



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 08:27 AM UTC

PDB ID : 1JHL / pdb_00001jhl
Title : THREE-DIMENSIONAL STRUCTURE OF A HETEROCLITIC ANTIGEN-ANTIBODY CROSS-REACTION COMPLEX
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Deposited on : 1993-05-04
Resolution : 2.40 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	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

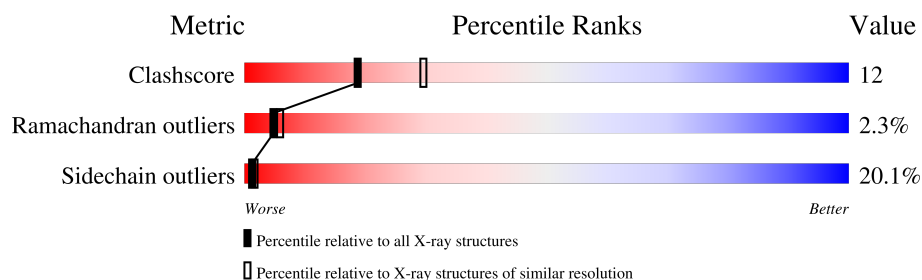
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)

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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	L	108	43% 36% 19% .
2	H	116	37% 41% 19% .
3	A	129	33% 44% 19% .

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 2745 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 IGG1-KAPPA D11.15 FV (LIGHT CHAIN).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	L	108	Total	C	N	O	S	0	0	0
			833	525	136	169	3			

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	2	ILE	VAL	conflict	GB 196740
L	3	GLU	GLN	conflict	GB 196740
L	4	LEU	ILE	conflict	GB 196740
L	12	VAL	PRO	conflict	GB 196740
L	14	SER	ALA	conflict	GB 196740
L	32	SER	TYR	conflict	GB 196740
L	45	ASN	LYS	conflict	GB 196740
L	65	SER	ASN	conflict	GB 196740
L	87	ILE	TYR	conflict	GB 196740

- Molecule 2 is a protein called IGG1-KAPPA D11.15 FV (HEAVY CHAIN).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	116	Total	C	N	O	S	0	0	0
			916	577	150	185	4			

- Molecule 3 is a protein called PHEASANT EGG WHITE LYSOZYME.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	A	129	Total	C	N	O	S	0	0	0
			996	614	187	184	11			

There is a discrepancy between the modelled and reference sequences:

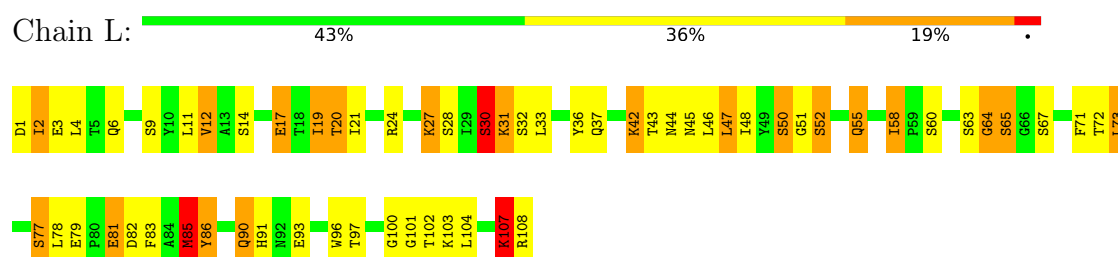
Chain	Residue	Modelled	Actual	Comment	Reference
A	103	ASP	ASN	conflict	UNP P00702

