Full wwPDB X-ray Structure Validation Report ⓘ

Oct 18, 2021 – 10:12 am BST

PDB ID	:	7OJ6
Title	:	Crystal structure of Pseudomonas aeruginosa LpxA in complex with compound 1
Authors	:	Ryan, M.D.; Parkes, A.L.; Southey, M.; Andersen, O.A.; Zahn, M.; Barker, J.; DeJonge, B.L.M.
Deposited on	:	2021-05-14
Resolution	:	1.84 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 following versions of software and data (see references ⓘ) were used in the production of this report:

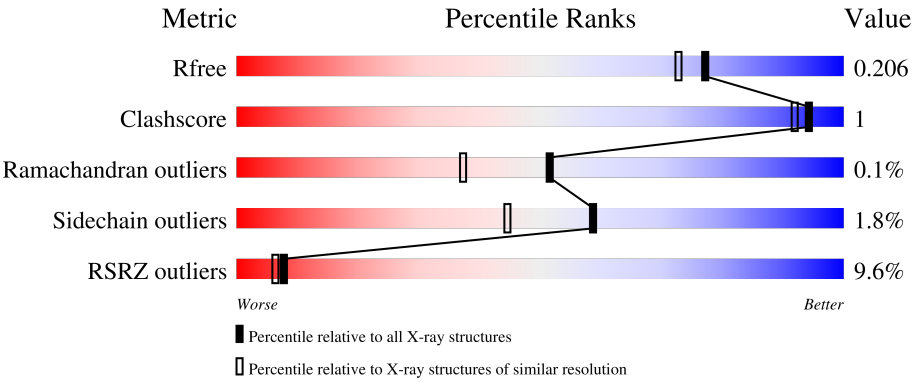
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.23.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0267
CCP4	:	7.1.010 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.23.2

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 1.84 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	4003 (1.86-1.82)
Clashscore	141614	4233 (1.86-1.82)
Ramachandran outliers	138981	4185 (1.86-1.82)
Sidechain outliers	138945	4186 (1.86-1.82)
RSRZ outliers	127900	3957 (1.86-1.82)

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	261	4% 82% 15%
1	B	261	7% 85% 11%
1	C	261	17% 82% 14%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 6635 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.

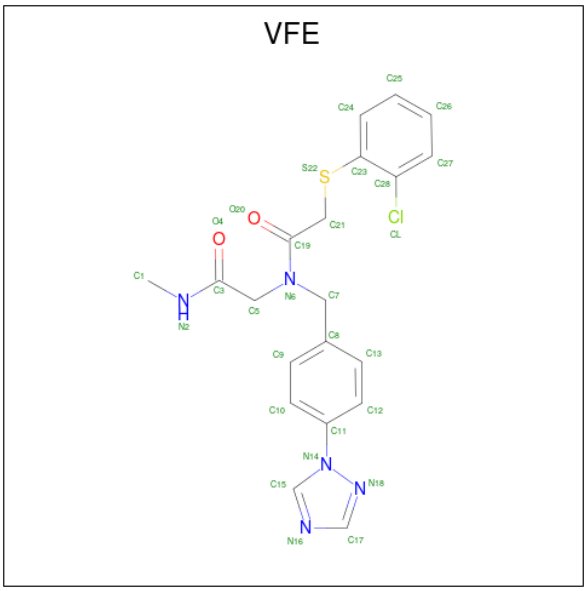
- Molecule 1 is a protein called Acyl-[acyl-carrier-protein]-UDP-N-acetylglucosamine O-acyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	258	Total	C	N	O	S	0	2	0
			1990	1245	370	368	7			
1	B	258	Total	C	N	O	S	0	3	0
			1998	1250	373	368	7			
1	C	258	Total	C	N	O	S	0	1	0
			1983	1241	366	369	7			

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP A6V1E4
A	-1	SER	-	expression tag	UNP A6V1E4
A	0	HIS	-	expression tag	UNP A6V1E4
B	-2	GLY	-	expression tag	UNP A6V1E4
B	-1	SER	-	expression tag	UNP A6V1E4
B	0	HIS	-	expression tag	UNP A6V1E4
C	-2	GLY	-	expression tag	UNP A6V1E4
C	-1	SER	-	expression tag	UNP A6V1E4
C	0	HIS	-	expression tag	UNP A6V1E4

- Molecule 2 is 2-[2-(2-chlorophenyl)sulfanylethanoyl-[[4-(1,2,4-triazol-1-yl)phenyl]methyl]amino]-N-methyl-ethanamide (three-letter code: VFE) (formula: $C_{20}H_{20}ClN_5O_2S$) (labeled as "Ligand of Interest" by depositor).

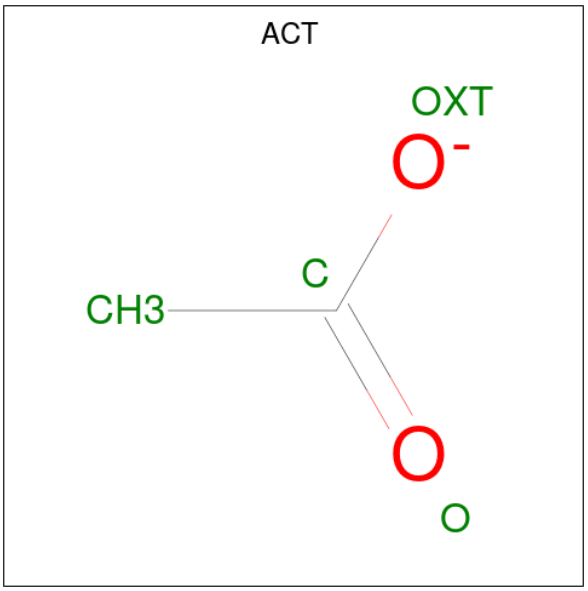


Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	Cl	N	O	S	0	0
			29	20	1	5	2	1		
2	B	1	Total	C	Cl	N	O	S	0	0
			29	20	1	5	2	1		
2	C	1	Total	C	Cl	N	O	S	0	0
			29	20	1	5	2	1		

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	10	Total	Cl	0	0
			10	10		
3	B	7	Total	Cl	0	0
			7	7		
3	C	5	Total	Cl	0	0
			5	5		

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



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

- Molecule 5 is water.

