Full wwPDB X-ray Structure Validation Report ⓘ

Aug 4, 2026 – 05:16 PM EDT

PDB ID	:	1B3F / pdb_00001b3f
Title	:	OLIGO-PEPTIDE BINDING PROTEIN (OPPA) COMPLEXED WITH KHK
Authors	:	Tame, J.R.H.; Wilkinson, A.J.
Deposited on	:	1998-12-14
Resolution	:	1.80 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:

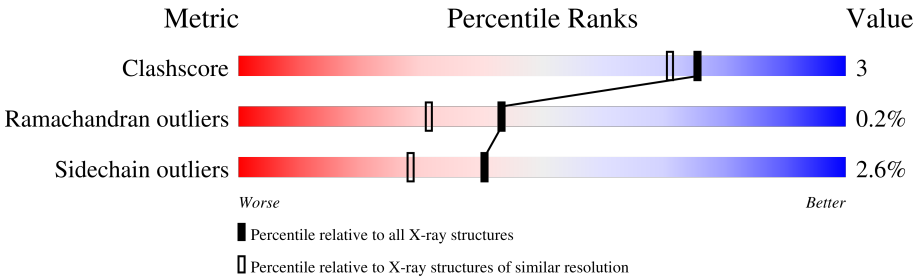
MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.80 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	8479 (1.80-1.80)
Ramachandran outliers	187476	8391 (1.80-1.80)
Sidechain outliers	187428	8390 (1.80-1.80)

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 <=5%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	517	86% 13% .
2	B	3	100%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 4664 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.

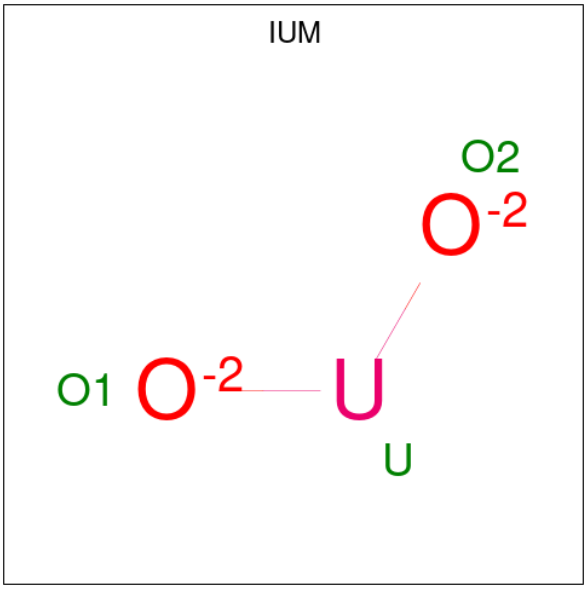
- Molecule 1 is a protein called PROTEIN (OLIGO-PEPTIDE BINDING PROTEIN).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	517	4168	2667	700	796	5	0	1	0

- Molecule 2 is a protein called PROTEIN (LYS-HIS-LYS).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	B	3	33	21	8	4	0	1	0

- Molecule 3 is URANYL (VI) ION (CCD ID: IUM) (formula: O_2U).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	U		
3	A	1	1	1	0	0
3	A	1	Total	U	0	0
			1	1		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total U 1 1	0	0
3	A	1	Total U 1 1	0	0
3	A	1	Total U 1 1	0	0
3	A	1	Total U 1 1	0	0
3	A	1	Total U 1 1	0	0
3	A	1	Total U 1 1	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	450	Total O 451 451	0	1
4	B	4	Total O 4 4	0	0

