Full wwPDB X-ray Structure Validation Report (i)

Oct 2, 2023 – 11:27 PM EDT

PDB ID	:	6PBJ
Title	:	The structure of 3-deoxy-d-arabino-heptulosonate 7-phosphate synthase with Gly190Pro mutation
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Deposited on	:	2019-06-13
Resolution	:	1.90 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 (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	:	FAILED
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	FAILED
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)	:	2.35.1

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 1.90 Å.

There are no overall percentile quality scores available for this entry.

MolProbity and EDS failed to run properly - the sequence quality summary graphics cannot be shown.

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 7214 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.

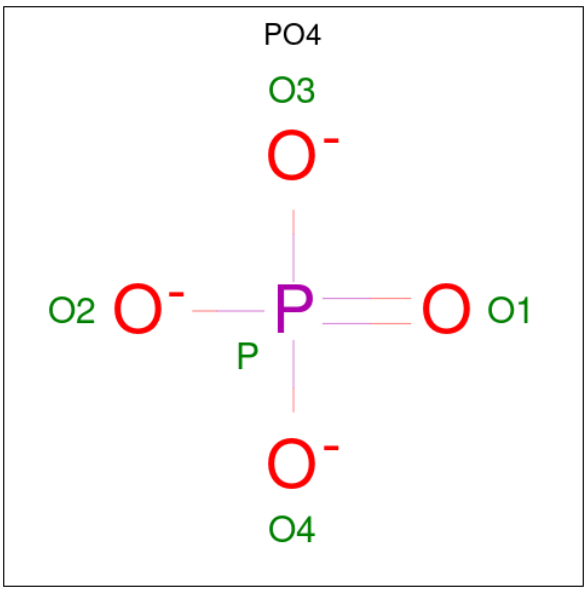
- Molecule 1 is a protein called Phospho-2-dehydro-3-deoxyheptonate aldolase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	444	3411	2140	617	636	18	0	9	0
1	B	416	3185	2005	578	586	16	0	4	0

There are 6 discrepancies between the modelled and reference sequences:

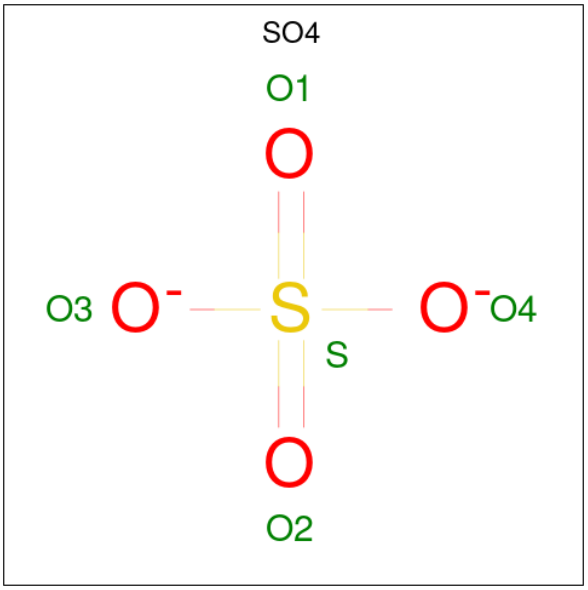
Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	expression tag	UNP A0A0T9FW33
A	0	ALA	-	expression tag	UNP A0A0T9FW33
A	190	PRO	GLY	engineered mutation	UNP A0A0T9FW33
B	-1	GLY	-	expression tag	UNP A0A0T9FW33
B	0	ALA	-	expression tag	UNP A0A0T9FW33
B	190	PRO	GLY	engineered mutation	UNP A0A0T9FW33

- Molecule 2 is PHOSPHATE ION (three-letter code: PO4) (formula: O_4P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	O	P		
2	A	1	5	4	1	0	0
			Total	O	P		
2	B	1	5	4	1	0	0