3 Residue-property plots

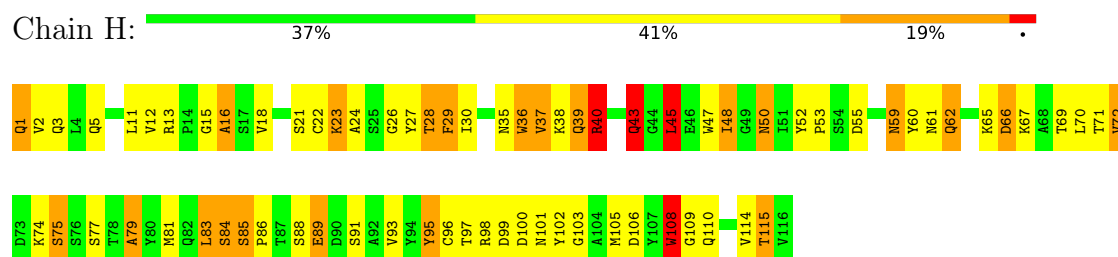
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded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

Note EDS was not executed.

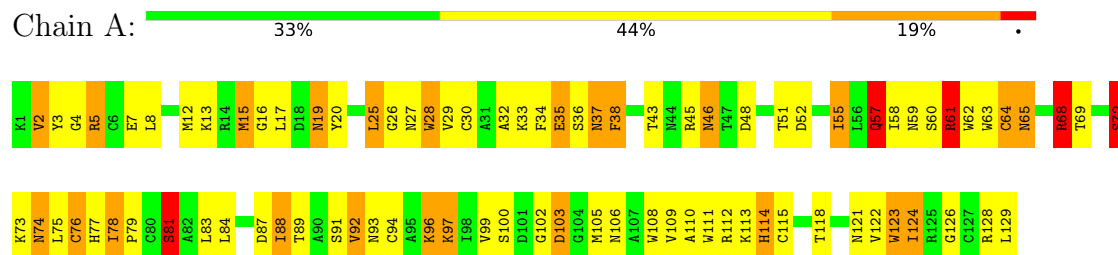
• Molecule 1: IGG1-KAPPA D11.15 FV (LIGHT CHAIN)



• Molecule 2: IGG1-KAPPA D11.15 FV (HEAVY CHAIN)



• Molecule 3: PHEASANT EGG WHITE LYSOZYME



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 65	Depositor
Cell constants a, b, c, α , β , γ	57.80Å 57.80Å 282.10Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	7.00 – 2.40	Depositor
% Data completeness (in resolution range)	(Not available) (7.00-2.40)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, R_{free}	0.214 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2745	wwPDB-VP
Average B, all atoms (Å ²)	19.0	wwPDB-VP

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	L	1.32	3/852 (0.4%)	2.24	43/1153 (3.7%)
2	H	1.39	8/939 (0.9%)	2.45	65/1276 (5.1%)
3	A	1.47	7/1017 (0.7%)	2.58	89/1373 (6.5%)
All	All	1.40	18/2808 (0.6%)	2.44	197/3802 (5.2%)

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
3	A	0	1

All (18) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	28	THR	CA-CB	8.65	1.64	1.52
3	A	124	ILE	CA-CB	8.61	1.64	1.54
3	A	109	VAL	CA-CB	7.24	1.62	1.54
2	H	12	VAL	N-CA	-7.13	1.37	1.46
3	A	77	HIS	CD2-NE2	-6.57	1.30	1.37
1	L	2	ILE	CA-CB	6.34	1.61	1.54
2	H	93	VAL	CA-CB	-6.32	1.46	1.54
2	H	89	GLU	CA-CB	-6.06	1.43	1.53
3	A	114	HIS	CA-CB	-5.98	1.44	1.53
3	A	29	VAL	CA-CB	5.98	1.62	1.54
2	H	110	GLN	CA-CB	5.87	1.62	1.53
3	A	114	HIS	CD2-NE2	-5.84	1.31	1.37
2	H	48	ILE	CA-CB	5.71	1.61	1.54
2	H	18	VAL	CA-CB	5.69	1.62	1.54
1	L	6	GLN	CA-CB	-5.66	1.43	1.53
3	A	55	ILE	CA-CB	5.64	1.62	1.54
1	L	91	HIS	CD2-NE2	-5.47	1.31	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	55	ASP	CA-C	-5.22	1.47	1.52

