



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 16, 2024 – 09:08 PM EDT

PDB ID : 5O68  
Title : Crystal Structure of the Pseudomonas functional amyloid secretion protein FapF - R157A mutant  
Authors : Rouse, S.L.; Hare, S.; Lambert, S.; Morgan, R.M.L.; Hawthorne, W.J.; Berry, J.; Matthews, S.J.  
Deposited on : 2017-06-05  
Resolution : 3.08 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtrriage (Phenix) : 1.13  
EDS : 2.37.1  
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) : 2.37.1

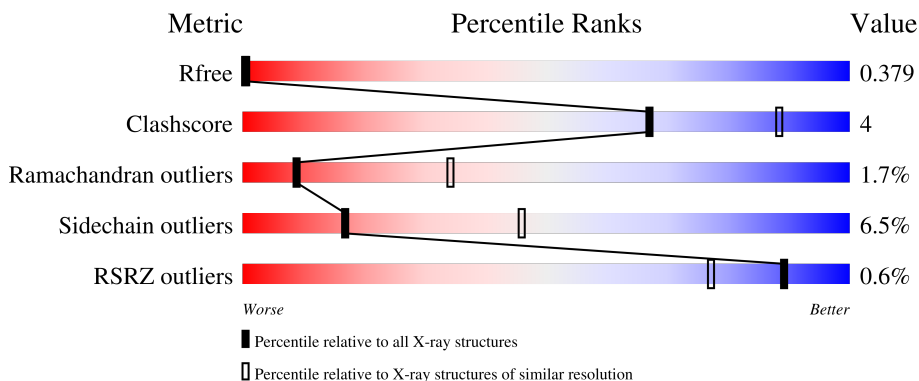
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.08 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	1447 (3.10-3.06)
Clashscore	141614	1546 (3.10-3.06)
Ramachandran outliers	138981	1487 (3.10-3.06)
Sidechain outliers	138945	1486 (3.10-3.06)
RSRZ outliers	127900	1416 (3.10-3.06)

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  $\geq 3$ , 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	334	68% 13% 19%
1	B	334	69% 12% 18%
1	C	334	2% 70% 8% 22%
1	D	334	65% 15% 19%

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Mol	Chain	Length	Quality of chain
1	E	334	<p>%</p> <p>69% 12% 18%</p>
1	F	334	<p>2%</p> <p>65% 10% 24%</p>
1	G	334	<p>69% 11% 19%</p>
1	H	334	<p>71% 10% 19%</p>
1	I	334	<p>66% 10% 23%</p>
1	J	334	<p>69% 10% 20%</p>
1	K	334	<p>67% 13% 19%</p>
1	L	334	<p>66% 11% 23%</p>

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 23772 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 FapF.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	272	2001	1276	322	397	6	0	0	0
1	B	274	2037	1299	329	403	6	0	0	0
1	C	262	1922	1229	315	372	6	0	0	0
1	D	271	2013	1291	325	392	5	0	0	0
1	E	273	2028	1294	329	400	5	0	0	0
1	F	254	1860	1192	304	358	6	0	0	0
1	G	271	2014	1294	323	391	6	0	0	0
1	H	272	1982	1261	321	394	6	0	0	0
1	I	256	1895	1212	310	368	5	0	0	0
1	J	268	1993	1283	319	385	6	0	0	0
1	K	272	2016	1287	328	396	5	0	0	0
1	L	258	1904	1218	312	368	6	0	0	0

There are 144 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	73	THR	-	expression tag	UNP C4IN73
A	74	SER	-	expression tag	UNP C4IN73
A	75	HIS	-	expression tag	UNP C4IN73
A	76	HIS	-	expression tag	UNP C4IN73
A	77	HIS	-	expression tag	UNP C4IN73

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Chain	Residue	Modelled	Actual	Comment	Reference
A	78	HIS	-	expression tag	UNP C4IN73
A	79	HIS	-	expression tag	UNP C4IN73
A	80	HIS	-	expression tag	UNP C4IN73
A	81	GLY	-	expression tag	UNP C4IN73
A	82	THR	-	expression tag	UNP C4IN73
A	157	ALA	ARG	engineered mutation	UNP C4IN73
A	273	MET	LEU	conflict	UNP C4IN73
B	73	THR	-	expression tag	UNP C4IN73
B	74	SER	-	expression tag	UNP C4IN73
B	75	HIS	-	expression tag	UNP C4IN73
B	76	HIS	-	expression tag	UNP C4IN73
B	77	HIS	-	expression tag	UNP C4IN73
B	78	HIS	-	expression tag	UNP C4IN73
B	79	HIS	-	expression tag	UNP C4IN73
B	80	HIS	-	expression tag	UNP C4IN73
B	81	GLY	-	expression tag	UNP C4IN73
B	82	THR	-	expression tag	UNP C4IN73
B	157	ALA	ARG	engineered mutation	UNP C4IN73
B	273	MET	LEU	conflict	UNP C4IN73
C	73	THR	-	expression tag	UNP C4IN73
C	74	SER	-	expression tag	UNP C4IN73
C	75	HIS	-	expression tag	UNP C4IN73
C	76	HIS	-	expression tag	UNP C4IN73
C	77	HIS	-	expression tag	UNP C4IN73
C	78	HIS	-	expression tag	UNP C4IN73
C	79	HIS	-	expression tag	UNP C4IN73
C	80	HIS	-	expression tag	UNP C4IN73
C	81	GLY	-	expression tag	UNP C4IN73
C	82	THR	-	expression tag	UNP C4IN73
C	157	ALA	ARG	engineered mutation	UNP C4IN73
C	273	MET	LEU	conflict	UNP C4IN73
D	73	THR	-	expression tag	UNP C4IN73
D	74	SER	-	expression tag	UNP C4IN73
D	75	HIS	-	expression tag	UNP C4IN73
D	76	HIS	-	expression tag	UNP C4IN73
D	77	HIS	-	expression tag	UNP C4IN73
D	78	HIS	-	expression tag	UNP C4IN73
D	79	HIS	-	expression tag	UNP C4IN73
D	80	HIS	-	expression tag	UNP C4IN73
D	81	GLY	-	expression tag	UNP C4IN73
D	82	THR	-	expression tag	UNP C4IN73
D	157	ALA	ARG	engineered mutation	UNP C4IN73

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Chain	Residue	Modelled	Actual	Comment	Reference
D	273	MET	LEU	conflict	UNP C4IN73
E	73	THR	-	expression tag	UNP C4IN73
E	74	SER	-	expression tag	UNP C4IN73
E	75	HIS	-	expression tag	UNP C4IN73
E	76	HIS	-	expression tag	UNP C4IN73
E	77	HIS	-	expression tag	UNP C4IN73
E	78	HIS	-	expression tag	UNP C4IN73
E	79	HIS	-	expression tag	UNP C4IN73
E	80	HIS	-	expression tag	UNP C4IN73
E	81	GLY	-	expression tag	UNP C4IN73
E	82	THR	-	expression tag	UNP C4IN73
E	157	ALA	ARG	engineered mutation	UNP C4IN73
E	273	MET	LEU	conflict	UNP C4IN73
F	73	THR	-	expression tag	UNP C4IN73
F	74	SER	-	expression tag	UNP C4IN73
F	75	HIS	-	expression tag	UNP C4IN73
F	76	HIS	-	expression tag	UNP C4IN73
F	77	HIS	-	expression tag	UNP C4IN73
F	78	HIS	-	expression tag	UNP C4IN73
F	79	HIS	-	expression tag	UNP C4IN73
F	80	HIS	-	expression tag	UNP C4IN73
F	81	GLY	-	expression tag	UNP C4IN73
F	82	THR	-	expression tag	UNP C4IN73
F	157	ALA	ARG	engineered mutation	UNP C4IN73
F	273	MET	LEU	conflict	UNP C4IN73
G	73	THR	-	expression tag	UNP C4IN73
G	74	SER	-	expression tag	UNP C4IN73
G	75	HIS	-	expression tag	UNP C4IN73
G	76	HIS	-	expression tag	UNP C4IN73
G	77	HIS	-	expression tag	UNP C4IN73
G	78	HIS	-	expression tag	UNP C4IN73
G	79	HIS	-	expression tag	UNP C4IN73
G	80	HIS	-	expression tag	UNP C4IN73
G	81	GLY	-	expression tag	UNP C4IN73
G	82	THR	-	expression tag	UNP C4IN73
G	157	ALA	ARG	engineered mutation	UNP C4IN73
G	273	MET	LEU	conflict	UNP C4IN73
H	73	THR	-	expression tag	UNP C4IN73
H	74	SER	-	expression tag	UNP C4IN73
H	75	HIS	-	expression tag	UNP C4IN73
H	76	HIS	-	expression tag	UNP C4IN73
H	77	HIS	-	expression tag	UNP C4IN73

