Full wwPDB X-ray Structure Validation Report (i)

Aug 27, 2023 – 12:12 PM EDT

PDB ID	:	3IJH
Title	:	Structure of S67-27 in Complex with Ko
Authors	:	Brooks, C.L.; Blackler, R.J.; Evans, S.V.
Deposited on	:	2009-08-04
Resolution	:	2.10 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:

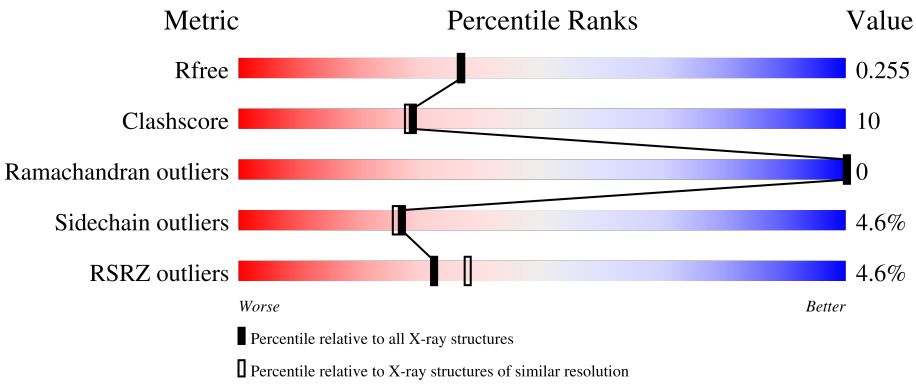
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35

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 2.10 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	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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% 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	219	3% 81% 16%
1	C	219	9% 77% 20%
2	B	226	% 76% 19%
2	D	226	5% 83% 12%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 7282 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.

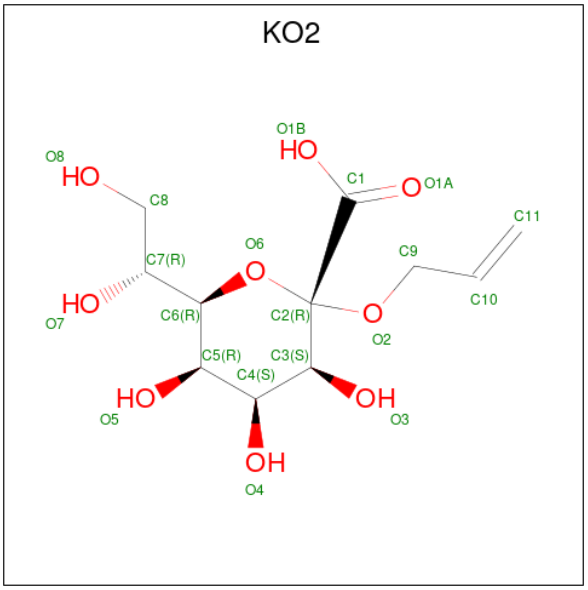
- Molecule 1 is a protein called Immunoglobulin light chain (IGG3).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	217	1684	1045	290	342	7	0	1	0
1	C	217	1694	1050	293	344	7	0	3	0

- Molecule 2 is a protein called Immunoglobulin heavy chain (IGG3).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	221	1698	1085	279	326	8	0	2	0
2	D	221	1698	1085	279	326	8	0	2	0

- Molecule 3 is prop-2-en-1-yl D-glycero-alpha-D-talo-oct-2-ulopyranosidonic acid (three-letter code: KO2) (formula: $C_{11}H_{18}O_9$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
3	B	1	20	11	9	0	0
			Total	C	O		
3	C	1	20	11	9	0	0

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
4	B	1	1	1	0	0
			Total	Mg		
4	D	1	1	1	0	0

- Molecule 5 is water.

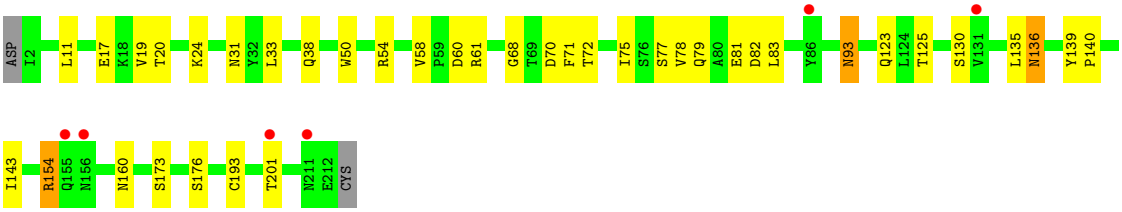
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
5	A	142	142	142	0	0
			Total	O		
5	B	117	117	117	0	0
			Total	O		
5	C	80	80	80	0	0
			Total	O		
5	D	127	127	127	0	0

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.

