Full wwPDB X-ray Structure Validation Report (i)

Nov 17, 2024 – 12:46 PM EST

PDB ID	:	4MOM
Title	:	Pyranose 2-oxidase H450G mutant with 3-fluorinated galactose
Authors	:	Tan, T.C.; Spadiut, O.; Gandini, R.; Haltrich, D.; Divne, C.
Deposited on	:	2013-09-12
Resolution	:	1.90 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

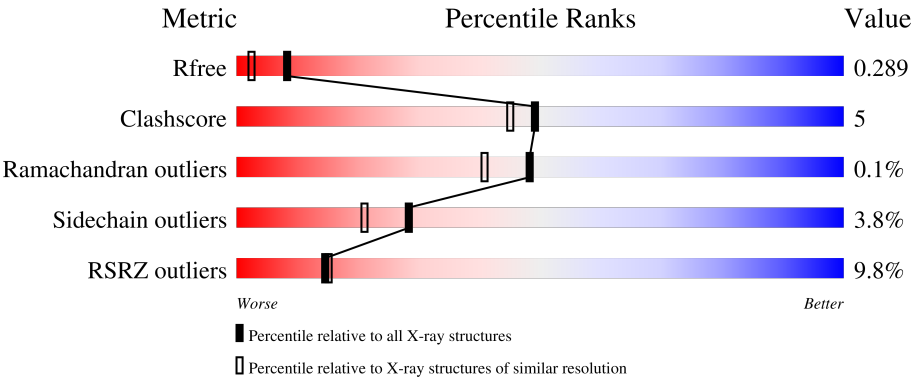
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 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}	164625	7293 (1.90-1.90)
Clashscore	180529	8090 (1.90-1.90)
Ramachandran outliers	177936	8022 (1.90-1.90)
Sidechain outliers	177891	8022 (1.90-1.90)
RSRZ outliers	164620	7292 (1.90-1.90)

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	633	6% 80% 11% 9%
1	B	633	6% 78% 12% • 9%
1	C	633	16% 74% 16% • 9%
1	D	633	7% 77% 12% • 9%

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 19522 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 Pyranose 2-oxidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	576	Total	C	N	O	S	0	0	0
			4536	2864	775	872	25			
1	B	576	Total	C	N	O	S	0	0	0
			4536	2864	775	872	25			
1	C	574	Total	C	N	O	S	0	0	0
			4520	2855	773	868	24			
1	D	574	Total	C	N	O	S	0	0	0
			4520	2855	773	868	24			

There are 52 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	2	ALA	SER	cloning artifact	UNP Q7ZA32
A	450	GLY	HIS	engineered mutation	UNP Q7ZA32
A	623	ALA	-	expression tag	UNP Q7ZA32
A	624	ALA	-	expression tag	UNP Q7ZA32
A	625	ALA	-	expression tag	UNP Q7ZA32
A	626	LEU	-	expression tag	UNP Q7ZA32
A	627	GLU	-	expression tag	UNP Q7ZA32
A	628	HIS	-	expression tag	UNP Q7ZA32
A	629	HIS	-	expression tag	UNP Q7ZA32
A	630	HIS	-	expression tag	UNP Q7ZA32
A	631	HIS	-	expression tag	UNP Q7ZA32
A	632	HIS	-	expression tag	UNP Q7ZA32
A	633	HIS	-	expression tag	UNP Q7ZA32
B	2	ALA	SER	cloning artifact	UNP Q7ZA32
B	450	GLY	HIS	engineered mutation	UNP Q7ZA32
B	623	ALA	-	expression tag	UNP Q7ZA32
B	624	ALA	-	expression tag	UNP Q7ZA32
B	625	ALA	-	expression tag	UNP Q7ZA32
B	626	LEU	-	expression tag	UNP Q7ZA32
B	627	GLU	-	expression tag	UNP Q7ZA32
B	628	HIS	-	expression tag	UNP Q7ZA32

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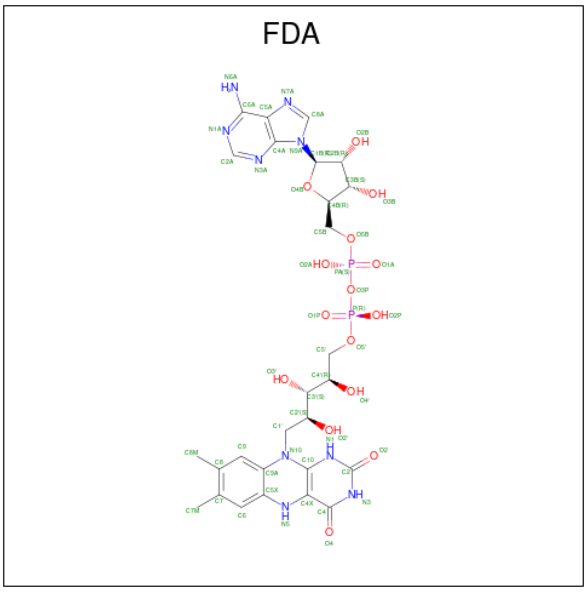
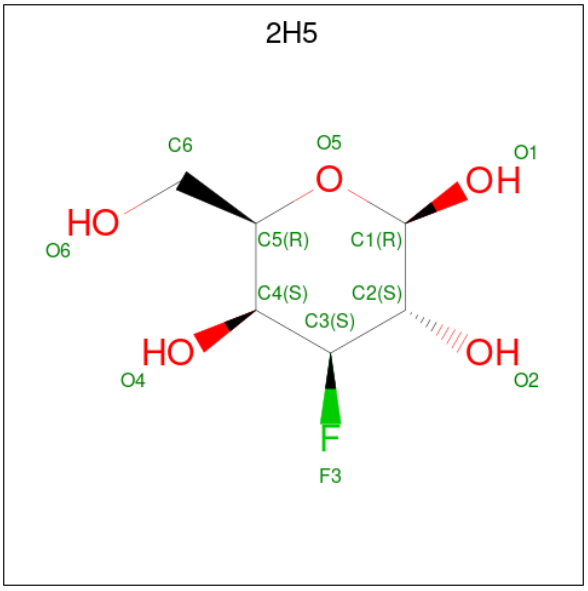
Chain	Residue	Modelled	Actual	Comment	Reference
B	629	HIS	-	expression tag	UNP Q7ZA32
B	630	HIS	-	expression tag	UNP Q7ZA32
B	631	HIS	-	expression tag	UNP Q7ZA32
B	632	HIS	-	expression tag	UNP Q7ZA32
B	633	HIS	-	expression tag	UNP Q7ZA32
C	2	ALA	SER	cloning artifact	UNP Q7ZA32
C	450	GLY	HIS	engineered mutation	UNP Q7ZA32
C	623	ALA	-	expression tag	UNP Q7ZA32
C	624	ALA	-	expression tag	UNP Q7ZA32
C	625	ALA	-	expression tag	UNP Q7ZA32
C	626	LEU	-	expression tag	UNP Q7ZA32
C	627	GLU	-	expression tag	UNP Q7ZA32
C	628	HIS	-	expression tag	UNP Q7ZA32
C	629	HIS	-	expression tag	UNP Q7ZA32
C	630	HIS	-	expression tag	UNP Q7ZA32
C	631	HIS	-	expression tag	UNP Q7ZA32
C	632	HIS	-	expression tag	UNP Q7ZA32
C	633	HIS	-	expression tag	UNP Q7ZA32
D	2	ALA	SER	cloning artifact	UNP Q7ZA32
D	450	GLY	HIS	engineered mutation	UNP Q7ZA32
D	623	ALA	-	expression tag	UNP Q7ZA32
D	624	ALA	-	expression tag	UNP Q7ZA32
D	625	ALA	-	expression tag	UNP Q7ZA32
D	626	LEU	-	expression tag	UNP Q7ZA32
D	627	GLU	-	expression tag	UNP Q7ZA32
D	628	HIS	-	expression tag	UNP Q7ZA32
D	629	HIS	-	expression tag	UNP Q7ZA32
D	630	HIS	-	expression tag	UNP Q7ZA32
D	631	HIS	-	expression tag	UNP Q7ZA32
D	632	HIS	-	expression tag	UNP Q7ZA32
D	633	HIS	-	expression tag	UNP Q7ZA32

- Molecule 2 is DIHYDROFLAVINE-ADENINE DINUCLEOTIDE (three-letter code: FDA) (formula: $C_{27}H_{35}N_9O_{15}P_2$).



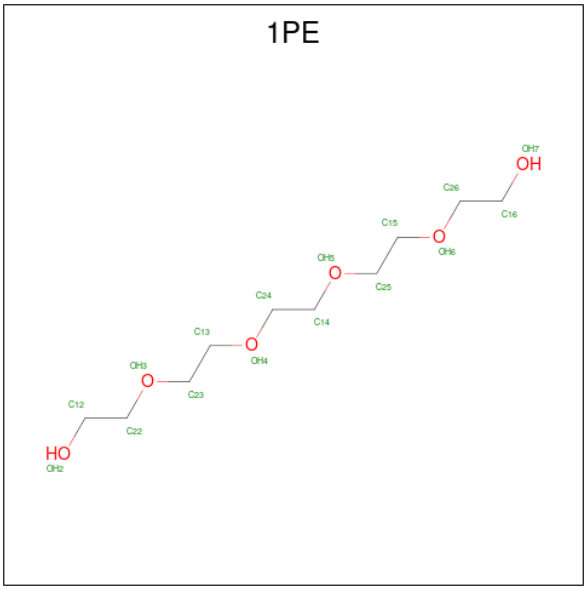
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	B	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	C	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	D	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

- Molecule 3 is 3-deoxy-3-fluoro-beta-D-galactopyranose (three-letter code: 2H5) (formula: $C_6H_{11}FO_5$).



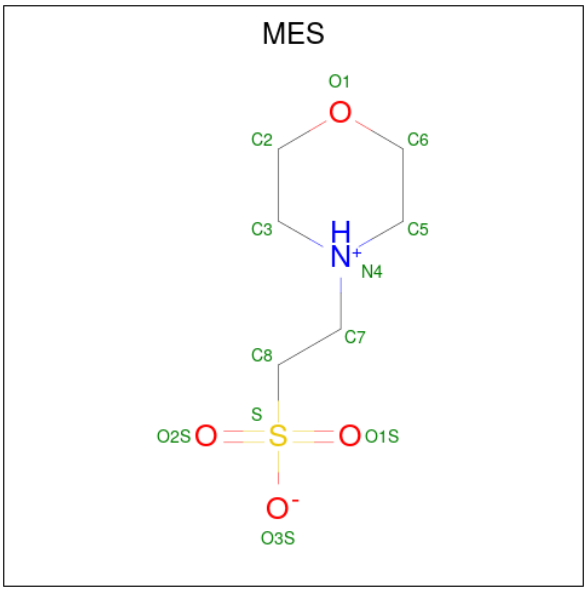
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C F O 12 6 1 5	0	0
3	B	1	Total C F O 12 6 1 5	0	0
3	C	1	Total C F O 12 6 1 5	0	0
3	D	1	Total C F O 12 6 1 5	0	0

- Molecule 4 is PENTAETHYLENE GLYCOL (three-letter code: 1PE) (formula: $C_{10}H_{22}O_6$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 12 8 4	0	0
4	B	1	Total C O 16 10 6	0	0
4	C	1	Total C O 16 10 6	0	0
4	D	1	Total C O 16 10 6	0	0

- Molecule 5 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: $C_6H_{13}NO_4S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	B	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
5	D	1	Total	C	N	O	S	0	0
			11	6	1	3	1		

- Molecule 6 is water.

