Full wwPDB X-ray Structure Validation Report (i)

Mar 3, 2024 – 01:43 AM EST

PDB ID	:	6B6G
Title	:	Crystal Structure of GABA Aminotransferase bound to (S)-3-Amino-4-(difluoromethylenyl)cyclopent-1-ene-1-carboxylic acid, an Potent Inactivatorfor the Treatment of Addiction
Authors	:	Mascarenhas, R.; Juncosa, J.I.; Takaya, K.; Le, L.V.; Moschitto, M.J.; Silverman, R.B.; Liu, D.
Deposited on	:	2017-10-02
Resolution	:	1.95 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 (i) 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 (i)) were used in the production of this report:

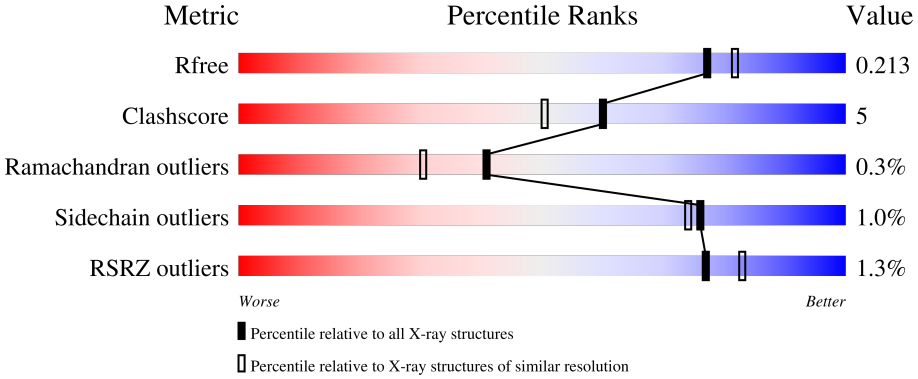
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 1.95 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}	130704	2580 (1.96-1.96)
Clashscore	141614	2705 (1.96-1.96)
Ramachandran outliers	138981	2678 (1.96-1.96)
Sidechain outliers	138945	2678 (1.96-1.96)
RSRZ outliers	127900	2539 (1.96-1.96)

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	462	.% 93% 6% •
1	B	462	4% 86% 13%
1	C	462	91% 8%
1	D	462	90% 8% •

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 16396 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.

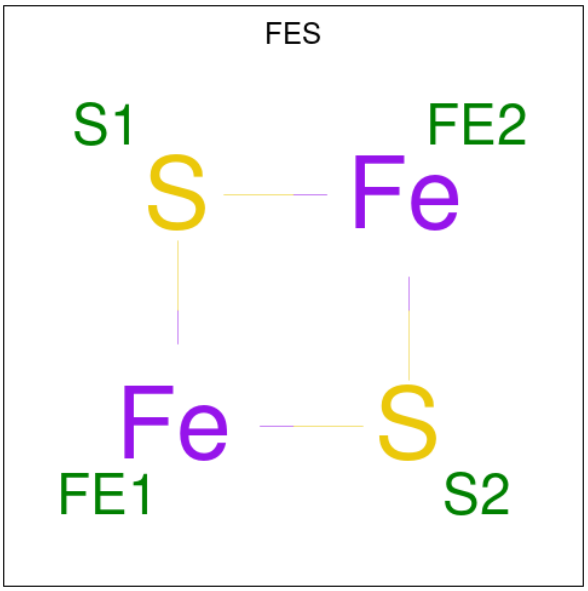
- Molecule 1 is a protein called 4-aminobutyrate aminotransferase, mitochondrial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	461	3725	2379	644	677	25	0	12	0
1	B	462	3717	2368	643	681	25	0	9	0
1	C	462	3719	2372	643	679	25	0	9	0
1	D	462	3767	2404	654	683	26	0	16	0

There are 8 discrepancies between the modelled and reference sequences:

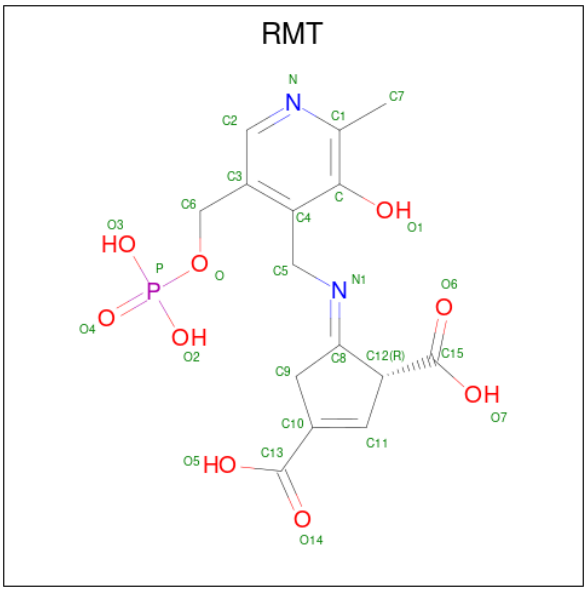
Chain	Residue	Modelled	Actual	Comment	Reference
A	158	GLU	GLN	conflict	UNP P80147
A	472	ALA	LYS	conflict	UNP P80147
B	158	GLU	GLN	conflict	UNP P80147
B	472	ALA	LYS	conflict	UNP P80147
C	158	GLU	GLN	conflict	UNP P80147
C	472	ALA	LYS	conflict	UNP P80147
D	158	GLU	GLN	conflict	UNP P80147
D	472	ALA	LYS	conflict	UNP P80147

- Molecule 2 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe_2S_2).



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

- Molecule 3 is (3R,4E)-4-[({3-hydroxy-2-methyl-5-[(phosphonooxy)methyl]pyridin-4-yl }methyl)imino]cyclopent-1-ene-1,3-dicarboxylic acid (three-letter code: RMT) (formula: $C_{15}H_{17}N_2O_9P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	27	15	2	9	1	0	0

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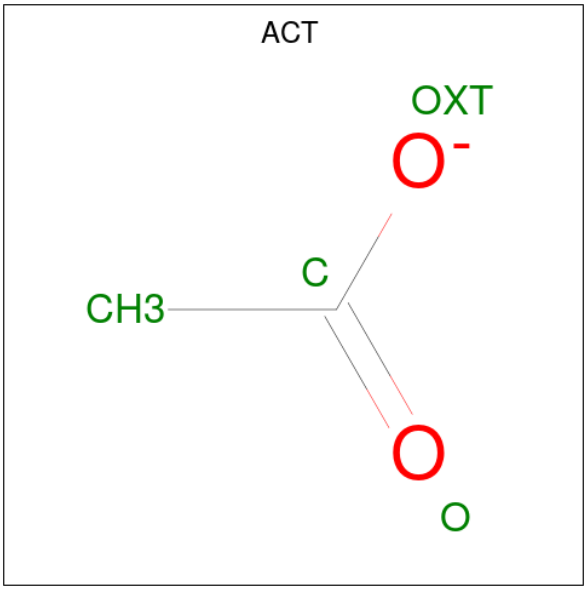
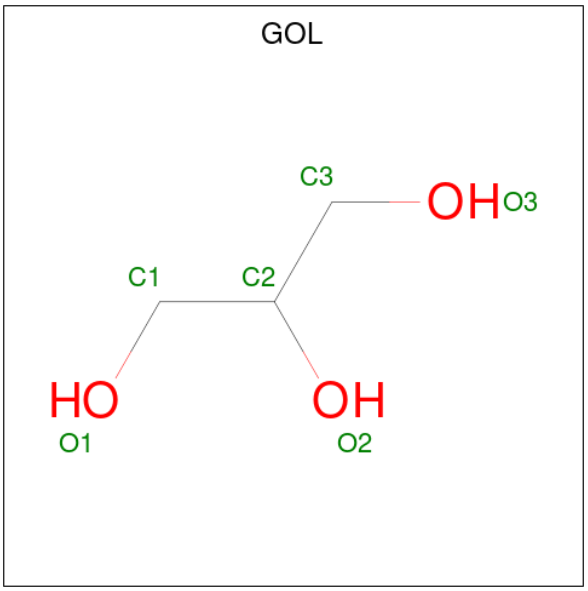
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	B	1	15	8	1	5	1	0	0
			Total	C	N	O	P		
3	C	1	27	15	2	9	1	0	0
			Total	C	N	O	P		
3	D	1	27	15	2	9	1	0	0

- Molecule 4 is ACETATE ION (three-letter code: ACT) (formula: $C_2H_3O_2$).



