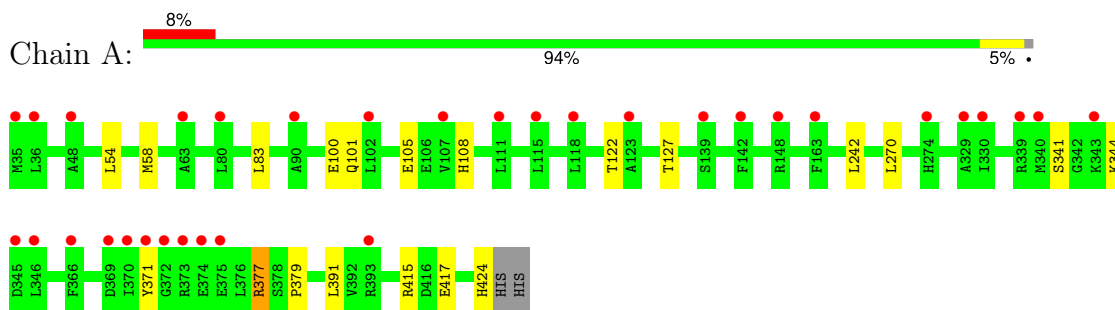
- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	12	Total O 12 12	0	0
2	B	7	Total O 7 7	0	0
2	D	4	Total O 4 4	0	0
2	E	8	Total O 8 8	0	0
2	F	4	Total O 4 4	0	0
2	G	5	Total O 5 5	0	0
2	H	1	Total O 1 1	0	0
2	I	4	Total O 4 4	0	0

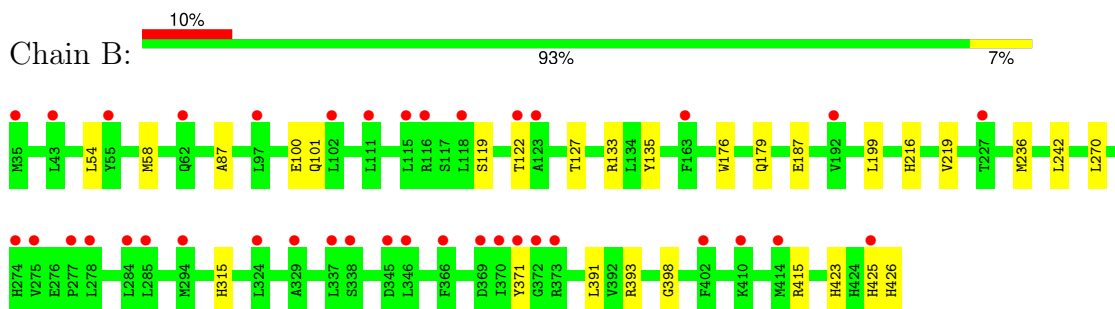
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

