



# wwPDB X-ray Structure Validation Summary Report ⓘ

Jul 31, 2023 – 12:55 AM EDT

PDB ID : 1OSM  
Title : OSMOPORIN (OMPK36) FROM KLEBSIELLA PNEUMONIAE  
Authors : Dutzler, R.; Schirmer, T.  
Deposited on : 1999-01-08  
Resolution : 3.20 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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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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 : 2.34  
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) : 2.34

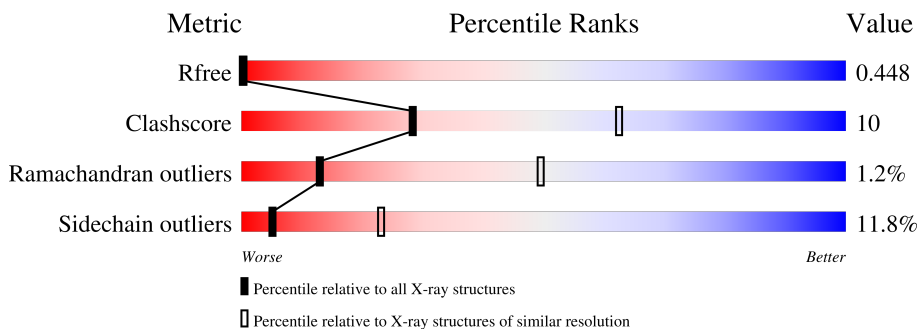
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.20 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	1133 (3.20-3.20)
Clashscore	141614	1253 (3.20-3.20)
Ramachandran outliers	138981	1234 (3.20-3.20)
Sidechain outliers	138945	1233 (3.20-3.20)

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  $\geq 3$ , 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  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	A	342	79% (Green), 17% (Yellow), 4% (Orange), 2% (Red), 0% (Grey)
1	B	342	79% (Green), 16% (Yellow), 5% (Orange), 0% (Red), 0% (Grey)
1	C	342	80% (Green), 16% (Yellow), 4% (Orange), 0% (Red), 0% (Grey)

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	D12	A	342	-	-	X	-

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<b>Mol</b>	<b>Type</b>	<b>Chain</b>	<b>Res</b>	<b>Chirality</b>	<b>Geometry</b>	<b>Clashes</b>	<b>Electron density</b>
2	D12	A	345	-	-	X	-
2	D12	A	348	-	-	X	-
2	D12	A	349	-	-	X	-

## 2 Entry composition [i](#)

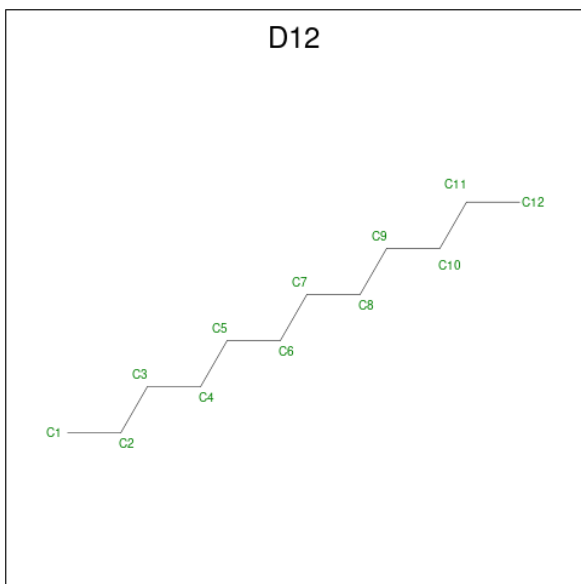
There are 2 unique types of molecules in this entry. The entry contains 8100 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 OMPK36.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	342	Total 2664	C 1670	N 442	O 550	S 2	0	0	0
1	B	342	Total 2664	C 1670	N 442	O 550	S 2	0	0	0
1	C	342	Total 2664	C 1670	N 442	O 550	S 2	0	0	0

- Molecule 2 is DODECANE (three-letter code: D12) (formula:  $C_{12}H_{26}$ ).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total 12	C 12	0	0
2	A	1	Total 12	C 12	0	0
2	A	1	Total 12	C 12	0	0