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

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
5	B	1	6	3	3	0	0
			Total	C	O		
5	C	1	6	3	3	0	0

- Molecule 6 is water.

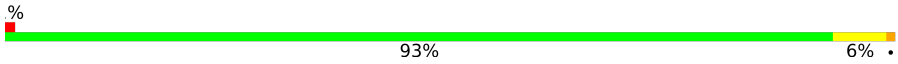
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
6	A	307	307	307	0	0
			Total	O		
6	B	249	249	249	0	0
			Total	O		
6	C	367	367	367	0	0
			Total	O		
6	D	413	413	413	0	0

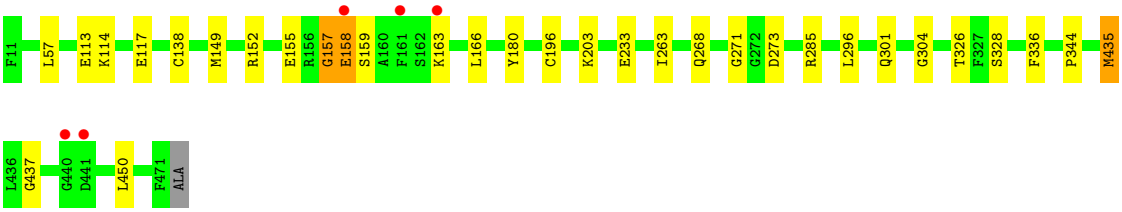
3 Residue-property plots (i)

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: 4-aminobutyrate aminotransferase, mitochondrial

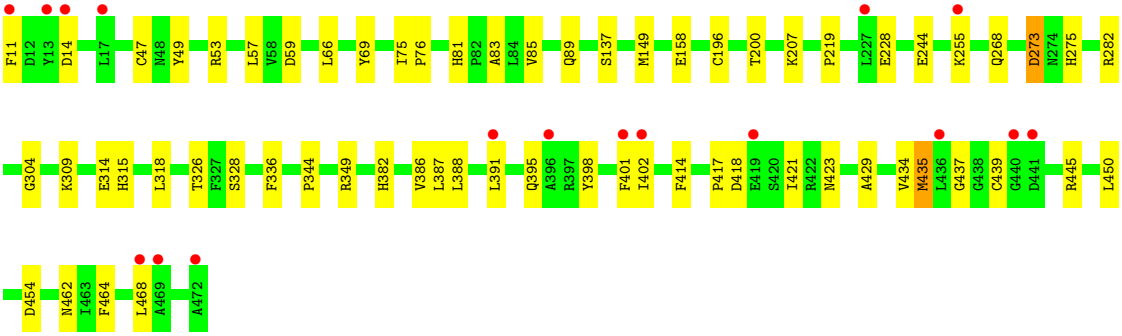
Chain A:





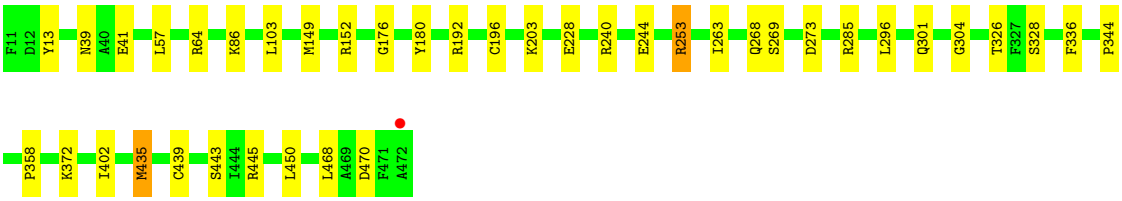
• Molecule 1: 4-aminobutyrate aminotransferase, mitochondrial

Chain B:



• Molecule 1: 4-aminobutyrate aminotransferase, mitochondrial

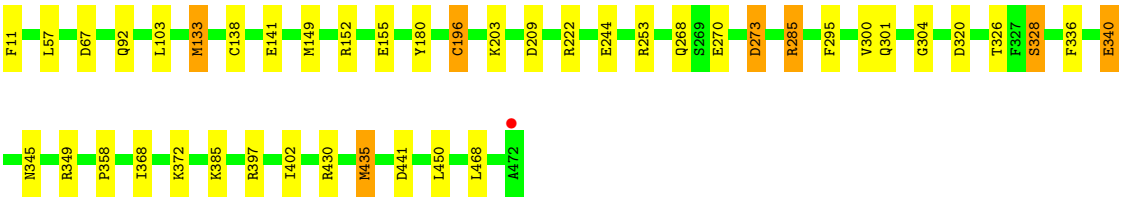
Chain C:



• Molecule 1: 4-aminobutyrate aminotransferase, mitochondrial

Chain D:

90%
8%


F11
L57
D67
Q92
L103
M133
C138
E141
M149
R152
E155
Y180
C196
K203
D209
R222
E244
R253
Q268
S269
E270
D273
R285
F295
V300
Q301
G304
D320
T326
F327
S328
F336
E340
N345
R349
P358
I368
K372
K385
R397
I402
R430
M435
D441
L450
L468
A472

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	69.63Å 228.02Å 70.82Å 90.00° 109.14° 90.00°	Depositor
Resolution (Å)	45.71 – 1.95 66.90 – 1.95	Depositor EDS
% Data completeness (in resolution range)	98.3 (45.71-1.95) 98.3 (66.90-1.95)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.02 (at 1.95Å)	Xtriage
Refinement program	PHENIX 1.11.1_2575	Depositor
R, R_{free}	0.168 , 0.213 0.171 , 0.213	Depositor DCC
R_{free} test set	7313 reflections (4.92%)	wwPDB-VP
Wilson B-factor (Å^2)	28.1	Xtriage
Anisotropy	0.141	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 54.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.024 for l,-k,h	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	16396	wwPDB-VP
Average B, all atoms (Å^2)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.89% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: FES, RMT, ACT, GOL

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	0.39	1/3844 (0.0%)	0.55	1/5186 (0.0%)
1	B	0.37	1/3812 (0.0%)	0.53	0/5150
1	C	0.44	1/3814 (0.0%)	0.58	1/5151 (0.0%)
1	D	0.47	1/3882 (0.0%)	0.61	1/5237 (0.0%)
All	All	0.42	4/15352 (0.0%)	0.57	3/20724 (0.0%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	196	CYS	CB-SG	-6.48	1.71	1.82
1	C	196	CYS	CB-SG	-6.05	1.72	1.82
1	B	196	CYS	CB-SG	-5.66	1.72	1.81
1	A	196	CYS	CB-SG	-5.62	1.72	1.81

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	133	MET	CG-SD-CE	6.64	110.83	100.20
1	A	157	GLY	C-N-CA	6.04	136.79	121.70
1	C	192	ARG	NE-CZ-NH1	-5.44	117.58	120.30

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	3725	0	3710	22	0
1	B	3717	0	3643	46	0
1	C	3719	0	3659	23	1
1	D	3767	0	3722	41	1
2	A	4	0	0	1	0
2	C	4	0	0	0	0
3	A	27	0	0	2	0
3	B	15	0	0	1	0
3	C	27	0	0	2	0
3	D	27	0	0	2	0
4	A	8	0	6	1	0
4	C	4	0	3	0	0
4	D	4	0	3	0	0
5	B	6	0	8	2	0
5	C	6	0	8	0	0
6	A	307	0	0	5	0
6	B	249	0	0	10	0
6	C	367	0	0	9	0
6	D	413	0	0	13	0
All	All	16396	0	14762	137	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 5.

