



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 04:25 AM UTC

PDB ID : 4YCW / pdb_00004ycw
Title : Crystal structure of cladosporin in complex with plasmodium like human lysyl-tRNA synthetase mutant
Authors : Fang, P.; Wang, J.; Guo, M.
Deposited on : 2015-02-20
Resolution : 2.90 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

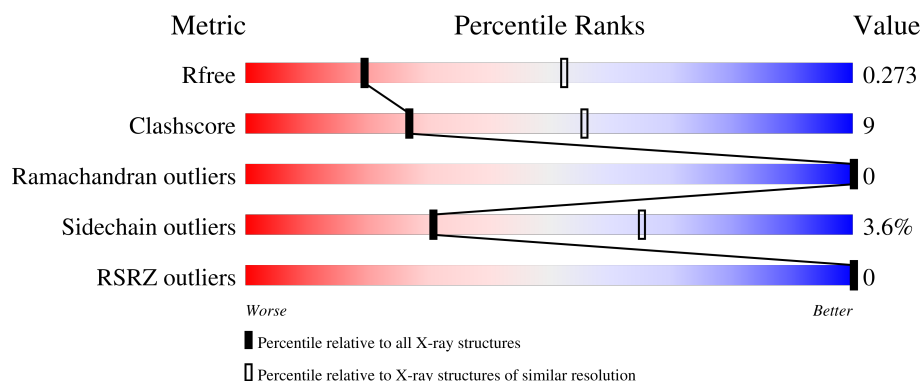
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.90 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	2481 (2.90-2.90)
Clashscore	190562	2690 (2.90-2.90)
Ramachandran outliers	187476	2623 (2.90-2.90)
Sidechain outliers	187428	2625 (2.90-2.90)
RSRZ outliers	180081	2481 (2.90-2.90)

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	513	 84% 14% .
1	B	513	 80% 17% .
1	E	513	 71% 23% . . .
1	F	513	 71% 23% . . .
2	C	42	 17% 5% 79%

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Mol	Chain	Length	Quality of chain
2	D	42	17%5% 79%
2	G	42	19% 79%
2	H	42	10%12% 79%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 16000 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 Lysine-tRNA ligase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	501	Total	C	N	O	S	0	0	0
			3998	2563	669	738	28			
1	B	501	Total	C	N	O	S	0	0	0
			3976	2547	673	728	28			
1	E	499	Total	C	N	O	S	0	0	0
			3776	2400	655	696	25			
1	F	498	Total	C	N	O	S	0	0	0
			3811	2429	650	705	27			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	69	MET	-	initiating methionine	UNP Q15046
A	300	THR	PRO	conflict	UNP Q15046
A	321	VAL	GLN	conflict	UNP Q15046
A	337	SER	THR	conflict	UNP Q15046
B	69	MET	-	initiating methionine	UNP Q15046
B	300	THR	PRO	conflict	UNP Q15046
B	321	VAL	GLN	conflict	UNP Q15046
B	337	SER	THR	conflict	UNP Q15046
E	69	MET	-	initiating methionine	UNP Q15046
E	300	THR	PRO	conflict	UNP Q15046
E	321	VAL	GLN	conflict	UNP Q15046
E	337	SER	THR	conflict	UNP Q15046
F	69	MET	-	initiating methionine	UNP Q15046
F	300	THR	PRO	conflict	UNP Q15046
F	321	VAL	GLN	conflict	UNP Q15046
F	337	SER	THR	conflict	UNP Q15046

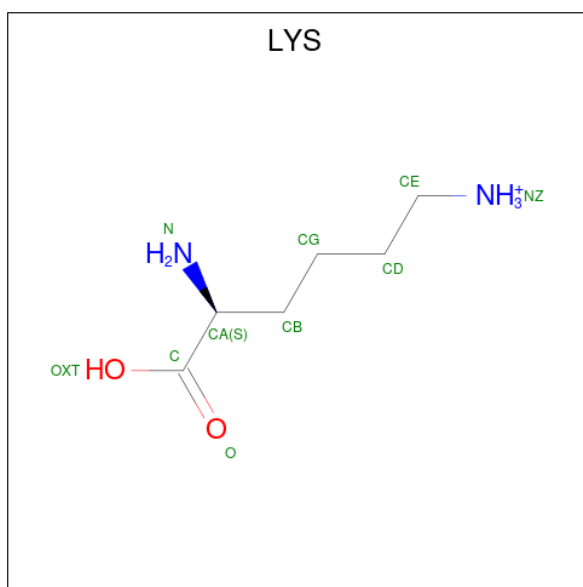
- Molecule 2 is a protein called Aminoacyl tRNA synthase complex-interacting multifunctional protein 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	9	Total	C	N	O	S	0	0	0
			78	53	12	12	1			
2	D	9	Total	C	N	O	S	0	0	0
			78	53	12	12	1			
2	G	9	Total	C	N	O	S	0	0	0
			78	53	12	12	1			
2	H	9	Total	C	N	O	S	0	0	0
			76	51	12	12	1			

There are 24 discrepancies between the modelled and reference sequences:

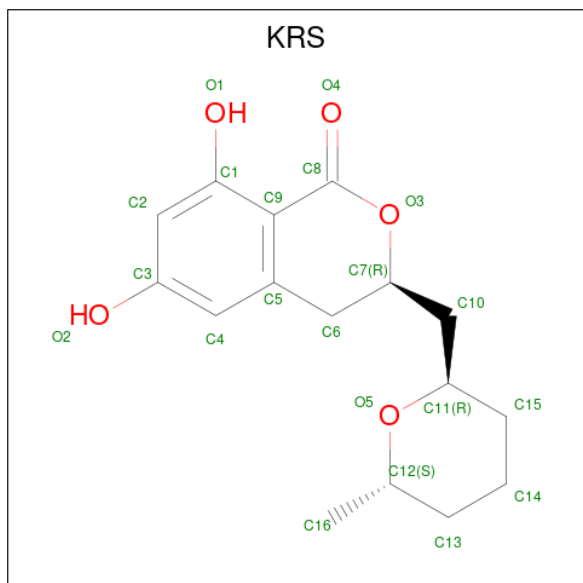
Chain	Residue	Modelled	Actual	Comment	Reference
C	37	HIS	-	expression tag	UNP Q13155
C	38	HIS	-	expression tag	UNP Q13155
C	39	HIS	-	expression tag	UNP Q13155
C	40	HIS	-	expression tag	UNP Q13155
C	41	HIS	-	expression tag	UNP Q13155
C	42	HIS	-	expression tag	UNP Q13155
D	37	HIS	-	expression tag	UNP Q13155
D	38	HIS	-	expression tag	UNP Q13155
D	39	HIS	-	expression tag	UNP Q13155
D	40	HIS	-	expression tag	UNP Q13155
D	41	HIS	-	expression tag	UNP Q13155
D	42	HIS	-	expression tag	UNP Q13155
G	37	HIS	-	expression tag	UNP Q13155
G	38	HIS	-	expression tag	UNP Q13155
G	39	HIS	-	expression tag	UNP Q13155
G	40	HIS	-	expression tag	UNP Q13155
G	41	HIS	-	expression tag	UNP Q13155
G	42	HIS	-	expression tag	UNP Q13155
H	37	HIS	-	expression tag	UNP Q13155
H	38	HIS	-	expression tag	UNP Q13155
H	39	HIS	-	expression tag	UNP Q13155
H	40	HIS	-	expression tag	UNP Q13155
H	41	HIS	-	expression tag	UNP Q13155
H	42	HIS	-	expression tag	UNP Q13155

- Molecule 3 is LYSINE (CCD ID: LYS) (formula: $C_6H_{15}N_2O_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			9	6	2	1		
3	B	1	Total	C	N	O	0	0
			9	6	2	1		
3	E	1	Total	C	N	O	0	0
			9	6	2	1		
3	F	1	Total	C	N	O	0	0
			9	6	2	1		

- Molecule 4 is cladosporin (CCD ID: KRS) (formula: C₁₆H₂₀O₅).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			21	16	5		
4	B	1	Total	C	O	0	0
			21	16	5		
4	E	1	Total	C	O	0	0
			21	16	5		
4	F	1	Total	C	O	0	0
			21	16	5		

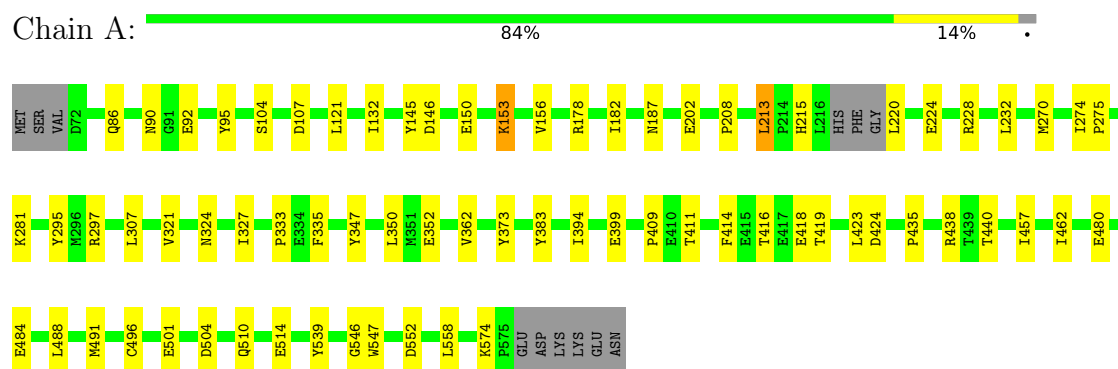
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	3	Total	O	0	0
			3	3		
5	B	3	Total	O	0	0
			3	3		
5	E	2	Total	O	0	0
			2	2		
5	F	1	Total	O	0	0
			1	1		

