



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 11, 2021 – 01:23 AM EDT

PDB ID : 2R4F  
Title : Substituted Pyrazoles as Hepatselective HMG-COA reductase inhibitors  
Authors : Pavlovsky, A.; Pfefferkorn, J.A.; Harris, M.S.; Finzel, B.C.  
Deposited on : 2007-08-31  
Resolution : 1.70 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.

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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 : 2.23.2  
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) : 2.23.2

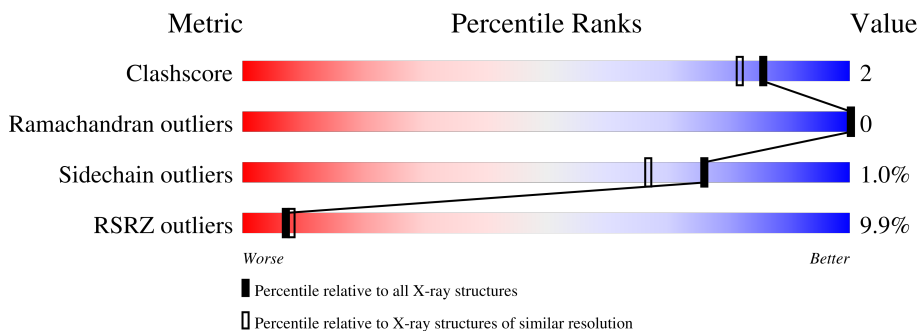
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.70 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))
Clashscore	141614	4695 (1.70-1.70)
Ramachandran outliers	138981	4610 (1.70-1.70)
Sidechain outliers	138945	4610 (1.70-1.70)
RSRZ outliers	127900	4222 (1.70-1.70)

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	441	 9% 89% 6% 5%
1	B	441	 10% 88% 8%
1	C	441	 10% 88% 8%
1	D	441	 8% 85% 11%

## 2 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 13374 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 3-hydroxy-3-methylglutaryl-coenzyme A reductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	420	3123	1945	548	600	30	0	0	0
1	B	405	3013	1874	529	580	30	0	2	0
1	C	404	2997	1862	524	579	32	0	3	0
1	D	394	2921	1815	512	564	30	0	3	0

There are 28 discrepancies between the modelled and reference sequences:

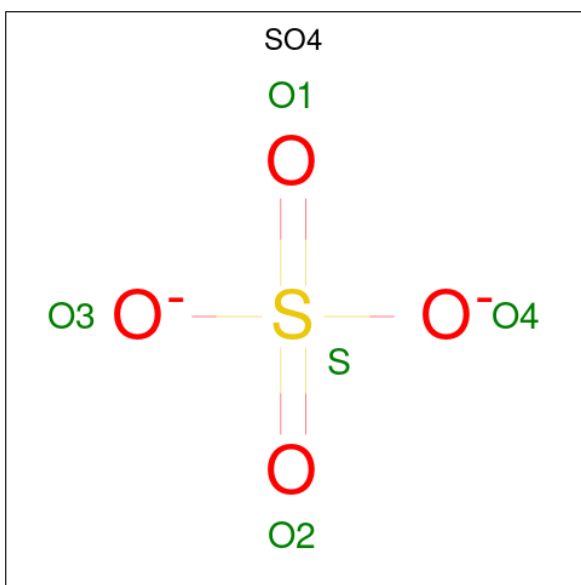
Chain	Residue	Modelled	Actual	Comment	Reference
A	435	HIS	-	expression tag	UNP P04035
A	436	HIS	-	expression tag	UNP P04035
A	437	HIS	-	expression tag	UNP P04035
A	438	HIS	-	expression tag	UNP P04035
A	439	HIS	-	expression tag	UNP P04035
A	440	HIS	-	expression tag	UNP P04035
A	485	ILE	MET	engineered mutation	UNP P04035
B	435	HIS	-	expression tag	UNP P04035
B	436	HIS	-	expression tag	UNP P04035
B	437	HIS	-	expression tag	UNP P04035
B	438	HIS	-	expression tag	UNP P04035
B	439	HIS	-	expression tag	UNP P04035
B	440	HIS	-	expression tag	UNP P04035
B	485	ILE	MET	engineered mutation	UNP P04035
C	435	HIS	-	expression tag	UNP P04035
C	436	HIS	-	expression tag	UNP P04035
C	437	HIS	-	expression tag	UNP P04035
C	438	HIS	-	expression tag	UNP P04035
C	439	HIS	-	expression tag	UNP P04035
C	440	HIS	-	expression tag	UNP P04035
C	485	ILE	MET	engineered mutation	UNP P04035

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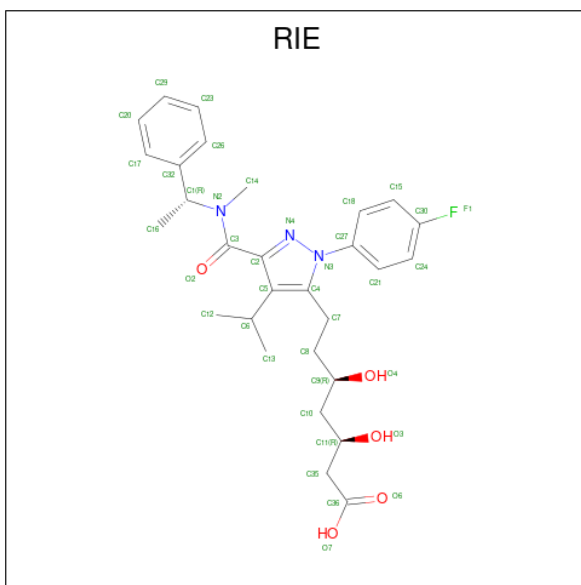
Chain	Residue	Modelled	Actual	Comment	Reference
D	435	HIS	-	expression tag	UNP P04035
D	436	HIS	-	expression tag	UNP P04035
D	437	HIS	-	expression tag	UNP P04035
D	438	HIS	-	expression tag	UNP P04035
D	439	HIS	-	expression tag	UNP P04035
D	440	HIS	-	expression tag	UNP P04035
D	485	ILE	MET	engineered mutation	UNP P04035

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total O S 5 4 1	0	0
2	B	1	Total O S 5 4 1	0	0
2	C	1	Total O S 5 4 1	0	0
2	D	1	Total O S 5 4 1	0	0

- Molecule 3 is (3R,5R)-7-[1-(4-fluorophenyl)-4-(1-methylethyl)-3-{methyl[(1R)-1-phenylethyl]carbamoyl}-1H-pyrazol-5-yl]-3,5-dihydroxyheptanoic acid (three-letter code: RIE) (formula: C<sub>29</sub>H<sub>36</sub>FN<sub>3</sub>O<sub>5</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	F	N	O		
3	A	1	Total 38	C 29	F 1	N 3	O 5	0	0
3	B	1	Total 38	C 29	F 1	N 3	O 5	0	0
3	C	1	Total 38	C 29	F 1	N 3	O 5	0	0
3	D	1	Total 38	C 29	F 1	N 3	O 5	0	0

