



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 22, 2020 – 07:27 pm BST

PDB ID : 3KNZ  
Title : Crystal structure of Putative sugar binding protein (NP\_459565.1) from Salmonella typhimurium LT2 at 2.50 Å resolution  
Authors : Joint Center for Structural Genomics (JCSG)  
Deposited on : 2009-11-12  
Resolution : 2.50 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
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) : 2.11

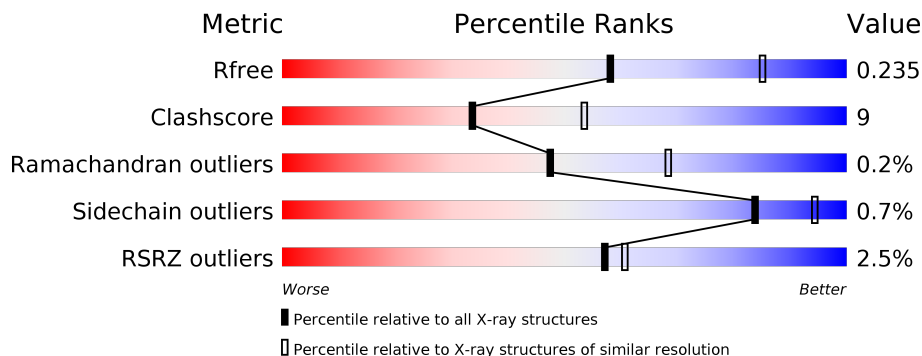
# 1 Overall quality at a glance

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))
$R_{free}$	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (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 on 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	366	 2% 73% 14% 11% 12%
1	B	366	 2% 75% 12% 11% 12%
1	C	366	 2% 76% 11% 11% 12%
1	D	366	 2% 77% 11% 11% 12%
1	E	366	 3% 73% 14% 11% 12%
1	F	366	 2% 73% 13% 13% 12%

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 15298 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 Putative sugar binding protein.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	322	2480	1574	430	459	6	11	0	2	0
1	B	321	2474	1568	433	456	6	11	0	1	0
1	C	321	2462	1561	430	454	6	11	0	0	0
1	D	322	2478	1570	434	457	6	11	0	1	0
1	E	322	2487	1575	434	461	6	11	0	2	0
1	F	317	2464	1564	432	452	5	11	0	3	0

There are 120 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	MSE	-	EXPRESSION TAG	UNP Q8ZR49
A	-17	GLY	-	EXPRESSION TAG	UNP Q8ZR49
A	-16	SER	-	EXPRESSION TAG	UNP Q8ZR49
A	-15	ASP	-	EXPRESSION TAG	UNP Q8ZR49
A	-14	LYS	-	EXPRESSION TAG	UNP Q8ZR49
A	-13	ILE	-	EXPRESSION TAG	UNP Q8ZR49
A	-12	HIS	-	EXPRESSION TAG	UNP Q8ZR49
A	-11	HIS	-	EXPRESSION TAG	UNP Q8ZR49
A	-10	HIS	-	EXPRESSION TAG	UNP Q8ZR49
A	-9	HIS	-	EXPRESSION TAG	UNP Q8ZR49
A	-8	HIS	-	EXPRESSION TAG	UNP Q8ZR49
A	-7	HIS	-	EXPRESSION TAG	UNP Q8ZR49
A	-6	GLU	-	EXPRESSION TAG	UNP Q8ZR49
A	-5	ASN	-	EXPRESSION TAG	UNP Q8ZR49
A	-4	LEU	-	EXPRESSION TAG	UNP Q8ZR49
A	-3	TYR	-	EXPRESSION TAG	UNP Q8ZR49
A	-2	PHE	-	EXPRESSION TAG	UNP Q8ZR49

