



wwPDB X-ray Structure Validation Summary Report ⓘ

Apr 5, 2022 – 10:12 am BST

PDB ID : 7O3L
Title : Crystal Structure of AcrB Double Mutant
Authors : Ababou, A.
Deposited on : 2021-04-02
Resolution : 3.53 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 ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.4, 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

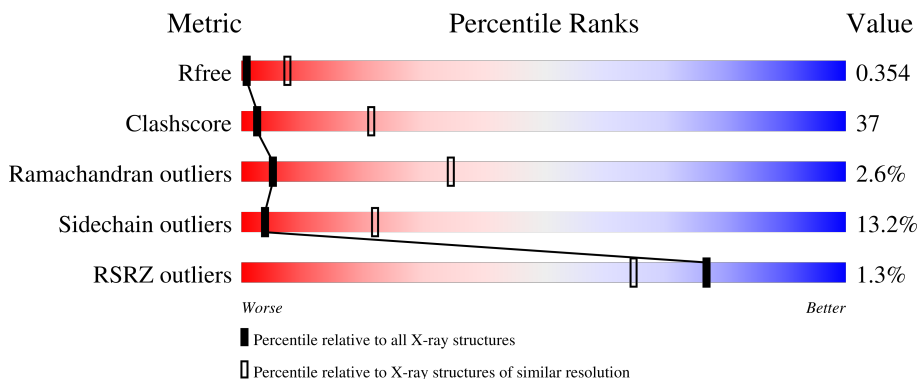
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.53 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	1161 (3.60-3.44)
Clashscore	141614	1244 (3.60-3.44)
Ramachandran outliers	138981	1206 (3.60-3.44)
Sidechain outliers	138945	1207 (3.60-3.44)
RSRZ outliers	127900	1080 (3.60-3.44)

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 $\leq 5\%$. 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	
1	B	1069	
1	C	1069	
1	D	1069	
1	E	1069	

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Mol	Chain	Length	Quality of chain
1	F	1069	 41% 48% 8%

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 47722 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
			Total	C	N	O	S			
1	A	1044	7930	5093	1315	1479	43	0	0	0
1	B	1042	7913	5083	1311	1476	43	0	0	0
1	C	1042	7913	5083	1311	1476	43	0	0	0
1	D	1044	7930	5093	1315	1479	43	0	0	0
1	E	1042	7913	5083	1311	1476	43	0	0	0
1	F	1042	7913	5083	1311	1476	43	0	0	0

There are 132 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

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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	615	ALA	PHE	engineered mutation	UNP E2QH56
A	617	ALA	PHE	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	615	ALA	PHE	engineered mutation	UNP E2QH56
B	617	ALA	PHE	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

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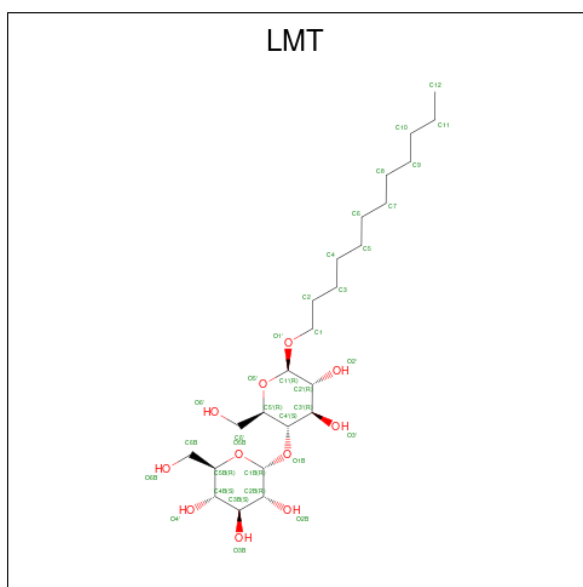
Chain	Residue	Modelled	Actual	Comment	Reference
C	-4	PRO	-	expression tag	UNP E2QH56
C	-3	ARG	-	expression tag	UNP E2QH56
C	-2	GLY	-	expression tag	UNP E2QH56
C	-1	SER	-	expression tag	UNP E2QH56
C	0	HIS	-	expression tag	UNP E2QH56
C	615	ALA	PHE	engineered mutation	UNP E2QH56
C	617	ALA	PHE	engineered 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	615	ALA	PHE	engineered mutation	UNP E2QH56
D	617	ALA	PHE	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

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Chain	Residue	Modelled	Actual	Comment	Reference
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
E	-2	GLY	-	expression tag	UNP E2QH56
E	-1	SER	-	expression tag	UNP E2QH56
E	0	HIS	-	expression tag	UNP E2QH56
E	615	ALA	PHE	engineered mutation	UNP E2QH56
E	617	ALA	PHE	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	615	ALA	PHE	engineered mutation	UNP E2QH56
F	617	ALA	PHE	engineered mutation	UNP E2QH56

