



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 06:42 AM UTC

PDB ID : 6ZYT / pdb_00006zyt
Title : Monomeric streptavidin with a conjugated biotinylated pyrrolidine
Authors : Nodling, A.R.; Lipka-Lloyd, M.; Tsai, Y.H.; Rizkallah, P.; Luk, L.Y.P.; Jin, Y.
Deposited on : 2020-08-03
Resolution : 1.80 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

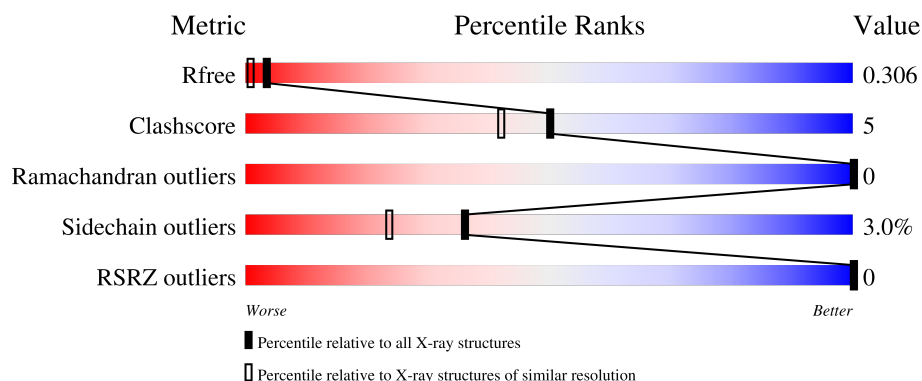
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.80 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}	180053	7662 (1.80-1.80)
Clashscore	190562	8479 (1.80-1.80)
Ramachandran outliers	187476	8391 (1.80-1.80)
Sidechain outliers	187428	8390 (1.80-1.80)
RSRZ outliers	180081	7663 (1.80-1.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	AAA	145	 68% 7% 24%
1	BBB	145	 68% 12% 21%
1	CCC	145	 61% 15% 23%
1	DDD	145	 72% 5% 23%
1	EEE	145	 60% 15% 25%

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Mol	Chain	Length	Quality of chain
1	FFF	145	63% 12% 23%

2 Entry composition [i](#)

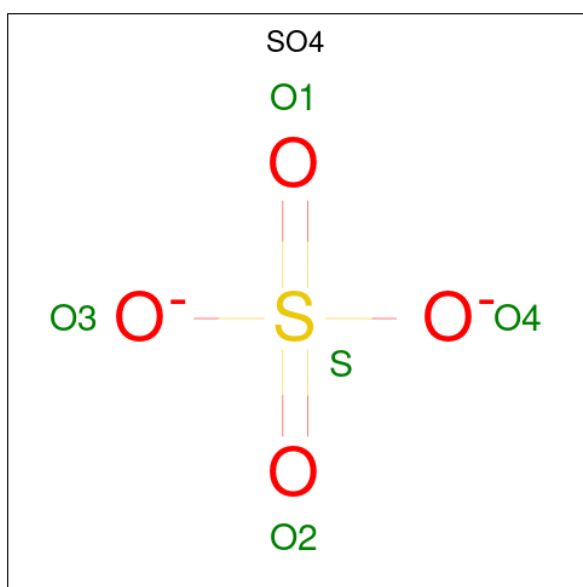
There are 4 unique types of molecules in this entry. The entry contains 5622 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Streptavidin/Rhizavidin Hybrid.

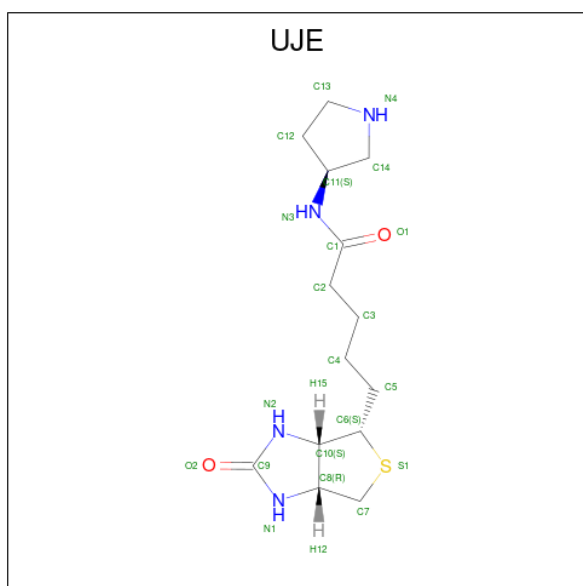
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	BBB	115	Total	C	N	O	S	0	2	0
			907	549	167	189	2			
1	AAA	110	Total	C	N	O	S	0	0	0
			860	523	157	178	2			
1	CCC	111	Total	C	N	O	S	0	0	0
			864	525	158	179	2			
1	FFF	111	Total	C	N	O	S	0	0	0
			864	525	158	179	2			
1	DDD	112	Total	C	N	O	S	0	1	0
			878	534	161	181	2			
1	EEE	109	Total	C	N	O	S	0	1	0
			858	521	158	177	2			

- Molecule 2 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	BBB	1	Total	O	S	0	0
			5	4	1		
2	BBB	1	Total	O	S	0	0
			5	4	1		
2	AAA	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is 5-((3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl)-N-((S)-pyrrolidin-3-yl)pentanamide (CCD ID: UJE) (formula: C₁₄H₂₄N₄O₂S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	BBB	1	Total	C	N	O	S	0	0
			21	14	4	2	1		
3	AAA	1	Total	C	N	O	S	0	0
			21	14	4	2	1		
3	CCC	1	Total	C	N	O	S	0	0
			21	14	4	2	1		
3	FFF	1	Total	C	N	O	S	0	0
			21	14	4	2	1		
3	DDD	1	Total	C	N	O	S	0	0
			21	14	4	2	1		
3	EEE	1	Total	C	N	O	S	0	0
			21	14	4	2	1		

- Molecule 4 is water.

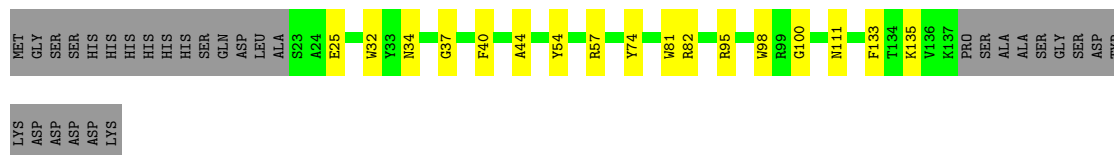
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	BBB	43	Total 43	O 43	0	0
4	AAA	67	Total 67	O 67	0	0
4	CCC	49	Total 49	O 49	0	0
4	FFF	22	Total 22	O 22	0	0
4	DDD	48	Total 48	O 48	0	0
4	EEE	21	Total 21	O 21	0	0

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: Streptavidin/Rhizavidin Hybrid

Chain BBB: 



- Molecule 1: Streptavidin/Rhizavidin Hybrid

Chain AAA: 



- Molecule 1: Streptavidin/Rhizavidin Hybrid

Chain CCC: 



