wwPDB X-ray Structure Validation Summary Report (i)

Jan 3, 2024 – 09:54 am GMT

PDB ID	:	4ZIW
Title	:	Crystal structure of AcrB deletion mutant in P21 space group
Authors	:	Ababou, A.; Koronakis, V.
Deposited on	:	2015-04-28
Resolution	:	3.40 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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:

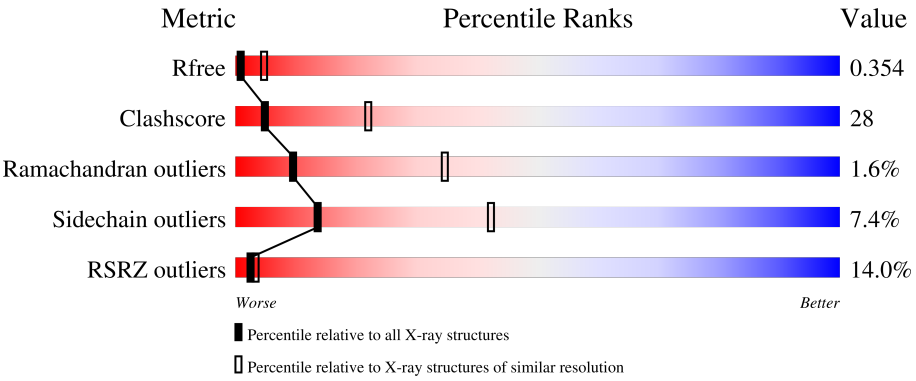
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
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 3.40 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1026 (3.48-3.32)
Clashscore	141614	1055 (3.48-3.32)
Ramachandran outliers	138981	1038 (3.48-3.32)
Sidechain outliers	138945	1038 (3.48-3.32)
RSRZ outliers	127900	2173 (3.50-3.30)

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	1044	12% 47% 47% 5% •
1	B	1044	10% 50% 45% •
1	C	1044	12% 47% 47% 5% •
1	D	1044	16% 44% 50% 5% ••
1	E	1044	17% 47% 47% 5% •

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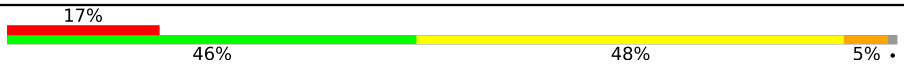
Mol	Chain	Length	Quality of chain
1	F	1044	

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
2	LMT	B	2000	-	-	-	X
2	LMT	D	2000	X	-	-	-
2	LMT	E	1101	X	-	-	X

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 47532 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 Multidrug efflux pump subunit AcrB.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	1038	Total	C	N	O	S	0	0	0
			7893	5072	1306	1472	43			
1	B	1039	Total	C	N	O	S	0	0	0
			7900	5076	1307	1474	43			
1	C	1035	Total	C	N	O	S	0	0	0
			7867	5057	1299	1468	43			
1	D	1038	Total	C	N	O	S	0	0	0
			7893	5072	1306	1472	43			
1	E	1037	Total	C	N	O	S	0	0	0
			7883	5066	1303	1471	43			
1	F	1037	Total	C	N	O	S	0	0	0
			7883	5066	1303	1471	43			

There are 36 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	615	GLY	PHE	engineered mutation	UNP P31224
A	?	-	GLY	deletion	UNP P31224
A	?	-	PHE	deletion	UNP P31224
A	?	-	ALA	deletion	UNP P31224
A	?	-	GLY	deletion	UNP P31224
A	?	-	ARG	deletion	UNP P31224
B	615	GLY	PHE	engineered mutation	UNP P31224
B	?	-	GLY	deletion	UNP P31224
B	?	-	PHE	deletion	UNP P31224
B	?	-	ALA	deletion	UNP P31224
B	?	-	GLY	deletion	UNP P31224
B	?	-	ARG	deletion	UNP P31224
C	615	GLY	PHE	engineered mutation	UNP P31224
C	?	-	GLY	deletion	UNP P31224
C	?	-	PHE	deletion	UNP P31224
C	?	-	ALA	deletion	UNP P31224
C	?	-	GLY	deletion	UNP P31224

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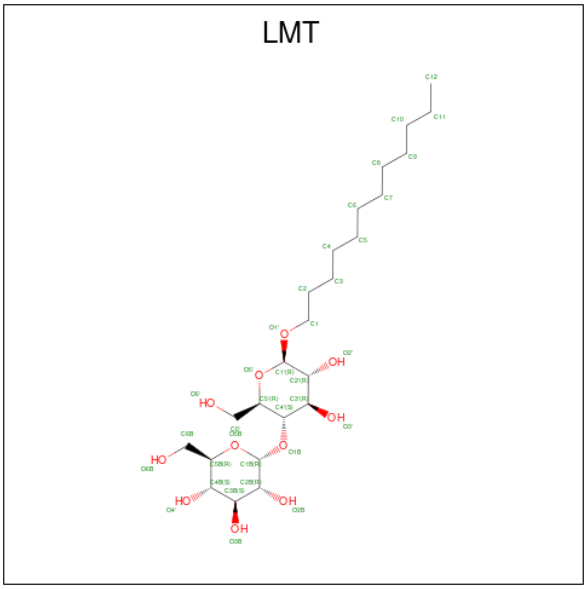
Chain	Residue	Modelled	Actual	Comment	Reference
C	?	-	ARG	deletion	UNP P31224
D	615	GLY	PHE	engineered mutation	UNP P31224
D	?	-	GLY	deletion	UNP P31224
D	?	-	PHE	deletion	UNP P31224
D	?	-	ALA	deletion	UNP P31224
D	?	-	GLY	deletion	UNP P31224
D	?	-	ARG	deletion	UNP P31224
E	615	GLY	PHE	engineered mutation	UNP P31224
E	?	-	GLY	deletion	UNP P31224
E	?	-	PHE	deletion	UNP P31224
E	?	-	ALA	deletion	UNP P31224
E	?	-	GLY	deletion	UNP P31224
E	?	-	ARG	deletion	UNP P31224
F	615	GLY	PHE	engineered mutation	UNP P31224
F	?	-	GLY	deletion	UNP P31224
F	?	-	PHE	deletion	UNP P31224
F	?	-	ALA	deletion	UNP P31224
F	?	-	GLY	deletion	UNP P31224
F	?	-	ARG	deletion	UNP P31224

- Molecule 2 is DODECYL-BETA-D-MALTOSIDE (three-letter code: LMT) (formula: $C_{24}H_{46}O_{11}$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 35 24 11	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	1	Total C O 35 24 11	0	0
2	C	1	Total C O 35 24 11	0	0
2	D	1	Total C O 35 24 11	0	0
2	E	1	Total C O 35 24 11	0	0
2	F	1	Total C O 35 24 11	0	0

- Molecule 3 is NICKEL (II) ION (three-letter code: NI) (formula: Ni).

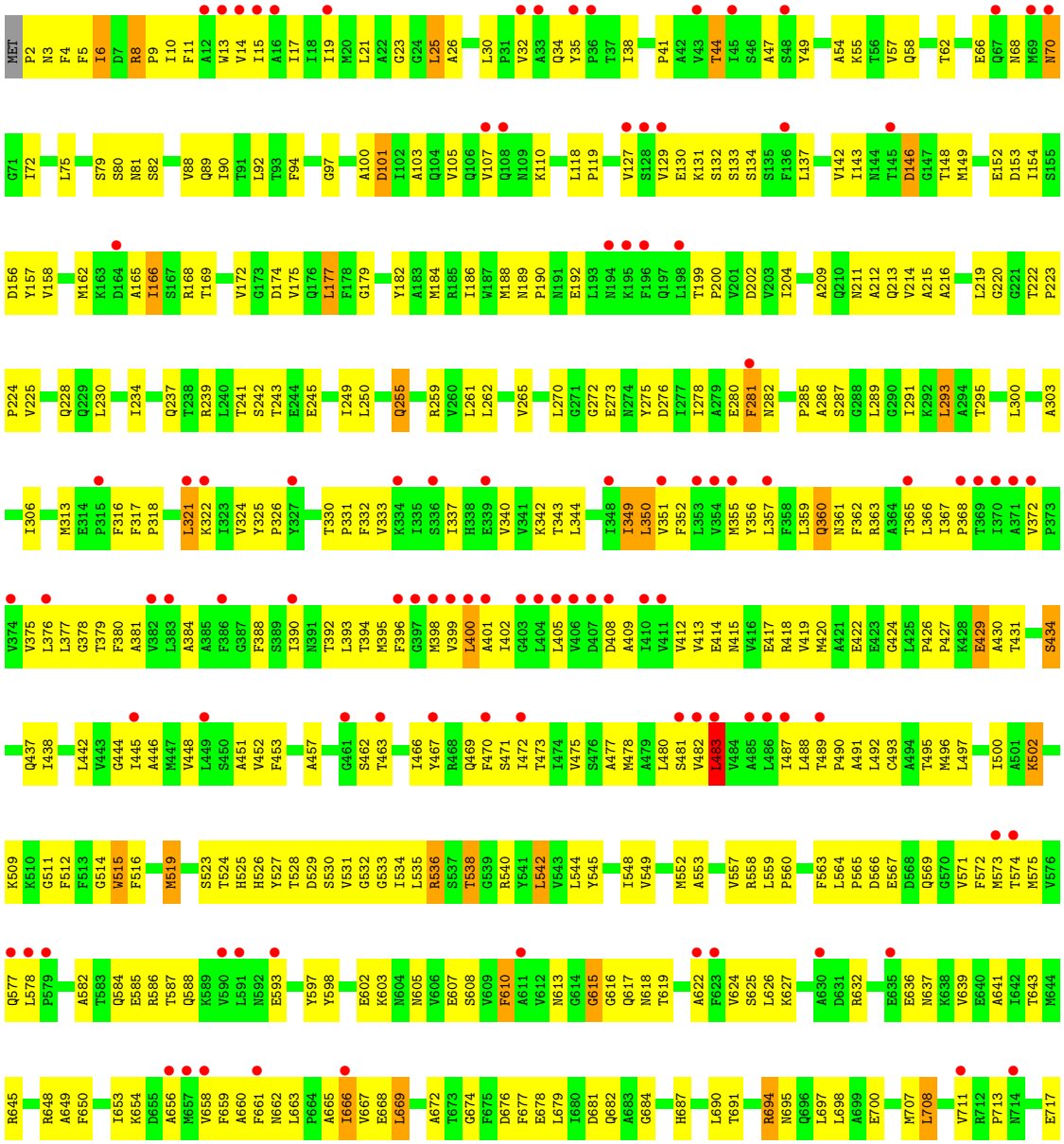
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Ni 1 1	0	0
3	C	1	Total Ni 1 1	0	0
3	E	1	Total Ni 1 1	0	0

