



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 11:49 PM UTC

PDB ID : 2IGF / pdb_00002igf
Title : CRYSTAL STRUCTURES OF AN ANTIBODY TO A PEPTIDE AND ITS
COMPLEX WITH PEPTIDE ANTIGEN AT 2.8 ANGSTROMS
Authors : Stanfield, R.L.; Wilson, I.A.
Deposited on : 1991-03-21
Resolution : 2.80 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
Mogul	:	2022.3.0, CSD as543be (2022)
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

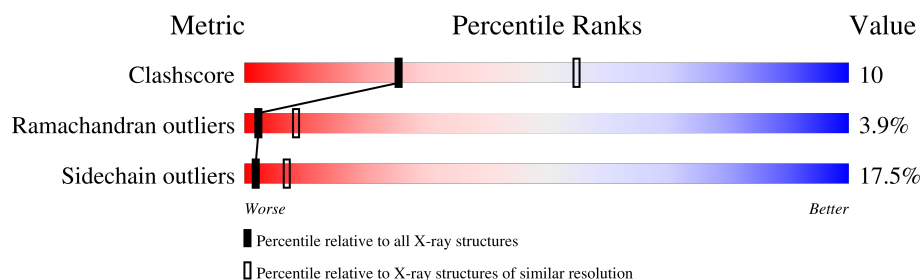
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	4276 (2.80-2.80)
Ramachandran outliers	187476	4196 (2.80-2.80)
Sidechain outliers	187428	4198 (2.80-2.80)

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	219	47% 39% 11% .
2	H	221	42% 39% 17% .
3	P	19	11% 26% 63%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 3436 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 B13I2 FAB (LIGHT CHAIN).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	L	219	Total	C	N	O	S	0	0	0
			1692	1058	284	343	7			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	26	ASN	SER	conflict	PIR PC4203
L	27A	THR	SER	conflict	PIR PC4203
L	27C	LEU	VAL	conflict	PIR PC4203
L	27D	LEU	HIS	conflict	PIR PC4203
L	27E	SER	THR	conflict	PIR PC4203
L	28	ASP	ASN	conflict	PIR PC4203
L	30	ASP	ASN	conflict	PIR PC4203
L	96	PRO	ARG	conflict	PIR PC4203

- Molecule 2 is a protein called IGG1-KAPPA B13I2 FAB (HEAVY CHAIN).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	221	Total	C	N	O	S	0	0	0
			1672	1053	280	330	9			

There are 33 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
H	3	GLN	LYS	conflict	PIR S38864
H	5	VAL	LEU	conflict	PIR S38864
H	27	PHE	LEU	conflict	PIR S38864
H	31	ARG	SER	conflict	PIR S38864
H	32	CYS	TYR	conflict	PIR S38864
H	33	ALA	GLY	conflict	PIR S38864
H	40	THR	ILE	conflict	PIR S38864
H	42	GLU	ASP	conflict	PIR S38864