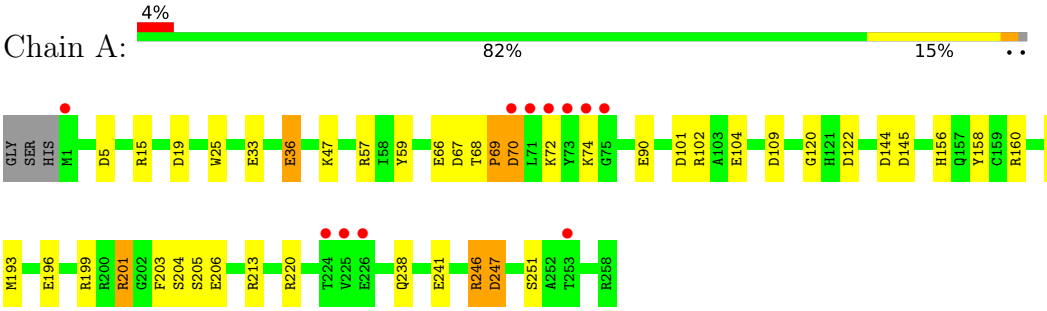
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	203	Total O 203 203	0	0
5	B	177	Total O 177 177	0	0
5	C	163	Total O 163 163	0	0

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.

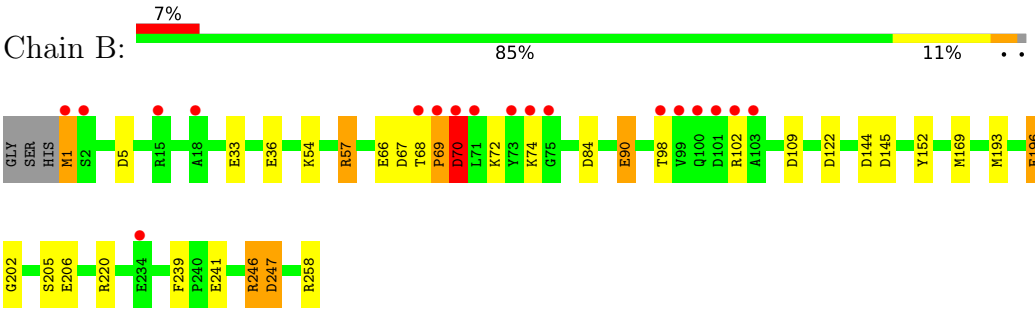
• Molecule 1: Acyl-[acyl-carrier-protein]-UDP-N-acetylglucosamine O-acyltransferase

Chain A:



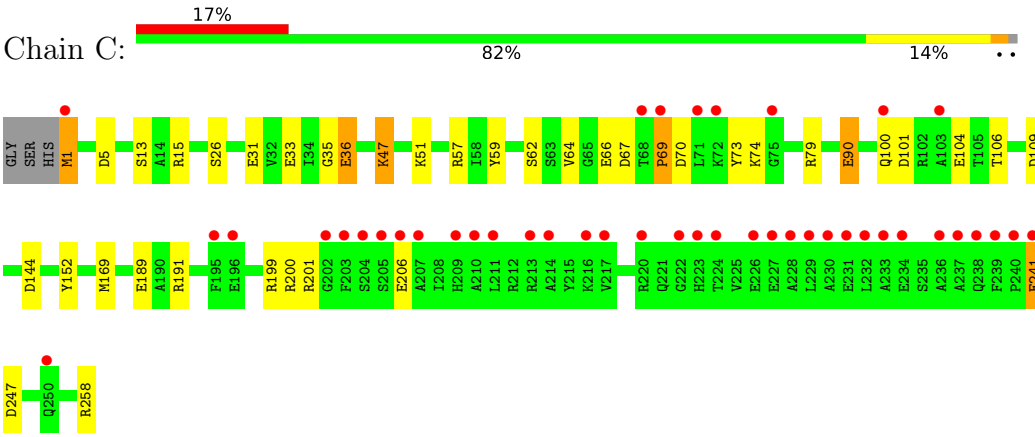
• Molecule 1: Acyl-[acyl-carrier-protein]-UDP-N-acetylglucosamine O-acyltransferase

Chain B:



• Molecule 1: Acyl-[acyl-carrier-protein]-UDP-N-acetylglucosamine O-acyltransferase

Chain C:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	I 41	Depositor
Cell constants a, b, c, α, β, γ	167.17Å 167.17Å 98.37Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	59.52 – 1.84 59.52 – 1.84	Depositor EDS
% Data completeness (in resolution range)	97.6 (59.52-1.84) 97.6 (59.52-1.84)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.44 (at 1.84Å)	Xtriage
Refinement program	REFMAC 5.8.0135	Depositor
R, R_{free}	0.171 , 0.198 0.183 , 0.206	Depositor DCC
R_{free} test set	5793 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å^2)	32.5	Xtriage
Anisotropy	0.186	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	(Not available) , (Not available)	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.000 for -k,-h,-l	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	6635	wwPDB-VP
Average B, all atoms (Å^2)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.53% 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: ACT, CL, VFE

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	1.72	27/2038 (1.3%)	1.65	31/2762 (1.1%)
1	B	1.68	19/2049 (0.9%)	1.51	33/2776 (1.2%)
1	C	1.67	28/2025 (1.4%)	1.47	30/2745 (1.1%)
All	All	1.69	74/6112 (1.2%)	1.55	94/8283 (1.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	2
1	C	0	1
All	All	0	3

All (74) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	66	GLU	CD-OE1	9.86	1.36	1.25
1	B	90	GLU	CG-CD	9.84	1.66	1.51
1	B	206	GLU	CD-OE1	9.84	1.36	1.25
1	A	196	GLU	CG-CD	9.06	1.65	1.51
1	B	241	GLU	CD-OE1	8.79	1.35	1.25
1	A	205	SER	CB-OG	-8.65	1.31	1.42
1	A	206	GLU	CD-OE1	8.57	1.35	1.25
1	A	66	GLU	CD-OE2	8.43	1.34	1.25
1	C	70	ASP	CB-CG	8.14	1.68	1.51
1	C	90	GLU	CG-CD	7.60	1.63	1.51
1	B	66	GLU	CD-OE1	7.54	1.33	1.25
1	C	31	GLU	CG-CD	7.39	1.63	1.51
1	A	25	TRP	CE3-CZ3	7.08	1.50	1.38

