wwPDB X-ray Structure Validation Summary Report (i)

Apr 28, 2024 – 07:06 am BST

PDB ID	:	1UZZ
Title	:	Erythrina cristagalli bound to N-linked oligosaccharide and lactose
Authors	:	Turton, K.; Natesh, R.; Thiyagarajan, N.; Chaddock, J.A.; Acharya, K.R.
Deposited on	:	2004-03-20
Resolution	:	2.13 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*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) 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 (i)) were used in the production of this report:

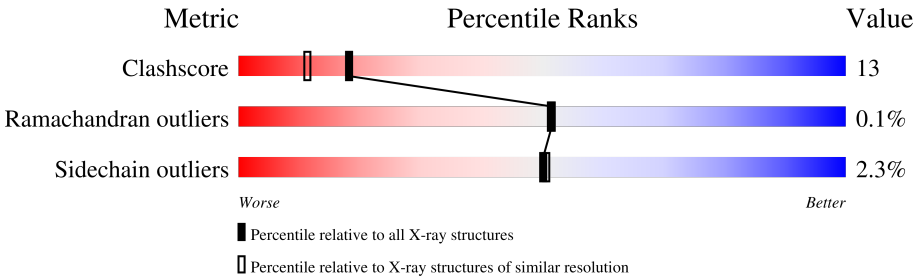
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.13 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	141614	2653 (2.16-2.12)
Ramachandran outliers	138981	2618 (2.16-2.12)
Sidechain outliers	138945	2617 (2.16-2.12)

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 <=5%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	242	73% 24%
1	B	242	79% 19%
1	C	242	75% 23%
1	D	242	69% 29%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	GOL	A	1240	-	X	-	-
2	GOL	B	1240	-	X	-	-
2	GOL	D	1241	-	X	-	-

2 Entry composition (i)

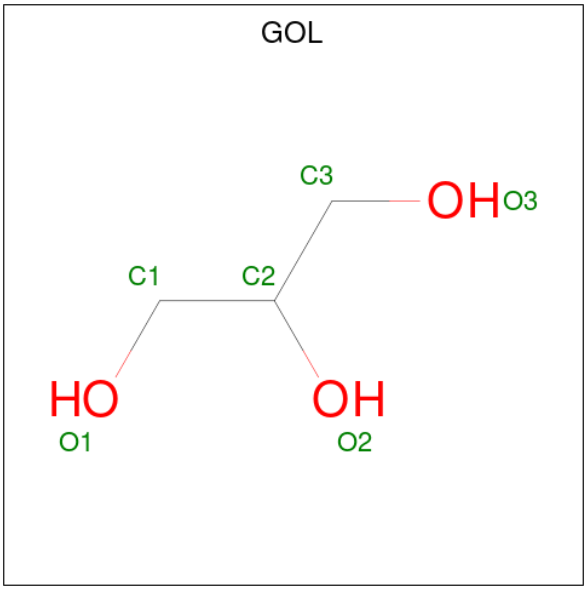
There are 5 unique types of molecules in this entry. The entry contains 8343 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Lectin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	240	Total	C	N	O	S	0	0	1
			1856	1189	302	362	3			
1	B	240	Total	C	N	O	S	0	0	1
			1856	1189	302	362	3			
1	C	241	Total	C	N	O	S	0	0	1
			1863	1193	303	364	3			
1	D	241	Total	C	N	O	S	0	0	1
			1863	1193	303	364	3			

- Molecule 2 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			6	3	3		
2	B	1	Total	C	O	0	0
			6	3	3		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	D	1	Total C O 6 3 3	0	0

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

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

- Molecule 4 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Mn 1 1	0	0
4	B	1	Total Mn 1 1	0	0
4	C	1	Total Mn 1 1	0	0
4	D	1	Total Mn 1 1	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	250	Total O 250 250	0	0
5	B	242	Total O 242 242	0	0
5	C	188	Total O 188 188	0	0
5	D	199	Total O 199 199	0	0

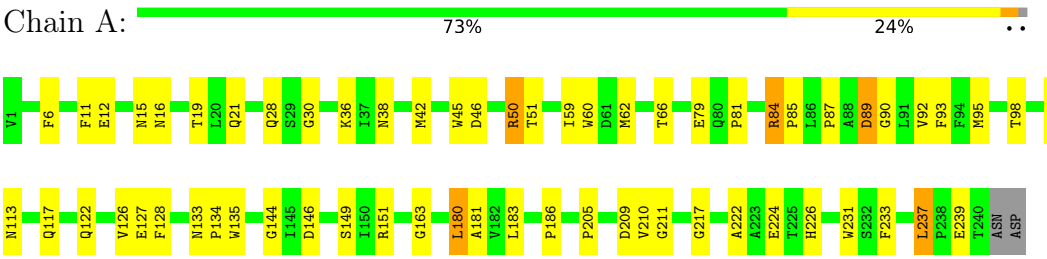
3 Residue-property plots (i)

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. 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. 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.