All (137) 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:157:GLY:HA3	1:A:158:GLU:HG3	1.21	1.19
1:C:152:ARG:NH1	6:C:601:HOH:O	1.97	0.96
1:B:387:LEU:HD13	1:B:391:LEU:HD21	1.48	0.95
1:D:285[B]:ARG:NH1	1:D:320:ASP:O	2.04	0.91
1:D:152:ARG:NH1	6:D:602:HOH:O	2.04	0.90
1:B:81:HIS:HD2	1:B:83:ALA:H	1.22	0.88
1:A:203:LYS:NZ	6:A:601:HOH:O	2.10	0.85
1:B:81:HIS:CD2	1:B:83:ALA:H	1.98	0.81
3:D:501:RMT:O4	6:D:601:HOH:O	1.99	0.80
1:C:86:LYS:NZ	6:C:603:HOH:O	2.13	0.78
1:C:176:GLY:O	6:C:601:HOH:O	2.02	0.78
1:A:157:GLY:HA3	1:A:158:GLU:CG	2.10	0.77
1:D:285[A]:ARG:NH1	6:D:606:HOH:O	2.17	0.76

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:502:RMT:O2	6:B:601:HOH:O	2.02	0.75
1:B:158:GLU:OE1	6:B:602:HOH:O	2.04	0.74
1:D:133:MET:HE2	1:D:138:CYS:HB2	1.70	0.73
1:D:152:ARG:NH2	6:D:605:HOH:O	2.17	0.72
1:D:57:LEU:HD23	1:D:435[B]:MET:HE1	1.72	0.72
1:A:163:LYS:HG3	1:A:166:LEU:HB2	1.71	0.72
3:C:503:RMT:O4	6:C:602:HOH:O	2.08	0.71
1:D:340:GLU:OE2	6:D:603:HOH:O	2.08	0.70
1:D:301:GLN:NE2	3:D:501:RMT:O6	2.24	0.70
3:A:502:RMT:O2	6:A:602:HOH:O	2.11	0.69
1:B:11:PHE:N	6:B:610:HOH:O	2.28	0.67
1:C:301:GLN:NE2	3:C:503:RMT:O6	2.29	0.65
1:B:81:HIS:HD2	1:B:83:ALA:N	1.93	0.65
1:A:301:GLN:NE2	3:A:502:RMT:O7	2.29	0.62
1:D:203:LYS:NZ	1:D:270:GLU:OE1	2.33	0.61
1:D:133:MET:HE2	1:D:138:CYS:CB	2.31	0.61
1:B:219:PRO:HG3	1:B:244:GLU:OE2	2.02	0.59
1:B:228:GLU:OE1	1:B:228:GLU:N	2.27	0.59
1:A:163:LYS:HG3	1:A:166:LEU:HD12	1.85	0.59
1:A:155:GLU:OE1	1:A:180:TYR:OH	2.21	0.58
1:D:155:GLU:OE1	1:D:180:TYR:OH	2.20	0.57
1:B:66:LEU:HB3	1:B:434:VAL:HG12	1.85	0.57
1:B:398:TYR:CG	1:B:468:LEU:HD12	2.39	0.56
1:B:423:ASN:ND2	6:B:609:HOH:O	2.26	0.56
1:A:437:GLY:N	6:A:604:HOH:O	2.23	0.56
1:B:314:GLU:HA	5:B:501:GOL:H12	1.88	0.56
1:D:133:MET:CE	1:D:138:CYS:HB2	2.33	0.56
1:A:233:GLU:OE1	1:A:233:GLU:N	2.31	0.55
1:C:263:ILE:HG13	1:C:296:LEU:HG	1.89	0.54
1:C:304:GLY:O	1:C:450:LEU:HD11	2.07	0.54
1:A:326:THR:HG22	1:A:336:PHE:HB3	1.88	0.54
1:B:434:VAL:O	6:B:603:HOH:O	2.18	0.54
1:B:75:ILE:O	6:B:605:HOH:O	2.18	0.54
1:B:464:PHE:O	1:B:468:LEU:HD23	2.07	0.54
1:B:137:SER:OG	6:B:606:HOH:O	2.18	0.53
1:B:402:ILE:HG23	1:B:414:PHE:CD1	2.43	0.53
1:C:253:ARG:NH1	6:C:612:HOH:O	2.42	0.53
1:B:395:GLN:O	6:B:604:HOH:O	2.18	0.53
1:C:39:ASN:OD1	1:C:41:GLU:HG3	2.10	0.52
1:B:386:VAL:HG21	1:B:454:ASP:OD2	2.10	0.52
1:B:429:ALA:HB1	1:B:434:VAL:HG23	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:387:LEU:HD13	1:B:391:LEU:CD2	2.31	0.51
1:D:253:ARG:NH2	6:D:604:HOH:O	2.17	0.51
1:C:57:LEU:HD23	1:C:435[B]:MET:SD	2.50	0.51
1:B:387:LEU:O	1:B:391:LEU:HD22	2.11	0.51
1:B:326:THR:HG22	1:B:336:PHE:HB3	1.93	0.50
1:C:149:MET:HE1	1:C:344:PRO:HB3	1.94	0.50
1:D:430:ARG:CD	1:D:435[A]:MET:HE2	2.42	0.50
1:B:388:LEU:HA	1:B:391:LEU:HD23	1.94	0.49
1:A:263:ILE:HG13	1:A:296:LEU:HG	1.94	0.49
1:A:149:MET:HE1	1:A:344:PRO:HB3	1.94	0.49
1:A:57:LEU:HD23	1:A:435[B]:MET:HE1	1.94	0.49
1:A:304:GLY:O	1:A:450:LEU:HD11	2.12	0.49
1:C:439:CYS:HB3	1:C:445:ARG:HD2	1.94	0.49
1:D:430:ARG:HD3	1:D:435[A]:MET:HE2	1.95	0.49
1:C:152:ARG:HG2	1:C:180:TYR:CE2	2.48	0.48
1:D:11:PHE:N	6:D:616:HOH:O	2.46	0.48
1:C:326:THR:HG22	1:C:336:PHE:HB3	1.96	0.48
1:B:382:HIS:NE2	1:B:454:ASP:OD1	2.46	0.48
1:C:439:CYS:O	1:C:443:SER:HB2	2.14	0.48
1:C:268:GLN:O	1:C:273:ASP:HA	2.13	0.48
1:B:200:THR:O	1:B:207:LYS:NZ	2.40	0.48
1:C:372:LYS:NZ	6:C:605:HOH:O	2.18	0.48
1:B:85:VAL:O	1:B:89:GLN:HG3	2.13	0.47
1:D:402[B]:ILE:HD11	1:D:468:LEU:HD11	1.95	0.47
1:A:113:GLU:O	1:A:117:GLU:HG3	2.15	0.47
1:A:138:CYS:HB3	2:A:501:FES:S2	2.54	0.47
1:D:326:THR:HG22	1:D:336:PHE:HB3	1.97	0.47
1:D:67:ASP:HA	1:D:435[B]:MET:HB3	1.97	0.47
1:B:401:PHE:O	1:B:417:PRO:HD3	2.15	0.47
1:B:318:LEU:H	5:B:501:GOL:H11	1.80	0.46
1:D:133:MET:HE2	1:D:138:CYS:SG	2.55	0.46
1:D:397:ARG:NH2	6:D:608:HOH:O	2.48	0.46
1:A:114:LYS:HD3	1:A:114:LYS:HA	1.74	0.46
1:D:304:GLY:O	1:D:450:LEU:HD11	2.15	0.46
1:A:271:GLY:HA2	6:A:601:HOH:O	2.15	0.46
1:B:402:ILE:HD11	1:B:468:LEU:HD11	1.97	0.45
1:D:244:GLU:OE1	6:D:607:HOH:O	2.21	0.45
1:C:103:LEU:HD21	1:C:358:PRO:HG3	1.98	0.44
1:D:149[B]:MET:HE1	1:D:349:ARG:HB3	2.00	0.44
1:A:158:GLU:OE1	1:A:159:SER:OG	2.35	0.44
1:C:203:LYS:NZ	6:C:620:HOH:O	2.49	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:C:601:HOH:O	1:D:209:ASP:HA	2.17	0.44
1:D:133:MET:HE3	6:D:838:HOH:O	2.17	0.44
1:B:309:LYS:HD2	1:B:315:HIS:CE1	2.53	0.44
1:A:152[B]:ARG:HD2	1:A:152[B]:ARG:HA	1.65	0.44
1:C:13:TYR:CD2	1:C:64:ARG:HD2	2.53	0.44
1:B:273:ASP:OD1	1:B:275:HIS:HE1	2.01	0.43
1:D:103:LEU:HD21	1:D:358:PRO:HG3	2.01	0.43
1:D:441:ASP:HA	6:D:856:HOH:O	2.19	0.43
1:D:340:GLU:HG3	6:D:863:HOH:O	2.19	0.43
1:B:255:LYS:HG2	6:B:816:HOH:O	2.19	0.43
1:D:141:GLU:HG2	1:D:196:CYS:SG	2.59	0.43
1:D:435[B]:MET:HE2	1:D:435[B]:MET:HB2	1.43	0.43
1:B:418:ASP:OD1	1:B:421:ILE:HG13	2.20	0.42
1:D:149[A]:MET:HG2	1:D:349:ARG:NH2	2.35	0.42
1:D:285[A]:ARG:HG2	1:D:295:PHE:CD2	2.54	0.42
1:B:47:CYS:HB2	1:B:49:TYR:CE2	2.54	0.42
1:D:345:ASN:HB2	6:D:629:HOH:O	2.19	0.42
1:B:268:GLN:O	1:B:273:ASP:HA	2.20	0.42
1:D:149[A]:MET:HG2	1:D:349:ARG:CZ	2.49	0.42
1:D:385:LYS:HE3	1:D:385:LYS:HB2	1.78	0.42
1:B:149:MET:HG2	1:B:349:ARG:NH2	2.34	0.42
1:B:282:ARG:HG2	1:B:318:LEU:HD11	2.01	0.42
1:B:304:GLY:O	1:B:450:LEU:HD11	2.19	0.42
1:B:57:LEU:HB3	1:B:435[B]:MET:HE1	2.02	0.41
1:D:300:VAL:HG13	1:D:328:SER:HB3	2.01	0.41
4:A:504:ACT:O	6:A:603:HOH:O	2.22	0.41
1:D:285[B]:ARG:NH1	1:D:320:ASP:OD1	2.48	0.41
1:B:149:MET:HE1	1:B:344:PRO:HB3	2.01	0.41
1:B:462[A]:ASN:OD1	6:B:607:HOH:O	2.21	0.41
1:C:152:ARG:HG2	1:C:180:TYR:HE2	1.85	0.41
1:A:152[A]:ARG:HA	1:A:152[A]:ARG:HD2	1.78	0.41
1:A:268:GLN:O	1:A:273:ASP:HA	2.20	0.41
1:C:402[B]:ILE:HD11	1:C:468:LEU:HD11	2.02	0.41
1:B:47:CYS:HA	1:B:59:ASP:HA	2.03	0.41
1:B:69:TYR:CE1	1:B:437:GLY:HA3	2.56	0.41
1:B:439:CYS:HB3	1:B:445:ARG:HD3	2.03	0.41
1:C:269:SER:HB2	6:C:739:HOH:O	2.20	0.41
1:D:268:GLN:O	1:D:273:ASP:HA	2.21	0.40
1:C:240:ARG:NH1	1:C:244:GLU:OE2	2.54	0.40
1:B:391:LEU:HD22	1:B:391:LEU:H	1.86	0.40
1:D:368:ILE:O	1:D:372:LYS:HG3	2.22	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:C:470:ASP:OD2	1:D:222[A]:ARG:NH1[1_454]	2.17	0.03

