



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 10:33 AM UTC

PDB ID : 3AYG / pdb_00003ayg
Title : Crystal structure of nitric oxide reductase complex with HQNO
Authors : Matsumoto, Y.; Tosha, T.; Pisiakov, A.V.; Hino, T.; Sugimoti, H.; Nagano, S.; Sugita, Y.; Shiro, Y.
Deposited on : 2011-05-06
Resolution : 2.70 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

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

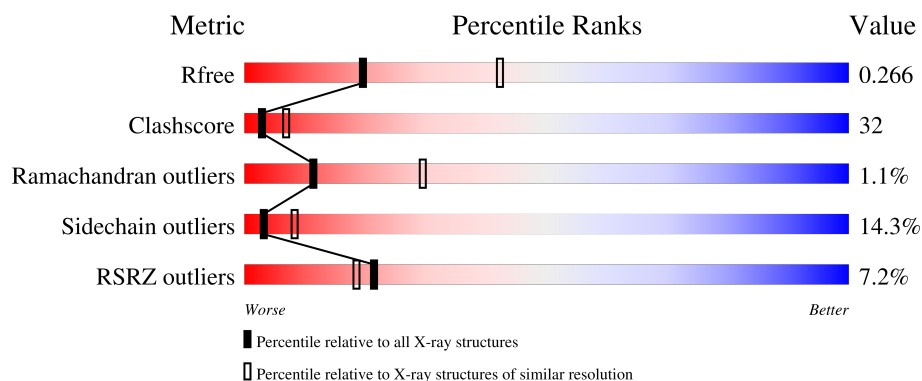
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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))
R_{free}	180053	3538 (2.70-2.70)
Clashscore	190562	3843 (2.70-2.70)
Ramachandran outliers	187476	3778 (2.70-2.70)
Sidechain outliers	187428	3778 (2.70-2.70)
RSRZ outliers	180081	3538 (2.70-2.70)

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 ≥ 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	800	

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
7	HQO	A	811	-	-	X	-

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 6448 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.

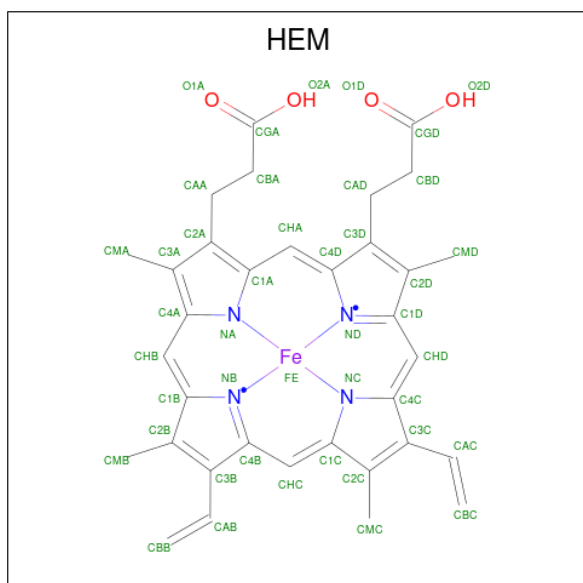
- Molecule 1 is a protein called Nitric oxide reductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	754	6078	4055	966	1034	23	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	793	LEU	-	expression tag	UNP B3Y963
A	794	GLU	-	expression tag	UNP B3Y963
A	795	HIS	-	expression tag	UNP B3Y963
A	796	HIS	-	expression tag	UNP B3Y963
A	797	HIS	-	expression tag	UNP B3Y963
A	798	HIS	-	expression tag	UNP B3Y963
A	799	HIS	-	expression tag	UNP B3Y963
A	800	HIS	-	expression tag	UNP B3Y963

- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	Fe	N	O	
			43	34	1	4	4	
2	A	1	Total	C	Fe	N	O	
			43	34	1	4	4	

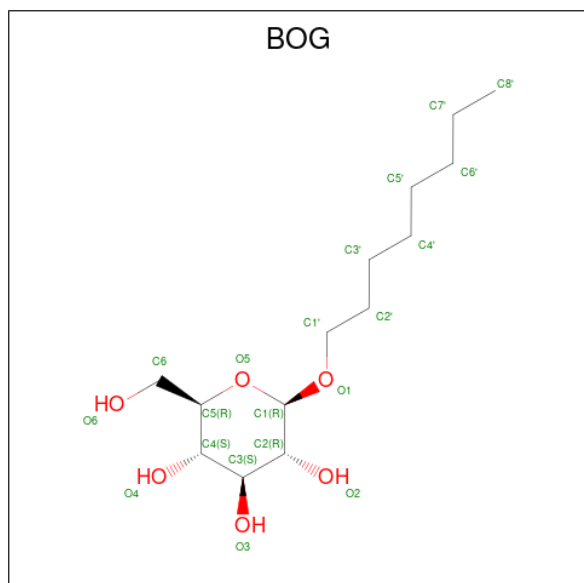
- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Zn		
			1	1	0	0

- Molecule 4 is CALCIUM ION (CCD ID: CA) (formula: Ca).

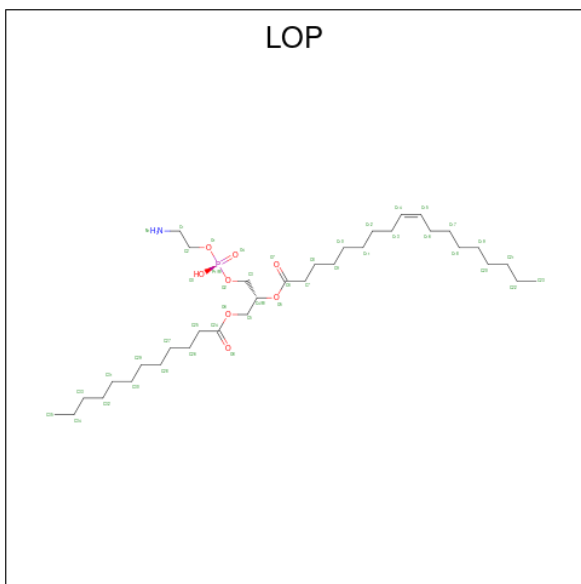
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Ca		
			1	1	0	0

- Molecule 5 is octyl beta-D-glucopyranoside (CCD ID: BOG) (formula: C₁₄H₂₈O₆).



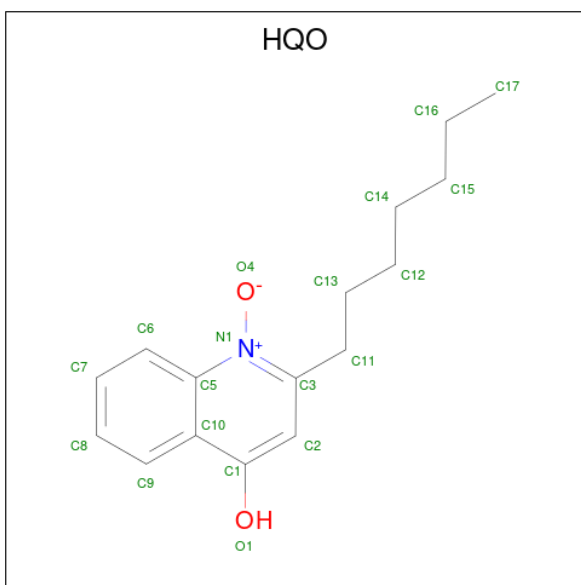
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O		
			20	14	6	0	0
5	A	1	Total	C	O		
			20	14	6	0	0
5	A	1	Total	C	O		
			20	14	6	0	0

- Molecule 6 is (1R)-2-{[(R)-(2-AMINOETHOXY)(HYDROXY)PHOSPHORYL]OXY}-1-[(DODECANOYLOXY)METHYL]ETHYL (9Z)-OCTADEC-9-ENOATE (CCD ID: LOP) (formula: $C_{35}H_{68}NO_8P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	A	1	Total	C	N	O	P	0	0
			45	35	1	8	1		
6	A	1	Total	C	N	O	P	0	0
			45	35	1	8	1		

- Molecule 7 is 2-HEPTYL-4-HYDROXY QUINOLINE N-OXIDE (CCD ID: HQO) (formula: $C_{16}H_{21}NO_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	A	1	Total	C	N	O	0	0
			19	16	1	2		

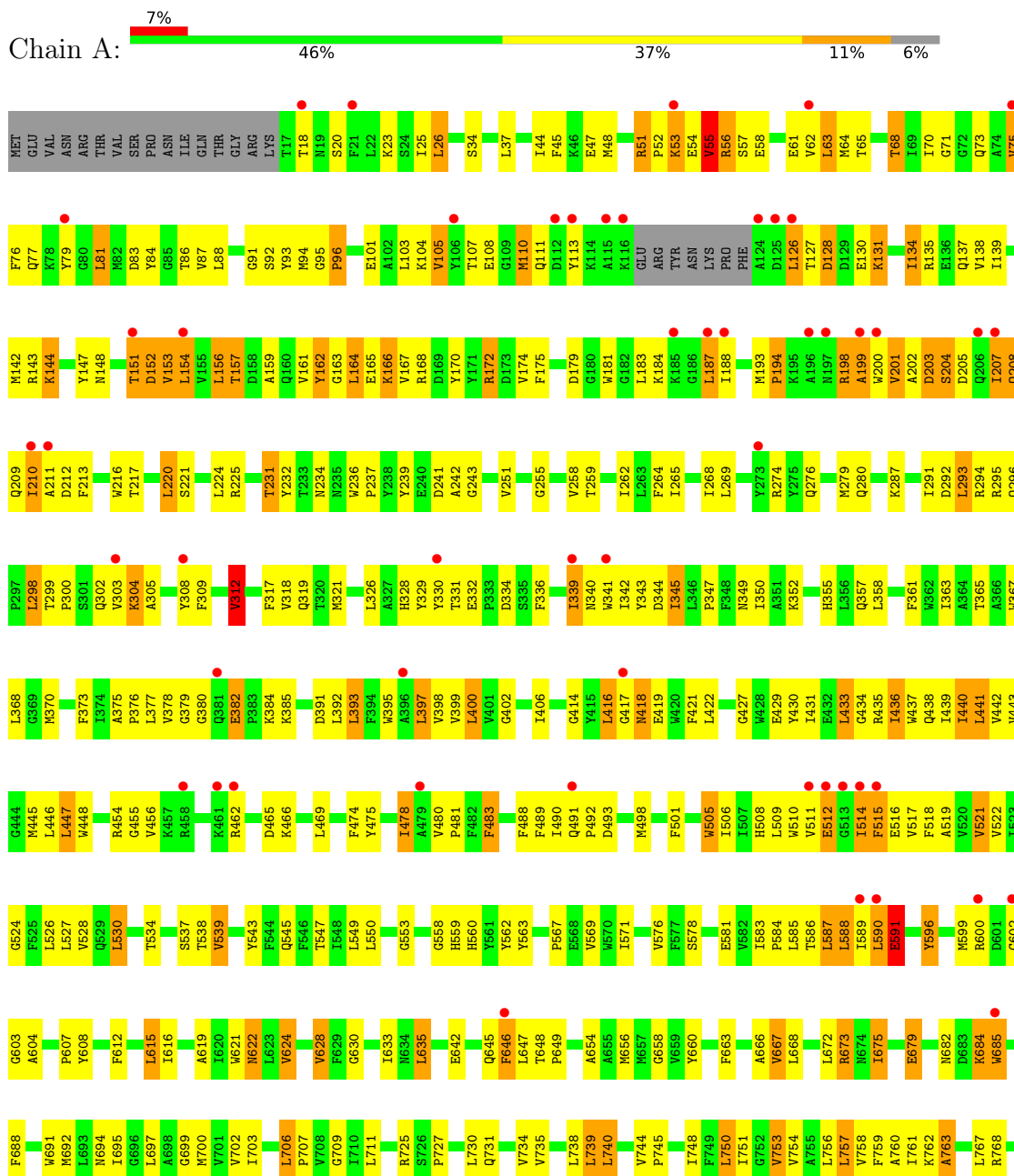
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	113	Total	O	0	0
			113	113		

