wwPDB X-ray Structure Validation Summary Report (i)

Apr 5, 2022 – 01:18 pm BST

PDB ID	:	7O3M
Title	:	Crystal Structure of AcrB Single Mutant - 1
Authors	:	Ababou, A.
Deposited on	:	2021-04-02
Resolution	:	3.55 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 following versions of software and data (see references (i)) were used in the production of this report:

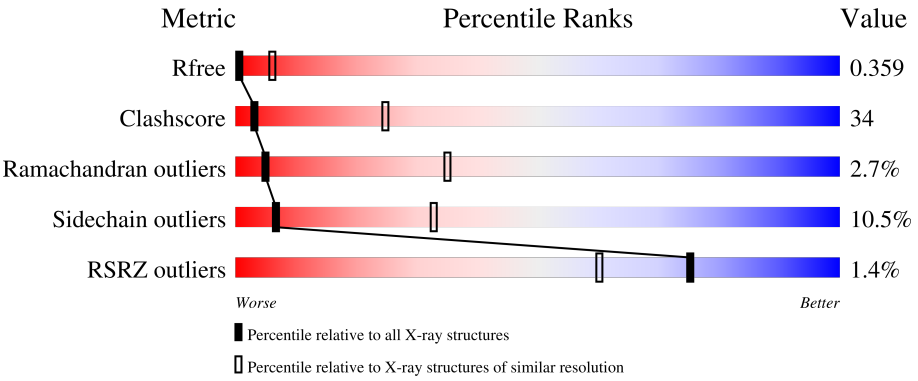
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.27
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0267
CCP4	:	7.1.010 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.27

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 3.55 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.



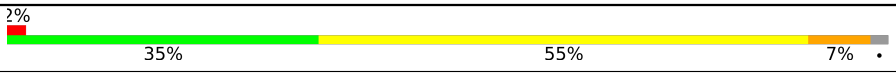
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1020 (3.62-3.50)
Clashscore	141614	1100 (3.62-3.50)
Ramachandran outliers	138981	1065 (3.62-3.50)
Sidechain outliers	138945	1066 (3.62-3.50)
RSRZ outliers	127900	1009 (3.64-3.48)

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	1069	41% 51% 6%
1	B	1069	44% 45% 7%
1	C	1069	41% 49% 7%
1	D	1069	42% 48% 8%
1	E	1069	3% 38% 52% 7%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	1069	

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	A	2000	X	-	-	-
2	LMT	B	2000	X	-	-	-
2	LMT	C	2000	X	-	-	-
2	LMT	D	2000	X	-	-	-
2	LMT	E	2000	X	-	-	-
2	LMT	F	2000	X	-	-	-

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 47792 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 Efflux pump membrane transporter.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	1044	Total	C	N	O	S	0	0	0
			7936	5102	1312	1479	43			
1	B	1042	Total	C	N	O	S	0	0	0
			7919	5092	1308	1476	43			
1	C	1044	Total	C	N	O	S	0	0	0
			7936	5102	1312	1479	43			
1	D	1044	Total	C	N	O	S	0	0	0
			7936	5102	1312	1479	43			
1	E	1042	Total	C	N	O	S	0	0	0
			7919	5092	1308	1476	43			
1	F	1044	Total	C	N	O	S	0	0	0
			7936	5102	1312	1479	43			

There are 126 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	initiating methionine	UNP E2QH56
A	-18	GLY	-	expression tag	UNP E2QH56
A	-17	SER	-	expression tag	UNP E2QH56
A	-16	SER	-	expression tag	UNP E2QH56
A	-15	HIS	-	expression tag	UNP E2QH56
A	-14	HIS	-	expression tag	UNP E2QH56
A	-13	HIS	-	expression tag	UNP E2QH56
A	-12	HIS	-	expression tag	UNP E2QH56
A	-11	HIS	-	expression tag	UNP E2QH56
A	-10	HIS	-	expression tag	UNP E2QH56
A	-9	SER	-	expression tag	UNP E2QH56
A	-8	SER	-	expression tag	UNP E2QH56
A	-7	GLY	-	expression tag	UNP E2QH56
A	-6	LEU	-	expression tag	UNP E2QH56
A	-5	VAL	-	expression tag	UNP E2QH56
A	-4	PRO	-	expression tag	UNP E2QH56
A	-3	ARG	-	expression tag	UNP E2QH56

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP E2QH56
A	-1	SER	-	expression tag	UNP E2QH56
A	0	HIS	-	expression tag	UNP E2QH56
A	620	ALA	ARG	engineered mutation	UNP E2QH56
B	-19	MET	-	initiating methionine	UNP E2QH56
B	-18	GLY	-	expression tag	UNP E2QH56
B	-17	SER	-	expression tag	UNP E2QH56
B	-16	SER	-	expression tag	UNP E2QH56
B	-15	HIS	-	expression tag	UNP E2QH56
B	-14	HIS	-	expression tag	UNP E2QH56
B	-13	HIS	-	expression tag	UNP E2QH56
B	-12	HIS	-	expression tag	UNP E2QH56
B	-11	HIS	-	expression tag	UNP E2QH56
B	-10	HIS	-	expression tag	UNP E2QH56
B	-9	SER	-	expression tag	UNP E2QH56
B	-8	SER	-	expression tag	UNP E2QH56
B	-7	GLY	-	expression tag	UNP E2QH56
B	-6	LEU	-	expression tag	UNP E2QH56
B	-5	VAL	-	expression tag	UNP E2QH56
B	-4	PRO	-	expression tag	UNP E2QH56
B	-3	ARG	-	expression tag	UNP E2QH56
B	-2	GLY	-	expression tag	UNP E2QH56
B	-1	SER	-	expression tag	UNP E2QH56
B	0	HIS	-	expression tag	UNP E2QH56
B	620	ALA	ARG	engineered mutation	UNP E2QH56
C	-19	MET	-	initiating methionine	UNP E2QH56
C	-18	GLY	-	expression tag	UNP E2QH56
C	-17	SER	-	expression tag	UNP E2QH56
C	-16	SER	-	expression tag	UNP E2QH56
C	-15	HIS	-	expression tag	UNP E2QH56
C	-14	HIS	-	expression tag	UNP E2QH56
C	-13	HIS	-	expression tag	UNP E2QH56
C	-12	HIS	-	expression tag	UNP E2QH56
C	-11	HIS	-	expression tag	UNP E2QH56
C	-10	HIS	-	expression tag	UNP E2QH56
C	-9	SER	-	expression tag	UNP E2QH56
C	-8	SER	-	expression tag	UNP E2QH56
C	-7	GLY	-	expression tag	UNP E2QH56
C	-6	LEU	-	expression tag	UNP E2QH56
C	-5	VAL	-	expression tag	UNP E2QH56
C	-4	PRO	-	expression tag	UNP E2QH56
C	-3	ARG	-	expression tag	UNP E2QH56

Continued on next page...

Continued from previous page...

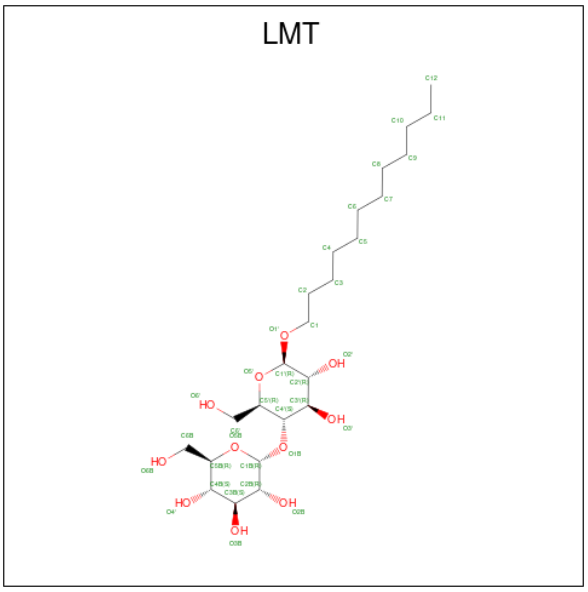
Chain	Residue	Modelled	Actual	Comment	Reference
C	-2	GLY	-	expression tag	UNP E2QH56
C	-1	SER	-	expression tag	UNP E2QH56
C	0	HIS	-	expression tag	UNP E2QH56
C	620	ALA	ARG	engineered mutation	UNP E2QH56
D	-19	MET	-	initiating methionine	UNP E2QH56
D	-18	GLY	-	expression tag	UNP E2QH56
D	-17	SER	-	expression tag	UNP E2QH56
D	-16	SER	-	expression tag	UNP E2QH56
D	-15	HIS	-	expression tag	UNP E2QH56
D	-14	HIS	-	expression tag	UNP E2QH56
D	-13	HIS	-	expression tag	UNP E2QH56
D	-12	HIS	-	expression tag	UNP E2QH56
D	-11	HIS	-	expression tag	UNP E2QH56
D	-10	HIS	-	expression tag	UNP E2QH56
D	-9	SER	-	expression tag	UNP E2QH56
D	-8	SER	-	expression tag	UNP E2QH56
D	-7	GLY	-	expression tag	UNP E2QH56
D	-6	LEU	-	expression tag	UNP E2QH56
D	-5	VAL	-	expression tag	UNP E2QH56
D	-4	PRO	-	expression tag	UNP E2QH56
D	-3	ARG	-	expression tag	UNP E2QH56
D	-2	GLY	-	expression tag	UNP E2QH56
D	-1	SER	-	expression tag	UNP E2QH56
D	0	HIS	-	expression tag	UNP E2QH56
D	620	ALA	ARG	engineered mutation	UNP E2QH56
E	-19	MET	-	initiating methionine	UNP E2QH56
E	-18	GLY	-	expression tag	UNP E2QH56
E	-17	SER	-	expression tag	UNP E2QH56
E	-16	SER	-	expression tag	UNP E2QH56
E	-15	HIS	-	expression tag	UNP E2QH56
E	-14	HIS	-	expression tag	UNP E2QH56
E	-13	HIS	-	expression tag	UNP E2QH56
E	-12	HIS	-	expression tag	UNP E2QH56
E	-11	HIS	-	expression tag	UNP E2QH56
E	-10	HIS	-	expression tag	UNP E2QH56
E	-9	SER	-	expression tag	UNP E2QH56
E	-8	SER	-	expression tag	UNP E2QH56
E	-7	GLY	-	expression tag	UNP E2QH56
E	-6	LEU	-	expression tag	UNP E2QH56
E	-5	VAL	-	expression tag	UNP E2QH56
E	-4	PRO	-	expression tag	UNP E2QH56
E	-3	ARG	-	expression tag	UNP E2QH56