*Continued on next page...*

*Continued from previous page...*

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLN	-	EXPRESSION TAG	UNP Q8ZR49
A	0	GLY	-	EXPRESSION TAG	UNP Q8ZR49
A	1	MSE	-	EXPRESSION TAG	UNP Q8ZR49
B	-18	MSE	-	EXPRESSION TAG	UNP Q8ZR49
B	-17	GLY	-	EXPRESSION TAG	UNP Q8ZR49
B	-16	SER	-	EXPRESSION TAG	UNP Q8ZR49
B	-15	ASP	-	EXPRESSION TAG	UNP Q8ZR49
B	-14	LYS	-	EXPRESSION TAG	UNP Q8ZR49
B	-13	ILE	-	EXPRESSION TAG	UNP Q8ZR49
B	-12	HIS	-	EXPRESSION TAG	UNP Q8ZR49
B	-11	HIS	-	EXPRESSION TAG	UNP Q8ZR49
B	-10	HIS	-	EXPRESSION TAG	UNP Q8ZR49
B	-9	HIS	-	EXPRESSION TAG	UNP Q8ZR49
B	-8	HIS	-	EXPRESSION TAG	UNP Q8ZR49
B	-7	HIS	-	EXPRESSION TAG	UNP Q8ZR49
B	-6	GLU	-	EXPRESSION TAG	UNP Q8ZR49
B	-5	ASN	-	EXPRESSION TAG	UNP Q8ZR49
B	-4	LEU	-	EXPRESSION TAG	UNP Q8ZR49
B	-3	TYR	-	EXPRESSION TAG	UNP Q8ZR49
B	-2	PHE	-	EXPRESSION TAG	UNP Q8ZR49
B	-1	GLN	-	EXPRESSION TAG	UNP Q8ZR49
B	0	GLY	-	EXPRESSION TAG	UNP Q8ZR49
B	1	MSE	-	EXPRESSION TAG	UNP Q8ZR49
C	-18	MSE	-	EXPRESSION TAG	UNP Q8ZR49
C	-17	GLY	-	EXPRESSION TAG	UNP Q8ZR49
C	-16	SER	-	EXPRESSION TAG	UNP Q8ZR49
C	-15	ASP	-	EXPRESSION TAG	UNP Q8ZR49
C	-14	LYS	-	EXPRESSION TAG	UNP Q8ZR49
C	-13	ILE	-	EXPRESSION TAG	UNP Q8ZR49
C	-12	HIS	-	EXPRESSION TAG	UNP Q8ZR49
C	-11	HIS	-	EXPRESSION TAG	UNP Q8ZR49
C	-10	HIS	-	EXPRESSION TAG	UNP Q8ZR49
C	-9	HIS	-	EXPRESSION TAG	UNP Q8ZR49
C	-8	HIS	-	EXPRESSION TAG	UNP Q8ZR49
C	-7	HIS	-	EXPRESSION TAG	UNP Q8ZR49
C	-6	GLU	-	EXPRESSION TAG	UNP Q8ZR49
C	-5	ASN	-	EXPRESSION TAG	UNP Q8ZR49
C	-4	LEU	-	EXPRESSION TAG	UNP Q8ZR49
C	-3	TYR	-	EXPRESSION TAG	UNP Q8ZR49
C	-2	PHE	-	EXPRESSION TAG	UNP Q8ZR49
C	-1	GLN	-	EXPRESSION TAG	UNP Q8ZR49
C	0	GLY	-	EXPRESSION TAG	UNP Q8ZR49

