Full wwPDB X-ray Structure Validation Report ⓘ

Oct 3, 2023 – 08:37 AM EDT

PDB ID	:	6OKD
Title	:	Crystal Structure of human transferrin receptor in complex with a cystine-dense peptide
Authors	:	Finton, K.A.K.; Rupert, P.B.; Strong, R.K.
Deposited on	:	2019-04-12
Resolution	:	1.85 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	:	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 1.85 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 6 unique types of molecules in this entry. The entry contains 11117 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 Transferrin receptor protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	619	Total	C	N	O	S	0	5	0
			4792	3083	793	902	14			
1	B	617	Total	C	N	O	S	0	5	0
			4776	3075	792	895	14			

There are 62 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	GLY	-	expression tag	UNP P02786
A	2	SER	-	expression tag	UNP P02786
A	24	SER	GLY	conflict	UNP P02786
A	643	GLY	-	expression tag	UNP P02786
A	644	GLY	-	expression tag	UNP P02786
A	645	GLY	-	expression tag	UNP P02786
A	646	SER	-	expression tag	UNP P02786
A	647	HIS	-	expression tag	UNP P02786
A	648	HIS	-	expression tag	UNP P02786
A	649	HIS	-	expression tag	UNP P02786
A	650	HIS	-	expression tag	UNP P02786
A	651	HIS	-	expression tag	UNP P02786
A	652	HIS	-	expression tag	UNP P02786
A	653	GLY	-	expression tag	UNP P02786
A	654	GLY	-	expression tag	UNP P02786
A	655	GLY	-	expression tag	UNP P02786
A	656	SER	-	expression tag	UNP P02786
A	657	LEU	-	expression tag	UNP P02786
A	658	ASN	-	expression tag	UNP P02786
A	659	ASP	-	expression tag	UNP P02786
A	660	ILE	-	expression tag	UNP P02786
A	661	PHE	-	expression tag	UNP P02786
A	662	GLU	-	expression tag	UNP P02786
A	663	ALA	-	expression tag	UNP P02786
A	664	GLN	-	expression tag	UNP P02786

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
A	665	LYS	-	expression tag	UNP P02786
A	666	ILE	-	expression tag	UNP P02786
A	667	GLU	-	expression tag	UNP P02786
A	668	TRP	-	expression tag	UNP P02786
A	669	HIS	-	expression tag	UNP P02786
A	670	GLU	-	expression tag	UNP P02786
B	1	GLY	-	expression tag	UNP P02786
B	2	SER	-	expression tag	UNP P02786
B	24	SER	GLY	conflict	UNP P02786
B	643	GLY	-	expression tag	UNP P02786
B	644	GLY	-	expression tag	UNP P02786
B	645	GLY	-	expression tag	UNP P02786
B	646	SER	-	expression tag	UNP P02786
B	647	HIS	-	expression tag	UNP P02786
B	648	HIS	-	expression tag	UNP P02786
B	649	HIS	-	expression tag	UNP P02786
B	650	HIS	-	expression tag	UNP P02786
B	651	HIS	-	expression tag	UNP P02786
B	652	HIS	-	expression tag	UNP P02786
B	653	GLY	-	expression tag	UNP P02786
B	654	GLY	-	expression tag	UNP P02786
B	655	GLY	-	expression tag	UNP P02786
B	656	SER	-	expression tag	UNP P02786
B	657	LEU	-	expression tag	UNP P02786
B	658	ASN	-	expression tag	UNP P02786
B	659	ASP	-	expression tag	UNP P02786
B	660	ILE	-	expression tag	UNP P02786
B	661	PHE	-	expression tag	UNP P02786
B	662	GLU	-	expression tag	UNP P02786
B	663	ALA	-	expression tag	UNP P02786
B	664	GLN	-	expression tag	UNP P02786
B	665	LYS	-	expression tag	UNP P02786
B	666	ILE	-	expression tag	UNP P02786
B	667	GLU	-	expression tag	UNP P02786
B	668	TRP	-	expression tag	UNP P02786
B	669	HIS	-	expression tag	UNP P02786
B	670	GLU	-	expression tag	UNP P02786

- Molecule 2 is a protein called transferrin receptor binding cystine-dense peptide.