- Molecule 1: Streptavidin/Rhizavidin Hybrid

Chain FFF: 



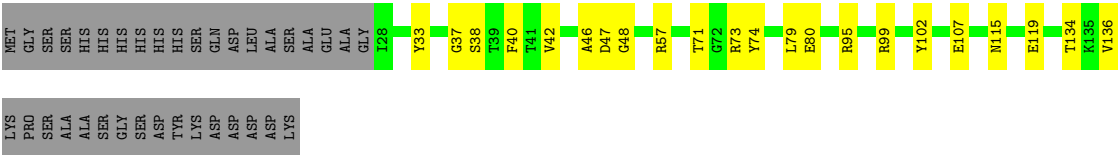
- Molecule 1: Streptavidin/Rhizavidin Hybrid

Chain DDD: 72% 5% 23%



● Molecule 1: Streptavidin/Rhizavidin Hybrid

Chain EEE: 60% 15% 25%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	41.79Å 52.74Å 89.36Å 75.24° 78.24° 84.88°	Depositor
Resolution (Å)	25.48 – 1.80 25.48 – 1.80	Depositor EDS
% Data completeness (in resolution range)	95.7 (25.48-1.80) 95.8 (25.48-1.80)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.83 (at 1.80Å)	Xtriage
Refinement program	REFMAC 5.8.0258	Depositor
R, R_{free}	0.259 , 0.301 0.262 , 0.306	Depositor DCC
R_{free} test set	3144 reflections (3.75%)	wwPDB-VP
Wilson B-factor (Å ²)	27.9	Xtriage
Anisotropy	0.609	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 27.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	5622	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.92% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: UJE, 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	AAA	0.96	0/880	1.23	0/1196
1	BBB	0.96	0/927	1.25	0/1258
1	CCC	0.97	0/884	1.25	2/1201 (0.2%)
1	DDD	0.98	0/898	1.21	0/1219
1	EEE	1.02	0/878	1.29	0/1194
1	FFF	1.01	0/884	1.28	0/1201
All	All	0.98	0/5351	1.25	2/7269 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	CCC	44	ALA	CA-C-N	5.02	125.11	120.34
1	CCC	44	ALA	C-N-CA	5.02	125.11	120.34

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	AAA	860	0	775	6	0
1	BBB	907	0	812	9	0
1	CCC	864	0	778	11	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	DDD	878	0	795	3	0
1	EEE	858	0	768	14	0
1	FFF	864	0	778	14	0
2	AAA	5	0	0	0	0
2	BBB	10	0	0	0	0
3	AAA	21	0	0	0	0
3	BBB	21	0	0	0	0
3	CCC	21	0	0	0	0
3	DDD	21	0	0	0	0
3	EEE	21	0	0	0	0
3	FFF	21	0	0	0	0
4	AAA	67	0	0	0	0
4	BBB	43	0	0	1	0
4	CCC	49	0	0	0	0
4	DDD	48	0	0	0	0
4	EEE	21	0	0	0	0
4	FFF	22	0	0	1	0
All	All	5622	0	4706	53	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 5.

All (53) 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:AAA:51:THR:HG23	1:CCC:130:GLN:OE1	1.87	0.74
1:EEE:40:PHE:CE1	1:EEE:42:VAL:HG11	2.24	0.72
1:CCC:109:ARG:HD3	1:CCC:134:THR:HG22	1.77	0.66
1:FFF:57:ARG:HE	1:EEE:71:THR:HG21	1.63	0.64
1:FFF:33:TYR:CD2	1:FFF:39:THR:HG22	2.35	0.61
1:BBB:32:TRP:CZ2	1:BBB:135:LYS:HE2	2.37	0.60
1:DDD:109:ARG:HD3	1:DDD:134:THR:HG22	1.85	0.58
1:FFF:107:GLU:HG2	4:FFF:318:HOH:O	2.04	0.56
1:EEE:40:PHE:CZ	1:EEE:42:VAL:HG11	2.40	0.56
1:FFF:90:GLU:OE1	1:EEE:73:ARG:NH1	2.39	0.56
1:AAA:80:GLU:OE2	1:AAA:99:ARG:NH1	2.35	0.55
1:FFF:33:TYR:CE2	1:FFF:39:THR:HG22	2.43	0.54
1:EEE:40:PHE:CE1	1:EEE:42:VAL:CG1	2.91	0.53
1:BBB:25:GLU:HG3	1:BBB:44:ALA:O	2.08	0.53
1:FFF:55:GLU:OE1	1:FFF:57:ARG:NH2	2.40	0.51
1:BBB:34:ASN:HB3	1:BBB:133:PHE:CE1	2.46	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:DDD:78[A]:LYS:HD3	1:DDD:101:GLN:OE1	2.12	0.50
1:CCC:32:TRP:HB3	1:CCC:133:PHE:HB3	1.95	0.49
1:FFF:34:ASN:ND2	1:FFF:38:SER:HB2	2.28	0.48
1:BBB:100:GLY:HA3	1:BBB:111:ASN:O	2.13	0.48
1:CCC:48:GLY:HA2	1:CCC:74:TYR:CE1	2.49	0.48
1:EEE:37:GLY:O	1:EEE:57:ARG:HD2	2.14	0.48
1:EEE:79:LEU:HD11	1:EEE:102:TYR:HB2	1.97	0.47
1:CCC:34:ASN:HA	1:CCC:132:THR:O	2.14	0.47
1:CCC:103:GLN:HG2	1:CCC:109:ARG:HB2	1.97	0.47
1:FFF:34:ASN:HD21	1:FFF:38:SER:HB2	1.81	0.46
1:CCC:70:LEU:HD11	1:CCC:81:TRP:CD1	2.51	0.46
1:AAA:51:THR:HG21	1:CCC:113:GLN:HG2	1.98	0.45
1:FFF:33:TYR:O	1:FFF:133:PHE:HA	2.17	0.45
1:BBB:37:GLY:O	1:BBB:57:ARG:HD2	2.17	0.45
1:BBB:44:ALA:HB1	1:BBB:74:TYR:CE1	2.52	0.44
1:FFF:109:ARG:NH1	1:FFF:134:THR:OG1	2.51	0.43
1:CCC:74:TYR:HA	1:CCC:78:LYS:O	2.18	0.43
1:EEE:119:GLU:CD	1:EEE:119:GLU:H	2.27	0.43
1:EEE:48:GLY:HA2	1:EEE:74:TYR:CE1	2.54	0.43
1:FFF:81:TRP:C	1:FFF:82:ARG:HG3	2.43	0.42
1:FFF:94:SER:HB3	1:FFF:118:TYR:HB3	2.00	0.42
1:CCC:39:THR:OG1	1:CCC:55:GLU:HB3	2.20	0.42
1:FFF:95:ARG:C	1:FFF:95:ARG:HE	2.28	0.42
1:DDD:80:GLU:OE1	1:DDD:99:ARG:NH1	2.52	0.42
1:EEE:33:TYR:HA	1:EEE:38:SER:O	2.19	0.42
1:BBB:81:TRP:NE1	1:BBB:98:TRP:CE3	2.88	0.41
1:EEE:80:GLU:OE1	1:EEE:99:ARG:NH1	2.53	0.41
1:AAA:115:ASN:OD1	1:AAA:128:GLN:HG2	2.20	0.41
1:CCC:82:ARG:HA	1:CCC:96:THR:O	2.20	0.41
1:EEE:46:ALA:O	1:EEE:47:ASP:OD2	2.39	0.41
1:AAA:97:GLU:O	1:AAA:114:TRP:HA	2.20	0.41
1:BBB:82[B]:ARG:NH1	4:BBB:306:HOH:O	2.53	0.41
1:EEE:134:THR:CG2	1:EEE:136:VAL:HG12	2.51	0.41
1:BBB:40:PHE:HB3	1:BBB:54:TYR:CD2	2.56	0.41
1:AAA:79:LEU:HD21	1:AAA:102:TYR:HB2	2.02	0.40
1:FFF:97:GLU:CD	1:FFF:99:ARG:HH12	2.29	0.40
1:EEE:107:GLU:CD	1:EEE:107:GLU:H	2.29	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	AAA	108/145 (74%)	107 (99%)	1 (1%)	0	100	100
1	BBB	115/145 (79%)	112 (97%)	3 (3%)	0	100	100
1	CCC	109/145 (75%)	107 (98%)	2 (2%)	0	100	100
1	DDD	111/145 (77%)	108 (97%)	3 (3%)	0	100	100
1	EEE	108/145 (74%)	101 (94%)	7 (6%)	0	100	100
1	FFF	109/145 (75%)	105 (96%)	4 (4%)	0	100	100
All	All	660/870 (76%)	640 (97%)	20 (3%)	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	AAA	88/115 (76%)	85 (97%)	3 (3%)	32	20
1	BBB	91/115 (79%)	90 (99%)	1 (1%)	65	60
1	CCC	88/115 (76%)	85 (97%)	3 (3%)	32	20
1	DDD	89/115 (77%)	85 (96%)	4 (4%)	24	12
1	EEE	87/115 (76%)	84 (97%)	3 (3%)	32	20
1	FFF	88/115 (76%)	84 (96%)	4 (4%)	24	12
All	All	531/690 (77%)	513 (97%)	18 (3%)	36	20