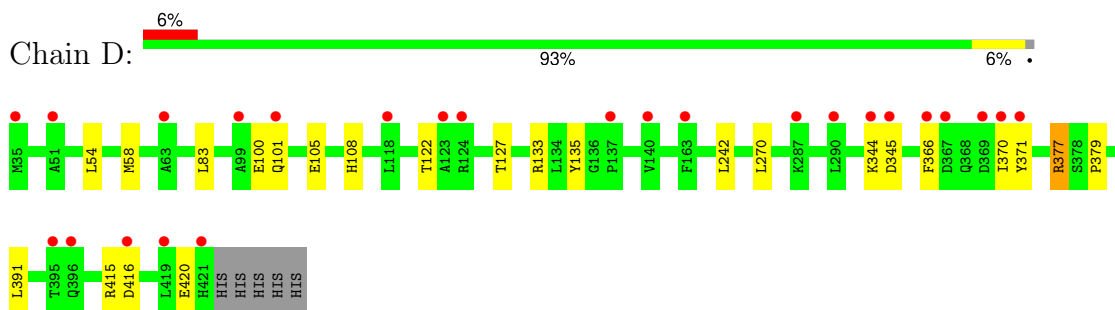
- Molecule 1: Serpin H1



- Molecule 1: Serpin H1

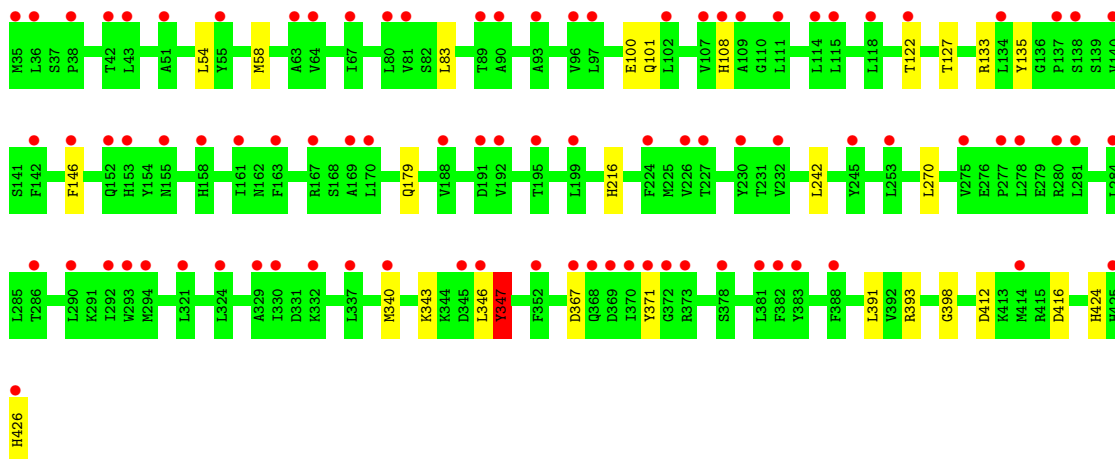


- Molecule 1: Serpin H1

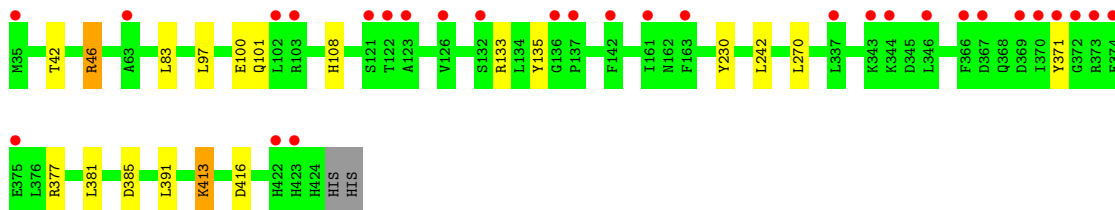


- Molecule 1: Serpin H1

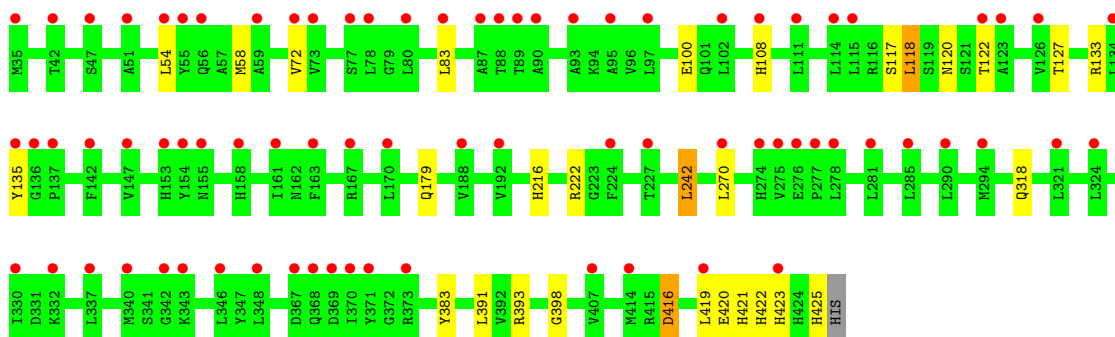
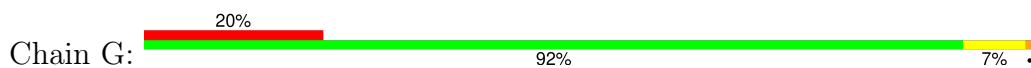




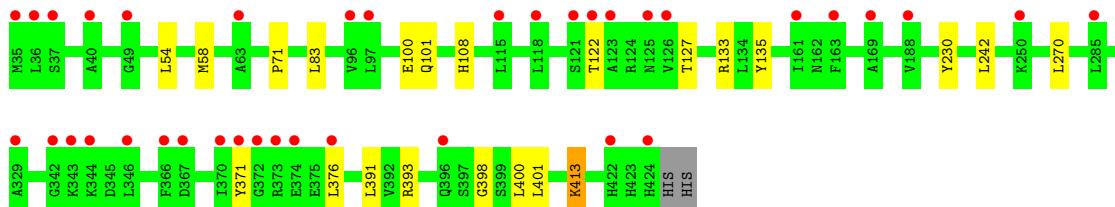
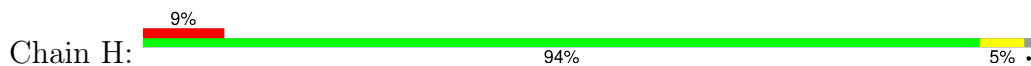
- Molecule 1: Serpin H1