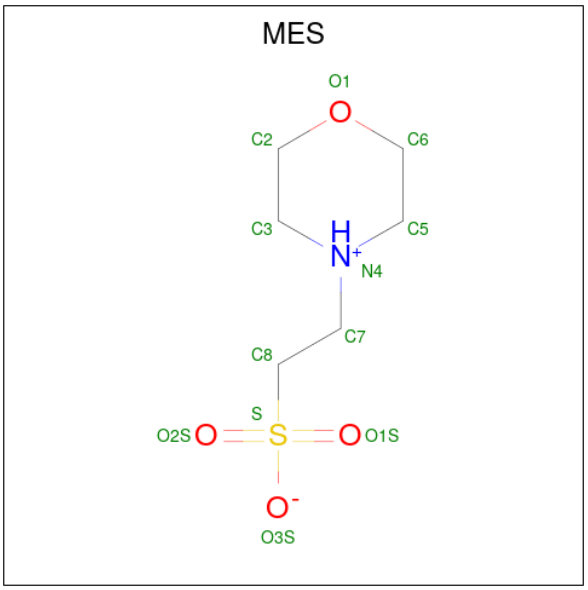
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	43	Total	C	N	O	S	0	0	0
			317	188	57	65	7			

Continued on next page...

Continued from previous page...

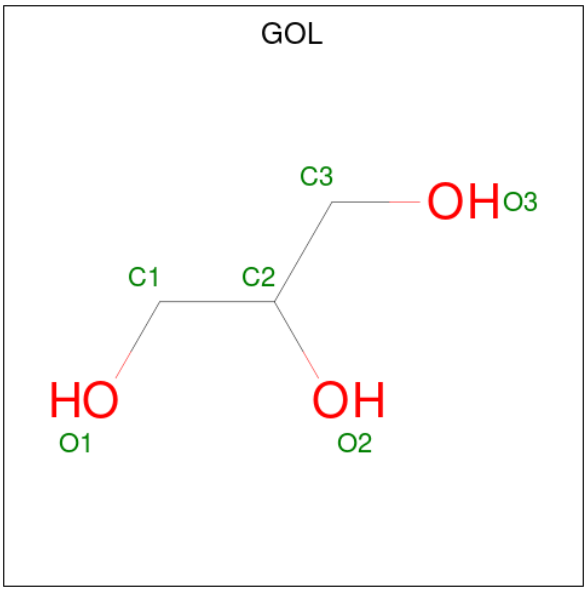
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	42	Total	C	N	O	S	0	1	0
			310	184	52	65	9			

- Molecule 3 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: $C_6H_{13}NO_4S$).



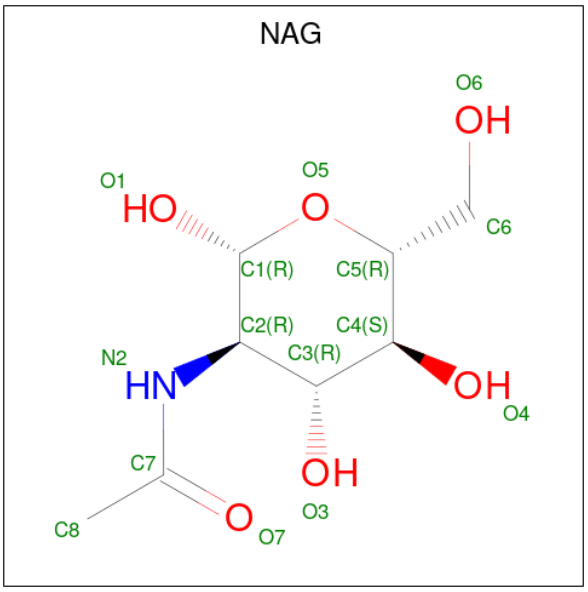
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
3	B	1	Total	C	N	O	S	0	0
			12	6	1	4	1		

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C N O 14 8 1 5	0	0
5	A	1	Total C N O 14 8 1 5	0	0
5	B	1	Total C N O 14 8 1 5	0	0
5	B	1	Total C N O 14 8 1 5	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	379	Total O 379 379	0	0
6	B	366	Total O 366 366	0	0
6	C	19	Total O 19 19	0	0
6	D	18	Total O 18 18	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	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	102.60Å 145.50Å 133.49Å 90.00° 90.02° 90.00°	Depositor
Resolution (Å)	50.01 – 1.85	Depositor
% Data completeness (in resolution range)	99.4 (50.01-1.85)	Depositor
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.86 (at 1.84Å)	Xtriage
Refinement program	REFMAC 5.8.0158	Depositor
R, R_{free}	0.163 , 0.187	Depositor
Wilson B-factor (Å^2)	20.5	Xtriage
Anisotropy	0.299	Xtriage
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.479 for -h,-k,l	Xtriage
Total number of atoms	11117	wwPDB-VP
Average B, all atoms (Å^2)	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.10% 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

4.1 Standard geometry

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

4.2 Too-close contacts

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

4.3 Torsion angles

4.3.1 Protein backbone

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

4.3.2 Protein sidechains

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

4.3.3 RNA

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

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

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

4.5 Carbohydrates

There are no monosaccharides in this entry.

