Full wwPDB X-ray Structure Validation Report ⓘ

Sep 14, 2023 – 06:43 AM EDT

PDB ID	:	4S21
Title	:	Crystal structure of the photosensory core module of bacteriophytochrome RPA3015 from R. palustris
Authors	:	Yang, X.; Stojkovi, E.A.; Ozarowski, W.B.; Moffat, K.
Deposited on	:	2015-01-17
Resolution	:	3.25 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:

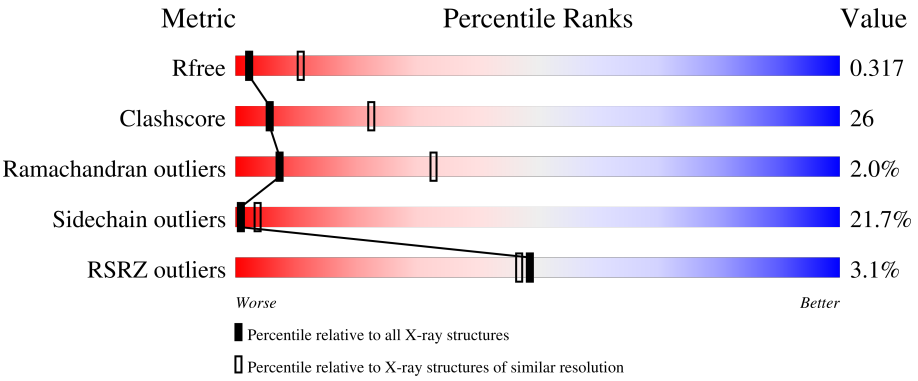
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

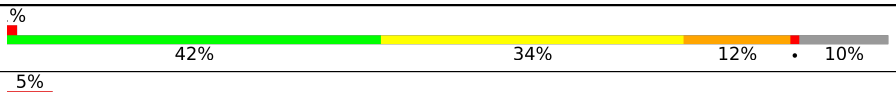
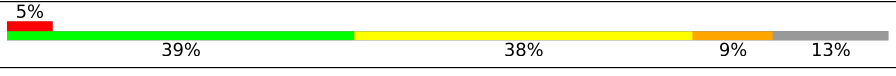
The reported resolution of this entry is 3.25 Å.

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	1191 (3.30-3.22)
Clashscore	141614	1251 (3.30-3.22)
Ramachandran outliers	138981	1229 (3.30-3.22)
Sidechain outliers	138945	1228 (3.30-3.22)
RSRZ outliers	127900	1154 (3.30-3.22)

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 <=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	525	
1	B	525	

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 7251 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 Bacteriophytochrome (Light-regulated signal transduction histidine kinase), PhyB1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	473	Total	C	N	O	S	0	0	0
			3639	2295	659	671	14			
1	B	455	Total	C	N	O	S	0	0	0
			3525	2221	638	651	15			

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	expression tag	UNP Q6N5G3
A	-18	GLY	-	expression tag	UNP Q6N5G3
A	-17	SER	-	expression tag	UNP Q6N5G3
A	-16	SER	-	expression tag	UNP Q6N5G3
A	-15	HIS	-	expression tag	UNP Q6N5G3
A	-14	HIS	-	expression tag	UNP Q6N5G3
A	-13	HIS	-	expression tag	UNP Q6N5G3
A	-12	HIS	-	expression tag	UNP Q6N5G3
A	-11	HIS	-	expression tag	UNP Q6N5G3
A	-10	HIS	-	expression tag	UNP Q6N5G3
A	-9	SER	-	expression tag	UNP Q6N5G3
A	-8	SER	-	expression tag	UNP Q6N5G3
A	-7	GLY	-	expression tag	UNP Q6N5G3
A	-6	LEU	-	expression tag	UNP Q6N5G3
A	-5	VAL	-	expression tag	UNP Q6N5G3
A	-4	PRO	-	expression tag	UNP Q6N5G3
A	-3	ARG	-	expression tag	UNP Q6N5G3
A	-2	GLY	-	expression tag	UNP Q6N5G3
A	-1	SER	-	expression tag	UNP Q6N5G3
A	0	HIS	-	expression tag	UNP Q6N5G3
B	-19	MET	-	expression tag	UNP Q6N5G3
B	-18	GLY	-	expression tag	UNP Q6N5G3
B	-17	SER	-	expression tag	UNP Q6N5G3
B	-16	SER	-	expression tag	UNP Q6N5G3

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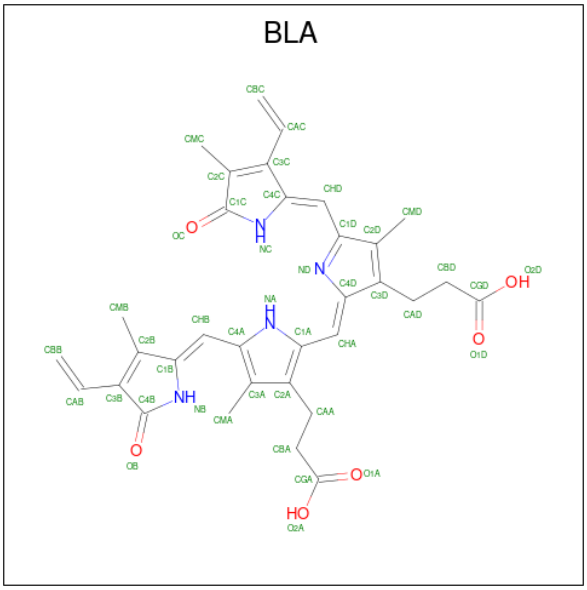
Chain	Residue	Modelled	Actual	Comment	Reference
B	-15	HIS	-	expression tag	UNP Q6N5G3
B	-14	HIS	-	expression tag	UNP Q6N5G3
B	-13	HIS	-	expression tag	UNP Q6N5G3
B	-12	HIS	-	expression tag	UNP Q6N5G3
B	-11	HIS	-	expression tag	UNP Q6N5G3
B	-10	HIS	-	expression tag	UNP Q6N5G3
B	-9	SER	-	expression tag	UNP Q6N5G3
B	-8	SER	-	expression tag	UNP Q6N5G3
B	-7	GLY	-	expression tag	UNP Q6N5G3
B	-6	LEU	-	expression tag	UNP Q6N5G3
B	-5	VAL	-	expression tag	UNP Q6N5G3
B	-4	PRO	-	expression tag	UNP Q6N5G3
B	-3	ARG	-	expression tag	UNP Q6N5G3
B	-2	GLY	-	expression tag	UNP Q6N5G3
B	-1	SER	-	expression tag	UNP Q6N5G3
B	0	HIS	-	expression tag	UNP Q6N5G3

- Molecule 2 is BILIVERDINE IX ALPHA (three-letter code: BLA) (formula: $C_{33}H_{34}N_4O_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			43	33	4	6		
2	B	1	Total	C	N	O	0	0
			43	33	4	6		

- Molecule 3 is water.

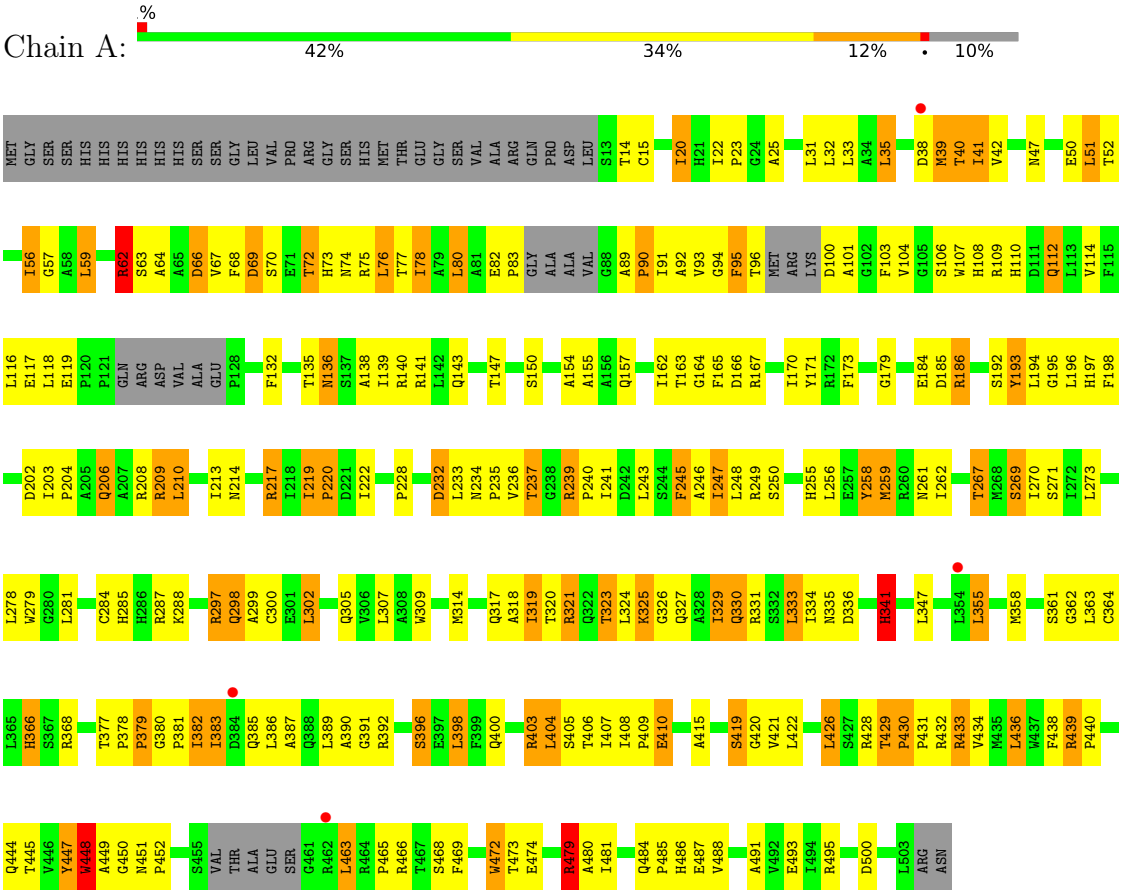
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O 1 1	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