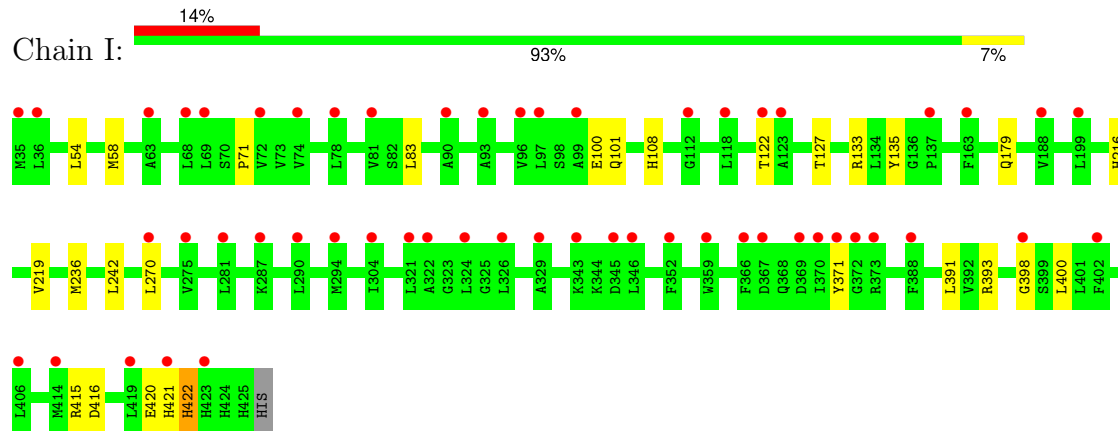
- Molecule 1: Serpin H1



- Molecule 1: Serpin H1



● Molecule 1: Serpin H1



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	87.30Å 92.00Å 123.58Å 85.23° 70.69° 83.23°	Depositor
Resolution (Å)	116.50 – 2.47 116.50 – 2.47	Depositor EDS
% Data completeness (in resolution range)	69.4 (116.50-2.47) 69.4 (116.50-2.47)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.81 (at 2.48Å)	Xtrriage
Refinement program	BUSTER 2.11.8	Depositor
R, R_{free}	0.243 , 0.264 0.240 , 0.262	Depositor DCC
R_{free} test set	4465 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	62.3	Xtrriage
Anisotropy	0.022	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 48.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	48565	wwPDB-VP
Average B, all atoms (Å ²)	73.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.78% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.44	0/3104	0.61	0/4193
1	B	0.45	0/3135	0.61	0/4233
1	D	0.45	0/3071	0.63	0/4147
1	E	0.42	0/3128	0.60	0/4224
1	F	0.44	0/3111	0.61	0/4200
1	G	0.41	0/3101	0.61	0/4190
1	H	0.41	0/3105	0.59	0/4193
1	I	0.42	0/3117	0.61	0/4209
All	All	0.43	0/24872	0.61	0/33589

There are no bond length outliers.

There are no bond angle outliers.

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	3039	3013	3013	6	0
1	B	3068	3047	3047	13	0
1	D	3009	2999	2999	8	0
1	E	3061	3037	3037	12	0
1	F	3046	3035	3035	9	0
1	G	3036	2991	2991	17	0
1	H	3041	3020	3020	9	0
1	I	3051	3027	3027	13	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	12	0	0	0	0
2	B	7	0	0	0	0
2	D	4	0	0	0	0
2	E	8	0	0	0	0
2	F	4	0	0	0	0
2	G	5	0	0	0	0
2	H	1	0	0	0	0
2	I	4	0	0	0	0
All	All	24396	24169	24169	80	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 2.

