



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 15, 2023 – 12:43 AM JST

PDB ID : 6ISD  
Title : Crystal structure of Arabidopsis thaliana HPPD complexed with sulcotrione  
Authors : Yang, W.C.; Yang, G.F.  
Deposited on : 2018-11-16  
Resolution : 2.40 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
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

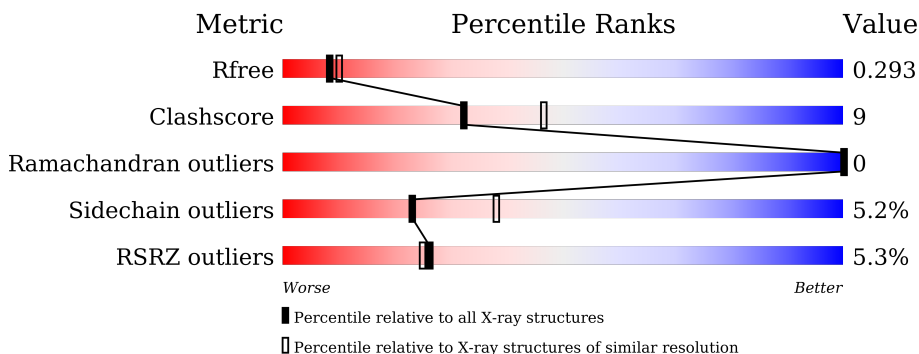
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.40 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	3907 (2.40-2.40)
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)
RSRZ outliers	127900	3811 (2.40-2.40)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	445	 5% 64% 17% • 17%
1	B	445	 4% 64% 18% • 17%

## 2 Entry composition [i](#)

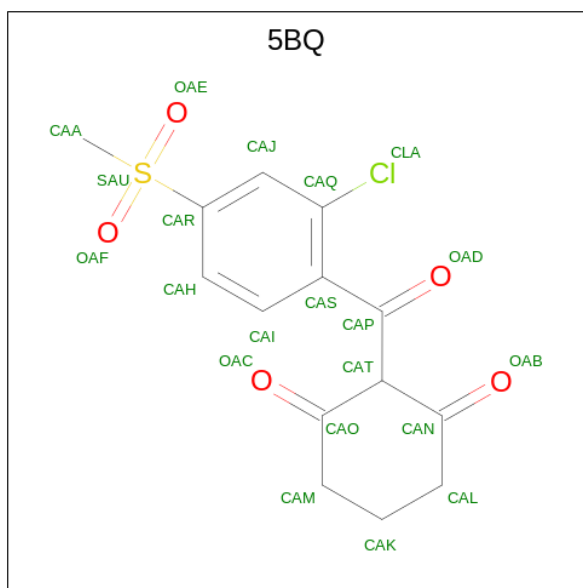
There are 4 unique types of molecules in this entry. The entry contains 5713 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 4-hydroxyphenylpyruvate dioxygenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	369	Total 2811	C 1799	N 480	O 519	S 13	0	0	0
1	B	371	Total 2791	C 1784	N 474	O 520	S 13	0	0	0

- Molecule 2 is 2-[2-chloro-4-(methylsulfonyl)benzoyl]cyclohexane-1,3-dione (three-letter code: 5BQ) (formula: C<sub>14</sub>H<sub>13</sub>ClO<sub>5</sub>S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	Cl	O	S		
2	A	1	Total 21	C 14	Cl 1	O 5	S 1	0	0
2	B	1	Total 21	C 14	Cl 1	O 5	S 1	0	0

- Molecule 3 is COBALT (II) ION (three-letter code: CO) (formula: Co).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Co 1 1	0	0
3	B	1	Total Co 1 1	0	0

