Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 06:03 PM UTC

PDB ID	:	5S7G / pdb_00005s7g
Title	:	XChem group deposition – Crystal Structure of human ACVR1 in complex with XS035844b
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Deposited on	:	2020-12-11
Resolution	:	1.78 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:

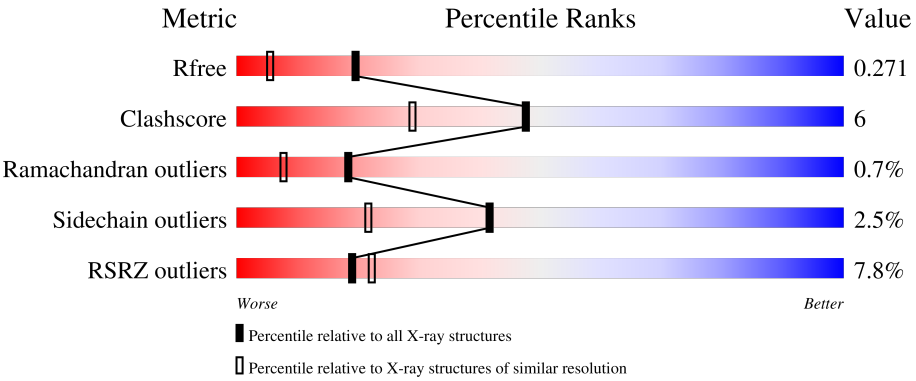
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal 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 1.78 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	1365 (1.78-1.78)
Clashscore	190562	1395 (1.78-1.78)
Ramachandran outliers	187476	1382 (1.78-1.78)
Sidechain outliers	187428	1382 (1.78-1.78)
RSRZ outliers	180081	1365 (1.78-1.78)

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	301	5% 84% 10% 6%
1	B	301	9% 77% 16% 7%

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	PPI	A	509	-	X	-	-
5	PPI	A	510	-	-	X	-
5	PPI	B	505	-	-	X	-

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 5209 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.

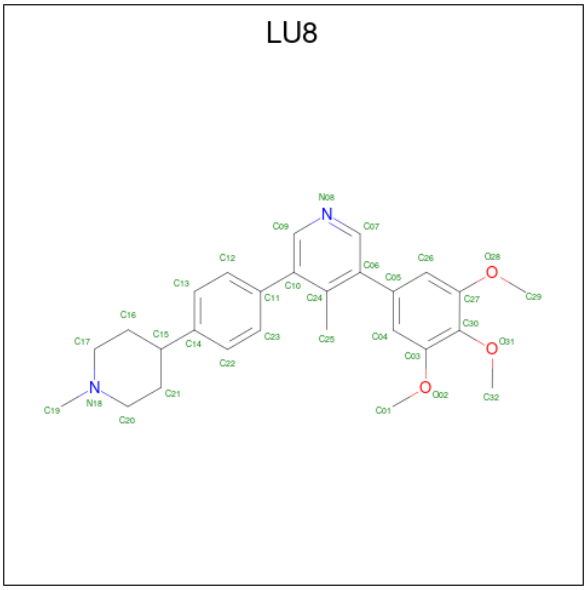
- Molecule 1 is a protein called Activin receptor type-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	284	Total	C	N	O	S	0	8	0
			2301	1473	393	420	15			
1	B	281	Total	C	N	O	S	0	6	0
			2242	1435	382	409	16			

There are 6 discrepancies between the modelled and reference sequences:

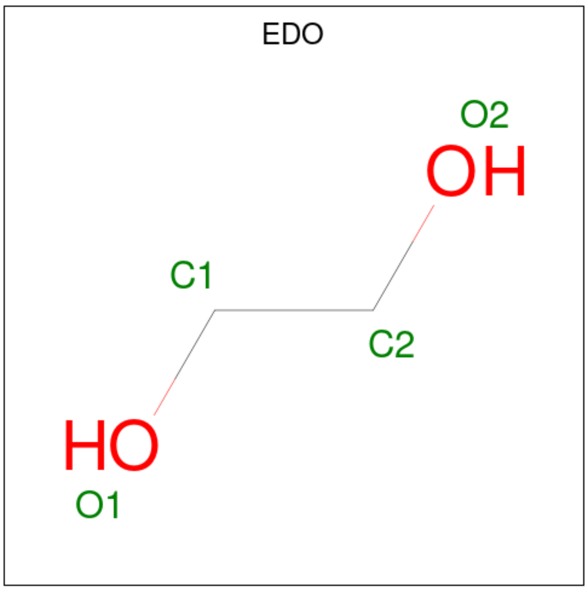
Chain	Residue	Modelled	Actual	Comment	Reference
A	199	SER	-	expression tag	UNP Q04771
A	200	MET	-	expression tag	UNP Q04771
A	207	ASP	GLN	engineered mutation	UNP Q04771
B	199	SER	-	expression tag	UNP Q04771
B	200	MET	-	expression tag	UNP Q04771
B	207	ASP	GLN	engineered mutation	UNP Q04771

- Molecule 2 is 4-methyl-3-[4-(1-methylpiperidin-4-yl)phenyl]-5-(3,4,5-trimethoxyphenyl)pyridine (CCD ID: LU8) (formula: $C_{27}H_{32}N_2O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C N O 32 27 2 3	0	0
2	A	1	Total C N O 32 27 2 3	0	0
2	A	1	Total C N O 32 27 2 3	0	0
2	B	1	Total C N O 32 27 2 3	0	0