All (197) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	99	ASP	CA-CB-CG	10.26	122.86	112.60
3	A	59	ASN	OD1-CG-ND2	-9.72	112.88	122.60
2	H	55	ASP	CA-CB-CG	9.68	122.28	112.60
3	A	34	PHE	CA-CB-CG	-9.68	104.12	113.80
3	A	60	SER	N-CA-C	9.53	124.46	113.02
2	H	100	ASP	CA-CB-CG	9.23	121.83	112.60
2	H	88	SER	N-CA-C	9.13	121.23	111.28
3	A	76	CYS	N-CA-C	-9.00	102.30	113.28
3	A	65	ASN	CA-CB-CG	-8.95	103.65	112.60
3	A	64	CYS	CA-C-N	-8.85	110.51	122.72
3	A	64	CYS	C-N-CA	-8.85	110.51	122.72
3	A	35	GLU	CA-C-O	-8.85	111.79	120.90
1	L	64	GLY	O-C-N	8.84	130.56	123.49
3	A	28	TRP	CD2-CE2-CZ2	-8.76	113.64	122.40
2	H	35	ASN	CA-CB-CG	8.59	121.19	112.60
3	A	27	ASN	OD1-CG-ND2	-8.57	114.03	122.60
3	A	2	VAL	O-C-N	8.31	131.90	123.18
2	H	89	GLU	N-CA-C	8.23	121.17	111.71
2	H	95	TYR	CA-C-O	-8.21	111.29	120.32
1	L	19	ILE	N-CA-CB	-8.17	97.75	111.23
3	A	43	THR	O-C-N	-7.83	114.18	123.27
2	H	66	ASP	CA-CB-CG	-7.81	104.79	112.60
1	L	9	SER	N-CA-C	-7.76	102.46	112.23
3	A	106	ASN	CB-CG-ND2	7.75	128.03	116.40
2	H	61	ASN	CA-CB-CG	7.72	120.32	112.60
1	L	79	GLU	N-CA-C	-7.70	100.38	110.39
3	A	106	ASN	OD1-CG-ND2	-7.68	114.92	122.60
3	A	74	ASN	OD1-CG-ND2	-7.68	114.92	122.60
1	L	30	SER	N-CA-C	7.68	127.16	110.80
3	A	91	SER	N-CA-C	-7.62	102.92	111.07
3	A	5	ARG	CA-C-O	-7.54	112.83	120.90
3	A	27	ASN	N-CA-C	7.45	119.04	111.07
3	A	114	HIS	CA-CB-CG	7.36	121.16	113.80
3	A	106	ASN	CA-CB-CG	7.33	119.93	112.60
1	L	52	SER	N-CA-C	7.29	122.47	113.50
3	A	46	ASN	OD1-CG-ND2	-7.28	115.32	122.60
2	H	84	SER	N-CA-C	-7.21	98.30	109.76