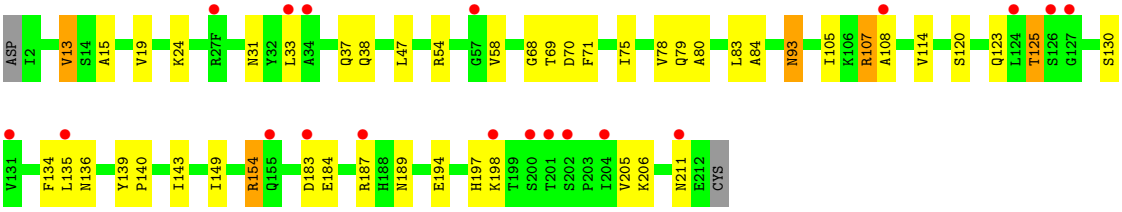
• Molecule 1: Immunoglobulin light chain (IGG3)

Chain A:



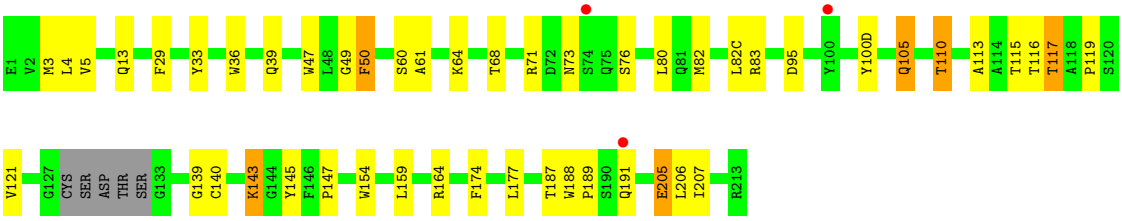
• Molecule 1: Immunoglobulin light chain (IGG3)

Chain C:



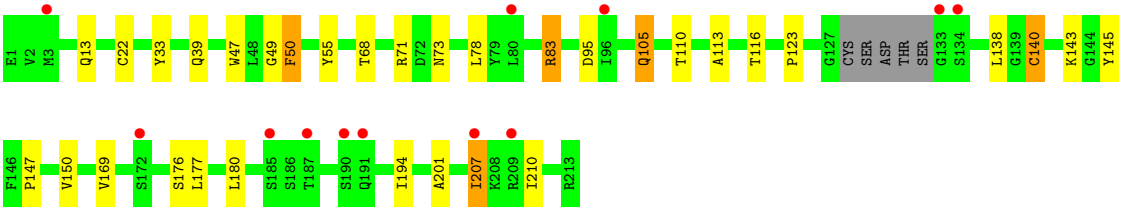
• Molecule 2: Immunoglobulin heavy chain (IGG3)

Chain B:



• Molecule 2: Immunoglobulin heavy chain (IGG3)

Chain D:


E1
V2
M3
Q13
C22
Y33
Q39
W47
L48
G49
F50
Y55
T68
R71
D72
N73
L78
Y79
L80
R83
D95
I96
Q105
T110
A113
T116
P123
G127
CYS
SER
ASP
THR
SER
G133
S134
L138
G139
C140
K143
G144
Y145
F146
P147
V150
V169
S172
S176
L177
L180
S185
S186
T187
S190
Q191
I194
A201
I207
K208
R209
I210
R213

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	46.46Å 127.88Å 156.21Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.87 – 2.10 19.96 – 2.10	Depositor EDS
% Data completeness (in resolution range)	97.8 (19.87-2.10) 99.3 (19.96-2.10)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.97 (at 2.09Å)	Xtriage
Refinement program	PHENIX 1.4_4	Depositor
R, R_{free}	0.213 , 0.254 0.217 , 0.255	Depositor DCC
R_{free} test set	2786 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å^2)	31.4	Xtriage
Anisotropy	0.547	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 48.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.52$, $< L^2 > = 0.36$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	7282	wwPDB-VP
Average B, all atoms (Å^2)	31.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.36% 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: KO2, MG

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	0.29	0/1725	0.48	0/2336
1	C	0.26	0/1745	0.46	0/2362
2	B	0.27	0/1750	0.47	0/2385
2	D	0.27	0/1750	0.50	0/2385
All	All	0.27	0/6970	0.48	0/9468

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	1684	0	1635	31	0
1	C	1694	0	1642	41	0
2	B	1698	0	1666	44	0
2	D	1698	0	1666	32	0
3	B	20	0	17	1	0
3	C	20	0	17	0	0
4	B	1	0	0	0	0
4	D	1	0	0	0	0
5	A	142	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	B	117	0	0	0	0
5	C	80	0	0	0	0
5	D	127	0	0	2	0
All	All	7282	0	6643	130	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 10.