- Molecule 3 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0

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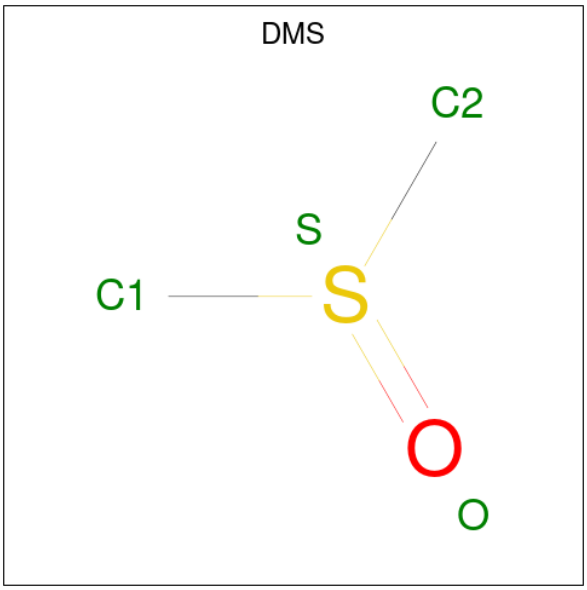
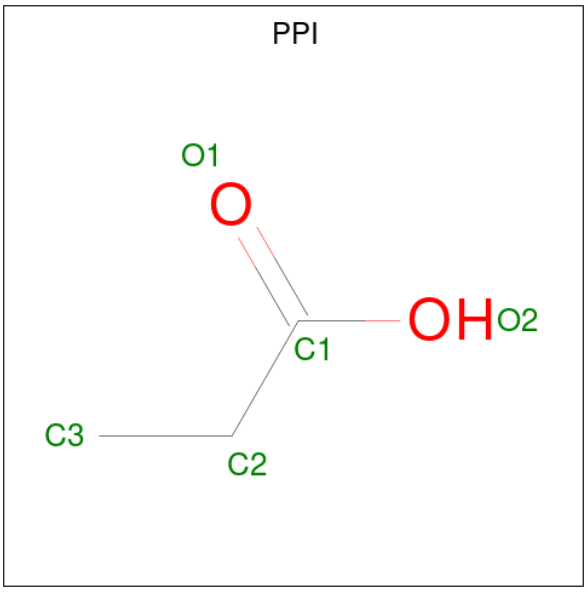
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0

- Molecule 4 is DIMETHYL SULFOXIDE (CCD ID: DMS) (formula: C_2H_6OS).



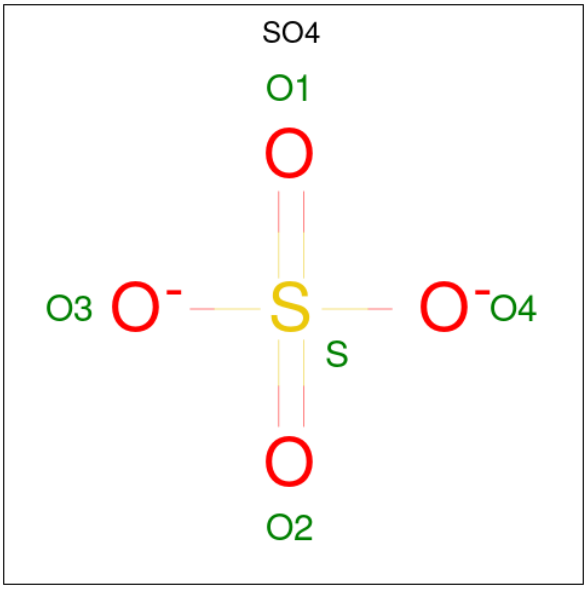
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O S 4 2 1 1	0	0
4	B	1	Total C O S 4 2 1 1	0	0

- Molecule 5 is PROPANOIC ACID (CCD ID: PPI) (formula: $C_3H_6O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 5 3 2	0	0
5	A	1	Total C O 5 3 2	0	0
5	B	1	Total C O 5 3 2	0	0

- Molecule 6 is SULFATE ION (CCD ID: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total O S 5 4 1	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total O S 5 4 1	0	0
6	A	1	Total O S 5 4 1	0	0
6	B	1	Total O S 5 4 1	0	0
6	B	1	Total O S 5 4 1	0	0
6	B	1	Total O S 5 4 1	0	0

- Molecule 7 is water.

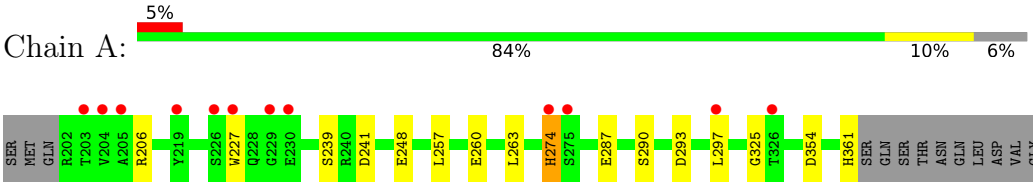
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	230	Total O 230 230	0	0
7	B	207	Total O 207 207	0	0

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.

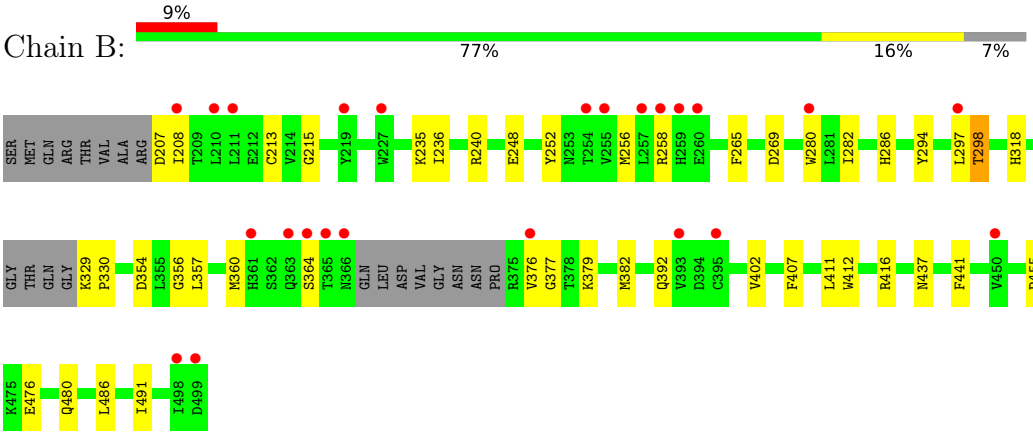
• Molecule 1: Activin receptor type-1

Chain A:



• Molecule 1: Activin receptor type-1

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	128.60Å 84.59Å 89.93Å 90.00° 131.46° 90.00°	Depositor
Resolution (Å)	42.33 – 1.78 42.33 – 1.78	Depositor EDS
% Data completeness (in resolution range)	98.9 (42.33-1.78) 98.9 (42.33-1.78)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.01 (at 1.78Å)	Xtriage
Refinement program	REFMAC 5.8.0258	Depositor
R, R_{free}	0.204 , 0.252 0.221 , 0.271	Depositor DCC
R_{free} test set	3281 reflections (4.74%)	wwPDB-VP
Wilson B-factor (Å^2)	30.5	Xtriage
Anisotropy	0.234	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 46.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.021 for -h-2*l,-k,l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	5209	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 5.25% 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: LU8, EDO, DMS, PPI, SO4

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	1.04	0/2358	1.32	1/3202 (0.0%)
1	B	1.05	0/2299	1.37	0/3124
All	All	1.04	0/4657	1.35	1/6326 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	325	GLY	CA-C-O	-6.42	117.83	122.45

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	2301	0	2256	22	1
1	B	2242	0	2177	27	1
2	A	96	0	0	2	0
2	B	32	0	0	0	0
3	A	32	0	48	1	0
3	B	16	0	24	1	0
4	A	4	0	6	0	0
4	B	4	0	6	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	10	0	10	5	0
5	B	5	0	5	6	0
6	A	15	0	0	0	0
6	B	15	0	0	0	0
7	A	230	0	0	4	0
7	B	207	0	0	2	0
All	All	5209	0	4532	52	1

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 (52) 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:248:GLU:OE1	5:B:505:PPI:H31	1.70	0.91
1:A:248:GLU:OE2	5:A:510:PPI:C3	2.26	0.84
1:A:248:GLU:OE2	5:A:510:PPI:H32	1.83	0.79
1:A:274:HIS:CB	7:A:745:HOH:O	2.33	0.76
1:B:235:LYS:NZ	5:B:505:PPI:H32	2.04	0.73
1:A:263:LEU:HD23	5:A:510:PPI:H22	1.75	0.69
1:B:256:MET:HB2	1:B:329:LYS:HB2	1.76	0.67
1:A:248:GLU:OE2	5:A:510:PPI:H33	1.95	0.65
1:A:257:LEU:HA	3:A:514:EDO:H21	1.82	0.61
1:B:294:TYR:O	1:B:298:THR:HG23	2.00	0.61
1:B:411[B]:LEU:HG	1:B:474:MET:HE2	1.83	0.61
1:B:235:LYS:HZ2	5:B:505:PPI:H32	1.64	0.60
1:B:294:TYR:O	1:B:298:THR:CG2	2.50	0.60
1:A:476:GLU:HB3	1:A:486:LEU:HG	1.84	0.58
1:B:322:GLU:HG3	1:B:330:PRO:HA	1.85	0.57
1:B:356:GLY:HA3	5:B:505:PPI:H21	1.88	0.55
1:B:455:PRO:O	7:B:601:HOH:O	2.18	0.55
1:A:446:LYS:HE2	7:A:656:HOH:O	2.07	0.54
1:A:454:ARG:HH22	1:A:480[B]:GLN:CD	2.15	0.53
1:A:260:GLU:OE2	7:A:601:HOH:O	2.19	0.52
1:A:407:PHE:CE2	1:A:491:ILE:HG21	2.46	0.51
1:B:330:PRO:HG3	1:B:360:MET:HE3	1.91	0.51
1:B:236:ILE:HG12	1:B:280:TRP:CZ3	2.46	0.50
1:B:256:MET:HB2	1:B:329:LYS:CB	2.40	0.49
1:A:476:GLU:OE1	1:A:486:LEU:HD11	2.12	0.49
1:B:252:TYR:CD1	1:B:265:PHE:HB2	2.48	0.49
1:B:235:LYS:HZ3	5:B:505:PPI:H32	1.75	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:476:GLU:HB3	1:B:486:LEU:HG	1.96	0.48
1:B:357:LEU:HD13	1:B:376:VAL:HB	1.96	0.48
1:B:407[B]:PHE:CE2	1:B:491:ILE:HG21	2.49	0.47
5:B:505:PPI:H33	7:B:630:HOH:O	2.15	0.46
1:A:470:LEU:O	1:A:474:MET:HG2	2.15	0.46
1:A:427:TYR:CD2	1:A:427:TYR:C	2.95	0.45
1:A:227:TRP:O	1:A:227:TRP:CE3	2.69	0.45
1:B:412:TRP:CZ2	1:B:416:ARG:HD2	2.51	0.45
1:B:324:PHE:HE1	1:B:364:SER:CB	2.30	0.45
1:B:379:LYS:HD2	1:B:441:PHE:N	2.32	0.45
2:A:508:LU8:C25	2:A:508:LU8:C23	2.94	0.44
1:B:318:HIS:O	1:B:329:LYS:HE3	2.18	0.44
1:A:290:SER:HG	1:A:293[B]:ASP:CG	2.27	0.43
1:B:213:CYS:SG	1:B:215:GLY:O	2.76	0.43
1:A:412:TRP:CZ2	1:A:416:ARG:HD2	2.56	0.41
1:B:286:HIS:CE1	3:B:508:EDO:H21	2.55	0.41
1:B:470:LEU:O	1:B:474:MET:HG2	2.20	0.41
1:A:361:HIS:HB2	1:A:396:PHE:CD1	2.56	0.41
1:A:379:LYS:NZ	7:A:618:HOH:O	2.53	0.41
1:B:208:ILE:CD1	1:B:282:ILE:HD13	2.50	0.41
1:A:428:LYS:HA	1:A:428:LYS:HD3	1.93	0.40
1:A:454:ARG:NH2	1:A:480[B]:GLN:OE1	2.53	0.40
2:A:501:LU8:C12	2:A:501:LU8:C25	3.00	0.40
1:A:354:ASP:H	5:A:510:PPI:C2	2.34	0.40
1:B:377:GLY:O	1:B:382:MET:HE3	2.21	0.40