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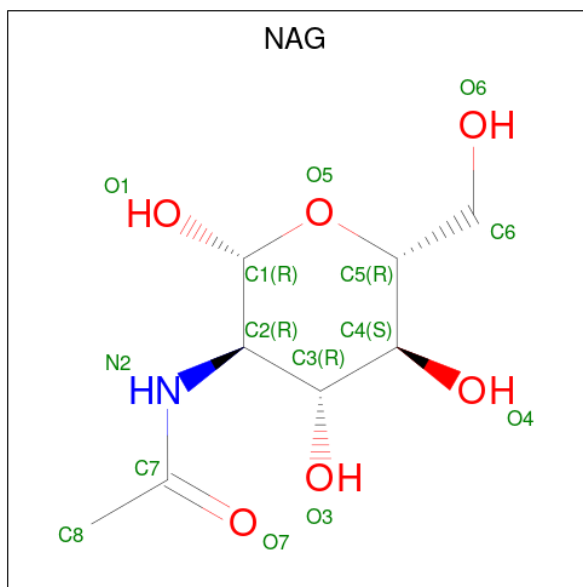
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Chain	Residue	Modelled	Actual	Comment	Reference
H	50	GLY	THR	conflict	PIR S38864
H	55	SER	THR	conflict	PIR S38864
H	58	PHE	TYR	conflict	PIR S38864
H	62	THR	SER	conflict	PIR S38864
H	68	ILE	THR	conflict	PIR S38864
H	72	ASN	ASP	conflict	PIR S38864
H	75	ARG	LYS	conflict	PIR S38864
H	79	SER	TYR	conflict	PIR S38864
H	83	ARG	LYS	conflict	PIR S38864
H	89	ILE	MET	conflict	PIR S38864
H	93	THR	ALA	conflict	PIR S38864
H	?	-	GLN	deletion	PIR S38864
H	95	TYR	GLY	conflict	PIR S38864
H	96	SER	VAL	conflict	PIR S38864
H	98	ASP	THR	conflict	PIR S38864
H	99	PRO	MET	conflict	PIR S38864
H	100	PHE	ILE	conflict	PIR S38864
H	100B	TYR	ARG	conflict	PIR S38864
H	101	ASP	ALA	conflict	PIR S38864
H	108	THR	LEU	conflict	PIR S38864
H	109	LEU	VAL	conflict	PIR S38864
H	113	SER	ALA	conflict	PIR S38864
H	114	ALA	GLY	conflict	PIR S38864
H	198	PRO	THR	conflict	PIR S38864
H	199	ARG	TRP	conflict	PIR S38864

- Molecule 3 is a protein called PEPTIDE (RESIDUES 69-87 OF MYOHEMERYTHRIN).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	P	7	Total	C	N	O	0	0	0
			58	38	11	9			

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C₈H₁₅NO₆).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
4	L	1	14	8	1	5	0	0

4 Data and refinement statistics

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

Property	Value	Source
Space group	P 63 2 2	Depositor
Cell constants a, b, c, α , β , γ	142.50Å 142.50Å 101.50Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	8.00 – 2.80	Depositor
% Data completeness (in resolution range)	(Not available) (8.00-2.80)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, R_{free}	0.220 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3436	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: NAG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z > 5$	RMSZ	# $ Z > 5$
1	L	1.22	5/1730 (0.3%)	2.21	91/2347 (3.9%)
2	H	1.26	5/1715 (0.3%)	2.24	92/2340 (3.9%)
3	P	1.66	2/59 (3.4%)	2.14	2/78 (2.6%)
All	All	1.24	12/3504 (0.3%)	2.22	185/4765 (3.9%)

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	L	0	3
2	H	0	2
All	All	0	5

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	L	198	HIS	CD2-NE2	-7.52	1.29	1.37
3	P	73	HIS	CD2-NE2	-7.11	1.30	1.37
3	P	73	HIS	CG-ND1	-6.98	1.30	1.38
2	H	172	HIS	CD2-NE2	-6.70	1.30	1.37
2	H	212	HIS	CD2-NE2	-6.62	1.30	1.37
1	L	93	HIS	CD2-NE2	-5.99	1.31	1.37
1	L	189	HIS	CD2-NE2	-5.94	1.31	1.37
1	L	59	PRO	CA-CB	-5.71	1.46	1.53
2	H	172	HIS	CG-ND1	-5.64	1.32	1.38
2	H	2	VAL	CA-CB	-5.11	1.48	1.54
2	H	33	ALA	CA-CB	-5.10	1.45	1.53
1	L	27(B)	ILE	CA-CB	5.04	1.60	1.54