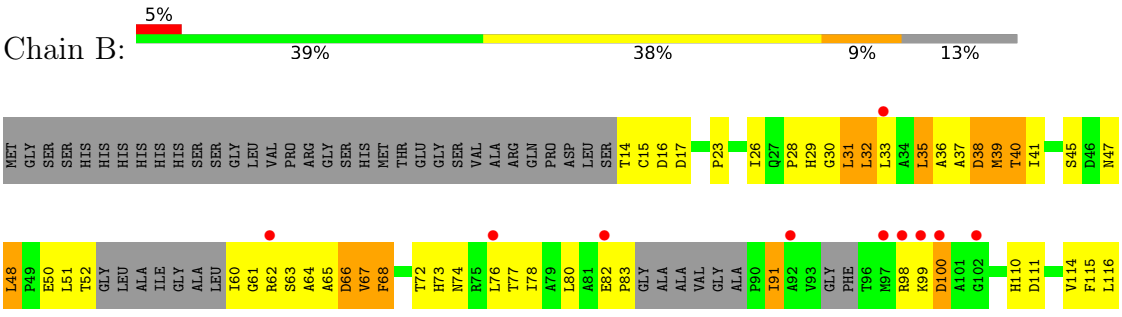
• Molecule 1: Bacteriophytochrome (Light-regulated signal transduction histidine kinase), PhyB1

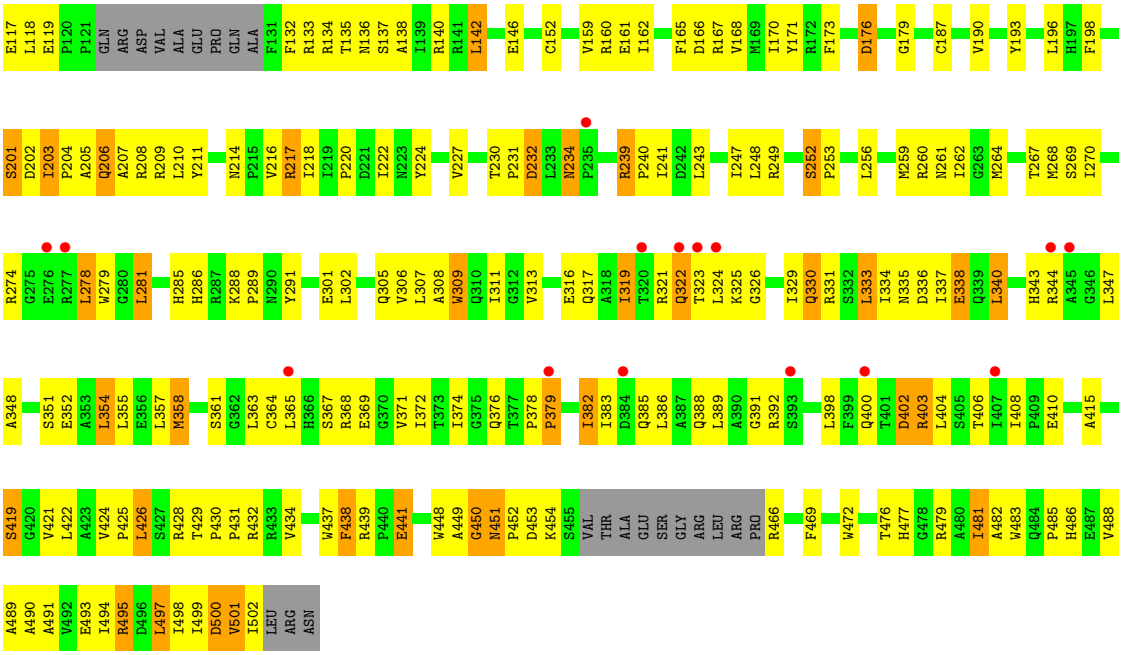
Chain A:



• Molecule 1: Bacteriophytochrome (Light-regulated signal transduction histidine kinase), PhyB1

Chain B:




E117 L118 E119 P120 P121 GLN ARG ASP VAL ALA GLU PRO GLN ALA F131 F132 R133 R134 T135 N136 S137 A138 I139 R140 R141 L142 E146 C152 V159 R160 E161 I162 F165 D166 R167 V168 M169 I170 Y171 R172 F173 D176 G179 C187 V190 Y193 L196 H197 F198
S201 D202 I203 P204 A205 Q206 A207 R208 R209 L210 Y211 N214 P215 V216 R217 I218 I219 P220 D221 I222 N223 Y224 V227 T230 P231 D232 L233 N234 P235 R239 P240 I241 D242 L243 I247 L248 R249 S252 P253 L256 M259 R260 N261 I262 G263 M264 T267 M268 S269 I270
R274 G275 E276 R277 L278 W279 G280 L281 H285 H286 R287 K288 P289 N290 Y291 E301 L302 Q305 V306 L307 A308 W309 Q310 I311 G312 V313 E316 Q317 A318 I319 T320 R321 Q322 T323 L324 K325 G326 I329 Q330 R331 S332 L333 I334 N335 D336 I337 E338 Q339 L340 H343 R344 A345 G346 L347
A348 S351 E352 A353 L354 L355 E356 L357 M358 S361 G362 L363 C364 L365 H366 S367 R368 E369 G370 V371 I372 T373 I374 G375 Q376 T377 P378 P379 I382 I383 D384 Q385 L386 A387 Q388 L389 A390 G391 R392 S393 L398 F399 Q400 T401 D402 R403 L404 S405 T406 I407 I408 P409 E410 A415
S419 G420 V421 L422 A423 V424 P425 L426 S427 R428 T429 P430 P431 R432 R433 V434 W437 F438 R439 P440 E441 W448 A449 G450 N451 P452 D453 K454 S455 VAL THR ALA GLU SER GLY ARG LEU ARG PRO R466 F469 W472 T476 H477 G478 R479 A480 I481 A482 W483 Q484 P485 H486 E487 V488
A489 A490 A491 V492 E493 I494 R495 D496 L497 I498 I499 D500 V501 I502 LEU ARG ASN

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 61	Depositor
Cell constants a, b, c, α, β, γ	175.36Å 175.36Å 96.19Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	39.89 – 3.25 42.17 – 3.05	Depositor EDS
% Data completeness (in resolution range)	94.4 (39.89-3.25) 61.9 (42.17-3.05)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.34 (at 3.06Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8_1069)	Depositor
R, R_{free}	0.262 , 0.316 0.270 , 0.317	Depositor DCC
R_{free} test set	997 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å^2)	108.3	Xtriage
Anisotropy	0.041	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.27 , 91.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.42$, $< L^2 > = 0.25$	Xtriage
Estimated twinning fraction	0.107 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.90	EDS
Total number of atoms	7251	wwPDB-VP
Average B, all atoms (Å^2)	158.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.40% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: BLA

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	0.34	0/3716	0.64	4/5057 (0.1%)
1	B	0.32	0/3598	0.69	1/4893 (0.0%)
All	All	0.33	0/7314	0.66	5/9950 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	B	0	3
All	All	0	5

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	479	ARG	NE-CZ-NH2	6.00	123.30	120.30
1	A	89	ALA	C-N-CD	-5.66	108.14	120.60
1	A	62	ARG	NE-CZ-NH1	5.47	123.04	120.30
1	A	355	LEU	CA-CB-CG	5.36	127.63	115.30
1	B	100	ASP	CB-CG-OD1	5.01	122.81	118.30

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	341	HIS	Peptide

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Mol	Chain	Res	Type	Group
1	A	448	TRP	Peptide
1	B	38	ASP	Peptide
1	B	426	LEU	Peptide
1	B	68	PHE	Peptide

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3639	0	3625	186	0
1	B	3525	0	3507	181	0
2	A	43	0	31	10	0
2	B	43	0	31	10	0
3	A	1	0	0	1	0
All	All	7251	0	7194	370	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 26.