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	116	TYR	CE1-CZ	7.05	1.47	1.38
1	C	36	GLU	CB-CG	-6.93	1.39	1.52
1	C	90	GLU	CB-CG	-6.87	1.39	1.52
1	B	196	GLU	CG-CD	6.84	1.62	1.51
1	A	90	GLU	CB-CG	-6.68	1.39	1.52
1	A	241	GLU	CD-OE1	6.65	1.32	1.25
1	A	251	SER	CB-OG	-6.62	1.33	1.42
1	C	122	ASP	CB-CG	6.55	1.65	1.51
1	C	66	GLU	CD-OE1	6.53	1.32	1.25
1	B	202	GLY	C-O	-6.50	1.13	1.23
1	C	206	GLU	CD-OE1	6.49	1.32	1.25
1	A	101	ASP	CB-CG	6.47	1.65	1.51
1	A	36	GLU	CB-CG	-6.42	1.40	1.52
1	C	26	SER	CA-CB	-6.39	1.43	1.52
1	C	70	ASP	N-CA	6.31	1.58	1.46
1	B	205	SER	CB-OG	-6.29	1.34	1.42
1	A	104	GLU	CG-CD	6.28	1.61	1.51
1	B	66	GLU	CD-OE2	6.21	1.32	1.25
1	C	13	SER	CA-CB	6.21	1.62	1.52
1	C	152	TYR	CE1-CZ	-6.21	1.30	1.38
1	C	69	PRO	CA-C	6.19	1.65	1.52
1	C	35	GLY	CA-C	6.10	1.61	1.51
1	B	246[A]	ARG	CZ-NH2	-6.09	1.25	1.33
1	B	246[B]	ARG	CZ-NH2	-6.09	1.25	1.33
1	C	101	ASP	CB-CG	6.05	1.64	1.51
1	A	59	TYR	CE2-CZ	6.00	1.46	1.38
1	C	59	TYR	CG-CD2	6.00	1.47	1.39
1	C	169	MET	CB-CG	-5.92	1.32	1.51
1	C	64	VAL	CA-CB	-5.88	1.42	1.54
1	C	51	LYS	CE-NZ	-5.85	1.34	1.49
1	B	152	TYR	CE2-CZ	5.83	1.46	1.38
1	B	33	GLU	CG-CD	5.80	1.60	1.51
1	C	152	TYR	CE2-CZ	5.79	1.46	1.38
1	A	33	GLU	CD-OE1	-5.78	1.19	1.25
1	A	120	GLY	CA-C	5.71	1.60	1.51
1	A	120	GLY	N-CA	-5.70	1.37	1.46
1	A	69	PRO	N-CA	5.69	1.56	1.47
1	B	90	GLU	CB-CG	-5.66	1.41	1.52
1	A	158	TYR	CG-CD1	5.63	1.46	1.39
1	C	189	GLU	CD-OE2	-5.63	1.19	1.25
1	C	106	THR	CB-OG1	5.61	1.54	1.43
1	B	33	GLU	CD-OE1	-5.60	1.19	1.25

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	169	MET	CB-CG	-5.58	1.33	1.51
1	A	246[A]	ARG	CZ-NH2	-5.51	1.25	1.33
1	A	246[B]	ARG	CZ-NH2	-5.51	1.25	1.33
1	B	70	ASP	CB-CG	5.49	1.63	1.51
1	A	205	SER	CA-CB	5.38	1.61	1.52
1	B	70	ASP	CA-C	5.30	1.66	1.52
1	A	238	GLN	CG-CD	5.26	1.63	1.51
1	A	156	HIS	CA-C	5.24	1.66	1.52
1	A	204	SER	CA-CB	5.23	1.60	1.52
1	B	98	THR	CA-C	5.18	1.66	1.52
1	C	33	GLU	CB-CG	-5.16	1.42	1.52
1	B	69	PRO	N-CA	5.16	1.56	1.47
1	A	160	ARG	CG-CD	5.13	1.64	1.51
1	C	152	TYR	CG-CD1	5.13	1.45	1.39
1	C	152	TYR	CB-CG	-5.12	1.44	1.51
1	A	36	GLU	CD-OE1	5.08	1.31	1.25
1	B	36	GLU	CG-CD	5.06	1.59	1.51
1	C	57	ARG	CZ-NH2	5.04	1.39	1.33
1	C	201	ARG	CZ-NH1	5.03	1.39	1.33