All (185) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	72	ASN	OD1-CG-ND2	-11.45	111.16	122.60
2	H	101	ASP	CA-CB-CG	8.95	121.55	112.60
2	H	72	ASN	CB-CG-ND2	8.88	129.72	116.40
1	L	7	THR	CA-CB-OG1	-8.73	96.50	109.60
2	H	162	ASN	OD1-CG-ND2	-8.38	114.22	122.60
1	L	61	ARG	N-CA-C	-8.27	103.21	113.38
1	L	50	LYS	CB-CG-CD	-8.15	92.56	111.30
1	L	27(B)	ILE	N-CA-CB	-8.05	101.57	112.28
1	L	66	GLY	CA-C-O	-7.98	116.54	122.37
1	L	198	HIS	CB-CG-CD2	-7.92	120.90	131.20
2	H	106	GLY	CA-C-O	-7.89	114.98	121.77
2	H	75	ARG	N-CA-C	-7.88	100.98	110.44
1	L	211	ARG	N-CA-C	7.82	127.46	110.80
2	H	212	HIS	CB-CG-CD2	-7.81	121.05	131.20
2	H	82	MET	CG-SD-CE	-7.72	83.91	100.90
2	H	61	ASP	CA-CB-CG	7.65	120.25	112.60
2	H	27	PHE	O-C-N	-7.63	115.90	123.46
1	L	139	PHE	N-CA-C	7.40	120.42	109.24
2	H	45	LEU	CD1-CG-CD2	-7.38	94.57	110.80
2	H	125	ALA	CA-C-O	-7.36	112.70	120.87
2	H	13	LYS	CA-C-N	7.34	127.10	119.76
2	H	13	LYS	C-N-CA	7.34	127.10	119.76
2	H	47	TRP	CA-C-O	-7.30	112.69	120.80
1	L	118	PHE	CA-C-N	7.19	127.79	120.38
1	L	118	PHE	C-N-CA	7.19	127.79	120.38
1	L	177	SER	CA-C-O	-7.18	112.42	120.32
2	H	2	VAL	CA-C-O	-7.18	113.55	121.23
2	H	50	GLY	CA-C-O	-7.18	115.01	121.47
2	H	75	ARG	CA-CB-CG	7.17	128.44	114.10
2	H	162	ASN	CB-CG-ND2	7.14	127.12	116.40
2	H	199	ARG	O-C-N	-7.01	113.25	121.32
2	H	73	ASN	OD1-CG-ND2	-7.00	115.60	122.60
1	L	212	ASN	N-CA-C	6.98	121.86	111.81
2	H	57	THR	N-CA-CB	-6.96	99.43	110.77
2	H	109	LEU	N-CA-C	-6.92	98.44	109.59
2	H	57	THR	CA-CB-OG1	-6.89	99.26	109.60
1	L	140	TYR	O-C-N	-6.84	114.76	121.94
2	H	33	ALA	O-C-N	-6.84	114.61	122.68
2	H	209	ASN	OD1-CG-ND2	-6.79	115.81	122.60
2	H	92	CYS	N-CA-C	-6.77	97.70	108.73
2	H	98	ASP	CB-CA-C	6.75	116.52	110.44
1	L	209	PHE	CA-CB-CG	6.71	120.51	113.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	76	ASN	N-CA-C	6.67	125.01	110.80
1	L	4	MET	CG-SD-CE	-6.64	86.28	100.90
2	H	102	TYR	CA-C-O	-6.64	113.61	121.11
1	L	51	VAL	CA-C-O	-6.62	112.50	120.78
1	L	210	ASN	CA-CB-CG	-6.55	106.05	112.60
1	L	190	ASN	CA-CB-CG	6.50	119.10	112.60
2	H	71	ARG	NE-CZ-NH1	6.50	128.00	121.50
1	L	46	LEU	N-CA-C	-6.46	100.00	110.20
1	L	71	PHE	CA-C-O	-6.43	113.92	121.44
2	H	81	GLN	N-CA-C	-6.34	98.90	109.24
1	L	150	ILE	CA-C-O	6.34	127.45	120.48
1	L	180	THR	CA-C-O	6.33	127.28	120.38
1	L	189	HIS	CB-CG-CD2	-6.32	122.99	131.20
2	H	35	SER	CA-C-O	-6.29	114.71	121.38
1	L	89	PHE	O-C-N	-6.28	115.88	123.10
1	L	75	ILE	N-CA-C	-6.26	98.10	107.37
1	L	138	ASN	OD1-CG-ND2	-6.23	116.37	122.60
1	L	113	PRO	N-CA-C	6.22	120.22	111.33
1	L	1	ASP	CA-CB-CG	-6.21	106.39	112.60
2	H	179	GLN	CA-CB-CG	-6.20	101.71	114.10
1	L	205	ILE	N-CA-C	-6.20	100.78	109.21
1	L	88	CYS	CA-C-O	-6.19	114.11	121.66
2	H	125	ALA	CA-C-N	6.18	127.57	119.84
2	H	125	ALA	C-N-CA	6.18	127.57	119.84
1	L	51	VAL	CG1-CB-CG2	-6.18	97.21	110.80
1	L	87	TYR	CA-C-O	-6.16	113.71	120.36
2	H	82(B)	SER	N-CA-C	6.15	123.89	110.80
1	L	13	VAL	O-C-N	-6.14	116.25	123.00
1	L	145	ASN	OD1-CG-ND2	-6.13	116.47	122.60
1	L	208	SER	N-CA-C	6.13	118.39	109.07
1	L	138	ASN	N-CA-C	6.10	123.79	110.80
3	P	71	VAL	CA-C-N	6.10	126.46	119.93
3	P	71	VAL	C-N-CA	6.10	126.46	119.93
2	H	212	HIS	CB-CG-ND1	6.07	131.81	122.70
2	H	94	ARG	CA-C-O	-6.07	113.64	120.32
1	L	82	ASP	CA-CB-CG	6.07	118.67	112.60
2	H	204	THR	CA-C-O	-6.06	114.25	120.80
2	H	86	ASP	CA-CB-CG	6.05	118.65	112.60
1	L	93	HIS	CA-CB-CG	6.04	119.84	113.80
2	H	150	GLU	N-CA-C	-6.04	102.17	109.72
2	H	165	SER	N-CA-C	-6.01	104.80	111.36
2	H	56	TYR	O-C-N	6.01	130.85	123.21

