WORLDWIDE PDB
PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Nov 14, 2023 – 10:15 PM JST

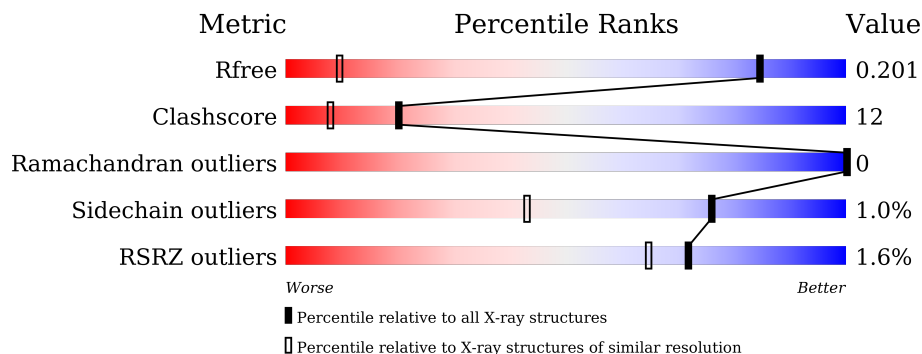|		
PDB ID	:	6AGN
Title	:	Structure of HEWL co-crystallised with Cinnamaldehyde
Authors	:	Seyedarabi, A.; Seraj, Z.
Deposited on	:	2018-08-13
Resolution	:	1.08 Å(reported)

1   Overall quality at a glance ⓘ

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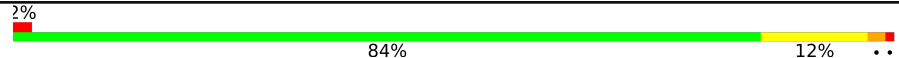*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.08 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	Percentile Ranks	Value
Rfree		0.201
Clashscore		12
Ramachandran outliers		0
Sidechain outliers		1.0%
RSRZ outliers		1.6%

Worse   *Better*

▌Percentile relative to all X-ray structures

▯Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1386 (1.12-1.04)
Clashscore	141614	1021 (1.10-1.06)
Ramachandran outliers	138981	1381 (1.12-1.04)
Sidechain outliers	138945	1379 (1.12-1.04)
RSRZ outliers	127900	1359 (1.12-1.04)

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% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	129	2% ▬ 84% ▬ 12% ▬ ••

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
5	9Y3	A	207	-	X	-	-
6	9Y6	A	208[B]	-	X	-	-

2 Entry composition ⓘ

There are 7 unique types of molecules in this entry. The entry contains 1292 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 Lysozyme C.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	129	Total 1030	C 631	N 203	O 186	S 10	0	8	0

- Molecule 2 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).
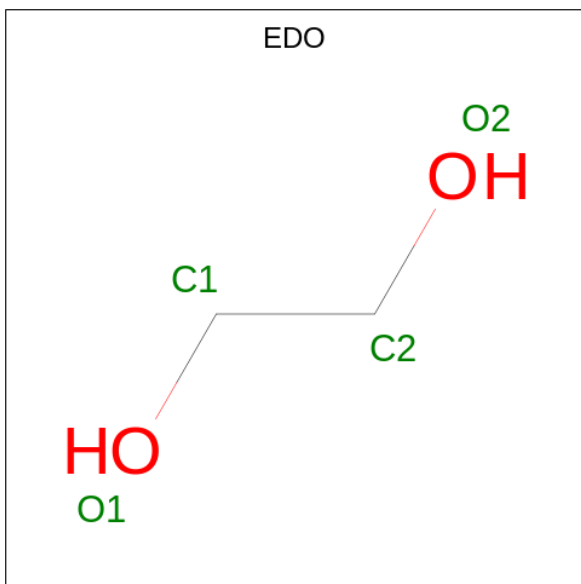
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total 4	C 2	O 2	0	0
2	A	1	Total 4	C 2	O 2	0	0