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	BBB	95	ARG
1	AAA	79	LEU
1	AAA	95	ARG
1	AAA	113	GLN
1	CCC	73	ARG
1	CCC	88	SER
1	CCC	95	ARG
1	FFF	41	THR
1	FFF	88	SER
1	FFF	95	ARG
1	FFF	107	GLU
1	DDD	78[A]	LYS
1	DDD	78[B]	LYS
1	DDD	79	LEU
1	DDD	95	ARG
1	EEE	95[A]	ARG
1	EEE	95[B]	ARG
1	EEE	115	ASN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

9 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
3	UJE	BBB	203	-	22,23,23	1.08	1 (4%)	28,31,31	2.02	8 (28%)
2	SO4	BBB	202	-	4,4,4	0.34	0	6,6,6	0.14	0
3	UJE	FFF	201	-	22,23,23	1.09	1 (4%)	28,31,31	1.44	5 (17%)
3	UJE	DDD	201	-	22,23,23	1.07	1 (4%)	28,31,31	1.75	4 (14%)
2	SO4	AAA	201	-	4,4,4	0.36	0	6,6,6	0.10	0
3	UJE	EEE	201	-	22,23,23	0.97	1 (4%)	28,31,31	1.01	3 (10%)
2	SO4	BBB	201	-	4,4,4	0.37	0	6,6,6	0.08	0
3	UJE	AAA	202	-	22,23,23	1.16	3 (13%)	28,31,31	2.40	9 (32%)
3	UJE	CCC	201	-	22,23,23	1.29	1 (4%)	28,31,31	1.87	5 (17%)

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	UJE	BBB	203	-	-	1/11/39/39	0/3/3/3
3	UJE	FFF	201	-	-	3/11/39/39	0/3/3/3
3	UJE	DDD	201	-	-	2/11/39/39	0/3/3/3
3	UJE	EEE	201	-	-	2/11/39/39	0/3/3/3
3	UJE	AAA	202	-	-	2/11/39/39	0/3/3/3
3	UJE	CCC	201	-	-	1/11/39/39	0/3/3/3

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	CCC	201	UJE	C6-S1	-5.20	1.74	1.82
3	FFF	201	UJE	C6-S1	-4.32	1.75	1.82
3	DDD	201	UJE	C6-S1	-4.08	1.76	1.82
3	BBB	203	UJE	C6-S1	-3.88	1.76	1.82
3	EEE	201	UJE	C6-S1	-3.75	1.76	1.82
3	AAA	202	UJE	C6-S1	-2.75	1.78	1.82
3	AAA	202	UJE	C7-S1	-2.42	1.74	1.81
3	AAA	202	UJE	O1-C1	-2.03	1.19	1.23

All (34) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	AAA	202	UJE	C2-C1-N3	6.80	127.84	115.86
3	BBB	203	UJE	C11-N3-C1	6.40	132.33	122.88
3	DDD	201	UJE	C11-N3-C1	5.90	131.59	122.88
3	AAA	202	UJE	C11-N3-C1	5.71	131.31	122.88
3	CCC	201	UJE	C11-N3-C1	4.99	130.25	122.88
3	AAA	202	UJE	O1-C1-N3	-4.83	114.78	122.95
3	CCC	201	UJE	C12-C11-N3	4.76	121.72	111.98
3	DDD	201	UJE	C12-C11-N3	3.92	119.99	111.98
3	BBB	203	UJE	C7-S1-C6	3.46	97.18	89.98
3	FFF	201	UJE	C10-C6-S1	-3.44	101.13	105.03
3	CCC	201	UJE	C8-C7-S1	-3.30	101.51	106.06
3	AAA	202	UJE	C6-C10-N2	3.26	116.79	113.34
3	BBB	203	UJE	C8-C7-S1	-3.12	101.76	106.06
3	FFF	201	UJE	C7-S1-C6	3.10	96.43	89.98
3	BBB	203	UJE	C10-C6-S1	-3.04	101.58	105.03
3	CCC	201	UJE	C6-C10-N2	-2.92	110.25	113.34
3	CCC	201	UJE	C10-C6-S1	-2.91	101.73	105.03
3	FFF	201	UJE	C7-C8-N1	-2.75	109.64	113.18
3	AAA	202	UJE	C8-C7-S1	-2.68	102.38	106.06
3	DDD	201	UJE	C8-C7-S1	-2.64	102.43	106.06
3	BBB	203	UJE	C12-C11-N3	2.62	117.33	111.98
3	EEE	201	UJE	C7-S1-C6	2.61	95.41	89.98
3	BBB	203	UJE	O1-C1-N3	2.61	127.36	122.95
3	AAA	202	UJE	O1-C1-C2	-2.60	117.31	122.02
3	BBB	203	UJE	C2-C1-N3	-2.60	111.28	115.86
3	DDD	201	UJE	C10-C6-S1	-2.55	102.14	105.03
3	AAA	202	UJE	C12-C11-N3	-2.48	106.92	111.98
3	AAA	202	UJE	C7-S1-C6	2.28	94.72	89.98
3	EEE	201	UJE	C7-C8-N1	-2.26	110.28	113.18
3	FFF	201	UJE	C8-C7-S1	-2.19	103.05	106.06
3	AAA	202	UJE	C7-C8-C10	2.17	112.50	109.06
3	FFF	201	UJE	C13-N4-C14	2.13	110.53	105.19
3	BBB	203	UJE	C7-C8-N1	-2.08	110.50	113.18
3	EEE	201	UJE	C4-C5-C6	-2.05	109.34	114.04

