



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 5, 2026 – 05:06 PM UTC

PDB ID : 1NFK / pdb_00001nfk
Title : STRUCTURE OF THE NUCLEAR FACTOR KAPPA-B (NF-KB) P50 HO-MODIMER
Authors : Ghosh, G.; Van Duyne, G.; Ghosh, S.; Sigler, P.B.
Deposited on : 1995-02-28
Resolution : 2.30 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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

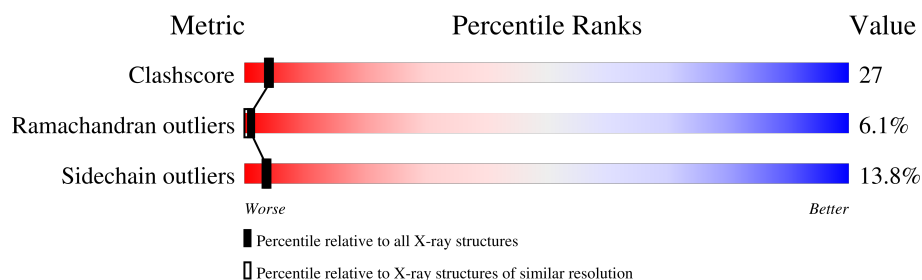
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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))
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (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 ≥ 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	C	11	36% 45% 18%
1	D	11	55% 36% 9%
2	A	325	51% 34% 9% • •
2	B	325	38% 43% 13% • •

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 7477 atoms, of which 1810 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 DNA chain called DNA (5'-D(*TP*GP*GP*GP*AP*AP*TP*TP*CP*CP*C)-3').

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	C	11	Total	C	H	N	O	P	0	0	0
			246	107	24	40	65	10			
1	D	11	Total	C	H	N	O	P	0	0	0
			246	107	24	40	65	10			

- Molecule 2 is a protein called PROTEIN (NUCLEAR FACTOR KAPPA-B (NF-KB)).

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	A	312	Total	C	H	N	O	S	0	0	0
			3017	1554	564	428	459	12			
2	B	312	Total	C	H	N	O	S	0	0	0
			3017	1554	564	428	459	12			

- Molecule 3 is water.

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	C	25	Total	H	O	0	0
			75	50	25		
3	D	26	Total	H	O	0	0
			78	52	26		
3	A	152	Total	H	O	0	0
			456	304	152		
3	B	114	Total	H	O	0	0
			342	228	114		

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.

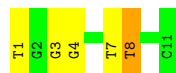
- Molecule 1: DNA (5'-D(*TP*GP*GP*GP*AP*AP*TP*TP*CP*CP*C)-3')

Chain C: 



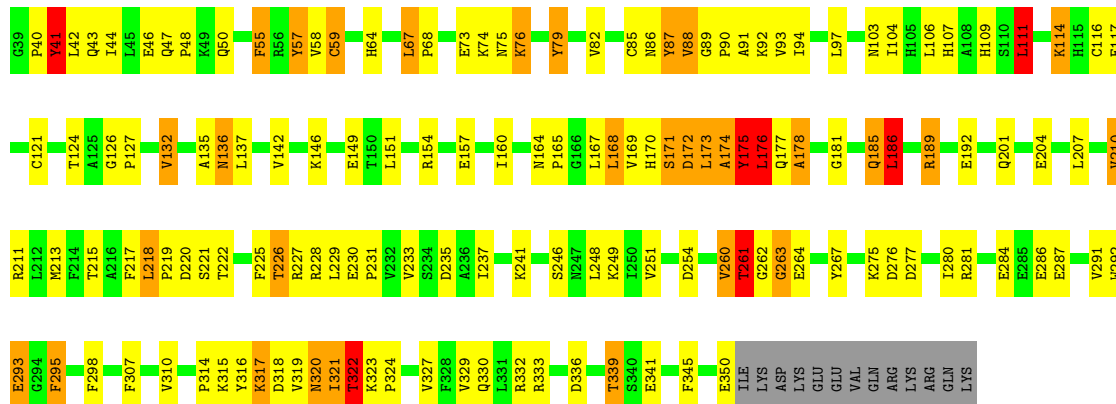
- Molecule 1: DNA (5'-D(*TP*GP*GP*GP*AP*AP*TP*TP*CP*CP*C)-3')

