



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 09:34 PM UTC

PDB ID : 5DWI / pdb_00005dwi
Title : Crystal Structure of the ER-alpha Ligand-binding Domain in Complex with a Resorciny 2-Chloro-substituted Diaryl-imine analog 4-[(E)-[(2-chlorophenyl)imino](4-hydroxyphenyl)methyl]benzene-1,3-diol
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Deposited on : 2015-09-22
Resolution : 2.43 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	:	4-5-2 with Phenix2.0
Mogul	:	NOT EXECUTED
Xtriage (Phenix)	:	2.0
EDS	:	NOT EXECUTED
Buster-report	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

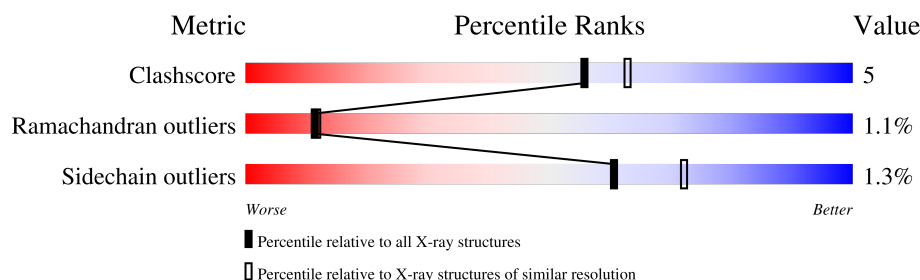
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.43 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	190562	2400 (2.46-2.42)
Ramachandran outliers	187476	2379 (2.46-2.42)
Sidechain outliers	187428	2379 (2.46-2.42)

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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	257	
1	B	257	
2	C	14	
2	D	14	

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 3790 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 Estrogen receptor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	232	Total	C	N	O	S	0	1	0
			1793	1146	307	321	19			
1	B	231	Total	C	N	O	S	0	0	0
			1773	1132	302	320	19			

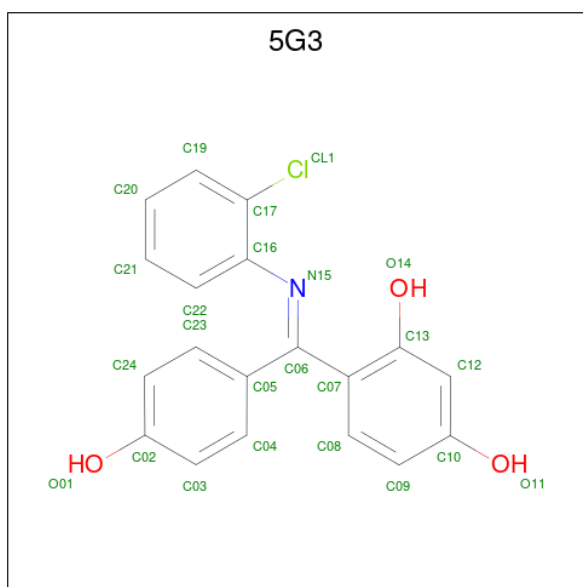
There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	537	SER	TYR	engineered mutation	UNP P03372
B	537	SER	TYR	engineered mutation	UNP P03372

- Molecule 2 is a protein called Nuclear receptor coactivator 2.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	10	Total	C	N	O	0	0	0
			71	47	13	11			
2	D	9	Total	C	N	O	0	0	0
			64	42	10	12			

- Molecule 3 is 4-[(E)-[(2-chlorophenyl)imino](4-hydroxyphenyl)methyl]benzene-1,3-diol (CCD ID: 5G3) (formula: C₁₉H₁₄ClNO₃).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	Cl	N	O	0	0
			24	19	1	1	3		
3	B	1	Total	C	Cl	N	O	0	0
			24	19	1	1	3		

- Molecule 4 is water.


Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	23	Total	O	0	0
			23	23		
4	B	17	Total	O	0	0
			17	17		
4	C	1	Total	O	0	0
			1	1		

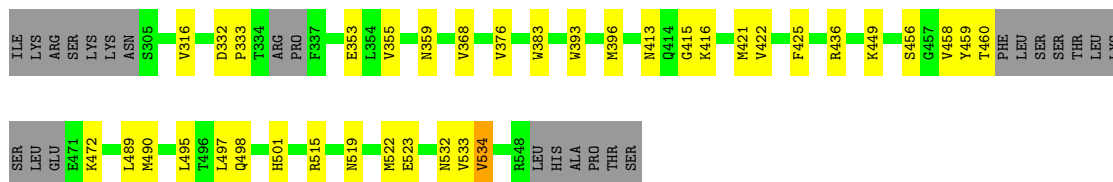
3 Residue-property plots [i](#)

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.


Note EDS was not executed.

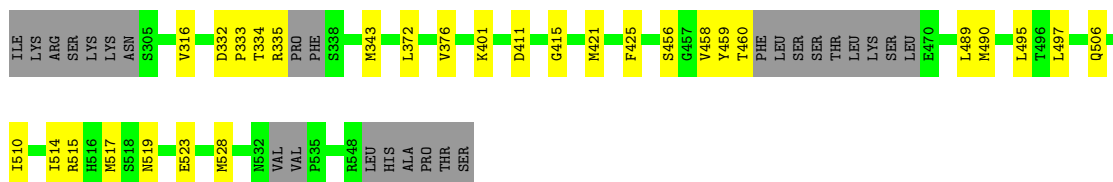
- Molecule 1: Estrogen receptor

Chain A: 



- Molecule 1: Estrogen receptor

Chain B: 



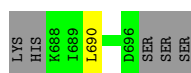
- Molecule 2: Nuclear receptor coactivator 2

Chain C: 



- Molecule 2: Nuclear receptor coactivator 2

Chain D: 



4 Data and refinement statistics

EDS was not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	54.84Å 82.69Å 58.39Å 90.00° 110.42° 90.00°	Depositor
Resolution (Å)	46.40 – 2.43	Depositor
% Data completeness (in resolution range)	90.7 (46.40-2.43)	Depositor
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.85 (at 2.42Å)	Xtriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.189 , 0.231	Depositor
Wilson B-factor (Å ²)	47.5	Xtriage
Anisotropy	0.498	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3790	wwPDB-VP
Average B, all atoms (Å ²)	70.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.80% 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.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 5G3

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	0.30	0/1825	0.71	2/2473 (0.1%)
1	B	0.29	0/1802	0.70	2/2438 (0.1%)
2	C	0.26	0/71	0.72	0/96
2	D	0.22	0/63	0.66	0/85
All	All	0.29	0/3761	0.71	4/5092 (0.1%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	332	ASP	CA-C-N	8.87	130.92	119.84
1	A	332	ASP	C-N-CA	8.87	130.92	119.84
1	B	332	ASP	CA-C-N	7.94	129.77	119.84
1	B	332	ASP	C-N-CA	7.94	129.77	119.84

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	1793	0	1783	21	0
1	B	1773	0	1769	15	0
2	C	71	0	66	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	64	0	61	1	0
3	A	24	0	0	1	0
3	B	24	0	0	0	0
4	A	23	0	0	4	0
4	B	17	0	0	0	0
4	C	1	0	0	0	0
All	All	3790	0	3679	35	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 5.