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	BBB	203	UJE	C12-C11-N3-C1
3	CCC	201	UJE	C12-C11-N3-C1

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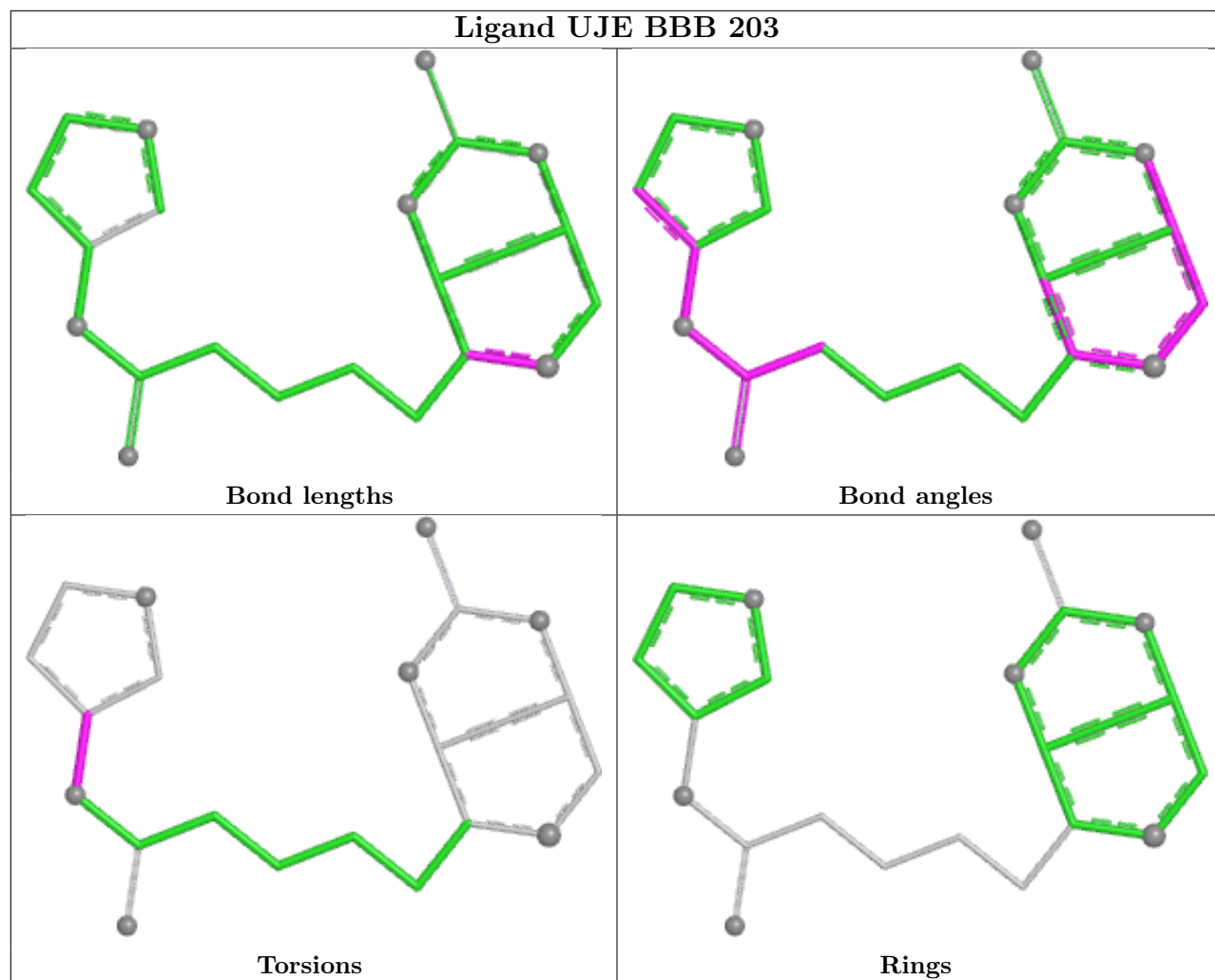
Mol	Chain	Res	Type	Atoms
3	FFF	201	UJE	C4-C5-C6-S1
3	FFF	201	UJE	C4-C5-C6-C10
3	FFF	201	UJE	C14-C11-N3-C1
3	DDD	201	UJE	C12-C11-N3-C1
3	EEE	201	UJE	C4-C5-C6-C10
3	AAA	202	UJE	O1-C1-N3-C11
3	AAA	202	UJE	C2-C1-N3-C11
3	EEE	201	UJE	C4-C5-C6-S1
3	DDD	201	UJE	C2-C1-N3-C11

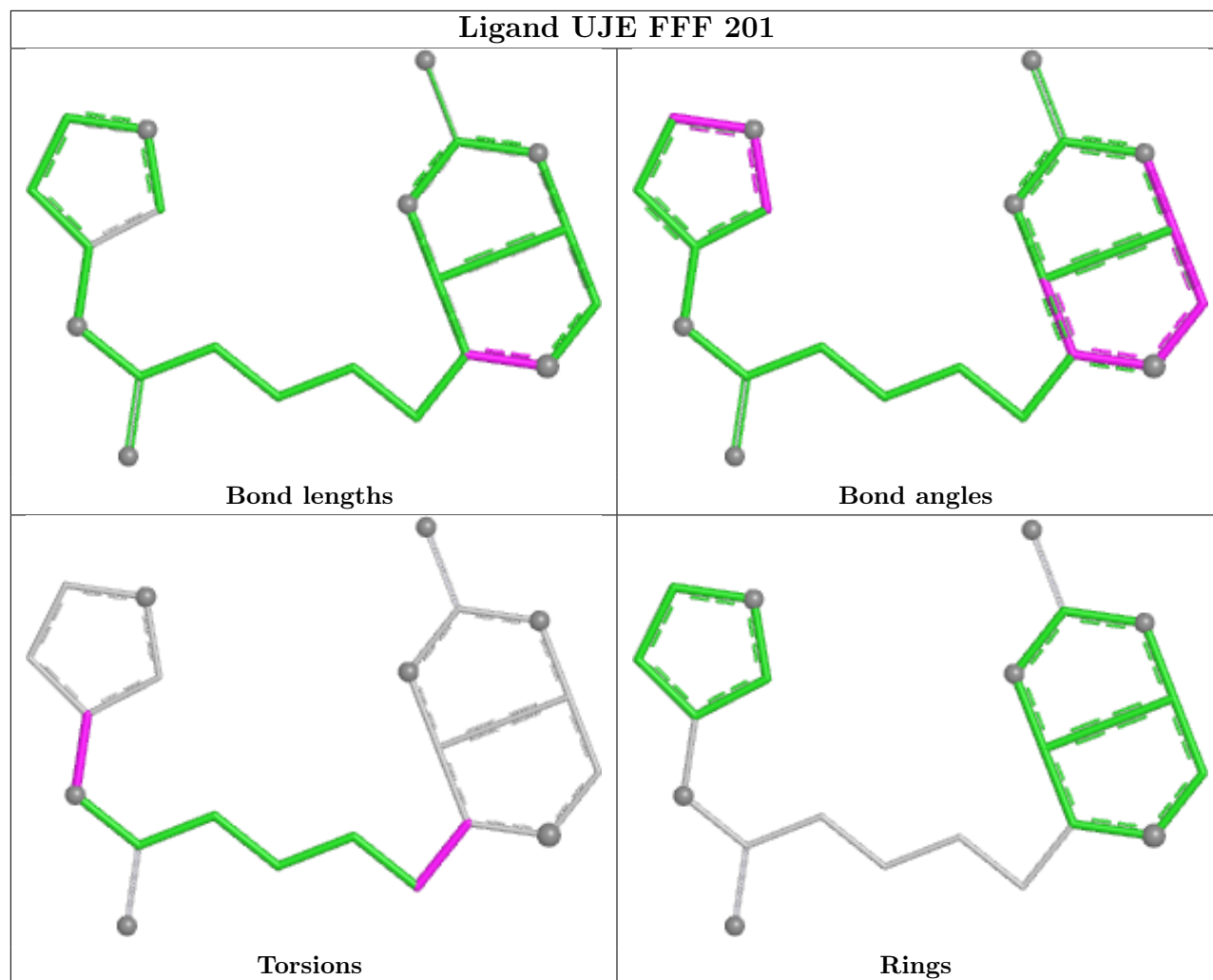
There are no ring outliers.