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

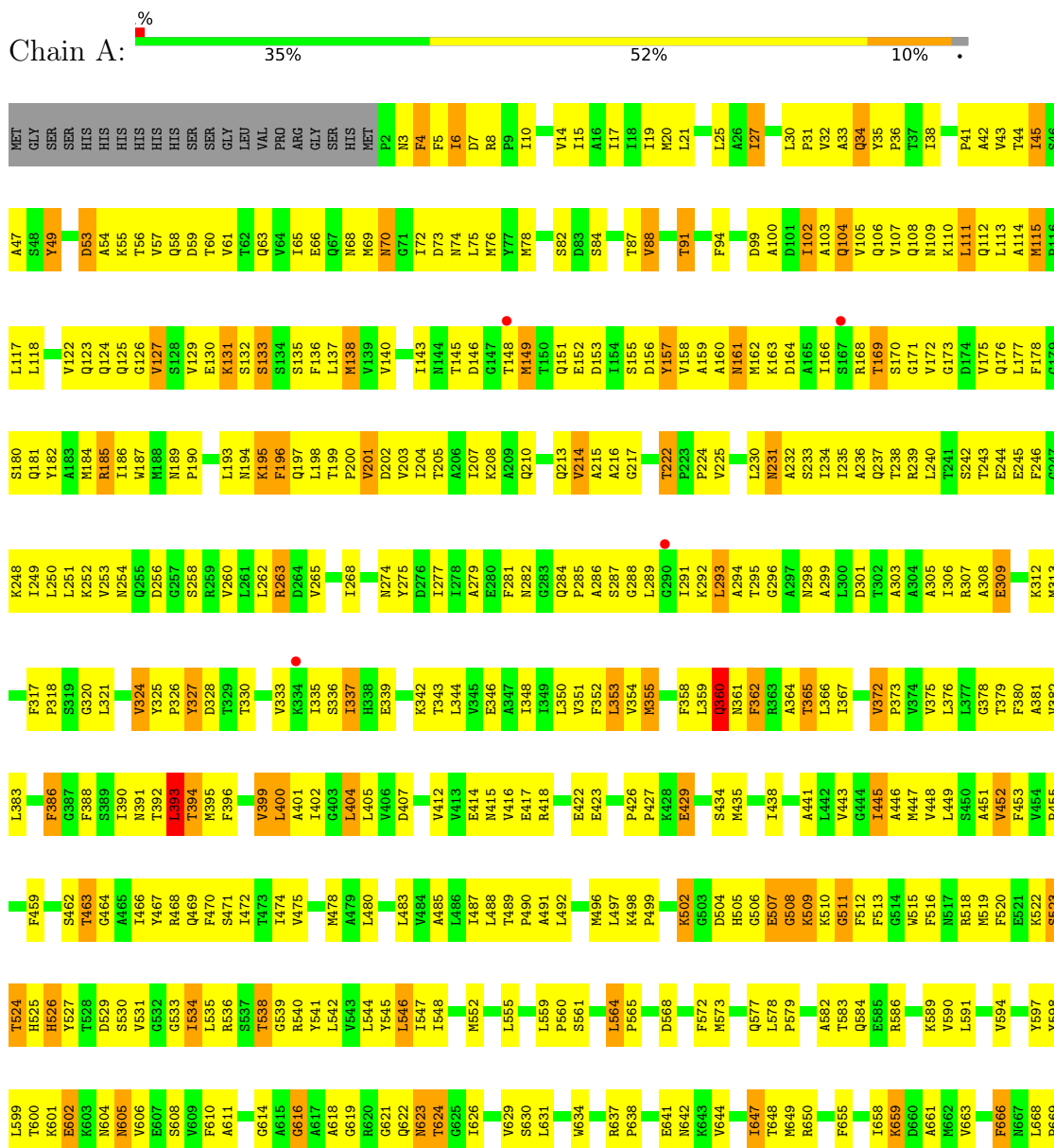


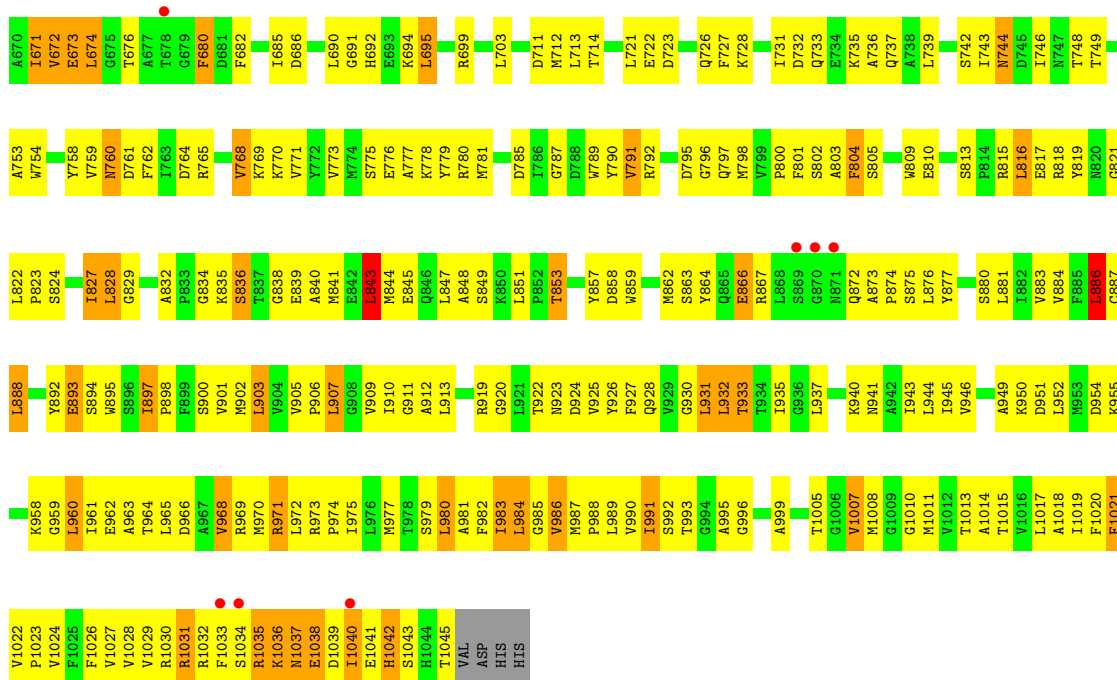
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			35	24	11		
2	B	1	Total	C	O	0	0
			35	24	11		
2	C	1	Total	C	O	0	0
			35	24	11		
2	D	1	Total	C	O	0	0
			35	24	11		
2	E	1	Total	C	O	0	0
			35	24	11		
2	F	1	Total	C	O	0	0
			35	24	11		

3 Residue-property plots

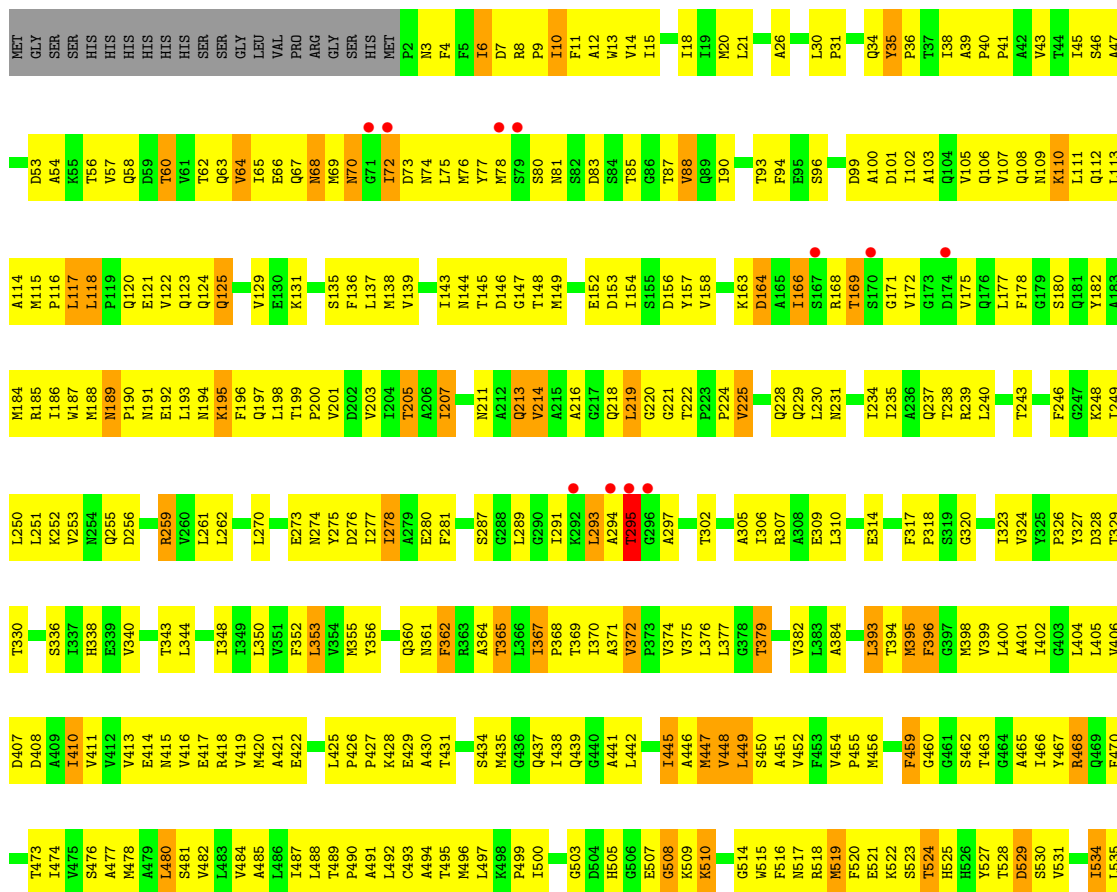
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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.

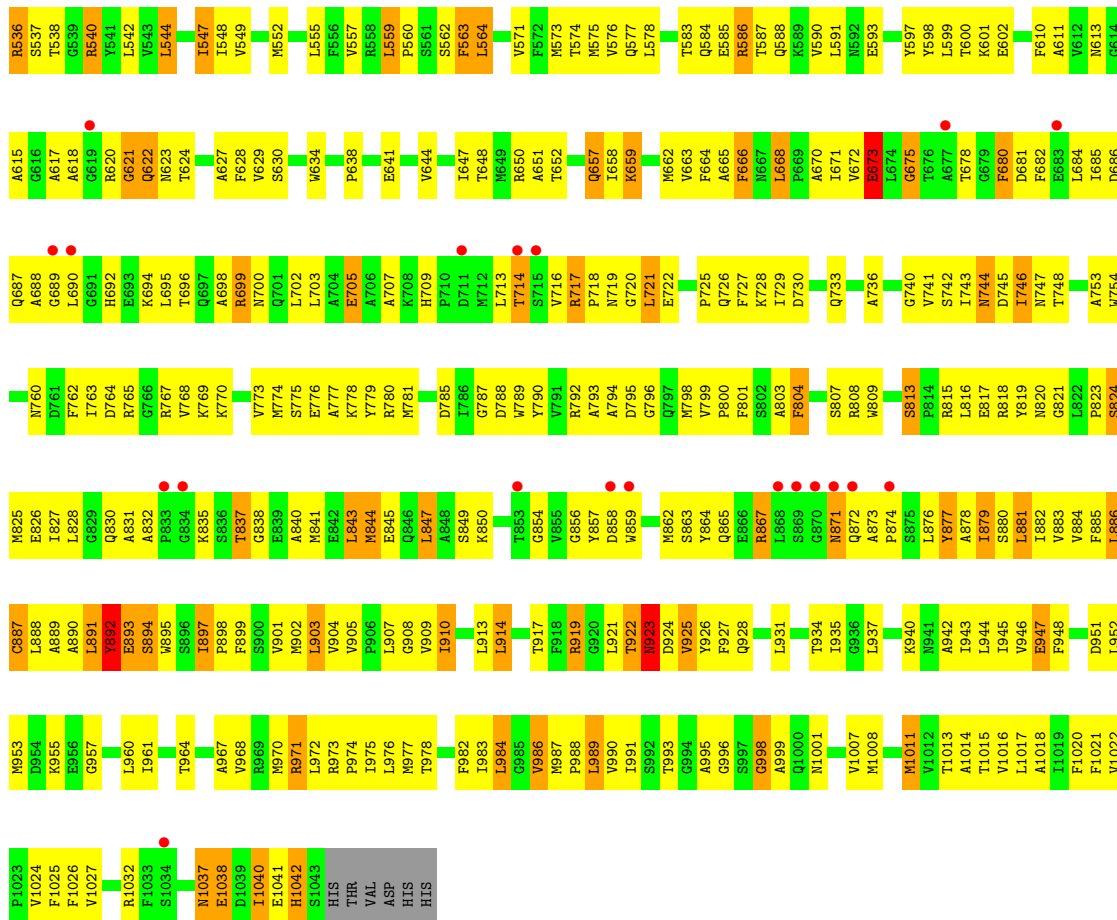
- Molecule 1: Efflux pump membrane transporter



