



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 20, 2026 – 12:53 AM UTC

PDB ID : 7PW0 / pdb_00007pw0
Title : Crystal structure of the c-Src SH3 domain N112G-N113Y-T114N-E115H mutant
Authors : Camara-Artigas, A.; Salinas Garcia, M.C.
Deposited on : 2021-10-05
Resolution : 1.70 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

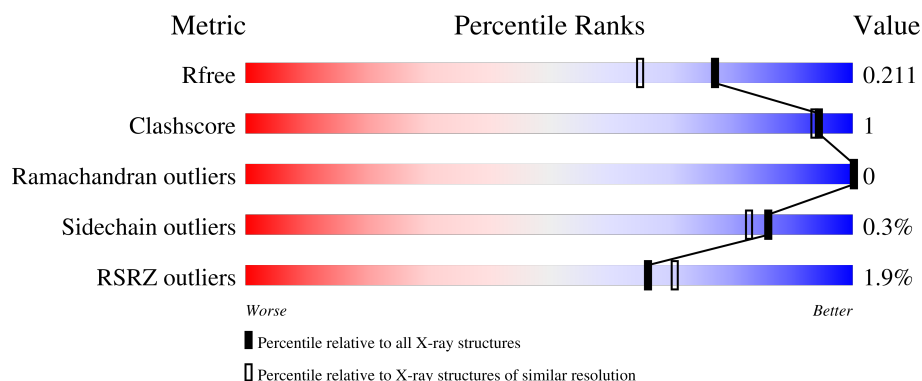
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.70 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))
R_{free}	180053	5551 (1.70-1.70)
Clashscore	190562	5924 (1.70-1.70)
Ramachandran outliers	187476	5846 (1.70-1.70)
Sidechain outliers	187428	5846 (1.70-1.70)
RSRZ outliers	180081	5554 (1.70-1.70)

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	60	93%
1	B	60	92% 5%
1	C	60	2% 93%
1	D	60	93% 7%
1	E	60	3% 92% 7%

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Mol	Chain	Length	Quality of chain
1	F	60	3% 92% 7%
1	G	60	3% 98%
1	H	60	3% 93% 5%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 7333 atoms, of which 3323 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 Isoform 1 of Proto-oncogene tyrosine-protein kinase Src.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	58	Total	C	H	N	O	0	0	0
			849	288	403	72	86			
1	B	57	Total	C	H	N	O	0	0	0
			862	289	414	74	85			
1	C	58	Total	C	H	N	O	0	0	0
			862	291	411	73	87			
1	D	56	Total	C	H	N	O	0	0	0
			832	282	397	70	83			
1	E	59	Total	C	H	N	O	0	0	0
			886	297	426	74	89			
1	F	59	Total	C	H	N	O	0	0	0
			899	299	433	75	92			
1	G	59	Total	C	H	N	O	0	0	0
			901	300	434	75	92			
1	H	59	Total	C	H	N	O	0	0	0
			856	289	405	73	89			

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	112	GLY	ASN	engineered mutation	UNP P00523-1
A	113	TYR	ASN	engineered mutation	UNP P00523-1
A	114	ASN	THR	engineered mutation	UNP P00523-1
A	115	HIS	GLU	engineered mutation	UNP P00523-1
B	112	GLY	ASN	engineered mutation	UNP P00523-1
B	113	TYR	ASN	engineered mutation	UNP P00523-1
B	114	ASN	THR	engineered mutation	UNP P00523-1
B	115	HIS	GLU	engineered mutation	UNP P00523-1
C	112	GLY	ASN	engineered mutation	UNP P00523-1
C	113	TYR	ASN	engineered mutation	UNP P00523-1
C	114	ASN	THR	engineered mutation	UNP P00523-1
C	115	HIS	GLU	engineered mutation	UNP P00523-1
D	112	GLY	ASN	engineered mutation	UNP P00523-1