All (130) 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)
2:B:116:THR:H	1:C:125:THR:HG21	1.37	0.87
1:C:38:GLN:HE22	2:D:39:GLN:HE22	1.17	0.87
2:D:83:ARG:HG2	2:D:83:ARG:HH11	1.46	0.80
2:B:61:ALA:HA	2:B:64:LYS:HE2	1.64	0.79
2:D:83:ARG:HH11	2:D:83:ARG:CG	1.97	0.78
1:A:38:GLN:HE22	2:B:39:GLN:HE22	1.32	0.75
2:B:116:THR:H	1:C:125:THR:CG2	1.99	0.75
1:C:83:LEU:HD12	1:C:105:ILE:HG12	1.69	0.75
2:B:115:THR:HA	1:C:125:THR:HG23	1.71	0.72
2:B:13:GLN:NE2	2:B:113:ALA:HA	2.05	0.71
2:B:205:GLU:HB2	2:D:207:ILE:HG12	1.71	0.70
1:C:107:ARG:HD3	1:C:108:ALA:O	1.91	0.69
1:A:31:ASN:HD21	1:A:68:GLY:H	1.41	0.68
2:D:83:ARG:HG2	2:D:83:ARG:NH1	2.08	0.68
2:B:33:TYR:HB2	2:B:95:ASP:HB3	1.76	0.66
1:C:80:ALA:O	1:C:83:LEU:HD13	1.95	0.66
1:C:149:ILE:HD12	1:C:154:ARG:HG3	1.77	0.66
1:C:33:LEU:HD22	1:C:71:PHE:CG	2.31	0.66
1:A:11:LEU:HD11	1:A:19:VAL:HG23	1.78	0.66
2:B:105:GLN:NE2	2:B:105:GLN:H	1.94	0.65
2:D:13:GLN:NE2	2:D:113:ALA:HA	2.11	0.65
2:D:71:ARG:HE	2:D:73:ASN:HD21	1.45	0.64
2:D:33:TYR:HB2	2:D:95:ASP:HB3	1.79	0.64
1:A:54:ARG:HG2	1:A:58:VAL:HB	1.79	0.63
1:A:31:ASN:ND2	1:A:68:GLY:H	1.97	0.62
1:A:61:ARG:NH1	1:A:82:ASP:OD2	2.31	0.62
2:B:116:THR:N	1:C:125:THR:HG21	2.14	0.62
1:A:19:VAL:HG12	1:A:75:ILE:HB	1.82	0.61
2:D:140[B]:CYS:SG	2:D:210:ILE:HD11	2.40	0.61
1:A:33:LEU:HD22	1:A:71:PHE:CG	2.36	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:184:GLU:HG2	1:C:187[A]:ARG:NH2	2.18	0.58
2:B:13:GLN:HE22	2:B:113:ALA:HA	1.68	0.58
2:B:71:ARG:HE	2:B:73:ASN:HD21	1.50	0.57
1:C:15:ALA:HA	1:C:78:VAL:HG23	1.86	0.57
1:C:37:GLN:HB2	1:C:47:LEU:HD11	1.86	0.57
2:B:71:ARG:NE	2:B:73:ASN:HD21	2.04	0.55
1:C:189:ASN:HD21	1:C:211:ASN:H	1.55	0.55
1:C:83:LEU:CD1	1:C:105:ILE:HG12	2.34	0.55
2:D:83:ARG:HH11	2:D:83:ARG:CB	2.20	0.54
1:A:24:LYS:HE2	1:A:70:ASP:OD2	2.09	0.53
2:B:3:MET:HA	2:B:3:MET:HE2	1.90	0.53
2:D:71:ARG:NE	2:D:73:ASN:HD21	2.07	0.52
1:A:11:LEU:HD11	1:A:19:VAL:CG2	2.39	0.52
2:D:105:GLN:NE2	2:D:105:GLN:H	2.07	0.51
1:C:139:TYR:CG	1:C:140:PRO:HA	2.46	0.51
1:C:123:GLN:NE2	1:C:130:SER:H	2.09	0.51
2:B:139:GLY:HA2	2:B:154:TRP:CH2	2.46	0.51
1:A:123:GLN:NE2	1:A:130:SER:H	2.08	0.51
1:A:17:GLU:O	1:A:78:VAL:HG13	2.11	0.50
1:A:54:ARG:HD2	1:A:58:VAL:O	2.11	0.50
2:D:169:VAL:HG12	5:D:252:HOH:O	2.11	0.50
1:C:123:GLN:HE22	1:C:130:SER:H	1.59	0.50
1:C:139:TYR:O	1:C:197:HIS:HE1	1.93	0.50
1:C:189:ASN:ND2	1:C:211:ASN:H	2.10	0.50
2:D:123:PRO:HG3	5:D:391:HOH:O	2.12	0.50
2:B:50:PHE:HD1	2:B:50:PHE:C	2.15	0.49
2:B:105:GLN:H	2:B:105:GLN:HE21	1.60	0.49
2:D:177:LEU:C	2:D:177:LEU:HD12	2.33	0.49
1:C:47:LEU:HA	1:C:58:VAL:HG21	1.95	0.49
1:C:31:ASN:ND2	1:C:68:GLY:H	2.11	0.49
1:A:79:GLN:HB3	1:A:81:GLU:OE2	2.13	0.48
1:C:31:ASN:HD21	1:C:68:GLY:H	1.61	0.48
2:B:119:PRO:HB3	2:B:145:TYR:HB3	1.96	0.48
2:D:13:GLN:HE22	2:D:113:ALA:HA	1.76	0.48
1:A:136:ASN:HD21	2:B:164:ARG:HG3	1.79	0.48
2:D:33:TYR:CB	2:D:95:ASP:HB3	2.43	0.48
1:C:93:ASN:HD22	1:C:93:ASN:C	2.18	0.47
1:C:134:PHE:CE1	2:D:180:LEU:HD13	2.50	0.47
2:D:194:ILE:HD13	2:D:207:ILE:HD12	1.96	0.47
2:B:50:PHE:C	2:B:50:PHE:CD1	2.86	0.47