*Continued on next page...*

*Continued from previous page...*

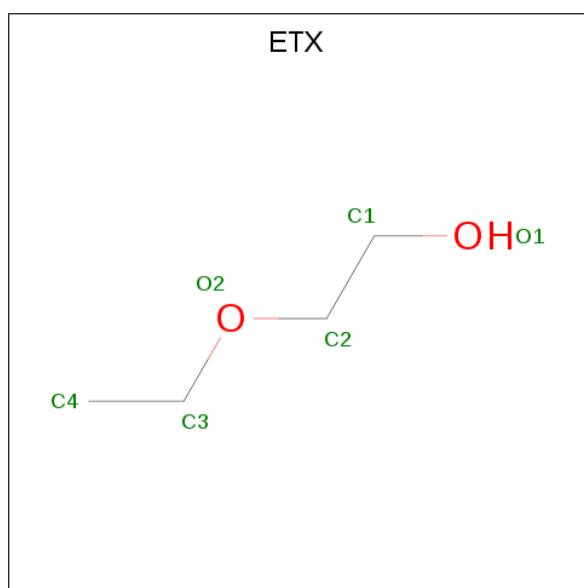
Chain	Residue	Modelled	Actual	Comment	Reference
C	1	MSE	-	EXPRESSION TAG	UNP Q8ZR49
D	-18	MSE	-	EXPRESSION TAG	UNP Q8ZR49
D	-17	GLY	-	EXPRESSION TAG	UNP Q8ZR49
D	-16	SER	-	EXPRESSION TAG	UNP Q8ZR49
D	-15	ASP	-	EXPRESSION TAG	UNP Q8ZR49
D	-14	LYS	-	EXPRESSION TAG	UNP Q8ZR49
D	-13	ILE	-	EXPRESSION TAG	UNP Q8ZR49
D	-12	HIS	-	EXPRESSION TAG	UNP Q8ZR49
D	-11	HIS	-	EXPRESSION TAG	UNP Q8ZR49
D	-10	HIS	-	EXPRESSION TAG	UNP Q8ZR49
D	-9	HIS	-	EXPRESSION TAG	UNP Q8ZR49
D	-8	HIS	-	EXPRESSION TAG	UNP Q8ZR49
D	-7	HIS	-	EXPRESSION TAG	UNP Q8ZR49
D	-6	GLU	-	EXPRESSION TAG	UNP Q8ZR49
D	-5	ASN	-	EXPRESSION TAG	UNP Q8ZR49
D	-4	LEU	-	EXPRESSION TAG	UNP Q8ZR49
D	-3	TYR	-	EXPRESSION TAG	UNP Q8ZR49
D	-2	PHE	-	EXPRESSION TAG	UNP Q8ZR49
D	-1	GLN	-	EXPRESSION TAG	UNP Q8ZR49
D	0	GLY	-	EXPRESSION TAG	UNP Q8ZR49
D	1	MSE	-	EXPRESSION TAG	UNP Q8ZR49
E	-18	MSE	-	EXPRESSION TAG	UNP Q8ZR49
E	-17	GLY	-	EXPRESSION TAG	UNP Q8ZR49
E	-16	SER	-	EXPRESSION TAG	UNP Q8ZR49
E	-15	ASP	-	EXPRESSION TAG	UNP Q8ZR49
E	-14	LYS	-	EXPRESSION TAG	UNP Q8ZR49
E	-13	ILE	-	EXPRESSION TAG	UNP Q8ZR49
E	-12	HIS	-	EXPRESSION TAG	UNP Q8ZR49
E	-11	HIS	-	EXPRESSION TAG	UNP Q8ZR49
E	-10	HIS	-	EXPRESSION TAG	UNP Q8ZR49
E	-9	HIS	-	EXPRESSION TAG	UNP Q8ZR49
E	-8	HIS	-	EXPRESSION TAG	UNP Q8ZR49
E	-7	HIS	-	EXPRESSION TAG	UNP Q8ZR49
E	-6	GLU	-	EXPRESSION TAG	UNP Q8ZR49
E	-5	ASN	-	EXPRESSION TAG	UNP Q8ZR49
E	-4	LEU	-	EXPRESSION TAG	UNP Q8ZR49
E	-3	TYR	-	EXPRESSION TAG	UNP Q8ZR49
E	-2	PHE	-	EXPRESSION TAG	UNP Q8ZR49
E	-1	GLN	-	EXPRESSION TAG	UNP Q8ZR49
E	0	GLY	-	EXPRESSION TAG	UNP Q8ZR49
E	1	MSE	-	EXPRESSION TAG	UNP Q8ZR49
F	-18	MSE	-	EXPRESSION TAG	UNP Q8ZR49

*Continued on next page...*

Continued from previous page...

