Full wwPDB X-ray Structure Validation Report ⓘ

Mar 18, 2026 – 03:29 AM UTC

PDB ID	:	1GWR / pdb_00001gwr
Title	:	HUMAN OESTROGEN RECEPTOR ALPHA LIGAND-BINDING DOMAIN IN COMPLEX WITH 17BETA-OESTRADIOL AND TIF2 NRBOX3 PEPTIDE
Authors	:	Pike, A.C.W.; Brzozowski, A.M.
Deposited on	:	2002-03-22
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
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:

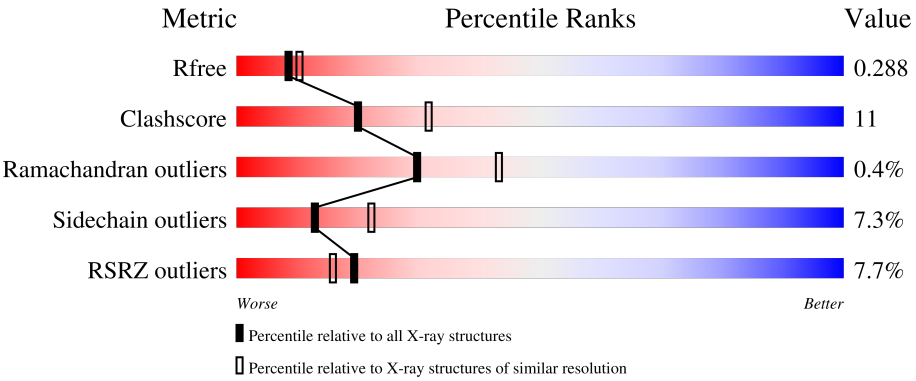
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal 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 (i)

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}	180053	4912 (2.40-2.40)
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (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 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	245	8% 56% 34% 7%
1	B	245	7% 57% 34% 6%
2	C	9	89% 11%
2	D	9	78% 22%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 3987 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.

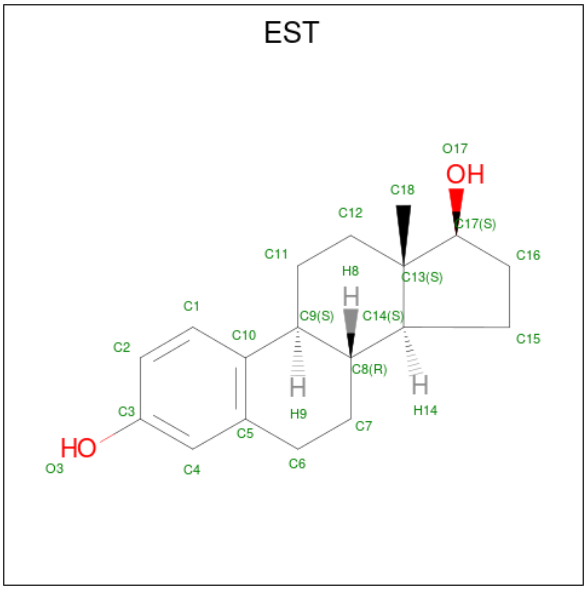
- Molecule 1 is a protein called OESTROGEN RECEPTOR.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	238	Total	C	N	O	S	0	2	0
			1876	1201	322	334	19			
1	B	239	Total	C	N	O	S	0	2	0
			1880	1198	323	339	20			

- Molecule 2 is a protein called TRANSCRIPTION INTERMEDIARY FACTOR-2.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	9	Total	C	N	O	0	0	0
			70	47	10	13			
2	D	9	Total	C	N	O	0	0	0
			76	50	13	13			

- Molecule 3 is ESTRADIOL (CCD ID: EST) (formula: $C_{18}H_{24}O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			20	18	2		
3	B	1	Total	C	O	0	0
			20	18	2		

- Molecule 4 is water.

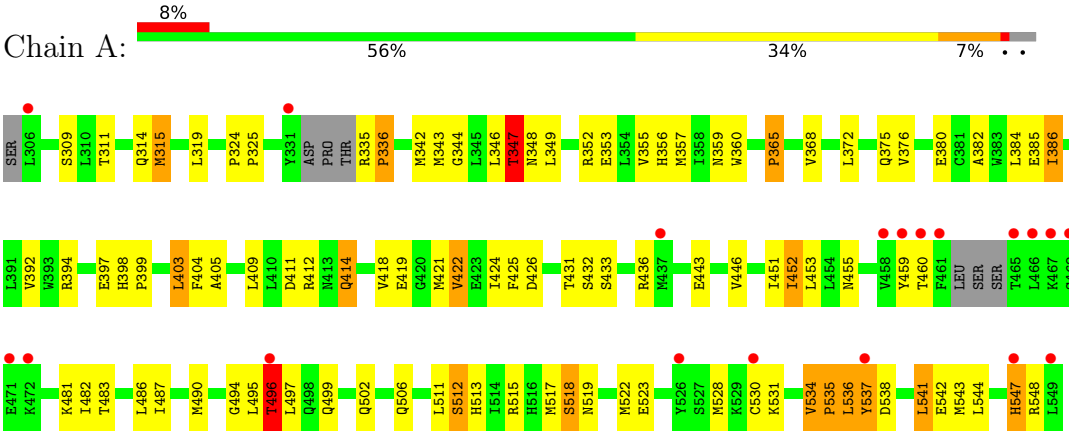
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	26	Total	O	0	0
			26	26		
4	B	19	Total	O	0	0
			19	19		

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 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.