All (370) 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:B:322:GLN:HG3	1:B:486:HIS:HA	1.50	0.94
1:A:75:ARG:NH2	1:A:92:ALA:O	2.06	0.88
1:B:202:ASP:OD1	1:B:466:ARG:NH2	2.10	0.83
1:A:141:ARG:HH21	1:A:154:ALA:HA	1.48	0.79
2:A:900:BLA:ND	3:A:1001:HOH:O	2.16	0.79
1:B:274:ARG:NH1	1:B:308:ALA:O	2.17	0.77
1:A:20:ILE:O	1:A:249:ARG:NH1	2.15	0.77
1:A:140:ARG:HA	1:A:143:GLN:HG3	1.65	0.77
1:B:415:ALA:O	1:B:419:SER:OG	2.01	0.76
1:B:76:LEU:HG	1:B:91:ILE:HG12	1.68	0.76
1:B:331:ARG:HA	1:B:334:ILE:HD12	1.68	0.75
1:B:439:ARG:NH2	1:B:482:ALA:O	2.18	0.75
1:B:160:ARG:NH1	1:B:187:CYS:SG	2.60	0.75
1:B:261:ASN:ND2	1:B:466:ARG:O	2.20	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:70:SER:O	1:A:74:ASN:ND2	2.21	0.73
2:A:900:BLA:HMA1	2:A:900:BLA:NB	2.03	0.72
1:A:368:ARG:HD3	1:A:432:ARG:HB3	1.69	0.72
1:A:214:ASN:O	1:A:217:ARG:NH1	2.22	0.72
1:B:430:PRO:HA	1:B:432:ARG:HB2	1.71	0.72
1:A:331:ARG:O	1:A:335:ASN:ND2	2.22	0.71
1:A:109:ARG:HG2	1:A:114:VAL:HG22	1.71	0.71
1:B:449:ALA:HB1	1:B:469:PHE:HB3	1.72	0.71
1:B:319:ILE:O	1:B:322:GLN:NE2	2.22	0.71
1:A:202:ASP:HB3	2:A:900:BLA:HHB	1.73	0.71
1:A:309:TRP:CH2	1:B:309:TRP:HB3	2.27	0.70
1:B:358:MET:HE1	1:B:491:ALA:HB2	1.72	0.70
1:A:66:ASP:OD1	1:A:66:ASP:N	2.21	0.70
1:B:337:ILE:HG12	1:B:347:LEU:HA	1.73	0.70
1:B:404:LEU:HD11	1:B:421:VAL:HB	1.73	0.70
1:A:439:ARG:NH1	1:A:487:GLU:OE2	2.23	0.70
1:B:211:TYR:OH	2:B:900:BLA:HAD2	1.92	0.70
1:A:23:PRO:HD2	1:A:243:LEU:HD12	1.74	0.69
1:A:436:LEU:HD13	1:A:438:PHE:HE1	1.57	0.69
1:B:36:ALA:HB3	1:B:40:THR:HG23	1.73	0.69
1:B:485:PRO:HA	1:B:488:VAL:HB	1.74	0.68
1:B:325:LYS:N	1:B:326:GLY:HA3	2.09	0.68
1:B:338:GLU:HA	1:B:340:LEU:HD12	1.76	0.68
1:B:352:GLU:HA	1:B:355:LEU:HD12	1.75	0.68
1:B:334:ILE:HD13	1:B:497:LEU:HD12	1.74	0.67
1:A:403:ARG:HG2	1:A:479:ARG:HG2	1.75	0.67
1:A:68:PHE:HA	1:A:95:PHE:HB2	1.77	0.67
1:A:217:ARG:NH2	1:A:269:SER:OG	2.23	0.67
1:A:479:ARG:HG3	1:A:479:ARG:HH21	1.59	0.66
1:A:366:HIS:HE2	1:A:383:ILE:HG23	1.59	0.66
1:A:107:TRP:HB3	1:A:116:LEU:HD23	1.77	0.66
1:B:159:VAL:HA	1:B:162:ILE:HG12	1.79	0.65
1:A:39:MET:SD	1:A:39:MET:N	2.69	0.65
1:B:165:PHE:HA	1:B:286:HIS:HD2	1.61	0.65
1:A:157:GLN:NE2	1:A:185:ASP:OD1	2.30	0.65
1:B:425:PRO:HA	1:B:434:VAL:HG22	1.78	0.65
1:B:351:SER:O	1:B:355:LEU:N	2.27	0.64
1:A:449:ALA:HB1	1:A:469:PHE:HD1	1.63	0.64
1:A:80:LEU:HD21	1:A:114:VAL:HG11	1.80	0.63
1:B:218:ILE:HG13	1:B:268:MET:HB2	1.80	0.63
1:B:421:VAL:HG22	1:B:438:PHE:HB3	1.80	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:206:GLN:HA	1:A:209:ARG:HD2	1.81	0.62
1:A:42:VAL:HG11	1:A:235:PRO:HD3	1.80	0.62
1:B:232:ASP:HA	1:B:241:ILE:HG12	1.81	0.62
1:A:406:THR:HB	1:A:407:ILE:HD12	1.82	0.62
1:B:67:VAL:HG12	1:B:73:HIS:HB2	1.81	0.62
1:B:391:GLY:HA3	1:B:432:ARG:HD3	1.80	0.62
1:A:219:ILE:HD11	1:A:222:ILE:HG22	1.82	0.62
1:A:404:LEU:HD11	1:A:421:VAL:HB	1.81	0.62
1:A:426:LEU:HD13	1:A:495:ARG:HD2	1.81	0.62
1:B:36:ALA:N	1:B:40:THR:O	2.32	0.61
1:A:186:ARG:NH2	1:A:192:SER:HB2	2.14	0.61
1:A:271:SER:HA	1:A:281:LEU:HD12	1.81	0.61
1:A:132:PHE:O	1:A:135:THR:OG1	2.16	0.60
1:A:117:GLU:HB3	1:A:248:LEU:HD12	1.83	0.60
1:A:232:ASP:O	1:A:240:PRO:HA	2.01	0.60
1:A:333:LEU:HA	1:A:336:ASP:HB2	1.83	0.60
1:A:415:ALA:O	1:A:419:SER:OG	2.16	0.60
1:B:40:THR:HA	1:B:64:ALA:H	1.66	0.59
1:A:14:THR:HB	1:A:463:LEU:HD21	1.84	0.59
1:A:270:ILE:HD11	1:A:300:CYS:HB3	1.85	0.59
1:A:112:GLN:HB2	1:A:236:VAL:HG11	1.83	0.59
1:A:166:ASP:OD2	1:A:287:ARG:NH1	2.36	0.59
1:A:485:PRO:HA	1:A:488:VAL:HB	1.84	0.59
1:B:31:LEU:HB2	1:B:48:LEU:HD23	1.85	0.59
1:B:347:LEU:O	1:B:351:SER:N	2.36	0.59
1:A:203:ILE:HG22	1:A:208:ARG:HG3	1.84	0.58
1:A:422:LEU:HD11	1:A:488:VAL:HG22	1.84	0.58
1:A:355:LEU:HD22	1:A:362:GLY:HA2	1.86	0.58
1:B:216:VAL:HG23	1:B:270:ILE:HG13	1.86	0.58
1:B:33:LEU:HG	1:B:48:LEU:HD21	1.85	0.58
1:B:306:VAL:HA	1:B:309:TRP:NE1	2.18	0.58
1:B:64:ALA:O	1:B:66:ASP:N	2.37	0.58
1:A:450:GLY:HA2	1:A:451:ASN:HB2	1.85	0.58
1:A:472:TRP:C	1:A:472:TRP:CD1	2.77	0.58
1:A:96:THR:HG1	1:A:100:ASP:N	2.02	0.57
1:A:324:LEU:O	1:A:327:GLN:HB2	2.03	0.57
1:B:348:ALA:HA	1:B:351:SER:HB3	1.86	0.57
1:A:403:ARG:CG	1:A:479:ARG:HG2	2.34	0.56
1:A:163:THR:O	1:A:165:PHE:N	2.39	0.56
1:A:94:GLY:HA2	1:A:101:ALA:O	2.06	0.56
1:B:274:ARG:HD3	1:B:279:TRP:CD1	2.41	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:104:VAL:HB	1:A:119:GLU:HB3	1.88	0.56
1:A:47:ASN:O	1:A:50:GLU:HG2	2.05	0.56
1:B:441:GLU:OE1	1:B:441:GLU:N	2.32	0.56
1:A:155:ALA:HB2	1:A:307:LEU:HD13	1.88	0.56
1:A:358:MET:HE1	1:A:491:ALA:HB2	1.89	0.55
1:B:378:PRO:HG2	1:B:382:ILE:HG13	1.88	0.55
1:A:171:TYR:CZ	1:A:179:GLY:HA3	2.41	0.55
1:B:334:ILE:O	1:B:338:GLU:N	2.38	0.55
1:B:26:ILE:HG21	1:B:32:LEU:HD23	1.89	0.55
1:B:402:ASP:OD2	1:B:403:ARG:NH1	2.40	0.55
1:A:377:THR:HG23	1:A:382:ILE:HD12	1.89	0.55
1:A:382:ILE:O	1:A:386:LEU:HB2	2.08	0.55
1:B:402:ASP:OD1	1:B:402:ASP:N	2.30	0.55
1:B:439:ARG:NH2	1:B:481:ILE:O	2.35	0.55
1:A:500:ASP:HB3	1:B:428:ARG:HB2	1.88	0.54
1:A:382:ILE:HD11	1:A:438:PHE:CZ	2.42	0.54
1:B:138:ALA:O	1:B:142:LEU:HB2	2.08	0.54
1:B:403:ARG:CD	1:B:479:ARG:HG2	2.37	0.54
1:A:93:VAL:O	1:A:103:PHE:HB2	2.07	0.54
1:A:366:HIS:NE2	1:A:383:ILE:HG23	2.22	0.54
1:A:387:ALA:HA	1:A:390:ALA:HB2	1.88	0.54
1:B:454:LYS:HG2	1:B:466:ARG:HD3	1.90	0.54
1:A:366:HIS:HB3	1:A:434:VAL:HB	1.90	0.54
1:B:305:GLN:O	1:B:309:TRP:CD1	2.62	0.53
1:A:403:ARG:HD3	1:A:479:ARG:CZ	2.38	0.53
1:B:23:PRO:HD2	1:B:243:LEU:HD12	1.90	0.53
1:A:479:ARG:HH21	1:A:479:ARG:CG	2.21	0.53