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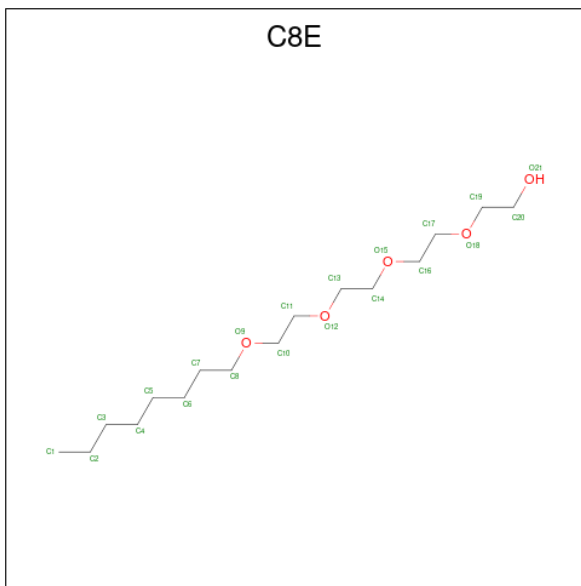
Chain	Residue	Modelled	Actual	Comment	Reference
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H	79	HIS	-	expression tag	UNP C4IN73
H	80	HIS	-	expression tag	UNP C4IN73
H	81	GLY	-	expression tag	UNP C4IN73
H	82	THR	-	expression tag	UNP C4IN73
H	157	ALA	ARG	engineered mutation	UNP C4IN73
H	273	MET	LEU	conflict	UNP C4IN73
I	73	THR	-	expression tag	UNP C4IN73
I	74	SER	-	expression tag	UNP C4IN73
I	75	HIS	-	expression tag	UNP C4IN73
I	76	HIS	-	expression tag	UNP C4IN73
I	77	HIS	-	expression tag	UNP C4IN73
I	78	HIS	-	expression tag	UNP C4IN73
I	79	HIS	-	expression tag	UNP C4IN73
I	80	HIS	-	expression tag	UNP C4IN73
I	81	GLY	-	expression tag	UNP C4IN73
I	82	THR	-	expression tag	UNP C4IN73
I	157	ALA	ARG	engineered mutation	UNP C4IN73
I	273	MET	LEU	conflict	UNP C4IN73
J	73	THR	-	expression tag	UNP C4IN73
J	74	SER	-	expression tag	UNP C4IN73
J	75	HIS	-	expression tag	UNP C4IN73
J	76	HIS	-	expression tag	UNP C4IN73
J	77	HIS	-	expression tag	UNP C4IN73
J	78	HIS	-	expression tag	UNP C4IN73
J	79	HIS	-	expression tag	UNP C4IN73
J	80	HIS	-	expression tag	UNP C4IN73
J	81	GLY	-	expression tag	UNP C4IN73
J	82	THR	-	expression tag	UNP C4IN73
J	157	ALA	ARG	engineered mutation	UNP C4IN73
J	273	MET	LEU	conflict	UNP C4IN73
K	73	THR	-	expression tag	UNP C4IN73
K	74	SER	-	expression tag	UNP C4IN73
K	75	HIS	-	expression tag	UNP C4IN73
K	76	HIS	-	expression tag	UNP C4IN73
K	77	HIS	-	expression tag	UNP C4IN73
K	78	HIS	-	expression tag	UNP C4IN73
K	79	HIS	-	expression tag	UNP C4IN73
K	80	HIS	-	expression tag	UNP C4IN73
K	81	GLY	-	expression tag	UNP C4IN73
K	82	THR	-	expression tag	UNP C4IN73
K	157	ALA	ARG	engineered mutation	UNP C4IN73

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Chain	Residue	Modelled	Actual	Comment	Reference
K	273	MET	LEU	conflict	UNP C4IN73
L	73	THR	-	expression tag	UNP C4IN73
L	74	SER	-	expression tag	UNP C4IN73
L	75	HIS	-	expression tag	UNP C4IN73
L	76	HIS	-	expression tag	UNP C4IN73
L	77	HIS	-	expression tag	UNP C4IN73
L	78	HIS	-	expression tag	UNP C4IN73
L	79	HIS	-	expression tag	UNP C4IN73
L	80	HIS	-	expression tag	UNP C4IN73
L	81	GLY	-	expression tag	UNP C4IN73
L	82	THR	-	expression tag	UNP C4IN73
L	157	ALA	ARG	engineered mutation	UNP C4IN73
L	273	MET	LEU	conflict	UNP C4IN73

- Molecule 2 is (HYDROXYETHYLOXY)TRI(ETHYLOXY)OCTANE (three-letter code: C8E) (formula: C<sub>16</sub>H<sub>34</sub>O<sub>5</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 21 16 5	0	0
2	A	1	Total C 8 8	0	0
2	A	1	Total C O 12 8 4	0	0
2	C	1	Total C O 9 6 3	0	0

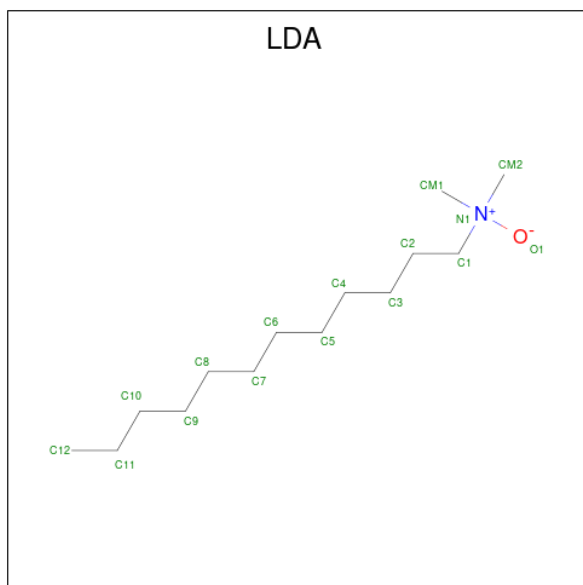
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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	C	1	11	10	1	0	0

- Molecule 3 is LAURYL DIMETHYLAMINE-N-OXIDE (three-letter code: LDA) (formula:  $C_{14}H_{31}NO$ ).



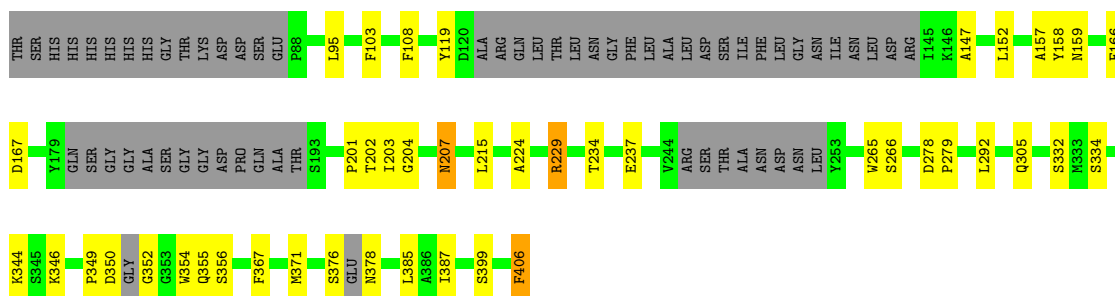
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	A	1	12	10	1	1	0	0
3	B	1	9	7	1	1	0	0
3	C	1	9	7	1	1	0	0
3	I	1	16	14	1	1	0	0

### 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.

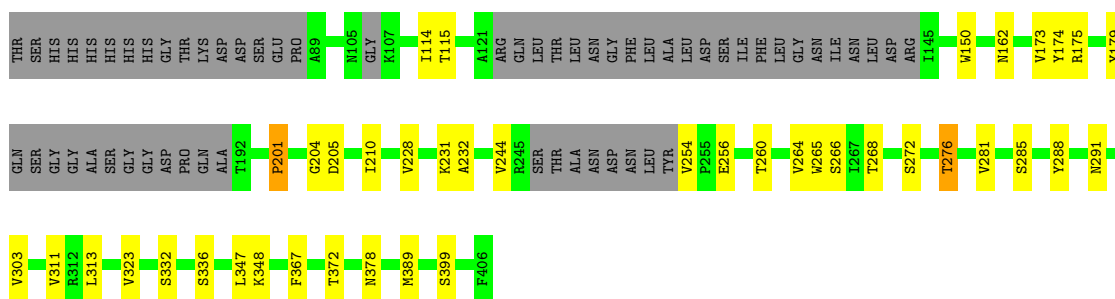
- Molecule 1: FapF

Chain A: 



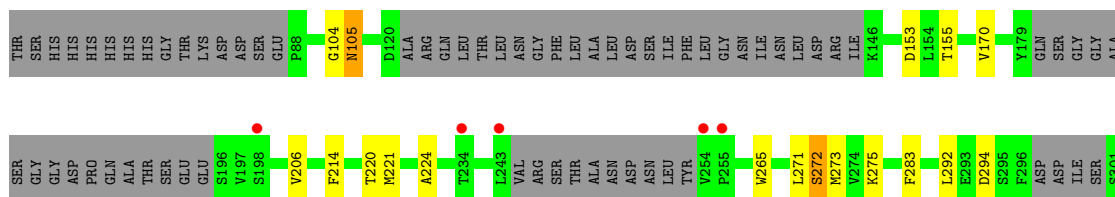
- Molecule 1: FapF

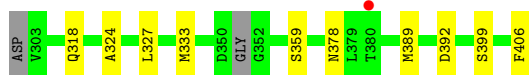
Chain B: 



- Molecule 1: FapF

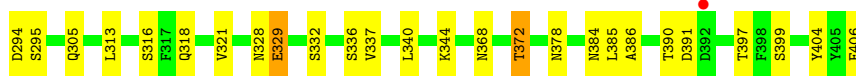
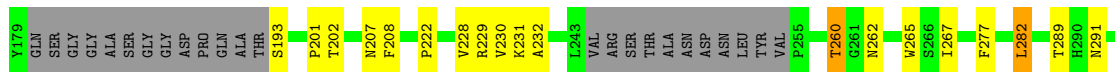
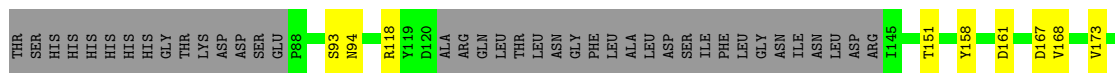
Chain C: 