All (94) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	57	ARG	NE-CZ-NH1	29.91	135.25	120.30
1	A	57	ARG	NE-CZ-NH2	-23.28	108.66	120.30
1	C	201	ARG	NE-CZ-NH2	-14.88	112.86	120.30
1	B	122	ASP	CB-CG-OD1	14.33	131.19	118.30
1	B	199	ARG	NE-CZ-NH2	-13.32	113.64	120.30
1	A	122	ASP	CB-CG-OD1	13.28	130.26	118.30
1	A	199	ARG	NE-CZ-NH2	-13.12	113.74	120.30
1	A	66	GLU	OE1-CD-OE2	12.76	138.61	123.30
1	C	70	ASP	CB-CG-OD1	10.86	128.07	118.30
1	B	67	ASP	CB-CG-OD1	10.77	128.00	118.30
1	B	66	GLU	OE1-CD-OE2	10.55	135.96	123.30
1	C	1	MET	CA-CB-CG	10.24	130.70	113.30
1	C	122	ASP	CB-CG-OD1	10.17	127.45	118.30
1	A	169	MET	CG-SD-CE	-10.17	83.93	100.20
1	A	67	ASP	CB-CG-OD1	9.83	127.14	118.30
1	C	169	MET	CG-SD-CE	-9.78	84.55	100.20
1	C	67	ASP	CB-CG-OD1	9.69	127.02	118.30
1	C	57	ARG	NE-CZ-NH2	9.49	125.05	120.30
1	B	57[A]	ARG	NE-CZ-NH2	-9.39	115.61	120.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	57[B]	ARG	NE-CZ-NH2	-9.39	115.61	120.30
1	A	57	ARG	CD-NE-CZ	9.02	136.23	123.60
1	C	144	ASP	CB-CG-OD1	8.96	126.36	118.30
1	B	109	ASP	CB-CG-OD1	8.84	126.26	118.30
1	A	67	ASP	CB-CG-OD2	-8.84	110.34	118.30
1	B	67	ASP	CB-CG-OD2	-8.25	110.87	118.30
1	A	213	ARG	CG-CD-NE	-8.11	94.76	111.80
1	B	144	ASP	CB-CG-OD1	8.02	125.52	118.30
1	B	70	ASP	CB-CG-OD1	7.81	125.33	118.30
1	A	144	ASP	CB-CG-OD1	7.77	125.30	118.30
1	B	57[A]	ARG	CB-CG-CD	7.75	131.74	111.60
1	B	57[B]	ARG	CB-CG-CD	7.75	131.74	111.60
1	B	169	MET	CG-SD-CE	-7.48	88.22	100.20
1	A	193	MET	CG-SD-CE	-7.48	88.23	100.20
1	C	5	ASP	CB-CG-OD1	7.37	124.93	118.30
1	B	145	ASP	CB-CG-OD1	7.26	124.83	118.30
1	A	70	ASP	CB-CG-OD1	7.08	124.67	118.30
1	B	54	LYS	CD-CE-NZ	-6.88	95.88	111.70
1	B	74	LYS	CA-CB-CG	6.81	128.39	113.40
1	A	109	ASP	CB-CG-OD1	6.77	124.40	118.30
1	C	67	ASP	CB-CG-OD2	-6.77	112.21	118.30
1	C	199	ARG	NE-CZ-NH2	6.72	123.66	120.30
1	A	247	ASP	CB-CG-OD2	-6.71	112.26	118.30
1	B	1	MET	CB-CG-SD	6.70	132.51	112.40
1	B	247	ASP	CB-CG-OD2	-6.67	112.30	118.30
1	C	246	ARG	NE-CZ-NH2	-6.67	116.97	120.30
1	C	47[A]	LYS	CD-CE-NZ	-6.58	96.56	111.70
1	C	47[B]	LYS	CD-CE-NZ	-6.58	96.56	111.70
1	A	199	ARG	NE-CZ-NH1	6.47	123.53	120.30
1	B	1	MET	CG-SD-CE	6.47	110.55	100.20
1	C	247	ASP	CB-CG-OD1	6.39	124.05	118.30
1	A	19	ASP	CB-CG-OD1	6.36	124.03	118.30
1	C	104	GLU	OE1-CD-OE2	6.23	130.78	123.30
1	C	258	ARG	NE-CZ-NH2	-6.22	117.19	120.30
1	C	69	PRO	C-N-CA	6.21	137.23	121.70
1	A	201[A]	ARG	NE-CZ-NH2	-6.16	117.22	120.30
1	A	201[B]	ARG	NE-CZ-NH2	-6.16	117.22	120.30
1	C	116	TYR	CD1-CE1-CZ	-6.16	114.26	119.80
1	B	84	ASP	CB-CG-OD1	6.14	123.83	118.30
1	A	191	ARG	NE-CZ-NH2	-6.14	117.23	120.30
1	C	200	ARG	NE-CZ-NH1	6.12	123.36	120.30
1	C	109	ASP	CB-CG-OD2	-6.09	112.81	118.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	220	ARG	NE-CZ-NH2	6.08	123.34	120.30
1	B	1	MET	CB-CA-C	6.04	122.48	110.40
1	A	47	LYS	CD-CE-NZ	-5.98	97.95	111.70
1	C	116	TYR	CG-CD1-CE1	5.94	126.06	121.30
1	C	79	ARG	NE-CZ-NH1	5.89	123.24	120.30
1	B	122	ASP	OD1-CG-OD2	-5.75	112.38	123.30
1	C	241	GLU	CB-CA-C	5.72	121.85	110.40
1	C	191	ARG	NE-CZ-NH2	-5.68	117.46	120.30
1	A	66	GLU	CG-CD-OE1	-5.62	107.06	118.30
1	A	68	THR	CA-CB-CG2	5.61	120.26	112.40
1	A	145	ASP	CB-CG-OD1	5.59	123.33	118.30
1	C	201	ARG	NE-CZ-NH1	5.53	123.07	120.30
1	B	193	MET	CG-SD-CE	-5.51	91.38	100.20
1	C	66	GLU	OE1-CD-OE2	5.46	129.85	123.30
1	B	1	MET	N-CA-C	-5.41	96.39	111.00
1	C	62	SER	CA-CB-OG	-5.41	96.61	111.20
1	C	57	ARG	NE-CZ-NH1	-5.39	117.60	120.30
1	A	104	GLU	OE1-CD-OE2	5.37	129.75	123.30
1	B	102	ARG	NE-CZ-NH1	5.31	122.95	120.30
1	A	246[A]	ARG	NE-CZ-NH2	-5.30	117.65	120.30
1	A	246[B]	ARG	NE-CZ-NH2	-5.30	117.65	120.30
1	B	239	PHE	CZ-CE2-CD2	-5.26	113.79	120.10
1	A	5	ASP	CB-CG-OD2	-5.22	113.60	118.30
1	A	122	ASP	OD1-CG-OD2	-5.16	113.49	123.30
1	B	5	ASP	CB-CG-OD2	-5.13	113.68	118.30
1	C	116	TYR	CZ-CE2-CD2	5.12	124.41	119.80
1	B	220	ARG	CG-CD-NE	-5.10	101.10	111.80
1	A	203	PHE	CB-CG-CD1	5.07	124.35	120.80
1	B	258	ARG	NE-CZ-NH2	-5.05	117.78	120.30
1	B	200	ARG	CG-CD-NE	-5.02	101.25	111.80
1	B	70	ASP	CB-CG-OD2	-5.02	113.78	118.30
1	B	205	SER	CB-CA-C	-5.01	100.57	110.10
1	B	241	GLU	CG-CD-OE2	-5.01	108.28	118.30

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	70	ASP	Peptide
1	B	90	GLU	Sidechain
1	C	90	GLU	Sidechain

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	1990	0	1973	5	0
1	B	1998	0	1986	6	0
1	C	1983	0	1959	4	0
2	A	29	0	0	0	0
2	B	29	0	0	1	0
2	C	29	0	0	0	0
3	A	10	0	0	0	0
3	B	7	0	0	1	0
3	C	5	0	0	0	0
4	A	4	0	3	0	0
4	B	4	0	3	0	0
4	C	4	0	3	0	0
5	A	203	0	0	2	0
5	B	177	0	0	2	0
5	C	163	0	0	2	0
All	All	6635	0	5927	16	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 1.