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	103	LYS	N-CA-C	-7.20	96.99	108.73
2	H	83	LEU	CA-C-O	7.06	127.99	120.36
2	H	88	SER	CA-C-O	7.06	128.03	120.55
3	A	38	PHE	CA-CB-CG	7.05	120.85	113.80
3	A	124	ILE	CA-CB-CG1	6.96	122.23	110.40
2	H	62	GLN	OE1-CD-NE2	-6.88	115.72	122.60
1	L	45	ASN	CA-CB-CG	6.88	119.48	112.60
3	A	28	TRP	CE2-CD2-CE3	6.88	125.68	118.80
2	H	16	ALA	CA-C-O	-6.84	113.15	121.36
2	H	43	GLN	N-CA-C	-6.82	100.70	110.59
3	A	46	ASN	CB-CG-ND2	6.81	126.61	116.40
2	H	36	TRP	CG-CD1-NE1	-6.78	101.39	110.20
3	A	77	HIS	CB-CG-CD2	-6.77	122.40	131.20
1	L	102	THR	N-CA-C	-6.75	98.20	109.07
2	H	103	GLY	N-CA-C	-6.69	105.82	114.85
3	A	114	HIS	CB-CG-CD2	-6.68	122.52	131.20
2	H	89	GLU	CB-CG-CD	-6.66	101.28	112.60
3	A	19	ASN	CA-CB-CG	-6.63	105.97	112.60
1	L	77	SER	CA-C-O	6.62	129.98	120.51
2	H	12	VAL	CB-CA-C	6.62	120.70	110.50
2	H	77	SER	CB-CA-C	-6.56	102.58	111.89
3	A	100	SER	N-CA-C	-6.51	105.33	113.28
1	L	73	LEU	N-CA-C	-6.51	97.76	108.76
3	A	61	ARG	N-CA-C	-6.50	104.05	112.23
3	A	89	THR	N-CA-C	6.49	118.90	111.11
1	L	1	ASP	CA-CB-CG	6.49	119.09	112.60
2	H	12	VAL	N-CA-CB	-6.49	100.80	111.44
2	H	69	THR	CA-CB-OG1	-6.48	99.87	109.60
3	A	63	TRP	CG-CD2-CE3	6.46	140.37	133.90
2	H	52	TYR	CB-CA-C	-6.46	102.72	110.15
1	L	27	LYS	CA-C-O	-6.42	114.32	121.51
3	A	88	ILE	N-CA-C	6.39	122.64	109.34
2	H	74	LYS	CB-CG-CD	-6.39	96.60	111.30
3	A	87	ASP	N-CA-CB	-6.36	99.92	110.47
2	H	40	ARG	O-C-N	-6.29	115.54	121.20
3	A	123	TRP	CE2-CD2-CG	-6.27	99.68	107.20
2	H	13	ARG	N-CA-C	-6.26	101.88	109.83
2	H	1	GLN	CG-CD-NE2	6.26	125.78	116.40
2	H	59	ASN	CA-CB-CG	-6.24	106.36	112.60
3	A	5	ARG	CB-CG-CD	-6.23	96.96	111.30
3	A	62	TRP	CG-CD2-CE3	6.23	140.13	133.90
3	A	126	GLY	N-CA-C	-6.20	106.20	114.25