1:B:498:ILE:O	1:B:501:VAL:N	2.38	0.53
1:B:152:CYS:HB3	1:B:170:ILE:HG21	1.91	0.53
1:A:51:LEU:HD23	1:A:95:PHE:HZ	1.74	0.53
1:B:31:LEU:CB	1:B:48:LEU:HB3	2.39	0.53
1:B:451:ASN:C	1:B:453:ASP:H	2.12	0.53
1:A:448:TRP:CD1	1:A:448:TRP:N	2.78	0.52
1:A:198:PHE:CD2	2:A:900:BLA:HAB	2.44	0.52
1:A:361:SER:HB2	1:A:440:PRO:HD3	1.92	0.52
1:A:366:HIS:HE1	1:A:368:ARG:HA	1.74	0.52
1:A:320:THR:O	1:A:323:THR:HG22	2.09	0.52
1:A:378:PRO:HG2	1:A:382:ILE:HG13	1.92	0.52
1:B:41:ILE:HG13	1:B:64:ALA:HB2	1.92	0.52
1:B:167:ARG:HB3	1:B:285:HIS:HB2	1.92	0.52
2:A:900:BLA:HMA2	2:A:900:BLA:CGA	2.40	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:408:ILE:O	1:B:408:ILE:HG13	2.10	0.52
1:A:255:HIS:NE2	2:A:900:BLA:HBA1	2.25	0.51
1:B:371:VAL:HG11	1:B:383:ILE:HG12	1.92	0.51
1:A:380:GLY:H	1:A:381:PRO:HD2	1.74	0.51
1:B:450:GLY:HA2	1:B:472:TRP:HB3	1.93	0.51
1:A:255:HIS:O	1:A:258:TYR:HB3	2.10	0.51
1:B:32:LEU:O	1:B:45:SER:HB3	2.10	0.51
1:A:103:PHE:HD1	1:A:118:LEU:HB3	1.74	0.51
1:A:135:THR:O	1:A:139:ILE:HG13	2.11	0.51
1:B:16:ASP:HB3	1:B:205:ALA:HB3	1.93	0.51
1:B:369:GLU:N	1:B:369:GLU:OE2	2.44	0.51
1:A:331:ARG:HA	1:A:334:ILE:HD12	1.92	0.50
1:A:426:LEU:HB3	1:A:433:ARG:HB2	1.92	0.50
1:B:324:LEU:C	1:B:326:GLY:HA3	2.30	0.50
1:B:28:PRO:HD2	1:B:224:TYR:HB2	1.94	0.50
1:B:259:MET:HA	1:B:262:ILE:HG22	1.92	0.50
1:A:396:SER:O	1:A:396:SER:OG	2.27	0.50
1:B:206:GLN:HA	1:B:209:ARG:NE	2.26	0.50
1:A:219:ILE:O	1:A:219:ILE:HG13	2.09	0.50
1:A:318:ALA:HA	1:A:321:ARG:HD3	1.92	0.50
1:A:323:THR:OG1	1:A:493:GLU:OE2	2.27	0.50
1:B:41:ILE:HD13	1:B:62:ARG:HH21	1.77	0.50
1:A:297:ARG:HA	1:A:300:CYS:HB2	1.93	0.50
1:B:302:LEU:O	1:B:306:VAL:HG23	2.12	0.50
1:A:314:MET:HA	1:A:317:GLN:HG2	1.93	0.50
1:B:210:LEU:O	1:B:214:ASN:N	2.39	0.50
1:B:30:GLY:O	1:B:47:ASN:ND2	2.45	0.50
1:B:249:ARG:HH22	2:B:900:BLA:CGD	2.24	0.49
1:A:309:TRP:CE3	1:A:309:TRP:HA	2.46	0.49
1:A:329:ILE:O	1:A:329:ILE:HG13	2.10	0.49
1:B:40:THR:HA	1:B:64:ALA:N	2.26	0.49
1:B:173:PHE:HE2	1:B:278:LEU:HG	1.77	0.49
1:A:62:ARG:HG3	1:A:62:ARG:HH11	1.76	0.49
1:A:327:GLN:O	1:A:330:GLN:NE2	2.45	0.49
1:A:197:HIS:HB3	1:A:448:TRP:CE3	2.47	0.49
1:B:319:ILE:HD11	1:B:485:PRO:HG2	1.93	0.49
1:B:331:ARG:O	1:B:335:ASN:ND2	2.38	0.49
1:B:72:THR:HA	1:B:76:LEU:HD13	1.94	0.49
1:A:51:LEU:HD23	1:A:95:PHE:CZ	2.47	0.49
1:A:141:ARG:HE	1:A:154:ALA:HB1	1.78	0.49
1:A:184:GLU:OE2	1:A:192:SER:OG	2.22	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:333:LEU:HA	1:B:336:ASP:HB2	1.95	0.49
1:B:495:ARG:HA	1:B:498:ILE:HB	1.94	0.49
1:A:287:ARG:HG3	1:A:287:ARG:HH11	1.78	0.48
1:B:501:VAL:HG12	1:B:501:VAL:O	2.12	0.48
1:A:186:ARG:HH21	1:A:192:SER:HB2	1.78	0.48
1:A:206:GLN:O	1:A:210:LEU:HD23	2.13	0.48
1:A:33:LEU:HB3	1:A:35:LEU:HD21	1.95	0.48
1:A:341:HIS:ND1	1:A:341:HIS:N	2.61	0.48
1:A:472:TRP:C	1:A:472:TRP:HD1	2.17	0.48
1:A:76:LEU:HD23	1:A:91:ILE:HD13	1.95	0.48
1:B:403:ARG:HD2	1:B:479:ARG:HG2	1.95	0.48
1:B:173:PHE:CE2	1:B:278:LEU:HG	2.49	0.48
1:B:403:ARG:HB3	1:B:406:THR:OG1	2.13	0.48
1:B:72:THR:O	1:B:76:LEU:HD22	2.13	0.48
1:B:382:ILE:HG22	1:B:383:ILE:HG13	1.95	0.48
1:B:432:ARG:O	1:B:434:VAL:HG23	2.14	0.48
1:A:222:ILE:HB	1:A:256:LEU:HD22	1.95	0.47
1:B:159:VAL:HG23	1:B:168:VAL:HG11	1.95	0.47
1:B:230:THR:HA	1:B:231:PRO:HA	1.67	0.47
1:A:197:HIS:O	1:A:448:TRP:HB3	2.14	0.47
1:B:491:ALA:O	1:B:494:ILE:HB	2.15	0.47
1:A:173:PHE:HB2	1:A:279:TRP:O	2.14	0.47
2:A:900:BLA:NB	2:A:900:BLA:CMA	2.75	0.47
1:B:50:GLU:HG3	1:B:51:LEU:HG	1.96	0.47
1:B:365:LEU:HD12	1:B:372:ILE:HB	1.95	0.47
1:B:137:SER:HA	1:B:140:ARG:HD2	1.96	0.47
1:A:259:MET:SD	1:A:267:THR:HG21	2.54	0.47
1:A:368:ARG:CZ	1:A:431:PRO:HA	2.44	0.47
1:A:385:GLN:O	1:A:408:ILE:HD11	2.13	0.47
1:B:253:PRO:HA	1:B:256:LEU:HB2	1.95	0.47
1:A:217:ARG:HH21	1:A:269:SER:HG	1.57	0.47
1:B:490:ALA:O	1:B:494:ILE:HG13	2.14	0.47
1:B:429:THR:HA	1:B:432:ARG:HE	1.80	0.47
1:B:500:ASP:C	1:B:502:ILE:H	2.18	0.47
1:A:62:ARG:HH11	1:A:62:ARG:CG	2.27	0.46
1:A:465:PRO:HA	2:A:900:BLA:HMC2	1.97	0.46
1:A:69:ASP:HB2	1:A:94:GLY:O	2.16	0.46
1:B:368:ARG:CZ	1:B:431:PRO:HB3	2.45	0.46
1:A:319:ILE:HD12	1:A:319:ILE:HA	1.73	0.46
1:A:368:ARG:NH2	1:A:431:PRO:HA	2.29	0.46
1:B:166:ASP:HB2	1:B:286:HIS:HA	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:171:TYR:CZ	1:B:179:GLY:HA3	2.50	0.46
1:B:31:LEU:HB3	1:B:48:LEU:HB3	1.97	0.46
1:A:23:PRO:HB2	1:A:250:SER:HB3	1.96	0.46
1:A:194:LEU:HD12	1:A:195:GLY:H	1.80	0.46
1:B:32:LEU:HB2	1:B:117:GLU:HA	1.97	0.46
1:B:316:GLU:HA	1:B:319:ILE:HB	1.97	0.46
1:A:20:ILE:HD13	1:A:20:ILE:HA	1.68	0.46
1:A:162:ILE:HD11	1:A:300:CYS:SG	2.56	0.46
1:A:284:CYS:O	1:A:285:HIS:HD2	1.99	0.46
1:B:29:HIS:CG	1:B:291:TYR:HE1	2.33	0.46
1:B:309:TRP:O	1:B:313:VAL:N	2.48	0.46
1:A:193:TYR:HE2	1:A:262:ILE:HD11	1.81	0.46
1:A:258:TYR:O	1:A:261:ASN:HB2	2.15	0.46
1:A:325:LYS:H	1:A:325:LYS:HG3	1.41	0.46
1:A:368:ARG:NH1	1:A:430:PRO:HA	2.31	0.46
1:B:206:GLN:OE1	1:B:207:ALA:N	2.48	0.46
1:B:117:GLU:OE2	1:B:247:ILE:N	2.47	0.45
1:B:357:LEU:HB2	1:B:358:MET:HG2	1.97	0.45
1:A:463:LEU:H	1:A:463:LEU:HG	1.48	0.45
1:A:56:ILE:HD12	1:A:57:GLY:H	1.81	0.45
1:B:68:PHE:HB2	1:B:72:THR:OG1	2.17	0.45
1:A:135:THR:O	1:A:139:ILE:N	2.46	0.45
1:A:74:ASN:O	1:A:78:ILE:HG22	2.16	0.45
1:B:419:SER:OG	1:B:441:GLU:HB3	2.16	0.45
1:A:20:ILE:HG23	1:A:249:ARG:NH1	2.31	0.45
1:A:398:LEU:HD22	1:A:398:LEU:HA	1.80	0.45
1:A:76:LEU:O	1:A:80:LEU:HD12	2.17	0.45
1:B:67:VAL:HG13	1:B:68:PHE:H	1.81	0.45
1:B:278:LEU:HD11	1:B:281:LEU:HD12	1.98	0.45
1:A:219:ILE:HA	1:A:220:PRO:HD3	1.78	0.44