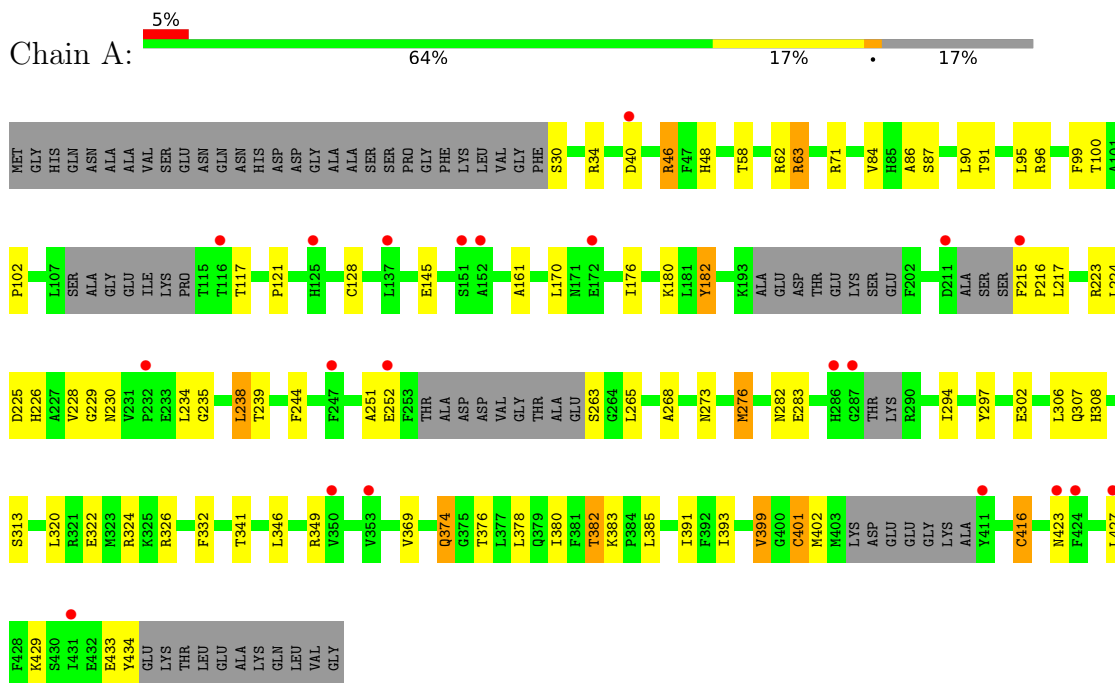
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	32	Total O 32 32	0	0
4	B	35	Total O 35 35	0	0

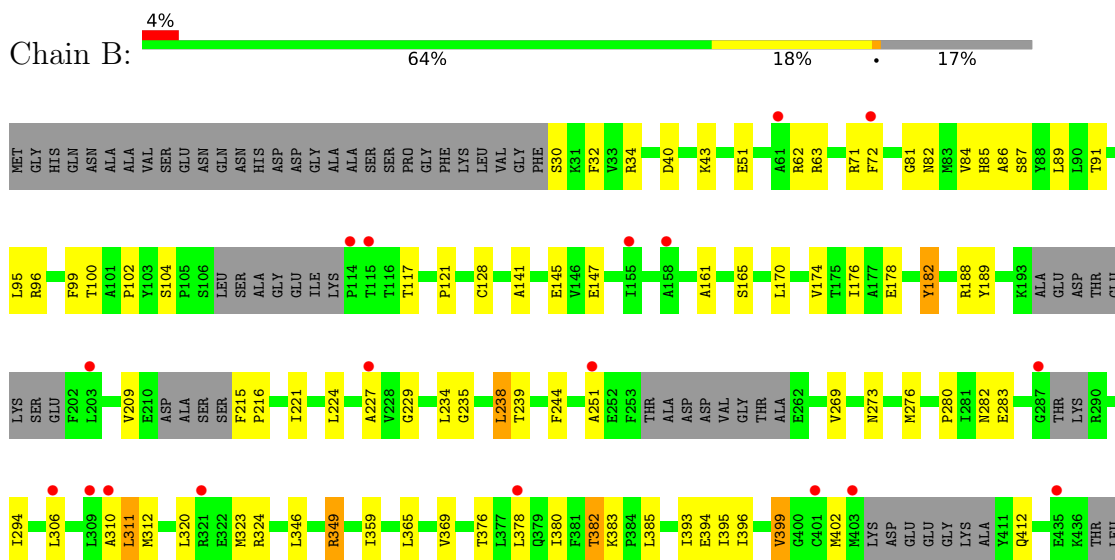
### 3 Residue-property plots [i](#)

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: 4-hydroxyphenylpyruvate dioxygenase