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	73	LEU	N-CA-C	-5.97	99.67	109.40
1	L	62	PHE	CA-CB-CG	-5.96	107.84	113.80
1	L	94	VAL	CG1-CB-CG2	-5.94	97.72	110.80
2	H	98	ASP	N-CA-C	-5.93	96.96	108.59
2	H	199	ARG	CA-CB-CG	-5.89	102.31	114.10
1	L	36	TYR	CA-C-O	-5.89	114.46	121.11
1	L	7	THR	CA-CB-CG2	5.89	120.51	110.50
2	H	103	TRP	O-C-N	-5.86	116.12	123.27
1	L	93	HIS	CB-CG-CD2	-5.86	123.58	131.20
2	H	29	PHE	CA-CB-CG	5.83	119.63	113.80
1	L	25	SER	CA-C-O	-5.82	114.54	120.71
2	H	71	ARG	NE-CZ-NH2	-5.81	113.97	119.20
2	H	42	GLU	CA-CB-CG	5.80	125.69	114.10
1	L	58	VAL	CA-C-N	5.78	125.79	119.89
1	L	58	VAL	C-N-CA	5.78	125.79	119.89
1	L	189	HIS	N-CA-C	5.78	118.01	109.69
1	L	74	LYS	CA-CB-CG	5.76	125.62	114.10
2	H	13	LYS	CA-C-O	-5.75	114.69	120.96
1	L	124	GLN	CG-CD-NE2	5.74	125.02	116.40
1	L	178	THR	CA-CB-OG1	-5.74	101.00	109.60
1	L	137	ASN	N-CA-C	5.73	118.38	110.35
1	L	21	ILE	N-CA-C	-5.73	100.17	108.71
2	H	61	ASP	CA-C-O	-5.72	113.79	120.20
2	H	78	LEU	N-CA-C	-5.71	100.47	109.50
1	L	47	LEU	O-C-N	-5.69	116.22	121.79
1	L	83	LEU	CD1-CG-CD2	-5.68	98.31	110.80
1	L	27(C)	LEU	CA-C-O	-5.66	114.53	120.58
2	H	129	ALA	N-CA-C	5.63	122.80	110.80
2	H	97	SER	N-CA-C	-5.63	105.22	111.36
1	L	83	LEU	CA-CB-CG	5.62	135.97	116.30
2	H	144	VAL	CA-C-O	5.61	127.22	120.66
1	L	69	THR	N-CA-CB	-5.61	102.96	111.15
2	H	47	TRP	CA-CB-CG	5.60	124.24	113.60
1	L	161	ASN	OD1-CG-ND2	-5.54	117.06	122.60
2	H	11	LEU	N-CA-C	-5.51	100.81	109.25
2	H	71	ARG	N-CA-C	5.51	118.40	108.48
1	L	27(B)	ILE	CB-CA-C	5.49	118.82	111.85
2	H	206	THR	N-CA-C	-5.48	102.35	110.46
2	H	40	THR	CA-C-O	-5.48	112.66	120.16
2	H	216	SER	CA-C-O	-5.48	112.68	120.51
1	L	153	SER	N-CA-C	-5.47	102.80	110.35
2	H	12	VAL	N-CA-C	-5.46	100.47	108.99