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	471/462 (102%)	449 (95%)	20 (4%)	2 (0%)	34	22
1	B	469/462 (102%)	442 (94%)	25 (5%)	2 (0%)	34	22
1	C	469/462 (102%)	451 (96%)	17 (4%)	1 (0%)	47	38
1	D	476/462 (103%)	456 (96%)	19 (4%)	1 (0%)	47	38
All	All	1885/1848 (102%)	1798 (95%)	81 (4%)	6 (0%)	41	30

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	328	SER
1	D	328	SER
1	A	158	GLU
1	C	328	SER
1	B	328	SER
1	B	76	PRO

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	409/400 (102%)	406 (99%)	3 (1%)	84	82
1	B	401/400 (100%)	396 (99%)	5 (1%)	71	68
1	C	402/400 (100%)	396 (98%)	6 (2%)	65	60
1	D	408/400 (102%)	401 (98%)	7 (2%)	60	55
All	All	1620/1600 (101%)	1599 (99%)	21 (1%)	76	65

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	285	ARG
1	A	435[A]	MET
1	A	435[B]	MET
1	B	14	ASP
1	B	53	ARG
1	B	273	ASP
1	B	435[A]	MET
1	B	435[B]	MET
1	C	228[A]	GLU
1	C	228[B]	GLU
1	C	253	ARG
1	C	285	ARG
1	C	435[A]	MET
1	C	435[B]	MET
1	D	92	GLN
1	D	273	ASP
1	D	285[A]	ARG
1	D	285[B]	ARG
1	D	340	GLU
1	D	435[A]	MET
1	D	435[B]	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	81	HIS
1	B	275	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 monosaccharides in this entry.