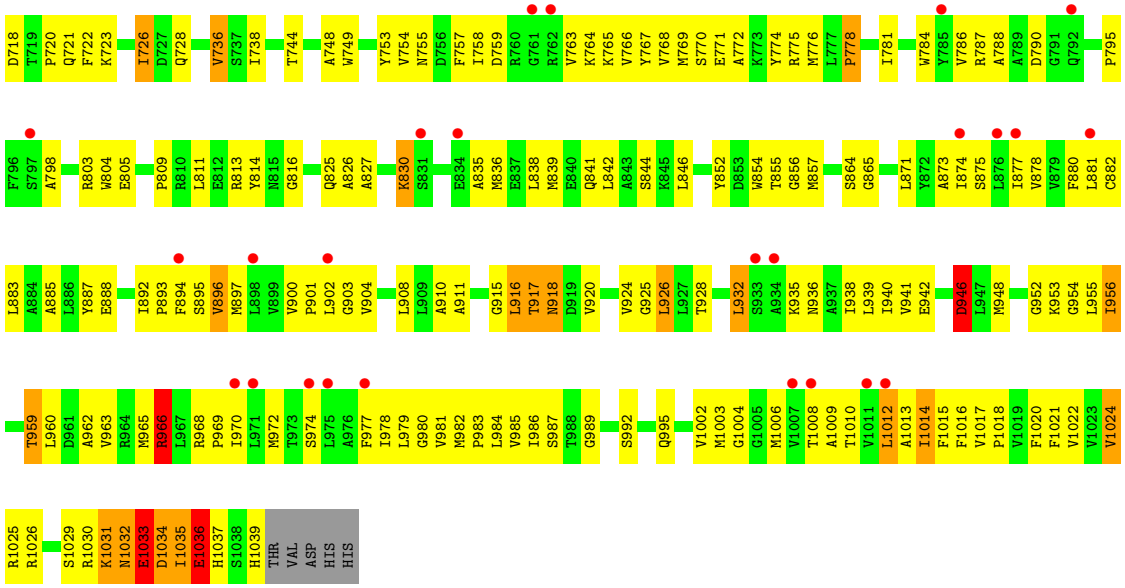
3 Residue-property plots (i)

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: Multidrug efflux pump subunit AcrB

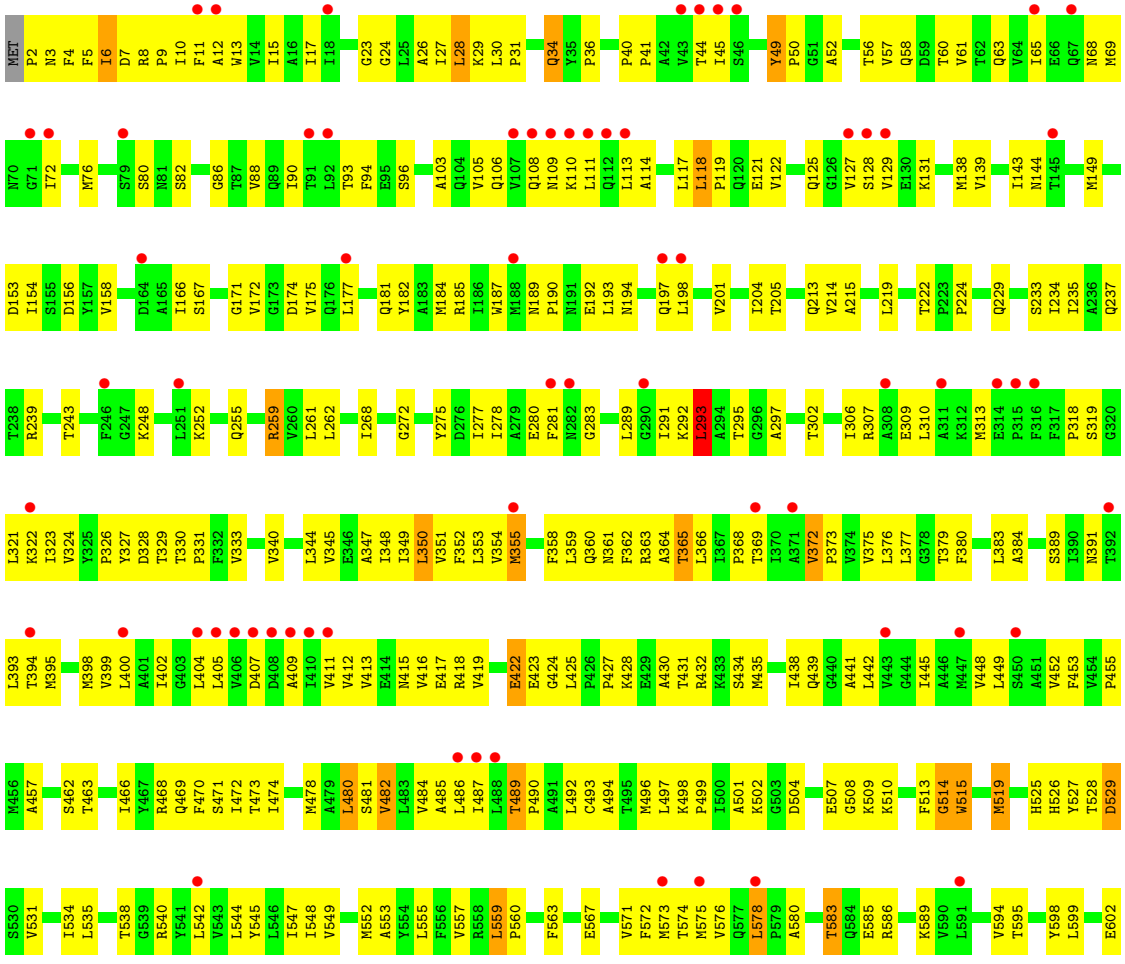
Chain A:

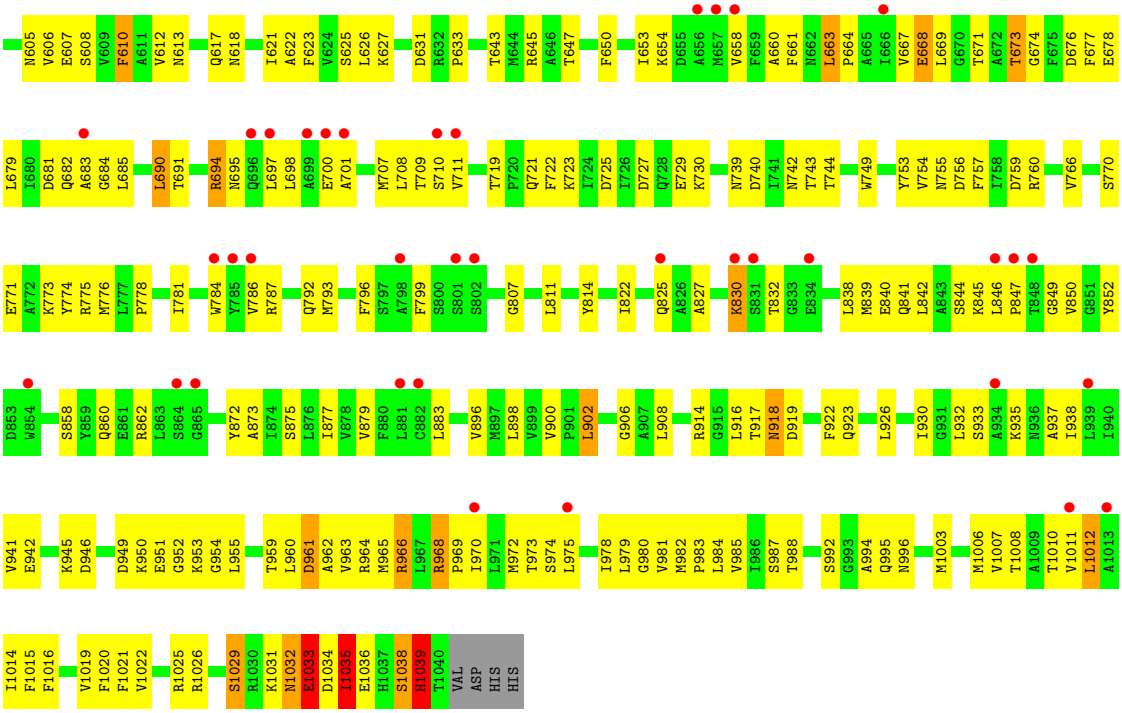




• Molecule 1: Multidrug efflux pump subunit AcrB

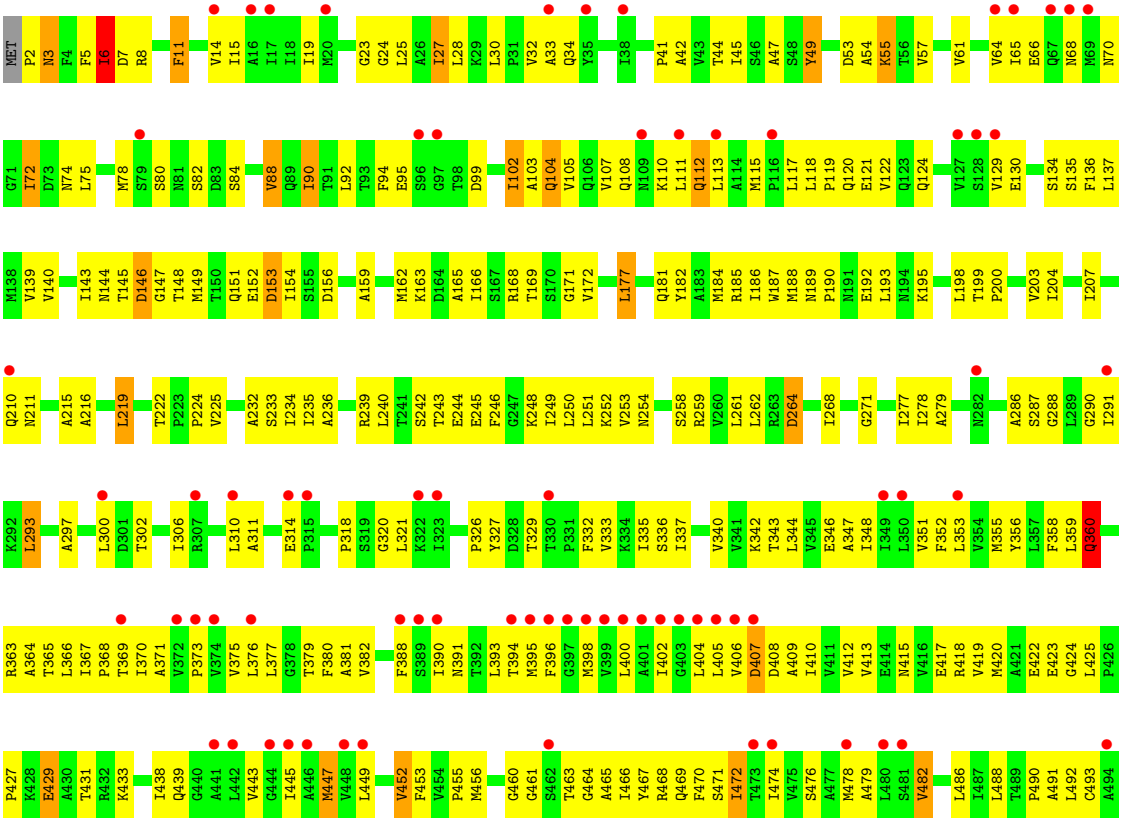
Chain B:

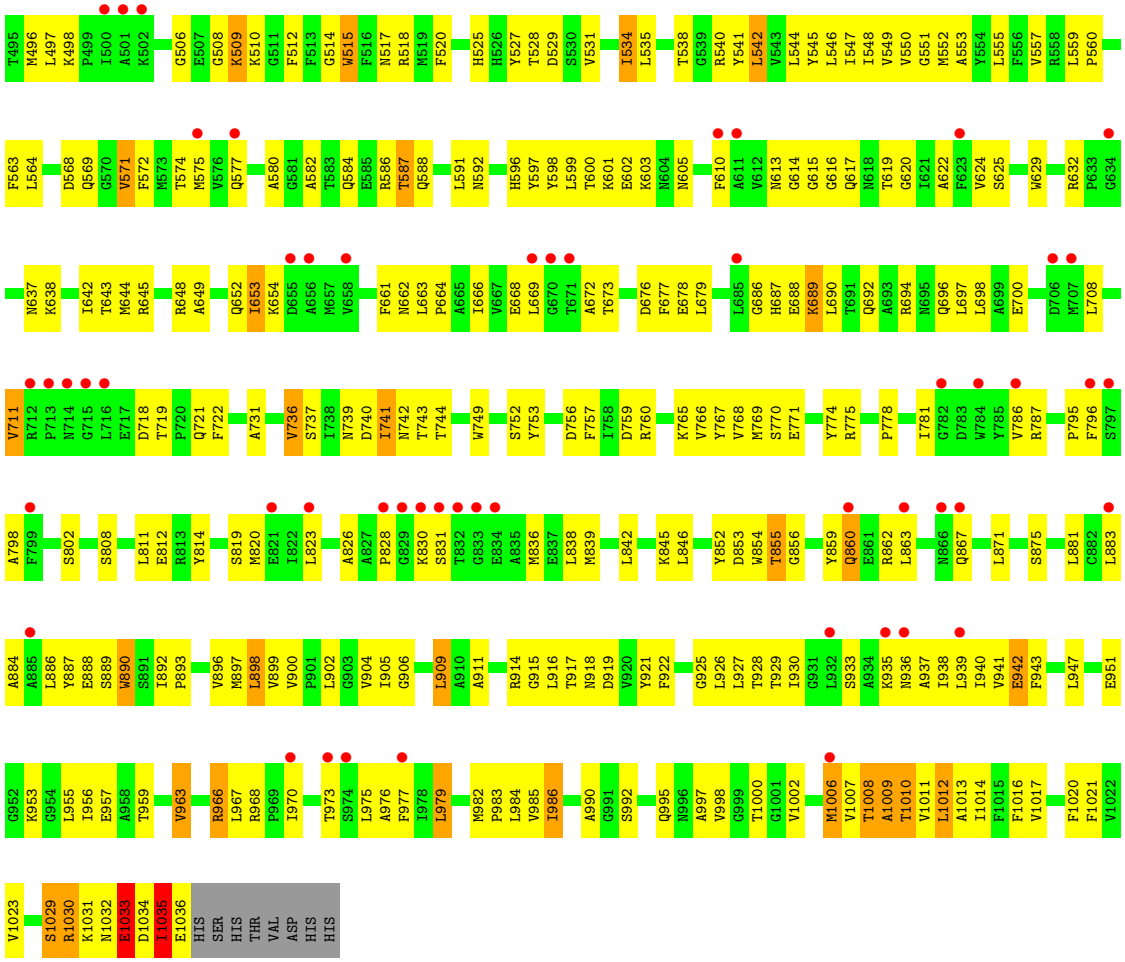




• Molecule 1: Multidrug efflux pump subunit AcrB

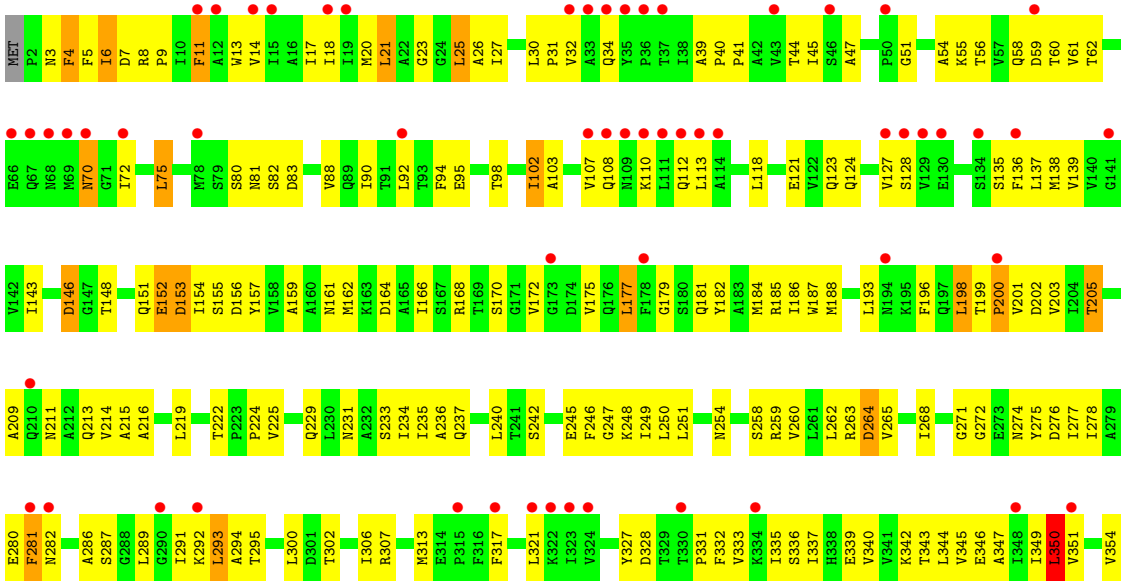
Chain C:

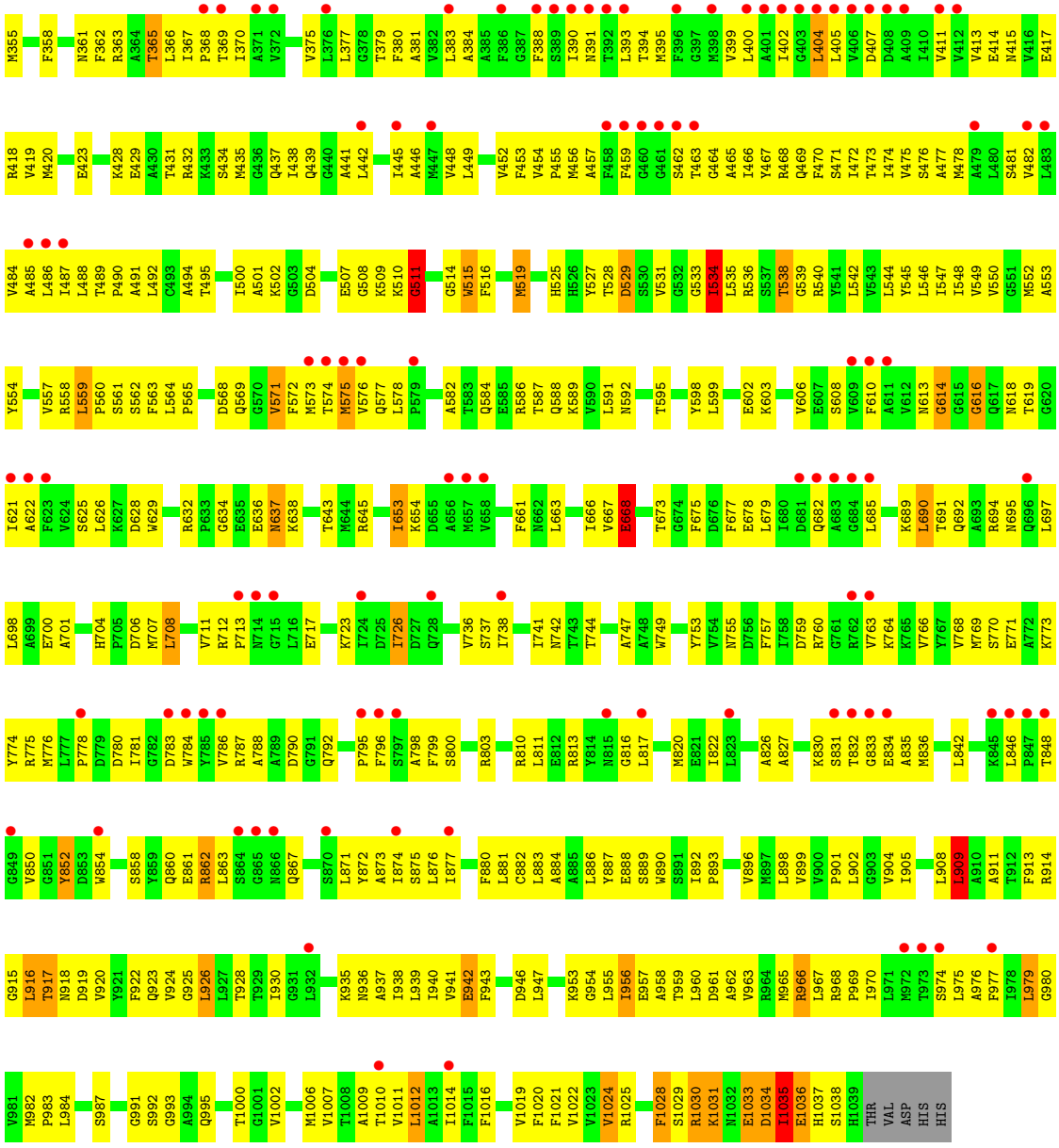




• Molecule 1: Multidrug efflux pump subunit AcrB

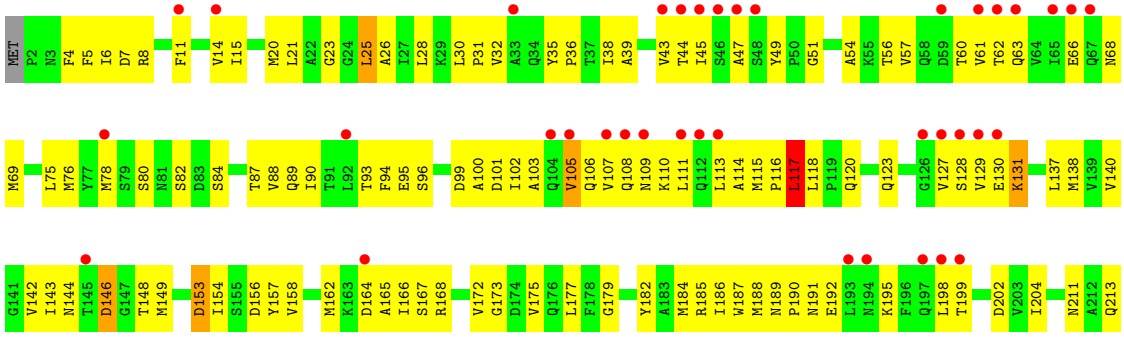
Chain D:

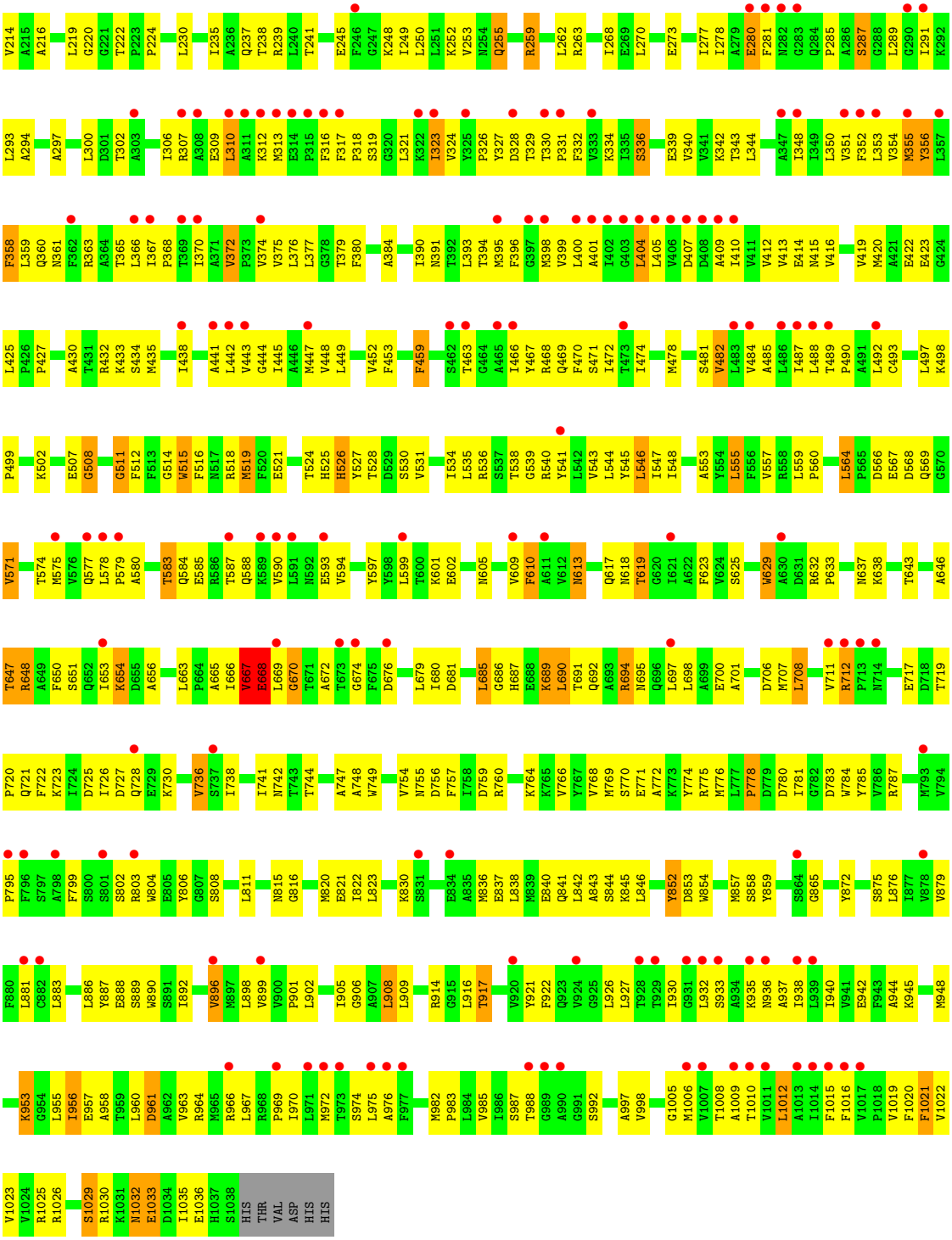




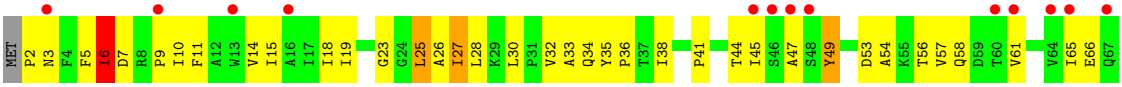
• Molecule 1: Multidrug efflux pump subunit AcrB

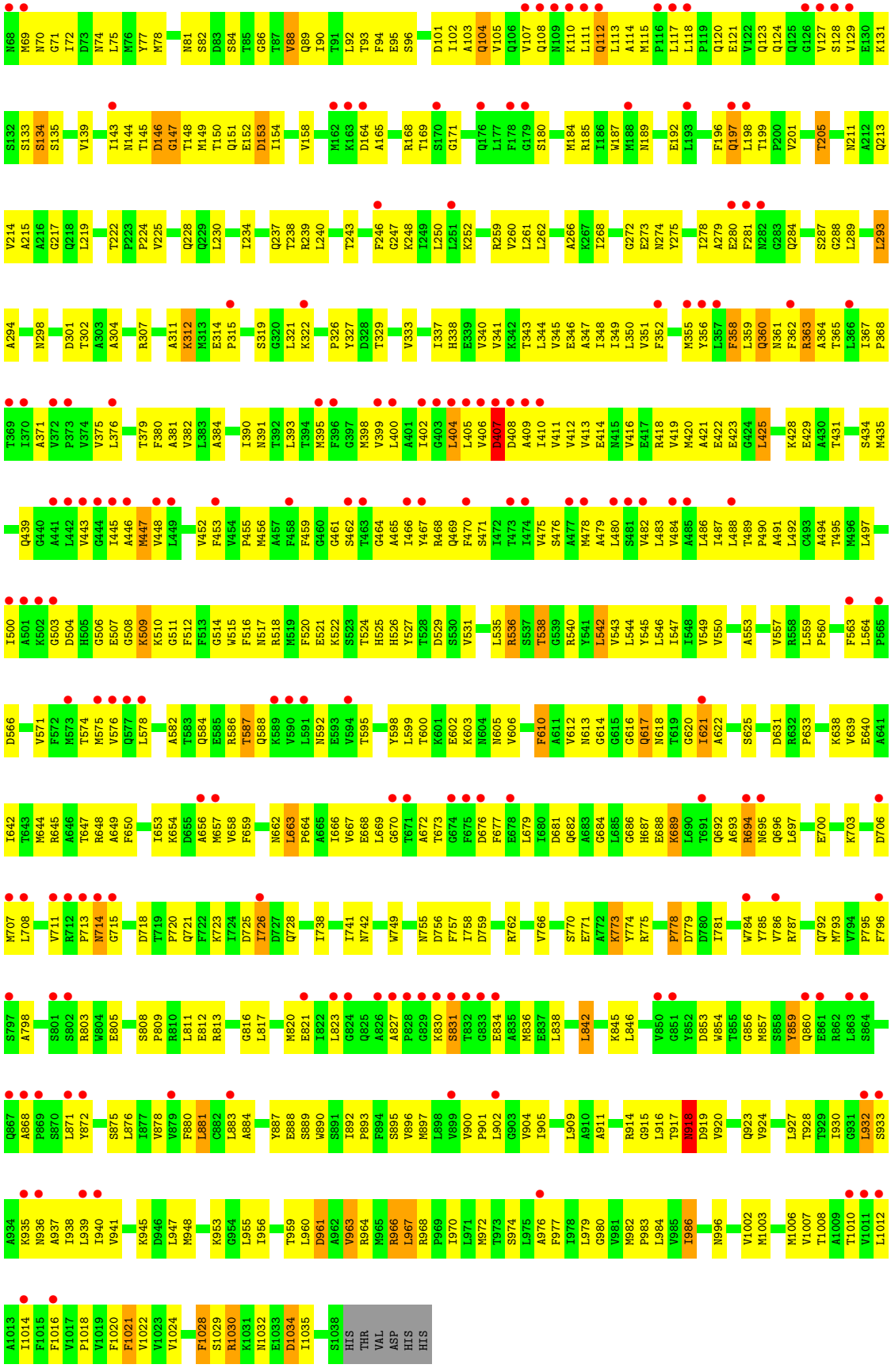
Chain E:





• Molecule 1: Multidrug efflux pump subunit AcrB




N68 M69 N70 G71 I72 D73 N74 L75 M76 Y77 M78 N81 S82 D83 S84 T85 G86 T87 V88 Q89 I90 T91 L92 T93 F94 E95 S96 D101 I102 A103 Q104 V105 Q106 V107 Q108 N109 K110 L111 Q112 L113 A114 M115 P116 L117 L118 P119 Q120 E121 V122 Q123 Q124 Q125 G126 V127 S128 V129 E130 K131
S132 S133 S134 S135 V139 I143 N144 T145 D146 G147 T148 M149 T150 Q151 E152 D153 I154 V158 M162 K163 D164 A165 R168 T169 S170 G171 Q176 L177 F178 G179 S180 M184 R185 I186 W187 M188 N189 E192 L193 F196 Q197 L198 T199 P200 V201 T205 N211 A212 Q213
V214 A215 A216 G217 Q218 L219 T222 P223 P224 V225 Q228 Q229 L230 I234 Q237 T238 R239 L240 T243 F246 G247 K248 I249 L250 L251 K252 R259 V260 L261 L262 A266 K267 I268 G272 E273 N274 Y275 I278 A279 E280 F281 N282 G283 Q284 S287 G288 L289 L293
A294 N298 D301 T302 A303 A304 R307 A311 K312 M313 E314 P315 S319 G320 L321 K322 P326 Y327 D328 T329 V333 I337 H338 E339 V340 V341 K342 T343 L344 V345 E346 A347 I348 I349 L350 V351 F352 M355 Y356 L357 F358 L359 Q360 N361 F362 R363 A364 T365 L366 I367 P368
T369 I370 A371 V372 P373 V374 V375 L376 T379 F380 A381 V382 L383 A384 I390 N391 T392 L393 T394 M395 F396 G397 M398 V399 L400 A401 I402 G403 L404 L405 V406 D407 D408 A409 I410 V411 V412 V413 E414 N415 V416 E417 R418 V419 M420 A421 E422 E423 G424 L425 K428 E429 A430 T431 S434 M435
Q439 G440 A441 L442 V443 G444 I445 A446 M447 V448 L449 V452 F453 V454 P455 M456 A457 F458 F459 G460 G461 S462 T463 G464 A465 I466 Y467 R468 Q469 F470 S471 I472 T473 I474 V475 S476 A477 M478 A479 L480 S481 V482 L483 V484 A485 L486 I487 L488 T489 P490 A491 L492 C493 A494 T495 M496 L497
I500 A501 K502 G503 D504 H505 G506 E507 G508 K509 K510 G511 F512 F513 G514 W515 F516 N517 R518 M519 F520 E521 K522 S523 T524 H525 H526 Y527 T528 D529 S530 V531 L535 R536 S537 T538 G539 R540 Y541 L542 V543 L544 Y545 L546 I547 I548 V549 V550 A553 V557 R558 L559 P560 F563 L564 P565
D566 V571 F572 M573 T574 M575 V576 Q577 L578 A582 T583 Q584 E585 R586 T587 Q588 K589 V590 L591 N592 E593 V594 T595 Y598 L599 T600 K601 E602 K603 N604 N605 V606 F610 A611 V612 N613 G614 G615 G616 Q617 N618 T619 G620 I621 A622 S625 D631 R632 P633 K638 V639 E640 A641
I642 T643 M644 R645 A646 T647 R648 A649 F650 I653 K654 D655 A656 M657 V658 F659 N662 L663 P664 A665 I666 V667 E668 L669 G670 T671 A672 T673 G674 F675 D676 F677 E678 L679 I680 D681 Q682 A683 G684 L685 G686 H687 E688 K689 L690 T691 Q692 A693 R694 N695 Q696 L697 E700 K703 D706
M707 L708 V711 R712 P713 N714 G715 D718 T719 P720 Q721 F722 K723 I724 D725 I726 D727 Q728 I738 I741 N742 W749 N755 D756 F757 I758 D759 R762 V766 S770 E771 A772 K773 Y774 R775 P778 D779 D780 I781 W784 Y785 V786 R787 Q792 M793 V794 P795 F796
S797 A798 S801 S802 R803 W804 E805 S808 P809 R810 L811 E812 R813 G816 L817 M820 E821 I822 L823 G824 Q825 A826 A827 P828 G829 K830 S831 T832 G833 E834 A835 M836 E837 L838 L842 K845 L846 V850 G851 Y852 D853 W854 T855 G856 M857 S858 Y859 Q860 E861 R862 L863 S864
Q867 A868 P869 S870 L871 Y872 S875 L876 I877 V878 V879 F880 L881 C882 L883 A884 Y887 E888 S889 W890 S891 I892 P893 P894 S895 V896 M897 L898 V899 V900 P901 L902 G903 V904 I905 L909 A910 A911 R914 G915 L916 T917 N918 D919 V920 Q923 V924 L927 T928 T929 I930 G931 L932 S933
A934 K935 N936 A937 I938 L939 I940 V941 K945 D946 L947 M948 K953 G954 L955 I956 T959 I960 D961 A962 V963 R964 M965 R966 L967 R968 P969 I970 L971 M972 T973 S974 L975 A976 F977 I978 L979 G980 V981 M982 P983 L984 V985 I986 N996 V1002 M1003 M1006 V1007 T1008 A1009 T1010 V1011 L1012
A1013 I1014 F1015 F1016 V1017 P1018 V1019 F1020 F1021 V1022 V1023 V1024 F1028 S1029 R1030 K1031 N1032 E1033 D1034 I1035 S1038 HIS THR VAL ASP HIS HIS

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	152.07Å 157.78Å 219.39Å 90.00° 93.14° 90.00°	Depositor
Resolution (Å)	20.00 – 3.40 109.53 – 3.40	Depositor EDS
% Data completeness (in resolution range)	99.8 (20.00-3.40) 97.9 (109.53-3.40)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.93 (at 3.41Å)	Xtriage
Refinement program	PHENIX 1.8.2_1309	Depositor
R, R_{free}	0.275 , 0.349 0.285 , 0.354	Depositor DCC
R_{free} test set	7110 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	98.9	Xtriage
Anisotropy	0.077	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.26 , 74.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.39$, $< L^2 > = 0.21$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.80	EDS
Total number of atoms	47532	wwPDB-VP
Average B, all atoms (Å^2)	77.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 47.48 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 9.8623e-05.*

[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: NI, LMT

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	0.65	1/8043 (0.0%)	0.89	11/10922 (0.1%)
1	B	0.65	1/8050 (0.0%)	0.89	9/10932 (0.1%)
1	C	0.67	1/8015 (0.0%)	0.91	9/10884 (0.1%)
1	D	0.60	1/8043 (0.0%)	0.89	15/10922 (0.1%)
1	E	0.60	1/8032 (0.0%)	0.87	12/10907 (0.1%)
1	F	0.60	0/8032	0.89	7/10907 (0.1%)
All	All	0.63	5/48215 (0.0%)	0.89	63/65474 (0.1%)

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	A	0	3
1	B	0	2
1	C	0	1
1	D	0	1
1	F	0	1
All	All	0	8

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	515	TRP	CB-CG	7.50	1.63	1.50
1	A	515	TRP	CB-CG	6.68	1.62	1.50
1	E	515	TRP	CB-CG	5.77	1.60	1.50
1	B	515	TRP	CB-CG	5.72	1.60	1.50
1	C	515	TRP	CB-CG	5.07	1.59	1.50

The worst 5 of 63 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	939	LEU	CA-CB-CG	-8.38	96.02	115.30
1	C	529	ASP	CB-CG-OD1	8.07	125.56	118.30
1	F	529	ASP	CB-CG-OD1	7.98	125.48	118.30
1	A	529	ASP	CB-CG-OD1	7.69	125.22	118.30
1	D	350	LEU	CA-CB-CG	-7.26	98.61	115.30

There are no chirality outliers.

5 of 8 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1033	GLU	Peptide
1	A	1034	ASP	Peptide
1	A	1036	GLU	Peptide
1	B	1033	GLU	Peptide
1	B	1035	ILE	Peptide

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	7893	0	8034	457	0
1	B	7900	0	8041	384	0
1	C	7867	0	8015	444	0
1	D	7893	0	8034	515	0
1	E	7883	0	8027	461	0
1	F	7883	0	8027	477	0
2	A	35	0	46	4	0
2	B	35	0	46	3	0
2	C	35	0	46	1	0
2	D	35	0	46	3	0
2	E	35	0	46	8	0
2	F	35	0	46	1	0
3	A	1	0	0	0	0
3	C	1	0	0	0	0
3	E	1	0	0	0	0
All	All	47532	0	48454	2651	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 28.

The worst 5 of 2651 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:E:536:ARG:NE	2:E:1101:LMT:O3B	1.81	1.13
1:A:424:GLY:HA3	1:A:502:LYS:HG2	1.38	1.04
1:D:954:GLY:HA2	1:D:1034:ASP:H	1.23	1.03
1:C:686:GLY:HA3	1:C:689:LYS:HD3	1.42	1.01
1:D:533:GLY:HA2	1:D:536:ARG:HD3	1.48	0.95

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	1036/1044 (99%)	942 (91%)	79 (8%)	15 (1%)	11	37
1	B	1037/1044 (99%)	942 (91%)	85 (8%)	10 (1%)	15	46
1	C	1033/1044 (99%)	931 (90%)	84 (8%)	18 (2%)	9	34
1	D	1036/1044 (99%)	934 (90%)	83 (8%)	19 (2%)	8	32
1	E	1035/1044 (99%)	937 (90%)	87 (8%)	11 (1%)	14	44
1	F	1035/1044 (99%)	926 (90%)	84 (8%)	25 (2%)	6	28
All	All	6212/6264 (99%)	5612 (90%)	502 (8%)	98 (2%)	9	34

5 of 98 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	672	ALA
1	A	986	ILE
1	A	1029	SER
1	A	1033	GLU
1	B	617	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	846/852 (99%)	781 (92%)	65 (8%)	13	40
1	B	847/852 (99%)	789 (93%)	58 (7%)	16	45
1	C	843/852 (99%)	774 (92%)	69 (8%)	11	37
1	D	846/852 (99%)	789 (93%)	57 (7%)	16	46
1	E	845/852 (99%)	775 (92%)	70 (8%)	11	36
1	F	845/852 (99%)	789 (93%)	56 (7%)	16	46
All	All	5072/5112 (99%)	4697 (93%)	375 (7%)	13	42

5 of 375 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	738	ILE
1	E	575	MET
1	D	926	LEU
1	E	177	LEU
1	E	690	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 28 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	67	GLN
1	F	755	ASN
1	E	605	ASN
1	F	682	GLN
1	E	569	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 9 ligands modelled in this entry, 3 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	LMT	F	2000	-	36,36,36	1.85	8 (22%)	47,47,47	1.14	4 (8%)
2	LMT	B	2000	-	36,36,36	1.81	12 (33%)	47,47,47	1.50	8 (17%)
2	LMT	E	1101	-	36,36,36	1.83	10 (27%)	47,47,47	1.92	9 (19%)
2	LMT	D	2000	-	36,36,36	1.87	9 (25%)	47,47,47	1.70	8 (17%)
2	LMT	A	1101	-	36,36,36	1.80	11 (30%)	47,47,47	1.37	6 (12%)
2	LMT	C	1101	-	36,36,36	1.85	10 (27%)	47,47,47	1.40	6 (12%)

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	LMT	F	2000	-	-	15/21/61/61	0/2/2/2
2	LMT	B	2000	-	-	13/21/61/61	0/2/2/2
2	LMT	E	1101	-	1/1/10/10	12/21/61/61	0/2/2/2
2	LMT	D	2000	-	1/1/10/10	12/21/61/61	0/2/2/2
2	LMT	A	1101	-	-	8/21/61/61	0/2/2/2
2	LMT	C	1101	-	-	12/21/61/61	0/2/2/2

