



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 17, 2017 – 09:00 AM EDT

PDB ID : 3DT3
Title : Human Estrogen receptor alpha LBD with GW368
Authors : Williams, S.P.; Miller, A.B.
Deposited on : unknown
Resolution : 2.40 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

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20030345
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20030345

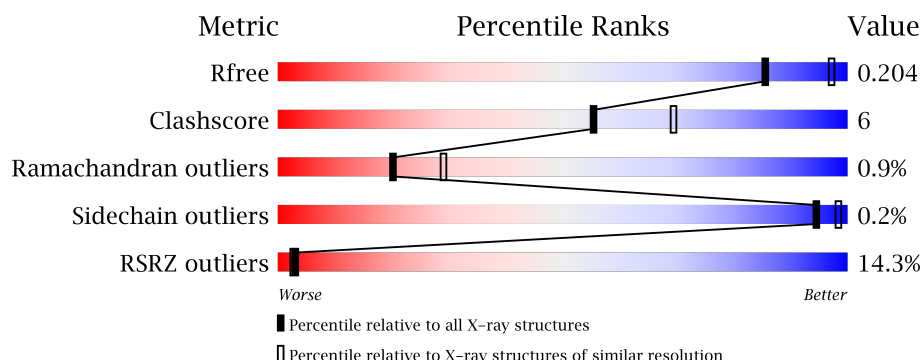
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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}	100719	3166 (2.40-2.40)
Clashscore	112137	3674 (2.40-2.40)
Ramachandran outliers	110173	3616 (2.40-2.40)
Sidechain outliers	110143	3617 (2.40-2.40)
RSRZ outliers	101464	3195 (2.40-2.40)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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 $\leq 5\%$. 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	255	<div> <div>12%</div> <div> <div></div> <div>84%</div> <div>9%</div> <div>7%</div> </div> </div>
1	B	255	<div> <div>15%</div> <div> <div></div> <div>82%</div> <div>13%</div> <div>6%</div> </div> </div>

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 3863 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.

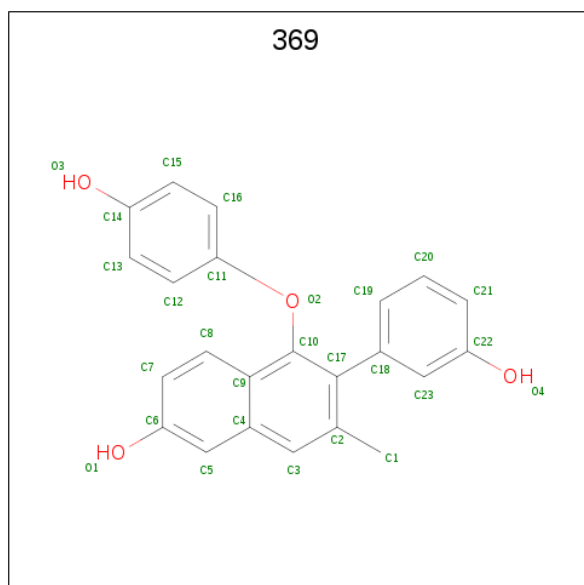
- Molecule 1 is a protein called Estrogen receptor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	236	Total	C	N	O	S	0	0	0
			1845	1178	318	331	18			
1	B	240	Total	C	N	O	S	0	0	0
			1864	1195	316	334	19			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	297	GLY	-	EXPRESSION TAG	UNP P03372
A	298	SER	-	EXPRESSION TAG	UNP P03372
B	297	GLY	-	EXPRESSION TAG	UNP P03372
B	298	SER	-	EXPRESSION TAG	UNP P03372

- Molecule 2 is 5-(4-hydroxyphenoxy)-6-(3-hydroxyphenyl)-7-methylnaphthalen-2-ol (three-letter code: 369) (formula: C₂₃H₁₈O₄).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			27	23	4		
2	B	1	Total	C	O	0	0
			27	23	4		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	54	Total	O	0	0
			54	54		
3	B	46	Total	O	0	0
			46	46		

- Molecule 1: Estrogen receptor



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	103.31Å 58.00Å 88.33Å 90.00° 105.15° 90.00°	Depositor
Resolution (Å)	28.42 – 2.40 28.42 – 2.40	Depositor EDS
% Data completeness (in resolution range)	100.0 (28.42-2.40) 98.7 (28.42-2.40)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.87 (at 2.39Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.203 , 0.262 0.208 , 0.204	Depositor DCC
R_{free} test set	1473 reflections (8.09%)	DCC
Wilson B-factor (Å ²)	43.1	Xtriage
Anisotropy	0.147	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 45.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	3863	wwPDB-VP
Average B, all atoms (Å ²)	44.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.54% 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: 369

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	0.35	0/1875	0.51	0/2533
1	B	0.37	0/1898	0.50	0/2572
All	All	0.36	0/3773	0.51	0/5105

There are no bond length outliers.