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: Nitric oxide reductase



T771	H772	G773	E774	G775	E776	E777	LEU	PRO	VAL	ALA	ASN	HIS	TRP	MET	LYS	ASP	ARG	LEU	LYS	ASN	SER	LEU	GLU	HIS	HIS	HIS	HIS	HIS
------	------	------	------	------	------	------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	110.52Å 149.09Å 151.59Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	42.60 – 2.70 42.60 – 2.70	Depositor EDS
% Data completeness (in resolution range)	99.7 (42.60-2.70) 99.7 (42.60-2.70)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.03 (at 2.69Å)	Xtriage
Refinement program	CNS 1.2	Depositor
R, R_{free}	0.236 , 0.267 0.229 , 0.266	Depositor DCC
R_{free} test set	1732 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	62.9	Xtriage
Anisotropy	0.439	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 50.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	6448	wwPDB-VP
Average B, all atoms (Å ²)	69.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.90% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: HEM, CA, ZN, LOP, HQO, BOG

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	0.55	2/6262 (0.0%)	1.05	38/8517 (0.4%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	619	ALA	CA-CB	-5.71	1.44	1.53
1	A	110	MET	SD-CE	-5.65	1.65	1.79

All (38) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	332	GLU	CA-C-N	11.43	131.13	119.24
1	A	332	GLU	C-N-CA	11.43	131.13	119.24
1	A	208	GLN	N-CA-C	-10.62	100.61	114.31
1	A	18	THR	N-CA-C	8.21	121.04	111.02
1	A	763	ALA	N-CA-C	-7.52	105.02	114.56
1	A	702	VAL	N-CA-C	6.93	117.72	110.72
1	A	587	LEU	N-CA-C	-6.90	103.34	112.72
1	A	172	ARG	N-CA-C	-6.66	104.10	111.36
1	A	515	PHE	N-CA-C	6.65	121.52	113.41
1	A	684	LYS	N-CA-C	-6.57	103.74	111.03
1	A	55	VAL	N-CA-C	-6.31	99.38	108.53
1	A	56	ARG	N-CA-C	6.16	117.24	108.74
1	A	591	GLU	N-CA-C	-6.15	104.84	112.90
1	A	602	GLY	N-CA-C	-6.10	100.34	110.95
1	A	368	LEU	N-CA-C	-6.07	104.74	111.36
1	A	553	GLY	N-CA-C	5.92	119.83	112.73
1	A	642	GLU	N-CA-C	5.91	117.80	111.36
1	A	563	TYR	N-CA-C	5.73	120.09	112.30
1	A	418	ASN	N-CA-C	-5.64	106.44	113.15

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	312	VAL	N-CA-C	-5.62	104.89	110.62
1	A	20	SER	N-CA-C	5.57	117.80	111.11
1	A	538	THR	N-CA-C	5.48	116.94	111.07
1	A	203	ASP	N-CA-C	-5.41	101.35	109.15
1	A	604	ALA	N-CA-C	-5.31	106.75	113.18
1	A	505	TRP	N-CA-C	-5.29	105.62	111.71
1	A	608	TYR	N-CA-C	5.29	119.45	112.25
1	A	373	PHE	N-CA-C	5.26	117.42	111.11
1	A	162	TYR	N-CA-C	-5.22	105.59	111.28
1	A	624	VAL	N-CA-C	5.21	115.88	110.82
1	A	596	TYR	N-CA-C	-5.15	105.67	111.28
1	A	514	ILE	CB-CA-C	-5.11	105.17	112.22
1	A	231	THR	N-CA-C	5.10	117.39	110.35
1	A	675	ILE	N-CA-C	5.10	116.03	111.90
1	A	558	GLY	N-CA-C	5.09	120.04	113.27
1	A	128	ASP	N-CA-C	-5.08	105.82	111.36
1	A	489	PHE	N-CA-C	-5.05	107.08	113.20
1	A	576	VAL	N-CA-C	5.05	115.28	110.53
1	A	646	PHE	N-CA-C	5.05	118.90	112.34

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	6078	0	6095	399	1
2	A	86	0	60	5	0
3	A	1	0	0	0	0
4	A	1	0	0	0	0
5	A	60	0	84	3	0
6	A	90	0	134	32	0
7	A	19	0	20	9	0
8	A	113	0	0	7	0
All	All	6448	0	6393	412	1

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 32.