All (1) 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:206:ARG:NH2	1:B:269:ASP:OD2[2_555]	2.15	0.05

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	288/301 (96%)	279 (97%)	8 (3%)	1 (0%)	36 22
1	B	281/301 (93%)	274 (98%)	4 (1%)	3 (1%)	11 3
All	All	569/602 (94%)	553 (97%)	12 (2%)	4 (1%)	18 8

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	274	HIS
1	B	258	ARG
1	B	354	ASP
1	B	392	GLN

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	248/270 (92%)	243 (98%)	5 (2%)	48 29
1	B	241/270 (89%)	234 (97%)	7 (3%)	37 16
All	All	489/540 (91%)	477 (98%)	12 (2%)	42 22

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	239	SER
1	A	241	ASP
1	A	287	GLU
1	A	297	LEU
1	A	490	ARG
1	B	207	ASP
1	B	240	ARG
1	B	297	LEU
1	B	298	THR

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Mol	Chain	Res	Type
1	B	402	VAL
1	B	437	ASN
1	B	480	GLN

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	284	HIS
1	B	278	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)

27 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	EDO	A	516	-	3,3,3	0.08	0	2,2,2	0.18	0
6	SO4	A	512	-	4,4,4	0.50	0	6,6,6	0.16	0
3	EDO	A	505	-	3,3,3	0.44	0	2,2,2	0.65	0
4	DMS	A	506	-	3,3,3	0.22	0	3,3,3	0.09	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
6	SO4	B	502	-	4,4,4	0.26	0	6,6,6	0.27	0
3	EDO	B	503	-	3,3,3	0.22	0	2,2,2	0.23	0
3	EDO	A	504	-	3,3,3	0.11	0	2,2,2	0.25	0
3	EDO	A	502	-	3,3,3	0.19	0	2,2,2	0.28	0
5	PPI	A	510	-	4,4,4	1.66	1 (25%)	4,4,4	1.09	0
3	EDO	B	509	-	3,3,3	0.14	0	2,2,2	0.30	0
2	LU8	A	507	-	35,35,35	0.56	0	47,49,49	1.71	8 (17%)
3	EDO	B	510	-	3,3,3	0.06	0	2,2,2	0.12	0
2	LU8	B	501	-	35,35,35	0.68	0	47,49,49	1.39	7 (14%)
6	SO4	B	506	-	4,4,4	0.34	0	6,6,6	0.06	0
2	LU8	A	501	-	35,35,35	0.87	2 (5%)	47,49,49	1.58	9 (19%)
2	LU8	A	508	-	35,35,35	0.68	0	47,49,49	2.05	11 (23%)
6	SO4	A	513	-	4,4,4	0.36	0	6,6,6	0.24	0
3	EDO	A	503	-	3,3,3	0.32	0	2,2,2	0.46	0
6	SO4	B	507	-	4,4,4	0.31	0	6,6,6	0.11	0
5	PPI	A	509	-	4,4,4	1.02	0	4,4,4	1.81	2 (50%)
6	SO4	A	511	-	4,4,4	0.36	0	6,6,6	0.24	0
4	DMS	B	504	-	3,3,3	0.24	0	3,3,3	0.05	0
5	PPI	B	505	-	4,4,4	1.02	0	4,4,4	1.37	1 (25%)
3	EDO	A	515	-	3,3,3	0.21	0	2,2,2	0.36	0
3	EDO	A	514	-	3,3,3	0.55	0	2,2,2	0.70	0
3	EDO	A	517	-	3,3,3	0.22	0	2,2,2	0.25	0
3	EDO	B	508	-	3,3,3	0.34	0	2,2,2	0.45	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
3	EDO	A	516	-	-	1/1/1/1	-
3	EDO	A	505	-	-	0/1/1/1	-
3	EDO	B	503	-	-	0/1/1/1	-
3	EDO	A	504	-	-	0/1/1/1	-
3	EDO	A	502	-	-	1/1/1/1	-
5	PPI	A	510	-	-	2/2/2/2	-
3	EDO	B	509	-	-	1/1/1/1	-
2	LU8	A	507	-	-	1/18/28/28	0/4/4/4
3	EDO	B	510	-	-	0/1/1/1	-
2	LU8	B	501	-	-	2/18/28/28	0/4/4/4
2	LU8	A	501	-	-	0/18/28/28	0/4/4/4

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	LU8	A	508	-	-	2/18/28/28	0/4/4/4
3	EDO	A	503	-	-	0/1/1/1	-
5	PPI	A	509	-	-	2/2/2/2	-
5	PPI	B	505	-	-	2/2/2/2	-
3	EDO	A	515	-	-	0/1/1/1	-
3	EDO	A	514	-	-	1/1/1/1	-
3	EDO	A	517	-	-	1/1/1/1	-
3	EDO	B	508	-	-	1/1/1/1	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	510	PPI	O1-C1	2.68	1.30	1.22
2	A	501	LU8	C27-C30	-2.13	1.36	1.41
2	A	501	LU8	C14-C15	-2.04	1.48	1.52