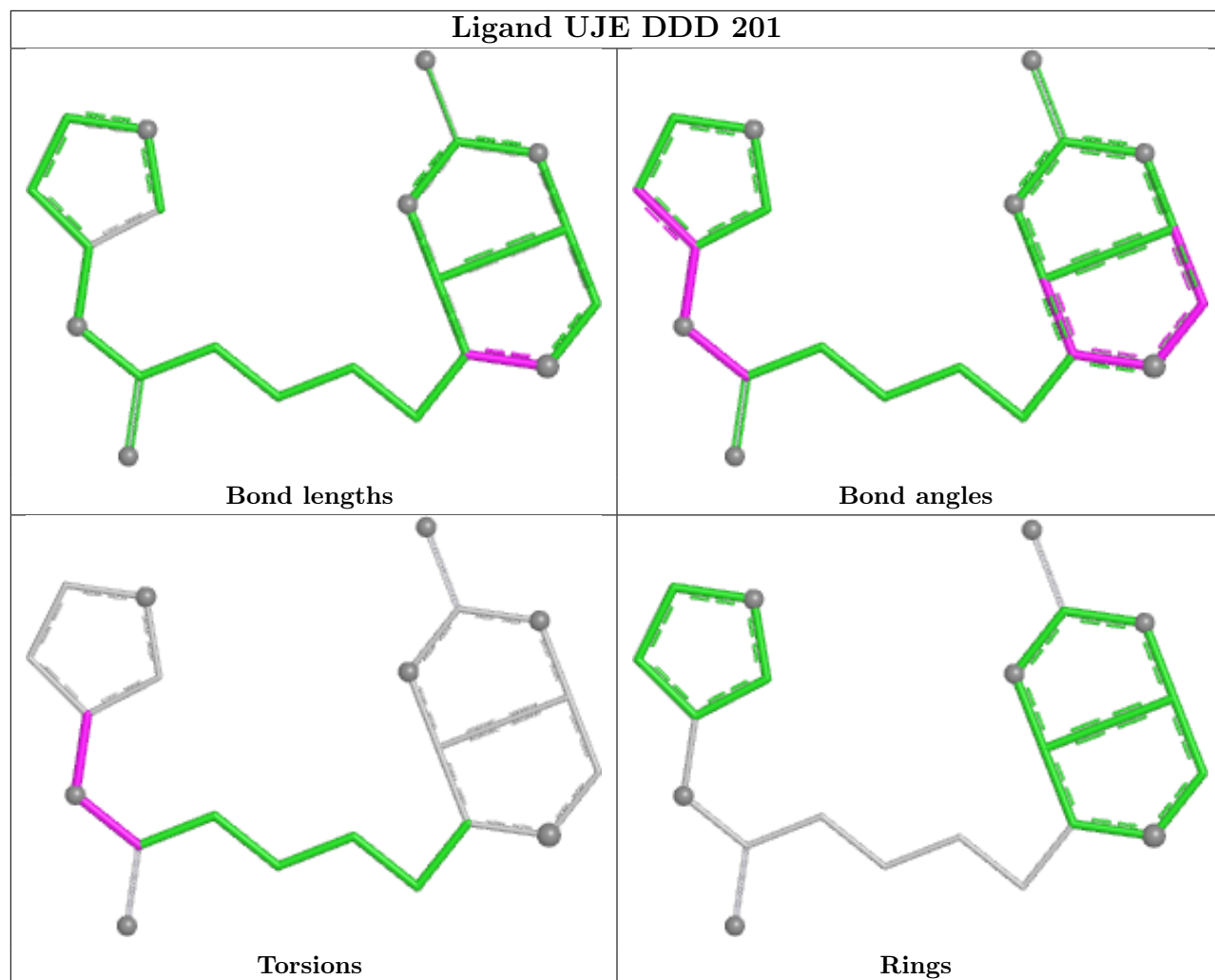
No monomer is involved in short contacts.

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.

