



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 28, 2020 – 09:05 AM BST

PDB ID : 3NYC  
Title : Crystal Structure of Pseudomonas aeruginosa D-Arginine Dehydrogenase  
Authors : Fu, G.; Weber, I.T.  
Deposited on : 2010-07-14  
Resolution : 1.06 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 : 2.13  
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) : 2.13

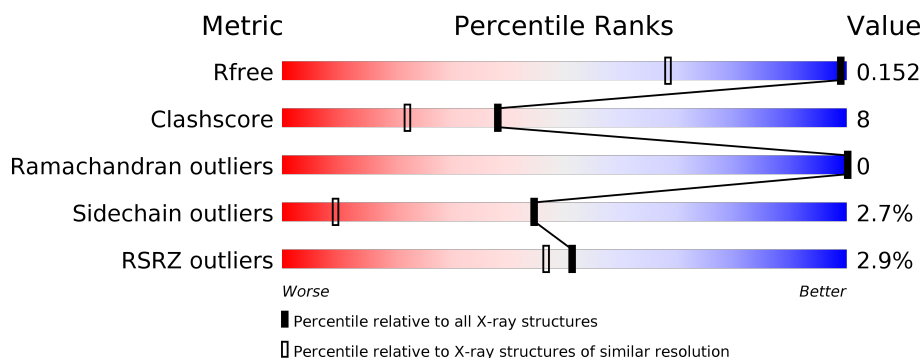
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.06 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	1202 (1.10-1.02)
Clashscore	141614	1252 (1.10-1.02)
Ramachandran outliers	138981	1204 (1.10-1.02)
Sidechain outliers	138945	1202 (1.10-1.02)
RSRZ outliers	127900	1178 (1.10-1.02)

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 on 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	381	<div> <div>3%</div> <div> <div></div> <div>84%</div> <div>13%</div> <div>..</div> </div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	IAR	A	1600[B]	-	-	X	-

## 2 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 3622 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.

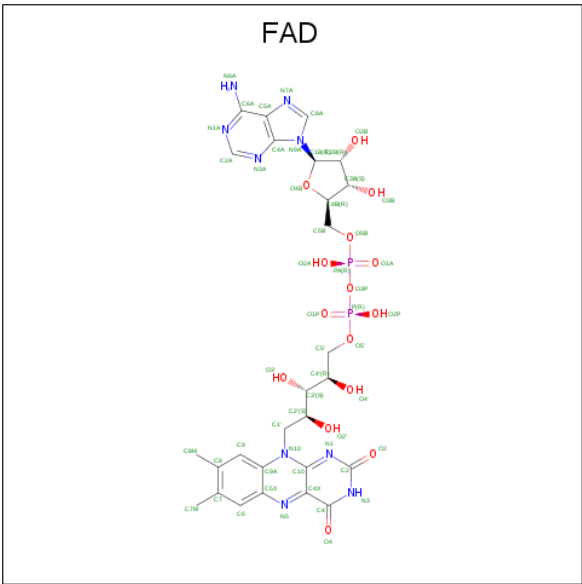
- Molecule 1 is a protein called D-Arginine Dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	381	3097	1957	561	563	16	0	31	0

There are 7 discrepancies between the modelled and reference sequences:

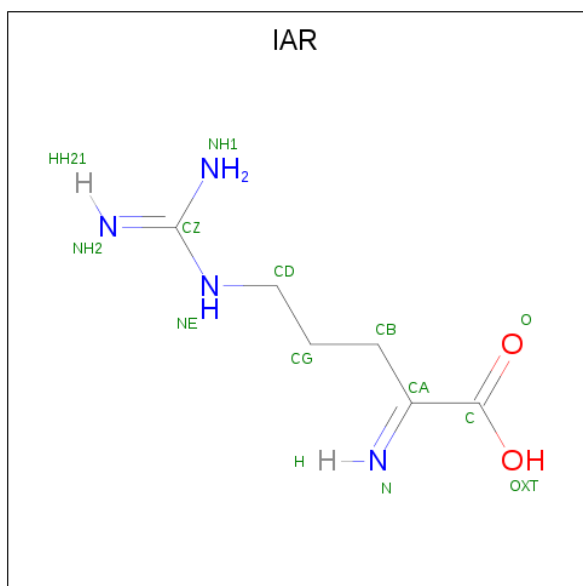
Chain	Residue	Modelled	Actual	Comment	Reference
A	995	HIS	-	EXPRESSION TAG	UNP Q9HXE3
A	996	HIS	-	EXPRESSION TAG	UNP Q9HXE3
A	997	HIS	-	EXPRESSION TAG	UNP Q9HXE3
A	998	HIS	-	EXPRESSION TAG	UNP Q9HXE3
A	999	HIS	-	EXPRESSION TAG	UNP Q9HXE3
A	1000	HIS	-	EXPRESSION TAG	UNP Q9HXE3
A	1001	PRO	-	EXPRESSION TAG	UNP Q9HXE3