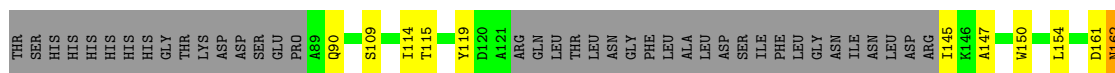
- Molecule 1: FapF

Chain D: 65% 15% 19%



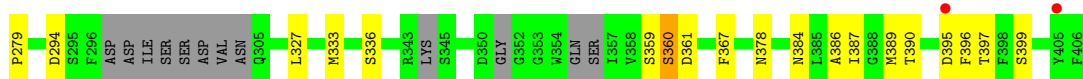
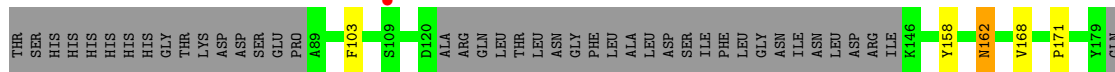
- Molecule 1: FapF

Chain E: 69% 12% 18%



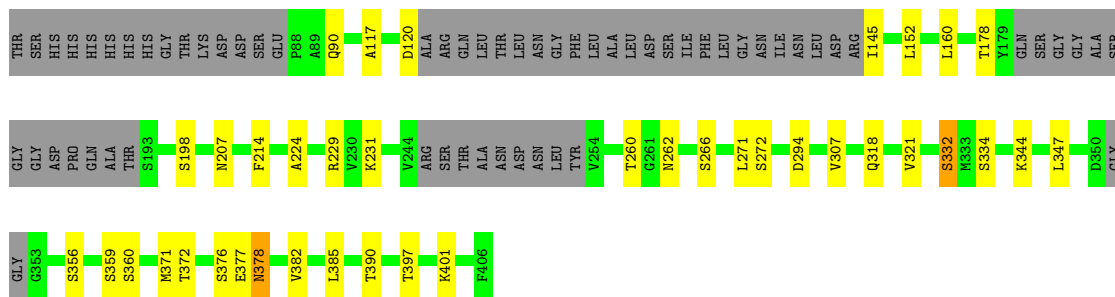
- Molecule 1: FapF

Chain F: 65% 10% 24%



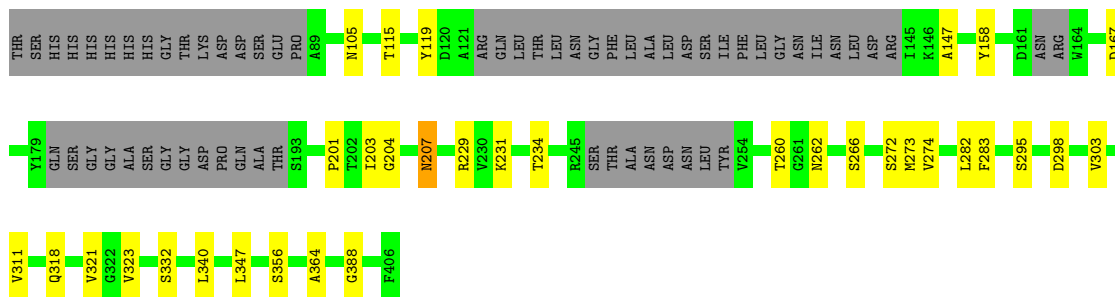
- Molecule 1: FapF

Chain G: 69% 11% 19%



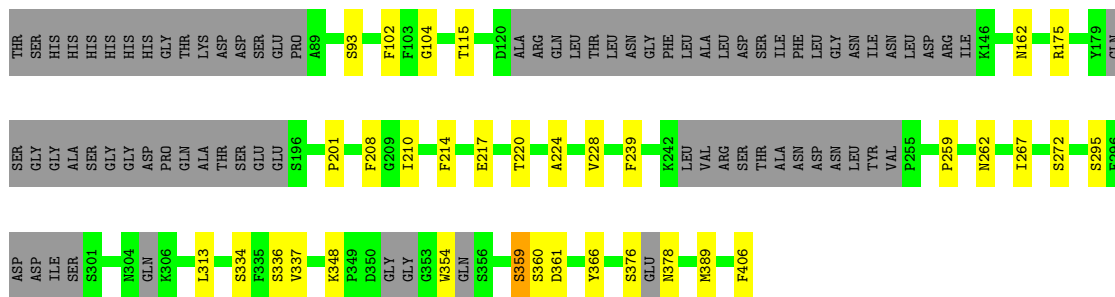
- Molecule 1: FapF

Chain H: 71% 10% 19%



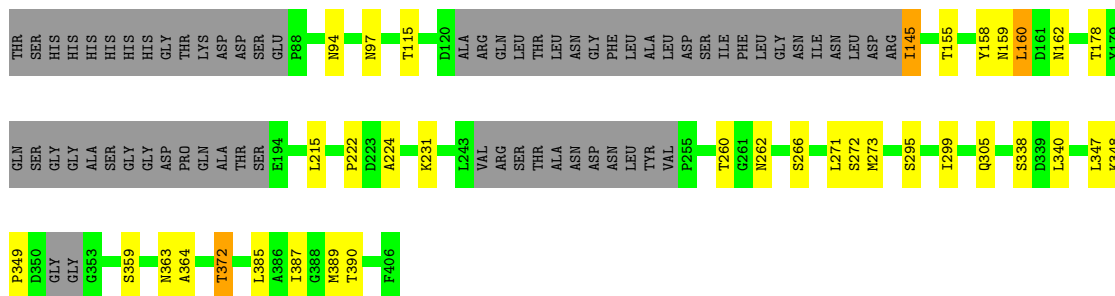
- Molecule 1: FapF

Chain I: 66% 10% 23%



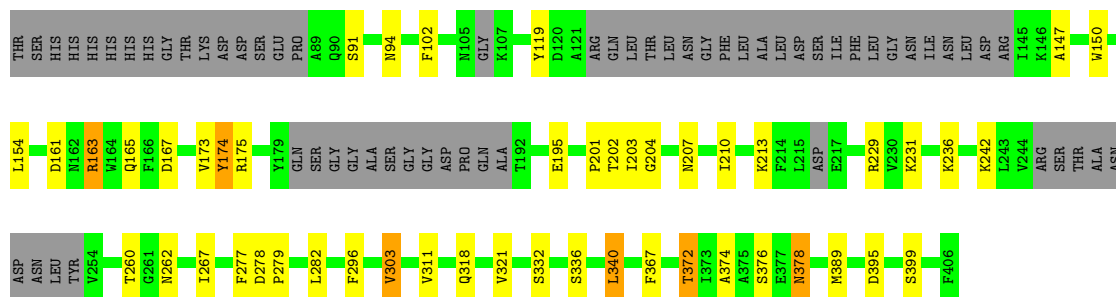
- Molecule 1: FapF

Chain J: 69% 10% 20%



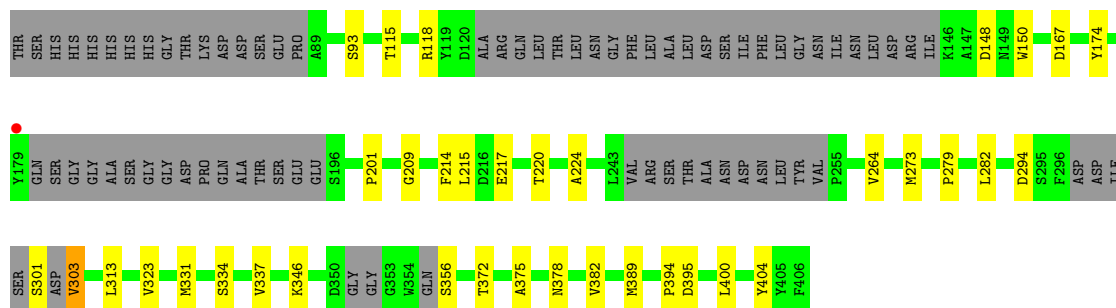
- Molecule 1: FapF

Chain K:  67% 13% 19%



● Molecule 1: FapF

Chain L:  66% 11% 23%



## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	80.59Å 125.71Å 142.67Å 87.09° 84.70° 89.92°	Depositor
Resolution (Å)	91.73 – 3.08 91.73 – 3.08	Depositor EDS
% Data completeness (in resolution range)	96.4 (91.73-3.08) 96.5 (91.73-3.08)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.04 (at 3.07Å)	Xtrriage
Refinement program	REFMAC 5.8.0103	Depositor
R, $R_{free}$	0.319 , 0.369 0.334 , 0.379	Depositor DCC
$R_{free}$ test set	4983 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	41.5	Xtrriage
Anisotropy	0.174	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 44.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	0.038 for -h,k,-l	Xtrriage
$F_o, F_c$ correlation	0.88	EDS
Total number of atoms	23772	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	46.0	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 80.72 % 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 4.1929e-07. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: C8E, LDA

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	0.58	0/2047	0.76	3/2789 (0.1%)
1	B	0.57	0/2083	0.75	0/2834
1	C	0.58	0/1966	0.71	0/2674
1	D	0.58	0/2063	0.74	0/2807
1	E	0.56	0/2076	0.74	0/2826
1	F	0.60	0/1902	0.73	0/2586
1	G	0.57	0/2063	0.75	2/2808 (0.1%)
1	H	0.60	0/2025	0.75	3/2758 (0.1%)
1	I	0.60	0/1937	0.72	0/2631
1	J	0.56	0/2042	0.71	0/2780
1	K	0.62	0/2061	0.79	1/2802 (0.0%)
1	L	0.60	0/1947	0.74	1/2646 (0.0%)
All	All	0.59	0/24212	0.74	10/32941 (0.0%)

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	G	0	1

There are no bond length outliers.