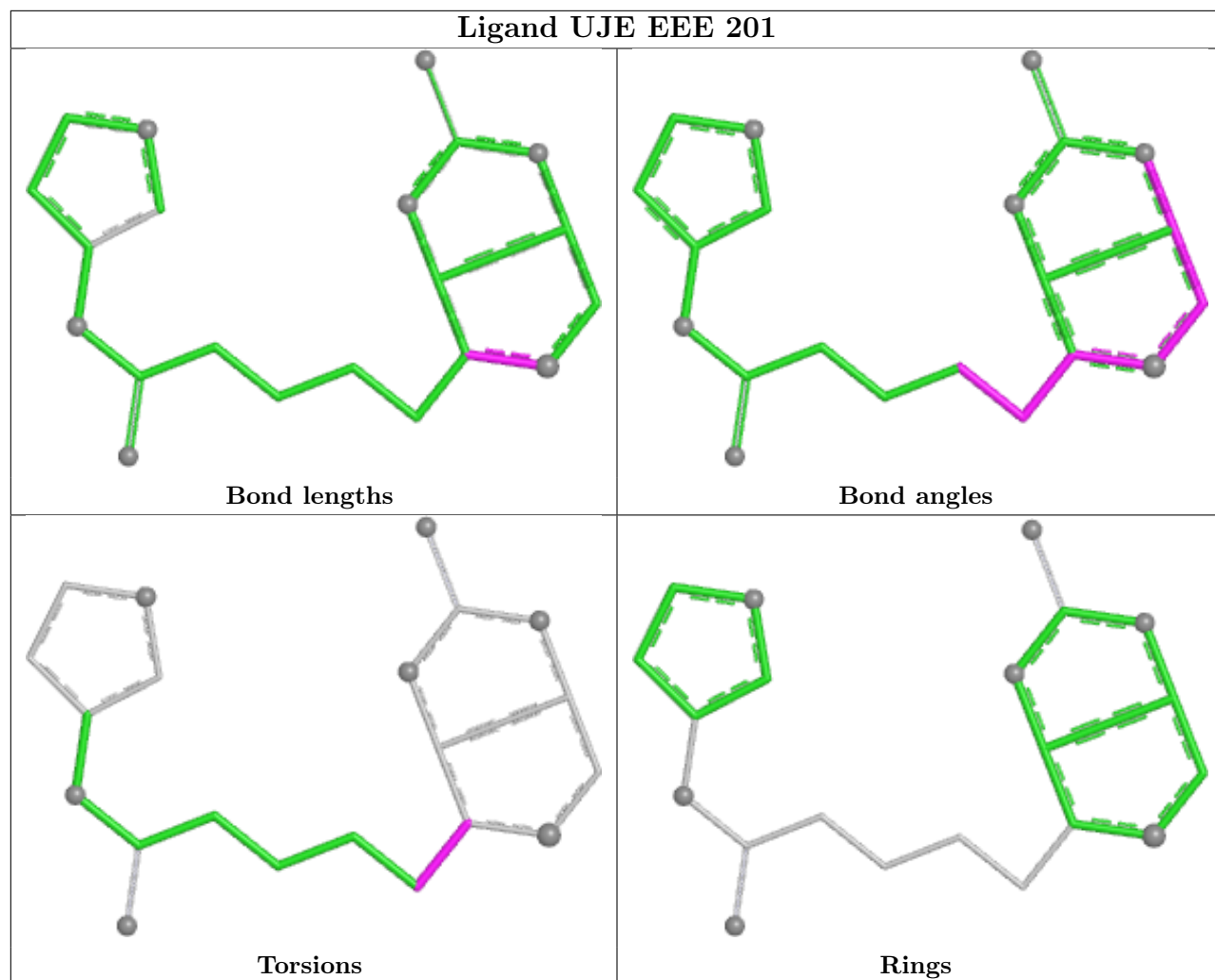
Ligand UJE BBB 203



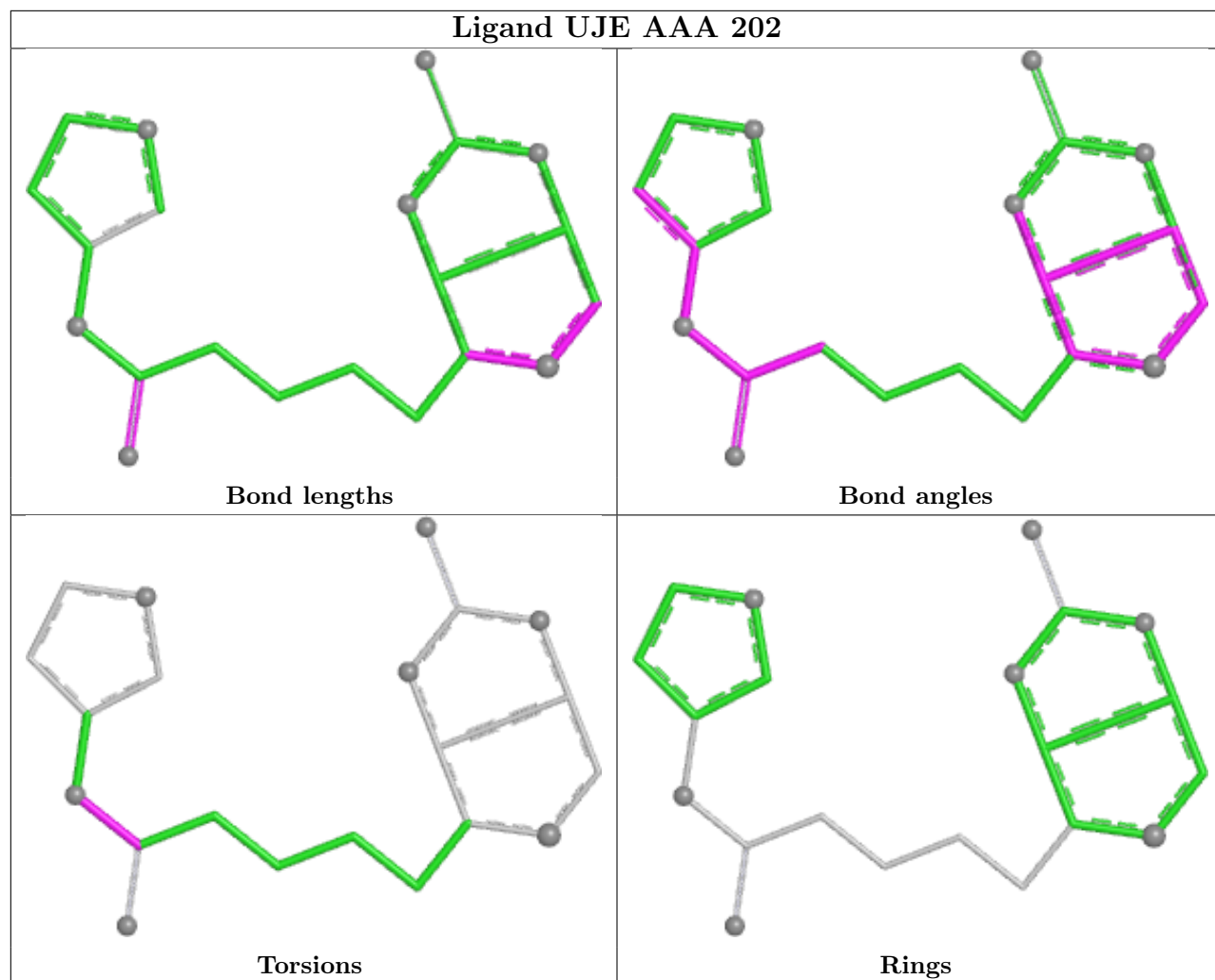


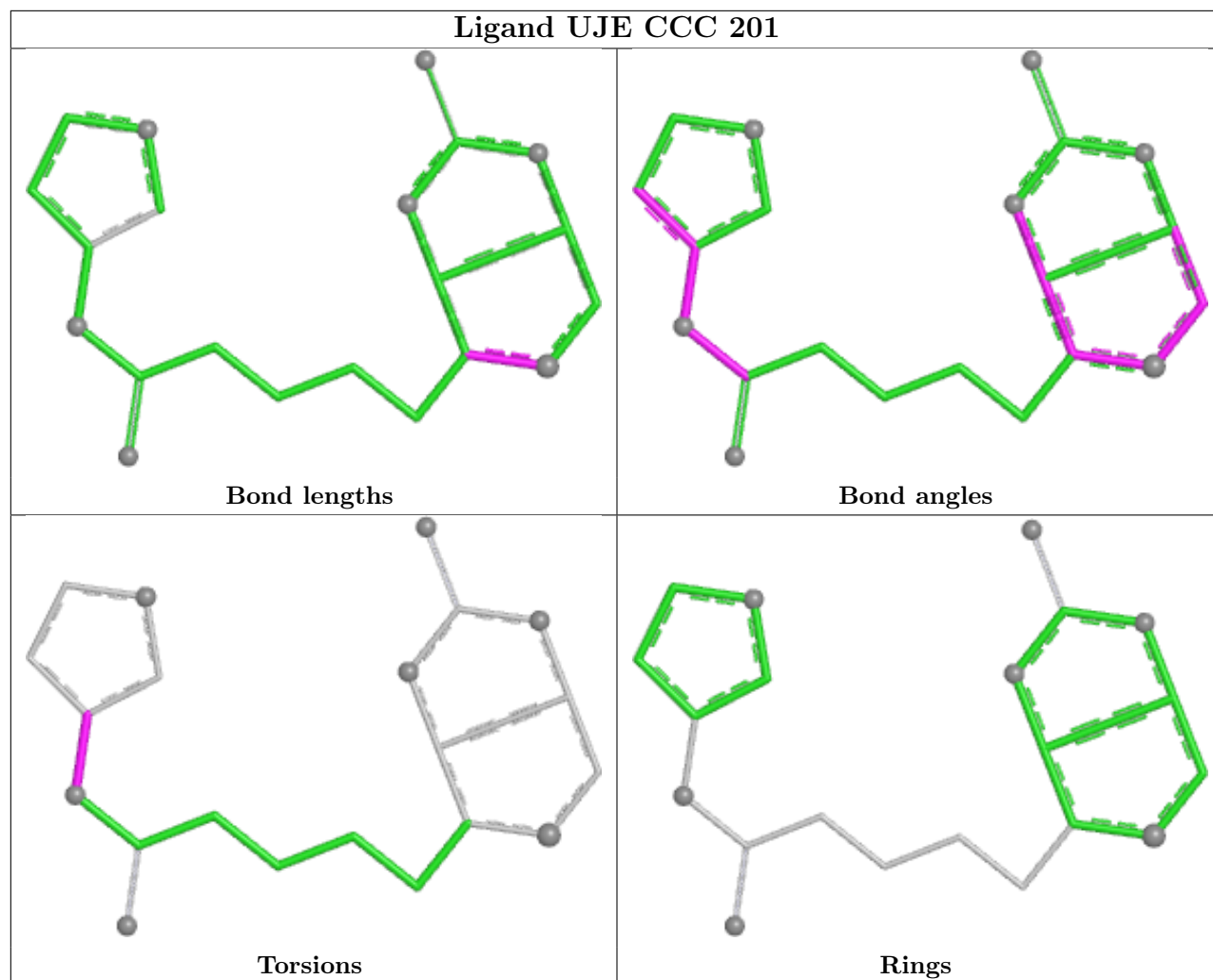


Ligand UJE EEE 201



Ligand UJE AAA 202





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	AAA	110/145 (75%)	-0.96	0 100 100	22, 31, 45, 67	0
1	BBB	115/145 (79%)	-0.96	0 100 100	14, 31, 47, 58	2 (1%)
1	CCC	111/145 (76%)	-1.01	0 100 100	22, 32, 46, 64	0
1	DDD	112/145 (77%)	-1.03	0 100 100	16, 31, 40, 53	1 (0%)