All (412) 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:168:ARG:NE	1:A:208:GLN:HE21	1.33	1.27
1:A:110:MET:HE2	1:A:138:VAL:CG2	1.72	1.17
1:A:164:LEU:O	1:A:168:ARG:HG3	1.41	1.16
1:A:110:MET:CE	1:A:138:VAL:HG23	1.74	1.14
1:A:168:ARG:HE	1:A:208:GLN:NE2	1.48	1.12
1:A:198:ARG:HG3	1:A:198:ARG:HH11	1.06	1.10
1:A:172:ARG:HG3	1:A:207:ILE:HD11	1.35	1.08
1:A:336:PHE:CZ	7:A:811:HQO:H122	1.88	1.08
1:A:465:ASP:HA	6:A:809:LOP:H11	1.43	1.00
1:A:168:ARG:NE	1:A:208:GLN:NE2	2.09	0.93
1:A:293:LEU:HD23	1:A:293:LEU:H	1.34	0.92
1:A:225:ARG:HH11	1:A:232:TYR:HA	1.35	0.91
1:A:110:MET:HE2	1:A:138:VAL:HG23	0.93	0.91
1:A:126:LEU:H	1:A:126:LEU:HD22	1.35	0.91
1:A:164:LEU:CD1	1:A:168:ARG:HH11	1.86	0.89
1:A:441:LEU:HD22	1:A:445:MET:HE2	1.58	0.85
1:A:164:LEU:HD13	1:A:168:ARG:HH11	1.42	0.85
1:A:198:ARG:HH12	1:A:203:ASP:HA	1.41	0.85
1:A:675:ILE:O	1:A:768:ARG:HG3	1.76	0.85
1:A:56:ARG:HB3	1:A:62:VAL:HA	1.57	0.85
1:A:138:VAL:HG22	1:A:142:MET:HE2	1.57	0.85
1:A:198:ARG:HG3	1:A:198:ARG:NH1	1.77	0.84
1:A:336:PHE:CE1	7:A:811:HQO:H122	2.13	0.83
1:A:56:ARG:HA	1:A:63:LEU:HD22	1.59	0.82
1:A:172:ARG:HA	1:A:207:ILE:HD12	1.61	0.82
1:A:104:LYS:HE2	1:A:108:GLU:OE2	1.80	0.81
1:A:198:ARG:HH11	1:A:198:ARG:CG	1.92	0.80
1:A:126:LEU:HB3	1:A:130:GLU:HG2	1.64	0.80
1:A:164:LEU:CD1	1:A:168:ARG:NH1	2.45	0.80
1:A:164:LEU:HD11	1:A:168:ARG:NH1	1.96	0.79
1:A:585:LEU:HA	1:A:588:LEU:HD22	1.61	0.79
1:A:225:ARG:NH1	1:A:232:TYR:C	2.41	0.78
1:A:110:MET:HG2	1:A:159:ALA:O	1.83	0.78
1:A:75:VAL:CG2	1:A:210:ILE:HG12	2.14	0.78
1:A:168:ARG:HE	1:A:208:GLN:HE21	0.78	0.77
1:A:422:LEU:O	1:A:436:ILE:HG23	1.86	0.76
1:A:293:LEU:H	1:A:293:LEU:CD2	1.99	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:336:PHE:HZ	7:A:811:HQO:H122	1.45	0.75
1:A:624:VAL:HA	1:A:628:VAL:HG13	1.67	0.75
6:A:810:LOP:H132	6:A:810:LOP:H292	1.69	0.75
1:A:64:MET:HE2	1:A:212:ASP:CG	2.13	0.74
1:A:543:TYR:O	1:A:547:THR:HG23	1.88	0.74
1:A:318:VAL:HG23	1:A:358:LEU:HD13	1.69	0.73
1:A:341:TRP:O	1:A:345:ILE:HG22	1.88	0.73
1:A:588:LEU:HD23	1:A:622:ASN:HB3	1.70	0.73
1:A:225:ARG:NH1	1:A:232:TYR:HA	2.03	0.72
1:A:168:ARG:CZ	1:A:208:GLN:HE21	2.02	0.72
1:A:466:LYS:HB2	6:A:809:LOP:O3	1.90	0.72
1:A:321:MET:HE2	1:A:750:LEU:HD21	1.71	0.71
1:A:175:PHE:HD1	1:A:187:LEU:HD11	1.55	0.71
1:A:55:VAL:HG13	1:A:64:MET:HB3	1.73	0.71
1:A:633:ILE:HD12	2:A:802:HEM:HBD2	1.72	0.71
1:A:300:PRO:HD2	1:A:382:GLU:HG3	1.73	0.70
1:A:104:LYS:O	1:A:108:GLU:HG2	1.90	0.70
1:A:599:MET:HE1	6:A:810:LOP:C7	2.21	0.70
1:A:135:ARG:O	1:A:138:VAL:HG12	1.92	0.70
1:A:517:VAL:O	1:A:521:VAL:HG12	1.91	0.69
1:A:193:MET:HE3	1:A:198:ARG:HB3	1.74	0.69
6:A:810:LOP:H112	6:A:810:LOP:H272	1.75	0.69
1:A:380:GLY:O	1:A:777:GLU:HG2	1.91	0.69
1:A:199:ALA:HB2	1:A:418:ASN:HB3	1.75	0.68
1:A:210:ILE:HG22	1:A:211:ALA:N	2.07	0.68
1:A:164:LEU:HD13	1:A:168:ARG:HD2	1.75	0.68
6:A:810:LOP:H91	6:A:810:LOP:O7	1.94	0.68
1:A:302:GLN:HE22	1:A:377:LEU:HD13	1.58	0.68
1:A:534:THR:OG1	1:A:537:SER:HB3	1.94	0.68
1:A:225:ARG:NH1	1:A:232:TYR:O	2.27	0.67
1:A:225:ARG:HH11	1:A:232:TYR:CA	2.08	0.67
1:A:646:PHE:C	1:A:649:PRO:HD2	2.20	0.67
1:A:585:LEU:O	1:A:588:LEU:HB2	1.95	0.66
1:A:255:GLY:O	1:A:259:THR:HG23	1.95	0.66
1:A:198:ARG:NH1	1:A:203:ASP:HA	2.08	0.66
1:A:599:MET:HE1	6:A:810:LOP:H71	1.77	0.66
1:A:735:VAL:HG12	1:A:739:LEU:HD22	1.77	0.66
1:A:336:PHE:HD2	1:A:342:ILE:HD12	1.61	0.65
1:A:164:LEU:O	1:A:168:ARG:CG	2.32	0.65
1:A:217:THR:HA	1:A:220:LEU:CD1	2.26	0.64
1:A:44:ILE:HG12	1:A:567:PRO:HD2	1.79	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:188:ILE:HG21	1:A:207:ILE:HG22	1.79	0.64
1:A:336:PHE:HE1	7:A:811:HQO:H131	1.62	0.64
1:A:216:TRP:O	1:A:220:LEU:HD13	1.97	0.64
1:A:334:ASP:HA	1:A:343:TYR:CD2	2.32	0.64
1:A:435:ARG:NH2	1:A:490:ILE:O	2.30	0.64
1:A:86:THR:OG1	1:A:725:ARG:NH2	2.31	0.64
1:A:75:VAL:HG22	1:A:210:ILE:HG12	1.80	0.64
1:A:217:THR:HA	1:A:220:LEU:HD11	1.78	0.64
6:A:810:LOP:H112	6:A:810:LOP:H251	1.78	0.64
1:A:299:THR:HB	1:A:382:GLU:HG2	1.80	0.63
1:A:93:TYR:CE2	1:A:649:PRO:HG3	2.33	0.63
1:A:107:THR:O	1:A:111:GLN:HG3	1.99	0.63
1:A:207:ILE:HG13	1:A:207:ILE:O	1.99	0.63
1:A:375:ALA:HB3	1:A:376:PRO:HD3	1.80	0.63
1:A:298:LEU:CD1	1:A:303:VAL:HG13	2.29	0.63
1:A:433:LEU:HD13	1:A:438:GLN:CG	2.28	0.63
1:A:164:LEU:O	1:A:164:LEU:HD22	2.00	0.62
1:A:621:TRP:CZ2	6:A:810:LOP:H192	2.34	0.62
1:A:440:ILE:O	1:A:440:ILE:HD12	2.00	0.62
1:A:771:THR:HG22	1:A:772:HIS:CD2	2.35	0.62
1:A:225:ARG:NH1	1:A:232:TYR:CA	2.62	0.61
1:A:65:THR:HG23	1:A:68:THR:H	1.64	0.61
1:A:93:TYR:HE2	1:A:649:PRO:HG3	1.63	0.61
1:A:436:ILE:O	1:A:436:ILE:HD12	2.00	0.61
1:A:336:PHE:HE1	7:A:811:HQO:C13	2.14	0.61
1:A:51:ARG:NH2	1:A:493:ASP:O	2.27	0.61
1:A:429:GLU:O	1:A:430:TYR:HB2	2.01	0.61
1:A:607:PRO:O	1:A:673:ARG:HD2	2.01	0.60
1:A:393:LEU:O	1:A:397:LEU:HD22	2.01	0.60
1:A:194:PRO:O	1:A:198:ARG:HD3	2.01	0.60
6:A:810:LOP:C6	6:A:810:LOP:O6	2.49	0.60
1:A:101:GLU:O	1:A:105:VAL:HG23	2.02	0.60
1:A:395:TRP:HA	1:A:398:VAL:HG12	1.83	0.60
1:A:347:PRO:HD2	1:A:350:ILE:HD12	1.84	0.60
1:A:393:LEU:HD22	1:A:397:LEU:HD21	1.81	0.60
1:A:336:PHE:CE1	7:A:811:HQO:C12	2.83	0.60
1:A:179:ASP:OD1	1:A:183:LEU:HB3	2.02	0.59
1:A:198:ARG:HH12	1:A:203:ASP:CA	2.14	0.59
1:A:549:LEU:C	1:A:549:LEU:HD13	2.26	0.59
1:A:113:TYR:HB2	1:A:162:TYR:CD2	2.37	0.59
1:A:480:VAL:HB	1:A:481:PRO:CD	2.33	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:436:ILE:O	1:A:440:ILE:HG23	2.03	0.59
1:A:168:ARG:HH21	1:A:208:GLN:HG3	1.66	0.59
1:A:302:GLN:NE2	1:A:377:LEU:HD13	2.18	0.59
1:A:168:ARG:HH21	1:A:208:GLN:CG	2.15	0.58
1:A:534:THR:OG1	1:A:537:SER:CB	2.52	0.58
6:A:809:LOP:O3	6:A:809:LOP:H4	2.03	0.58
1:A:363:ILE:HG22	1:A:515:PHE:CE1	2.38	0.58
1:A:151:THR:O	1:A:153:VAL:N	2.33	0.58
1:A:225:ARG:HH12	1:A:232:TYR:C	2.12	0.58
1:A:187:LEU:HD13	1:A:188:ILE:H	1.69	0.58
1:A:675:ILE:CG2	1:A:767:LEU:HD22	2.34	0.58
1:A:264:PHE:O	1:A:268:ILE:HG12	2.04	0.58
1:A:454:ARG:HG2	1:A:454:ARG:HH11	1.68	0.58
1:A:220:LEU:HD22	1:A:221:SER:N	2.19	0.57
1:A:370:MET:HE2	1:A:526:LEU:HD21	1.87	0.57
1:A:583:ILE:HB	1:A:584:PRO:HD3	1.86	0.57
1:A:293:LEU:HD23	1:A:293:LEU:N	2.12	0.57
1:A:421:PHE:CE1	1:A:492:PRO:HD3	2.39	0.57
1:A:549:LEU:HD13	1:A:549:LEU:O	2.05	0.57
1:A:309:PHE:HA	1:A:312:VAL:HG13	1.87	0.57
1:A:293:LEU:HA	1:A:296:GLN:CD	2.29	0.57
1:A:363:ILE:HG22	1:A:515:PHE:CZ	2.40	0.57
1:A:53:LYS:HE2	1:A:54:GLU:HG3	1.87	0.57
1:A:395:TRP:HA	1:A:398:VAL:CG1	2.34	0.57
1:A:685:TRP:CE3	1:A:685:TRP:HA	2.39	0.57
6:A:809:LOP:O4	6:A:809:LOP:H12	2.05	0.57
1:A:93:TYR:HA	1:A:725:ARG:HH12	1.69	0.56
1:A:170:TYR:O	1:A:174:VAL:HG23	2.05	0.56
1:A:23:LYS:HD3	6:A:809:LOP:H31	1.86	0.56
1:A:203:ASP:HB3	8:A:904:HOH:O	2.04	0.56
1:A:433:LEU:HD13	1:A:438:GLN:HG2	1.87	0.56
1:A:758:VAL:O	1:A:762:LYS:HG2	2.06	0.56
1:A:599:MET:HE1	6:A:810:LOP:H72	1.87	0.56
1:A:187:LEU:HD13	1:A:188:ILE:N	2.20	0.56
1:A:217:THR:O	1:A:220:LEU:HD22	2.06	0.56
1:A:64:MET:HE2	1:A:212:ASP:CB	2.36	0.56
1:A:616:ILE:HD13	6:A:810:LOP:H82	1.86	0.56
1:A:692:MET:CE	1:A:748:ILE:HG23	2.35	0.56
1:A:429:GLU:HG2	1:A:430:TYR:CD2	2.40	0.56
1:A:581:GLU:O	1:A:584:PRO:HD2	2.04	0.56
1:A:402:GLY:O	1:A:406:ILE:HG12	2.06	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:624:VAL:HG11	6:A:810:LOP:H211	1.88	0.55
1:A:434:GLY:O	1:A:437:TRP:HB2	2.06	0.55
1:A:382:GLU:HB2	1:A:773:GLY:O	2.05	0.55
1:A:70:ILE:HD13	1:A:493:ASP:HB2	1.88	0.55
1:A:339:ILE:HG22	1:A:340:ASN:N	2.21	0.55
1:A:304:LYS:HG2	1:A:391:ASP:OD1	2.06	0.55
1:A:203:ASP:O	1:A:204:SER:HB2	2.06	0.55
1:A:395:TRP:O	1:A:399:VAL:HG23	2.06	0.55
1:A:699:GLY:O	1:A:703:ILE:HB	2.06	0.55
1:A:52:PRO:HA	1:A:152:ASP:OD1	2.06	0.55
1:A:774:GLU:OE1	1:A:774:GLU:N	2.40	0.55
1:A:34:SER:OG	6:A:809:LOP:H233	2.05	0.54
1:A:113:TYR:CD2	1:A:159:ALA:HA	2.42	0.54
1:A:648:THR:HB	1:A:649:PRO:HD3	1.87	0.54
1:A:691:TRP:CE3	1:A:695:ILE:HD11	2.42	0.54
1:A:694:ASN:HB3	6:A:810:LOP:H312	1.90	0.54
1:A:56:ARG:HB2	1:A:61:GLU:O	2.08	0.54
1:A:144:LYS:HZ2	1:A:144:LYS:HB3	1.72	0.54
1:A:156:LEU:H	1:A:156:LEU:HD23	1.73	0.54
1:A:156:LEU:HD23	1:A:156:LEU:N	2.21	0.54
1:A:393:LEU:HD22	1:A:397:LEU:CD2	2.38	0.54
1:A:400:LEU:HG	1:A:440:ILE:CG1	2.39	0.54
1:A:25:ILE:HD13	5:A:806:BOG:H6'1	1.90	0.53
1:A:691:TRP:CE2	6:A:810:LOP:H282	2.42	0.53
1:A:55:VAL:CG1	1:A:64:MET:HB3	2.39	0.53
1:A:83:ASP:O	1:A:349:ASN:HA	2.07	0.53
1:A:131:LYS:O	1:A:131:LYS:HD3	2.08	0.53
1:A:291:ILE:CG2	1:A:607:PRO:HG3	2.39	0.53
1:A:400:LEU:HB2	1:A:440:ILE:HD11	1.90	0.53
1:A:55:VAL:HA	1:A:154:LEU:O	2.09	0.53
1:A:55:VAL:HB	1:A:154:LEU:HD12	1.91	0.53
1:A:172:ARG:HA	1:A:207:ILE:CD1	2.33	0.53
1:A:86:THR:HG22	1:A:91:GLY:CA	2.39	0.53
1:A:384:LYS:O	1:A:385:LYS:HB2	2.09	0.53
1:A:491:GLN:HB2	1:A:492:PRO:HD2	1.90	0.53
1:A:299:THR:CB	1:A:382:GLU:HG2	2.39	0.53
1:A:440:ILE:HD12	1:A:440:ILE:C	2.33	0.53
1:A:675:ILE:HG22	1:A:767:LEU:HD22	1.91	0.53
1:A:53:LYS:HD2	1:A:53:LYS:O	2.09	0.52
1:A:771:THR:HG22	1:A:772:HIS:HD2	1.73	0.52
1:A:274:ARG:O	1:A:274:ARG:HG3	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:339:ILE:C	1:A:340:ASN:HD22	2.17	0.52
1:A:210:ILE:CG2	1:A:211:ALA:N	2.71	0.52
1:A:294:ARG:HH12	1:A:679:GLU:HG2	1.74	0.52
1:A:336:PHE:HD2	1:A:342:ILE:CD1	2.20	0.52