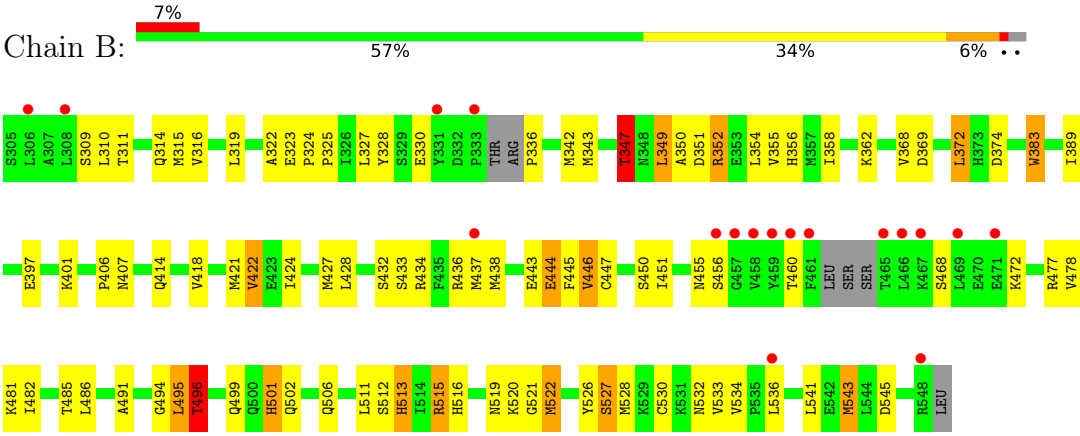
• Molecule 1: OESTROGEN RECEPTOR

Chain A:



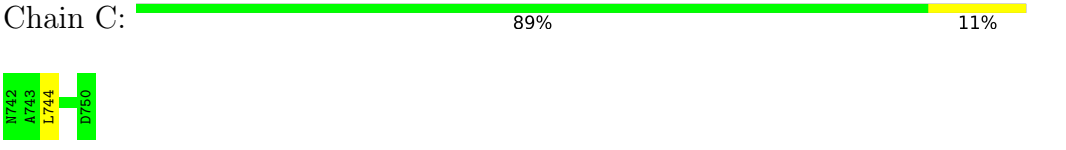
• Molecule 1: OESTROGEN RECEPTOR

Chain B:



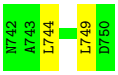
• Molecule 2: TRANSCRIPTION INTERMEDIARY FACTOR-2

Chain C:



• Molecule 2: TRANSCRIPTION INTERMEDIARY FACTOR-2

Chain D:


N742
A743
L744
L749
D750

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	56.31Å 90.54Å 59.23Å 90.00° 109.83° 90.00°	Depositor
Resolution (Å)	25.00 – 2.40 25.00 – 2.40	Depositor EDS
% Data completeness (in resolution range)	95.0 (25.00-2.40) 94.6 (25.00-2.40)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.72 (at 2.41Å)	Xtriage
Refinement program	REFMAC 5.0	Depositor
R, R_{free}	0.225 , 0.288 0.224 , 0.288	Depositor DCC
R_{free} test set	1052 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å^2)	35.6	Xtriage
Anisotropy	0.474	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 41.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	3987	wwPDB-VP
Average B, all atoms (Å^2)	41.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 12.80% 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.

5 Model quality

5.1 Standard geometry

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

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	0.81	0/1920	2.02	63/2594 (2.4%)
1	B	0.79	0/1924	2.04	72/2600 (2.8%)
2	C	0.62	0/70	1.46	0/95
2	D	0.71	0/76	1.61	0/102
All	All	0.80	0/3990	2.01	135/5391 (2.5%)

There are no bond length outliers.

All (135) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	519	ASN	OD1-CG-ND2	-11.52	111.08	122.60
1	B	356	HIS	CA-CB-CG	-9.52	104.28	113.80
1	A	352	ARG	CD-NE-CZ	9.29	137.41	124.40
1	A	422	VAL	CB-CA-C	-9.19	100.01	112.04
1	A	455	ASN	OD1-CG-ND2	9.13	131.73	122.60
1	B	347	THR	N-CA-CB	-9.06	96.75	110.16
1	B	519	ASN	OD1-CG-ND2	-8.80	113.80	122.60
1	B	436	ARG	CD-NE-CZ	8.60	136.44	124.40
1	B	351	ASP	CA-CB-CG	-8.36	104.25	112.60
1	A	346	LEU	CA-C-N	8.15	131.86	120.29
1	A	346	LEU	C-N-CA	8.15	131.86	120.29
1	B	501	HIS	CB-CA-C	-8.02	97.21	110.85
1	B	446	VAL	CA-C-O	7.95	129.30	120.64
1	B	521	GLY	CA-C-O	-7.79	112.72	120.75
1	A	347	THR	CA-CB-CG2	7.74	123.65	110.50
1	B	422	VAL	CB-CA-C	-7.67	102.07	111.88
1	B	383	TRP	CA-C-O	-7.66	112.36	120.63
1	B	515	ARG	CA-C-O	7.59	128.60	120.55
1	A	537	TYR	CA-C-N	7.56	133.21	121.19
1	A	537	TYR	C-N-CA	7.56	133.21	121.19