All (35) 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:519:ASN:HD22	1:B:519:ASN:HD22	1.15	0.93
1:A:523:GLU:OE2	4:A:1001:HOH:O	2.06	0.74
1:A:456:SER:OG	4:A:1002:HOH:O	2.11	0.69
1:A:376:VAL:HG13	2:C:690:LEU:HD23	1.77	0.65
1:B:376:VAL:HG13	2:D:690:LEU:HD23	1.79	0.64
1:A:355:VAL:O	1:A:359:ASN:ND2	2.32	0.62
1:A:396:MET:O	1:A:436:ARG:NH1	2.33	0.61
1:A:449:LYS:NZ	4:A:1004:HOH:O	2.35	0.57
1:B:343:MET:HG3	1:B:528:MET:HE1	1.88	0.56
1:A:498:GLN:HA	1:A:501[B]:HIS:CE1	2.42	0.55
1:A:316:VAL:HG21	1:A:489:LEU:HD21	1.89	0.54
1:A:413:ASN:HA	1:A:416:LYS:HE2	1.89	0.54
1:A:421:MET:HE3	1:A:425:PHE:HE1	1.73	0.53
1:B:401:LYS:HD3	1:B:411:ASP:HB3	1.90	0.53
1:B:456:SER:HA	1:B:515:ARG:NH2	2.25	0.52
1:A:456:SER:HA	1:A:515:ARG:NH2	2.26	0.51
1:B:421:MET:HE3	1:B:425:PHE:HE1	1.76	0.50
1:A:383:TRP:NE1	1:A:522:MET:HE1	2.28	0.48
1:B:490:MET:HB3	1:B:495:LEU:HD12	1.96	0.48
1:A:393:TRP:O	1:A:396:MET:HB2	2.14	0.47
1:B:334:THR:HG22	1:B:335:ARG:H	1.79	0.47
4:A:1001:HOH:O	1:B:523:GLU:OE2	2.20	0.46
2:C:688:LYS:H	2:C:691:HIS:CD2	2.34	0.45
1:A:353:GLU:OE1	3:A:900:5G3:O11	2.34	0.45
1:A:497:LEU:HD22	1:B:497:LEU:HD21	1.99	0.44
1:A:458:VAL:HG13	1:A:459:TYR:CD1	2.53	0.44
1:A:490:MET:HB3	1:A:495:LEU:HD12	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:532:ASN:C	1:A:534:VAL:H	2.25	0.44
1:B:514:ILE:HA	1:B:517:MET:HE2	1.99	0.43
1:B:458:VAL:HG13	1:B:459:TYR:CD1	2.53	0.43
1:A:415:GLY:O	1:A:421:MET:HB3	2.18	0.43
1:B:506:GLN:O	1:B:510:ILE:HG12	2.20	0.42
1:A:519:ASN:O	1:A:523:GLU:HG3	2.20	0.41
1:B:415:GLY:O	1:B:421:MET:HB3	2.20	0.41
1:B:316:VAL:HG21	1:B:489:LEU:HD21	2.03	0.41

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	227/257 (88%)	216 (95%)	7 (3%)	4 (2%)	6	5
1	B	223/257 (87%)	215 (96%)	7 (3%)	1 (0%)	30	36
2	C	8/14 (57%)	8 (100%)	0	0	100	100
2	D	7/14 (50%)	7 (100%)	0	0	100	100
All	All	465/542 (86%)	446 (96%)	14 (3%)	5 (1%)	11	12

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	333	PRO
1	A	534	VAL
1	B	333	PRO
1	A	472	LYS
1	A	533	VAL

5.3.2 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	194/232 (84%)	191 (98%)	3 (2%)	57	69
1	B	192/232 (83%)	190 (99%)	2 (1%)	68	77
2	C	6/14 (43%)	6 (100%)	0	100	100
2	D	6/14 (43%)	6 (100%)	0	100	100
All	All	398/492 (81%)	393 (99%)	5 (1%)	61	72

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	368	VAL
1	A	422	VAL
1	A	460	THR
1	B	372	LEU
1	B	460	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	356	HIS
1	A	516	HIS
1	B	474	HIS
1	B	501	HIS
1	B	516	HIS
1	B	519	ASN
1	B	524	HIS
2	C	691	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

Mogul was not executed - this section is therefore empty.

5.5 Carbohydrates [i](#)

Mogul was not executed - this section is therefore empty.

5.6 Ligand geometry [i](#)

Mogul was not executed - this section is therefore empty.