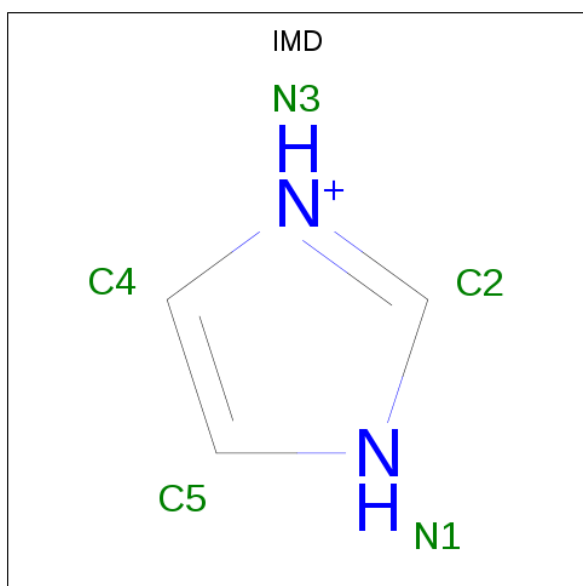
Chain	Residue	Modelled	Actual	Comment	Reference
F	-17	GLY	-	EXPRESSION TAG	UNP Q8ZR49
F	-16	SER	-	EXPRESSION TAG	UNP Q8ZR49
F	-15	ASP	-	EXPRESSION TAG	UNP Q8ZR49
F	-14	LYS	-	EXPRESSION TAG	UNP Q8ZR49
F	-13	ILE	-	EXPRESSION TAG	UNP Q8ZR49
F	-12	HIS	-	EXPRESSION TAG	UNP Q8ZR49
F	-11	HIS	-	EXPRESSION TAG	UNP Q8ZR49
F	-10	HIS	-	EXPRESSION TAG	UNP Q8ZR49
F	-9	HIS	-	EXPRESSION TAG	UNP Q8ZR49
F	-8	HIS	-	EXPRESSION TAG	UNP Q8ZR49
F	-7	HIS	-	EXPRESSION TAG	UNP Q8ZR49
F	-6	GLU	-	EXPRESSION TAG	UNP Q8ZR49
F	-5	ASN	-	EXPRESSION TAG	UNP Q8ZR49
F	-4	LEU	-	EXPRESSION TAG	UNP Q8ZR49
F	-3	TYR	-	EXPRESSION TAG	UNP Q8ZR49
F	-2	PHE	-	EXPRESSION TAG	UNP Q8ZR49
F	-1	GLN	-	EXPRESSION TAG	UNP Q8ZR49
F	0	GLY	-	EXPRESSION TAG	UNP Q8ZR49
F	1	MSE	-	EXPRESSION TAG	UNP Q8ZR49

- Molecule 2 is 2-ETHOXYETHANOL (three-letter code: ETX) (formula: C<sub>4</sub>H<sub>10</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			6	4	2		
2	D	1	Total	C	O	0	0
			6	4	2		

- Molecule 3 is IMIDAZOLE (three-letter code: IMD) (formula:  $C_3H_5N_2$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	N	0	0
			5	3	2		
3	C	1	Total	C	N	0	0
			5	3	2		

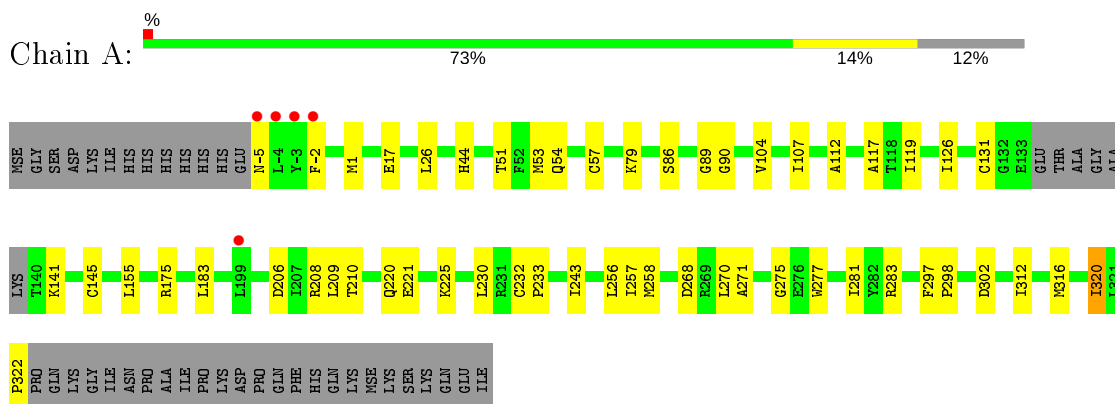
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	93	Total	O	0	0
			93	93		
4	B	74	Total	O	0	0
			74	74		
4	C	88	Total	O	0	0
			88	88		
4	D	70	Total	O	0	0
			70	70		
4	E	55	Total	O	0	0
			55	55		
4	F	51	Total	O	0	0
			51	51		

