



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 07:58 PM UTC

PDB ID : 1FGK / pdb_00001fgk
Title : CRYSTAL STRUCTURE OF THE TYROSINE KINASE DOMAIN OF FIBROBLAST GROWTH FACTOR RECEPTOR 1
Authors : Mohammadi, M.; Schlessinger, J.; Hubbard, S.R.
Deposited on : 1997-02-08
Resolution : 2.00 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)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

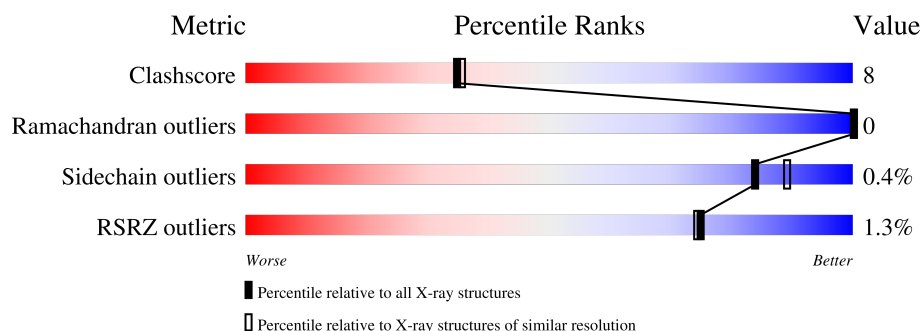
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	310	72% 17% 10%
1	B	310	70% 17% 12%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 4586 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 FGF RECEPTOR 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	278	Total	C	N	O	S	0	1	0
			2190	1400	381	391	18			
1	B	272	Total	C	N	O	S	0	2	0
			2134	1364	364	387	19			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	457	VAL	LEU	conflict	UNP P11362
A	488	ALA	CYS	conflict	UNP P11362
A	584	SER	CYS	conflict	UNP P11362
B	457	VAL	LEU	conflict	UNP P11362
B	488	ALA	CYS	engineered mutation	UNP P11362
B	584	SER	CYS	conflict	UNP P11362

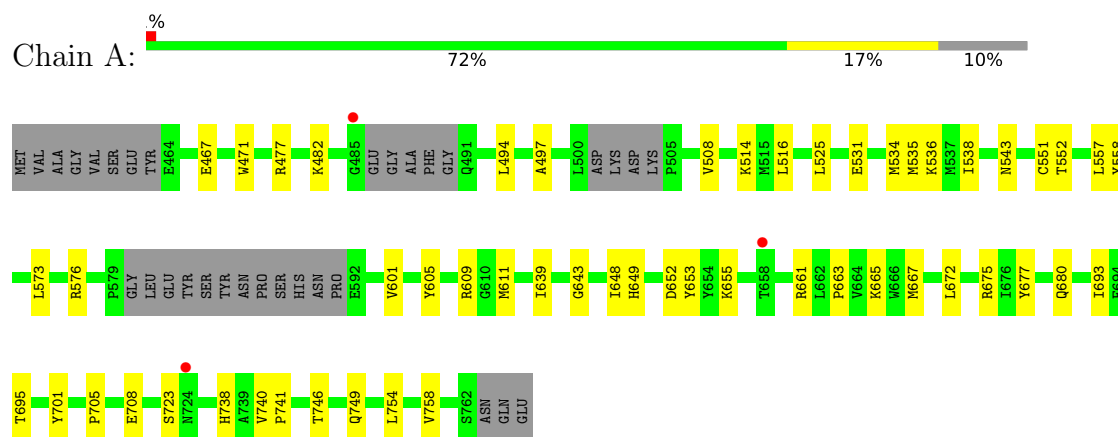
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	157	Total	O	0	0
			157	157		
2	B	105	Total	O	0	0
			105	105		

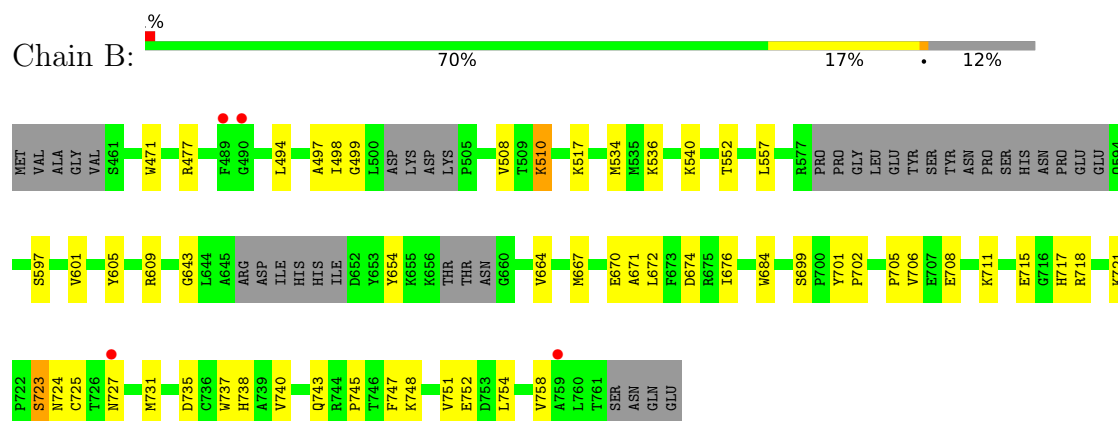
3 Residue-property plots [i](#)

