



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 4, 2026 – 10:04 PM UTC

PDB ID : 1RDT / pdb_00001rdt
Title : Crystal Structure of a new rexinoid bound to the RXRalpha ligand binding domain in the RXRalpha/PPARgamma heterodimer
Authors : Haffner, C.D.; Lenhard, J.M.; Miller, A.B.; McDougald, D.L.; Dwornik, K.; Ittoop, O.R.; Gampe Jr., R.T.; Xu, H.E.; Blanchard, S.; Montana, V.G.
Deposited on : 2003-11-06
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)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
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

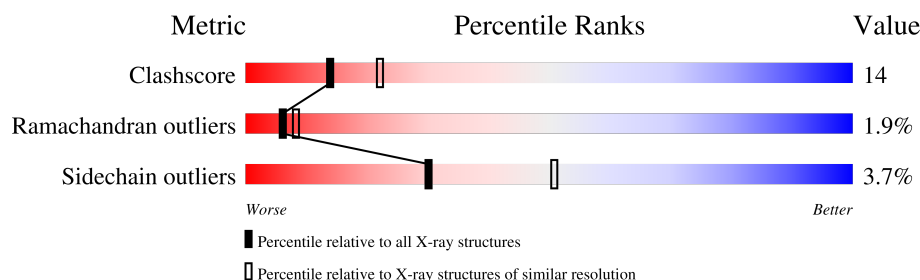
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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))
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	242	
2	B	25	
3	D	284	
4	E	23	

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	L79	A	463	X	-	-	-

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 4027 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 Retinoic acid receptor RXR-alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	211	Total	C	N	O	S	0	0	0
			1644	1054	285	295	10			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	221	MET	-	cloning artifact	UNP P19793
A	222	LYS	-	cloning artifact	UNP P19793
A	223	LYS	-	cloning artifact	UNP P19793
A	224	GLY	-	cloning artifact	UNP P19793

- Molecule 2 is a protein called LxxLL motif coactivator.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	B	9	Total	C	N	O	0	0	0
			77	50	17	10			

- Molecule 3 is a protein called Peroxisome proliferator activated receptor gamma.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	D	253	Total	C	N	O	S	0	0	0
			1998	1288	327	376	7			

There are 13 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	194	MET	-	cloning artifact	UNP P37231
D	195	LYS	-	cloning artifact	UNP P37231
D	196	LYS	-	cloning artifact	UNP P37231
D	197	GLY	-	cloning artifact	UNP P37231
D	198	HIS	-	cloning artifact	UNP P37231
D	199	HIS	-	cloning artifact	UNP P37231

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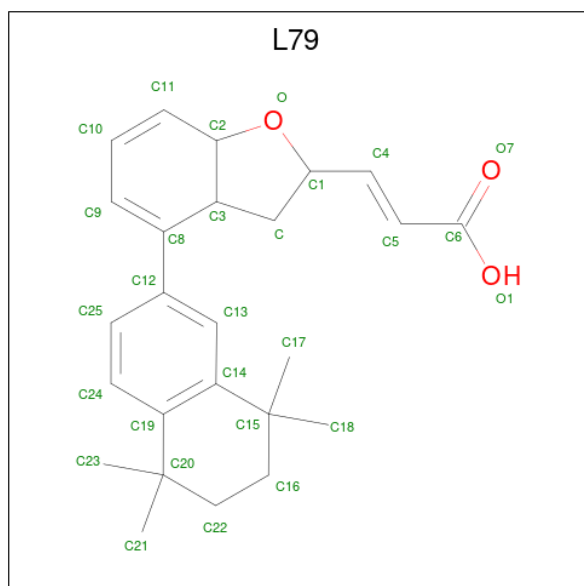
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Chain	Residue	Modelled	Actual	Comment	Reference
D	200	HIS	-	cloning artifact	UNP P37231
D	201	HIS	-	cloning artifact	UNP P37231
D	202	HIS	-	cloning artifact	UNP P37231
D	203	HIS	-	cloning artifact	UNP P37231
D	204	GLY	-	cloning artifact	UNP P37231
D	205	ARG	-	cloning artifact	UNP P37231
D	206	ALA	-	cloning artifact	UNP P37231

- Molecule 4 is a protein called LxxLL motif coactivator.