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	67	PHE	CA-CB-CG	5.46	119.26	113.80
1	L	18	GLN	CA-C-O	-5.46	114.94	121.11
2	H	73	ASN	CA-CB-CG	5.46	118.06	112.60
2	H	47	TRP	N-CA-C	-5.45	100.82	109.76
1	L	198	HIS	CB-CG-ND1	5.45	130.88	122.70
1	L	163	TRP	CG-CD2-CE3	5.42	139.32	133.90
1	L	175	MET	CA-C-O	-5.42	114.92	120.99
2	H	69	ILE	O-C-N	-5.41	117.35	122.98
2	H	179	GLN	O-C-N	-5.39	115.42	122.59
1	L	93	HIS	CB-CG-ND1	5.38	130.77	122.70
2	H	75	ARG	N-CA-CB	-5.37	99.61	111.69
2	H	103	TRP	CG-CD2-CE3	5.35	139.25	133.90
2	H	233	CYS	CA-CB-SG	5.33	126.66	114.40
2	H	151	PRO	N-CD-CG	-5.33	97.41	103.80
2	H	57	THR	CA-CB-CG2	5.33	119.55	110.50
2	H	204	THR	N-CA-C	5.32	118.29	110.30
1	L	45	LYS	CA-C-O	-5.32	115.15	121.16
2	H	13	LYS	N-CA-CB	-5.31	103.58	109.74
1	L	124	GLN	OE1-CD-NE2	-5.30	117.30	122.60
2	H	218	LYS	N-CA-C	-5.29	101.07	109.59
1	L	90	GLN	O-C-N	-5.28	116.28	123.14
1	L	157	ASN	N-CA-C	-5.28	101.56	109.95
2	H	110	THR	O-C-N	-5.26	117.03	123.30
2	H	172	HIS	CB-CG-CD2	-5.26	124.36	131.20
1	L	148	TRP	CG-CD1-NE1	-5.25	103.37	110.20
2	H	94	ARG	N-CA-CB	-5.25	102.30	110.55
2	H	87	THR	CA-C-O	-5.25	115.42	121.19
1	L	162	SER	CA-CB-OG	-5.24	100.62	111.10
1	L	156	GLN	CB-CG-CD	5.22	121.48	112.60
1	L	58	VAL	CG1-CB-CG2	-5.22	99.31	110.80
1	L	31	THR	O-C-N	-5.21	116.24	123.01
1	L	40	PRO	CA-N-CD	-5.21	104.71	112.00
2	H	7	SER	CA-C-O	-5.20	115.72	121.33
1	L	189	HIS	CA-CB-CG	-5.20	108.61	113.80
2	H	71	ARG	CB-CG-CD	-5.19	99.37	111.30
1	L	155	ARG	O-C-N	-5.18	115.69	122.59
1	L	42	GLN	CB-CG-CD	-5.18	103.79	112.60
2	H	94	ARG	CA-CB-CG	5.18	124.46	114.10
1	L	119	PRO	CA-C-N	5.17	126.31	119.84
1	L	119	PRO	C-N-CA	5.17	126.31	119.84
1	L	155	ARG	N-CA-C	-5.17	99.80	110.80
1	L	180	THR	N-CA-C	5.16	117.38	109.07