1	EEE	109/145 (75%)	-0.70	0 100 100	21, 49, 79, 87	1 (0%)
1	FFF	111/145 (76%)	-0.67	0 100 100	33, 49, 69, 86	0
All	All	668/870 (76%)	-0.89	0 100 100	14, 35, 65, 87	4 (0%)

There are no RSRZ outliers to report.

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 oligosaccharides in this entry.

6.4 Ligands [i](#)

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

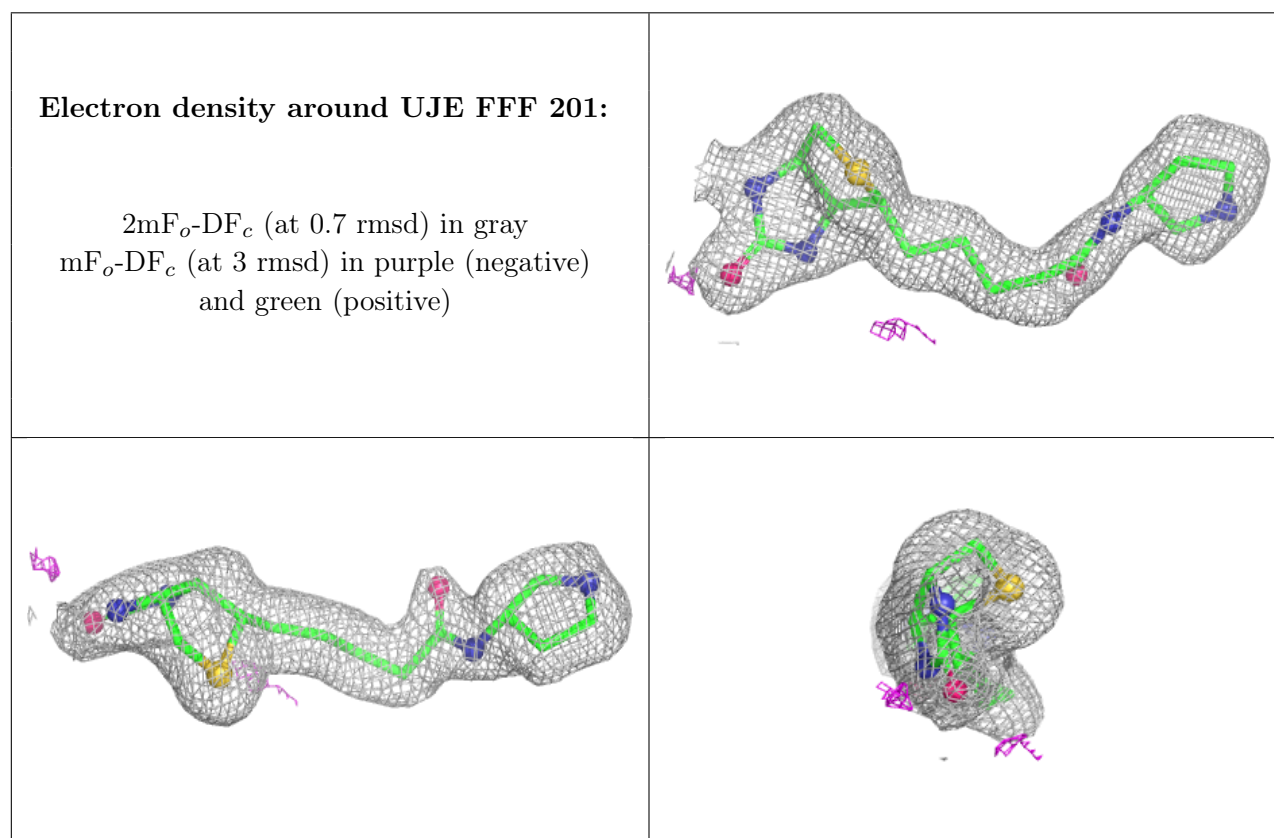
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	UJE	FFF	201	21/21	0.98	0.04	32,36,40,44	0