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	97	THR	OG1-CB-CG2	-6.19	96.92	109.30
3	A	73	LYS	N-CA-C	-6.18	106.06	113.97
3	A	4	GLY	N-CA-C	-6.14	100.75	111.62
3	A	62	TRP	CB-CG-CD1	-6.13	117.71	126.90
1	L	42	LYS	CA-CB-CG	6.12	126.35	114.10
3	A	75	LEU	N-CA-C	6.12	120.00	112.54
1	L	28	SER	CA-CB-OG	6.11	123.32	111.10
3	A	68	ARG	N-CA-CB	-6.10	101.11	110.44
3	A	16	GLY	O-C-N	-6.08	115.84	122.41
1	L	91	HIS	CA-CB-CG	6.07	119.87	113.80
2	H	65	LYS	N-CA-C	6.07	119.78	112.38
2	H	48	ILE	O-C-N	-6.05	115.61	121.90
3	A	112	ARG	CA-CB-CG	6.05	126.21	114.10
2	H	102	TYR	CA-C-O	6.05	126.25	119.41
3	A	128	ARG	N-CA-C	-6.04	98.67	108.52
1	L	27	LYS	CA-C-N	6.02	129.91	121.24
1	L	27	LYS	C-N-CA	6.02	129.91	121.24
1	L	58	ILE	N-CA-CB	-6.01	102.80	111.21
2	H	66	ASP	N-CA-C	6.00	120.60	113.28
3	A	27	ASN	CA-C-O	5.99	127.11	120.82
3	A	63	TRP	CE2-CD2-CG	-5.93	100.08	107.20
3	A	81	SER	N-CA-C	5.92	119.33	111.75
3	A	112	ARG	CB-CG-CD	-5.89	97.74	111.30
1	L	55	GLN	CG-CD-NE2	5.88	125.21	116.40
1	L	55	GLN	OE1-CD-NE2	-5.83	116.77	122.60
3	A	63	TRP	CG-CD1-NE1	-5.83	102.62	110.20
3	A	105	MET	CA-CB-CG	-5.83	102.45	114.10
1	L	81	GLU	CA-C-N	-5.81	113.75	122.24
1	L	81	GLU	C-N-CA	-5.81	113.75	122.24
1	L	67	SER	N-CA-CB	-5.79	100.70	110.49
3	A	2	VAL	CA-C-N	5.79	130.67	122.09
3	A	2	VAL	C-N-CA	5.79	130.67	122.09
2	H	96	CYS	O-C-N	-5.79	116.42	123.19
1	L	3	GLU	N-CA-C	-5.77	99.78	109.07
2	H	85	SER	CA-C-N	5.76	125.95	119.90
2	H	85	SER	C-N-CA	5.76	125.95	119.90
3	A	5	ARG	N-CA-C	5.75	118.02	111.11
2	H	5	GLN	OE1-CD-NE2	-5.75	116.85	122.60
3	A	63	TRP	N-CA-C	5.74	118.75	111.69
1	L	58	ILE	CA-CB-CG1	-5.72	100.68	110.40
3	A	51	THR	N-CA-CB	-5.71	101.50	110.69
1	L	107	LYS	O-C-N	5.70	129.44	123.06