2:B:143:LYS:HE2	2:B:143:LYS:HB3	1.66	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:135:LEU:HD23	1:C:143:ILE:HD13	1.96	0.47
1:C:38:GLN:NE2	2:D:39:GLN:HE22	1.98	0.47
1:A:38:GLN:HE22	2:B:39:GLN:NE2	2.08	0.47
1:C:54:ARG:HD3	1:C:58:VAL:O	2.14	0.46
2:B:177:LEU:C	2:B:177:LEU:HD12	2.35	0.46
1:A:38:GLN:NE2	2:B:39:GLN:HE22	2.06	0.46
1:C:38:GLN:HE22	2:D:39:GLN:NE2	1.99	0.46
2:B:110:THR:HG21	2:B:147:PRO:HB2	1.96	0.46
1:C:19:VAL:HG12	1:C:75:ILE:HB	1.97	0.46
1:C:114:VAL:O	1:C:206:LYS:HE3	2.15	0.46
2:B:82:MET:HB3	2:B:82(C):LEU:HD21	1.97	0.46
1:C:120:SER:CB	2:D:123:PRO:HD2	2.46	0.45
2:B:5:VAL:HA	2:B:105:GLN:HE22	1.81	0.45
2:B:29:PHE:CD2	2:B:76:SER:HA	2.50	0.45
2:D:50:PHE:HD1	2:D:50:PHE:C	2.20	0.45
1:C:194:GLU:HG2	1:C:205:VAL:HG22	1.97	0.45
2:D:50:PHE:C	2:D:50:PHE:CD1	2.89	0.45
1:A:154:ARG:HG2	1:A:154:ARG:HH11	1.81	0.45
2:B:187:THR:O	2:B:191:GLN:HB2	2.16	0.45
1:A:139:TYR:CG	1:A:140:PRO:HA	2.52	0.44
2:B:117:THR:HG21	2:B:174:PHE:HE1	1.82	0.44
2:B:47:TRP:CH2	2:B:49:GLY:HA2	2.53	0.44
2:B:60:SER:O	2:B:64:LYS:HG3	2.16	0.44
2:B:116:THR:N	1:C:125:THR:CG2	2.74	0.44
1:A:160:ASN:HD22	1:A:176:SER:HA	1.83	0.43
1:A:20:THR:HG23	1:A:72:THR:CG2	2.47	0.43
2:D:143:LYS:HB3	2:D:176:SER:HB2	1.99	0.43
1:A:77:SER:O	1:A:79:GLN:OE1	2.37	0.43
1:C:135:LEU:HD23	1:C:143:ILE:CD1	2.49	0.43
1:A:123:GLN:HE22	1:A:130:SER:H	1.65	0.43
2:D:47:TRP:CH2	2:D:49:GLY:HA2	2.54	0.43
2:D:55:TYR:CD1	2:D:71:ARG:HD3	2.54	0.43
1:A:136:ASN:ND2	1:A:173:SER:OG	2.47	0.43
2:B:36:TRP:CE2	2:B:80:LEU:HB2	2.54	0.42
1:C:83:LEU:O	1:C:84:ALA:HB2	2.19	0.42
1:A:123:GLN:HE22	1:A:130:SER:HB2	1.84	0.42
2:D:147:PRO:HD2	2:D:201:ALA:CB	2.49	0.42
2:B:121:VAL:HG23	2:B:206:LEU:HD12	2.01	0.42
2:B:47:TRP:CZ2	2:B:49:GLY:HA2	2.55	0.42
2:D:22:CYS:HB3	2:D:78:LEU:HB3	2.02	0.42
1:A:19:VAL:CG1	1:A:75:ILE:HB	2.49	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:31:ASN:O	1:A:50:TRP:HA	2.20	0.41
1:A:125:THR:CG2	2:D:116:THR:HB	2.50	0.41
1:A:50:TRP:CZ2	2:B:100(D):TYR:HA	2.55	0.41
2:B:188:TRP:CG	2:B:189:PRO:HA	2.56	0.41
1:A:135:LEU:HD23	1:A:143:ILE:HD13	2.02	0.41
2:B:71:ARG:HE	2:B:73:ASN:ND2	2.16	0.41
2:B:33:TYR:CB	2:B:95:ASP:HB3	2.47	0.41
2:B:119:PRO:O	2:B:206:LEU:HD11	2.20	0.41
1:C:24:LYS:HG3	1:C:69:THR:O	2.20	0.41
2:D:71:ARG:HE	2:D:73:ASN:ND2	2.13	0.41
1:A:93:ASN:C	1:A:93:ASN:HD22	2.23	0.41
2:B:3:MET:O	2:B:4:LEU:HD12	2.21	0.41
1:C:13:VAL:HG11	1:C:19:VAL:HG23	2.02	0.41
1:C:140:PRO:HG3	1:C:198:LYS:HD3	2.03	0.41
2:B:115:THR:HG23	1:C:125:THR:CG2	2.52	0.40
2:B:33:TYR:OH	3:B:214:KO2:H9A	2.22	0.40
2:D:145:TYR:CE2	2:D:150:VAL:HG13	2.57	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	216/219 (99%)	208 (96%)	8 (4%)	0	100	100
1	C	218/219 (100%)	209 (96%)	9 (4%)	0	100	100
2	B	219/226 (97%)	215 (98%)	4 (2%)	0	100	100
2	D	219/226 (97%)	217 (99%)	2 (1%)	0	100	100
All	All	872/890 (98%)	849 (97%)	23 (3%)	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	194/195 (100%)	187 (96%)	7 (4%)	35	36
1	C	196/195 (100%)	187 (95%)	9 (5%)	27	26
2	B	189/192 (98%)	177 (94%)	12 (6%)	18	15
2	D	189/192 (98%)	180 (95%)	9 (5%)	25	24
All	All	768/774 (99%)	731 (95%)	37 (5%)	27	24