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

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

- Molecule 4 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total Na 1 1		0	0

- Molecule 5 is (2Z)-3-phenylprop-2-enal (three-letter code: 9Y3) (formula: C_9H_8O).
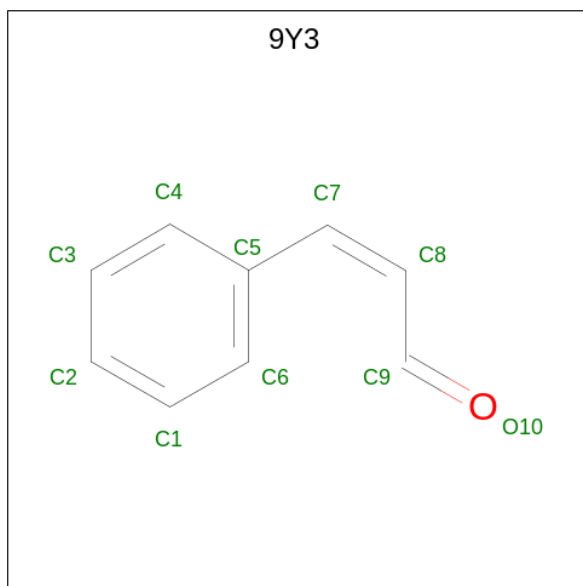
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total C O 10 9 1			0	0

- Molecule 6 is (2E)-3-phenylprop-2-enal (three-letter code: 9Y6) (formula: C_9H_8O).
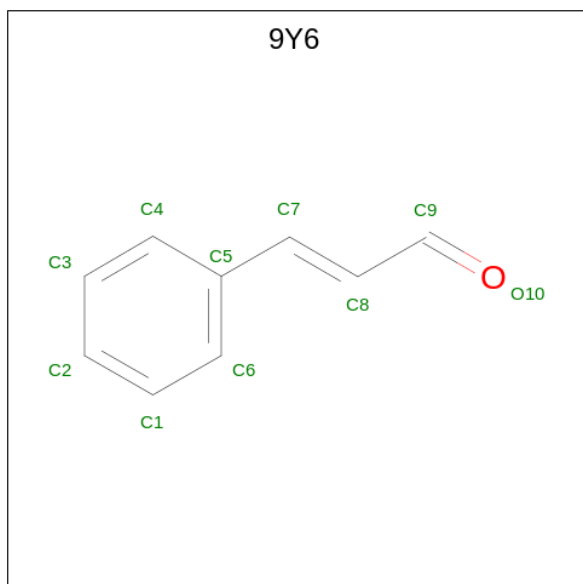
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total 12	C 10	O 2	0	1

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	228	Total 228	O 228	0	0

3 Residue-property plots ⓘ

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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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: Lysozyme C

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α, β, γ	78.75Å 78.75Å 37.10Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	37.10 – 1.08 35.22 – 1.08	Depositor EDS
% Data completeness (in resolution range)	99.7 (37.10-1.08) 99.7 (35.22-1.08)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.89 (at 1.08Å)	Xtriage
Refinement program	REFMAC 5.8.0135	Depositor
R, R_{free}	0.165 , 0.194 0.174 , 0.201	Depositor DCC
R_{free} test set	2599 reflections (5.12%)	wwPDB-VP
Wilson B-factor (Å²)	10.6	Xtriage
Anisotropy	0.010	Xtriage
Bulk solvent k_{sol}(e/Å³), B_{sol}(Å²)	0.34 , 38.2	EDS
L-test for twinning[2]	$< \lvert L \rvert > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	1292	wwPDB-VP
Average B, all atoms (Å²)	15.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.71% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< \lvert L \rvert >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: 9Y3, NA, EDO, CL, 9Y6

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	1.61	10/1090 (0.9%)	1.48	17/1469 (1.2%)