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: C<sub>27</sub>H<sub>33</sub>N<sub>9</sub>O<sub>15</sub>P<sub>2</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

- Molecule 3 is (2E)-5-[(diaminomethylidene)amino]-2-iminopentanoic acid (three-letter code: IAR) (formula: C<sub>6</sub>H<sub>12</sub>N<sub>4</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	1
			12	6	4	2		

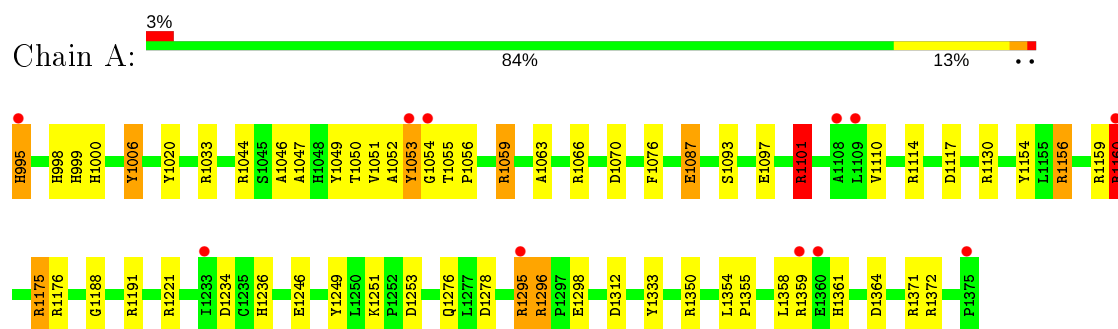
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	460	Total	O	0	15
			460	460		

### 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: D-Arginine Dehydrogenase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	62.18Å 78.08Å 89.72Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	10.00 – 1.06 38.90 – 1.06	Depositor EDS
% Data completeness (in resolution range)	96.3 (10.00-1.06) 92.5 (38.90-1.06)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.06	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.74 (at 1.06Å)	Xtriage
Refinement program	SHELXL-97	Depositor
R, $R_{free}$	0.134 , 0.160 0.128 , 0.152	Depositor DCC
$R_{free}$ test set	9523 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	8.5	Xtriage
Anisotropy	0.348	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 54.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.98	EDS
Total number of atoms	3622	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	15.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.78% 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: FAD, IAR

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	0.86	4/3241 (0.1%)	1.56	63/4418 (1.4%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1246	GLU	CD-OE2	6.90	1.33	1.25
1	A	1296[A]	ARG	N-CA	-6.73	1.32	1.46
1	A	1296[B]	ARG	N-CA	-6.73	1.32	1.46
1	A	1087	GLU	CD-OE2	-5.03	1.20	1.25

