



# wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 17, 2024 – 04:48 AM EDT

PDB ID : 2ZAG  
Title : Crystal structure of the SeMet-substituted soluble domain of STT3 from *P. furiosus*  
Authors : Maita, N.  
Deposited on : 2007-10-05  
Resolution : 3.00 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](mailto: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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.37.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

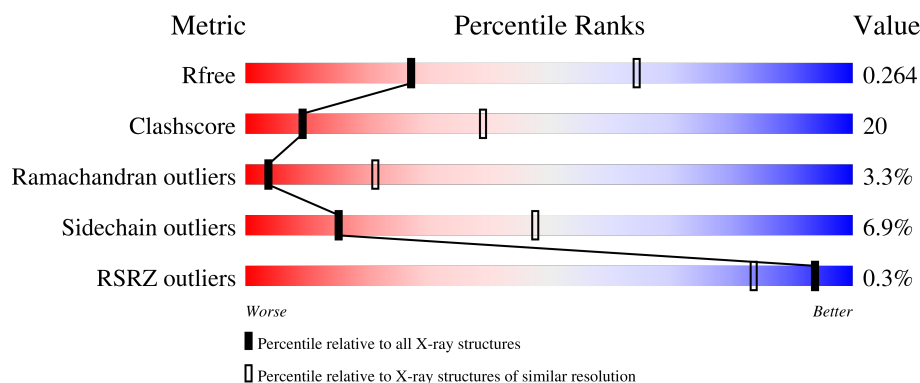
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.00 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))
$R_{free}$	130704	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

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  $\geq 3$ , 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	497	<div> <div>54%</div> <div>37%</div> <div>• • •</div> </div>
1	B	497	<div> <div>57%</div> <div>35%</div> <div>• •</div> </div>
1	C	497	<div> <div>52%</div> <div>39%</div> <div>5% •</div> </div>
1	D	497	<div> <div>56%</div> <div>35%</div> <div>6% •</div> </div>

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 15179 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 Oligosaccharyl transferase stt3 subunit related protein.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	478	Total	C	N	O	S	Se	0	0	0
			3790	2444	615	725	2	4			
1	B	477	Total	C	N	O	S	Se	0	0	0
			3786	2441	617	722	2	4			
1	C	478	Total	C	N	O	S	Se	0	0	0
			3792	2445	618	723	2	4			
1	D	480	Total	C	N	O	S	Se	0	0	0
			3803	2452	621	724	2	4			

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Ca	0	0
			1	1		
2	B	1	Total	Ca	0	0
			1	1		
2	C	1	Total	Ca	0	0
			1	1		
2	D	1	Total	Ca	0	0
			1	1		

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Cl	0	0
			1	1		
3	B	1	Total	Cl	0	0
			1	1		
3	C	1	Total	Cl	0	0
			1	1		
3	D	1	Total	Cl	0	0
			1	1		





E920	K927	R932	R933	I939	I943	R944	V945	E946	V948	F949	I950	A951	Y955	L956	M957	L958	E959	S963	A964	P965	H966	HTS
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## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	137.40Å 266.40Å 73.98Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 3.00 29.97 – 3.00	Depositor EDS
% Data completeness (in resolution range)	100.0 (20.00-3.00) 100.0 (29.97-3.00)	Depositor EDS
$R_{merge}$	0.14	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.15 (at 3.00Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.220 , 0.272 0.216 , 0.264	Depositor DCC
$R_{free}$ test set	3928 reflections (7.11%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	55.1	Xtriage
Anisotropy	0.418	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.31 , 49.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	15179	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	47.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.47% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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

Bond lengths and bond angles in the following residue types are not validated in this section: CL, CA

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	0.48	0/3876	0.73	1/5261 (0.0%)
1	B	0.44	0/3872	0.70	1/5255 (0.0%)
1	C	0.41	1/3878 (0.0%)	0.66	1/5263 (0.0%)
1	D	0.47	0/3891	0.71	1/5283 (0.0%)
All	All	0.45	1/15517 (0.0%)	0.70	4/21062 (0.0%)