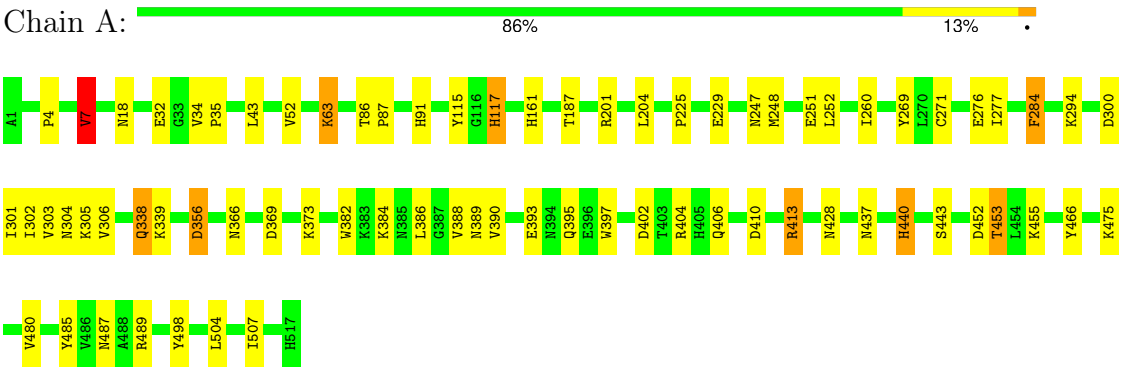
3 Residue-property plots (i)

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. 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: PROTEIN (OLIGO-PEPTIDE BINDING PROTEIN)

Chain A:



• Molecule 2: PROTEIN (LYS-HIS-LYS)

Chain B:

There are no outlier residues recorded for this chain.

4 Data and refinement statistics (i)

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

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	109.94Å 75.89Å 70.59Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	15.00 – 1.80	Depositor
% Data completeness (in resolution range)	97.2 (15.00-1.80)	Depositor
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	REFMAC	Depositor
R, R_{free}	0.177 , 0.217	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	4664	wwPDB-VP
Average B, all atoms (Å^2)	23.0	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: IUM

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	0.80	0/4284	1.50	32/5841 (0.5%)
2	B	0.76	0/38	1.40	0/42
All	All	0.80	0/4322	1.50	32/5883 (0.5%)

There are no bond length outliers.

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	284	PHE	CA-CB-CG	-8.11	105.69	113.80
1	A	489	ARG	CD-NE-CZ	8.06	135.68	124.40
1	A	18	ASN	CA-CB-CG	-7.72	104.88	112.60
1	A	117	HIS	CA-CB-CG	-7.51	106.29	113.80
1	A	413	ARG	NE-CZ-NH2	-7.46	112.49	119.20
1	A	440	HIS	CA-CB-CG	-6.87	106.93	113.80
1	A	393	GLU	CB-CG-CD	6.75	124.08	112.60
1	A	356	ASP	CA-CB-CG	6.59	119.19	112.60
1	A	437	ASN	CA-CB-CG	6.48	119.08	112.60
1	A	91	HIS	CA-CB-CG	-6.39	107.41	113.80
1	A	63	LYS	CA-CB-CG	6.08	126.26	114.10
1	A	260	ILE	CA-C-N	6.08	125.56	119.24
1	A	260	ILE	C-N-CA	6.08	125.56	119.24
1	A	247	ASN	CA-CB-CG	5.99	118.59	112.60
1	A	443	SER	CA-C-O	5.99	125.66	119.49
1	A	7	VAL	N-CA-CB	5.71	118.08	110.26
1	A	32	GLU	CA-C-N	-5.51	117.56	122.47
1	A	32	GLU	C-N-CA	-5.51	117.56	122.47
1	A	453	THR	CA-C-O	-5.50	113.89	120.10
1	A	252	LEU	N-CA-C	5.45	120.81	113.72
1	A	410	ASP	CA-CB-CG	-5.42	107.18	112.60
1	A	389	ASN	CA-CB-CG	-5.39	107.21	112.60