All (16) 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:C:47[B]:LYS:HD2	5:C:478:HOH:O	1.75	0.86
1:A:201[B]:ARG:NH2	5:A:401:HOH:O	1.60	0.75
1:C:36:GLU:HG2	5:C:468:HOH:O	1.93	0.67
2:B:301:VFE:N18	5:B:401:HOH:O	2.28	0.65
1:A:246[B]:ARG:NH1	1:A:247:ASP:OD1	2.31	0.63
1:B:201[A]:ARG:HG2	1:B:201[A]:ARG:HH11	1.65	0.62
1:B:201[A]:ARG:HG2	1:B:201[A]:ARG:NH1	2.16	0.60
1:B:69:PRO:O	1:B:70:ASP:C	2.45	0.54
1:B:201[A]:ARG:HH11	1:B:201[A]:ARG:CG	2.22	0.52
5:B:448:HOH:O	1:C:69:PRO:HB3	2.11	0.51
1:A:36:GLU:HG2	5:A:455:HOH:O	2.12	0.50
1:B:246[B]:ARG:NH2	1:B:247:ASP:OD1	2.43	0.50

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:69:PRO:O	1:A:70:ASP:C	2.56	0.44
1:B:196:GLU:HB3	3:B:303:CL:CL	2.56	0.42
1:A:246[B]:ARG:HE	1:A:246[B]:ARG:HB3	1.15	0.42
1:C:73:TYR:OH	1:C:100:GLN:OE1	2.29	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	258/261 (99%)	250 (97%)	7 (3%)	1 (0%)	34 20
1	B	259/261 (99%)	248 (96%)	11 (4%)	0	100 100
1	C	257/261 (98%)	249 (97%)	8 (3%)	0	100 100
All	All	774/783 (99%)	747 (96%)	26 (3%)	1 (0%)	51 37

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	72	LYS

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	208/208 (100%)	205 (99%)	3 (1%)	67	55
1	B	209/208 (100%)	204 (98%)	5 (2%)	49	32
1	C	207/208 (100%)	203 (98%)	4 (2%)	57	42
All	All	624/624 (100%)	612 (98%)	12 (2%)	59	42

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

Mol	Chain	Res	Type
1	A	15	ARG
1	A	74	LYS
1	A	102	ARG
1	B	1	MET
1	B	57[A]	ARG
1	B	57[B]	ARG
1	B	68	THR
1	B	72	LYS
1	C	1	MET
1	C	15	ARG
1	C	74	LYS
1	C	241	GLU

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

Mol	Chain	Res	Type
1	A	110	HIS
1	A	140	HIS
1	A	250	GLN
1	B	250	GLN
1	C	209	HIS
1	C	250	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 monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 28 ligands modelled in this entry, 22 are monoatomic - leaving 6 for Mogul analysis.

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	VFE	B	301	-	28,31,31	1.81	6 (21%)	35,41,41	1.58	9 (25%)
4	ACT	A	312	-	1,3,3	1.57	0	0,3,3	-	-
2	VFE	C	301	-	28,31,31	1.27	1 (3%)	35,41,41	1.78	8 (22%)
4	ACT	C	307	-	1,3,3	0.42	0	0,3,3	-	-
4	ACT	B	309	-	1,3,3	2.29	1 (100%)	0,3,3	-	-
2	VFE	A	301	-	28,31,31	1.22	2 (7%)	35,41,41	1.90	10 (28%)

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	VFE	B	301	-	-	2/23/23/23	0/3/3/3
2	VFE	C	301	-	-	2/23/23/23	0/3/3/3
2	VFE	A	301	-	-	2/23/23/23	0/3/3/3

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	301	VFE	C19-N6	4.55	1.44	1.35
2	C	301	VFE	C5-N6	4.29	1.51	1.45
2	B	301	VFE	C1-N2	4.19	1.53	1.45
2	B	301	VFE	C21-C19	-3.59	1.45	1.51
2	B	301	VFE	C21-S22	3.52	1.88	1.80

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	301	VFE	C7-C8	-2.90	1.46	1.51
4	B	309	ACT	CH3-C	2.29	1.51	1.48
2	B	301	VFE	C5-C3	2.25	1.55	1.52
2	A	301	VFE	C5-C3	-2.24	1.48	1.52
2	A	301	VFE	N18-N14	-2.24	1.33	1.38

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	301	VFE	O4-C3-C5	5.21	130.19	121.08
2	A	301	VFE	C15-N16-C17	-5.08	96.61	102.34
2	A	301	VFE	C17-N18-N14	-5.01	98.88	102.85
2	C	301	VFE	C5-C3-N2	-4.34	109.09	116.27
2	B	301	VFE	C11-N14-N18	3.88	122.24	118.80
2	A	301	VFE	C5-C3-N2	-2.89	111.48	116.27
2	C	301	VFE	C3-C5-N6	-2.88	106.72	113.60
2	A	301	VFE	O4-C3-C5	2.80	125.98	121.08
2	B	301	VFE	C15-N16-C17	-2.79	99.20	102.34
2	C	301	VFE	C11-N14-N18	2.73	121.22	118.80
2	C	301	VFE	C7-N6-C5	-2.72	111.90	116.58
2	B	301	VFE	C23-C28-CL	-2.70	114.95	119.69
2	A	301	VFE	C21-S22-C23	-2.67	98.52	102.61
2	B	301	VFE	C27-C28-CL	2.66	123.74	118.41
2	A	301	VFE	C3-C5-N6	-2.61	107.36	113.60
2	A	301	VFE	C24-C23-S22	2.56	127.71	121.46
2	C	301	VFE	C17-N18-N14	-2.56	100.82	102.85
2	B	301	VFE	C3-C5-N6	-2.56	107.49	113.60
2	A	301	VFE	C27-C28-CL	2.24	122.90	118.41
2	C	301	VFE	C15-N16-C17	-2.23	99.83	102.34
2	A	301	VFE	C10-C11-N14	2.21	121.09	119.15
2	B	301	VFE	C8-C7-N6	2.18	116.64	113.13
2	B	301	VFE	C9-C10-C11	2.14	122.18	119.07
2	B	301	VFE	O4-C3-C5	2.13	124.80	121.08
2	A	301	VFE	C25-C24-C23	2.09	123.27	119.63
2	B	301	VFE	C10-C11-N14	2.03	120.93	119.15
2	C	301	VFE	C13-C8-C9	2.03	121.36	118.17