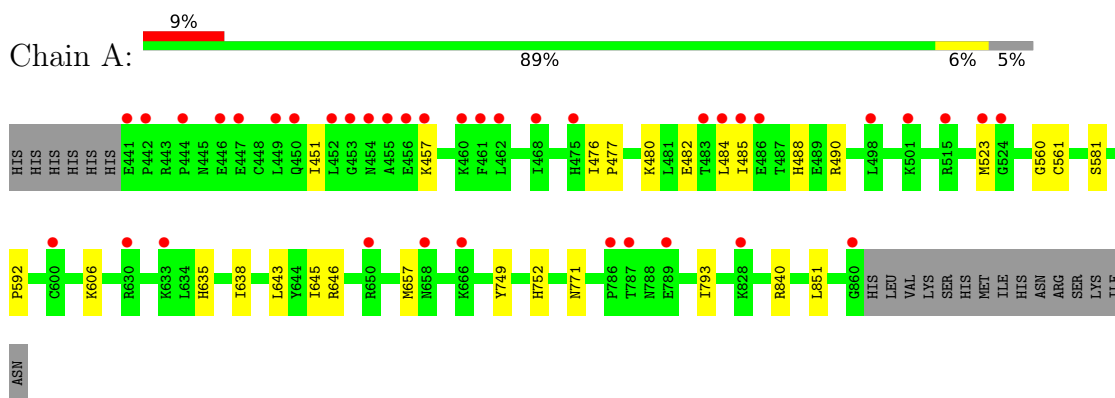
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	299	Total 299	O 299	0	0
4	B	291	Total 291	O 291	0	0
4	C	271	Total 271	O 271	0	0
4	D	287	Total 287	O 287	0	0

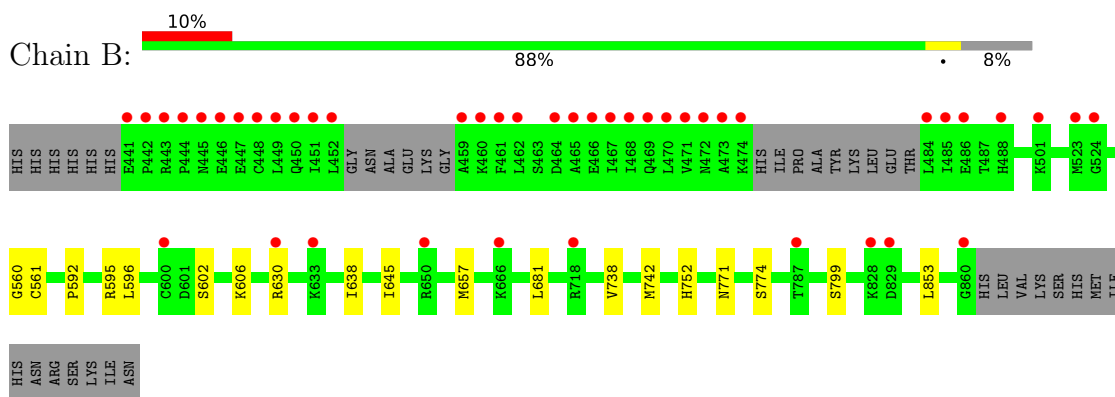
### 3 Residue-property plots [i](#)

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.

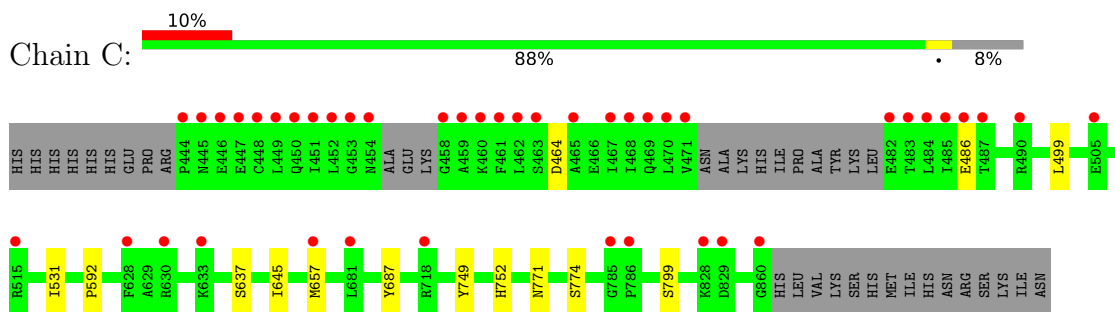
- Molecule 1: 3-hydroxy-3-methylglutaryl-coenzyme A reductase



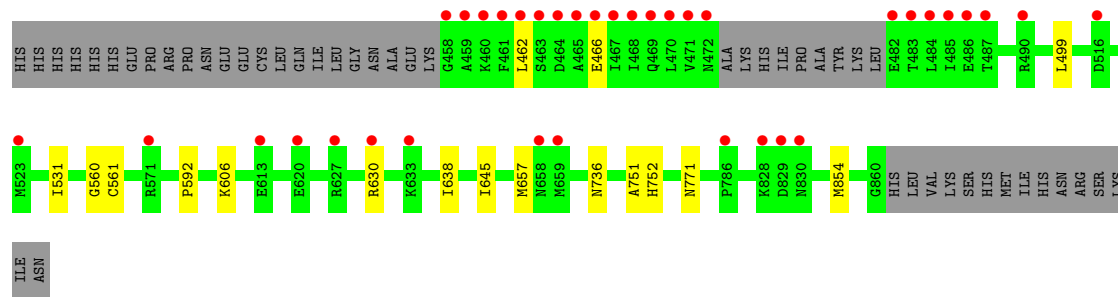
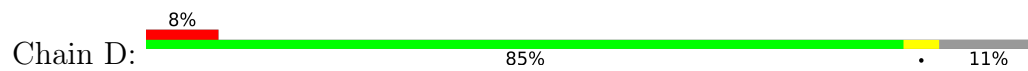
- Molecule 1: 3-hydroxy-3-methylglutaryl-coenzyme A reductase



- Molecule 1: 3-hydroxy-3-methylglutaryl-coenzyme A reductase



- Molecule 1: 3-hydroxy-3-methylglutaryl-coenzyme A reductase



## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	82.62Å 135.33Å 82.84Å 90.00° 97.53° 90.00°	Depositor
Resolution (Å)	39.54 – 1.70 39.54 – 1.70	Depositor EDS
% Data completeness (in resolution range)	93.7 (39.54-1.70) 89.0 (39.54-1.70)	Depositor EDS
$R_{merge}$	0.04	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.00 (at 1.70Å)	Xtrriage
Refinement program	REFMAC 5.1.24	Depositor
R, $R_{free}$	0.214 , 0.234 0.210 , (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	20.8	Xtrriage
Anisotropy	0.259	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 30.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.145 for l,-k,h	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	13374	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	27.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.77% of the height of the origin peak. No significant pseudotranslation is detected.*

<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: RIE, SO4

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	0.30	0/3168	0.45	0/4283
1	B	0.30	0/3063	0.44	0/4138
1	C	0.30	0/3051	0.44	0/4121
1	D	0.30	0/2975	0.45	0/4020
All	All	0.30	0/12257	0.45	0/16562

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	3123	0	3160	15	0
1	B	3013	0	3049	10	0
1	C	2997	0	3025	13	0
1	D	2921	0	2951	21	0
2	A	5	0	0	0	0
2	B	5	0	0	0	0
2	C	5	0	0	0	0
2	D	5	0	0	0	0
3	A	38	0	35	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	38	0	35	2	0
3	C	38	0	35	2	0
3	D	38	0	35	1	0
4	A	299	0	0	0	0
4	B	291	0	0	0	0
4	C	271	0	0	0	0
4	D	287	0	0	0	0
All	All	13374	0	12325	55	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 2.