The worst 5 of 60 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	1101	LMT	O1'-C1'	4.20	1.47	1.40
2	C	1101	LMT	O5'-C5'	4.10	1.54	1.44
2	F	2000	LMT	O5'-C1'	4.07	1.52	1.41
2	B	2000	LMT	O5'-C5'	3.97	1.54	1.44
2	F	2000	LMT	O5'-C5'	3.97	1.54	1.44

The worst 5 of 41 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	E	1101	LMT	O1B-C4'-C5'	-5.21	95.18	109.45
2	D	2000	LMT	O1'-C1'-C2'	5.11	116.28	108.30
2	C	1101	LMT	O1'-C1'-C2'	4.87	115.91	108.30
2	E	1101	LMT	C4B-C3B-C2B	4.82	119.23	110.82
2	E	1101	LMT	C3B-C4B-C5B	4.70	118.63	110.24

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	D	2000	LMT	C3B
2	E	1101	LMT	C2B

5 of 72 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	1101	LMT	C2'-C1'-O1'-C1
2	C	1101	LMT	O5'-C1'-O1'-C1
2	E	1101	LMT	C2-C1-O1'-C1'
2	F	2000	LMT	C2'-C1'-O1'-C1
2	E	1101	LMT	C4B-C5B-C6B-O6B

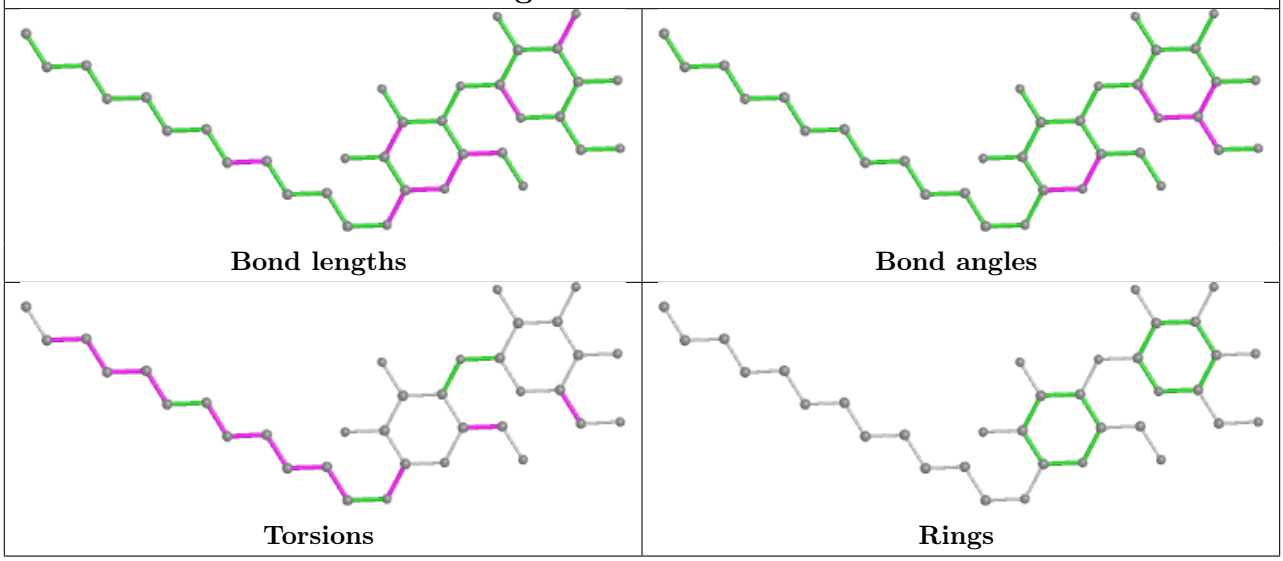
There are no ring outliers.

6 monomers are involved in 20 short contacts:

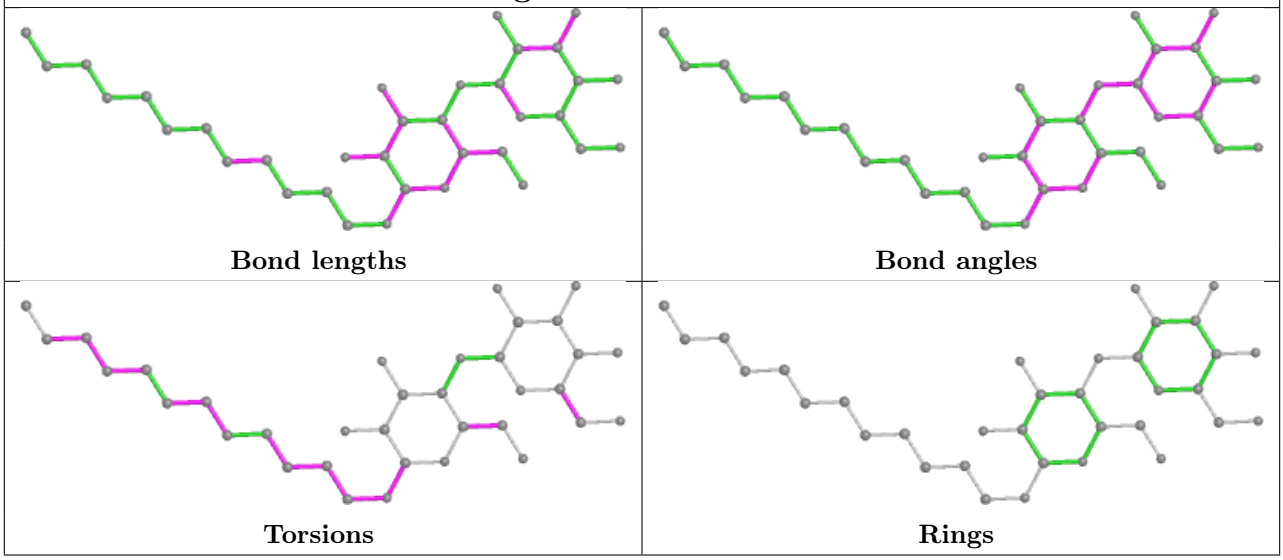
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	F	2000	LMT	1	0
2	B	2000	LMT	3	0
2	E	1101	LMT	8	0
2	D	2000	LMT	3	0
2	A	1101	LMT	4	0
2	C	1101	LMT	1	0

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.

