Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2024 – 06:16 AM EDT

PDB ID	:	6NPF
Title	:	Structure of E.coli enolase in complex with an analog of the natural product SF-2312 metabolite.
Authors	:	Erlandsen, H.; Krucinska, J.; Lombardo, M.; Wright, D.
Deposited on	:	2019-01-17
Resolution	:	2.57 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:

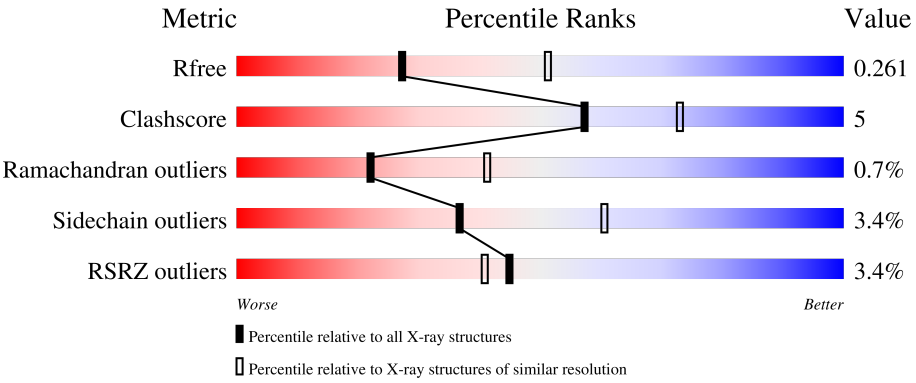
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 2.57 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	3676 (2.60-2.56)
Clashscore	141614	4049 (2.60-2.56)
Ramachandran outliers	138981	3979 (2.60-2.56)
Sidechain outliers	138945	3979 (2.60-2.56)
RSRZ outliers	127900	3614 (2.60-2.56)

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	449	2% 88% 9%
1	B	449	2% 87% 9%
1	C	449	% 83% 14%
1	D	449	4% 83% 13%
1	E	449	8% 81% 13% 5%

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Mol	Chain	Length	Quality of chain
1	F	449	3% 83% 12%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	TLA	C	703	-	-	X	-

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 19725 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 Enolase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	438	Total	C	N	O	S	0	0	0
			3249	2033	558	643	15			
1	B	436	Total	C	N	O	S	0	0	0
			3234	2024	554	641	15			
1	C	438	Total	C	N	O	S	0	0	0
			3249	2033	558	643	15			
1	D	432	Total	C	N	O	S	0	0	0
			3206	2008	549	634	15			
1	F	434	Total	C	N	O	S	0	0	0
			3219	2015	551	638	15			
1	E	426	Total	C	N	O	S	0	0	0
			3168	1988	542	623	15			

There are 102 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-17	GLY	-	expression tag	UNP B7MLA0
A	-16	SER	-	expression tag	UNP B7MLA0
A	-15	HIS	-	expression tag	UNP B7MLA0
A	-14	MET	-	expression tag	UNP B7MLA0
A	-13	ALA	-	expression tag	UNP B7MLA0
A	-12	SER	-	expression tag	UNP B7MLA0
A	-11	MET	-	expression tag	UNP B7MLA0
A	-10	THR	-	expression tag	UNP B7MLA0
A	-9	GLY	-	expression tag	UNP B7MLA0
A	-8	GLY	-	expression tag	UNP B7MLA0
A	-7	GLN	-	expression tag	UNP B7MLA0
A	-6	GLN	-	expression tag	UNP B7MLA0
A	-5	MET	-	expression tag	UNP B7MLA0
A	-4	GLY	-	expression tag	UNP B7MLA0
A	-3	ARG	-	expression tag	UNP B7MLA0
A	-2	GLY	-	expression tag	UNP B7MLA0
A	-1	SER	-	expression tag	UNP B7MLA0

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-17	GLY	-	expression tag	UNP B7MLA0
B	-16	SER	-	expression tag	UNP B7MLA0
B	-15	HIS	-	expression tag	UNP B7MLA0
B	-14	MET	-	expression tag	UNP B7MLA0
B	-13	ALA	-	expression tag	UNP B7MLA0
B	-12	SER	-	expression tag	UNP B7MLA0
B	-11	MET	-	expression tag	UNP B7MLA0
B	-10	THR	-	expression tag	UNP B7MLA0
B	-9	GLY	-	expression tag	UNP B7MLA0
B	-8	GLY	-	expression tag	UNP B7MLA0
B	-7	GLN	-	expression tag	UNP B7MLA0
B	-6	GLN	-	expression tag	UNP B7MLA0
B	-5	MET	-	expression tag	UNP B7MLA0
B	-4	GLY	-	expression tag	UNP B7MLA0
B	-3	ARG	-	expression tag	UNP B7MLA0
B	-2	GLY	-	expression tag	UNP B7MLA0
B	-1	SER	-	expression tag	UNP B7MLA0
C	-17	GLY	-	expression tag	UNP B7MLA0
C	-16	SER	-	expression tag	UNP B7MLA0
C	-15	HIS	-	expression tag	UNP B7MLA0
C	-14	MET	-	expression tag	UNP B7MLA0
C	-13	ALA	-	expression tag	UNP B7MLA0
C	-12	SER	-	expression tag	UNP B7MLA0
C	-11	MET	-	expression tag	UNP B7MLA0
C	-10	THR	-	expression tag	UNP B7MLA0
C	-9	GLY	-	expression tag	UNP B7MLA0
C	-8	GLY	-	expression tag	UNP B7MLA0
C	-7	GLN	-	expression tag	UNP B7MLA0
C	-6	GLN	-	expression tag	UNP B7MLA0
C	-5	MET	-	expression tag	UNP B7MLA0
C	-4	GLY	-	expression tag	UNP B7MLA0
C	-3	ARG	-	expression tag	UNP B7MLA0
C	-2	GLY	-	expression tag	UNP B7MLA0
C	-1	SER	-	expression tag	UNP B7MLA0
D	-17	GLY	-	expression tag	UNP B7MLA0
D	-16	SER	-	expression tag	UNP B7MLA0
D	-15	HIS	-	expression tag	UNP B7MLA0
D	-14	MET	-	expression tag	UNP B7MLA0
D	-13	ALA	-	expression tag	UNP B7MLA0
D	-12	SER	-	expression tag	UNP B7MLA0
D	-11	MET	-	expression tag	UNP B7MLA0
D	-10	THR	-	expression tag	UNP B7MLA0