All (55) 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:D:736:ASN:HD21	1:D:854:MET:HE3	1.16	1.08
1:D:751:ALA:HB2	1:D:854:MET:CE	1.87	1.04
1:D:736:ASN:ND2	1:D:854:MET:HE3	1.73	1.03
1:D:751:ALA:HB2	1:D:854:MET:HE2	1.48	0.93
1:D:736:ASN:HD21	1:D:854:MET:CE	1.92	0.81
1:D:751:ALA:HB2	1:D:854:MET:HE1	1.62	0.80
1:C:771[A]:ASN:OD1	1:D:771[A]:ASN:ND2	2.25	0.69
1:C:771[A]:ASN:CG	1:D:771[A]:ASN:HD21	1.98	0.67
1:C:771[A]:ASN:ND2	1:D:771[A]:ASN:OD1	2.30	0.64
1:C:771[A]:ASN:HD21	1:D:771[A]:ASN:CG	2.02	0.62
1:B:595:ARG:HD2	1:B:681:LEU:HD22	1.82	0.60
1:C:771[A]:ASN:ND2	1:D:771[A]:ASN:HD21	2.04	0.55
1:A:606:LYS:HD2	1:A:638:ILE:HD12	1.88	0.54
1:C:771[A]:ASN:HD21	1:D:771[A]:ASN:ND2	2.06	0.54
3:D:876:RIE:H12B	3:D:876:RIE:H7	1.89	0.54
1:B:606:LYS:HD2	1:B:638:ILE:HD12	1.90	0.53
3:C:876:RIE:H7	3:C:876:RIE:H12B	1.91	0.53
3:B:876:RIE:H7	3:B:876:RIE:H12B	1.90	0.53
1:C:771[A]:ASN:ND2	1:D:771[A]:ASN:ND2	2.57	0.53
3:A:876:RIE:H12B	3:A:876:RIE:H7	1.91	0.52
1:A:581:SER:OG	1:A:840:ARG:HD2	2.11	0.51
1:D:751:ALA:CB	1:D:854:MET:HE2	2.31	0.51
1:A:476:ILE:HG23	1:A:484:LEU:HD13	1.94	0.50
1:A:749:TYR:OH	1:C:749:TYR:OH	2.30	0.50
1:A:592:PRO:HD2	1:A:645:ILE:O	2.13	0.49
1:A:771:ASN:CG	1:B:771[B]:ASN:HD21	2.17	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:592:PRO:HD2	1:B:645:ILE:O	2.16	0.46
1:A:771:ASN:OD1	1:B:771[B]:ASN:ND2	2.43	0.46
1:D:592:PRO:HD2	1:D:645:ILE:O	2.16	0.45
1:A:482:GLU:HB3	1:A:488:HIS:HD2	1.82	0.44
1:C:499:LEU:HD22	1:C:531:ILE:HG21	2.00	0.44
1:A:638:ILE:HG13	1:A:643:LEU:HD13	2.00	0.43
1:B:560:GLY:O	1:B:561:CYS:HB2	2.18	0.42
3:B:876:RIE:H16B	3:B:876:RIE:H14	1.79	0.42
1:C:592:PRO:HD2	1:C:645:ILE:O	2.19	0.42
1:C:774:SER:HA	1:C:799:SER:O	2.19	0.42
1:A:485:ILE:HG21	1:A:490:ARG:HD3	2.00	0.42
1:D:606:LYS:HD2	1:D:638:ILE:HD12	2.00	0.42
1:B:596:LEU:HD13	1:B:602:SER:HA	2.01	0.42
1:D:499:LEU:HD22	1:D:531:ILE:HG21	2.01	0.42
1:C:771[A]:ASN:ND2	1:D:771[A]:ASN:CG	2.71	0.42
1:D:736:ASN:ND2	1:D:854:MET:CE	2.60	0.42
1:A:793:ILE:HD13	1:A:851:LEU:HG	2.02	0.42
1:B:774:SER:HA	1:B:799:SER:O	2.20	0.41
1:A:451:ILE:HG23	1:A:457:LYS:HD3	2.02	0.41
1:A:477:PRO:HG2	1:A:480:LYS:HB2	2.03	0.41
1:A:560:GLY:O	1:A:561:CYS:HB2	2.19	0.41
1:C:637:SER:HB2	1:C:687:TYR:OH	2.20	0.41
3:A:876:RIE:H14	3:A:876:RIE:H16B	1.80	0.41
1:B:738:VAL:O	1:B:742:MET:HG2	2.21	0.41
3:A:876:RIE:H21	1:B:853:LEU:HD11	2.02	0.41
1:A:635:HIS:HB3	1:A:646:ARG:HB3	2.03	0.40
1:D:462:LEU:HD22	1:D:466:GLU:HG2	2.02	0.40
3:C:876:RIE:H14	3:C:876:RIE:H16B	1.79	0.40
1:D:560:GLY:O	1:D:561:CYS:HB2	2.22	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	418/441 (95%)	405 (97%)	13 (3%)	0	100	100
1	B	401/441 (91%)	388 (97%)	13 (3%)	0	100	100
1	C	401/441 (91%)	387 (96%)	14 (4%)	0	100	100
1	D	393/441 (89%)	381 (97%)	12 (3%)	0	100	100
All	All	1613/1764 (91%)	1561 (97%)	52 (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	334/355 (94%)	331 (99%)	3 (1%)	78	70
1	B	325/355 (92%)	322 (99%)	3 (1%)	78	70
1	C	324/355 (91%)	320 (99%)	4 (1%)	71	59
1	D	315/355 (89%)	312 (99%)	3 (1%)	76	67
All	All	1298/1420 (91%)	1285 (99%)	13 (1%)	76	67

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	523	MET
1	A	657	MET
1	A	752	HIS
1	B	630	ARG
1	B	657	MET
1	B	752	HIS
1	C	464	ASP
1	C	486	GLU
1	C	657	MET
1	C	752	HIS
1	D	630	ARG
1	D	657	MET
1	D	752	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	488	HIS
1	B	488	HIS
1	B	510	GLN
1	B	658	ASN
1	C	635	HIS
1	D	510	GLN
1	D	635	HIS
1	D	736	ASN

### 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](#)

8 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
2	SO4	C	3	-	4,4,4	0.15	0	6,6,6	0.06	0
3	RIE	A	876	-	35,40,40	1.76	4 (11%)	42,56,56	1.95	9 (21%)
3	RIE	B	876	-	35,40,40	1.77	4 (11%)	42,56,56	1.93	9 (21%)
2	SO4	D	4	-	4,4,4	0.14	0	6,6,6	0.07	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	RIE	D	876	-	35,40,40	1.77	4 (11%)	42,56,56	1.93	9 (21%)
3	RIE	C	876	-	35,40,40	1.76	4 (11%)	42,56,56	1.93	9 (21%)
2	SO4	A	1	-	4,4,4	0.14	0	6,6,6	0.05	0
2	SO4	B	2	-	4,4,4	0.14	0	6,6,6	0.05	0