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	O	S		
3	A	1	5	4	1	0	0
			Total	O	S		
3	A	1	5	4	1	0	0
			Total	O	S		
3	A	1	5	4	1	0	0
			Total	O	S		
3	B	1	5	4	1	0	0
			Total	O	S		
3	B	1	5	4	1	0	0
			Total	O	S		
3	B	1	5	4	1	0	0

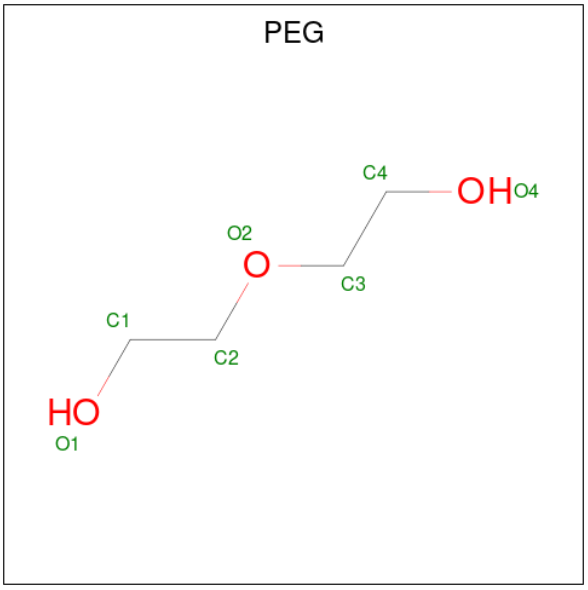
- Molecule 4 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

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

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

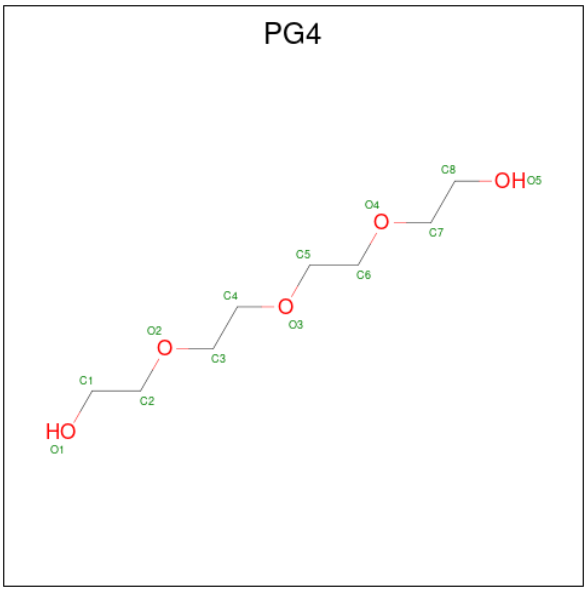
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Cl		
5	A	3	3	3	0	0
			Total	Cl		
5	B	3	3	3	0	0

- Molecule 6 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
6	A	1	7	4	3	0	0
			Total	C	O		
6	B	1	7	4	3	0	0
			Total	C	O		
6	B	1	7	4	3	0	0
			Total	C	O		
6	B	1	7	4	3	0	0

- Molecule 7 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: $C_8H_{18}O_5$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
7	A	1	13	8	5	0	0

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
8	A	240	240	240	0	0
			Total	O		
8	B	289	289	289	0	0

MolProbity and EDS failed to run properly - this section is therefore empty.

3 Data and refinement statistics (i)

EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α, β, γ	204.25Å 204.25Å 66.55Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	36.83 – 1.90	Depositor
% Data completeness (in resolution range)	99.8 (36.83-1.90)	Depositor
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.11 (at 1.89Å)	Xtriage
Refinement program	REFMAC 5.8.0258	Depositor
R, R_{free}	0.158 , 0.180	Depositor
Wilson B-factor (Å^2)	18.5	Xtriage
Anisotropy	0.054	Xtriage
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.004 for -h,-k,l	Xtriage
Reported twinning fraction	0.611 for h,-h-k,-l 0.389 for h+k,-k,-l	Depositor
Outliers	0 of 124853 reflections	Xtriage
Total number of atoms	7214	wwPDB-VP
Average B, all atoms (Å^2)	22.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.56% of the height of the origin peak. No significant pseudotranslation is detected.*

[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

4 Model quality (i)

4.1 Standard geometry (i)

MolProbity failed to run properly - this section is therefore empty.