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	403	LEU	O-C-N	-7.46	113.58	122.46
1	B	516	HIS	CA-CB-CG	-7.39	106.41	113.80
1	A	422	VAL	N-CA-CB	7.32	119.62	110.47
1	B	325	PRO	CB-CA-C	-7.20	100.66	110.60
1	B	347	THR	CB-CA-C	7.05	122.83	110.85
1	A	347	THR	N-CA-CB	-6.93	99.91	110.16
1	A	452	ILE	CA-C-O	-6.93	113.83	121.17
1	A	424	ILE	CA-C-O	-6.74	114.03	121.17
1	B	455	ASN	N-CA-C	6.72	121.79	112.45
1	A	512	SER	CA-C-N	6.69	130.47	120.31
1	A	512	SER	C-N-CA	6.69	130.47	120.31
1	B	352	ARG	NE-CZ-NH1	-6.67	114.83	121.50
1	B	389	ILE	CA-C-N	6.66	127.52	119.99
1	B	389	ILE	C-N-CA	6.66	127.52	119.99
1	B	446	VAL	N-CA-CB	-6.64	100.11	110.54
1	B	495	LEU	N-CA-CB	6.62	120.34	110.29
1	B	369	ASP	CA-CB-CG	6.61	119.21	112.60
1	B	446	VAL	O-C-N	-6.57	115.26	121.90
1	B	347	THR	CA-CB-CG2	6.51	121.57	110.50
1	B	486	LEU	CB-CA-C	-6.51	100.67	110.88
1	A	425	PHE	CA-CB-CG	6.43	120.23	113.80
1	B	324	PRO	CA-C-N	6.41	126.59	120.31
1	B	324	PRO	C-N-CA	6.41	126.59	120.31
1	B	446	VAL	CA-C-N	6.40	129.14	120.44
1	B	446	VAL	C-N-CA	6.40	129.14	120.44
1	B	512	SER	O-C-N	-6.37	115.37	122.12
1	A	348	ASN	N-CA-C	-6.36	104.42	111.36
1	A	436	ARG	CD-NE-CZ	6.36	133.30	124.40
1	A	344	GLY	CA-C-O	-6.34	114.16	121.00
1	A	535	PRO	CA-C-O	-6.29	114.00	121.67
1	B	443	GLU	CA-C-O	-6.22	112.82	119.97
1	B	543	MET	CA-CB-CG	6.21	126.51	114.10
1	B	533	VAL	CA-C-O	6.16	124.81	118.96
1	B	519	ASN	N-CA-CB	6.16	119.83	110.28
1	A	495	LEU	N-CA-CB	6.15	120.44	110.41
1	B	512	SER	N-CA-CB	-6.14	101.10	110.12
1	B	383	TRP	O-C-N	6.12	128.61	122.12
1	A	390	GLY	N-CA-C	-6.10	105.42	112.50
1	B	512	SER	CA-C-N	6.10	128.95	120.29
1	B	512	SER	C-N-CA	6.10	128.95	120.29
1	B	513[A]	HIS	O-C-N	6.09	129.10	122.15
1	B	513[B]	HIS	O-C-N	6.09	129.10	122.15

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	486	LEU	O-C-N	6.09	128.34	122.07
1	A	512	SER	CA-CB-OG	-6.07	98.95	111.10
1	B	519	ASN	CA-C-N	-6.07	111.67	120.29
1	B	519	ASN	C-N-CA	-6.07	111.67	120.29
1	A	496	THR	N-CA-CB	-6.06	101.45	110.17
1	B	451	ILE	CA-C-O	-6.03	114.78	121.17
1	A	535	PRO	CA-C-N	-5.93	113.61	122.74
1	A	535	PRO	C-N-CA	-5.93	113.61	122.74
1	A	537	TYR	CA-C-O	5.91	127.65	121.15
1	B	391	LEU	CA-C-O	5.91	126.81	120.55
1	A	365	PRO	N-CA-CB	5.88	108.41	103.17
1	B	424	ILE	CA-C-O	-5.87	114.85	120.95
1	B	496	THR	N-CA-CB	-5.86	101.88	110.26
1	B	355	VAL	CA-C-O	5.85	127.05	120.85
1	B	451	ILE	N-CA-C	-5.84	104.82	110.42
1	A	356	HIS	CA-CB-CG	-5.82	107.98	113.80
1	B	532	ASN	OD1-CG-ND2	5.82	128.42	122.60
1	B	374	ASP	CA-CB-CG	-5.81	106.79	112.60
1	A	483	THR	N-CA-CB	5.81	118.66	110.12
1	B	456	SER	N-CA-C	5.81	119.47	112.38
1	B	389	ILE	CA-CB-CG2	5.81	120.37	110.50
1	A	431	THR	CA-C-N	-5.78	112.92	120.44
1	A	431	THR	C-N-CA	-5.78	112.92	120.44
1	A	384	LEU	O-C-N	-5.78	114.49	122.46
1	B	545	ASP	CA-CB-CG	-5.76	106.84	112.60
1	B	327	LEU	N-CA-C	5.73	117.92	110.53
1	B	460	THR	N-CA-CB	5.68	120.09	110.49
1	A	359[A]	ASN	CA-CB-CG	5.57	118.17	112.60
1	A	359[B]	ASN	CA-CB-CG	5.57	118.17	112.60
1	A	433	SER	CB-CA-C	-5.56	101.56	110.79
1	A	443	GLU	CA-C-N	5.54	127.64	120.44
1	A	443	GLU	C-N-CA	5.54	127.64	120.44
1	A	360	TRP	N-CA-C	-5.51	104.91	111.69
1	A	325	PRO	O-C-N	-5.50	116.43	123.14
1	B	519	ASN	CB-CG-ND2	5.48	124.62	116.40
1	A	386	ILE	CB-CA-C	-5.48	104.75	112.14
1	B	494	GLY	CA-C-N	-5.46	112.33	121.39
1	B	494	GLY	C-N-CA	-5.46	112.33	121.39
1	A	523	GLU	O-C-N	5.44	127.67	122.07
1	A	405	ALA	CA-C-N	5.42	125.25	119.28
1	A	405	ALA	C-N-CA	5.42	125.25	119.28
1	A	536	LEU	CA-C-O	5.38	126.29	120.32