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	RIE	D	876	-	-	7/31/37/37	0/3/3/3
3	RIE	B	876	-	-	8/31/37/37	0/3/3/3
3	RIE	A	876	-	-	8/31/37/37	0/3/3/3
3	RIE	C	876	-	-	7/31/37/37	0/3/3/3

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	876	RIE	C4-C5	7.56	1.50	1.38
3	C	876	RIE	C4-C5	7.55	1.50	1.38
3	B	876	RIE	C4-C5	7.52	1.50	1.38
3	A	876	RIE	C4-C5	7.47	1.50	1.38
3	D	876	RIE	C2-C5	4.78	1.50	1.40
3	B	876	RIE	C2-C5	4.75	1.50	1.40
3	C	876	RIE	C2-C5	4.67	1.50	1.40
3	A	876	RIE	C2-C5	4.66	1.50	1.40
3	A	876	RIE	C27-N3	-3.33	1.34	1.44
3	B	876	RIE	C27-N3	-3.25	1.34	1.44
3	D	876	RIE	C27-N3	-3.24	1.34	1.44
3	C	876	RIE	C27-N3	-3.22	1.34	1.44
3	D	876	RIE	C5-C6	-2.61	1.49	1.53
3	B	876	RIE	C5-C6	-2.59	1.49	1.53
3	A	876	RIE	C5-C6	-2.59	1.49	1.53
3	C	876	RIE	C5-C6	-2.50	1.49	1.53

All (36) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	876	RIE	C4-N3-N4	6.23	116.75	111.13
3	D	876	RIE	C4-N3-N4	6.11	116.64	111.13

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	876	RIE	C4-N3-N4	5.99	116.53	111.13
3	C	876	RIE	C4-N3-N4	5.93	116.48	111.13
3	A	876	RIE	C5-C4-N3	-5.18	103.43	106.66
3	D	876	RIE	C5-C4-N3	-5.13	103.47	106.66
3	B	876	RIE	C5-C4-N3	-4.90	103.61	106.66
3	C	876	RIE	C32-C1-N2	4.80	116.30	109.60
3	A	876	RIE	C32-C1-N2	4.80	116.29	109.60
3	C	876	RIE	C5-C4-N3	-4.77	103.69	106.66
3	B	876	RIE	C32-C1-N2	4.66	116.10	109.60
3	D	876	RIE	C32-C1-N2	4.44	115.78	109.60
3	D	876	RIE	C18-C27-C21	-3.89	115.56	121.33
3	B	876	RIE	C18-C27-C21	-3.84	115.65	121.33
3	C	876	RIE	C18-C27-C21	-3.83	115.65	121.33
3	A	876	RIE	C18-C27-C21	-3.74	115.79	121.33
3	D	876	RIE	C24-C21-C27	2.71	123.02	119.07
3	B	876	RIE	C24-C21-C27	2.69	122.98	119.07
3	C	876	RIE	C24-C21-C27	2.66	122.94	119.07
3	C	876	RIE	C8-C7-C4	-2.63	106.69	112.66
3	D	876	RIE	C24-C30-C15	-2.63	119.33	122.83
3	A	876	RIE	C24-C21-C27	2.62	122.88	119.07
3	B	876	RIE	C24-C30-C15	-2.61	119.36	122.83
3	C	876	RIE	C24-C30-C15	-2.59	119.39	122.83
3	C	876	RIE	C15-C18-C27	2.52	122.74	119.07
3	D	876	RIE	C15-C18-C27	2.52	122.73	119.07
3	A	876	RIE	C24-C30-C15	-2.47	119.54	122.83
3	B	876	RIE	C15-C18-C27	2.45	122.63	119.07
3	A	876	RIE	C15-C18-C27	2.41	122.58	119.07
3	B	876	RIE	C8-C7-C4	-2.37	107.30	112.66
3	D	876	RIE	C8-C7-C4	-2.32	107.40	112.66
3	C	876	RIE	C10-C11-C35	-2.27	108.67	113.19
3	B	876	RIE	C10-C11-C35	-2.26	108.68	113.19
3	A	876	RIE	C10-C11-C35	-2.23	108.76	113.19
3	D	876	RIE	C10-C11-C35	-2.18	108.85	113.19
3	A	876	RIE	C8-C7-C4	-2.16	107.76	112.66

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	876	RIE	C16-C1-N2-C14
3	B	876	RIE	C16-C1-N2-C14
3	C	876	RIE	C16-C1-N2-C14

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Mol	Chain	Res	Type	Atoms
3	D	876	RIE	C16-C1-N2-C14
3	A	876	RIE	C2-C5-C6-C12
3	B	876	RIE	C2-C5-C6-C12
3	C	876	RIE	C2-C5-C6-C12
3	D	876	RIE	C2-C5-C6-C12
3	C	876	RIE	C4-C5-C6-C12
3	D	876	RIE	N2-C1-C32-C17
3	A	876	RIE	C18-C27-N3-N4
3	B	876	RIE	C18-C27-N3-N4
3	C	876	RIE	C21-C27-N3-N4
3	C	876	RIE	C18-C27-N3-N4
3	D	876	RIE	C18-C27-N3-N4
3	B	876	RIE	N2-C1-C32-C17
3	A	876	RIE	N2-C1-C32-C17
3	C	876	RIE	N2-C1-C32-C17
3	A	876	RIE	C21-C27-N3-N4
3	B	876	RIE	C21-C27-N3-N4
3	A	876	RIE	C4-C5-C6-C12
3	B	876	RIE	C4-C5-C6-C12
3	D	876	RIE	C4-C5-C6-C12
3	A	876	RIE	C32-C1-N2-C14
3	B	876	RIE	C32-C1-N2-C14
3	C	876	RIE	C32-C1-N2-C14
3	D	876	RIE	C32-C1-N2-C14
3	D	876	RIE	N2-C1-C32-C26
3	B	876	RIE	N2-C1-C32-C26
3	A	876	RIE	N2-C1-C32-C26

There are no ring outliers.