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	371	MET	C-N-CA	6.46	137.86	121.70
1	G	371	MET	C-N-CA	6.05	136.82	121.70
1	G	371	MET	CA-C-N	5.46	129.22	117.20
1	A	371	MET	CA-C-N	5.31	128.89	117.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	K	340	LEU	CA-CB-CG	5.25	127.37	115.30
1	L	118	ARG	NE-CZ-NH1	5.23	122.91	120.30
1	H	298	ASP	CB-CG-OD1	5.09	122.89	118.30
1	A	229	ARG	NE-CZ-NH1	5.05	122.83	120.30
1	H	282	LEU	CA-CB-CG	5.03	126.88	115.30
1	H	323	VAL	CB-CA-C	-5.00	101.89	111.40

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	G	376	SER	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	2001	0	1812	20	0
1	B	2037	0	1879	18	0
1	C	1922	0	1761	10	0
1	D	2013	0	1859	22	0
1	E	2028	0	1865	15	0
1	F	1860	0	1699	12	0
1	G	2014	0	1856	13	0
1	H	1982	0	1816	11	0
1	I	1895	0	1736	14	0
1	J	1993	0	1842	15	0
1	K	2016	0	1858	20	0
1	L	1904	0	1744	17	0
2	A	41	0	61	0	0
2	C	20	0	30	0	0
3	A	12	0	16	0	0
3	B	9	0	14	0	0
3	C	9	0	14	0	0
3	I	16	0	31	4	0
All	All	23772	0	21893	177	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 4.