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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). 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.

• Molecule 1: FGF RECEPTOR 1



• Molecule 1: FGF RECEPTOR 1



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	208.35Å 57.78Å 65.57Å 90.00° 107.23° 90.00°	Depositor
Resolution (Å)	6.00 – 2.00 6.00 – 2.00	Depositor EDS
% Data completeness (in resolution range)	87.4 (6.00-2.00) 90.7 (6.00-2.00)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.17 (at 1.96Å)	Xtriage
Refinement program	X-PLOR 3.44	Depositor
R, R_{free}	0.213 , 0.261 0.219 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	26.3	Xtriage
Anisotropy	0.738	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.56 , 89.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.025 for -h-2*k,l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	4586	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.66% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

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	A	0.52	0/2240	0.93	5/3028 (0.2%)
1	B	0.49	0/2185	0.94	4/2950 (0.1%)
All	All	0.51	0/4425	0.93	9/5978 (0.2%)

There are no bond length outliers.

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	543	ASN	N-CA-C	6.20	119.57	112.57
1	A	494	LEU	N-CA-C	-5.80	101.89	110.48
1	B	540	LYS	N-CA-C	5.63	119.28	110.32
1	A	723	SER	N-CA-C	-5.61	103.13	110.53
1	B	723	SER	N-CA-C	-5.37	102.94	110.50
1	B	706	VAL	N-CA-C	5.27	115.89	110.36
1	B	517	LYS	N-CA-C	-5.26	102.74	110.52
1	A	538	ILE	N-CA-C	5.19	115.92	110.62
1	A	695	THR	N-CA-C	-5.06	106.35	112.88

There are no chirality outliers.

There are no planarity outliers.

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	2190	0	2207	31	0
1	B	2134	0	2135	34	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	157	0	0	2	0
2	B	105	0	0	1	0
All	All	4586	0	4342	65	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 8.