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	60	ASP
1	A	83	LEU
1	A	93	ASN
1	A	136	ASN
1	A	154	ARG
1	A	193	CYS
1	A	201	THR
2	B	50	PHE
2	B	68	THR
2	B	83	ARG
2	B	105	GLN
2	B	110	THR
2	B	117	THR
2	B	140[A]	CYS
2	B	140[B]	CYS
2	B	143	LYS
2	B	159	LEU
2	B	205	GLU
2	B	207	ILE
1	C	13	VAL
1	C	70	ASP
1	C	79	GLN
1	C	93	ASN
1	C	107	ARG

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Mol	Chain	Res	Type
1	C	125	THR
1	C	136	ASN
1	C	154	ARG
1	C	183	ASP
2	D	50	PHE
2	D	68	THR
2	D	83	ARG
2	D	105	GLN
2	D	110	THR
2	D	138	LEU
2	D	140[A]	CYS
2	D	140[B]	CYS
2	D	207	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	31	ASN
1	A	38	GLN
1	A	42	GLN
1	A	93	ASN
1	A	123	GLN
1	A	136	ASN
1	A	156	ASN
1	A	160	ASN
2	B	13	GLN
2	B	73	ASN
2	B	105	GLN
1	C	31	ASN
1	C	38	GLN
1	C	42	GLN
1	C	93	ASN
1	C	123	GLN
1	C	136	ASN
1	C	160	ASN
1	C	188	HIS
1	C	189	ASN
2	D	13	GLN
2	D	73	ASN
2	D	105	GLN
2	D	171	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 for Mogul analysis.

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	KO2	B	214	-	17,20,20	1.22	2 (11%)	17,29,29	1.40	1 (5%)
3	KO2	C	214	-	17,20,20	1.28	2 (11%)	17,29,29	1.10	1 (5%)

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	KO2	B	214	-	-	2/14/40/40	0/1/1/1
3	KO2	C	214	-	-	1/14/40/40	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	214	KO2	C11-C10	3.73	1.53	1.28

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	214	KO2	C11-C10	3.56	1.52	1.28
3	C	214	KO2	O6-C2	2.75	1.45	1.41
3	B	214	KO2	O6-C2	2.46	1.45	1.41

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	B	214	KO2	C7-C6-C5	-4.01	107.38	114.03
3	C	214	KO2	C7-C6-C5	-2.55	109.81	114.03

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	214	KO2	C11-C10-C9-O2
3	B	214	KO2	C11-C10-C9-O2
3	B	214	KO2	O6-C2-O2-C9