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	79	SER	N-CA-C	5.15	116.12	108.86
1	L	50	LYS	CA-C-N	5.14	131.22	121.97
1	L	50	LYS	C-N-CA	5.14	131.22	121.97
2	H	183	ASP	N-CA-C	5.12	121.71	110.80
2	H	148	PHE	CA-C-O	-5.10	113.17	120.16
1	L	163	TRP	CB-CG-CD1	-5.09	119.27	126.90
2	H	200	PRO	N-CA-CB	-5.08	97.91	103.25
1	L	174	SER	CA-CB-OG	5.06	121.23	111.10
1	L	72	THR	N-CA-C	5.06	116.75	108.55
1	L	145	ASN	CA-CB-CG	5.06	117.66	112.60
2	H	156	THR	CA-CB-OG1	-5.06	102.01	109.60
2	H	3	GLN	N-CA-C	-5.05	100.47	109.06
1	L	12	PRO	N-CD-CG	-5.05	95.63	103.20
1	L	85	VAL	CA-C-O	-5.04	115.14	120.48
2	H	37	VAL	CA-C-O	-5.03	115.01	121.40
2	H	124	LEU	N-CA-C	-5.03	100.22	108.41
2	H	89	ILE	O-C-N	-5.02	117.46	123.03

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	H	150	GLU	Peptide
2	H	199	ARG	Peptide
1	L	39	LYS	Peptide
1	L	49	TYR	Sidechain
1	L	86	TYR	Sidechain

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	1692	0	1633	26	0
2	H	1672	0	1638	40	0
3	P	58	0	63	2	0
4	L	14	0	13	0	0
All	All	3436	0	3347	63	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 10.