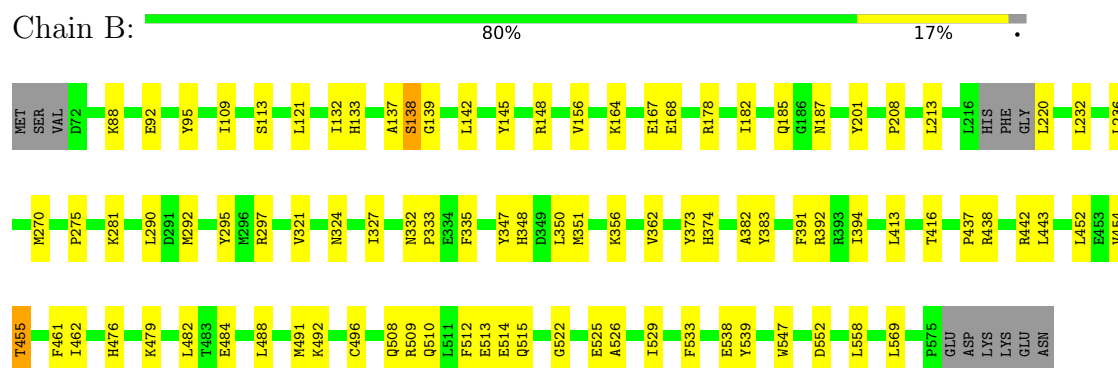
3 Residue-property plots

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.

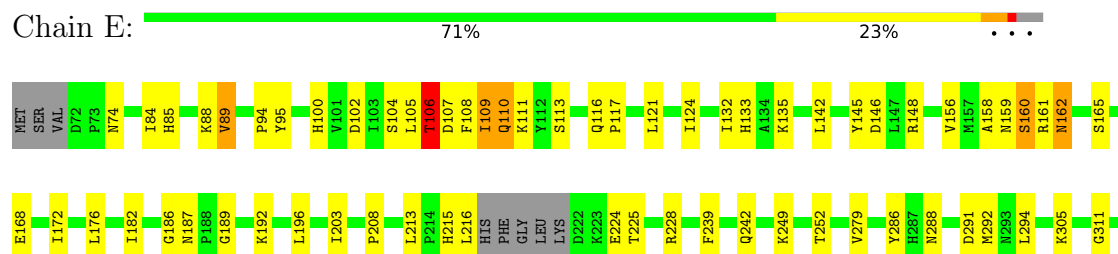
• Molecule 1: Lysine-tRNA ligase

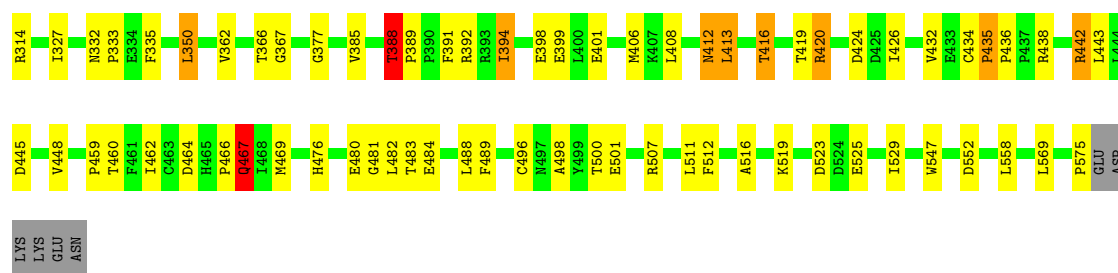


• Molecule 1: Lysine-tRNA ligase



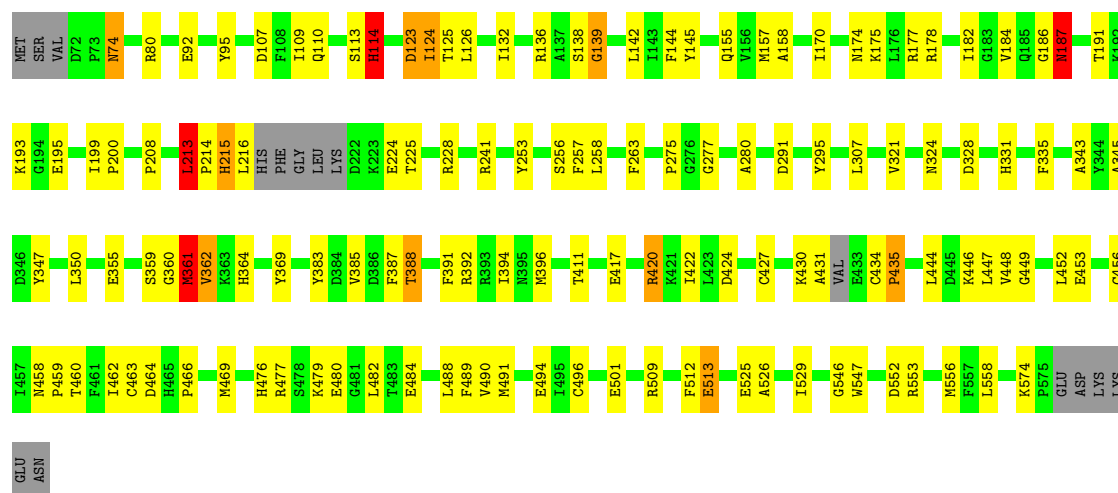
• Molecule 1: Lysine-tRNA ligase





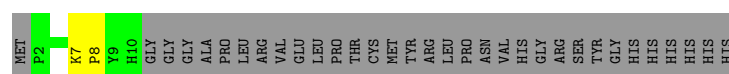
- Molecule 1: Lysine-tRNA ligase

Chain F: 71% 23% . . .



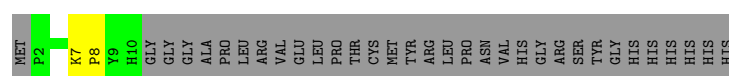
- Molecule 2: Aminoacyl tRNA synthase complex-interacting multifunctional protein 2

Chain C: 17% 5% 79%



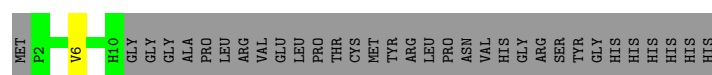
- Molecule 2: Aminoacyl tRNA synthase complex-interacting multifunctional protein 2

Chain D: 17% 5% 79%



- Molecule 2: Aminoacyl tRNA synthase complex-interacting multifunctional protein 2

Chain G: 19% . 79%



- Molecule 2: Aminoacyl tRNA synthase complex-interacting multifunctional protein 2

Chain H: 10% 12% 79%

MET	P2	M3	Y4	Q5	V6	K7	P8	Y9	H10	GLY	GLY	GLY	ALA	PRO	LEU	ARG	VAL	GLU	LEU	PRO	THR	CYS	MET	TYR	ARG	LEU	PRO	ASN	VAL	HIS	GLY	ARG	SER	TYR	GLY	HIS	HIS	HIS	HIS	HIS
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4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	51.28Å 75.56Å 162.99Å 90.80° 99.09° 109.83°	Depositor
Resolution (Å)	35.45 – 2.90 35.45 – 2.90	Depositor EDS
% Data completeness (in resolution range)	88.7 (35.45-2.90) 89.0 (35.45-2.90)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.14 (at 2.90Å)	Xtriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.223 , 0.268 0.227 , 0.273	Depositor DCC
R_{free} test set	2297 reflections (4.53%)	wwPDB-VP
Wilson B-factor (Å ²)	49.6	Xtriage
Anisotropy	0.075	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 12.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.448 for h,-h-k,-h-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	16000	wwPDB-VP
Average B, all atoms (Å ²)	62.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.68% 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: KRS

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	0.31	0/4091	0.75	3/5538 (0.1%)
1	B	0.29	0/4068	0.76	2/5509 (0.0%)
1	E	0.50	1/3859 (0.0%)	0.99	20/5251 (0.4%)
1	F	0.51	2/3902 (0.1%)	0.97	18/5304 (0.3%)
2	C	0.20	0/82	0.66	0/111
2	D	0.21	0/82	0.68	0/111
2	G	0.22	0/82	0.55	0/111
2	H	0.32	0/80	1.12	2/108 (1.9%)
All	All	0.41	3/16246 (0.0%)	0.87	45/22043 (0.2%)

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	E	0	2
1	F	0	2
All	All	0	4

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	110	GLN	C-O	6.50	1.31	1.24
1	E	106	THR	CA-C	-5.57	1.48	1.53
1	F	114	HIS	CA-C	5.13	1.59	1.52