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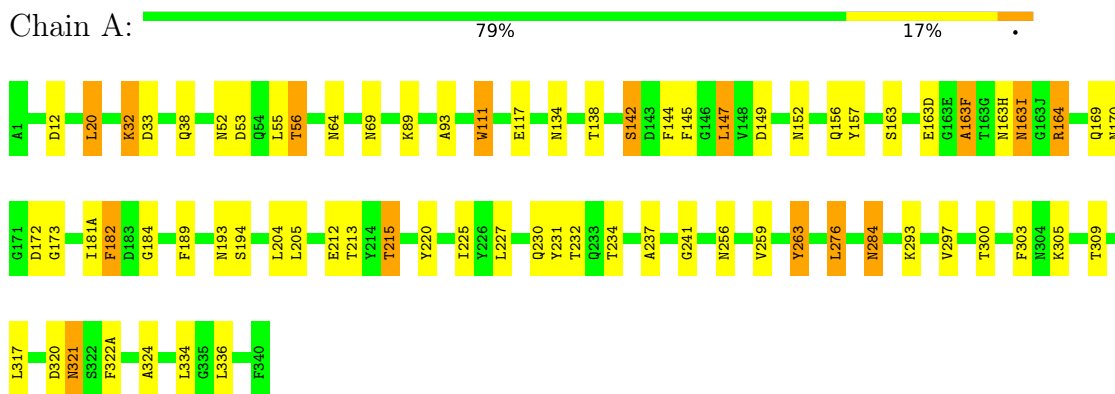
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>	<b>ZeroOcc</b>	<b>AltConf</b>
2	A	1	Total C 12 12	0	0
2	A	1	Total C 12 12	0	0
2	A	1	Total C 12 12	0	0
2	A	1	Total C 12 12	0	0
2	A	1	Total C 12 12	0	0
2	A	1	Total C 12 12	0	0

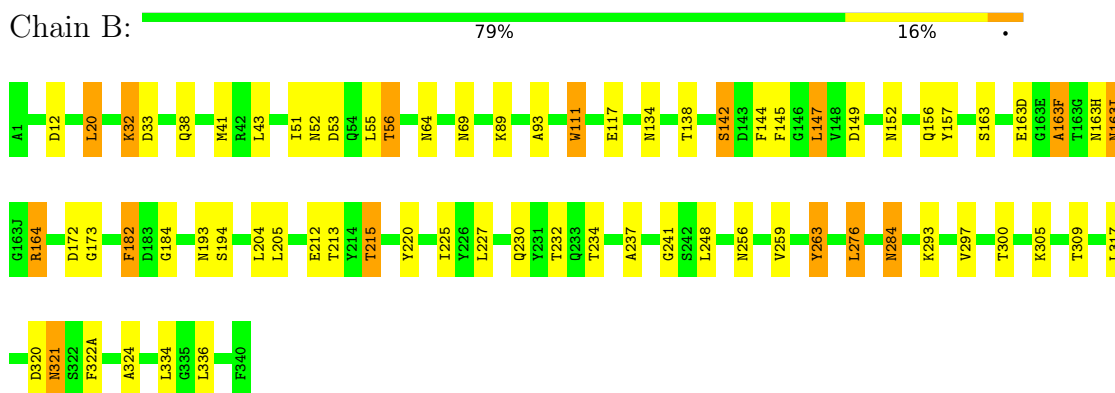
### 3 Residue-property plots [i](#)

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.

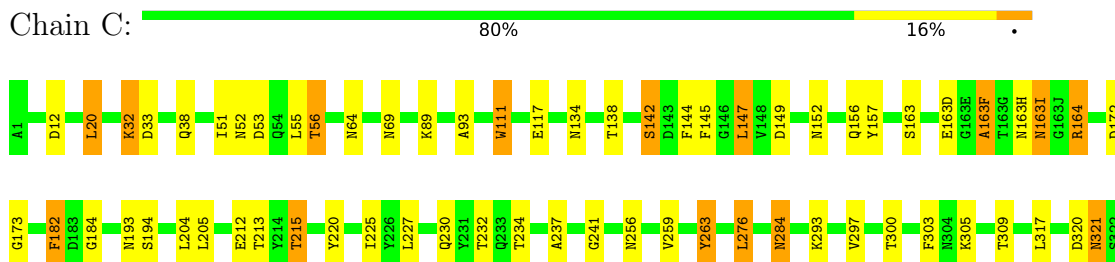
- Molecule 1: OMPK36

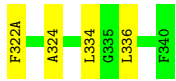


- Molecule 1: OMPK36



- Molecule 1: OMPK36





## 4 Data and refinement statistics i

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	191.80Å 76.80Å 223.40Å 90.00° 113.30° 90.00°	Depositor
Resolution (Å)	15.00 – 3.20 14.99 – 3.20	Depositor EDS
% Data completeness (in resolution range)	96.1 (15.00-3.20) 96.1 (14.99-3.20)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.50 (at 3.19Å)	Xtrriage
Refinement program	X-PLOR 3.8	Depositor
R, $R_{free}$	0.208 , 0.223 0.442 , 0.448	Depositor DCC
$R_{free}$ test set	4740 reflections (10.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	66.3	Xtrriage
Anisotropy	0.029	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 68.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.000 for h,-k,-h-l	Xtrriage
$F_o, F_c$ correlation	0.58	EDS
Total number of atoms	8100	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	53.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.76% 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: D12