All (38) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	508	LU8	C01-O02-C03	6.11	126.48	117.51
2	A	508	LU8	C29-O28-C27	5.44	125.49	117.51
2	A	508	LU8	C20-C21-C15	4.79	116.61	111.00
2	A	501	LU8	C01-O02-C03	4.74	124.47	117.51
2	B	501	LU8	C29-O28-C27	4.55	124.19	117.51
2	A	508	LU8	C17-C16-C15	4.52	116.29	111.00
2	A	507	LU8	O28-C27-C30	4.41	122.70	115.14
2	A	507	LU8	C26-C05-C06	-4.27	113.45	120.61
2	A	507	LU8	C01-O02-C03	4.20	123.67	117.51
2	A	508	LU8	C09-N08-C07	4.02	122.98	117.51
2	A	501	LU8	C16-C17-N18	3.91	116.24	111.20
2	A	507	LU8	C04-C05-C06	3.76	126.92	120.61
2	A	508	LU8	C16-C15-C21	3.59	117.49	109.68
2	A	507	LU8	O28-C27-C26	-3.49	118.08	124.08
2	A	508	LU8	C06-C07-N08	-3.38	119.51	124.27
2	A	501	LU8	C09-N08-C07	3.11	121.73	117.51
2	A	501	LU8	C20-N18-C17	2.98	114.28	109.54
2	A	507	LU8	C09-N08-C07	2.83	121.36	117.51
2	A	507	LU8	C06-C07-N08	-2.67	120.50	124.27
2	A	508	LU8	C32-O31-C30	2.58	121.75	114.74
5	A	509	PPI	O2-C1-O1	-2.56	116.75	123.33
2	A	501	LU8	O02-C03-C30	2.51	119.45	115.14

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	501	LU8	C17-C16-C15	2.36	113.76	111.00
2	A	507	LU8	C10-C09-N08	-2.35	120.96	124.27
2	B	501	LU8	O02-C03-C04	-2.35	120.03	124.08
5	A	509	PPI	O2-C1-C2	2.34	123.33	113.49
2	B	501	LU8	C01-O02-C03	2.34	120.94	117.51
2	A	501	LU8	C10-C09-N08	-2.27	121.08	124.27
2	B	501	LU8	C09-N08-C07	2.25	120.57	117.51
2	A	501	LU8	C06-C07-N08	-2.25	121.10	124.27
2	A	508	LU8	C10-C09-N08	-2.19	121.19	124.27
2	A	501	LU8	C17-C16-C15	2.16	113.53	111.00
2	A	501	LU8	C29-O28-C27	2.15	120.66	117.51
2	A	508	LU8	C22-C14-C15	-2.06	115.86	121.09
2	A	508	LU8	C13-C14-C15	2.06	126.30	121.09
2	B	501	LU8	C10-C09-N08	-2.05	121.38	124.27
5	B	505	PPI	O2-C1-C2	2.04	122.06	113.49
2	B	501	LU8	C06-C07-N08	-2.03	121.41	124.27

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	509	EDO	O1-C1-C2-O2
5	A	510	PPI	O1-C1-C2-C3
3	A	516	EDO	O1-C1-C2-O2
5	A	509	PPI	O1-C1-C2-C3
2	B	501	LU8	C13-C14-C15-C21
3	A	517	EDO	O1-C1-C2-O2
5	A	509	PPI	O2-C1-C2-C3
2	B	501	LU8	C22-C14-C15-C21
3	B	508	EDO	O1-C1-C2-O2
2	A	508	LU8	C13-C14-C15-C16
3	A	502	EDO	O1-C1-C2-O2
3	A	514	EDO	O1-C1-C2-O2
5	A	510	PPI	O2-C1-C2-C3
5	B	505	PPI	O1-C1-C2-C3
5	B	505	PPI	O2-C1-C2-C3
2	A	507	LU8	C26-C05-C06-C07
2	A	508	LU8	C04-C05-C06-C07

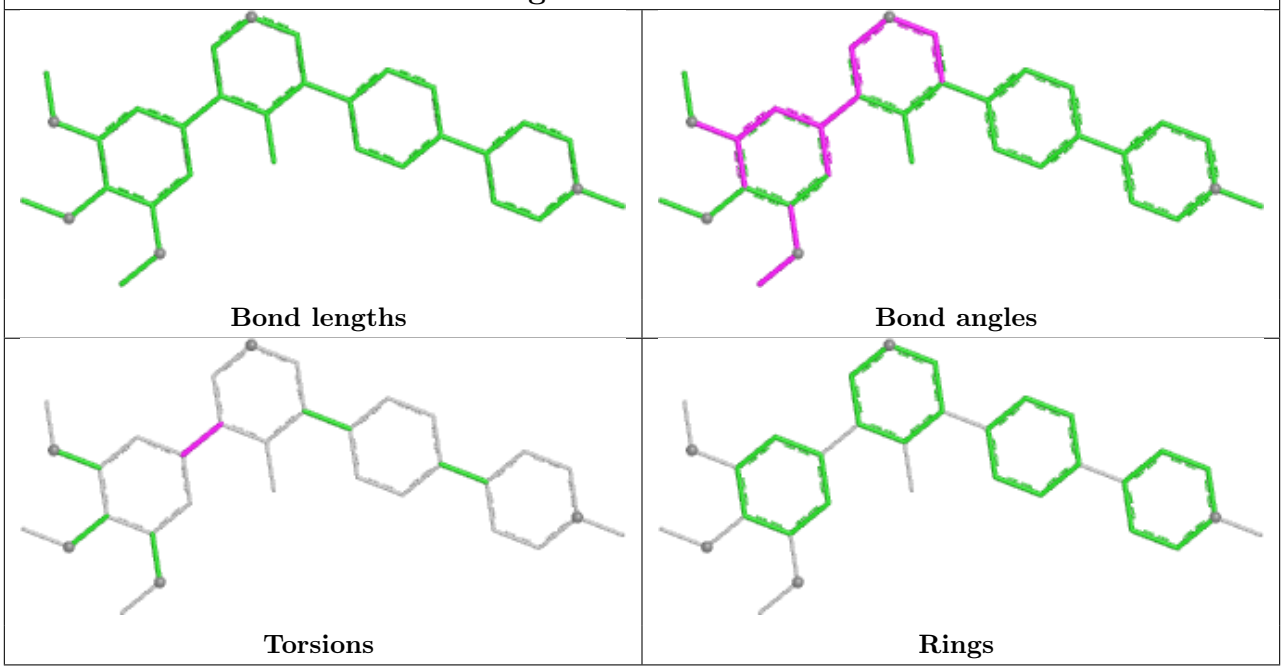
There are no ring outliers.