All (45) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	108	PHE	N-CA-C	-13.80	96.40	113.38
1	F	114	HIS	N-CA-C	10.17	125.07	112.87
1	E	481	GLY	N-CA-C	-9.07	104.29	115.08
1	E	388	THR	CA-C-N	7.65	128.26	120.38
1	E	388	THR	C-N-CA	7.65	128.26	120.38
1	E	106	THR	CB-CA-C	-7.45	107.99	116.63
1	E	435	PRO	CA-C-N	7.41	125.07	119.66
1	E	435	PRO	C-N-CA	7.41	125.07	119.66
1	F	139	GLY	N-CA-C	-6.76	100.56	111.59
1	E	367	GLY	N-CA-C	6.58	122.53	114.69
1	F	362	VAL	N-CA-C	-6.32	104.18	110.62
1	F	114	HIS	CA-C-N	6.27	132.79	122.07
1	F	114	HIS	C-N-CA	6.27	132.79	122.07
1	E	213	LEU	CA-C-N	6.18	126.53	119.92
1	E	213	LEU	C-N-CA	6.18	126.53	119.92
1	E	467	GLN	CA-CB-CG	6.08	126.26	114.10
1	F	187	ASN	N-CA-C	6.05	119.05	108.82
1	F	199	ILE	CA-C-N	6.05	125.81	119.76
1	F	199	ILE	C-N-CA	6.05	125.81	119.76
1	B	138	SER	N-CA-C	-5.97	104.89	111.82
1	F	361	MET	N-CA-C	5.84	120.53	113.17
1	F	435	PRO	CA-C-N	5.71	126.27	120.38
1	F	435	PRO	C-N-CA	5.71	126.27	120.38
1	E	186	GLY	N-CA-C	5.67	119.41	111.19
1	F	145	TYR	CA-C-N	-5.54	114.37	122.19
1	F	145	TYR	C-N-CA	-5.54	114.37	122.19
1	F	107	ASP	N-CA-C	-5.44	105.25	111.07
1	B	522	GLY	N-CA-C	5.34	124.76	116.01
1	E	111	LYS	N-CA-C	-5.28	105.61	111.36
1	A	435	PRO	CA-C-N	5.26	123.50	119.66
1	A	435	PRO	C-N-CA	5.26	123.50	119.66
1	E	377	GLY	CA-C-N	5.24	124.69	119.24
1	E	377	GLY	C-N-CA	5.24	124.69	119.24
1	A	457	ILE	N-CA-C	-5.17	106.61	111.48
1	E	366	THR	N-CA-C	5.16	119.63	113.23
1	E	161	ARG	CA-C-N	5.14	127.89	120.38
1	E	161	ARG	C-N-CA	5.14	127.89	120.38
2	H	7	LYS	CA-C-N	5.11	125.11	119.90
2	H	7	LYS	C-N-CA	5.11	125.11	119.90
1	F	422	ILE	N-CA-C	-5.07	105.45	110.62
1	E	106	THR	CA-C-N	-5.07	115.02	123.33
1	E	106	THR	C-N-CA	-5.07	115.02	123.33
1	F	291	ASP	N-CA-C	-5.05	104.71	111.02

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	213	LEU	CA-C-N	5.04	125.02	120.03
1	F	213	LEU	C-N-CA	5.04	125.02	120.03

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	E	106	THR	Peptide
1	E	162	ASN	Peptide
1	F	526	ALA	Peptide
1	F	74	ASN	Peptide

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	3998	0	3916	42	0
1	B	3976	0	3896	56	0
1	E	3776	0	3549	102	1
1	F	3811	0	3537	91	0
2	C	78	0	69	1	0
2	D	78	0	69	1	0
2	G	78	0	69	0	0
2	H	76	0	62	2	0
3	A	9	0	12	1	0
3	B	9	0	12	0	0
3	E	9	0	12	1	0
3	F	9	0	12	1	0
4	A	21	0	18	0	0
4	B	21	0	18	1	0
4	E	21	0	18	4	0
4	F	21	0	18	0	0
5	A	3	0	0	0	0
5	B	3	0	0	0	0
5	E	2	0	0	0	0
5	F	1	0	0	0	0
All	All	16000	0	15287	287	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 9.

