Full wwPDB X-ray Structure Validation Report (i)

Jan 7, 2024 – 11:52 am GMT

PDB ID	:	5MJP
Title	:	Multi-bunch pink beam serial crystallography: Phycocyanin (One chip)
Authors	:	Meents, A.; Oberthuer, D.; Lieske, J.; Srajer, V.; Sarrou, I.
Deposited on	:	2016-12-01
Resolution	:	2.11 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:

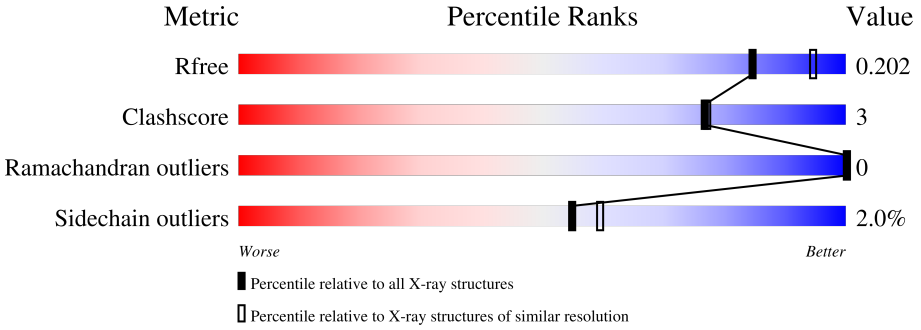
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.11 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	6241 (2.14-2.10)
Clashscore	141614	6778 (2.14-2.10)
Ramachandran outliers	138981	6705 (2.14-2.10)
Sidechain outliers	138945	6706 (2.14-2.10)

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%

Mol	Chain	Length	Quality of chain
1	A	162	94% 6% •
2	B	172	94% 6%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 5431 atoms, of which 2604 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.

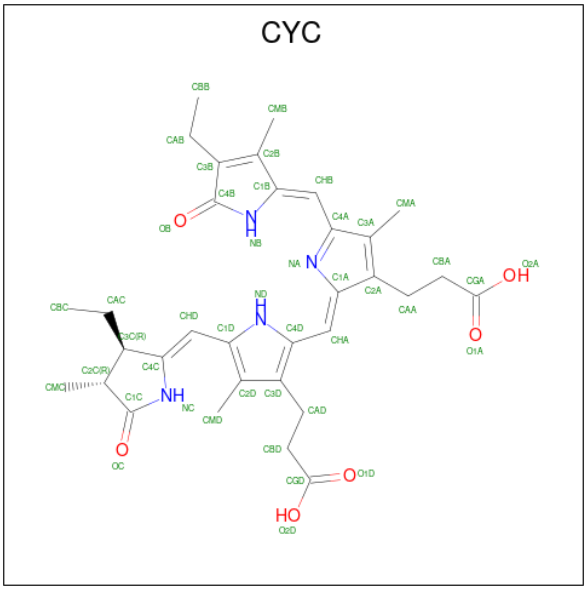
- Molecule 1 is a protein called C-phycocyanin alpha chain.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	162	2452	777	1216	209	243	7	0	2	0

- Molecule 2 is a protein called C-phycocyanin beta chain.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
2	B	172	2559	794	1277	229	251	8	0	2	0

- Molecule 3 is PHYCOCYANOBILIN (three-letter code: CYC) (formula: $C_{33}H_{40}N_4O_6$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	H	N	O		
3	A	1	80	33	37	4	6	0	0
3	B	1	80	33	37	4	6	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	H	N	O		
3	B	1	80	33	37	4	6	0	0

- Molecule 4 is water.

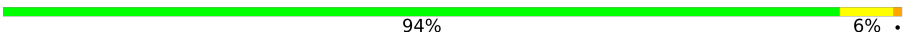
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	A	91	91	91	0	0
			Total	O		
4	B	89	89	89	0	0

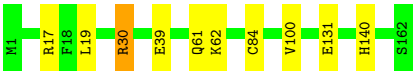
3 Residue-property plots (i)

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. 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. 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: C-phycocyanin alpha chain

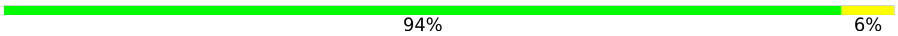
Chain A:





- Molecule 2: C-phycocyanin beta chain

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	H 3 2	Depositor
Cell constants a, b, c, α, β, γ	187.80Å 187.80Å 60.70Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	14.90 – 2.11 36.21 – 2.11	Depositor EDS
% Data completeness (in resolution range)	65.3 (14.90-2.11) 65.4 (36.21-2.11)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	7.98 (at 2.10Å)	Xtriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.169 , 0.200 0.170 , 0.202	Depositor DCC
R_{free} test set	1533 reflections (9.89%)	wwPDB-VP
Wilson B-factor (Å^2)	33.6	Xtriage
Anisotropy	0.076	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.41 , 46.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.46$, $< L^2 > = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.35	EDS
Total number of atoms	5431	wwPDB-VP
Average B, all atoms (Å^2)	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.60% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: CYC, MEN

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	0.28	0/1270	0.41	0/1721
2	B	0.26	0/1292	0.40	0/1748
All	All	0.27	0/2562	0.41	0/3469

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	1236	1216	1206	7	0
2	B	1282	1277	1282	6	0
3	A	43	37	37	3	0
3	B	86	74	73	2	0
4	A	91	0	0	3	2
4	B	89	0	0	4	1
All	All	2827	2604	2598	16	2

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 3.

All (16) close contacts within the same asymmetric unit are listed below, sorted by their clash

magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:61:GLN:NE2	4:A:601:HOH:O	2.06	0.87
2:B:68[B]:GLN:OE1	4:B:601:HOH:O	2.05	0.74
1:A:39:GLU:OE1	4:A:602:HOH:O	2.12	0.67
2:B:144:ASP:OD1	4:B:602:HOH:O	2.14	0.66
1:A:131:GLU:OE1	4:A:603:HOH:O	2.18	0.56
3:A:501:CYC:HBC2	3:A:501:CYC:HMC1	1.89	0.55
1:A:84:CYS:HA	3:A:501:CYC:HHD	1.88	0.54
3:B:202:CYC:HMD2	3:B:202:CYC:NC	2.24	0.53
3:A:501:CYC:NB	3:A:501:CYC:HMA1	2.24	0.52
2:B:57:ARG:NH1	4:B:610:HOH:O	2.46	0.48
2:B:114:ARG:NH2	2:B:169:ALA:O	2.47	0.48
1:A:30:ARG:NH2	1:A:100:VAL:O	2.50	0.44
3:B:201:CYC:HMA1	3:B:201:CYC:NB	2.32	0.44
1:A:19:LEU:O	2:B:45:THR:HG21	2.18	0.43
1:A:17[B]:ARG:CZ	1:A:17[B]:ARG:HB3	2.49	0.42
2:B:147:GLY:O	4:B:603:HOH:O	2.22	0.40

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

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:677:HOH:O	4:A:677:HOH:O[6_556]	1.77	0.43
4:A:647:HOH:O	4:B:672:HOH:O[5_556]	2.04	0.16

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	162/162 (100%)	160 (99%)	2 (1%)	0	100	100
2	B	171/172 (99%)	169 (99%)	2 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	333/334 (100%)	329 (99%)	4 (1%)	0	100	100

There are no Ramachandran outliers to report.

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	125/123 (102%)	122 (98%)	3 (2%)	49	52
2	B	129/127 (102%)	127 (98%)	2 (2%)	62	68
All	All	254/250 (102%)	249 (98%)	5 (2%)	55	59

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	ARG
1	A	62	LYS
1	A	140	HIS
2	B	111	ASN
2	B	146	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is 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	MEN	B	72	2	7,8,9	0.93	0	6,9,11	1.19	1 (16%)

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	MEN	B	72	2	-	2/7/8/10	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	72	MEN	CB-CA-C	-2.33	107.10	111.47

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	72	MEN	CA-CB-CG-OD1
2	B	72	MEN	CA-CB-CG-ND2

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

3 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	CYC	B	202	2	42,46,46	3.54	19 (45%)	50,67,67	1.55	11 (22%)
3	CYC	A	501	1	42,46,46	3.57	18 (42%)	50,67,67	1.54	12 (24%)
3	CYC	B	201	2	42,46,46	3.60	18 (42%)	50,67,67	1.74	12 (24%)