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	276	GLU	CB-CG-CD	-5.32	103.55	112.60
1	A	303	VAL	N-CA-C	5.30	116.08	110.72
1	A	485	TYR	CB-CA-C	-5.26	99.29	109.76
1	A	386	LEU	N-CA-CB	-5.25	103.39	110.95
1	A	437	ASN	OD1-CG-ND2	-5.18	117.42	122.60
1	A	161	HIS	N-CA-CB	-5.18	103.05	110.04
1	A	397	TRP	N-CA-C	5.18	119.86	111.37
1	A	485	TYR	CA-CB-CG	5.15	123.17	113.90
1	A	201	ARG	NE-CZ-NH2	5.14	123.83	119.20
1	A	271	CYS	CA-C-O	-5.13	115.11	121.06

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	4168	0	4076	25	0
2	B	33	0	44	0	0
3	A	8	0	0	0	0
4	A	451	0	0	1	0
4	B	4	0	0	0	0
All	All	4664	0	4120	25	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 3.

All (25) 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:452:ASP:HA	1:A:455:LYS:HE2	1.67	0.75
1:A:4:PRO:O	1:A:7:VAL:HG13	2.02	0.60
1:A:117:HIS:HE1	4:A:734:HOH:O	1.89	0.55
1:A:251:GLU:OE2	1:A:373:LYS:HE2	2.09	0.52
1:A:43:LEU:O	1:A:187:THR:HB	2.12	0.50

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:115:TYR:CE1	1:A:428:ASN:HB3	2.47	0.50
1:A:229:GLU:OE1	1:A:369:ASP:HB2	2.13	0.49
1:A:404:ARG:O	1:A:440:HIS:HE1	1.96	0.49
1:A:300:ASP:OD1	1:A:304:ASN:ND2	2.45	0.48
1:A:402[B]:ASP:OD2	1:A:406:GLN:NE2	2.46	0.48
1:A:453:THR:HG21	1:A:466:TYR:CE1	2.48	0.48
1:A:301:ILE:HG12	1:A:305:LYS:HD2	1.97	0.46
1:A:43:LEU:HD21	1:A:204:LEU:HD22	1.99	0.45
1:A:248:MET:HA	1:A:248:MET:HE2	1.98	0.45
1:A:498:TYR:HE1	1:A:507:ILE:HD11	1.81	0.45
1:A:277:ILE:CG2	1:A:284:PHE:HB3	2.47	0.45
1:A:251:GLU:CD	1:A:373:LYS:HE2	2.43	0.43
1:A:366:ASN:HA	1:A:395:GLN:O	2.18	0.43
1:A:338:GLN:HG3	1:A:339:LYS:N	2.33	0.43
1:A:382:TRP:HB3	1:A:388:VAL:CG2	2.49	0.42
1:A:34:VAL:HB	1:A:35:PRO:HD3	2.02	0.41
1:A:86:THR:HA	1:A:87:PRO:HD3	1.93	0.41
1:A:269:TYR:HB2	1:A:487:ASN:HB2	2.03	0.40
1:A:498:TYR:CE1	1:A:507:ILE:HD11	2.55	0.40
1:A:294:LYS:HA	1:A:480:VAL:HG13	2.03	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	516/517 (100%)	501 (97%)	14 (3%)	1 (0%)	43 31
2	B	1/3 (33%)	1 (100%)	0	0	100 100
All	All	517/520 (99%)	502 (97%)	14 (3%)	1 (0%)	43 31

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	225	PRO

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	456/455 (100%)	444 (97%)	12 (3%)	40 28
2	B	4/3 (133%)	4 (100%)	0	100 100
All	All	460/458 (100%)	448 (97%)	12 (3%)	40 28

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	7	VAL
1	A	52	VAL
1	A	63	LYS
1	A	302	ILE
1	A	306	VAL
1	A	338	GLN
1	A	356	ASP
1	A	384	LYS
1	A	390	VAL
1	A	413	ARG
1	A	475	LYS
1	A	504	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	104	ASN
1	A	117	HIS
1	A	199	ASN
1	A	220	GLN
1	A	279	ASN
1	A	338	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	391	ASN
1	A	440	HIS

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

Of 8 ligands modelled in this entry, 8 are modelled with single atom - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

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

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

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.