



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 9, 2023 – 06:50 AM EDT

PDB ID : 8D6U  
Title : Rana catesbeiana saxiphilin:F-STX (soaked)  
Authors : Chen, Z.; Zakrzewska, S.; Minor, D.L.  
Deposited on : 2022-06-06  
Resolution : 2.65 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 : 2.35.1  
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

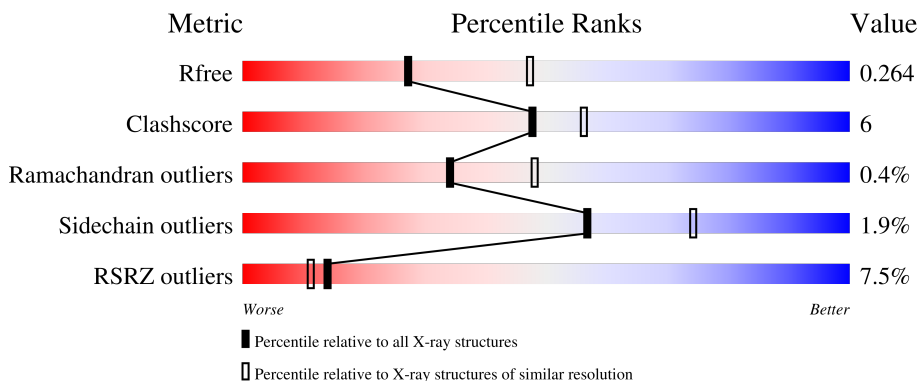
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.65 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	1332 (2.68-2.64)
Clashscore	141614	1374 (2.68-2.64)
Ramachandran outliers	138981	1349 (2.68-2.64)
Sidechain outliers	138945	1349 (2.68-2.64)
RSRZ outliers	127900	1318 (2.68-2.64)

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	853	
1	B	853	

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 12829 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.

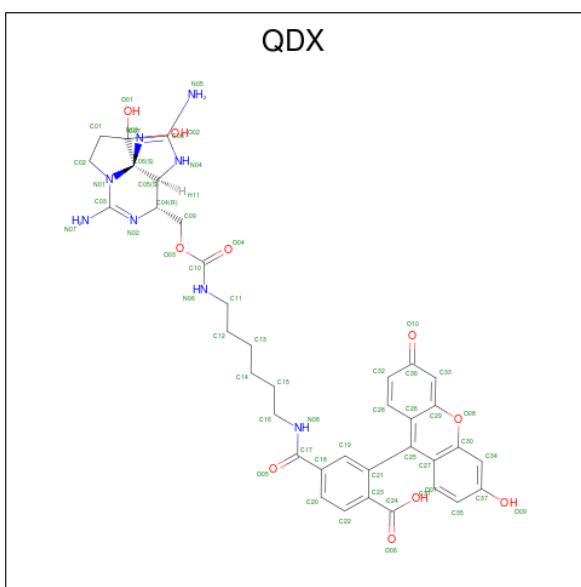
- Molecule 1 is a protein called Saxiphilin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	818	6315	3945	1090	1221	59	0	0	0
1	B	818	6315	3945	1090	1221	59	0	0	0

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	826	SER	-	expression tag	UNP P31226
A	827	ASN	-	expression tag	UNP P31226
A	828	SER	-	expression tag	UNP P31226
A	829	LEU	-	expression tag	UNP P31226
A	830	GLU	-	expression tag	UNP P31226
A	831	VAL	-	expression tag	UNP P31226
A	832	LEU	-	expression tag	UNP P31226
A	833	PHE	-	expression tag	UNP P31226
A	834	GLN	-	expression tag	UNP P31226
B	826	SER	-	expression tag	UNP P31226
B	827	ASN	-	expression tag	UNP P31226
B	828	SER	-	expression tag	UNP P31226
B	829	LEU	-	expression tag	UNP P31226
B	830	GLU	-	expression tag	UNP P31226
B	831	VAL	-	expression tag	UNP P31226
B	832	LEU	-	expression tag	UNP P31226
B	833	PHE	-	expression tag	UNP P31226
B	834	GLN	-	expression tag	UNP P31226

- Molecule 2 is (2P)-4-({6-[(3aS,4R,7R,10aS)-2,6-diamino-10,10-dihydroxy-3a,4,9,10-tetrahydro-3H,8H-pyrrolo[1,2-c]purin-4-yl]methoxy}carbonyl)amino]hexyl}carbamoyl)-2-{[4aP,9(9a)P]-6-hydroxy-3-oxo-3H-xanthen-9-yl}benzoic acid (three-letter code: QDX) (formula: C<sub>37</sub>H<sub>40</sub>N<sub>8</sub>O<sub>10</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
			Total	C	N			O
2	A	1	55	37	8	10	0	0
2	B	1	55	37	8	10	0	0

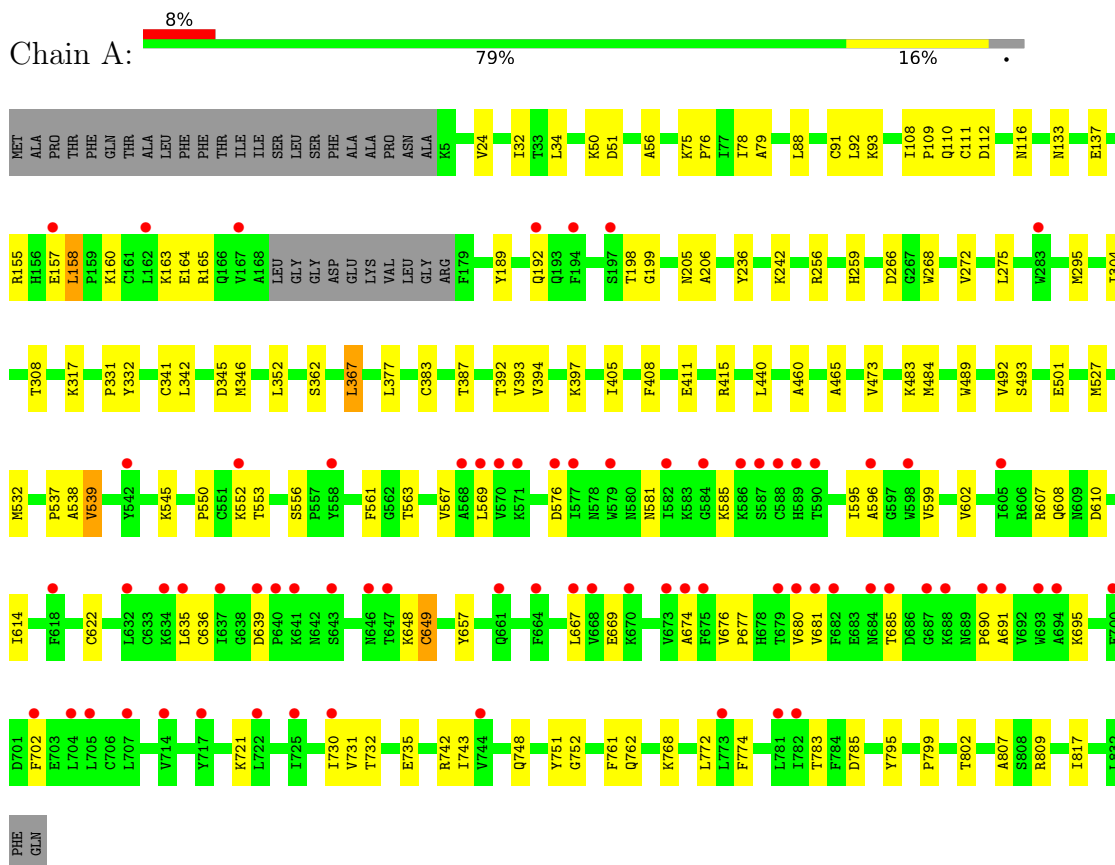
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
3	A	50	50	50	0	0
3	B	39	39	39	0	0