All (287) 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:F:224:GLU:HG2	1:F:228:ARG:HH22	1.16	1.10
1:E:420:ARG:HG3	1:E:420:ARG:HH11	1.27	1.00
1:E:413:LEU:O	1:E:416:THR:OG1	1.85	0.93
1:A:228:ARG:NH1	1:A:574:LYS:O	2.00	0.93
1:F:191:THR:HG22	1:F:195:GLU:H	1.34	0.90
1:E:406:MET:HE1	1:E:426:ILE:HD11	1.53	0.89
1:F:174:ASN:O	1:F:177:ARG:NH1	2.10	0.84
1:F:224:GLU:HG2	1:F:228:ARG:NH2	1.96	0.81
1:A:383:TYR:HB2	1:A:491:MET:HE1	1.65	0.78
1:B:392:ARG:HH12	1:B:455:THR:HG22	1.45	0.78
1:F:435:PRO:HD2	1:F:446:LYS:NZ	1.98	0.77
1:B:383:TYR:HB2	1:B:491:MET:HE1	1.65	0.77
1:E:335:PHE:HE2	4:E:602:KRS:H14	1.50	0.77
1:F:253:TYR:CE1	1:F:257:PHE:HB2	2.20	0.76
1:F:92:GLU:OE2	1:F:175:LYS:NZ	2.17	0.76
1:F:434:CYS:HA	1:F:446:LYS:HZ3	1.51	0.75
1:E:159:ASN:OD1	1:E:160:SER:N	2.21	0.73
1:E:488:LEU:HB3	1:E:496:CYS:HB2	1.68	0.73
1:F:420:ARG:NH2	1:F:420:ARG:HG2	2.03	0.73
1:F:420:ARG:HG2	1:F:420:ARG:HH21	1.54	0.72
1:E:445:ASP:HA	1:E:448:VAL:HG12	1.71	0.72
1:F:435:PRO:HD2	1:F:446:LYS:HZ3	1.54	0.72
1:B:488:LEU:HB3	1:B:496:CYS:HB2	1.71	0.71
1:A:488:LEU:HB3	1:A:496:CYS:HB2	1.72	0.71
1:F:355:GLU:HG2	1:F:391:PHE:HD2	1.55	0.71
1:E:107:ASP:HA	1:E:109:ILE:HG23	1.72	0.71
1:E:104:SER:O	1:E:106:THR:OG1	2.10	0.69
1:F:124:ILE:O	1:F:187:ASN:ND2	2.24	0.69
1:F:464:ASP:HB3	1:F:482:LEU:HD13	1.73	0.69
1:F:488:LEU:HB3	1:F:496:CYS:HB2	1.73	0.69
1:F:494:GLU:O	1:F:553:ARG:NH1	2.26	0.69
1:E:412:ASN:HB3	1:E:413:LEU:CD2	2.22	0.68
1:F:411:THR:OG1	1:F:480:GLU:O	2.10	0.68
1:E:420:ARG:HG3	1:E:420:ARG:NH1	1.96	0.68
1:F:215:HIS:ND1	1:F:216:LEU:N	2.41	0.68
1:F:448:VAL:HG23	1:F:452:LEU:HD12	1.75	0.68
1:A:104:SER:OG	1:A:107:ASP:OD1	2.10	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:392:ARG:HB3	1:F:460:THR:HG22	1.74	0.67
1:E:107:ASP:HB3	1:E:110:GLN:H	1.60	0.67
1:F:449:GLY:HA2	1:F:453:GLU:OE2	1.95	0.66
1:F:109:ILE:O	1:F:113:SER:HB2	1.95	0.66
1:B:437:PRO:O	1:B:442:ARG:NH2	2.29	0.65
1:E:466:PRO:HD2	1:E:469:MET:HE2	1.76	0.65
1:F:253:TYR:O	1:F:256:SER:N	2.30	0.65
1:F:125:THR:HA	1:F:187:ASN:ND2	2.12	0.65
1:F:253:TYR:CZ	1:F:257:PHE:HB2	2.32	0.65
1:E:292:MET:HE3	1:E:294:LEU:HD21	1.78	0.65
1:F:328:ASP:OD2	1:F:331:HIS:ND1	2.30	0.65
1:F:191:THR:HG23	1:F:193:LYS:H	1.62	0.65
1:F:494:GLU:HB3	1:F:553:ARG:HH12	1.63	0.64
1:A:350:LEU:HD13	1:A:547:TRP:HB2	1.79	0.64
1:A:424:ASP:OD2	1:A:438:ARG:NH2	2.30	0.64
1:A:394:ILE:HD11	1:A:462:ILE:HG12	1.80	0.63
1:F:350:LEU:HD13	1:F:547:TRP:HB2	1.79	0.63
1:E:406:MET:HE1	1:E:426:ILE:CD1	2.26	0.62
1:F:215:HIS:O	1:F:216:LEU:HG	1.99	0.62
1:F:144:PHE:CE1	1:F:157:MET:HG3	2.35	0.62
1:F:434:CYS:HA	1:F:446:LYS:NZ	2.14	0.62
1:E:142:LEU:HD12	1:E:158:ALA:O	2.00	0.61
1:F:509:ARG:O	1:F:513:GLU:HG2	2.01	0.61
1:E:288:ASN:HD22	1:F:324:ASN:ND2	1.99	0.60
1:E:84:ILE:HG23	1:E:88:LYS:NZ	2.16	0.60
1:B:515:GLN:HG2	1:B:526:ALA:HB1	1.83	0.60
1:E:311:GLY:O	1:F:241:ARG:NH2	2.34	0.60
1:B:392:ARG:HH12	1:B:455:THR:CG2	2.15	0.60
1:F:420:ARG:HH21	1:F:420:ARG:CG	2.15	0.59
1:E:165:SER:HB2	1:E:168:GLU:HG3	1.85	0.59
1:E:88:LYS:HZ1	1:E:94:PRO:HB2	1.67	0.59
1:E:332:ASN:O	4:E:602:KRS:H3	2.03	0.59
1:A:202:GLU:OE2	1:E:412:ASN:OD1	2.20	0.59
1:A:504:ASP:OD1	1:B:88:LYS:NZ	2.36	0.58
1:B:508:GLN:HE21	1:B:533:PHE:HE2	1.51	0.58
1:E:416:THR:HB	1:E:419:THR:H	1.68	0.57
2:H:8:PRO:HB3	2:H:10:HIS:CE1	2.39	0.57
1:A:409:PRO:HG2	1:A:419:THR:HG23	1.86	0.57
1:E:107:ASP:HB3	1:E:110:GLN:HG2	1.86	0.57
1:B:178:ARG:NH1	1:B:213:LEU:HB2	2.19	0.57
1:E:394:ILE:HG23	1:E:462:ILE:HA	1.87	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:327:ILE:HG12	1:A:333:PRO:HD3	1.87	0.57
1:B:327:ILE:HG12	1:B:333:PRO:HD3	1.87	0.56
1:E:392:ARG:HB3	1:E:460:THR:HG22	1.87	0.56
1:F:280:ALA:O	1:F:525:GLU:HG3	2.05	0.56
3:E:601:LYS:O	4:E:602:KRS:H16	2.05	0.56
1:F:258:LEU:HB3	1:F:263:PHE:HB2	1.87	0.56
1:A:178:ARG:NH1	1:A:213:LEU:HB3	2.21	0.56
1:B:362:VAL:HG22	1:B:558:LEU:HD21	1.87	0.56
1:E:350:LEU:HD13	1:E:547:TRP:HB2	1.87	0.56
1:B:513:GLU:HA	1:B:529:ILE:HD11	1.86	0.56
1:E:420:ARG:HH11	1:E:420:ARG:CG	2.09	0.56
1:F:394:ILE:HG22	1:F:462:ILE:HA	1.87	0.55
1:E:467:GLN:NE2	1:E:511:LEU:HD11	2.20	0.55
1:F:123:ASP:OD1	1:F:124:ILE:N	2.40	0.55
1:F:361:MET:HA	1:F:364:HIS:H	1.72	0.55
1:A:86:GLN:OE1	1:A:90:ASN:ND2	2.40	0.55
1:B:270:MET:HA	1:B:297:ARG:HD3	1.89	0.54
1:B:164:LYS:HG2	1:B:201:TYR:CZ	2.43	0.54
1:A:145:TYR:HB2	1:A:156:VAL:HB	1.90	0.54
1:A:362:VAL:HG22	1:A:558:LEU:HD21	1.89	0.54
1:B:348:HIS:HA	1:B:351:MET:HE3	1.88	0.54
1:B:509:ARG:NH2	1:B:538:GLU:OE2	2.41	0.54
1:E:335:PHE:CE2	4:E:602:KRS:H14	2.38	0.54
1:F:459:PRO:HA	1:F:489:PHE:O	2.07	0.54
1:F:178:ARG:NH1	1:F:213:LEU:HB3	2.24	0.53
1:B:350:LEU:HD13	1:B:547:TRP:HB2	1.88	0.53
1:B:479:LYS:HD3	1:B:482:LEU:HD12	1.89	0.53
1:E:466:PRO:HA	1:E:482:LEU:HA	1.90	0.53
1:E:107:ASP:HB3	1:E:110:GLN:CG	2.39	0.53
1:E:512:PHE:HB3	1:E:529:ILE:HG12	1.91	0.52
1:E:162:ASN:N	1:E:162:ASN:OD1	2.42	0.52
1:E:459:PRO:HA	1:E:489:PHE:O	2.10	0.52
1:A:423:LEU:HD12	1:A:440:THR:HG23	1.92	0.52
1:E:401:GLU:HB3	1:E:406:MET:O	2.08	0.52
1:B:512:PHE:HB3	1:B:529:ILE:HG12	1.91	0.52
1:F:383:TYR:HD2	1:F:491:MET:HE1	1.75	0.51
1:A:335:PHE:HB2	1:A:552:ASP:OD2	2.10	0.51
1:F:459:PRO:HB3	1:F:490:VAL:HG22	1.92	0.51
1:E:88:LYS:HZ2	1:E:94:PRO:HD2	1.75	0.51
1:B:121:LEU:O	1:B:187:ASN:HB3	2.10	0.51
1:E:106:THR:HB	1:E:107:ASP:C	2.36	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:413:LEU:CD2	1:E:413:LEU:N	2.73	0.51
1:F:191:THR:HG23	1:F:193:LYS:N	2.26	0.51
1:A:104:SER:HB2	1:A:150:GLU:OE2	2.11	0.51
1:E:132:ILE:HD11	1:E:182:ILE:HD13	1.91	0.51
1:E:239:PHE:O	1:E:242:GLN:HB2	2.11	0.51
1:A:373:TYR:HD2	1:A:491:MET:HE3	1.76	0.51
1:E:84:ILE:HG23	1:E:88:LYS:HZ3	1.76	0.51
1:A:146:ASP:OD1	1:A:153:LYS:NZ	2.32	0.51
1:F:494:GLU:HB3	1:F:553:ARG:NH1	2.26	0.51
1:E:362:VAL:HG22	1:E:558:LEU:HD21	1.93	0.50
1:A:121:LEU:O	1:A:187:ASN:HB3	2.11	0.50
1:A:424:ASP:OD2	1:A:438:ARG:HD3	2.11	0.50
1:F:253:TYR:CE1	1:F:361:MET:SD	3.04	0.50
1:A:274:ILE:HD12	1:A:275:PRO:HD2	1.93	0.50
1:B:145:TYR:HB2	1:B:156:VAL:HB	1.92	0.50
1:F:224:GLU:CG	1:F:228:ARG:HH22	2.05	0.50
1:F:430:LYS:O	1:F:431:ALA:HB2	2.11	0.50
1:E:391:PHE:CD2	1:E:459:PRO:HB2	2.46	0.50
1:F:335:PHE:HB2	1:F:552:ASP:OD2	2.11	0.50
1:F:157:MET:O	1:F:200:PRO:HD2	2.12	0.50
1:E:476:HIS:HA	1:E:484:GLU:HG3	1.94	0.50
1:F:512:PHE:HB3	1:F:529:ILE:HG12	1.94	0.49
1:A:394:ILE:HB	1:A:399:GLU:OE1	2.12	0.49
1:F:124:ILE:C	1:F:187:ASN:HD21	2.20	0.49
1:A:539:TYR:CE1	1:B:232:LEU:HD21	2.48	0.49
1:E:467:GLN:OE1	1:E:483:THR:CG2	2.61	0.49
1:B:510:GLN:O	1:B:514:GLU:HG3	2.11	0.49
1:E:239:PHE:HA	1:E:242:GLN:HB2	1.95	0.49
1:E:406:MET:CE	1:E:426:ILE:HD11	2.35	0.49
1:E:133:HIS:HD2	1:E:133:HIS:O	1.95	0.49
1:B:335:PHE:HB2	1:B:552:ASP:OD2	2.12	0.49
1:B:347:TYR:CD2	1:B:484:GLU:HB3	2.48	0.49
1:A:95:TYR:CE1	1:A:208:PRO:HD2	2.48	0.48
1:A:416:THR:HG22	1:A:418:GLU:H	1.78	0.48
1:E:215:HIS:ND1	1:E:216:LEU:HG	2.28	0.48
1:E:412:ASN:HB3	1:E:413:LEU:HD22	1.92	0.48
1:E:133:HIS:O	1:E:133:HIS:CD2	2.66	0.48
1:E:189:GLY:O	1:E:196:LEU:HD12	2.13	0.48
1:B:452:LEU:O	1:B:455:THR:HB	2.13	0.48
1:E:412:ASN:CB	1:E:413:LEU:CD2	2.91	0.48
1:E:480:GLU:C	1:E:482:LEU:H	2.22	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:109:ILE:HA	1:E:196:LEU:HD23	1.96	0.48
1:A:347:TYR:CD2	1:A:484:GLU:HB3	2.49	0.48
1:E:88:LYS:HZ2	1:E:94:PRO:CG	2.27	0.48
1:E:412:ASN:CB	1:E:413:LEU:HD23	2.43	0.48
1:B:220:LEU:HD22	1:B:236:LEU:HD12	1.95	0.47
1:E:85:HIS:O	1:E:89:VAL:HG23	2.14	0.47
1:E:314:ARG:NH2	2:H:4:TYR:O	2.35	0.47
1:E:406:MET:SD	1:E:426:ILE:HD12	2.54	0.47
1:B:413:LEU:O	1:B:416:THR:HG22	2.14	0.47
1:E:249:LYS:HA	1:E:252:THR:OG1	2.15	0.47
1:E:88:LYS:HZ2	1:E:94:PRO:HG2	1.78	0.47
1:F:424:ASP:O	1:F:427:CYS:HB2	2.14	0.47
1:A:501:GLU:OE2	3:A:601:LYS:NZ	2.45	0.47
1:B:332:ASN:O	4:B:602:KRS:H3	2.14	0.47
1:B:373:TYR:HD2	1:B:491:MET:HE3	1.80	0.47
1:E:100:HIS:NE2	1:E:102:ASP:OD1	2.47	0.47
1:E:133:HIS:CD2	1:E:133:HIS:C	2.93	0.47
1:F:359:SER:OG	1:F:360:GLY:N	2.47	0.47
1:F:114:HIS:ND1	1:F:114:HIS:C	2.73	0.47
1:F:132:ILE:HD11	1:F:182:ILE:HD13	1.97	0.46
1:B:525:GLU:HG2	1:B:526:ALA:N	2.31	0.46
1:B:95:TYR:CE1	1:B:208:PRO:HD2	2.51	0.46
1:B:138:SER:HB2	1:B:142:LEU:HB3	1.96	0.46
1:E:228:ARG:NH1	1:E:575:PRO:HA	2.30	0.46
1:E:305:LYS:HD3	1:E:501:GLU:HB3	1.96	0.46
1:E:435:PRO:O	1:E:442:ARG:NH1	2.48	0.46
1:F:124:ILE:HD12	1:F:126:LEU:HD13	1.97	0.46
1:A:232:LEU:HD21	1:B:539:TYR:CE2	2.51	0.46
1:E:286:TYR:OH	1:E:291:ASP:OD1	2.34	0.46
1:A:510:GLN:O	1:A:514:GLU:HG3	2.16	0.46
1:F:347:TYR:OH	1:F:463:CYS:HB3	2.15	0.46
1:E:391:PHE:CE2	1:E:459:PRO:HB2	2.51	0.46
1:B:515:GLN:HG2	1:B:526:ALA:CB	2.45	0.45
1:F:138:SER:OG	1:F:142:LEU:O	2.25	0.45
1:A:307:LEU:HD11	1:B:569:LEU:HD13	1.98	0.45
1:B:374:HIS:NE2	1:B:382:ALA:HB2	2.32	0.45
1:E:516:ALA:HB2	1:E:529:ILE:HG13	1.98	0.45
1:F:142:LEU:HD12	1:F:158:ALA:O	2.16	0.45
1:F:396:MET:SD	1:F:469:MET:HE1	2.56	0.45
1:F:385:VAL:HG23	1:F:458:ASN:HA	1.98	0.45
1:F:391:PHE:CE1	1:F:459:PRO:HG2	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:109:ILE:HA	1:E:196:LEU:CD2	2.46	0.45
1:F:275:PRO:HD3	1:F:295:TYR:CD1	2.51	0.45
1:F:435:PRO:HD2	1:F:446:LYS:HZ1	1.78	0.45
1:F:95:TYR:CE1	1:F:208:PRO:HD2	2.52	0.45
1:A:281:LYS:HB2	1:A:324:ASN:O	2.17	0.45
1:A:501:GLU:OE2	1:A:546:GLY:HA3	2.17	0.45
1:F:213:LEU:HA	1:F:214:PRO:HD3	1.76	0.45
1:F:434:CYS:HA	1:F:435:PRO:HD2	1.86	0.45
1:A:132:ILE:HD11	1:A:182:ILE:HD13	1.98	0.45
1:B:167:GLU:H	1:B:167:GLU:CD	2.24	0.44
1:E:95:TYR:CE2	1:E:208:PRO:HD2	2.52	0.44
1:F:355:GLU:HG2	1:F:391:PHE:CD2	2.45	0.44
1:A:411:THR:OG1	1:A:480:GLU:O	2.24	0.44
1:E:117:PRO:HB3	1:E:192:LYS:HA	1.99	0.44
1:E:569:LEU:HD13	1:F:307:LEU:HD11	2.00	0.44
1:F:138:SER:OG	1:F:139:GLY:N	2.50	0.44
1:F:369:TYR:CG	1:F:388:THR:HG23	2.52	0.44
1:A:270:MET:HA	1:A:297:ARG:HD3	2.00	0.44
1:B:454:VAL:HA	1:B:492:LYS:HG2	2.00	0.44
2:D:7:LYS:HA	2:D:8:PRO:HD3	1.90	0.44
2:C:7:LYS:HA	2:C:8:PRO:HD3	1.91	0.43
1:E:124:ILE:O	1:E:187:ASN:OD1	2.35	0.43
1:B:275:PRO:HD3	1:B:295:TYR:CD1	2.53	0.43
1:E:133:HIS:CG	1:E:148:ARG:HH21	2.36	0.43
1:E:406:MET:CE	1:E:426:ILE:CD1	2.94	0.43
1:F:501:GLU:OE2	1:F:546:GLY:HA3	2.18	0.43
1:B:438:ARG:HG2	1:B:443:LEU:HD21	2.00	0.43
1:E:88:LYS:NZ	1:E:94:PRO:HB2	2.33	0.43
1:E:438:ARG:CB	1:E:443:LEU:HD11	2.49	0.43
1:F:277:GLY:O	3:F:601:LYS:N	2.51	0.43
1:B:133:HIS:CG	1:B:148:ARG:HD2	2.53	0.42
1:E:239:PHE:C	1:E:242:GLN:HB2	2.44	0.42
1:A:373:TYR:HB3	1:A:491:MET:HE3	2.01	0.42
1:B:270:MET:HE2	1:B:297:ARG:NH2	2.34	0.42
1:E:498:ALA:HB2	1:E:547:TRP:CD1	2.54	0.42
1:F:343:ALA:C	1:F:345:ALA:H	2.27	0.42
1:B:132:ILE:HD11	1:B:182:ILE:HD13	2.00	0.42
1:B:281:LYS:HB2	1:B:324:ASN:O	2.19	0.42
1:B:392:ARG:NH1	1:B:455:THR:HG22	2.24	0.42
1:F:476:HIS:HA	1:F:484:GLU:CG	2.49	0.42
1:A:373:TYR:CD2	1:A:491:MET:HE3	2.53	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:401:GLU:OE2	1:E:408:LEU:HB2	2.19	0.42
1:F:552:ASP:O	1:F:556:MET:HG3	2.19	0.42
1:F:362:VAL:HG21	1:F:387:PHE:CD2	2.54	0.42
1:E:388:THR:HA	1:E:389:PRO:HD2	1.90	0.42
1:A:414:PHE:HA	1:A:419:THR:HG21	2.01	0.42
1:B:137:ALA:HB1	1:B:139:GLY:HA2	2.01	0.42
1:E:84:ILE:CG2	1:E:88:LYS:HZ3	2.33	0.42
1:E:327:ILE:HG12	1:E:333:PRO:HD3	2.02	0.42
1:B:476:HIS:HB3	1:B:479:LYS:O	2.20	0.42
1:E:116:GLN:CD	1:E:116:GLN:H	2.27	0.42
1:E:145:TYR:HB2	1:E:156:VAL:HB	2.01	0.41
1:E:279:VAL:HG13	1:E:525:GLU:O	2.20	0.41
1:F:186:GLY:HA3	1:F:200:PRO:HA	2.02	0.41
1:E:110:GLN:HA	1:E:113:SER:OG	2.20	0.41
1:F:477:ARG:HG2	1:F:484:GLU:OE2	2.20	0.41
1:B:394:ILE:HD11	1:B:462:ILE:HG12	2.00	0.41
1:E:172:ILE:O	1:E:176:LEU:HG	2.20	0.41
1:B:164:LYS:HE2	1:B:164:LYS:HB3	1.73	0.41
1:E:434:CYS:HA	1:E:435:PRO:HD2	1.90	0.41
1:F:80:ARG:NH1	1:F:177:ARG:HB2	2.34	0.41
1:B:185:GLN:O	1:B:201:TYR:N	2.47	0.41
1:E:146:ASP:OD2	1:E:148:ARG:NH1	2.52	0.41
1:E:224:GLU:O	1:E:228:ARG:HG3	2.21	0.41
1:A:411:THR:HA	1:A:414:PHE:CD1	2.56	0.41
1:B:290:LEU:HD23	1:B:292:MET:HE2	2.03	0.41
1:E:435:PRO:HA	1:E:436:PRO:HD3	1.79	0.41
1:E:159:ASN:C	1:E:162:ASN:OD1	2.64	0.41
1:E:172:ILE:HG12	1:E:203:ILE:HB	2.02	0.41
1:F:394:ILE:O	1:F:463:CYS:N	2.53	0.41
1:F:466:PRO:HA	1:F:482:LEU:HA	2.03	0.41
1:B:373:TYR:HB3	1:B:491:MET:HE3	2.03	0.40
1:E:88:LYS:NZ	1:E:94:PRO:HG2	2.36	0.40
1:E:88:LYS:HZ2	1:E:94:PRO:CD	2.33	0.40
1:E:335:PHE:HB2	1:E:552:ASP:OD2	2.21	0.40
1:E:519:LYS:HA	1:E:523:ASP:O	2.21	0.40
1:F:453:GLU:HA	1:F:456:CYS:SG	2.61	0.40
1:A:275:PRO:HD3	1:A:295:TYR:CD1	2.56	0.40
1:B:164:LYS:HB3	1:B:168:GLU:OE2	2.21	0.40
1:F:476:HIS:HA	1:F:484:GLU:HG2	2.02	0.40
1:F:476:HIS:HB3	1:F:479:LYS:O	2.20	0.40
1:B:109:ILE:O	1:B:113:SER:OG	2.33	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:391:PHE:HB2	1:B:461:PHE:CE2	2.57	0.40
1:F:558:LEU:HD23	1:F:558:LEU:HA	1.89	0.40
1:F:383:TYR:CD2	1:F:491:MET:HE1	2.56	0.40
1:F:444:LEU:HA	1:F:447:LEU:HB2	2.04	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:E:74:ASN:ND2	1:E:116:GLN:OE1[1_455]	2.17	0.03