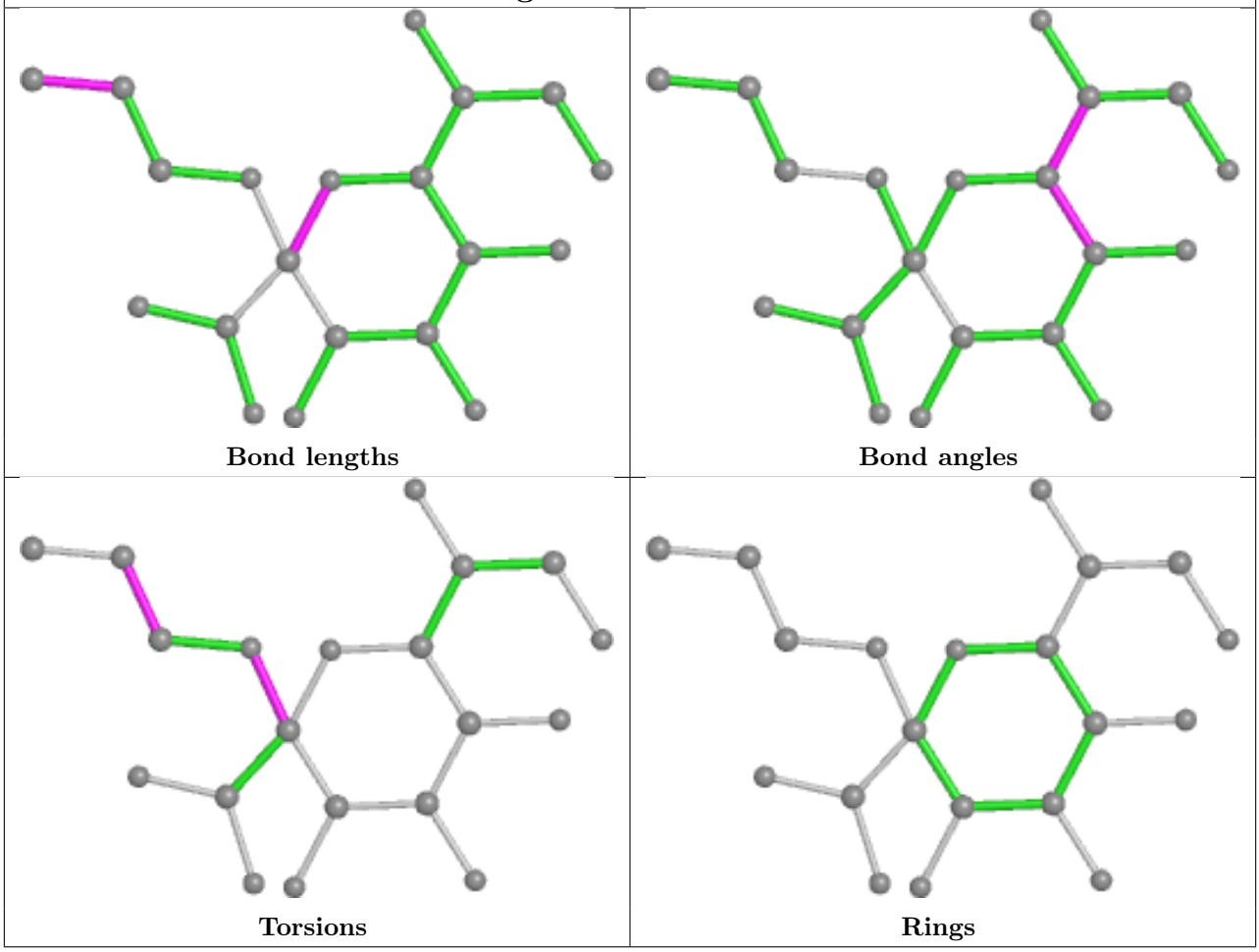
There are no ring outliers.

1 monomer is involved in 1 short contact:

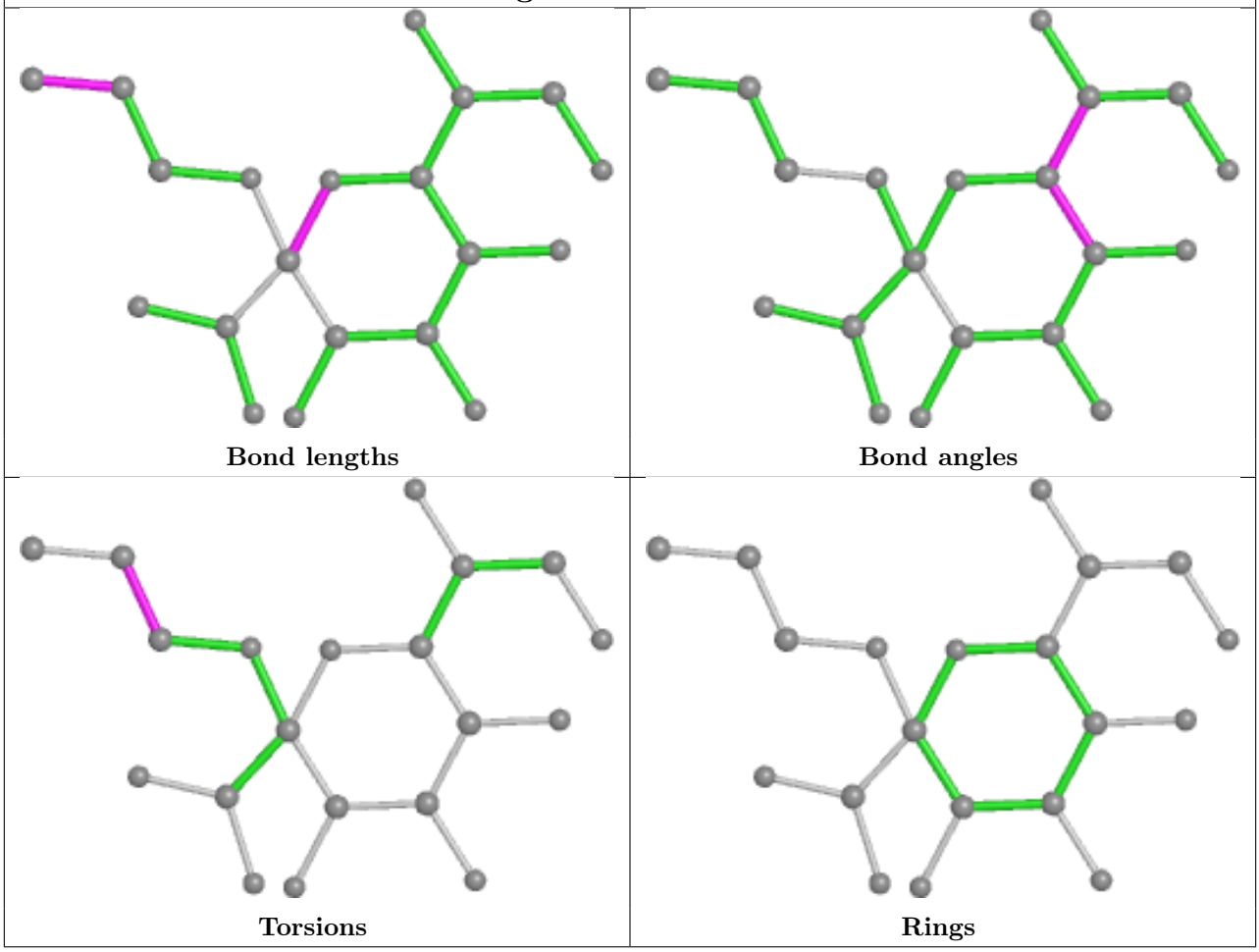
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	214	KO2	1	0