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
E	-2	GLY	-	expression tag	UNP E2QH56
E	-1	SER	-	expression tag	UNP E2QH56
E	0	HIS	-	expression tag	UNP E2QH56
E	620	ALA	ARG	engineered mutation	UNP E2QH56
F	-19	MET	-	initiating methionine	UNP E2QH56
F	-18	GLY	-	expression tag	UNP E2QH56
F	-17	SER	-	expression tag	UNP E2QH56
F	-16	SER	-	expression tag	UNP E2QH56
F	-15	HIS	-	expression tag	UNP E2QH56
F	-14	HIS	-	expression tag	UNP E2QH56
F	-13	HIS	-	expression tag	UNP E2QH56
F	-12	HIS	-	expression tag	UNP E2QH56
F	-11	HIS	-	expression tag	UNP E2QH56
F	-10	HIS	-	expression tag	UNP E2QH56
F	-9	SER	-	expression tag	UNP E2QH56
F	-8	SER	-	expression tag	UNP E2QH56
F	-7	GLY	-	expression tag	UNP E2QH56
F	-6	LEU	-	expression tag	UNP E2QH56
F	-5	VAL	-	expression tag	UNP E2QH56
F	-4	PRO	-	expression tag	UNP E2QH56
F	-3	ARG	-	expression tag	UNP E2QH56
F	-2	GLY	-	expression tag	UNP E2QH56
F	-1	SER	-	expression tag	UNP E2QH56
F	0	HIS	-	expression tag	UNP E2QH56
F	620	ALA	ARG	engineered mutation	UNP E2QH56

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



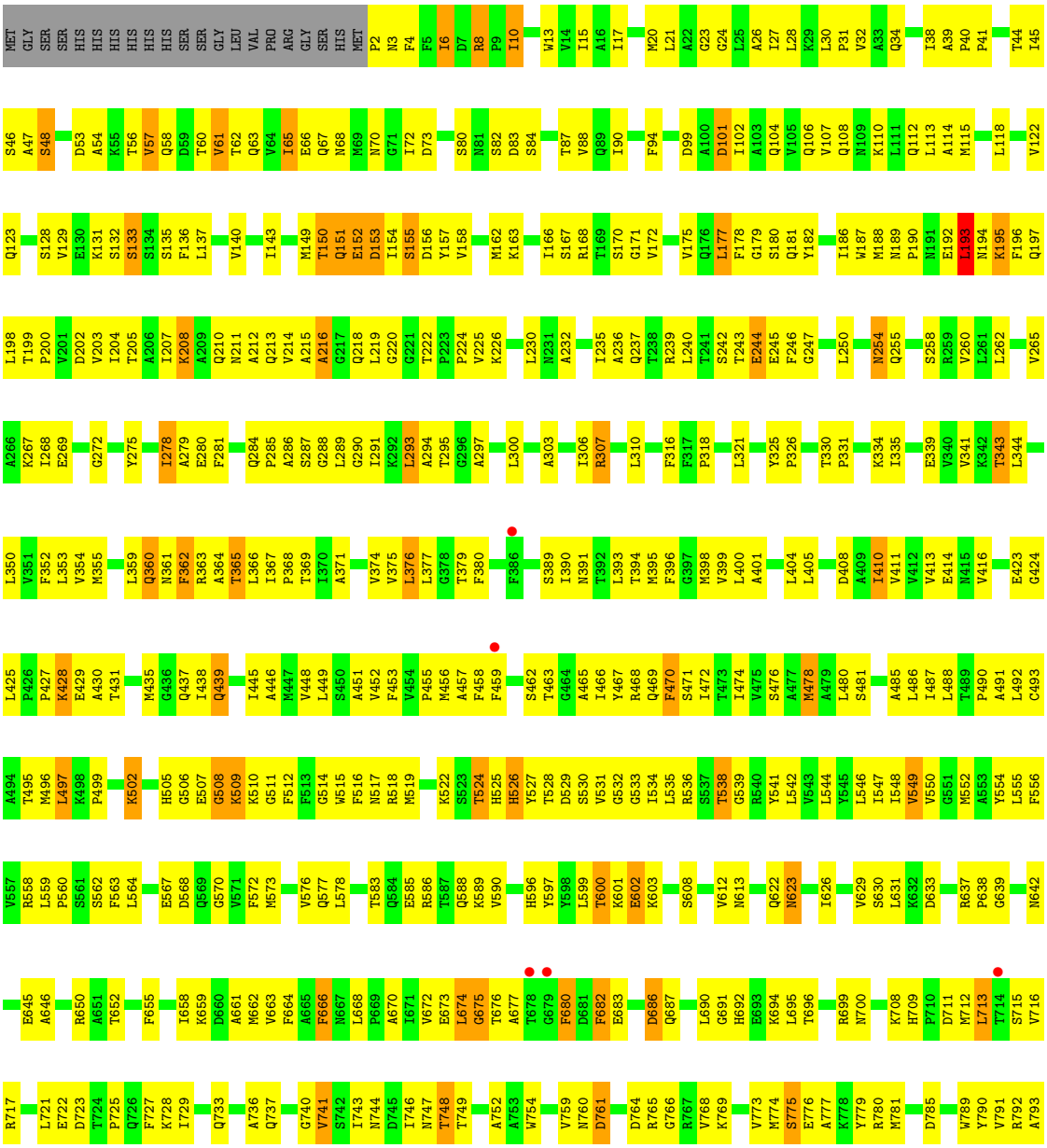
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			35	24	11		
2	B	1	Total	C	O	0	0
			35	24	11		
2	C	1	Total	C	O	0	0
			35	24	11		
2	D	1	Total	C	O	0	0
			35	24	11		
2	E	1	Total	C	O	0	0
			35	24	11		
2	F	1	Total	C	O	0	0
			35	24	11		

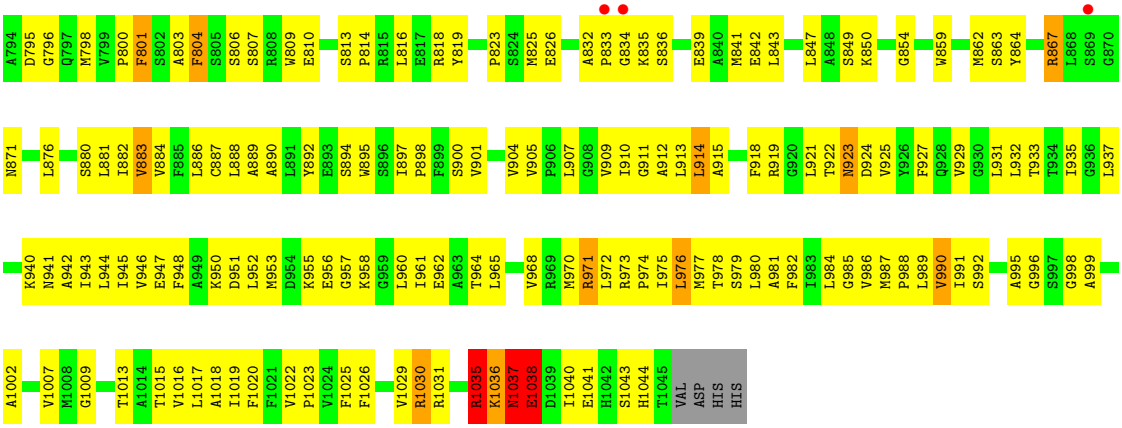
3 Residue-property plots (i)

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: Efflux pump membrane transporter

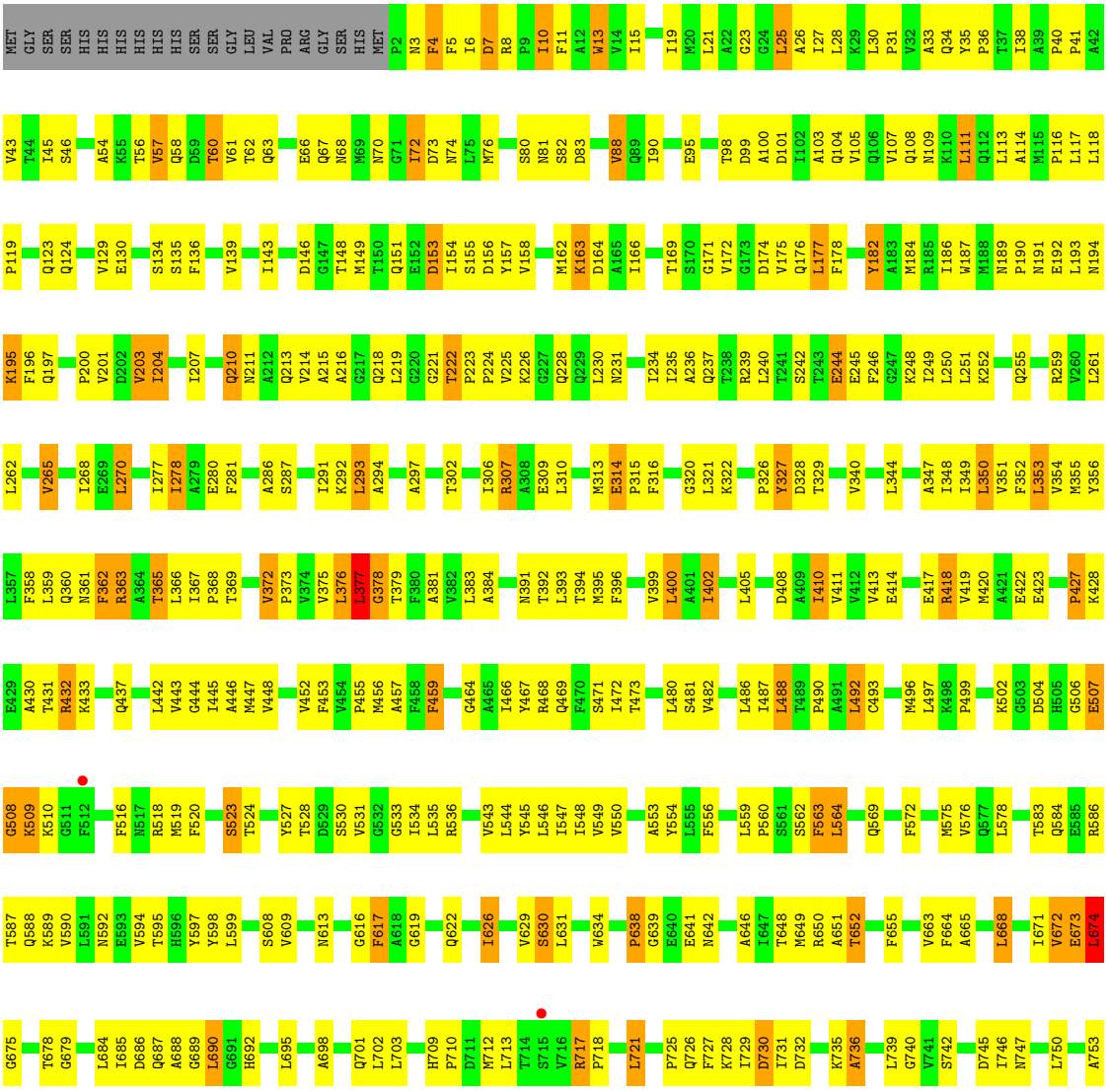
Chain A:

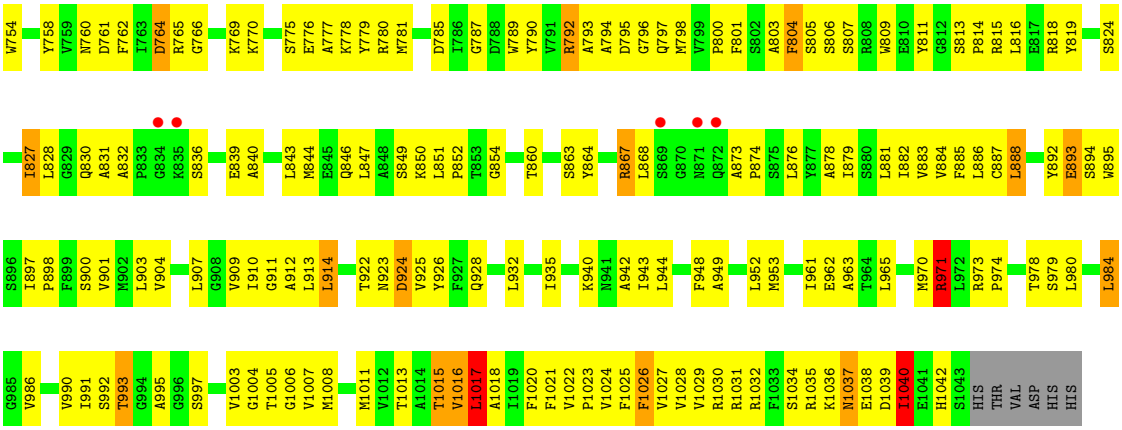




• Molecule 1: Efflux pump membrane transporter

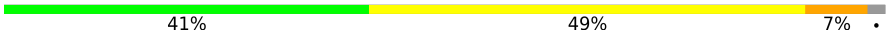
Chain B:

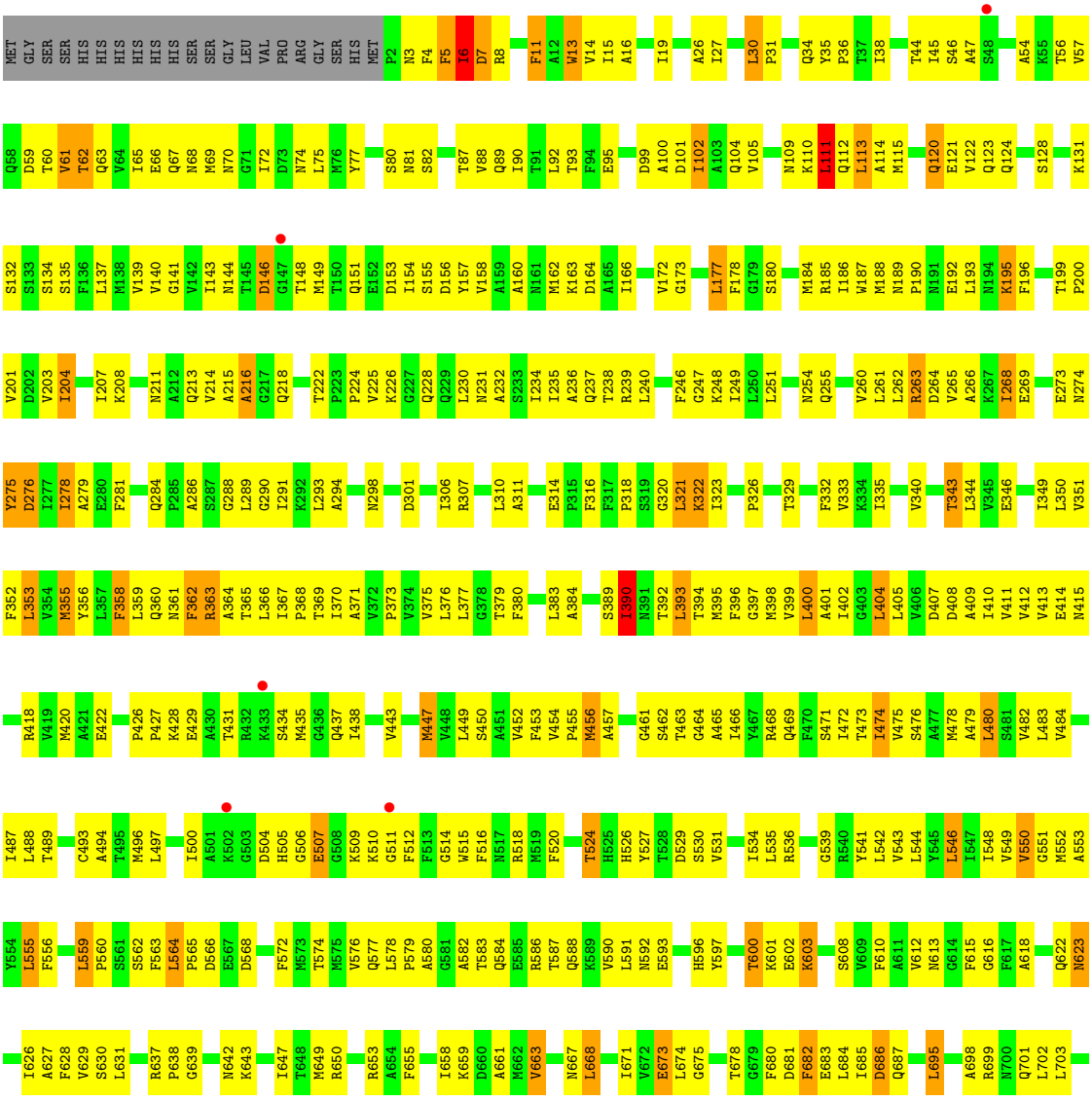


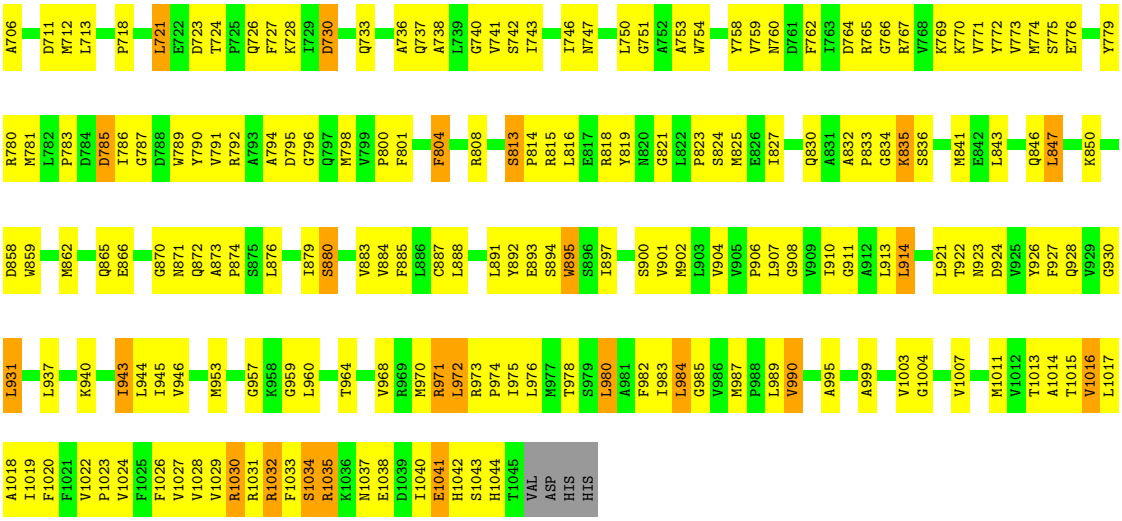


• Molecule 1: Efflux pump membrane transporter

Chain C:

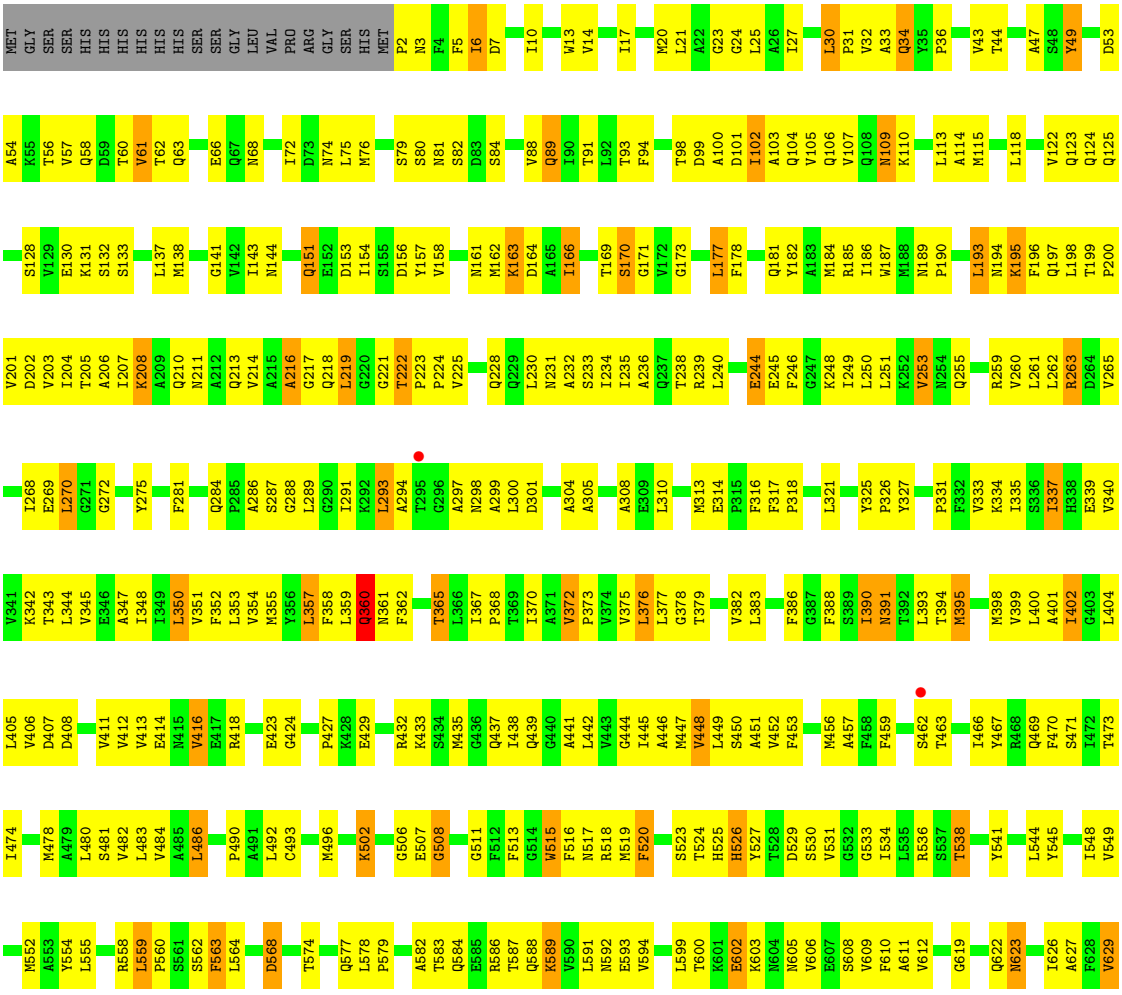


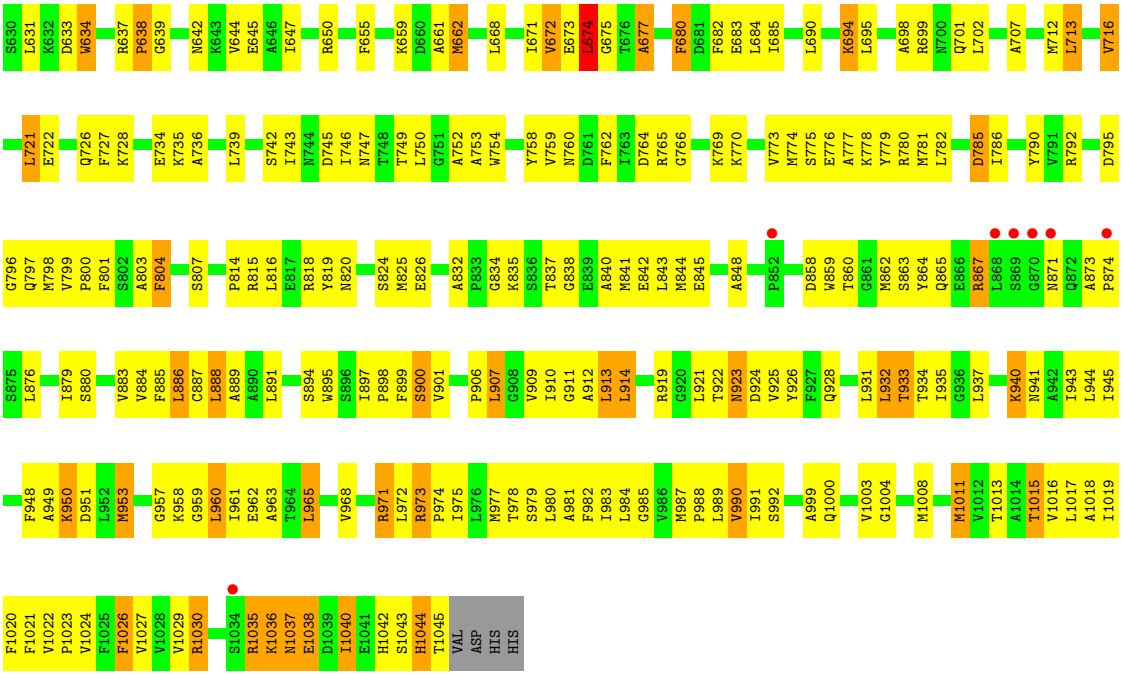




• Molecule 1: Efflux pump membrane transporter

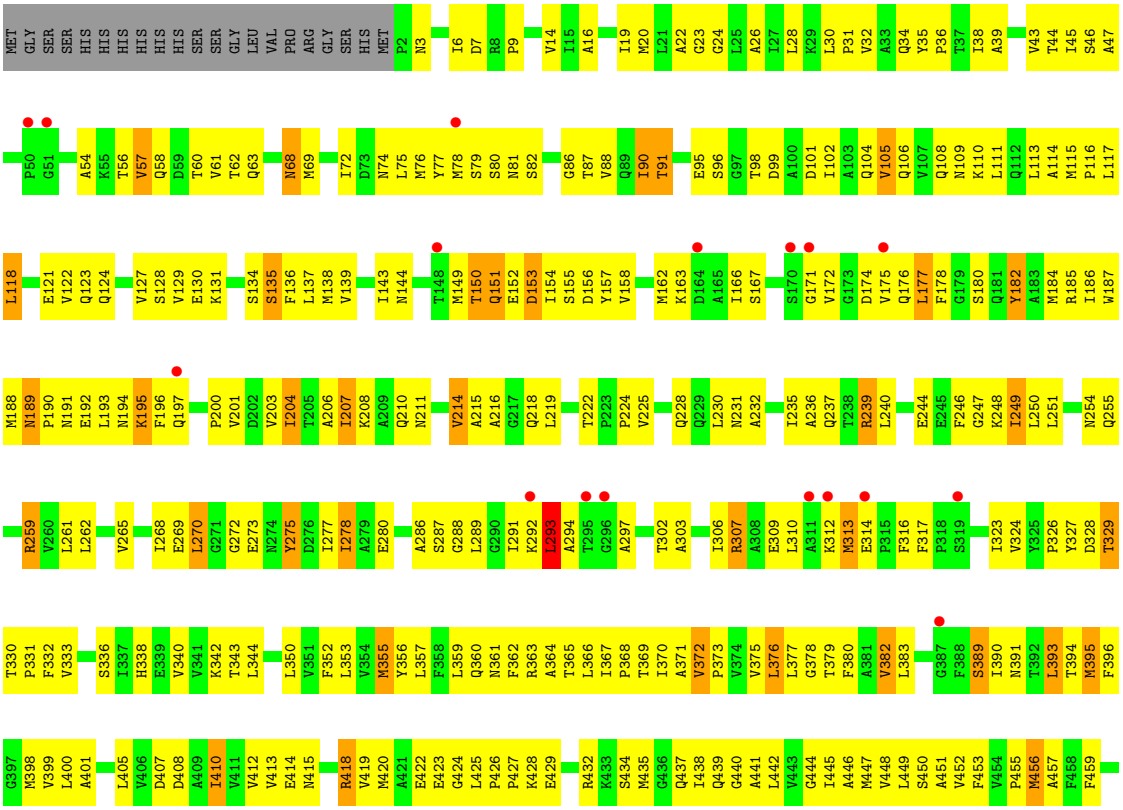
Chain D:

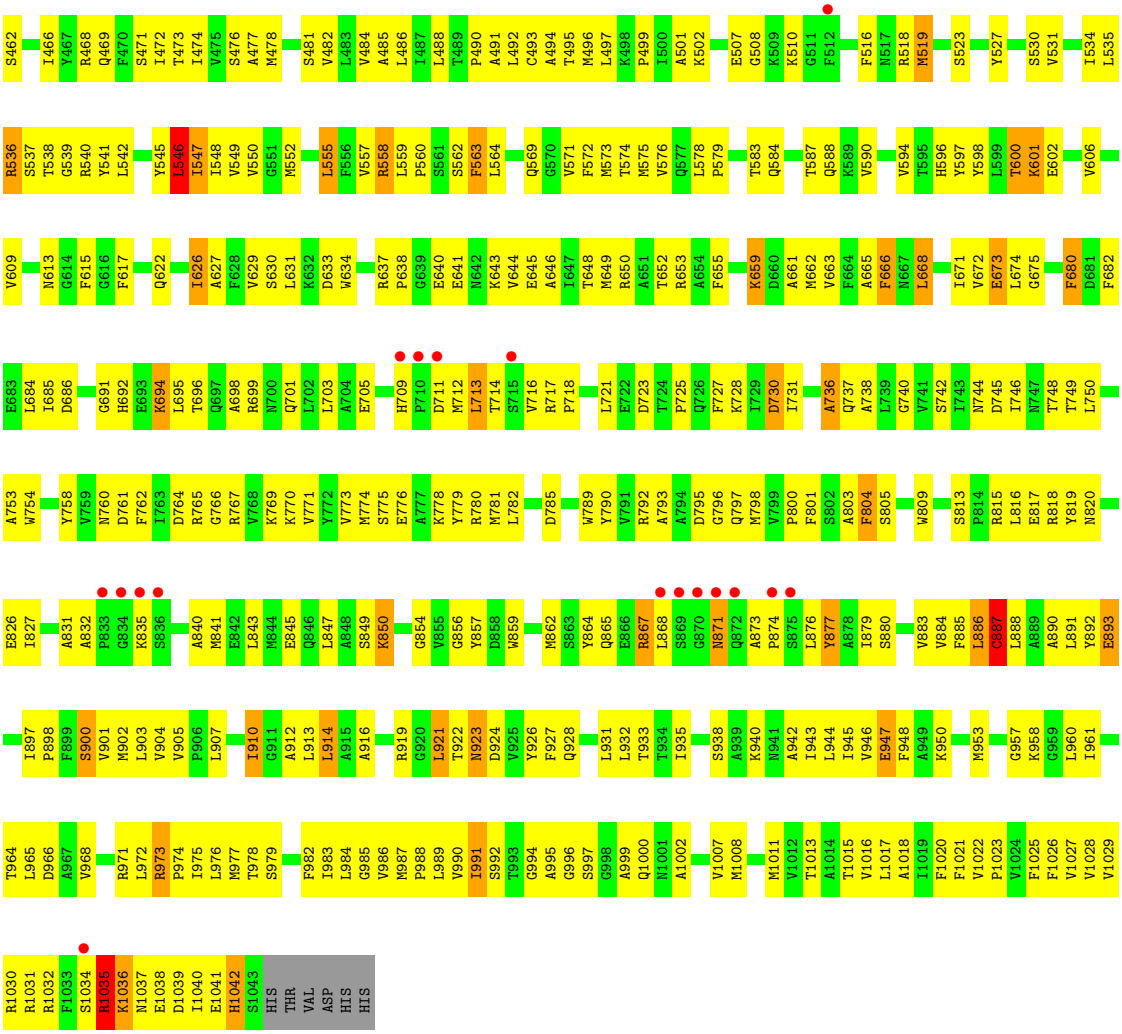




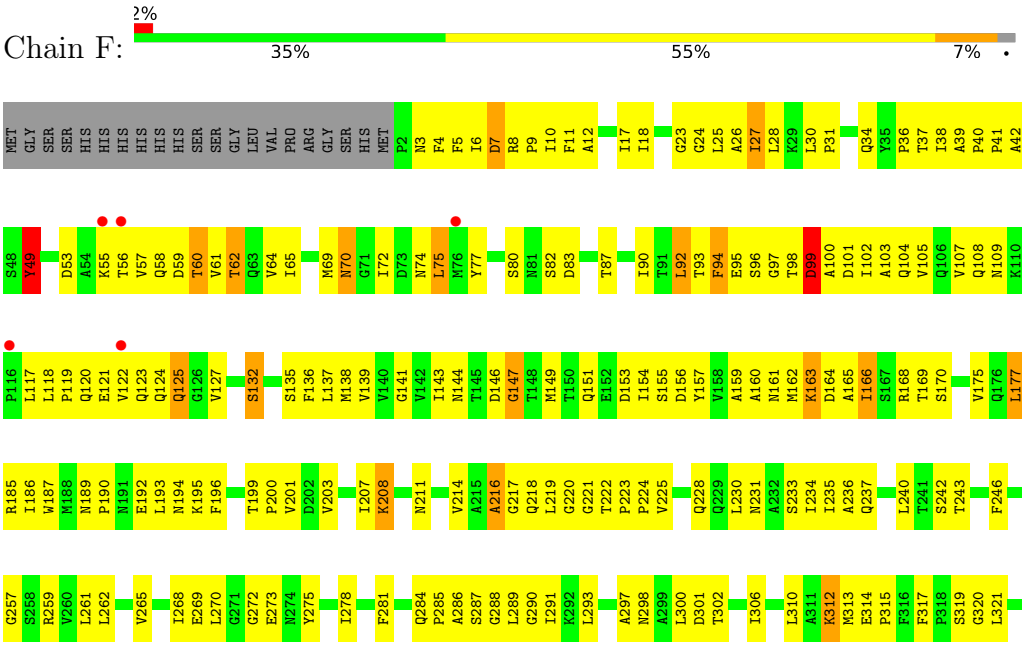
• Molecule 1: Efflux pump membrane transporter