All (63) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1101[A]	ARG	NE-CZ-NH1	16.19	128.40	120.30
1	A	1101[B]	ARG	NE-CZ-NH1	16.19	128.40	120.30
1	A	1175	ARG	NE-CZ-NH2	-16.11	112.25	120.30
1	A	1059	ARG	NE-CZ-NH2	-13.54	113.53	120.30
1	A	1246	GLU	OE1-CD-OE2	-13.06	107.63	123.30
1	A	1371	ARG	NE-CZ-NH1	11.33	125.96	120.30
1	A	1221	ARG	NE-CZ-NH1	10.72	125.66	120.30
1	A	1333	TYR	CZ-CE2-CD2	-10.11	110.70	119.80
1	A	1070	ASP	CB-CG-OD2	-9.76	109.52	118.30
1	A	1372	ARG	NE-CZ-NH2	-9.72	115.44	120.30
1	A	1101[A]	ARG	NE-CZ-NH2	-9.40	115.60	120.30
1	A	1101[B]	ARG	NE-CZ-NH2	-9.40	115.60	120.30
1	A	1350	ARG	NE-CZ-NH1	9.15	124.87	120.30
1	A	1033	ARG	NE-CZ-NH1	8.45	124.52	120.30
1	A	1333	TYR	CG-CD2-CE2	8.40	128.02	121.30
1	A	1176	ARG	NE-CZ-NH2	-8.40	116.10	120.30
1	A	1246	GLU	CG-CD-OE2	8.39	135.09	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1130	ARG	NE-CZ-NH2	-7.99	116.31	120.30
1	A	1372	ARG	NE-CZ-NH1	7.96	124.28	120.30
1	A	1364	ASP	CB-CG-OD2	7.84	125.36	118.30
1	A	1175	ARG	NH1-CZ-NH2	7.64	127.80	119.40
1	A	1246	GLU	CB-CG-CD	7.50	134.44	114.20
1	A	1159	ARG	NE-CZ-NH1	7.48	124.04	120.30
1	A	1033	ARG	NE-CZ-NH2	-7.42	116.59	120.30
1	A	1160[A]	ARG	CD-NE-CZ	7.41	133.98	123.60
1	A	1160[B]	ARG	CD-NE-CZ	7.41	133.98	123.60
1	A	1020	TYR	CB-CG-CD2	-7.10	116.74	121.00
1	A	1253	ASP	CB-CG-OD2	6.83	124.44	118.30
1	A	1066	ARG	NE-CZ-NH2	-6.76	116.92	120.30
1	A	1249	TYR	CB-CG-CD1	6.62	124.97	121.00
1	A	1154	TYR	CB-CG-CD1	6.57	124.94	121.00
1	A	1359	ARG	CD-NE-CZ	6.43	132.61	123.60
1	A	1076	PHE	CB-CG-CD1	-6.35	116.36	120.80
1	A	1053[A]	TYR	CB-CG-CD1	6.18	124.71	121.00
1	A	1053[B]	TYR	CB-CG-CD1	6.18	124.71	121.00
1	A	1101[A]	ARG	CD-NE-CZ	6.17	132.24	123.60
1	A	1101[B]	ARG	CD-NE-CZ	6.17	132.24	123.60
1	A	1059	ARG	CD-NE-CZ	6.14	132.20	123.60
1	A	1278	ASP	CB-CG-OD1	6.00	123.70	118.30
1	A	1296[A]	ARG	CB-CA-C	-5.96	98.47	110.40
1	A	1296[B]	ARG	CB-CA-C	-5.96	98.47	110.40
1	A	1006	TYR	CB-CG-CD1	5.95	124.57	121.00
1	A	1191	ARG	NE-CZ-NH1	5.81	123.20	120.30
1	A	1114	ARG	NE-CZ-NH2	-5.73	117.44	120.30
1	A	1020	TYR	CB-CG-CD1	5.65	124.39	121.00
1	A	1312	ASP	CB-CG-OD2	5.63	123.37	118.30
1	A	1044	ARG	NE-CZ-NH1	-5.62	117.49	120.30
1	A	1278	ASP	CB-CG-OD2	-5.60	113.26	118.30
1	A	1070	ASP	CB-CG-OD1	5.57	123.32	118.30
1	A	1130	ARG	NE-CZ-NH1	5.56	123.08	120.30
1	A	1234	ASP	N-CA-CB	5.55	120.59	110.60
1	A	1359	ARG	NE-CZ-NH2	5.47	123.04	120.30
1	A	1097	GLU	OE1-CD-OE2	5.44	129.83	123.30
1	A	995	HIS	CA-CB-CG	5.43	122.84	113.60
1	A	1066	ARG	CA-CB-CG	-5.40	101.52	113.40
1	A	1249	TYR	CB-CG-CD2	-5.25	117.85	121.00
1	A	1059	ARG	NH1-CZ-NH2	5.07	124.98	119.40
1	A	1117	ASP	CB-CG-OD1	5.07	122.86	118.30
1	A	1159	ARG	NE-CZ-NH2	-5.04	117.78	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1049	TYR	CB-CG-CD1	-5.02	117.99	121.00
1	A	1333	TYR	CG-CD1-CE1	-5.01	117.29	121.30
1	A	1156	ARG	NE-CZ-NH2	-5.01	117.79	120.30
1	A	1191	ARG	NE-CZ-NH2	-5.01	117.80	120.30