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-9	GLY	-	expression tag	UNP B7MLA0
D	-8	GLY	-	expression tag	UNP B7MLA0
D	-7	GLN	-	expression tag	UNP B7MLA0
D	-6	GLN	-	expression tag	UNP B7MLA0
D	-5	MET	-	expression tag	UNP B7MLA0
D	-4	GLY	-	expression tag	UNP B7MLA0
D	-3	ARG	-	expression tag	UNP B7MLA0
D	-2	GLY	-	expression tag	UNP B7MLA0
D	-1	SER	-	expression tag	UNP B7MLA0
F	-17	GLY	-	expression tag	UNP B7MLA0
F	-16	SER	-	expression tag	UNP B7MLA0
F	-15	HIS	-	expression tag	UNP B7MLA0
F	-14	MET	-	expression tag	UNP B7MLA0
F	-13	ALA	-	expression tag	UNP B7MLA0
F	-12	SER	-	expression tag	UNP B7MLA0
F	-11	MET	-	expression tag	UNP B7MLA0
F	-10	THR	-	expression tag	UNP B7MLA0
F	-9	GLY	-	expression tag	UNP B7MLA0
F	-8	GLY	-	expression tag	UNP B7MLA0
F	-7	GLN	-	expression tag	UNP B7MLA0
F	-6	GLN	-	expression tag	UNP B7MLA0
F	-5	MET	-	expression tag	UNP B7MLA0
F	-4	GLY	-	expression tag	UNP B7MLA0
F	-3	ARG	-	expression tag	UNP B7MLA0
F	-2	GLY	-	expression tag	UNP B7MLA0
F	-1	SER	-	expression tag	UNP B7MLA0
E	-17	GLY	-	expression tag	UNP B7MLA0
E	-16	SER	-	expression tag	UNP B7MLA0
E	-15	HIS	-	expression tag	UNP B7MLA0
E	-14	MET	-	expression tag	UNP B7MLA0
E	-13	ALA	-	expression tag	UNP B7MLA0
E	-12	SER	-	expression tag	UNP B7MLA0
E	-11	MET	-	expression tag	UNP B7MLA0
E	-10	THR	-	expression tag	UNP B7MLA0
E	-9	GLY	-	expression tag	UNP B7MLA0
E	-8	GLY	-	expression tag	UNP B7MLA0
E	-7	GLN	-	expression tag	UNP B7MLA0
E	-6	GLN	-	expression tag	UNP B7MLA0
E	-5	MET	-	expression tag	UNP B7MLA0
E	-4	GLY	-	expression tag	UNP B7MLA0
E	-3	ARG	-	expression tag	UNP B7MLA0
E	-2	GLY	-	expression tag	UNP B7MLA0

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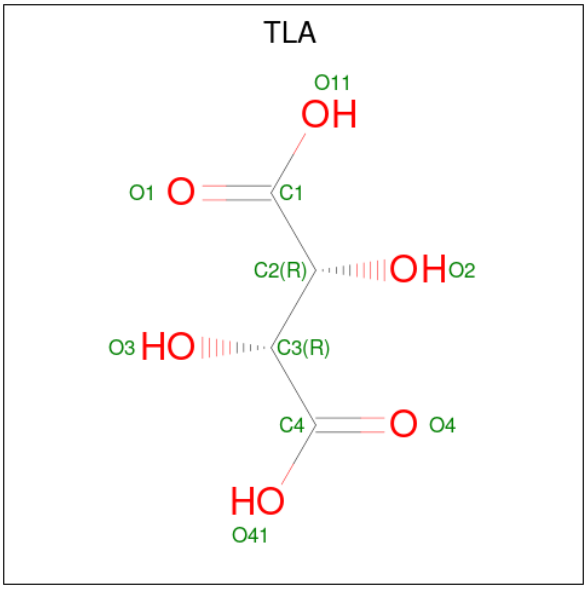
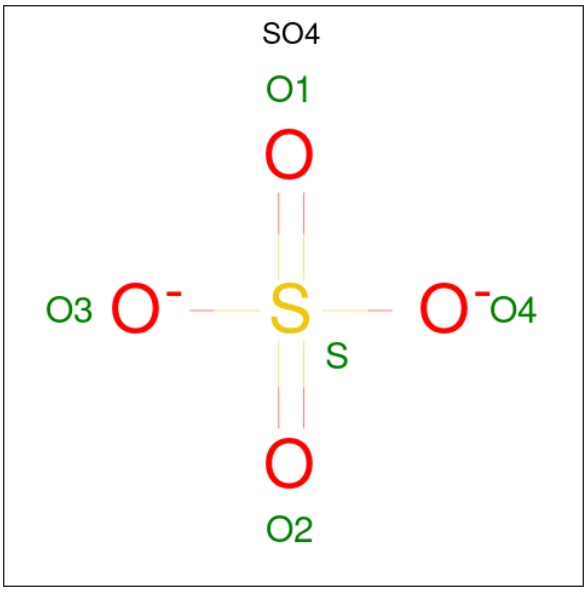
Chain	Residue	Modelled	Actual	Comment	Reference
E	-1	SER	-	expression tag	UNP B7MLA0

- Molecule 2 is L(+)-TARTARIC ACID (three-letter code: TLA) (formula: $C_4H_6O_6$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 10 4 6	0	0
2	B	1	Total C O 10 4 6	0	0
2	C	1	Total C O 10 4 6	0	0