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	124	ILE	CA-CB-CG2	-5.69	100.82	110.50
1	L	82	ASP	CB-CA-C	5.67	119.50	111.74
3	A	113	LYS	CA-CB-CG	-5.67	102.77	114.10
1	L	85	MET	O-C-N	-5.65	116.60	123.16
1	L	93	GLU	O-C-N	5.65	129.05	123.46
1	L	96	TRP	CG-CD2-CE3	5.65	139.55	133.90
3	A	37	ASN	OD1-CG-ND2	-5.63	116.97	122.60
3	A	92	VAL	O-C-N	-5.63	116.03	121.83
2	H	85	SER	N-CA-C	5.62	122.24	109.81
1	L	83	PHE	CA-C-O	5.61	126.39	120.33
2	H	106	ASP	CA-CB-CG	5.60	118.20	112.60
3	A	59	ASN	CB-CG-ND2	5.59	124.79	116.40
3	A	88	ILE	CB-CA-C	-5.59	102.12	111.29
3	A	59	ASN	CA-CB-CG	5.58	118.18	112.60
3	A	20	TYR	N-CA-C	-5.58	101.60	109.96
2	H	45	LEU	N-CA-C	-5.57	101.20	110.17
3	A	57	GLN	N-CA-C	5.57	122.67	110.80
3	A	37	ASN	CA-C-O	5.57	128.16	121.65
2	H	16	ALA	N-CA-C	-5.57	101.47	110.32
3	A	62	TRP	CE2-CD2-CG	-5.57	100.52	107.20
2	H	97	THR	O-C-N	-5.54	116.84	123.27
2	H	22	CYS	CA-C-O	5.54	126.45	120.63
2	H	47	TRP	CG-CD1-NE1	-5.54	103.00	110.20
3	A	7	GLU	CA-CB-CG	5.53	125.16	114.10
1	L	63	SER	N-CA-C	5.51	118.18	108.75
1	L	17	GLU	CA-CB-CG	5.48	125.06	114.10
3	A	4	GLY	O-C-N	-5.48	117.87	123.35
1	L	100	GLY	O-C-N	-5.48	115.58	122.70
2	H	15	GLY	CA-C-O	-5.48	112.86	119.00
2	H	109	GLY	N-CA-C	-5.48	104.22	112.60
1	L	19	ILE	CB-CA-C	5.45	120.23	111.29
2	H	65	LYS	CB-CG-CD	-5.42	98.83	111.30
3	A	63	TRP	CB-CG-CD1	-5.42	118.77	126.90
3	A	69	THR	CA-C-N	5.40	125.02	119.56
3	A	69	THR	C-N-CA	5.40	125.02	119.56
2	H	36	TRP	CD1-CG-CD2	5.40	114.94	106.30
2	H	75	SER	N-CA-C	5.40	120.22	111.37
3	A	32	ALA	CA-C-N	5.39	127.44	120.44
3	A	32	ALA	C-N-CA	5.39	127.44	120.44
3	A	83	LEU	N-CA-C	5.39	122.28	110.80
3	A	36	SER	CA-CB-OG	-5.38	100.34	111.10
3	A	108	TRP	CE2-CD2-CG	-5.37	100.76	107.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	100	ASP	N-CA-C	5.36	119.30	112.87
3	A	13	LYS	CA-CB-CG	-5.35	103.40	114.10
3	A	108	TRP	CG-CD2-CE3	5.35	139.25	133.90
2	H	36	TRP	CD2-CE2-CZ2	-5.31	117.09	122.40
3	A	79	PRO	N-CA-CB	5.30	106.78	103.23
3	A	123	TRP	CD1-CG-CD2	5.29	114.76	106.30
3	A	96	LYS	O-C-N	-5.27	116.14	122.15
1	L	55	GLN	N-CA-C	-5.22	102.55	110.28
3	A	28	TRP	CD1-CG-CD2	5.22	114.66	106.30
2	H	69	THR	CA-CB-CG2	5.21	119.35	110.50
2	H	26	GLY	O-C-N	-5.18	115.81	122.39
1	L	65	SER	O-C-N	-5.18	116.87	123.24
2	H	18	VAL	O-C-N	-5.17	117.48	123.07
3	A	63	TRP	CD1-CG-CD2	5.16	114.56	106.30
2	H	36	TRP	CE2-CD2-CG	-5.15	101.02	107.20
2	H	37	VAL	O-C-N	-5.15	117.62	123.03
1	L	86	TYR	N-CA-C	-5.14	101.03	109.40
2	H	100	ASP	CA-C-N	5.12	131.32	121.54
2	H	100	ASP	C-N-CA	5.12	131.32	121.54
3	A	93	ASN	OD1-CG-ND2	-5.11	117.49	122.60
3	A	72	SER	N-CA-C	5.11	117.64	110.23
2	H	79	ALA	N-CA-C	-5.11	101.95	110.17
2	H	24	ALA	CA-C-O	-5.10	115.14	120.80
1	L	90	GLN	CA-CB-CG	5.09	124.28	114.10
3	A	108	TRP	CB-CG-CD1	-5.09	119.27	126.90
2	H	108	TRP	CE2-CD2-CG	-5.07	101.12	107.20
2	H	50	ASN	CA-CB-CG	5.07	117.67	112.60
1	L	12	VAL	N-CA-C	-5.06	101.36	109.20
1	L	67	SER	CA-CB-OG	5.06	121.22	111.10
2	H	102	TYR	N-CA-C	5.05	119.57	113.41
3	A	79	PRO	CA-C-O	-5.04	114.60	120.85
2	H	29	PHE	N-CA-C	5.03	121.52	110.80
1	L	21	ILE	CB-CG1-CD1	5.02	124.34	113.80
2	H	37	VAL	CG1-CB-CG2	-5.01	99.78	110.80