All (63) 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)
2:H:140:LEU:HD21	2:H:199:ARG:HG3	1.57	0.87
2:H:72:ASN:HD22	2:H:75:ARG:HH21	1.31	0.78
1:L:160:LEU:HD11	2:H:179:GLN:HG3	1.66	0.76
2:H:198:PRO:HB3	2:H:203:GLU:HB2	1.73	0.71
2:H:198:PRO:HA	2:H:203:GLU:H	1.64	0.62
2:H:34:MET:HE1	2:H:94:ARG:HG2	1.80	0.62
1:L:148:TRP:O	1:L:155:ARG:HA	2.01	0.60
2:H:141:GLY:HA2	2:H:157:TRP:CH2	2.36	0.59
1:L:135:PHE:CE2	2:H:190:SER:HB3	2.40	0.57
2:H:72:ASN:HD22	2:H:75:ARG:NH2	2.02	0.57
2:H:141:GLY:HA2	2:H:157:TRP:HH2	1.69	0.56
1:L:111:ALA:HB3	1:L:139:PHE:HA	1.89	0.54
1:L:190:ASN:O	1:L:211:ARG:HB2	2.07	0.54
2:H:12:VAL:HG12	2:H:13:LYS:N	2.24	0.53
2:H:232:ASP:O	2:H:233:CYS:HB3	2.09	0.53
1:L:55:PHE:O	1:L:58:VAL:HG12	2.09	0.53
2:H:94:ARG:HD2	2:H:101:ASP:OD1	2.10	0.52
2:H:96:SER:HB3	2:H:98:ASP:O	2.10	0.51
2:H:22:CYS:CB	2:H:92:CYS:SG	2.99	0.49
1:L:108:ARG:HH21	1:L:111:ALA:HB2	1.76	0.49
1:L:117:ILE:HD12	1:L:194:CYS:HB2	1.94	0.49
2:H:31:ARG:O	3:P:70:VAL:HG21	2.12	0.48
2:H:93:THR:HG22	2:H:100(C):PHE:HB3	1.94	0.48
2:H:44:ARG:O	2:H:44:ARG:HG3	2.13	0.48
2:H:34:MET:CE	2:H:94:ARG:HG2	2.44	0.48
1:L:183:LYS:O	1:L:187:GLU:HG2	2.14	0.48
1:L:54:ARG:HB3	1:L:58:VAL:CG1	2.44	0.47
2:H:24:ALA:HB1	2:H:27:PHE:CZ	2.50	0.47
2:H:75:ARG:O	2:H:77:THR:HG23	2.15	0.47
2:H:87:THR:O	2:H:88:ALA:HB2	2.15	0.47
2:H:100:PHE:CD1	2:H:100:PHE:N	2.83	0.47
1:L:160:LEU:HD12	2:H:177:VAL:HG11	1.96	0.47
1:L:131:SER:HB3	1:L:180:THR:OG1	2.15	0.46
2:H:93:THR:CG2	2:H:100(C):PHE:HB3	2.45	0.46
1:L:33:LEU:HD13	1:L:71:PHE:CD2	2.50	0.45
1:L:136:LEU:HD22	1:L:175:MET:HG2	1.97	0.45
2:H:51:ILE:HG13	2:H:52:SER:N	2.31	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:180:SER:O	2:H:184:LEU:N	2.50	0.45
1:L:19:ALA:HB3	1:L:75:ILE:HD12	1.97	0.45
1:L:90:GLN:HE21	1:L:97:THR:H	1.64	0.45
2:H:48:VAL:O	2:H:60:PRO:HD2	2.18	0.44
1:L:161:ASN:HD22	1:L:177:SER:HA	1.82	0.44
1:L:20:SER:HA	1:L:73:LEU:O	2.18	0.43
2:H:119:PRO:HD2	2:H:217:THR:HG21	2.01	0.43
2:H:59:TYR:OH	2:H:69:ILE:HG22	2.19	0.43
2:H:35:SER:HB2	2:H:95:TYR:CE1	2.54	0.43
2:H:11:LEU:HD12	2:H:116:THR:HG22	2.01	0.42
2:H:82(A):SER:O	2:H:82(C):LEU:N	2.53	0.42
3:P:72:PRO:O	3:P:74:LYS:HE2	2.19	0.42
1:L:116:SER:HB2	1:L:135:PHE:HB2	2.01	0.42
2:H:125:ALA:O	2:H:127:GLY:N	2.53	0.42
1:L:90:GLN:CD	1:L:90:GLN:O	2.63	0.42
1:L:122:SER:HB3	1:L:214:CYS:OXT	2.20	0.42
1:L:76:SER:O	1:L:77:ARG:HB2	2.20	0.42
1:L:166:GLN:NE2	1:L:171:SER:O	2.53	0.41
2:H:39:GLN:HB2	2:H:45:LEU:HD12	2.01	0.41
1:L:89:PHE:CZ	1:L:96:PRO:HB2	2.56	0.41
2:H:205:VAL:H	2:H:222:LYS:NZ	2.19	0.40
2:H:58:PHE:CD1	2:H:58:PHE:N	2.88	0.40
1:L:91:GLY:HA3	2:H:100:PHE:O	2.21	0.40
1:L:112:ALA:HB2	1:L:200:THR:HG21	2.04	0.40
2:H:82:MET:HB3	2:H:82:MET:HE2	1.79	0.40
2:H:153:THR:O	2:H:210:VAL:HA	2.21	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	217/219 (99%)	186 (86%)	29 (13%)	2 (1%)	14	41
2	H	219/221 (99%)	182 (83%)	22 (10%)	15 (7%)	1	2
3	P	5/19 (26%)	5 (100%)	0	0	100	100
All	All	441/459 (96%)	373 (85%)	51 (12%)	17 (4%)	2	8

