Full wwPDB X-ray Structure Validation Report ⓘ

Oct 14, 2025 – 12:09 PM EDT

PDB ID	:	9YMM / pdb_00009ymm
Title	:	Crystal structure of Glutamate–tRNA ligase (GltX) from Moraxella catarrhalis in complex with 5'-O-(N-Glutamyl)sulfamoyladeonosine
Authors	:	Seattle Structural Genomics Center for Infectious Disease; Seattle Structural Genomics Center for Infectious Disease (SSGCID)
Deposited on	:	2025-10-10
Resolution	:	2.92 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:

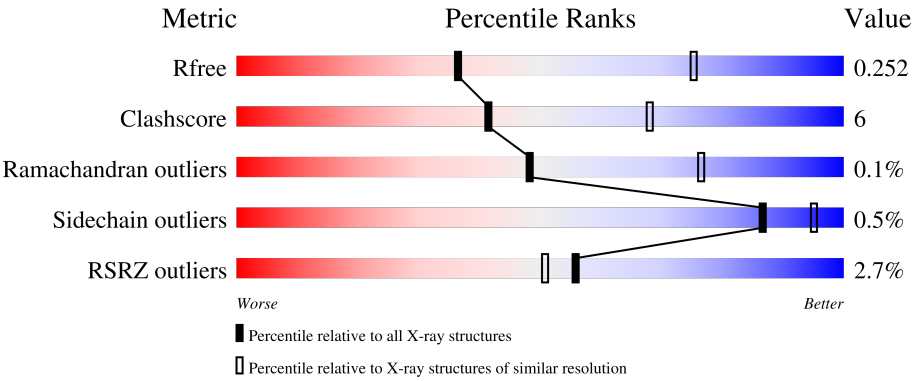
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

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 2.92 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}	164625	2797 (2.94-2.90)
Clashscore	180529	3049 (2.94-2.90)
Ramachandran outliers	177936	2981 (2.94-2.90)
Sidechain outliers	177891	2983 (2.94-2.90)
RSRZ outliers	164620	2799 (2.94-2.90)

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 <=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	519	4% 82% 12% 6%
1	B	519	2% 74% 13% 12%
1	C	519	2% 77% 13% 10%
1	D	519	3% 82% 12% 7%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 15316 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 Glutamate–tRNA ligase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	489	Total	C	N	O	S	0	0	0
			3840	2466	647	704	23			
1	B	456	Total	C	N	O	S	0	0	0
			3624	2332	613	660	19			
1	C	467	Total	C	N	O	S	0	0	0
			3691	2375	624	673	19			
1	D	485	Total	C	N	O	S	0	0	0
			3786	2425	642	697	22			

There are 88 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	MET	-	expression tag	UNP A0AB36DQE3
A	-6	ALA	-	expression tag	UNP A0AB36DQE3
A	-5	HIS	-	expression tag	UNP A0AB36DQE3
A	-4	HIS	-	expression tag	UNP A0AB36DQE3
A	-3	HIS	-	expression tag	UNP A0AB36DQE3
A	-2	HIS	-	expression tag	UNP A0AB36DQE3
A	-1	HIS	-	expression tag	UNP A0AB36DQE3
A	0	HIS	-	expression tag	UNP A0AB36DQE3
A	1	MET	-	expression tag	UNP A0AB36DQE3
A	2	GLY	-	expression tag	UNP A0AB36DQE3
A	3	THR	-	expression tag	UNP A0AB36DQE3
A	4	LEU	-	expression tag	UNP A0AB36DQE3
A	5	GLU	-	expression tag	UNP A0AB36DQE3
A	6	ALA	-	expression tag	UNP A0AB36DQE3
A	7	GLN	-	expression tag	UNP A0AB36DQE3
A	8	THR	-	expression tag	UNP A0AB36DQE3
A	9	GLN	-	expression tag	UNP A0AB36DQE3
A	10	GLY	-	expression tag	UNP A0AB36DQE3
A	11	PRO	-	expression tag	UNP A0AB36DQE3
A	12	GLY	-	expression tag	UNP A0AB36DQE3
A	13	SER	-	expression tag	UNP A0AB36DQE3

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Chain	Residue	Modelled	Actual	Comment	Reference
A	150	ASN	THR	conflict	UNP A0AB36DQE3
B	-7	MET	-	expression tag	UNP A0AB36DQE3
B	-6	ALA	-	expression tag	UNP A0AB36DQE3
B	-5	HIS	-	expression tag	UNP A0AB36DQE3
B	-4	HIS	-	expression tag	UNP A0AB36DQE3
B	-3	HIS	-	expression tag	UNP A0AB36DQE3
B	-2	HIS	-	expression tag	UNP A0AB36DQE3
B	-1	HIS	-	expression tag	UNP A0AB36DQE3
B	0	HIS	-	expression tag	UNP A0AB36DQE3
B	1	MET	-	expression tag	UNP A0AB36DQE3
B	2	GLY	-	expression tag	UNP A0AB36DQE3
B	3	THR	-	expression tag	UNP A0AB36DQE3
B	4	LEU	-	expression tag	UNP A0AB36DQE3
B	5	GLU	-	expression tag	UNP A0AB36DQE3
B	6	ALA	-	expression tag	UNP A0AB36DQE3
B	7	GLN	-	expression tag	UNP A0AB36DQE3
B	8	THR	-	expression tag	UNP A0AB36DQE3
B	9	GLN	-	expression tag	UNP A0AB36DQE3
B	10	GLY	-	expression tag	UNP A0AB36DQE3
B	11	PRO	-	expression tag	UNP A0AB36DQE3
B	12	GLY	-	expression tag	UNP A0AB36DQE3
B	13	SER	-	expression tag	UNP A0AB36DQE3
B	150	ASN	THR	conflict	UNP A0AB36DQE3
C	-7	MET	-	expression tag	UNP A0AB36DQE3
C	-6	ALA	-	expression tag	UNP A0AB36DQE3
C	-5	HIS	-	expression tag	UNP A0AB36DQE3
C	-4	HIS	-	expression tag	UNP A0AB36DQE3
C	-3	HIS	-	expression tag	UNP A0AB36DQE3
C	-2	HIS	-	expression tag	UNP A0AB36DQE3
C	-1	HIS	-	expression tag	UNP A0AB36DQE3
C	0	HIS	-	expression tag	UNP A0AB36DQE3
C	1	MET	-	expression tag	UNP A0AB36DQE3
C	2	GLY	-	expression tag	UNP A0AB36DQE3
C	3	THR	-	expression tag	UNP A0AB36DQE3
C	4	LEU	-	expression tag	UNP A0AB36DQE3
C	5	GLU	-	expression tag	UNP A0AB36DQE3
C	6	ALA	-	expression tag	UNP A0AB36DQE3
C	7	GLN	-	expression tag	UNP A0AB36DQE3
C	8	THR	-	expression tag	UNP A0AB36DQE3
C	9	GLN	-	expression tag	UNP A0AB36DQE3
C	10	GLY	-	expression tag	UNP A0AB36DQE3
C	11	PRO	-	expression tag	UNP A0AB36DQE3

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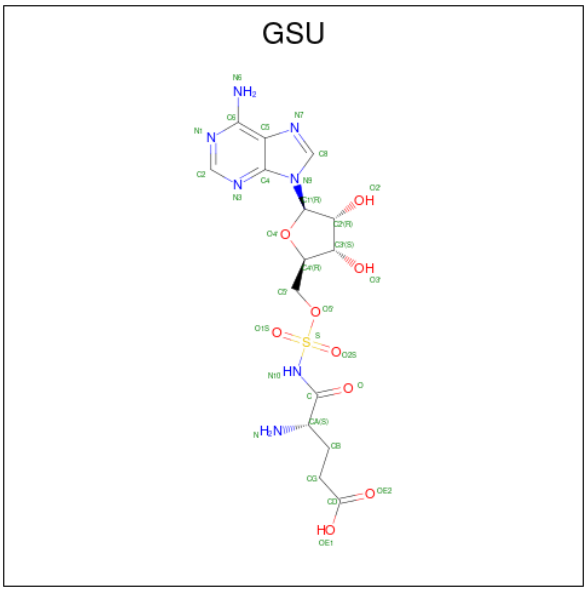
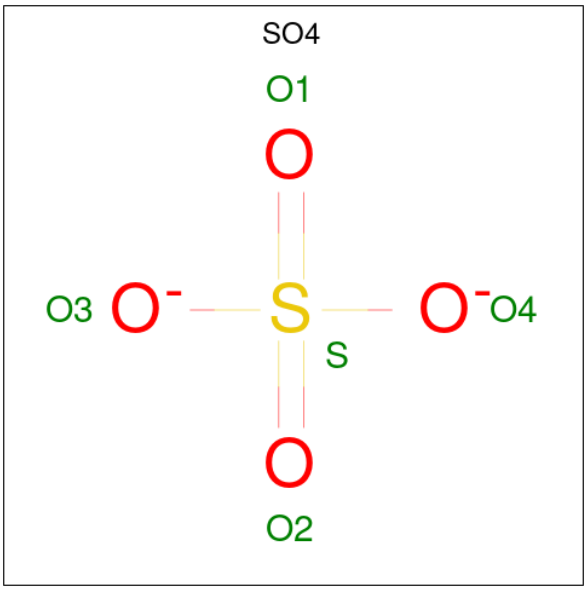
Chain	Residue	Modelled	Actual	Comment	Reference
C	12	GLY	-	expression tag	UNP A0AB36DQE3
C	13	SER	-	expression tag	UNP A0AB36DQE3
C	150	ASN	THR	conflict	UNP A0AB36DQE3
D	-7	MET	-	expression tag	UNP A0AB36DQE3
D	-6	ALA	-	expression tag	UNP A0AB36DQE3
D	-5	HIS	-	expression tag	UNP A0AB36DQE3
D	-4	HIS	-	expression tag	UNP A0AB36DQE3
D	-3	HIS	-	expression tag	UNP A0AB36DQE3
D	-2	HIS	-	expression tag	UNP A0AB36DQE3
D	-1	HIS	-	expression tag	UNP A0AB36DQE3
D	0	HIS	-	expression tag	UNP A0AB36DQE3
D	1	MET	-	expression tag	UNP A0AB36DQE3
D	2	GLY	-	expression tag	UNP A0AB36DQE3
D	3	THR	-	expression tag	UNP A0AB36DQE3
D	4	LEU	-	expression tag	UNP A0AB36DQE3
D	5	GLU	-	expression tag	UNP A0AB36DQE3
D	6	ALA	-	expression tag	UNP A0AB36DQE3
D	7	GLN	-	expression tag	UNP A0AB36DQE3
D	8	THR	-	expression tag	UNP A0AB36DQE3
D	9	GLN	-	expression tag	UNP A0AB36DQE3
D	10	GLY	-	expression tag	UNP A0AB36DQE3
D	11	PRO	-	expression tag	UNP A0AB36DQE3
D	12	GLY	-	expression tag	UNP A0AB36DQE3
D	13	SER	-	expression tag	UNP A0AB36DQE3
D	150	ASN	THR	conflict	UNP A0AB36DQE3