Chain D: 



- Molecule 2: PROTEIN (NUCLEAR FACTOR KAPPA-B (NF-KB))

Chain A: 



- Molecule 2: PROTEIN (NUCLEAR FACTOR KAPPA-B (NF-KB))

Chain B: 





4 Data and refinement statistics

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

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	84.20Å 132.10Å 80.10Å 90.00° 93.10° 90.00°	Depositor
Resolution (Å)	6.00 – 2.30	Depositor
% Data completeness (in resolution range)	(Not available) (6.00-2.30)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR 3.1	Depositor
R, R_{free}	0.230 , 0.340	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	7477	wwPDB-VP
Average B, all atoms (Å ²)	43.0	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	C	1.54	1/248 (0.4%)	1.49	2/381 (0.5%)
1	D	1.74	2/248 (0.8%)	1.51	1/381 (0.3%)
2	A	0.74	0/2505	1.22	24/3384 (0.7%)
2	B	0.66	0/2505	1.16	27/3384 (0.8%)
All	All	0.83	3/5506 (0.1%)	1.23	54/7530 (0.7%)

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
2	A	0	1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	8	DT	O3'-P	-6.81	1.50	1.61
1	D	7	DT	C5'-C4'	-6.60	1.39	1.52
1	C	8	DT	C5'-C4'	-5.68	1.40	1.52

The worst 5 of 54 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	60	GLU	N-CA-C	9.52	124.89	113.28
2	A	173	LEU	N-CA-C	8.11	121.40	109.07
2	A	126	GLY	CA-C-N	8.05	127.61	119.24
2	A	126	GLY	C-N-CA	8.05	127.61	119.24
2	A	261	THR	N-CA-C	-7.67	94.47	110.80

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	A	175	TYR	Sidechain

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	C	222	24	125	5	0
1	D	222	24	126	7	0
2	A	2453	564	2449	123	0
2	B	2453	564	2451	158	0
3	A	152	304	0	10	0
3	B	114	228	0	4	0
3	C	25	50	0	1	0
3	D	26	52	0	2	0
All	All	5667	1810	5151	283	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 27.

The worst 5 of 283 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:C:9:DC:H2'	2:A:59:CYS:SG	1.97	1.05
1:C:1:DT:H2''	1:C:2:DG:H5'	1.42	0.99
2:B:218:LEU:HB2	2:B:227:ARG:HB3	1.41	0.99
2:A:92:LYS:HG2	2:A:124:THR:HG22	1.44	0.98
2:B:147:VAL:HG12	2:B:202:THR:HG22	1.54	0.89

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	
2	A	310/325 (95%)	257 (83%)	35 (11%)	18 (6%)	1	0
2	B	310/325 (95%)	251 (81%)	39 (13%)	20 (6%)	1	0
All	All	620/650 (95%)	508 (82%)	74 (12%)	38 (6%)	1	0

5 of 38 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	A	87	TYR
2	A	172	ASP
2	A	261	THR
2	A	317	LYS
2	A	322	THR

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	
2	A	268/281 (95%)	229 (85%)	39 (15%)	3	3
2	B	268/281 (95%)	233 (87%)	35 (13%)	4	4
All	All	536/562 (95%)	462 (86%)	74 (14%)	3	4

5 of 74 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	200	GLN
2	B	319	VAL
2	B	207	LEU
2	B	255	ARG
2	A	222	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 17 such sidechains are listed below:

Mol	Chain	Res	Type
2	B	201	GLN
2	B	330	GLN
2	B	43	GLN
2	B	75	ASN
2	B	105	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

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.