Note EDS was not executed.

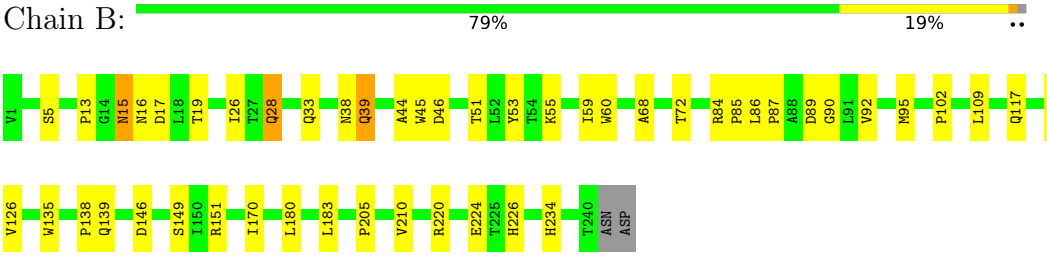
• Molecule 1: Lectin

Chain A:



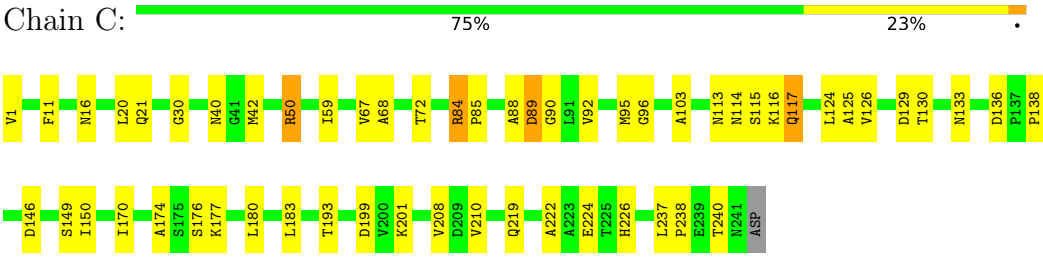
• Molecule 1: Lectin

Chain B:



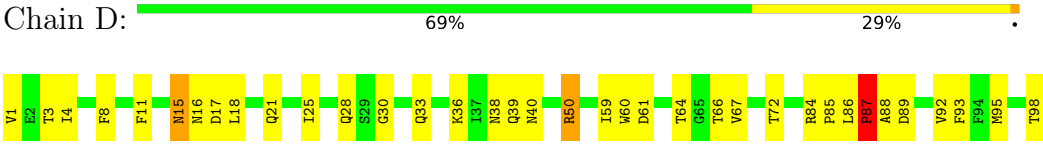
• Molecule 1: Lectin

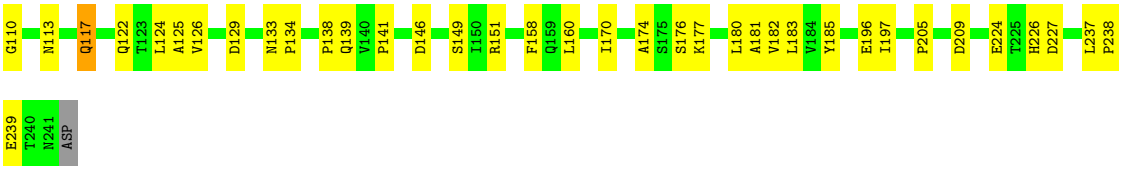
Chain C:



• Molecule 1: Lectin

Chain D:




G110
N113
Q117
Q122
T123
L124
A125
V126
D129
N133
P134
P138
Q139
V140
P141
D146
S149
I150
R151
F158
Q159
L160
I170
A174
S175
S176
K177
L180
A181
V182
L183
V184
Y185
E196
I197
P205
D209
E224
T225
H226
D227
L237
P238
E239
T240
N241
ASP

4 Data and refinement statistics (i)

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

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	55.28Å 55.37Å 86.93Å 86.23° 75.37° 82.13°	Depositor
Resolution (Å)	40.00 – 2.13	Depositor
% Data completeness (in resolution range)	90.3 (40.00-2.13)	Depositor
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.191 , 0.241	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	8343	wwPDB-VP
Average B, all atoms (Å^2)	23.0	wwPDB-VP

5 Model quality

5.1 Standard geometry

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

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	0.56	3/1907 (0.2%)	0.69	1/2609 (0.0%)
1	B	0.57	4/1907 (0.2%)	0.67	0/2609
1	C	0.51	3/1914 (0.2%)	0.70	2/2619 (0.1%)
1	D	0.50	3/1914 (0.2%)	0.69	2/2619 (0.1%)
All	All	0.54	13/7642 (0.2%)	0.69	5/10456 (0.0%)