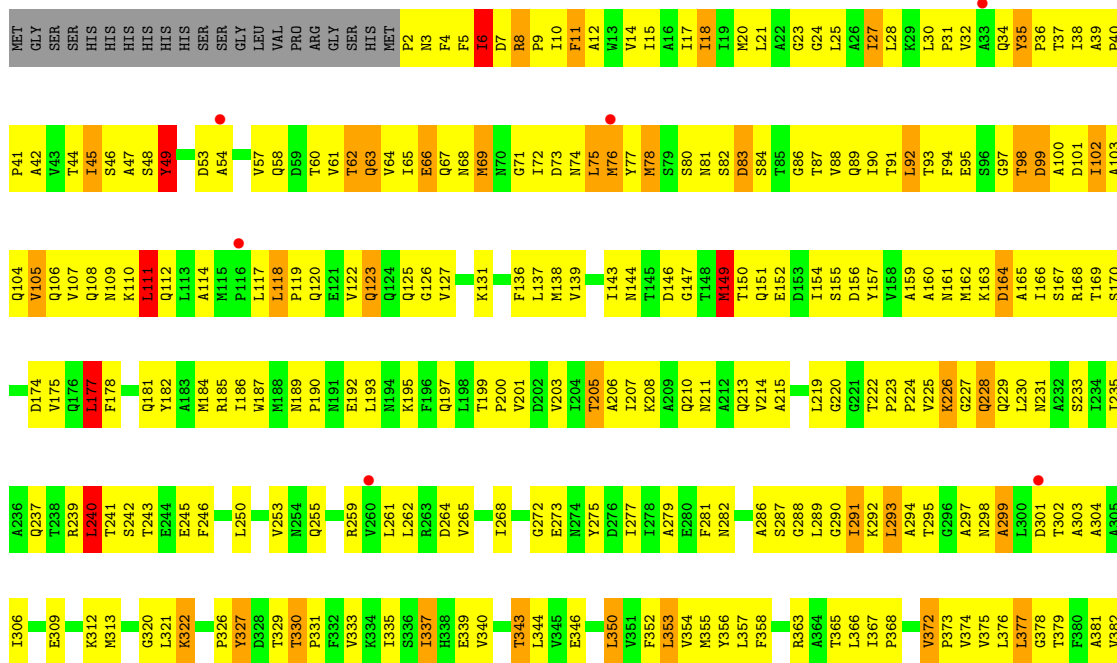
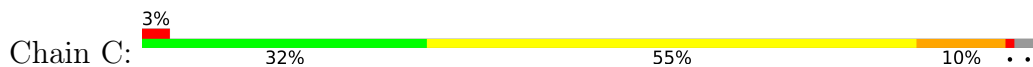


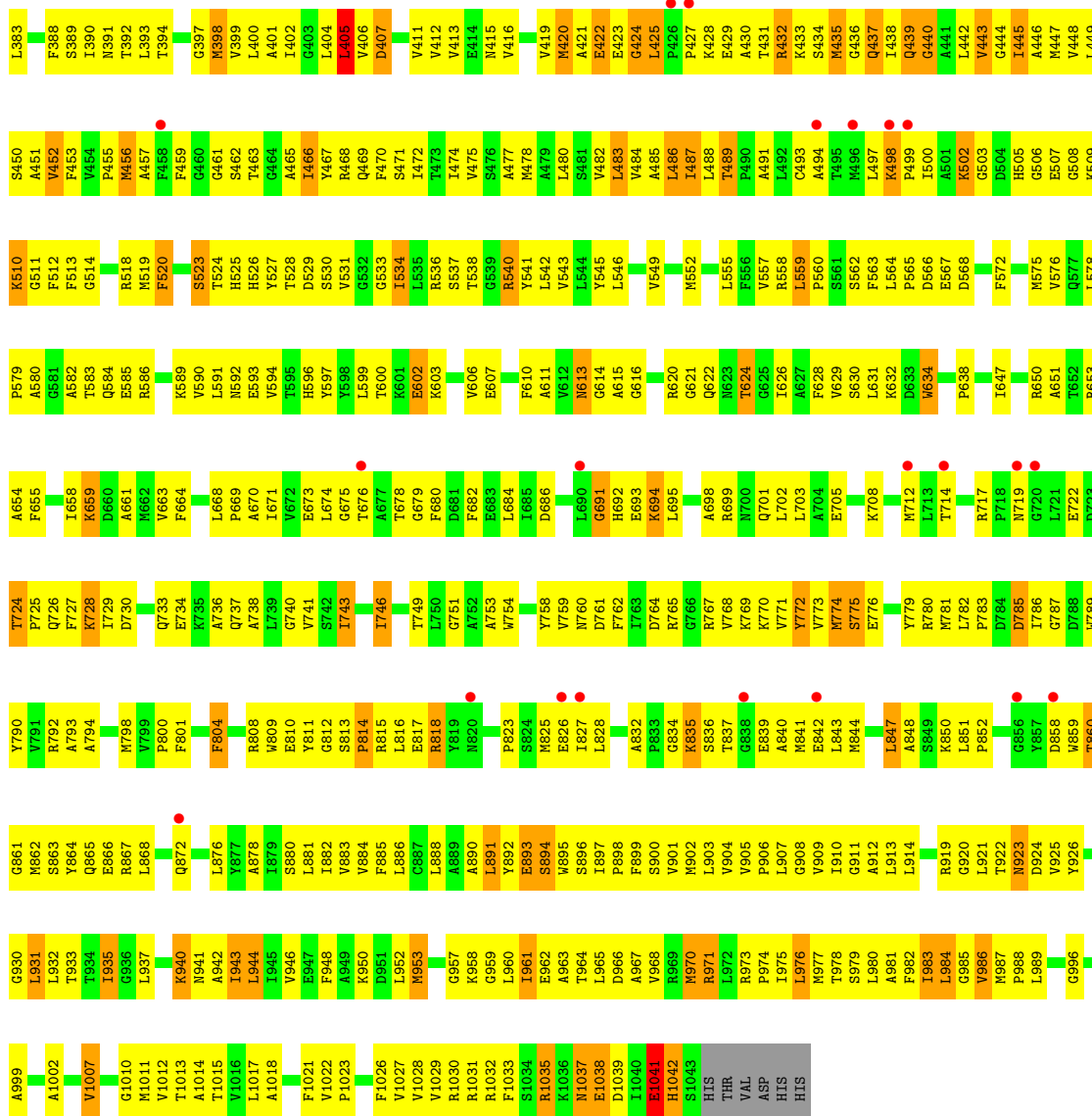
● Molecule 1: Efflux pump membrane transporter



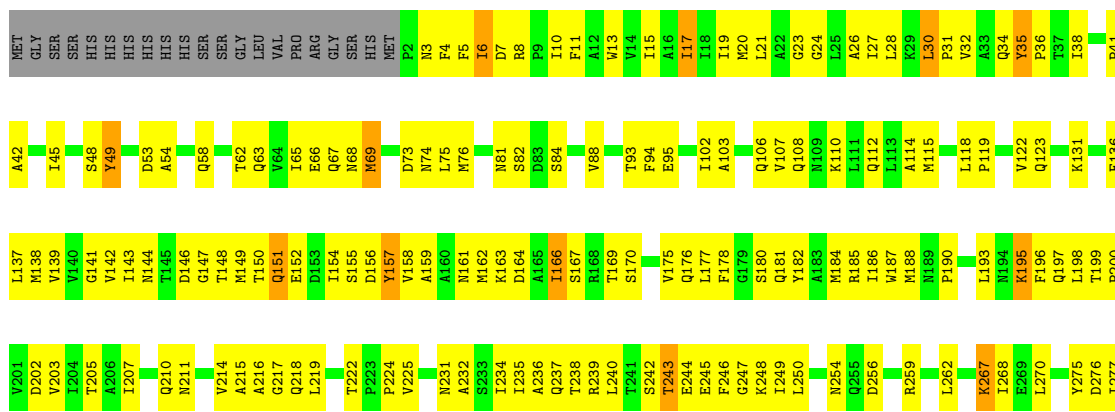


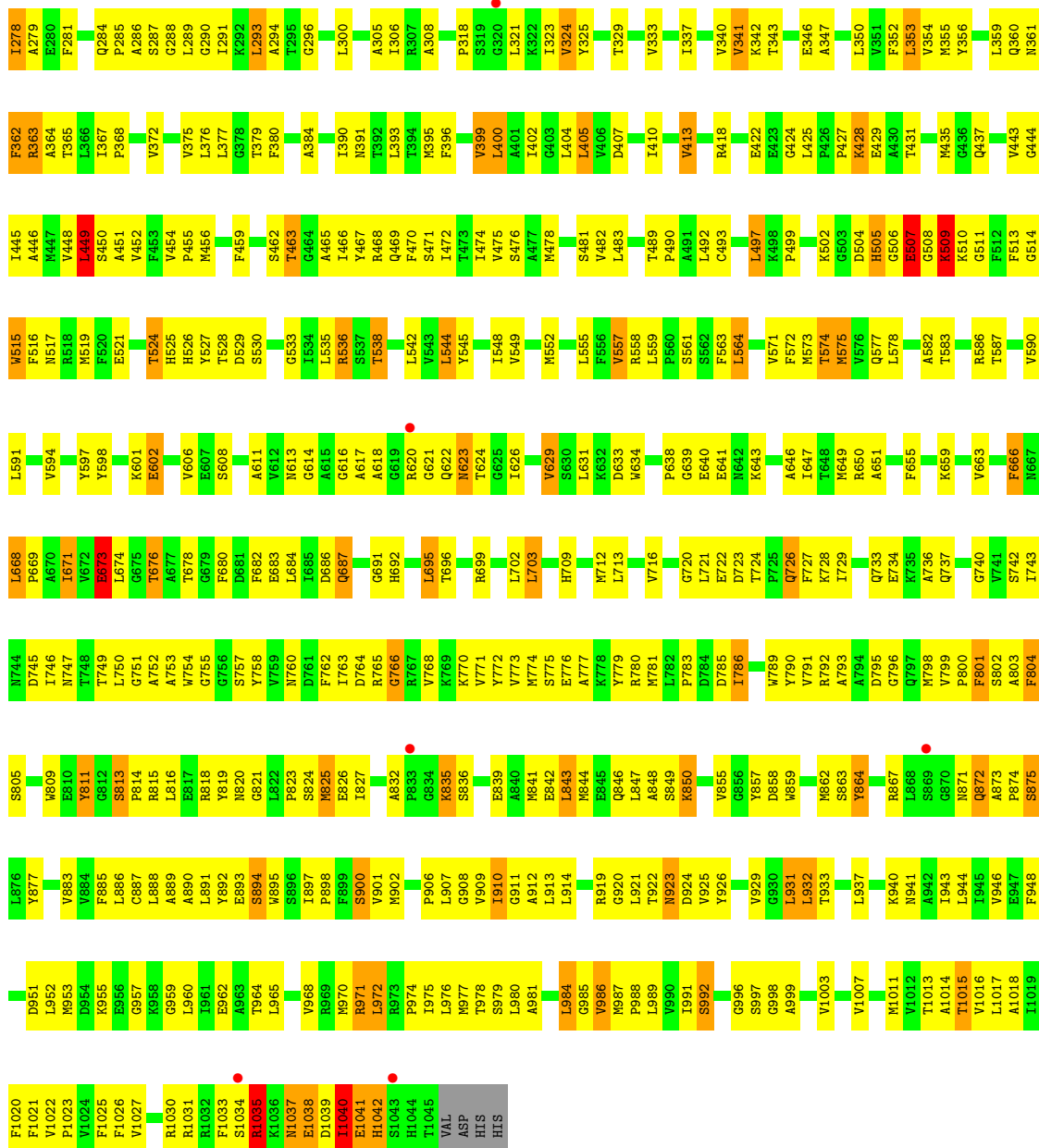
• Molecule 1: Efflux pump membrane transporter