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	3097	0	3036	44	0
2	A	53	0	31	0	0
3	A	12	0	9	8	0
4	A	460	0	0	20	0
All	All	3622	0	3076	47	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 8.

All (47) 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:1295:ARG:HH11	1:A:1295:ARG:HG2	1.28	0.98
1:A:1053[B]:TYR:CZ	3:A:1600[B]:IAR:HG2	2.10	0.87
3:A:1600[B]:IAR:CB	4:A:2459:HOH:O	2.26	0.83
1:A:1295:ARG:CG	1:A:1295:ARG:HH11	1.97	0.77
1:A:1047[B]:ALA:HB2	4:A:2425:HOH:O	1.89	0.71
1:A:1051[B]:VAL:O	1:A:1059:ARG:HG2	1.92	0.69
3:A:1600[B]:IAR:CA	4:A:2459:HOH:O	2.44	0.63
1:A:999[B]:HIS:HD2	1:A:1000:HIS:O	1.84	0.60
1:A:1295:ARG:NH1	1:A:1295:ARG:HG2	2.09	0.58
1:A:1056[B]:PRO:HD2	4:A:2163:HOH:O	2.06	0.56
1:A:1050[B]:THR:HG21	3:A:1600[B]:IAR:NH1	2.21	0.56
1:A:998:HIS:HD2	4:A:2298:HOH:O	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1053[A]:TYR:HE1	4:A:2311:HOH:O	1.90	0.55
1:A:1046[B]:ALA:HB2	4:A:2444:HOH:O	2.06	0.55
1:A:999[B]:HIS:CE1	1:A:1188:GLY:HA3	2.41	0.55
1:A:1295:ARG:CG	1:A:1295:ARG:NH1	2.63	0.55
1:A:1000:HIS:HD2	4:A:2433:HOH:O	1.92	0.53
1:A:1050[A]:THR:HB	4:A:2452:HOH:O	2.09	0.52
1:A:1050[B]:THR:HG23	1:A:1050[B]:THR:O	2.10	0.51
1:A:1053[B]:TYR:CE1	3:A:1600[B]:IAR:HG2	2.47	0.50
1:A:1052[A]:ALA:HB3	1:A:1053[A]:TYR:CD2	2.46	0.49
1:A:1051[A]:VAL:HG23	1:A:1110:VAL:HG22	1.94	0.48
1:A:1051[B]:VAL:HG13	4:A:2140:HOH:O	2.15	0.47
1:A:1046[B]:ALA:O	1:A:1251:LYS:NZ	2.45	0.46
1:A:1050[B]:THR:HB	4:A:2417:HOH:O	2.15	0.46
1:A:1276[B]:GLN:NE2	4:A:2385:HOH:O	2.50	0.45
1:A:1101[A]:ARG:NH2	4:A:2424:HOH:O	2.50	0.45
1:A:1050[A]:THR:HA	4:A:2140:HOH:O	2.18	0.44
1:A:1175:ARG:HD2	4:A:2285:HOH:O	2.18	0.44
3:A:1600[B]:IAR:HB3	4:A:2459:HOH:O	2.04	0.43
1:A:1101[A]:ARG:HH11	1:A:1101[A]:ARG:HG2	1.83	0.43
1:A:1160[A]:ARG:HG2	1:A:1160[A]:ARG:HH11	1.83	0.43
1:A:1052[A]:ALA:HB3	1:A:1053[A]:TYR:CE2	2.53	0.43
1:A:1054[A]:GLY:O	1:A:1059:ARG:NE	2.48	0.43
1:A:1046[B]:ALA:HB3	4:A:2459:HOH:O	2.18	0.43
1:A:1296[A]:ARG:NH1	1:A:1298:GLU:OE2	2.50	0.42
1:A:1361:HIS:HD2	4:A:2379:HOH:O	2.01	0.42
1:A:1355:PRO:HD2	1:A:1358:LEU:HD12	2.02	0.42
1:A:999[B]:HIS:HE1	4:A:2082:HOH:O	2.01	0.42
1:A:1087:GLU:OE2	3:A:1600[B]:IAR:NH2	2.53	0.41
1:A:1053[B]:TYR:OH	3:A:1600[B]:IAR:HG2	2.21	0.41
1:A:1156:ARG:O	1:A:1160[B]:ARG:HG3	2.20	0.41
1:A:1354:LEU:HA	1:A:1355:PRO:HD3	1.96	0.41
1:A:1295:ARG:NH1	4:A:2074:HOH:O	2.54	0.40
1:A:1051[A]:VAL:HG11	1:A:1063:ALA:HA	2.03	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