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



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

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

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

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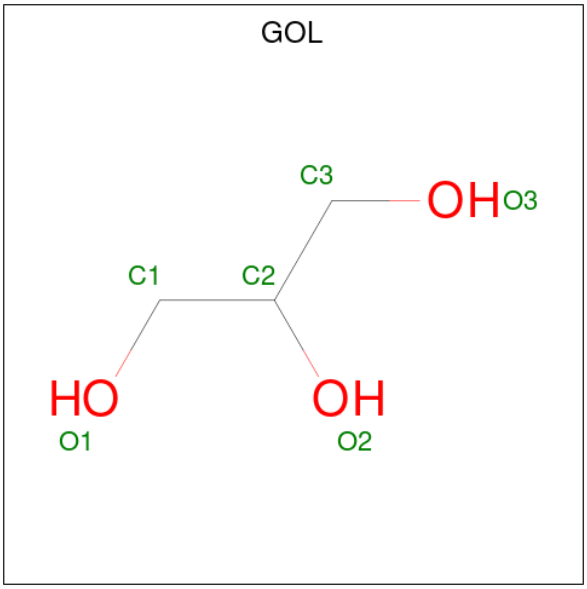
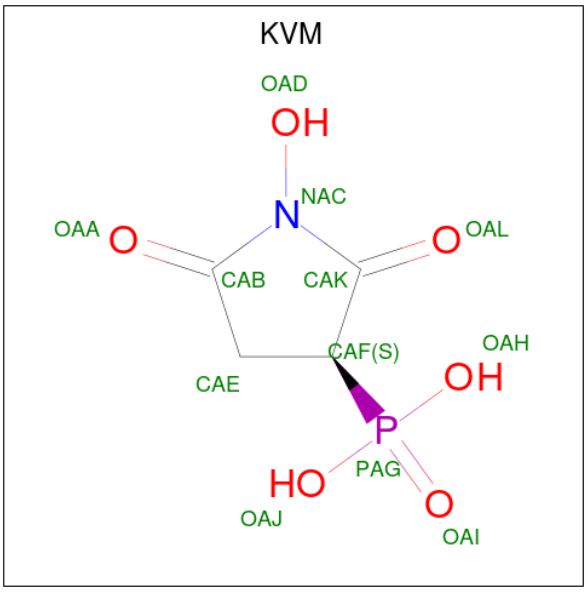
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total Mg 1 1	0	0
4	C	1	Total Mg 1 1	0	0
4	D	1	Total Mg 1 1	0	0
4	F	1	Total Mg 1 1	0	0
4	E	1	Total Mg 1 1	0	0

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0
5	C	1	Total C O 6 3 3	0	0
5	D	1	Total C O 6 3 3	0	0

- Molecule 6 is [(3S)-1-hydroxy-2,5-dioxopyrrolidin-3-yl]phosphonic acid (three-letter code: KVM) (formula: $C_4H_6NO_6P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	D	1	Total C N O P 12 4 1 6 1	0	0
6	F	1	Total C N O P 12 4 1 6 1	0	0
6	E	1	Total C N O P 12 4 1 6 1	0	0

- Molecule 7 is water.

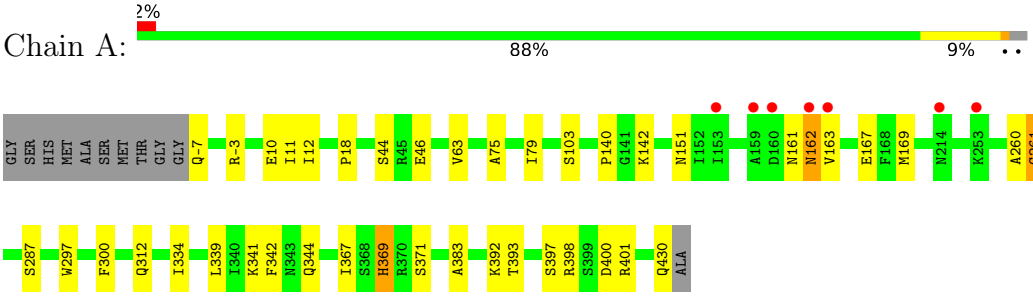
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	53	Total O 53 53	0	0
7	B	36	Total O 36 36	0	0
7	C	49	Total O 49 49	0	0
7	D	46	Total O 46 46	0	0
7	F	39	Total O 39 39	0	0
7	E	26	Total O 26 26	0	0

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.

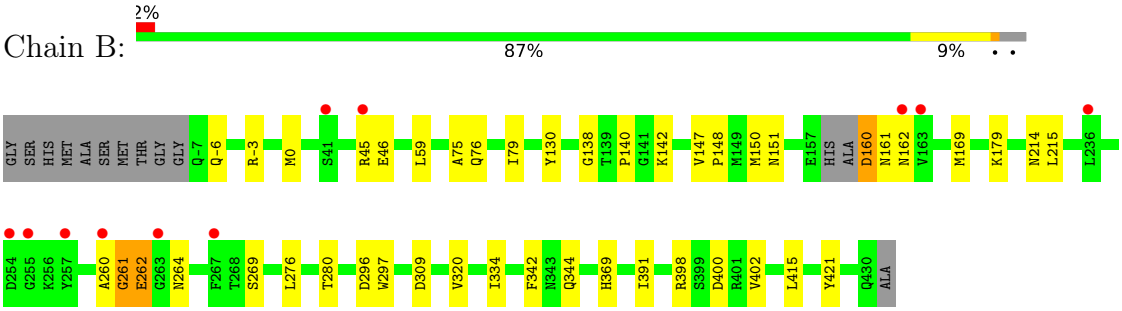
• Molecule 1: Enolase

Chain A:



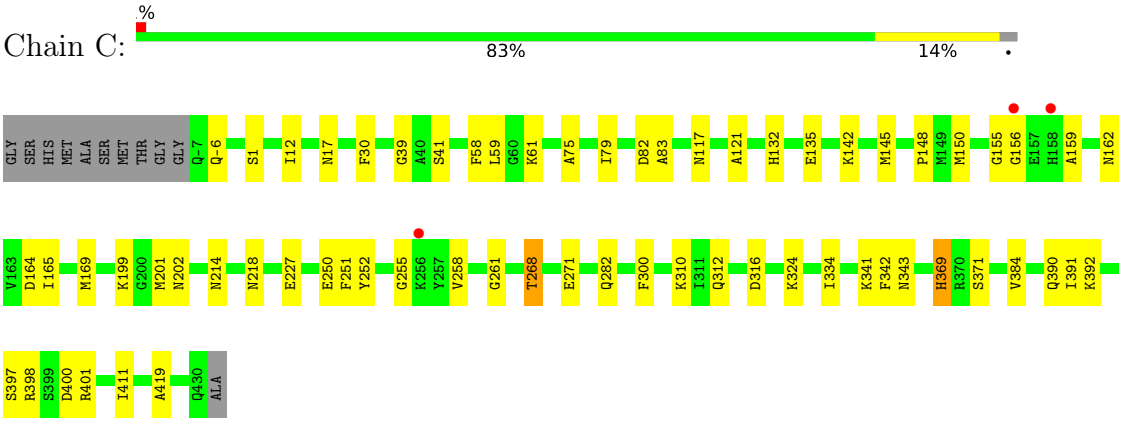
• Molecule 1: Enolase

Chain B:



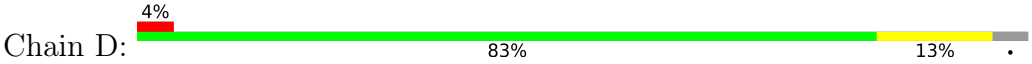
• Molecule 1: Enolase

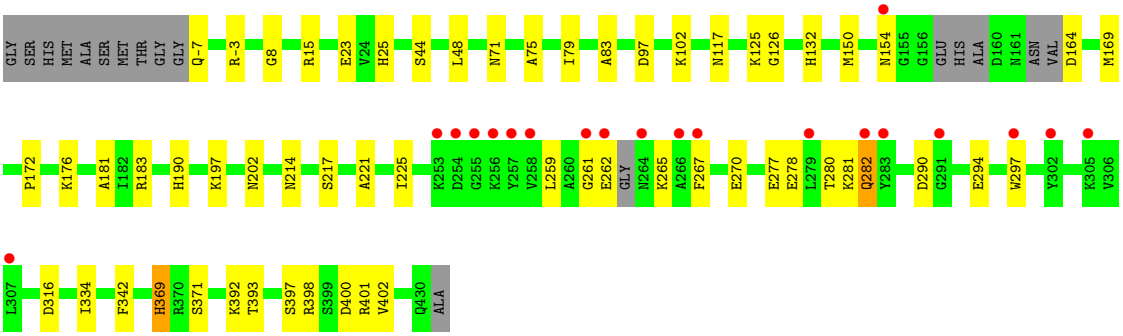
Chain C:



• Molecule 1: Enolase

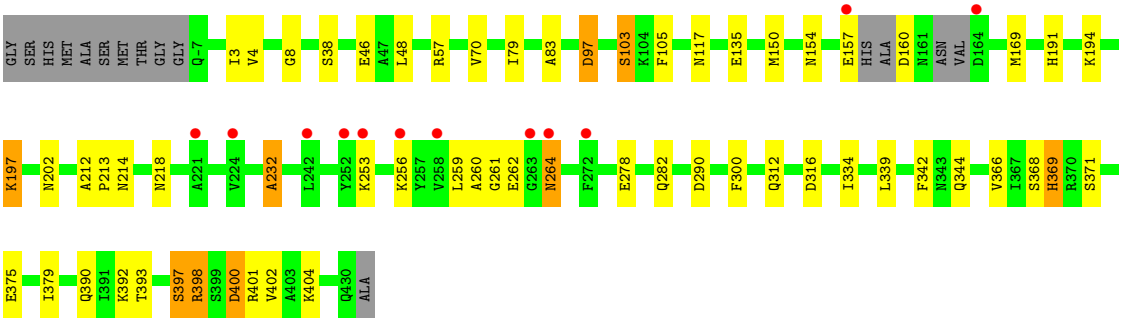
Chain D:





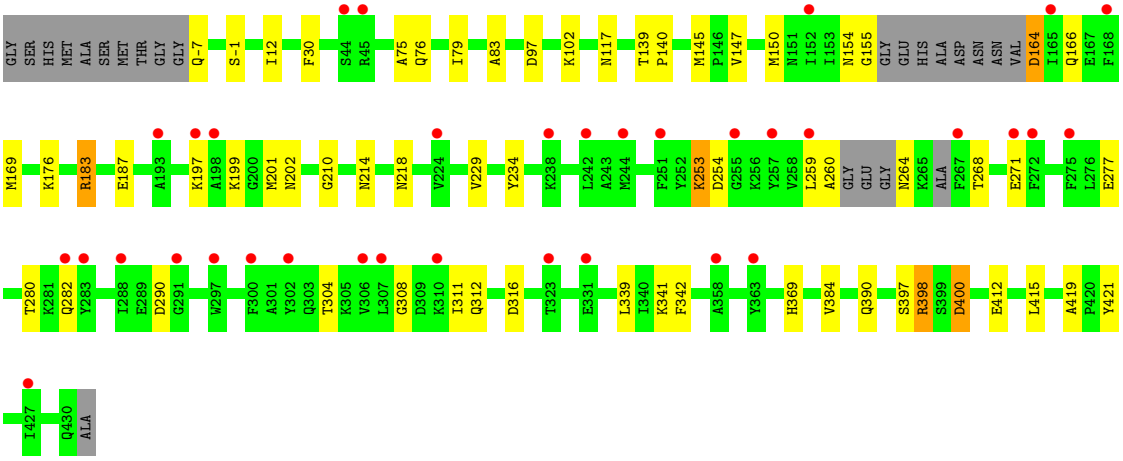
• Molecule 1: Enolase

Chain F:



• Molecule 1: Enolase

Chain E:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	104.18Å 143.11Å 206.68Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	93.03 – 2.57 93.03 – 2.57	Depositor EDS
% Data completeness (in resolution range)	99.1 (93.03-2.57) 99.1 (93.03-2.57)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.53 (at 2.58Å)	Xtriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.191 , 0.256 0.200 , 0.261	Depositor DCC
R_{free} test set	4924 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å^2)	43.1	Xtriage
Anisotropy	0.063	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 45.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	19725	wwPDB-VP
Average B, all atoms (Å^2)	50.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.80% 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: TLA, SO4, KVM, GOL, MG

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	0.74	0/3291	0.89	0/4428
1	B	0.74	0/3274	0.87	0/4403
1	C	0.73	0/3291	0.86	0/4428
1	D	0.74	0/3244	0.88	0/4359
1	E	0.77	0/3206	0.88	0/4308
1	F	0.76	0/3258	0.85	0/4379
All	All	0.75	0/19564	0.87	0/26305