All (177) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:170:VAL:HG13	1:C:206:VAL:HG22	1.67	0.75
1:H:203:ILE:O	1:H:260:THR:HG21	1.90	0.71
1:L:150:TRP:HB2	1:L:174:TYR:HB3	1.78	0.66
1:K:163:ARG:NH1	1:K:213:LYS:O	2.31	0.63
1:L:301:SER:O	1:L:303:VAL:N	2.31	0.63
1:C:327:LEU:HD11	1:C:333:MET:HB2	1.80	0.62
1:G:207:ASN:OD1	1:G:229:ARG:NH1	2.31	0.62
1:E:162:ASN:OD1	1:E:213:LYS:NZ	2.33	0.62
1:K:119:TYR:HB2	1:K:147:ALA:HB3	1.82	0.61
1:G:231:LYS:NZ	1:G:262:ASN:OD1	2.33	0.61
1:K:204:GLY:HA2	1:K:260:THR:HG22	1.82	0.60
1:B:205:ASP:HB3	1:B:231:LYS:HE2	1.85	0.58
1:H:340:LEU:HB3	1:H:364:ALA:HB3	1.87	0.57
1:A:119:TYR:HB2	1:A:147:ALA:HB3	1.87	0.57
1:K:367:PHE:HB2	1:K:389:MET:HE3	1.88	0.56
1:B:204:GLY:HA2	1:B:260:THR:HG22	1.88	0.56
1:J:299:ILE:HD12	1:J:347:LEU:HD11	1.87	0.55
1:L:331:MET:HA	1:L:372:THR:O	2.07	0.55
1:A:385:LEU:HD11	1:C:389:MET:HE1	1.88	0.55
1:D:167:ASP:OD1	1:D:229:ARG:NH2	2.32	0.55
1:E:242:LYS:HB3	1:E:303:VAL:HG22	1.90	0.54
1:F:367:PHE:HD2	1:F:387:ILE:HD12	1.73	0.54
1:D:94:ASN:CB	1:D:372:THR:HG21	2.37	0.54
1:G:214:PHE:CZ	1:G:224:ALA:HB1	2.43	0.54
1:H:119:TYR:HB2	1:H:147:ALA:HB3	1.90	0.53
1:D:207:ASN:OD1	1:D:229:ARG:NH1	2.41	0.53
1:J:340:LEU:HB3	1:J:364:ALA:HB3	1.89	0.53
1:B:311:VAL:HG12	1:B:347:LEU:HD23	1.90	0.53
1:H:274:VAL:HG13	1:H:283:PHE:HB3	1.90	0.53
1:E:367:PHE:HB2	1:E:389:MET:CE	2.39	0.52
1:F:218:SER:OG	1:F:221:MET:N	2.36	0.52
1:L:167:ASP:O	1:L:209:GLY:N	2.43	0.52
1:J:231:LYS:NZ	1:J:262:ASN:OD1	2.42	0.52
1:D:168:VAL:HG12	1:D:208:PHE:HB3	1.91	0.52
1:K:277:PHE:CD1	1:K:282:LEU:HD12	2.44	0.52
1:A:108:PHE:HB2	1:A:406:PHE:CD2	2.44	0.52
1:F:207:ASN:OD1	1:F:229:ARG:NH1	2.43	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:167:ASP:OD1	1:H:229:ARG:NH2	2.34	0.52
1:D:385:LEU:HD11	1:F:389:MET:CE	2.39	0.51
1:E:145:ILE:HA	1:E:178:THR:O	2.10	0.51
1:J:271:LEU:HD23	1:J:273:MET:CE	2.40	0.51
1:K:202:THR:HG21	1:K:236:LYS:HG3	1.90	0.51
1:K:367:PHE:HB2	1:K:389:MET:CE	2.40	0.51
1:K:94:ASN:HB2	1:K:372:THR:HG21	1.93	0.51
1:D:231:LYS:NZ	1:D:262:ASN:OD1	2.44	0.51
1:A:265:TRP:HB3	1:A:292:LEU:HD12	1.93	0.50
1:F:231:LYS:NZ	1:F:262:ASN:OD1	2.45	0.50
1:I:348:LYS:HB2	1:I:354:TRP:CD2	2.46	0.50
1:L:214:PHE:CZ	1:L:224:ALA:HB1	2.46	0.50
1:A:157:ALA:HB2	1:A:167:ASP:HB3	1.94	0.50
1:E:204:GLY:HA2	1:E:260:THR:HG22	1.93	0.50
1:H:311:VAL:HG12	1:H:347:LEU:CD2	2.41	0.50
1:I:359:SER:O	1:I:361:ASP:N	2.44	0.49
1:B:173:VAL:HG12	1:B:175:ARG:HG3	1.94	0.49
1:E:311:VAL:HG12	1:E:347:LEU:CD2	2.42	0.49
1:B:268:THR:HG23	1:B:288:TYR:O	2.13	0.49
1:C:104:GLY:O	1:C:105:ASN:CB	2.60	0.49
1:D:94:ASN:HB2	1:D:372:THR:HG21	1.95	0.49
1:L:264:VAL:CG2	1:L:313:LEU:HD12	2.42	0.49
1:A:346:LYS:HA	1:A:356:SER:HA	1.95	0.49
1:G:145:ILE:HA	1:G:178:THR:O	2.13	0.49
1:B:179:TYR:HB2	1:B:254:VAL:HG22	1.95	0.49
1:F:386:ALA:HB3	1:F:397:THR:HB	1.94	0.48
1:G:385:LEU:HD21	1:I:389:MET:HE1	1.95	0.48
1:G:377:GLU:O	1:G:378:ASN:CB	2.61	0.48
1:E:311:VAL:HG12	1:E:347:LEU:HD23	1.96	0.48
1:A:167:ASP:OD1	1:A:229:ARG:NH2	2.40	0.48
1:G:332:SER:HB3	1:G:372:THR:HG21	1.94	0.48
1:E:114:ILE:HD11	1:E:150:TRP:CE3	2.49	0.48
1:I:208:PHE:CE2	3:I:501:LDA:H121	2.48	0.48
1:H:207:ASN:N	1:H:207:ASN:OD1	2.47	0.48
1:J:271:LEU:HD23	1:J:273:MET:HE1	1.96	0.47
1:A:215:LEU:HB2	1:A:224:ALA:HB3	1.96	0.47
1:D:385:LEU:HD11	1:F:389:MET:HE1	1.96	0.47
1:G:385:LEU:HD22	1:I:337:VAL:HB	1.96	0.47
1:K:376:SER:O	1:K:378:ASN:N	2.47	0.47
1:E:318:GLN:HG3	1:E:340:LEU:HG	1.96	0.47
1:G:117:ALA:HB2	1:G:397:THR:HG23	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:231:LYS:NZ	1:H:262:ASN:OD1	2.48	0.47
1:D:386:ALA:HB3	1:D:397:THR:HB	1.95	0.47
1:A:376:SER:O	1:A:378:ASN:N	2.47	0.47
1:D:318:GLN:CG	1:D:340:LEU:HD12	2.45	0.46
1:E:389:MET:HG2	1:F:396:PHE:HB3	1.96	0.46
1:L:346:LYS:HA	1:L:356:SER:HA	1.97	0.46
1:A:207:ASN:OD1	1:A:229:ARG:NH1	2.48	0.46
1:B:311:VAL:HG12	1:B:347:LEU:CD2	2.46	0.46
1:K:277:PHE:CE1	1:K:282:LEU:HD12	2.51	0.46
1:J:94:ASN:HB2	1:J:372:THR:HG21	1.98	0.46
1:A:350:ASP:O	1:A:352:GLY:N	2.48	0.46
1:C:214:PHE:CZ	1:C:224:ALA:HB1	2.51	0.46
1:K:242:LYS:HB3	1:K:303:VAL:HG13	1.97	0.46
1:K:318:GLN:HG3	1:K:340:LEU:HG	1.98	0.45
1:D:230:VAL:HG22	1:D:267:ILE:CD1	2.47	0.45
1:J:159:ASN:HD21	1:J:162:ASN:HA	1.80	0.45
1:B:264:VAL:HG21	1:B:313:LEU:HD12	1.98	0.45
1:B:150:TRP:HB2	1:B:174:TYR:HB3	1.98	0.45
1:D:228:VAL:CG1	1:D:267:ILE:HD11	2.46	0.45
1:G:382:VAL:HB	1:G:401:LYS:HB2	1.98	0.45
1:D:336:SER:OG	1:D:368:ASN:HB2	2.17	0.45
1:D:230:VAL:HG22	1:D:267:ILE:HD13	1.99	0.45
1:B:276:THR:HG23	1:B:281:VAL:HG22	1.97	0.44
1:H:204:GLY:O	1:H:234:THR:OG1	2.35	0.44
1:D:277:PHE:CD2	1:D:282:LEU:HD22	2.52	0.44
1:D:173:VAL:HB	1:D:260:THR:CG2	2.48	0.44
1:B:205:ASP:HB3	1:B:231:LYS:CE	2.47	0.44
1:A:166:PHE:HE2	3:I:501:LDA:H122	1.82	0.44
1:J:299:ILE:CD1	1:J:347:LEU:HD11	2.47	0.44
1:E:114:ILE:HD11	1:E:150:TRP:HE3	1.82	0.44
1:J:385:LEU:HD11	1:L:389:MET:HE1	1.99	0.44
1:K:167:ASP:OD1	1:K:229:ARG:NH2	2.51	0.43
1:F:278:ASP:HA	1:F:279:PRO:HA	1.86	0.43
1:I:228:VAL:CG1	1:I:267:ILE:HD11	2.48	0.43
1:G:344:LYS:HD3	1:G:356:SER:OG	2.18	0.43
1:I:208:PHE:CD2	3:I:501:LDA:H121	2.54	0.43
1:B:264:VAL:CG2	1:B:313:LEU:HD12	2.49	0.43
1:L:214:PHE:CE1	1:L:224:ALA:HB1	2.54	0.43
1:B:210:ILE:HD12	1:B:228:VAL:CG2	2.48	0.43
1:L:382:VAL:HG12	1:L:382:VAL:O	2.19	0.43
1:A:367:PHE:CD2	1:A:387:ILE:HD13	2.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:221:MET:O	1:C:275:LYS:HE2	2.18	0.43
1:E:205:ASP:OD2	1:E:231:LYS:HE3	2.18	0.43
1:I:175:ARG:NH1	1:I:259:PRO:O	2.50	0.43
1:K:231:LYS:NZ	1:K:262:ASN:OD1	2.51	0.42
1:D:318:GLN:HG2	1:D:340:LEU:HD12	2.00	0.42
1:B:204:GLY:HA2	1:B:260:THR:CG2	2.48	0.42
1:E:218:SER:O	1:E:275:LYS:NZ	2.52	0.42
1:K:150:TRP:HB2	1:K:174:TYR:HB3	2.02	0.42
1:A:95:LEU:C	1:A:95:LEU:HD23	2.40	0.42
1:B:232:ALA:HB2	1:B:265:TRP:CZ3	2.55	0.42
1:B:266:SER:HB3	1:B:291:ASN:OD1	2.20	0.42
1:B:367:PHE:HB2	1:B:389:MET:HE2	2.01	0.42
1:E:119:TYR:HB2	1:E:147:ALA:HB3	2.01	0.42
1:I:262:ASN:HB2	1:I:313:LEU:HD11	2.01	0.42
1:A:367:PHE:HD2	1:A:387:ILE:HD13	1.84	0.42
1:D:390:THR:HG22	1:D:391:ASP:N	2.34	0.42
1:H:318:GLN:HG3	1:H:340:LEU:HG	2.01	0.42
1:C:271:LEU:HD12	1:C:272:SER:N	2.35	0.42
1:A:278:ASP:HA	1:A:279:PRO:HA	1.95	0.42
1:K:278:ASP:HA	1:K:279:PRO:HA	1.92	0.42
1:D:328:ASN:O	1:D:329:GLU:C	2.58	0.41
1:E:262:ASN:OD1	1:E:262:ASN:N	2.53	0.41
1:J:387:ILE:HG23	1:L:389:MET:CE	2.50	0.41
1:D:291:ASN:HD22	1:D:313:LEU:HB2	1.85	0.41
1:L:282:LEU:HD23	1:L:323:VAL:HG23	2.01	0.41
1:L:394:PRO:O	1:L:395:ASP:C	2.59	0.41
1:J:145:ILE:HA	1:J:178:THR:O	2.19	0.41
1:A:265:TRP:CB	1:A:292:LEU:HD12	2.51	0.41
1:B:114:ILE:HD11	1:B:150:TRP:CE3	2.55	0.41
1:C:283:PHE:HE2	1:C:324:ALA:HB2	1.85	0.41
1:L:214:PHE:O	1:L:215:LEU:HD23	2.20	0.41
1:G:90:GLN:HE22	1:G:377:GLU:HA	1.86	0.41
1:J:385:LEU:HD21	1:L:389:MET:HE1	2.03	0.41
1:D:289:THR:HB	1:D:316:SER:HB3	2.02	0.41
1:F:327:LEU:HD11	1:F:333:MET:HG3	2.02	0.41
1:F:359:SER:O	1:F:361:ASP:N	2.53	0.41
1:H:207:ASN:HD22	1:H:229:ARG:HD3	1.86	0.41
1:I:376:SER:HB2	1:I:378:ASN:N	2.36	0.41
1:J:160:LEU:O	1:J:162:ASN:N	2.53	0.41
1:L:264:VAL:HG22	1:L:313:LEU:HD12	2.03	0.41
1:A:203:ILE:HD11	1:I:406:PHE:CE1	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:166:PHE:CE2	3:I:501:LDA:H122	2.56	0.40
1:D:232:ALA:HB2	1:D:265:TRP:CH2	2.55	0.40
1:J:215:LEU:HB2	1:J:224:ALA:HB3	2.04	0.40
1:L:378:ASN:HB2	1:L:404:TYR:CE1	2.56	0.40
1:A:204:GLY:O	1:A:234:THR:OG1	2.39	0.40
1:I:102:PHE:O	1:I:104:GLY:N	2.54	0.40
1:K:332:SER:OG	1:K:372:THR:HB	2.20	0.40
1:C:265:TRP:HB2	1:C:292:LEU:HD22	2.04	0.40
1:F:241:ILE:HD13	1:F:257:SER:O	2.21	0.40
1:G:347:LEU:HD23	1:G:347:LEU:C	2.42	0.40
1:J:363:ASN:O	1:J:390:THR:HG21	2.21	0.40
1:K:102:PHE:HA	1:K:165:GLN:HE22	1.87	0.40
1:K:173:VAL:HG12	1:K:175:ARG:HG3	2.02	0.40
1:I:337:VAL:HA	1:I:366:TYR:O	2.22	0.40
1:C:271:LEU:HD21	1:C:273:MET:HE1	2.03	0.40
1:I:214:PHE:CE1	1:I:224:ALA:HB1	2.57	0.40
1:K:296:PHE:HE2	1:K:311:VAL:HG22	1.86	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	260/334 (78%)	241 (93%)	14 (5%)	5 (2%)	8	31
1	B	264/334 (79%)	243 (92%)	17 (6%)	4 (2%)	10	37
1	C	249/334 (75%)	231 (93%)	16 (6%)	2 (1%)	19	52
1	D	263/334 (79%)	242 (92%)	15 (6%)	6 (2%)	6	26
1	E	265/334 (79%)	237 (89%)	21 (8%)	7 (3%)	5	24
1	F	238/334 (71%)	216 (91%)	17 (7%)	5 (2%)	7	28
1	G	261/334 (78%)	241 (92%)	15 (6%)	5 (2%)	8	31

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	H	262/334 (78%)	237 (90%)	22 (8%)	3 (1%)	14	44
1	I	238/334 (71%)	213 (90%)	22 (9%)	3 (1%)	12	40
1	J	258/334 (77%)	225 (87%)	27 (10%)	6 (2%)	6	26
1	K	260/334 (78%)	238 (92%)	18 (7%)	4 (2%)	10	37
1	L	243/334 (73%)	229 (94%)	12 (5%)	2 (1%)	19	52
All	All	3061/4008 (76%)	2793 (91%)	216 (7%)	52 (2%)	9	34

All (52) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	378	ASN
1	C	105	ASN
1	D	161	ASP
1	D	329	GLU
1	E	378	ASN
1	F	360	SER
1	F	395	ASP
1	G	378	ASN
1	I	360	SER
1	K	395	ASP
1	L	375	ALA
1	A	354	TRP
1	B	201	PRO
1	C	359	SER
1	E	161	ASP
1	E	199	ARG
1	F	162	ASN
1	G	360	SER
1	H	201	PRO
1	I	201	PRO
1	I	239	PHE
1	K	201	PRO
1	A	103	PHE
1	A	201	PRO
1	D	305	GLN
1	E	90	GLN
1	F	103	PHE
1	G	160	LEU
1	G	359	SER
1	H	105	ASN