4.6 Ligand geometry

16 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	$\#\|Z\| > 2$
4	GOL	B	707	-	5,5,5	0.25	0	5,5,5	0.95	0
4	GOL	A	702	-	5,5,5	0.52	0	5,5,5	1.07	0
4	GOL	B	703	-	5,5,5	0.42	0	5,5,5	0.69	0
4	GOL	B	702	-	5,5,5	0.24	0	5,5,5	1.01	1 (20%)
4	GOL	A	703	-	5,5,5	0.25	0	5,5,5	0.58	0
5	NAG	A	707	1	14,14,15	0.46	0	17,19,21	0.61	0
5	NAG	A	706	1	14,14,15	0.50	0	17,19,21	1.03	1 (5%)
5	NAG	B	708	1	14,14,15	0.40	0	17,19,21	0.90	1 (5%)
4	GOL	A	705	-	5,5,5	0.62	0	5,5,5	0.74	0
3	MES	B	701	-	12,12,12	1.63	1 (8%)	14,16,16	1.06	0
4	GOL	B	706	-	5,5,5	0.57	0	5,5,5	1.93	1 (20%)
5	NAG	B	709	1	14,14,15	0.49	0	17,19,21	0.62	0
4	GOL	B	705	-	5,5,5	0.60	0	5,5,5	0.75	0
4	GOL	B	704	-	5,5,5	0.63	0	5,5,5	0.39	0
4	GOL	A	704	-	5,5,5	0.59	0	5,5,5	0.75	0
3	MES	A	701	-	12,12,12	1.73	1 (8%)	14,16,16	0.98	1 (7%)

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
4	GOL	B	707	-	-	2/4/4/4	-
4	GOL	A	702	-	-	0/4/4/4	-
4	GOL	B	703	-	-	2/4/4/4	-
4	GOL	B	702	-	-	0/4/4/4	-
4	GOL	A	703	-	-	2/4/4/4	-
5	NAG	A	707	1	-	0/6/23/26	0/1/1/1
5	NAG	A	706	1	-	0/6/23/26	0/1/1/1
5	NAG	B	708	1	-	0/6/23/26	0/1/1/1
4	GOL	A	705	-	-	2/4/4/4	-
3	MES	B	701	-	-	0/6/14/14	0/1/1/1
4	GOL	B	706	-	-	3/4/4/4	-
5	NAG	B	709	1	-	0/6/23/26	0/1/1/1
4	GOL	B	705	-	-	4/4/4/4	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	B	704	-	-	2/4/4/4	-
4	GOL	A	704	-	-	4/4/4/4	-
3	MES	A	701	-	-	1/6/14/14	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	701	MES	C8-S	-5.67	1.69	1.77
3	B	701	MES	C8-S	-5.29	1.70	1.77

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	B	706	GOL	C3-C2-C1	-3.81	96.89	111.70
3	A	701	MES	C5-N4-C3	2.48	114.42	108.83
5	A	706	NAG	O5-C5-C6	2.20	110.65	107.20
4	B	702	GOL	C3-C2-C1	-2.16	103.31	111.70
5	B	708	NAG	O3-C3-C2	-2.02	105.29	109.47

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	704	GOL	C1-C2-C3-O3
4	B	705	GOL	C1-C2-C3-O3
4	B	706	GOL	C1-C2-C3-O3
4	B	707	GOL	O1-C1-C2-C3
4	B	705	GOL	O2-C2-C3-O3
4	B	707	GOL	O1-C1-C2-O2
4	A	703	GOL	C1-C2-C3-O3
4	A	704	GOL	O1-C1-C2-C3
4	A	705	GOL	C1-C2-C3-O3
4	B	703	GOL	O1-C1-C2-C3
4	B	704	GOL	O1-C1-C2-C3
4	B	705	GOL	O1-C1-C2-C3
4	A	704	GOL	O2-C2-C3-O3
4	B	706	GOL	O2-C2-C3-O3
4	A	703	GOL	O2-C2-C3-O3
4	A	705	GOL	O2-C2-C3-O3
4	B	705	GOL	O1-C1-C2-O2
4	A	704	GOL	O1-C1-C2-O2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
4	B	703	GOL	O1-C1-C2-O2
4	B	704	GOL	O1-C1-C2-O2
3	A	701	MES	C8-C7-N4-C3
4	B	706	GOL	O1-C1-C2-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

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.