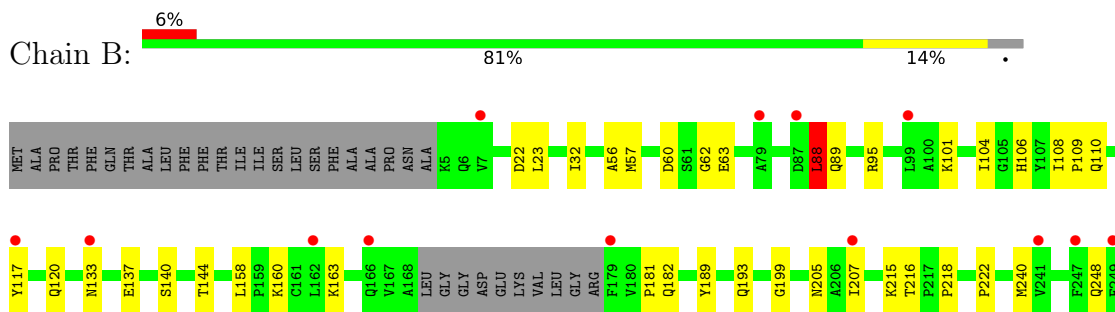
### 3 Residue-property plots

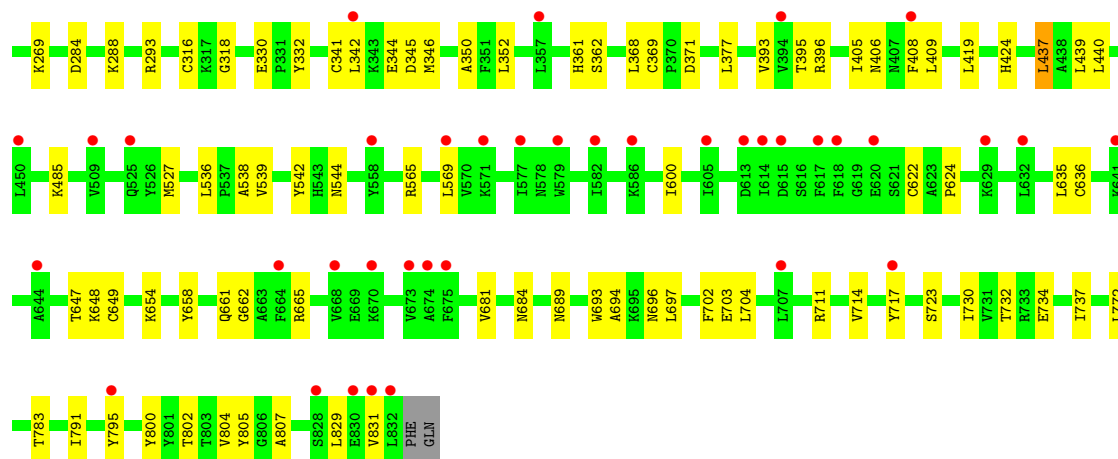
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Saxiphilin



- Molecule 1: Saxiphilin





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	96.44Å 109.37Å 256.36Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.97 – 2.65 47.97 – 2.65	Depositor EDS
% Data completeness (in resolution range)	99.7 (47.97-2.65) 99.7 (47.97-2.65)	Depositor EDS
$R_{merge}$	0.11	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.32 (at 2.65Å)	Xtrriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, $R_{free}$	0.236 , 0.266 0.234 , 0.264	Depositor DCC
$R_{free}$ test set	3949 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	83.7	Xtrriage
Anisotropy	0.652	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 85.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	12829	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	134.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.07% 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

### 5.1 Standard geometry

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

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	0.24	0/6441	0.45	0/8693
1	B	0.24	0/6441	0.45	0/8693
All	All	0.24	0/12882	0.45	0/17386

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

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	6315	0	6181	81	0
1	B	6315	0	6181	67	0
2	A	55	0	0	6	0
2	B	55	0	0	3	0
3	A	50	0	0	7	0
3	B	39	0	0	0	0
All	All	12829	0	12362	153	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 6.