1:A:299:THR:HB	1:A:382:GLU:CG	2.38	0.52
1:A:395:TRP:C	1:A:398:VAL:HG12	2.34	0.52
1:A:757:LEU:HD22	1:A:761:ILE:HG13	1.91	0.52
1:A:65:THR:H	1:A:68:THR:HG1	1.53	0.52
1:A:76:PHE:HB2	1:A:210:ILE:HD11	1.92	0.52
1:A:148:ASN:O	1:A:151:THR:O	2.28	0.52
1:A:26:LEU:HA	1:A:547:THR:HG22	1.93	0.51
1:A:157:THR:O	1:A:161:VAL:HG23	2.10	0.51
1:A:198:ARG:NH2	1:A:204:SER:O	2.42	0.51
1:A:47:GLU:OE2	5:A:807:BOG:H62	2.10	0.51
1:A:321:MET:HE1	1:A:750:LEU:HD11	1.91	0.51
1:A:436:ILE:HD12	1:A:436:ILE:C	2.35	0.51
1:A:744:VAL:HB	1:A:745:PRO:CD	2.40	0.51
6:A:810:LOP:O7	6:A:810:LOP:O6	2.28	0.51
1:A:647:LEU:HG	1:A:709:GLY:HA3	1.93	0.51
1:A:79:TYR:CE2	1:A:188:ILE:HG12	2.45	0.51
1:A:400:LEU:HG	1:A:440:ILE:HD11	1.93	0.50
1:A:491:GLN:HB2	1:A:492:PRO:CD	2.42	0.50
1:A:126:LEU:HB3	1:A:130:GLU:CG	2.38	0.50
6:A:810:LOP:H251	6:A:810:LOP:C11	2.42	0.50
1:A:483:PHE:CZ	6:A:809:LOP:H222	2.47	0.50
1:A:265:ILE:O	1:A:269:LEU:HB2	2.11	0.50
1:A:193:MET:HE2	1:A:201:VAL:CG1	2.41	0.50
1:A:339:ILE:HG22	1:A:340:ASN:H	1.76	0.50
1:A:439:ILE:O	1:A:442:VAL:HG22	2.11	0.50
1:A:384:LYS:O	1:A:454:ARG:NH2	2.45	0.50
1:A:697:LEU:HA	1:A:700:MET:HE3	1.93	0.50
1:A:209:GLN:O	1:A:212:ASP:HB2	2.12	0.49
1:A:279:MET:HA	1:A:537:SER:OG	2.12	0.49
1:A:480:VAL:HB	1:A:481:PRO:HD3	1.93	0.49
1:A:569:VAL:HG23	5:A:807:BOG:H3'1	1.94	0.49
1:A:590:LEU:HD23	1:A:590:LEU:C	2.37	0.49
1:A:86:THR:HG23	1:A:92:SER:O	2.12	0.49
1:A:175:PHE:CE2	1:A:210:ILE:HG21	2.46	0.49
1:A:280:GLN:N	1:A:537:SER:OG	2.44	0.49
1:A:586:THR:C	1:A:588:LEU:H	2.20	0.49
1:A:646:PHE:O	1:A:649:PRO:HD2	2.11	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:203:ASP:O	1:A:203:ASP:CG	2.54	0.49
1:A:292:ASP:CG	1:A:295:ARG:HG2	2.38	0.49
1:A:139:ILE:HD13	1:A:142:MET:HE3	1.94	0.49
1:A:309:PHE:HB3	1:A:668:LEU:HG	1.93	0.49
1:A:744:VAL:HB	1:A:745:PRO:HD3	1.94	0.49
1:A:88:LEU:HA	1:A:236:TRP:HZ3	1.78	0.49
1:A:336:PHE:CD2	1:A:342:ILE:CD1	2.96	0.49
1:A:692:MET:HE3	1:A:748:ILE:HG23	1.94	0.49
1:A:414:GLY:C	1:A:416:LEU:H	2.20	0.49
6:A:809:LOP:O6	6:A:809:LOP:C6	2.60	0.49
1:A:505:TRP:O	1:A:509:LEU:HB2	2.13	0.49
1:A:56:ARG:HA	1:A:63:LEU:CD2	2.36	0.48
1:A:510:TRP:CZ2	1:A:514:ILE:HD11	2.48	0.48
1:A:203:ASP:O	1:A:204:SER:CB	2.60	0.48
1:A:302:GLN:HE22	1:A:377:LEU:CD1	2.24	0.48
1:A:688:PHE:O	1:A:692:MET:HG2	2.13	0.48
1:A:84:TYR:C	1:A:92:SER:HB2	2.37	0.48
1:A:433:LEU:CD1	1:A:438:GLN:HG2	2.43	0.48
1:A:483:PHE:HZ	6:A:809:LOP:H222	1.79	0.48
1:A:526:LEU:O	1:A:530:LEU:HD13	2.13	0.48
1:A:166:LYS:N	1:A:166:LYS:HE2	2.29	0.48
1:A:445:MET:O	1:A:448:TRP:HB3	2.13	0.48
1:A:45:PHE:O	1:A:48:MET:HE2	2.13	0.48
1:A:188:ILE:CG2	1:A:207:ILE:HG22	2.42	0.48
1:A:139:ILE:HD11	1:A:241:ASP:O	2.14	0.48
1:A:474:PHE:O	1:A:478:ILE:CG2	2.61	0.48
1:A:475:TYR:CZ	6:A:809:LOP:H281	2.48	0.48
1:A:77:GLN:HB3	1:A:427:GLY:HA3	1.95	0.48
1:A:293:LEU:HA	1:A:296:GLN:HG3	1.95	0.48
1:A:511:VAL:O	1:A:515:PHE:CD2	2.66	0.48
1:A:515:PHE:HB2	1:A:660:TYR:CE1	2.49	0.48
1:A:615:LEU:HD13	1:A:666:ALA:HB1	1.96	0.48
1:A:56:ARG:HB2	1:A:61:GLU:C	2.39	0.47
1:A:184:LYS:NZ	1:A:344:ASP:O	2.46	0.47
1:A:199:ALA:HB2	1:A:418:ASN:CB	2.43	0.47
1:A:292:ASP:OD1	1:A:295:ARG:HG2	2.14	0.47
1:A:600:ARG:HH21	6:A:810:LOP:H31	1.79	0.47
1:A:187:LEU:CD1	1:A:187:LEU:H	2.27	0.47
1:A:126:LEU:HD23	1:A:131:LYS:HG2	1.97	0.47
1:A:187:LEU:H	1:A:187:LEU:HD12	1.79	0.47
1:A:378:VAL:HB	1:A:456:VAL:HG22	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:508:HIS:O	1:A:512:GLU:HG3	2.15	0.47
1:A:23:LYS:NZ	6:A:809:LOP:O4	2.39	0.47
1:A:524:GLY:O	1:A:528:VAL:HG23	2.15	0.47
1:A:65:THR:HG23	1:A:68:THR:N	2.29	0.47
1:A:761:ILE:C	1:A:763:ALA:H	2.23	0.47
1:A:201:VAL:CG2	1:A:209:GLN:HE22	2.28	0.47
1:A:578:SER:O	1:A:581:GLU:HB2	2.14	0.47
1:A:154:LEU:CD1	1:A:156:LEU:HD22	2.44	0.46
1:A:162:TYR:O	1:A:165:GLU:HB3	2.15	0.46
1:A:200:TRP:CE3	1:A:492:PRO:HB2	2.50	0.46
1:A:298:LEU:HD11	1:A:303:VAL:HG13	1.95	0.46
1:A:400:LEU:CG	1:A:440:ILE:HD11	2.46	0.46
1:A:773:GLY:C	1:A:775:GLY:H	2.22	0.46
1:A:86:THR:HG23	1:A:725:ARG:HH22	1.79	0.46
1:A:515:PHE:O	1:A:519:ALA:HB3	2.16	0.46
1:A:291:ILE:HG21	1:A:607:PRO:HG3	1.98	0.46
1:A:685:TRP:HA	1:A:685:TRP:HE3	1.81	0.46
1:A:379:GLY:HA3	1:A:455:GLY:O	2.16	0.46
1:A:367:TRP:CZ3	1:A:667:VAL:HG21	2.49	0.46
1:A:588:LEU:O	1:A:591:GLU:N	2.43	0.46
1:A:706:LEU:HB3	1:A:707:PRO:CD	2.46	0.46
1:A:330:TYR:OH	2:A:801:HEM:O1A	2.33	0.46
1:A:588:LEU:C	1:A:590:LEU:N	2.72	0.46
1:A:53:LYS:O	1:A:65:THR:HA	2.16	0.46
1:A:142:MET:CE	1:A:242:ALA:HA	2.46	0.46
1:A:225:ARG:NH2	1:A:234:ASN:OD1	2.48	0.46
1:A:336:PHE:CE1	7:A:811:HQO:H131	2.48	0.46
1:A:352:LYS:NZ	2:A:801:HEM:O2A	2.48	0.46
1:A:559:HIS:HA	1:A:562:TYR:CE1	2.51	0.46
1:A:126:LEU:H	1:A:126:LEU:CD2	2.13	0.45
1:A:198:ARG:NH1	1:A:202:ALA:O	2.49	0.45
1:A:305:ALA:O	1:A:308:TYR:HB2	2.16	0.45
1:A:94:MET:CE	1:A:329:TYR:HB3	2.46	0.45
1:A:200:TRP:CD2	1:A:492:PRO:HB2	2.52	0.45
1:A:181:TRP:CG	1:A:727:PRO:HB3	2.52	0.45
1:A:378:VAL:HG11	1:A:456:VAL:HG13	1.97	0.45
1:A:549:LEU:C	1:A:549:LEU:CD1	2.89	0.45
1:A:201:VAL:HG23	1:A:209:GLN:OE1	2.16	0.45
1:A:462:ARG:HG2	1:A:462:ARG:HH11	1.81	0.45
1:A:560:HIS:HA	8:A:994:HOH:O	2.17	0.45
1:A:668:LEU:HD23	1:A:668:LEU:C	2.42	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:217:THR:HA	1:A:220:LEU:HD13	1.97	0.45
1:A:612:PHE:HA	1:A:615:LEU:HB2	1.99	0.45
1:A:682:ASN:ND2	1:A:684:LYS:HB3	2.32	0.45
1:A:94:MET:HE1	1:A:329:TYR:O	2.17	0.45
1:A:760:ALA:O	1:A:763:ALA:HB3	2.16	0.45
1:A:615:LEU:HD12	1:A:615:LEU:HA	1.83	0.44
1:A:341:TRP:HE3	1:A:345:ILE:HG21	1.82	0.44
1:A:393:LEU:HG	1:A:447:LEU:HD13	1.99	0.44
1:A:127:THR:H	1:A:130:GLU:HB3	1.82	0.44
1:A:317:PHE:CZ	1:A:321:MET:HE3	2.53	0.44
1:A:599:MET:CE	6:A:810:LOP:H71	2.46	0.44
1:A:148:ASN:C	1:A:148:ASN:HD22	2.25	0.44
1:A:331:THR:CG2	1:A:740:LEU:HD13	2.47	0.44
1:A:52:PRO:HG3	1:A:147:TYR:CE1	2.53	0.44
1:A:522:VAL:O	1:A:526:LEU:HD13	2.18	0.44
1:A:654:ALA:O	1:A:658:GLY:HA3	2.18	0.44
1:A:56:ARG:CD	1:A:62:VAL:HG12	2.47	0.43
1:A:127:THR:N	1:A:130:GLU:HB3	2.32	0.43
1:A:319:GLN:NE2	1:A:355:HIS:CE1	2.86	0.43
1:A:331:THR:HG21	1:A:740:LEU:HD13	2.00	0.43
1:A:81:LEU:HD21	1:A:175:PHE:CE1	2.53	0.43
1:A:433:LEU:HD13	1:A:438:GLN:HG3	2.00	0.43
1:A:750:LEU:O	1:A:753:VAL:HG13	2.17	0.43
1:A:435:ARG:HD2	1:A:488:PHE:CE2	2.53	0.43
1:A:682:ASN:HD21	1:A:684:LYS:HB3	1.84	0.43
1:A:730:LEU:HA	1:A:735:VAL:HG11	1.99	0.43
2:A:801:HEM:HBA2	2:A:801:HEM:HHA	1.99	0.43
1:A:143:ARG:HD2	1:A:243:GLY:HA3	1.99	0.43
1:A:154:LEU:HD13	1:A:154:LEU:C	2.44	0.43
1:A:334:ASP:HA	1:A:343:TYR:CE2	2.53	0.43
1:A:731:GLN:NE2	8:A:1006:HOH:O	2.50	0.43
1:A:759:PHE:O	1:A:763:ALA:HB2	2.19	0.43
1:A:127:THR:HG22	1:A:128:ASP:N	2.34	0.43
1:A:293:LEU:HA	1:A:296:GLN:CG	2.49	0.43
1:A:55:VAL:HG22	1:A:64:MET:HB2	2.01	0.43
1:A:518:PHE:O	1:A:522:VAL:HG23	2.18	0.43
1:A:70:ILE:HG23	1:A:493:ASP:HA	2.01	0.43
1:A:258:VAL:O	1:A:262:ILE:HG12	2.17	0.43
1:A:506:ILE:O	1:A:510:TRP:HB3	2.19	0.43
1:A:336:PHE:CE1	7:A:811:HQO:C13	2.97	0.42
1:A:163:GLY:O	1:A:167:VAL:HG23	2.18	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:276:GLN:HA	8:A:931:HOH:O	2.19	0.42
1:A:292:ASP:CG	1:A:295:ARG:HH11	2.27	0.42
1:A:417:GLY:C	1:A:419:GLU:H	2.26	0.42
1:A:691:TRP:HE3	1:A:695:ILE:HD11	1.81	0.42
1:A:54:GLU:HA	1:A:64:MET:O	2.20	0.42
1:A:62:VAL:C	1:A:63:LEU:HD13	2.45	0.42
1:A:236:TRP:CG	1:A:237:PRO:HA	2.54	0.42
1:A:71:GLY:HA3	1:A:209:GLN:OE1	2.20	0.42
6:A:809:LOP:O3	6:A:809:LOP:C4	2.67	0.42
1:A:139:ILE:CD1	1:A:241:ASP:O	2.68	0.42
1:A:762:LYS:O	1:A:762:LYS:HG3	2.19	0.42
1:A:400:LEU:HG	1:A:440:ILE:HG13	2.01	0.42
6:A:810:LOP:O7	6:A:810:LOP:C9	2.65	0.42
1:A:84:TYR:OH	1:A:181:TRP:O	2.38	0.42
1:A:378:VAL:CB	1:A:456:VAL:HG22	2.50	0.42
1:A:431:ILE:O	1:A:431:ILE:HG22	2.20	0.42
1:A:539:VAL:HG22	8:A:984:HOH:O	2.20	0.42
1:A:630:GLY:C	2:A:802:HEM:HBC2	2.45	0.42
1:A:73:GLN:HA	1:A:213:PHE:CD2	2.55	0.41
1:A:442:VAL:HG23	1:A:443:VAL:N	2.35	0.41
1:A:113:TYR:HB2	1:A:162:TYR:HD2	1.82	0.41
1:A:328:HIS:ND1	7:A:811:HQO:O4	2.41	0.41
1:A:475:TYR:O	1:A:478:ILE:HG23	2.21	0.41
1:A:645:GLN:O	1:A:649:PRO:HD3	2.21	0.41
1:A:646:PHE:HA	1:A:649:PRO:HD2	2.03	0.41
1:A:71:GLY:O	1:A:75:VAL:HG13	2.20	0.41
1:A:239:TYR:CZ	1:A:241:ASP:HB2	2.55	0.41
1:A:635:LEU:HB2	8:A:901:HOH:O	2.21	0.41
1:A:751:ILE:O	1:A:754:VAL:HG22	2.21	0.41
1:A:318:VAL:HG23	1:A:319:GLN:N	2.36	0.41
1:A:340:ASN:O	1:A:341:TRP:C	2.63	0.41
1:A:498:MET:O	1:A:501:PHE:HB3	2.21	0.41
1:A:596:TYR:CE1	6:A:810:LOP:H71	2.55	0.41
1:A:86:THR:HG22	1:A:91:GLY:C	2.46	0.41
1:A:175:PHE:CD1	1:A:187:LEU:HD11	2.45	0.41
1:A:56:ARG:HD3	1:A:62:VAL:HG12	2.02	0.41
1:A:57:SER:OG	1:A:58:GLU:N	2.54	0.41
1:A:134:ILE:O	1:A:137:GLN:HB2	2.20	0.41
1:A:193:MET:CE	1:A:201:VAL:CG1	2.99	0.41
1:A:663:PHE:HB3	8:A:922:HOH:O	2.20	0.41
1:A:84:TYR:CE2	1:A:95:GLY:HA3	2.57	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:204:SER:O	1:A:205:ASP:C	2.64	0.40
1:A:326:LEU:HD11	1:A:352:LYS:HA	2.04	0.40
1:A:361:PHE:O	1:A:365:THR:HB	2.20	0.40
1:A:759:PHE:CD1	1:A:759:PHE:C	2.98	0.40
1:A:691:TRP:CD2	6:A:810:LOP:H282	2.57	0.40
1:A:139:ILE:HD11	1:A:241:ASP:C	2.47	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:294:ARG:NH2	1:A:334:ASP:OD1[8_455]	2.03	0.17