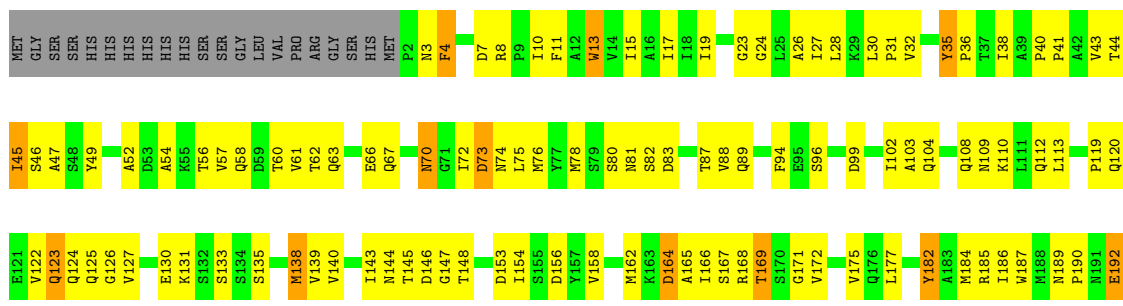


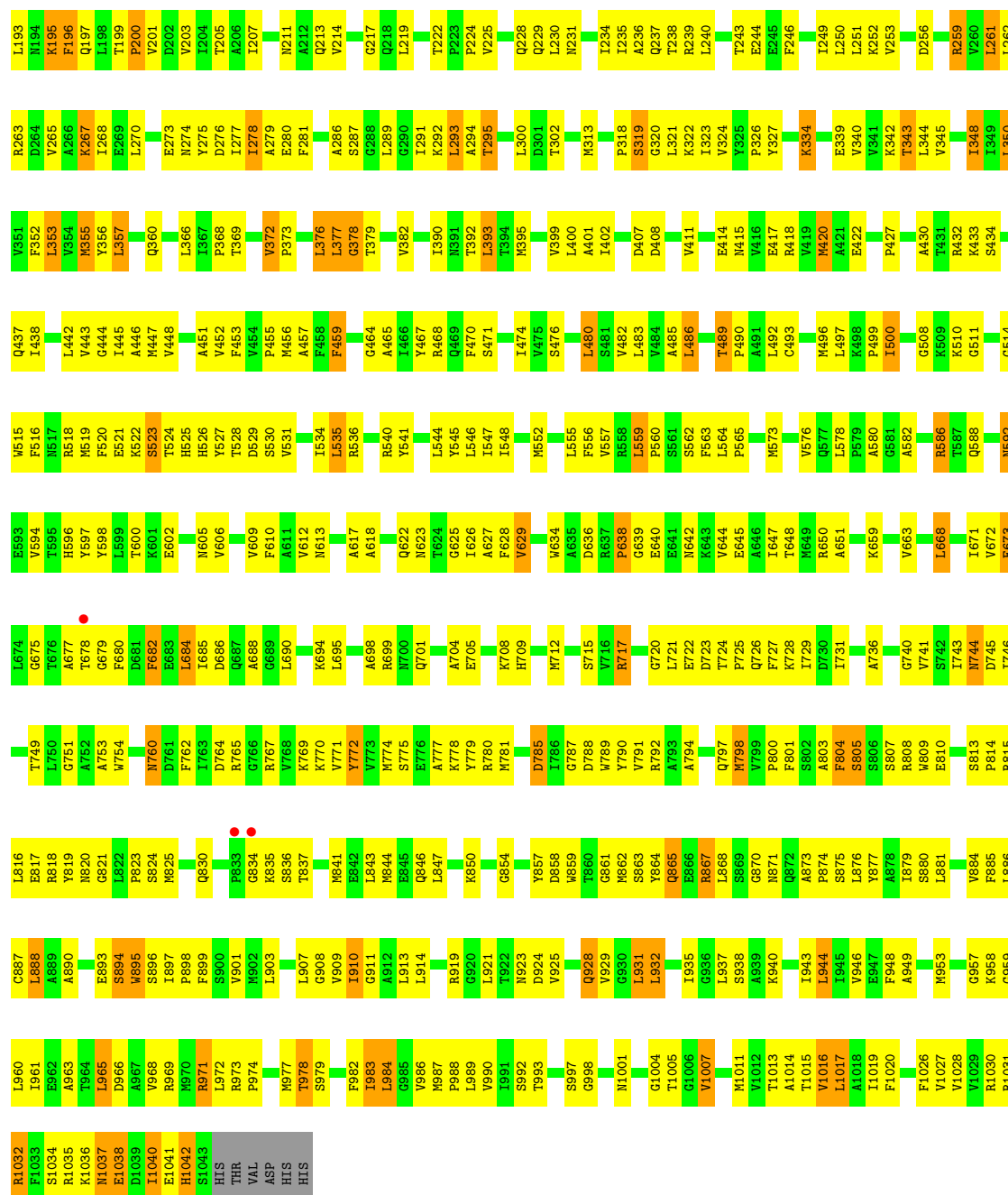
● Molecule 1: Efflux pump membrane transporter





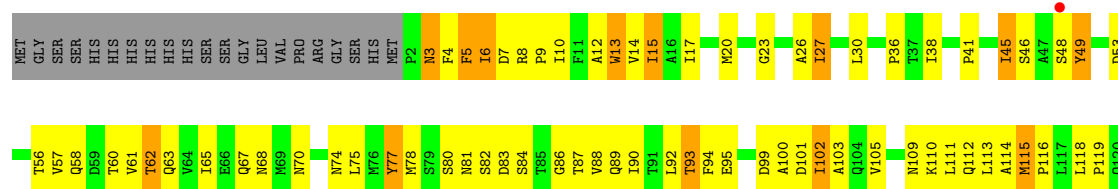
● Molecule 1: Efflux pump membrane transporter





- Molecule 1: Efflux pump membrane transporter

Chain F: 41% 48% 8% . .