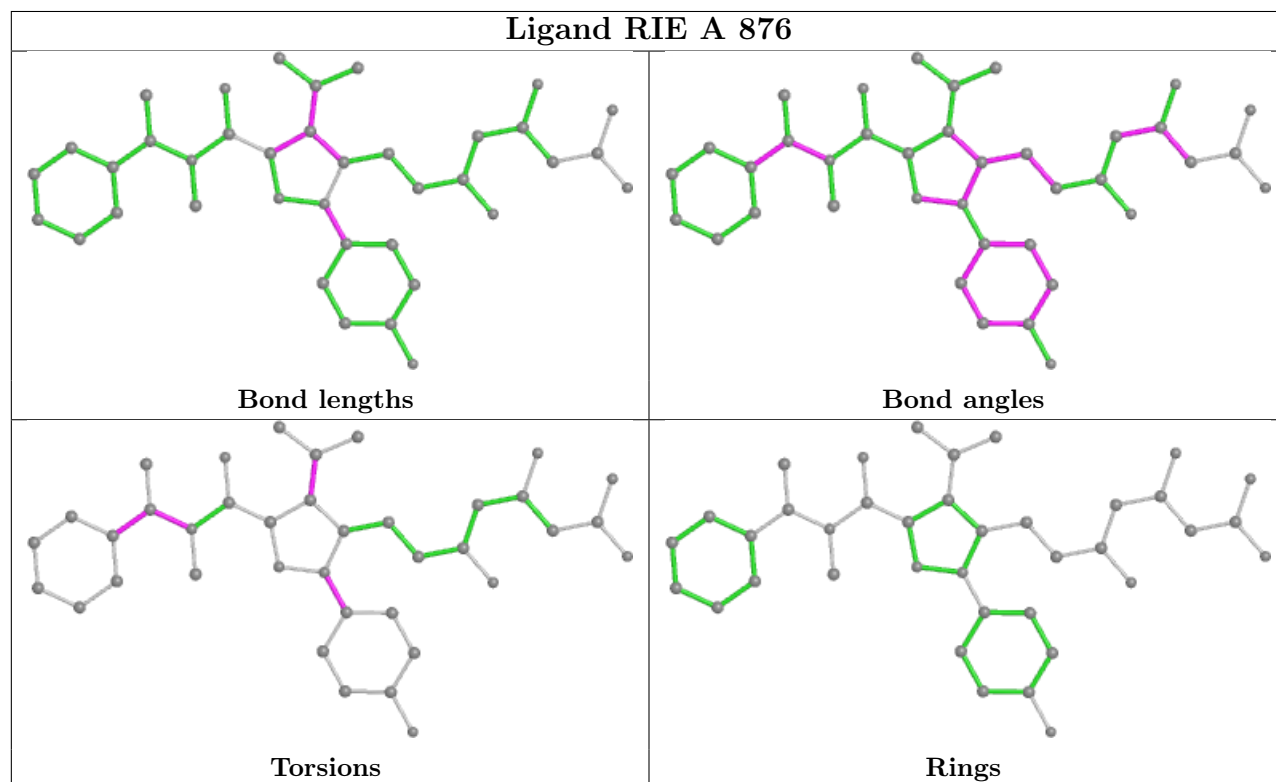
4 monomers are involved in 8 short contacts:

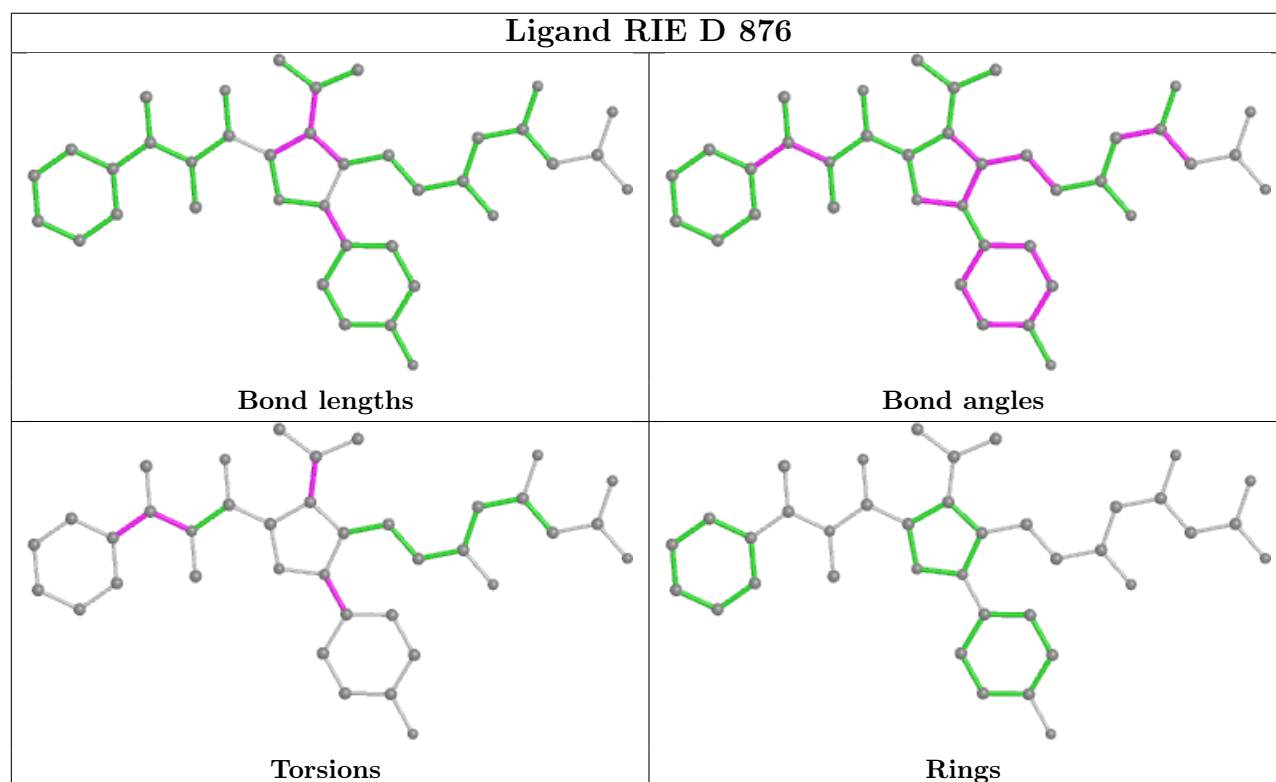
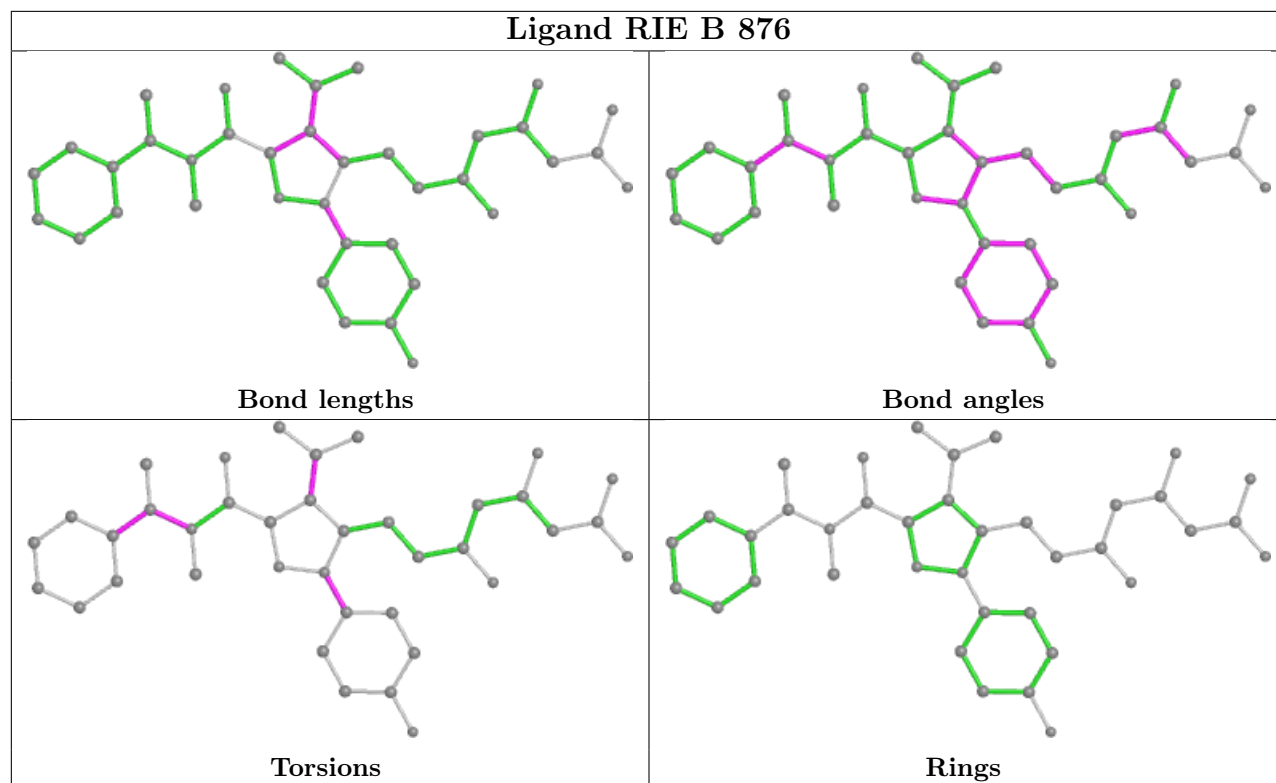
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	876	RIE	3	0
3	B	876	RIE	2	0
3	D	876	RIE	1	0
3	C	876	RIE	2	0