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	750/800 (94%)	690 (92%)	52 (7%)	8 (1%)	11	29

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	152	ASP
1	A	199	ALA
1	A	204	SER
1	A	157	THR
1	A	194	PRO
1	A	603	GLY
1	A	339	ILE
1	A	96	PRO

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	631/675 (94%)	541 (86%)	90 (14%)	3 8

All (90) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	26	LEU
1	A	37	LEU
1	A	51	ARG
1	A	53	LYS
1	A	55	VAL
1	A	63	LEU
1	A	68	THR
1	A	75	VAL
1	A	81	LEU
1	A	87	VAL
1	A	96	PRO
1	A	103	LEU
1	A	105	VAL
1	A	126	LEU
1	A	131	LYS
1	A	134	ILE
1	A	144	LYS
1	A	151	THR
1	A	153	VAL
1	A	154	LEU
1	A	156	LEU
1	A	164	LEU
1	A	166	LYS
1	A	187	LEU
1	A	198	ARG
1	A	201	VAL
1	A	207	ILE
1	A	210	ILE
1	A	220	LEU
1	A	224	LEU

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Mol	Chain	Res	Type
1	A	231	THR
1	A	251	VAL
1	A	287	LYS
1	A	293	LEU
1	A	298	LEU
1	A	304	LYS
1	A	312	VAL
1	A	345	ILE
1	A	357	GLN
1	A	382	GLU
1	A	392	LEU
1	A	393	LEU
1	A	397	LEU
1	A	400	LEU
1	A	416	LEU
1	A	433	LEU
1	A	436	ILE
1	A	440	ILE
1	A	441	LEU
1	A	446	LEU
1	A	447	LEU
1	A	469	LEU
1	A	478	ILE
1	A	483	PHE
1	A	512	GLU
1	A	516	GLU
1	A	521	VAL
1	A	527	LEU
1	A	530	LEU
1	A	539	VAL
1	A	545	GLN
1	A	550	LEU
1	A	571	ILE
1	A	587	LEU
1	A	588	LEU
1	A	589	ILE
1	A	590	LEU
1	A	591	GLU
1	A	615	LEU
1	A	622	ASN
1	A	628	VAL
1	A	635	LEU

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Mol	Chain	Res	Type
1	A	656	MET
1	A	667	VAL
1	A	672	LEU
1	A	673	ARG
1	A	679	GLU
1	A	685	TRP
1	A	706	LEU
1	A	711	LEU
1	A	734	VAL
1	A	738	LEU
1	A	739	LEU
1	A	740	LEU
1	A	750	LEU
1	A	753	VAL
1	A	756	LEU
1	A	757	LEU
1	A	774	GLU
1	A	777	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	73	GLN
1	A	77	GLN
1	A	148	ASN
1	A	208	GLN
1	A	296	GLN
1	A	340	ASN
1	A	381	GLN
1	A	426	GLN
1	A	471	HIS
1	A	529	GLN
1	A	560	HIS
1	A	595	GLN
1	A	622	ASN
1	A	682	ASN
1	A	731	GLN

5.3.3 RNA ⓘ

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](#)

Of 10 ligands modelled in this entry, 2 are monoatomic - leaving 8 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
6	LOP	A	810	-	44,44,44	0.71	1 (2%)	47,49,49	1.15	3 (6%)
5	BOG	A	806	-	20,20,20	1.54	3 (15%)	25,25,25	0.78	0
5	BOG	A	805	-	20,20,20	1.40	3 (15%)	25,25,25	0.74	0
6	LOP	A	809	-	44,44,44	0.71	0	47,49,49	1.16	3 (6%)
2	HEM	A	801	4,1	50,50,50	1.77	11 (22%)	67,82,82	1.11	5 (7%)
7	HQO	A	811	-	19,20,20	1.03	2 (10%)	20,26,26	1.08	1 (5%)
5	BOG	A	807	-	20,20,20	1.34	3 (15%)	25,25,25	0.83	1 (4%)
2	HEM	A	802	4,8,1	50,50,50	1.68	7 (14%)	67,82,82	1.06	4 (5%)

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
6	LOP	A	810	-	-	12/48/48/48	-
5	BOG	A	806	-	-	0/11/31/31	0/1/1/1
5	BOG	A	805	-	-	0/11/31/31	0/1/1/1
6	LOP	A	809	-	-	9/48/48/48	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	HEM	A	801	4,1	-	9/14/54/54	-
7	HQO	A	811	-	-	3/7/7/7	0/2/2/2
5	BOG	A	807	-	-	0/11/31/31	0/1/1/1
2	HEM	A	802	4,8,1	-	6/14/54/54	-

All (30) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	802	HEM	FE-NC	5.84	2.14	1.95
2	A	801	HEM	FE-NC	5.55	2.13	1.95
2	A	801	HEM	FE-NB	4.31	2.08	1.94
2	A	801	HEM	FE-NA	4.21	2.09	1.95
5	A	805	BOG	C5'-C4'	-3.88	1.32	1.51
5	A	806	BOG	C5'-C4'	-3.86	1.32	1.51
5	A	806	BOG	O1-C1	3.84	1.46	1.40
5	A	807	BOG	C5'-C4'	-3.81	1.32	1.51
2	A	802	HEM	FE-NA	3.51	2.06	1.95
5	A	807	BOG	O1-C1	3.22	1.45	1.40
5	A	805	BOG	O1-C1	2.92	1.45	1.40
2	A	802	HEM	CBB-CAB	2.61	1.42	1.30
2	A	801	HEM	CBB-CAB	2.60	1.42	1.30
2	A	802	HEM	CAC-C3C	-2.54	1.40	1.47
5	A	806	BOG	O5-C1	2.41	1.48	1.41
2	A	802	HEM	CHD-C1D	2.34	1.44	1.39
2	A	801	HEM	CMB-C2B	2.30	1.55	1.50
2	A	801	HEM	C1A-C2A	2.28	1.49	1.44
7	A	811	HQO	C10-C5	-2.17	1.39	1.42
2	A	802	HEM	CHD-C4C	2.17	1.42	1.38
5	A	807	BOG	O5-C1	2.15	1.47	1.41
2	A	802	HEM	CBD-CGD	2.15	1.55	1.50
7	A	811	HQO	C3-N1	2.13	1.40	1.36
5	A	805	BOG	O5-C1	2.13	1.47	1.41
2	A	801	HEM	CAC-C3C	-2.13	1.41	1.47
2	A	801	HEM	O2A-CGA	-2.10	1.23	1.30
2	A	801	HEM	CHD-C1D	2.09	1.44	1.39
2	A	801	HEM	CHD-C4C	2.08	1.42	1.38
2	A	801	HEM	C3C-C4C	2.05	1.49	1.46
6	A	810	LOP	C16-C15	-2.01	1.39	1.50

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	809	LOP	O5-C6-C7	4.19	120.54	111.48
6	A	810	LOP	O5-C6-C7	4.02	120.18	111.48
6	A	809	LOP	C4-O5-C6	-3.90	108.45	117.80
6	A	810	LOP	C4-O5-C6	-3.83	108.64	117.80
2	A	801	HEM	CBA-CAA-C2A	3.31	121.69	112.53
2	A	801	HEM	CAA-C2A-C1A	3.01	130.81	124.94
2	A	802	HEM	CBD-CAD-C3D	2.95	120.70	112.53
2	A	801	HEM	C3B-C4B-NB	2.94	111.58	109.47
2	A	802	HEM	C3B-C4B-NB	2.75	111.44	109.47
2	A	802	HEM	C4B-C3B-C2B	-2.71	104.78	107.28
2	A	801	HEM	C4B-C3B-C2B	-2.57	104.92	107.28
2	A	802	HEM	CAD-C3D-C4D	2.47	129.00	124.70
6	A	810	LOP	O6-C24-C25	2.45	119.30	111.83
6	A	809	LOP	O6-C24-C25	2.36	119.02	111.83
7	A	811	HQO	C1-C2-C3	2.12	120.05	118.45
2	A	801	HEM	C4C-C3C-C2C	-2.06	105.03	106.81
5	A	807	BOG	C6-C5-C4	-2.01	108.09	113.02

There are no chirality outliers.

All (39) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	801	HEM	C2C-C3C-CAC-CBC
2	A	802	HEM	C2C-C3C-CAC-CBC
2	A	802	HEM	C4C-C3C-CAC-CBC
6	A	809	LOP	C1-C2-O1-P1
6	A	809	LOP	C2-O1-P1-O2
6	A	809	LOP	C2-O1-P1-O4
6	A	809	LOP	C4-C3-O2-P1
6	A	810	LOP	N1-C1-C2-O1
6	A	810	LOP	C3-O2-P1-O3
2	A	801	HEM	C1A-C2A-CAA-CBA
6	A	810	LOP	C4-C3-O2-P1
2	A	801	HEM	C3A-C2A-CAA-CBA
7	A	811	HQO	C3-C11-C13-C12
6	A	809	LOP	C24-C25-C26-C27
7	A	811	HQO	C14-C12-C13-C11
7	A	811	HQO	C12-C14-C15-C16
2	A	801	HEM	C4C-C3C-CAC-CBC
6	A	810	LOP	C29-C30-C31-C32
6	A	810	LOP	O2-C3-C4-O5
6	A	810	LOP	O2-C3-C4-C5
6	A	810	LOP	C26-C27-C28-C29

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Mol	Chain	Res	Type	Atoms
6	A	809	LOP	C2-O1-P1-O3
6	A	809	LOP	C3-O2-P1-O4
6	A	810	LOP	C3-O2-P1-O1
6	A	810	LOP	C3-O2-P1-O4
6	A	810	LOP	C15-C16-C17-C18
2	A	801	HEM	C3D-CAD-CBD-CGD
6	A	809	LOP	C26-C27-C28-C29
2	A	802	HEM	CAA-CBA-CGA-O2A
2	A	802	HEM	CAA-CBA-CGA-O1A
2	A	801	HEM	CAD-CBD-CGD-O2D
2	A	802	HEM	CAD-CBD-CGD-O2D
2	A	801	HEM	CAA-CBA-CGA-O2A
2	A	801	HEM	CAD-CBD-CGD-O1D
2	A	802	HEM	CAD-CBD-CGD-O1D
6	A	809	LOP	C12-C13-C14-C15
2	A	801	HEM	CAA-CBA-CGA-O1A
6	A	810	LOP	C14-C15-C16-C17
6	A	810	LOP	C9-C10-C11-C12