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	511	LEU	CA-C-O	5.34	126.39	120.63
1	A	380	GLU	CA-C-O	-5.33	114.07	120.10
1	B	349	LEU	O-C-N	-5.33	116.49	122.03
1	B	446	VAL	CA-CB-CG1	5.32	119.45	110.40
1	B	527	SER	N-CA-C	-5.31	105.18	110.97
1	A	496	THR	CA-CB-OG1	-5.30	101.65	109.60
1	A	325	PRO	CB-CA-C	-5.29	103.30	110.60
1	B	401	LYS	CA-C-O	-5.25	114.97	121.11
1	A	451	ILE	N-CA-C	-5.24	105.28	110.62
1	A	324	PRO	CA-C-N	5.23	125.43	120.31
1	A	324	PRO	C-N-CA	5.23	125.43	120.31
1	B	422	VAL	N-CA-CB	5.21	116.30	110.51
1	B	336	PRO	N-CA-CB	5.21	108.73	103.00
1	A	414	GLN	N-CA-C	-5.21	106.44	112.89
1	A	534	VAL	CB-CA-C	-5.19	101.92	111.36
1	B	480	ASP	CA-CB-CG	5.18	117.78	112.60
1	B	445	PHE	CA-CB-CG	-5.18	108.62	113.80
1	A	389	ILE	O-C-N	-5.17	115.95	121.80
1	A	547	HIS	CA-C-O	-5.16	115.47	120.89
1	A	518	SER	N-CA-C	5.15	116.58	111.07
1	B	407	ASN	OD1-CG-ND2	-5.12	117.48	122.60
1	A	405	ALA	N-CA-CB	-5.12	106.02	111.29
1	B	534	VAL	N-CA-C	5.09	113.53	107.73
1	B	491	ALA	N-CA-C	-5.08	105.83	111.36
1	A	355	VAL	N-CA-C	-5.04	105.48	110.62
1	B	428	LEU	CA-C-O	-5.03	115.09	120.42
1	B	444	GLU	CA-C-O	5.01	125.80	120.24
1	A	336	PRO	N-CA-CB	5.01	108.00	103.34
1	A	494	GLY	CA-C-N	-5.01	113.50	122.07
1	A	494	GLY	C-N-CA	-5.01	113.50	122.07
1	A	375	GLN	CA-C-O	-5.00	115.55	120.90

There are no chirality outliers.

There are no planarity outliers.

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	1876	0	1888	51	0
1	B	1880	0	1884	44	0
2	C	70	0	69	3	0
2	D	76	0	80	5	0
3	A	20	0	24	0	0
3	B	20	0	24	0	0
4	A	26	0	0	0	0
4	B	19	0	0	0	0
All	All	3987	0	3969	90	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 11.

All (90) 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:B:496:THR:HG22	1:B:499:GLN:H	1.18	1.08
1:A:543:MET:HE1	2:C:744:LEU:HD22	1.43	1.00
1:A:496:THR:HG22	1:A:499:GLN:H	1.41	0.83
1:B:342:MET:HE3	1:B:418:VAL:HG23	1.60	0.81
1:B:543:MET:HE1	2:D:744:LEU:HD22	1.63	0.80
1:B:319:LEU:HB3	1:B:446:VAL:CG1	2.13	0.78
1:A:335:ARG:N	1:A:336:PRO:HD2	1.99	0.78
1:A:319:LEU:HB3	1:A:446:VAL:CG1	2.15	0.77
1:B:343:MET:O	1:B:347:THR:HB	1.87	0.74
1:A:418:VAL:HB	1:A:421:MET:HE2	1.71	0.73
1:A:376:VAL:HG13	2:C:744:LEU:HD23	1.71	0.71
1:B:496:THR:HB	1:B:499:GLN:OE1	1.91	0.69
1:A:502:GLN:O	1:A:506:GLN:HG3	1.94	0.67
1:A:319:LEU:HB3	1:A:446:VAL:HG12	1.76	0.67
1:B:343:MET:HE2	1:B:528:MET:HG3	1.79	0.63
1:A:522:MET:CE	1:A:544:LEU:HD12	2.29	0.63
1:A:357:MET:HE2	1:A:386:ILE:CG2	2.28	0.63
1:A:335:ARG:N	1:A:336:PRO:CD	2.63	0.62
1:B:438:MET:HE1	1:B:506:GLN:HB2	1.82	0.62
1:A:319:LEU:HB3	1:A:446:VAL:HG11	1.82	0.60
1:A:343:MET:O	1:A:347:THR:HB	2.02	0.60
1:A:543:MET:CE	2:C:744:LEU:HD22	2.27	0.60
1:A:315:MET:HE3	1:A:365:PRO:HG2	1.84	0.60
1:B:496:THR:HG22	1:B:499:GLN:N	2.02	0.59
1:B:495:LEU:HB3	1:B:499:GLN:HB3	1.85	0.58
1:B:383:TRP:HZ2	1:B:522:MET:HE1	1.68	0.58