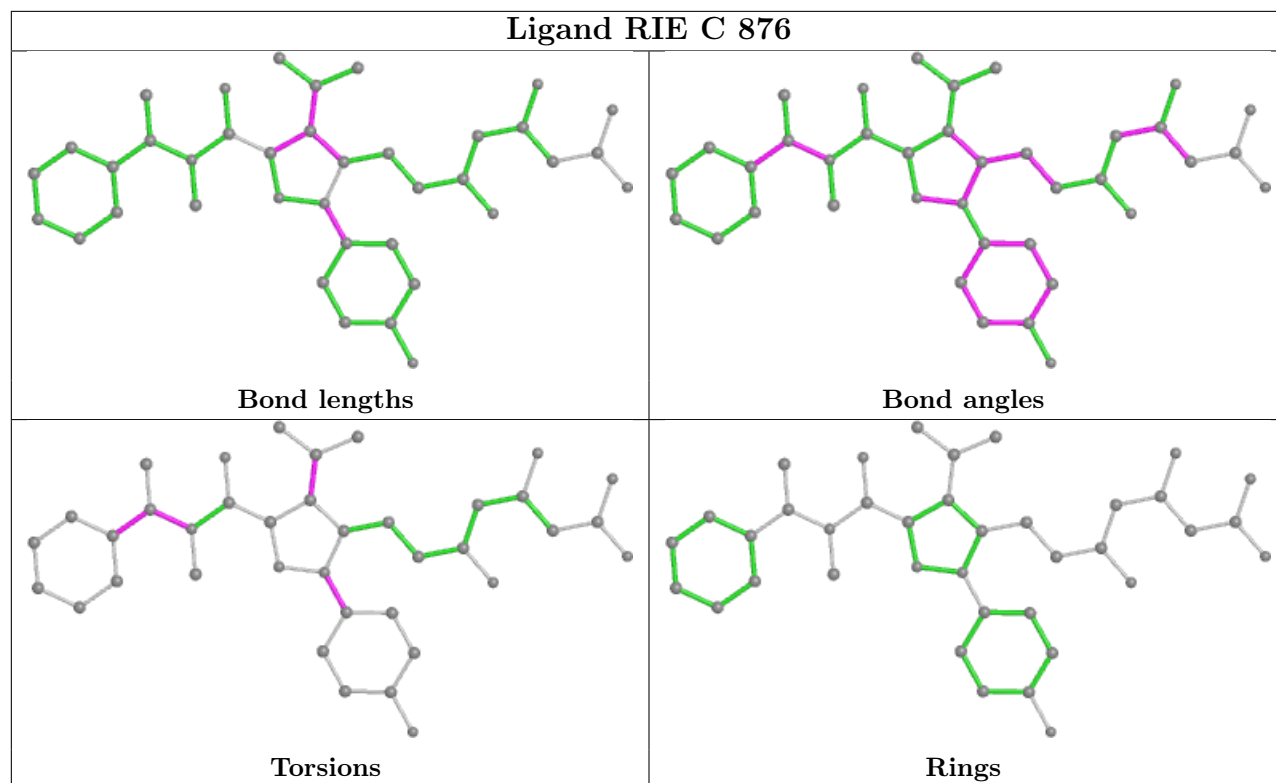
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier.



Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.







## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 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	420/441 (95%)	0.57	38 (9%) <b>9</b>   <b>10</b>	14, 23, 49, 69	0
1	B	405/441 (91%)	0.74	44 (10%) <b>5</b>   <b>6</b>	14, 23, 81, 109	0
1	C	404/441 (91%)	0.64	43 (10%) <b>6</b>   <b>7</b>	13, 22, 80, 101	0
1	D	394/441 (89%)	0.58	36 (9%) <b>9</b>   <b>10</b>	13, 22, 45, 94	0
All	All	1623/1764 (92%)	0.63	161 (9%) <b>7</b>   <b>8</b>	13, 23, 61, 109	0

All (161) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	449	LEU	16.3
1	B	452	LEU	16.2
1	D	484	LEU	14.0
1	B	461	PHE	13.5
1	A	455	ALA	11.8
1	B	444	PRO	11.0
1	B	450	GLN	10.8
1	C	484	LEU	10.6
1	D	469	GLN	9.8
1	B	451	ILE	9.8
1	D	470	LEU	9.5
1	B	473	ALA	9.5
1	C	461	PHE	9.2
1	D	472	ASN	8.9
1	C	483	THR	8.8
1	A	453	GLY	8.8
1	B	474	LYS	8.6
1	C	471	VAL	8.5
1	B	447	GLU	8.0
1	D	468	ILE	7.7
1	D	471	VAL	7.5

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	461	PHE	7.5
1	B	448	CYS	7.5
1	D	458	GLY	7.4
1	D	461	PHE	7.4
1	D	486	GLU	7.3
1	C	444	PRO	7.1
1	D	483	THR	6.9
1	B	445	ASN	6.8
1	B	484	LEU	6.8
1	A	441	GLU	6.7
1	D	485	ILE	6.5
1	C	470	LEU	6.5
1	C	458	GLY	6.4
1	A	442	PRO	6.3
1	B	471	VAL	6.3
1	C	462	LEU	6.2
1	B	446	GLU	5.9
1	A	454	ASN	5.8
1	C	451	ILE	5.4
1	C	482	GLU	5.3
1	D	462	LEU	5.3
1	C	450	GLN	5.2
1	C	452	LEU	5.2
1	A	446	GLU	5.1
1	C	486	GLU	5.0
1	D	487	THR	5.0
1	C	445	ASN	5.0
1	D	459	ALA	4.8
1	A	633	LYS	4.6
1	A	450	GLN	4.5
1	A	523	MET	4.5
1	B	470	LEU	4.4
1	C	453	GLY	4.4
1	D	466	GLU	4.3
1	B	485	ILE	4.3
1	C	468	ILE	4.3
1	B	462	LEU	4.3
1	B	442	PRO	4.2
1	D	786	PRO	4.2
1	C	829	ASP	4.1
1	C	487	THR	4.1
1	C	448	CYS	4.1