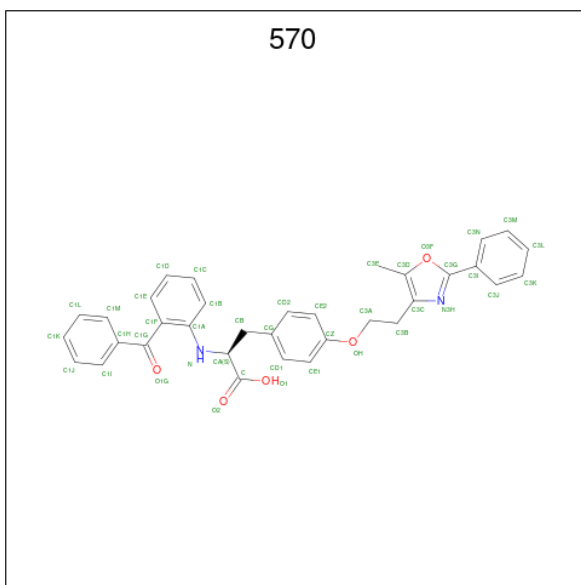
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	E	7	Total	C	N	O	0	0	0
			34	20	7	7			

- Molecule 5 is (S)-(2E)-3[4-(5,5,8,8-TETRAMETHYL-5,6,7,8-TETRAHYDRO-2-NAPHTHALENYL)TETRAHYDRO-1-BENZOFURAN-2-YL]-2-PROPENOIC ACID (CCD ID: L79) (formula: C₂₅H₃₀O₃).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	O		0	0
			28	25	3			

- Molecule 6 is 2-(2-BENZOYL-PHENYLAMINO)-3-{4-[2-(5-METHYL-2-PHENYL-OXAZO L-4-YL)-ETHOXY]-PHENYL}-PROPIONIC ACID (CCD ID: 570) (formula: C₃₄H₃₀N₂O₅).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	D	1	Total	C	N	O	0	0
			41	34	2	5		

- Molecule 7 is water.

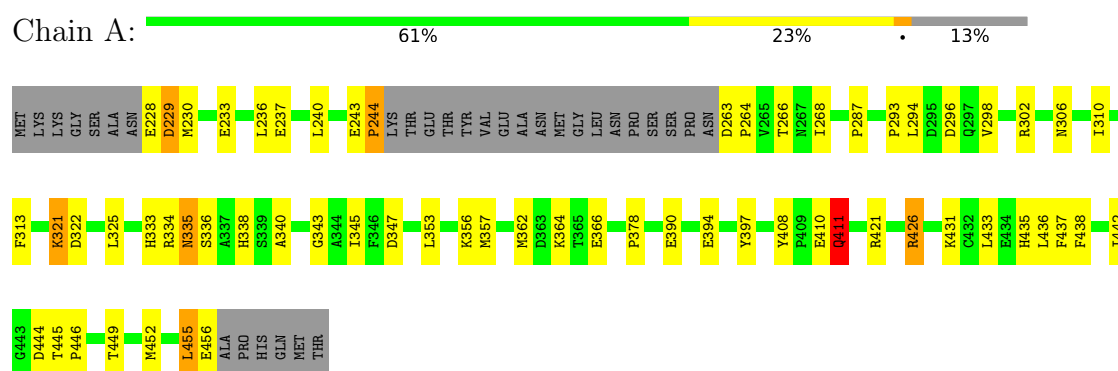
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	72	Total O 72 72	0	0
7	B	2	Total O 2 2	0	0
7	D	123	Total O 123 123	0	0
7	E	8	Total O 8 8	0	0

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. 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.

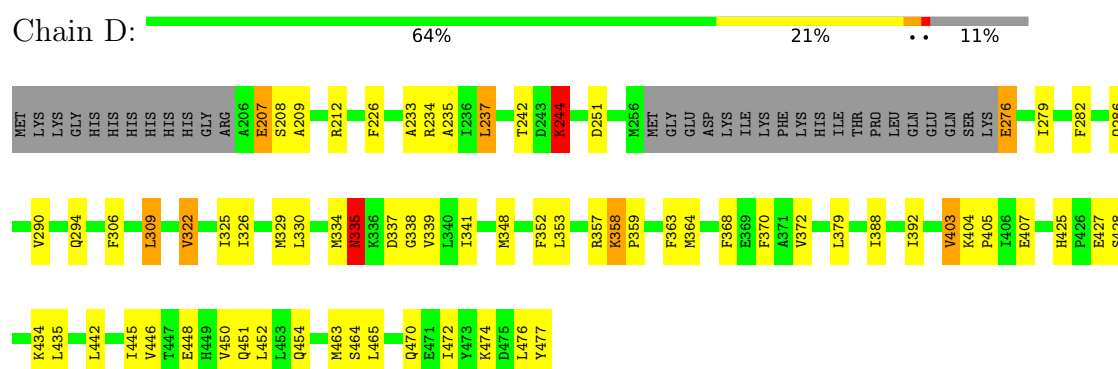
• Molecule 1: Retinoic acid receptor RXR-alpha