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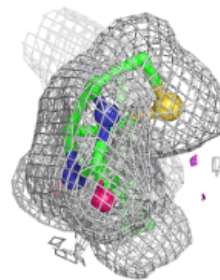
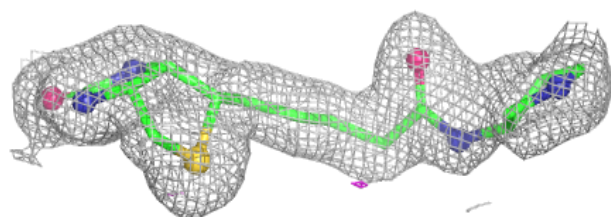
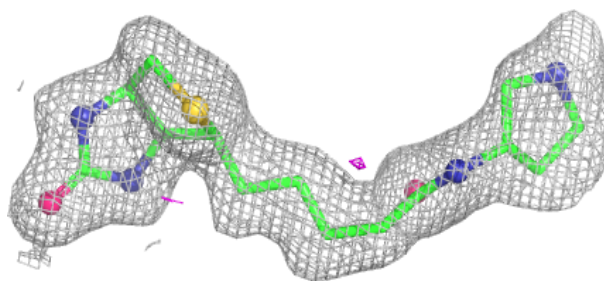
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	SO4	BBB	202	5/5	0.99	0.04	39,39,40,40	0
2	SO4	AAA	201	5/5	0.99	0.04	37,38,39,44	0
3	UJE	BBB	203	21/21	0.99	0.04	28,30,41,42	0
3	UJE	AAA	202	21/21	0.99	0.04	27,29,36,37	0
3	UJE	CCC	201	21/21	0.99	0.04	25,27,34,35	0
2	SO4	BBB	201	5/5	0.99	0.03	58,59,62,63	0
3	UJE	DDD	201	21/21	0.99	0.04	21,23,30,32	0
3	UJE	EEE	201	21/21	0.99	0.04	32,35,45,47	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.

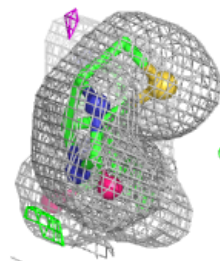
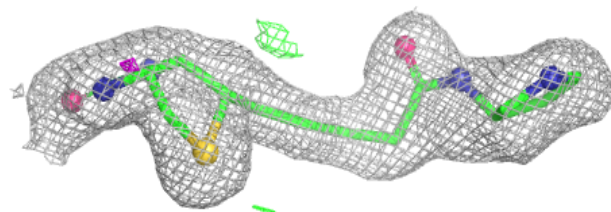
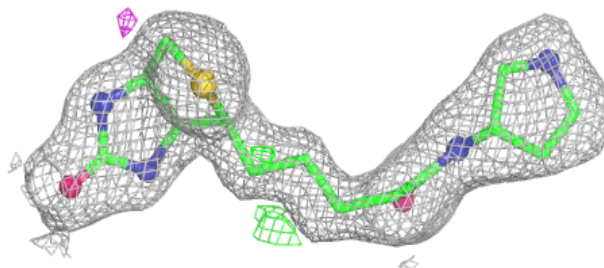


Electron density around UJE BBB 203:

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

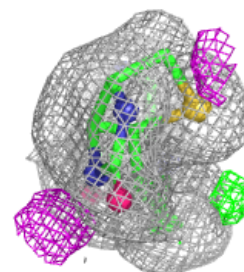
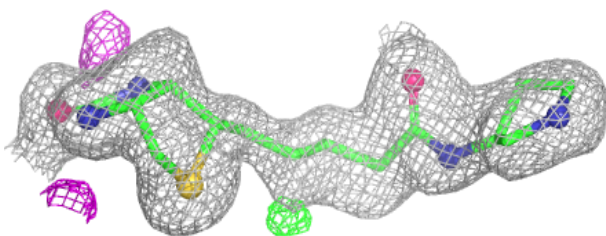
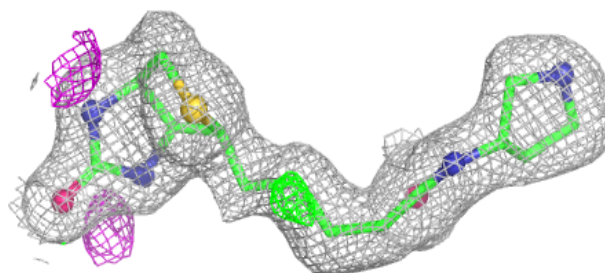
**Electron density around UJE AAA 202:**

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

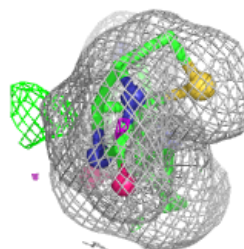
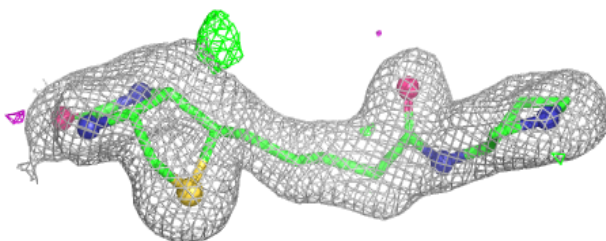
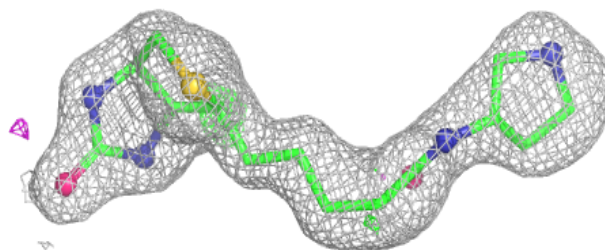


Electron density around UJE CCC 201:

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

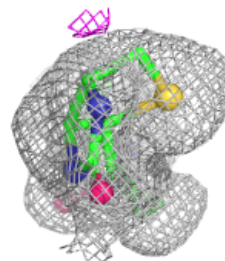
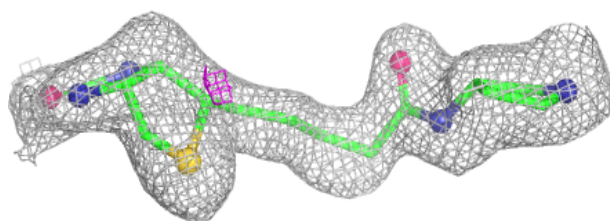
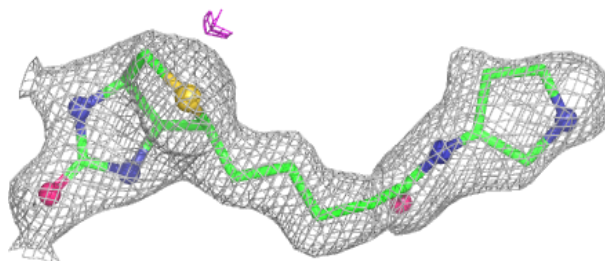
**Electron density around UJE DDD 201:**

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



Electron density around UJE EEE 201:

$2mF_o-DF_c$ (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.