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 KO2 B 214



Ligand KO2 C 214



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	217/219 (99%)	0.16	6 (2%)	53	59	17, 27, 45, 59	0
1	C	217/219 (99%)	0.55	19 (8%)	10	12	20, 35, 50, 61	0
2	B	221/226 (97%)	0.24	3 (1%)	75	78	19, 29, 41, 54	0
2	D	221/226 (97%)	0.32	12 (5%)	25	31	19, 30, 48, 63	0
All	All	876/890 (98%)	0.32	40 (4%)	32	38	17, 30, 47, 63	0

All (40) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	211	ASN	4.7
1	C	211	ASN	4.5
1	C	201	THR	3.7
1	C	200	SER	3.5
1	C	187[A]	ARG	3.3
1	A	131	VAL	3.3
2	D	134	SER	3.2
1	C	155	GLN	3.2
2	D	172	SER	3.1
1	C	126	SER	3.0
2	B	191	GLN	3.0
1	A	156	ASN	2.9
2	D	185	SER	2.9
1	C	27(F)	ARG	2.9
2	D	187	THR	2.8
1	C	131	VAL	2.8
1	C	34	ALA	2.7
1	C	57	GLY	2.6
2	D	207	ILE	2.6
2	D	3	MET	2.5
2	D	190	SER	2.5

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Mol	Chain	Res	Type	RSRZ
2	D	191	GLN	2.5
1	A	86	TYR	2.5
1	C	202	SER	2.5
2	D	209	ARG	2.4
2	B	100	TYR	2.4
1	C	204	ILE	2.4
2	B	74	SER	2.4
1	C	183	ASP	2.4
1	A	201	THR	2.2
1	C	33	LEU	2.2
1	C	135	LEU	2.2
1	C	198	LYS	2.2
1	A	155	GLN	2.1
2	D	133	GLY	2.1
1	C	124	LEU	2.1
2	D	96	ILE	2.1
2	D	80	LEU	2.1
1	C	108	ALA	2.0
1	C	127	GLY	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)

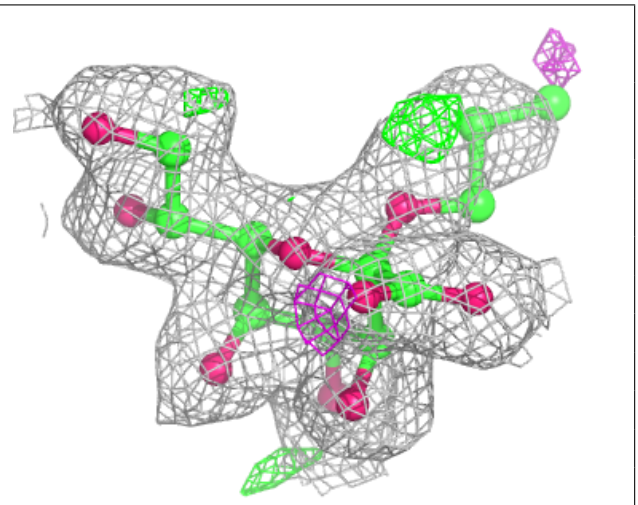
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

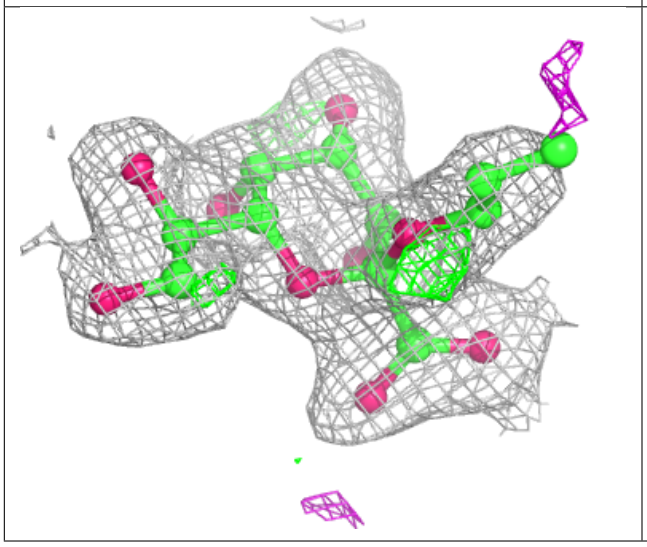
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	MG	D	214	1/1	0.86	0.16	33,33,33,33	0
3	KO2	B	214	20/20	0.89	0.13	19,25,40,41	0
4	MG	B	215	1/1	0.90	0.14	29,29,29,29	0
3	KO2	C	214	20/20	0.93	0.13	20,24,32,34	0