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	0.71	2/2720 (0.1%)	0.80	3/3682 (0.1%)
1	B	0.71	2/2720 (0.1%)	0.80	3/3682 (0.1%)
1	C	0.71	2/2720 (0.1%)	0.80	3/3682 (0.1%)
All	All	0.71	6/8160 (0.1%)	0.80	9/11046 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	1
1	C	0	1
All	All	0	3

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	111	TRP	CB-CG	6.16	1.61	1.50
1	A	111	TRP	CB-CG	6.13	1.61	1.50
1	B	111	TRP	CB-CG	6.13	1.61	1.50
1	B	163(D)	GLU	CG-CD	5.31	1.59	1.51
1	C	163(D)	GLU	CG-CD	5.31	1.59	1.51

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	142	SER	N-CA-C	5.62	126.16	111.00
1	B	142	SER	N-CA-C	5.61	126.14	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	C	142	SER	N-CA-C	5.60	126.11	111.00
1	B	111	TRP	CA-CB-CG	5.35	123.86	113.70
1	A	111	TRP	CA-CB-CG	5.34	123.84	113.70

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	263	TYR	Sidechain
1	B	263	TYR	Sidechain
1	C	263	TYR	Sidechain

## 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	2664	0	2452	45	0
1	B	2664	0	2452	43	0
1	C	2664	0	2452	42	0
2	A	108	0	234	33	0
All	All	8100	0	7590	153	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 10.

The worst 5 of 153 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance ( $\text{\AA}$ )	Clash overlap ( $\text{\AA}$ )
1:A:189:PHE:HB3	2:A:349:D12:H13	1.45	0.98
2:A:345:D12:H102	2:A:348:D12:H112	1.48	0.96
2:A:348:D12:H62	2:A:349:D12:H41	1.55	0.88
2:A:345:D12:H123	2:A:348:D12:C11	2.04	0.86
2:A:348:D12:H71	2:A:349:D12:H61	1.60	0.83

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	340/342 (99%)	313 (92%)	23 (7%)	4 (1%)	13	49
1	B	340/342 (99%)	313 (92%)	23 (7%)	4 (1%)	13	49
1	C	340/342 (99%)	313 (92%)	23 (7%)	4 (1%)	13	49
All	All	1020/1026 (99%)	939 (92%)	69 (7%)	12 (1%)	13	49

5 of 12 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	163(F)	ALA
1	B	163(F)	ALA
1	C	163(F)	ALA
1	A	147	LEU
1	B	147	LEU

### 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	272/272 (100%)	240 (88%)	32 (12%)	5	23
1	B	272/272 (100%)	240 (88%)	32 (12%)	5	23
1	C	272/272 (100%)	240 (88%)	32 (12%)	5	23
All	All	816/816 (100%)	720 (88%)	96 (12%)	5	23

5 of 96 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	300	THR
1	C	111	TRP
1	B	309	THR
1	C	20	LEU
1	C	149	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 34 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	252	ASN
1	C	277	GLN
1	C	316	ASN
1	B	60	GLN
1	B	9	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](#)

9 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
2	D12	A	345	-	11,11,11	0.36	0	10,10,10	0.63	0
2	D12	A	342	-	11,11,11	0.39	0	10,10,10	0.60	0
2	D12	A	349	-	11,11,11	0.30	0	10,10,10	0.74	0
2	D12	A	344	-	11,11,11	0.46	0	10,10,10	0.58	0
2	D12	A	346	-	11,11,11	0.38	0	10,10,10	0.63	0
2	D12	A	347	-	11,11,11	0.42	0	10,10,10	0.54	0
2	D12	A	348	-	11,11,11	0.29	0	10,10,10	0.71	0
2	D12	A	341	-	11,11,11	0.33	0	10,10,10	0.66	0
2	D12	A	343	-	11,11,11	0.33	0	10,10,10	0.67	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
2	D12	A	345	-	-	0/9/9/9	-
2	D12	A	342	-	-	0/9/9/9	-
2	D12	A	349	-	-	0/9/9/9	-
2	D12	A	344	-	-	2/9/9/9	-
2	D12	A	346	-	-	1/9/9/9	-
2	D12	A	347	-	-	0/9/9/9	-
2	D12	A	348	-	-	1/9/9/9	-
2	D12	A	341	-	-	1/9/9/9	-
2	D12	A	343	-	-	2/9/9/9	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 7 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	341	D12	C6-C7-C8-C9
2	A	344	D12	C5-C6-C7-C8
2	A	348	D12	C7-C8-C9-C10
2	A	346	D12	C5-C6-C7-C8
2	A	344	D12	C2-C3-C4-C5

There are no ring outliers.

7 monomers are involved in 33 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	345	D12	16	0
2	A	342	D12	8	0
2	A	349	D12	12	0
2	A	346	D12	2	0
2	A	347	D12	5	0
2	A	348	D12	18	0
2	A	341	D12	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

### 6.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.