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:502:GLN:O	1:B:506:GLN:HG3	2.02	0.58
1:B:427:MET:HE1	1:B:520:LYS:HD3	1.85	0.58
1:A:522:MET:HE1	1:A:544:LEU:HD12	1.86	0.57
1:B:342:MET:HE1	1:B:414:GLN:O	2.04	0.57
1:B:319:LEU:HB3	1:B:446:VAL:HG13	1.86	0.56
1:A:515:ARG:HH22	1:B:513[A]:HIS:CD2	2.24	0.55
1:B:315:MET:HE2	1:B:482:ILE:HG12	1.88	0.54
1:A:349:LEU:O	1:A:353:GLU:HG3	2.09	0.53
1:A:392:VAL:HG13	1:A:432:SER:HA	1.91	0.52
1:A:513:HIS:CE1	1:B:515:ARG:HH22	2.29	0.51
1:A:357:MET:HE2	1:A:386:ILE:HB	1.92	0.50
1:A:459:TYR:HE1	1:B:434:ARG:HD3	1.76	0.50
1:A:541:LEU:O	1:A:542:GLU:C	2.55	0.49
1:A:315:MET:CE	1:A:365:PRO:HG2	2.43	0.48
1:A:452:ILE:HD11	1:A:511:LEU:HD22	1.96	0.48
1:B:354:LEU:HD21	1:B:383:TRP:CE3	2.48	0.48
1:A:496:THR:HB	1:A:499:GLN:OE1	2.14	0.47
1:A:418:VAL:CB	1:A:421:MET:HE2	2.42	0.47
1:B:434:ARG:HA	1:B:437:MET:HE3	1.95	0.47
1:A:347:THR:HG22	1:A:537:TYR:HE2	1.80	0.47
1:A:419:GLU:OE1	1:A:531:LYS:NZ	2.48	0.47
1:B:311:THR:HG23	1:B:314:GLN:OE1	2.15	0.46
1:A:382:ALA:O	1:A:386:ILE:HG12	2.15	0.46
1:A:315:MET:HE2	1:A:482:ILE:HG12	1.98	0.46
1:A:342:MET:HE1	1:A:414:GLN:O	2.15	0.46
1:B:328:TYR:CZ	1:B:406:PRO:HG2	2.51	0.46
1:A:486:LEU:O	1:A:490:MET:HG3	2.16	0.46
1:B:427:MET:HE1	1:B:520:LYS:CD	2.46	0.46
1:B:352:ARG:HH11	1:B:352:ARG:HD2	1.54	0.45
1:B:372:LEU:HD21	2:D:749:LEU:HD21	1.99	0.45
1:A:411:ASP:O	1:A:412:ARG:C	2.60	0.45
1:A:547:HIS:O	1:A:548:ARG:C	2.60	0.45
1:A:528:MET:HA	1:A:528:MET:HE2	1.99	0.45
1:A:535:PRO:O	1:A:536:LEU:HD12	2.16	0.44
1:A:311:THR:HG23	1:A:314:GLN:OE1	2.16	0.44
1:B:310:LEU:O	1:B:481:LYS:HE3	2.18	0.44
1:B:444:GLU:O	1:B:447:CYS:HB2	2.18	0.44
1:B:526:TYR:CE1	1:B:530[A]:CYS:SG	3.11	0.44
1:B:543:MET:HA	1:B:543:MET:HE2	2.00	0.43
1:A:357:MET:CE	1:A:386:ILE:HB	2.49	0.43
1:A:412:ARG:NE	1:A:426:ASP:OD1	2.49	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:398:HIS:O	1:A:399:PRO:C	2.62	0.42
1:A:403:LEU:HD12	1:A:409:LEU:HD13	2.01	0.42
1:B:468:SER:O	1:B:472:LYS:HG3	2.19	0.42
1:B:543:MET:HE1	2:D:744:LEU:CD2	2.42	0.42
1:A:543:MET:HA	1:A:543:MET:HE2	2.01	0.42
1:B:543:MET:CE	2:D:744:LEU:HD22	2.42	0.42
1:A:342:MET:CE	1:A:418:VAL:HG23	2.50	0.42
1:B:322:ALA:O	1:B:323:GLU:C	2.62	0.42
1:A:403:LEU:CD1	1:A:409:LEU:HD13	2.50	0.41
1:A:487:ILE:HG13	1:B:501:HIS:ND1	2.36	0.41
1:A:513:HIS:O	1:A:517:MET:HG3	2.20	0.41
1:B:316:VAL:HG23	1:B:485:THR:CG2	2.51	0.41
1:B:354:LEU:O	1:B:358:ILE:HG13	2.19	0.41
1:B:421:MET:O	1:B:421:MET:HG3	2.20	0.41
1:A:403:LEU:O	1:A:404:PHE:C	2.63	0.41
1:A:515:ARG:NH2	1:B:513[A]:HIS:CD2	2.89	0.41
1:B:543:MET:HE1	2:D:744:LEU:HB2	2.02	0.41
1:A:385:GLU:HG3	1:A:518:SER:HB2	2.04	0.40
1:B:479:LEU:HD23	1:B:479:LEU:HA	1.97	0.40
1:B:478:VAL:HG12	1:B:482:ILE:HD11	2.04	0.40
1:B:349:LEU:O	1:B:350:ALA:C	2.64	0.40
1:B:536:LEU:HA	1:B:541:LEU:HD11	2.03	0.40
1:A:357:MET:HE2	1:A:386:ILE:CB	2.51	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	234/245 (96%)	226 (97%)	7 (3%)	1 (0%)	30	43
1	B	235/245 (96%)	228 (97%)	6 (3%)	1 (0%)	30	43

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
2	C	7/9 (78%)	5 (71%)	2 (29%)	0	100 100
2	D	7/9 (78%)	6 (86%)	1 (14%)	0	100 100
All	All	483/508 (95%)	465 (96%)	16 (3%)	2 (0%)	30 43

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	460	THR
1	B	330	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	206/221 (93%)	189 (92%)	17 (8%)	10 17
1	B	208/221 (94%)	194 (93%)	14 (7%)	15 26
2	C	7/8 (88%)	7 (100%)	0	100 100
2	D	8/8 (100%)	8 (100%)	0	100 100
All	All	429/458 (94%)	398 (93%)	31 (7%)	13 23