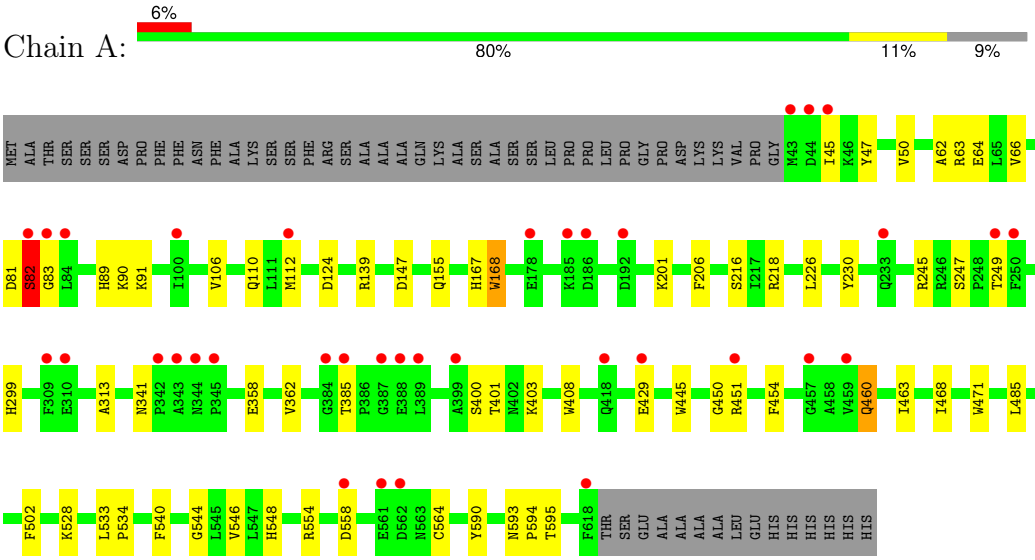
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	268	Total	O	0	0
			268	268		
6	B	348	Total	O	0	0
			348	348		
6	C	183	Total	O	0	0
			183	183		
6	D	268	Total	O	0	0
			268	268		

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.

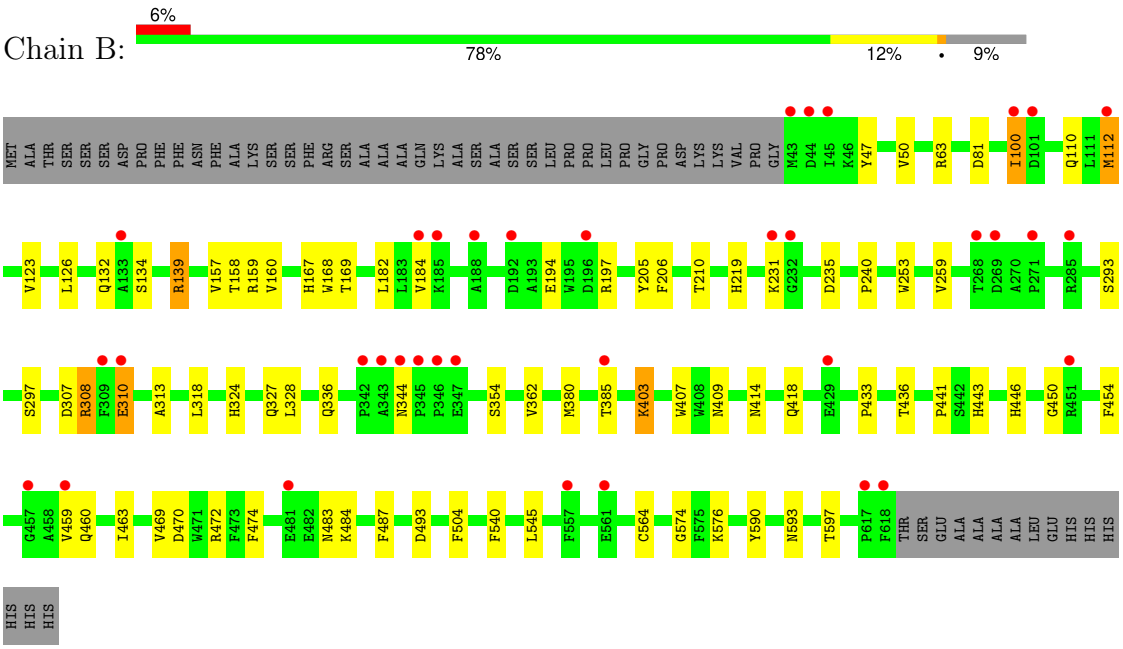
• Molecule 1: Pyranose 2-oxidase

Chain A:



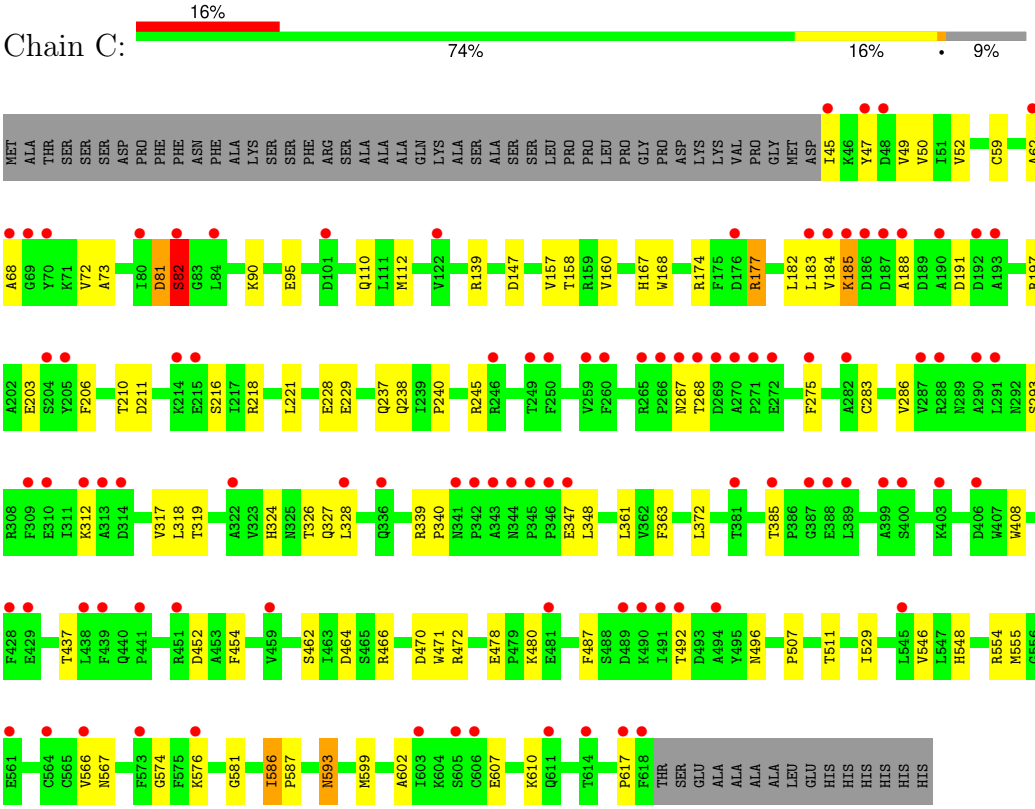
• Molecule 1: Pyranose 2-oxidase

Chain B:



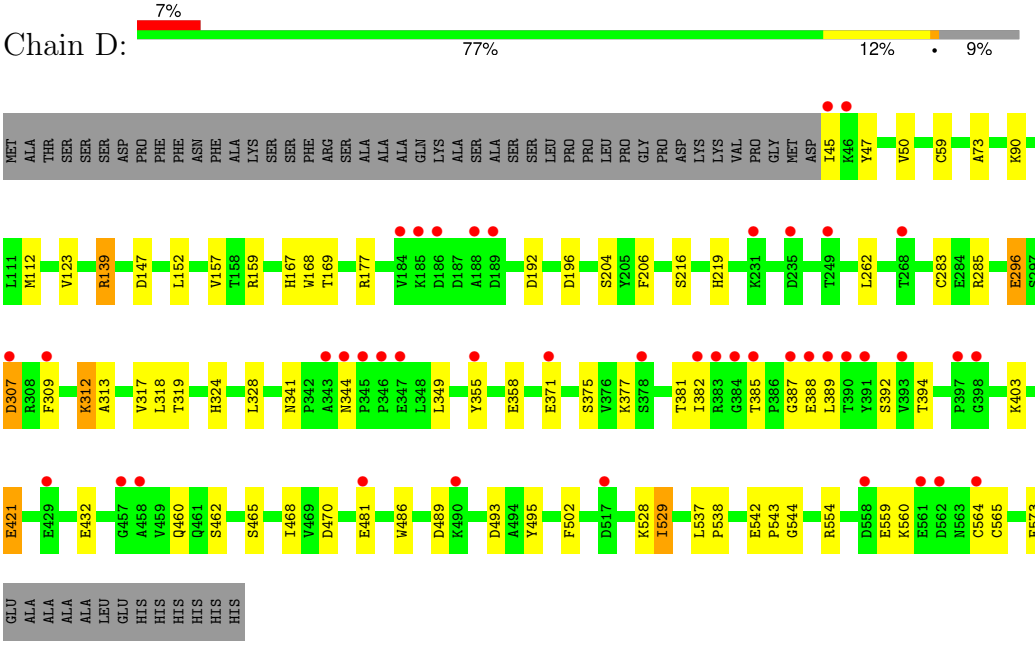
• Molecule 1: Pyranose 2-oxidase

Chain C:



• Molecule 1: Pyranose 2-oxidase

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	99.90Å 102.42Å 137.37Å 90.00° 91.19° 90.00°	Depositor
Resolution (Å)	50.00 – 1.90 50.00 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.2 (50.00-1.90) 99.2 (50.00-1.90)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.85 (at 1.90Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.238 , 0.280 0.247 , 0.289	Depositor DCC
R_{free} test set	3865 reflections (1.79%)	wwPDB-VP
Wilson B-factor (Å^2)	20.3	Xtriage
Anisotropy	0.125	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 39.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.012 for -k,-h,-l 0.001 for k,h,-l 0.020 for h,-k,-l	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	19522	wwPDB-VP
Average B, all atoms (Å^2)	24.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.24% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MES, 1PE, 2H5, FDA

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	1.03	3/4651 (0.1%)	0.99	7/6323 (0.1%)
1	B	1.05	5/4651 (0.1%)	1.01	10/6323 (0.2%)
1	C	0.83	2/4635 (0.0%)	0.91	11/6302 (0.2%)
1	D	0.92	3/4635 (0.1%)	0.93	7/6302 (0.1%)
All	All	0.96	13/18572 (0.1%)	0.96	35/25250 (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	B	0	1

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	564	CYS	CB-SG	-5.96	1.72	1.81
1	A	445	TRP	CD2-CE2	5.53	1.48	1.41
1	B	493	ASP	CB-CG	5.47	1.63	1.51
1	D	296	GLU	CD-OE1	5.42	1.31	1.25
1	B	407	TRP	CD2-CE2	5.41	1.47	1.41
1	D	486	TRP	CD2-CE2	5.23	1.47	1.41
1	B	253	TRP	CD2-CE2	5.22	1.47	1.41
1	D	147	ASP	CB-CG	5.19	1.62	1.51
1	A	168	TRP	CD2-CE2	5.14	1.47	1.41
1	A	471	TRP	CD2-CE2	5.13	1.47	1.41
1	C	408	TRP	CD2-CE2	5.12	1.47	1.41
1	B	597	THR	N-CA	-5.06	1.36	1.46
1	C	147	ASP	CB-CG	5.04	1.62	1.51