All (65) 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:B:738:HIS:HD2	1:B:740:VAL:H	1.23	0.85
1:B:494:LEU:HD11	1:B:510:LYS:HG3	1.60	0.84
1:B:498:ILE:HG13	1:B:508:VAL:HG12	1.62	0.81
1:A:738:HIS:HD2	1:A:740:VAL:H	1.40	0.69
1:B:754:LEU:O	1:B:758:VAL:HG23	1.95	0.67
1:B:605:TYR:CE2	1:B:609:ARG:HD2	2.32	0.65
1:B:738:HIS:CD2	1:B:740:VAL:H	2.13	0.63
1:B:721:LYS:HE3	1:B:725:CYS:O	1.99	0.63
1:A:667:MET:HE3	1:A:677:TYR:OH	2.00	0.62
1:A:665:LYS:HE2	1:A:701:TYR:HB2	1.82	0.61
1:B:494:LEU:HD11	1:B:510:LYS:CG	2.32	0.60
1:B:664:VAL:HA	1:B:667:MET:HE3	1.83	0.60
1:B:605:TYR:CZ	1:B:609:ARG:HD2	2.38	0.58
1:B:727:ASN:O	1:B:731:MET:HG2	2.05	0.57
1:A:551:CYS:HB2	1:A:558:TYR:HB2	1.87	0.56
1:A:754:LEU:O	1:A:758:VAL:HG23	2.06	0.55
1:A:605:TYR:CE2	1:A:609:ARG:HD2	2.41	0.54
1:B:597:SER:O	1:B:601:VAL:HG23	2.09	0.53
1:A:652:ASP:OD2	1:A:655:LYS:HB2	2.09	0.53
1:A:467:GLU:HG3	2:A:142:HOH:O	2.09	0.51
1:A:531:GLU:HG2	1:A:535:MET:HE2	1.92	0.51
1:A:649:HIS:CD2	1:A:675:ARG:HD3	2.45	0.50
1:A:705:PRO:HG2	1:A:708:GLU:HG2	1.94	0.50
1:B:738:HIS:HD2	1:B:740:VAL:N	2.00	0.50
1:B:701:TYR:HE1	1:B:717:HIS:CE1	2.30	0.49
1:A:649:HIS:HD2	1:A:675:ARG:HD3	1.78	0.49
1:A:576:ARG:HH11	1:A:576:ARG:HG3	1.78	0.48
1:B:747:PHE:O	1:B:751:VAL:HG23	2.14	0.48
1:B:705:PRO:HG2	1:B:708:GLU:HG2	1.95	0.48
1:A:746:THR:OG1	1:A:749:GLN:HG3	2.15	0.47
1:A:601:VAL:HG12	1:A:758:VAL:HG22	1.95	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:680:GLN:HG2	1:A:741:PRO:O	2.15	0.47
1:B:654:TYR:CD1	1:B:654:TYR:N	2.82	0.47
1:B:723:SER:O	1:B:724:ASN:HB2	2.14	0.47
1:B:711:LYS:O	1:B:715:GLU:HG3	2.16	0.46
1:B:701:TYR:HE1	1:B:717:HIS:HE1	1.62	0.46
1:B:674:ASP:O	1:B:676:ILE:HG13	2.16	0.46
1:A:605:TYR:CZ	1:A:609:ARG:HD2	2.51	0.46
1:B:477:ARG:NH2	1:B:499:GLY:O	2.48	0.46
1:A:552:THR:HG22	1:A:557:LEU:CD1	2.46	0.45
1:B:748:LYS:O	1:B:752:GLU:HG3	2.17	0.45
1:A:611:MET:SD	1:A:639:ILE:HD13	2.57	0.45
1:A:497:ALA:O	1:A:508:VAL:HA	2.17	0.45
1:B:471:TRP:CD1	1:B:536:LYS:HE2	2.52	0.44
1:B:684:TRP:CE3	1:B:737:TRP:HA	2.52	0.44
1:B:670:GLU:HG2	1:B:671:ALA:N	2.32	0.44
1:A:514:LYS:NZ	1:A:514:LYS:HB3	2.33	0.43
1:B:534[A]:MET:SD	1:B:643:GLY:HA2	2.59	0.43
1:A:471:TRP:CD1	1:A:536:LYS:HE2	2.53	0.43
1:A:648:ILE:HG13	1:A:649:HIS:N	2.33	0.43
1:B:699:SER:O	1:B:702:PRO:HD3	2.19	0.42
1:A:516:LEU:HD11	1:A:525:LEU:HA	2.01	0.41
1:A:514:LYS:HE3	2:A:238:HOH:O	2.19	0.41
1:A:482:LYS:HE2	1:A:482:LYS:HB3	1.82	0.41
1:B:498:ILE:HD12	1:B:498:ILE:N	2.36	0.41
1:B:667:MET:SD	1:B:672:LEU:HD13	2.61	0.41
1:A:534:MET:HE3	1:A:643:GLY:HA2	2.02	0.41
1:B:735:ASP:HB3	1:B:745:PRO:HD3	2.03	0.41
1:B:497:ALA:O	1:B:508:VAL:HA	2.21	0.41
1:B:552:THR:HG22	1:B:557:LEU:CD1	2.51	0.41
1:A:661:ARG:O	1:A:663:PRO:HD3	2.22	0.41
1:B:718:ARG:HA	2:B:11:HOH:O	2.21	0.41
1:A:653:TYR:CZ	1:A:672:LEU:HD12	2.55	0.40
1:A:477:ARG:NE	1:A:477:ARG:HA	2.36	0.40
1:A:573:LEU:HD13	1:A:693:ILE:HA	2.04	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	A	271/310 (87%)	264 (97%)	7 (3%)	0	100	100
1	B	264/310 (85%)	258 (98%)	6 (2%)	0	100	100
All	All	535/620 (86%)	522 (98%)	13 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	A	236/271 (87%)	236 (100%)	0	100	100
1	B	228/271 (84%)	226 (99%)	2 (1%)	70	78
All	All	464/542 (86%)	462 (100%)	2 (0%)	84	89

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	510	LYS
1	B	743	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	649	HIS

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Mol	Chain	Res	Type
1	A	743	GLN
1	B	680	GLN
1	B	717	HIS
1	B	738	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	278/310 (89%)	-0.55	3 (1%) 78 77	21, 32, 60, 76	1 (0%)
1	B	272/310 (87%)	-0.32	4 (1%) 72 71	23, 37, 63, 83	2 (0%)
All	All	550/620 (88%)	-0.44	7 (1%) 75 74	21, 35, 61, 83	3 (0%)

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	489	PHE	4.3
1	A	485	GLY	2.7
1	A	724	ASN	2.6
1	B	759	ALA	2.6
1	A	658	THR	2.5
1	B	490	GLY	2.2
1	B	727	ASN	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.