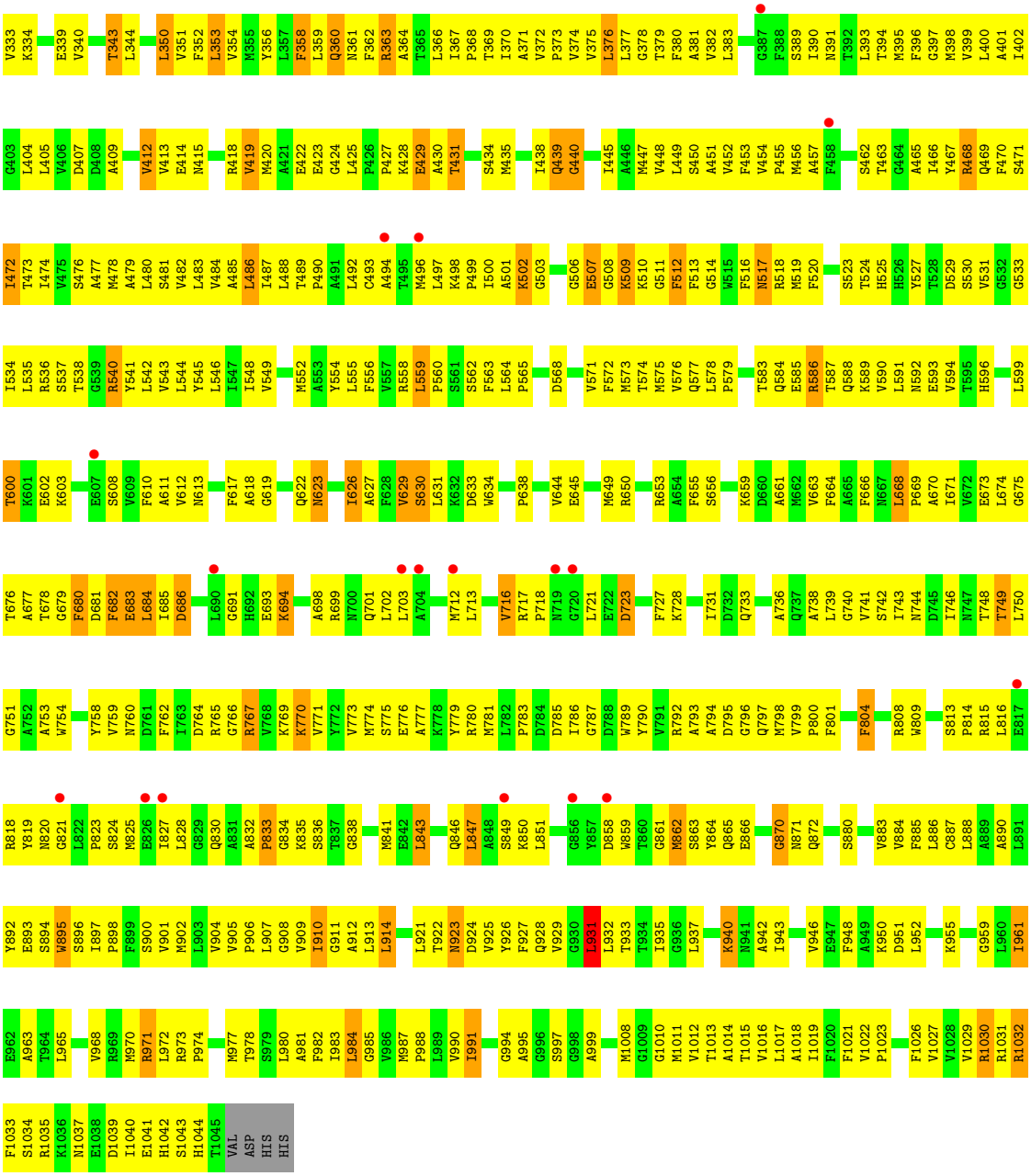
Chain E:





• Molecule 1: Efflux pump membrane transporter




V333 K334 E339 V340 T343 L344 L350 V351 F352 L353 V354 M355 Y356 L357 F358 L359 Q360 N361 F362 R363 A364 T365 L366 I367 P368 T369 I370 A371 V372 P373 V374 V375 L376 L377 G378 T379 F380 A381 V382 L383 G387 F388 S389 I390 N391 T392 L393 T394 M395 F396 G397 M398 V399 L400 A401 I402
G403 L404 L405 V406 D407 D408 A409 V412 V413 E414 N415 R418 V419 M420 A421 E422 E423 G424 L425 P426 P427 K428 E429 A430 T431 S434 M435 I438 Q439 G440 I445 A446 M447 V448 L449 S450 A451 V452 F453 V454 P455 M456 A457 F458 S462 T463 G464 A465 I466 Y467 R468 Q469 F470 S471
I472 T473 I474 V476 S476 A477 M478 A479 L480 S481 V482 L483 V484 A485 L486 I487 L488 T489 P490 A491 L492 C493 A494 T495 M496 L497 K498 P499 I500 A501 K502 G503 G506 E507 G508 K509 K510 G511 F512 F513 G514 W515 F516 N517 R518 M519 F520 S523 T524 H525 H526 Y527 T528 D529 S530 V531 G532 G533
I534 L535 R536 S537 T538 G539 R540 Y541 L542 V543 L544 Y545 L546 I547 I548 V549 M552 A553 Y554 L555 F556 V557 R558 L559 P560 S561 S562 F563 L564 P565 D568 V571 F572 M573 T574 M575 V576 Q577 L578 P579 T583 Q584 E585 R586 T587 Q588 K589 V590 L591 N592 E593 V594 T595 H596 L599
T600 K601 E602 K603 E607 S608 V609 F610 A611 V612 N613 F617 A618 G619 Q622 N623 I626 A627 F628 V629 S630 L631 K632 D633 W634 P638 V644 E645 M649 R650 R653 A654 F655 S656 K659 D660 A661 M662 V663 F664 A665 F666 N667 L668 P669 A670 I671 V672 E673 L674 G675
T676 A677 T678 G679 F680 D681 F682 E683 L684 I685 D686 L690 G691 H692 E693 K694 A698 R699 N700 Q701 L702 L703 A704 M712 L713 V716 R717 P718 N719 G720 L721 E722 D723 F727 K728 I731 D732 Q733 A736 Q737 A738 L739 G740 V741 S742 I743 N744 D745 I746 N747 T748 T749 L750
G751 A752 A753 W754 Y758 V759 N760 D761 F762 I763 D764 R765 G766 R767 V768 K769 K770 V771 Y772 V773 M774 S775 E776 A777 K778 Y779 R780 M781 L782 P783 D784 D785 I786 G787 D788 W789 Y790 V791 R792 A793 A794 D795 G796 Q797 M798 V799 P800 F801 F804 R808 W809 S813 P814 R815 L816 E817
R818 Y819 N820 G821 L822 P823 S824 M825 E826 I827 L828 G829 Q830 A831 A832 P833 G834 K835 S836 T837 G838 M841 E842 L843 Q846 L847 A848 S849 K850 L851 G856 Y857 D858 W859 T860 G861 M862 S863 Y864 Q865 E866 G870 N871 Q872 S880 V883 V884 F885 L886 C887 L888 A889 A890 L891
Y892 E893 S894 W895 S896 I897 P898 F899 S900 V901 M902 L903 V904 V905 P906 L907 G908 V909 I910 G911 A912 L913 L914 L921 T922 N923 D924 V925 Y926 F927 Q928 V929 G930 L931 L932 T933 T934 I935 G936 L937 K940 N941 A942 I943 V946 E947 F948 A949 K950 D951 L952 K955 G959 L960 I961
E962 A963 T964 L965 V968 R969 M970 R971 L972 R973 P974 M977 T978 S979 L980 A981 F982 I983 L984 G985 V986 M987 P988 L989 V990 I991 G994 A995 G996 S997 G998 A999 M1008 G1009 G1010 M1011 V1012 T1013 A1014 T1015 V1016 L1017 A1018 I1019 F1020 F1021 V1022 P1023 F1026 V1027 V1028 V1029 R1030 R1031 R1032
F1033 S1034 R1035 K1036 N1037 E1038 D1039 I1040 E1041 H1042 S1043 H1044 T1045 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	152.37Å 156.80Å 218.65Å 90.00° 92.48° 90.00°	Depositor
Resolution (Å)	19.95 – 3.55 19.95 – 3.55	Depositor EDS
% Data completeness (in resolution range)	99.6 (19.95-3.55) 99.6 (19.95-3.55)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.24 (at 3.52Å)	Xtriage
Refinement program	PHENIX 1.8.2_1309	Depositor
R, R_{free}	0.277 , 0.359 0.277 , 0.359	Depositor DCC
R_{free} test set	6134 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å^2)	101.9	Xtriage
Anisotropy	0.207	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	(Not available) , (Not available)	EDS
L-test for twinning[2]	$< \|L\| > = 0.39$, $< L^2 > = 0.22$	Xtriage
Estimated twinning fraction	0.074 for -k,-h,-l 0.095 for k,h,-l 0.089 for h,-k,-l	Xtriage
F_o,F_c correlation	0.89	EDS
Total number of atoms	47792	wwPDB-VP
Average B, all atoms (Å^2)	42.0	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 48.61 % 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 8.4003e-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: 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	0.66	0/8088	0.88	6/10983 (0.1%)
1	B	0.69	0/8070	0.90	11/10958 (0.1%)
1	C	0.67	0/8088	0.90	12/10983 (0.1%)
1	D	0.61	1/8088 (0.0%)	0.85	7/10983 (0.1%)
1	E	0.64	0/8070	0.87	6/10958 (0.1%)
1	F	0.63	0/8088	0.88	8/10983 (0.1%)
All	All	0.65	1/48492 (0.0%)	0.88	50/65848 (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	1
1	F	0	1
All	All	0	2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	515	TRP	CB-CG	5.94	1.60	1.50

The worst 5 of 50 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	971	ARG	NE-CZ-NH1	8.46	124.53	120.30
1	C	400	LEU	CA-CB-CG	8.33	134.46	115.30
1	F	486	LEU	CA-CB-CG	7.42	132.38	115.30
1	E	357	LEU	CA-CB-CG	7.28	132.05	115.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	30	LEU	CA-CB-CG	7.08	131.58	115.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1038	GLU	Peptide
1	F	7	ASP	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	7936	0	8072	516	0
1	B	7919	0	8058	500	0
1	C	7936	0	8072	533	0
1	D	7936	0	8072	541	0
1	E	7919	0	8058	610	0
1	F	7936	0	8072	669	0
2	A	35	0	46	1	0
2	B	35	0	46	12	0
2	C	35	0	46	6	0
2	D	35	0	46	3	0
2	E	35	0	46	6	0
2	F	35	0	46	2	0
All	All	47792	0	48680	3253	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 34.