• Molecule 2: LxxLL motif coactivator



• Molecule 3: Peroxisome proliferator activated receptor gamma



• Molecule 4: LxxLL motif coactivator



ASN	LEU	VAL	PRO	ASP	ALA	ALA	SER	LYS	HIS	K67	L73	ARG	GLY	GLY	SER	GLY	SER
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4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	49.69Å 54.58Å 211.70Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.40	Depositor
% Data completeness (in resolution range)	97.1 (20.00-2.40)	Depositor
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	CNX 2000	Depositor
R, R_{free}	0.221 , 0.259	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	4027	wwPDB-VP
Average B, all atoms (Å ²)	38.0	wwPDB-VP

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: 570, L79

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	0/1676	0.88	5/2261 (0.2%)
2	B	0.33	0/78	1.00	1/104 (1.0%)
3	D	0.30	0/2031	0.83	4/2739 (0.1%)
4	E	0.47	0/33	0.73	0/44
All	All	0.30	0/3818	0.85	10/5148 (0.2%)

There are no bond length outliers.

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	449	THR	N-CA-C	9.02	121.93	111.11
3	D	322	VAL	N-CA-C	7.29	117.42	110.42
1	A	411	GLN	CA-C-N	6.29	126.48	119.32
1	A	411	GLN	C-N-CA	6.29	126.48	119.32
3	D	403	VAL	N-CA-C	5.42	116.19	110.72
1	A	340	ALA	N-CA-C	-5.40	106.37	113.17
2	B	688	LYS	N-CA-C	5.39	117.85	111.33
3	D	235	ALA	N-CA-C	-5.36	105.52	111.36
1	A	421	ARG	N-CA-C	-5.11	106.90	113.23
3	D	335	ASN	N-CA-C	-5.05	101.74	108.86

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	1644	0	1662	51	2
2	B	77	0	80	7	2
3	D	1998	0	2028	58	0
4	E	34	0	12	0	0
5	A	28	0	26	2	0
6	D	41	0	29	0	0
7	A	72	0	0	2	0
7	B	2	0	0	0	0
7	D	123	0	0	3	0
7	E	8	0	0	0	0
All	All	4027	0	3837	110	2

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 14.