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	CYC	B	202	2	-	7/25/74/74	0/4/4/4
3	CYC	A	501	1	-	11/25/74/74	0/4/4/4
3	CYC	B	201	2	-	8/25/74/74	0/4/4/4

All (55) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	201	CYC	C1B-NB	9.59	1.53	1.37
3	B	202	CYC	C1B-NB	9.49	1.53	1.37
3	A	501	CYC	C1B-NB	9.41	1.53	1.37
3	B	202	CYC	C1C-NC	9.29	1.49	1.37
3	B	201	CYC	C1C-NC	9.15	1.49	1.37
3	A	501	CYC	C1C-NC	9.12	1.49	1.37
3	B	201	CYC	C4B-NB	7.66	1.54	1.38
3	B	202	CYC	C4B-NB	7.58	1.53	1.38
3	A	501	CYC	C4B-NB	7.40	1.53	1.38
3	A	501	CYC	C4C-NC	7.10	1.52	1.37
3	B	202	CYC	C4C-NC	6.98	1.52	1.37
3	B	201	CYC	C4C-NC	6.97	1.52	1.37
3	B	201	CYC	C1A-NA	6.28	1.52	1.38
3	A	501	CYC	C1A-NA	6.05	1.51	1.38
3	B	202	CYC	C1A-NA	5.91	1.51	1.38
3	B	201	CYC	CHB-C4A	5.85	1.54	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	201	CYC	C4A-NA	5.60	1.49	1.36
3	A	501	CYC	CHB-C4A	5.44	1.53	1.40
3	A	501	CYC	C4A-NA	5.38	1.48	1.36
3	B	202	CYC	C4A-NA	5.34	1.48	1.36
3	B	202	CYC	CHB-C4A	5.31	1.52	1.40
3	B	201	CYC	C2A-C3A	4.89	1.47	1.36
3	A	501	CYC	CHA-C1A	-4.89	1.31	1.35
3	B	202	CYC	C2A-C3A	4.84	1.47	1.36
3	B	202	CYC	C1A-C2A	4.76	1.53	1.45
3	A	501	CYC	C2A-C3A	4.73	1.46	1.36
3	B	201	CYC	C2C-C1C	-4.67	1.47	1.52
3	B	201	CYC	C1A-C2A	4.62	1.53	1.45
3	A	501	CYC	C2C-C1C	-4.51	1.48	1.52
3	A	501	CYC	C1A-C2A	4.32	1.52	1.45
3	B	202	CYC	CHA-C1A	-3.91	1.31	1.35
3	B	202	CYC	C2C-C1C	-3.74	1.48	1.52
3	B	201	CYC	CHA-C1A	-3.54	1.32	1.35
3	B	201	CYC	C1D-CHD	3.31	1.54	1.41
3	A	501	CYC	C1D-CHD	3.30	1.53	1.41
3	B	202	CYC	C4D-CHA	3.22	1.53	1.41
3	B	201	CYC	C4D-CHA	3.20	1.53	1.41
3	B	202	CYC	C1D-CHD	3.09	1.53	1.41
3	A	501	CYC	C4D-CHA	3.01	1.52	1.41
3	B	201	CYC	C3B-C2B	2.72	1.42	1.36
3	B	202	CYC	C3B-C2B	2.67	1.42	1.36
3	B	201	CYC	C1B-C2B	2.66	1.49	1.45
3	B	202	CYC	OB-C4B	-2.62	1.18	1.23
3	A	501	CYC	CHB-C1B	-2.62	1.31	1.38
3	A	501	CYC	OB-C4B	-2.59	1.18	1.23
3	A	501	CYC	OC-C1C	-2.57	1.18	1.23
3	B	202	CYC	CHB-C1B	-2.56	1.31	1.38
3	B	202	CYC	C1B-C2B	2.54	1.49	1.45
3	A	501	CYC	C3B-C2B	2.53	1.42	1.36
3	B	201	CYC	OC-C1C	-2.44	1.18	1.23
3	A	501	CYC	C1B-C2B	2.44	1.49	1.45
3	B	201	CYC	OB-C4B	-2.39	1.19	1.23
3	B	202	CYC	CHD-C4C	-2.29	1.32	1.38
3	B	201	CYC	CHB-C1B	-2.21	1.32	1.38
3	B	202	CYC	OC-C1C	-2.19	1.19	1.23