T1016 V1017 A1018 I1019 F1020 F1021 V1022 F1023 V1024 V1027 V1028 R1031 R1032 F1033 S1034 R1035 K1036 M1037 E1038 D1039 I1040 E1041 H1042 S1043 HIS THR VAL ASP HIS HIS	V946 E947 F948 L952 M953 D954 K955 E956 A990 L891 G958 G959 L960 I961 E962 A963 T964 L965 V968 R971 L972 R973 P974 I975 M977 T978 S979 L980 L981 F982 L983 L984 G985 V986 M987 P988 L989 V990 S992 A995 G996 S997 G998 A999 Q1000 T1005 G1006 V1007 M1008 M1011 V1012 T1013 A1014	L876 L879 S880 V884 F885 L886 A890 L891 V892 M895 S896 L897 P898 V901 M902 L903 V904 P906 L907 G908 V909 I910 G911 A912 L913 L914 A915 A916 R919 G920 L921 T922 D924 V925 F926 F927 Q928 V929 G930 L931 L932 L933 T935 G936 L937 K940 M941 A942 L943 L944 I945	K728 I729 Q733 E734 L739 G740 V741 S742 L743 D744 M745 L746 I747 F748 T749 G751 M752 E753 A754 Q830 P833 G834 K835 S836 T837 M841 E842 L843 E844 E845 D846 L847 L851 H857 D858 H859 T860 G861 H862 S863 Y864 O865 E866 H867 L868 S869 G870 H871 O872 L873 P874 S875	F572 M573 T574 M575 V576 E577 L578 P579 A580 G581 D582 T583 Q584 E585 S586 M587 V588 L589 R589 K510 V590 L591 H596 E597 G598 D599 T600 A601 M602 K603 V606 A611 V612 M613 A614 A615 A618 G619 R620 G621 D622 M623 T624 G625 I626 A627 S630 L631 K632 G633 M634 L637 D638 F639 L640 I641 E642 G643 E644 A645 R646 M647 E648 L649 V649 G650 K651 D652 T653 M654 L655 R656 S657 E658 G659 D660 T661 M662 V663 F664 A665 F666 M667 L668 P669 A670 I671 V672 E673 L674 G675 T678 K679 F680 D681 F682 D686 G687 A688 H692 E693 K694 L695 M699 L702 K708 R717 F718 M719 G720 L721 E722 D723 T724 F725 Q726 M727	M420 A421 E422 E423 G424 K428 E429 L432 K433 S434 I438 L442 V443 G444 I445 A446 M447 V448 L449 S450 A451 V452 F453 G454 H455 E456 Y457 T528 D529 S530 V531 I534 A535 R540 Y541 L542 V543 L544 E545 E546 R547 L548 L555 L559 P560 S561 S562 F563 L564 P565 D566 E567 M642	I348 V351 F352 L353 Y356 L357 F358 L359 Q360 N361 F362 R363 A364 T365 P368 L289 T369 I370 A371 V372 P373 V374 V375 L376 L377 G378 P379 F380 A381 R382 L383 A384 I390 L393 T394 M395 M398 V399 L400 A401 I402 G403 L404 L405 V406 D407 L480 S481 I410 V482 L483 V484 A485 M486 E417 L488 V419	V260 L261 L262 R263 D264 V265 E266 K267 L268 I278 Q284 P285 A286 S287 G288 L289 E290 I291 R292 K293 I306 R307 F380 L310 A311 E314 P315 F316 F317 L321 K322 I323 M398 V399 L400 A401 I402 G403 L404 L405 V406 D407 L480 S481 I410 V482 L483 V484 A485 M486 E417 L488 V419	V191 E192 L193 M194 K195 F196 Q197 L198 T199 P200 V201 D202 V203 I204 T205 A206 Q210 M211 A212 Q213 V214 A215 T150 A216 G217 Q218 L219 P222 R223 D224 V225 K226 E244 F245 G246 G247 K248 L249 L250 M184 L251 K252 V253 I186 M187 M188 R189 R259
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4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	152.15Å 156.72Å 218.75Å 90.00° 92.40° 90.00°	Depositor
Resolution (Å)	19.93 – 3.53 19.93 – 3.53	Depositor EDS
% Data completeness (in resolution range)	99.8 (19.93-3.53) 99.8 (19.93-3.53)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.85 (at 3.52Å)	Xtrriage
Refinement program	PHENIX 1.8.2_1309	Depositor
R, R_{free}	0.264 , 0.354 0.264 , 0.354	Depositor DCC
R_{free} test set	6240 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å ²)	104.6	Xtrriage
Anisotropy	0.122	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	(Not available) , (Not available)	EDS
L-test for twinning ²	$\langle L \rangle = 0.40$, $\langle L^2 \rangle = 0.23$	Xtrriage
Estimated twinning fraction	0.060 for -k,-h,-l 0.074 for k,h,-l 0.074 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	47722	wwPDB-VP
Average B, all atoms (Å ²)	44.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 36.61 % 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 4.8693e-04.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0.67	1/8080 (0.0%)	0.92	10/10972 (0.1%)
1	B	0.67	1/8062 (0.0%)	0.93	14/10947 (0.1%)
1	C	0.68	0/8062	0.96	20/10947 (0.2%)
1	D	0.69	1/8080 (0.0%)	0.93	11/10972 (0.1%)
1	E	0.72	1/8062 (0.0%)	0.93	8/10947 (0.1%)
1	F	0.71	0/8062	0.95	11/10947 (0.1%)
All	All	0.69	4/48408 (0.0%)	0.94	74/65732 (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	C	0	1
1	F	0	1
All	All	0	2

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	515	TRP	CB-CG	8.43	1.65	1.50
1	E	895	TRP	CB-CG	7.59	1.64	1.50
1	B	13	TRP	CB-CG	-5.38	1.40	1.50
1	A	309	GLU	CB-CG	-5.29	1.42	1.52

The worst 5 of 74 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	483	LEU	CA-CB-CG	-10.27	91.69	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	111	LEU	CA-CB-CG	9.16	136.36	115.30
1	A	886	LEU	CA-CB-CG	9.03	136.07	115.30
1	C	483	LEU	CA-CB-CG	-8.58	95.56	115.30
1	A	393	LEU	CA-CB-CG	8.36	134.53	115.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	1041	GLU	Peptide
1	F	1041	GLU	Peptide

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	7930	0	8072	634	1
1	B	7913	0	8058	686	1
1	C	7913	0	8058	747	0
1	D	7930	0	8072	547	0
1	E	7913	0	8058	494	0
1	F	7913	0	8058	571	0
2	A	35	0	46	7	0
2	B	35	0	46	3	0
2	C	35	0	46	5	0
2	D	35	0	46	4	0
2	E	35	0	46	17	0
2	F	35	0	46	2	0
All	All	47722	0	48652	3527	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 37.

The worst 5 of 3527 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:HH21	2:E:2000:LMT:C3B	1.42	1.33
1:E:536:ARG:NE	2:E:2000:LMT:H4B	1.48	1.26
1:E:536:ARG:HE	2:E:2000:LMT:C4B	1.56	1.19
1:A:541:TYR:OH	2:A:2000:LMT:H6E	1.41	1.18
1:C:74:ASN:HB3	1:C:95:GLU:HB2	1.34	1.10

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:529:ASP:OD2	1:B:525:HIS:NE2[2_555]	1.98	0.22

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%)	891 (86%)	117 (11%)	34 (3%)	4	30
1	B	1040/1069 (97%)	893 (86%)	126 (12%)	21 (2%)	7	41
1	C	1040/1069 (97%)	874 (84%)	132 (13%)	34 (3%)	4	30
1	D	1042/1069 (98%)	904 (87%)	113 (11%)	25 (2%)	6	36
1	E	1040/1069 (97%)	899 (86%)	124 (12%)	17 (2%)	9	45
1	F	1040/1069 (97%)	898 (86%)	110 (11%)	32 (3%)	4	32
All	All	6244/6414 (97%)	5359 (86%)	722 (12%)	163 (3%)	5	34

5 of 163 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	133	SER
1	A	507	GLU
1	A	512	PHE
1	A	992	SER

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Mol	Chain	Res	Type
1	A	995	ALA

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	848/870 (98%)	725 (86%)	123 (14%)	3	19
1	B	846/870 (97%)	721 (85%)	125 (15%)	3	18
1	C	846/870 (97%)	723 (86%)	123 (14%)	3	19
1	D	848/870 (98%)	753 (89%)	95 (11%)	6	29
1	E	846/870 (97%)	748 (88%)	98 (12%)	5	27
1	F	846/870 (97%)	741 (88%)	105 (12%)	4	24
All	All	5080/5220 (97%)	4411 (87%)	669 (13%)	4	22

5 of 669 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	1040	ILE
1	F	102	ILE
1	E	145	THR
1	D	1035	ARG
1	E	592	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 38 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	517	ASN
1	F	109	ASN
1	D	726	GLN
1	E	68	ASN
1	F	733	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	C	2000	-	36,36,36	1.82	8 (22%)	47,47,47	1.37	8 (17%)
2	LMT	E	2000	-	36,36,36	1.82	10 (27%)	47,47,47	2.51	15 (31%)
2	LMT	F	2000	-	36,36,36	1.89	11 (30%)	47,47,47	2.15	15 (31%)
2	LMT	D	2000	-	36,36,36	1.92	9 (25%)	47,47,47	1.49	9 (19%)
2	LMT	B	2000	-	36,36,36	1.85	9 (25%)	47,47,47	1.58	7 (14%)
2	LMT	A	2000	-	36,36,36	1.98	9 (25%)	47,47,47	1.67	9 (19%)

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	C	2000	-	3/3/10/10	12/21/61/61	0/2/2/2
2	LMT	E	2000	-	2/2/10/10	12/21/61/61	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	LMT	F	2000	-	3/3/10/10	15/21/61/61	0/2/2/2
2	LMT	D	2000	-	2/2/10/10	14/21/61/61	0/2/2/2
2	LMT	B	2000	-	2/2/10/10	10/21/61/61	0/2/2/2
2	LMT	A	2000	-	2/2/10/10	10/21/61/61	0/2/2/2

The worst 5 of 56 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	2000	LMT	O1'-C1'	4.63	1.48	1.40
2	A	2000	LMT	O5'-C5'	4.45	1.55	1.44
2	F	2000	LMT	O1'-C1'	4.41	1.47	1.40
2	C	2000	LMT	O5'-C5'	4.30	1.54	1.44
2	F	2000	LMT	O5'-C5'	4.27	1.54	1.44

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	2000	LMT	O3B-C3B-C4B	-7.15	93.83	110.35
2	E	2000	LMT	C4B-C3B-C2B	7.14	123.29	110.82
2	A	2000	LMT	O5B-C5B-C4B	5.58	119.82	109.69
2	F	2000	LMT	O1B-C1B-C2B	5.48	122.29	108.10
2	B	2000	LMT	C1'-C2'-C3'	5.35	121.13	110.00

5 of 14 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	B	2000	LMT	C4B
2	C	2000	LMT	C2'