All (35) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	139	ARG	NE-CZ-NH1	9.84	125.22	120.30
1	B	139	ARG	NE-CZ-NH2	-9.62	115.49	120.30
1	A	139	ARG	NE-CZ-NH1	9.31	124.96	120.30
1	D	470	ASP	CB-CG-OD1	8.68	126.11	118.30
1	D	139	ARG	NE-CZ-NH2	-8.34	116.13	120.30
1	C	82	SER	N-CA-CB	7.72	122.09	110.50
1	B	493	ASP	CB-CG-OD1	6.85	124.47	118.30
1	D	139	ARG	NE-CZ-NH1	6.67	123.63	120.30
1	C	211	ASP	CB-CG-OD1	6.33	124.00	118.30
1	D	283	CYS	CA-CB-SG	-6.32	102.62	114.00
1	A	147	ASP	CB-CG-OD1	6.25	123.92	118.30
1	A	63	ARG	NE-CZ-NH2	-6.25	117.18	120.30
1	D	493	ASP	CB-CG-OD1	6.24	123.91	118.30
1	A	139	ARG	NE-CZ-NH2	-6.12	117.24	120.30
1	C	466	ARG	NE-CZ-NH2	-6.01	117.30	120.30
1	A	245	ARG	NE-CZ-NH1	5.96	123.28	120.30
1	C	422	ASP	CB-CG-OD1	-5.81	113.07	118.30
1	B	308	ARG	NE-CZ-NH2	-5.76	117.42	120.30
1	A	288	ARG	NE-CZ-NH2	-5.73	117.43	120.30
1	A	245	ARG	NE-CZ-NH2	-5.73	117.44	120.30
1	C	174	ARG	NE-CZ-NH1	5.68	123.14	120.30
1	B	308	ARG	NE-CZ-NH1	5.67	123.14	120.30
1	C	81	ASP	N-CA-C	-5.67	95.70	111.00
1	C	464	ASP	CB-CG-OD1	5.57	123.32	118.30
1	C	81	ASP	CB-CG-OD1	-5.54	113.32	118.30
1	C	245	ARG	NE-CZ-NH1	5.53	123.07	120.30
1	B	81	ASP	CB-CG-OD1	-5.50	113.36	118.30
1	B	472	ARG	NE-CZ-NH1	5.43	123.02	120.30
1	C	139	ARG	NE-CZ-NH2	-5.40	117.60	120.30
1	C	470	ASP	CB-CG-OD1	5.24	123.01	118.30
1	D	196	ASP	CB-CG-OD1	5.20	122.98	118.30
1	B	112	MET	CG-SD-CE	5.20	108.52	100.20
1	D	387	GLY	N-CA-C	5.14	125.94	113.10
1	B	307	ASP	CB-CG-OD1	5.05	122.84	118.30
1	B	235	ASP	CB-CG-OD2	5.01	122.81	118.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	436	THR	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	4536	0	4384	34	0
1	B	4536	0	4384	47	0
1	C	4520	0	4371	62	0
1	D	4520	0	4371	43	0
2	A	53	0	28	3	0
2	B	53	0	29	1	0
2	C	53	0	29	1	0
2	D	53	0	29	2	0
3	A	12	0	11	4	0
3	B	12	0	11	0	0
3	C	12	0	11	2	0
3	D	12	0	11	1	0
4	A	12	0	14	0	0
4	B	16	0	22	1	0
4	C	16	0	22	0	0
4	D	16	0	22	3	0
5	B	12	0	13	1	0
5	D	11	0	9	1	0
6	A	268	0	0	2	0
6	B	348	0	0	12	0
6	C	183	0	0	4	0
6	D	268	0	0	3	0
All	All	19522	0	17771	191	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 5.

All (191) 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)
5:D:804:MES:C2	5:D:804:MES:C6	2.11	1.26
1:C:361:LEU:HD22	1:C:546:VAL:HG22	1.38	1.02
1:B:110:GLN:HE21	1:B:167:HIS:HD1	1.07	0.96
1:C:110:GLN:HE21	1:C:167:HIS:HD1	1.14	0.93
1:A:460:GLN:HE22	1:A:463:ILE:H	0.93	0.92