There are no bond angle outliers.

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	1845	0	1857	18	0
1	B	1864	0	1853	30	0
2	A	27	0	18	1	0
2	B	27	0	18	0	0
3	A	54	0	0	0	0
3	B	46	0	0	2	0
All	All	3863	0	3746	44	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 6.

All (44) 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	1.03	0.92
1:A:519:ASN:ND2	1:B:519:ASN:HD22	1.86	0.70
1:B:306:LEU:CD2	1:B:308:LEU:HD13	2.26	0.66
1:B:331:TYR:CB	3:B:51:HOH:O	2.45	0.64
1:B:358:ILE:HG21	1:B:544:LEU:CD2	2.27	0.64
1:B:358:ILE:HG21	1:B:544:LEU:HD21	1.81	0.61
1:A:519:ASN:HD22	1:B:519:ASN:ND2	1.87	0.61
1:B:343:MET:HG2	1:B:528:MET:HE1	1.85	0.58
1:A:455:ASN:O	1:A:458:VAL:HG22	2.03	0.58
1:B:403:LEU:HD13	1:B:409:LEU:HD13	1.89	0.55
1:B:418:VAL:HG21	1:B:421:MET:HE1	1.89	0.55
1:A:358:ILE:CD1	1:A:379:LEU:HD13	2.38	0.54
1:B:513:HIS:HB3	3:B:65:HOH:O	2.06	0.54
1:B:455:ASN:O	1:B:458:VAL:HG12	2.08	0.53
1:B:343:MET:CE	1:B:421:MET:CE	2.88	0.51
1:A:376:VAL:HG22	1:A:544:LEU:HD12	1.94	0.50
1:B:514:ILE:HA	1:B:517:MET:HE2	1.94	0.49
1:B:358:ILE:CG2	1:B:544:LEU:HD21	2.42	0.49
1:B:343:MET:HE2	1:B:421:MET:CE	2.43	0.49
1:A:415:GLY:HA2	1:A:421:MET:HE3	1.95	0.48
1:A:458:VAL:CG1	1:A:475:ILE:HG21	2.43	0.48
1:B:316:VAL:HG23	1:B:485:THR:CG2	2.44	0.48
1:B:306:LEU:HD22	1:B:308:LEU:HD13	1.94	0.48
1:A:343:MET:HG2	1:A:418:VAL:HG21	1.96	0.47
2:A:1:369:H1	2:A:1:369:C23	2.44	0.46
1:B:362:LYS:CD	1:B:548:ARG:CZ	2.94	0.46
1:A:458:VAL:HG11	1:A:475:ILE:HG21	1.98	0.46
1:B:316:VAL:HG23	1:B:485:THR:HG23	1.97	0.46
1:A:396:MET:O	1:A:436:ARG:HD3	2.16	0.46
1:B:403:LEU:CD1	1:B:409:LEU:HD13	2.46	0.45
1:B:376:VAL:HG21	1:B:541:LEU:HD23	1.98	0.45
1:B:310:LEU:O	1:B:481:LYS:NZ	2.38	0.45
1:A:454:LEU:O	1:A:458:VAL:HG13	2.17	0.44
1:B:358:ILE:HD12	1:B:379:LEU:HD13	2.00	0.44
1:B:343:MET:HG2	1:B:528:MET:CE	2.48	0.44
1:B:376:VAL:HG21	1:B:541:LEU:CD2	2.48	0.43
1:A:415:GLY:C	1:A:417:CYS:H	2.22	0.43
1:B:343:MET:HE1	1:B:421:MET:CE	2.48	0.43
1:A:415:GLY:O	1:A:421:MET:HE2	2.19	0.42
1:A:513:HIS:CE1	1:B:515:ARG:HH22	2.39	0.41
1:A:487:ILE:HG13	1:B:501:HIS:CG	2.55	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:358:ILE:HD13	1:A:379:LEU:HD13	2.03	0.40
1:A:461:PHE:C	1:A:463:SER:N	2.75	0.40
1:B:392:VAL:HG13	1:B:432:SER:HA	2.03	0.40

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	228/255 (89%)	221 (97%)	4 (2%)	3 (1%)	14	19
1	B	234/255 (92%)	228 (97%)	5 (2%)	1 (0%)	38	54
All	All	462/510 (91%)	449 (97%)	9 (2%)	4 (1%)	20	29

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	416	LYS
1	A	533	VAL
1	A	340	ALA
1	B	419	GLU