1:A:299:ALA:O	1:A:302:LEU:HB3	2.17	0.44
1:A:326:GLY:O	1:A:330:GLN:HB3	2.18	0.44
1:A:330:GLN:HB3	1:A:330:GLN:HE21	1.59	0.44
1:A:382:ILE:HA	1:A:386:LEU:HD12	1.98	0.44
1:A:40:THR:O	1:A:40:THR:OG1	2.35	0.44
1:A:447:TYR:HD2	1:A:473:THR:HG22	1.82	0.44
2:B:900:BLA:NB	2:B:900:BLA:HMA1	2.32	0.44
1:A:245:PHE:CD2	1:A:245:PHE:N	2.86	0.44
1:B:35:LEU:HA	1:B:41:ILE:HA	2.00	0.44
1:B:330:GLN:HG2	1:B:334:ILE:HD11	1.99	0.44
1:A:90:PRO:HG2	1:B:133:ARG:HH11	1.83	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:108:HIS:HD2	1:A:110:HIS:HB2	1.82	0.44
1:A:420:GLY:HA3	1:A:480:ALA:HB2	2.00	0.44
1:B:132:PHE:O	1:B:135:THR:OG1	2.30	0.44
1:A:309:TRP:HA	1:A:309:TRP:HE3	1.82	0.44
1:B:203:ILE:HD11	2:B:900:BLA:HMB2	1.99	0.44
1:B:239:ARG:HE	1:B:239:ARG:HB2	1.38	0.44
1:B:382:ILE:O	1:B:386:LEU:HB2	2.18	0.44
1:B:142:LEU:HD23	1:B:142:LEU:HA	1.85	0.44
1:B:51:LEU:HD22	1:B:99:LYS:HZ1	1.82	0.43
1:B:134:ARG:NH2	1:B:161:GLU:O	2.51	0.43
1:B:309:TRP:CD1	1:B:309:TRP:N	2.86	0.43
1:B:491:ALA:HA	1:B:494:ILE:HD12	2.00	0.43
1:A:136:ASN:HA	1:A:139:ILE:HB	2.00	0.43
1:B:35:LEU:HG	1:B:114:VAL:HB	2.00	0.43
1:B:134:ARG:H	1:B:134:ARG:HG3	1.57	0.43
1:B:201:SER:O	2:B:900:BLA:HBC1	2.18	0.43
1:A:52:THR:HG21	1:A:67:VAL:HG13	2.00	0.43
1:B:60:ILE:HG22	1:B:61:GLY:N	2.33	0.43
1:A:466:ARG:NH2	1:A:469:PHE:HE1	2.16	0.43
1:B:343:HIS:O	1:B:347:LEU:N	2.32	0.43
1:B:354:LEU:HA	1:B:357:LEU:HG	2.00	0.43
1:B:365:LEU:HB2	1:B:372:ILE:HB	1.99	0.43
1:A:73:HIS:O	1:A:77:THR:HG23	2.18	0.43
1:B:82:GLU:N	1:B:83:PRO:HD3	2.32	0.43
1:B:494:ILE:O	1:B:498:ILE:HG13	2.18	0.43
1:A:25:ALA:HA	1:A:228:PRO:HA	2.00	0.43
1:B:35:LEU:HB3	1:B:41:ILE:HG12	2.01	0.43
1:A:62:ARG:HG3	1:A:62:ARG:NH1	2.34	0.43
1:A:408:ILE:HG22	1:A:410:GLU:HG2	2.00	0.43
2:A:900:BLA:HMA1	2:A:900:BLA:C1B	2.48	0.43
1:B:385:GLN:NE2	1:B:410:GLU:OE2	2.32	0.43
1:B:378:PRO:HA	1:B:379:PRO:HD3	1.57	0.42
1:B:14:THR:HA	1:B:17:ASP:OD2	2.20	0.42
1:B:15:CYS:SG	1:B:204:PRO:HB3	2.59	0.42
1:B:171:TYR:OH	1:B:198:PHE:HB2	2.18	0.42
1:B:358:MET:HE3	1:B:358:MET:HB3	1.89	0.42
1:B:234:ASN:HB2	1:B:239:ARG:O	2.19	0.42
1:B:365:LEU:O	1:B:371:VAL:HA	2.18	0.42
1:A:245:PHE:N	1:A:245:PHE:HD2	2.17	0.42
1:B:424:VAL:HG11	1:B:495:ARG:HG2	2.01	0.42
2:B:900:BLA:HMA1	2:B:900:BLA:C1B	2.49	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:900:BLA:CGA	2:B:900:BLA:HMA2	2.49	0.42
1:A:68:PHE:HB3	1:A:72:THR:CG2	2.49	0.42
1:A:391:GLY:O	1:A:392:ARG:HG2	2.20	0.42
1:A:436:LEU:HD13	1:A:438:PHE:CE1	2.47	0.42
1:B:286:HIS:ND1	1:B:288:LYS:O	2.53	0.42
1:A:82:GLU:HA	1:A:83:PRO:HD3	1.91	0.42
1:A:203:ILE:HA	1:A:204:PRO:HD2	1.92	0.42
1:A:318:ALA:HB1	1:A:486:HIS:NE2	2.34	0.42
1:A:210:LEU:HA	1:A:213:ILE:HG12	2.01	0.42
1:A:379:PRO:HB2	1:A:380:GLY:H	1.65	0.42
1:B:73:HIS:O	1:B:77:THR:HG23	2.19	0.42
1:B:270:ILE:HG21	1:B:301:GLU:HA	2.02	0.42
1:A:32:LEU:HD13	1:A:117:GLU:HG2	2.00	0.42
1:A:72:THR:O	1:A:76:LEU:HG	2.20	0.42
1:A:429:THR:CB	1:A:430:PRO:HD2	2.49	0.42
1:B:307:LEU:HG	1:B:311:ILE:HG13	2.01	0.42
1:B:485:PRO:O	1:B:489:ALA:N	2.52	0.42
1:A:309:TRP:CZ2	1:B:309:TRP:HB3	2.55	0.42
1:B:489:ALA:O	1:B:493:GLU:HB2	2.20	0.42
1:A:405:SER:O	1:A:409:PRO:HA	2.20	0.41
1:B:252:SER:HB2	2:B:900:BLA:HBD2	2.02	0.41
1:B:368:ARG:H	1:B:368:ARG:HG3	1.73	0.41
1:A:298:GLN:O	1:B:136:ASN:ND2	2.53	0.41
2:A:900:BLA:CMA	2:A:900:BLA:HB	2.33	0.41
1:B:426:LEU:O	1:B:432:ARG:HA	2.20	0.41
1:B:428:ARG:NH2	1:B:431:PRO:HD3	2.35	0.41
1:B:388:GLN:O	1:B:392:ARG:HG3	2.20	0.41
1:A:68:PHE:HB3	1:A:72:THR:HG22	2.02	0.41
1:A:203:ILE:CG2	1:A:208:ARG:HG3	2.48	0.41
1:A:243:LEU:O	1:A:249:ARG:HD2	2.20	0.41
1:B:37:ALA:O	1:B:39:MET:HG2	2.20	0.41
1:B:217:ARG:HG3	2:B:900:BLA:HBA2	2.03	0.41
1:B:262:ILE:HG23	1:B:264:MET:H	1.85	0.41
1:B:319:ILE:HD12	1:B:319:ILE:HA	1.85	0.41
1:B:386:LEU:HA	1:B:389:LEU:HB3	2.02	0.41
1:A:246:ALA:HB3	1:A:249:ARG:HB3	2.02	0.41
1:A:451:ASN:N	1:A:452:PRO:HD3	2.35	0.41
1:B:51:LEU:HD13	1:B:99:LYS:HZ2	1.86	0.41
1:B:176:ASP:OD1	1:B:176:ASP:N	2.52	0.41
1:A:210:LEU:O	1:A:214:ASN:N	2.31	0.41
1:A:302:LEU:O	1:A:305:GLN:HB2	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:404:LEU:N	1:A:419:SER:O	2.53	0.41
1:B:202:ASP:HA	2:B:900:BLA:C1C	2.51	0.41
1:A:434:VAL:HG12	1:A:436:LEU:HG	2.03	0.41
1:A:380:GLY:N	1:A:381:PRO:HD2	2.35	0.41
1:B:41:ILE:HD13	1:B:62:ARG:NH2	2.36	0.41
1:B:286:HIS:HD1	1:B:288:LYS:H	1.69	0.41
1:B:386:LEU:HA	1:B:386:LEU:HD23	1.90	0.41
1:A:41:ILE:HD11	1:A:59:LEU:HB3	2.02	0.41
1:A:358:MET:HE3	1:A:358:MET:HB3	1.65	0.41
1:B:222:ILE:O	1:B:256:LEU:HD22	2.20	0.41
1:B:363:LEU:HG	1:B:374:ILE:HB	2.03	0.41
1:A:39:MET:HB3	1:A:64:ALA:HB2	2.03	0.41
1:A:247:ILE:H	1:A:247:ILE:HG13	1.51	0.40
1:B:60:ILE:HG22	1:B:61:GLY:H	1.86	0.40
1:B:222:ILE:HD13	1:B:259:MET:HB2	2.03	0.40
1:A:138:ALA:HA	1:A:141:ARG:HB3	2.03	0.40
1:A:428:ARG:HH12	1:B:497:LEU:HD11	1.85	0.40
1:B:74:ASN:O	1:B:78:ILE:HG13	2.21	0.40
1:B:204:PRO:O	1:B:208:ARG:HG3	2.21	0.40
1:B:340:LEU:HD21	1:B:343:HIS:HB3	2.03	0.40
1:A:141:ARG:NH2	1:A:154:ALA:HA	2.27	0.40
1:A:186:ARG:HH11	1:A:186:ARG:HG2	1.87	0.40
1:A:479:ARG:CG	1:A:479:ARG:NH2	2.85	0.40
1:B:422:LEU:HD23	1:B:437:TRP:CE3	2.57	0.40
1:A:237:THR:OG1	1:A:239:ARG:HD2	2.22	0.40
1:A:429:THR:HG22	1:A:432:ARG:CZ	2.51	0.40
1:B:110:HIS:HB3	1:B:115:PHE:CE2	2.56	0.40
1:B:498:ILE:O	1:B:500:ASP:N	2.55	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	463/525 (88%)	418 (90%)	38 (8%)	7 (2%)	10 39
1	B	443/525 (84%)	398 (90%)	34 (8%)	11 (2%)	5 28
All	All	906/1050 (86%)	816 (90%)	72 (8%)	18 (2%)	7 33