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	497/513 (97%)	486 (98%)	11 (2%)	0	100	100
1	B	497/513 (97%)	489 (98%)	8 (2%)	0	100	100
1	E	495/513 (96%)	477 (96%)	18 (4%)	0	100	100
1	F	492/513 (96%)	476 (97%)	16 (3%)	0	100	100
2	C	7/42 (17%)	7 (100%)	0	0	100	100
2	D	7/42 (17%)	7 (100%)	0	0	100	100
2	G	7/42 (17%)	7 (100%)	0	0	100	100
2	H	7/42 (17%)	7 (100%)	0	0	100	100
All	All	2009/2220 (90%)	1956 (97%)	53 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	427/455 (94%)	419 (98%)	8 (2%)	50	79
1	B	423/455 (93%)	419 (99%)	4 (1%)	70	90
1	E	376/455 (83%)	350 (93%)	26 (7%)	14	41
1	F	379/455 (83%)	360 (95%)	19 (5%)	22	53
2	C	8/36 (22%)	8 (100%)	0	100	100
2	D	8/36 (22%)	8 (100%)	0	100	100
2	G	8/36 (22%)	7 (88%)	1 (12%)	4	15
2	H	7/36 (19%)	6 (86%)	1 (14%)	3	11
All	All	1636/1964 (83%)	1577 (96%)	59 (4%)	31	65