5.6 Ligand geometry (i)

12 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	FES	C	501	1	0,4,4	-	-	-		
3	RMT	C	503	-	25,28,28	2.41	4 (16%)	27,41,41	1.32	4 (14%)
3	RMT	A	502	-	25,28,28	2.61	4 (16%)	27,41,41	1.23	2 (7%)
4	ACT	D	502	-	3,3,3	1.02	0	3,3,3	1.69	1 (33%)
5	GOL	C	502	-	5,5,5	0.29	0	5,5,5	0.48	0
2	FES	A	501	1	0,4,4	-	-	-		
5	GOL	B	501	-	5,5,5	0.54	0	5,5,5	0.26	0
3	RMT	B	502	-	15,15,28	3.12	3 (20%)	20,22,41	1.27	2 (10%)
4	ACT	A	504	-	3,3,3	0.76	0	3,3,3	1.12	0
4	ACT	C	504	-	3,3,3	0.77	0	3,3,3	1.59	0
4	ACT	A	503	-	3,3,3	0.74	0	3,3,3	1.22	0
3	RMT	D	501	-	25,28,28	2.71	4 (16%)	27,41,41	1.49	3 (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	FES	C	501	1	-	-	0/1/1/1
3	RMT	C	503	-	-	3/18/31/31	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	RMT	A	502	-	-	3/18/31/31	0/2/2/2
5	GOL	C	502	-	-	2/4/4/4	-
2	FES	A	501	1	-	-	0/1/1/1
3	RMT	B	502	-	-	0/6/6/31	0/1/1/2
5	GOL	B	501	-	-	1/4/4/4	-
3	RMT	D	501	-	-	4/18/31/31	0/2/2/2

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	501	RMT	C-C1	9.20	1.50	1.40
3	A	502	RMT	C-C1	8.53	1.49	1.40
3	B	502	RMT	C-C1	8.17	1.49	1.40
3	C	503	RMT	C-C1	8.03	1.48	1.40
3	B	502	RMT	C3-C4	7.63	1.48	1.40
3	A	502	RMT	C3-C4	6.16	1.49	1.40
3	D	501	RMT	C3-C4	6.07	1.49	1.40
3	D	501	RMT	C-C4	5.72	1.48	1.40
3	A	502	RMT	C-C4	5.62	1.48	1.40
3	C	503	RMT	C3-C4	5.46	1.48	1.40
3	C	503	RMT	C-C4	5.29	1.48	1.40
3	B	502	RMT	C-C4	4.09	1.48	1.40
3	D	501	RMT	C12-C8	3.32	1.51	1.43
3	A	502	RMT	C12-C8	3.28	1.51	1.43
3	C	503	RMT	C12-C8	2.84	1.50	1.43

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	501	RMT	C2-C3-C4	3.42	120.54	118.12
3	D	501	RMT	O7-C15-C12	3.36	122.50	114.22
3	D	501	RMT	C-C4-C3	-3.26	115.60	118.72
3	C	503	RMT	C2-N-C1	2.79	124.33	119.17
3	A	502	RMT	C2-C3-C4	2.72	120.05	118.12
3	C	503	RMT	O7-C15-C12	2.56	120.52	114.22
3	B	502	RMT	C2-C3-C4	2.47	120.10	118.16
3	C	503	RMT	C2-C3-C4	2.40	119.82	118.12
3	B	502	RMT	C2-N-C1	2.40	123.62	119.17
3	A	502	RMT	C-C4-C3	-2.37	116.45	118.72
4	D	502	ACT	OXT-C-O	-2.35	113.39	122.05
3	C	503	RMT	C4-C-C1	-2.15	116.76	120.06

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	502	RMT	C-C4-C5-N1
3	A	502	RMT	C3-C4-C5-N1
3	C	503	RMT	C-C4-C5-N1
3	C	503	RMT	C3-C4-C5-N1
3	D	501	RMT	C-C4-C5-N1
3	D	501	RMT	C3-C4-C5-N1
5	C	502	GOL	C1-C2-C3-O3
5	C	502	GOL	O2-C2-C3-O3
3	C	503	RMT	C8-C12-C15-O7
3	D	501	RMT	C8-C12-C15-O7
3	D	501	RMT	C11-C12-C15-O6
5	B	501	GOL	O1-C1-C2-O2
3	A	502	RMT	C8-C12-C15-O7

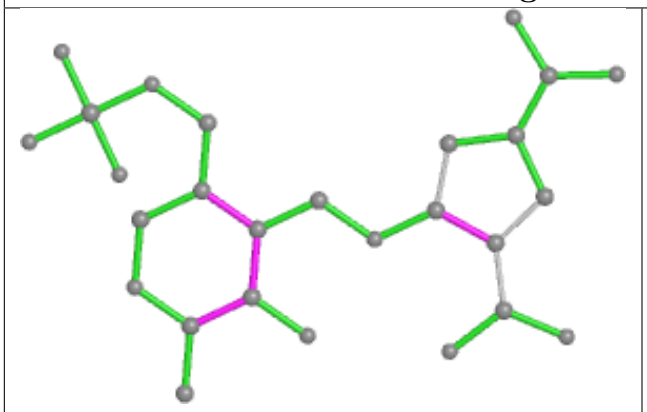
There are no ring outliers.

7 monomers are involved in 11 short contacts:

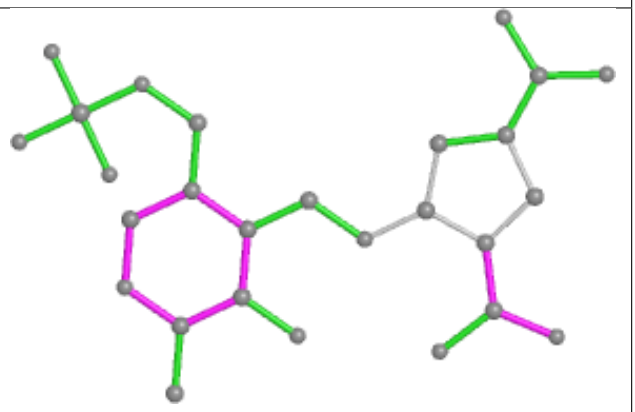
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	503	RMT	2	0
3	A	502	RMT	2	0
2	A	501	FES	1	0
5	B	501	GOL	2	0
3	B	502	RMT	1	0
4	A	504	ACT	1	0
3	D	501	RMT	2	0

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 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.