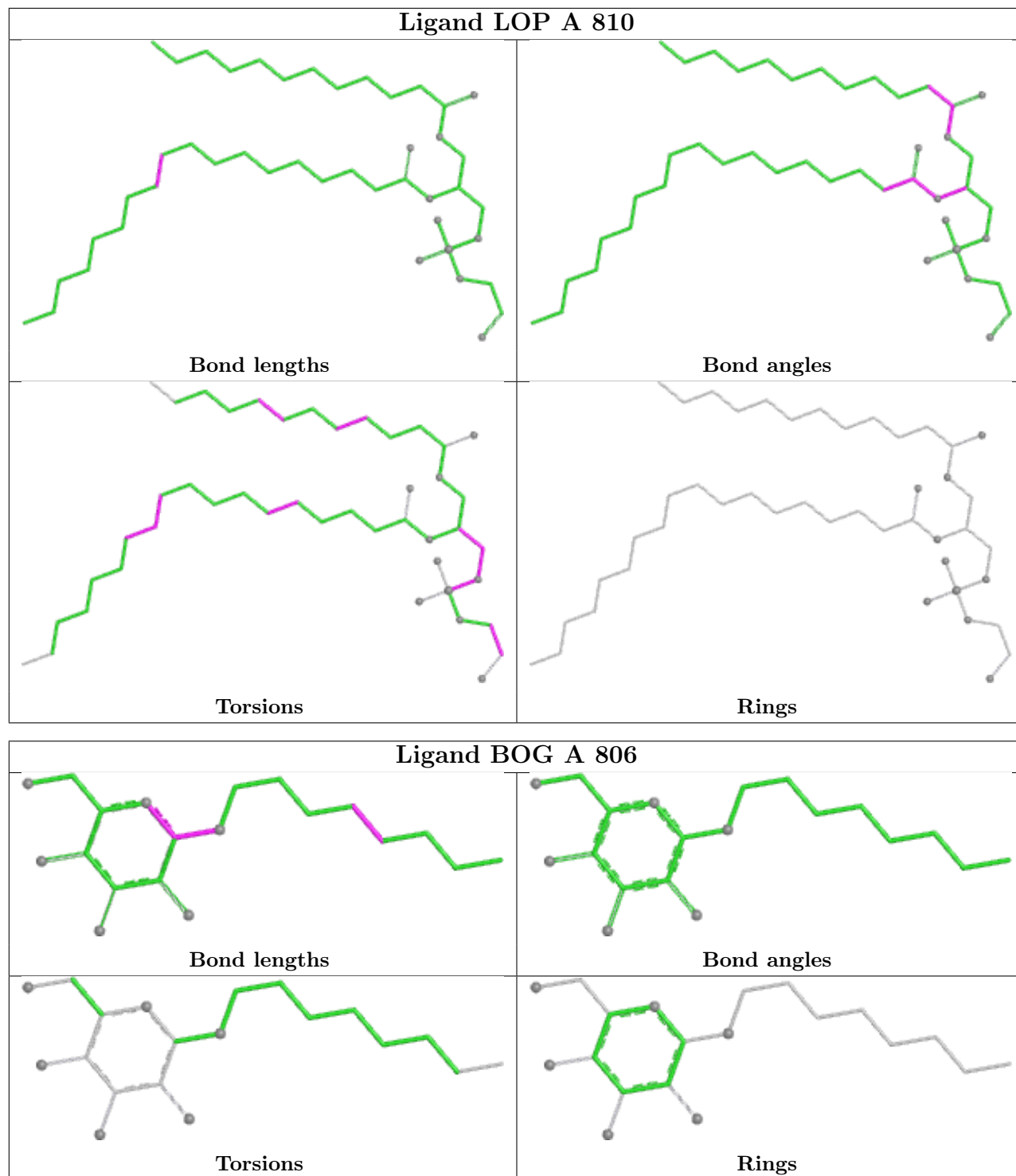
There are no ring outliers.

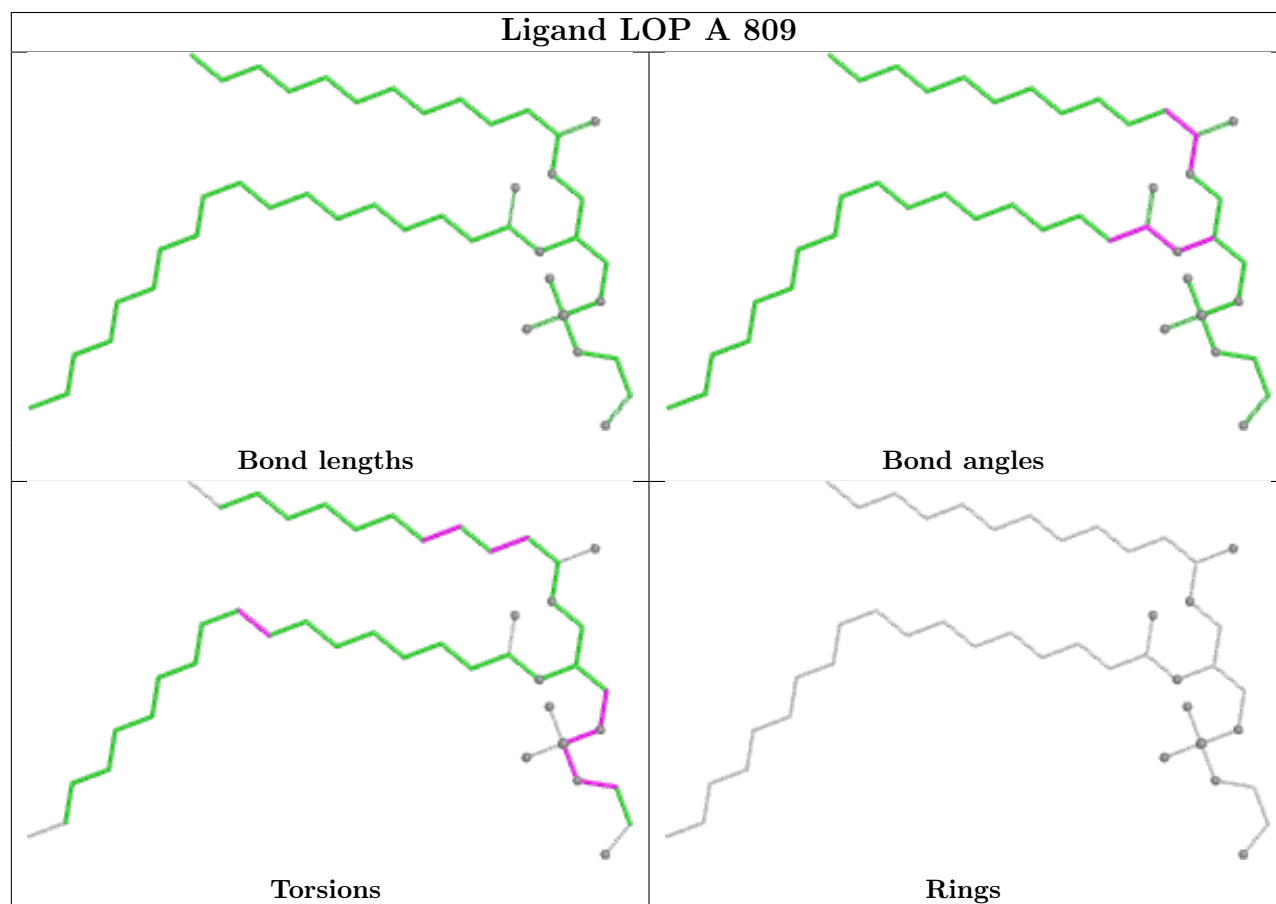
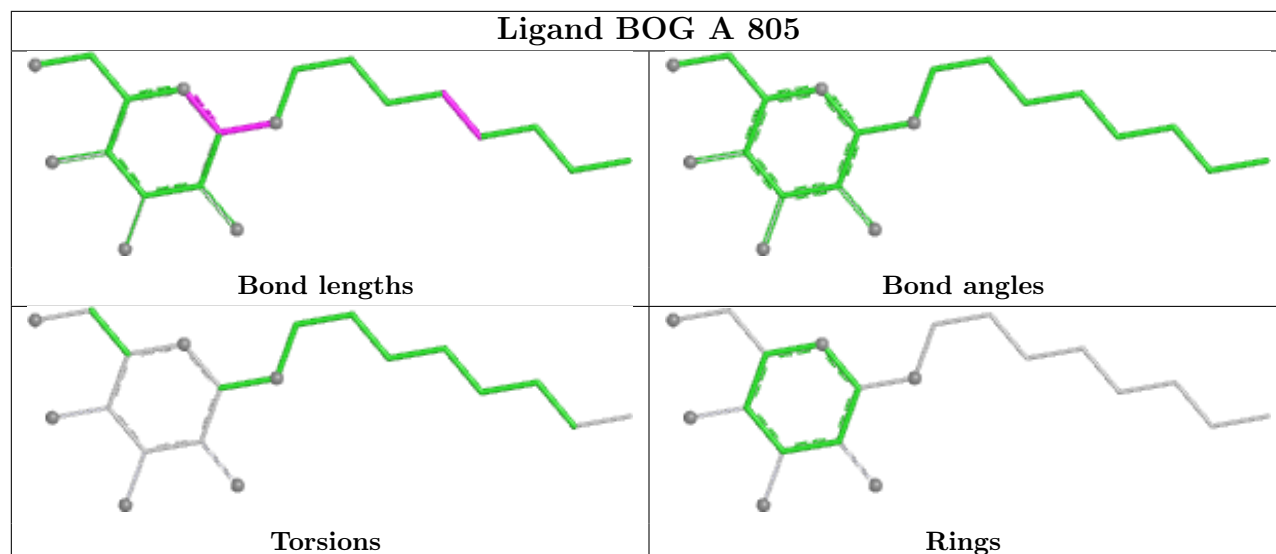
7 monomers are involved in 49 short contacts:

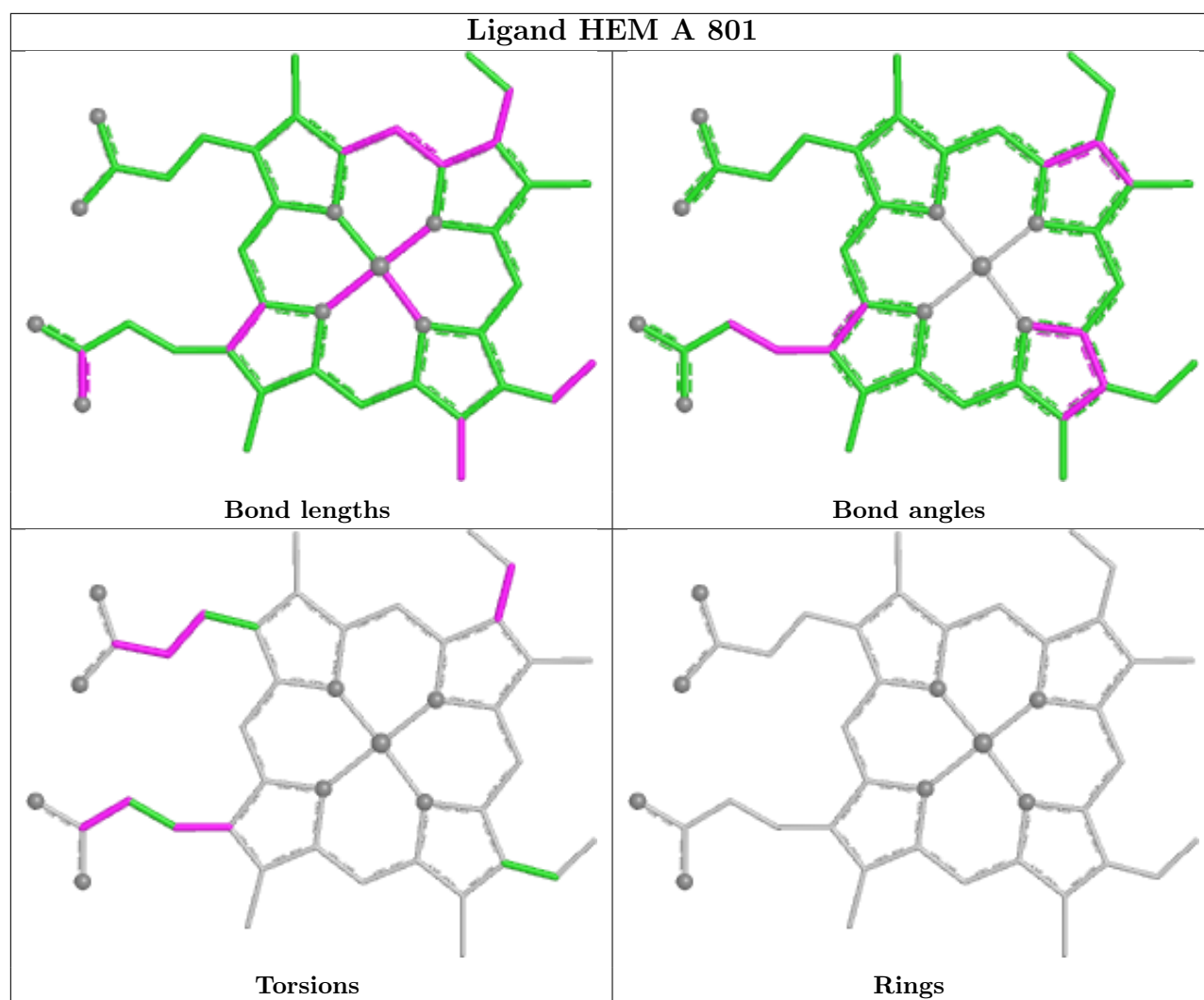
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	810	LOP	20	0
5	A	806	BOG	1	0
6	A	809	LOP	12	0
2	A	801	HEM	3	0
7	A	811	HQO	9	0
5	A	807	BOG	2	0
2	A	802	HEM	2	0