All (59) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	92	GLU
1	A	153	LYS
1	A	213	LEU
1	A	215	HIS
1	A	220	LEU
1	A	224	GLU
1	A	321	VAL
1	A	352	GLU
1	B	92	GLU
1	B	321	VAL
1	B	356	LYS
1	B	455	THR
1	E	89	VAL
1	E	105	LEU
1	E	106	THR
1	E	109	ILE
1	E	110	GLN
1	E	121	LEU
1	E	135	LYS

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Mol	Chain	Res	Type
1	E	160	SER
1	E	225	THR
1	E	350	LEU
1	E	385	VAL
1	E	388	THR
1	E	394	ILE
1	E	398	GLU
1	E	399	GLU
1	E	412	ASN
1	E	413	LEU
1	E	416	THR
1	E	420	ARG
1	E	424	ASP
1	E	432	VAL
1	E	442	ARG
1	E	464	ASP
1	E	467	GLN
1	E	500	THR
1	E	507	ARG
1	F	74	ASN
1	F	114	HIS
1	F	123	ASP
1	F	124	ILE
1	F	136	ARG
1	F	155	GLN
1	F	170	ILE
1	F	184	VAL
1	F	187	ASN
1	F	213	LEU
1	F	215	HIS
1	F	225	THR
1	F	321	VAL
1	F	361	MET
1	F	388	THR
1	F	417	GLU
1	F	420	ARG
1	F	513	GLU
1	F	574	LYS
2	G	6	VAL
2	H	5	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	116	GLN
1	A	155	GLN
1	A	272	ASN
1	A	287	HIS
1	A	324	ASN
1	E	110	GLN
1	E	133	HIS
1	E	229	GLN
1	E	272	ASN
1	E	288	ASN
1	E	412	ASN
1	E	458	ASN
1	F	133	HIS
1	F	155	GLN
1	F	242	GLN
1	F	272	ASN
2	H	10	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

8 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
4	KRS	E	602	-	23,23,23	2.04	3 (13%)	33,33,33	1.44	7 (21%)
3	LYS	A	601	-	7,8,9	0.46	0	3,8,10	0.45	0
3	LYS	F	601	-	7,8,9	0.46	0	3,8,10	0.43	0
3	LYS	B	601	-	7,8,9	0.47	0	3,8,10	0.46	0
3	LYS	E	601	-	7,8,9	0.47	0	3,8,10	0.43	0
4	KRS	B	602	-	23,23,23	1.73	3 (13%)	33,33,33	2.44	10 (30%)
4	KRS	F	602	-	23,23,23	1.99	3 (13%)	33,33,33	1.50	7 (21%)
4	KRS	A	602	-	23,23,23	2.00	3 (13%)	33,33,33	1.49	6 (18%)

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
4	KRS	E	602	-	-	0/4/26/26	0/3/3/3
3	LYS	A	601	-	-	0/6/7/9	-
3	LYS	F	601	-	-	0/6/7/9	-
3	LYS	B	601	-	-	0/6/7/9	-
3	LYS	E	601	-	-	0/6/7/9	-
4	KRS	B	602	-	-	0/4/26/26	0/3/3/3
4	KRS	F	602	-	-	0/4/26/26	0/3/3/3
4	KRS	A	602	-	-	0/4/26/26	0/3/3/3

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	E	602	KRS	O3-C8	7.44	1.46	1.34
4	A	602	KRS	O3-C8	7.31	1.46	1.34
4	F	602	KRS	O3-C8	7.19	1.45	1.34
4	B	602	KRS	O3-C8	5.33	1.43	1.34
4	F	602	KRS	C9-C1	4.53	1.48	1.41
4	E	602	KRS	C9-C1	4.51	1.48	1.41
4	A	602	KRS	C9-C1	4.43	1.48	1.41
4	E	602	KRS	C9-C5	3.50	1.48	1.41
4	A	602	KRS	C9-C5	3.42	1.48	1.41
4	F	602	KRS	C9-C5	3.41	1.48	1.41
4	B	602	KRS	O5-C12	-3.09	1.39	1.44
4	B	602	KRS	O3-C7	-2.69	1.40	1.46

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	602	KRS	O5-C12-C13	-8.34	103.60	109.91
4	B	602	KRS	C14-C13-C12	-5.99	106.93	111.00
4	A	602	KRS	C7-O3-C8	-4.10	112.74	118.78
4	B	602	KRS	C11-C10-C7	-4.05	108.31	114.43
4	F	602	KRS	C7-O3-C8	-3.94	112.97	118.78
4	E	602	KRS	C7-O3-C8	-3.82	113.14	118.78
4	B	602	KRS	O3-C8-O4	3.53	121.39	117.53
4	E	602	KRS	C1-C9-C8	3.44	123.55	119.77
4	B	602	KRS	O1-C1-C9	-3.32	115.00	121.14
4	F	602	KRS	C1-C9-C8	2.93	123.00	119.77
4	A	602	KRS	C1-C9-C8	2.92	122.99	119.77
4	B	602	KRS	C1-C9-C5	2.72	121.44	118.61
4	A	602	KRS	C11-C10-C7	-2.67	110.39	114.43
4	B	602	KRS	O3-C7-C10	-2.67	101.89	106.10
4	B	602	KRS	C4-C5-C9	-2.66	116.15	119.54
4	F	602	KRS	C11-C10-C7	-2.62	110.48	114.43
4	F	602	KRS	C14-C13-C12	-2.62	109.22	111.00
4	B	602	KRS	O1-C1-C2	2.44	126.03	119.45
4	E	602	KRS	C2-C1-C9	-2.35	118.29	120.92
4	F	602	KRS	C2-C1-C9	-2.33	118.31	120.92
4	A	602	KRS	C14-C13-C12	-2.30	109.44	111.00
4	E	602	KRS	C11-C10-C7	-2.30	110.95	114.43
4	B	602	KRS	C2-C3-C4	2.30	123.62	120.47
4	A	602	KRS	C2-C1-C9	-2.27	118.38	120.92
4	E	602	KRS	O3-C8-O4	2.22	119.96	117.53
4	F	602	KRS	C10-C7-C6	-2.19	109.33	113.44
4	E	602	KRS	O3-C7-C10	2.16	109.50	106.10
4	E	602	KRS	C10-C7-C6	-2.11	109.47	113.44
4	A	602	KRS	O3-C8-O4	2.11	119.84	117.53
4	F	602	KRS	O3-C8-O4	2.05	119.77	117.53

There are no chirality outliers.