- Molecule 2 is O5'-(L-GLUTAMYL-SULFAMOYL)-ADENOSINE (CCD ID: GSU) (formula: $C_{15}H_{21}N_7O_9S$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	S	0	0
			32	15	7	9	1		
2	B	1	Total	C	N	O	S	0	0
			32	15	7	9	1		
2	C	1	Total	C	N	O	S	0	0
			32	15	7	9	1		
2	D	1	Total	C	N	O	S	0	0
			32	15	7	9	1		

- Molecule 3 is SULFATE ION (CCD ID: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	B	1	Total 5	O 4	S 1	0	0
3	B	1	Total 5	O 4	S 1	0	0
3	B	1	Total 5	O 4	S 1	0	0
3	B	1	Total 5	O 4	S 1	0	0
3	B	1	Total 5	O 4	S 1	0	0
3	C	1	Total 5	O 4	S 1	0	0
3	C	1	Total 5	O 4	S 1	0	0

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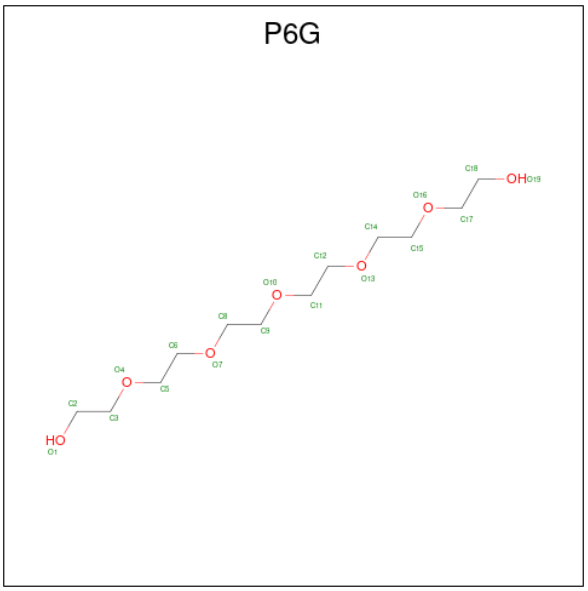
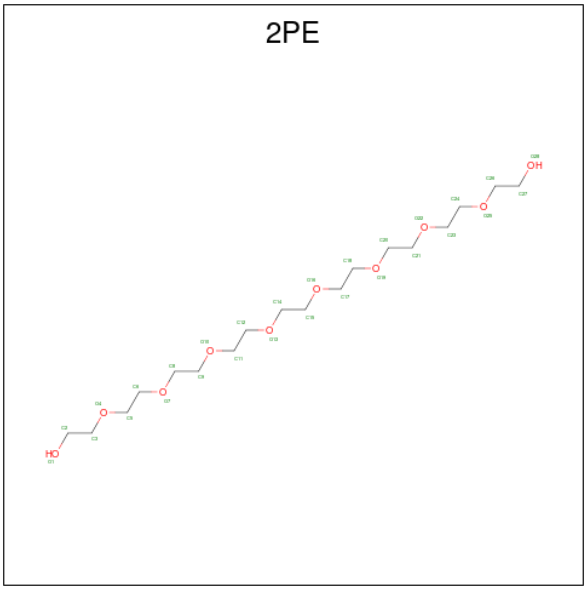
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	C	1	Total O S 5 4 1	0	0
3	C	1	Total O S 5 4 1	0	0
3	C	1	Total O S 5 4 1	0	0
3	C	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0

- Molecule 4 is HEXAETHYLENE GLYCOL (CCD ID: P6G) (formula: $C_{12}H_{26}O_7$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total C O 19 12 7	0	0

- Molecule 5 is NONAETHYLENE GLYCOL (CCD ID: 2PE) (formula: $C_{18}H_{38}O_{10}$).



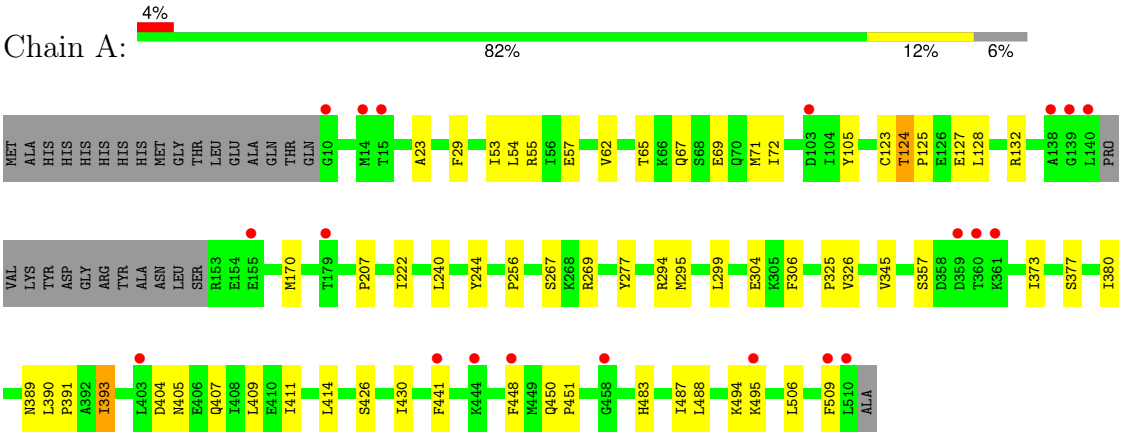
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	D	1	Total C O 28 18 10	0	0

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.

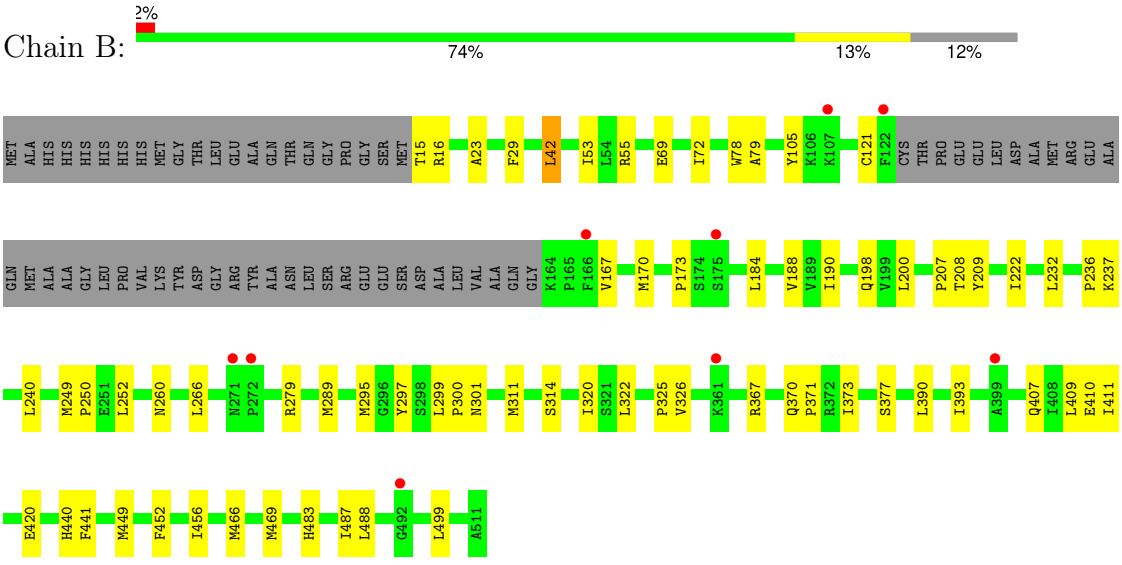
• Molecule 1: Glutamate–tRNA ligase

Chain A:



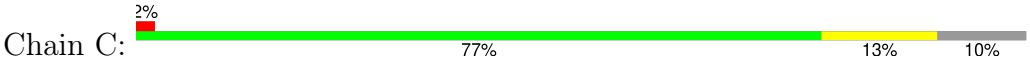
• Molecule 1: Glutamate–tRNA ligase

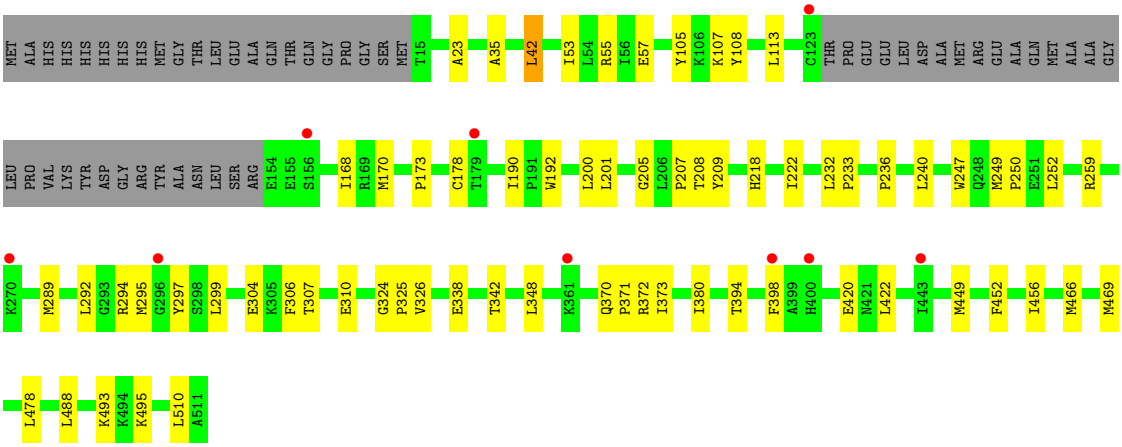
Chain B:



• Molecule 1: Glutamate–tRNA ligase

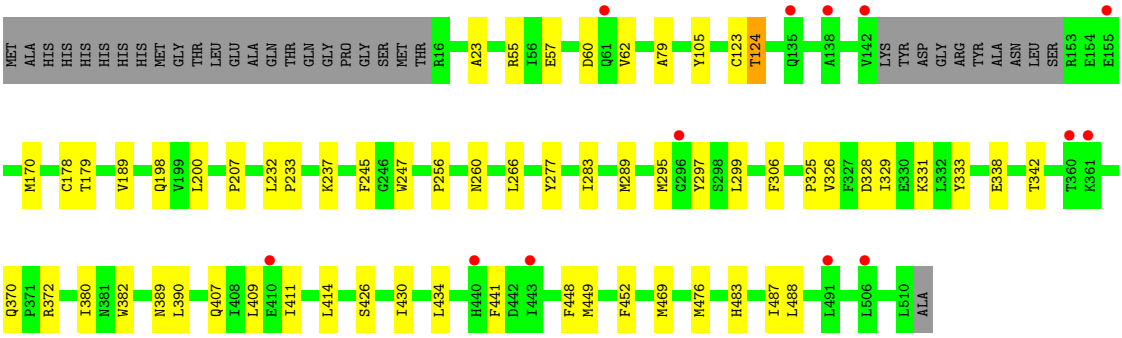
Chain C:





• Molecule 1: Glutamate–tRNA ligase

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	53.71Å 124.22Å 458.21Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.30 – 2.92 49.30 – 2.92	Depositor EDS
% Data completeness (in resolution range)	99.8 (49.30-2.92) 99.9 (49.30-2.92)	Depositor EDS
R_{merge}	0.22	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.94 (at 2.91Å)	Xtriage
Refinement program	PHENIX (2.0_5765: ???)	Depositor
R, R_{free}	0.214 , 0.253 0.218 , 0.252	Depositor DCC
R_{free} test set	3359 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å^2)	63.2	Xtriage
Anisotropy	1.001	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 71.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.46$, $< L^2 > = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	15316	wwPDB-VP
Average B, all atoms (Å^2)	83.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.75% 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: P6G, GSU, SO4, 2PE

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	0.25	0/3932	0.44	0/5336
1	B	0.23	0/3714	0.41	0/5041
1	C	0.23	0/3781	0.42	0/5130
1	D	0.23	0/3879	0.42	0/5277
All	All	0.23	0/15306	0.42	0/20784

There are no bond length outliers.

There are no bond angle outliers.

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	3840	0	3798	42	0
1	B	3624	0	3594	54	0
1	C	3691	0	3651	52	0
1	D	3786	0	3669	47	0
2	A	32	0	20	0	0
2	B	32	0	20	1	0
2	C	32	0	20	0	0
2	D	32	0	20	0	0
3	A	75	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	25	0	0	0	0
3	C	30	0	0	0	0
3	D	70	0	0	1	0
4	B	19	0	26	1	0
5	D	28	0	38	0	0
All	All	15316	0	14856	190	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 6.