6 monomers are involved in 15 short contacts:

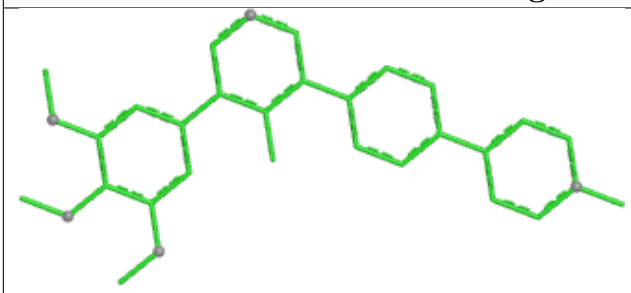
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	510	PPI	5	0
2	A	501	LU8	1	0
2	A	508	LU8	1	0
5	B	505	PPI	6	0
3	A	514	EDO	1	0
3	B	508	EDO	1	0

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 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.

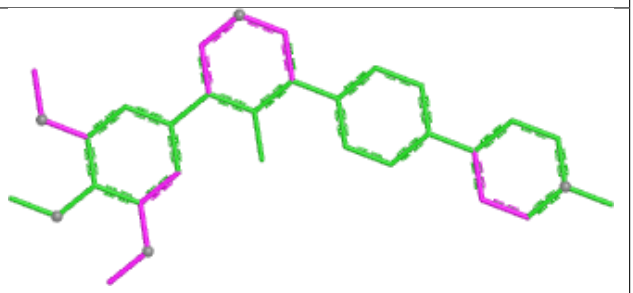
Ligand LU8 A 507



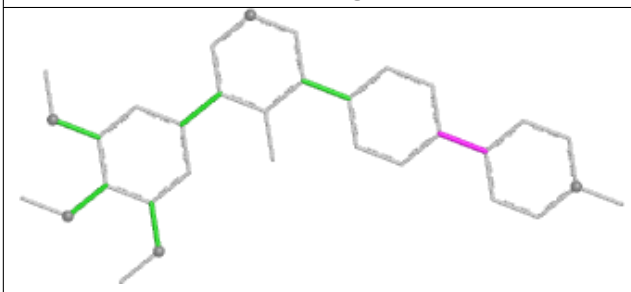
Ligand LU8 B 501



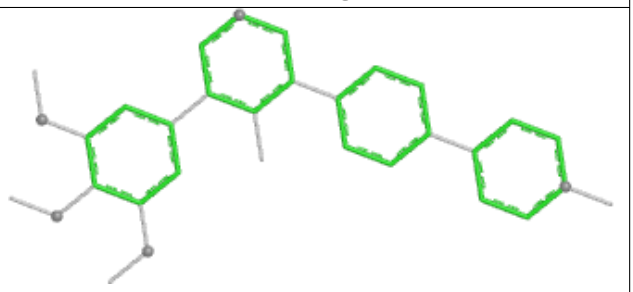
Bond lengths



Bond angles

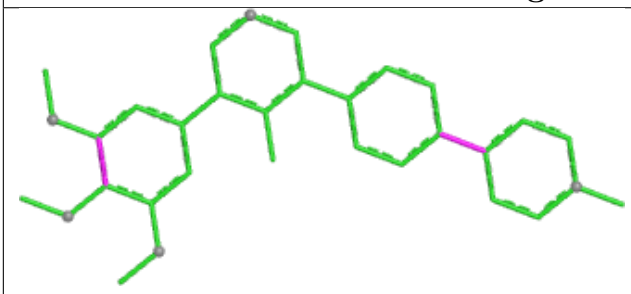


Torsions

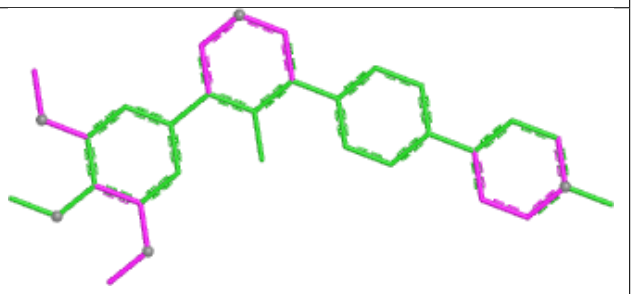


Rings

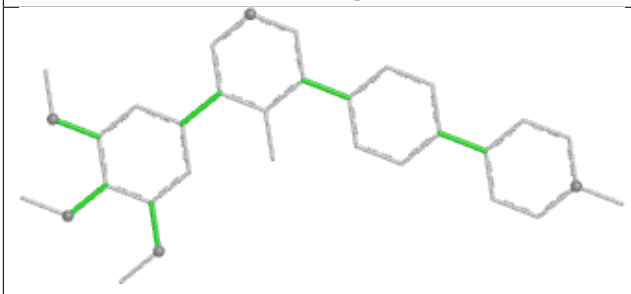
Ligand LU8 A 501



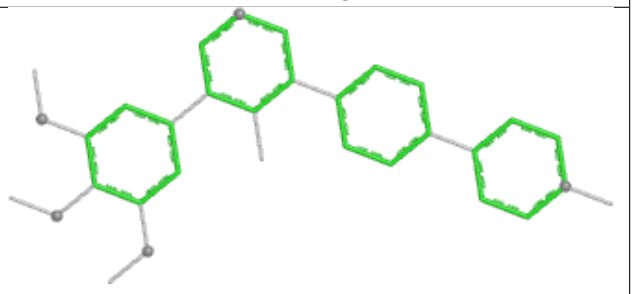
Bond lengths



Bond angles

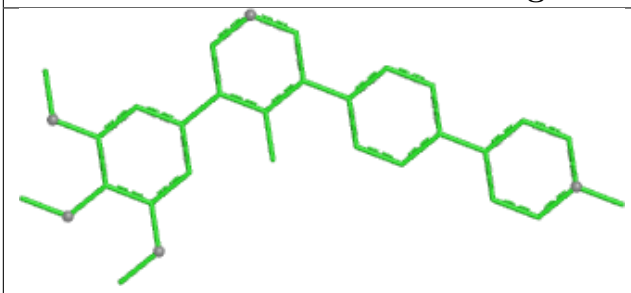


Torsions

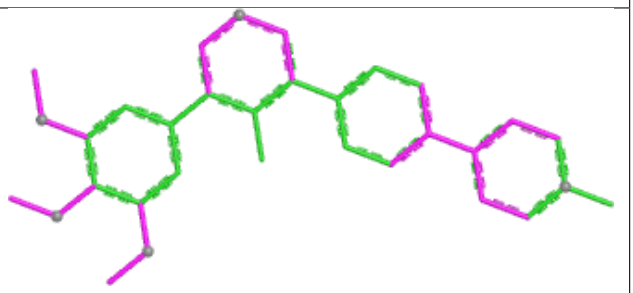


Rings

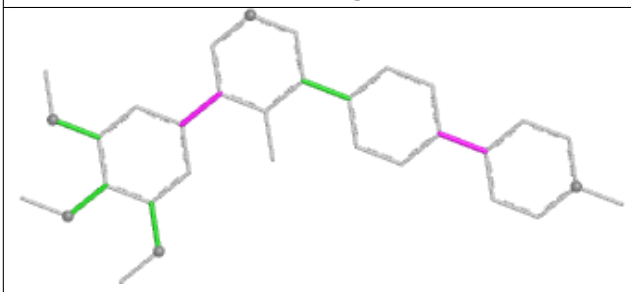
Ligand LU8 A 508



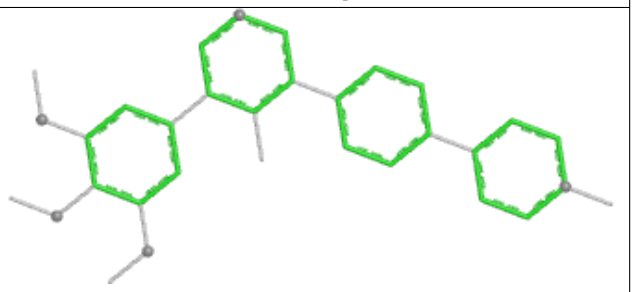
Bond lengths



Bond angles



Torsions



Rings

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

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	284/301 (94%)	0.43	16 (5%)	30	36	15, 35, 67, 101	8 (2%)