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	68[A]	ARG	CD-NE	-9.85	1.29	1.46
1	A	68[B]	ARG	CD-NE	-9.85	1.29	1.46
1	A	5	ARG	N-CA	-8.02	1.30	1.46
1	A	45[A]	ARG	CG-CD	-7.34	1.33	1.51
1	A	45[B]	ARG	CG-CD	-7.34	1.33	1.51
1	A	110	ALA	CA-CB	-7.16	1.37	1.52
1	A	100	SER	CB-OG	-6.01	1.34	1.42
1	A	70	PRO	CA-C	-5.48	1.41	1.52
1	A	101	ASP	CB-CG	-5.25	1.40	1.51
1	A	5	ARG	CG-CD	5.04	1.64	1.51

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	48	ASP	CB-CG-OD1	11.39	128.55	118.30
1	A	5	ARG	NE-CZ-NH1	8.43	124.52	120.30
1	A	14[A]	ARG	NE-CZ-NH1	-7.77	116.41	120.30
1	A	14[B]	ARG	NE-CZ-NH1	-7.77	116.41	120.30
1	A	45[A]	ARG	NE-CZ-NH1	-7.11	116.74	120.30
1	A	45[B]	ARG	NE-CZ-NH1	-7.11	116.74	120.30
1	A	48	ASP	CB-CG-OD2	-7.04	111.96	118.30
1	A	14[A]	ARG	NE-CZ-NH2	6.99	123.80	120.30
1	A	14[B]	ARG	NE-CZ-NH2	6.99	123.80	120.30
1	A	52	ASP	CB-CG-OD1	6.99	124.59	118.30
1	A	101	ASP	CB-CG-OD1	6.17	123.86	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	109[A]	VAL	CA-CB-CG1	-6.12	101.72	110.90
1	A	109[B]	VAL	CA-CB-CG1	-6.12	101.72	110.90
1	A	73	ARG	NE-CZ-NH1	-5.99	117.30	120.30
1	A	5	ARG	CG-CD-NE	5.75	123.88	111.80
1	A	45[A]	ARG	NE-CZ-NH2	5.56	123.08	120.30
1	A	45[B]	ARG	NE-CZ-NH2	5.56	123.08	120.30

There are no chirality outliers.

There are no planarity outliers.

CLOSE-CONTACTS INFOmissingINFO

5.2 Torsion angles ⓘ

5.2.1 Protein backbone ⓘ

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	134/129 (104%)	133 (99%)	1 (1%)	0	100	100

There are no Ramachandran outliers to report.

5.2.2 Protein sidechains ⓘ

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	113/105 (108%)	111 (98%)	2 (2%)	59	20

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	68[A]	ARG
1	A	68[B]	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	46	ASN
1	A	93	ASN

5.2.3 RNA ⓘ

There are no RNA molecules in this entry.

5.3 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.4 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.5 Ligand geometry ⓘ

Of 9 ligands modelled in this entry, 4 are monoatomic - leaving 5 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	#$|Z| > 2$
5	9Y3	A	207	-	10,10,10	2.41	5 (50%)	11,11,11	3.44	6 (54%)
2	EDO	A	202	-	3,3,3	0.37	0	2,2,2	0.21	0
6	9Y6	A	208[A]	-	10,10,10	2.69	4 (40%)	11,11,11	2.55	4 (36%)
6	9Y6	A	208[B]	-	10,10,10	2.83	5 (50%)	11,11,11	2.75	5 (45%)
2	EDO	A	201	-	3,3,3	0.70	0	2,2,2	0.41	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
5	9Y3	A	207	-	-	4/4/4/4	0/1/1/1
2	EDO	A	202	-	-	1/1/1/1	-
6	9Y6	A	208[A]	-	-	2/4/4/4	0/1/1/1
6	9Y6	A	208[B]	-	-	2/4/4/4	0/1/1/1
2	EDO	A	201	-	-	0/1/1/1	-