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Chain	Residue	Modelled	Actual	Comment	Reference
D	113	TYR	ASN	engineered mutation	UNP P00523-1
D	114	ASN	THR	engineered mutation	UNP P00523-1
D	115	HIS	GLU	engineered mutation	UNP P00523-1
E	112	GLY	ASN	engineered mutation	UNP P00523-1
E	113	TYR	ASN	engineered mutation	UNP P00523-1
E	114	ASN	THR	engineered mutation	UNP P00523-1
E	115	HIS	GLU	engineered mutation	UNP P00523-1
F	112	GLY	ASN	engineered mutation	UNP P00523-1
F	113	TYR	ASN	engineered mutation	UNP P00523-1
F	114	ASN	THR	engineered mutation	UNP P00523-1
F	115	HIS	GLU	engineered mutation	UNP P00523-1
G	112	GLY	ASN	engineered mutation	UNP P00523-1
G	113	TYR	ASN	engineered mutation	UNP P00523-1
G	114	ASN	THR	engineered mutation	UNP P00523-1
G	115	HIS	GLU	engineered mutation	UNP P00523-1
H	112	GLY	ASN	engineered mutation	UNP P00523-1
H	113	TYR	ASN	engineered mutation	UNP P00523-1
H	114	ASN	THR	engineered mutation	UNP P00523-1
H	115	HIS	GLU	engineered mutation	UNP P00523-1

- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	44	Total O 44 44	0	0
2	B	57	Total O 57 57	0	0
2	C	48	Total O 48 48	0	0
2	D	54	Total O 54 54	0	0
2	E	53	Total O 53 53	0	0
2	F	48	Total O 48 48	0	0
2	G	45	Total O 45 45	0	0
2	H	37	Total O 37 37	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 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: Isoform 1 of Proto-oncogene tyrosine-protein kinase Src

Chain A:  93% . .

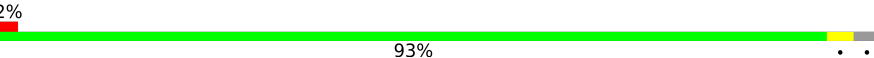


- Molecule 1: Isoform 1 of Proto-oncogene tyrosine-protein kinase Src

Chain B:  92% . 5%

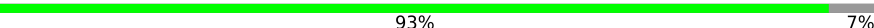


- Molecule 1: Isoform 1 of Proto-oncogene tyrosine-protein kinase Src

Chain C:  93% . .

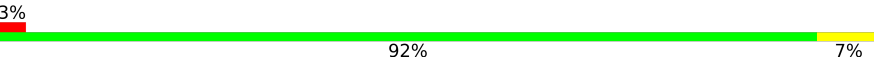


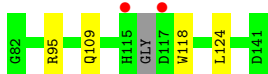
- Molecule 1: Isoform 1 of Proto-oncogene tyrosine-protein kinase Src

Chain D:  93% 7%

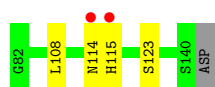
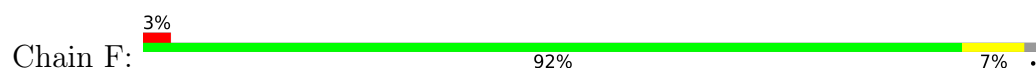


- Molecule 1: Isoform 1 of Proto-oncogene tyrosine-protein kinase Src

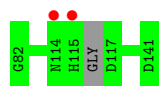
Chain E:  92% 7% .



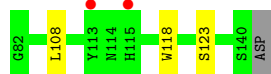
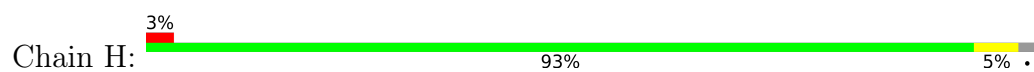
- Molecule 1: Isoform 1 of Proto-oncogene tyrosine-protein kinase Src



- Molecule 1: Isoform 1 of Proto-oncogene tyrosine-protein kinase Src



- Molecule 1: Isoform 1 of Proto-oncogene tyrosine-protein kinase Src



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	37.26Å 93.14Å 80.44Å 90.00° 97.25° 90.00°	Depositor
Resolution (Å)	19.95 – 1.70 19.95 – 1.70	Depositor EDS
% Data completeness (in resolution range)	97.5 (19.95-1.70) 98.9 (19.95-1.70)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.78 (at 1.70Å)	Xtriage
Refinement program	PHENIX 1.19.1	Depositor
R, R_{free}	0.208 , 0.228 0.209 , 0.211	Depositor DCC
R_{free} test set	2898 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å ²)	23.3	Xtriage
Anisotropy	0.623	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.40 , 48.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7333	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 40.73 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.6215e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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 [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	0.17	0/460	0.43	0/631
1	B	0.21	0/462	0.44	0/632
1	C	0.19	0/465	0.44	0/637
1	D	0.17	0/449	0.43	0/615
1	E	0.45	1/472 (0.2%)	0.50	0/644
1	F	0.69	1/479 (0.2%)	0.63	0/654
1	G	0.20	0/479	0.46	0/653
1	H	0.71	1/464 (0.2%)	0.57	0/636
All	All	0.41	3/3730 (0.1%)	0.49	0/5102

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	115	HIS	CA-C	-6.39	1.47	1.52
1	E	118	TRP	C-O	-5.27	1.17	1.24
1	H	118	TRP	C-O	-5.08	1.17	1.24

There are no bond angle outliers.