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	C	469	GLN	4.0
1	C	449	LEU	4.0
1	B	468	ILE	4.0
1	B	523	MET	4.0
1	B	486	GLU	3.9
1	D	465	ALA	3.9
1	C	467	ILE	3.8
1	A	457	LYS	3.8
1	B	472	ASN	3.8
1	A	456	GLU	3.7
1	A	462	LEU	3.7
1	A	449	LEU	3.7
1	A	650	ARG	3.7
1	D	630	ARG	3.7
1	C	460	LYS	3.6
1	B	460	LYS	3.6
1	B	633	LYS	3.6
1	A	630	ARG	3.5
1	A	452	LEU	3.5
1	B	459	ALA	3.5
1	C	446	GLU	3.5
1	B	469	GLN	3.4
1	C	447	GLU	3.4
1	A	444	PRO	3.4
1	A	485	ILE	3.4
1	B	467	ILE	3.4
1	C	630	ARG	3.3
1	D	467	ILE	3.3
1	C	463	SER	3.3
1	B	829	ASP	3.3
1	A	828	LYS	3.3
1	D	829	ASP	3.3
1	D	633	LYS	3.3
1	D	463	SER	3.1
1	A	483	THR	3.1
1	C	860	GLY	3.1
1	D	464	ASP	3.0
1	B	464	ASP	2.9
1	C	485	ILE	2.9
1	C	459	ALA	2.9
1	D	828	LYS	2.8
1	B	787	THR	2.8

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	443	ARG	2.8
1	A	501	LYS	2.8
1	B	466	GLU	2.8
1	C	633	LYS	2.8
1	B	650	ARG	2.7
1	A	658	ASN	2.7
1	B	441	GLU	2.7
1	A	786	PRO	2.7
1	B	828	LYS	2.7
1	C	628	PHE	2.7
1	C	454	ASN	2.6
1	A	468	ILE	2.6
1	B	524	GLY	2.5
1	D	571	ARG	2.5
1	C	786	PRO	2.5
1	D	516	ASP	2.5
1	B	501	LYS	2.5
1	D	523	MET	2.5
1	D	627	ARG	2.4
1	A	600	CYS	2.4
1	C	828	LYS	2.4
1	A	498	LEU	2.4
1	A	460	LYS	2.4
1	C	490	ARG	2.3
1	A	787	THR	2.3
1	A	486	GLU	2.2
1	C	657	MET	2.2
1	D	659	MET	2.2
1	D	620	GLU	2.2
1	A	515	ARG	2.2
1	B	666	LYS	2.2
1	B	718	ARG	2.2
1	D	658	ASN	2.2
1	D	490	ARG	2.2
1	A	475	HIS	2.2
1	D	830	ASN	2.2
1	A	447	GLU	2.1
1	A	524	GLY	2.1
1	A	860	GLY	2.1
1	B	630	ARG	2.1
1	B	600	CYS	2.1
1	D	460	LYS	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	488	HIS	2.1
1	A	484	LEU	2.1
1	C	505	GLU	2.1
1	C	681	LEU	2.1
1	C	718	ARG	2.1
1	B	860	GLY	2.1
1	A	666	LYS	2.1
1	D	482	GLU	2.1
1	B	465	ALA	2.1
1	A	789	GLU	2.1
1	D	613	GLU	2.1
1	C	515	ARG	2.0
1	C	465	ALA	2.0
1	C	785	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.

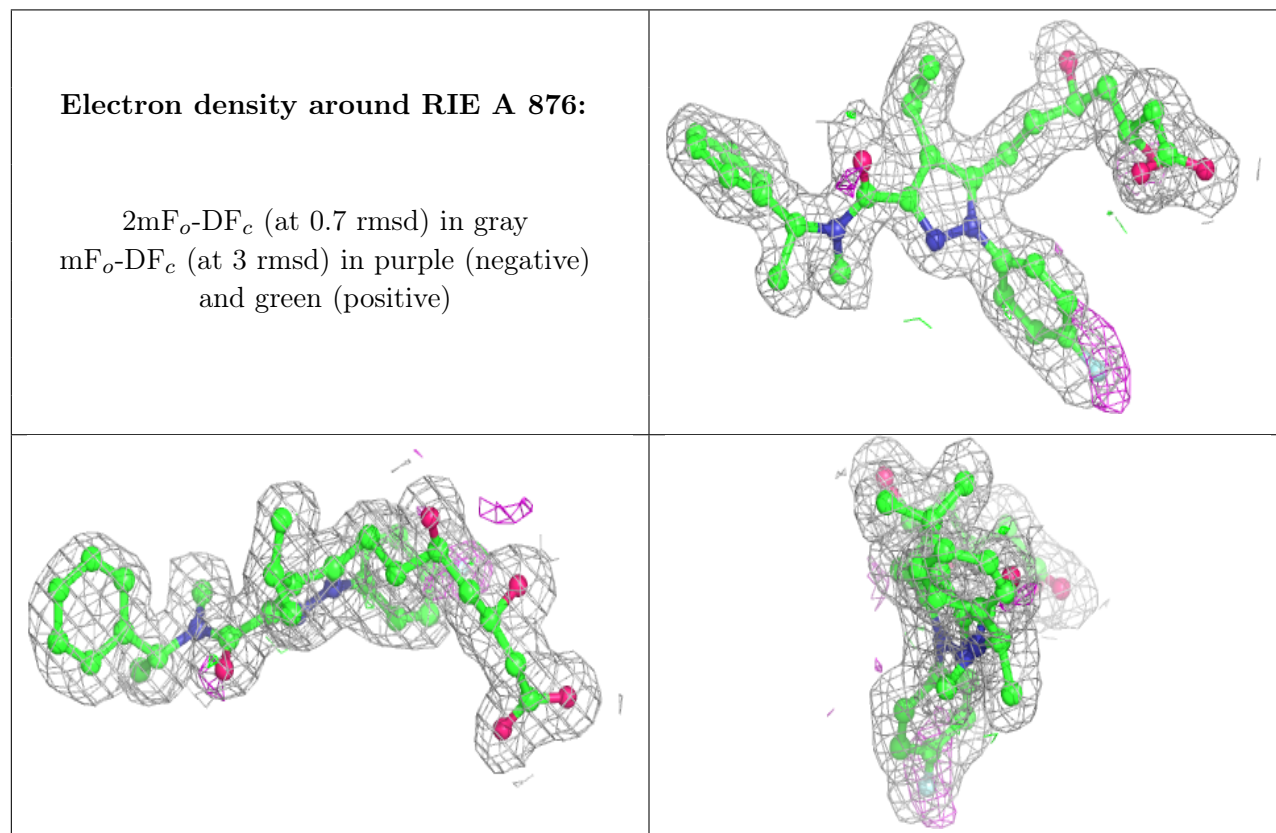
## 6.4 Ligands [i](#)

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, 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	SO4	A	1	5/5	0.83	0.20	47,47,47,47	0
2	SO4	B	2	5/5	0.85	0.21	58,58,58,58	0
3	RIE	A	876	38/38	0.90	0.12	16,21,23,23	0
3	RIE	C	876	38/38	0.92	0.11	15,20,22,22	0
3	RIE	B	876	38/38	0.93	0.10	16,22,23,24	0
2	SO4	C	3	5/5	0.93	0.13	42,42,42,42	0
3	RIE	D	876	38/38	0.93	0.10	16,20,22,22	0
2	SO4	D	4	5/5	0.95	0.12	45,45,45,45	0

