



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 14, 2023 – 03:27 am GMT

PDB ID : 2YK6
Title : Structure of Neisseria LOS-specific sialyltransferase (NST), in complex with CDP.
Authors : Lin, L.Y.C.; Rakic, B.; Chiu, C.P.C.; Lameignere, E.; Wakarchuk, W.W.; Withers, S.G.; Strynadka, N.C.J.
Deposited on : 2011-05-25
Resolution : 2.83 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 : 4.02b-467
Xtrriage (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) : 2.36

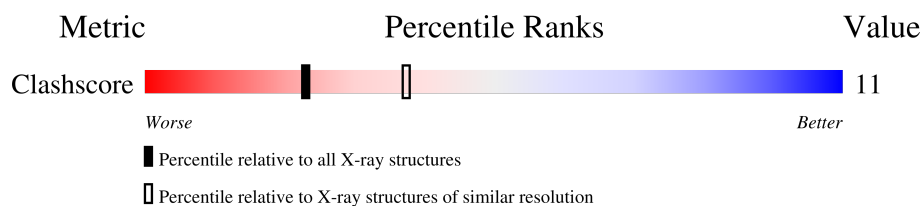
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.83 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	1078 (2.86-2.82)

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 2764 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.

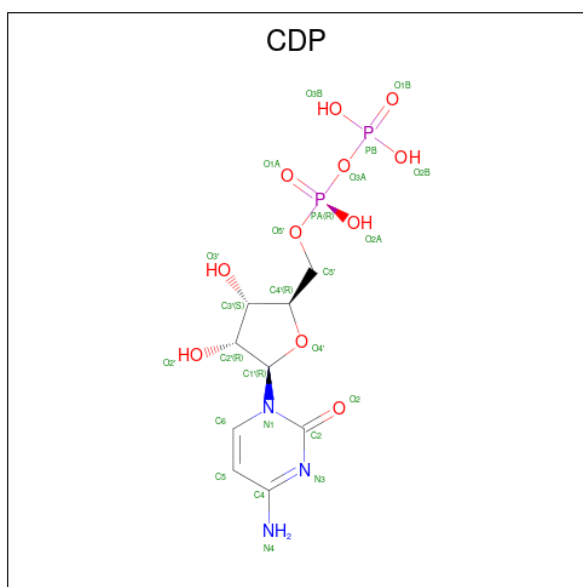
- Molecule 1 is a protein called CMP-N-ACETYLNEURAMINATE-BETA-GALACTOSAMIDE-ALPHA-2,3-SIALYLTRANSFERASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	325	2637	1715	429	481	12	0	0	0

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	371	LEU	-	expression tag	UNP P72097
A	372	VAL	-	expression tag	UNP P72097
A	373	PRO	-	expression tag	UNP P72097
A	374	ARG	-	expression tag	UNP P72097
A	102	TRP	ARG	variant	UNP P72097
A	129	ALA	SER	variant	UNP P72097
A	168	ILE	GLY	variant	UNP P72097
A	242	ALA	THR	variant	UNP P72097
A	273	ASN	LYS	variant	UNP P72097

- Molecule 2 is CYTIDINE-5'-DIPHOSPHATE (three-letter code: CDP) (formula: C₉H₁₅N₃O₁₁P₂).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	25	9	3	11	2	0	0

- Molecule 3 is PENTAETHYLENE GLYCOL (three-letter code: 1PE) (formula: $C_{10}H_{22}O_6$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
3	A	1	16	10	6	0	0

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



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

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	81	Total	O	0	0
			81	81		

SEQUENCE-PLOTS INFOmissingINFO

3 Data and refinement statistics

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

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	86.10Å 123.51Å 41.65Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	70.71 – 2.83	Depositor
% Data completeness (in resolution range)	99.5 (70.71-2.83)	Depositor
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.57 (at 2.81Å)	Xtrriage
Refinement program	REFMAC 5.5.0110	Depositor
R, R_{free}	0.190 , 0.257	Depositor
Wilson B-factor (Å ²)	39.9	Xtrriage
Anisotropy	0.104	Xtrriage
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	2764	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.52% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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.

4 Model quality [i](#)

4.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: CDP, SO4, 1PE

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	0.75	1/2706 (0.0%)	0.80	2/3662 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	55	CYS	CB-SG	-7.65	1.69	1.82

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	303	ILE	CG1-CB-CG2	-5.51	99.28	111.40
1	A	131	LEU	CA-CB-CG	5.29	127.46	115.30

There are no chirality outliers.

There are no planarity outliers.

4.2 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	2637	0	2638	58	1
2	A	25	0	12	2	0
3	A	16	0	22	1	0
4	A	5	0	0	0	0
5	A	81	0	0	2	2

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	2764	0	2672	61	3

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 11.