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	201/229 (88%)	201 (100%)	0	100	100
1	B	201/229 (88%)	200 (100%)	1 (0%)	91	96
All	All	402/458 (88%)	401 (100%)	1 (0%)	94	98

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	547	HIS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	498	GLN
1	B	414	GLN
1	B	519	ASN
1	B	547	HIS

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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

2 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	369	A	1	-	30,30,30	1.11	3 (10%)	42,43,43	1.03	3 (7%)
2	369	B	2	-	30,30,30	1.27	3 (10%)	42,43,43	1.16	5 (11%)

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	369	A	1	-	-	0/8/8/8	0/4/4/4
2	369	B	2	-	-	0/8/8/8	0/4/4/4

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	2	369	C17-C18	-3.90	1.43	1.50
2	A	1	369	C17-C18	-2.71	1.45	1.50
2	B	2	369	C9-C4	-2.69	1.38	1.43
2	A	1	369	C9-C4	-2.61	1.38	1.43
2	B	2	369	C10-C9	-2.45	1.38	1.43
2	A	1	369	C10-C9	-2.16	1.38	1.43

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1	369	C19-C18-C17	-2.80	116.12	120.79
2	B	2	369	C19-C18-C17	-2.68	116.32	120.79
2	B	2	369	C5-C4-C3	-2.13	117.88	122.19
2	B	2	369	C18-C23-C22	-2.13	117.77	119.72
2	B	2	369	C21-C22-C23	2.27	122.71	120.20
2	A	1	369	O2-C10-C9	2.45	120.64	116.97
2	A	1	369	C23-C18-C17	2.77	125.08	120.58
2	B	2	369	O2-C10-C9	2.93	121.36	116.97

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1	369	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

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	236/255 (92%)	0.71	30 (12%) 4 4	37, 43, 56, 63	0
1	B	240/255 (94%)	0.78	38 (15%) 2 2	36, 43, 55, 63	0
All	All	476/510 (93%)	0.74	68 (14%) 3 3	36, 43, 55, 63	0

All (68) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	533	VAL	9.0
1	A	340	ALA	6.5
1	A	461	PHE	5.9
1	B	338	SER	5.8
1	B	546	ALA	5.5
1	B	530	CYS	5.5
1	A	463	SER	5.4
1	B	340	ALA	5.4
1	B	547	HIS	4.2
1	B	466	LEU	4.0
1	A	551	ALA	3.9
1	B	334	THR	3.7
1	B	333	PRO	3.6
1	A	420	GLY	3.6
1	B	417	CYS	3.6
1	B	339	GLU	3.5
1	A	526	TYR	3.4
1	A	509	LEU	3.4
1	B	336	PRO	3.4
1	B	419	GLU	3.4
1	A	464	SER	3.3
1	B	337	PHE	3.3
1	A	417	CYS	3.2
1	A	389	ILE	3.2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	527	SER	3.2
1	B	452	ILE	3.2
1	B	532	ASN	3.1
1	A	412	ARG	3.0
1	A	460	THR	3.0
1	B	528	MET	3.0
1	B	527	SER	2.9
1	B	511	LEU	2.9
1	B	467	LYS	2.9
1	B	468	SER	2.9
1	A	452	ILE	2.8
1	A	508	LEU	2.8
1	B	308	LEU	2.8
1	B	317	SER	2.8
1	B	332	ASP	2.8
1	A	550	HIS	2.8
1	B	465	THR	2.7
1	A	386	ILE	2.7
1	A	511	LEU	2.6
1	A	528	MET	2.6
1	B	526	TYR	2.6
1	A	413	ASN	2.5
1	B	493	ALA	2.4
1	B	389	ILE	2.4
1	A	537	TYR	2.4
1	A	390	GLY	2.3
1	B	497	LEU	2.3
1	A	532	ASN	2.3
1	A	339	GLU	2.3
1	B	437	MET	2.2
1	A	419	GLU	2.2
1	B	464	SER	2.2
1	B	387	LEU	2.2
1	B	386	ILE	2.2
1	B	508	LEU	2.2
1	B	342	MET	2.1
1	A	534	VAL	2.1
1	B	534	VAL	2.1
1	B	451	ILE	2.1
1	A	307	ALA	2.1
1	A	524	HIS	2.1
1	B	439	ASN	2.1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	510	ILE	2.0
1	A	549	LEU	2.0

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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(\AA^2)	Q<0.9
2	369	A	1	27/27	0.90	0.18	-0.18	37,39,42,43	0
2	369	B	2	27/27	0.90	0.18	-0.26	37,39,46,48	0

6.5 Other polymers [i](#)

There are no such residues in this entry.