All (110) 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)
3:D:358:LYS:HB3	3:D:359:PRO:HD2	1.30	1.06
3:D:242:THR:HG22	7:D:566:HOH:O	1.55	1.04
3:D:358:LYS:HB3	3:D:359:PRO:CD	1.90	1.02
1:A:233:GLU:HG3	7:A:103:HOH:O	0.84	1.00
3:D:335:ASN:C	3:D:335:ASN:HD22	1.92	0.77
1:A:243:GLU:HB2	1:A:244:PRO:C	2.09	0.76
3:D:357:ARG:NH2	3:D:358:LYS:HD2	2.00	0.76
3:D:358:LYS:CB	3:D:359:PRO:HD2	2.15	0.75
3:D:335:ASN:ND2	3:D:338:GLY:H	1.83	0.74
1:A:335:ASN:ND2	1:A:336:SER:H	1.86	0.74
1:A:345:ILE:HD13	1:A:431:LYS:HD2	1.70	0.72
1:A:426:ARG:HB2	1:A:426:ARG:HH11	1.55	0.71
1:A:333:HIS:HB2	1:A:335:ASN:HD21	1.56	0.70
1:A:335:ASN:HD22	1:A:336:SER:H	1.39	0.70
3:D:357:ARG:HH21	3:D:358:LYS:HD2	1.56	0.70
1:A:233:GLU:CG	7:A:103:HOH:O	1.65	0.67
3:D:474:LYS:HE3	7:D:568:HOH:O	1.95	0.67
3:D:450:VAL:O	3:D:454:GLN:HG2	1.96	0.65
3:D:448:GLU:O	3:D:452:LEU:HD13	1.97	0.64
1:A:335:ASN:HD22	1:A:335:ASN:N	1.94	0.64
1:A:298:VAL:HG13	2:B:690:LEU:HD23	1.81	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:306:ASN:OD1	5:A:463:L79:H10	1.99	0.61
3:D:207:GLU:HG3	3:D:209:ALA:H	1.67	0.60
3:D:442:LEU:O	3:D:446:VAL:HG23	2.02	0.59
3:D:335:ASN:ND2	3:D:337:ASP:H	1.99	0.59
1:A:233:GLU:O	1:A:237:GLU:HG3	2.02	0.59
2:B:688:LYS:O	2:B:692:ARG:HB2	2.03	0.58
1:A:228:GLU:O	1:A:229:ASP:HB2	2.03	0.57
3:D:363:PHE:CZ	3:D:452:LEU:HB3	2.39	0.57
3:D:335:ASN:HD21	3:D:338:GLY:N	2.03	0.57
1:A:335:ASN:ND2	1:A:336:SER:N	2.52	0.57
3:D:370:PHE:HB2	3:D:445:ILE:HD11	1.86	0.56
1:A:333:HIS:HB2	1:A:335:ASN:ND2	2.21	0.56
3:D:335:ASN:C	3:D:335:ASN:ND2	2.62	0.55
3:D:325:ILE:HD11	3:D:392:ILE:HG13	1.89	0.54
3:D:379:LEU:HD11	3:D:435:LEU:HD13	1.89	0.54
3:D:335:ASN:HD21	3:D:338:GLY:H	1.50	0.54
3:D:233:ALA:O	3:D:237:LEU:HD22	2.09	0.53
3:D:427:GLU:HG2	7:D:573:HOH:O	2.08	0.53
1:A:338:HIS:CE1	1:A:343:GLY:HA3	2.43	0.53
3:D:226:PHE:CG	3:D:329:MET:HE1	2.44	0.53
3:D:476:LEU:HG	3:D:477:TYR:HD1	1.74	0.53
1:A:310:ILE:HA	1:A:313:PHE:CE2	2.44	0.52
1:A:436:LEU:HD11	5:A:463:L79:H9	1.91	0.52
1:A:353:LEU:O	1:A:357:MET:HG3	2.08	0.52
3:D:334:MET:HE2	3:D:368:PHE:CE1	2.45	0.52
3:D:286:GLN:OE1	3:D:465:LEU:HD12	2.09	0.51
1:A:230:MET:SD	1:A:287:PRO:HG2	2.50	0.51
1:A:378:PRO:HG3	1:A:390:GLU:OE1	2.09	0.51
3:D:425:HIS:HB3	3:D:428:SER:OG	2.11	0.51
1:A:233:GLU:H	1:A:233:GLU:CD	2.19	0.51
3:D:244:LYS:HB2	3:D:244:LYS:NZ	2.25	0.50
3:D:306:PHE:O	3:D:309:LEU:HB2	2.12	0.50
3:D:306:PHE:HA	3:D:309:LEU:HD22	1.94	0.50
3:D:403:VAL:O	3:D:407:GLU:HG3	2.12	0.50
1:A:228:GLU:O	1:A:228:GLU:HG3	2.12	0.49
3:D:353:LEU:HD13	3:D:364:MET:HG3	1.93	0.49