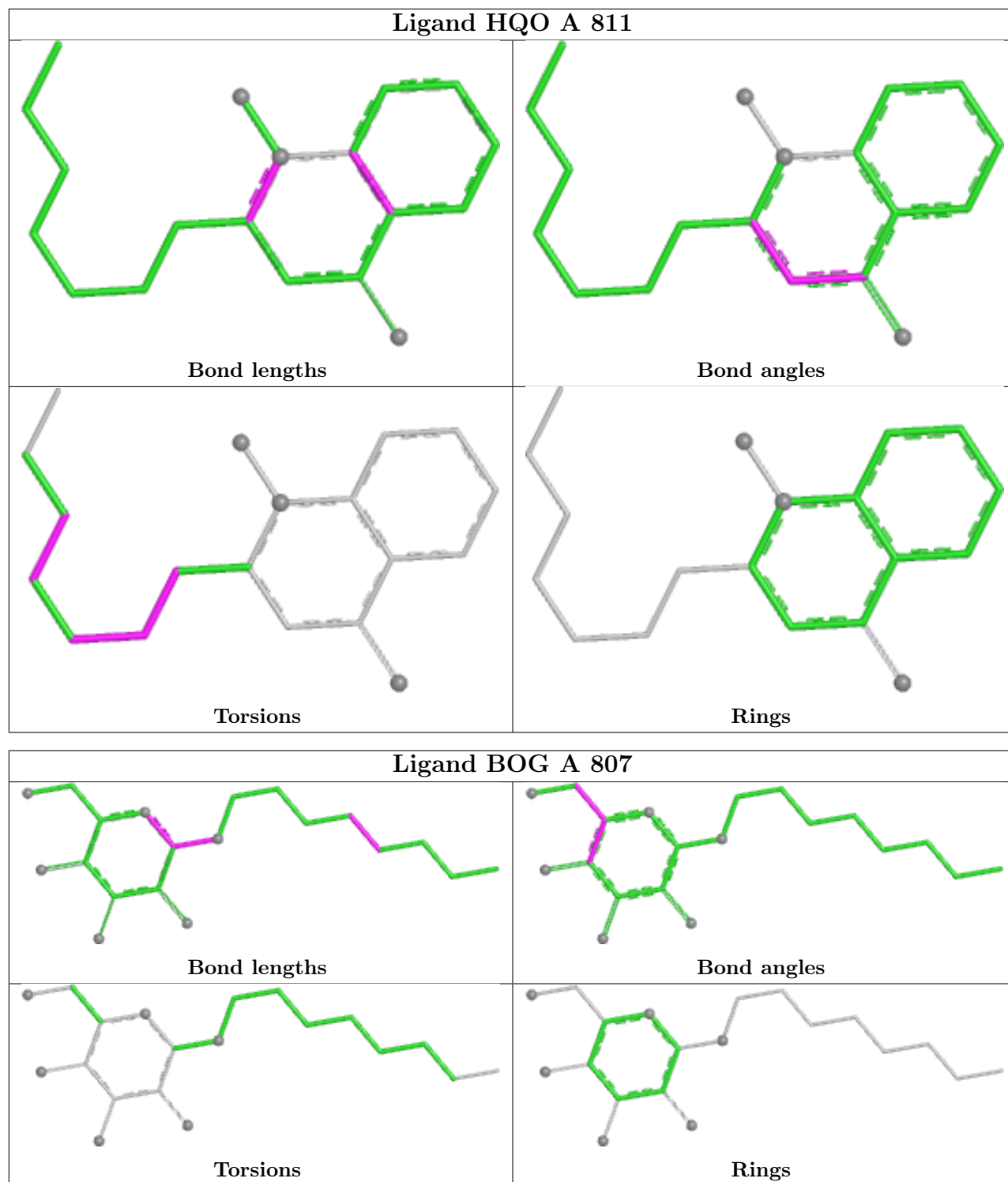
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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

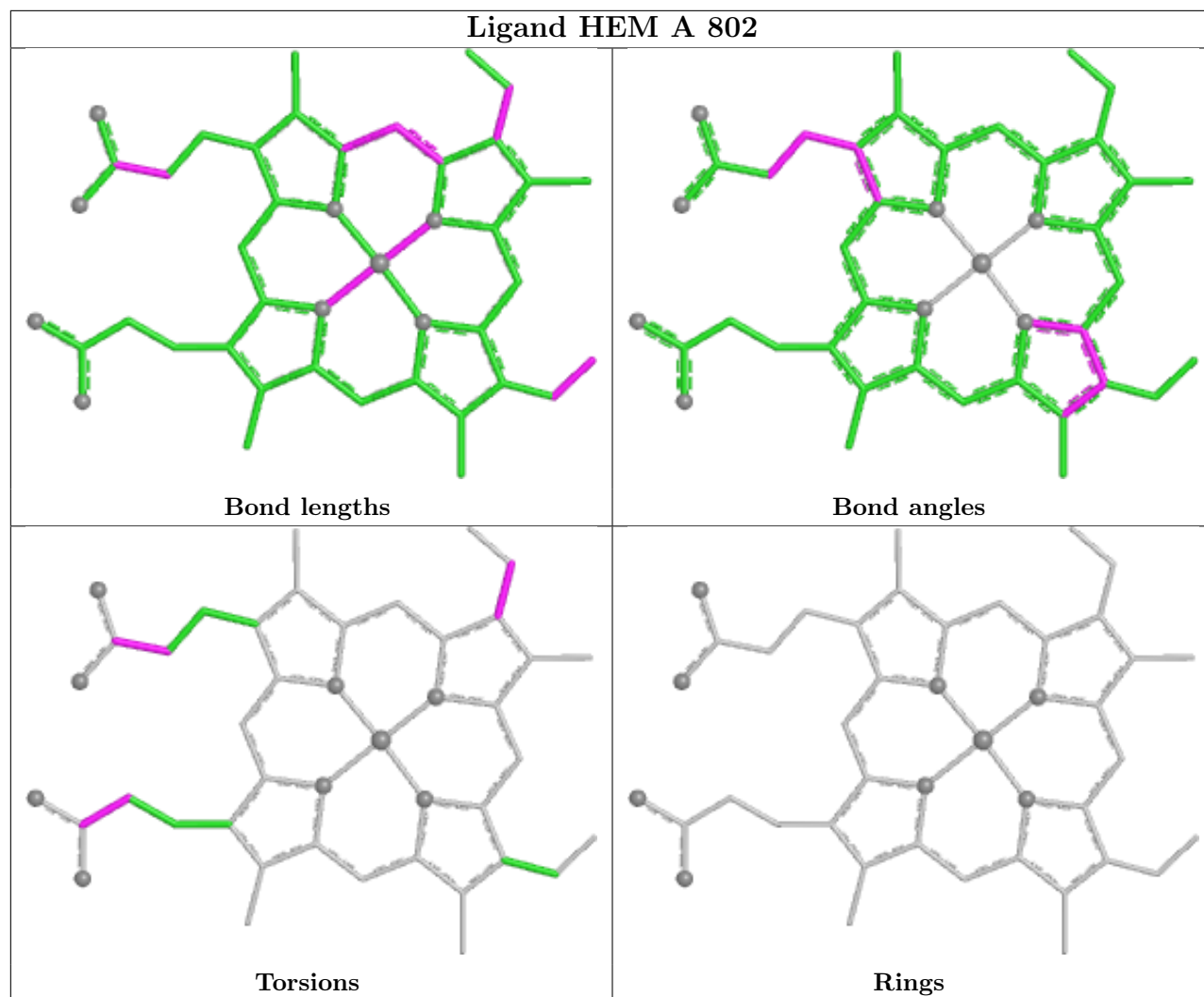
equivalents in the CSD to analyse the geometry.











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, 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	A	754/800 (94%)	0.55	54 (7%) 21 18	39, 67, 96, 108	0

All (54) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	515	PHE	6.4
1	A	79	TYR	6.0
1	A	458	ARG	5.5
1	A	513	GLY	4.7
1	A	199	ALA	4.5
1	A	124	ALA	4.3
1	A	53	LYS	3.9
1	A	125	ASP	3.8
1	A	196	ALA	3.8
1	A	600	ARG	3.7
1	A	777	GLU	3.5
1	A	330	TYR	3.4
1	A	589	ILE	3.3
1	A	187	LEU	3.1
1	A	590	LEU	2.9
1	A	113	TYR	2.9
1	A	341	TRP	2.9
1	A	197	ASN	2.8
1	A	154	LEU	2.8
1	A	512	GLU	2.8
1	A	303	VAL	2.8
1	A	211	ALA	2.7
1	A	461	LYS	2.7
1	A	206	GLN	2.7
1	A	339	ILE	2.7
1	A	151	THR	2.7
1	A	514	ILE	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	685	TRP	2.6
1	A	273	TYR	2.5
1	A	112	ASP	2.4
1	A	511	VAL	2.4
1	A	18	THR	2.4
1	A	200	TRP	2.4
1	A	207	ILE	2.4
1	A	396	ALA	2.4
1	A	462	ARG	2.3
1	A	417	GLY	2.3
1	A	381	GLN	2.3
1	A	115	ALA	2.2
1	A	21	PHE	2.2
1	A	126	LEU	2.2
1	A	116	LYS	2.2
1	A	185	LYS	2.1
1	A	479	ALA	2.1
1	A	646	PHE	2.1
1	A	776	GLU	2.1
1	A	106	TYR	2.1
1	A	188	ILE	2.1
1	A	210	ILE	2.1
1	A	491	GLN	2.0
1	A	308	TYR	2.0
1	A	602	GLY	2.0
1	A	62	VAL	2.0
1	A	75	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 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,

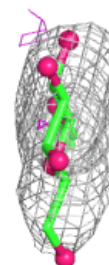
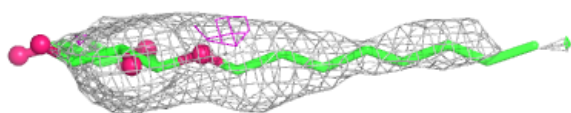
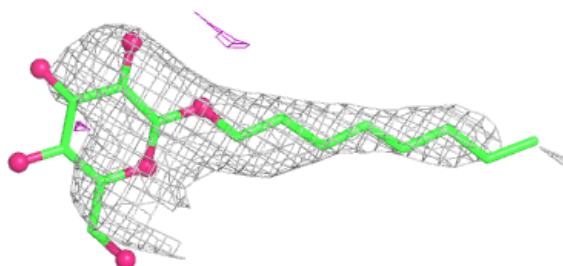
median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	BOG	A	805	20/20	0.79	0.20	94,107,112,113	0
6	LOP	A	809	45/45	0.81	0.27	94,104,125,126	0
6	LOP	A	810	45/45	0.81	0.20	64,80,113,114	0
5	BOG	A	806	20/20	0.83	0.19	94,106,109,110	0
5	BOG	A	807	20/20	0.86	0.18	95,107,110,110	0
7	HQO	A	811	19/19	0.90	0.15	67,71,85,86	0
2	HEM	A	801	43/43	0.97	0.10	45,52,58,60	0
2	HEM	A	802	43/43	0.97	0.09	33,41,54,59	0
4	CA	A	804	1/1	0.98	0.06	49,49,49,49	0
3	ZN	A	803	1/1	1.00	0.02	65,65,65,65	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.