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	208[A]	9Y6	C1-C6	5.74	1.51	1.38
6	A	208[B]	9Y6	C1-C6	5.74	1.51	1.38
6	A	208[A]	9Y6	C5-C7	3.89	1.58	1.47
6	A	208[B]	9Y6	C5-C7	3.89	1.58	1.47
5	A	207	9Y3	C4-C5	-3.58	1.32	1.39
5	A	207	9Y3	C3-C4	-3.51	1.31	1.38
6	A	208[A]	9Y6	C8-C7	-3.04	1.29	1.34
6	A	208[B]	9Y6	C8-C7	-3.04	1.29	1.34
5	A	207	9Y3	C6-C5	-3.02	1.33	1.39
5	A	207	9Y3	C3-C2	-2.84	1.30	1.38
6	A	208[A]	9Y6	C6-C5	2.62	1.44	1.39
6	A	208[B]	9Y6	C6-C5	2.62	1.44	1.39
5	A	207	9Y3	O10-C9	-2.31	1.14	1.22
6	A	208[B]	9Y6	O10-C9	2.26	1.29	1.22

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	207	9Y3	C1-C6-C5	-6.37	112.94	120.65
5	A	207	9Y3	C5-C7-C8	-6.30	117.23	127.21
6	A	208[A]	9Y6	C2-C1-C6	-5.97	111.10	120.19
6	A	208[B]	9Y6	C2-C1-C6	-5.97	111.10	120.19
5	A	207	9Y3	C2-C1-C6	4.35	126.81	120.19
6	A	208[A]	9Y6	C1-C6-C5	3.83	125.28	120.65
6	A	208[B]	9Y6	C1-C6-C5	3.83	125.28	120.65
5	A	207	9Y3	O10-C9-C8	3.52	137.68	125.67
6	A	208[B]	9Y6	C7-C8-C9	3.32	132.01	121.28
6	A	208[A]	9Y6	C5-C7-C8	-2.78	122.81	127.21
6	A	208[B]	9Y6	C5-C7-C8	-2.78	122.81	127.21

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	207	9Y3	C3-C4-C5	2.36	123.51	120.65
6	A	208[A]	9Y6	C2-C3-C4	2.21	123.55	120.19
6	A	208[B]	9Y6	C2-C3-C4	2.21	123.55	120.19
5	A	207	9Y3	C4-C5-C7	-2.05	113.91	121.29

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	207	9Y3	C7-C8-C9-O10
6	A	208[A]	9Y6	C7-C8-C9-O10
6	A	208[B]	9Y6	C7-C8-C9-O10
5	A	207	9Y3	C6-C5-C7-C8
5	A	207	9Y3	C4-C5-C7-C8
5	A	207	9Y3	C5-C7-C8-C9
2	A	202	EDO	O1-C1-C2-O2
6	A	208[A]	9Y6	C6-C5-C7-C8
6	A	208[B]	9Y6	C6-C5-C7-C8

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	207	9Y3	2	0
6	A	208[A]	9Y6	0	2
6	A	208[B]	9Y6	0	2

5.6 Other polymers (i)

There are no such residues in this entry.

5.7 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	129/129 (100%)	0.08	2 (1%)	72	65	7, 11, 19, 32	0

All (2) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	129[A]	LEU	2.9
1	A	47	THR	2.6

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	9Y6	A	208[A]	10/10	0.69	0.33	16,24,28,32	8
6	9Y6	A	208[B]	10/10	0.69	0.33	16,24,28,31	8
2	EDO	A	202	4/4	0.80	0.13	49,51,51,52	0
5	9Y3	A	207	10/10	0.80	0.31	33,47,53,57	0
2	EDO	A	201	4/4	0.92	0.10	11,13,15,19	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	CL	A	204	1/1	0.96	0.07	15,15,15,15	0
3	CL	A	203	1/1	0.98	0.06	12,12,12,12	0
4	NA	A	206	1/1	0.99	0.05	9,9,9,9	0
3	CL	A	205	1/1	0.99	0.04	11,11,11,11	0

6.5 Other polymers (i)

There are no such residues in this entry.