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:68:ALA:HB2	1:C:610:LYS:HZ1	1.32	0.91
1:C:68:ALA:HB2	1:C:610:LYS:NZ	1.88	0.88
1:D:110:GLN:HE21	1:D:167:HIS:HD1	1.24	0.81
1:C:157:VAL:HG21	1:C:324:HIS:HE1	1.47	0.80
1:A:460:GLN:NE2	1:A:463:ILE:H	1.78	0.79
1:B:459:VAL:HG23	6:B:936:HOH:O	1.84	0.76
1:C:68:ALA:CB	1:C:610:LYS:NZ	2.49	0.75
1:B:418:GLN:HG3	6:B:1064:HOH:O	1.88	0.73
1:B:100:ILE:O	1:B:100:ILE:HD13	1.89	0.73
1:C:507:PRO:HD2	1:C:511:THR:HG21	1.72	0.72
1:D:421:GLU:OE1	1:D:421:GLU:N	2.20	0.71
1:D:432:GLU:OE1	1:D:432:GLU:N	2.24	0.70
1:C:68:ALA:CB	1:C:610:LYS:HZ3	2.04	0.69
1:C:81:ASP:OD1	1:C:81:ASP:C	2.29	0.68
1:C:218:ARG:HD2	6:C:1033:HOH:O	1.94	0.68
1:B:574:GLY:O	1:B:576:LYS:NZ	2.27	0.67
1:B:126:LEU:HD12	1:B:132:GLN:CG	2.25	0.66
2:C:801:FDA:N5	3:C:802:2H5:H1	2.11	0.66
1:C:361:LEU:CD2	1:C:546:VAL:HG22	2.19	0.65
1:A:460:GLN:HE22	1:A:463:ILE:N	1.79	0.64
1:C:157:VAL:HG21	1:C:324:HIS:CE1	2.30	0.64
1:B:328:LEU:HD23	1:B:328:LEU:C	2.17	0.64
1:C:177:ARG:HH22	1:C:188:ALA:HB1	1.63	0.64
1:D:169:THR:O	1:D:169:THR:HG22	1.98	0.63
1:D:489:ASP:OD1	1:D:489:ASP:C	2.37	0.63
4:D:803:1PE:H251	4:D:803:1PE:OH7	1.99	0.62
1:A:81:ASP:OD1	1:A:82:SER:N	2.31	0.61
1:A:110:GLN:HE21	1:A:167:HIS:HD1	1.48	0.61
1:B:545:LEU:HD12	6:B:1077:HOH:O	2.01	0.61
1:B:194:GLU:OE2	1:B:197:ARG:NH2	2.32	0.61
1:D:123:VAL:HG13	6:D:1110:HOH:O	2.01	0.60
1:D:157:VAL:HG11	1:D:324:HIS:CE1	2.37	0.60
2:D:801:FDA:N5	3:D:802:2H5:H1	2.17	0.60
4:D:803:1PE:H251	4:D:803:1PE:C16	2.30	0.59
1:B:336:GLN:NE2	1:B:344:ASN:O	2.35	0.59
1:D:318:LEU:HD13	1:D:328:LEU:HD22	1.84	0.59
1:C:81:ASP:OD1	1:C:82:SER:N	2.36	0.59
1:B:443:HIS:NE2	6:B:1013:HOH:O	2.32	0.58
4:B:704:1PE:H152	6:B:1094:HOH:O	2.03	0.57
1:C:47:TYR:CE2	1:C:73:ALA:HB2	2.38	0.57
1:A:230:TYR:OH	1:A:528:LYS:NZ	2.38	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:318:LEU:HD13	1:C:328:LEU:HD23	1.87	0.55
1:C:548:HIS:CE1	1:C:593:ASN:HA	2.41	0.55
1:B:126:LEU:HD12	1:B:132:GLN:HG3	1.89	0.55
1:B:403:LYS:HD2	6:B:1023:HOH:O	2.08	0.55
1:C:199:TYR:O	1:C:203:GLU:HG3	2.07	0.55
1:C:177:ARG:NH2	1:C:188:ALA:HB1	2.21	0.54
1:C:317:VAL:HG12	1:C:319:THR:HG23	1.88	0.54
1:D:381:THR:HB	1:D:394:THR:OG1	2.08	0.54
1:C:237:GLN:NE2	1:C:238:GLN:O	2.37	0.54
1:C:548:HIS:HE2	3:C:802:2H5:H9	1.55	0.54
1:B:414:ASN:O	1:B:418:GLN:HG2	2.08	0.54
1:C:228:GLU:OE1	1:C:229:GLU:OE2	2.25	0.54
1:A:124:ASP:O	1:D:543:PRO:HD3	2.08	0.54
1:D:47:TYR:CE2	1:D:73:ALA:HB2	2.43	0.53
1:B:297:SER:HB2	1:B:310:GLU:HG3	1.91	0.53
1:C:49:VAL:HB	1:C:72:VAL:HG22	1.91	0.53
1:D:375:SER:HA	6:D:1101:HOH:O	2.09	0.52
1:A:230:TYR:CZ	1:A:528:LYS:NZ	2.77	0.52
1:D:90:LYS:NZ	1:D:110:GLN:OE1	2.43	0.52
1:C:110:GLN:NE2	1:C:167:HIS:HD1	1.97	0.51
1:D:177:ARG:NH2	1:D:192:ASP:OD2	2.41	0.51
1:A:50:VAL:HG13	1:A:313:ALA:HB2	1.92	0.51
1:A:533:LEU:HD12	1:A:534:PRO:HD2	1.92	0.51
1:D:537:LEU:HB3	1:D:538:PRO:HD2	1.93	0.51
1:A:358:GLU:HG2	1:A:544:GLY:HA2	1.92	0.51
1:C:555:MET:HB2	1:C:566:VAL:HG23	1.92	0.51
1:C:81:ASP:OD2	1:C:90:LYS:NZ	2.41	0.50
1:A:548:HIS:NE2	3:A:802:2H5:O2	2.36	0.50
1:B:318:LEU:HD13	1:B:328:LEU:HD22	1.92	0.50
1:B:590:TYR:CZ	6:B:1002:HOH:O	2.55	0.50
1:A:554:ARG:O	1:A:564:CYS:HB2	2.11	0.50
1:C:361:LEU:HB2	1:C:546:VAL:HG21	1.94	0.50
1:B:483:ASN:OD1	1:B:504:PHE:HA	2.13	0.49
1:C:182:LEU:HD13	1:C:185:LYS:HA	1.95	0.49
1:C:183:LEU:O	1:C:184:VAL:HG23	2.13	0.49
1:A:546:VAL:O	1:A:546:VAL:HG22	2.12	0.48
1:A:249:THR:HG21	1:A:429:GLU:OE2	2.13	0.48
1:C:95:GLU:OE1	1:D:495:TYR:OH	2.21	0.48
1:D:371:GLU:CD	6:D:1039:HOH:O	2.52	0.48
1:C:206:PHE:CZ	1:C:599:MET:HE1	2.50	0.47
1:D:528:LYS:C	1:D:529:ILE:HD13	2.34	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:362:VAL:HG12	1:A:540:PHE:CD1	2.49	0.47
1:B:354:SER:OG	1:B:484:LYS:NZ	2.46	0.47
1:C:418:GLN:NE2	6:C:1051:HOH:O	2.37	0.47
1:D:349:LEU:HD13	1:D:565:CYS:HB3	1.95	0.47
1:A:47:TYR:CE2	1:A:73:ALA:HB2	2.50	0.47
1:C:347:GLU:HG3	1:C:348:LEU:HG	1.95	0.47
1:C:52:VAL:HG22	1:C:283:CYS:SG	2.54	0.47
1:D:50:VAL:HG13	1:D:313:ALA:HB2	1.96	0.47
1:D:317:VAL:HG12	1:D:319:THR:HG23	1.97	0.47
1:C:221:LEU:HD11	1:C:372:LEU:HD22	1.96	0.47
1:C:326:THR:HG22	1:C:487:PHE:HE2	1.80	0.46
1:D:216:SER:HB3	1:D:219:HIS:HB3	1.96	0.46
1:C:47:TYR:CD2	1:C:73:ALA:HB2	2.51	0.46
1:C:158:THR:HG22	1:C:160:VAL:HG22	1.97	0.46
1:D:47:TYR:CD2	1:D:73:ALA:HB2	2.50	0.46
1:D:157:VAL:HG11	1:D:324:HIS:HE1	1.80	0.46
1:D:529:ILE:HD13	1:D:529:ILE:N	2.30	0.46
1:C:555:MET:HE2	1:C:567:ASN:O	2.16	0.46
1:D:559:GLU:HG3	1:D:573:PHE:CD2	2.50	0.46
1:B:210:THR:HG23	6:B:1030:HOH:O	2.15	0.45
2:A:801:FDA:N5	3:A:802:2H5:H1	2.31	0.45
1:B:47:TYR:O	1:B:313:ALA:HA	2.15	0.45
1:C:361:LEU:HB2	1:C:546:VAL:CG2	2.45	0.45
1:A:548:HIS:CE1	3:A:802:2H5:O2	2.70	0.45
1:B:63:ARG:HD2	1:B:259:VAL:O	2.17	0.45
1:D:382:ILE:HD13	1:D:416:MET:HE1	1.97	0.45
1:C:327:GLN:HB2	1:C:487:PHE:CE1	2.52	0.45
1:B:50:VAL:HG13	1:B:313:ALA:HB2	1.98	0.45
1:B:293:SER:O	1:B:576:LYS:HG2	2.16	0.45
1:D:554:ARG:O	1:D:564:CYS:HB2	2.17	0.45
1:D:300:ILE:HD11	1:D:309:PHE:HB2	1.99	0.45
1:B:380:MET:HE3	1:B:409:ASN:OD1	2.16	0.45
1:A:548:HIS:CE1	3:A:802:2H5:H9	2.31	0.44
1:A:590:TYR:CD1	1:A:590:TYR:N	2.85	0.44
1:C:452:ASP:HB2	1:C:472:ARG:NH1	2.32	0.44
1:A:450:GLY:C	1:A:451:ARG:HG2	2.38	0.44
1:B:446:HIS:HB3	1:B:474:PHE:HB2	1.99	0.44
1:C:319:THR:HG22	1:C:581:GLY:HA3	1.99	0.44
1:A:47:TYR:O	1:A:313:ALA:HA	2.18	0.44
1:B:219:HIS:HA	1:B:433:PRO:HB3	2.00	0.44
1:D:382:ILE:HD13	1:D:416:MET:CE	2.48	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:286:VAL:HG23	1:C:286:VAL:O	2.18	0.44
1:A:62:ALA:O	1:A:66:VAL:HG23	2.18	0.43
1:C:197:ARG:NE	6:C:1019:HOH:O	2.45	0.43
1:D:296:GLU:O	1:D:312:LYS:NZ	2.34	0.43
1:A:218:ARG:HD2	6:A:1045:HOH:O	2.17	0.43
1:C:158:THR:CG2	1:C:160:VAL:HG22	2.48	0.43
1:D:169:THR:O	1:D:169:THR:CG2	2.64	0.43
1:B:327:GLN:HB2	1:B:487:PHE:CE1	2.53	0.43
1:B:450:GLY:O	1:B:470:ASP:HB2	2.18	0.43
1:B:469:VAL:HG23	6:B:939:HOH:O	2.17	0.43
1:C:267:ASN:O	1:C:268:THR:C	2.55	0.43
1:C:363:PHE:HA	1:C:471:TRP:O	2.19	0.43
1:D:101:ASP:OD1	1:D:101:ASP:N	2.49	0.43
1:B:126:LEU:HD12	1:B:132:GLN:HG2	1.98	0.43
1:B:157:VAL:HG21	1:B:324:HIS:HE1	1.83	0.43
1:D:465:SER:HA	1:D:468:ILE:HD12	2.01	0.43
1:C:59:CYS:HA	1:C:62:ALA:HB3	2.00	0.42
1:C:293:SER:HA	1:C:574:GLY:O	2.19	0.42
1:D:307:ASP:N	1:D:307:ASP:OD1	2.51	0.42
1:A:451:ARG:HD3	1:A:468:ILE:O	2.19	0.42
1:B:308:ARG:NH2	6:B:1024:HOH:O	2.53	0.42
1:C:437:THR:HG23	1:C:437:THR:O	2.20	0.42
1:C:478:GLU:OE2	1:C:480:LYS:HE2	2.20	0.42
1:C:586:ILE:HA	1:C:587:PRO:HD3	1.69	0.42
1:D:285:ARG:O	1:D:298:LEU:HD12	2.20	0.42
1:D:355:TYR:CZ	1:D:481:GLU:HB2	2.54	0.42
1:A:590:TYR:CE2	1:A:594:PRO:HB3	2.55	0.42
1:B:380:MET:HE1	1:B:409:ASN:HB3	2.01	0.42
1:A:81:ASP:O	1:A:83:GLY:N	2.46	0.42
1:C:206:PHE:CE2	1:C:599:MET:SD	3.13	0.42
1:C:72:VAL:O	1:C:275:PHE:HA	2.20	0.41
1:C:339:ARG:HA	1:C:340:PRO:HD3	1.94	0.41
1:D:159:ARG:HA	2:D:801:FDA:O2B	2.21	0.41
1:B:182:LEU:HD22	1:B:184:VAL:O	2.20	0.41
1:B:403:LYS:CD	6:B:1023:HOH:O	2.66	0.41
1:D:59:CYS:SG	1:D:262:LEU:HD21	2.61	0.41
1:D:389:LEU:HD23	1:D:389:LEU:HA	1.79	0.41
1:B:362:VAL:HG12	1:B:540:PHE:CD1	2.55	0.41
1:B:158:THR:HG22	1:B:160:VAL:HG22	2.01	0.41
1:A:595:THR:OG1	2:A:801:FDA:O2	2.37	0.41
1:B:169:THR:O	1:B:169:THR:HG22	2.19	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:599:MET:O	1:C:602:ALA:HB3	2.21	0.41
1:B:63:ARG:NE	1:B:205:TYR:CE1	2.89	0.41
1:C:462:SER:O	1:D:139:ARG:HD2	2.21	0.41
1:D:152:LEU:HD12	1:D:502:PHE:CE1	2.56	0.41
1:A:90:LYS:HD2	1:A:106:VAL:CG1	2.51	0.40
1:A:155:GLN:NE2	1:A:358:GLU:OE2	2.52	0.40
1:B:219:HIS:HB2	1:B:433:PRO:HA	2.04	0.40
1:C:197:ARG:NH2	1:C:607:GLU:OE2	2.54	0.40
4:D:803:1PE:C16	4:D:803:1PE:C25	2.96	0.40
1:A:89:HIS:CE1	1:A:91:LYS:HB2	2.56	0.40
1:A:226:LEU:HD23	1:A:226:LEU:HA	1.96	0.40
6:A:949:HOH:O	1:B:123:VAL:HG21	2.21	0.40
1:B:159:ARG:HA	2:B:702:FDA:O2B	2.22	0.40
1:B:474:PHE:CD1	1:B:474:PHE:N	2.89	0.40
1:A:485:LEU:HD13	1:A:502:PHE:CE1	2.56	0.40
1:B:132:GLN:NE2	5:B:701:MES:O1S	2.50	0.40
1:B:460:GLN:OE1	1:B:463:ILE:N	2.35	0.40
1:C:197:ARG:NH2	6:C:1019:HOH:O	2.51	0.40
1:A:76:ASP:OD1	2:A:801:FDA:O2B	2.28	0.40
1:B:418:GLN:CG	6:B:1064:HOH:O	2.60	0.40
1:C:372:LEU:HD11	1:C:529:ILE:HD12	2.03	0.40
1:D:358:GLU:HG2	1:D:544:GLY:HA2	2.03	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	574/633 (91%)	554 (96%)	19 (3%)	1 (0%)	44 36
1	B	574/633 (91%)	555 (97%)	19 (3%)	0	100 100
1	C	572/633 (90%)	547 (96%)	24 (4%)	1 (0%)	44 36

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	D	572/633 (90%)	547 (96%)	25 (4%)	0	100 100
All	All	2292/2532 (90%)	2203 (96%)	87 (4%)	2 (0%)	48 41

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	82	SER
1	C	617	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	503/547 (92%)	482 (96%)	21 (4%)	25 18
1	B	503/547 (92%)	489 (97%)	14 (3%)	38 33
1	C	501/547 (92%)	480 (96%)	21 (4%)	25 18
1	D	501/547 (92%)	480 (96%)	21 (4%)	25 18
All	All	2008/2188 (92%)	1931 (96%)	77 (4%)	28 21

All (77) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	45	ILE
1	A	64	GLU
1	A	82	SER
1	A	112	MET
1	A	168	TRP
1	A	201	LYS
1	A	206	PHE
1	A	216	SER
1	A	247	SER
1	A	299	HIS
1	A	341	ASN
1	A	385	THR

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Mol	Chain	Res	Type
1	A	400	SER
1	A	401	THR
1	A	403	LYS
1	A	408	TRP
1	A	454	PHE
1	A	460	GLN
1	A	490	LYS
1	A	558	ASP
1	A	593	ASN
1	B	100	ILE
1	B	112	MET
1	B	134	SER
1	B	139	ARG
1	B	168	TRP
1	B	206	PHE
1	B	231	LYS
1	B	240	PRO
1	B	310	GLU
1	B	385	THR
1	B	403	LYS
1	B	441	PRO
1	B	454	PHE
1	B	593	ASN
1	C	45	ILE
1	C	50	VAL
1	C	82	SER
1	C	112	MET
1	C	168	TRP
1	C	177	ARG
1	C	185	LYS
1	C	191	ASP
1	C	210	THR
1	C	216	SER
1	C	240	PRO
1	C	312	LYS
1	C	385	THR
1	C	454	PHE
1	C	492	THR
1	C	496	ASN
1	C	554	ARG
1	C	560	LYS
1	C	576	LYS

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Mol	Chain	Res	Type
1	C	586	ILE
1	C	593	ASN
1	D	45	ILE
1	D	101	ASP
1	D	112	MET
1	D	168	TRP
1	D	204	SER
1	D	206	PHE
1	D	307	ASP
1	D	312	LYS
1	D	341	ASN
1	D	344	ASN
1	D	377	LYS
1	D	385	THR
1	D	388	GLU
1	D	392	SER
1	D	403	LYS
1	D	421	GLU
1	D	460	GLN
1	D	462	SER
1	D	529	ILE
1	D	542	GLU
1	D	560	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	263	GLN
1	A	341	ASN
1	A	460	GLN
1	B	110	GLN
1	B	344	ASN
1	B	611	GLN
1	C	110	GLN
1	C	207	GLN
1	C	263	GLN
1	C	461	GLN
1	D	132	GLN
1	D	299	HIS
1	D	324	HIS
1	D	341	ASN
1	D	418	GLN