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	A	65	ASN	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	L	833	0	811	16	0
2	H	916	0	866	20	0
3	A	996	0	958	28	0
All	All	2745	0	2635	64	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 12.

All (64) 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)
3:A:17:LEU:HD22	3:A:92:VAL:HG13	1.65	0.78
3:A:76:CYS:HB2	3:A:78:ILE:HD12	1.67	0.74
2:H:67:LYS:O	2:H:83:LEU:HD23	1.89	0.72
2:H:30:ILE:HA	2:H:53:PRO:HB2	1.73	0.70
2:H:40:ARG:HH12	2:H:89:GLU:HB2	1.59	0.67
3:A:61:ARG:O	3:A:72:SER:HA	1.96	0.65
3:A:110:ALA:O	3:A:114:HIS:HB2	1.96	0.64
1:L:14:SER:O	1:L:17:GLU:HG2	1.99	0.61
3:A:64:CYS:HB3	3:A:78:ILE:HD11	1.82	0.61
3:A:64:CYS:HB3	3:A:78:ILE:CD1	2.31	0.61
3:A:55:ILE:HG21	3:A:88:ILE:HG22	1.83	0.60
3:A:92:VAL:O	3:A:96:LYS:HG3	2.03	0.59
1:L:12:VAL:HG12	1:L:107:LYS:HB2	1.85	0.58
3:A:76:CYS:HB2	3:A:78:ILE:CD1	2.37	0.55
3:A:58:ILE:HD13	3:A:94:CYS:SG	2.47	0.55
3:A:45:ARG:HD3	3:A:68:ARG:NH2	2.23	0.54
3:A:8:LEU:HD11	3:A:12:MET:HE3	1.90	0.54
3:A:17:LEU:HD13	3:A:96:LYS:HE2	1.91	0.53
2:H:48:ILE:HG21	2:H:81:MET:HE3	1.92	0.52
2:H:91:SER:HA	2:H:114:VAL:O	2.10	0.52
2:H:29:PHE:HZ	2:H:72:VAL:CG2	2.23	0.52
1:L:36:TYR:O	1:L:86:TYR:HA	2.11	0.51
2:H:37:VAL:HB	2:H:95:TYR:HB2	1.94	0.50
2:H:11:LEU:HD12	2:H:115:THR:HB	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:38:LYS:NZ	2:H:40:ARG:HD3	2.28	0.49
2:H:39:GLN:HB3	2:H:45:LEU:HD13	1.95	0.48
2:H:23:LYS:HD3	2:H:23:LYS:C	2.38	0.48
3:A:45:ARG:HD3	3:A:68:ARG:HH21	1.78	0.48
2:H:36:TRP:CE2	2:H:81:MET:HB2	2.49	0.48
1:L:17:GLU:O	1:L:78:LEU:HG	2.13	0.48
1:L:50:SER:O	1:L:52:SER:N	2.47	0.47
2:H:27:TYR:CE2	2:H:29:PHE:HA	2.50	0.47
3:A:15:MET:HE1	3:A:88:ILE:HG13	1.95	0.47
1:L:65:SER:O	1:L:71:PHE:HA	2.16	0.46
3:A:64:CYS:HA	3:A:74:ASN:OD1	2.16	0.46
3:A:94:CYS:O	3:A:97:LYS:N	2.50	0.45
3:A:2:VAL:HA	3:A:38:PHE:O	2.17	0.45
1:L:30:SER:O	1:L:31:LYS:HB2	2.17	0.45
2:H:16:ALA:O	2:H:86:PRO:HD2	2.16	0.44
3:A:52:ASP:HB3	3:A:57:GLN:HB3	1.99	0.44
3:A:3:TYR:HB2	3:A:38:PHE:HB3	2.01	0.43
1:L:4:LEU:HA	1:L:24:ARG:O	2.18	0.43
3:A:111:TRP:CD1	3:A:115:CYS:HB2	2.53	0.43
3:A:45:ARG:HH11	3:A:45:ARG:HG3	1.84	0.43
1:L:20:THR:HG23	1:L:72:THR:HG23	2.01	0.43
2:H:40:ARG:NE	2:H:43:GLN:HE21	2.16	0.43
3:A:25:LEU:O	3:A:26:GLY:C	2.61	0.42
2:H:2:VAL:HG13	2:H:27:TYR:CD1	2.53	0.42
3:A:35:GLU:HG2	3:A:110:ALA:HB3	2.02	0.42
3:A:81:SER:HA	3:A:84:LEU:HD13	2.01	0.42
1:L:64:GLY:HA2	1:L:72:THR:O	2.19	0.42
2:H:105:MET:HB2	2:H:108:TRP:CZ3	2.54	0.42
2:H:60:TYR:CE1	2:H:70:LEU:HD13	2.55	0.42
1:L:20:THR:HA	1:L:73:LEU:O	2.20	0.41
2:H:50:ASN:OD1	2:H:59:ASN:HB2	2.19	0.41
1:L:2:ILE:HB	1:L:90:GLN:HG2	2.01	0.41
3:A:15:MET:HE2	3:A:15:MET:HB2	1.90	0.41
1:L:85:MET:HE1	1:L:101:GLY:HA3	2.02	0.41
3:A:30:CYS:HB2	3:A:123:TRP:CD1	2.55	0.41
1:L:37:GLN:HB2	1:L:47:LEU:HD21	2.02	0.41
2:H:72:VAL:HG23	2:H:79:ALA:HA	2.01	0.41
1:L:14:SER:HB2	1:L:17:GLU:OE1	2.21	0.41
1:L:55:GLN:HA	1:L:55:GLN:OE1	2.21	0.40
3:A:28:TRP:CH2	3:A:99:VAL:HG11	2.56	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	L	106/108 (98%)	94 (89%)	8 (8%)	4 (4%)	2	2
2	H	114/116 (98%)	107 (94%)	6 (5%)	1 (1%)	14	22
3	A	127/129 (98%)	108 (85%)	16 (13%)	3 (2%)	4	5
All	All	347/353 (98%)	309 (89%)	30 (9%)	8 (2%)	5	6