- Molecule 1: 4-hydroxyphenylpyruvate dioxygenase



GLU  
ALA  
LYS  
GLN  
LEU  
VAL  
GLY

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	95.57Å 95.57Å 198.81Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.75 – 2.40 29.88 – 2.39	Depositor EDS
% Data completeness (in resolution range)	99.1 (29.75-2.40) 98.3 (29.88-2.39)	Depositor EDS
$R_{merge}$	0.21	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.43 (at 2.39Å)	Xtrriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, $R_{free}$	0.258 , 0.294 0.259 , 0.293	Depositor DCC
$R_{free}$ test set	1839 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	31.4	Xtrriage
Anisotropy	0.755	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 37.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	5713	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	32.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 34.05 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 7.2564e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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

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

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: CO, 5BQ

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	0.44	0/2876	0.60	0/3883
1	B	0.47	0/2852	0.62	0/3851
All	All	0.46	0/5728	0.61	0/7734

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	2811	0	2691	51	0
1	B	2791	0	2661	48	0
2	A	21	0	0	0	0
2	B	21	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	32	0	0	1	0
4	B	35	0	0	1	0
All	All	5713	0	5352	97	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 9.



All (97) 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:374:GLN:HB2	1:A:401:CYS:SG	2.17	0.85
1:A:121:PRO:HG3	1:A:170:LEU:HD21	1.65	0.76
1:A:234:LEU:HB2	1:A:283:GLU:HB2	1.73	0.69
1:A:180:LYS:NZ	4:A:701:HOH:O	2.25	0.69
1:A:225:ASP:OD2	1:A:226:HIS:ND1	2.26	0.67
1:B:51:GLU:OE1	1:B:188:ARG:NH2	2.24	0.64
1:B:102:PRO:HD3	1:B:128:CYS:SG	2.37	0.64
1:B:227:ALA:HB1	1:B:306:LEU:HD11	1.80	0.64
1:A:34:ARG:NH2	1:A:251:ALA:O	2.32	0.63
1:A:382:THR:HG23	1:A:383:LYS:O	1.99	0.63
1:A:322:GLU:OE1	1:A:326:ARG:NH2	2.28	0.61
1:A:401:CYS:HB2	1:A:416:CYS:HB2	1.86	0.57
1:B:87:SER:HA	1:B:99:PHE:O	2.05	0.57
1:B:71:ARG:NE	1:B:216:PRO:HB2	2.20	0.56
1:A:265:LEU:HB3	1:A:294:ILE:CD1	2.36	0.56
1:B:349:ARG:NH2	1:B:369:VAL:O	2.38	0.56
1:A:382:THR:HG22	1:A:393:ILE:H	1.70	0.56
1:B:165:SER:HB3	1:B:178:GLU:HB2	1.87	0.56
1:B:369:VAL:HG22	1:B:378:LEU:HD23	1.88	0.56
1:A:48:HIS:HD2	1:A:145:GLU:HG3	1.71	0.55
1:A:349:ARG:NH2	1:A:369:VAL:O	2.39	0.55
1:A:302:GLU:OE2	1:B:104:SER:OG	2.24	0.54
1:B:234:LEU:HB2	1:B:283:GLU:HB2	1.88	0.54
1:B:382:THR:HG22	1:B:393:ILE:H	1.72	0.54
1:B:81:GLY:O	1:B:117:THR:OG1	2.24	0.54
1:A:265:LEU:HB3	1:A:294:ILE:HD13	1.89	0.54
1:A:230:ASN:OD1	1:A:282:ASN:HB2	2.08	0.54
1:A:238:LEU:HD21	1:A:268:ALA:HB3	1.90	0.53
1:B:323:MET:HE1	1:B:395:ILE:HG12	1.89	0.53
1:A:401:CYS:CB	1:A:416:CYS:HB2	2.40	0.52
1:B:51:GLU:HB3	1:B:141:ALA:HB3	1.92	0.52
1:B:176:ILE:HD11	1:B:188:ARG:HD3	1.91	0.52
1:A:95:LEU:HD13	1:A:224:LEU:HB2	1.91	0.51