All (153) 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:A:901:QDX:C07	2:A:901:QDX:C06	1.75	1.53
2:B:901:QDX:C07	2:B:901:QDX:C06	1.74	1.44
2:B:901:QDX:C07	2:B:901:QDX:N03	2.22	1.01
2:A:901:QDX:C07	2:A:901:QDX:N03	2.27	0.95
1:A:111:CYS:SG	3:A:1006:HOH:O	2.34	0.85
1:A:341:CYS:SG	3:A:1011:HOH:O	2.38	0.82
1:A:91:CYS:SG	3:A:1006:HOH:O	2.46	0.72
1:A:539:VAL:HG23	1:A:730:ILE:HB	1.72	0.71
1:B:284:ASP:HB3	1:B:288:LYS:HD2	1.72	0.71
1:A:242:LYS:NZ	1:A:345:ASP:OD1	2.20	0.69
1:A:56:ALA:HB2	1:A:405:ILE:HD13	1.75	0.69
1:B:539:VAL:HG12	1:B:783:THR:HA	1.76	0.67
1:A:473:VAL:HG23	1:A:743:ILE:HD12	1.78	0.66
1:B:158:LEU:HB2	1:B:163:LYS:HE3	1.76	0.66
1:A:636:CYS:SG	3:A:1005:HOH:O	2.54	0.66
1:A:88:LEU:O	1:A:93:LYS:NZ	2.28	0.65
1:B:485:LYS:HD2	1:B:772:LEU:HB2	1.78	0.65
2:B:901:QDX:N03	2:B:901:QDX:C01	2.47	0.65
1:B:248:GLN:HA	1:B:368:LEU:HD11	1.79	0.65
1:B:62:GLY:O	1:B:269:LYS:NZ	2.31	0.64
1:B:636:CYS:O	1:B:648:LYS:NZ	2.30	0.63
1:B:569:LEU:HD11	1:B:681:VAL:HB	1.78	0.63
1:A:205:ASN:OD1	1:A:206:ALA:N	2.32	0.63
1:B:182:GLN:OE1	1:B:193:GLN:NE2	2.32	0.62
1:A:317:LYS:HB3	1:A:331:PRO:HG2	1.82	0.62
1:B:56:ALA:HB2	1:B:405:ILE:HD13	1.81	0.61
2:A:901:QDX:N03	2:A:901:QDX:C01	2.52	0.61
1:B:95:ARG:HA	1:B:109:PRO:HD2	1.81	0.60
1:A:317:LYS:HB2	1:A:332:TYR:CE2	2.36	0.60
1:B:344:GLU:O	1:B:346:MET:N	2.35	0.60
1:B:622:CYS:HB2	1:B:635:LEU:HB2	1.83	0.60
1:B:216:THR:HG21	1:B:222:PRO:HA	1.85	0.59
1:B:802:THR:HG22	1:B:807:ALA:HB2	1.84	0.59
1:B:661:GLN:OE1	1:B:684:ASN:ND2	2.36	0.58
1:A:785:ASP:O	2:A:901:QDX:N05	2.36	0.58
1:A:164:GLU:OE1	1:A:189:TYR:OH	2.21	0.58
1:A:160:LYS:HD3	1:A:189:TYR:HE2	1.69	0.58
1:A:411:GLU:OE1	1:A:415:ARG:NH1	2.37	0.57
1:B:409:LEU:HD13	1:B:437:LEU:HD23	1.87	0.56
1:A:32:ILE:HG21	1:A:408:PHE:HB2	1.87	0.56
1:B:654:LYS:H	1:B:654:LYS:HD2	1.71	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:607:ARG:HE	1:A:608:GLN:HG3	1.73	0.54
1:B:542:TYR:CZ	1:B:544:ASN:HB3	2.43	0.53
1:B:23:LEU:HD13	1:B:419:LEU:HD23	1.90	0.53
1:A:681:VAL:O	1:A:685:THR:OG1	2.18	0.53
1:A:362:SER:HA	1:A:377:LEU:HD23	1.90	0.53
1:A:602:VAL:HG23	1:A:614:ILE:HG21	1.91	0.52
1:A:275:LEU:HD12	1:A:295:MET:HE1	1.92	0.52
1:B:694:ALA:HA	1:B:697:LEU:HG	1.91	0.52
1:B:681:VAL:HG21	1:B:714:VAL:HG11	1.91	0.52
1:A:657:TYR:OH	1:A:669:GLU:OE1	2.25	0.52
1:A:802:THR:HG22	1:A:807:ALA:HB2	1.92	0.52
1:B:318:GLY:N	1:B:330:GLU:OE2	2.41	0.51
1:B:240:MET:HE2	1:B:352:LEU:HD21	1.91	0.51
1:B:600:ILE:HD13	1:B:723:SER:HB3	1.91	0.51
1:B:95:ARG:HE	1:B:108:ILE:HG22	1.75	0.51
1:B:32:ILE:HG21	1:B:408:PHE:HB2	1.92	0.51
1:A:735:GLU:OE1	1:A:735:GLU:N	2.44	0.51
1:A:569:LEU:HD22	1:A:681:VAL:HG22	1.92	0.50
1:B:160:LYS:HD2	1:B:189:TYR:HE2	1.76	0.50
1:A:489:TRP:O	1:A:493:SER:HB3	2.12	0.50
1:A:532:MET:HG2	1:A:817:ILE:HG23	1.93	0.50
1:B:332:TYR:CG	1:B:341:CYS:HB2	2.47	0.49
1:A:79:ALA:HB3	1:A:440:LEU:HD21	1.93	0.49
1:A:567:VAL:HG12	1:A:721:LYS:HA	1.94	0.49
1:A:78:ILE:HB	1:A:393:VAL:HB	1.93	0.49
1:B:57:MET:O	1:B:393:VAL:HA	2.13	0.49
1:B:703:GLU:OE1	1:B:711:ARG:NH1	2.45	0.49
1:A:108:ILE:O	1:A:110:GLN:NE2	2.46	0.49
1:A:308:THR:HB	1:B:293:ARG:HD3	1.95	0.49
1:A:158:LEU:HD12	1:A:163:LYS:HB2	1.95	0.48
1:A:742:ARG:HG3	1:A:743:ILE:H	1.78	0.48
1:B:60:ASP:HB3	1:B:63:GLU:HG3	1.95	0.48
1:B:181:PRO:HA	1:B:193:GLN:NE2	2.29	0.48
1:A:460:ALA:HA	1:A:465:ALA:HB2	1.94	0.48
1:A:76:PRO:HA	1:A:394:VAL:HG12	1.95	0.48
1:A:259:HIS:CD2	1:A:304:ILE:HG12	2.49	0.48
1:A:76:PRO:HB3	1:A:392:THR:HG21	1.95	0.47
1:A:527:MET:HG3	1:A:795:TYR:CZ	2.50	0.47