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Mol	Chain	Res	Type
1	D	419	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

14 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	$\#\|Z\| > 2$
3	2H5	D	802	-	12,12,12	0.67	0	17,17,17	1.74	5 (29%)
2	FDA	C	801	1	53,58,58	1.65	10 (18%)	64,89,89	2.69	21 (32%)
4	1PE	D	803	-	15,15,15	0.62	0	14,14,14	0.22	0
2	FDA	D	801	1	53,58,58	1.38	7 (13%)	64,89,89	2.10	18 (28%)
5	MES	D	804	-	10,10,12	2.05	1 (10%)	12,13,16	1.47	3 (25%)
2	FDA	B	702	1	53,58,58	1.86	13 (24%)	64,89,89	1.97	16 (25%)
4	1PE	B	704	-	15,15,15	0.63	0	14,14,14	0.28	0
2	FDA	A	801	1	53,58,58	1.71	9 (16%)	64,89,89	2.53	16 (25%)
3	2H5	B	703	-	12,12,12	1.15	1 (8%)	17,17,17	2.35	7 (41%)
4	1PE	A	803	-	11,11,15	0.68	0	10,10,14	0.26	0
4	1PE	C	803	-	15,15,15	0.51	0	14,14,14	0.22	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	2H5	C	802	-	12,12,12	0.83	0	17,17,17	2.77	7 (41%)
5	MES	B	701	-	12,12,12	2.48	1 (8%)	15,16,16	1.37	1 (6%)
3	2H5	A	802	-	12,12,12	1.14	1 (8%)	17,17,17	1.71	4 (23%)

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
3	2H5	D	802	-	-	2/2/22/22	0/1/1/1
2	FDA	C	801	1	-	3/30/50/50	0/6/6/6
4	1PE	D	803	-	-	7/13/13/13	-
2	FDA	D	801	1	-	1/30/50/50	0/6/6/6
5	MES	D	804	-	-	2/10/10/14	-
2	FDA	B	702	1	-	3/30/50/50	0/6/6/6
4	1PE	B	704	-	-	7/13/13/13	-
2	FDA	A	801	1	-	1/30/50/50	0/6/6/6
3	2H5	B	703	-	-	0/2/22/22	0/1/1/1
4	1PE	A	803	-	-	4/9/9/13	-
4	1PE	C	803	-	-	6/13/13/13	-
3	2H5	C	802	-	-	2/2/22/22	0/1/1/1
5	MES	B	701	-	-	0/6/14/14	0/1/1/1
3	2H5	A	802	-	-	0/2/22/22	0/1/1/1

All (43) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	701	MES	C8-S	-8.16	1.66	1.77
5	D	804	MES	C8-S	-6.18	1.68	1.77
2	B	702	FDA	PA-O3P	5.73	1.65	1.59
2	A	801	FDA	C2-N1	-4.53	1.30	1.37
2	D	801	FDA	C4'-C3'	4.30	1.60	1.53
2	C	801	FDA	C2A-N3A	4.23	1.38	1.32
2	B	702	FDA	C2-N3	-4.13	1.30	1.37
2	C	801	FDA	C5X-N5	-4.02	1.33	1.39
2	C	801	FDA	C6-C5X	3.99	1.45	1.39
2	C	801	FDA	PA-O3P	3.94	1.63	1.59
2	A	801	FDA	O3B-C3B	-3.83	1.33	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	702	FDA	O3B-C3B	-3.58	1.34	1.43
2	B	702	FDA	P-O3P	-3.43	1.55	1.59
2	C	801	FDA	C2A-N1A	3.41	1.40	1.33
2	A	801	FDA	C2'-C3'	-3.36	1.47	1.53
2	A	801	FDA	C1'-C2'	3.34	1.57	1.52
2	A	801	FDA	C5X-C9A	-3.29	1.36	1.40
2	D	801	FDA	C2A-N3A	3.21	1.37	1.32
2	B	702	FDA	C10-N1	-3.10	1.31	1.37
2	B	702	FDA	C4X-N5	-3.05	1.30	1.35
2	C	801	FDA	C1B-N9A	-2.91	1.42	1.49
2	B	702	FDA	O4B-C1B	-2.89	1.37	1.40
2	C	801	FDA	C5X-C9A	2.85	1.43	1.40
2	C	801	FDA	C4X-C4	2.84	1.50	1.41
2	B	702	FDA	O4B-C4B	-2.82	1.38	1.45
2	C	801	FDA	O4B-C4B	-2.80	1.38	1.45
3	A	802	2H5	C3-C4	2.60	1.55	1.52
2	B	702	FDA	C4X-C4	2.56	1.49	1.41
2	D	801	FDA	C2B-C3B	-2.54	1.46	1.53
2	D	801	FDA	C4X-C4	2.45	1.49	1.41
2	D	801	FDA	C5X-N5	-2.36	1.35	1.39
2	A	801	FDA	O4B-C1B	-2.31	1.37	1.40
2	B	702	FDA	C5'-C4'	2.29	1.54	1.51
2	C	801	FDA	P-O3P	2.23	1.61	1.59
2	A	801	FDA	O4B-C4B	-2.22	1.40	1.45
3	B	703	2H5	C3-C2	-2.18	1.50	1.52
2	D	801	FDA	C2-N3	-2.16	1.33	1.37
2	B	702	FDA	PA-O1A	-2.13	1.43	1.50
2	B	702	FDA	C2A-N1A	2.11	1.37	1.33
2	A	801	FDA	C6-C5X	2.10	1.42	1.39
2	B	702	FDA	C7M-C7	-2.03	1.47	1.51
2	A	801	FDA	C2-N3	-2.03	1.34	1.37
2	D	801	FDA	C9A-N10	-2.02	1.37	1.41

All (98) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	801	FDA	O4-C4-N3	-13.31	95.09	120.11
2	A	801	FDA	O4-C4-C4X	-12.08	98.14	127.26
3	C	802	2H5	F3-C3-C4	8.41	116.10	108.81
2	C	801	FDA	C4-N3-C2	-6.84	116.95	126.37
2	C	801	FDA	N3A-C2A-N1A	-6.59	119.73	128.67
2	B	702	FDA	N3A-C2A-N1A	-6.41	119.97	128.67

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	801	FDA	N3A-C2A-N1A	-6.33	120.08	128.67
2	A	801	FDA	O4-C4-N3	6.20	131.76	120.11
2	A	801	FDA	O4B-C1B-N9A	6.04	116.75	108.75
2	D	801	FDA	C5A-C6A-N6A	5.74	129.06	120.31
2	D	801	FDA	N3A-C2A-N1A	-5.61	121.06	128.67
2	B	702	FDA	O2B-C2B-C3B	5.52	129.51	111.82
2	B	702	FDA	O4B-C1B-N9A	5.49	116.03	108.75
2	D	801	FDA	O3B-C3B-C4B	4.80	124.86	111.08
2	C	801	FDA	C1B-N9A-C4A	-4.77	118.27	126.64
3	A	802	2H5	F3-C3-C2	-4.58	104.84	108.81
2	B	702	FDA	C1'-N10-C9A	4.57	129.51	120.63
2	D	801	FDA	C4B-O4B-C1B	-4.54	105.77	109.92
3	B	703	2H5	O5-C5-C4	4.46	117.73	109.70
2	D	801	FDA	C5B-C4B-C3B	4.36	130.90	115.21
2	C	801	FDA	O2B-C2B-C3B	4.34	125.72	111.82
2	D	801	FDA	C4A-C5A-N7A	-4.25	104.84	109.34
3	B	703	2H5	F3-C3-C2	-4.25	105.14	108.81
3	D	802	2H5	F3-C3-C4	4.04	112.31	108.81
5	B	701	MES	O3S-S-C8	4.00	113.82	106.00
2	D	801	FDA	O4-C4-C4X	-3.96	117.72	127.26
2	D	801	FDA	O4B-C1B-N9A	3.90	113.91	108.75
3	B	703	2H5	C3-C4-C5	3.90	114.29	109.68
2	A	801	FDA	C6-C5X-C9A	-3.84	115.59	119.80
2	B	702	FDA	C7M-C7-C6	-3.84	112.81	119.57
3	C	802	2H5	F3-C3-C2	-3.82	105.51	108.81
3	B	703	2H5	C3-C2-C1	3.52	116.51	110.84
2	C	801	FDA	O4-C4-C4X	-3.45	118.94	127.26
2	D	801	FDA	C5'-C4'-C3'	-3.42	105.76	112.22
3	C	802	2H5	O6-C6-C5	-3.40	99.76	111.33
2	A	801	FDA	C9-C8-C7	-3.40	114.70	119.69
2	A	801	FDA	O3P-PA-O1A	-3.37	100.56	110.70
2	B	702	FDA	C5B-C4B-C3B	3.30	127.09	115.21
2	A	801	FDA	C5B-C4B-C3B	3.28	127.00	115.21
2	C	801	FDA	O2-C2-N1	-3.23	116.12	121.86
2	C	801	FDA	C5B-C4B-C3B	3.19	126.70	115.21
2	D	801	FDA	C4-N3-C2	-3.18	121.99	126.37
2	B	702	FDA	O4-C4-N3	-3.12	114.25	120.11
2	A	801	FDA	O2B-C2B-C3B	3.12	121.80	111.82
2	C	801	FDA	C4B-O4B-C1B	-3.11	107.08	109.92
2	A	801	FDA	C4B-O4B-C1B	-2.99	107.18	109.92
2	B	702	FDA	O3B-C3B-C4B	2.91	119.43	111.08
2	A	801	FDA	O4B-C4B-C3B	2.88	110.86	105.15