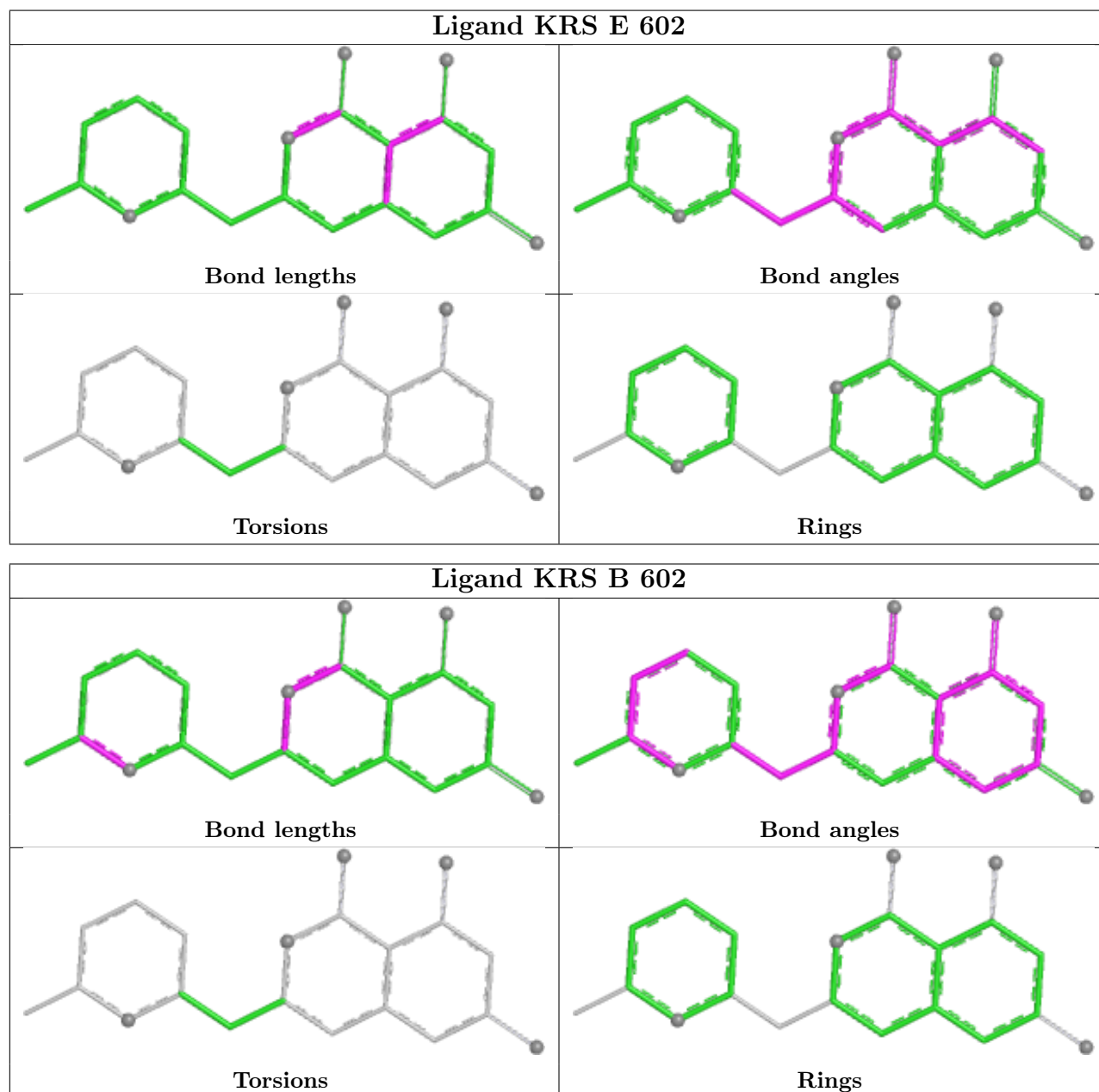
There are no torsion outliers.

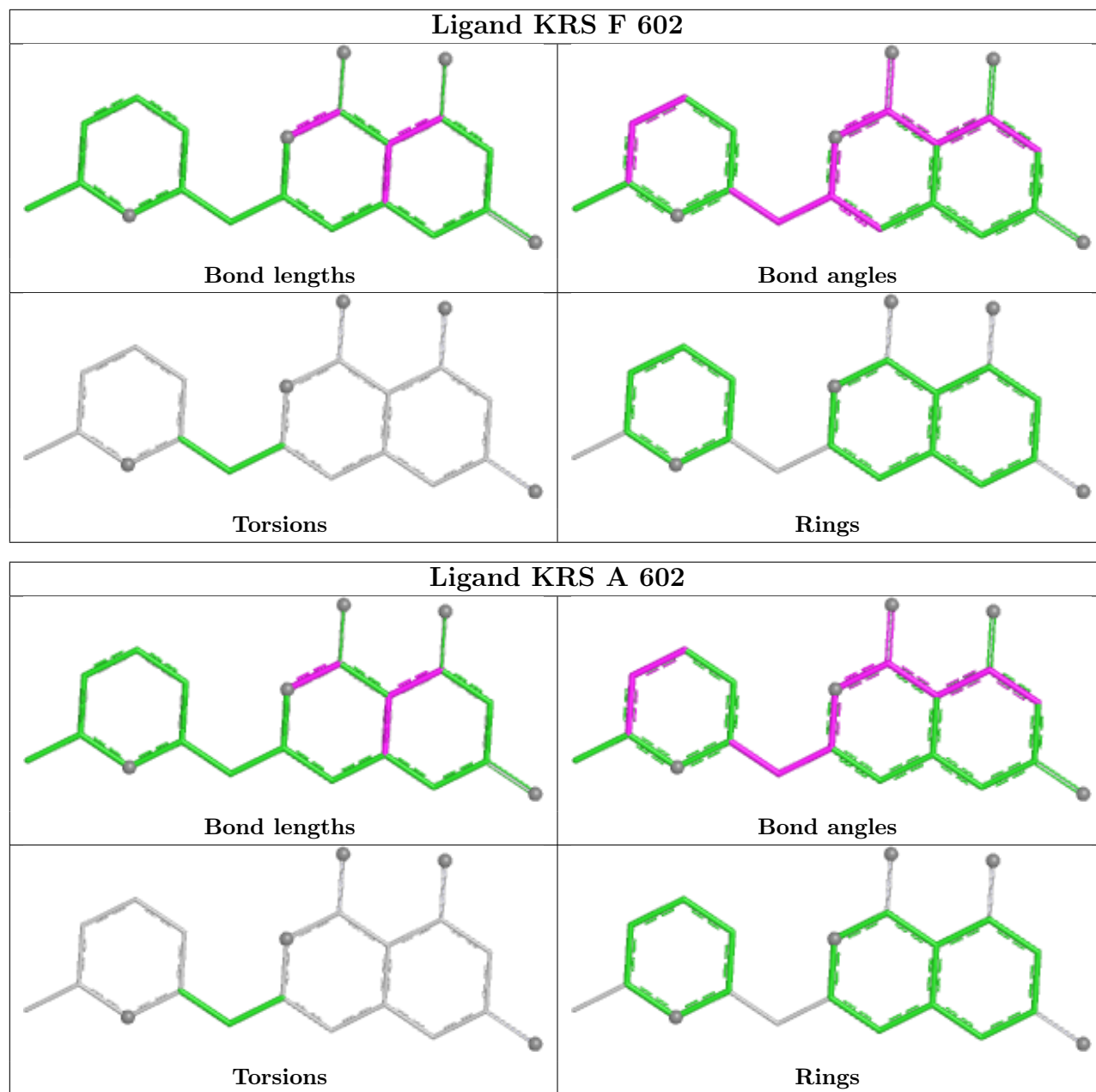
There are no ring outliers.

5 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	602	KRS	4	0
3	A	601	LYS	1	0
3	F	601	LYS	1	0
3	E	601	LYS	1	0
4	B	602	KRS	1	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 [i](#)

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

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	501/513 (97%)	-1.44	0 100 100	25, 46, 80, 202	2 (0%)
1	B	501/513 (97%)	-1.41	0 100 100	24, 47, 83, 174	1 (0%)
1	E	499/513 (97%)	-1.03	0 100 100	34, 72, 128, 198	1 (0%)
1	F	498/513 (97%)	-1.02	0 100 100	30, 72, 126, 160	4 (0%)
2	C	9/42 (21%)	-1.16	0 100 100	30, 49, 58, 81	0
2	D	9/42 (21%)	-1.26	0 100 100	34, 47, 62, 68	0
2	G	9/42 (21%)	-0.47	0 100 100	62, 90, 104, 108	0
2	H	9/42 (21%)	-0.87	0 100 100	63, 82, 90, 106	0
All	All	2035/2220 (91%)	-1.22	0 100 100	24, 57, 117, 202	8 (0%)

There are no RSRZ outliers to report.