1	B	281/301 (93%)	0.71	28 (9%)	12	14	14, 42, 80, 128	6 (2%)
All	All	565/602 (93%)	0.57	44 (7%)	19	22	14, 39, 75, 128	14 (2%)

All (44) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	364	SER	7.5
1	B	324	PHE	4.8
1	B	255	VAL	4.8
1	B	297	LEU	4.4
1	B	257	LEU	4.3
1	A	204	VAL	4.1
1	A	227	TRP	4.1
1	A	205	ALA	4.0
1	B	208	ILE	3.6
1	B	323	ILE	3.6
1	B	227	TRP	3.5
1	A	297	LEU	3.5
1	A	498	ILE	3.4
1	A	326	THR	3.3
1	B	393	VAL	3.3
1	B	499	ASP	3.2
1	B	365	THR	3.0
1	B	254	THR	3.0
1	B	363	GLN	3.0
1	A	274	HIS	2.9
1	B	376	VAL	2.8
1	B	321	ILE	2.7
1	B	498	ILE	2.7
1	B	211	LEU	2.6

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Mol	Chain	Res	Type	RSRZ
1	B	258	ARG	2.6
1	B	259	HIS	2.5
1	A	219	TYR	2.5
1	A	229	GLY	2.4
1	B	450	VAL	2.3
1	B	260	GLU	2.3
1	A	203	THR	2.3
1	A	489	LEU	2.3
1	A	230	GLU	2.3
1	A	275	SER	2.2
1	B	366	ASN	2.2
1	A	226	SER	2.2
1	B	395[A]	CYS	2.2
1	B	210	LEU	2.2
1	B	322	GLU	2.1
1	B	361	HIS	2.1
1	B	280	TRP	2.1
1	A	473	LEU	2.1
1	A	488	ALA	2.1
1	B	219	TYR	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
6	SO4	B	507	5/5	0.63	0.13	112,113,119,119	0
5	PPI	B	505	5/5	0.71	0.21	71,79,89,91	0
5	PPI	A	509	5/5	0.73	0.16	58,61,63,64	0