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	L	30	SER
3	A	57	GLN
3	A	102	GLY
1	L	51	GLY
1	L	60	SER
1	L	77	SER
3	A	103	ASP
2	H	101	ASN

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	L	94/94 (100%)	73 (78%)	21 (22%)	1	1
2	H	100/100 (100%)	81 (81%)	19 (19%)	1	2
3	A	105/105 (100%)	85 (81%)	20 (19%)	1	2

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	299/299 (100%)	239 (80%)	60 (20%)	1 2

All (60) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	L	11	LEU
1	L	19	ILE
1	L	20	THR
1	L	27	LYS
1	L	31	LYS
1	L	32	SER
1	L	33	LEU
1	L	42	LYS
1	L	43	THR
1	L	44	ASN
1	L	46	LEU
1	L	47	LEU
1	L	48	ILE
1	L	50	SER
1	L	58	ILE
1	L	81	GLU
1	L	85	MET
1	L	97	THR
1	L	104	LEU
1	L	107	LYS
1	L	108	ARG
2	H	1	GLN
2	H	3	GLN
2	H	21	SER
2	H	23	LYS
2	H	28	THR
2	H	39	GLN
2	H	40	ARG
2	H	43	GLN
2	H	45	LEU
2	H	62	GLN
2	H	66	ASP
2	H	71	THR
2	H	72	VAL
2	H	75	SER
2	H	84	SER
2	H	85	SER

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Mol	Chain	Res	Type
2	H	98	ARG
2	H	108	TRP
2	H	115	THR
3	A	5	ARG
3	A	15	MET
3	A	19	ASN
3	A	25	LEU
3	A	33	LYS
3	A	37	ASN
3	A	46	ASN
3	A	48	ASP
3	A	61	ARG
3	A	68	ARG
3	A	72	SER
3	A	78	ILE
3	A	81	SER
3	A	97	LYS
3	A	103	ASP
3	A	118	THR
3	A	121	ASN
3	A	122	VAL
3	A	124	ILE
3	A	129	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	L	44	ASN
2	H	35	ASN
2	H	39	GLN
2	H	43	GLN
2	H	61	ASN
2	H	62	GLN
3	A	93	ASN

5.3.3 RNA ⓘ

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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.