1:A:667:LEU:HB2	1:A:674:ALA:HB2	1.97	0.47
1:A:483:LYS:HD3	1:A:501:GLU:HG3	1.96	0.47
1:A:552:LYS:HG3	1:A:553:THR:HG22	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:538:ALA:HB2	1:B:732:THR:HG22	1.97	0.47
1:A:75:LYS:HG2	1:A:397:LYS:HA	1.97	0.46
1:A:346:MET:HB2	3:A:1011:HOH:O	2.15	0.46
1:A:772:LEU:O	1:A:774:PHE:N	2.45	0.46
1:B:624:PRO:HG2	1:B:658:TYR:HA	1.96	0.46
1:B:689:ASN:HD21	1:B:694:ALA:HB3	1.80	0.46
1:A:484:MET:HE2	1:A:768:LYS:HD2	1.96	0.46
1:A:538:ALA:HB2	1:A:732:THR:HG22	1.98	0.46
1:B:647:THR:HB	1:B:654:LYS:HB3	1.98	0.46
1:A:24:VAL:HG22	1:A:34:LEU:HB3	1.98	0.46
1:B:182:GLN:H	1:B:193:GLN:HE22	1.63	0.46
1:A:367:LEU:HB3	1:A:383:CYS:SG	2.55	0.45
1:A:691:ALA:HB1	1:A:695:LYS:HE3	1.98	0.45
1:B:88:LEU:HB3	1:B:89:GLN:H	1.60	0.45
1:B:199:GLY:HA3	1:B:218:PRO:HB3	1.97	0.45
1:B:536:LEU:HD22	1:B:791:ILE:HG12	1.98	0.45
1:A:581:ASN:O	1:A:585:LYS:NZ	2.34	0.45
1:A:266:ASP:OD1	1:A:266:ASP:N	2.46	0.45
1:A:268:TRP:O	1:A:272:VAL:HG23	2.16	0.45
1:A:596:ALA:HB3	1:A:677:PRO:HD3	1.98	0.45
1:B:342:LEU:HB2	1:B:350:ALA:HB2	1.99	0.45
1:B:369:CYS:HB2	1:B:371:ASP:OD1	2.17	0.45
1:A:569:LEU:HD11	1:A:702:PHE:HB3	1.99	0.44
1:A:622:CYS:HB2	1:A:635:LEU:HD12	1.98	0.44
1:A:272:VAL:HG22	1:A:295:MET:HE2	1.99	0.44
1:A:492:VAL:O	1:A:751:TYR:OH	2.29	0.44
1:B:406:ASN:ND2	1:B:439:LEU:HD22	2.32	0.44
1:B:316:CYS:HB3	1:B:330:GLU:OE2	2.18	0.44
1:A:537:PRO:HA	1:A:731:VAL:HG12	1.99	0.44
1:B:624:PRO:HA	1:B:649:CYS:HA	2.00	0.44
1:A:748:GLN:O	1:A:752:GLY:N	2.49	0.43
1:B:140:SER:HB3	1:B:831:VAL:HG12	2.00	0.43
1:A:614:ILE:H	1:A:614:ILE:HG13	1.57	0.43
1:B:565:ARG:HG3	1:B:717:TYR:HD1	1.82	0.43
1:B:734:GLU:HA	1:B:737:ILE:HG12	2.00	0.43
1:A:595:ILE:HA	1:A:599:VAL:HB	1.99	0.43
1:B:661:GLN:HG3	1:B:693:TRP:HH2	1.82	0.43
1:A:192:GLN:HB2	1:A:809:ARG:HH21	1.82	0.43
1:A:268:TRP:HZ3	1:A:304:ILE:HD13	1.84	0.43
1:A:676:VAL:HG12	1:A:677:PRO:O	2.19	0.43
1:A:50:LYS:NZ	1:A:51:ASP:OD1	2.39	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:236:TYR:CE2	1:A:387:THR:HG22	2.54	0.42
1:B:205:ASN:C	1:B:207:ILE:H	2.22	0.42
1:A:155:ARG:HH12	1:A:157:GLU:HB3	1.85	0.42
1:A:576:ASP:O	1:A:581:ASN:ND2	2.53	0.42
1:A:649:CYS:SG	3:A:1005:HOH:O	2.61	0.42
1:A:721:LYS:NZ	2:A:901:QDX:O09	2.48	0.42
1:B:160:LYS:HD2	1:B:189:TYR:CE2	2.55	0.42
1:B:527:MET:HG3	1:B:795:TYR:CZ	2.55	0.42
1:B:697:LEU:HD13	1:B:702:PHE:HZ	1.85	0.42
1:B:133:ASN:HB2	1:B:137:GLU:HB2	2.02	0.41
1:B:538:ALA:N	1:B:730:ILE:O	2.52	0.41
1:B:662:GLY:HA2	1:B:665:ARG:HE	1.86	0.41
1:A:92:LEU:HD12	1:A:92:LEU:H	1.85	0.41
1:B:104:ILE:H	1:B:104:ILE:HG12	1.64	0.41
1:B:800:TYR:O	1:B:804:VAL:HG22	2.20	0.41
1:A:799:PRO:HD2	2:A:901:QDX:O07	2.21	0.41
1:B:22:ASP:OD2	1:B:424:HIS:NE2	2.53	0.41
1:B:205:ASN:O	1:B:207:ILE:N	2.53	0.41
1:B:362:SER:HA	1:B:377:LEU:HD13	2.03	0.41
1:A:112:ASP:OD1	1:A:116:ASN:N	2.54	0.41
1:A:545:LYS:H	1:A:545:LYS:HG2	1.65	0.41
1:B:395:THR:OG1	1:B:396:ARG:N	2.51	0.41
1:A:133:ASN:HD21	1:A:137:GLU:HB2	1.86	0.40
1:B:215:LYS:HE2	1:B:215:LYS:HB2	1.92	0.40
1:B:804:VAL:HG23	1:B:805:TYR:CD2	2.55	0.40
1:B:829:LEU:HG	1:B:831:VAL:HG13	2.03	0.40
1:A:109:PRO:HB2	3:A:1006:HOH:O	2.21	0.40
1:A:539:VAL:HG12	1:A:783:THR:HA	2.03	0.40
1:A:377:LEU:HD22	1:A:377:LEU:H	1.86	0.40
1:A:550:PRO:HA	1:A:556:SER:HB3	2.02	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	814/853 (95%)	767 (94%)	44 (5%)	3 (0%)	34	48
1	B	814/853 (95%)	762 (94%)	49 (6%)	3 (0%)	34	48
All	All	1628/1706 (95%)	1529 (94%)	93 (6%)	6 (0%)	34	48