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	D	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	487	GLU	CB-CG	-5.25	1.42	1.52

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	847	GLY	N-CA-C	5.55	126.97	113.10
1	D	860	THR	N-CA-C	-5.52	96.09	111.00
1	A	566	LEU	CA-CB-CG	5.29	127.48	115.30
1	B	860	THR	N-CA-C	-5.05	97.36	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:



Mol	Chain	Res	Type	Group
1	D	955	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	3790	0	3721	146	0
1	B	3786	0	3724	131	0
1	C	3792	0	3728	177	0
1	D	3803	0	3726	154	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	1	0	0	1	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	1	0
All	All	15179	0	14899	593	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 20.

The worst 5 of 593 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:560:TRP:HE1	1:C:891:MSE:HE1	1.25	0.98
1:B:537:ASP:HB3	1:B:870:ILE:HD12	1.46	0.97
1:B:834:ILE:HD13	1:B:834:ILE:H	1.32	0.95
1:B:560:TRP:HE1	1:B:891:MSE:HE1	1.36	0.89
1:A:846:SER:HB3	1:A:917:GLU:HG3	1.57	0.87

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	476/497 (96%)	414 (87%)	49 (10%)	13 (3%)	5	26
1	B	475/497 (96%)	408 (86%)	54 (11%)	13 (3%)	5	26
1	C	476/497 (96%)	398 (84%)	59 (12%)	19 (4%)	3	17
1	D	478/497 (96%)	410 (86%)	50 (10%)	18 (4%)	3	18
All	All	1905/1988 (96%)	1630 (86%)	212 (11%)	63 (3%)	4	21

5 of 63 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	535	ALA
1	A	626	ASN
1	A	696	ALA
1	B	529	SER
1	B	777	GLU

### 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	404/419 (96%)	368 (91%)	36 (9%)	9	35
1	B	404/419 (96%)	376 (93%)	28 (7%)	15	48
1	C	404/419 (96%)	386 (96%)	18 (4%)	27	64
1	D	404/419 (96%)	374 (93%)	30 (7%)	13	44
All	All	1616/1676 (96%)	1504 (93%)	112 (7%)	15	48

5 of 112 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	852	LYS
1	D	927	LYS
1	C	626	ASN
1	D	920	GLU
1	D	725	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 46 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	591	ASN
1	C	790	HIS
1	C	626	ASN
1	C	737	ASN
1	C	904	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

## 5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

## 5.6 Ligand geometry ⓘ

Of 8 ligands modelled in this entry, 8 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	474/497 (95%)	-0.45	0	100   100	12, 41, 67, 82	0
1	B	473/497 (95%)	-0.38	1 (0%)	95   87	14, 49, 71, 85	0
1	C	474/497 (95%)	-0.28	1 (0%)	95   87	25, 61, 86, 97	0
1	D	476/497 (95%)	-0.45	3 (0%)	89   72	13, 41, 81, 99	0
All	All	1897/1988 (95%)	-0.39	5 (0%)	94   84	12, 47, 79, 99	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	776	ASN	3.1
1	C	595	SER	3.1
1	D	777	GLU	2.2
1	D	776	ASN	2.2
1	D	526	ARG	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 monosaccharides in this entry.

### 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	CL	A	5	1/1	0.93	0.14	48,48,48,48	0
2	CA	C	3	1/1	0.94	0.19	57,57,57,57	0
3	CL	B	6	1/1	0.94	0.18	69,69,69,69	0
2	CA	D	4	1/1	0.95	0.20	30,30,30,30	0
3	CL	C	7	1/1	0.95	0.18	79,79,79,79	0
2	CA	B	2	1/1	0.96	0.24	34,34,34,34	0
2	CA	A	1	1/1	0.96	0.23	32,32,32,32	0
3	CL	D	8	1/1	0.96	0.17	48,48,48,48	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.