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Mol	Chain	Res	Type
1	J	348	LYS
1	K	161	ASP
1	A	305	GLN
1	B	162	ASN
1	D	378	ASN
1	E	395	ASP
1	G	307	VAL
1	J	359	SER
1	K	374	ALA
1	L	201	PRO
1	A	344	LYS
1	E	377	GLU
1	J	305	GLN
1	E	201	PRO
1	J	160	LEU
1	J	349	PRO
1	D	201	PRO
1	F	171	PRO
1	D	222	PRO
1	H	388	GLY
1	B	244	VAL
1	J	222	PRO

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	203/280 (72%)	190 (94%)	13 (6%)	17 46
1	B	210/280 (75%)	197 (94%)	13 (6%)	18 48
1	C	194/280 (69%)	184 (95%)	10 (5%)	23 54
1	D	206/280 (74%)	187 (91%)	19 (9%)	9 31
1	E	208/280 (74%)	196 (94%)	12 (6%)	20 50
1	F	186/280 (66%)	170 (91%)	16 (9%)	10 36
1	G	206/280 (74%)	193 (94%)	13 (6%)	18 47

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	H	201/280 (72%)	190 (94%)	11 (6%)	21	52
1	I	193/280 (69%)	182 (94%)	11 (6%)	20	50
1	J	204/280 (73%)	192 (94%)	12 (6%)	19	49
1	K	206/280 (74%)	191 (93%)	15 (7%)	14	42
1	L	193/280 (69%)	181 (94%)	12 (6%)	18	48
All	All	2410/3360 (72%)	2253 (94%)	157 (6%)	17	46

All (157) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	152	LEU
1	A	158	TYR
1	A	159	ASN
1	A	202	THR
1	A	207	ASN
1	A	237	GLU
1	A	266	SER
1	A	332	SER
1	A	334	SER
1	A	349	PRO
1	A	355	GLN
1	A	399	SER
1	A	406	PHE
1	B	115	THR
1	B	201	PRO
1	B	256	GLU
1	B	272	SER
1	B	276	THR
1	B	285	SER
1	B	303	VAL
1	B	323	VAL
1	B	332	SER
1	B	336	SER
1	B	348	LYS
1	B	372	THR
1	B	399	SER
1	C	153	ASP
1	C	155	THR
1	C	220	THR
1	C	272	SER

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	C	294	ASP
1	C	318	GLN
1	C	378	ASN
1	C	392	ASP
1	C	399	SER
1	C	406	PHE
1	D	93	SER
1	D	118	ARG
1	D	151	THR
1	D	158	TYR
1	D	193	SER
1	D	202	THR
1	D	260	THR
1	D	282	LEU
1	D	294	ASP
1	D	295	SER
1	D	321	VAL
1	D	332	SER
1	D	337	VAL
1	D	344	LYS
1	D	372	THR
1	D	384	ASN
1	D	399	SER
1	D	404	TYR
1	D	406	PHE
1	E	109	SER
1	E	115	THR
1	E	154	LEU
1	E	162	ASN
1	E	203	ILE
1	E	207	ASN
1	E	228	VAL
1	E	285	SER
1	E	357	ILE
1	E	372	THR
1	E	390	THR
1	E	399	SER
1	F	158	TYR
1	F	162	ASN
1	F	168	VAL
1	F	198	SER
1	F	207	ASN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	F	216	ASP
1	F	226	VAL
1	F	271	LEU
1	F	273	MET
1	F	294	ASP
1	F	336	SER
1	F	360	SER
1	F	378	ASN
1	F	384	ASN
1	F	390	THR
1	F	399	SER
1	G	120	ASP
1	G	152	LEU
1	G	198	SER
1	G	260	THR
1	G	266	SER
1	G	271	LEU
1	G	272	SER
1	G	294	ASP
1	G	318	GLN
1	G	321	VAL
1	G	332	SER
1	G	334	SER
1	G	390	THR
1	H	115	THR
1	H	158	TYR
1	H	207	ASN
1	H	266	SER
1	H	272	SER
1	H	273	MET
1	H	295	SER
1	H	303	VAL
1	H	321	VAL
1	H	332	SER
1	H	356	SER
1	I	93	SER
1	I	115	THR
1	I	162	ASN
1	I	210	ILE
1	I	217	GLU
1	I	220	THR
1	I	272	SER

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	I	295	SER
1	I	334	SER
1	I	336	SER
1	I	359	SER
1	J	97	ASN
1	J	115	THR
1	J	145	ILE
1	J	155	THR
1	J	158	TYR
1	J	260	THR
1	J	266	SER
1	J	272	SER
1	J	295	SER
1	J	338	SER
1	J	372	THR
1	J	389	MET
1	K	91	SER
1	K	154	LEU
1	K	163	ARG
1	K	174	TYR
1	K	195	GLU
1	K	203	ILE
1	K	207	ASN
1	K	210	ILE
1	K	267	ILE
1	K	303	VAL
1	K	321	VAL
1	K	336	SER
1	K	372	THR
1	K	378	ASN
1	K	399	SER
1	L	93	SER
1	L	115	THR
1	L	148	ASP
1	L	217	GLU
1	L	220	THR
1	L	273	MET
1	L	279	PRO
1	L	294	ASP
1	L	303	VAL
1	L	334	SER
1	L	337	VAL

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Mol	Chain	Res	Type
1	L	400	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	97	ASN
1	A	169	ASN
1	A	304	ASN
1	D	97	ASN
1	D	159	ASN
1	D	169	ASN
1	D	318	GLN
1	D	384	ASN
1	E	318	GLN
1	F	97	ASN
1	F	159	ASN
1	G	90	GLN
1	G	97	ASN
1	G	318	GLN
1	H	318	GLN
1	I	378	ASN
1	I	384	ASN
1	J	304	ASN
1	K	318	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

9 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	C8E	C	502	-	10,10,20	0.61	0	9,9,19	0.59	0
3	LDA	C	503	-	5,8,15	3.17	1 (20%)	7,10,17	0.53	0
3	LDA	A	504	-	6,9,15	2.93	1 (16%)	8,11,17	0.71	0
2	C8E	A	501	-	20,20,20	0.60	0	19,19,19	0.45	0
3	LDA	B	501	-	5,8,15	3.19	1 (20%)	7,10,17	0.55	0
2	C8E	C	501	-	8,8,20	0.55	0	7,7,19	0.25	0
2	C8E	A	503	-	11,11,20	0.73	0	10,10,19	0.46	0
2	C8E	A	502	-	7,7,20	0.56	0	6,6,19	0.22	0
3	LDA	I	501	-	12,15,15	2.11	1 (8%)	14,17,17	0.95	1 (7%)

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	C8E	C	502	-	-	5/8/8/18	-
3	LDA	C	503	-	-	2/6/6/13	-
3	LDA	A	504	-	-	1/7/7/13	-
2	C8E	A	501	-	-	11/18/18/18	-
3	LDA	B	501	-	-	1/6/6/13	-
2	C8E	C	501	-	-	5/6/6/18	-
2	C8E	A	503	-	-	5/9/9/18	-
2	C8E	A	502	-	-	3/5/5/18	-
3	LDA	I	501	-	-	8/13/13/13	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	I	501	LDA	O1-N1	-7.24	1.25	1.42
3	A	504	LDA	O1-N1	-7.13	1.25	1.42
3	B	501	LDA	O1-N1	-7.07	1.25	1.42
3	C	503	LDA	O1-N1	-7.03	1.25	1.42

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	I	501	LDA	CM2-N1-C1	2.29	115.05	110.23

There are no chirality outliers.

All (41) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	503	LDA	N1-C1-C2-C3
3	I	501	LDA	C2-C1-N1-O1
3	I	501	LDA	C2-C1-N1-CM1
3	I	501	LDA	C2-C1-N1-CM2
2	A	501	C8E	O15-C16-C17-O18
2	A	503	C8E	O12-C13-C14-O15
2	C	501	C8E	O15-C16-C17-O18
2	A	503	C8E	O15-C16-C17-O18
2	C	501	C8E	O18-C19-C20-O21
3	I	501	LDA	C11-C10-C9-C8
2	C	502	C8E	C6-C7-C8-O9
2	C	502	C8E	C4-C5-C6-C7
2	A	501	C8E	O12-C13-C14-O15
2	A	502	C8E	C4-C5-C6-C7
2	A	502	C8E	C3-C4-C5-C6
2	A	501	C8E	C5-C6-C7-C8
2	A	501	C8E	O18-C19-C20-O21
3	I	501	LDA	C5-C6-C7-C8
2	A	502	C8E	C1-C2-C3-C4
2	A	501	C8E	C2-C3-C4-C5
3	C	503	LDA	C2-C3-C4-C5
2	A	501	C8E	C1-C2-C3-C4
3	I	501	LDA	N1-C1-C2-C3
2	A	503	C8E	C11-C10-O9-C8
2	C	502	C8E	C11-C10-O9-C8
2	A	501	C8E	C11-C10-O9-C8
3	B	501	LDA	C2-C3-C4-C5
2	A	503	C8E	C17-C16-O15-C14