The worst 5 of 13 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	89	ASP	CG-OD1	12.49	1.54	1.25
1	B	86	LEU	C-N	-11.44	1.12	1.34
1	A	87	PRO	N-CA	-10.76	1.28	1.47
1	B	90	GLY	CA-C	7.77	1.64	1.51
1	D	87	PRO	CA-CB	7.23	1.68	1.53

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	89	ASP	CB-CG-OD2	11.56	128.71	118.30
1	D	87	PRO	N-CA-C	7.00	130.29	112.10
1	D	87	PRO	CA-CB-CG	-6.83	91.01	104.00
1	A	89	ASP	CB-CG-OD2	6.35	124.01	118.30
1	C	89	ASP	OD1-CG-OD2	-5.31	113.21	123.30

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	1856	0	1793	49	0
1	B	1856	0	1793	37	0
1	C	1863	0	1800	47	0
1	D	1863	0	1800	67	0
2	A	6	0	4	2	0
2	B	6	0	4	0	0
2	D	6	0	4	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	250	0	0	8	0
5	B	242	0	0	5	0
5	C	188	0	0	4	0
5	D	199	0	0	7	0
All	All	8343	0	7198	197	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 13.

The worst 5 of 197 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:50:ARG:HD3	1:A:102:PRO:HB3	1.45	0.98
1:D:67:VAL:HG13	1:D:174:ALA:HB1	1.54	0.87
1:A:95:MET:HG2	1:A:210:VAL:HG12	1.60	0.81
1:C:138:PRO:HG2	1:C:139:GLN:NE2	1.97	0.79
1:C:114:ASN:ND2	1:C:116:LYS:HE2	1.98	0.78

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	238/242 (98%)	230 (97%)	8 (3%)	0	100	100
1	B	238/242 (98%)	231 (97%)	7 (3%)	0	100	100
1	C	239/242 (99%)	226 (95%)	13 (5%)	0	100	100
1	D	239/242 (99%)	222 (93%)	16 (7%)	1 (0%)	34	29
All	All	954/968 (99%)	909 (95%)	44 (5%)	1 (0%)	51	51

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	87	PRO

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	205/208 (99%)	199 (97%)	6 (3%)	42	40
1	B	205/208 (99%)	200 (98%)	5 (2%)	49	49
1	C	206/208 (99%)	203 (98%)	3 (2%)	65	68
1	D	206/208 (99%)	201 (98%)	5 (2%)	49	49
All	All	822/832 (99%)	803 (98%)	19 (2%)	50	51

5 of 19 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	15	ASN
1	D	109	LEU
1	D	117	GLN
1	D	87	PRO
1	B	39	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 26 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	113	ASN
1	C	156	GLN
1	D	113	ASN
1	C	139	GLN
1	D	15	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 monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 11 ligands modelled in this entry, 8 are monoatomic - leaving 3 for Mogul analysis.

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	$\#\|Z\|>2$
2	GOL	B	1240	-	5,5,5	4.59	5 (100%)	5,5,5	5.74	3 (60%)
2	GOL	A	1240	-	5,5,5	4.56	5 (100%)	5,5,5	5.81	3 (60%)
2	GOL	D	1241	-	5,5,5	4.51	5 (100%)	5,5,5	5.76	3 (60%)

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
2	GOL	B	1240	-	-	2/4/4/4	-
2	GOL	A	1240	-	-	3/4/4/4	-
2	GOL	D	1241	-	-	2/4/4/4	-

The worst 5 of 15 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1240	GOL	C3-C2	-7.69	1.20	1.51
2	A	1240	GOL	C3-C2	-7.43	1.21	1.51
2	D	1241	GOL	C3-C2	-7.36	1.21	1.51
2	A	1240	GOL	O1-C1	4.55	1.61	1.42
2	B	1240	GOL	O1-C1	4.54	1.61	1.42

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	1240	GOL	O3-C3-C2	10.65	161.25	110.20
2	D	1241	GOL	O3-C3-C2	10.47	160.40	110.20
2	B	1240	GOL	O3-C3-C2	10.44	160.25	110.20
2	D	1241	GOL	O2-C2-C3	6.78	138.99	109.12
2	A	1240	GOL	O2-C2-C3	6.67	138.50	109.12

There are no chirality outliers.

5 of 7 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1240	GOL	O1-C1-C2-C3
2	A	1240	GOL	C1-C2-C3-O3
2	B	1240	GOL	C1-C2-C3-O3
2	D	1241	GOL	O1-C1-C2-C3

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Mol	Chain	Res	Type	Atoms
2	D	1241	GOL	C1-C2-C3-O3

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1240	GOL	2	0

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	B	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	B	86:LEU	C	87:PRO	N	1.12

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.