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	410/381 (108%)	400 (98%)	10 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains

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	318/293 (108%)	306 (96%)	12 (4%)	33	4

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	995	HIS
1	A	1006	TYR
1	A	1055[A]	THR
1	A	1055[B]	THR
1	A	1093	SER
1	A	1101[A]	ARG
1	A	1101[B]	ARG
1	A	1160[A]	ARG
1	A	1160[B]	ARG
1	A	1236[A]	HIS
1	A	1236[B]	HIS
1	A	1295	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	998	HIS
1	A	1168	ASN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates ⓘ

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	FAD	A	1500	-	51,58,58	1.24	6 (11%)	60,89,89	2.01	10 (16%)
3	IAR	A	1600[B]	-	9,11,11	1.11	1 (11%)	6,13,13	1.33	1 (16%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	FAD	A	1500	-	-	1/30/50/50	0/6/6/6
3	IAR	A	1600[B]	-	-	3/6/11/11	-

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1500	FAD	C4X-C10	3.70	1.42	1.38
2	A	1500	FAD	C4-N3	3.53	1.39	1.33
2	A	1500	FAD	C5X-N5	3.22	1.40	1.35
3	A	1600[B]	IAR	CA-N	2.86	1.34	1.27
2	A	1500	FAD	C2A-N3A	2.77	1.36	1.32
2	A	1500	FAD	C9A-N10	2.28	1.41	1.38
2	A	1500	FAD	C4X-N5	2.02	1.36	1.33

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1500	FAD	C4-N3-C2	9.44	123.12	115.14
2	A	1500	FAD	C1'-N10-C9A	6.12	123.11	118.29
2	A	1500	FAD	C4-C4X-C10	-5.63	116.22	119.95
2	A	1500	FAD	C4X-C4-N3	-3.98	117.99	123.43
2	A	1500	FAD	O4B-C1B-C2B	-2.67	103.03	106.93
2	A	1500	FAD	C5X-C9A-N10	2.59	119.59	117.72
3	A	1600[B]	IAR	NE-CZ-NH2	2.27	124.69	120.70
2	A	1500	FAD	C10-C4X-N5	2.25	122.81	121.26
2	A	1500	FAD	C5A-C6A-N6A	2.25	123.77	120.35
2	A	1500	FAD	C9A-N10-C10	-2.16	119.08	121.91
2	A	1500	FAD	C4-C4X-N5	2.03	120.92	118.60

There are no chirality outliers.