All (18) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	90	PRO
1	A	430	PRO
1	B	66	ASP
1	A	164	GLY
1	A	379	PRO
1	B	65	ALA
1	B	379	PRO
1	A	341	HIS
1	A	383	ILE
1	B	111	ASP
1	B	501	VAL
1	B	220	PRO
1	B	240	PRO
1	A	220	PRO
1	B	452	PRO
1	B	499	ILE
1	B	450	GLY
1	B	451	ASN

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	382/424 (90%)	291 (76%)	91 (24%)	0 2
1	B	373/424 (88%)	300 (80%)	73 (20%)	1 5
All	All	755/848 (89%)	591 (78%)	164 (22%)	1 4

All (164) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	15	CYS
1	A	20	ILE
1	A	22	ILE
1	A	31	LEU
1	A	35	LEU
1	A	38	ASP
1	A	39	MET
1	A	40	THR
1	A	41	ILE
1	A	51	LEU
1	A	56	ILE
1	A	59	LEU
1	A	62	ARG
1	A	63	SER
1	A	66	ASP
1	A	69	ASP
1	A	72	THR
1	A	76	LEU
1	A	78	ILE
1	A	80	LEU
1	A	95	PHE
1	A	106	SER
1	A	112	GLN
1	A	136	ASN
1	A	147	THR
1	A	150	SER
1	A	167	ARG
1	A	170	ILE
1	A	186	ARG
1	A	193	TYR
1	A	196	LEU
1	A	206	GLN
1	A	209	ARG
1	A	210	LEU
1	A	217	ARG
1	A	219	ILE
1	A	232	ASP
1	A	233	LEU
1	A	234	ASN
1	A	237	THR
1	A	239	ARG
1	A	241	ILE
1	A	245	PHE

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Mol	Chain	Res	Type
1	A	247	ILE
1	A	258	TYR
1	A	259	MET
1	A	267	THR
1	A	269	SER
1	A	273	LEU
1	A	278	LEU
1	A	288	LYS
1	A	297	ARG
1	A	298	GLN
1	A	302	LEU
1	A	319	ILE
1	A	321	ARG
1	A	323	THR
1	A	325	LYS
1	A	329	ILE
1	A	330	GLN
1	A	333	LEU
1	A	341	HIS
1	A	347	LEU
1	A	363	LEU
1	A	364	CYS
1	A	366	HIS
1	A	382	ILE
1	A	389	LEU
1	A	396	SER
1	A	398	LEU
1	A	400	GLN
1	A	403	ARG
1	A	404	LEU
1	A	410	GLU
1	A	419	SER
1	A	426	LEU
1	A	429	THR
1	A	433	ARG
1	A	436	LEU
1	A	439	ARG
1	A	444	GLN
1	A	445	THR
1	A	447	TYR
1	A	448	TRP
1	A	463	LEU

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Mol	Chain	Res	Type
1	A	468	SER
1	A	472	TRP
1	A	474	GLU
1	A	479	ARG
1	A	481	ILE
1	A	484	GLN
1	B	31	LEU
1	B	32	LEU
1	B	35	LEU
1	B	38	ASP
1	B	39	MET
1	B	40	THR
1	B	48	LEU
1	B	52	THR
1	B	63	SER
1	B	67	VAL
1	B	80	LEU
1	B	91	ILE
1	B	98	ARG
1	B	100	ASP
1	B	116	LEU
1	B	118	LEU
1	B	119	GLU
1	B	142	LEU
1	B	146	GLU
1	B	176	ASP
1	B	190	VAL
1	B	193	TYR
1	B	196	LEU
1	B	201	SER
1	B	203	ILE
1	B	206	GLN
1	B	217	ARG
1	B	227	VAL
1	B	232	ASP
1	B	234	ASN
1	B	239	ARG
1	B	248	LEU
1	B	252	SER
1	B	260	ARG
1	B	267	THR
1	B	269	SER

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Mol	Chain	Res	Type
1	B	278	LEU
1	B	281	LEU
1	B	289	PRO
1	B	309	TRP
1	B	317	GLN
1	B	319	ILE
1	B	321	ARG
1	B	322	GLN
1	B	323	THR
1	B	329	ILE
1	B	330	GLN
1	B	333	LEU
1	B	338	GLU
1	B	340	LEU
1	B	344	ARG
1	B	354	LEU
1	B	358	MET
1	B	361	SER
1	B	364	CYS
1	B	367	SER
1	B	376	GLN
1	B	382	ILE
1	B	398	LEU
1	B	400	GLN
1	B	402	ASP
1	B	403	ARG
1	B	419	SER
1	B	438	PHE
1	B	441	GLU
1	B	448	TRP
1	B	476	THR
1	B	477	HIS
1	B	481	ILE
1	B	483	TRP
1	B	495	ARG
1	B	497	LEU
1	B	500	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	108	HIS

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Mol	Chain	Res	Type
1	A	285	HIS
1	A	330	GLN
1	B	29	HIS

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	BLA	A	900	1	42,46,46	2.95	20 (47%)	53,67,67	1.97	14 (26%)
2	BLA	B	900	1	42,46,46	2.87	15 (35%)	53,67,67	2.14	14 (26%)

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	BLA	A	900	1	-	7/26/74/74	0/4/4/4

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	BLA	B	900	1	-	11/26/74/74	0/4/4/4

All (35) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	900	BLA	CHB-C1B	9.17	1.53	1.34
2	A	900	BLA	CHB-C1B	8.37	1.51	1.34
2	A	900	BLA	CHD-C4C	6.87	1.54	1.38
2	A	900	BLA	CHD-C1D	6.47	1.55	1.40
2	B	900	BLA	CHD-C4C	6.23	1.52	1.38
2	B	900	BLA	CHA-C4D	5.92	1.40	1.35
2	A	900	BLA	CHA-C4D	5.85	1.40	1.35
2	B	900	BLA	CHD-C1D	5.35	1.53	1.40
2	B	900	BLA	CBC-CAC	4.82	1.54	1.30
2	A	900	BLA	CBC-CAC	4.69	1.53	1.30
2	A	900	BLA	C4D-C3D	-4.26	1.38	1.45
2	B	900	BLA	C1D-C2D	-4.12	1.36	1.45
2	A	900	BLA	C4A-CHB	3.55	1.54	1.41
2	B	900	BLA	C3C-C4C	-3.53	1.39	1.45
2	B	900	BLA	C4A-CHB	3.45	1.54	1.41
2	B	900	BLA	C1B-C2B	-3.45	1.38	1.45
2	A	900	BLA	C1C-C2C	-3.41	1.38	1.47
2	B	900	BLA	C1C-C2C	-3.20	1.39	1.47
2	A	900	BLA	C1D-C2D	-3.20	1.38	1.45
2	B	900	BLA	C4D-C3D	-3.07	1.40	1.45
2	B	900	BLA	CAC-C3C	2.98	1.55	1.47
2	B	900	BLA	CAB-C3B	-2.92	1.39	1.47
2	A	900	BLA	C3C-C4C	-2.90	1.40	1.45
2	A	900	BLA	CAB-C3B	-2.83	1.39	1.47
2	B	900	BLA	C3B-C4B	-2.79	1.39	1.47
2	A	900	BLA	C3B-C4B	-2.77	1.39	1.47
2	A	900	BLA	CAC-C3C	2.77	1.55	1.47
2	A	900	BLA	CBA-CGA	2.67	1.56	1.50
2	A	900	BLA	C1B-C2B	-2.63	1.40	1.45
2	A	900	BLA	C1B-NB	-2.48	1.33	1.37
2	A	900	BLA	C4B-NB	-2.35	1.33	1.38
2	A	900	BLA	CAA-C2A	2.34	1.55	1.52
2	A	900	BLA	C4C-NC	-2.16	1.34	1.37
2	A	900	BLA	C1C-NC	-2.12	1.33	1.38
2	B	900	BLA	C4C-NC	-2.03	1.34	1.37