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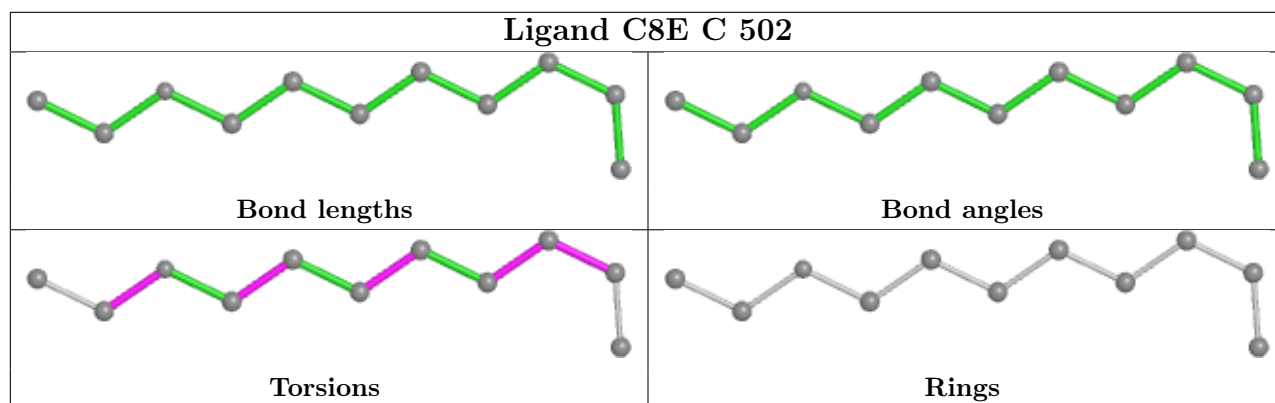
Mol	Chain	Res	Type	Atoms
3	I	501	LDA	C2-C3-C4-C5
2	A	501	C8E	C20-C19-O18-C17
2	C	502	C8E	C1-C2-C3-C4
2	A	501	C8E	C6-C7-C8-O9
2	C	502	C8E	C2-C3-C4-C5
2	C	501	C8E	C20-C19-O18-C17
2	A	501	C8E	C3-C4-C5-C6
2	C	501	C8E	C16-C17-O18-C19
2	A	503	C8E	C10-C11-O12-C13
2	C	501	C8E	C13-C14-O15-C16
3	I	501	LDA	C7-C8-C9-C10
3	A	504	LDA	C1-C2-C3-C4
2	A	501	C8E	C13-C14-O15-C16

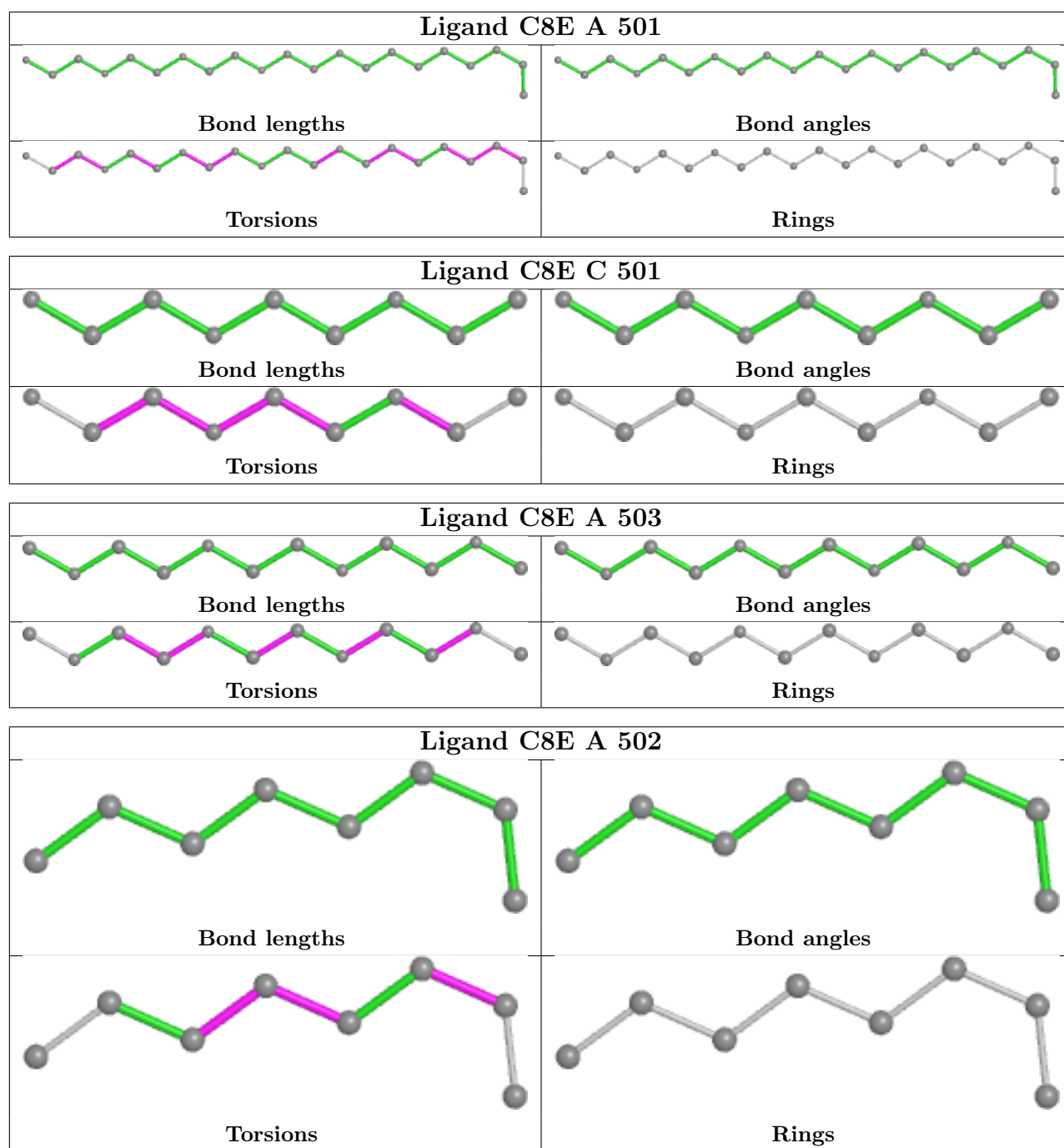
There are no ring outliers.

1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	I	501	LDA	4	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	272/334 (81%)	-0.26	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	25, 47, 69, 78	0
1	B	274/334 (82%)	-0.03	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	23, 43, 62, 76	0
1	C	262/334 (78%)	0.19	6 (2%) <span style="border: 1px solid blue; padding: 2px;">60</span> <span style="border: 1px solid red; padding: 2px;">37</span>	27, 45, 72, 81	0
1	D	271/334 (81%)	-0.24	1 (0%) <span style="border: 1px solid blue; padding: 2px;">92</span> <span style="border: 1px solid blue; padding: 2px;">84</span>	24, 46, 74, 88	0
1	E	273/334 (81%)	-0.02	3 (1%) <span style="border: 1px solid blue; padding: 2px;">80</span> <span style="border: 1px solid blue; padding: 2px;">62</span>	19, 42, 63, 78	0
1	F	254/334 (76%)	0.20	7 (2%) <span style="border: 1px solid blue; padding: 2px;">53</span> <span style="border: 1px solid red; padding: 2px;">28</span>	24, 45, 68, 78	0
1	G	271/334 (81%)	-0.13	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	23, 49, 70, 88	0
1	H	272/334 (81%)	-0.11	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	20, 42, 60, 75	0
1	I	256/334 (76%)	-0.02	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	22, 46, 68, 83	0
1	J	268/334 (80%)	-0.12	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	23, 49, 74, 89	0
1	K	272/334 (81%)	-0.06	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	24, 42, 62, 77	0
1	L	258/334 (77%)	-0.02	1 (0%) <span style="border: 1px solid blue; padding: 2px;">92</span> <span style="border: 1px solid blue; padding: 2px;">84</span>	21, 46, 68, 89	0
All	All	3203/4008 (79%)	-0.05	18 (0%) <span style="border: 1px solid blue; padding: 2px;">89</span> <span style="border: 1px solid blue; padding: 2px;">77</span>	19, 45, 68, 89	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	257	SER	3.1
1	D	392	ASP	3.1
1	C	255	PRO	3.0
1	C	380	THR	2.9
1	C	198	SER	2.8
1	F	258	LEU	2.8
1	C	254	VAL	2.8
1	C	243	LEU	2.7
1	E	311	VAL	2.4
1	F	200	ASP	2.4
1	F	109	SER	2.4

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Mol	Chain	Res	Type	RSRZ
1	E	338	SER	2.3
1	F	254	VAL	2.3
1	E	296	PHE	2.2
1	L	179	TYR	2.1
1	C	234	THR	2.1
1	F	405	TYR	2.1
1	F	395	ASP	2.1

## 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](#)

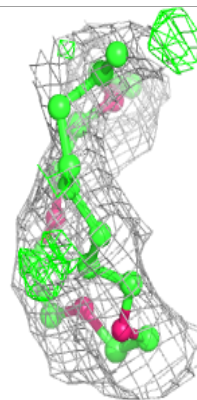
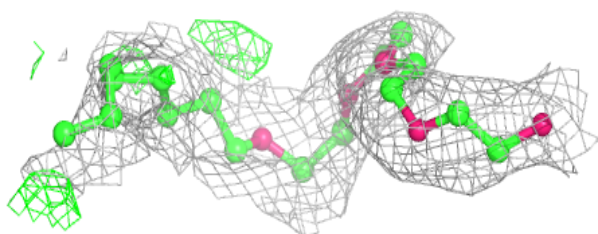
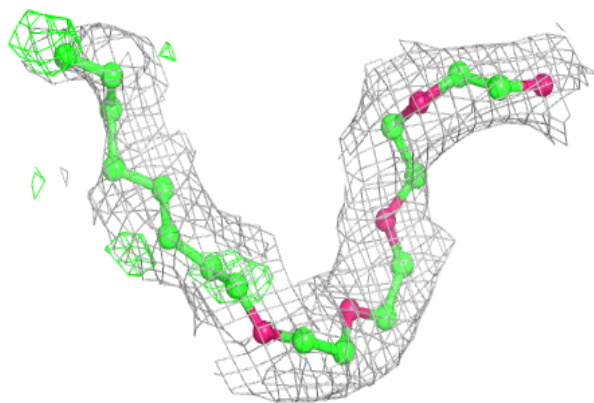
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	LDA	B	501	9/16	0.70	0.30	72,76,80,84	0
2	C8E	A	501	21/21	0.77	0.25	62,80,84,85	0
3	LDA	C	503	9/16	0.82	0.25	74,83,94,96	0
2	C8E	A	502	8/21	0.86	0.40	41,43,44,44	0
2	C8E	C	502	11/21	0.88	0.29	38,39,44,45	0
3	LDA	A	504	12/16	0.88	0.31	7,73,88,89	0
3	LDA	I	501	16/16	0.89	0.28	45,52,61,63	0
2	C8E	A	503	12/21	0.90	0.41	51,56,68,69	0
2	C8E	C	501	9/21	0.91	0.39	64,68,72,72	0