All (190) 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:C:371:PRO:HB2	1:C:372:ARG:NH1	2.00	0.77
1:A:295:MET:HE1	1:A:326:VAL:O	1.85	0.76
1:C:249:MET:HE2	1:C:252:LEU:HD11	1.70	0.74
1:A:295:MET:HE1	1:A:326:VAL:C	2.13	0.73
1:B:184:LEU:HD11	1:B:320:ILE:HB	1.71	0.72
1:B:184:LEU:HD22	1:B:322:LEU:HD21	1.71	0.71
1:D:328:ASP:HB3	1:D:331:LYS:HD3	1.72	0.71
1:B:170:MET:HE3	1:B:198:GLN:HB3	1.73	0.70
1:D:407:GLN:O	1:D:411:ILE:HD12	1.94	0.67
1:C:371:PRO:HB2	1:C:372:ARG:HH11	1.58	0.67
1:B:295:MET:HE1	1:B:326:VAL:C	2.20	0.66
1:B:295:MET:HE3	1:B:325:PRO:HB2	1.78	0.66
1:B:249:MET:HE2	1:B:252:LEU:HD11	1.78	0.65
1:A:391:PRO:O	1:A:393:ILE:HD12	1.98	0.64
1:D:426:SER:O	1:D:430:ILE:HD12	1.96	0.64
1:C:295:MET:HE3	1:C:325:PRO:HB2	1.80	0.64
1:B:483:HIS:O	1:B:487:ILE:HD12	1.99	0.63
1:C:259:ARG:HD2	1:C:324:GLY:HA3	1.81	0.62
1:B:250:PRO:O	1:B:252:LEU:HD12	1.99	0.62
1:C:295:MET:HE1	1:C:326:VAL:C	2.23	0.62
1:A:294:ARG:HD2	1:A:304:GLU:O	2.00	0.61
1:D:295:MET:HE1	1:D:326:VAL:C	2.25	0.61
1:C:170:MET:HB3	1:C:200:LEU:HD11	1.81	0.61
1:B:407:GLN:O	1:B:411:ILE:HD12	2.01	0.60
1:C:452:PHE:CD2	1:C:469:MET:HE1	2.37	0.60
1:A:426:SER:O	1:A:430:ILE:HD12	2.01	0.60
1:C:173:PRO:HD3	1:C:240:LEU:HD21	1.84	0.60
1:A:407:GLN:O	1:A:411:ILE:HD12	2.01	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:295:MET:HE3	1:D:325:PRO:HB2	1.82	0.59
1:B:483:HIS:CE1	1:B:487:ILE:HD11	2.38	0.59
1:D:297:TYR:HE1	1:D:299:LEU:HD23	1.69	0.58
1:C:208:THR:HG22	1:C:209:TYR:H	1.68	0.58
1:A:299:LEU:HD11	1:A:306:PHE:CG	2.38	0.58
1:B:170:MET:HE1	1:B:237:LYS:HB3	1.86	0.58
1:D:170:MET:HB3	1:D:200:LEU:HD11	1.87	0.57
1:B:170:MET:HE2	1:B:200:LEU:HD21	1.87	0.57
1:D:23:ALA:HB1	1:D:57:GLU:HG3	1.87	0.57
1:A:411:ILE:HG23	1:A:448:PHE:CE1	2.40	0.56
1:C:250:PRO:O	1:C:252:LEU:HD12	2.05	0.56
1:C:493:LYS:N	1:C:493:LYS:HD3	2.21	0.56
1:B:393:ILE:HD11	1:B:487:ILE:HD13	1.85	0.56
1:A:105:TYR:CD2	1:A:207:PRO:HG3	2.41	0.56
1:A:483:HIS:NE2	1:A:487:ILE:HD11	2.21	0.55
1:C:249:MET:HE2	1:C:252:LEU:CD1	2.35	0.55
1:A:295:MET:HE3	1:A:325:PRO:HB2	1.88	0.55
1:C:42:LEU:C	1:C:42:LEU:HD13	2.32	0.55
1:A:494:LYS:HG3	1:A:495:LYS:HD2	1.87	0.55
1:C:208:THR:HG22	1:C:209:TYR:N	2.21	0.55
1:C:449:MET:HE2	1:C:466:MET:HE2	1.89	0.55
1:C:380:ILE:HD11	1:D:380:ILE:CD1	2.37	0.54
1:D:329:ILE:HD11	1:D:333:TYR:OH	2.07	0.54
1:D:389:ASN:CG	1:D:390:LEU:HD12	2.33	0.54
1:B:440:HIS:ND1	1:B:441:PHE:CE1	2.73	0.53
1:B:452:PHE:CD2	1:B:469:MET:HE1	2.44	0.53
1:B:409:LEU:HD21	1:B:488:LEU:HB2	1.91	0.53
1:C:105:TYR:CD2	1:C:207:PRO:HG3	2.44	0.52
1:B:299:LEU:HD21	1:B:311:MET:HA	1.90	0.52
1:D:277:TYR:OH	1:D:390:LEU:HD11	2.09	0.52
1:C:297:TYR:HE2	1:C:299:LEU:HD23	1.75	0.52
1:A:389:ASN:C	1:A:390:LEU:HD12	2.35	0.51
1:D:411:ILE:HG23	1:D:448:PHE:CE2	2.45	0.51
1:C:53:ILE:HD11	1:C:222:ILE:HD11	1.92	0.51
1:A:405:ASN:O	1:A:409:LEU:HD13	2.10	0.51
1:A:430:ILE:HD12	1:A:430:ILE:H	1.76	0.51
1:B:15:THR:HG22	1:B:16:ARG:H	1.75	0.51
1:C:449:MET:HE2	1:C:466:MET:CE	2.41	0.51
1:B:300:PRO:O	1:B:301:ASN:HB2	2.11	0.50
1:B:42:LEU:HD13	1:B:42:LEU:C	2.36	0.50
1:D:256:PRO:HB2	1:D:325:PRO:HD3	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:456:ILE:HG13	1:C:469:MET:HE2	1.94	0.50
1:B:208:THR:HG22	1:B:209:TYR:H	1.77	0.50
1:C:398:PHE:HB2	1:C:488:LEU:HD21	1.93	0.50
1:C:420:GLU:HG2	1:C:478:LEU:HD13	1.93	0.50
1:D:372:ARG:HD3	1:D:382:TRP:CH2	2.47	0.50
1:B:184:LEU:CD2	1:B:322:LEU:HD21	2.42	0.49
1:B:410:GLU:HG3	1:B:499:LEU:HD11	1.93	0.49
1:A:506:LEU:HD22	1:A:509:PHE:HZ	1.77	0.49
1:B:483:HIS:NE2	1:B:487:ILE:HD11	2.27	0.49
1:B:440:HIS:ND1	1:B:441:PHE:HE1	2.10	0.49
1:D:295:MET:HE1	1:D:326:VAL:O	2.12	0.49
1:B:188:VAL:HG21	1:B:232:LEU:HD11	1.94	0.49
1:D:60:ASP:OD1	1:D:62:VAL:HG12	2.13	0.48
1:B:121:CYS:O	1:B:167:VAL:HG22	2.14	0.48
1:C:42:LEU:HD13	1:C:42:LEU:O	2.13	0.48
1:B:297:TYR:HE2	1:B:299:LEU:HD23	1.78	0.48
1:D:452:PHE:CD2	1:D:469:MET:HE1	2.48	0.48
1:D:283:ILE:HD11	1:D:333:TYR:CD1	2.49	0.47
1:D:299:LEU:HD11	1:D:306:PHE:CG	2.49	0.47
1:D:389:ASN:CG	1:D:390:LEU:CD1	2.87	0.47
1:C:299:LEU:HD11	1:C:306:PHE:CG	2.49	0.47
1:A:240:LEU:HG	1:A:244:TYR:CZ	2.49	0.47
1:A:124:THR:HG22	1:A:125:PRO:HD2	1.95	0.47
1:B:390:LEU:HD23	1:B:483:HIS:CG	2.49	0.47
1:C:495:LYS:H	1:C:495:LYS:HD2	1.79	0.47
1:D:123:CYS:O	1:D:124:THR:HB	2.15	0.47
1:A:23:ALA:HB1	1:A:57:GLU:HG3	1.97	0.47
1:D:123:CYS:O	1:D:124:THR:CB	2.62	0.47
1:B:69:GLU:O	1:B:72:ILE:HG22	2.14	0.47
1:B:173:PRO:HD3	1:B:240:LEU:HD21	1.97	0.47
1:D:179:THR:HG22	1:D:189:VAL:HG12	1.97	0.47
1:D:483:HIS:NE2	1:D:487:ILE:HD11	2.30	0.47
1:C:449:MET:CE	1:C:466:MET:HE2	2.45	0.47
1:A:405:ASN:O	1:A:409:LEU:CD1	2.63	0.47
1:D:105:TYR:CD2	1:D:207:PRO:HG3	2.50	0.47
1:A:409:LEU:HD11	1:A:488:LEU:HB3	1.96	0.46
1:C:23:ALA:HA	1:C:55:ARG:O	2.15	0.46
1:A:295:MET:HE3	1:A:325:PRO:CB	2.45	0.46
1:D:389:ASN:C	1:D:390:LEU:HD12	2.40	0.46
1:D:389:ASN:OD1	1:D:390:LEU:HD12	2.16	0.46
1:B:53:ILE:HD11	1:B:222:ILE:HD11	1.96	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:190:ILE:HD12	1:B:236:PRO:HG3	1.97	0.46
1:C:190:ILE:HD12	1:C:236:PRO:CG	2.45	0.46
1:A:65:THR:HG22	1:A:67:GLN:H	1.81	0.46
1:A:414:LEU:HD12	1:A:441:PHE:HZ	1.80	0.46
1:A:267:SER:OG	1:A:269:ARG:NH1	2.49	0.46
1:A:377:SER:O	1:A:380:ILE:HG22	2.16	0.46
1:A:345:VAL:HG11	1:B:367:ARG:HB2	1.96	0.46
1:B:29:PHE:CE2	1:B:420:GLU:HG3	2.51	0.45
1:D:409:LEU:HD11	1:D:488:LEU:HB3	1.99	0.45
1:B:78:TRP:CD1	1:B:279:ARG:HD3	2.52	0.45
1:B:449:MET:HE2	1:B:466:MET:HE3	1.99	0.45
1:B:260:ASN:ND2	1:B:266:LEU:HD12	2.32	0.45
1:B:105:TYR:CD2	1:B:207:PRO:HG3	2.52	0.45
1:C:289:MET:CE	1:C:292:LEU:HD12	2.47	0.45
1:D:331:LYS:HE2	3:D:608:SO4:O1	2.16	0.45
1:A:277:TYR:OH	1:A:390:LEU:HD11	2.16	0.45
1:B:440:HIS:HD1	1:B:441:PHE:HE1	1.53	0.45
1:C:23:ALA:HB1	1:C:57:GLU:HG3	1.98	0.45
1:C:493:LYS:HD3	1:C:493:LYS:H	1.80	0.45
1:A:389:ASN:HB2	1:B:377:SER:OG	2.17	0.44
1:C:307:THR:OG1	1:C:310:GLU:HG3	2.17	0.44
1:B:300:PRO:HG2	1:B:314:SER:HB2	2.00	0.44
1:C:493:LYS:H	1:C:493:LYS:CD	2.29	0.44
1:B:184:LEU:HD22	1:B:322:LEU:CD2	2.44	0.44
1:A:54:LEU:C	1:A:54:LEU:HD23	2.42	0.44
1:A:29:PHE:CD1	1:A:71:MET:HE1	2.53	0.44
1:A:357:SER:HB3	4:B:602:P6G:H81	1.98	0.44
1:D:411:ILE:HG23	1:D:448:PHE:CZ	2.53	0.44
1:C:42:LEU:C	1:C:42:LEU:CD1	2.91	0.44
1:A:256:PRO:HB2	1:A:325:PRO:HD3	1.98	0.44
1:A:450:GLN:HB2	1:A:451:PRO:HD3	2.00	0.44
1:B:456:ILE:HG13	1:B:469:MET:HE2	2.00	0.44
1:D:198:GLN:HB2	1:D:237:LYS:HD3	1.99	0.44
1:C:201:LEU:HD11	1:C:205:GLY:O	2.18	0.43
1:D:260:ASN:OD1	1:D:266:LEU:HD12	2.17	0.43
1:B:170:MET:HB3	1:B:200:LEU:HD11	2.00	0.43
1:D:232:LEU:HB3	1:D:233:PRO:HD3	2.00	0.43
1:D:245:PHE:HB3	1:D:247:TRP:CE2	2.54	0.43
1:A:53:ILE:HD11	1:A:222:ILE:HD11	2.00	0.43
1:D:434:LEU:HD13	1:D:449:MET:HE1	2.00	0.43
1:B:390:LEU:HD23	1:B:483:HIS:ND1	2.34	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:42:LEU:HD13	1:B:42:LEU:O	2.19	0.42
1:D:23:ALA:HA	1:D:55:ARG:O	2.19	0.42
1:D:414:LEU:CD1	1:D:441:PHE:HZ	2.31	0.42
1:C:113:LEU:HD11	1:C:168:ILE:CD1	2.49	0.42
1:C:370:GLN:HB3	1:C:371:PRO:HD3	2.01	0.42
1:D:328:ASP:CB	1:D:331:LYS:HD3	2.45	0.42
1:B:23:ALA:HA	1:B:55:ARG:O	2.19	0.42
1:C:338:GLU:O	1:C:342:THR:HG23	2.19	0.42
1:C:178:CYS:HB2	1:C:192:TRP:CE2	2.54	0.42
1:A:123:CYS:O	1:A:124:THR:CB	2.68	0.42
1:B:373:ILE:O	1:B:373:ILE:HG13	2.19	0.42
1:A:373:ILE:O	1:A:373:ILE:HG13	2.19	0.41
1:B:370:GLN:HB3	1:B:371:PRO:HD3	2.02	0.41
1:C:218:HIS:CE1	1:C:247:TRP:CE2	3.08	0.41
1:C:348:LEU:HD22	1:D:370:GLN:HG3	2.01	0.41
1:C:190:ILE:HD12	1:C:236:PRO:HG3	2.03	0.41
1:B:190:ILE:HD12	1:B:236:PRO:CG	2.50	0.41
1:C:380:ILE:HD11	1:D:380:ILE:HD12	2.02	0.41
1:A:23:ALA:HA	1:A:55:ARG:O	2.20	0.41
1:C:294:ARG:HD2	1:C:304:GLU:O	2.21	0.41
1:C:35:ALA:HB1	1:C:289:MET:HE1	2.01	0.41
1:D:23:ALA:HB1	1:D:57:GLU:CG	2.50	0.41
1:C:232:LEU:HB3	1:C:233:PRO:HD3	2.03	0.41
1:C:373:ILE:HG13	1:C:373:ILE:O	2.21	0.41
1:B:79:ALA:O	1:B:289:MET:HG3	2.21	0.41
1:C:107:LYS:HG3	1:C:108:TYR:N	2.35	0.41
1:C:422:LEU:CD2	1:C:510:LEU:HD11	2.50	0.41
1:D:338:GLU:O	1:D:342:THR:HG23	2.21	0.40
1:A:128:LEU:HD21	1:A:132:ARG:CZ	2.51	0.40
1:B:23:ALA:O	2:B:601:GSU:N	2.54	0.40
1:C:452:PHE:HD2	1:C:469:MET:HE1	1.83	0.40
1:D:178:CYS:O	1:D:189:VAL:HA	2.22	0.40
1:A:123:CYS:O	1:A:127:GLU:HB2	2.21	0.40
1:A:391:PRO:C	1:A:393:ILE:HD12	2.46	0.40
1:D:329:ILE:HG12	1:D:333:TYR:CZ	2.56	0.40
1:D:407:GLN:O	1:D:411:ILE:CD1	2.67	0.40
1:A:69:GLU:O	1:A:72:ILE:HG22	2.21	0.40
1:B:15:THR:HG22	1:B:16:ARG:N	2.36	0.40
1:D:79:ALA:O	1:D:289:MET:HG3	2.21	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	485/519 (93%)	475 (98%)	9 (2%)	1 (0%)	44 72
1	B	452/519 (87%)	445 (98%)	7 (2%)	0	100 100
1	C	463/519 (89%)	450 (97%)	13 (3%)	0	100 100
1	D	481/519 (93%)	472 (98%)	8 (2%)	1 (0%)	44 72
All	All	1881/2076 (91%)	1842 (98%)	37 (2%)	2 (0%)	48 76

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	124	THR
1	A	124	THR

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	406/443 (92%)	402 (99%)	4 (1%)	73 90
1	B	386/443 (87%)	385 (100%)	1 (0%)	91 97
1	C	389/443 (88%)	387 (100%)	2 (0%)	86 95
1	D	393/443 (89%)	392 (100%)	1 (0%)	91 97
All	All	1574/1772 (89%)	1566 (100%)	8 (0%)	86 95

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	62	VAL
1	A	170	MET
1	A	393	ILE
1	A	404	ASP
1	B	42	LEU
1	C	42	LEU
1	C	394	THR
1	D	476	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	418	GLN
1	A	421	ASN
1	A	440	HIS
1	A	467	ASN
1	B	418	GLN
1	B	503	ASN
1	B	508	ASN
1	C	93	HIS
1	C	388	GLN
1	C	418	GLN
1	C	503	ASN
1	C	508	ASN
1	D	213	ASN
1	D	508	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