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	309	SER
1	A	315	MET
1	A	347	THR
1	A	368	VAL
1	A	372	LEU
1	A	394	ARG
1	A	397	GLU
1	A	422	VAL
1	A	453	LEU
1	A	481	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	496	THR
1	A	497	LEU
1	A	512	SER
1	A	530	CYS
1	A	534	VAL
1	A	538	ASP
1	A	541	LEU
1	B	309	SER
1	B	347	THR
1	B	362	LYS
1	B	368	VAL
1	B	372	LEU
1	B	397	GLU
1	B	422	VAL
1	B	432	SER
1	B	433	SER
1	B	450	SER
1	B	477	ARG
1	B	496	THR
1	B	522	MET
1	B	527	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	488	HIS
1	A	500	GLN
1	B	398	HIS
1	B	413	ASN
1	B	439	ASN
1	B	488	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 oligosaccharides 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	$\#\|Z\| > 2$
3	EST	B	600	-	23,23,23	1.14	2 (8%)	36,36,36	1.96	12 (33%)
3	EST	A	600	-	23,23,23	1.22	1 (4%)	36,36,36	1.80	11 (30%)

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
3	EST	B	600	-	-	-	0/4/4/4
3	EST	A	600	-	-	-	0/4/4/4

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	600	EST	C1-C10	3.07	1.43	1.39
3	B	600	EST	C7-C8	2.23	1.57	1.53
3	B	600	EST	C8-C14	-2.18	1.49	1.53

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	B	600	EST	C6-C7-C8	-4.39	103.27	110.61
3	B	600	EST	C18-C13-C17	-4.14	103.26	109.58
3	A	600	EST	C7-C8-C14	-4.09	105.29	112.08
3	B	600	EST	C1-C2-C3	-3.18	116.51	119.88

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	600	EST	C12-C11-C9	-3.11	108.32	112.34
3	B	600	EST	C12-C13-C14	3.07	111.83	107.25
3	B	600	EST	C7-C6-C5	-3.07	107.05	112.87
3	B	600	EST	O17-C17-C13	-3.02	108.47	114.80
3	A	600	EST	C15-C14-C13	-2.98	100.34	103.84
3	A	600	EST	C18-C13-C17	-2.87	105.19	109.58
3	B	600	EST	C7-C8-C9	-2.81	106.58	109.27
3	A	600	EST	C4-C5-C10	2.70	122.89	119.49
3	A	600	EST	C18-C13-C12	2.66	114.53	110.61
3	A	600	EST	C3-C4-C5	-2.63	117.81	120.77
3	A	600	EST	C6-C5-C4	-2.54	114.89	119.91
3	A	600	EST	C13-C14-C8	-2.39	111.02	114.41
3	A	600	EST	C11-C12-C13	-2.37	108.75	112.74
3	B	600	EST	C2-C3-C4	2.30	122.71	120.19
3	B	600	EST	C11-C12-C13	-2.29	108.88	112.74
3	B	600	EST	C18-C13-C14	2.15	115.58	111.68
3	B	600	EST	C11-C9-C10	2.15	117.05	113.84
3	A	600	EST	C16-C15-C14	-2.12	100.99	105.14
3	B	600	EST	C6-C5-C4	-2.00	115.96	119.91

There are no chirality outliers.

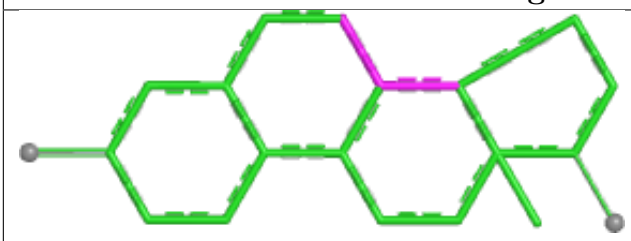
There are no torsion outliers.

There are no ring outliers.

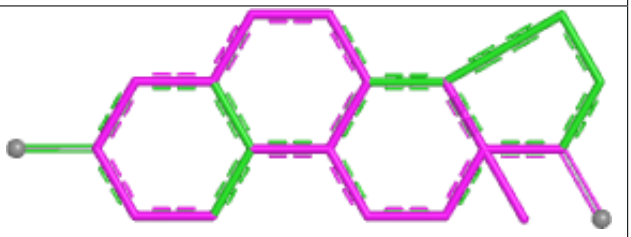
No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

