



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 1, 2026 – 09:55 PM UTC

PDB ID : 1NF1 / pdb_00001nf1
Title : THE GAP RELATED DOMAIN OF NEUROFIBROMIN
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Deposited on : 1998-07-08
Resolution : 2.50 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

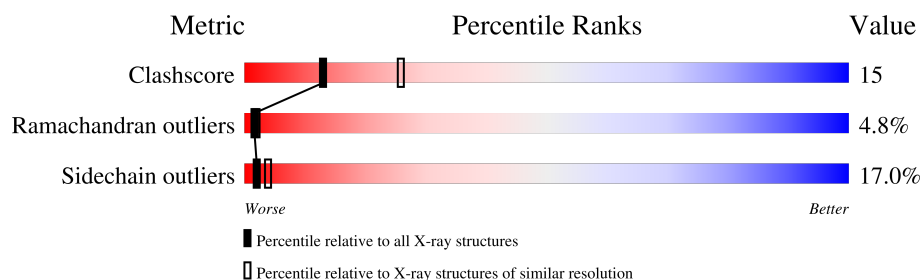
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)

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	A	333	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 1948 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 (NEUROFIBROMIN).

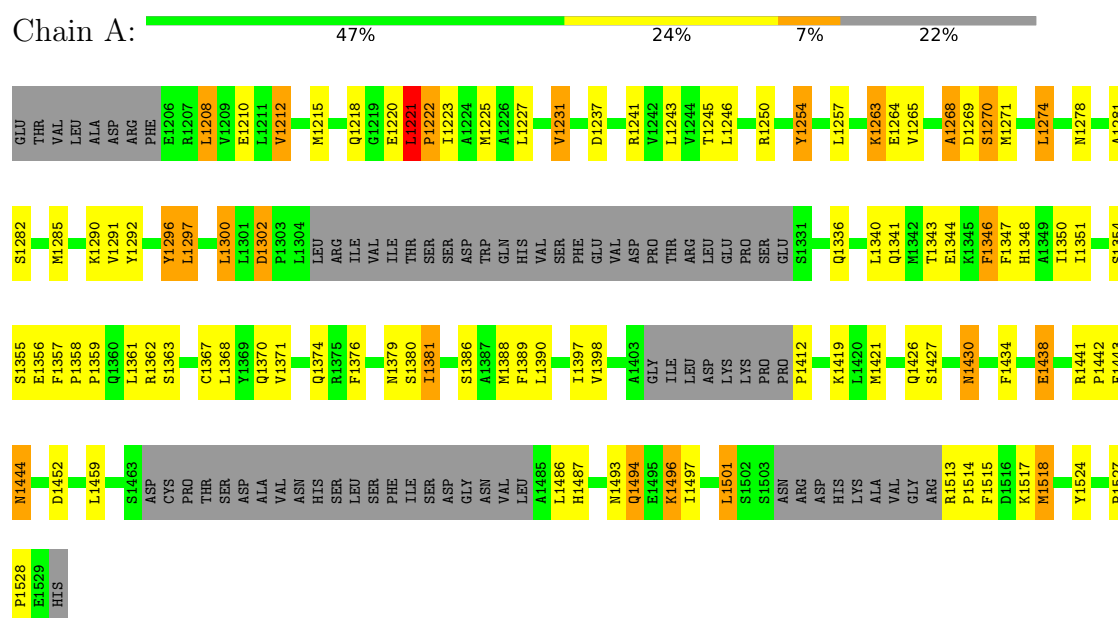
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	260	1948	1259	332	343	14	0	0	0

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: PROTEIN (NEUROFIBROMIN)



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	88.25Å 58.30Å 74.80Å 90.00° 118.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.50	Depositor
% Data completeness (in resolution range)	93.1 (30.00-2.50)	Depositor
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR 3.8	Depositor
R, R_{free}	0.266 , 0.369	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	1948	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

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	1.13	1/1988 (0.1%)	1.22	7/2691 (0.3%)

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	A	1	4

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1486	LEU	CA-CB	44.81	2.43	1.53

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1486	LEU	CB-CA-C	-42.31	29.72	110.10
1	A	1412	PRO	N-CA-CB	6.79	110.47	103.00
1	A	1278	ASN	N-CA-C	6.46	117.65	108.54
1	A	1208	LEU	N-CA-C	-5.85	105.03	111.82
1	A	1494	GLN	N-CA-C	5.83	118.58	111.82
1	A	1231	VAL	CA-C-N	5.62	126.86	119.84
1	A	1231	VAL	C-N-CA	5.62	126.86	119.84

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	A	1486	LEU	CA

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1254	TYR	Sidechain
1	A	1296	TYR	Sidechain
1	A	1302	ASP	Peptide
1	A	1524	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	A	1948	0	1861	57	0
All	All	1948	0	1861	57	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 15.