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	446	403	403	1	0
1	B	448	414	414	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	451	411	411	1	0
1	D	435	397	396	0	0
1	E	460	426	425	1	0
1	F	466	433	435	4	0
1	G	467	434	433	0	0
1	H	451	405	405	1	0
2	A	44	0	0	0	0
2	B	57	0	0	0	0
2	C	48	0	0	0	0
2	D	54	0	0	0	0
2	E	53	0	0	0	0
2	F	48	0	0	0	0
2	G	45	0	0	0	0
2	H	37	0	0	0	0
All	All	4010	3323	3322	9	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 1.

All (9) 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:106:GLU:HG2	1:C:125:THR:HG21	1.90	0.53
1:B:108:LEU:HD23	1:B:123:SER:HA	1.94	0.50
1:H:108:LEU:HD23	1:H:123:SER:HA	1.96	0.48
1:F:114:ASN:HD22	1:F:114:ASN:N	2.15	0.44
1:F:108:LEU:HD13	1:F:123:SER:HA	2.01	0.43
1:A:110:ILE:HG21	1:A:113:TYR:CD1	2.53	0.43
1:E:109:GLN:HG3	1:E:124:LEU:HD11	2.01	0.42
1:F:114:ASN:HD22	1:F:114:ASN:H	1.67	0.41
1:F:114:ASN:N	1:F:114:ASN:ND2	2.68	0.41

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	56/60 (93%)	55 (98%)	1 (2%)	0	100	100
1	B	55/60 (92%)	54 (98%)	1 (2%)	0	100	100
1	C	56/60 (93%)	55 (98%)	1 (2%)	0	100	100
1	D	54/60 (90%)	53 (98%)	1 (2%)	0	100	100
1	E	55/60 (92%)	53 (96%)	2 (4%)	0	100	100
1	F	57/60 (95%)	53 (93%)	4 (7%)	0	100	100
1	G	55/60 (92%)	53 (96%)	2 (4%)	0	100	100
1	H	57/60 (95%)	55 (96%)	2 (4%)	0	100	100
All	All	445/480 (93%)	431 (97%)	14 (3%)	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	45/51 (88%)	45 (100%)	0	100	100
1	B	46/51 (90%)	46 (100%)	0	100	100
1	C	46/51 (90%)	46 (100%)	0	100	100
1	D	44/51 (86%)	44 (100%)	0	100	100
1	E	47/51 (92%)	46 (98%)	1 (2%)	47	30
1	F	49/51 (96%)	49 (100%)	0	100	100
1	G	49/51 (96%)	49 (100%)	0	100	100
1	H	45/51 (88%)	45 (100%)	0	100	100
All	All	371/408 (91%)	370 (100%)	1 (0%)	86	83

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	95	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	122	HIS
1	C	109	GLN
1	C	122	HIS
1	H	122	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 ⓘ

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	58/60 (96%)	0.06	0	100	100	25, 33, 53, 67	0
1	B	57/60 (95%)	-0.06	0	100	100	27, 34, 51, 65	0
1	C	58/60 (96%)	0.08	1 (1%)	69	73	28, 34, 55, 70	0
1	D	56/60 (93%)	-0.09	0	100	100	26, 33, 56, 58	0
1	E	59/60 (98%)	-0.00	2 (3%)	48	52	24, 33, 58, 82	0
1	F	59/60 (98%)	-0.08	2 (3%)	48	52	23, 32, 53, 71	0
1	G	59/60 (98%)	0.16	2 (3%)	48	52	26, 35, 59, 69	0
1	H	59/60 (98%)	0.27	2 (3%)	48	52	26, 37, 62, 70	0
All	All	465/480 (96%)	0.04	9 (1%)	66	71	23, 34, 58, 82	0

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	115	HIS	4.4
1	C	83	VAL	3.9
1	E	115	HIS	3.5
1	H	115	HIS	3.1
1	G	114	ASN	2.6
1	F	115	HIS	2.3
1	H	113	TYR	2.3
1	E	117	ASP	2.3
1	F	114	ASN	2.0

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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.