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

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

6.3 Carbohydrates [i](#)

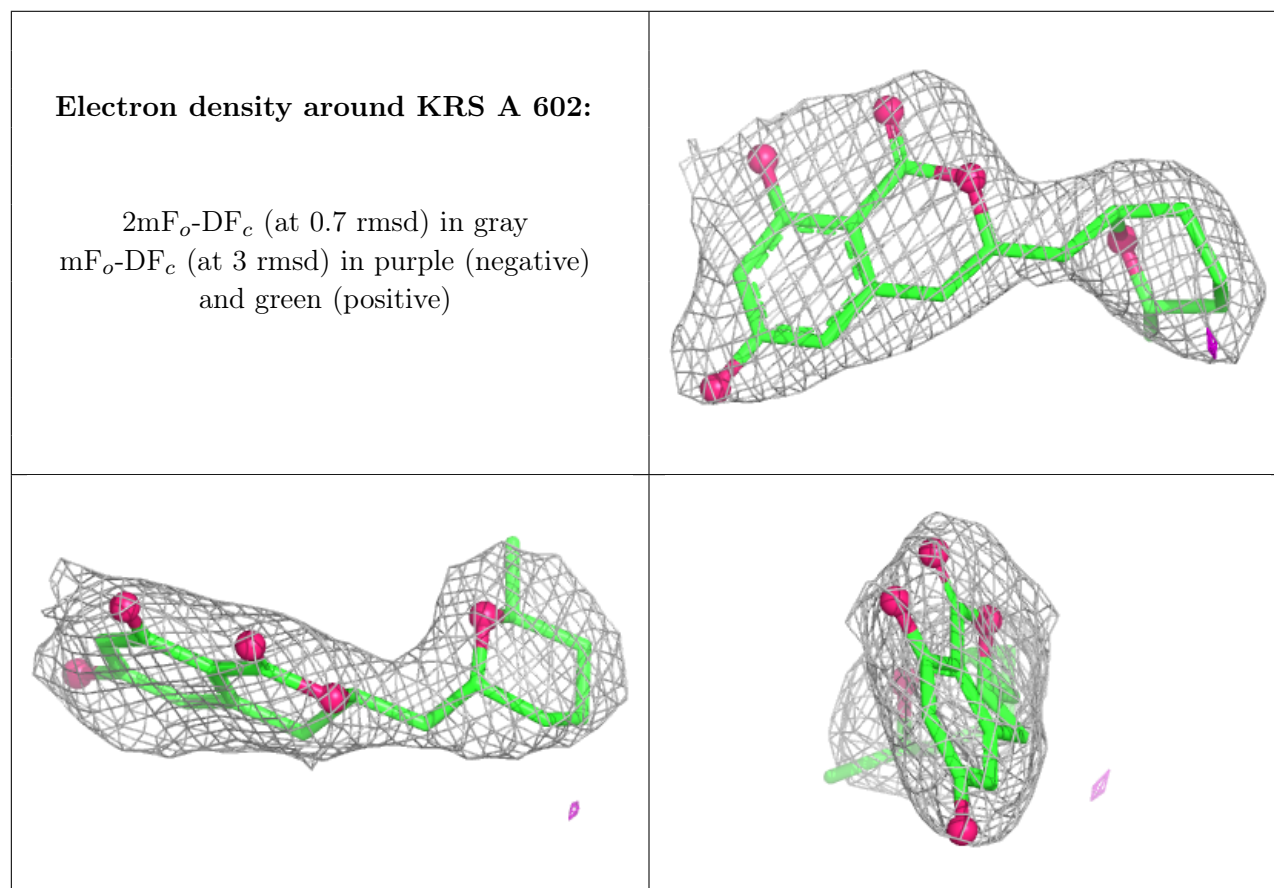
There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

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

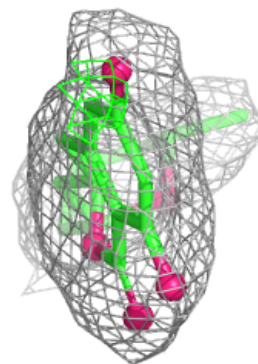
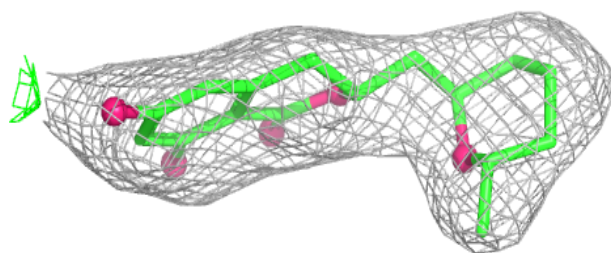
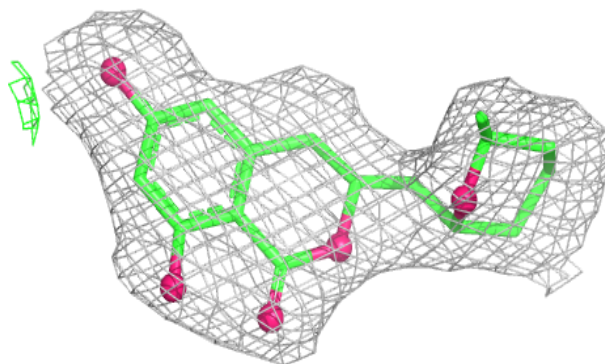
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	LYS	E	601	9/10	0.98	0.05	30,36,38,43	0
3	LYS	B	601	9/10	0.99	0.05	26,31,39,40	0
3	LYS	A	601	9/10	0.99	0.04	28,29,34,37	0
3	LYS	F	601	9/10	0.99	0.05	36,44,57,58	0
4	KRS	A	602	21/21	0.99	0.04	26,33,45,51	0
4	KRS	B	602	21/21	0.99	0.04	28,40,47,49	0
4	KRS	E	602	21/21	0.99	0.05	44,54,62,66	0
4	KRS	F	602	21/21	0.99	0.05	36,47,56,61	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.

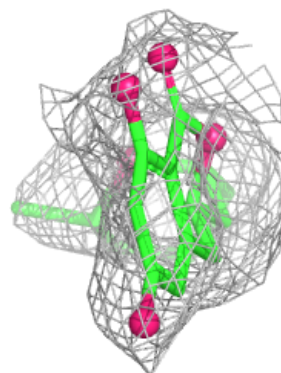
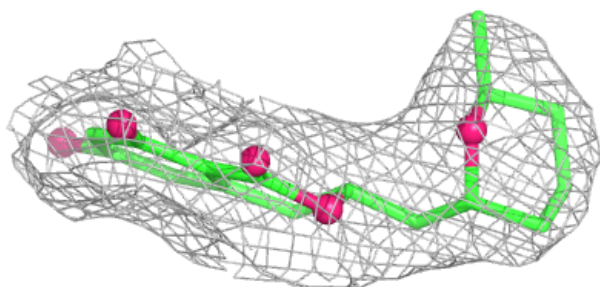
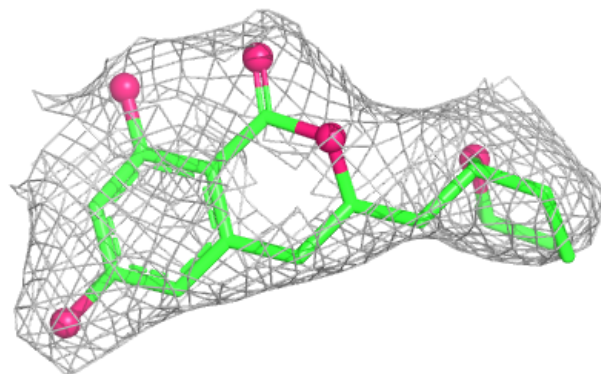


Electron density around KRS B 602:

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

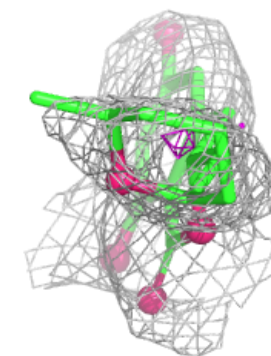
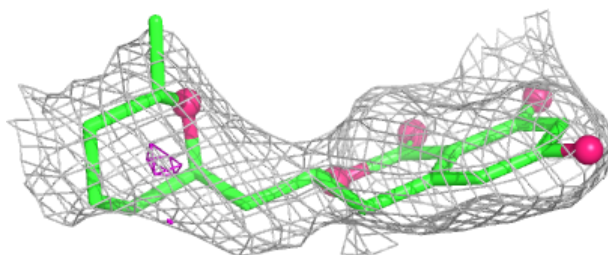
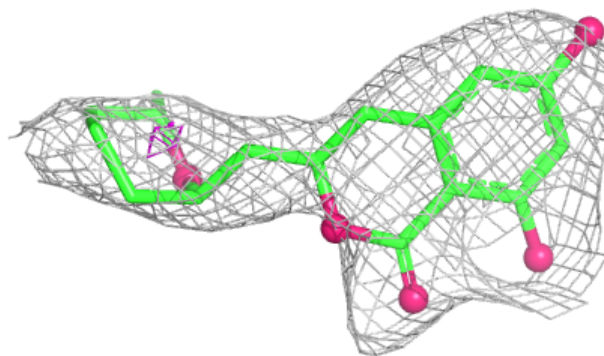
**Electron density around KRS E 602:**

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



Electron density around KRS F 602:

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



6.5 Other polymers [i](#)

There are no such residues in this entry.