All (80) 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:H:230:TYR:OH	1:H:413:LYS:HD2	1.95	0.67
1:F:42:THR:O	1:F:46:ARG:HD2	2.02	0.59
1:F:385:ASP:OD2	1:G:422:HIS:HD2	1.87	0.58
1:H:122:THR:O	1:H:127:THR:OG1	2.21	0.58
1:E:122:THR:O	1:E:127:THR:OG1	2.22	0.57
1:I:421:HIS:O	1:I:422:HIS:HB2	2.05	0.56
1:I:421:HIS:O	1:I:422:HIS:CB	2.56	0.54
1:D:122:THR:O	1:D:127:THR:OG1	2.26	0.53
1:G:423:HIS:ND1	1:G:425:HIS:CE1	2.76	0.53
1:G:117:SER:O	1:G:120:ASN:OD1	2.27	0.51
1:B:58:MET:HE1	1:B:315:HIS:CE1	2.47	0.50
1:E:424:HIS:CE1	1:E:426:HIS:CD2	2.99	0.50
1:G:222:ARG:NH1	1:G:383:TYR:OH	2.38	0.50
1:G:122:THR:O	1:G:127:THR:OG1	2.30	0.50
1:E:346:LEU:O	1:E:347:TYR:O	2.29	0.49
1:A:122:THR:O	1:A:127:THR:OG1	2.31	0.49
1:I:122:THR:O	1:I:127:THR:OG1	2.30	0.49
1:G:179:GLN:HA	1:I:216:HIS:CE1	2.47	0.48
1:B:58:MET:HE3	1:B:315:HIS:CG	2.48	0.48
1:B:216:HIS:CE1	1:E:179:GLN:HA	2.47	0.48
1:G:83:LEU:HD13	1:G:108:HIS:CD2	2.49	0.47
1:H:393:ARG:NH1	1:H:398:GLY:O	2.47	0.47
1:E:83:LEU:HD13	1:E:108:HIS:CD2	2.50	0.47
1:F:83:LEU:HD13	1:F:108:HIS:CD2	2.50	0.47
1:A:83:LEU:HD13	1:A:108:HIS:CD2	2.49	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:83:LEU:HD13	1:H:108:HIS:CD2	2.49	0.47
1:I:83:LEU:HD13	1:I:108:HIS:CD2	2.50	0.47
1:G:216:HIS:CE1	1:I:179:GLN:HA	2.50	0.46
1:D:83:LEU:HD13	1:D:108:HIS:CD2	2.50	0.46
1:E:54:LEU:O	1:E:58:MET:HG3	2.16	0.46
1:I:54:LEU:O	1:I:58:MET:HG3	2.16	0.46
1:B:58:MET:CE	1:B:315:HIS:CE1	3.00	0.45
1:A:54:LEU:O	1:A:58:MET:HG3	2.16	0.45
1:I:71:PRO:HG2	1:I:400:LEU:O	2.16	0.45
1:G:83:LEU:CD1	1:G:108:HIS:CD2	3.00	0.45
1:A:83:LEU:CD1	1:A:108:HIS:CD2	2.99	0.45
1:G:54:LEU:O	1:G:58:MET:HG3	2.16	0.45
1:H:71:PRO:HD2	1:H:401:LEU:O	2.17	0.45
1:H:54:LEU:O	1:H:58:MET:HG3	2.17	0.45
1:H:83:LEU:CD1	1:H:108:HIS:CD2	3.00	0.45
1:D:344:LYS:HG2	1:D:345:ASP:N	2.31	0.44
1:I:83:LEU:CD1	1:I:108:HIS:CD2	3.01	0.44
1:F:46:ARG:HB3	1:F:97:LEU:O	2.17	0.44
1:I:393:ARG:NH1	1:I:398:GLY:O	2.51	0.44
1:E:83:LEU:CD1	1:E:108:HIS:CD2	3.00	0.44
1:A:377:ARG:O	1:A:379:PRO:HD3	2.18	0.44
1:F:83:LEU:CD1	1:F:108:HIS:CD2	3.01	0.44
1:F:381:LEU:HD11	1:G:421:HIS:CE1	2.53	0.43
1:D:54:LEU:O	1:D:58:MET:HG3	2.18	0.43
1:E:146:PHE:CE2	1:E:340:MET:HG3	2.54	0.43
1:A:270:LEU:HD12	1:A:270:LEU:N	2.35	0.42
1:B:425:HIS:O	1:B:426:HIS:HB2	2.19	0.42
1:D:83:LEU:CD1	1:D:108:HIS:CD2	3.01	0.42
1:B:133:ARG:HD3	1:B:135:TYR:CZ	2.54	0.42
1:E:270:LEU:HD12	1:E:270:LEU:N	2.35	0.42
1:B:270:LEU:HD12	1:B:270:LEU:N	2.35	0.42
1:H:270:LEU:HD12	1:H:270:LEU:N	2.34	0.42
1:E:393:ARG:NH1	1:E:398:GLY:O	2.51	0.42
1:D:270:LEU:N	1:D:270:LEU:HD12	2.35	0.42
1:G:270:LEU:HD12	1:G:270:LEU:N	2.35	0.42
1:E:133:ARG:HD3	1:E:135:TYR:CZ	2.55	0.41
1:F:270:LEU:HD12	1:F:270:LEU:N	2.35	0.41
1:B:393:ARG:NH1	1:B:398:GLY:O	2.53	0.41
1:G:72:VAL:HG21	1:G:118:LEU:HD21	2.01	0.41
1:G:133:ARG:HD3	1:G:135:TYR:CZ	2.55	0.41
1:G:416:ASP:O	1:G:419:LEU:HG	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:425:HIS:ND1	1:G:242:LEU:HD11	2.35	0.41
1:B:122:THR:O	1:B:127:THR:OG1	2.38	0.41
1:F:230:TYR:CE1	1:F:413:LYS:HG3	2.56	0.41
1:H:133:ARG:HD3	1:H:135:TYR:CZ	2.55	0.41
1:B:179:GLN:HA	1:E:216:HIS:CE1	2.56	0.41
1:B:219:VAL:HA	1:B:236:MET:O	2.21	0.41
1:D:133:ARG:HD3	1:D:135:TYR:CZ	2.56	0.41
1:D:377:ARG:O	1:D:379:PRO:HD3	2.21	0.41
1:F:133:ARG:HD3	1:F:135:TYR:CZ	2.56	0.41
1:I:133:ARG:HD3	1:I:135:TYR:CZ	2.55	0.41
1:I:219:VAL:HA	1:I:236:MET:O	2.21	0.41
1:I:270:LEU:N	1:I:270:LEU:HD12	2.35	0.41
1:B:133:ARG:HB2	1:B:176:TRP:CZ2	2.56	0.40
1:G:393:ARG:NH1	1:G:398:GLY:O	2.54	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	388/392 (99%)	360 (93%)	26 (7%)	2 (0%)	25	41
1	B	390/392 (100%)	364 (93%)	25 (6%)	1 (0%)	37	54
1	D	385/392 (98%)	350 (91%)	32 (8%)	3 (1%)	16	29
1	E	390/392 (100%)	359 (92%)	29 (7%)	2 (0%)	25	41
1	F	388/392 (99%)	362 (93%)	25 (6%)	1 (0%)	37	54
1	G	389/392 (99%)	363 (93%)	26 (7%)	0	100	100
1	H	388/392 (99%)	362 (93%)	26 (7%)	0	100	100
1	I	389/392 (99%)	364 (94%)	24 (6%)	1 (0%)	37	54
All	All	3107/3136 (99%)	2884 (93%)	213 (7%)	10 (0%)	37	54