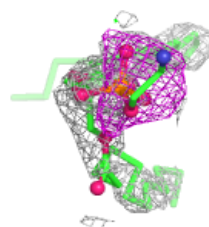
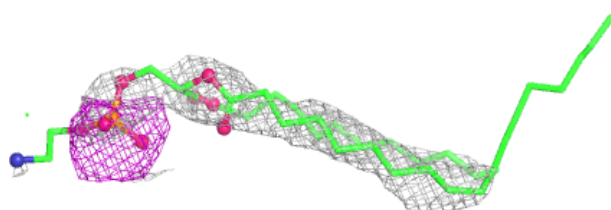
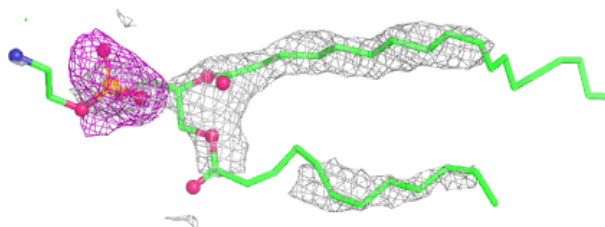
Electron density around BOG A 805:

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

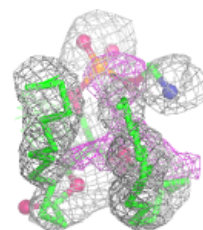
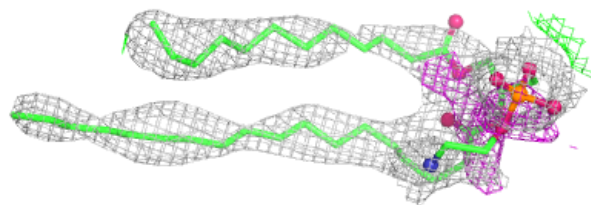
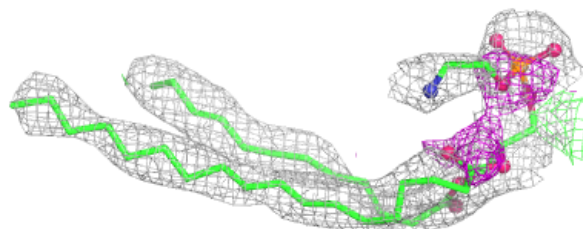


Electron density around LOP A 809:

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

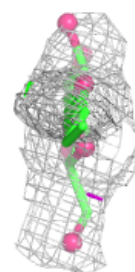
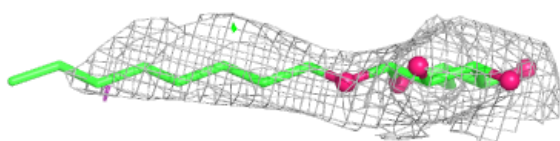
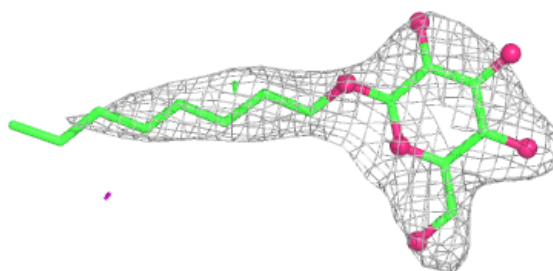
**Electron density around LOP A 810:**

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

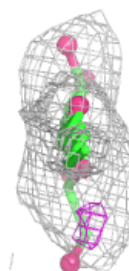
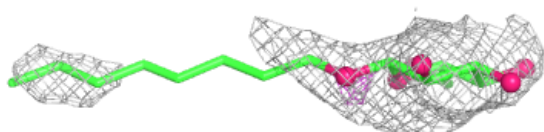
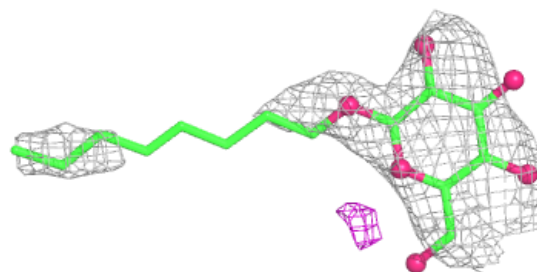


Electron density around BOG A 806:

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

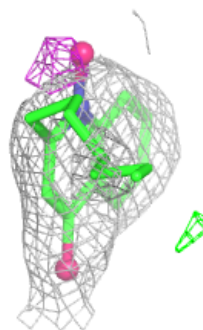
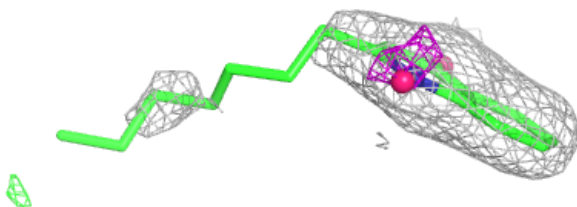
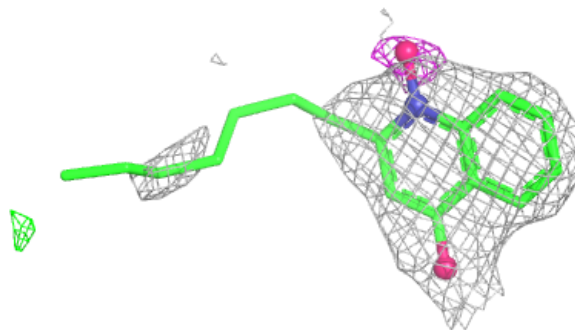
**Electron density around BOG A 807:**

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



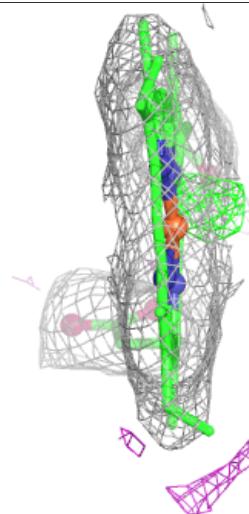
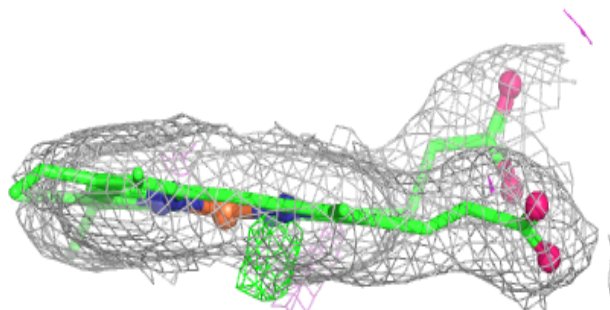
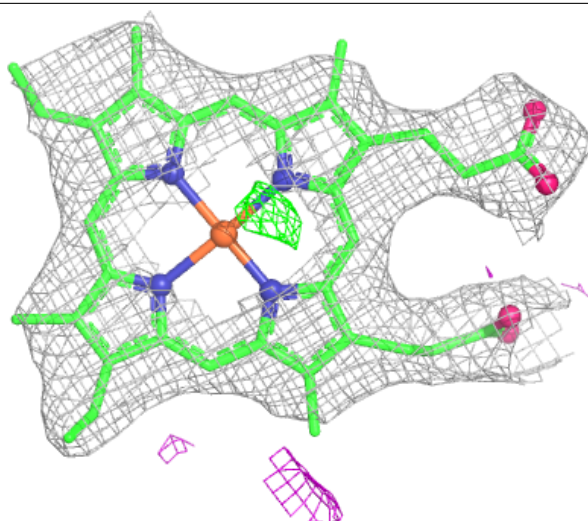
Electron density around HQO A 811:

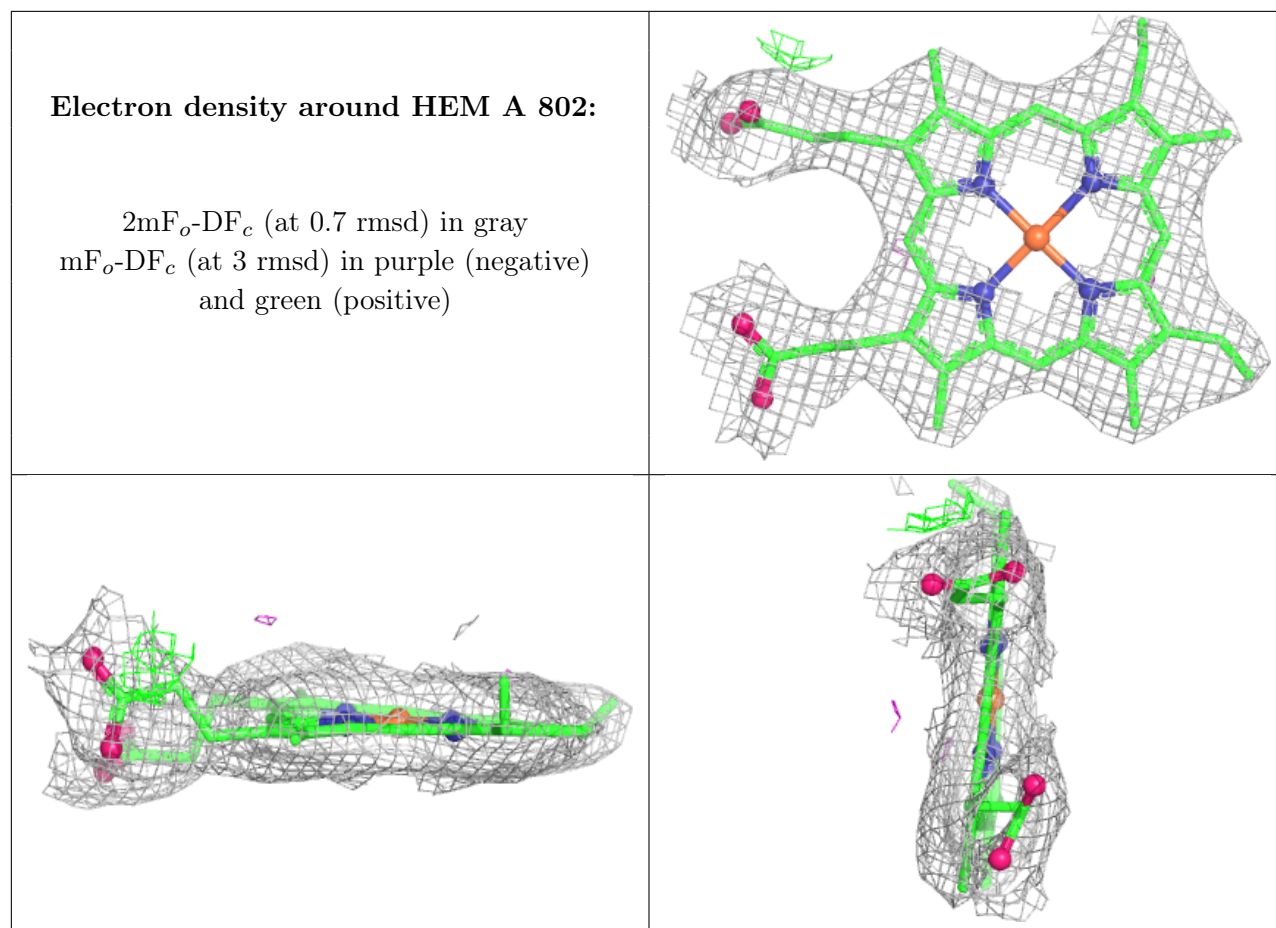
$2mF_o - DF_c$ (at 0.7 rmsd) in gray
 $mF_o - DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around HEM A 801:

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





6.5 Other polymers ⓘ

There are no such residues in this entry.