



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 05:49 PM UTC

PDB ID : 1XZD / pdb_00001xzd
Title : FUSARIUM SOLANI CUTINASE MUTANT WITH SER 213 REPLACED BY CYS
Authors : Longhi, S.; Cambillau, C.
Deposited on : 1995-11-28
Resolution : 2.70 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)	:	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

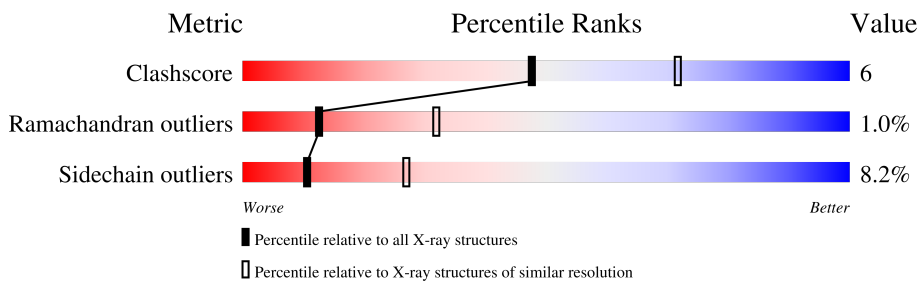
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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))
Clashscore	190562	3843 (2.70-2.70)
Ramachandran outliers	187476	3778 (2.70-2.70)
Sidechain outliers	187428	3778 (2.70-2.70)

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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	214	 72% 17% .. 8%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2392 atoms, of which 747 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 CUTINASE.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	197	Total	C	H	N	O	S	0	0	0
			1774	893	335	260	280	6			

There are 3 discrepancies between the modelled and reference sequences:

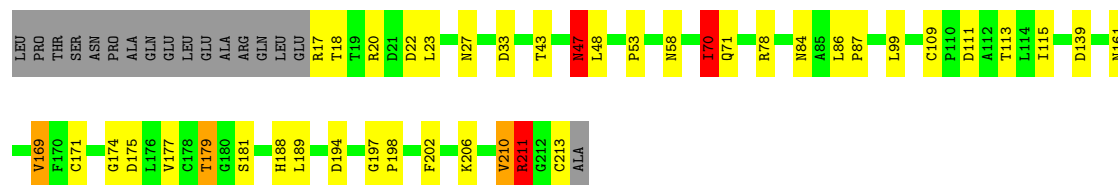
Chain	Residue	Modelled	Actual	Comment	Reference
A	16	GLU	GLY	conflict	UNP P00590
A	32	ALA	ARG	cloning artifact	UNP P00590
A	213	CYS	SER	engineered mutation	UNP P00590

- Molecule 2 is water.

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	206	Total	H	O	0	0
			618	412	206		

Note EDS was not executed.

Chain A: 72% 17% 2% 9%



4 Data and refinement statistics

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

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	35.12Å 67.36Å 37.05Å 90.00° 93.90° 90.00°	Depositor
Resolution (Å)	8.00 – 2.70	Depositor
% Data completeness (in resolution range)	(Not available) (8.00-2.70)	Depositor
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR 3.1	Depositor
R, R_{free}	0.097 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2392	wwPDB-VP
Average B, all atoms (Å ²)	9.0	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	A	0.99	3/1462 (0.2%)	1.70	17/1984 (0.9%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	70	ILE	CA-CB	7.74	1.63	1.54
1	A	188	HIS	CD2-NE2	-5.82	1.31	1.37
1	A	169	VAL	CA-CB	5.15	1.60	1.54

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	211	ARG	O-C-N	-9.88	109.45	122.59
1	A	211	ARG	N-CA-C	9.27	130.54	110.80
1	A	22	ASP	CA-CB-CG	7.68	120.28	112.60
1	A	179	THR	N-CA-CB	-7.52	98.84	111.17
1	A	47	ASN	CA-CB-CG	7.48	120.08	112.60
1	A	211	ARG	CA-C-O	-7.43	109.89	120.51
1	A	210	VAL	CA-C-N	6.45	133.85	121.54
1	A	210	VAL	C-N-CA	6.45	133.85	121.54
1	A	109	CYS	O-C-N	-6.29	115.71	121.37
1	A	84	ASN	CA-CB-CG	6.17	118.77	112.60
1	A	179	THR	CA-CB-OG1	-6.06	100.51	109.60
1	A	179	THR	CB-CA-C	5.87	120.58	111.13
1	A	161	ASN	OD1-CG-ND2	-5.45	117.15	122.60
1	A	197	GLY	CA-C-N	5.43	124.89	119.24
1	A	197	GLY	C-N-CA	5.43	124.89	119.24
1	A	58	ASN	OD1-CG-ND2	-5.21	117.39	122.60
1	A	179	THR	CA-CB-CG2	5.08	119.13	110.50

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	1439	335	1424	16	3
2	A	206	412	0	1	6
All	All	1645	747	1424	16	7

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 6.

All (16) 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:111:ASP:HB3	1:A:213:CYS:SG	2.12	0.90
1:A:111:ASP:CB	1:A:213:CYS:SG	2.63	0.86
1:A:20:ARG:H	1:A:47:ASN:HD21	1.35	0.73
1:A:111:ASP:HB2	1:A:213:CYS:SG	2.34	0.68
1:A:48:LEU:HD21	1:A:70:ILE:HD11	1.84	0.60
1:A:194:ASP:HA	1:A:198:PRO:HD2	1.89	0.54
1:A:210:VAL:O	1:A:211:ARG:HB2	2.08	0.53
1:A:202:PHE:CE1	1:A:206:LYS:HE3	2.44	0.52
1:A:17:ARG:HD2	1:A:53:PRO:HA	1.91	0.51
1:A:33:ASP:OD1	1:A:213:CYS:HB3	2.13	0.49
1:A:175:ASP:OD1	1:A:177:VAL:HG22	2.12	0.49
1:A:23:LEU:HB3	1:A:71:GLN:HE21	1.78	0.49
1:A:17:ARG:HG2	1:A:20:ARG:HD3	2.00	0.43
1:A:177:VAL:HA	1:A:181:SER:O	2.18	0.43
1:A:111:ASP:C	1:A:213:CYS:SG	3.04	0.40
1:A:139:ASP:HA	2:A:669:HOH:O	2.20	0.40

All (7) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:113:THR:HG1	2:A:621:HOH:H1[1_455]	1.07	0.53
2:A:644:HOH:H2	2:A:657:HOH:H2[1_554]	1.14	0.46
2:A:670:HOH:H2	2:A:681:HOH:H2[1_554]	1.21	0.39

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:27:ASN:HD21	1:A:169:VAL:H[1_556]	1.23	0.37
2:A:507:HOH:H1	2:A:587:HOH:H1[1_455]	1.26	0.34
1:A:174:GLY:H	2:A:523:HOH:H2[1_554]	1.31	0.29
2:A:644:HOH:H1	2:A:652:HOH:H2[1_554]	1.31	0.29

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	195/214 (91%)	186 (95%)	7 (4%)	2 (1%)	12	32

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	18	THR
1	A	211	ARG

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	146/160 (91%)	134 (92%)	12 (8%)	10	27

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

Mol	Chain	Res	Type
1	A	43	THR
1	A	47	ASN
1	A	70	ILE
1	A	78	ARG
1	A	86	LEU
1	A	87	PRO
1	A	99	LEU
1	A	115	ILE
1	A	171	CYS
1	A	179	THR
1	A	189	LEU
1	A	211	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	47	ASN
1	A	71	GLN
1	A	121	GLN
1	A	152	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.