4.2 Too-close contacts (i)

MolProbity failed to run properly - this section is therefore empty.

4.3 Torsion angles (i)

4.3.1 Protein backbone (i)

MolProbity failed to run properly - this section is therefore empty.

4.3.2 Protein sidechains (i)

MolProbity failed to run properly - this section is therefore empty.

4.3.3 RNA (i)

MolProbity failed to run properly - this section is therefore empty.

4.4 Non-standard residues in protein, DNA, RNA chains (i)

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

4.5 Carbohydrates (i)

There are no monosaccharides in this entry.

4.6 Ligand geometry (i)

Of 21 ligands modelled in this entry, 8 are monoatomic - leaving 13 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	$\#\|Z\| > 2$
3	SO4	B	503	-	4,4,4	0.45	0	6,6,6	0.15	0
3	SO4	A	503	-	4,4,4	0.33	0	6,6,6	0.05	0
6	PEG	B	510	-	6,6,6	0.22	0	5,5,5	0.16	0
3	SO4	B	502	-	4,4,4	0.42	0	6,6,6	0.28	0
3	SO4	A	504	-	4,4,4	0.55	0	6,6,6	0.12	0
7	PG4	A	510	-	12,12,12	0.45	0	11,11,11	0.25	0
3	SO4	B	504	-	4,4,4	0.37	0	6,6,6	0.12	0
3	SO4	A	502	-	4,4,4	0.48	0	6,6,6	0.20	0
2	PO4	B	501	-	4,4,4	1.92	1 (25%)	6,6,6	0.55	0
6	PEG	B	511	-	6,6,6	0.29	0	5,5,5	0.27	0
2	PO4	A	501	-	4,4,4	1.11	0	6,6,6	0.48	0
6	PEG	B	509	-	6,6,6	0.38	0	5,5,5	0.14	0
6	PEG	A	509	-	6,6,6	0.47	0	5,5,5	0.15	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
6	PEG	B	510	-	-	3/4/4/4	-
7	PG4	A	510	-	-	3/10/10/10	-
6	PEG	B	511	-	-	2/4/4/4	-
6	PEG	B	509	-	-	1/4/4/4	-
6	PEG	A	509	-	-	2/4/4/4	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	PO4	P-O2	-2.65	1.46	1.54

There are no bond angle outliers.

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	510	PG4	O3-C5-C6-O4
6	B	510	PEG	C1-C2-O2-C3
6	B	510	PEG	O1-C1-C2-O2
6	A	509	PEG	C4-C3-O2-C2
7	A	510	PG4	O2-C3-C4-O3
6	A	509	PEG	O1-C1-C2-O2
6	B	510	PEG	C4-C3-O2-C2
7	A	510	PG4	C4-C3-O2-C2
6	B	511	PEG	O2-C3-C4-O4
6	B	509	PEG	C1-C2-O2-C3
6	B	511	PEG	C1-C2-O2-C3

There are no ring outliers.

No monomer is involved in short contacts.

4.7 Other polymers (i)

There are no such residues in this entry.

4.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

5 Fit of model and data (i)

5.1 Protein, DNA and RNA chains (i)

EDS failed to run properly - this section is therefore empty.

5.2 Non-standard residues in protein, DNA, RNA chains (i)

EDS failed to run properly - this section is therefore empty.

5.3 Carbohydrates (i)

EDS failed to run properly - this section is therefore empty.

5.4 Ligands (i)

EDS failed to run properly - this section is therefore empty.

5.5 Other polymers (i)

EDS failed to run properly - this section is therefore empty.