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	B	0	1
1	F	0	2
All	All	0	3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	261	GLY	Peptide
1	F	160	ASP	Peptide
1	F	232	ALA	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	3249	0	3274	27	0
1	B	3234	0	3261	27	0
1	C	3249	0	3274	44	0
1	D	3206	0	3235	34	0
1	E	3168	0	3208	40	0
1	F	3219	0	3245	36	0
2	A	10	0	4	0	0
2	B	10	0	4	0	0
2	C	10	0	4	4	0
3	A	10	0	0	0	0
3	B	5	0	0	0	0
3	C	10	0	0	0	0
3	D	15	0	0	1	0
3	F	15	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
4	E	1	0	0	0	0
4	F	1	0	0	0	0
5	A	6	0	8	0	0
5	B	6	0	8	0	0
5	C	6	0	8	0	0
5	D	6	0	8	0	0
6	D	12	0	0	1	0
6	E	12	0	0	1	0
6	F	12	0	0	1	0
7	A	53	0	0	3	0
7	B	36	0	0	1	0
7	C	49	0	0	1	0
7	D	46	0	0	4	0
7	E	26	0	0	1	0
7	F	39	0	0	1	0
All	All	19725	0	19541	191	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

All (191) 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:312:GLN:HE22	1:C:390:GLN:HE22	1.15	0.93
1:F:312:GLN:HE22	1:F:390:GLN:HE22	1.01	0.90
1:E:154:ASN:ND2	1:E:210:GLY:O	2.12	0.83
1:E:164:ASP:HB3	1:E:218:ASN:HD21	1.47	0.80
1:C:369:HIS:CD2	1:C:401:ARG:HH11	2.02	0.77
1:F:312:GLN:HE22	1:F:390:GLN:NE2	1.84	0.73
1:E:312:GLN:HE22	1:E:390:GLN:HE22	1.33	0.72
1:F:312:GLN:NE2	1:F:390:GLN:HE22	1.84	0.70
1:C:75:ALA:O	1:C:79:ILE:HG12	1.90	0.69
1:F:369:HIS:CD2	1:F:401:ARG:HH11	2.09	0.69
1:E:164:ASP:CB	1:E:218:ASN:HD21	2.06	0.69
1:B:160:ASP:N	1:B:160:ASP:OD1	2.25	0.67
1:E:398:ARG:HB3	1:E:400:ASP:OD1	1.96	0.66
1:D:-7:GLN:OE1	7:D:701:HOH:O	2.13	0.65
1:D:44:SER:OG	1:D:294:GLU:OE2	2.14	0.65
1:D:172:PRO:HG2	1:D:181:ALA:HB1	1.78	0.65
1:F:202:ASN:ND2	1:E:202:ASN:HD21	1.98	0.62
6:E:602:KVM:OAA	7:E:701:HOH:O	2.16	0.62
1:C:164:ASP:H	1:C:218:ASN:HD21	1.48	0.62
1:D:75:ALA:O	1:D:79:ILE:HG12	1.99	0.62
1:A:297:TRP:CE3	1:A:334:ILE:HD12	2.36	0.61
1:A:260:ALA:O	1:A:261:GLY:O	2.19	0.61
1:C:83:ALA:HA	1:C:117:ASN:HD21	1.65	0.61
1:F:290:ASP:OD2	1:F:316:ASP:HB3	2.00	0.61
1:C:162:ASN:N	1:C:214:ASN:ND2	2.50	0.60
1:E:83:ALA:HA	1:E:117:ASN:HD21	1.67	0.60
1:D:8:GLY:H	1:D:71:ASN:HD21	1.50	0.59
1:E:229:VAL:HG12	1:E:234:TYR:O	2.03	0.59
1:C:312:GLN:NE2	1:C:390:GLN:HE22	1.93	0.59
1:D:8:GLY:H	1:D:71:ASN:ND2	2.01	0.59
1:B:75:ALA:O	1:B:79:ILE:HG12	2.04	0.58
1:F:218:ASN:HD22	1:F:262:GLU:HG3	1.68	0.58
1:A:161:ASN:O	1:A:162:ASN:HB2	2.03	0.57
1:F:278:GLU:OE2	1:F:282:GLN:NE2	2.38	0.57
1:D:15:ARG:NH1	7:D:703:HOH:O	2.38	0.56
1:E:259:LEU:N	1:E:259:LEU:HD12	2.21	0.56
1:F:4:VAL:O	1:F:79:ILE:HD12	2.06	0.55
1:F:194:LYS:O	1:F:197:LYS:HE3	2.07	0.55
1:B:-6:GLN:HE22	1:D:-3:ARG:NH2	2.04	0.55
1:E:312:GLN:HE22	1:E:390:GLN:NE2	2.05	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:183:ARG:NH1	1:E:187:GLU:OE2	2.40	0.54
1:E:155:GLY:N	1:E:166:GLN:O	2.40	0.54
1:E:75:ALA:O	1:E:79:ILE:HG12	2.06	0.54
1:C:41:SER:HB2	1:C:250:GLU:OE2	2.08	0.54
1:C:61:LYS:NZ	7:C:801:HOH:O	2.41	0.53
1:D:297:TRP:CE3	1:D:334:ILE:HD13	2.43	0.53
1:E:268:THR:HG22	1:E:271:GLU:CD	2.29	0.53
1:E:150:MET:O	1:E:169:MET:HA	2.09	0.53
1:C:300:PHE:HB3	1:C:334:ILE:HG23	1.90	0.53
1:B:162:ASN:HB2	1:B:215:LEU:O	2.09	0.52
1:E:97:ASP:OD2	1:E:102:LYS:HA	2.10	0.52
1:F:339:LEU:HG	1:F:368:SER:HB2	1.91	0.52
1:D:277:GLU:O	1:D:280:THR:HB	2.10	0.52