1:B:320:LEU:HD21	1:B:380:ILE:HG21	1.92	0.51
1:B:382:THR:HG23	1:B:383:LYS:O	2.11	0.51
1:A:84:VAL:HG23	1:A:117:THR:HG23	1.93	0.50
1:B:269:VAL:HA	1:B:280:PRO:HA	1.93	0.50
1:B:282:ASN:HB3	1:B:294:ILE:HD13	1.93	0.50
1:A:63:ARG:NH1	1:B:62:ARG:HD2	2.28	0.49
1:B:121:PRO:HG3	1:B:170:LEU:HD21	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:252:GLU:OE1	1:A:252:GLU:N	2.47	0.48
1:A:320:LEU:O	1:A:324:ARG:HG3	2.13	0.48
1:B:40:ASP:HB2	1:B:273:ASN:ND2	2.29	0.48
1:A:215:PHE:HB3	1:A:216:PRO:HD3	1.94	0.48
1:A:341:THR:CG2	1:A:434:TYR:HB2	2.44	0.48
1:A:369:VAL:HG22	1:A:378:LEU:HD23	1.96	0.47
1:B:376:THR:HB	1:B:399:VAL:HG13	1.95	0.47
1:A:40:ASP:HB2	1:A:273:ASN:ND2	2.29	0.47
1:B:89:LEU:HD21	1:B:96:ARG:HD3	1.95	0.46
1:B:235:GLY:O	1:B:239:THR:HG23	2.14	0.46
1:A:91:THR:HG22	1:A:96:ARG:HG2	1.97	0.46
1:B:161:ALA:HB2	1:B:244:PHE:CG	2.51	0.46
1:B:402:MET:SD	1:B:412:GLN:HB2	2.55	0.46
1:A:46:ARG:CZ	1:A:276:MET:HG3	2.45	0.46
1:B:72:PHE:O	4:B:601:HOH:O	2.21	0.46
1:A:433:GLU:O	1:A:434:TYR:HB3	2.15	0.46
1:A:46:ARG:HH22	1:A:223:ARG:NE	2.14	0.46
1:A:161:ALA:HB2	1:A:244:PHE:CG	2.51	0.46
1:A:102:PRO:HD3	1:A:128:CYS:SG	2.57	0.45
1:A:320:LEU:HD11	1:A:380:ILE:HD13	1.98	0.45
1:B:224:LEU:HD12	1:B:310:ALA:O	2.16	0.45
1:B:324:ARG:NH2	1:B:365:LEU:O	2.49	0.45
1:A:87:SER:HA	1:A:99:PHE:O	2.17	0.45
1:B:215:PHE:HA	1:B:216:PRO:HD3	1.87	0.45
1:B:394:GLU:HG2	1:B:396:ILE:HG23	1.99	0.44
1:B:32:PHE:HZ	1:B:251:ALA:HB1	1.81	0.44
1:A:307:GLN:O	1:A:391:ILE:HA	2.18	0.44
1:A:86:ALA:O	1:A:100:THR:HA	2.18	0.44
1:A:46:ARG:HA	1:A:46:ARG:HD2	1.53	0.44
1:B:176:ILE:HA	1:B:189:TYR:O	2.17	0.44
1:A:297:TYR:OH	1:A:306:LEU:O	2.24	0.43
1:B:385:LEU:HD11	1:B:393:ILE:HG13	1.99	0.43
1:A:71:ARG:O	1:A:90:LEU:HA	2.18	0.43
1:A:228:VAL:HG21	1:A:308:HIS:CE1	2.53	0.43
1:B:91:THR:HA	1:B:95:LEU:O	2.18	0.43
1:A:346:LEU:HD12	1:A:349:ARG:NH1	2.34	0.43
1:B:346:LEU:HD23	1:B:346:LEU:HA	1.87	0.43
1:A:182:TYR:CZ	1:A:229:GLY:HA3	2.54	0.43
1:A:91:THR:HA	1:A:95:LEU:O	2.19	0.42
1:B:234:LEU:HG	1:B:238:LEU:HD22	2.01	0.42
1:B:34:ARG:NH2	1:B:251:ALA:HB3	2.35	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:376:THR:HB	1:A:399:VAL:HG13	2.00	0.42
1:B:43:LYS:HB3	1:B:147:GLU:HB2	2.02	0.42
1:A:423:ASN:O	1:A:427:LEU:HB2	2.20	0.42
1:A:401:CYS:HB2	1:A:416:CYS:SG	2.60	0.42
1:B:221:ILE:HD12	1:B:311:LEU:HB3	2.02	0.41
1:A:235:GLY:O	1:A:239:THR:HG23	2.19	0.41
1:B:72:PHE:CD2	1:B:209:VAL:HG11	2.55	0.41
1:A:294:ILE:H	1:A:294:ILE:HD12	1.85	0.41
1:A:58:THR:O	1:A:62:ARG:HG3	2.20	0.41
1:B:32:PHE:CZ	1:B:251:ALA:HB1	2.55	0.41
1:B:86:ALA:O	1:B:100:THR:HA	2.20	0.41
1:B:378:LEU:O	1:B:396:ILE:HA	2.21	0.41
1:B:82:ASN:HD21	1:B:85:HIS:CE1	2.39	0.41
1:B:182:TYR:CZ	1:B:229:GLY:HA3	2.56	0.40
1:B:84:VAL:HG23	1:B:117:THR:CG2	2.52	0.40
1:A:332:PHE:CE1	1:A:385:LEU:HD22	2.56	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	355/445 (80%)	340 (96%)	15 (4%)	0	100	100
1	B	357/445 (80%)	336 (94%)	21 (6%)	0	100	100
All	All	712/890 (80%)	676 (95%)	36 (5%)	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	293/371 (79%)	276 (94%)	17 (6%)	20	32
1	B	286/371 (77%)	273 (96%)	13 (4%)	27	44
All	All	579/742 (78%)	549 (95%)	30 (5%)	23	38