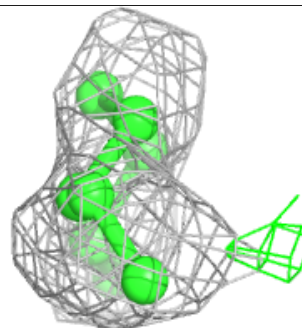
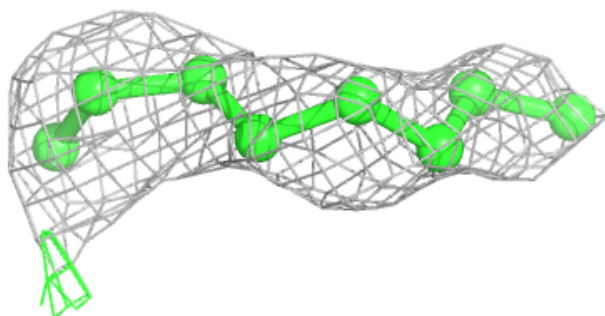
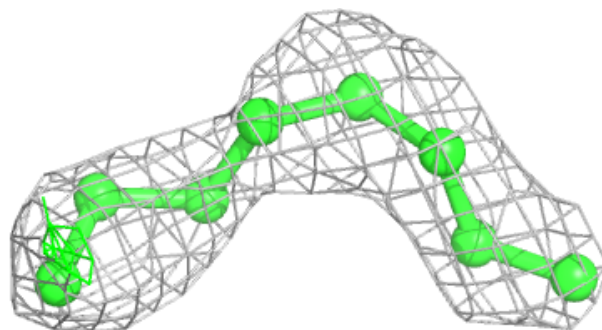
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around C8E A 501:**

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

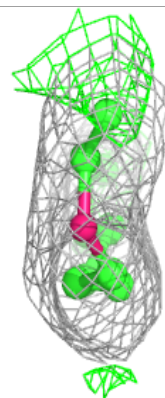
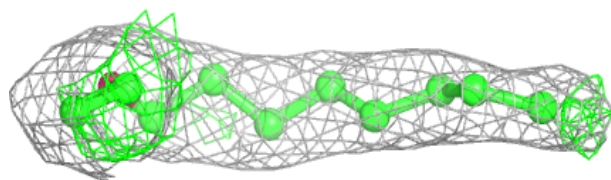
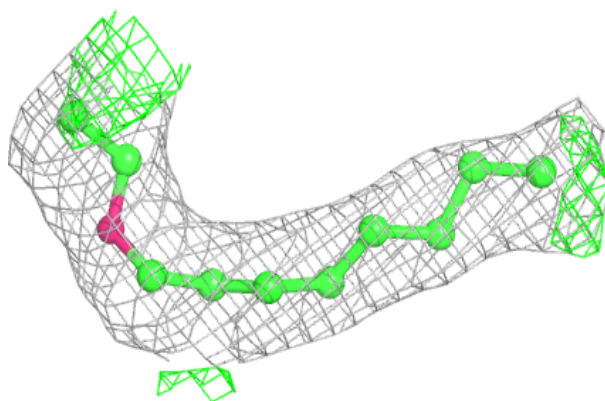
**Electron density around C8E A 502:**

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

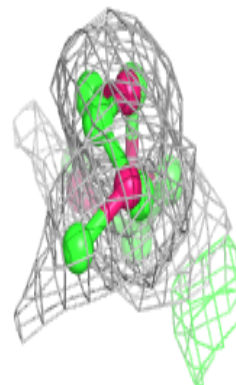
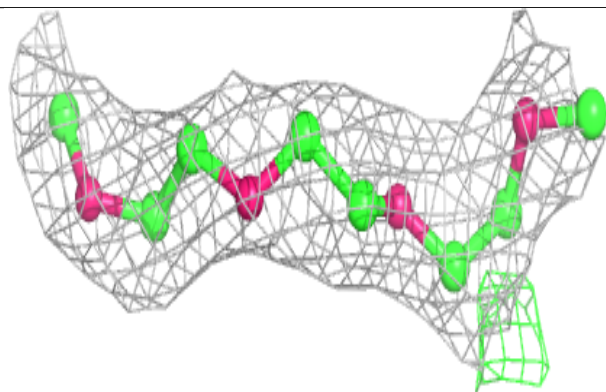
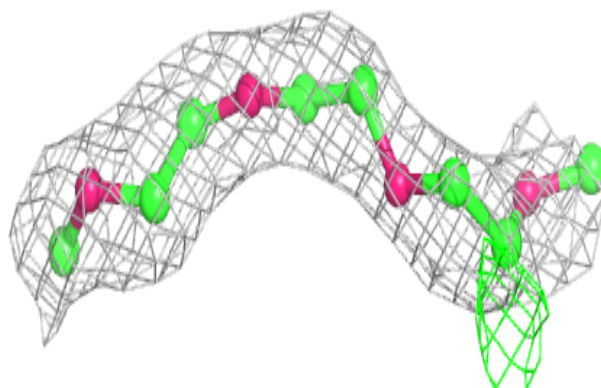


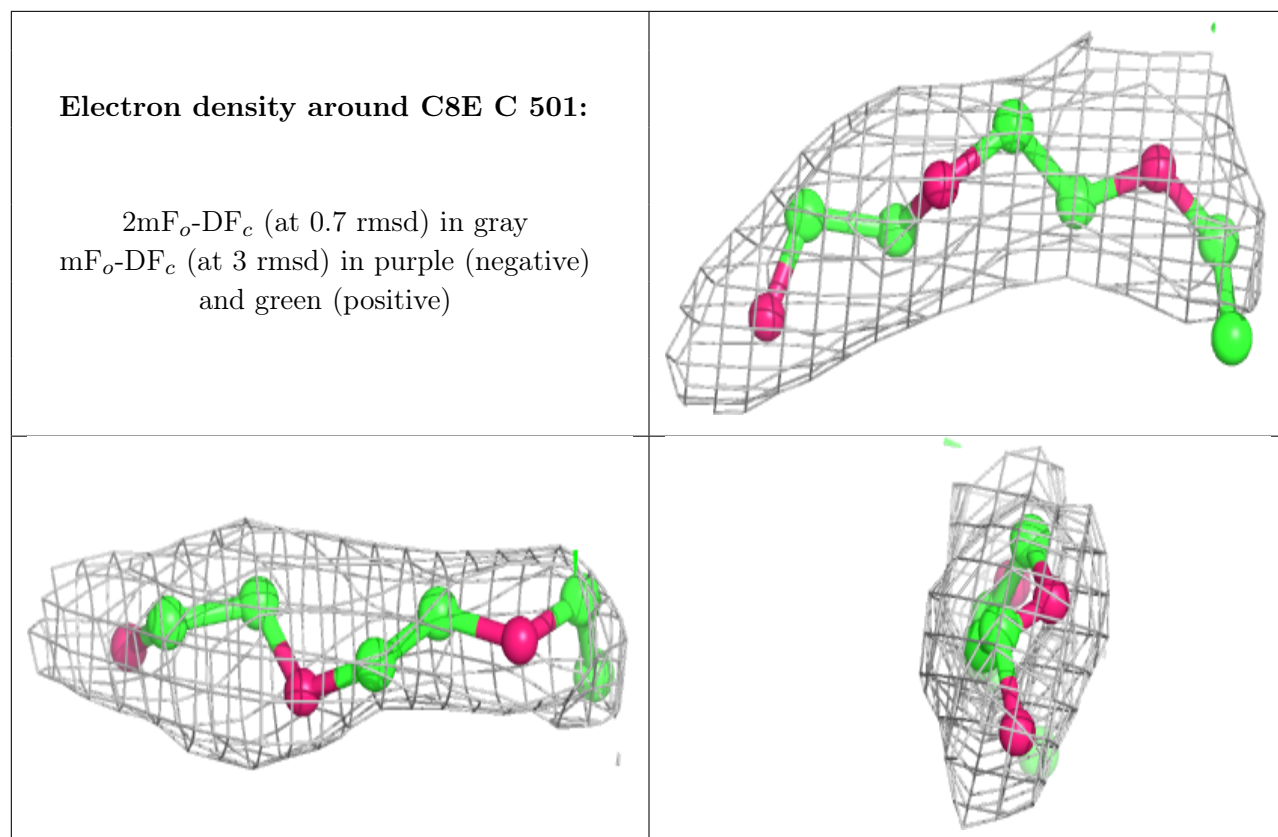
**Electron density around C8E C 502:**

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

**Electron density around C8E A 503:**

$2mF_o-DF_c$  (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.