1:D:97:ASP:OD2	1:D:102:LYS:HA	2.10	0.51
1:A:430:GLN:C	7:A:713:HOH:O	2.48	0.51
1:D:150:MET:O	1:D:169:MET:HA	2.11	0.51
1:A:297:TRP:CE3	1:A:334:ILE:CD1	2.94	0.51
1:A:369:HIS:CD2	1:A:401:ARG:HH11	2.29	0.51
1:F:83:ALA:HA	1:F:117:ASN:HD21	1.76	0.51
1:B:-6:GLN:HE22	1:D:-3:ARG:HH21	1.60	0.50
1:A:151:ASN:HA	1:A:169:MET:HG2	1.92	0.50
1:C:1:SER:OG	1:C:82:ASP:OD1	2.25	0.50
1:E:164:ASP:HB3	1:E:218:ASN:ND2	2.23	0.50
1:B:147:VAL:HG22	1:B:421:TYR:CZ	2.46	0.50
1:C:145:MET:HE3	1:C:419:ALA:CB	2.42	0.50
1:C:252:TYR:CZ	1:C:255:GLY:HA2	2.47	0.50
1:F:57:ARG:HA	1:E:183:ARG:NH1	2.27	0.49
1:A:287:SER:HA	1:A:312:GLN:O	2.12	0.49
1:D:217:SER:HB2	1:D:262:GLU:OE2	2.12	0.49
1:D:369:HIS:CD2	1:D:401:ARG:HH11	2.30	0.49
1:C:341:LYS:NZ	2:C:703:TLA:H2	2.28	0.49
1:A:75:ALA:O	1:A:79:ILE:HG12	2.12	0.48
1:A:11:ILE:O	1:A:18:PRO:HA	2.13	0.48
3:D:603:SO4:O1	7:D:702:HOH:O	2.19	0.48
1:D:83:ALA:HA	1:D:117:ASN:HD21	1.77	0.48
1:C:341:LYS:HZ3	2:C:703:TLA:C2	2.26	0.48
1:A:167:GLU:OE1	1:A:392:LYS:NZ	2.39	0.48
1:F:402:VAL:CG1	1:E:12:ILE:HB	2.44	0.48
1:A:367:ILE:HG13	1:A:383:ALA:HA	1.96	0.48
1:E:154:ASN:HD21	1:E:210:GLY:C	2.15	0.48
1:A:-3:ARG:HD2	1:C:-6:GLN:NE2	2.29	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:297:TRP:CE3	1:D:334:ILE:CD1	2.96	0.48
1:C:150:MET:O	1:C:169:MET:HA	2.14	0.48
1:F:259:LEU:HD12	1:F:259:LEU:N	2.28	0.48
1:E:199:LYS:HB3	1:E:201:MET:HE3	1.96	0.48
1:C:268:THR:HG22	1:C:271:GLU:CD	2.34	0.47
1:D:132:HIS:HE1	7:D:726:HOH:O	1.96	0.47
1:E:277:GLU:O	1:E:280:THR:HB	2.14	0.47
1:F:191:HIS:NE2	1:F:232:ALA:CB	2.78	0.47
1:C:341:LYS:HZ3	2:C:703:TLA:H2	1.80	0.47
1:C:41:SER:CB	1:C:250:GLU:OE2	2.63	0.47
1:D:23:GLU:OE1	1:D:25:HIS:HE1	1.97	0.47
1:C:169:MET:SD	1:C:392:LYS:HD2	2.55	0.47
1:E:145:MET:SD	1:E:412:GLU:HB2	2.54	0.47
1:F:191:HIS:NE2	1:F:232:ALA:HB3	2.30	0.46
1:E:147:VAL:HG22	1:E:421:TYR:CZ	2.49	0.46
1:B:46:GLU:CD	1:B:344:GLN:HG2	2.36	0.46
1:D:392:LYS:NZ	6:D:601:KVM:OAD	2.31	0.46
1:A:63:VAL:HA	7:A:720:HOH:O	2.15	0.46
1:E:415:LEU:HD13	1:E:419:ALA:HB2	1.97	0.46
1:F:157:GLU:N	7:F:804:HOH:O	2.49	0.46
1:F:379:ILE:HD11	1:F:404:LYS:HG2	1.97	0.46
1:E:280:THR:HG23	1:E:311:ILE:HD11	1.98	0.46
1:A:12:ILE:HB	1:B:402:VAL:CG1	2.46	0.45
1:C:30:PHE:HA	1:E:-7:GLN:O	2.16	0.45
1:C:145:MET:CE	1:C:419:ALA:HB1	2.46	0.45
1:C:199:LYS:NZ	1:C:227:GLU:OE2	2.49	0.45
1:F:97:ASP:HB2	1:F:105:PHE:CD2	2.52	0.45
1:E:154:ASN:ND2	1:E:210:GLY:C	2.70	0.45
1:D:290:ASP:OD2	1:D:316:ASP:HB3	2.16	0.45
1:B:261:GLY:O	1:B:262:GLU:CG	2.65	0.45
1:F:212:ALA:N	1:F:213:PRO:CD	2.79	0.45
1:C:202:ASN:HD21	1:D:202:ASN:HD21	1.65	0.45
1:B:297:TRP:CE3	1:B:334:ILE:HD12	2.52	0.45
1:C:316:ASP:CG	1:C:341:LYS:HZ2	2.20	0.45
1:C:369:HIS:CD2	1:C:401:ARG:NH1	2.80	0.45
1:F:392:LYS:HE3	6:F:703:KVM:OAA	2.17	0.45
1:E:253:LYS:HE3	1:E:253:LYS:HA	1.99	0.45
1:B:297:TRP:CE3	1:B:334:ILE:CD1	3.01	0.44
1:D:369:HIS:CD2	1:D:393:THR:HA	2.51	0.44
1:C:39:GLY:HA2	2:C:703:TLA:O41	2.17	0.44
1:B:161:ASN:HB2	1:B:214:ASN:HA	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:46:GLU:CD	1:F:344:GLN:HG2	2.38	0.44
1:E:259:LEU:O	1:E:260:ALA:C	2.56	0.44
1:E:290:ASP:OD2	1:E:316:ASP:HB3	2.18	0.44
1:E:339:LEU:HD23	1:E:341:LYS:NZ	2.33	0.44