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	88	LEU
1	B	345	ASP
1	B	106	HIS
1	A	639	ASP
1	A	199	GLY
1	A	690	PRO

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	704/731 (96%)	688 (98%)	16 (2%)	50	68
1	B	704/731 (96%)	693 (98%)	11 (2%)	62	78
All	All	1408/1462 (96%)	1381 (98%)	27 (2%)	57	74

All (27) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	158	LEU
1	A	165	ARG
1	A	198	THR
1	A	256	ARG
1	A	342	LEU
1	A	352	LEU
1	A	367	LEU

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Mol	Chain	Res	Type
1	A	539	VAL
1	A	561	PHE
1	A	563	THR
1	A	610	ASP
1	A	648	LYS
1	A	649	CYS
1	A	680	VAL
1	A	761	PHE
1	A	762	GLN
1	B	88	LEU
1	B	101	LYS
1	B	110	GLN
1	B	117	TYR
1	B	120	GLN
1	B	144	THR
1	B	361	HIS
1	B	437	LEU
1	B	440	LEU
1	B	696	ASN
1	B	704	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	193	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

2 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	QDX	B	901	-	55,61,61	5.20	26 (47%)	67,91,91	3.31	24 (35%)
2	QDX	A	901	-	55,61,61	5.21	25 (45%)	67,91,91	3.32	24 (35%)

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	QDX	B	901	-	-	18/30/80/80	0/7/7/7
2	QDX	A	901	-	-	16/30/80/80	0/7/7/7

All (51) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	901	QDX	C31-C27	19.30	1.70	1.39
2	B	901	QDX	C31-C27	19.20	1.70	1.39
2	B	901	QDX	C02-N01	-11.21	1.33	1.47
2	A	901	QDX	C02-N01	-10.84	1.34	1.47
2	A	901	QDX	C34-C37	-10.64	1.23	1.39
2	B	901	QDX	C34-C37	-10.54	1.23	1.39
2	A	901	QDX	C32-C28	10.51	1.58	1.35
2	B	901	QDX	C32-C28	10.43	1.58	1.35
2	B	901	QDX	C08-N04	10.02	1.51	1.35
2	A	901	QDX	C08-N04	10.00	1.51	1.35
2	A	901	QDX	C34-C30	-8.92	1.22	1.38
2	B	901	QDX	C34-C30	-8.87	1.22	1.38
2	A	901	QDX	C33-C36	-8.73	1.24	1.45
2	B	901	QDX	C33-C36	-8.69	1.24	1.45
2	A	901	QDX	C01-C02	-8.62	1.36	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	901	QDX	C01-C02	-8.60	1.36	1.52
2	A	901	QDX	C35-C31	7.83	1.53	1.38
2	B	901	QDX	C35-C31	7.77	1.52	1.38
2	B	901	QDX	C03-N07	7.04	1.47	1.34
2	A	901	QDX	C03-N07	7.04	1.46	1.34
2	B	901	QDX	C17-N08	6.34	1.47	1.33
2	A	901	QDX	C17-N08	6.29	1.47	1.33
2	B	901	QDX	C10-N06	6.01	1.47	1.34
2	B	901	QDX	C33-C29	-5.95	1.21	1.36
2	A	901	QDX	C33-C29	-5.94	1.21	1.36
2	A	901	QDX	C10-N06	5.90	1.47	1.34
2	A	901	QDX	C28-C26	5.70	1.53	1.40
2	B	901	QDX	C28-C26	5.68	1.53	1.40
2	A	901	QDX	O10-C36	5.37	1.41	1.24
2	B	901	QDX	O10-C36	5.34	1.40	1.24
2	A	901	QDX	C08-N05	5.28	1.46	1.34
2	B	901	QDX	C08-N05	5.26	1.46	1.34
2	A	901	QDX	C03-N01	4.68	1.44	1.35
2	A	901	QDX	O08-C30	-4.49	1.31	1.38
2	B	901	QDX	C03-N01	4.48	1.43	1.35
2	B	901	QDX	O08-C30	-4.46	1.31	1.38
2	A	901	QDX	C21-C25	4.05	1.55	1.49
2	B	901	QDX	C21-C25	3.76	1.54	1.49
2	B	901	QDX	O03-C10	3.59	1.42	1.35
2	A	901	QDX	O03-C10	3.56	1.42	1.35
2	A	901	QDX	C26-C25	3.50	1.50	1.39
2	B	901	QDX	C26-C25	3.41	1.50	1.39
2	A	901	QDX	C05-N04	2.95	1.51	1.45
2	B	901	QDX	C05-N04	2.86	1.51	1.45
2	B	901	QDX	C18-C17	2.32	1.55	1.50
2	A	901	QDX	C18-C17	2.30	1.55	1.50
2	B	901	QDX	C35-C37	-2.29	1.34	1.38
2	A	901	QDX	C35-C37	-2.28	1.34	1.38
2	B	901	QDX	C27-C25	-2.25	1.41	1.47
2	A	901	QDX	C27-C25	-2.13	1.41	1.47
2	B	901	QDX	C23-C24	2.01	1.53	1.49

All (48) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	901	QDX	C29-C33-C36	10.18	129.75	120.76
2	B	901	QDX	C29-C33-C36	10.11	129.68	120.76

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	901	QDX	O08-C30-C27	-9.73	112.31	121.56
2	A	901	QDX	O08-C30-C27	-9.63	112.41	121.56
2	A	901	QDX	C30-O08-C29	8.06	134.78	119.70
2	B	901	QDX	C30-O08-C29	8.04	134.75	119.70
2	B	901	QDX	C35-C37-C34	7.90	128.82	120.17
2	A	901	QDX	C35-C37-C34	7.74	128.66	120.17
2	A	901	QDX	C31-C27-C30	-7.05	108.96	118.21
2	B	901	QDX	C31-C27-C30	-6.77	109.33	118.21
2	A	901	QDX	O03-C10-N06	6.61	120.89	110.61
2	B	901	QDX	O03-C10-N06	6.44	120.63	110.61
2	B	901	QDX	C28-C26-C25	6.24	137.35	123.96
2	A	901	QDX	C28-C26-C25	6.23	137.32	123.96
2	A	901	QDX	C33-C29-C26	6.20	131.66	122.90
2	B	901	QDX	C33-C29-C26	6.13	131.56	122.90
2	B	901	QDX	C01-C02-N01	5.45	109.99	103.83
2	B	901	QDX	C31-C35-C37	-5.10	114.28	119.88
2	A	901	QDX	C31-C35-C37	-5.06	114.33	119.88
2	B	901	QDX	O08-C29-C26	-4.67	115.21	120.49
2	A	901	QDX	O08-C29-C26	-4.65	115.24	120.49
2	A	901	QDX	C01-C02-N01	4.25	108.63	103.83
2	B	901	QDX	C35-C31-C27	-4.20	114.14	120.94
2	A	901	QDX	C30-C34-C37	4.18	125.83	119.05
2	A	901	QDX	C35-C31-C27	-4.12	114.26	120.94
2	B	901	QDX	C30-C34-C37	4.11	125.72	119.05
2	B	901	QDX	C25-C26-C29	-3.51	114.61	119.29
2	B	901	QDX	O04-C10-N06	-3.47	119.64	124.96
2	A	901	QDX	C34-C30-C27	3.45	127.96	121.35
2	A	901	QDX	O04-C10-N06	-3.43	119.70	124.96
2	A	901	QDX	C28-C26-C29	-3.41	107.92	115.62
2	A	901	QDX	C25-C26-C29	-3.39	114.77	119.29
2	A	901	QDX	C31-C27-C25	3.37	130.02	123.28
2	B	901	QDX	C28-C26-C29	-3.35	108.05	115.62
2	B	901	QDX	C34-C30-C27	3.31	127.70	121.35
2	B	901	QDX	C31-C27-C25	3.20	129.68	123.28
2	A	901	QDX	N01-C03-N02	-3.05	121.17	125.42
2	B	901	QDX	C28-C32-C36	-3.03	117.04	121.23
2	B	901	QDX	N01-C03-N02	-3.01	121.23	125.42
2	A	901	QDX	C28-C32-C36	-2.99	117.09	121.23
2	B	901	QDX	O08-C30-C34	2.80	119.99	115.79
2	A	901	QDX	O08-C30-C34	2.56	119.63	115.79
2	A	901	QDX	O03-C10-O04	-2.53	119.40	124.25
2	A	901	QDX	C32-C28-C26	-2.50	116.97	121.49