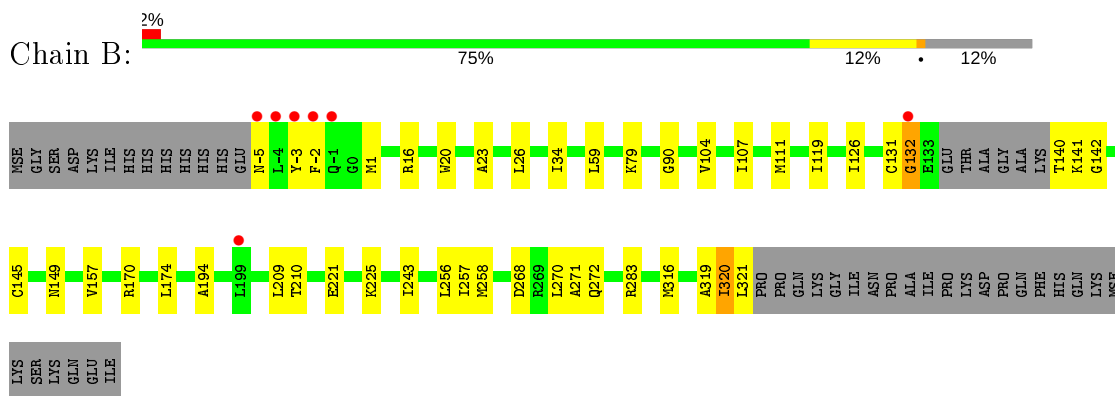
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

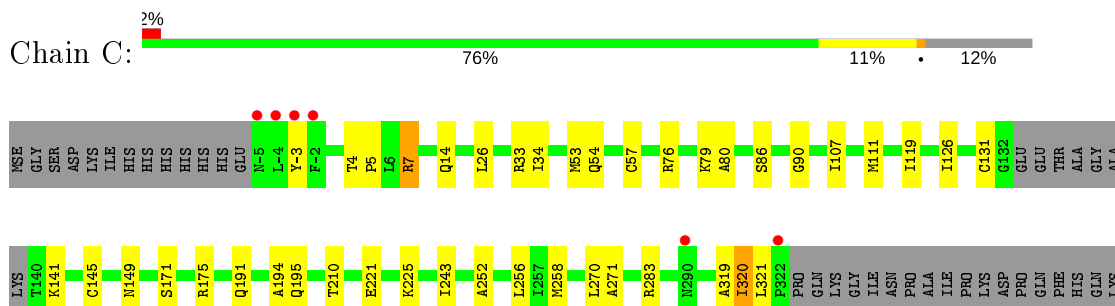
- Molecule 1: Putative sugar binding protein