1:D:125:LYS:NZ	1:D:132:HIS:HD2	2.16	0.44
1:A:369:HIS:HE1	7:A:706:HOH:O	2.01	0.43
1:C:162:ASN:N	1:C:214:ASN:HD21	2.16	0.43
1:B:320:VAL:O	1:B:320:VAL:HG23	2.19	0.43
1:F:397:SER:O	1:F:398:ARG:HB2	2.18	0.43
1:A:151:ASN:CA	1:A:169:MET:HG2	2.48	0.43
1:C:83:ALA:CA	1:C:117:ASN:HD21	2.30	0.43
1:B:162:ASN:ND2	1:B:261:GLY:CA	2.82	0.43
1:C:155:GLY:O	1:C:165:ILE:O	2.36	0.43
1:D:278:GLU:O	1:D:281:LYS:O	2.35	0.43
1:D:281:LYS:O	1:D:282:GLN:HB3	2.17	0.43
1:B:162:ASN:ND2	1:B:261:GLY:HA2	2.33	0.43
1:C:59:LEU:N	1:C:59:LEU:HD12	2.34	0.43
1:C:199:LYS:HD3	1:C:201:MET:CE	2.48	0.43
1:A:261:GLY:O	1:A:262:GLU:C	2.57	0.43
1:B:269:SER:OG	1:B:296:ASP:OD2	2.36	0.43
1:E:145:MET:HE1	1:E:384:VAL:CG2	2.49	0.43
1:C:12:ILE:HB	1:D:402:VAL:CG1	2.48	0.42
1:F:3:ILE:HD11	1:F:117:ASN:ND2	2.34	0.42
1:F:369:HIS:CD2	1:F:393:THR:HA	2.55	0.42
1:E:214:ASN:HD22	1:E:214:ASN:HA	1.70	0.42
1:A:10:GLU:OE1	1:B:179:LYS:NZ	2.39	0.42
1:E:304:THR:O	1:E:308:GLY:HA3	2.20	0.42
1:C:148:PRO:HA	1:C:391:ILE:O	2.20	0.42
1:A:46:GLU:CD	1:A:344:GLN:HG2	2.40	0.42
1:A:339:LEU:HD23	1:A:341:LYS:HE3	2.01	0.42
1:B:138:GLY:HA2	7:B:603:HOH:O	2.20	0.42
1:B:161:ASN:CB	1:B:214:ASN:HA	2.50	0.42
1:C:251:PHE:HB2	1:C:258:VAL:O	2.18	0.42
1:D:126:GLY:O	1:E:-1:SER:HA	2.20	0.42
1:C:83:ALA:CB	1:C:117:ASN:HD21	2.32	0.42
1:B:130:TYR:CE1	1:B:415:LEU:HD11	2.55	0.42
1:C:58:PHE:CE1	1:D:183:ARG:HA	2.54	0.42
1:D:259:LEU:N	1:D:259:LEU:HD12	2.35	0.42
1:F:339:LEU:HD12	1:F:366:VAL:HB	2.02	0.42
1:A:369:HIS:CD2	1:A:393:THR:HA	2.55	0.41
1:E:139:THR:N	1:E:140:PRO:HD3	2.35	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:278:GLU:OE1	1:A:278:GLU:HA	2.19	0.41
1:B:276:LEU:O	1:B:280:THR:HG23	2.21	0.41
1:A:140:PRO:HG3	1:F:135:GLU:O	2.20	0.41
1:B:150:MET:O	1:B:169:MET:HA	2.20	0.41
1:A:-3:ARG:HD2	1:C:-6:GLN:HE22	1.85	0.41
1:C:384:VAL:HG11	1:C:411:ILE:HG21	2.02	0.41
1:F:8:GLY:CA	1:F:70:VAL:HG11	2.51	0.41
1:F:48:LEU:HD23	1:F:103:SER:HA	2.01	0.41
1:A:-7:GLN:O	1:E:30:PHE:HA	2.20	0.41
1:C:121:ALA:HB3	1:C:132:HIS:CE1	2.56	0.41
1:C:162:ASN:H	1:C:214:ASN:ND2	2.19	0.41
1:D:164:ASP:OD2	1:D:259:LEU:HB3	2.20	0.41
1:F:259:LEU:O	1:F:264:ASN:HA	2.20	0.41
1:B:140:PRO:HG3	1:C:135:GLU:O	2.20	0.41
1:E:176:LYS:HE2	1:E:176:LYS:HA	2.03	0.41
1:F:150:MET:O	1:F:169:MET:HA	2.21	0.41
1:B:-3:ARG:HA	1:B:0:MET:HE3	2.03	0.41
1:C:17:ASN:HD21	1:D:190:HIS:CE1	2.39	0.41
1:B:59:LEU:HD12	1:B:59:LEU:N	2.35	0.40
1:F:202:ASN:HD21	1:E:202:ASN:HD21	1.68	0.40
1:B:148:PRO:HA	1:B:391:ILE:O	2.21	0.40
1:B:151:ASN:HA	1:B:169:MET:HG2	2.03	0.40
1:F:375:GLU:H	1:F:375:GLU:CD	2.23	0.40
1:D:259:LEU:HD13	1:D:267:PHE:CE1	2.57	0.40
1:A:300:PHE:HB3	1:A:334:ILE:HG23	2.03	0.40
1:D:221:ALA:O	1:D:225:ILE:HG13	2.21	0.40
1:F:300:PHE:HB3	1:F:334:ILE:HG23	2.04	0.40
1:F:398:ARG:HB3	1:F:400:ASP:OD1	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	436/449 (97%)	411 (94%)	21 (5%)	4 (1%)	17	34
1	B	432/449 (96%)	412 (95%)	17 (4%)	3 (1%)	22	41
1	C	436/449 (97%)	414 (95%)	18 (4%)	4 (1%)	17	34
1	D	424/449 (94%)	404 (95%)	17 (4%)	3 (1%)	22	41
1	E	418/449 (93%)	391 (94%)	26 (6%)	1 (0%)	47	69
1	F	428/449 (95%)	399 (93%)	26 (6%)	3 (1%)	22	41
All	All	2574/2694 (96%)	2431 (94%)	125 (5%)	18 (1%)	22	41