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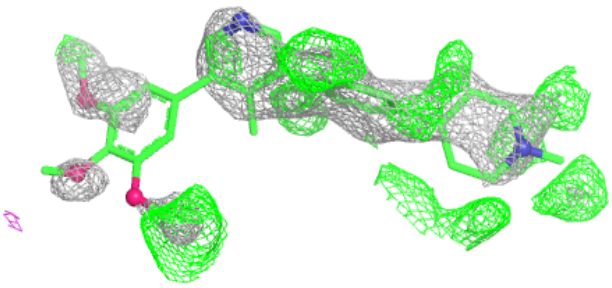
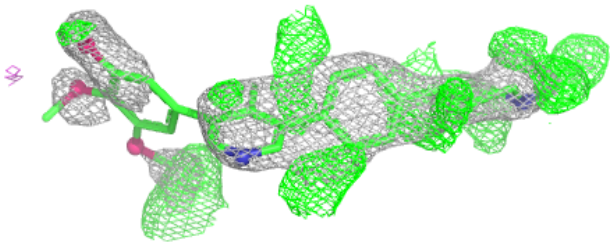
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	SO4	B	506	5/5	0.75	0.09	107,114,119,121	5
3	EDO	A	515	4/4	0.77	0.20	70,76,76,81	0
3	EDO	A	516	4/4	0.77	0.16	81,82,82,82	0
2	LU8	A	507	32/32	0.78	0.38	49,56,64,65	32
3	EDO	A	504	4/4	0.78	0.20	72,72,76,78	0
5	PPI	A	510	5/5	0.79	0.20	28,30,49,51	0
3	EDO	B	508	4/4	0.79	0.23	51,54,67,71	0
4	DMS	A	506	4/4	0.83	0.21	80,82,85,88	0
3	EDO	B	503	4/4	0.84	0.20	68,71,72,82	0
3	EDO	A	517	4/4	0.84	0.14	52,56,58,62	0
3	EDO	B	509	4/4	0.84	0.14	57,63,66,66	0
3	EDO	A	514	4/4	0.85	0.14	39,40,42,48	0
3	EDO	B	510	4/4	0.85	0.19	91,91,92,96	0
4	DMS	B	504	4/4	0.86	0.13	89,90,91,93	0
3	EDO	A	505	4/4	0.89	0.13	33,44,45,48	0
3	EDO	A	503	4/4	0.91	0.11	35,38,39,40	0
2	LU8	A	508	32/32	0.92	0.11	37,44,82,86	0
3	EDO	A	502	4/4	0.92	0.12	38,49,53,58	0
2	LU8	B	501	32/32	0.94	0.10	33,38,75,82	0
2	LU8	A	501	32/32	0.95	0.08	26,30,65,68	0
6	SO4	B	502	5/5	0.96	0.06	44,45,52,54	0
6	SO4	A	512	5/5	0.97	0.06	33,37,44,49	0
6	SO4	A	513	5/5	0.98	0.04	29,32,35,36	5
6	SO4	A	511	5/5	0.98	0.07	32,34,35,36	0

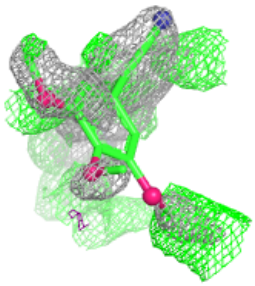
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around LU8 A 507:

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

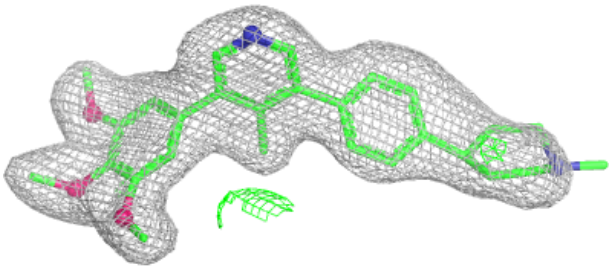


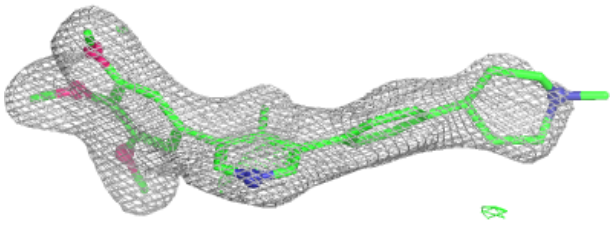


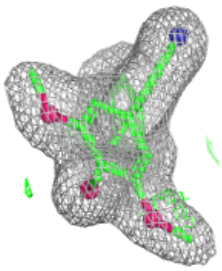


Electron density around LU8 A 508:

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

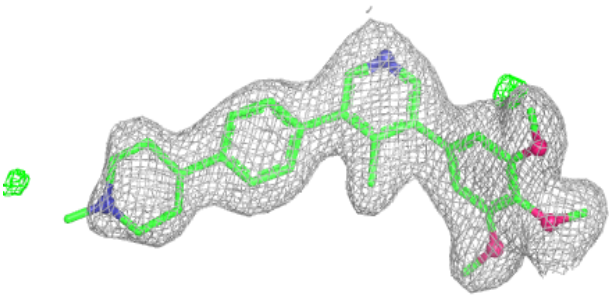


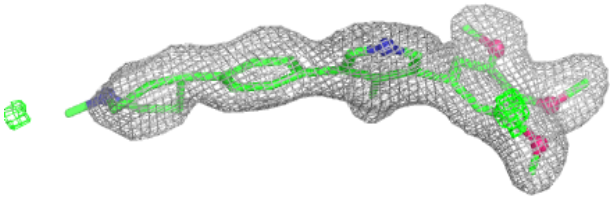


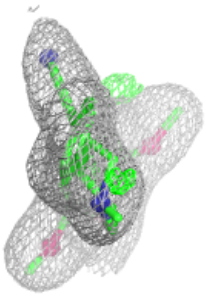


Electron density around LU8 B 501:

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

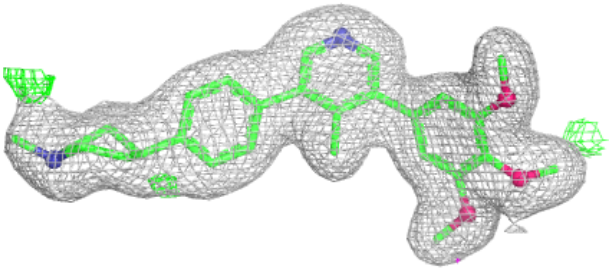


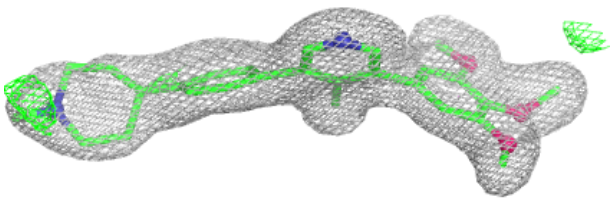


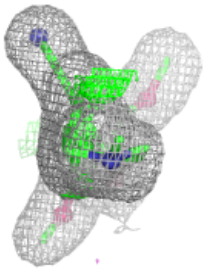


Electron density around LU8 A 501:

$2mF_o$-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.