5 of 73 torsion outliers are listed below:

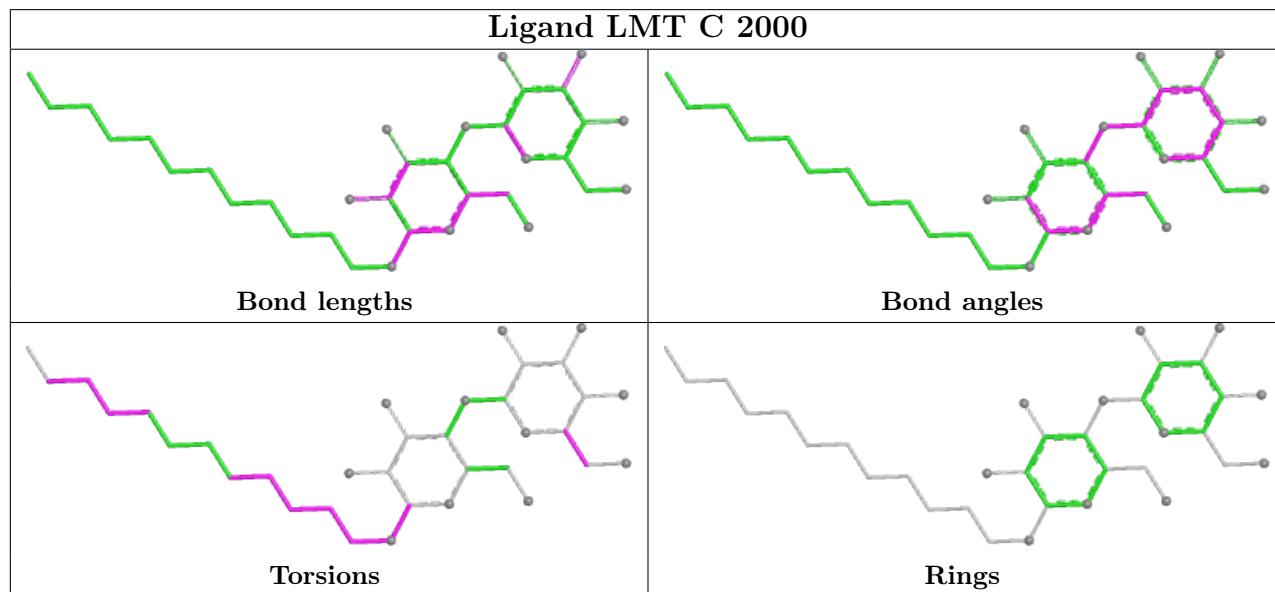
Mol	Chain	Res	Type	Atoms
2	C	2000	LMT	C2'-C1'-O1'-C1
2	C	2000	LMT	O5'-C1'-O1'-C1
2	D	2000	LMT	O5'-C1'-O1'-C1
2	F	2000	LMT	C2-C1-O1'-C1'
2	C	2000	LMT	O5B-C5B-C6B-O6B

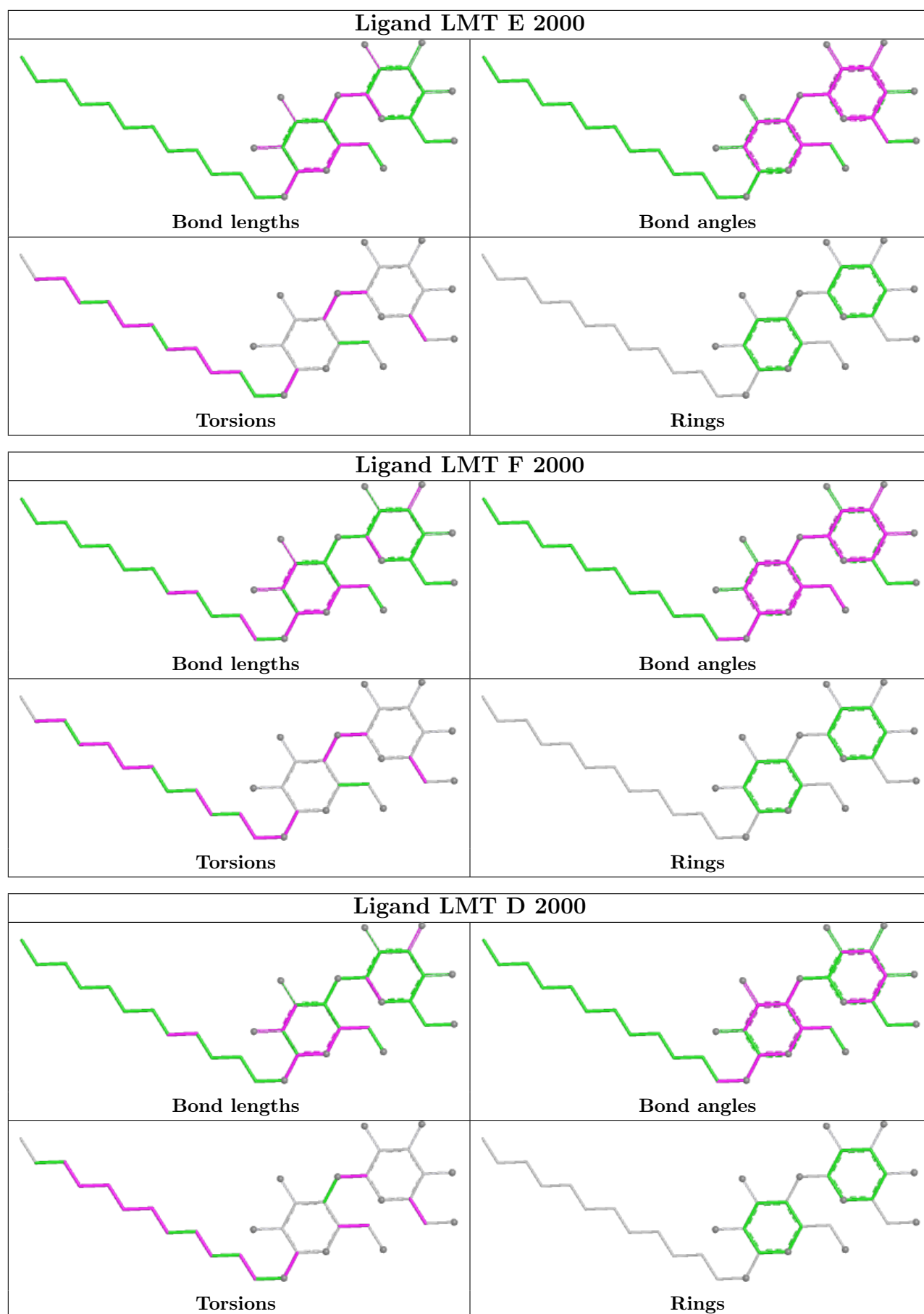
There are no ring outliers.

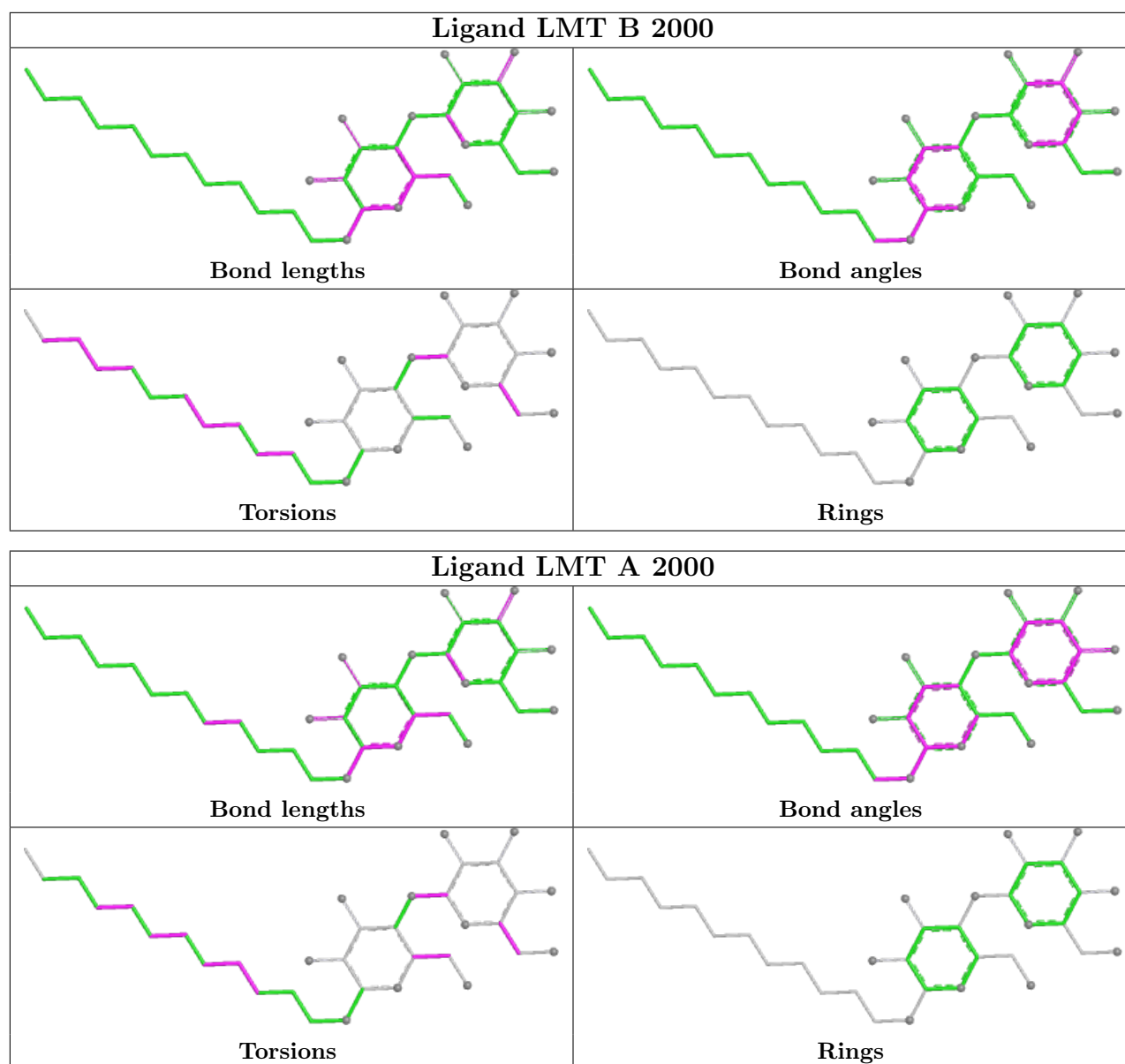
6 monomers are involved in 38 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	2000	LMT	5	0
2	E	2000	LMT	17	0
2	F	2000	LMT	2	0
2	D	2000	LMT	4	0
2	B	2000	LMT	3	0
2	A	2000	LMT	7	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 than 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.