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	347	TYR
1	I	422	HIS
1	A	377	ARG
1	B	87	ALA
1	D	377	ARG
1	F	377	ARG
1	D	420	GLU
1	E	367	ASP
1	A	344	LYS
1	D	370	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	322/337 (96%)	312 (97%)	10 (3%)	35 59
1	B	326/337 (97%)	315 (97%)	11 (3%)	32 55
1	D	319/337 (95%)	310 (97%)	9 (3%)	38 63
1	E	325/337 (96%)	316 (97%)	9 (3%)	38 63
1	F	323/337 (96%)	315 (98%)	8 (2%)	42 67
1	G	320/337 (95%)	313 (98%)	7 (2%)	47 70
1	H	322/337 (96%)	314 (98%)	8 (2%)	42 67
1	I	323/337 (96%)	315 (98%)	8 (2%)	42 67
All	All	2580/2696 (96%)	2510 (97%)	70 (3%)	40 64

All (70) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	100	GLU
1	A	101	GLN
1	A	105	GLU
1	A	242	LEU

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Mol	Chain	Res	Type
1	A	341	SER
1	A	371	TYR
1	A	391	LEU
1	A	415	ARG
1	A	417	GLU
1	A	424	HIS
1	B	54	LEU
1	B	100	GLU
1	B	101	GLN
1	B	119	SER
1	B	187	GLU
1	B	199	LEU
1	B	242	LEU
1	B	371	TYR
1	B	391	LEU
1	B	415	ARG
1	B	423	HIS
1	D	100	GLU
1	D	101	GLN
1	D	105	GLU
1	D	242	LEU
1	D	366	PHE
1	D	371	TYR
1	D	391	LEU
1	D	415	ARG
1	D	416	ASP
1	E	100	GLU
1	E	101	GLN
1	E	242	LEU
1	E	343	LYS
1	E	347	TYR
1	E	371	TYR
1	E	391	LEU
1	E	412	ASP
1	E	416	ASP
1	F	46	ARG
1	F	100	GLU
1	F	101	GLN
1	F	242	LEU
1	F	371	TYR
1	F	391	LEU
1	F	413	LYS

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Mol	Chain	Res	Type
1	F	416	ASP
1	G	100	GLU
1	G	118	LEU
1	G	242	LEU
1	G	318	GLN
1	G	391	LEU
1	G	416	ASP
1	G	420	GLU
1	H	100	GLU
1	H	101	GLN
1	H	242	LEU
1	H	371	TYR
1	H	376	LEU
1	H	391	LEU
1	H	400	LEU
1	H	413	LYS
1	I	100	GLU
1	I	101	GLN
1	I	242	LEU
1	I	371	TYR
1	I	391	LEU
1	I	415	ARG
1	I	416	ASP
1	I	420	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	171	GLN
1	A	353	HIS
1	A	421	HIS
1	B	353	HIS
1	B	422	HIS
1	D	171	GLN
1	D	353	HIS
1	E	353	HIS
1	E	422	HIS
1	F	101	GLN
1	F	171	GLN
1	F	353	HIS
1	F	422	HIS
1	G	353	HIS

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Mol	Chain	Res	Type
1	G	422	HIS
1	G	425	HIS
1	H	171	GLN
1	H	353	HIS
1	H	422	HIS
1	I	171	GLN
1	I	353	HIS
1	I	425	HIS