3:D:242:THR:HG23	3:D:242:THR:O	2.12	0.49
3:D:465:LEU:O	3:D:470:GLN:NE2	2.46	0.48
1:A:394:GLU:HA	1:A:397:TYR:CD2	2.48	0.48
1:A:335:ASN:HD22	1:A:336:SER:N	2.08	0.48
1:A:293:PRO:HD2	1:A:296:ASP:OD2	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:451:GLN:O	3:D:454:GLN:HB2	2.14	0.47
3:D:476:LEU:HG	3:D:477:TYR:CD1	2.49	0.47
1:A:408:TYR:HB3	1:A:411:GLN:HG3	1.97	0.47
3:D:207:GLU:HG3	3:D:209:ALA:N	2.30	0.47
1:A:313:PHE:C	1:A:313:PHE:CD1	2.93	0.47
3:D:234:ARG:HH11	3:D:234:ARG:HG2	1.80	0.47
3:D:404:LYS:HB3	3:D:405:PRO:HD3	1.97	0.46
1:A:426:ARG:HB2	1:A:426:ARG:NH1	2.27	0.46
3:D:279:ILE:O	3:D:282:PHE:HB3	2.16	0.45
3:D:325:ILE:HD13	3:D:388:ILE:HG23	1.98	0.45
1:A:228:GLU:O	1:A:229:ASP:CB	2.63	0.45
1:A:243:GLU:CD	1:A:364:LYS:NZ	2.75	0.45
1:A:302:ARG:CZ	2:B:687:HIS:NE2	2.80	0.45
3:D:325:ILE:HD11	3:D:392:ILE:CG1	2.46	0.45
1:A:435:HIS:O	1:A:438:PHE:HB3	2.17	0.45
3:D:208:SER:O	3:D:212:ARG:HG2	2.17	0.45
1:A:362:MET:HA	1:A:366:GLU:OE2	2.17	0.44
1:A:263:ASP:O	1:A:266:THR:HB	2.17	0.44
1:A:452:MET:O	1:A:456:GLU:HG3	2.17	0.44
3:D:244:LYS:HG3	3:D:244:LYS:O	2.17	0.44
1:A:338:HIS:ND1	1:A:343:GLY:HA3	2.33	0.44
2:B:691:HIS:CE1	2:B:695:GLN:NE2	2.86	0.44
1:A:243:GLU:N	1:A:244:PRO:C	2.76	0.43
1:A:433:LEU:HD22	1:A:437:PHE:CE2	2.53	0.43
1:A:455:LEU:HD12	1:A:455:LEU:HA	1.84	0.43
3:D:322:VAL:HG21	3:D:472:ILE:HD13	2.00	0.43
1:A:302:ARG:HG2	1:A:302:ARG:HH11	1.83	0.43
3:D:334:MET:HG2	3:D:339:VAL:HB	2.00	0.43
1:A:294:LEU:C	1:A:294:LEU:HD23	2.43	0.42
3:D:322:VAL:O	3:D:326:ILE:HG13	2.19	0.42
3:D:251:ASP:HA	3:D:352:PHE:CD1	2.55	0.42
3:D:341:ILE:HD13	3:D:348:MET:HE3	2.01	0.42
1:A:356:LYS:NZ	3:D:403:VAL:HG11	2.34	0.42
3:D:276:GLU:OE1	3:D:276:GLU:HA	2.18	0.42
1:A:321:LYS:HB3	1:A:322:ASP:H	1.70	0.41
1:A:240:LEU:HA	1:A:243:GLU:HG3	2.02	0.41
3:D:330:LEU:HD21	3:D:364:MET:HE1	2.01	0.41
2:B:691:HIS:CE1	2:B:695:GLN:HE22	2.39	0.41
3:D:363:PHE:CE1	3:D:452:LEU:HB3	2.56	0.41
1:A:243:GLU:CB	1:A:244:PRO:C	2.87	0.41
1:A:394:GLU:CD	3:D:434:LYS:HE2	2.45	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:302:ARG:NH1	2:B:687:HIS:CD2	2.89	0.41
1:A:294:LEU:HD21	2:B:691:HIS:HD2	1.86	0.41
1:A:334:ARG:HD2	1:A:347:ASP:OD1	2.20	0.41
3:D:330:LEU:O	3:D:334:MET:HG3	2.20	0.41
1:A:264:PRO:O	1:A:268:ILE:HG13	2.20	0.40
3:D:290:VAL:HG12	3:D:294:GLN:HE21	1.87	0.40
3:D:368:PHE:O	3:D:372:VAL:HG23	2.21	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:240:LEU:CD1	2:B:692:ARG:NE[3_645]	1.66	0.54
1:A:240:LEU:CD1	2:B:692:ARG:CD[3_645]	1.76	0.44