- Molecule 1: Putative sugar binding protein



- Molecule 1: Putative sugar binding protein

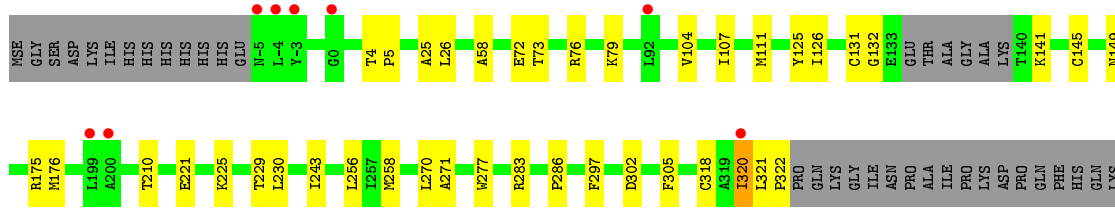




MSE  
LYS  
SER  
LYS  
GLN  
GLU  
ILE

● Molecule 1: Putative sugar binding protein

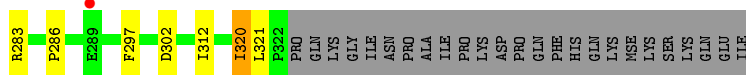
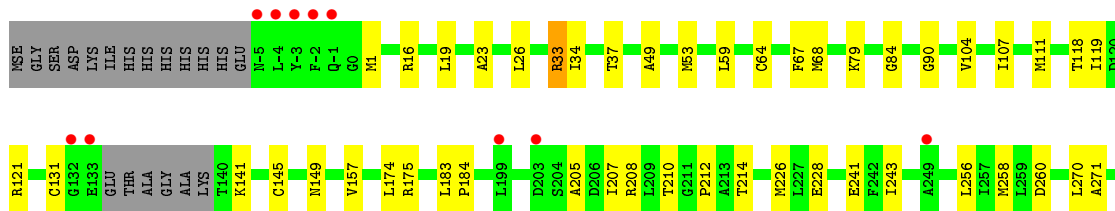
Chain D: 2% 77% 11% 12%



MSE  
LYS  
SER  
LYS  
GLU  
ILE

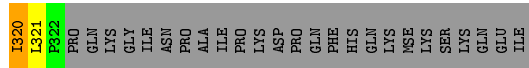
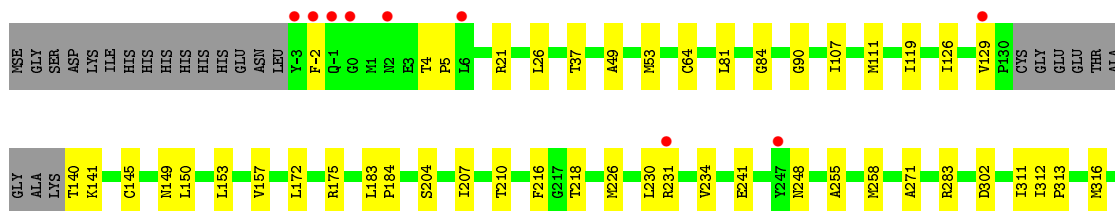
● Molecule 1: Putative sugar binding protein

Chain E: 3% 73% 14% 12%



● Molecule 1: Putative sugar binding protein

Chain F: 2% 73% 13% 13%



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	90.03Å 173.34Å 208.57Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.91 – 2.50 29.91 – 2.50	Depositor EDS
% Data completeness (in resolution range)	100.0 (29.91-2.50) 100.0 (29.91-2.50)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	0.12	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.84 (at 2.51Å)	Xtrriage
Refinement program	REFMAC 5.5.0053, PHENIX	Depositor
R, $R_{free}$	0.203 , 0.232 0.206 , 0.235	Depositor DCC
$R_{free}$ test set	5672 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	42.2	Xtrriage
Anisotropy	0.169	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 38.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	15298	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	27.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.03% 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 [i](#)

### 5.1 Standard geometry [i](#)

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

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	0.36	0/2523	0.57	0/3412
1	B	0.35	0/2513	0.56	0/3397
1	C	0.37	0/2499	0.56	0/3381
1	D	0.34	0/2518	0.55	0/3406
1	E	0.36	0/2530	0.56	0/3422
1	F	0.35	0/2510	0.54	0/3394
All	All	0.36	0/15093	0.56	0/20412

There are no bond length outliers.

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	2480	0	2472	45	0
1	B	2474	0	2469	36	0
1	C	2462	0	2453	42	0
1	D	2478	0	2470	40	0
1	E	2487	0	2478	49	0
1	F	2464	0	2473	49	0
2	A	6	0	10	0	0

*Continued on next page...*

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	6	0	10	1	0
3	A	5	0	5	0	0
3	C	5	0	5	0	0
4	A	93	0	0	0	0
4	B	74	0	0	1	0
4	C	88	0	0	2	0
4	D	70	0	0	0	0
4	E	55	0	0	2	0
4	F	51	0	0	3	0
All	All	15298	0	14845	253	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 9.