All (61) 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:280:HIS:HD2	1:A:282:ARG:H	1.17	0.87
1:A:141:ALA:HB3	1:A:144:GLU:HG3	1.58	0.84
1:A:165:ASP:H	1:A:169:ASN:HD21	1.26	0.84
1:A:280:HIS:H	1:A:283:GLN:HE21	1.29	0.81
1:A:280:HIS:H	1:A:283:GLN:NE2	1.84	0.75
1:A:280:HIS:CD2	1:A:282:ARG:H	2.07	0.69
1:A:245:GLU:OE2	1:A:335:HIS:HE1	1.78	0.67
1:A:255:GLY:HA3	1:A:283:GLN:HE22	1.59	0.67
1:A:165:ASP:H	1:A:169:ASN:ND2	1.93	0.65
2:A:1374:CDP:O1B	2:A:1374:CDP:C5'	2.47	0.62
1:A:116:PHE:CZ	1:A:128:LYS:HD2	2.39	0.58
1:A:324:ALA:O	1:A:328:MET:HB2	2.03	0.57
2:A:1374:CDP:O1B	2:A:1374:CDP:O5'	2.23	0.57
1:A:64:ALA:HB3	1:A:96:ILE:HD11	1.88	0.56
1:A:140:LEU:HD23	1:A:140:LEU:N	2.20	0.55
1:A:237:ALA:O	1:A:240:LEU:HB2	2.06	0.55
1:A:137:ARG:HD3	1:A:139:TYR:CZ	2.42	0.54
1:A:56:TYR:H	1:A:60:GLN:NE2	2.05	0.54
1:A:77:TYR:CD1	1:A:102:TRP:HB3	2.43	0.53
1:A:164:ASP:OD2	1:A:213:THR:HA	2.09	0.53
1:A:277:VAL:HG11	1:A:287:LEU:HD23	1.92	0.51
1:A:168:ILE:O	1:A:168:ILE:HG13	2.10	0.51
1:A:140:LEU:O	1:A:162:THR:HA	2.12	0.49
1:A:114:LYS:HB2	1:A:132:LEU:HD11	1.95	0.49
1:A:267:LYS:HE2	1:A:372:VAL:O	2.14	0.48
1:A:61:MET:O	1:A:65:GLU:HG3	2.13	0.48
1:A:339:LEU:O	1:A:341:PRO:HD3	2.14	0.47
1:A:189:ARG:HD2	1:A:193:ARG:HH21	1.80	0.47
1:A:354:TYR:O	1:A:358:THR:HG23	2.15	0.47
1:A:115:SER:O	1:A:128:LYS:NZ	2.48	0.47
1:A:140:LEU:N	1:A:140:LEU:CD2	2.78	0.46
1:A:206:ASN:O	1:A:207:ALA:C	2.53	0.46
1:A:165:ASP:N	1:A:169:ASN:ND2	2.62	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:140:LEU:HD23	1:A:140:LEU:H	1.81	0.46
1:A:280:HIS:HD2	1:A:282:ARG:N	1.99	0.46
1:A:71:HIS:HB3	1:A:74:GLU:HG3	1.98	0.46
1:A:280:HIS:HB3	1:A:283:GLN:HB2	1.97	0.45
1:A:203:LYS:HE2	1:A:221:ILE:O	2.16	0.45
1:A:183:VAL:HG12	1:A:184:ASN:H	1.80	0.45
1:A:245:GLU:HA	1:A:312:HIS:O	2.16	0.45
1:A:280:HIS:CD2	1:A:281:PRO:HD2	2.52	0.45
1:A:145:LYS:O	1:A:149:ALA:HB2	2.17	0.45
1:A:78:VAL:HG11	1:A:96:ILE:HG21	1.99	0.44
3:A:1375:1PE:H232	5:A:2010:HOH:O	2.17	0.44
1:A:114:LYS:HE3	1:A:132:LEU:HD21	1.99	0.44
1:A:317:ILE:HG21	1:A:328:MET:HE1	1.98	0.43
1:A:114:LYS:HG2	5:A:2012:HOH:O	2.17	0.43
1:A:131:LEU:HD12	1:A:132:LEU:N	2.34	0.43
1:A:280:HIS:O	1:A:283:GLN:HB3	2.18	0.42
1:A:116:PHE:CD2	1:A:120:PRO:HG3	2.54	0.42
1:A:321:PHE:HA	1:A:357:PHE:CZ	2.55	0.42
1:A:246:THR:O	1:A:248:GLY:N	2.52	0.42
1:A:78:VAL:O	1:A:103:ALA:HA	2.19	0.42
1:A:105:PHE:C	1:A:105:PHE:CD1	2.93	0.42
1:A:259:LYS:HA	1:A:285:TYR:CE1	2.55	0.41
1:A:137:ARG:HA	1:A:159:GLU:O	2.21	0.41
1:A:137:ARG:HD3	1:A:139:TYR:OH	2.21	0.41
1:A:325:ALA:HB1	1:A:336:VAL:HG11	2.02	0.41
1:A:146:VAL:HG22	1:A:201:ILE:HG13	2.01	0.41
1:A:258:ASP:C	1:A:260:GLU:N	2.74	0.41
1:A:150:ALA:O	1:A:154:THR:HG23	2.21	0.40

All (3) 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)
5:A:2004:HOH:O	5:A:2057:HOH:O[3_655]	1.68	0.52
5:A:2003:HOH:O	5:A:2080:HOH:O[3_655]	2.14	0.06
1:A:66:ARG:NH1	1:A:233:PRO:O[2_665]	2.18	0.02

4.3 Torsion angles [i](#)

4.3.1 Protein backbone [i](#)

There are no protein backbone outliers to report in this entry.

4.3.2 Protein sidechains [i](#)

There are no protein residues with a non-rotameric sidechain to report in this entry.

4.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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](#)

3 ligands are modelled in this entry.

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.

4.7 Other polymers [i](#)

There are no such residues in this entry.

4.8 Polymer linkage issues

There are no chain breaks in this entry.

5 Fit of model and data

5.1 Protein, DNA and RNA chains

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

5.2 Non-standard residues in protein, DNA, RNA chains

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

5.3 Carbohydrates

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

5.4 Ligands

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

5.5 Other polymers

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