46 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	SO4	D	611	-	4,4,4	0.69	0	6,6,6	0.14	0
3	SO4	C	605	-	4,4,4	0.71	0	6,6,6	0.11	0
3	SO4	D	607	-	4,4,4	0.69	0	6,6,6	0.08	0
3	SO4	B	605	-	4,4,4	0.75	0	6,6,6	0.29	0
3	SO4	A	606	-	4,4,4	0.73	0	6,6,6	0.21	0
3	SO4	A	611	-	4,4,4	0.72	0	6,6,6	0.26	0
3	SO4	A	612	-	4,4,4	0.73	0	6,6,6	0.09	0
3	SO4	A	615	-	4,4,4	0.71	0	6,6,6	0.08	0
3	SO4	B	603	-	4,4,4	0.72	0	6,6,6	0.19	0
3	SO4	D	615	-	4,4,4	0.74	0	6,6,6	0.16	0
2	GSU	A	601	-	30,34,34	1.24	5 (16%)	33,50,50	1.10	2 (6%)
3	SO4	D	606	-	4,4,4	0.72	0	6,6,6	0.10	0
3	SO4	A	610	-	4,4,4	0.68	0	6,6,6	0.13	0
3	SO4	B	606	-	4,4,4	0.71	0	6,6,6	0.12	0
3	SO4	C	606	-	4,4,4	0.69	0	6,6,6	0.08	0
3	SO4	A	607	-	4,4,4	0.76	0	6,6,6	0.12	0
2	GSU	C	601	-	30,34,34	1.38	5 (16%)	33,50,50	1.09	2 (6%)
3	SO4	D	609	-	4,4,4	0.71	0	6,6,6	0.11	0
3	SO4	A	603	-	4,4,4	0.80	0	6,6,6	0.19	0
2	GSU	B	601	-	30,34,34	1.35	5 (16%)	33,50,50	0.99	2 (6%)
3	SO4	D	603	-	4,4,4	0.73	0	6,6,6	0.16	0
3	SO4	A	613	-	4,4,4	0.75	0	6,6,6	0.18	0
3	SO4	B	607	-	4,4,4	0.69	0	6,6,6	0.15	0
5	2PE	D	602	-	27,27,27	0.35	0	26,26,26	0.26	0
3	SO4	C	603	-	4,4,4	0.68	0	6,6,6	0.14	0
3	SO4	D	613	-	4,4,4	0.73	0	6,6,6	0.09	0
3	SO4	B	604	-	4,4,4	0.69	0	6,6,6	0.09	0
3	SO4	A	616	-	4,4,4	0.71	0	6,6,6	0.10	0
3	SO4	A	608	-	4,4,4	0.69	0	6,6,6	0.08	0
3	SO4	D	616	-	4,4,4	0.74	0	6,6,6	0.16	0
3	SO4	D	608	-	4,4,4	0.73	0	6,6,6	0.13	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	SO4	D	612	-	4,4,4	0.75	0	6,6,6	0.15	0
3	SO4	A	602	-	4,4,4	0.65	0	6,6,6	0.19	0
4	P6G	B	602	-	18,18,18	0.33	0	17,17,17	0.17	0
3	SO4	A	604	-	4,4,4	0.67	0	6,6,6	0.07	0
3	SO4	A	609	-	4,4,4	0.72	0	6,6,6	0.11	0
2	GSU	D	601	-	30,34,34	1.11	3 (10%)	33,50,50	1.07	1 (3%)
3	SO4	A	614	-	4,4,4	0.78	0	6,6,6	0.09	0
3	SO4	C	602	-	4,4,4	0.70	0	6,6,6	0.30	0
3	SO4	D	614	-	4,4,4	0.76	0	6,6,6	0.05	0
3	SO4	D	610	-	4,4,4	0.75	0	6,6,6	0.19	0
3	SO4	C	607	-	4,4,4	0.69	0	6,6,6	0.12	0
3	SO4	D	604	-	4,4,4	0.71	0	6,6,6	0.12	0
3	SO4	A	605	-	4,4,4	0.75	0	6,6,6	0.12	0
3	SO4	C	604	-	4,4,4	0.76	0	6,6,6	0.25	0
3	SO4	D	605	-	4,4,4	0.71	0	6,6,6	0.14	0

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	P6G	B	602	-	-	7/16/16/16	-
5	2PE	D	602	-	-	11/25/25/25	-
2	GSU	D	601	-	-	3/19/40/40	0/3/3/3
2	GSU	C	601	-	-	4/19/40/40	0/3/3/3
2	GSU	A	601	-	-	3/19/40/40	0/3/3/3
2	GSU	B	601	-	-	8/19/40/40	0/3/3/3

All (18) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	601	GSU	S-N10	3.77	1.66	1.59
2	B	601	GSU	S-N10	3.58	1.65	1.59
2	C	601	GSU	C1'-N9	-3.04	1.42	1.49
2	B	601	GSU	C1'-N9	-2.95	1.42	1.49
2	A	601	GSU	S-N10	2.95	1.64	1.59
2	D	601	GSU	S-N10	2.78	1.64	1.59
2	C	601	GSU	O2S-S	2.76	1.44	1.42
2	A	601	GSU	C1'-N9	-2.75	1.43	1.49
2	A	601	GSU	O1S-S	2.42	1.44	1.42

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	601	GSU	C1'-N9	-2.42	1.43	1.49
2	C	601	GSU	C8-N7	-2.40	1.30	1.34
2	B	601	GSU	C8-N7	-2.38	1.30	1.34
2	B	601	GSU	O1S-S	2.27	1.44	1.42
2	C	601	GSU	O1S-S	2.27	1.44	1.42
2	B	601	GSU	O2S-S	2.22	1.44	1.42
2	A	601	GSU	C8-N7	-2.20	1.30	1.34
2	D	601	GSU	C8-N7	-2.12	1.30	1.34
2	A	601	GSU	O2S-S	2.10	1.44	1.42

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	601	GSU	C5-C6-N6	2.47	124.07	120.31
2	A	601	GSU	O5'-S-O1S	2.17	112.05	105.48
2	A	601	GSU	C5-C6-N6	2.15	123.58	120.31
2	B	601	GSU	C5-C6-N6	2.12	123.54	120.31
2	C	601	GSU	C5'-O5'-S	2.08	121.35	116.97
2	C	601	GSU	O5'-C5'-C4'	-2.01	103.97	107.57
2	B	601	GSU	O5'-S-O1S	2.00	111.53	105.48

There are no chirality outliers.

All (36) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	601	GSU	N-CA-CB-CG
2	C	601	GSU	N-CA-CB-CG
2	D	601	GSU	N-CA-CB-CG
2	B	601	GSU	C-CA-CB-CG
5	D	602	2PE	O22-C23-C24-O25
5	D	602	2PE	O4-C5-C6-O7
5	D	602	2PE	O19-C20-C21-O22
5	D	602	2PE	O1-C2-C3-O4
4	B	602	P6G	O4-C5-C6-O7
5	D	602	2PE	C5-C6-O7-C8
4	B	602	P6G	C15-C14-O13-C12
5	D	602	2PE	C9-C8-O7-C6
2	A	601	GSU	C5'-O5'-S-N10
5	D	602	2PE	C12-C11-O10-C9
5	D	602	2PE	C17-C18-O19-C20
2	A	601	GSU	C3'-C4'-C5'-O5'
2	C	601	GSU	C-CA-CB-CG

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Mol	Chain	Res	Type	Atoms
5	D	602	2PE	O7-C8-C9-O10
4	B	602	P6G	C2-C3-O4-C5
5	D	602	2PE	C11-C12-O13-C14
2	D	601	GSU	OE1-CD-CG-CB
2	B	601	GSU	O-C-CA-N
4	B	602	P6G	C14-C15-O16-C17
2	C	601	GSU	OE1-CD-CG-CB
2	B	601	GSU	OE1-CD-CG-CB
2	C	601	GSU	OE2-CD-CG-CB
2	D	601	GSU	OE2-CD-CG-CB
2	B	601	GSU	OE2-CD-CG-CB
2	B	601	GSU	C5'-O5'-S-N10
4	B	602	P6G	O13-C14-C15-O16
4	B	602	P6G	O1-C2-C3-O4
5	D	602	2PE	O10-C11-C12-O13
4	B	602	P6G	C11-C12-O13-C14
2	A	601	GSU	O4'-C4'-C5'-O5'
2	B	601	GSU	C3'-C4'-C5'-O5'
2	B	601	GSU	N10-C-CA-N

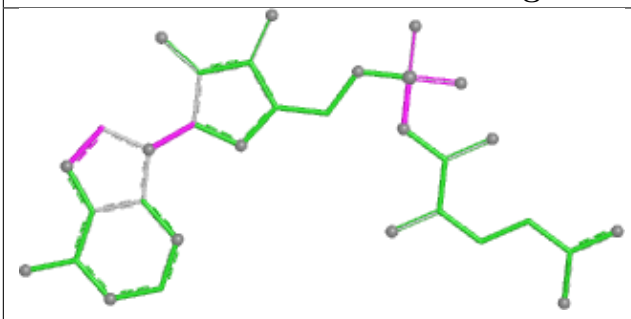
There are no ring outliers.

3 monomers are involved in 3 short contacts:

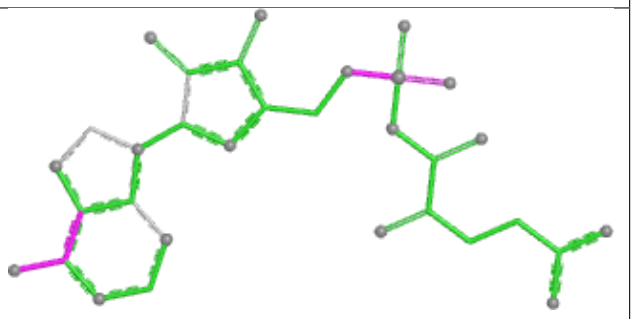
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	601	GSU	1	0
3	D	608	SO4	1	0
4	B	602	P6G	1	0

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 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.