All (35) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	B	201	CYC	C2C-C3C-C4C	4.52	108.12	101.34
3	B	201	CYC	CHD-C4C-NC	3.86	129.80	125.20
3	B	202	CYC	C2C-C3C-C4C	3.68	106.86	101.34
3	B	202	CYC	C2A-C1A-NA	-3.27	105.29	110.05
3	B	201	CYC	C2A-C1A-NA	-3.27	105.30	110.05
3	B	201	CYC	C1B-C2B-C3B	3.22	111.23	107.87
3	A	501	CYC	CBD-CAD-C3D	-3.13	107.28	112.62
3	B	202	CYC	C1B-NB-C4B	-3.04	106.79	110.67
3	A	501	CYC	C1B-NB-C4B	-2.94	106.92	110.67
3	A	501	CYC	CMA-C3A-C4A	2.86	129.47	125.06
3	B	202	CYC	C1A-C2A-C3A	2.79	109.88	106.78
3	A	501	CYC	C2A-C1A-NA	-2.75	106.05	110.05
3	B	201	CYC	C1A-C2A-C3A	2.66	109.73	106.78
3	A	501	CYC	C1B-C2B-C3B	2.63	110.61	107.87
3	B	202	CYC	C4D-CHA-C1A	-2.59	125.71	128.81
3	B	202	CYC	C1B-C2B-C3B	2.58	110.57	107.87
3	A	501	CYC	C1A-C2A-C3A	2.57	109.63	106.78
3	A	501	CYC	C1B-CHB-C4A	-2.46	122.06	128.08
3	B	201	CYC	C1B-NB-C4B	-2.42	107.59	110.67
3	A	501	CYC	CHD-C4C-NC	2.32	127.97	125.20
3	B	201	CYC	CBD-CAD-C3D	-2.30	108.70	112.62
3	B	201	CYC	CMC-C2C-C1C	-2.30	107.45	112.40
3	A	501	CYC	C4D-CHA-C1A	-2.23	126.14	128.81
3	A	501	CYC	O2D-CGD-CBD	2.21	121.13	114.03
3	B	202	CYC	CHD-C4C-NC	2.20	127.82	125.20
3	B	201	CYC	CAB-C3B-C4B	2.18	124.82	121.38
3	A	501	CYC	CAB-C3B-C4B	2.18	124.82	121.38
3	B	201	CYC	C1B-CHB-C4A	-2.15	122.84	128.08
3	B	201	CYC	O2A-CGA-CBA	2.13	120.89	114.03
3	B	202	CYC	CBD-CAD-C3D	-2.13	108.99	112.62
3	B	202	CYC	CAB-C3B-C4B	2.13	124.74	121.38
3	B	202	CYC	C1B-CHB-C4A	-2.12	122.90	128.08
3	B	201	CYC	CAC-C3C-C2C	-2.05	109.14	114.26
3	B	202	CYC	CAA-CBA-CGA	-2.04	109.22	113.60
3	A	501	CYC	CBC-CAC-C3C	-2.01	108.99	113.47

There are no chirality outliers.

All (26) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	501	CYC	NA-C4A-CHB-C1B
3	A	501	CYC	C3A-C4A-CHB-C1B
3	A	501	CYC	C4C-C3C-CAC-CBC

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Mol	Chain	Res	Type	Atoms
3	A	501	CYC	ND-C1D-CHD-C4C
3	A	501	CYC	C2D-C1D-CHD-C4C
3	B	201	CYC	NA-C4A-CHB-C1B
3	B	201	CYC	C3A-C4A-CHB-C1B
3	B	201	CYC	C4B-C3B-CAB-CBB
3	B	202	CYC	NA-C4A-CHB-C1B
3	B	202	CYC	C3A-C4A-CHB-C1B
3	B	202	CYC	C2C-C3C-CAC-CBC
3	B	202	CYC	C4C-C3C-CAC-CBC
3	B	201	CYC	C2B-C3B-CAB-CBB
3	A	501	CYC	C2B-C3B-CAB-CBB
3	A	501	CYC	NC-C4C-CHD-C1D
3	A	501	CYC	C2C-C3C-CAC-CBC
3	A	501	CYC	CAA-CBA-CGA-O2A
3	B	201	CYC	CAD-CBD-CGD-O2D
3	A	501	CYC	CAA-CBA-CGA-O1A
3	B	201	CYC	CAD-CBD-CGD-O1D
3	B	202	CYC	CAA-CBA-CGA-O2A
3	B	202	CYC	CAA-CBA-CGA-O1A
3	B	201	CYC	CAA-CBA-CGA-O2A
3	B	202	CYC	CAD-CBD-CGD-O2D
3	A	501	CYC	CAD-CBD-CGD-O2D
3	B	201	CYC	CAA-CBA-CGA-O1A

There are no ring outliers.