The worst 5 of 253 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:E:79:LYS:HE2	1:E:107:ILE:HD11	1.44	0.97
1:B:131:CYS:SG	1:B:141:LYS:NZ	2.37	0.97
1:C:141:LYS:NZ	1:C:145:CYS:SG	2.39	0.96
1:C:131:CYS:SG	1:C:141:LYS:NZ	2.41	0.94
1:D:141:LYS:HE2	1:D:145:CYS:SG	2.10	0.91

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	320/366 (87%)	311 (97%)	9 (3%)	0	100 100
1	B	318/366 (87%)	311 (98%)	5 (2%)	2 (1%)	25 43

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	317/366 (87%)	309 (98%)	8 (2%)	0	100	100
1	D	319/366 (87%)	309 (97%)	9 (3%)	1 (0%)	41	61
1	E	320/366 (87%)	312 (98%)	8 (2%)	0	100	100
1	F	316/366 (86%)	310 (98%)	6 (2%)	0	100	100
All	All	1910/2196 (87%)	1862 (98%)	45 (2%)	3 (0%)	47	68

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	132	GLY
1	D	132	GLY
1	B	142	GLY

### 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	258/287 (90%)	256 (99%)	2 (1%)	81	93
1	B	257/287 (90%)	256 (100%)	1 (0%)	91	97
1	C	256/287 (89%)	254 (99%)	2 (1%)	81	93
1	D	258/287 (90%)	256 (99%)	2 (1%)	81	93
1	E	260/287 (91%)	258 (99%)	2 (1%)	81	93
1	F	258/287 (90%)	257 (100%)	1 (0%)	91	97
All	All	1547/1722 (90%)	1537 (99%)	10 (1%)	84	95

5 of 10 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	320	ILE
1	D	72	GLU
1	E	33	ARG
1	C	7	ARG

Continued on next page...

*Continued from previous page...*

Mol	Chain	Res	Type
1	D	320	ILE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 7 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	54	GLN
1	E	144	HIS
1	C	195	GLN
1	A	182	HIS
1	D	54	GLN

### 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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

4 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
3	IMD	A	349	-	3,5,5	0.45	0	4,5,5	0.48	0
2	ETX	D	348	-	5,5,5	0.56	0	4,4,4	0.23	0
2	ETX	A	348	-	5,5,5	0.60	0	4,4,4	0.19	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	IMD	C	348	-	3,5,5	0.44	0	4,5,5	0.50	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	IMD	A	349	-	-	-	0/1/1/1
2	ETX	D	348	-	-	2/3/3/3	-
2	ETX	A	348	-	-	1/3/3/3	-
3	IMD	C	348	-	-	-	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	348	ETX	O1-C1-C2-O2
2	D	348	ETX	O1-C1-C2-O2
2	D	348	ETX	C1-C2-O2-C3

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	348	ETX	1	0

## 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	311/366 (84%)	-0.18	5 (1%) 72 74	19, 25, 40, 64	0
1	B	310/366 (84%)	-0.16	7 (2%) 60 63	19, 25, 40, 61	0
1	C	310/366 (84%)	-0.20	6 (1%) 66 69	19, 25, 40, 66	0
1	D	311/366 (84%)	-0.18	8 (2%) 56 59	19, 25, 40, 66	0
1	E	311/366 (84%)	-0.05	11 (3%) 44 47	19, 25, 40, 65	0
1	F	306/366 (83%)	-0.12	9 (2%) 51 55	19, 25, 39, 60	0
All	All	1859/2196 (84%)	-0.15	46 (2%) 57 61	19, 25, 40, 66	0

The worst 5 of 46 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	-2	PHE	6.4
1	D	-4	LEU	6.3
1	F	-1	GLN	6.0
1	E	-4	LEU	5.8
1	A	199	LEU	5.7

### 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 carbohydrates 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(Å <sup>2</sup> )	Q<0.9
2	ETX	A	348	6/6	0.64	0.27	39,51,51,52	0
2	ETX	D	348	6/6	0.77	0.25	45,52,55,55	0
3	IMD	A	349	5/5	0.88	0.20	53,55,56,57	0
3	IMD	C	348	5/5	0.91	0.15	45,45,47,50	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.