All (4) torsion outliers are listed below:

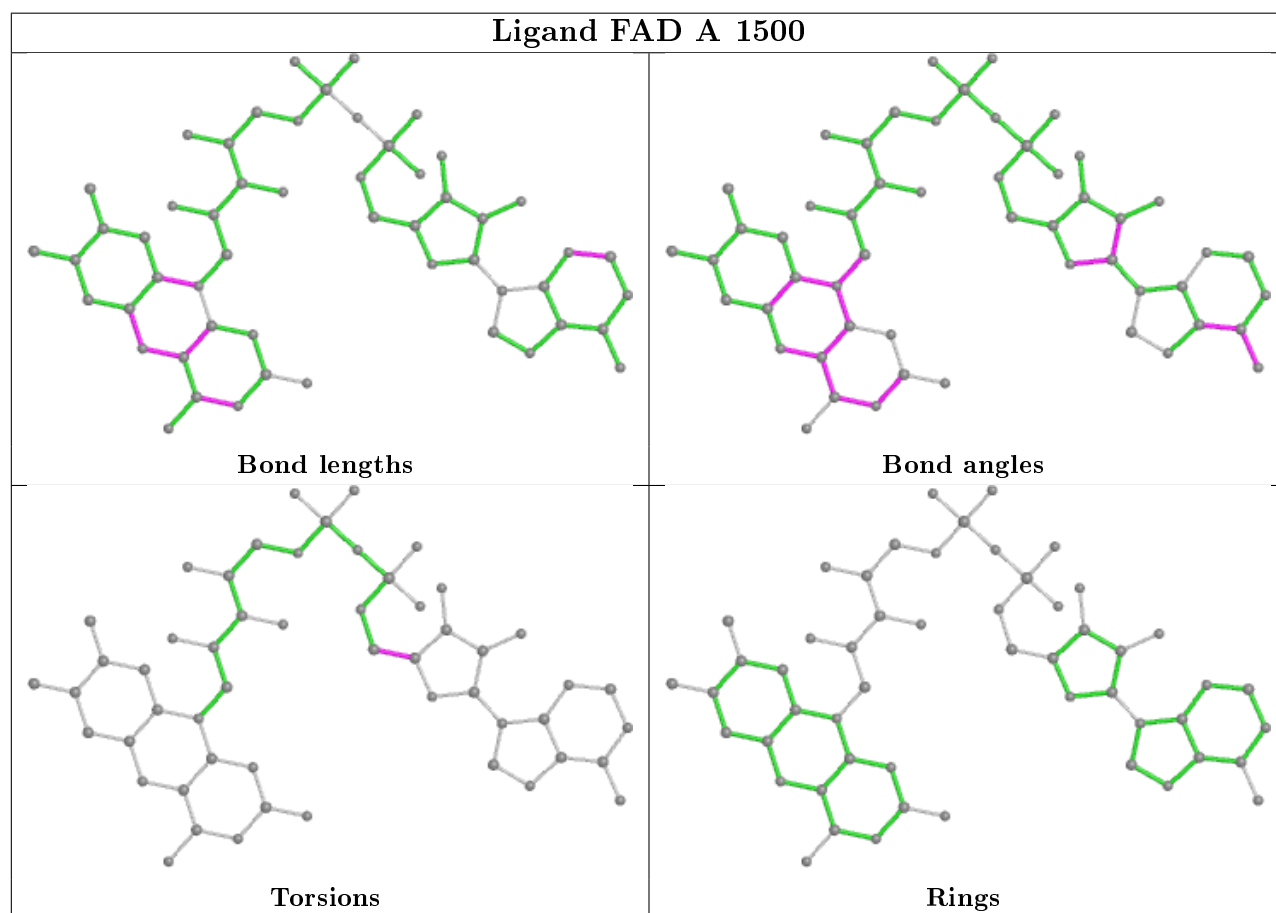
Mol	Chain	Res	Type	Atoms
3	A	1600[B]	IAR	NH1-CZ-NE-CD
3	A	1600[B]	IAR	NE-CD-CG-CB
3	A	1600[B]	IAR	NH2-CZ-NE-CD
2	A	1500	FAD	O4B-C4B-C5B-O5B

There are no ring outliers.