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	301	VFE	N2-C3-C5-N6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
2	B	301	VFE	N2-C3-C5-N6
2	C	301	VFE	N2-C3-C5-N6
2	A	301	VFE	O4-C3-C5-N6
2	B	301	VFE	O4-C3-C5-N6
2	C	301	VFE	O4-C3-C5-N6

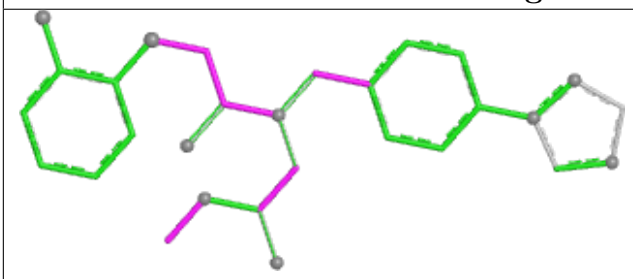
There are no ring outliers.

1 monomer is involved in 1 short contact:

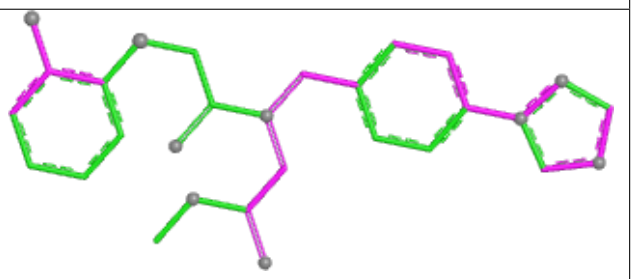
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	301	VFE	1	0

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.