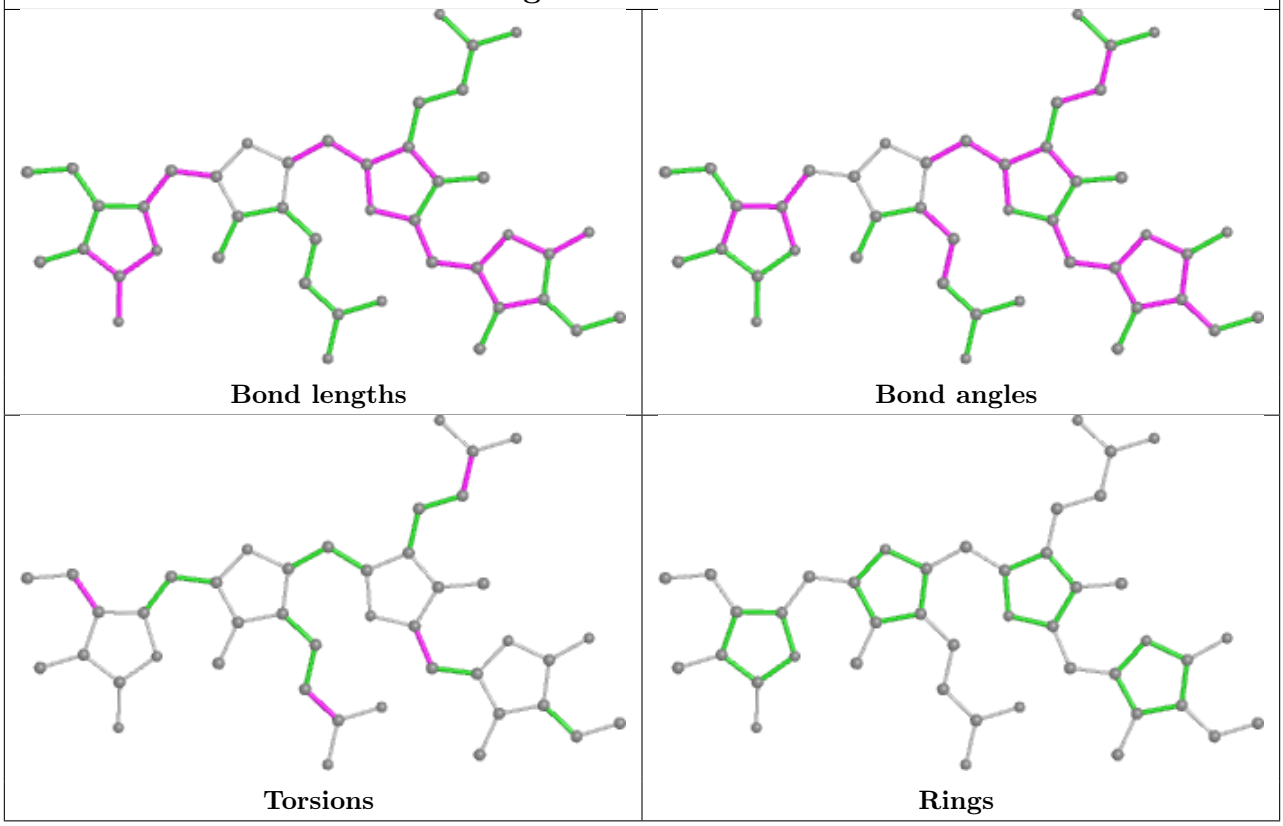
3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	202	CYC	1	0
3	A	501	CYC	3	0
3	B	201	CYC	1	0