5.3 Torsion angles ⓘ

5.3.1 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	207/242 (86%)	189 (91%)	13 (6%)	5 (2%)	4	5
2	B	7/25 (28%)	7 (100%)	0	0	100	100
3	D	249/284 (88%)	236 (95%)	9 (4%)	4 (2%)	7	11
4	E	5/23 (22%)	5 (100%)	0	0	100	100
All	All	468/574 (82%)	437 (93%)	22 (5%)	9 (2%)	6	8

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	321	LYS
1	A	446	PRO

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Mol	Chain	Res	Type
3	D	358	LYS
1	A	444	ASP
3	D	244	LYS
3	D	464	SER
1	A	442	ILE
3	D	463	MET
1	A	445	THR

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	175/208 (84%)	166 (95%)	9 (5%)	21	37
2	B	8/24 (33%)	8 (100%)	0	100	100
3	D	219/254 (86%)	213 (97%)	6 (3%)	39	62
All	All	402/486 (83%)	387 (96%)	15 (4%)	30	51

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	229	ASP
1	A	236	LEU
1	A	244	PRO
1	A	325	LEU
1	A	335	ASN
1	A	410	GLU
1	A	411	GLN
1	A	426	ARG
1	A	455	LEU
3	D	207	GLU
3	D	237	LEU
3	D	244	LYS
3	D	276	GLU
3	D	309	LEU
3	D	335	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	270	GLN
1	A	275	GLN
1	A	297	GLN
1	A	333	HIS
1	A	335	ASN
1	A	411	GLN
2	B	691	HIS
2	B	695	GLN
3	D	283	GLN
3	D	294	GLN
3	D	308	ASN
3	D	335	ASN
3	D	402	ASN
3	D	451	GLN

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
5	L79	A	463	-	31,31,31	4.24	17 (54%)	41,48,48	3.10	12 (29%)
6	570	D	478	-	44,45,45	2.36	23 (52%)	57,61,61	1.85	9 (15%)

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	L79	A	463	-	3/3/7/12	3/9/50/50	0/4/4/4
6	570	D	478	-	-	3/30/30/30	0/5/5/5

All (40) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	463	L79	C3-C2	-12.22	1.39	1.54
5	A	463	L79	C9-C8	10.53	1.53	1.35
5	A	463	L79	C10-C11	8.73	1.53	1.34
5	A	463	L79	C-C3	-7.37	1.39	1.54
6	D	478	570	C3I-C3G	-6.51	1.34	1.47
5	A	463	L79	C-C1	-6.36	1.39	1.54
6	D	478	570	C3G-N3H	6.01	1.38	1.30
5	A	463	L79	C10-C9	4.83	1.53	1.41
5	A	463	L79	O-C2	-3.99	1.37	1.44
6	D	478	570	C1F-C1A	-3.65	1.35	1.41
5	A	463	L79	O-C1	-3.41	1.37	1.44
6	D	478	570	C1E-C1F	-3.30	1.34	1.39
6	D	478	570	C3J-C3I	-3.11	1.34	1.39
5	A	463	L79	C13-C14	-3.10	1.35	1.39
6	D	478	570	C1F-C1G	3.06	1.56	1.49
6	D	478	570	C1M-C1H	-2.99	1.34	1.39
5	A	463	L79	C25-C12	-2.99	1.34	1.39
5	A	463	L79	C13-C12	-2.98	1.35	1.39
5	A	463	L79	C24-C19	-2.97	1.35	1.39
6	D	478	570	C3N-C3I	-2.95	1.34	1.39
6	D	478	570	C1B-C1A	-2.92	1.35	1.39
6	D	478	570	C1I-C1H	-2.89	1.35	1.39
5	A	463	L79	C19-C14	-2.80	1.35	1.40
5	A	463	L79	O1-C6	-2.71	1.23	1.30
5	A	463	L79	C1-C4	-2.65	1.37	1.50
5	A	463	L79	C25-C24	-2.60	1.34	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	D	478	570	C3M-C3N	-2.51	1.34	1.38
6	D	478	570	CE2-CD2	-2.50	1.34	1.38
6	D	478	570	C3K-C3J	-2.43	1.34	1.38
6	D	478	570	CE1-CD1	-2.42	1.34	1.38
6	D	478	570	C1C-C1B	-2.42	1.34	1.38
6	D	478	570	C1J-C1I	-2.42	1.34	1.38
6	D	478	570	C1A-N	2.42	1.43	1.37
6	D	478	570	C1D-C1E	-2.37	1.34	1.38
6	D	478	570	C1L-C1M	-2.34	1.34	1.38
6	D	478	570	O1-C	-2.26	1.23	1.30
5	A	463	L79	C12-C8	2.21	1.51	1.48
6	D	478	570	CE1-CZ	-2.05	1.34	1.38
6	D	478	570	CD1-CG	-2.04	1.34	1.38
6	D	478	570	CD2-CG	-2.03	1.34	1.38