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, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	390/392 (99%)	0.56	33 (8%) 18 17	15, 31, 59, 72	0
1	B	392/392 (100%)	0.79	38 (9%) 15 14	15, 36, 56, 72	0
1	D	387/392 (98%)	0.60	25 (6%) 26 25	16, 32, 56, 72	0
1	E	392/392 (100%)	1.27	89 (22%) 3 3	15, 40, 63, 82	0
1	F	390/392 (99%)	0.57	29 (7%) 22 21	17, 32, 62, 75	0
1	G	391/392 (99%)	1.13	77 (19%) 3 4	15, 41, 73, 91	0
1	H	390/392 (99%)	0.78	37 (9%) 15 14	19, 37, 62, 77	0
1	I	391/392 (99%)	1.09	54 (13%) 8 7	20, 41, 63, 76	0
All	All	3123/3136 (99%)	0.85	382 (12%) 10 9	15, 36, 63, 91	0

All (382) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	118	LEU	5.1
1	I	345	ASP	5.0
1	E	163	PHE	4.9
1	A	345	ASP	4.6
1	B	371	TYR	4.6
1	I	371	TYR	4.6
1	D	345	ASP	4.5
1	I	321	LEU	4.5
1	E	167	ARG	4.4
1	F	123	ALA	4.4
1	E	371	TYR	4.3
1	G	122	THR	4.2
1	E	346	LEU	4.1
1	I	370	ILE	4.1
1	H	373	ARG	4.0
1	E	51	ALA	4.0

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Mol	Chain	Res	Type	RSRZ
1	D	140	VAL	4.0
1	D	371	TYR	3.9
1	E	370	ILE	3.9
1	G	93	ALA	3.9
1	G	371	TYR	3.9
1	I	369	ASP	3.8
1	H	374	GLU	3.8
1	E	81	VAL	3.8
1	I	163	PHE	3.8
1	A	373	ARG	3.7
1	E	278	LEU	3.7
1	D	419	LEU	3.6
1	G	102	LEU	3.6
1	E	138	SER	3.6
1	E	102	LEU	3.6
1	H	342	GLY	3.6
1	G	80	LEU	3.6
1	E	373	ARG	3.6
1	I	346	LEU	3.5
1	E	372	GLY	3.5
1	H	63	ALA	3.5
1	E	55	TYR	3.5
1	B	163	PHE	3.5
1	H	367	ASP	3.5
1	I	372	GLY	3.5
1	F	373	ARG	3.5
1	E	140	VAL	3.5
1	F	126	VAL	3.5
1	D	421	HIS	3.4
1	H	123	ALA	3.3
1	F	136	GLY	3.3
1	A	369	ASP	3.3
1	D	123	ALA	3.3
1	G	348	LEU	3.3
1	F	163	PHE	3.3
1	G	161	ILE	3.2
1	E	122	THR	3.2
1	E	90	ALA	3.2
1	H	396	GLN	3.2
1	E	284	LEU	3.2
1	E	226	VAL	3.2
1	I	419	LEU	3.1

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Mol	Chain	Res	Type	RSRZ
1	E	321	LEU	3.1
1	E	290	LEU	3.1
1	G	419	LEU	3.1
1	E	192	VAL	3.1
1	E	111	LEU	3.1
1	E	142	PHE	3.1
1	E	369	ASP	3.1
1	A	374	GLU	3.1
1	G	35	MET	3.1
1	H	370	ILE	3.0
1	E	109	ALA	3.0
1	I	99	ALA	3.0
1	B	122	THR	3.0
1	E	108	HIS	3.0
1	I	118	LEU	3.0
1	E	329	ALA	3.0
1	A	118	LEU	3.0
1	G	115	LEU	3.0
1	I	68	LEU	3.0
1	I	96	VAL	3.0
1	A	340	MET	3.0
1	D	101	GLN	3.0
1	E	155	ASN	3.0
1	H	35	MET	3.0
1	G	369	ASP	2.9
1	I	122	THR	2.9
1	G	163	PHE	2.9
1	D	367	ASP	2.9
1	E	294	MET	2.9
1	H	126	VAL	2.9
1	E	115	LEU	2.9
1	G	97	LEU	2.9
1	I	97	LEU	2.9
1	I	366	PHE	2.9
1	G	192	VAL	2.9
1	I	123	ALA	2.9
1	B	115	LEU	2.9
1	H	163	PHE	2.9
1	I	423	HIS	2.9
1	E	191	ASP	2.8
1	H	122	THR	2.8
1	I	36	LEU	2.8