5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	1044/1069 (97%)	-0.38	11 (1%) 80 69	13, 49, 91, 117	0
1	B	1042/1069 (97%)	-0.19	31 (2%) 50 37	11, 49, 101, 139	0
1	C	1042/1069 (97%)	-0.17	27 (2%) 56 42	8, 62, 104, 135	0
1	D	1044/1069 (97%)	-0.48	6 (0%) 89 81	9, 36, 74, 116	0
1	E	1042/1069 (97%)	-0.58	3 (0%) 94 89	7, 28, 59, 88	0
1	F	1042/1069 (97%)	-0.57	3 (0%) 94 89	5, 30, 61, 103	0
All	All	6256/6414 (97%)	-0.40	81 (1%) 77 65	5, 40, 91, 139	0

The worst 5 of 81 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	715	SER	15.5
1	B	689	GLY	7.9
1	C	720	GLY	7.0
1	C	856	GLY	5.2
1	B	870	GLY	5.1

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

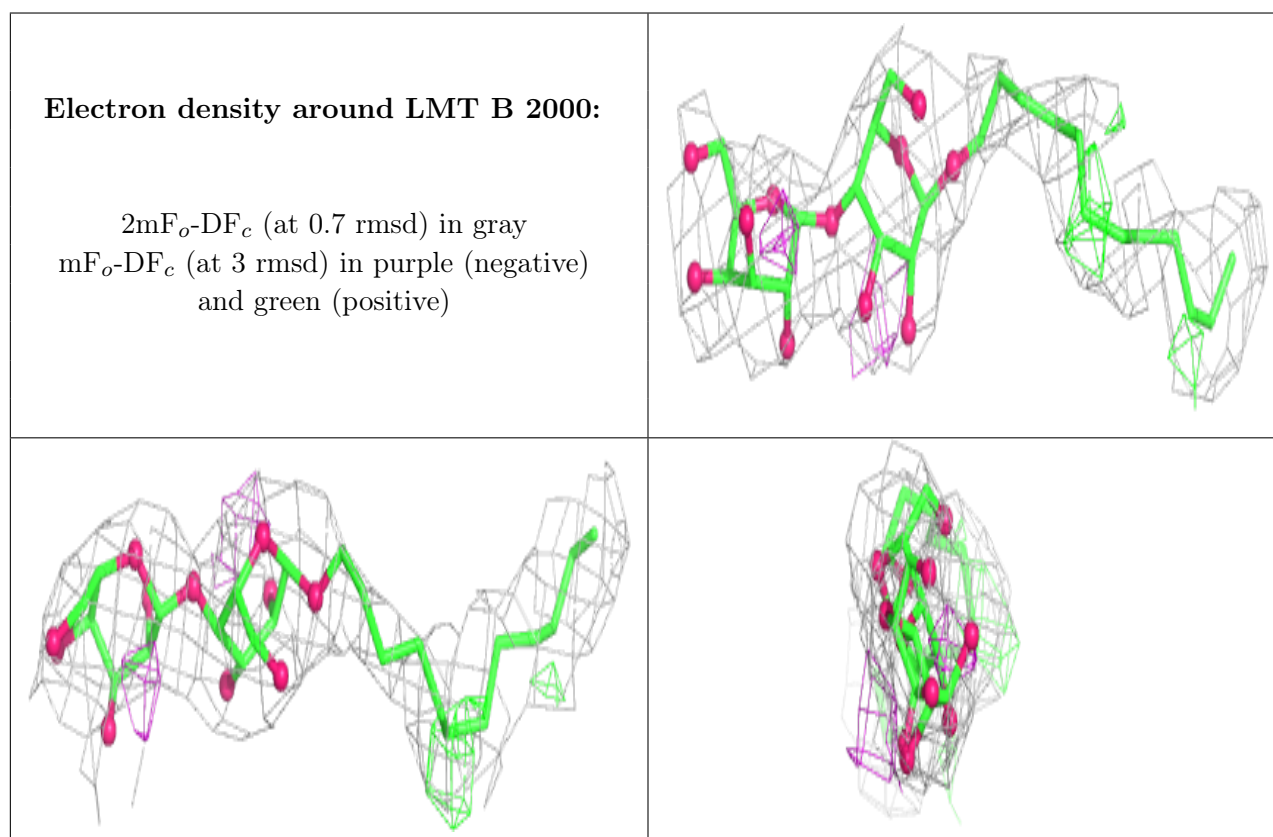
There are no monosaccharides in this entry.

6.4 Ligands [i](#)

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

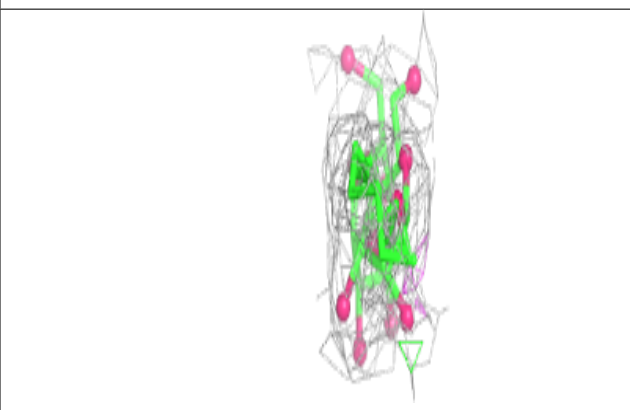
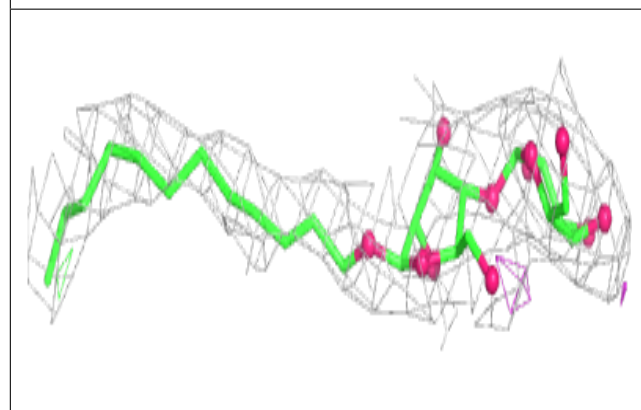
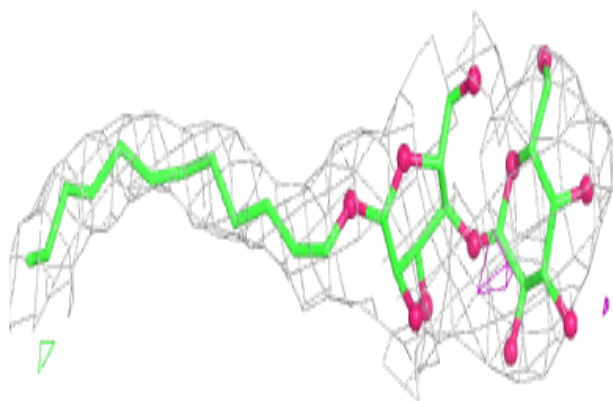
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	LMT	B	2000	35/35	0.83	0.34	11,43,62,64	0
2	LMT	D	2000	35/35	0.86	0.37	20,39,53,62	0
2	LMT	E	2000	35/35	0.86	0.38	14,53,70,88	0
2	LMT	C	2000	35/35	0.88	0.38	12,33,43,47	0
2	LMT	F	2000	35/35	0.88	0.30	14,40,70,74	0
2	LMT	A	2000	35/35	0.89	0.30	31,50,62,70	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.