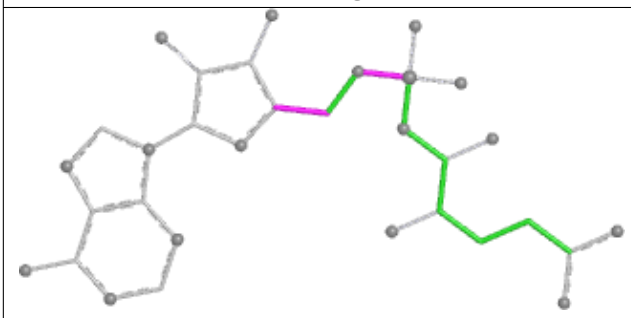
Ligand GSU A 601



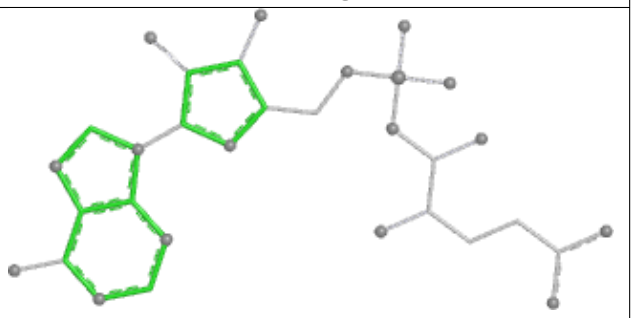
Bond lengths



Bond angles

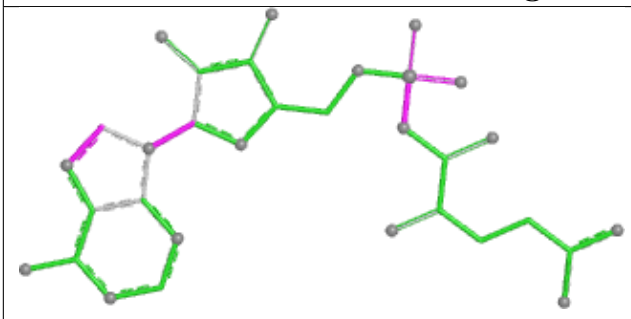


Torsions

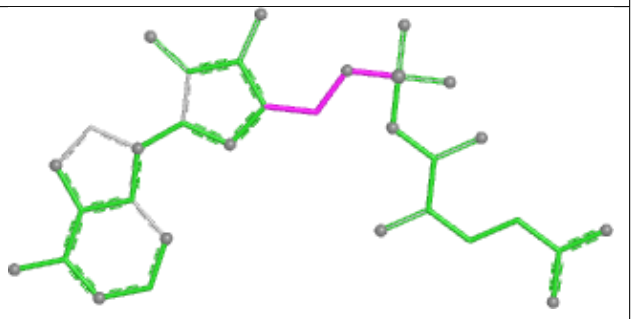


Rings

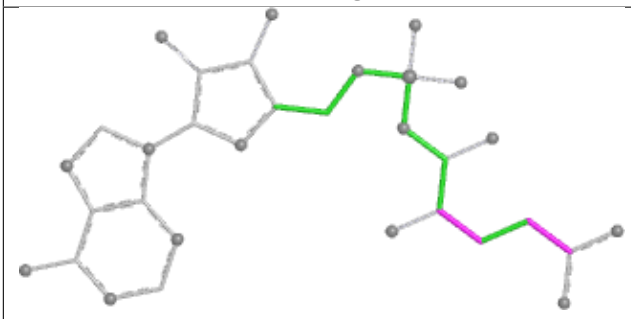
Ligand GSU C 601



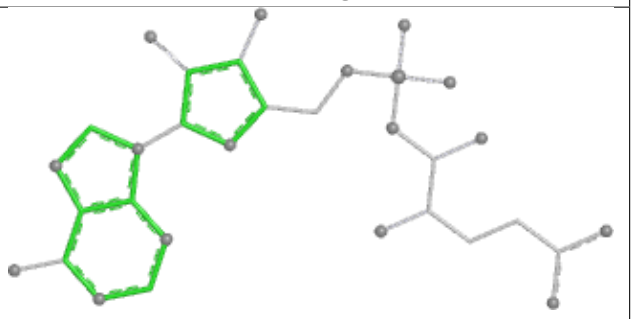
Bond lengths



Bond angles

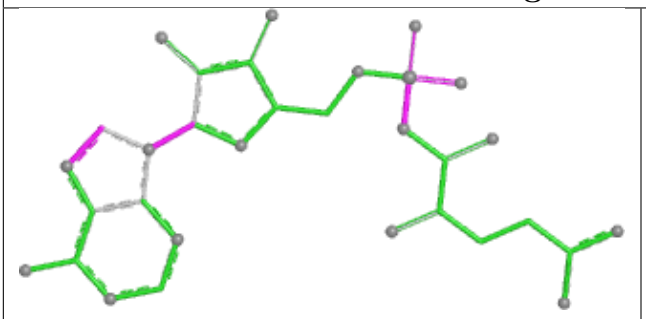


Torsions

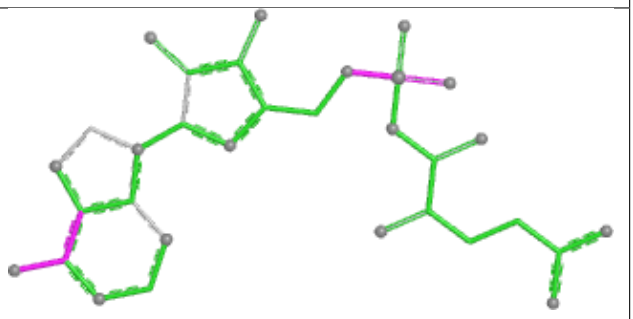


Rings

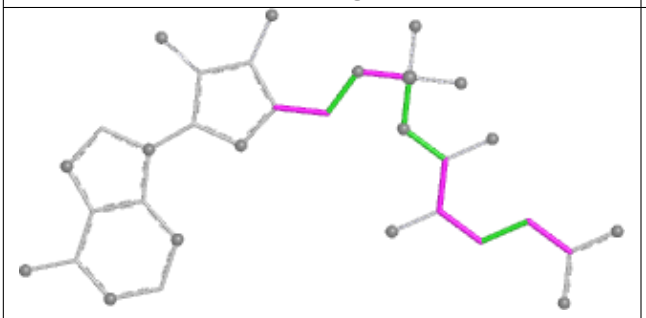
Ligand GSU B 601



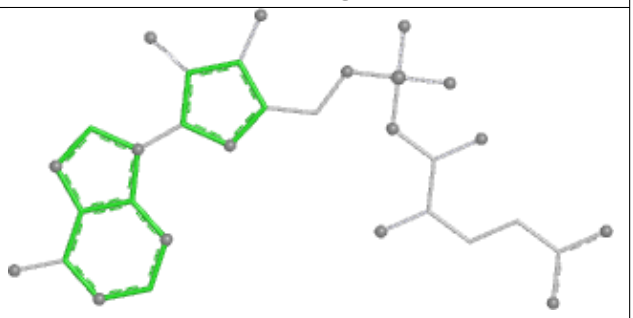
Bond lengths



Bond angles

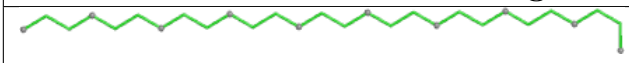


Torsions

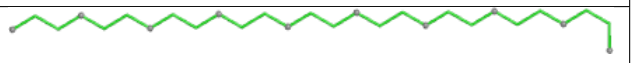


Rings

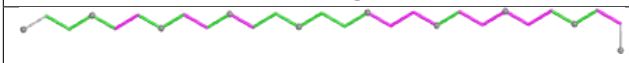
Ligand 2PE D 602



Bond lengths



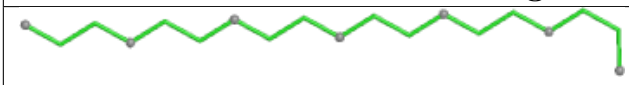
Bond angles



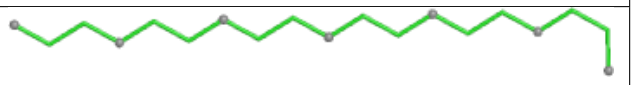
Torsions

Rings

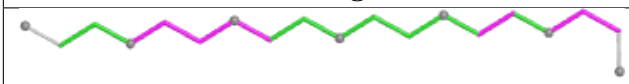
Ligand P6G B 602



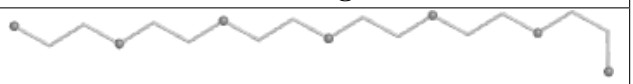
Bond lengths



Bond angles

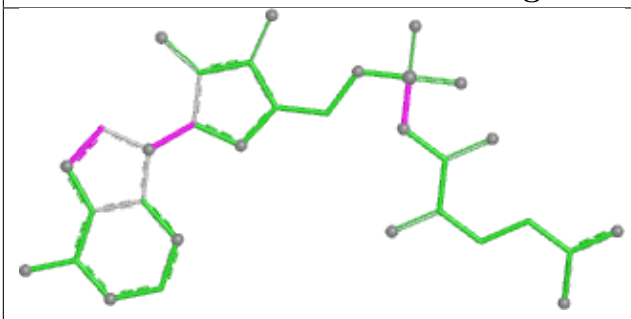


Torsions

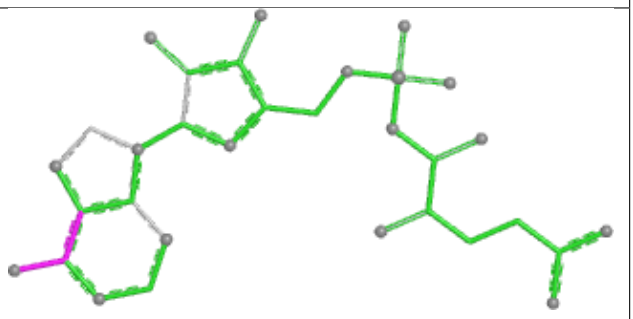


Rings

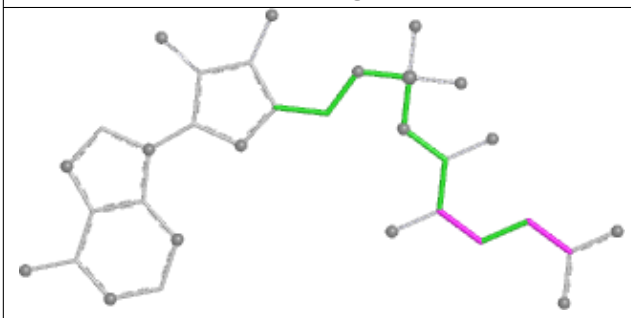
Ligand GSU D 601



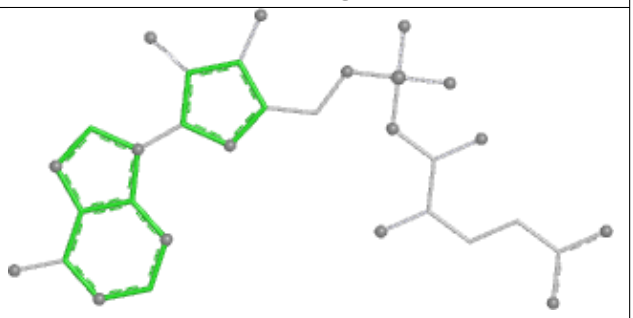
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