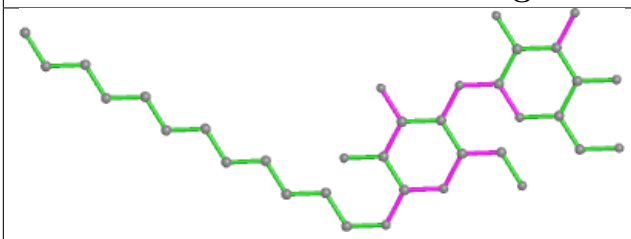
Ligand LMT F 2000



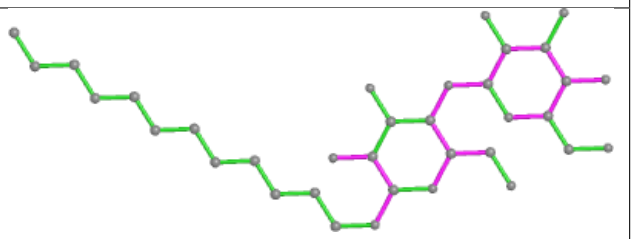
Ligand LMT B 2000



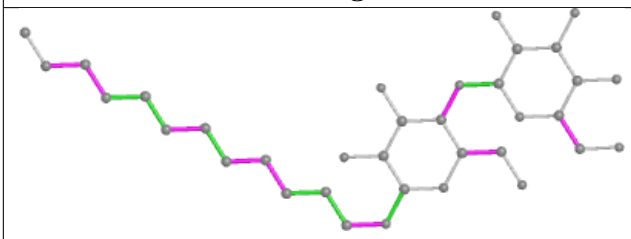
Ligand LMT E 1101



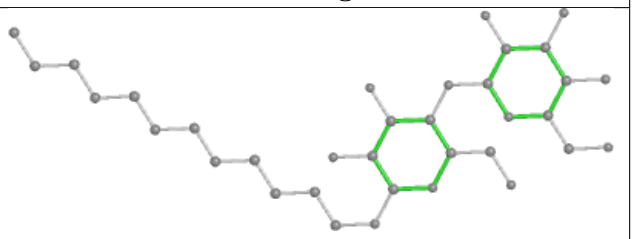
Bond lengths



Bond angles

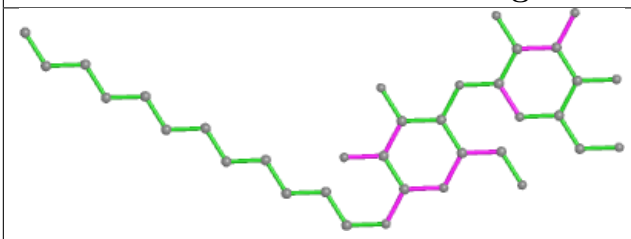


Torsions

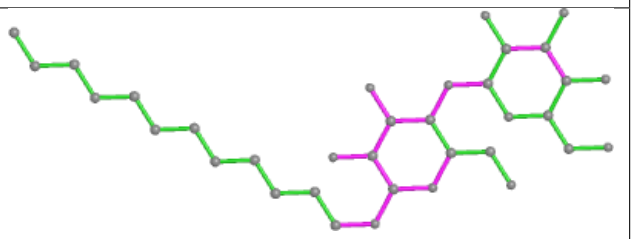


Rings

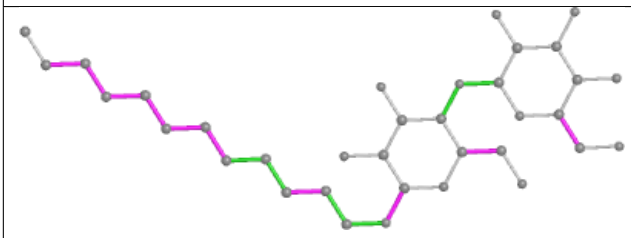
Ligand LMT D 2000



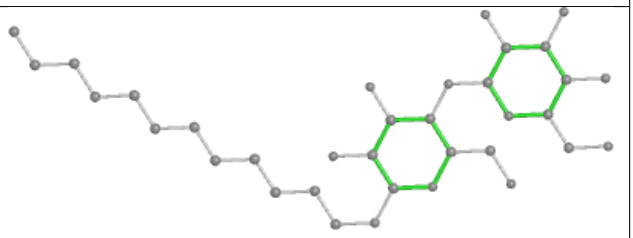
Bond lengths



Bond angles

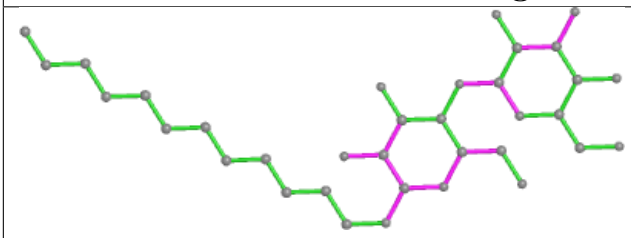


Torsions

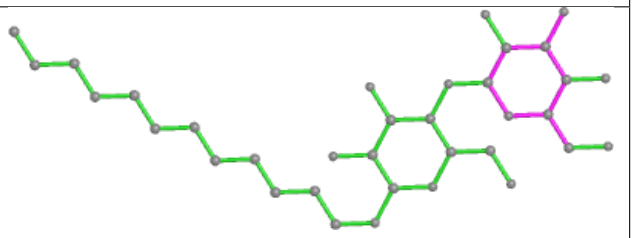


Rings

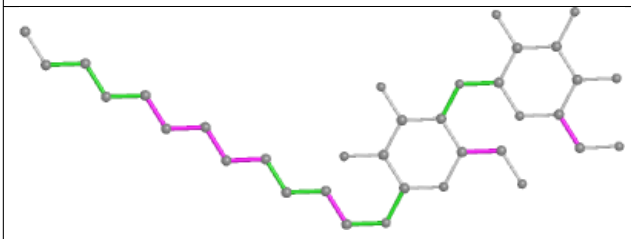
Ligand LMT A 1101



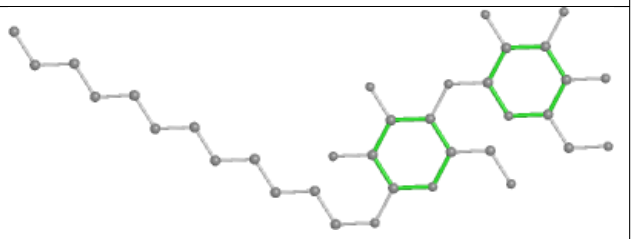
Bond lengths



Bond angles

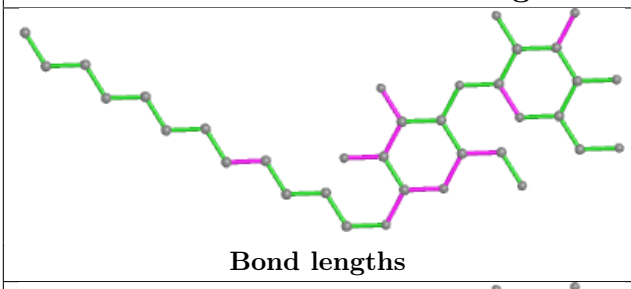


Torsions

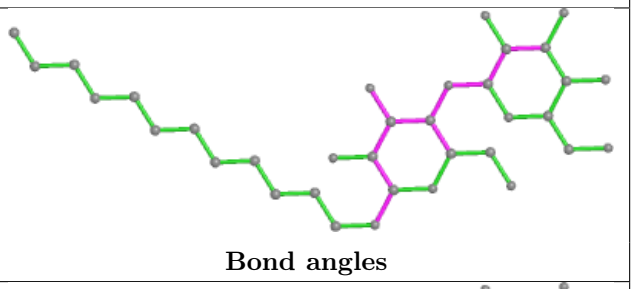


Rings

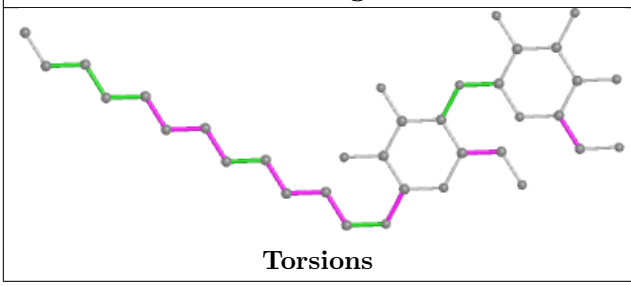
Ligand LMT C 1101



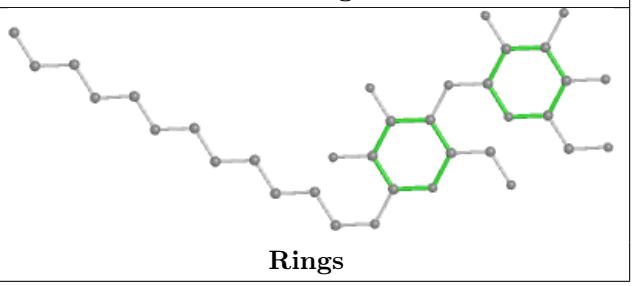
Bond lengths



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	1038/1044 (99%)	0.42	127 (12%)	4	5	27, 75, 109, 132	0
1	B	1039/1044 (99%)	0.37	102 (9%)	7	9	18, 68, 104, 130	0
1	C	1035/1044 (99%)	0.49	125 (12%)	4	5	17, 69, 104, 126	0
1	D	1038/1044 (99%)	0.59	162 (15%)	2	2	16, 90, 130, 173	0
1	E	1037/1044 (99%)	0.69	180 (17%)	1	1	40, 91, 115, 134	0
1	F	1037/1044 (99%)	0.73	177 (17%)	1	2	24, 84, 118, 142	0
All	All	6224/6264 (99%)	0.55	873 (14%)	2	3	16, 80, 115, 173	0

The worst 5 of 873 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	128	SER	16.7
1	E	314	GLU	14.0
1	E	315	PRO	12.2
1	F	714	ASN	11.8
1	F	442	LEU	11.2

6.2 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates

There are no monosaccharides in this entry.

6.4 Ligands (i)

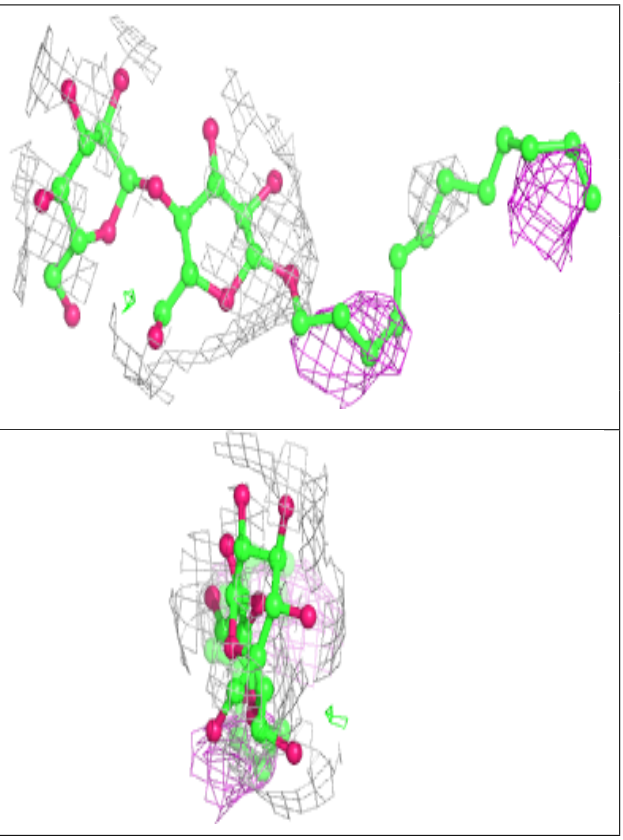
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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
2	LMT	B	2000	35/35	0.73	0.43	31,50,60,69	0
2	LMT	E	1101	35/35	0.78	0.42	41,74,104,107	0
2	LMT	D	2000	35/35	0.82	0.34	21,41,56,63	0
2	LMT	C	1101	35/35	0.82	0.33	12,41,56,72	0
2	LMT	F	2000	35/35	0.82	0.39	40,64,89,94	0
2	LMT	A	1101	35/35	0.86	0.32	31,41,90,99	0
3	NI	E	1102	1/1	0.96	0.15	170,170,170,170	0
3	NI	A	1102	1/1	0.97	0.19	154,154,154,154	0
3	NI	C	1102	1/1	0.98	0.09	41,41,41,41	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.

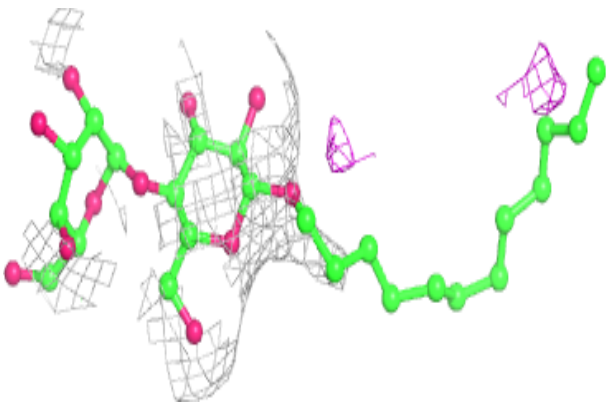
Electron density around LMT B 2000:

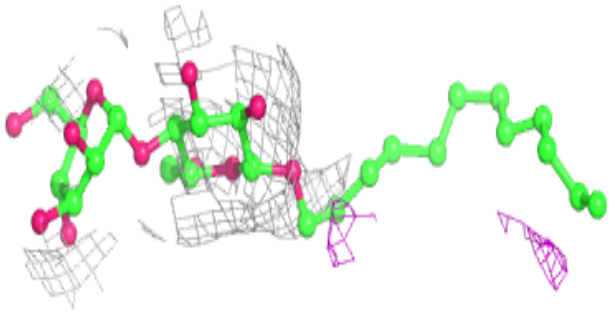
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



Electron density around LMT E 1101:

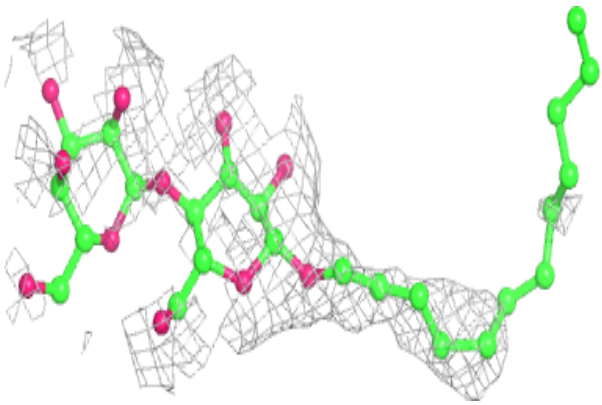
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

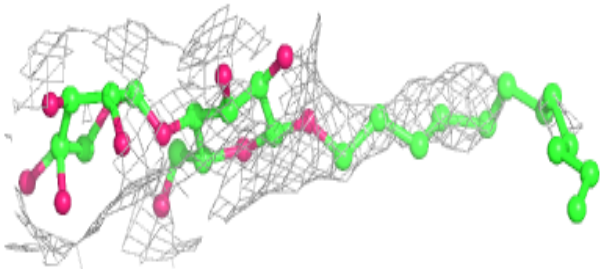


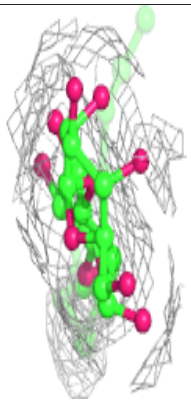


Electron density around LMT D 2000:

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

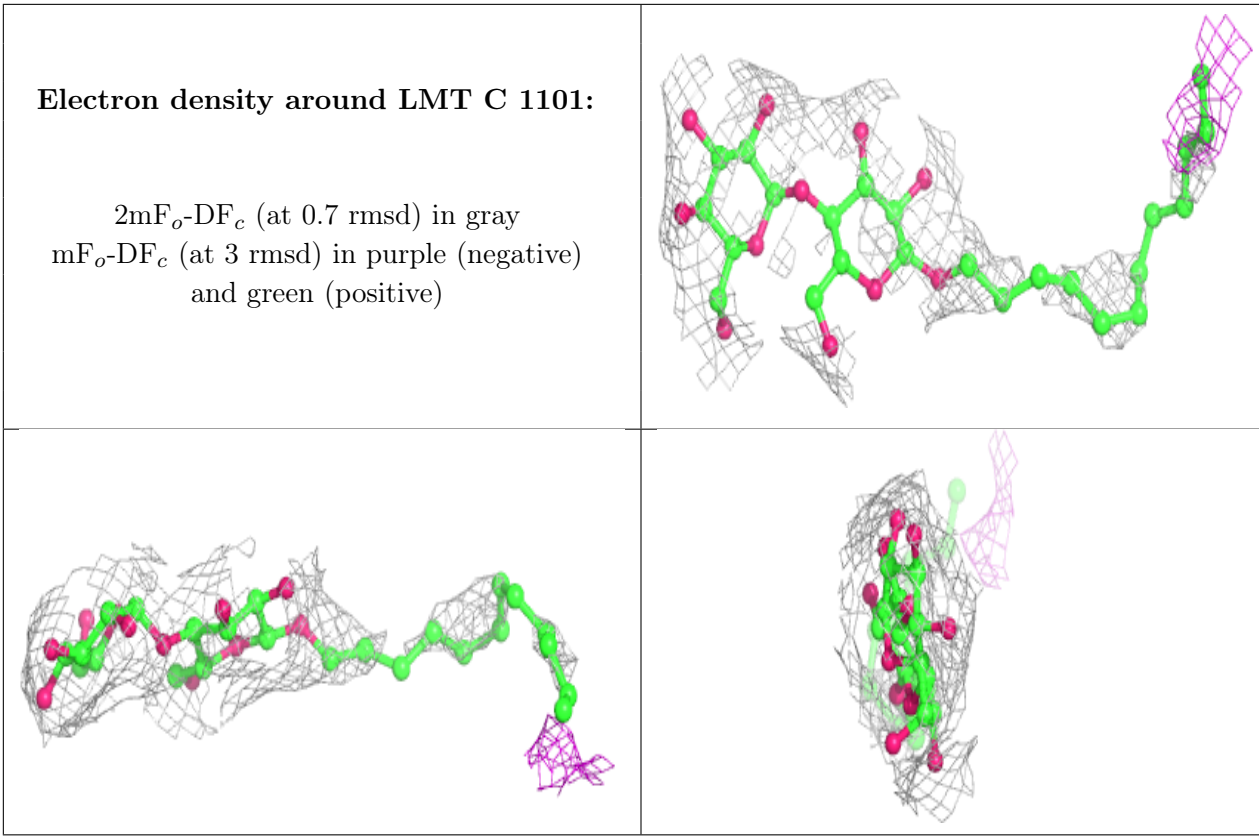






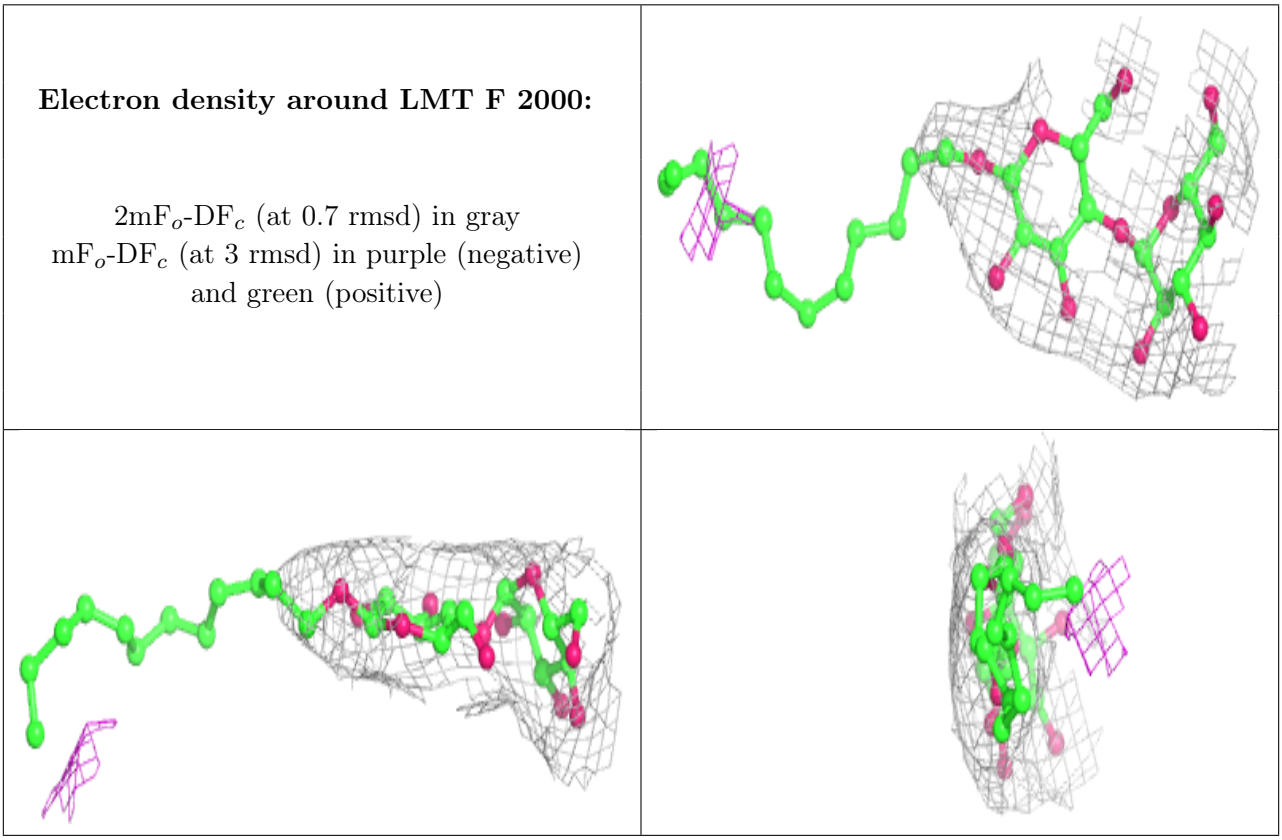
Electron density around LMT C 1101:

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



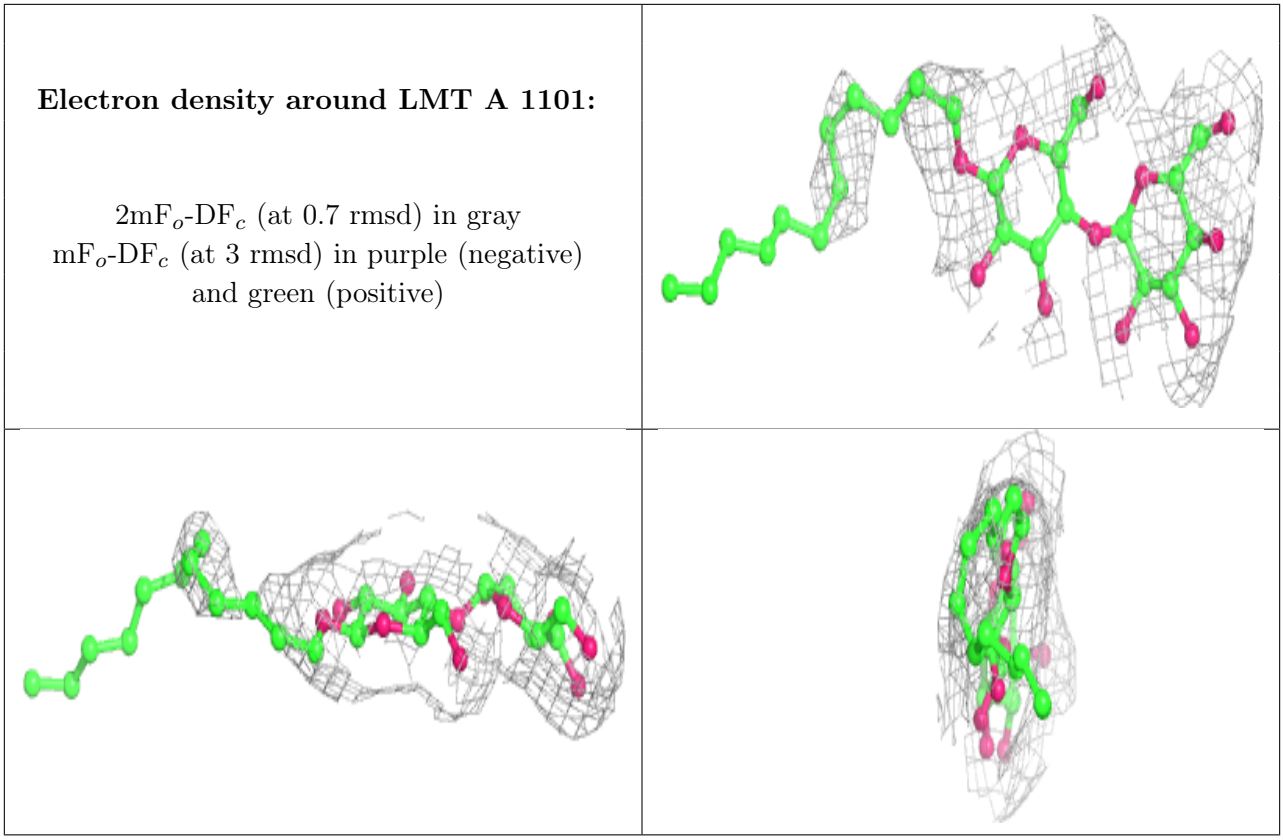
Electron density around LMT F 2000:

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



Electron density around LMT A 1101:

$2mF_o$-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.