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	801	FDA	O4B-C4B-C5B	2.85	118.46	109.33
2	B	702	FDA	O4B-C4B-C5B	2.81	118.33	109.33
3	B	703	2H5	F3-C3-C4	2.79	111.23	108.81
5	D	804	MES	O1S-S-C8	2.73	110.86	106.73
2	C	801	FDA	C4-C4X-N5	2.70	123.28	116.37
2	C	801	FDA	C7M-C7-C6	-2.66	114.88	119.57
2	A	801	FDA	O2P-P-O5'	2.63	119.47	107.57
2	C	801	FDA	C5X-C9A-N10	2.61	120.97	118.01
5	D	804	MES	O2S-S-C8	2.59	110.65	106.73
3	C	802	2H5	C3-C4-C5	-2.56	106.66	109.68
2	D	801	FDA	N6A-C6A-N1A	-2.53	112.94	118.33
3	C	802	2H5	O5-C5-C4	2.45	114.12	109.70
3	D	802	2H5	O5-C5-C6	2.45	112.50	106.44
2	C	801	FDA	O3P-PA-O1A	-2.44	103.35	110.70
3	B	703	2H5	C4-C3-C2	-2.44	108.67	111.50
2	C	801	FDA	C9-C9A-C5X	-2.43	116.56	119.95
2	D	801	FDA	C4-C4X-N5	2.42	122.55	116.37
2	C	801	FDA	N6A-C6A-N1A	2.41	123.49	118.33
2	D	801	FDA	O2A-PA-O1A	2.40	123.59	112.44
3	D	802	2H5	O4-C4-C3	2.39	114.04	109.63
2	D	801	FDA	O4B-C4B-C3B	2.38	109.87	105.15
2	D	801	FDA	O4-C4-N3	2.36	124.55	120.11
3	C	802	2H5	C3-C2-C1	2.35	114.63	110.84
2	C	801	FDA	O3B-C3B-C4B	2.25	117.54	111.08
2	C	801	FDA	O2A-PA-O1A	2.25	122.89	112.44
2	B	702	FDA	O5'-P-O1P	-2.22	100.14	108.94
2	B	702	FDA	O3P-PA-O1A	-2.21	104.04	110.70
2	C	801	FDA	O4B-C1B-N9A	2.21	111.67	108.75
2	C	801	FDA	O4B-C4B-C3B	2.21	109.53	105.15
3	D	802	2H5	C3-C4-C5	-2.20	107.08	109.68
2	B	702	FDA	O2-C2-N3	-2.18	117.98	121.86
2	A	801	FDA	C6-C5X-N5	2.18	123.54	119.76
2	B	702	FDA	C5X-C6-C7	-2.18	115.28	119.92
3	C	802	2H5	C6-C5-C4	2.17	118.36	113.02
2	D	801	FDA	N3-C2-N1	2.15	119.12	115.74
2	B	702	FDA	O2A-PA-O3P	2.15	113.09	107.27
3	A	802	2H5	F3-C3-C4	2.15	110.68	108.81
5	D	804	MES	O3S-S-O2S	-2.14	106.05	111.40
3	A	802	2H5	O2-C2-C1	2.14	114.17	109.25
3	B	703	2H5	O1-C1-C2	-2.11	102.86	108.98
2	D	801	FDA	O3'-C3'-C4'	-2.08	104.20	108.93
2	C	801	FDA	O3B-C3B-C2B	2.08	118.49	111.82

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	802	2H5	O2-C2-C3	2.08	113.47	109.63
2	B	702	FDA	C5A-C6A-N6A	2.08	123.48	120.31
2	A	801	FDA	C9A-C9-C8	2.07	123.39	119.22
3	D	802	2H5	C3-C2-C1	2.07	114.17	110.84
2	C	801	FDA	O2A-PA-O3P	2.05	112.82	107.27
2	A	801	FDA	O4'-C4'-C3'	2.04	114.02	109.25
2	D	801	FDA	O3P-P-O1P	2.03	116.82	110.70
2	B	702	FDA	C4-N3-C2	2.01	129.13	126.37

There are no chirality outliers.

All (38) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	801	FDA	PA-O3P-P-O5'
3	C	802	2H5	O5-C5-C6-O6
4	D	803	1PE	OH7-C16-C26-OH6
4	A	803	1PE	OH6-C15-C25-OH5
4	D	803	1PE	OH2-C12-C22-OH3
4	B	704	1PE	OH6-C15-C25-OH5
3	D	802	2H5	O5-C5-C6-O6
4	C	803	1PE	OH2-C12-C22-OH3
4	C	803	1PE	OH4-C13-C23-OH3
5	D	804	MES	N4-C7-C8-S
4	B	704	1PE	OH2-C12-C22-OH3
2	B	702	FDA	C3B-C4B-C5B-O5B
4	D	803	1PE	OH4-C13-C23-OH3
4	B	704	1PE	OH5-C14-C24-OH4
4	D	803	1PE	C25-C15-OH6-C26
2	B	702	FDA	PA-O3P-P-O5'
2	D	801	FDA	PA-O3P-P-O5'
3	C	802	2H5	C4-C5-C6-O6
4	A	803	1PE	C23-C13-OH4-C24
4	C	803	1PE	C13-C23-OH3-C22
4	A	803	1PE	C15-C25-OH5-C14
4	B	704	1PE	OH7-C16-C26-OH6
4	C	803	1PE	OH6-C15-C25-OH5
4	C	803	1PE	C16-C26-OH6-C15
4	A	803	1PE	C24-C14-OH5-C25
4	C	803	1PE	C14-C24-OH4-C13
2	A	801	FDA	C3B-C4B-C5B-O5B
4	D	803	1PE	C12-C22-OH3-C23
5	D	804	MES	C2-C3-N4-C5

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Mol	Chain	Res	Type	Atoms
4	D	803	1PE	OH5-C14-C24-OH4
4	B	704	1PE	C13-C23-OH3-C22
2	B	702	FDA	C5B-O5B-PA-O1A
4	B	704	1PE	C15-C25-OH5-C14
3	D	802	2H5	C4-C5-C6-O6
4	B	704	1PE	C12-C22-OH3-C23
4	D	803	1PE	C24-C14-OH5-C25
2	C	801	FDA	P-O3P-PA-O2A
2	C	801	FDA	O4B-C4B-C5B-O5B

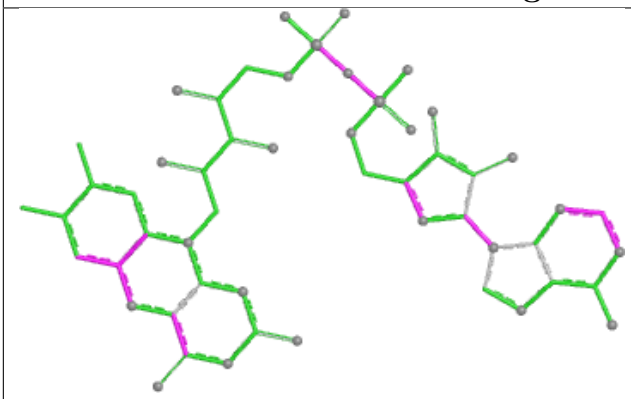
There are no ring outliers.

11 monomers are involved in 17 short contacts:

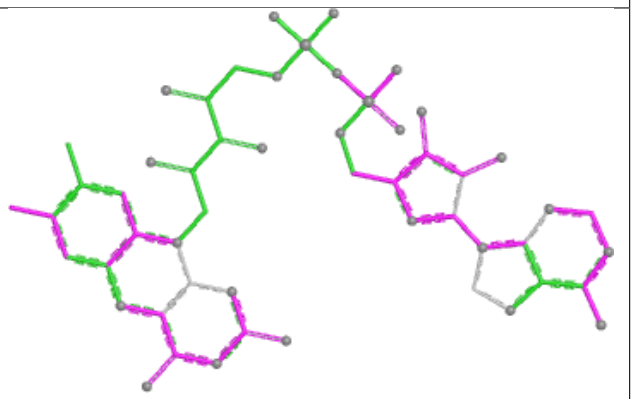
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	802	2H5	1	0
2	C	801	FDA	1	0
4	D	803	1PE	3	0
2	D	801	FDA	2	0
5	D	804	MES	1	0
2	B	702	FDA	1	0
4	B	704	1PE	1	0
2	A	801	FDA	3	0
3	C	802	2H5	2	0
5	B	701	MES	1	0
3	A	802	2H5	4	0

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 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.

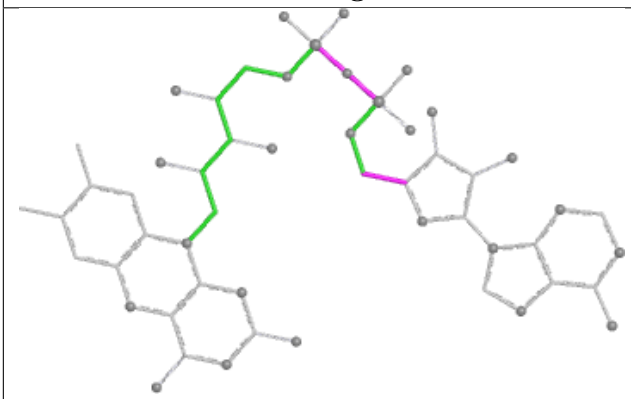
Ligand FDA C 801



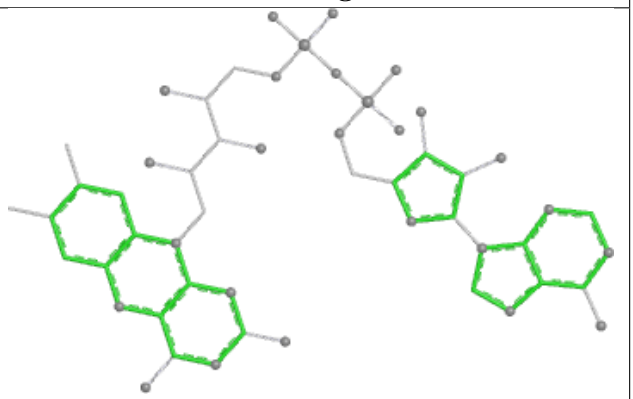
Bond lengths



Bond angles



Torsions



Rings

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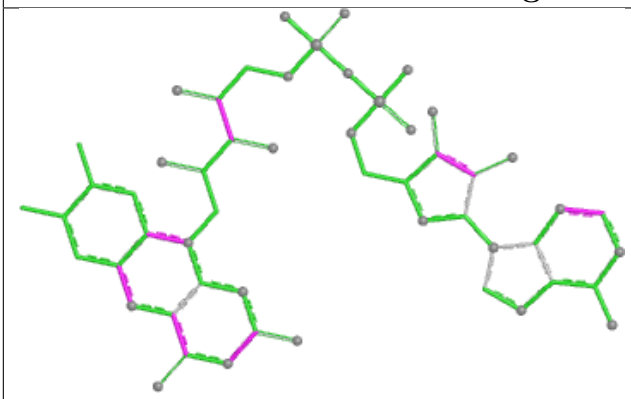
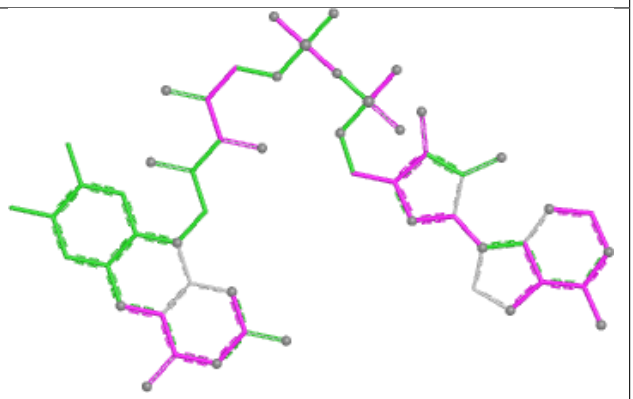
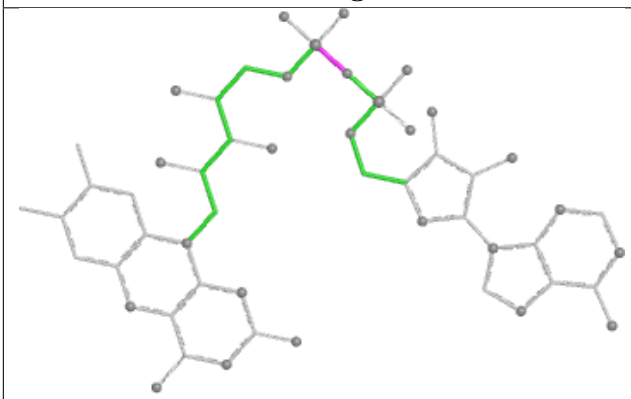