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Mol	Chain	Res	Type	RSRZ
1	G	324	LEU	2.8
1	F	370	ILE	2.8
1	I	112	GLY	2.8
1	G	111	LEU	2.8
1	H	346	LEU	2.8
1	E	352	PHE	2.8
1	E	188	VAL	2.8
1	E	275	VAL	2.8
1	G	155	ASN	2.7
1	B	35	MET	2.7
1	F	422	HIS	2.7
1	F	371	TYR	2.7
1	A	63	ALA	2.7
1	E	340	MET	2.7
1	E	153	HIS	2.7
1	A	163	PHE	2.7
1	D	163	PHE	2.7
1	E	170	LEU	2.7
1	I	281	LEU	2.7
1	A	35	MET	2.7
1	E	161	ILE	2.7
1	I	275	VAL	2.7
1	E	97	LEU	2.7
1	G	414	MET	2.7
1	D	344	LYS	2.7
1	H	343	LYS	2.7
1	E	152	GLN	2.7
1	B	337	LEU	2.6
1	E	232	VAL	2.6
1	G	73	VAL	2.6
1	G	285	LEU	2.6
1	G	340	MET	2.6
1	B	274	HIS	2.6
1	E	367	ASP	2.6
1	E	67	ILE	2.6
1	A	372	GLY	2.6
1	G	142	PHE	2.6
1	E	281	LEU	2.6
1	B	370	ILE	2.6
1	E	89	THR	2.6
1	I	398	GLY	2.6
1	B	373	ARG	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	111	LEU	2.6
1	B	97	LEU	2.6
1	D	118	LEU	2.6
1	E	63	ALA	2.6
1	I	329	ALA	2.6
1	E	345	ASP	2.6
1	G	42	THR	2.6
1	E	42	THR	2.6
1	E	292	ILE	2.6
1	I	78	LEU	2.5
1	I	199	LEU	2.5
1	G	275	VAL	2.5
1	G	423	HIS	2.5
1	H	188	VAL	2.5
1	A	90	ALA	2.5
1	F	161	ILE	2.5
1	G	330	ILE	2.5
1	B	369	ASP	2.5
1	E	368	GLN	2.5
1	H	371	TYR	2.5
1	B	366	PHE	2.5
1	E	146	PHE	2.5
1	G	373	ARG	2.5
1	B	284	LEU	2.5
1	E	36	LEU	2.5
1	G	134	LEU	2.5
1	G	346	LEU	2.5
1	G	72	VAL	2.5
1	G	370	ILE	2.5
1	B	414	MET	2.5
1	D	366	PHE	2.5
1	B	346	LEU	2.5
1	E	199	LEU	2.5
1	I	74	VAL	2.5
1	A	329	ALA	2.5
1	E	286	THR	2.5
1	E	414	MET	2.5
1	H	372	GLY	2.5
1	I	367	ASP	2.5
1	F	344	LYS	2.5
1	A	366	PHE	2.5
1	F	423	HIS	2.5

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Mol	Chain	Res	Type	RSRZ
1	H	424	HIS	2.5
1	G	277	PRO	2.5
1	A	139	SER	2.5
1	D	124	ARG	2.5
1	B	345	ASP	2.5
1	G	55	TYR	2.5
1	G	321	LEU	2.4
1	I	290	LEU	2.4
1	I	324	LEU	2.4
1	D	63	ALA	2.4
1	G	77	SER	2.4
1	A	148	ARG	2.4
1	B	410	LYS	2.4
1	I	343	LYS	2.4
1	G	136	GLY	2.4
1	A	115	LEU	2.4
1	I	402	PHE	2.4
1	B	192	VAL	2.4
1	E	107	VAL	2.4
1	I	63	ALA	2.4
1	D	287	LYS	2.4
1	B	43	LEU	2.4
1	E	253	LEU	2.4
1	G	54	LEU	2.4
1	G	83	LEU	2.4
1	I	69	LEU	2.4
1	G	147	VAL	2.4
1	A	48	ALA	2.4
1	H	250	LYS	2.4
1	D	370	ILE	2.4
1	E	330	ILE	2.4
1	A	80	LEU	2.4
1	B	324	LEU	2.4
1	D	369	ASP	2.4
1	G	154	TYR	2.4
1	F	137	PRO	2.4
1	A	107	VAL	2.4
1	I	72	VAL	2.4
1	G	87	ALA	2.4
1	H	329	ALA	2.4
1	E	227	THR	2.4
1	G	281	LEU	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	343	LYS	2.3
1	E	35	MET	2.3
1	F	375	GLU	2.3
1	B	329	ALA	2.3
1	F	372	GLY	2.3
1	G	278	LEU	2.3
1	H	125	ASN	2.3
1	E	245	TYR	2.3
1	G	167	ARG	2.3
1	H	96	VAL	2.3
1	D	99	ALA	2.3
1	E	93	ALA	2.3
1	I	90	ALA	2.3
1	B	285	LEU	2.3
1	G	89	THR	2.3
1	G	158	HIS	2.3
1	G	274	HIS	2.3
1	G	343	LYS	2.3
1	D	35	MET	2.3
1	E	80	LEU	2.3
1	E	378	SER	2.3
1	H	121	SER	2.3
1	A	142	PHE	2.3
1	H	344	LYS	2.3
1	E	137	PRO	2.3
1	A	371	TYR	2.3
1	B	275	VAL	2.3
1	A	123	ALA	2.3
1	F	63	ALA	2.3
1	E	114	LEU	2.2
1	G	170	LEU	2.2
1	G	47	SER	2.2
1	B	277	PRO	2.2
1	G	135	TYR	2.2
1	I	304	ILE	2.2
1	A	36	LEU	2.2
1	H	285	LEU	2.2
1	G	227	THR	2.2
1	I	294	MET	2.2
1	E	277	PRO	2.2
1	A	330	ILE	2.2
1	G	407	VAL	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	51	ALA	2.2
1	G	51	ALA	2.2
1	G	90	ALA	2.2
1	H	169	ALA	2.2
1	B	111	LEU	2.2
1	E	134	LEU	2.2
1	F	102	LEU	2.2
1	G	332	LYS	2.2
1	I	414	MET	2.2
1	B	402	PHE	2.2
1	F	142	PHE	2.2
1	G	224	PHE	2.2
1	G	137	PRO	2.2
1	G	367	ASP	2.2
1	F	374	GLU	2.2
1	E	425	HIS	2.2
1	F	343	LYS	2.2
1	H	376	LEU	2.2
1	E	224	PHE	2.2
1	E	382	PHE	2.2
1	F	366	PHE	2.2
1	H	366	PHE	2.2
1	E	38	PRO	2.2
1	I	137	PRO	2.2
1	E	293	TRP	2.2
1	I	93	ALA	2.2
1	I	421	HIS	2.2
1	B	55	TYR	2.1
1	B	118	LEU	2.1
1	E	230	TYR	2.1
1	E	381	LEU	2.1
1	F	337	LEU	2.1
1	B	294	MET	2.1
1	E	280	ARG	2.1
1	B	338	SER	2.1
1	F	132	SER	2.1
1	F	367	ASP	2.1
1	G	368	GLN	2.1
1	E	158	HIS	2.1
1	B	123	ALA	2.1
1	G	78	LEU	2.1
1	G	95	ALA	2.1