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	463	L79	O-C2-C11	11.66	126.85	110.56
5	A	463	L79	O-C1-C4	8.91	127.84	109.33
6	D	478	570	C3E-C3D-C3C	-6.81	129.65	135.22
5	A	463	L79	O-C2-C3	6.38	108.77	100.69
6	D	478	570	O3F-C3D-C3E	5.30	122.82	115.88
6	D	478	570	O3F-C3G-N3H	-4.84	109.08	114.37
5	A	463	L79	C16-C15-C14	4.63	117.50	110.11
5	A	463	L79	C22-C20-C19	4.40	117.14	110.11
6	D	478	570	C1F-C1G-C1H	3.96	125.89	119.56
5	A	463	L79	C2-C11-C10	-3.91	113.69	121.04
5	A	463	L79	C12-C8-C9	-3.86	115.73	122.02
6	D	478	570	C1A-C1F-C1G	3.52	124.25	121.96
6	D	478	570	O3F-C3G-C3I	3.06	124.06	118.73
6	D	478	570	O1G-C1G-C1H	-3.02	115.31	120.15
5	A	463	L79	O-C1-C	2.56	109.60	103.73
5	A	463	L79	C-C1-C4	2.54	122.55	115.19
6	D	478	570	CG-CB-CA	2.47	119.93	113.36
5	A	463	L79	C10-C9-C8	-2.26	118.52	121.10
5	A	463	L79	C25-C12-C13	-2.22	116.67	119.25
5	A	463	L79	C3-C-C1	2.15	106.41	102.68
6	D	478	570	O1-C-CA	2.01	120.31	113.51

All (3) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
5	A	463	L79	C1
5	A	463	L79	C2
5	A	463	L79	C3

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	463	L79	O-C1-C4-C5
6	D	478	570	OH-C3A-C3B-C3C
6	D	478	570	CE1-CZ-OH-C3A
6	D	478	570	CE2-CZ-OH-C3A
5	A	463	L79	C13-C12-C8-C9
5	A	463	L79	C25-C12-C8-C9

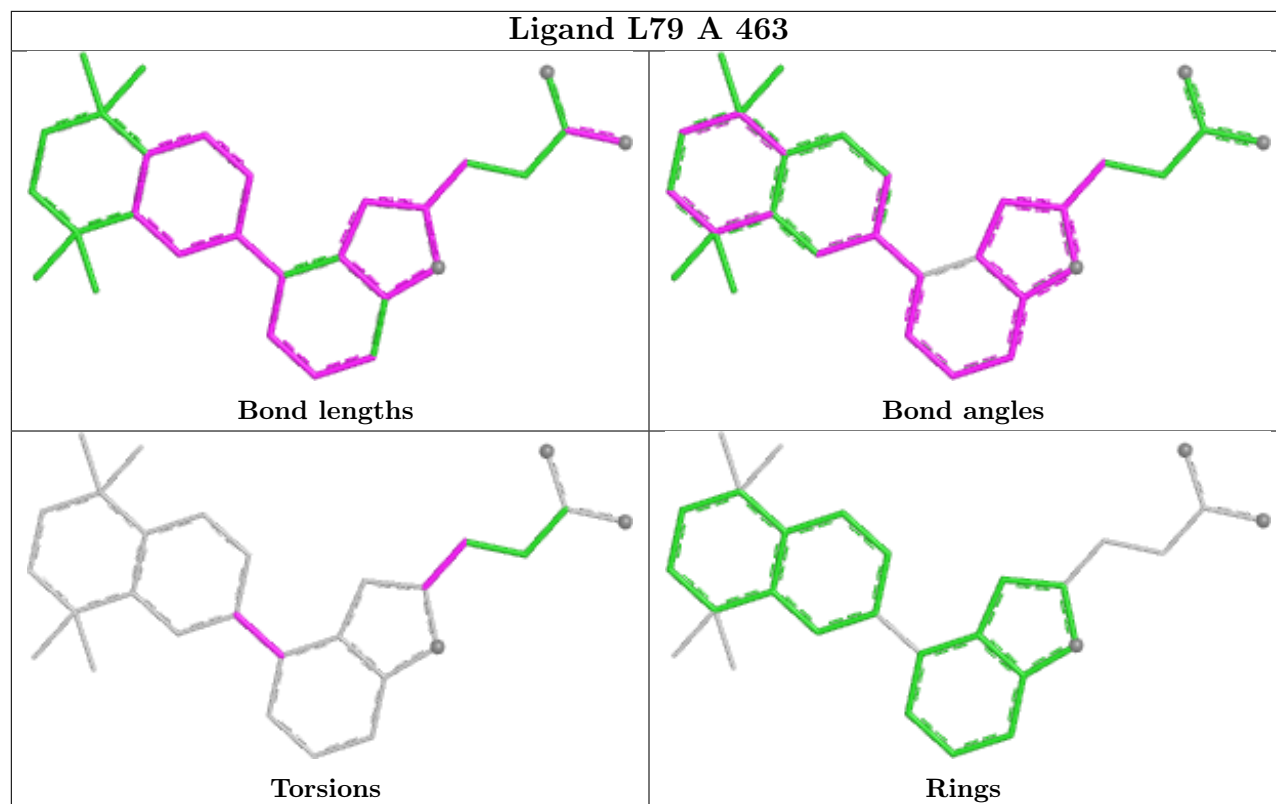
There are no ring outliers.