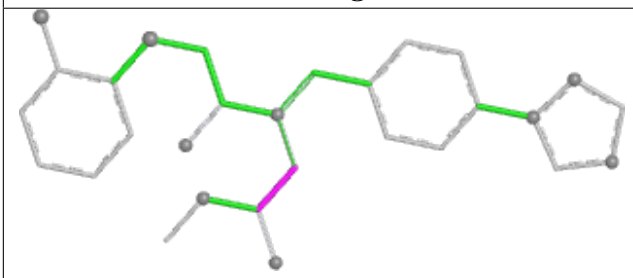
Ligand VFE B 301



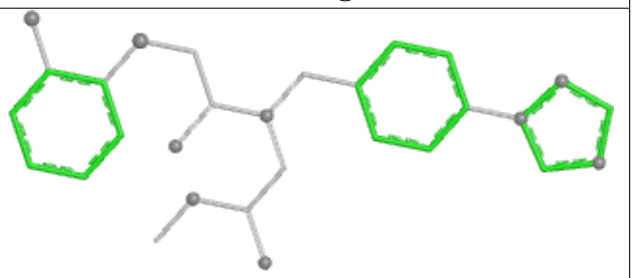
Bond lengths



Bond angles

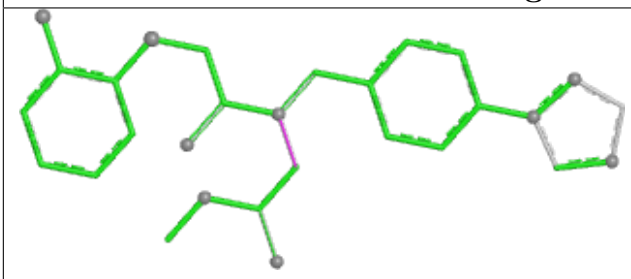


Torsions

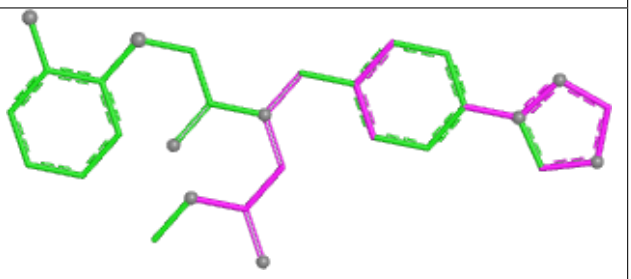


Rings

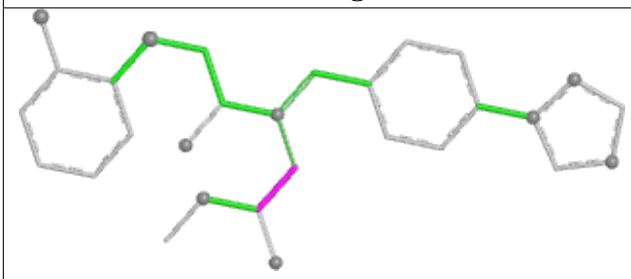
Ligand VFE C 301



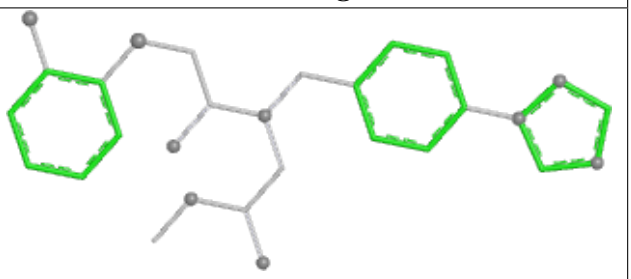
Bond lengths



Bond angles

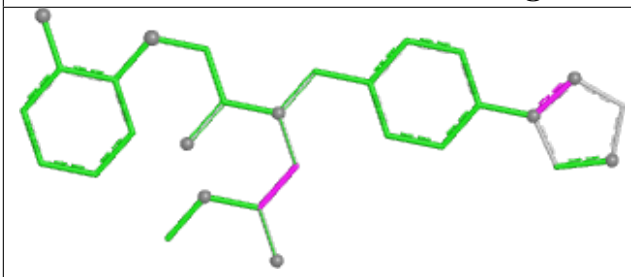


Torsions

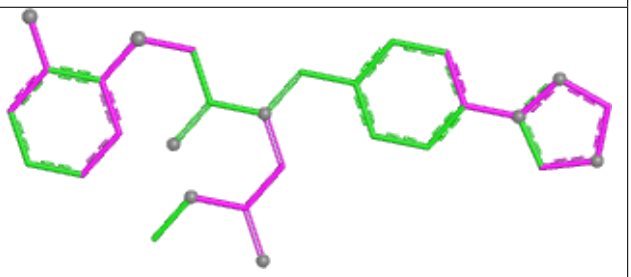


Rings

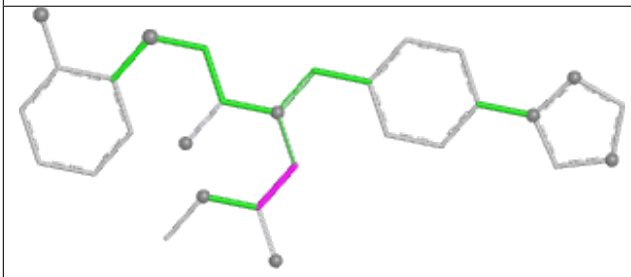
Ligand VFE A 301



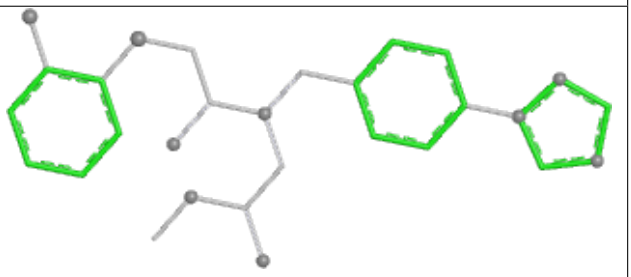
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	258/261 (98%)	0.38	11 (4%) 35 32	25, 34, 76, 110	0
1	B	258/261 (98%)	0.31	18 (6%) 16 14	26, 38, 77, 115	0
1	C	258/261 (98%)	0.72	45 (17%) 1 1	26, 38, 93, 112	0
All	All	774/783 (98%)	0.47	74 (9%) 8 6	25, 37, 86, 115	0

All (74) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	70	ASP	7.1
1	B	74	LYS	6.3
1	B	102	ARG	6.1
1	C	237	ALA	6.0
1	C	207	ALA	5.5
1	B	1	MET	5.4
1	C	233	ALA	5.3
1	B	75	GLY	5.2
1	C	205	SER	5.1
1	C	239	PHE	4.9
1	A	74	LYS	4.8
1	C	236	ALA	4.5
1	C	206	GLU	4.3
1	C	203	PHE	4.3
1	C	232	LEU	4.3
1	C	209	HIS	4.2
1	A	226	GLU	4.2
1	C	1	MET	4.1
1	A	1	MET	3.9
1	B	73	TYR	3.9
1	C	234	GLU	3.9
1	B	70	ASP	3.7
1	C	75	GLY	3.7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	C	230	ALA	3.7
1	B	99	VAL	3.7
1	C	213	ARG	3.7
1	C	229	LEU	3.7
1	C	210	ALA	3.6
1	C	69	PRO	3.5
1	C	238	GLN	3.5
1	A	71	LEU	3.4
1	A	224	THR	3.2
1	B	100	GLN	3.2
1	B	69	PRO	3.2
1	B	101	ASP	3.1
1	C	195	PHE	3.1
1	C	103	ALA	3.0
1	B	71	LEU	3.0
1	C	216	LYS	3.0
1	C	68	THR	2.9
1	A	253	THR	2.9
1	C	240	PRO	2.8
1	C	214	ALA	2.8
1	A	73	TYR	2.8
1	B	2	SER	2.8
1	C	71	LEU	2.8
1	B	68	THR	2.7
1	B	103	ALA	2.7
1	A	72	LYS	2.7
1	C	250	GLN	2.7
1	C	226	GLU	2.7
1	C	196	GLU	2.6
1	B	18	ALA	2.6
1	C	222	GLY	2.6
1	A	75	GLY	2.6
1	C	204	SER	2.6
1	C	223	HIS	2.5
1	C	72	LYS	2.4
1	C	231	GLU	2.4
1	C	228	ALA	2.4
1	B	234	GLU	2.3
1	C	241	GLU	2.3
1	B	98	THR	2.3
1	C	243	ALA	2.3
1	C	220	ARG	2.2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	225	VAL	2.2
1	C	224	THR	2.2
1	C	211	LEU	2.1
1	C	202	GLY	2.1
1	C	246	ARG	2.1
1	C	217	VAL	2.1
1	C	100	GLN	2.1
1	C	227	GLU	2.0
1	B	15	ARG	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, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	CL	A	311	1/1	0.80	0.12	72,72,72,72	0
3	CL	A	310	1/1	0.88	0.16	81,81,81,81	0
3	CL	B	303	1/1	0.89	0.10	68,68,68,68	0
3	CL	B	308	1/1	0.91	0.08	53,53,53,53	0
4	ACT	A	312	4/4	0.91	0.19	57,62,65,66	0
4	ACT	B	309	4/4	0.91	0.21	70,72,73,84	0
2	VFE	A	301	29/29	0.95	0.11	24,31,40,41	0
2	VFE	B	301	29/29	0.95	0.11	26,35,45,47	0
3	CL	A	305	1/1	0.95	0.08	51,51,51,51	0
4	ACT	C	307	4/4	0.95	0.13	46,57,58,65	0
3	CL	A	302	1/1	0.96	0.14	50,50,50,50	0
3	CL	B	307	1/1	0.96	0.09	51,51,51,51	0
2	VFE	C	301	29/29	0.96	0.09	29,32,40,42	0
3	CL	C	305	1/1	0.97	0.08	54,54,54,54	0

Continued on next page...