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	SER
1	A	46	ARG
1	A	63	ARG
1	A	176	ILE
1	A	182	TYR
1	A	217	LEU
1	A	238	LEU
1	A	263	SER
1	A	276	MET
1	A	313	SER
1	A	374	GLN
1	A	382	THR
1	A	399	VAL
1	A	401	CYS
1	A	402	MET
1	A	416	CYS
1	A	429	LYS
1	B	30	SER
1	B	63	ARG
1	B	145	GLU
1	B	174	VAL
1	B	182	TYR
1	B	238	LEU
1	B	276	MET
1	B	311	LEU
1	B	312	MET
1	B	349	ARG

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Mol	Chain	Res	Type
1	B	359	ILE
1	B	382	THR
1	B	399	VAL

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](#)

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
2	5BQ	A	600	3	20,22,22	4.57	5 (25%)	26,33,33	4.19	13 (50%)
2	5BQ	B	501	3	20,22,22	4.51	5 (25%)	26,33,33	3.97	12 (46%)

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	5BQ	A	600	3	-	8/14/28/28	0/2/2/2
2	5BQ	B	501	3	-	9/14/28/28	0/2/2/2

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	5BQ	OAD-CAP	13.55	1.41	1.22
2	A	600	5BQ	OAD-CAP	13.53	1.41	1.22
2	A	600	5BQ	OAB-CAN	12.58	1.43	1.21
2	B	501	5BQ	OAB-CAN	12.39	1.43	1.21
2	A	600	5BQ	CAM-CAO	5.46	1.60	1.50
2	B	501	5BQ	CAM-CAO	5.17	1.59	1.50
2	B	501	5BQ	CAR-SAU	3.95	1.81	1.77
2	A	600	5BQ	CAS-CAP	3.81	1.55	1.49
2	A	600	5BQ	CAR-SAU	3.74	1.81	1.77
2	B	501	5BQ	CAS-CAP	3.04	1.54	1.49