1 monomer is involved in 2 short contacts:

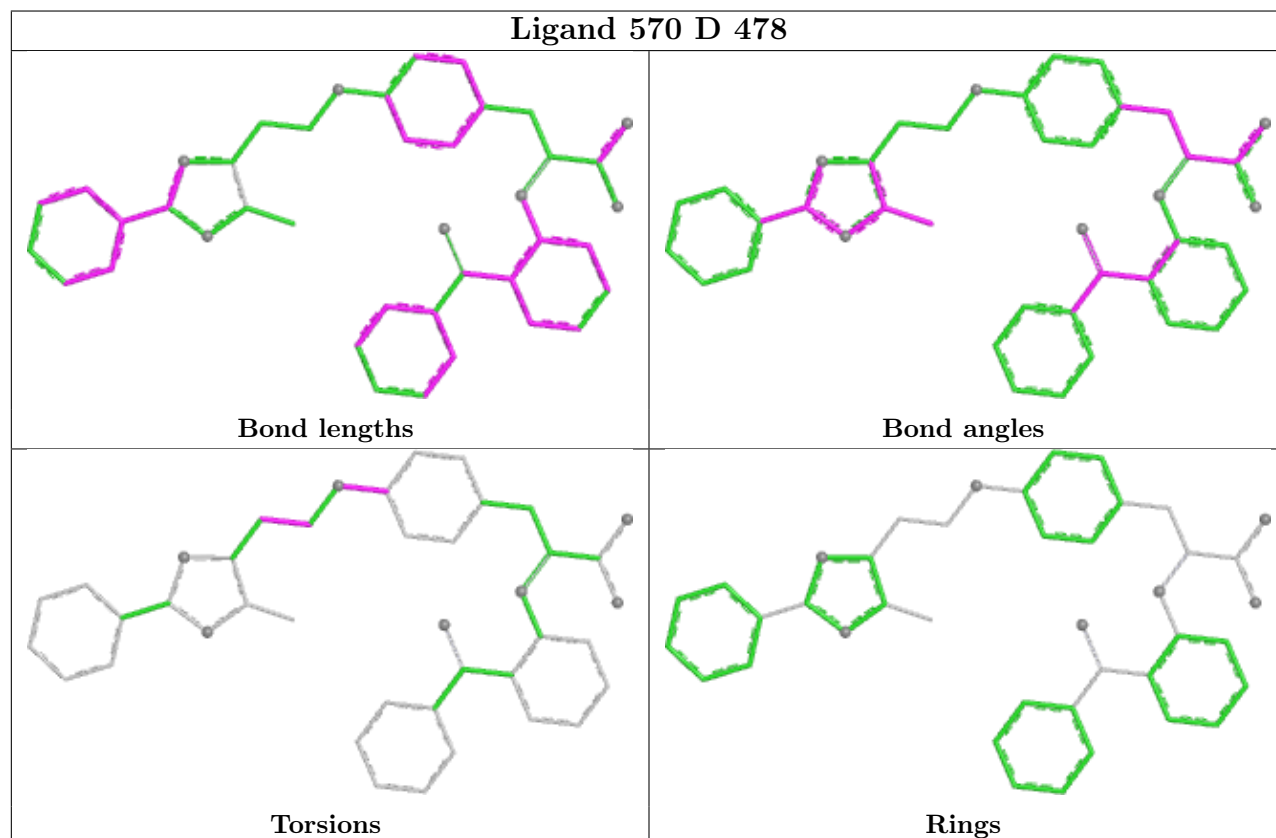
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	463	L79	2	0

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 than 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 L79 A 463



Ligand 570 D 478



5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

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.

6.5 Other polymers

EDS was not executed - this section is therefore empty.