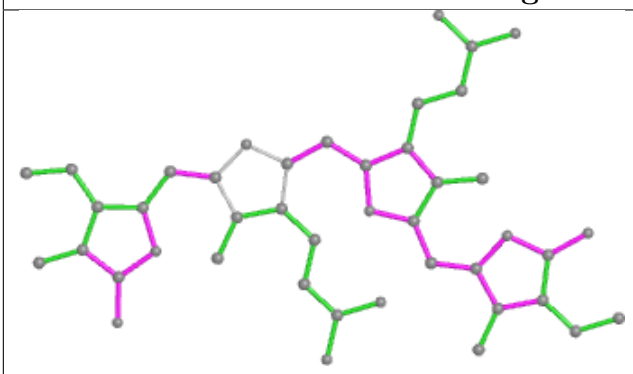
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier.

The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

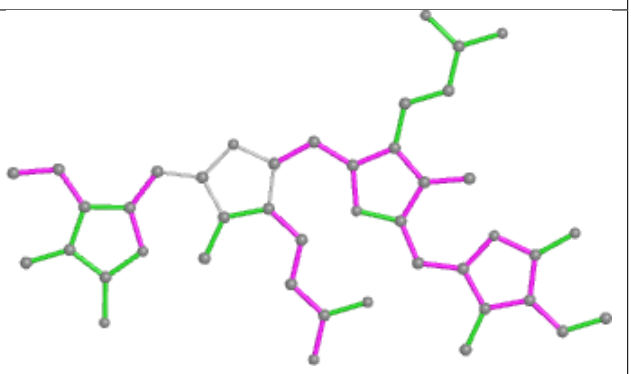
Ligand CYC B 202



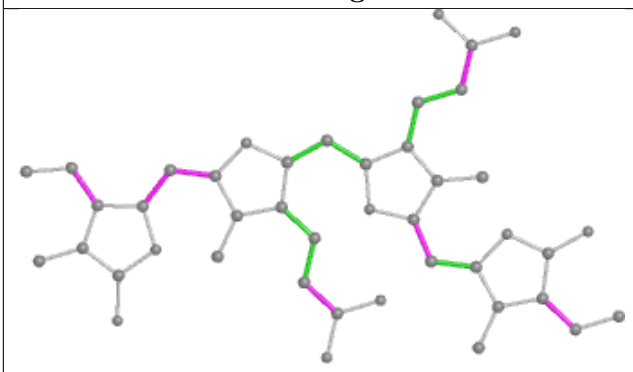
Ligand CYC A 501



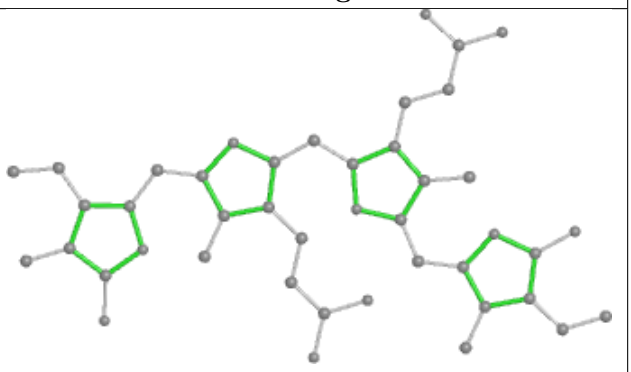
Bond lengths



Bond angles

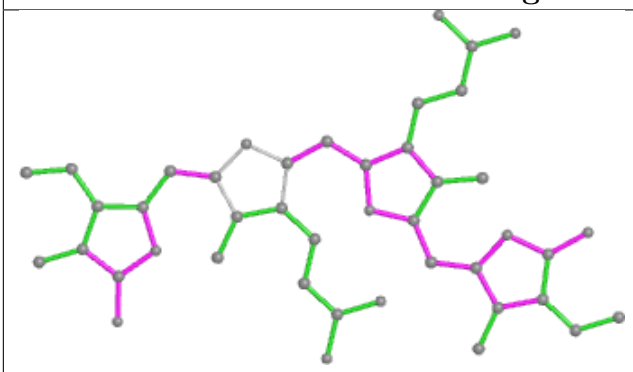


Torsions