Bond lengths



Bond angles



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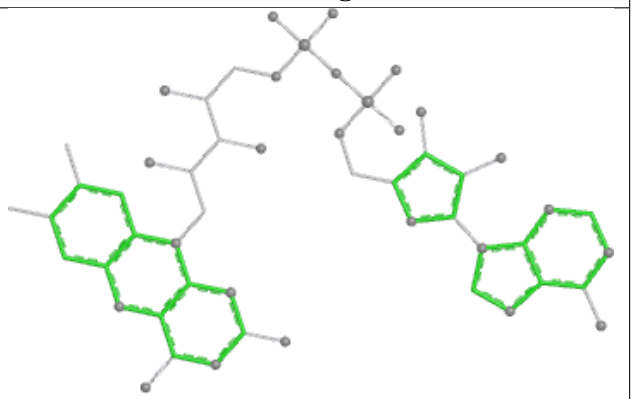
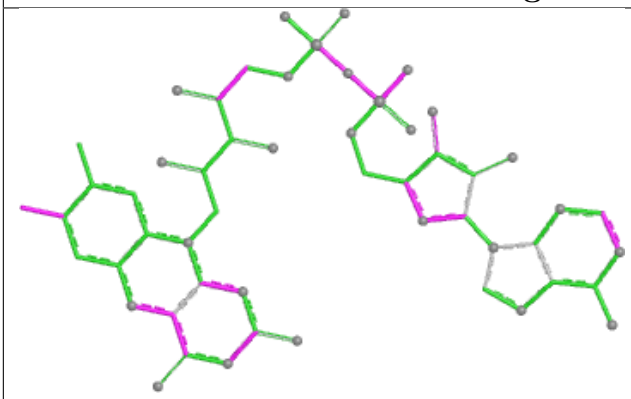
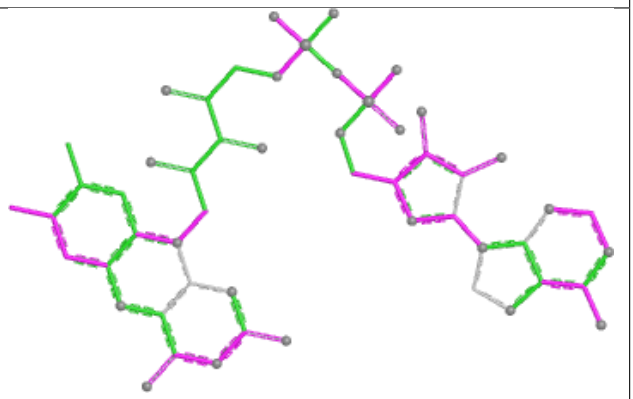


Rings

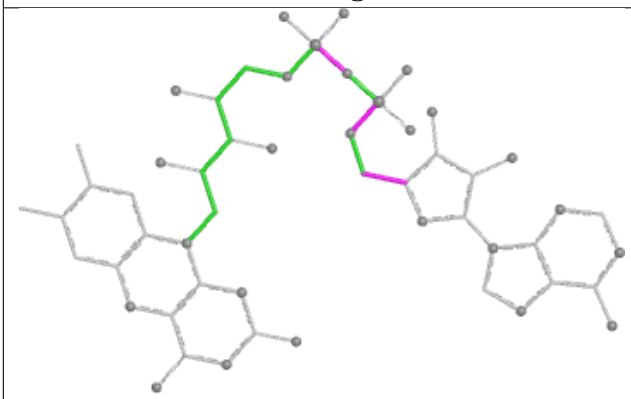
Ligand FDA B 702



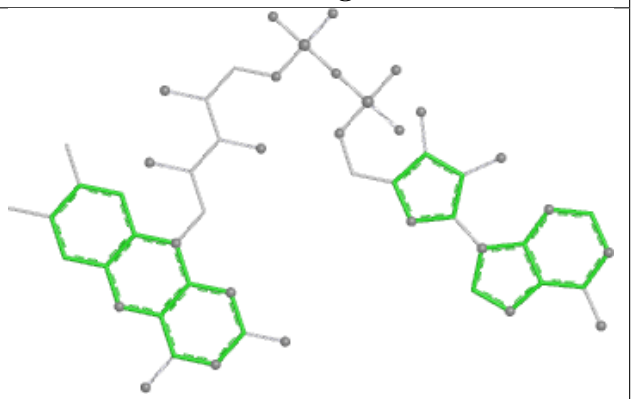
Bond lengths



Bond angles

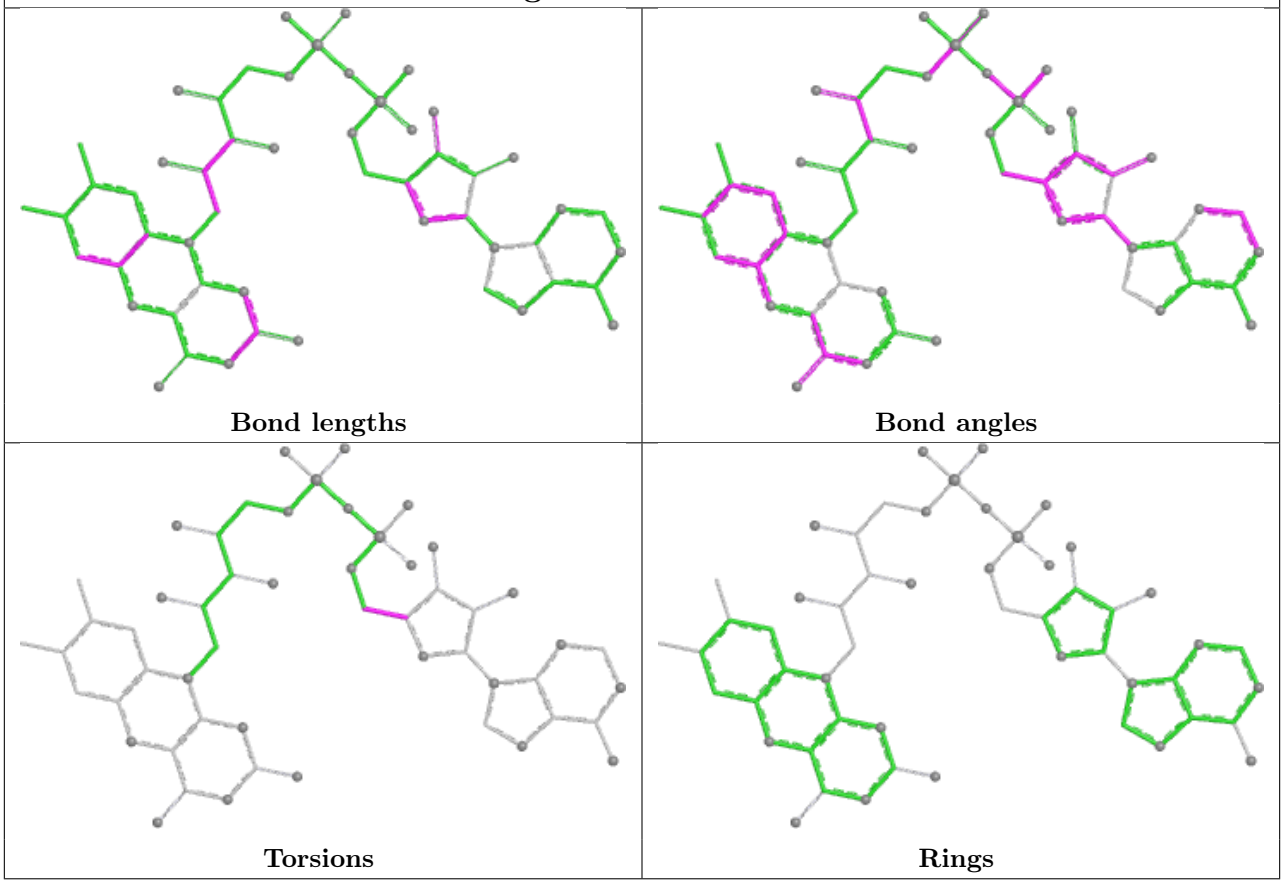


Torsions



Rings

Ligand FDA A 801



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	576/633 (90%)	0.51	40 (6%) 24 25	11, 19, 37, 62	0
1	B	576/633 (90%)	0.50	36 (6%) 27 28	10, 18, 35, 61	0
1	C	574/633 (90%)	1.15	104 (18%) 4 4	14, 29, 51, 88	0
1	D	574/633 (90%)	0.70	46 (8%) 20 21	12, 22, 43, 64	0
All	All	2300/2532 (90%)	0.72	226 (9%) 14 15	10, 22, 44, 88	0

All (226) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	618	PHE	5.8
1	B	45	ILE	5.8
1	D	343	ALA	5.7
1	B	343	ALA	5.4
1	D	345	PRO	5.1
1	C	343	ALA	4.9
1	C	45	ILE	4.9
1	A	343	ALA	4.9
1	D	45	ILE	4.8
1	B	345	PRO	4.8
1	D	385	THR	4.7
1	D	389	LEU	4.6
1	A	344	ASN	4.6
1	B	43	MET	4.6
1	C	617	PRO	4.5
1	B	100	ILE	4.4
1	C	270	ALA	4.3
1	C	82	SER	4.1
1	C	187	ASP	4.0
1	D	382	ILE	4.0
1	B	342	PRO	4.0

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Mol	Chain	Res	Type	RSRZ
1	B	459	VAL	4.0
1	C	345	PRO	4.0
1	C	290	ALA	4.0
1	C	342	PRO	3.9
1	C	346	PRO	3.9
1	D	398	GLY	3.9
1	A	342	PRO	3.9
1	A	45	ILE	3.9
1	A	44	ASP	3.9
1	C	459	VAL	3.8
1	C	266	PRO	3.8
1	C	309	PHE	3.8
1	C	400	SER	3.8
1	B	618	PHE	3.8
1	C	492	THR	3.8
1	D	618	PHE	3.7
1	D	564	CYS	3.7
1	C	494	ALA	3.7
1	C	291	LEU	3.6
1	C	312	LYS	3.6
1	C	184	VAL	3.6
1	D	562	ASP	3.5
1	C	188	ALA	3.5
1	D	387	GLY	3.5
1	C	249	THR	3.3
1	D	184	VAL	3.3
1	B	44	ASP	3.3
1	A	82	SER	3.2
1	B	188	ALA	3.2
1	D	558	ASP	3.2
1	C	271	PRO	3.2
1	C	204	SER	3.2
1	B	385	THR	3.1
1	A	490	LYS	3.1
1	D	185	LYS	3.1
1	C	451	ARG	3.1
1	B	271	PRO	3.1
1	C	310	GLU	3.1
1	C	347	GLU	3.1
1	C	268	THR	3.1
1	D	100	ILE	3.1
1	C	269	ASP	3.1

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Mol	Chain	Res	Type	RSRZ
1	C	267	ASN	3.0
1	C	47	TYR	3.0
1	D	188	ALA	3.0
1	C	573	PHE	3.0
1	B	344	ASN	3.0
1	C	603	ILE	3.0
1	A	496	ASN	3.0
1	C	68	ALA	3.0
1	B	231	LYS	3.0
1	C	576	LYS	2.9
1	C	489	ASP	2.9
1	D	378	SER	2.9
1	C	66	VAL	2.9
1	C	201	LYS	2.9
1	A	385	THR	2.9
1	C	385	THR	2.9
1	A	451	ARG	2.9
1	C	259	VAL	2.9
1	A	250	PHE	2.8
1	C	606	CYS	2.8
1	D	347	GLU	2.8
1	C	387	GLY	2.8
1	A	388	GLU	2.8
1	D	307	ASP	2.8
1	C	190	ALA	2.8
1	D	384	GLY	2.8
1	B	451	ARG	2.7
1	D	383	ARG	2.7
1	C	322	ALA	2.7
1	A	429	GLU	2.7
1	C	441	PRO	2.7
1	B	309	PHE	2.7
1	B	133	ALA	2.7
1	C	399	ALA	2.7
1	A	418	GLN	2.7
1	C	185	LYS	2.7
1	C	215	GLU	2.7
1	C	481	GLU	2.7
1	A	387	GLY	2.6
1	D	309	PHE	2.6
1	C	307	ASP	2.6
1	B	561	GLU	2.6