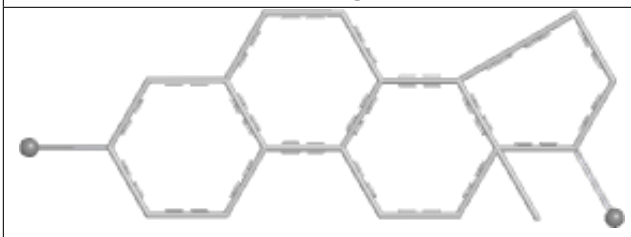
Ligand EST B 600



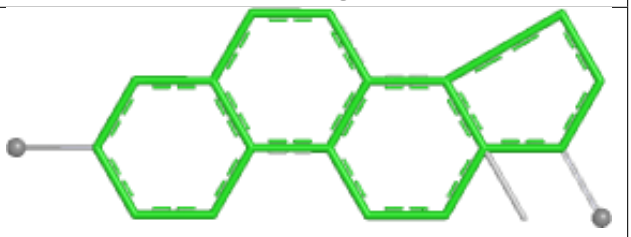
Bond lengths



Bond angles

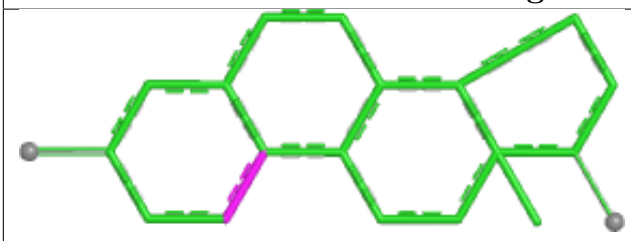


Torsions

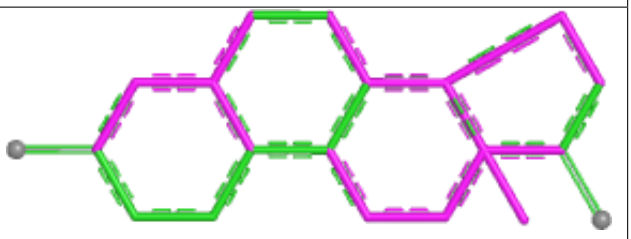


Rings

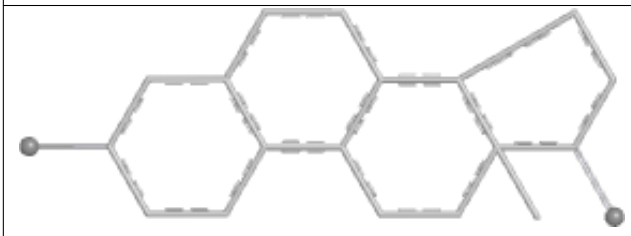
Ligand EST A 600



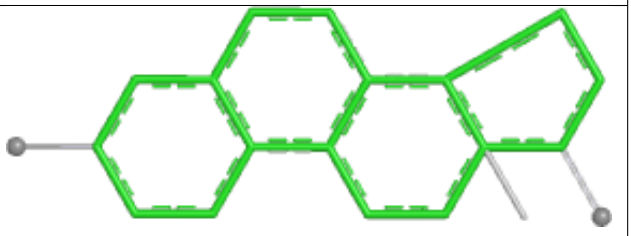
Bond lengths



Bond angles



Torsions



Rings

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, 95^{th} 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	238/245 (97%)	0.41	20 (8%) 17 14	17, 37, 85, 140	2 (0%)
1	B	239/245 (97%)	0.39	18 (7%) 20 17	17, 35, 81, 140	2 (0%)
2	C	9/9 (100%)	0.87	0 100 100	49, 52, 60, 66	0
2	D	9/9 (100%)	0.52	0 100 100	36, 41, 50, 59	0
All	All	495/508 (97%)	0.41	38 (7%) 19 16	17, 36, 83, 140	4 (0%)

All (38) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	465	THR	4.9
1	A	466	LEU	4.8
1	B	459	TYR	4.7
1	A	461	PHE	4.3
1	A	458	VAL	4.1
1	A	459	TYR	4.1
1	B	461	PHE	3.9
1	A	460	THR	3.9
1	B	465	THR	3.6
1	B	467	LYS	3.6
1	B	460	THR	3.3
1	B	331	TYR	3.2
1	B	458	VAL	3.0
1	A	437	MET	2.9
1	A	472	LYS	2.9
1	B	466	LEU	2.9
1	B	306	LEU	2.9
1	A	526	TYR	2.8
1	A	530	CYS	2.7
1	B	333	PRO	2.6
1	A	549	LEU	2.6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	467	LYS	2.6
1	B	437	MET	2.5
1	B	457	GLY	2.5
1	B	471	GLU	2.5
1	B	536	LEU	2.5
1	A	547	HIS	2.5
1	B	548	ARG	2.5
1	A	306	LEU	2.4
1	B	456	SER	2.4
1	A	496	THR	2.3
1	A	331	TYR	2.3
1	A	469	LEU	2.2
1	A	537	TYR	2.2
1	A	468	SER	2.1
1	B	308	LEU	2.1
1	B	469	LEU	2.1
1	A	471	GLU	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 oligosaccharides in this entry.