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	900	BLA	C1A-CHA-C4D	-8.16	119.06	128.81
2	A	900	BLA	CHA-C4D-ND	5.83	136.91	128.83
2	B	900	BLA	CAD-C3D-C4D	4.85	133.59	125.01
2	A	900	BLA	CHA-C4D-C3D	-4.76	114.32	125.32
2	A	900	BLA	C1A-CHA-C4D	-4.73	123.16	128.81
2	B	900	BLA	CHD-C1D-ND	4.48	134.31	124.93
2	A	900	BLA	C4C-CHD-C1D	-4.16	117.91	128.08
2	B	900	BLA	CHD-C4C-C3C	-3.60	118.64	127.91
2	A	900	BLA	C3B-C4B-NB	3.58	110.23	106.19
2	B	900	BLA	CAD-C3D-C2D	-3.40	121.55	127.88
2	B	900	BLA	C1D-C2D-C3D	3.28	110.28	106.51
2	A	900	BLA	CMB-C2B-C1B	3.16	128.11	124.17
2	A	900	BLA	CHD-C1D-ND	2.87	130.93	124.93
2	B	900	BLA	C4C-CHD-C1D	-2.78	121.29	128.08
2	B	900	BLA	C3B-C4B-NB	2.58	109.11	106.19
2	B	900	BLA	C4C-NC-C1C	-2.58	107.38	110.67
2	A	900	BLA	CAD-CBD-CGD	-2.56	108.09	113.60
2	A	900	BLA	C4D-ND-C1D	2.48	111.19	106.51
2	B	900	BLA	CHD-C1D-C2D	-2.47	118.55	124.90
2	A	900	BLA	CBC-CAC-C3C	-2.43	115.52	127.62
2	A	900	BLA	C1D-C2D-C3D	2.34	109.19	106.51
2	B	900	BLA	C3C-C4C-NC	2.30	110.40	106.80
2	B	900	BLA	CHD-C4C-NC	2.28	130.95	126.06
2	B	900	BLA	CAD-CBD-CGD	-2.28	108.70	113.60
2	A	900	BLA	C2D-C1D-ND	-2.25	105.72	110.53
2	A	900	BLA	CBA-CAA-C2A	2.10	116.20	112.62
2	A	900	BLA	CAA-CBA-CGA	2.09	119.61	113.76
2	B	900	BLA	CBC-CAC-C3C	-2.05	117.44	127.62

There are no chirality outliers.

All (18) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	900	BLA	NA-C4A-CHB-C1B
2	A	900	BLA	C3A-C4A-CHB-C1B
2	B	900	BLA	NA-C4A-CHB-C1B
2	B	900	BLA	C3A-C4A-CHB-C1B
2	B	900	BLA	NB-C1B-CHB-C4A
2	B	900	BLA	C2B-C1B-CHB-C4A
2	B	900	BLA	C2C-C3C-CAC-CBC
2	A	900	BLA	NB-C1B-CHB-C4A
2	A	900	BLA	CAA-CBA-CGA-O2A
2	B	900	BLA	CAD-CBD-CGD-O1D

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Mol	Chain	Res	Type	Atoms
2	A	900	BLA	CAA-CBA-CGA-O1A
2	A	900	BLA	CAD-CBD-CGD-O2D
2	B	900	BLA	CAA-CBA-CGA-O2A
2	A	900	BLA	CAD-CBD-CGD-O1D
2	B	900	BLA	CAD-CBD-CGD-O2D
2	B	900	BLA	CAA-CBA-CGA-O1A
2	B	900	BLA	C4C-C3C-CAC-CBC
2	B	900	BLA	NC-C4C-CHD-C1D

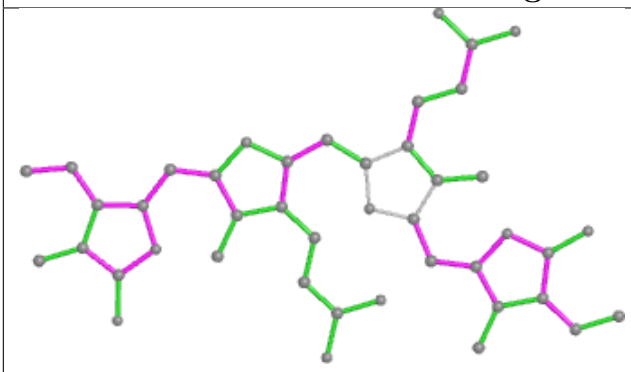
There are no ring outliers.

2 monomers are involved in 20 short contacts:

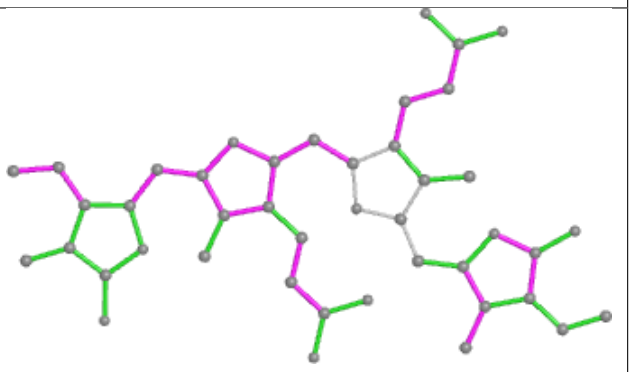
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	900	BLA	10	0
2	B	900	BLA	10	0

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 then 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.