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Mol	Chain	Res	Type	RSRZ
1	C	491	ILE	2.6
1	C	250	PHE	2.6
1	C	265	ARG	2.6
1	A	384	GLY	2.6
1	A	43	MET	2.5
1	A	112	MET	2.5
1	C	344	ASN	2.5
1	C	605	SER	2.5
1	D	371	GLU	2.5
1	C	192	ASP	2.5
1	D	458	ALA	2.5
1	C	205	TYR	2.5
1	C	611	GLN	2.5
1	C	545	LEU	2.5
1	A	83	GLY	2.5
1	B	232	GLY	2.5
1	A	249	THR	2.5
1	C	48	ASP	2.5
1	C	561	GLU	2.5
1	C	176	ASP	2.5
1	C	313	ALA	2.5
1	C	186	ASP	2.4
1	D	388	GLU	2.4
1	D	561	GLU	2.4
1	C	564	CYS	2.4
1	D	517	ASP	2.4
1	B	457	GLY	2.4
1	D	457	GLY	2.4
1	C	341	ASN	2.4
1	C	193	ALA	2.4
1	C	260	PHE	2.4
1	A	233	GLN	2.4
1	C	70	TYR	2.4
1	D	344	ASN	2.4
1	C	62	ALA	2.4
1	A	269	ASP	2.4
1	C	314	ASP	2.4
1	B	184	VAL	2.4
1	C	439	PHE	2.4
1	D	231	LYS	2.3
1	D	346	PRO	2.3
1	D	481	GLU	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	393	VAL	2.3
1	A	309	PHE	2.3
1	C	428	PHE	2.3
1	C	557	PHE	2.3
1	D	235	ASP	2.3
1	B	310	GLU	2.3
1	D	429	GLU	2.3
1	A	457	GLY	2.3
1	C	122	VAL	2.3
1	C	275	PHE	2.3
1	D	390	THR	2.3
1	C	406	ASP	2.3
1	D	418	GLN	2.3
1	C	559	GLU	2.3
1	D	397	PRO	2.3
1	C	388	GLU	2.3
1	D	391	TYR	2.3
1	C	300	ILE	2.2
1	C	67	GLY	2.2
1	C	381	THR	2.2
1	C	272	GLU	2.2
1	C	282	ALA	2.2
1	C	490	LYS	2.2
1	B	112	MET	2.2
1	C	429	GLU	2.2
1	A	459	VAL	2.2
1	C	246	ARG	2.2
1	C	288	ARG	2.2
1	C	84	LEU	2.2
1	C	389	LEU	2.2
1	A	185	LYS	2.2
1	D	355	TYR	2.2
1	A	100	ILE	2.2
1	A	489	ASP	2.2
1	C	287	VAL	2.2
1	C	328	LEU	2.2
1	A	310	GLU	2.2
1	B	269	ASP	2.1
1	B	268	THR	2.1
1	C	403	LYS	2.1
1	C	69	GLY	2.1
1	A	561	GLU	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	481	GLU	2.1
1	C	183	LEU	2.1
1	A	192	ASP	2.1
1	B	101	ASP	2.1
1	D	268	THR	2.1
1	B	429	GLU	2.1
1	C	566	VAL	2.1
1	A	618	PHE	2.1
1	A	562	ASP	2.1
1	D	186	ASP	2.1
1	C	80	ILE	2.1
1	C	214	LYS	2.1
1	C	614	THR	2.1
1	D	46	LYS	2.1
1	D	249	THR	2.1
1	D	490	LYS	2.1
1	B	347	GLU	2.1
1	A	186	ASP	2.1
1	A	558	ASP	2.1
1	B	192	ASP	2.1
1	C	101	ASP	2.1
1	A	84	LEU	2.1
1	B	346	PRO	2.1
1	C	65	LEU	2.1
1	D	189	ASP	2.0
1	A	345	PRO	2.0
1	A	399	ALA	2.0
1	B	617	PRO	2.0
1	B	185	LYS	2.0
1	A	178	GLU	2.0
1	C	336	GLN	2.0
1	B	285	ARG	2.0
1	B	196	ASP	2.0
1	C	560	LYS	2.0
1	A	389	LEU	2.0
1	C	438	LEU	2.0
1	B	557	PHE	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

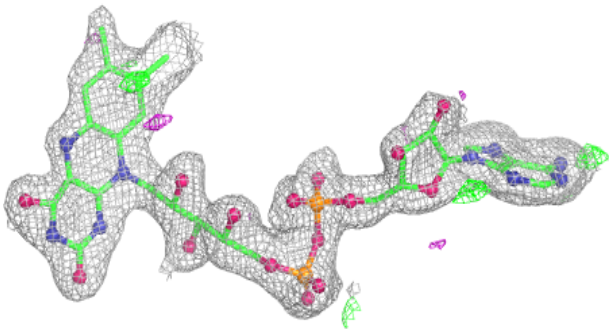
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

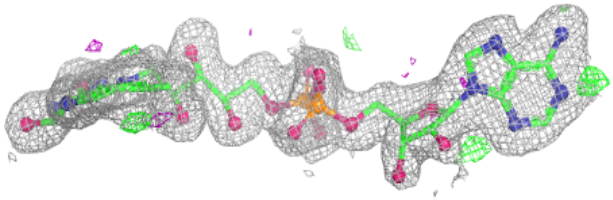
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	1PE	C	803	16/16	0.72	0.20	43,50,64,69	0
4	1PE	A	803	12/16	0.79	0.15	27,31,36,36	0
5	MES	D	804	11/12	0.79	0.15	31,38,44,49	0
4	1PE	D	803	16/16	0.80	0.16	31,37,48,51	0
3	2H5	C	802	12/12	0.81	0.16	39,42,47,50	0
4	1PE	B	704	16/16	0.83	0.16	28,41,53,54	0
3	2H5	A	802	12/12	0.83	0.11	29,31,34,34	0
3	2H5	D	802	12/12	0.90	0.10	26,30,33,34	0
5	MES	B	701	12/12	0.90	0.14	28,38,41,44	0
3	2H5	B	703	12/12	0.90	0.10	24,26,28,29	0
2	FDA	C	801	53/53	0.94	0.09	18,20,28,32	0
2	FDA	B	702	53/53	0.96	0.06	6,9,15,20	0
2	FDA	A	801	53/53	0.96	0.06	7,9,12,16	0
2	FDA	D	801	53/53	0.97	0.06	11,13,19,25	0

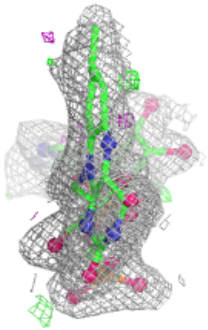
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around FDA C 801:

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

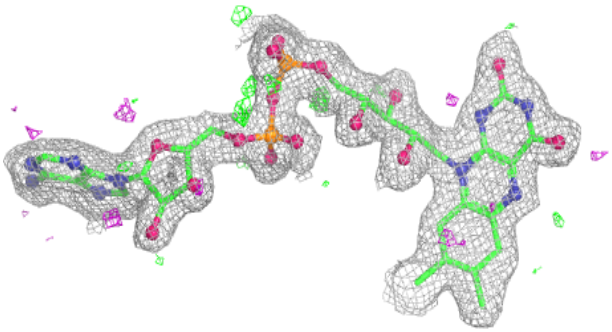


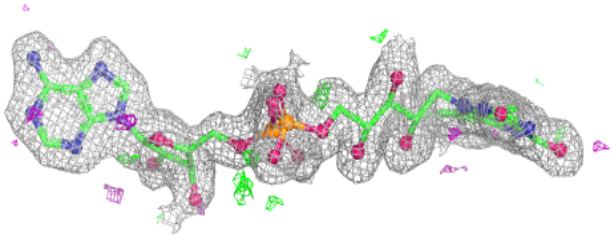


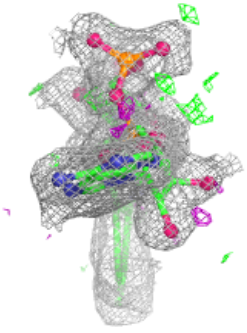


Electron density around FDA B 702:

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

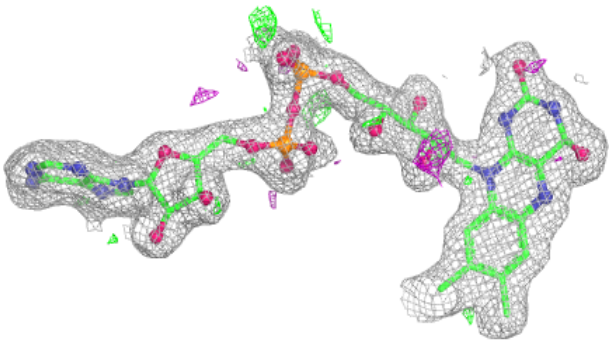


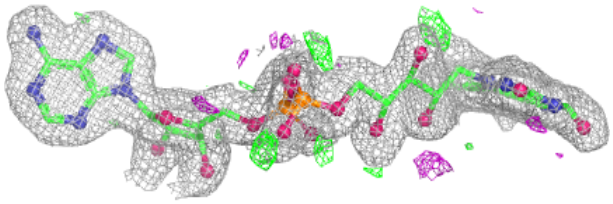


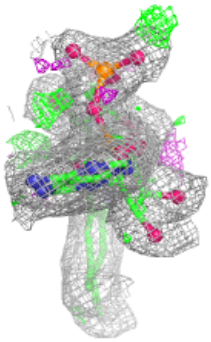


Electron density around FDA A 801:

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

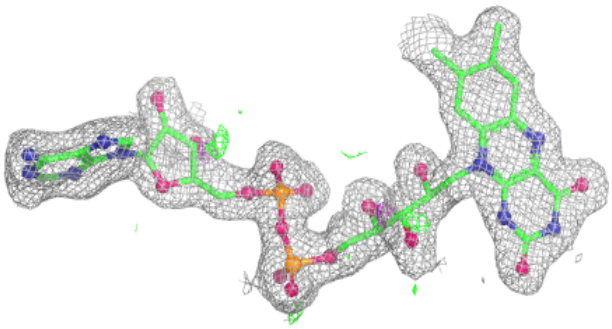


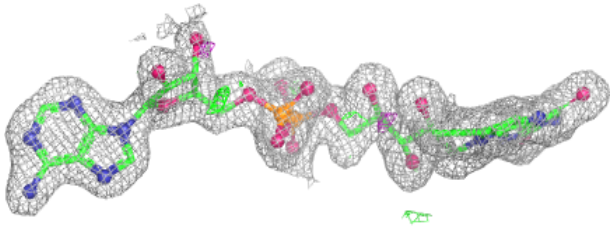


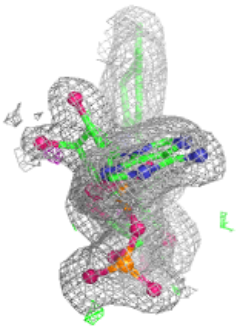


Electron density around FDA D 801:

$2mF_o$-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.