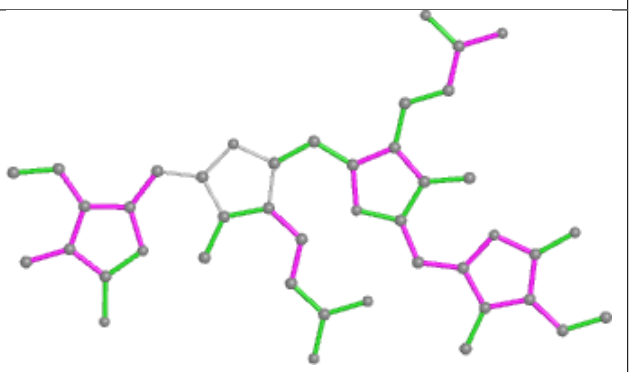


Rings

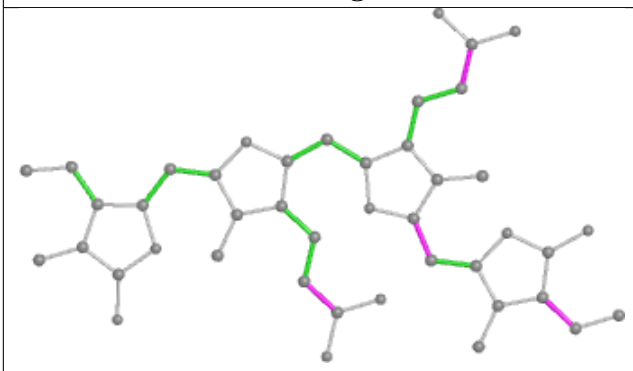
Ligand CYC B 201



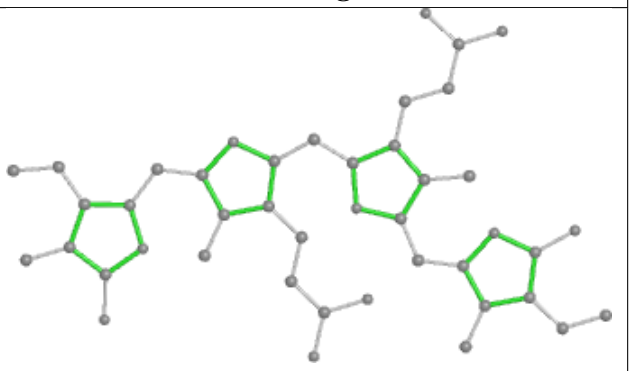
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates (i)

Unable to reproduce the depositors R factor - this section is therefore empty.

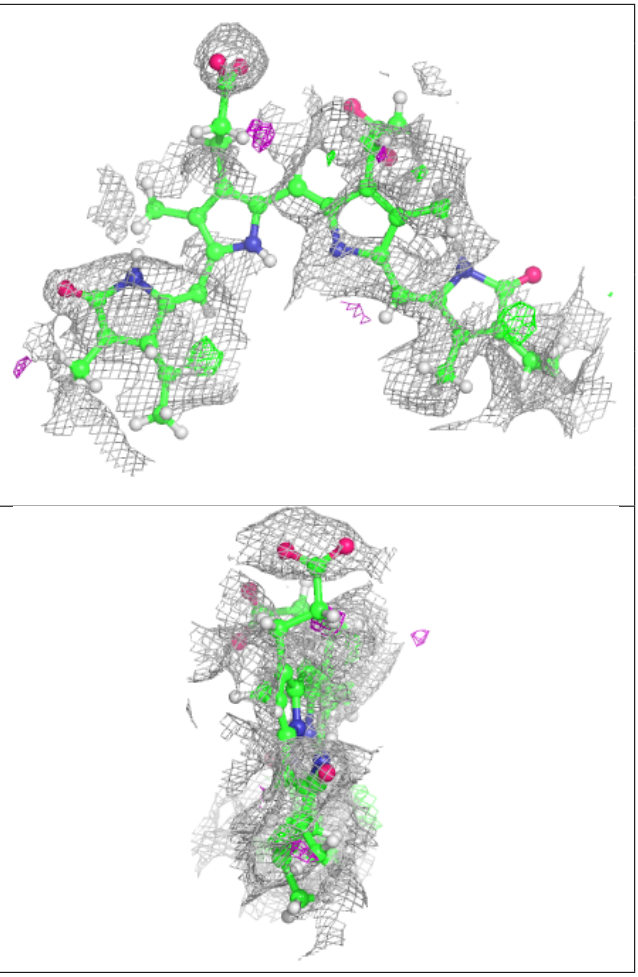
6.4 Ligands (i)

Unable to reproduce the depositors R factor - this section is therefore empty.