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Mol	Chain	Res	Type	RSRZ
1	G	114	LEU	2.1
1	G	337	LEU	2.1
1	I	35	MET	2.1
1	I	270	LEU	2.1
1	I	373	ARG	2.1
1	B	227	THR	2.1
1	E	388	PHE	2.1
1	I	388	PHE	2.1
1	A	375	GLU	2.1
1	D	396	GLN	2.1
1	D	416	ASP	2.1
1	F	369	ASP	2.1
1	A	370	ILE	2.1
1	E	96	VAL	2.1
1	G	188	VAL	2.1
1	E	324	LEU	2.1
1	E	337	LEU	2.1
1	G	294	MET	2.1
1	G	123	ALA	2.1
1	A	393	ARG	2.1
1	G	88	THR	2.1
1	I	352	PHE	2.1
1	B	62	GLN	2.1
1	H	161	ILE	2.1
1	E	64	VAL	2.1
1	F	35	MET	2.1
1	A	346	LEU	2.1
1	D	290	LEU	2.1
1	G	126	VAL	2.1
1	H	115	LEU	2.1
1	H	118	LEU	2.1
1	I	81	VAL	2.1
1	I	188	VAL	2.1
1	I	406	LEU	2.1
1	B	116	ARG	2.1
1	E	169	ALA	2.1
1	F	103	ARG	2.1
1	H	40	ALA	2.1
1	E	383	TYR	2.1
1	D	137	PRO	2.1
1	D	395	THR	2.1
1	E	195	THR	2.1

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Mol	Chain	Res	Type	RSRZ
1	G	56	GLN	2.1
1	H	37	SER	2.1
1	E	426	HIS	2.1
1	G	153	HIS	2.1
1	B	278	LEU	2.0
1	E	43	LEU	2.0
1	I	326	LEU	2.0
1	A	339	ARG	2.0
1	G	59	ALA	2.0
1	B	372	GLY	2.0
1	G	342	GLY	2.0
1	E	332	LYS	2.0
1	I	287	LYS	2.0
1	G	276	GLU	2.0
1	G	108	HIS	2.0
1	A	102	LEU	2.0
1	B	102	LEU	2.0
1	F	346	LEU	2.0
1	G	270	LEU	2.0
1	G	290	LEU	2.0
1	H	36	LEU	2.0
1	H	97	LEU	2.0
1	I	322	ALA	2.0
1	H	49	GLY	2.0
1	I	359	TRP	2.0
1	F	122	THR	2.0
1	A	274	HIS	2.0
1	B	425	HIS	2.0
1	F	121	SER	2.0
1	H	422	HIS	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 monosaccharides in this entry.

6.4 Ligands

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.