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	901	QDX	C32-C28-C26	-2.49	116.97	121.49
2	B	901	QDX	O03-C10-O04	-2.36	119.72	124.25
2	A	901	QDX	O08-C29-C33	-2.33	113.11	116.61
2	B	901	QDX	O08-C29-C33	-2.25	113.23	116.61

There are no chirality outliers.

All (34) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	901	QDX	O03-C10-N06-C11
2	A	901	QDX	O04-C10-N06-C11
2	A	901	QDX	C21-C25-C27-C31
2	A	901	QDX	C26-C25-C27-C31
2	B	901	QDX	O03-C10-N06-C11
2	B	901	QDX	O04-C10-N06-C11
2	B	901	QDX	N06-C10-O03-C09
2	B	901	QDX	O04-C10-O03-C09
2	B	901	QDX	C21-C25-C27-C31
2	B	901	QDX	C26-C25-C27-C31
2	A	901	QDX	O05-C17-C18-C20
2	A	901	QDX	N08-C17-C18-C20
2	A	901	QDX	N08-C17-C18-C19
2	A	901	QDX	O05-C17-C18-C19
2	B	901	QDX	O05-C17-C18-C20
2	B	901	QDX	N08-C17-C18-C20
2	B	901	QDX	N08-C17-C18-C19
2	B	901	QDX	O05-C17-C18-C19
2	A	901	QDX	N06-C10-O03-C09
2	A	901	QDX	O04-C10-O03-C09
2	B	901	QDX	C12-C13-C14-C15
2	B	901	QDX	C11-C12-C13-C14
2	B	901	QDX	C13-C14-C15-C16
2	A	901	QDX	C13-C14-C15-C16
2	B	901	QDX	C14-C15-C16-N08
2	A	901	QDX	N06-C11-C12-C13
2	A	901	QDX	C22-C23-C24-O06
2	A	901	QDX	C22-C23-C24-O07
2	B	901	QDX	C22-C23-C24-O07
2	B	901	QDX	C22-C23-C24-O06
2	A	901	QDX	C21-C23-C24-O06
2	B	901	QDX	C21-C23-C24-O06
2	A	901	QDX	C21-C23-C24-O07

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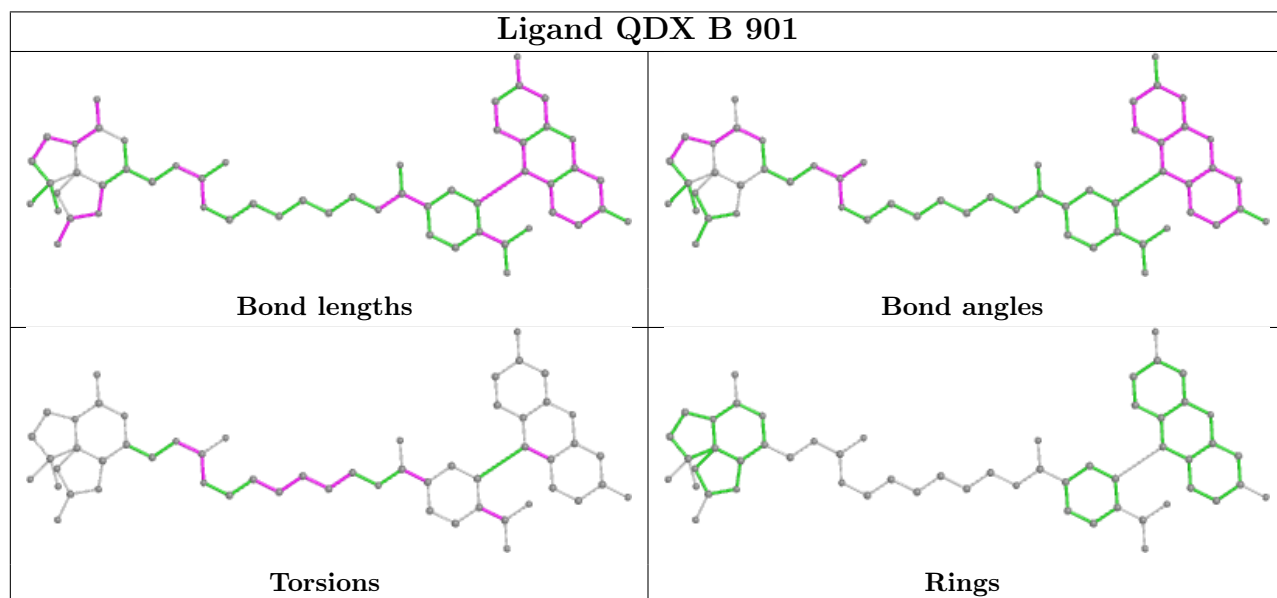
Mol	Chain	Res	Type	Atoms
2	B	901	QDX	C21-C23-C24-O07