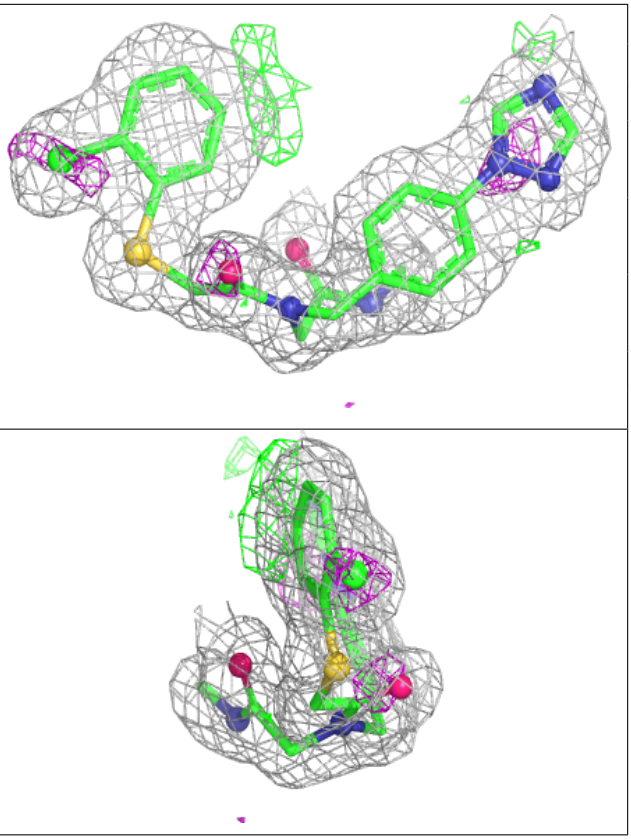
Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	CL	B	306	1/1	0.97	0.09	37,37,37,37	0
3	CL	C	302	1/1	0.98	0.14	32,32,32,32	0
3	CL	C	303	1/1	0.98	0.10	36,36,36,36	0
3	CL	B	304	1/1	0.98	0.11	41,41,41,41	0
3	CL	C	306	1/1	0.98	0.07	47,47,47,47	0
3	CL	A	304	1/1	0.98	0.10	40,40,40,40	0
3	CL	A	308	1/1	0.98	0.14	32,32,32,32	0
3	CL	A	309	1/1	0.98	0.08	49,49,49,49	0
3	CL	C	304	1/1	0.99	0.07	38,38,38,38	0
3	CL	A	303	1/1	0.99	0.10	34,34,34,34	0
3	CL	B	302	1/1	0.99	0.08	46,46,46,46	0
3	CL	A	306	1/1	0.99	0.09	41,41,41,41	0
3	CL	A	307	1/1	0.99	0.10	35,35,35,35	0
3	CL	B	305	1/1	0.99	0.12	36,36,36,36	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.

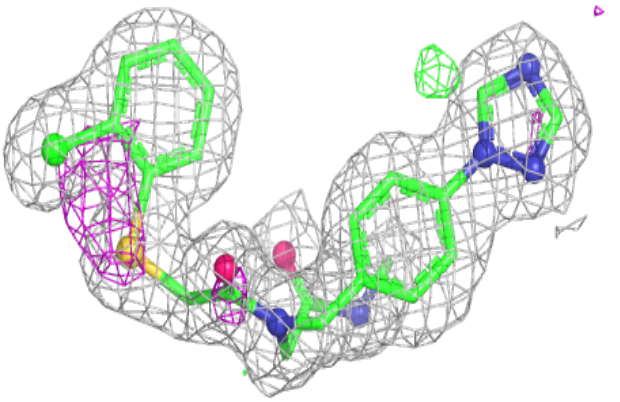
Electron density around VFE A 301:

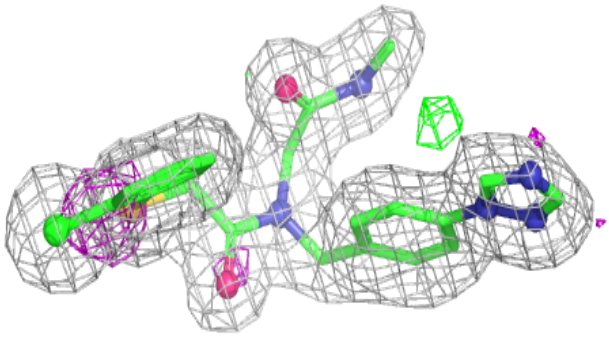
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

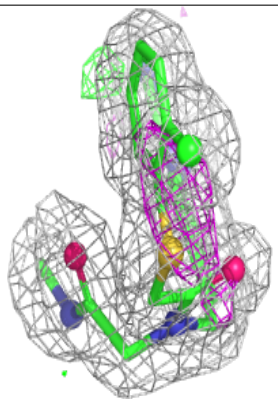


Electron density around VFE B 301:

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

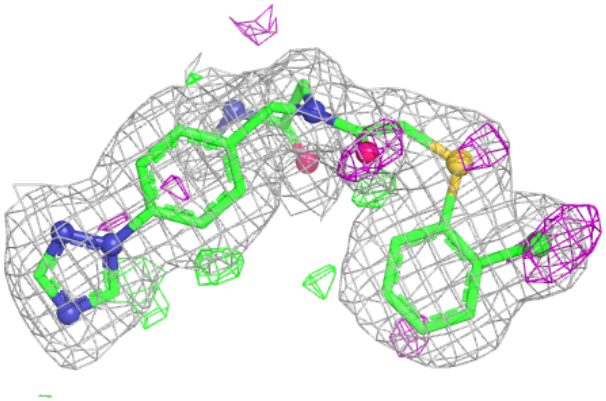


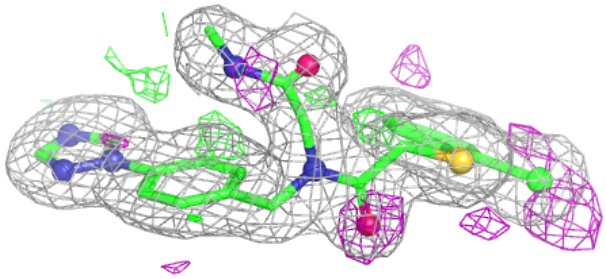


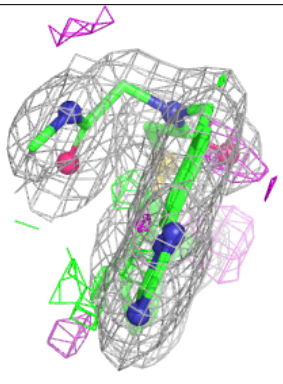


Electron density around VFE C 301:

$2mF_o$-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.