5.7 Other polymers [i](#)

Mogul was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

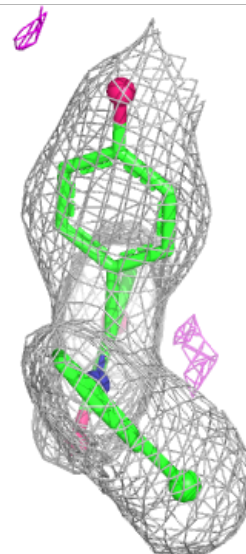
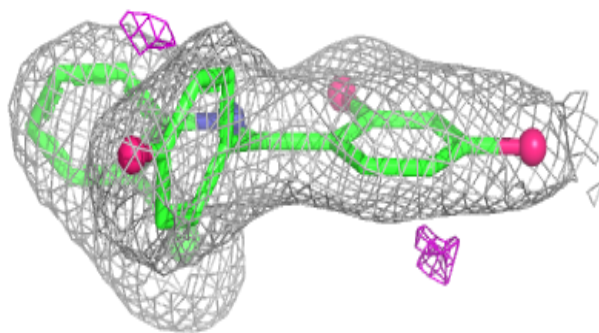
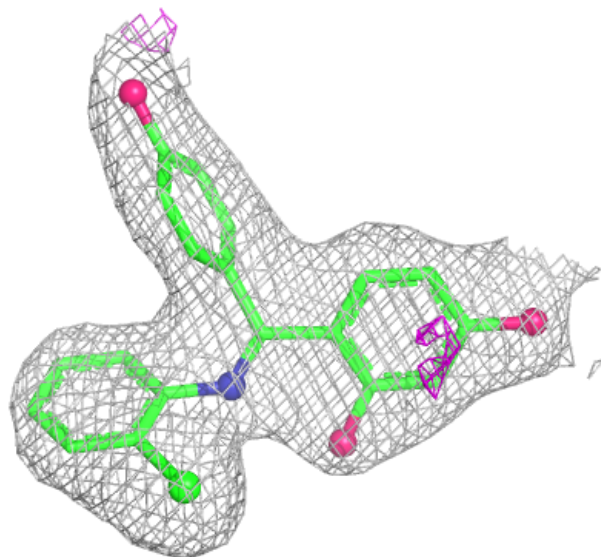
6.4 Ligands

EDS was not executed - this section is therefore empty.

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

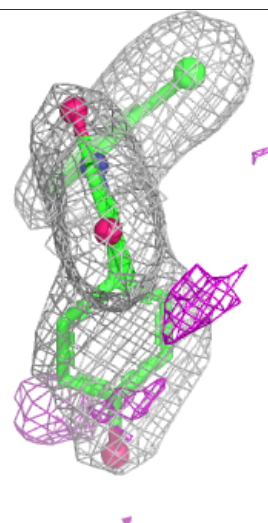
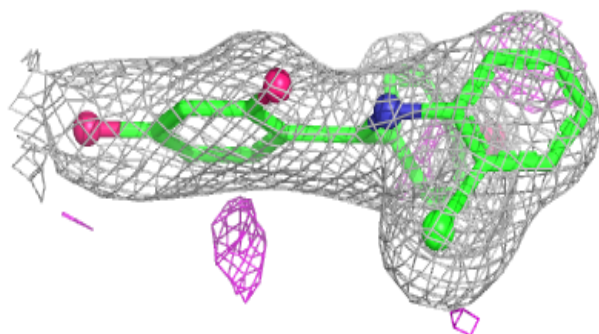
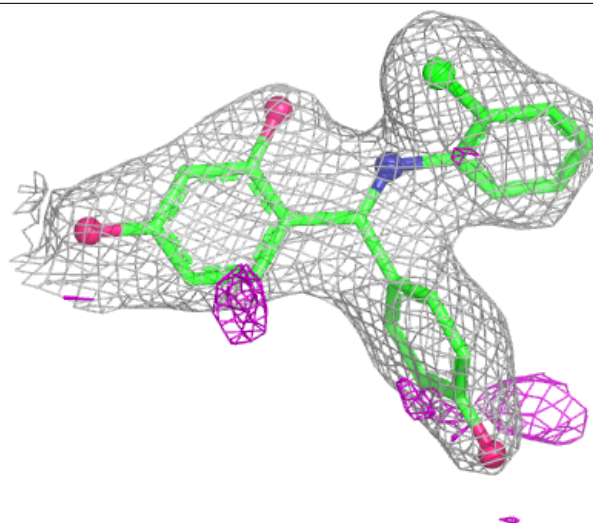
Electron density around 5G3 A 900:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around 5G3 B 901:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.