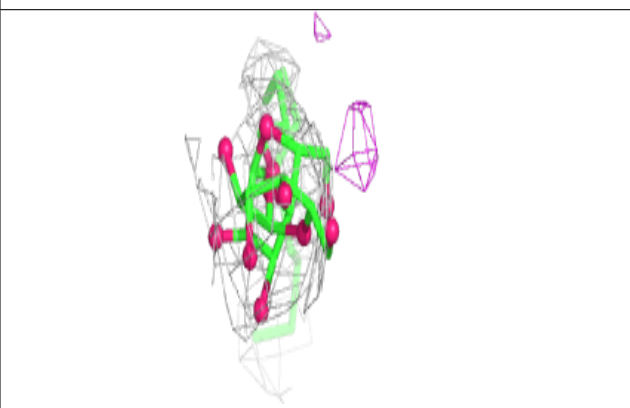
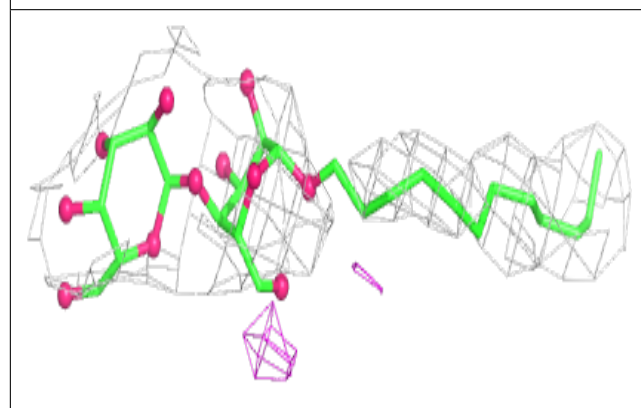
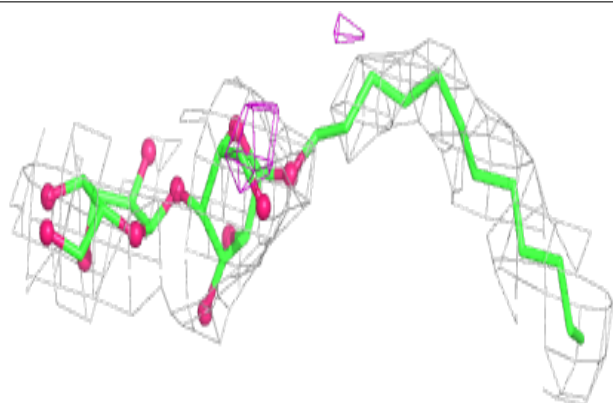


Electron density around LMT D 2000:

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

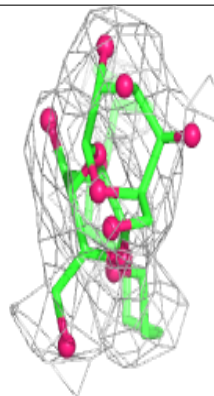
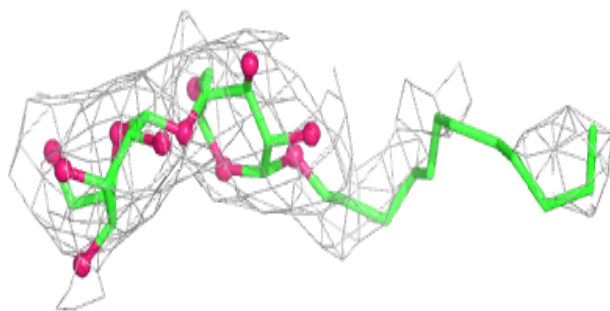
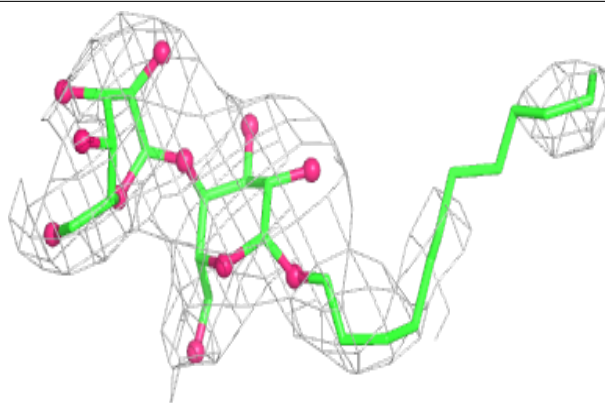
**Electron density around LMT E 2000:**

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

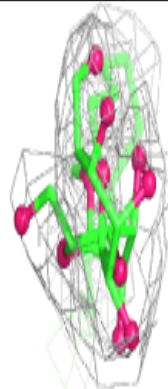
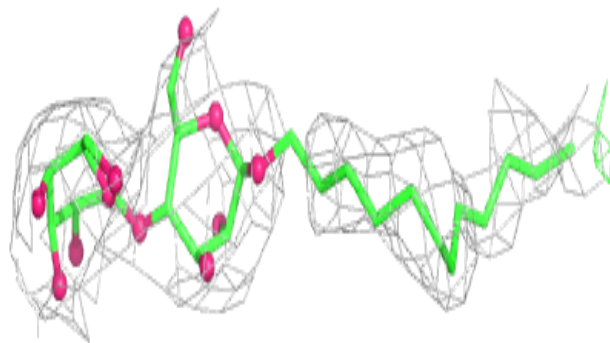
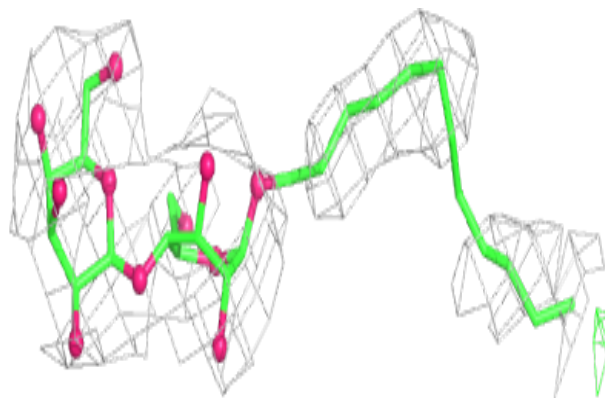


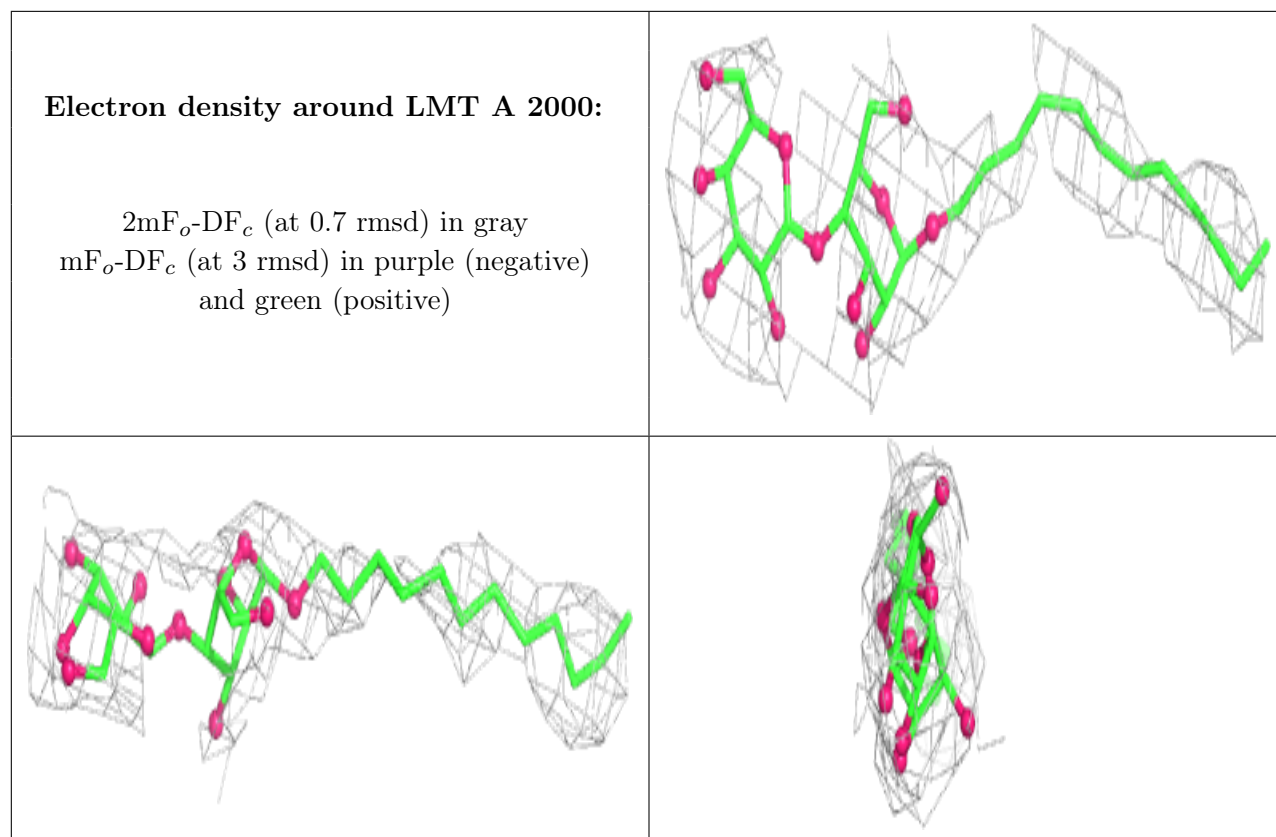
Electron density around LMT C 2000:

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

**Electron density around LMT 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)





6.5 Other polymers [i](#)

There are no such residues in this entry.