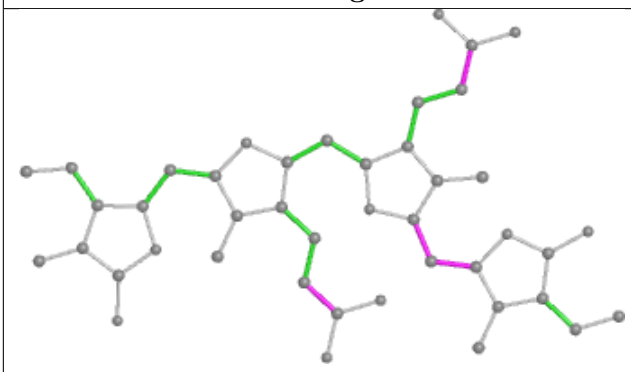
Ligand BLA A 900



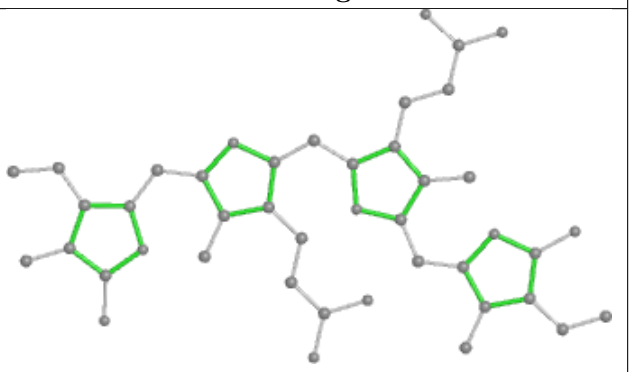
Bond lengths



Bond angles

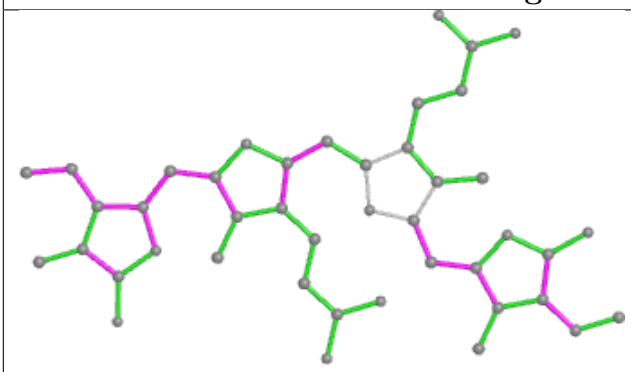


Torsions

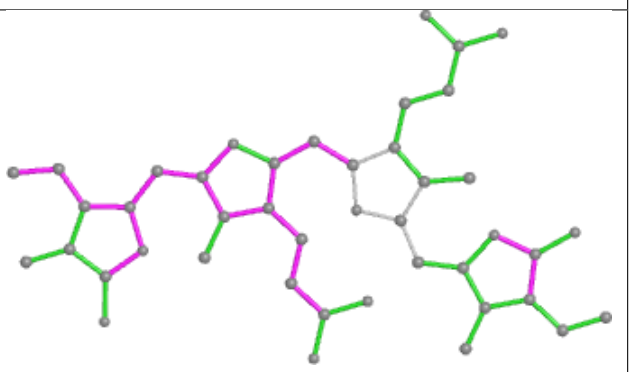


Rings

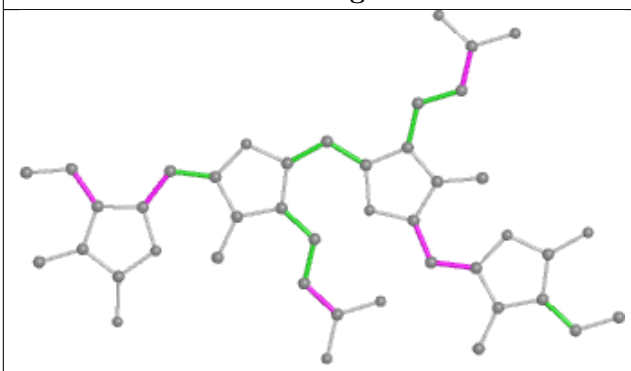
Ligand BLA B 900



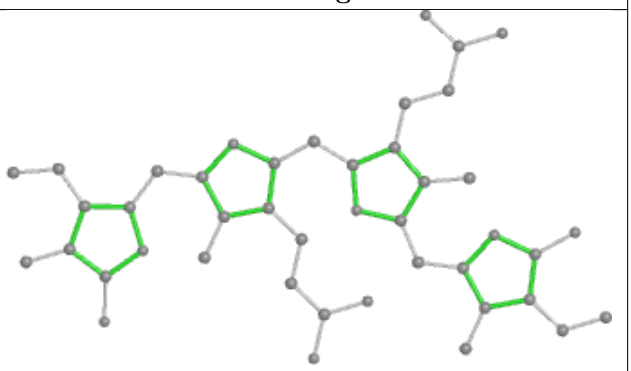
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} 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	473/525 (90%)	-0.20	4 (0%)	86 86	79, 125, 206, 294	0
1	B	455/525 (86%)	0.10	25 (5%)	25 23	106, 174, 272, 340	0
All	All	928/1050 (88%)	-0.05	29 (3%)	49 47	79, 149, 250, 340	0

All (29) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	345	ALA	10.9
1	B	393	SER	6.1
1	B	384	ASP	4.9
1	B	82	GLU	4.7
1	B	97	MET	4.2
1	B	100	ASP	4.1
1	B	76	LEU	3.8
1	B	99	LYS	3.5
1	B	322	GLN	3.5
1	B	92	ALA	3.2
1	B	320	THR	3.1
1	B	344	ARG	2.9
1	B	324	LEU	2.9
1	B	379	PRO	2.7
1	A	384	ASP	2.6
1	B	323	THR	2.4
1	B	400	GLN	2.3
1	B	62	ARG	2.3
1	B	102	GLY	2.3
1	B	276	GLU	2.3
1	A	462	ARG	2.2
1	B	365	LEU	2.2
1	B	277	ARG	2.2
1	A	38	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	407	ILE	2.2
1	B	98	ARG	2.1
1	B	33	LEU	2.1
1	A	354	LEU	2.0
1	B	235	PRO	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (i)

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

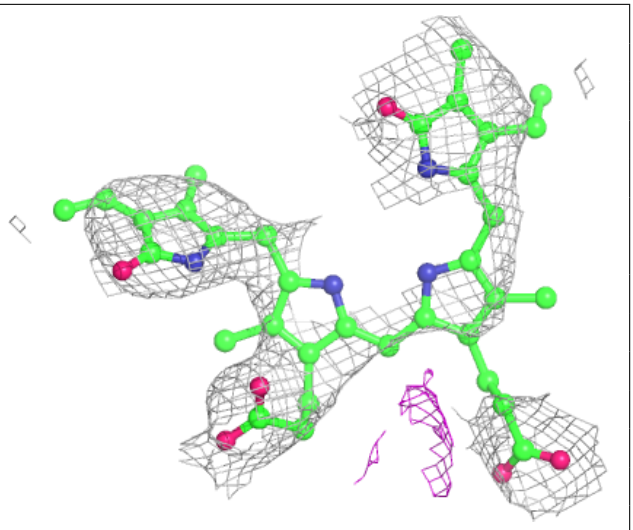
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

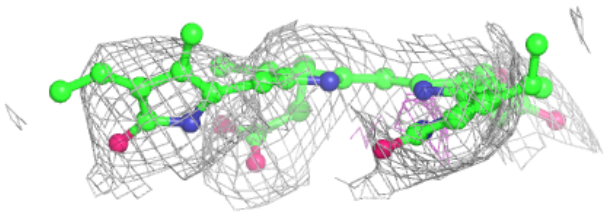
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	BLA	B	900	43/43	0.90	0.35	134,144,172,183	0
2	BLA	A	900	43/43	0.92	0.30	80,115,135,145	0

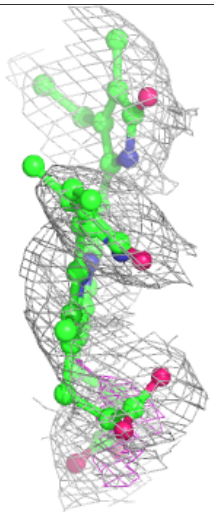
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around BLA B 900:

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

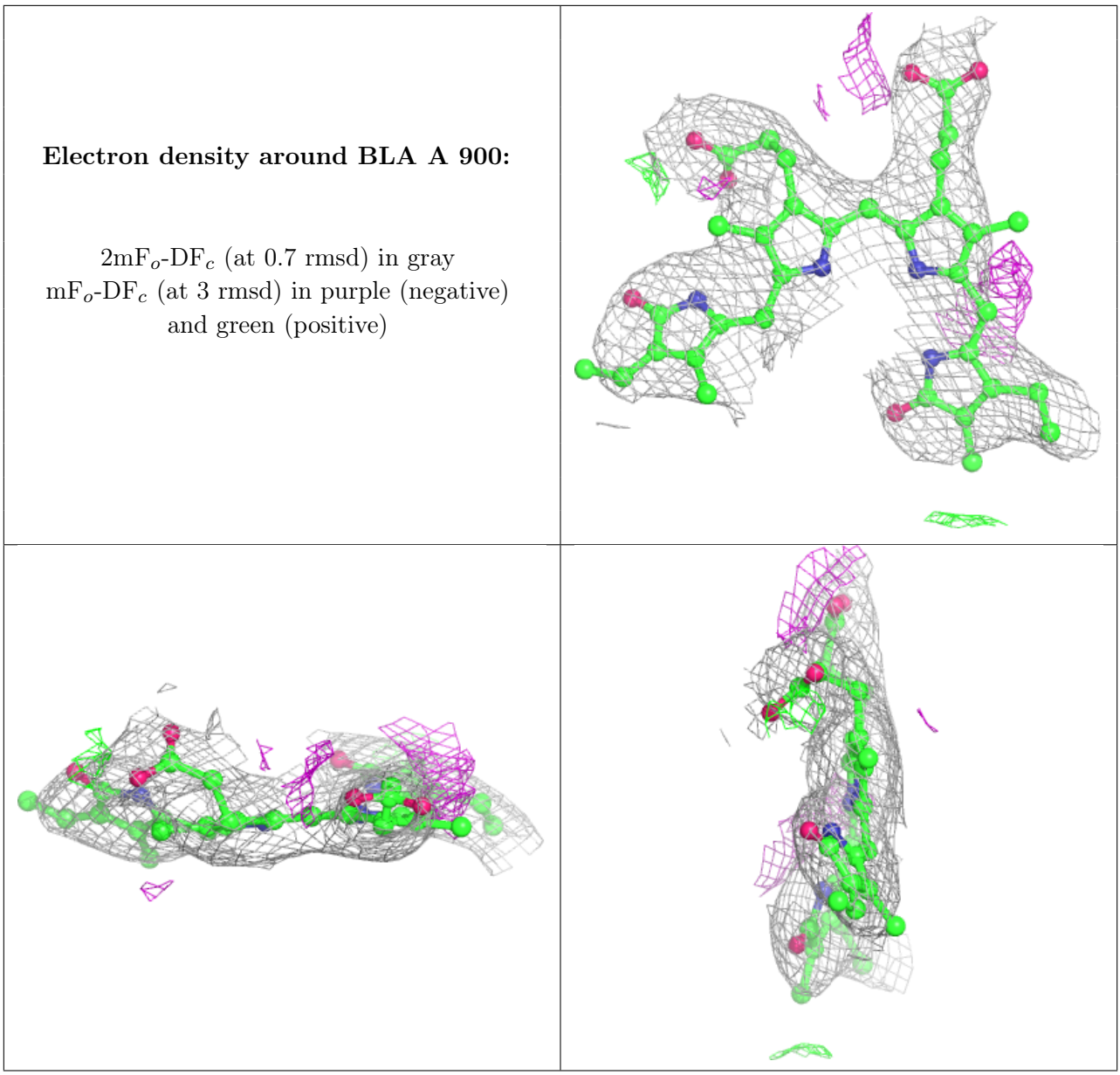






Electron density around BLA A 900:

$2mF_o$-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.