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	600	5BQ	OAF-SAU-OAE	-9.91	100.85	117.92
2	A	600	5BQ	OAD-CAP-CAT	-9.37	107.46	119.50
2	B	501	5BQ	OAF-SAU-OAE	-9.18	102.12	117.92
2	B	501	5BQ	OAB-CAN-CAL	-8.30	106.67	122.11
2	A	600	5BQ	OAB-CAN-CAL	-8.25	106.77	122.11
2	A	600	5BQ	OAD-CAP-CAS	-7.92	108.73	120.62
2	B	501	5BQ	OAD-CAP-CAT	-7.62	109.71	119.50
2	B	501	5BQ	CAS-CAP-CAT	-6.39	111.02	118.96
2	B	501	5BQ	OAD-CAP-CAS	-6.26	111.23	120.62
2	B	501	5BQ	OAF-SAU-CAR	6.25	113.34	108.25
2	A	600	5BQ	OAF-SAU-CAR	5.33	112.59	108.25
2	B	501	5BQ	CAA-SAU-CAR	4.97	110.46	104.58
2	A	600	5BQ	OAE-SAU-CAR	4.82	112.18	108.25
2	A	600	5BQ	CAJ-CAR-SAU	-4.08	115.82	119.06
2	A	600	5BQ	CAH-CAR-SAU	3.65	122.97	119.58
2	A	600	5BQ	CAA-SAU-CAR	3.50	108.72	104.58
2	A	600	5BQ	CAS-CAP-CAT	-3.49	114.62	118.96
2	B	501	5BQ	CAK-CAL-CAN	3.32	119.38	111.60
2	B	501	5BQ	CAH-CAR-SAU	3.06	122.42	119.58
2	B	501	5BQ	CAQ-CAS-CAP	-3.04	117.94	123.45
2	A	600	5BQ	CAK-CAM-CAO	2.82	118.20	111.60
2	A	600	5BQ	CAQ-CAS-CAP	-2.76	118.45	123.45
2	A	600	5BQ	OAE-SAU-CAA	2.68	112.35	108.49

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	501	5BQ	CAJ-CAR-SAU	-2.08	117.42	119.06
2	B	501	5BQ	CAQ-CAJ-CAR	2.05	120.11	118.80

There are no chirality outliers.

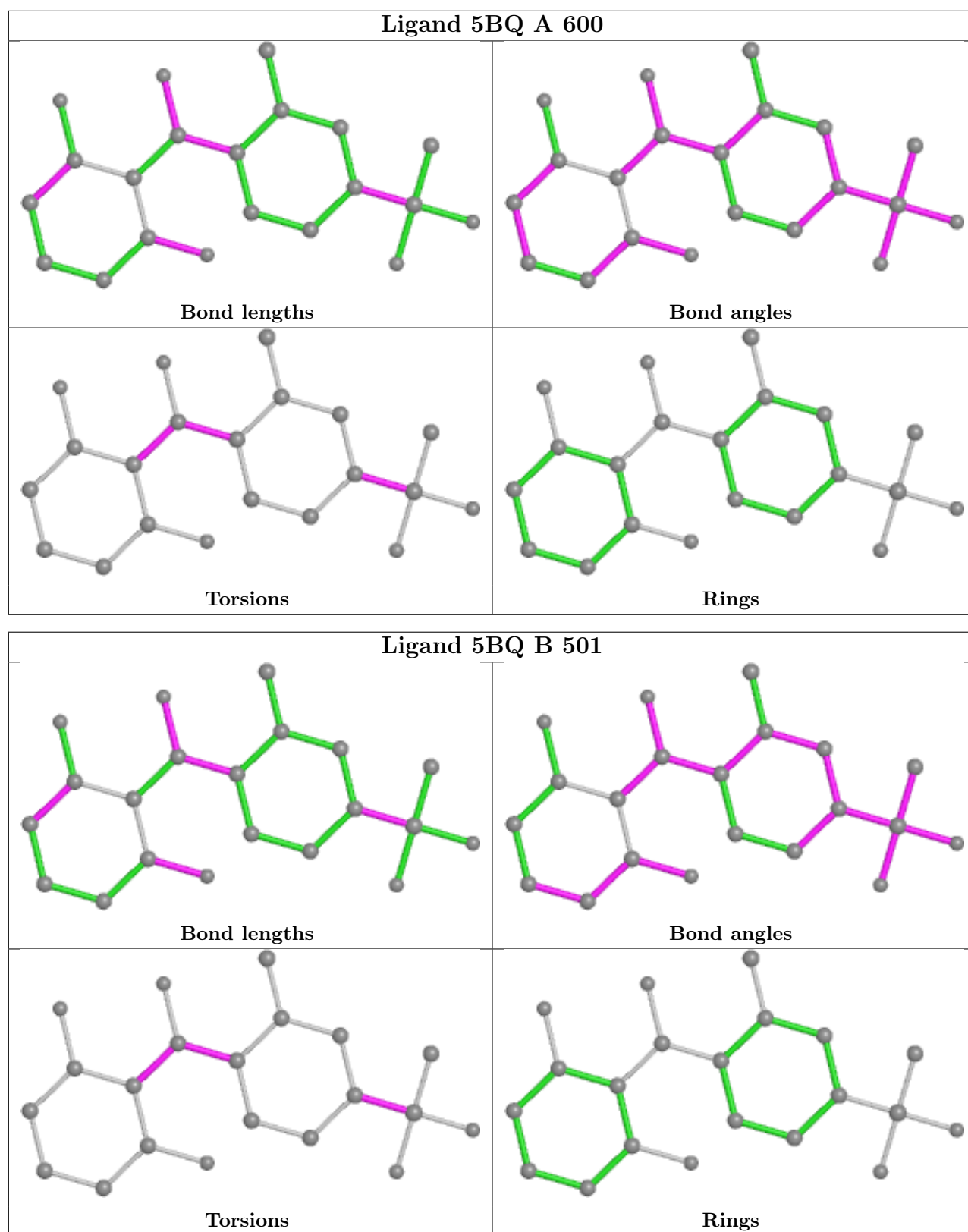
All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	600	5BQ	OAD-CAP-CAT-CAO
2	B	501	5BQ	OAD-CAP-CAT-CAO
2	B	501	5BQ	OAD-CAP-CAS-CAI
2	A	600	5BQ	CAJ-CAR-SAU-OAF
2	A	600	5BQ	CAH-CAR-SAU-OAF
2	B	501	5BQ	CAH-CAR-SAU-OAE
2	B	501	5BQ	CAH-CAR-SAU-CAA
2	B	501	5BQ	CAJ-CAR-SAU-OAE
2	B	501	5BQ	CAJ-CAR-SAU-CAA
2	A	600	5BQ	OAD-CAP-CAS-CAI
2	A	600	5BQ	CAJ-CAR-SAU-CAA
2	B	501	5BQ	OAD-CAP-CAS-CAQ
2	A	600	5BQ	CAH-CAR-SAU-CAA
2	A	600	5BQ	OAD-CAP-CAS-CAQ
2	A	600	5BQ	CAS-CAP-CAT-CAN
2	B	501	5BQ	CAS-CAP-CAT-CAN
2	B	501	5BQ	CAT-CAP-CAS-CAQ