The worst 5 of 3253 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:235:ILE:HD11	1:B:726:GLN:HB2	1.41	1.03
1:F:559:LEU:HD22	1:F:560:PRO:HD2	1.40	1.00

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:352:PHE:HD1	1:A:369:THR:HG1	1.09	0.99
1:F:74:ASN:HB3	1:F:95:GLU:HB2	1.41	0.99
1:D:971:ARG:HG2	1:D:974:PRO:HG2	1.47	0.96

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	1042/1069 (98%)	880 (84%)	133 (13%)	29 (3%)	5	34
1	B	1040/1069 (97%)	894 (86%)	116 (11%)	30 (3%)	4	34
1	C	1042/1069 (98%)	901 (86%)	114 (11%)	27 (3%)	5	35
1	D	1042/1069 (98%)	888 (85%)	126 (12%)	28 (3%)	5	35
1	E	1040/1069 (97%)	895 (86%)	119 (11%)	26 (2%)	5	36
1	F	1042/1069 (98%)	884 (85%)	132 (13%)	26 (2%)	5	36
All	All	6248/6414 (97%)	5342 (86%)	740 (12%)	166 (3%)	5	35

5 of 166 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	360	GLN
1	A	508	GLY
1	A	638	PRO
1	A	833	PRO
1	A	871	ASN

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	849/871 (98%)	766 (90%)	83 (10%)	8	35
1	B	847/871 (97%)	758 (90%)	89 (10%)	7	33
1	C	849/871 (98%)	757 (89%)	92 (11%)	6	32
1	D	849/871 (98%)	757 (89%)	92 (11%)	6	32
1	E	847/871 (97%)	755 (89%)	92 (11%)	6	31
1	F	849/871 (98%)	761 (90%)	88 (10%)	7	33
All	All	5090/5226 (97%)	4554 (90%)	536 (10%)	7	33

5 of 536 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	177	LEU
1	F	419	VAL
1	F	166	ILE
1	F	910	ILE
1	C	269	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 37 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	106	GLN
1	F	588	GLN
1	E	108	GLN
1	F	70	ASN
1	C	588	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)

6 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	LMT	E	2000	-	36,36,36	1.86	8 (22%)	47,47,47	1.38	8 (17%)
2	LMT	C	2000	-	36,36,36	1.80	8 (22%)	47,47,47	1.74	10 (21%)
2	LMT	F	2000	-	36,36,36	1.90	9 (25%)	47,47,47	1.50	9 (19%)
2	LMT	A	2000	-	36,36,36	2.01	9 (25%)	47,47,47	1.54	12 (25%)
2	LMT	D	2000	-	36,36,36	2.01	9 (25%)	47,47,47	1.33	5 (10%)
2	LMT	B	2000	-	36,36,36	1.93	9 (25%)	47,47,47	1.27	7 (14%)

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	E	2000	-	2/2/10/10	10/21/61/61	0/2/2/2
2	LMT	C	2000	-	3/3/10/10	6/21/61/61	0/2/2/2
2	LMT	F	2000	-	3/3/10/10	12/21/61/61	0/2/2/2
2	LMT	A	2000	-	2/2/10/10	14/21/61/61	0/2/2/2
2	LMT	D	2000	-	2/2/10/10	10/21/61/61	0/2/2/2
2	LMT	B	2000	-	1/1/10/10	13/21/61/61	0/2/2/2

The worst 5 of 52 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	2000	LMT	O5'-C5'	5.00	1.56	1.44
2	D	2000	LMT	O1'-C1'	4.64	1.48	1.40
2	B	2000	LMT	O1'-C1'	4.59	1.48	1.40
2	E	2000	LMT	O5'-C5'	4.48	1.55	1.44
2	A	2000	LMT	O1'-C1'	4.42	1.47	1.40

The worst 5 of 51 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	2000	LMT	C2'-C3'-C4'	5.21	121.58	109.68
2	F	2000	LMT	O1'-C1'-C2'	4.77	115.75	108.30
2	C	2000	LMT	O1'-C1'-C2'	4.04	114.61	108.30
2	D	2000	LMT	C1'-O5'-C5'	3.87	121.28	113.69
2	E	2000	LMT	C1B-O1B-C4'	-3.61	109.02	117.96

5 of 13 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	A	2000	LMT	C3'
2	A	2000	LMT	C4B
2	B	2000	LMT	C3'
2	C	2000	LMT	C2B
2	C	2000	LMT	C1B

5 of 65 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	2000	LMT	C2'-C1'-O1'-C1
2	A	2000	LMT	O5'-C1'-O1'-C1
2	D	2000	LMT	O5'-C1'-O1'-C1
2	E	2000	LMT	O5'-C1'-O1'-C1
2	E	2000	LMT	C2-C1-O1'-C1'

There are no ring outliers.

6 monomers are involved in 30 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	2000	LMT	6	0
2	C	2000	LMT	6	0
2	F	2000	LMT	2	0
2	A	2000	LMT	1	0

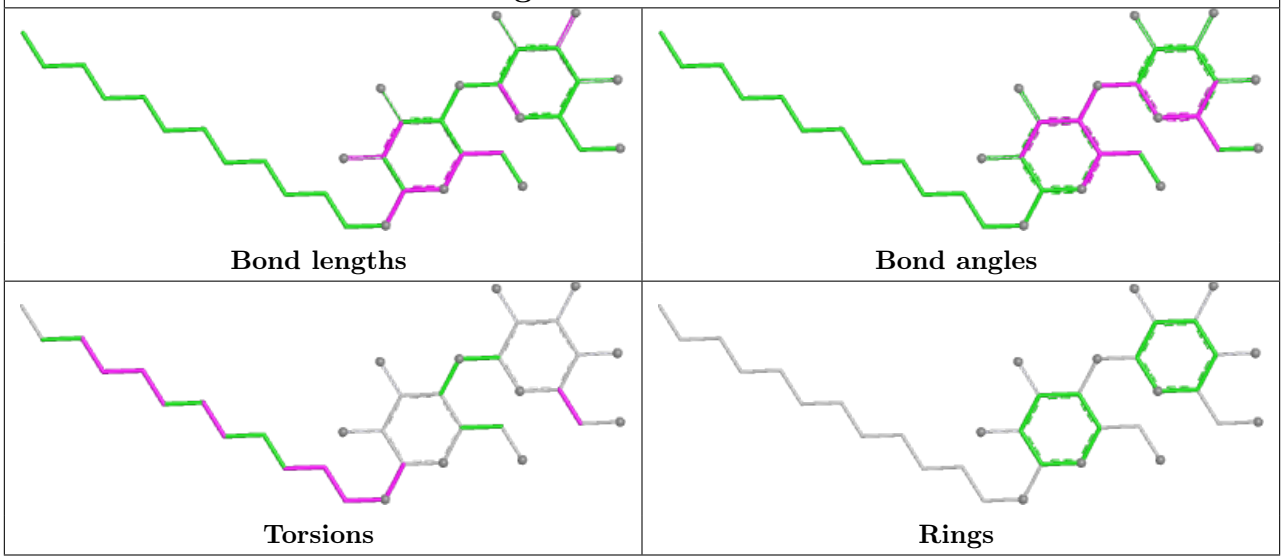
Continued on next page...

Continued from previous page...

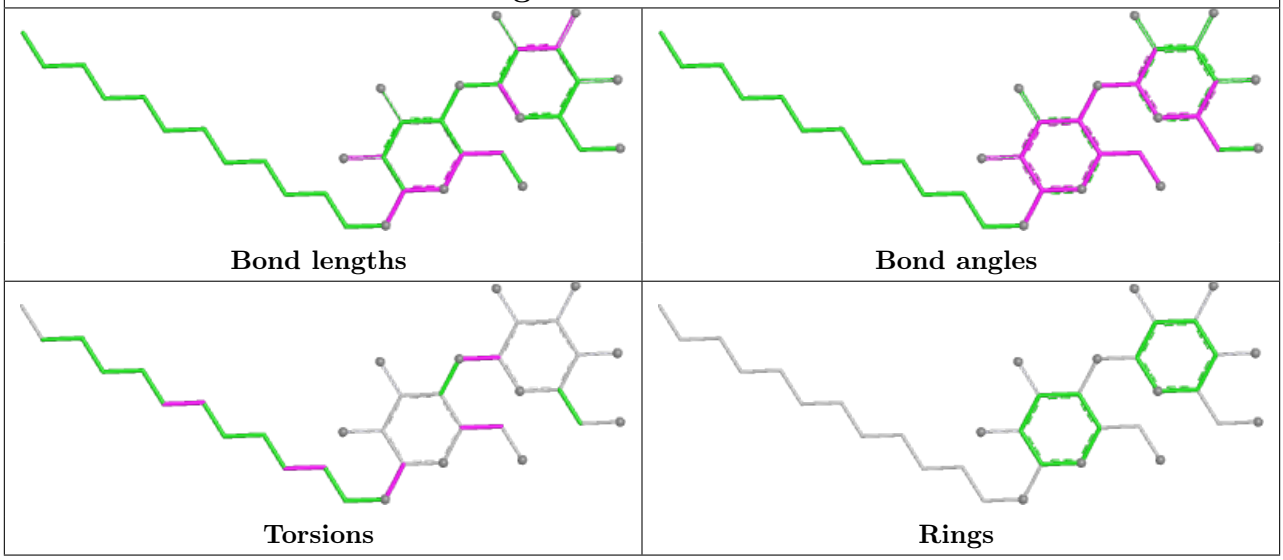
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	2000	LMT	3	0
2	B	2000	LMT	12	0

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.