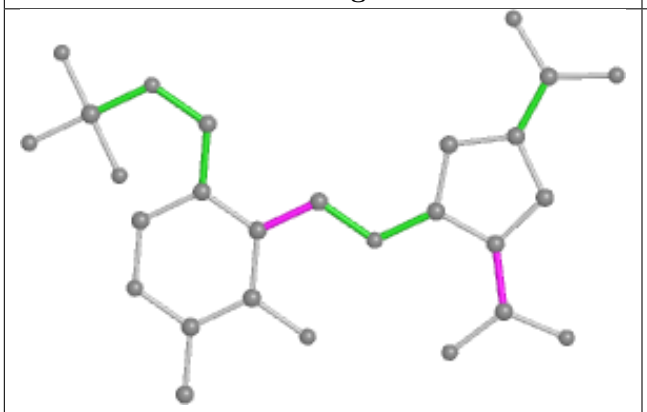
Ligand RMT C 503



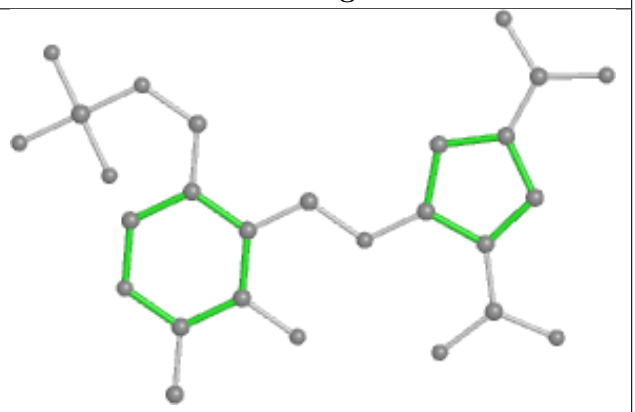
Bond lengths



Bond angles

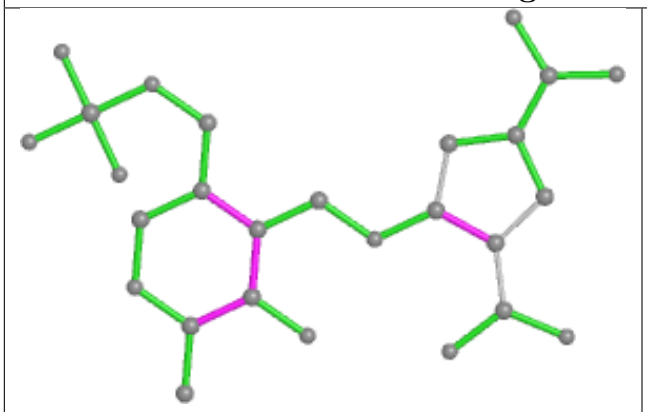


Torsions

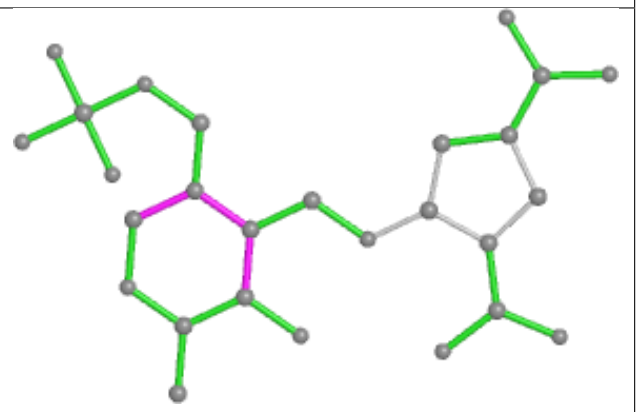


Rings

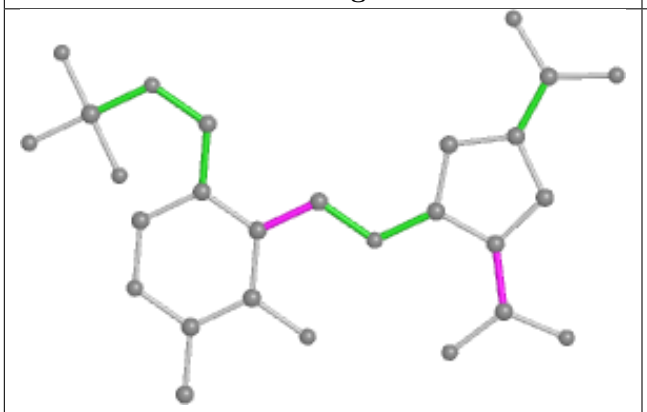
Ligand RMT A 502



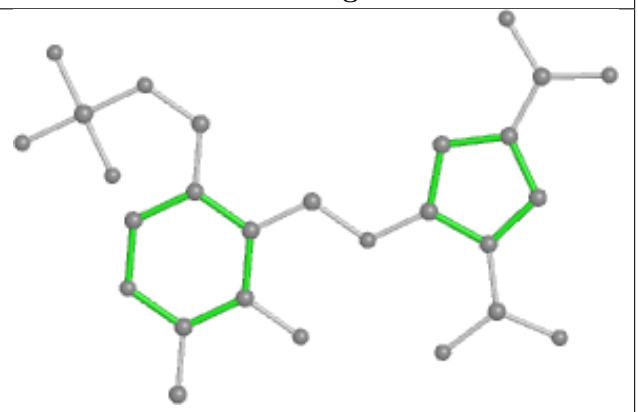
Bond lengths



Bond angles

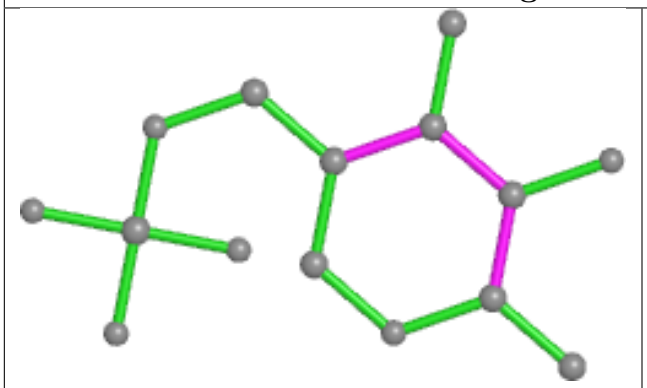


Torsions

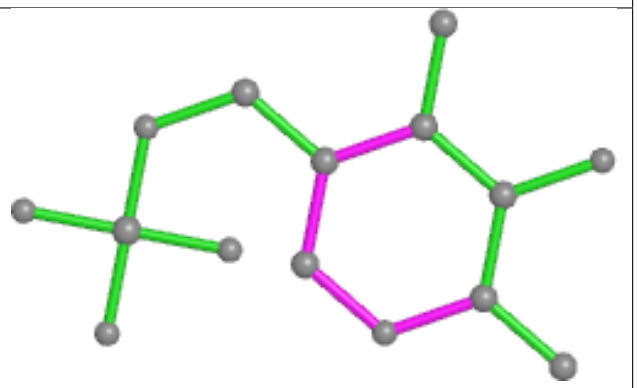


Rings

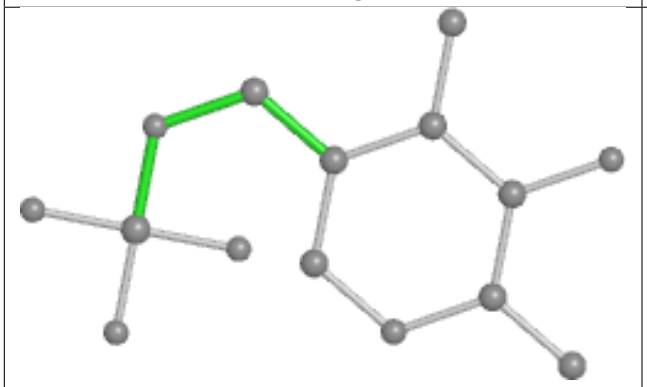
Ligand RMT B 502



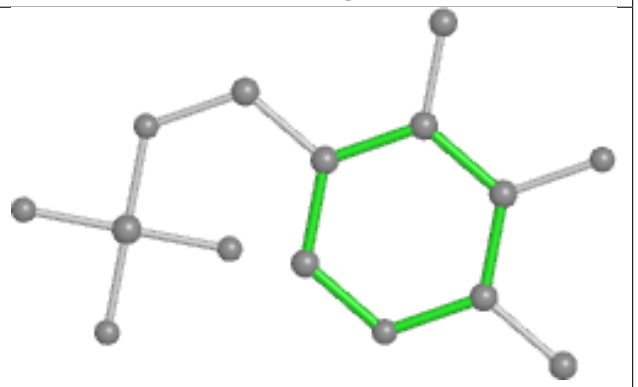
Bond lengths



Bond angles

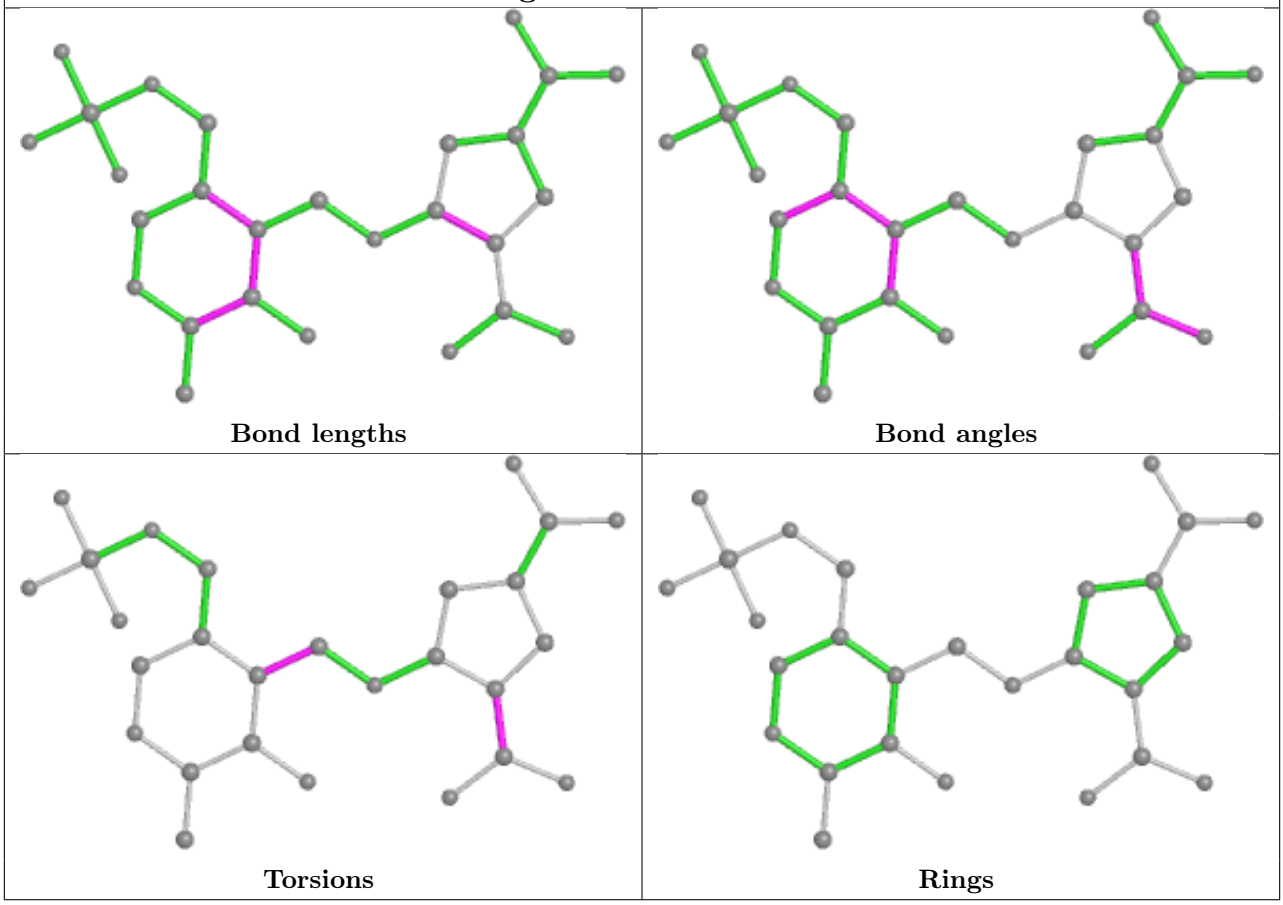


Torsions



Rings

Ligand RMT D 501



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 (i)

6.1 Protein, DNA and RNA chains (i)

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	461/462 (99%)	-0.24	5 (1%)	80	85	18, 32, 54, 84	0
1	B	462/462 (100%)	0.12	17 (3%)	41	51	21, 41, 70, 87	0
1	C	462/462 (100%)	-0.38	1 (0%)	95	97	14, 24, 42, 70	0
1	D	462/462 (100%)	-0.37	1 (0%)	95	97	13, 21, 35, 65	0
All	All	1847/1848 (99%)	-0.22	24 (1%)	77	83	13, 28, 57, 87	0

All (24) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	472	ALA	5.7
1	B	469	ALA	5.6
1	B	440	GLY	4.6
1	B	396	ALA	4.5
1	B	17	LEU	4.1