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



## 5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.



## 5.8 Polymer linkage issues

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<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	369/445 (82%)	0.48	21 (5%) 23 22	18, 30, 49, 71	0
1	B	371/445 (83%)	0.47	18 (4%) 29 28	17, 31, 52, 67	0
All	All	740/890 (83%)	0.47	39 (5%) 26 25	17, 31, 51, 71	0

All (39) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	114	PRO	4.0
1	A	431	ILE	3.8
1	A	286	HIS	3.8
1	A	427	LEU	3.5
1	A	350	VAL	3.3
1	A	215	PHE	3.3
1	A	411	TYR	3.1
1	B	309	LEU	3.1
1	A	211	ASP	3.0
1	A	353	VAL	2.9
1	A	252	GLU	2.8
1	A	247	PHE	2.8
1	A	424	PHE	2.8
1	B	61	ALA	2.8
1	B	401	CYS	2.7
1	B	72	PHE	2.7
1	A	40	ASP	2.6
1	A	116	THR	2.6
1	A	232	PRO	2.5
1	A	172	GLU	2.5
1	A	287	GLY	2.5
1	A	423	ASN	2.5
1	B	435	GLU	2.4
1	B	287	GLY	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	227	ALA	2.4
1	A	137	LEU	2.3
1	B	203	LEU	2.2
1	B	378	LEU	2.2
1	B	306	LEU	2.2
1	B	155	ILE	2.2
1	B	158	ALA	2.2
1	B	403	MET	2.2
1	B	251	ALA	2.2
1	B	310	ALA	2.1
1	A	152	ALA	2.1
1	B	321	ARG	2.1
1	B	115	THR	2.0
1	A	125	HIS	2.0
1	A	151	SER	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](#)