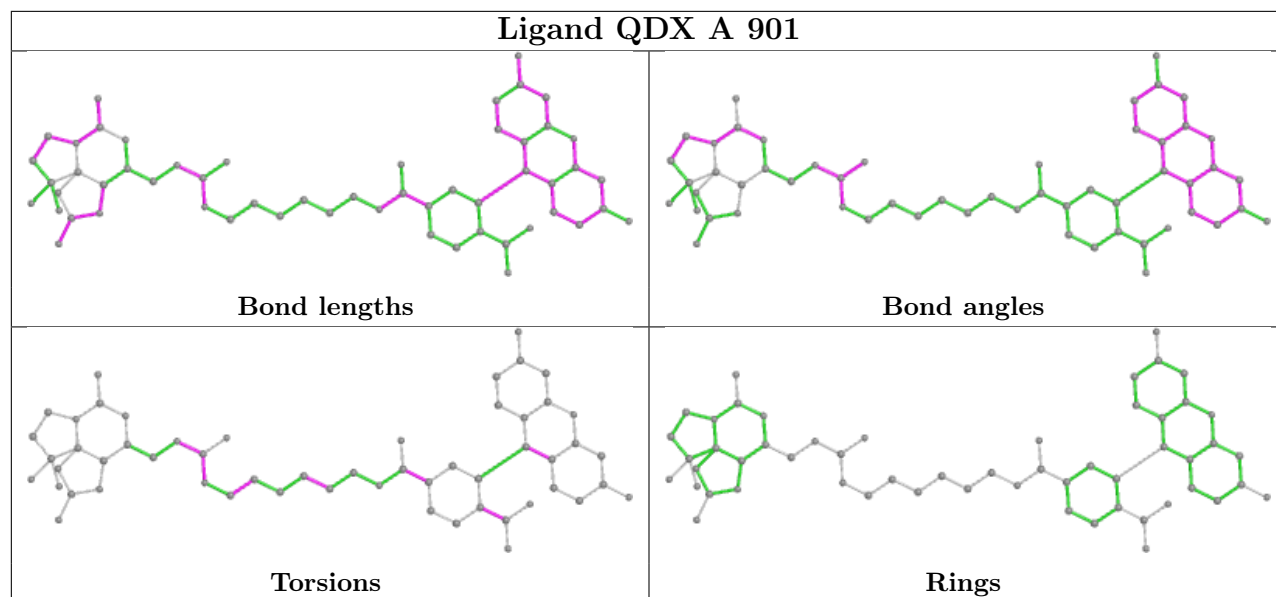
There are no ring outliers.

2 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	901	QDX	3	0
2	A	901	QDX	6	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	818/853 (95%)	0.58	72 (8%) <b>10</b> <b>8</b>	72, 119, 213, 280	0
1	B	818/853 (95%)	0.54	51 (6%) <b>20</b> <b>17</b>	85, 126, 203, 332	0
All	All	1636/1706 (95%)	0.56	123 (7%) <b>14</b> <b>11</b>	72, 123, 209, 332	0

All (123) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	675	PHE	11.0
1	A	674	ALA	10.6
1	A	157	GLU	9.9
1	A	569	LEU	8.4
1	A	702	PHE	8.0
1	B	830	GLU	8.0
1	A	558	TYR	7.9
1	A	637	ILE	7.7
1	A	579	TRP	7.1
1	A	570	VAL	6.9
1	B	615	ASP	6.6
1	A	693	TRP	6.5
1	B	670	LYS	5.7
1	B	179	PHE	5.5
1	A	688	LYS	5.5
1	A	162	LEU	5.4
1	B	668	VAL	5.3
1	A	577	ILE	5.1
1	A	639	ASP	4.9
1	B	629	LYS	4.8
1	B	641	LYS	4.7
1	A	684	ASN	4.7
1	B	664	PHE	4.7
1	A	664	PHE	4.5

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	704	LEU	4.5
1	A	640	PRO	4.4
1	B	613	ASP	4.3
1	B	87	ASP	4.2
1	A	685	THR	4.2
1	A	691	ALA	4.2
1	A	582	ILE	4.2
1	A	598	TRP	4.1
1	B	614	ILE	4.0
1	B	577	ILE	4.0
1	A	568	ALA	4.0
1	A	646	ASN	4.0
1	A	681	VAL	4.0
1	B	644	ALA	3.9
1	B	675	PHE	3.9
1	A	605	ILE	3.7
1	B	831	VAL	3.7
1	B	707	LEU	3.7
1	B	166	GLN	3.6
1	A	680	VAL	3.6
1	A	694	ALA	3.6
1	A	682	PHE	3.5
1	A	586	LYS	3.5
1	A	687	GLY	3.5
1	A	632	LEU	3.5
1	B	832	LEU	3.5
1	B	828	SER	3.4
1	A	725	ILE	3.4
1	A	641	LYS	3.3
1	B	241	VAL	3.3
1	A	717	TYR	3.3
1	A	618	PHE	3.3
1	B	408	PHE	3.1
1	A	634	LYS	3.1
1	A	197	SER	3.1
1	A	647	THR	3.0
1	B	571	LYS	3.0
1	A	673	VAL	3.0
1	B	620	GLU	3.0
1	A	635	LEU	2.9
1	A	589	HIS	2.9
1	B	673	VAL	2.9

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	617	PHE	2.9
1	A	571	LYS	2.8
1	B	162	LEU	2.8
1	A	167	VAL	2.8
1	A	668	VAL	2.8
1	A	714	VAL	2.8
1	A	542	TYR	2.7
1	B	579	TRP	2.7
1	A	707	LEU	2.6
1	B	558	TYR	2.6
1	A	552	LYS	2.6
1	B	605	ILE	2.6
1	A	590	THR	2.5
1	B	207	ILE	2.5
1	B	357	LEU	2.5
1	A	584	GLY	2.5
1	A	781	LEU	2.5
1	B	342	LEU	2.5
1	B	717	TYR	2.5
1	A	690	PRO	2.4
1	B	674	ALA	2.4
1	A	596	ALA	2.4
1	B	525	GLN	2.4
1	B	586	LYS	2.4
1	A	670	LYS	2.4
1	B	247	PHE	2.4
1	A	700	GLU	2.4
1	A	679	THR	2.4
1	B	582	ILE	2.4
1	A	587	SER	2.4
1	A	722	LEU	2.4
1	A	667	LEU	2.3
1	B	632	LEU	2.3
1	A	194	PHE	2.3
1	A	661	GLN	2.3
1	A	773	LEU	2.3
1	B	99	LEU	2.3
1	A	705	LEU	2.2
1	B	117	TYR	2.2
1	A	192	GLN	2.2
1	A	283	TRP	2.2
1	B	618	PHE	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	569	LEU	2.2
1	A	744	VAL	2.2
1	A	576	ASP	2.2
1	A	643	SER	2.1
1	A	588	CYS	2.1
1	B	133	ASN	2.1
1	A	730	ILE	2.1
1	B	7	VAL	2.1
1	B	249	PHE	2.1
1	B	795	TYR	2.0
1	B	79	ALA	2.0
1	B	394	VAL	2.0
1	A	782	ILE	2.0
1	B	450	LEU	2.0
1	B	509	VAL	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.