1 monomer is involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1600[B]	IAR	8	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 ⓘ

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 [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, 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	381/381 (100%)	-0.04	11 (2%)	51	47	6, 11, 31, 69	0

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1295	ARG	5.3
1	A	1375	PRO	5.2
1	A	995	HIS	4.5
1	A	1109	LEU	3.8
1	A	1233	ILE	3.2
1	A	1360	GLU	2.6
1	A	1053[A]	TYR	2.6
1	A	1359	ARG	2.4
1	A	1054[A]	GLY	2.3
1	A	1160[A]	ARG	2.2
1	A	1108	ALA	2.1

### 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](#)

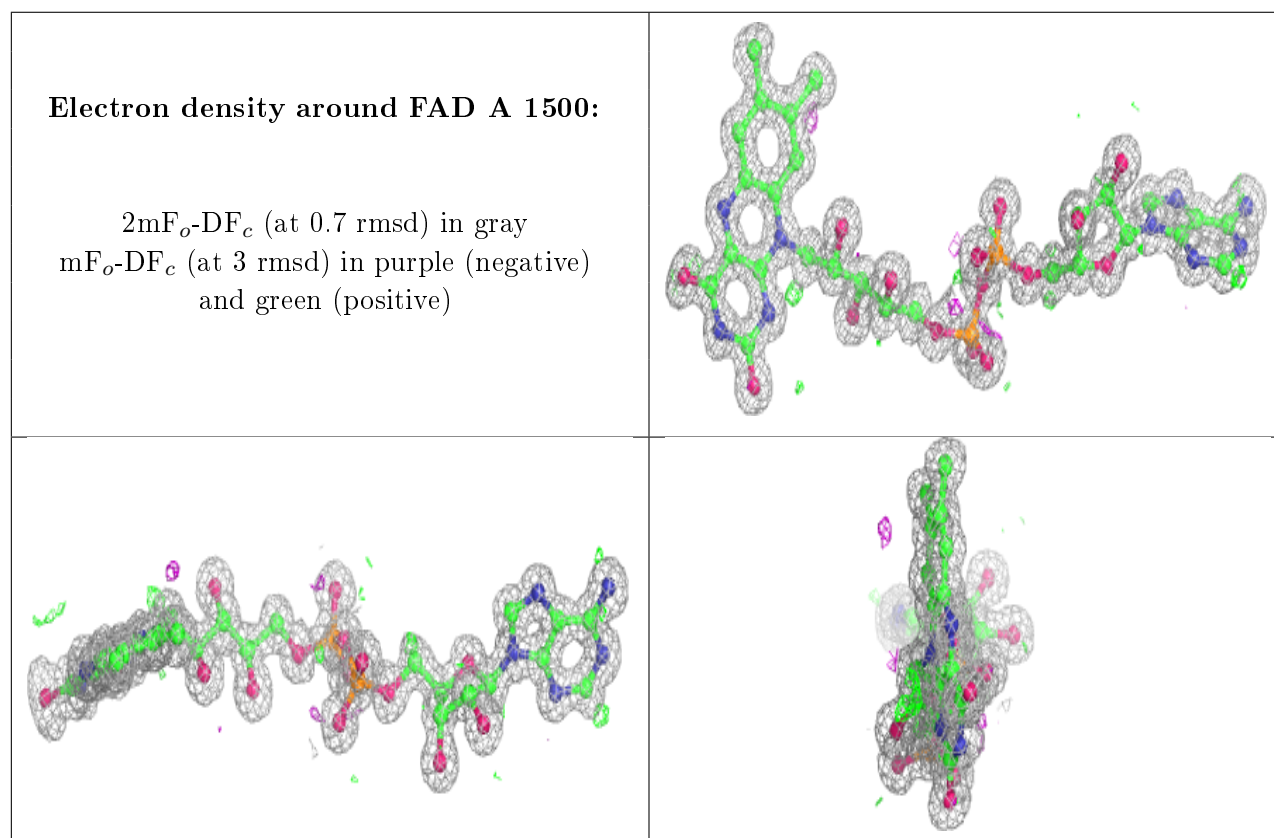
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,



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
3	IAR	A	1600[B]	12/12	0.95	0.22	12,18,36,36	12
2	FAD	A	1500	53/53	0.99	0.06	5,6,9,16	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.



## 6.5 Other polymers [i](#)

There are no such residues in this entry.