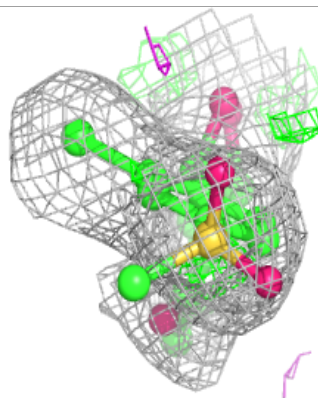
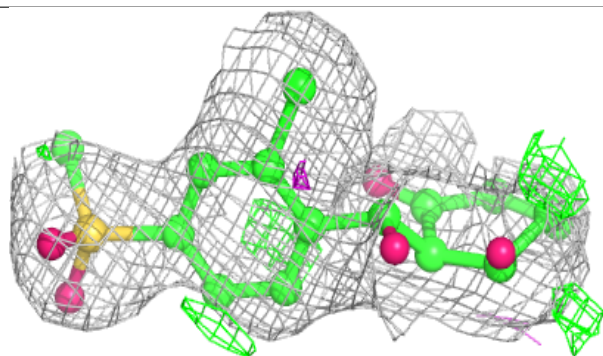
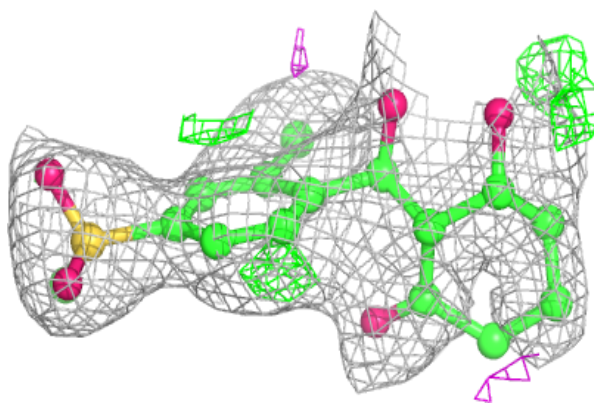
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	5BQ	A	600	21/21	0.91	0.17	20,31,47,70	0
2	5BQ	B	501	21/21	0.95	0.16	23,33,46,51	0
3	CO	B	502	1/1	0.98	0.10	23,23,23,23	0
3	CO	A	601	1/1	0.99	0.06	25,25,25,25	0

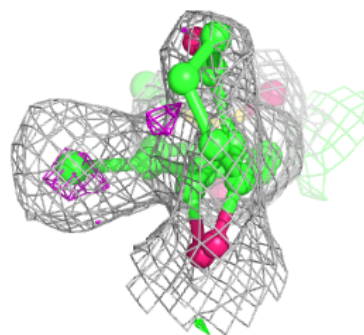
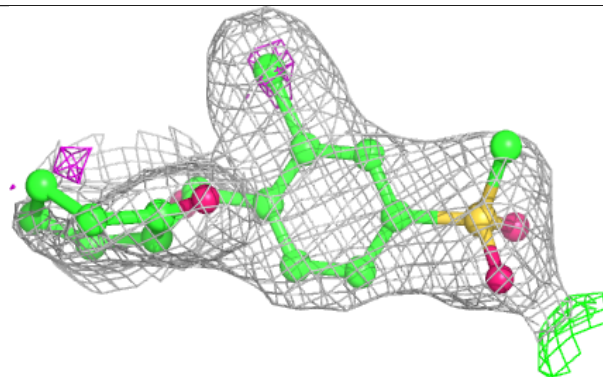
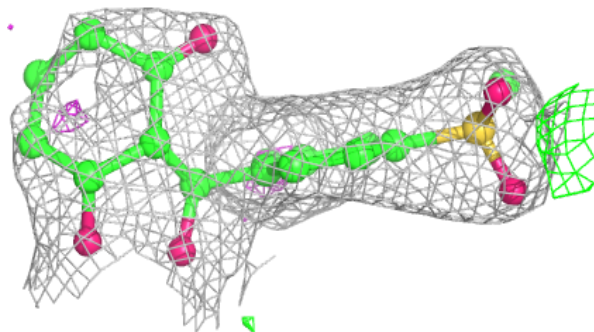
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around 5BQ A 600:**

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

**Electron density around 5BQ B 501:**

$2mF_o-DF_c$  (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.