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.

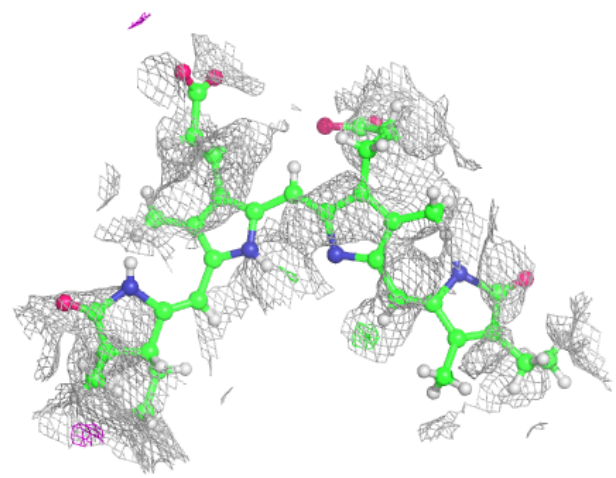
Electron density around CYC A 501:

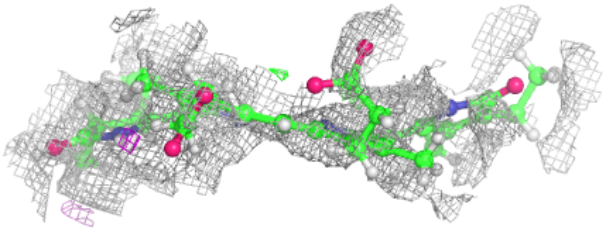
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

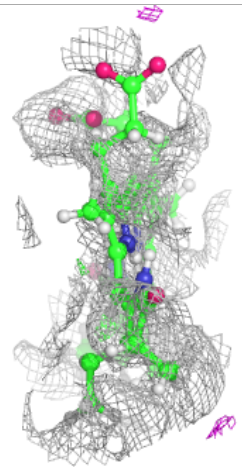


Electron density around CYC B 201:

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

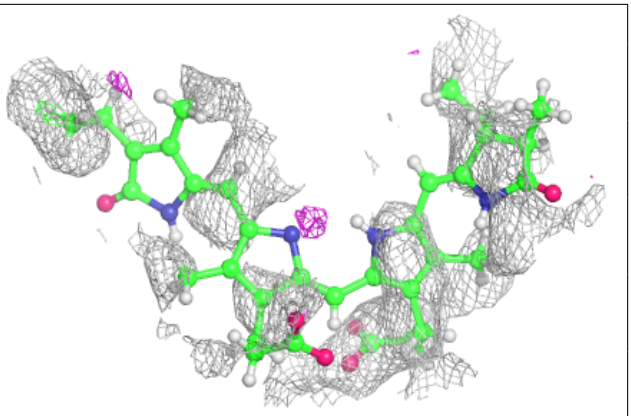


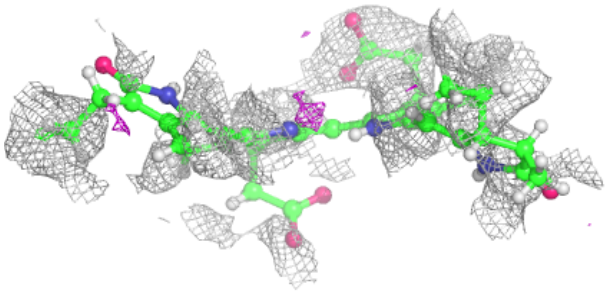


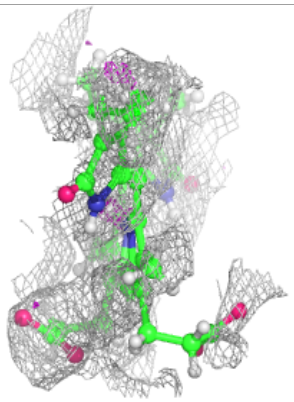


Electron density around CYC B 202:

$2mF_o$-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)

Unable to reproduce the depositors R factor - this section is therefore empty.