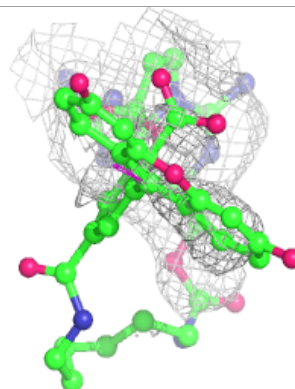
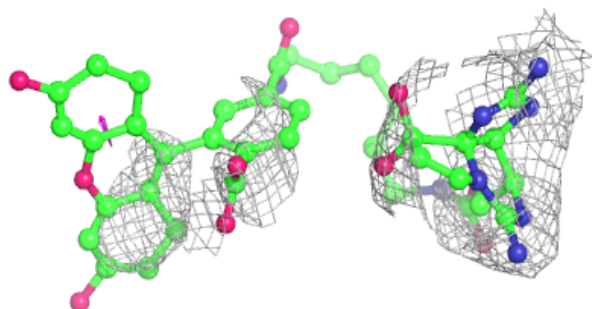
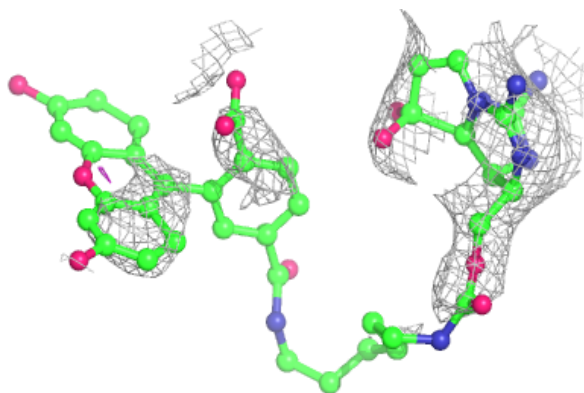
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	QDX	A	901	55/55	0.81	0.34	157,198,230,232	0
2	QDX	B	901	55/55	0.86	0.36	115,165,198,209	0

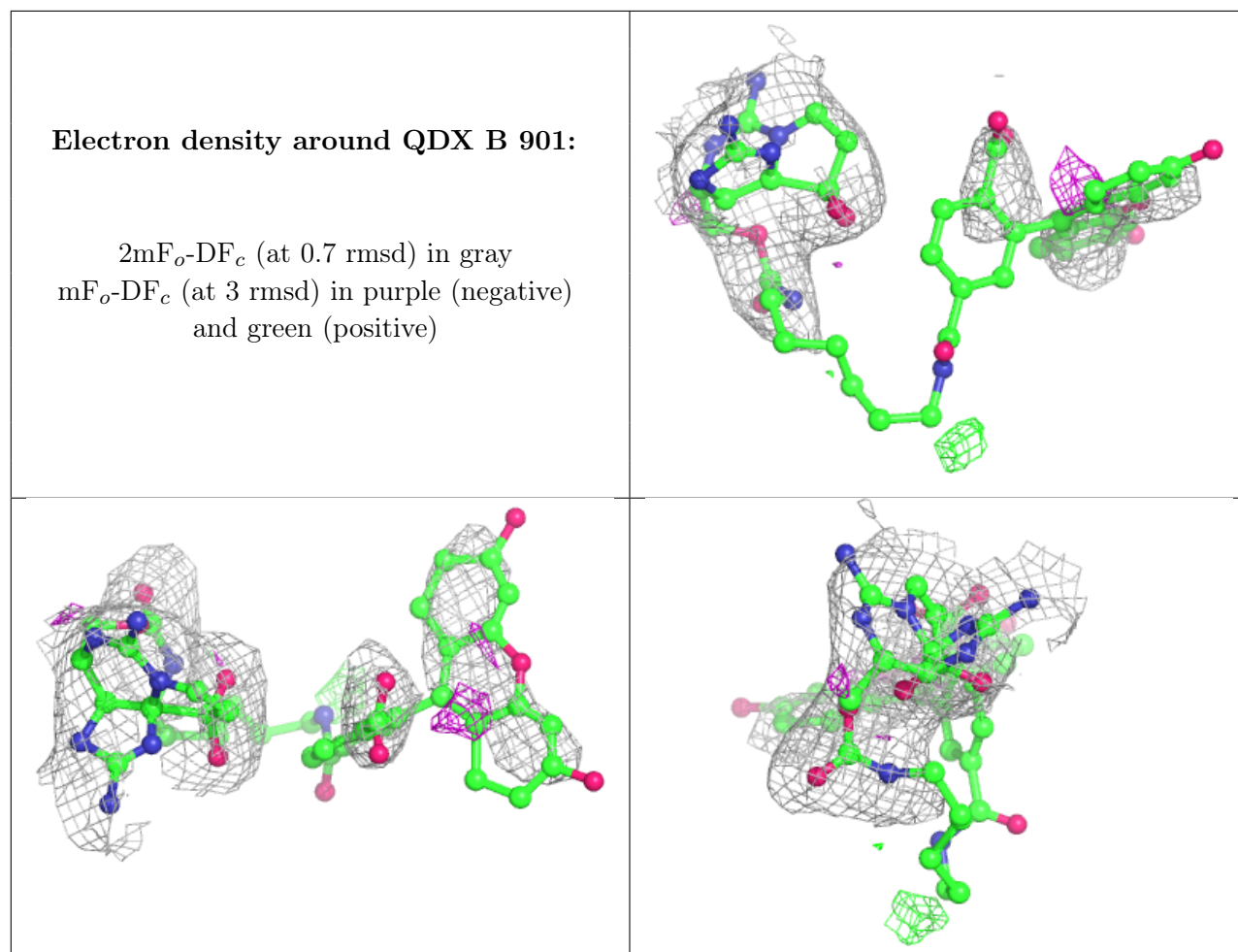
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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



**Electron density around QDX A 901:**

$2mF_o-DF_c$  (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.