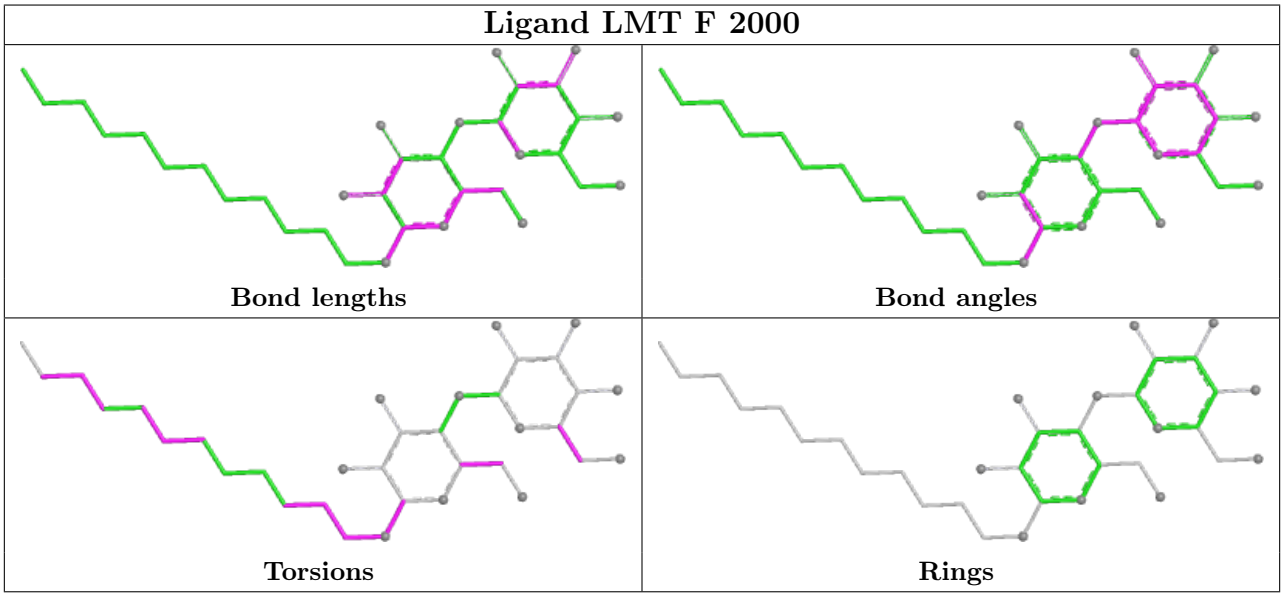
Ligand LMT E 2000



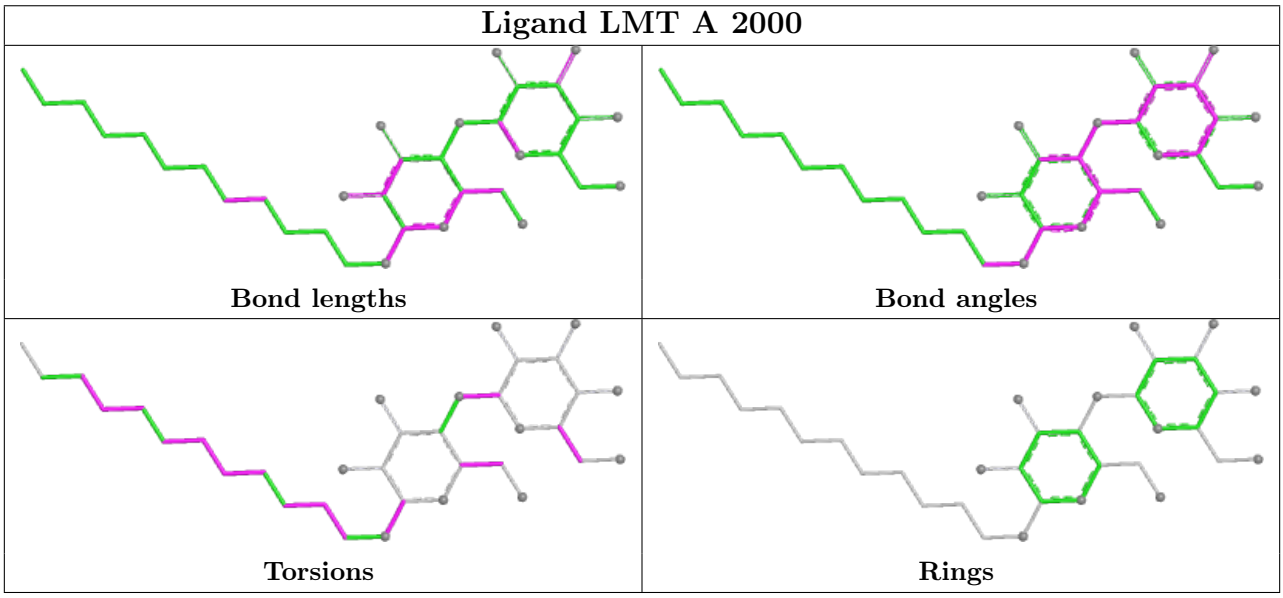
Ligand LMT C 2000



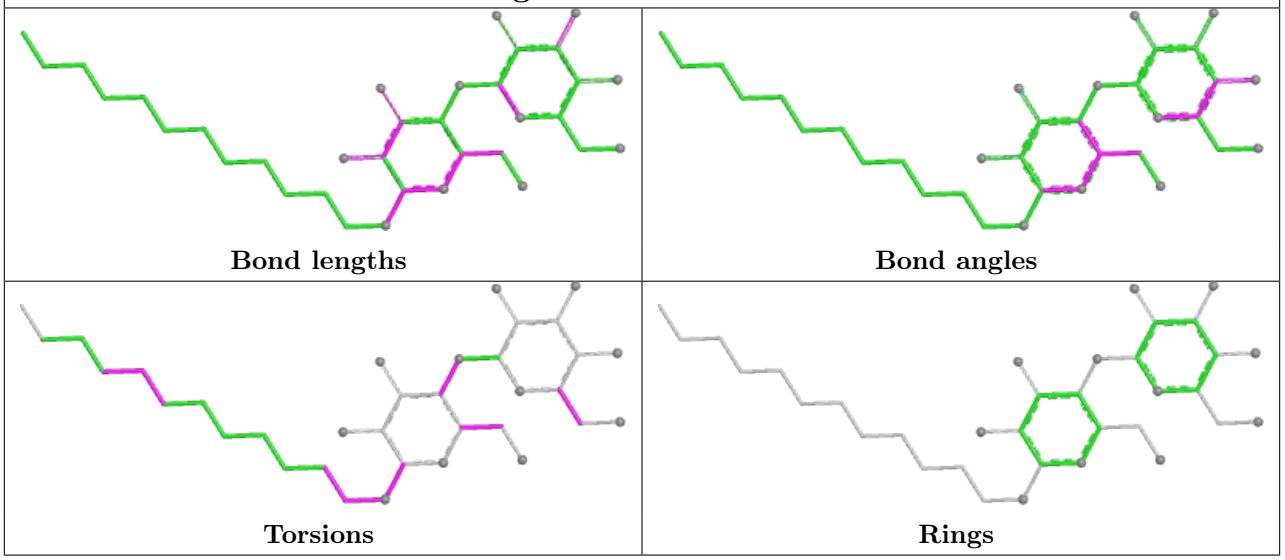
Ligand LMT F 2000



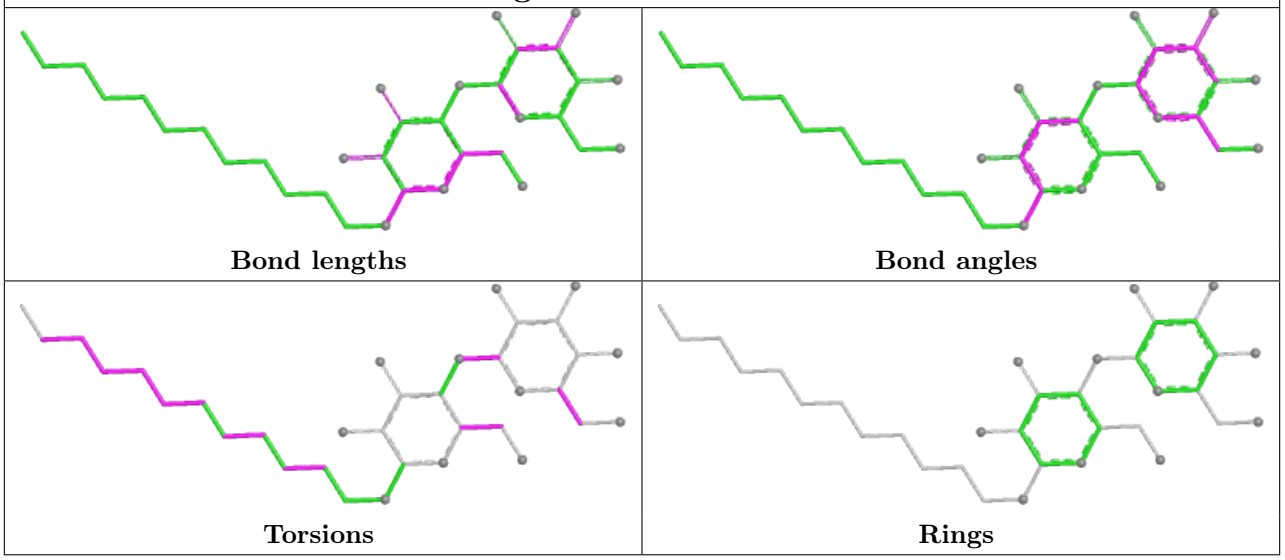
Ligand LMT A 2000



Ligand LMT D 2000



Ligand LMT B 2000



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	1044/1069 (97%)	-0.45	8 (0%)	86	74	5, 35, 83, 118	0
1	B	1042/1069 (97%)	-0.55	7 (0%)	87	78	3, 27, 62, 108	0
1	C	1044/1069 (97%)	-0.55	5 (0%)	91	83	4, 29, 60, 88	0
1	D	1044/1069 (97%)	-0.36	9 (0%)	84	72	10, 49, 88, 114	0
1	E	1042/1069 (97%)	-0.26	34 (3%)	46	32	5, 46, 100, 129	0
1	F	1044/1069 (97%)	-0.24	23 (2%)	62	45	5, 54, 104, 142	0
All	All	6260/6414 (97%)	-0.40	86 (1%)	75	60	3, 39, 90, 142	0

The worst 5 of 86 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	715	SER	6.5
1	F	849	SER	6.4
1	E	295	THR	5.2
1	E	834	GLY	4.5
1	E	170	SER	4.5

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)

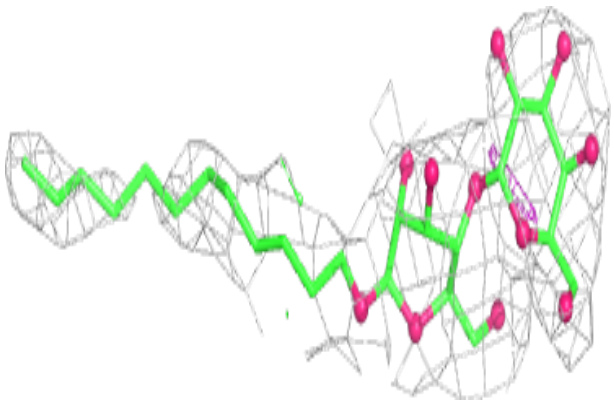
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