1	B	436	LEU	3.7
1	B	468	LEU	3.5
1	B	441	ASP	3.5
1	D	472	ALA	3.2
1	A	163	LYS	3.1
1	B	227	LEU	3.0
1	A	441	ASP	2.9
1	B	14	ASP	2.8
1	B	401	PHE	2.7
1	B	13	TYR	2.7
1	A	161	PHE	2.6
1	A	440	GLY	2.3
1	B	255	LYS	2.2
1	B	11	PHE	2.1
1	B	391	LEU	2.1
1	B	419	GLU	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	472	ALA	2.1
1	B	402	ILE	2.1
1	A	158	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 monosaccharides in this entry.

6.4 Ligands (i)

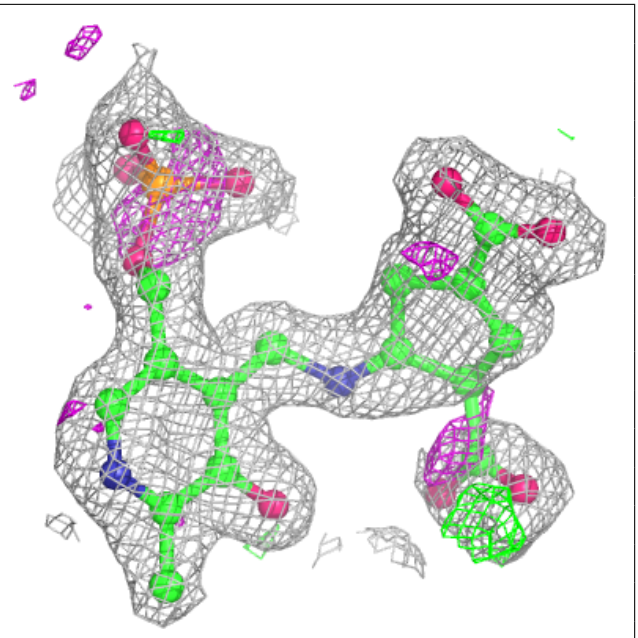
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

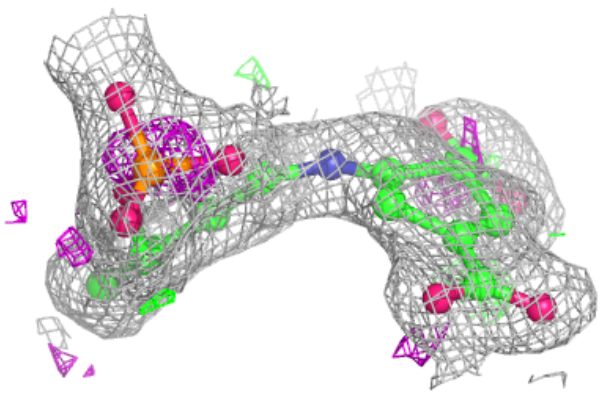
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	ACT	D	502	4/4	0.69	0.20	26,37,47,56	0
4	ACT	A	503	4/4	0.75	0.15	27,40,43,46	0
5	GOL	B	501	6/6	0.79	0.31	38,51,57,65	0
4	ACT	C	504	4/4	0.84	0.12	27,35,49,56	0
4	ACT	A	504	4/4	0.88	0.11	39,41,52,55	0
3	RMT	D	501	27/27	0.93	0.15	23,33,53,54	0
3	RMT	B	502	15/27	0.93	0.16	23,37,42,46	15
3	RMT	C	503	27/27	0.94	0.17	23,31,57,59	0
5	GOL	C	502	6/6	0.94	0.13	32,44,46,46	0
3	RMT	A	502	27/27	0.95	0.16	25,35,53,57	0
2	FES	A	501	4/4	0.99	0.09	24,25,25,26	0
2	FES	C	501	4/4	0.99	0.10	19,19,20,23	0

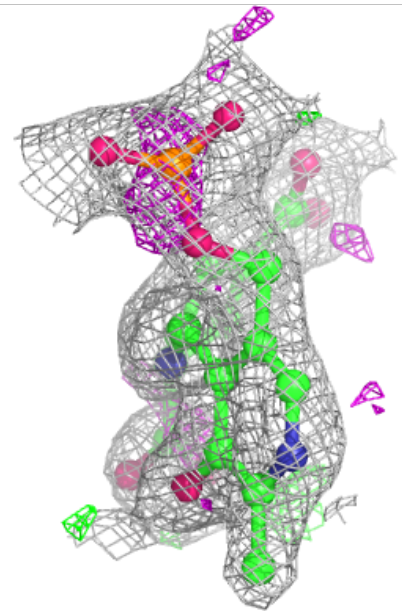
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around RMT D 501:

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

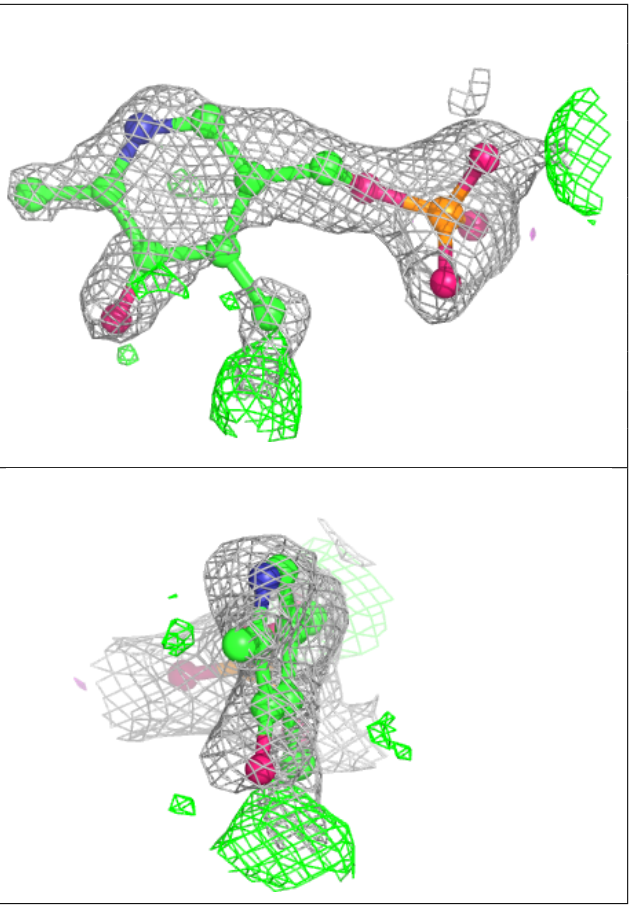






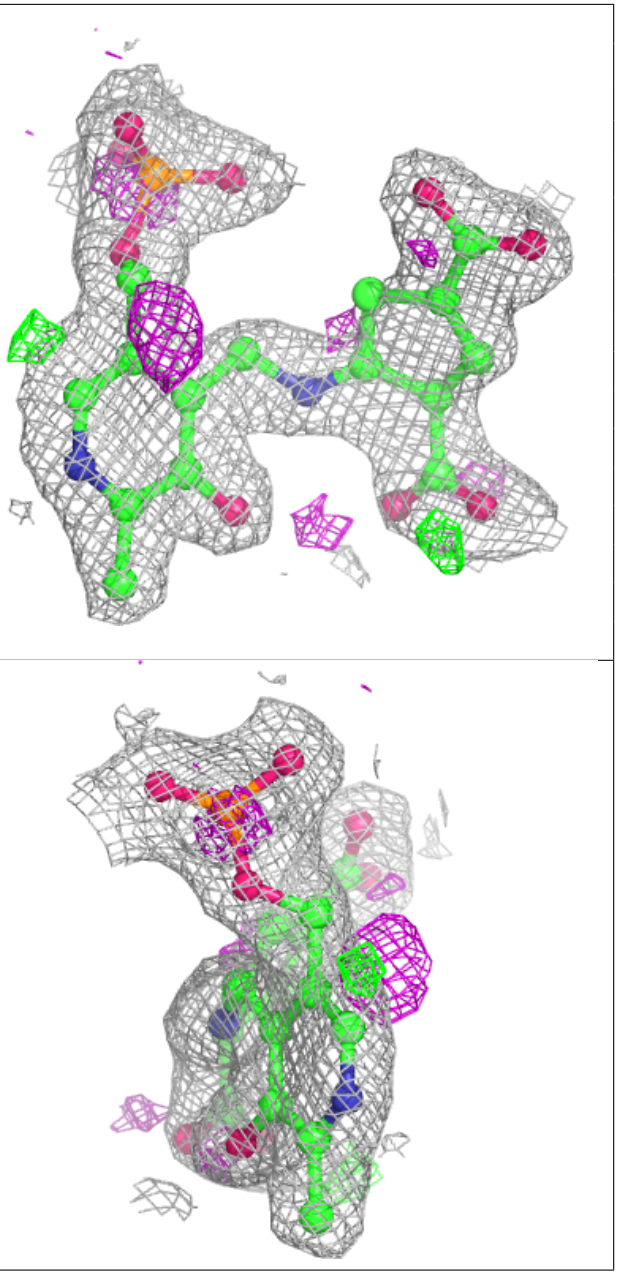
Electron density around RMT B 502:

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



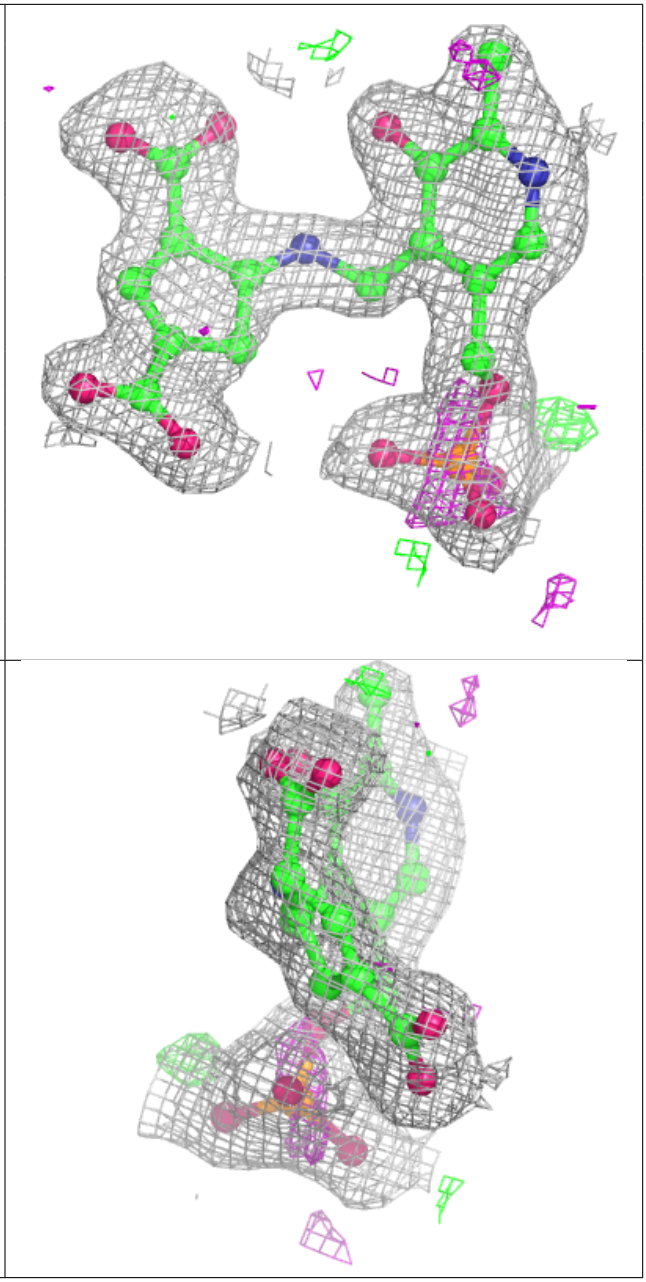
Electron density around RMT C 503:

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



Electron density around RMT A 502:

$2mF_o$-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.