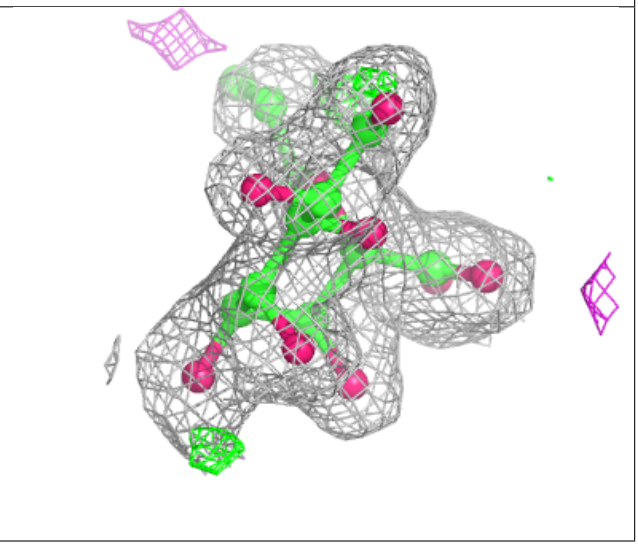
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around KO2 B 214:

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

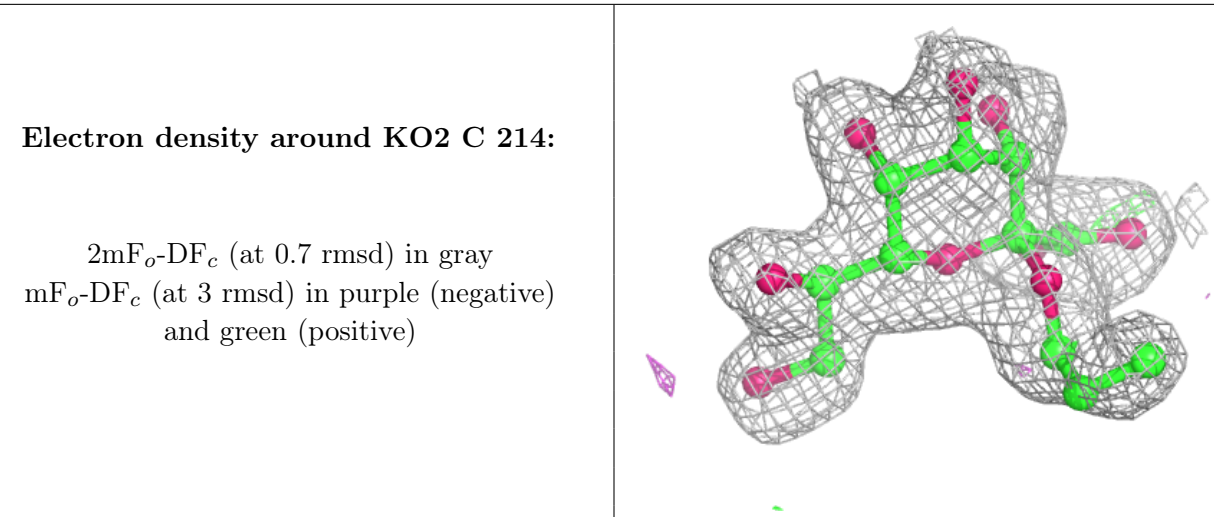


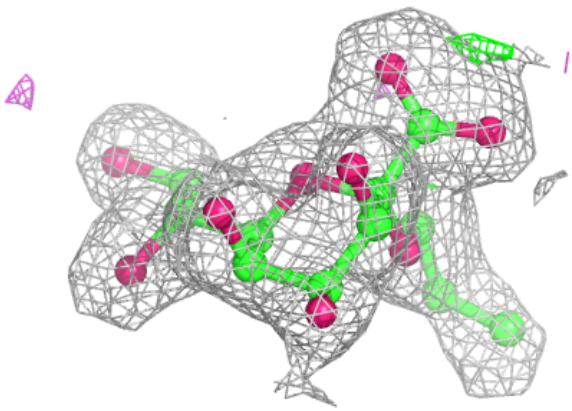


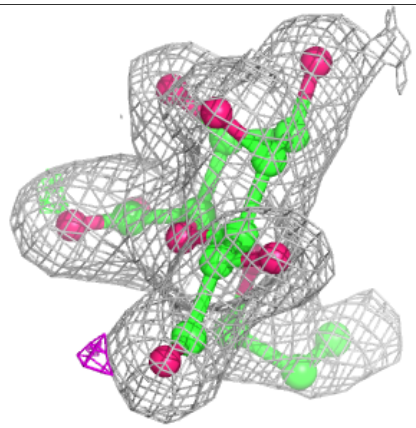


Electron density around KO2 C 214:

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.