All (17) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	L	40	PRO
1	L	211	ARG
2	H	76	ASN
2	H	82(B)	SER
2	H	129	ALA
2	H	183	ASP
2	H	199	ARG
2	H	200	PRO
2	H	151	PRO
2	H	196	SER
2	H	217	THR
2	H	88	ALA
2	H	213	PRO
2	H	133	GLN
2	H	163	SER
2	H	126	PRO
2	H	169	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	L	195/196 (100%)	164 (84%)	31 (16%)	2	9
2	H	192/192 (100%)	154 (80%)	38 (20%)	1	5
3	P	7/17 (41%)	7 (100%)	0	100	100
All	All	394/405 (97%)	325 (82%)	69 (18%)	2	7

All (69) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	L	1	ASP
1	L	2	VAL
1	L	5	THR
1	L	7	THR
1	L	13	VAL
1	L	14	SER
1	L	15	LEU
1	L	40	PRO
1	L	43	SER
1	L	46	LEU
1	L	51	VAL
1	L	52	SER
1	L	63	SER
1	L	73	LEU
1	L	74	LYS
1	L	81	GLU
1	L	83	LEU
1	L	97	THR
1	L	103	LYS
1	L	107	LYS
1	L	108	ARG
1	L	117	ILE
1	L	131	SER
1	L	151	ASP
1	L	153	SER
1	L	162	SER
1	L	175	MET
1	L	180	THR
1	L	191	SER
1	L	195	GLU
1	L	204	PRO
2	H	4	LEU
2	H	6	GLU
2	H	7	SER
2	H	19	LYS
2	H	21	SER
2	H	25	SER
2	H	28	THR
2	H	30	SER
2	H	31	ARG
2	H	38	ARG
2	H	42	GLU

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Mol	Chain	Res	Type
2	H	45	LEU
2	H	51	ILE
2	H	57	THR
2	H	76	ASN
2	H	85	GLU
2	H	100	PHE
2	H	100(B)	TYR
2	H	100(C)	PHE
2	H	109	LEU
2	H	126	PRO
2	H	135	ASN
2	H	140	LEU
2	H	150	GLU
2	H	152	VAL
2	H	156	THR
2	H	166	LEU
2	H	175	PRO
2	H	177	VAL
2	H	179	GLN
2	H	187	LEU
2	H	193	VAL
2	H	200	PRO
2	H	208	CYS
2	H	210	VAL
2	H	213	PRO
2	H	222	LYS
2	H	228	ARG

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	38	GLN
1	L	124	GLN
1	L	145	ASN
1	L	161	ASN
1	L	189	HIS
2	H	39	GLN
2	H	179	GLN

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 ⓘ

1 ligand is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	L	600	1	14,14,15	1.26	2 (14%)	17,19,21	1.53	3 (17%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	L	600	1	-	0/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	L	600	NAG	C1-C2	-2.47	1.49	1.52
4	L	600	NAG	C3-C2	-2.11	1.48	1.52

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
4	L	600	NAG	C1-O5-C5	3.46	116.82	112.19
4	L	600	NAG	O4-C4-C3	-2.56	104.35	110.38
4	L	600	NAG	C8-C7-N2	-2.24	112.41	116.12

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

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.