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	489/519 (94%)	0.27	20 (4%)	42	35	50, 71, 130, 182	0
1	B	456/519 (87%)	0.29	9 (1%)	64	58	60, 84, 128, 213	0
1	C	467/519 (89%)	0.25	9 (1%)	66	60	52, 81, 123, 206	0
1	D	485/519 (93%)	0.24	13 (2%)	56	51	52, 73, 128, 155	0
All	All	1897/2076 (91%)	0.26	51 (2%)	56	51	50, 78, 128, 213	0

All (51) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	142	VAL	5.1
1	D	155	GLU	3.9
1	D	360	THR	3.2
1	C	123	CYS	3.1
1	A	360	THR	3.1
1	A	361	LYS	3.0
1	A	139	GLY	2.8
1	B	107	LYS	2.8
1	B	361	LYS	2.8
1	D	361	LYS	2.8
1	A	140	LEU	2.8
1	D	491	LEU	2.8
1	A	138	ALA	2.7
1	B	271	ASN	2.7
1	C	361	LYS	2.7
1	A	10	GLY	2.6
1	C	296	GLY	2.6
1	A	403	LEU	2.6
1	A	510	LEU	2.6
1	A	15	THR	2.6
1	A	14	MET	2.5

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Mol	Chain	Res	Type	RSRZ
1	C	156	SER	2.5
1	A	509	PHE	2.4
1	A	179	THR	2.4
1	C	179	THR	2.4
1	B	272	PRO	2.3
1	A	458	GLY	2.3
1	B	175	SER	2.3
1	B	399	ALA	2.3
1	D	135	GLN	2.3
1	A	103	ASP	2.3
1	D	506	LEU	2.3
1	A	495	LYS	2.3
1	D	296	GLY	2.3
1	A	441	PHE	2.3
1	A	448	PHE	2.3
1	B	166	PHE	2.3
1	A	444	LYS	2.3
1	D	410	GLU	2.2
1	D	443	ILE	2.2
1	D	138	ALA	2.2
1	C	270	LYS	2.2
1	D	61	GLN	2.1
1	A	359	ASP	2.1
1	B	122	PHE	2.1
1	C	400	HIS	2.1
1	C	443	ILE	2.1
1	B	492	GLY	2.1
1	C	398	PHE	2.0
1	A	155	GLU	2.0
1	D	440	HIS	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, 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
3	SO4	A	612	5/5	0.57	0.28	110,111,126,133	0
3	SO4	B	604	5/5	0.68	0.22	99,121,135,136	0
3	SO4	B	606	5/5	0.68	0.23	105,108,114,121	0
3	SO4	A	615	5/5	0.69	0.26	101,107,116,125	0
3	SO4	A	616	5/5	0.69	0.27	95,101,105,113	0
3	SO4	C	605	5/5	0.69	0.23	112,113,123,124	0
3	SO4	D	608	5/5	0.70	0.16	89,103,107,117	0
3	SO4	B	605	5/5	0.71	0.17	98,106,124,132	0
3	SO4	B	607	5/5	0.71	0.21	107,114,115,131	0
3	SO4	D	612	5/5	0.74	0.31	88,89,102,112	0
3	SO4	A	608	5/5	0.75	0.15	112,116,131,132	0
3	SO4	C	607	5/5	0.75	0.22	106,108,121,122	0
3	SO4	D	615	5/5	0.75	0.26	95,100,110,112	0
3	SO4	C	604	5/5	0.77	0.19	89,90,94,101	0
3	SO4	D	614	5/5	0.77	0.21	95,103,104,116	0
3	SO4	C	606	5/5	0.77	0.17	113,116,121,125	0
3	SO4	A	609	5/5	0.79	0.17	99,100,111,119	0
3	SO4	A	604	5/5	0.80	0.15	87,88,96,107	0
3	SO4	D	616	5/5	0.81	0.13	84,98,108,111	0
3	SO4	A	614	5/5	0.82	0.18	81,85,93,106	0
3	SO4	A	605	5/5	0.82	0.14	81,88,103,105	0
3	SO4	A	606	5/5	0.84	0.10	84,94,112,122	0
3	SO4	A	602	5/5	0.84	0.16	65,68,85,92	0
3	SO4	D	604	5/5	0.84	0.11	100,100,107,108	0
3	SO4	A	613	5/5	0.84	0.26	78,83,93,98	0
3	SO4	D	609	5/5	0.85	0.19	96,97,114,120	0
3	SO4	D	607	5/5	0.86	0.14	90,92,105,108	0
3	SO4	A	611	5/5	0.87	0.18	83,87,100,109	0
3	SO4	D	611	5/5	0.87	0.12	89,90,93,94	0
3	SO4	D	613	5/5	0.88	0.15	85,86,92,103	0
3	SO4	A	607	5/5	0.88	0.10	92,98,105,116	0
5	2PE	D	602	28/28	0.88	0.16	53,66,77,87	0
3	SO4	A	603	5/5	0.89	0.11	69,75,86,90	0
3	SO4	D	605	5/5	0.89	0.15	76,80,86,87	0
3	SO4	A	610	5/5	0.89	0.10	85,87,98,105	0
4	P6G	B	602	19/19	0.89	0.15	58,65,83,84	0
3	SO4	D	603	5/5	0.89	0.10	77,81,92,94	0

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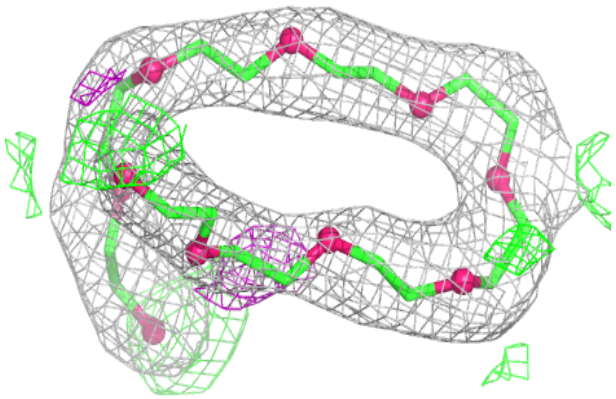
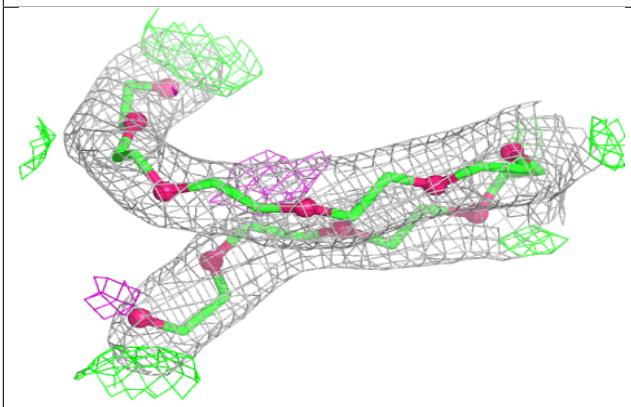
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	SO4	D	606	5/5	0.90	0.10	87,89,98,100	0
3	SO4	C	603	5/5	0.90	0.09	99,100,105,105	0
3	SO4	C	602	5/5	0.90	0.15	67,68,82,90	0
2	GSU	B	601	32/32	0.91	0.12	60,69,79,79	0
2	GSU	C	601	32/32	0.91	0.11	59,68,75,78	0
2	GSU	D	601	32/32	0.92	0.09	49,59,65,66	0
3	SO4	D	610	5/5	0.92	0.09	91,96,109,118	0
2	GSU	A	601	32/32	0.93	0.11	42,58,74,127	0
3	SO4	B	603	5/5	0.93	0.10	73,75,82,83	0

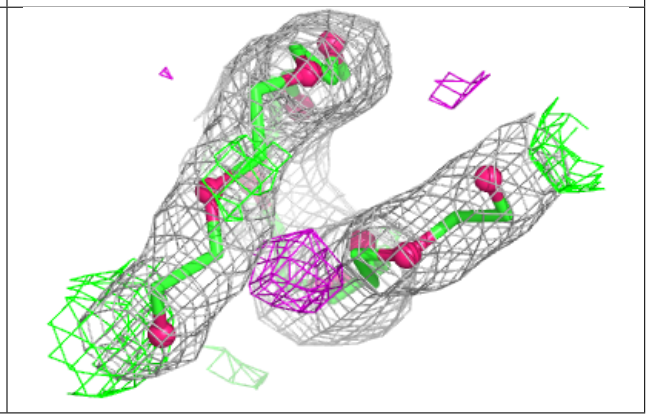
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around 2PE D 602:

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

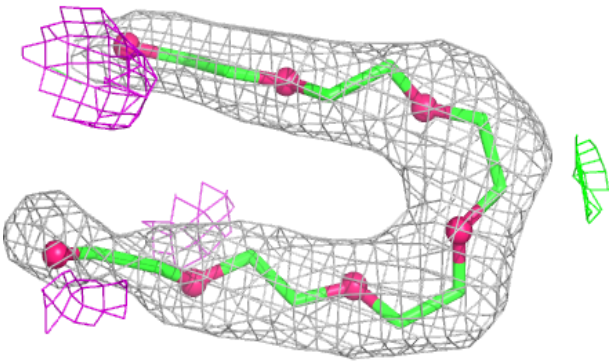


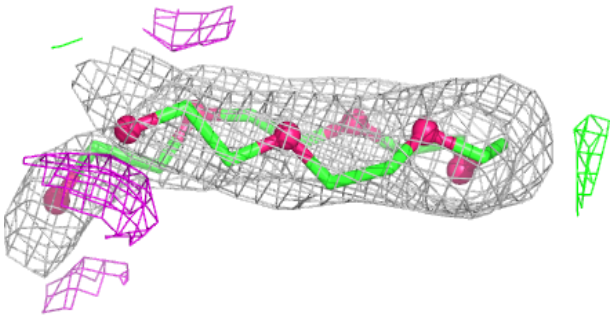


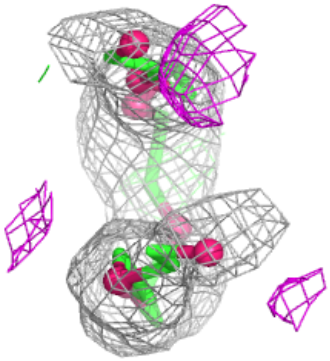


Electron density around P6G B 602:

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

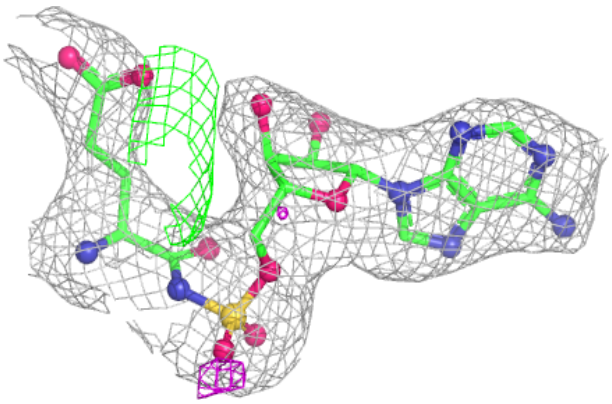


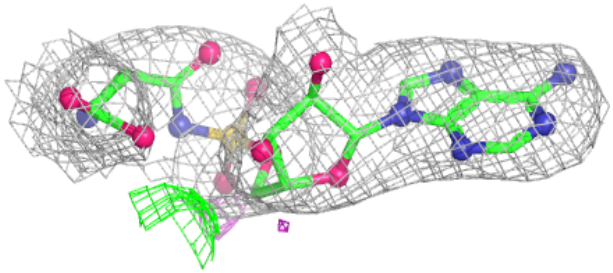


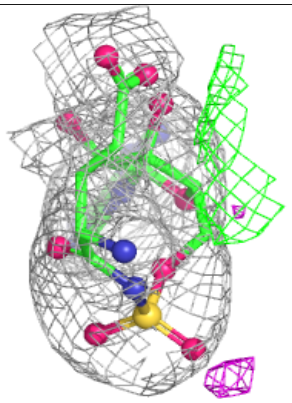


Electron density around GSU B 601:

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

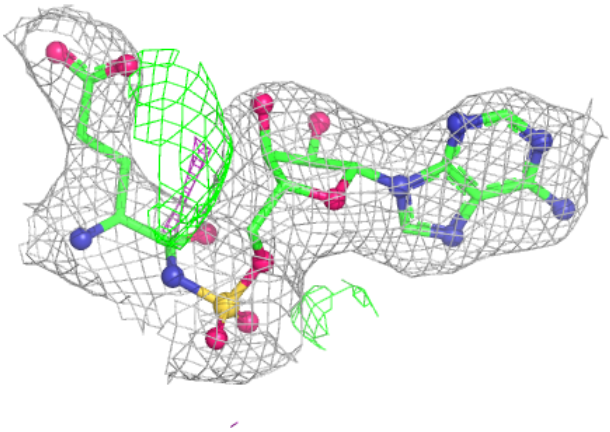


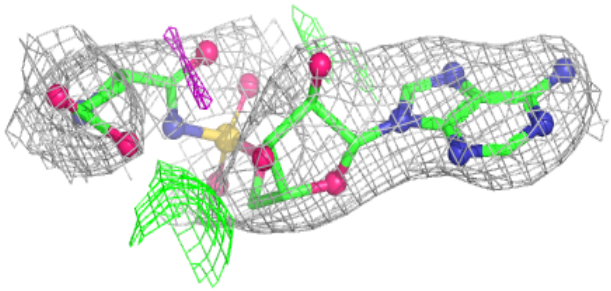


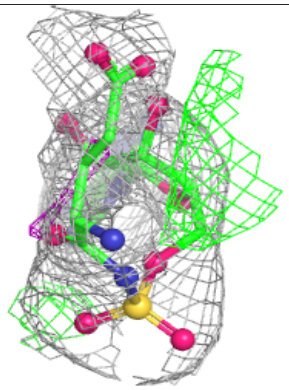


Electron density around GSU C 601:

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

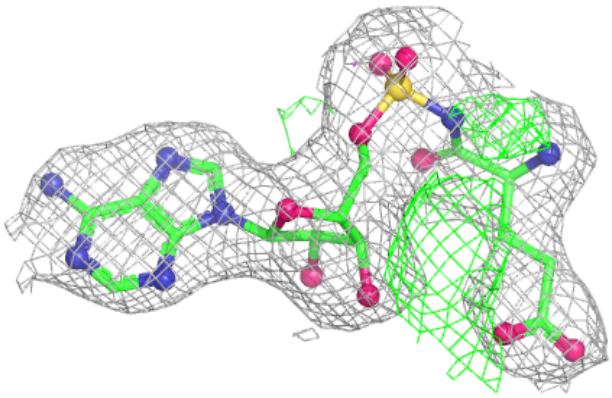


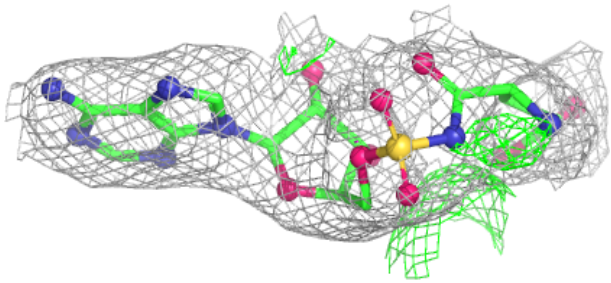


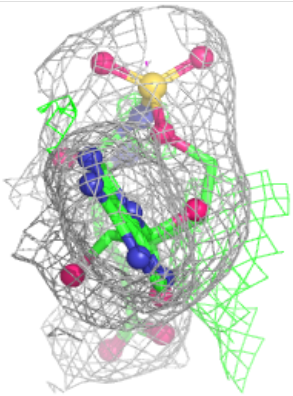


Electron density around GSU D 601:

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

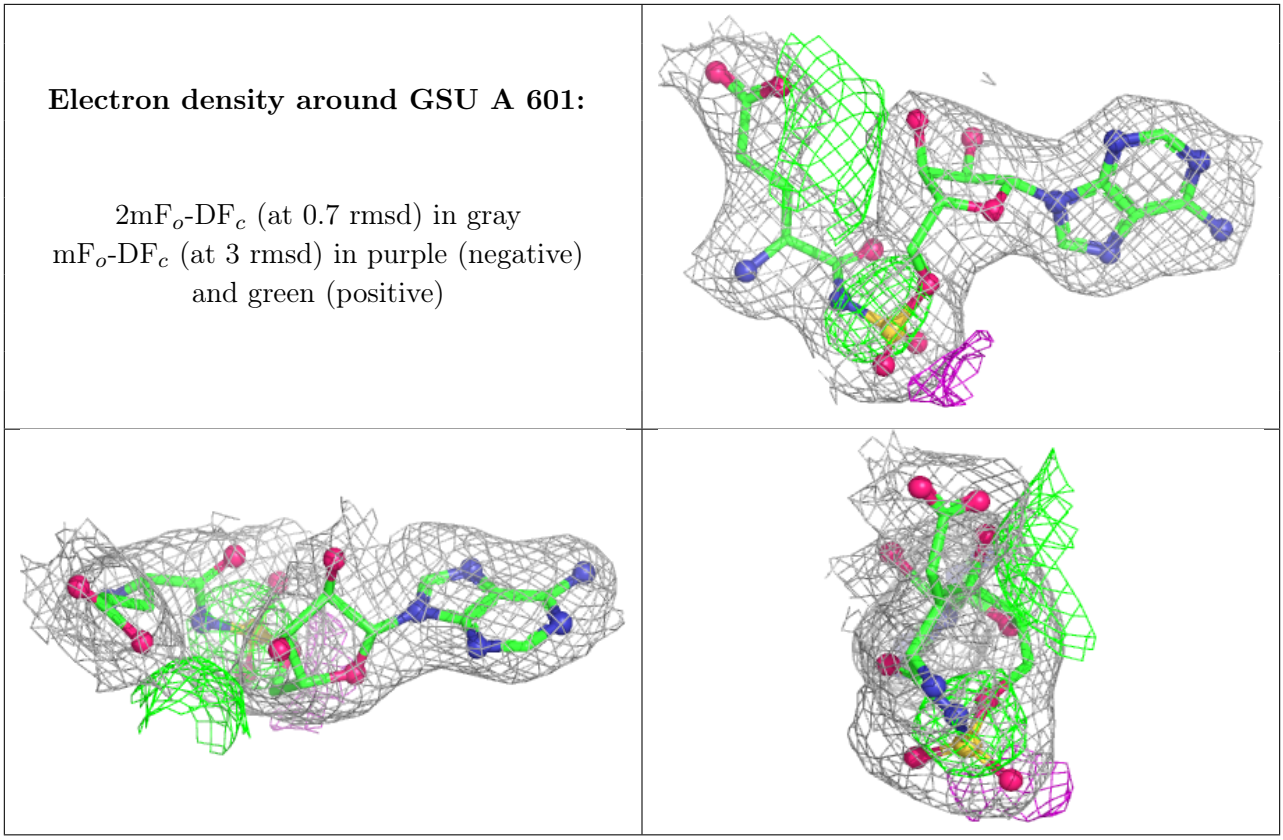






Electron density around GSU A 601:

$2mF_o$-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.