All (57) 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:1208:LEU:O	1:A:1212:VAL:HG23	1.82	0.79
1:A:1376:PHE:O	1:A:1380:SER:HB3	1.88	0.74
1:A:1285:MET:HE1	1:A:1368:LEU:HD22	1.71	0.72
1:A:1390:LEU:HB2	1:A:1426:GLN:HE22	1.55	0.70
1:A:1344:GLU:O	1:A:1348:HIS:HB2	1.94	0.67
1:A:1434:PHE:H	1:A:1444:ASN:HD21	1.41	0.66
1:A:1340:LEU:O	1:A:1344:GLU:HB2	2.00	0.62
1:A:1357:PHE:HD2	1:A:1362:ARG:HG2	1.68	0.59
1:A:1343:THR:OG1	1:A:1421:MET:HG3	2.04	0.58
1:A:1497:ILE:O	1:A:1501:LEU:HD22	2.03	0.58
1:A:1221:LEU:N	1:A:1222:PRO:HD3	2.20	0.56
1:A:1291:VAL:HG12	1:A:1292:TYR:HD1	1.71	0.56
1:A:1513:ARG:N	1:A:1514:PRO:HD3	2.22	0.55
1:A:1441:ARG:N	1:A:1442:PRO:HD2	2.22	0.55
1:A:1357:PHE:CD2	1:A:1362:ARG:HG2	2.42	0.54
1:A:1487:HIS:CE1	1:A:1527:PRO:HB3	2.43	0.53
1:A:1426:GLN:HE21	1:A:1430:ASN:HD21	1.55	0.53
1:A:1493:ASN:O	1:A:1496:LYS:HG2	2.09	0.52
1:A:1367:CYS:O	1:A:1371:VAL:HG23	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1254:TYR:HD1	1:A:1257:LEU:HD12	1.74	0.52
1:A:1227:LEU:O	1:A:1231:VAL:HB	2.10	0.51
1:A:1515:PHE:HD1	1:A:1518:MET:HE3	1.76	0.51
1:A:1291:VAL:HG12	1:A:1292:TYR:CD1	2.47	0.50
1:A:1254:TYR:CD1	1:A:1257:LEU:HD12	2.47	0.50
1:A:1340:LEU:HD21	1:A:1443:PHE:CE1	2.47	0.49
1:A:1271:MET:CA	1:A:1274:LEU:HD22	2.43	0.49
1:A:1296:TYR:O	1:A:1300:LEU:HB3	2.13	0.48
1:A:1358:PRO:HA	1:A:1359:PRO:HD3	1.67	0.48
1:A:1370:GLN:O	1:A:1374:GLN:HG2	2.14	0.47
1:A:1347:PHE:O	1:A:1351:ILE:HG13	2.14	0.47
1:A:1212:VAL:O	1:A:1215:MET:HB3	2.13	0.47
1:A:1268:ALA:HB2	1:A:1274:LEU:CD1	2.44	0.47
1:A:1390:LEU:HB2	1:A:1426:GLN:NE2	2.26	0.47
1:A:1514:PRO:HA	1:A:1517:LYS:HD2	1.96	0.47
1:A:1381:ILE:HD12	1:A:1459:LEU:HD13	1.96	0.47
1:A:1444:ASN:HD22	1:A:1444:ASN:HA	1.53	0.46
1:A:1347:PHE:O	1:A:1350:ILE:HB	2.15	0.46
1:A:1354:SER:O	1:A:1362:ARG:NH2	2.47	0.46
1:A:1223:ILE:HG22	1:A:1223:ILE:O	2.16	0.46
1:A:1297:LEU:HD22	1:A:1300:LEU:HD23	1.98	0.45
1:A:1497:ILE:HG13	1:A:1518:MET:HE1	1.98	0.45
1:A:1419:LYS:O	1:A:1419:LYS:HD3	2.16	0.45
1:A:1515:PHE:CD1	1:A:1518:MET:HE3	2.50	0.45
1:A:1426:GLN:NE2	1:A:1430:ASN:HD21	2.16	0.44
1:A:1346:PHE:O	1:A:1350:ILE:HG12	2.16	0.44
1:A:1494:GLN:HA	1:A:1497:ILE:HG12	1.99	0.44
1:A:1430:ASN:HD22	1:A:1430:ASN:N	2.15	0.44
1:A:1210:GLU:HG2	1:A:1250:ARG:HH22	1.83	0.43
1:A:1263:LYS:HD2	1:A:1263:LYS:HA	1.70	0.43
1:A:1210:GLU:HG2	1:A:1250:ARG:NH2	2.34	0.42
1:A:1221:LEU:O	1:A:1225:MET:HG3	2.20	0.41
1:A:1350:ILE:HG21	1:A:1389:PHE:HZ	1.86	0.41
1:A:1351:ILE:HG13	1:A:1351:ILE:H	1.69	0.41
1:A:1245:THR:HG23	1:A:1246:LEU:HG	2.02	0.41
1:A:1285:MET:CE	1:A:1368:LEU:HD22	2.48	0.41
1:A:1381:ILE:O	1:A:1381:ILE:HG12	2.13	0.40
1:A:1438:GLU:HG3	1:A:1441:ARG:HD3	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	248/333 (74%)	202 (82%)	34 (14%)	12 (5%)	2 2

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1270	SER
1	A	1220	GLU
1	A	1281	ALA
1	A	1302	ASP
1	A	1336	GLN
1	A	1528	PRO
1	A	1268	ALA
1	A	1379	ASN
1	A	1269	ASP
1	A	1221	LEU
1	A	1398	VAL
1	A	1222	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	194/299 (65%)	161 (83%)	33 (17%)	2 4

All (33) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1212	VAL
1	A	1218	GLN
1	A	1221	LEU
1	A	1237	ASP
1	A	1241	ARG
1	A	1243	LEU
1	A	1263	LYS
1	A	1264	GLU
1	A	1265	VAL
1	A	1270	SER
1	A	1274	LEU
1	A	1282	SER
1	A	1290	LYS
1	A	1297	LEU
1	A	1300	LEU
1	A	1341	GLN
1	A	1346	PHE
1	A	1355	SER
1	A	1356	GLU
1	A	1361	LEU
1	A	1363	SER
1	A	1381	ILE
1	A	1386	SER
1	A	1388	MET
1	A	1397	ILE
1	A	1427	SER
1	A	1430	ASN
1	A	1438	GLU
1	A	1444	ASN
1	A	1452	ASP
1	A	1496	LYS
1	A	1501	LEU
1	A	1518	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1370	GLN
1	A	1430	ASN
1	A	1444	ASN

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.