6.4 Ligands (i)

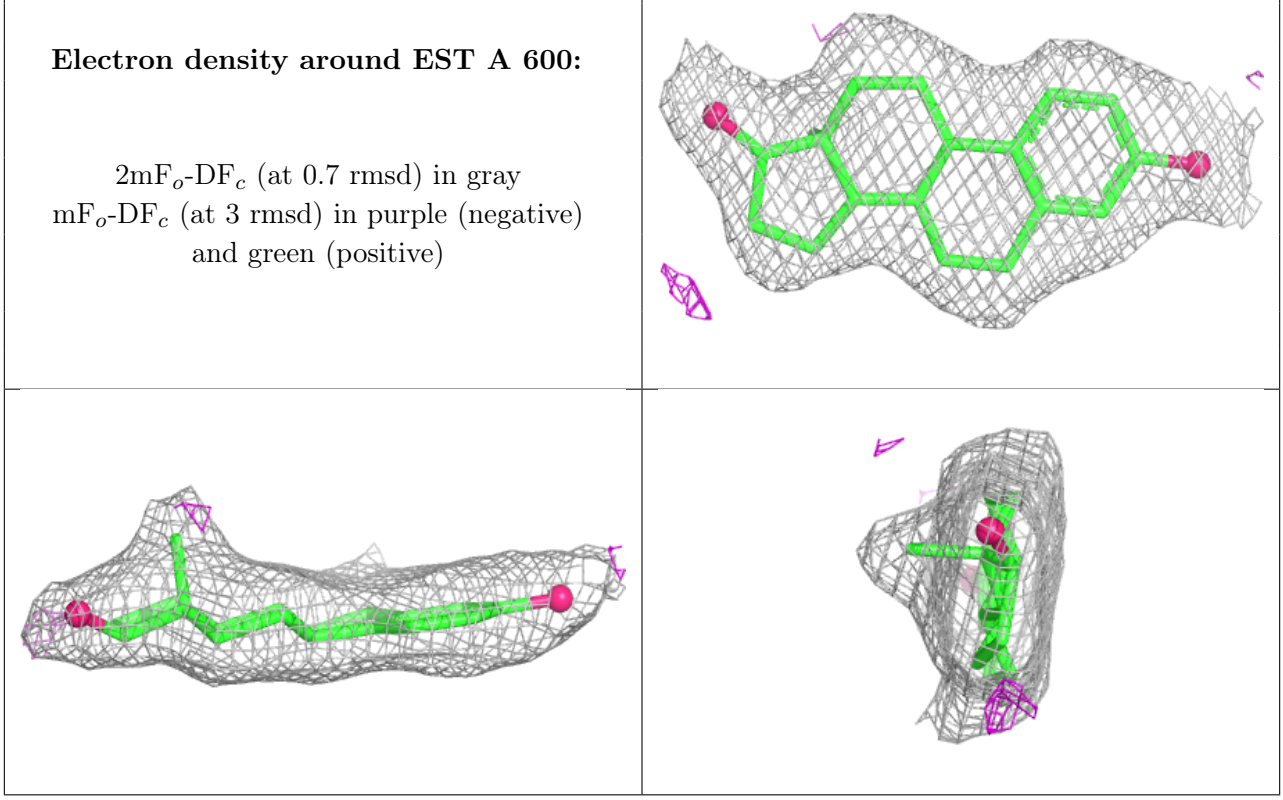
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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
3	EST	A	600	20/20	0.90	0.09	19,24,25,26	0
3	EST	B	600	20/20	0.94	0.08	21,23,27,29	0

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.

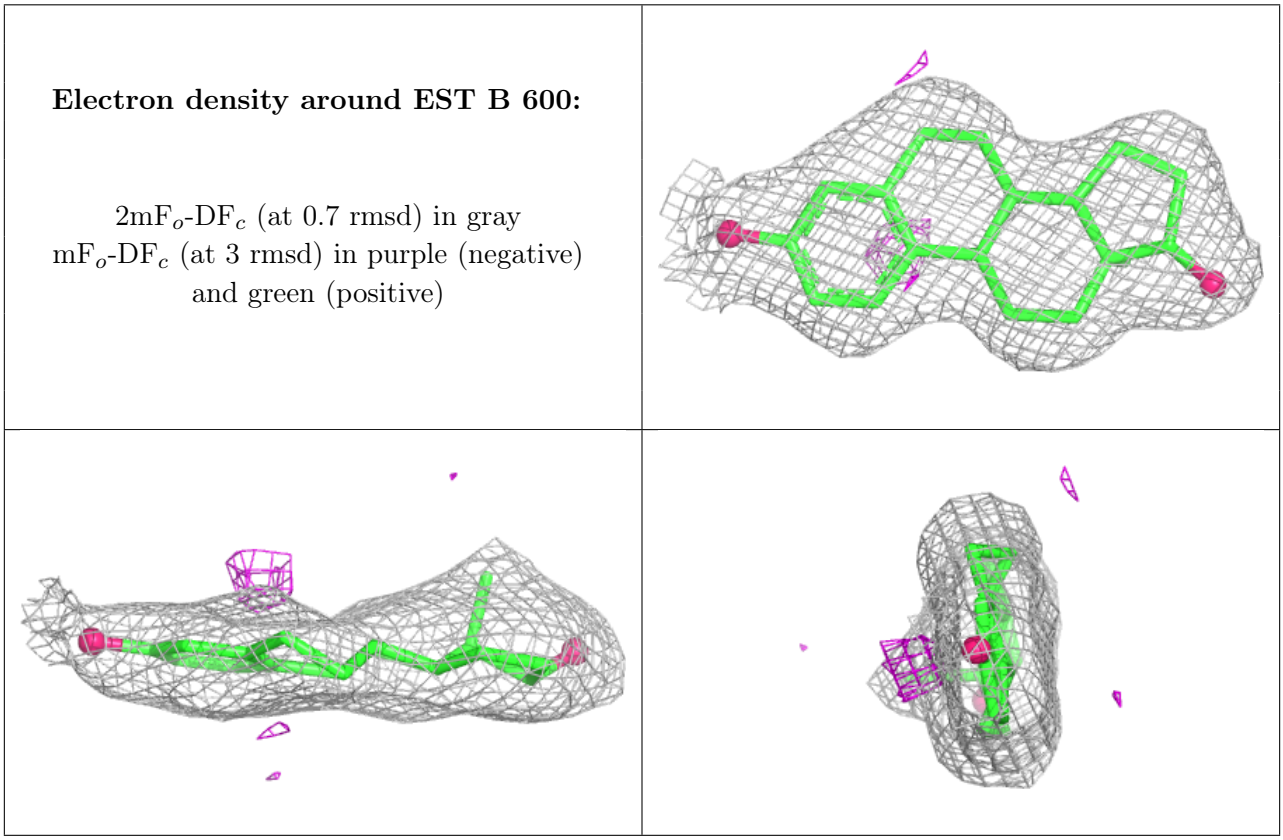
Electron density around EST A 600:

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



Electron density around EST B 600:

$2mF_o$-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)

There are no such residues in this entry.