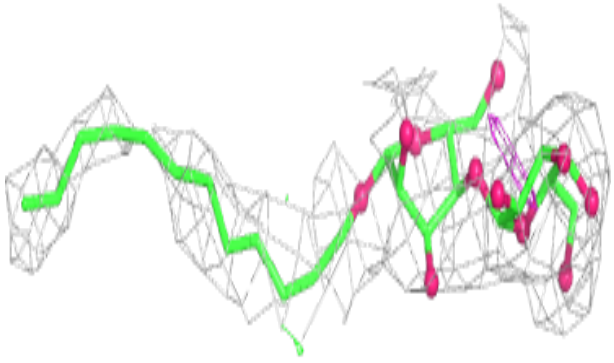
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	LMT	A	2000	35/35	0.86	0.37	2,31,49,54	0
2	LMT	F	2000	35/35	0.86	0.34	13,38,54,58	0
2	LMT	D	2000	35/35	0.87	0.26	1,25,38,40	0
2	LMT	C	2000	35/35	0.88	0.25	5,22,46,50	0
2	LMT	B	2000	35/35	0.89	0.29	6,32,47,61	0
2	LMT	E	2000	35/35	0.90	0.34	3,34,48,49	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 A 2000:

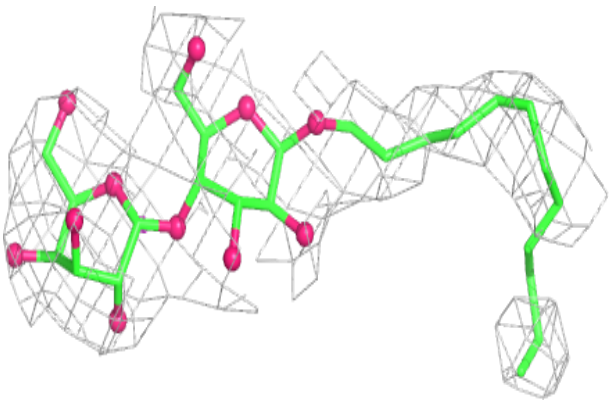
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

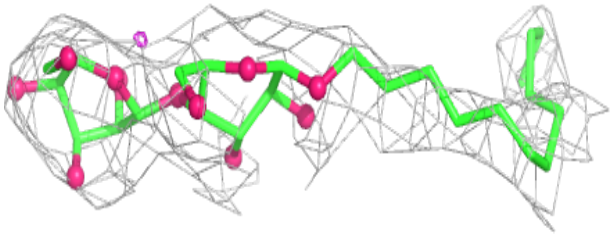


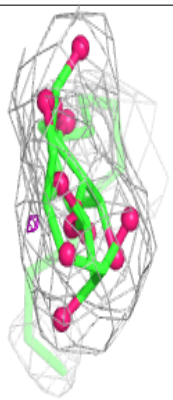


Electron density around LMT F 2000:

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

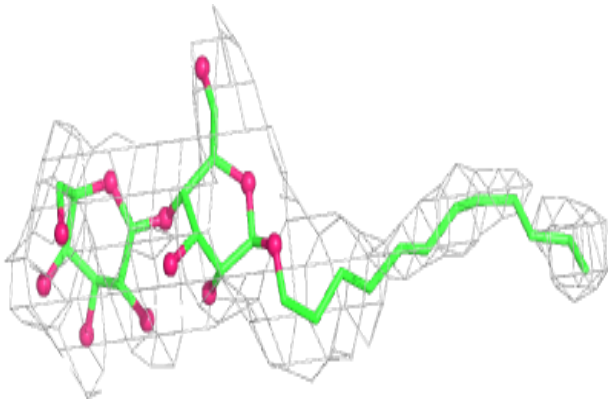


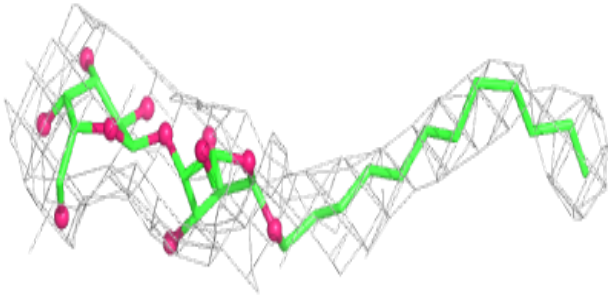




Electron density around LMT D 2000:

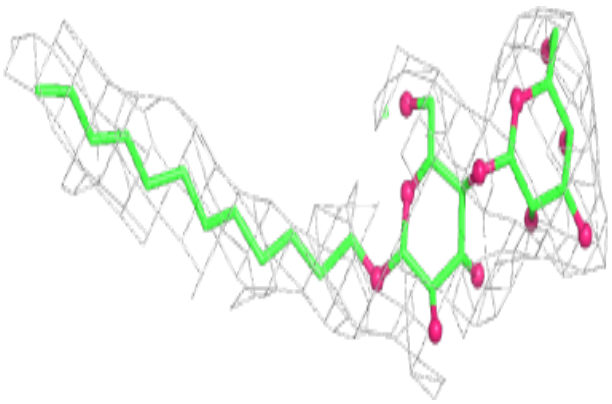
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

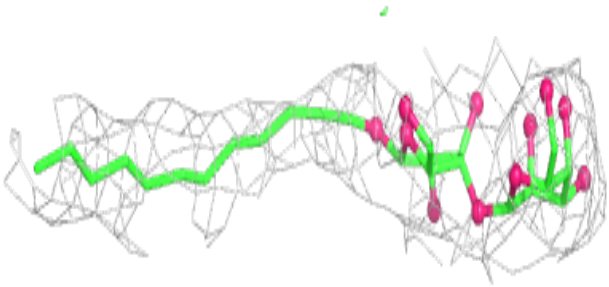




Electron density around LMT C 2000:

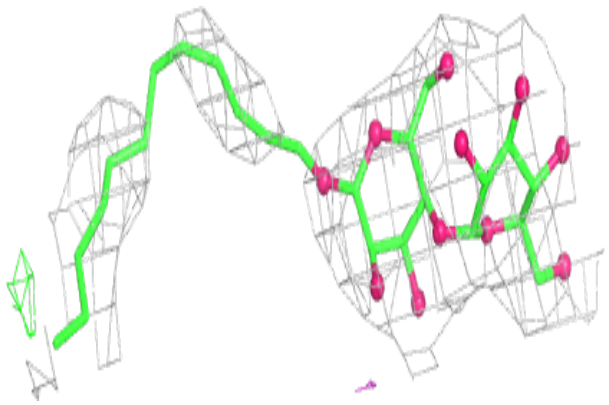
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

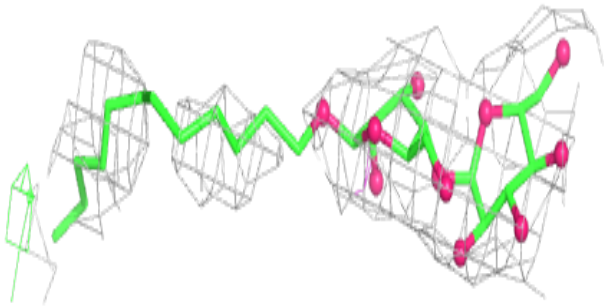




Electron density around LMT B 2000:

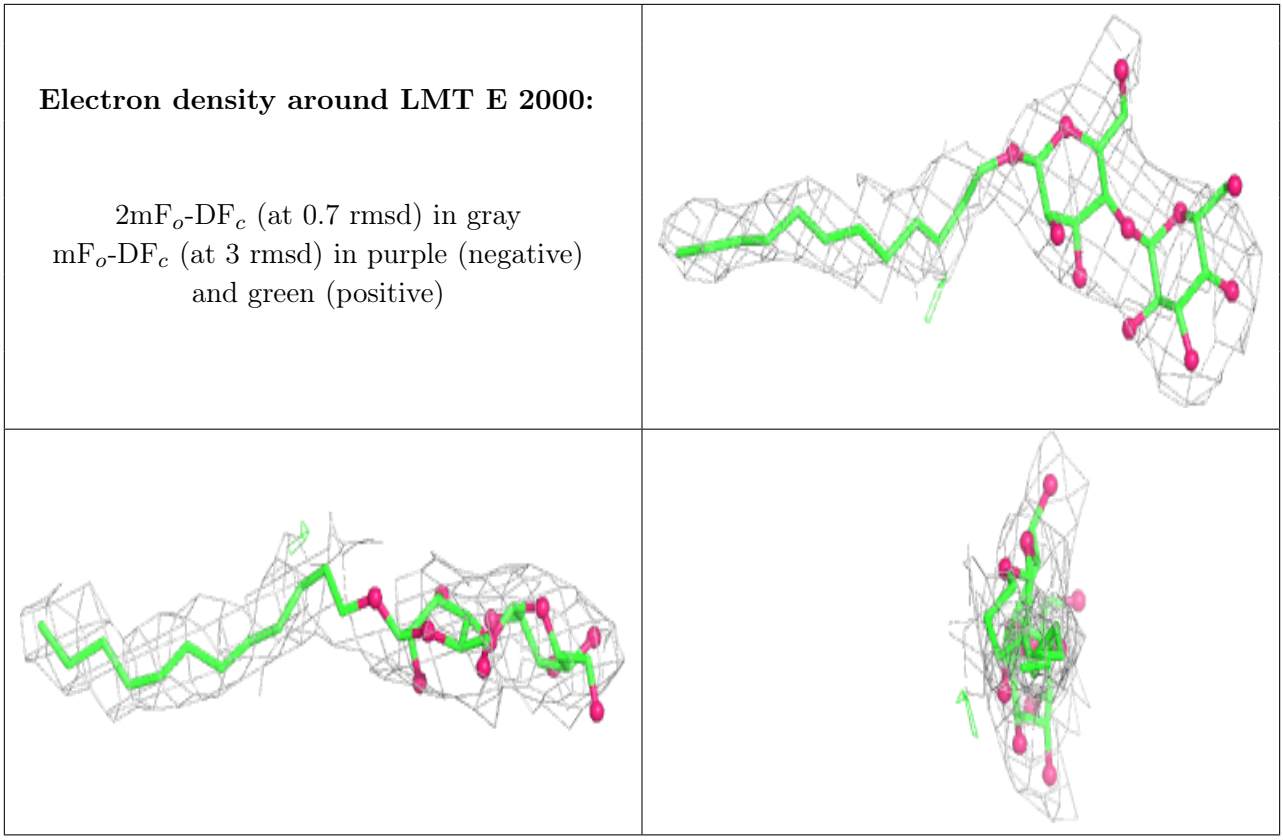
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)





Electron density around LMT E 2000:

$2mF_o$-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.