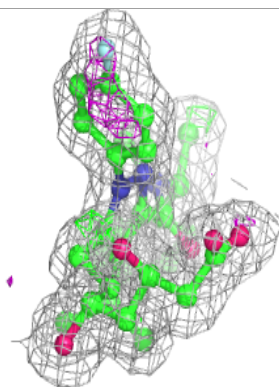
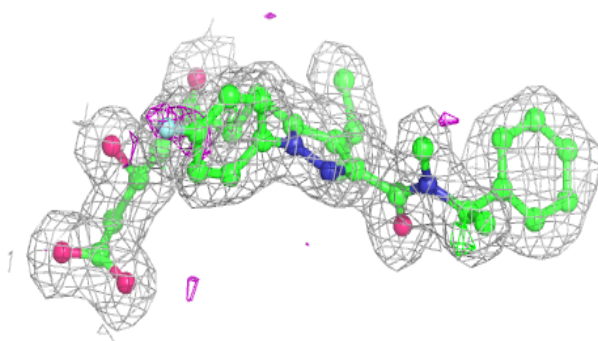
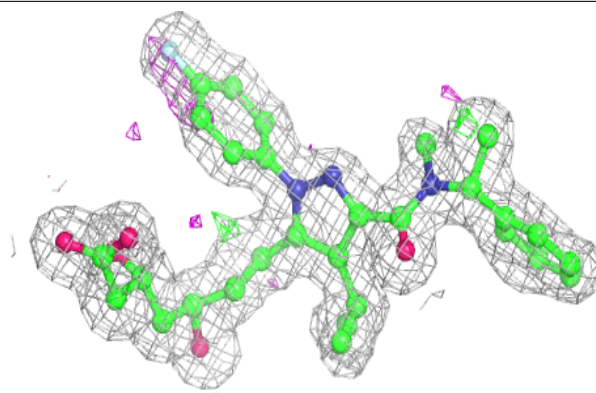


The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

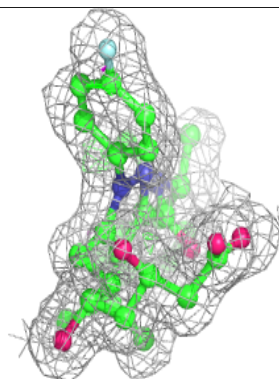
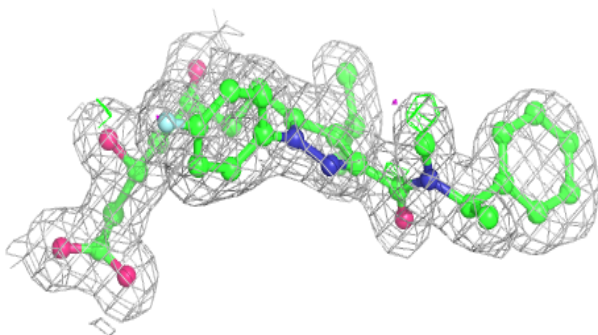
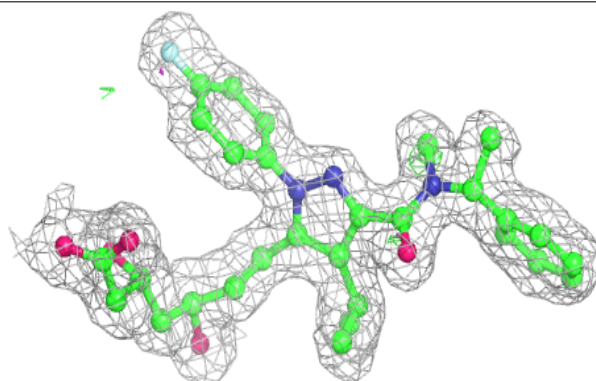


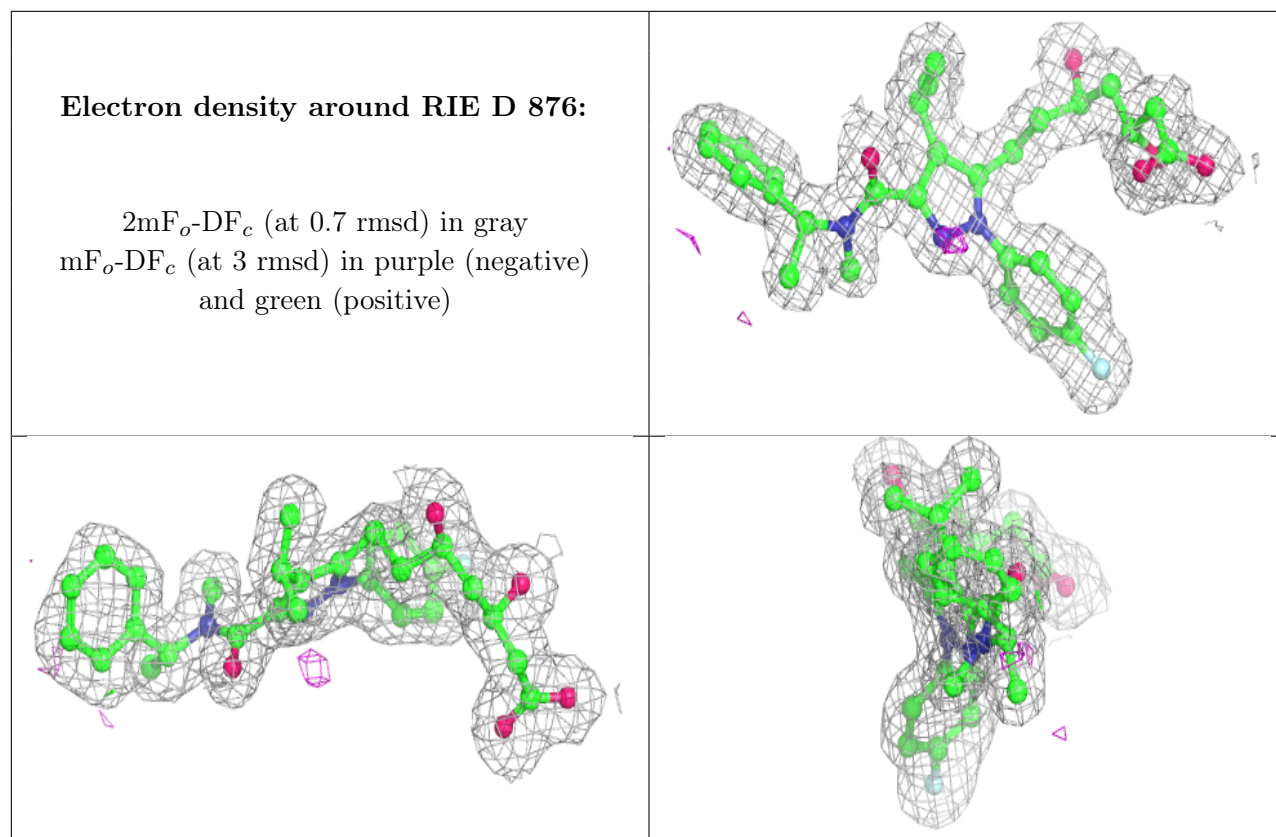
**Electron density around RIE C 876:**

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

**Electron density around RIE B 876:**

$2mF_o-DF_c$  (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.