All (18) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	261	GLY
1	B	262	GLU
1	A	262	GLU
1	A	162	ASN
1	B	260	ALA
1	D	261	GLY
1	D	282	GLN
1	B	398	ARG
1	F	261	GLY
1	A	398	ARG
1	F	260	ALA
1	F	398	ARG
1	E	398	ARG
1	C	159	ALA
1	C	261	GLY
1	C	398	ARG
1	D	398	ARG
1	C	156	GLY

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.

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	331/337 (98%)	322 (97%)	9 (3%)	44	68
1	B	330/337 (98%)	321 (97%)	9 (3%)	44	68
1	C	331/337 (98%)	320 (97%)	11 (3%)	38	61
1	D	327/337 (97%)	315 (96%)	12 (4%)	34	57
1	E	324/337 (96%)	312 (96%)	12 (4%)	34	57
1	F	328/337 (97%)	314 (96%)	14 (4%)	29	52
All	All	1971/2022 (98%)	1904 (97%)	67 (3%)	37	60

All (67) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	44	SER
1	A	103	SER
1	A	142	LYS
1	A	163	VAL
1	A	342	PHE
1	A	369	HIS
1	A	371	SER
1	A	397	SER
1	A	400	ASP
1	B	45	ARG
1	B	76	GLN
1	B	142	LYS
1	B	160	ASP
1	B	264	ASN
1	B	309	ASP
1	B	342	PHE
1	B	369	HIS
1	B	400	ASP
1	C	142	LYS
1	C	268	THR
1	C	282	GLN
1	C	310	LYS
1	C	324	LYS
1	C	342	PHE
1	C	343	ASN
1	C	369	HIS
1	C	371	SER

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Mol	Chain	Res	Type
1	C	397	SER
1	C	400	ASP
1	D	48	LEU
1	D	154	ASN
1	D	176	LYS
1	D	197	LYS
1	D	214	ASN
1	D	265	LYS
1	D	270	GLU
1	D	342	PHE
1	D	369	HIS
1	D	371	SER
1	D	397	SER
1	D	400	ASP
1	F	38	SER
1	F	97	ASP
1	F	103	SER
1	F	154	ASN
1	F	197	LYS
1	F	214	ASN
1	F	253	LYS
1	F	256	LYS
1	F	264	ASN
1	F	342	PHE
1	F	369	HIS
1	F	371	SER
1	F	397	SER
1	F	400	ASP
1	E	76	GLN
1	E	164	ASP
1	E	183	ARG
1	E	197	LYS
1	E	253	LYS
1	E	254	ASP
1	E	264	ASN
1	E	282	GLN
1	E	342	PHE
1	E	369	HIS
1	E	397	SER
1	E	400	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (46) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	-7	GLN
1	A	17	ASN
1	A	154	ASN
1	A	161	ASN
1	A	190	HIS
1	A	264	ASN
1	A	369	HIS
1	B	-6	GLN
1	B	17	ASN
1	B	154	ASN
1	B	162	ASN
1	B	190	HIS
1	B	202	ASN
1	B	312	GLN
1	B	390	GLN
1	C	17	ASN
1	C	117	ASN
1	C	132	HIS
1	C	202	ASN
1	C	214	ASN
1	C	218	ASN
1	C	312	GLN
1	C	369	HIS
1	D	25	HIS
1	D	71	ASN
1	D	117	ASN
1	D	132	HIS
1	D	214	ASN
1	D	282	GLN
1	D	303	GLN
1	D	369	HIS
1	F	25	HIS
1	F	117	ASN
1	F	132	HIS
1	F	202	ASN
1	F	218	ASN
1	F	312	GLN
1	F	369	HIS
1	F	422	ASN
1	E	25	HIS
1	E	117	ASN
1	E	151	ASN
1	E	154	ASN

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Mol	Chain	Res	Type
1	E	214	ASN
1	E	218	ASN
1	E	390	GLN

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

Of 27 ligands modelled in this entry, 6 are monoatomic - leaving 21 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	SO4	D	606	-	4,4,4	0.35	0	6,6,6	0.12	0
3	SO4	F	701	-	4,4,4	0.39	0	6,6,6	0.11	0
6	KVM	E	602	4	9,12,12	7.08	6 (66%)	11,19,19	2.74	6 (54%)
3	SO4	C	701	-	4,4,4	0.32	0	6,6,6	0.19	0
3	SO4	F	704	-	4,4,4	0.34	0	6,6,6	0.16	0
3	SO4	C	704	-	4,4,4	0.34	0	6,6,6	0.15	0
5	GOL	A	605	-	5,5,5	0.20	0	5,5,5	0.44	0
5	GOL	B	503	-	5,5,5	0.16	0	5,5,5	0.36	0
3	SO4	A	602	-	4,4,4	0.30	0	6,6,6	0.15	0
2	TLA	A	601	4	9,9,9	2.44	2 (22%)	12,12,12	1.94	3 (25%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
2	TLA	B	501	4	9,9,9	2.53	3 (33%)	12,12,12	2.98	5 (41%)
6	KVM	D	601	4	9,12,12	5.75	6 (66%)	11,19,19	4.68	6 (54%)
2	TLA	C	703	4	9,9,9	1.90	2 (22%)	12,12,12	1.78	3 (25%)
3	SO4	A	604	-	4,4,4	0.30	0	6,6,6	0.15	0
3	SO4	D	603	-	4,4,4	0.36	0	6,6,6	0.14	0
5	GOL	D	605	-	5,5,5	0.16	0	5,5,5	0.36	0
3	SO4	D	602	-	4,4,4	0.24	0	6,6,6	0.12	0
5	GOL	C	705	-	5,5,5	0.17	0	5,5,5	0.38	0
3	SO4	F	705	-	4,4,4	0.31	0	6,6,6	0.14	0
3	SO4	B	504	-	4,4,4	0.33	0	6,6,6	0.19	0
6	KVM	F	703	4	9,12,12	4.97	6 (66%)	11,19,19	3.18	5 (45%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	KVM	E	602	4	-	0/6/22/22	0/1/1/1
2	TLA	A	601	4	-	2/12/12/12	-
2	TLA	B	501	4	-	4/12/12/12	-
6	KVM	F	703	4	-	6/6/22/22	0/1/1/1
5	GOL	A	605	-	-	4/4/4/4	-
6	KVM	D	601	4	-	6/6/22/22	0/1/1/1
2	TLA	C	703	4	-	8/12/12/12	-
5	GOL	B	503	-	-	0/4/4/4	-
5	GOL	D	605	-	-	2/4/4/4	-
5	GOL	C	705	-	-	4/4/4/4	-

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	E	602	KVM	OAD-NAC	-15.32	1.18	1.38
6	D	601	KVM	OAD-NAC	10.53	1.52	1.38
6	D	601	KVM	CAE-CAB	-10.08	1.35	1.50
6	F	703	KVM	OAD-NAC	10.06	1.51	1.38
6	E	602	KVM	CAE-CAB	-9.34	1.36	1.50
6	F	703	KVM	CAE-CAB	-8.43	1.38	1.50
6	E	602	KVM	PAG-CAF	-7.45	1.71	1.81

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	E	602	KVM	PAG-OAI	7.03	1.61	1.49
2	B	501	TLA	C2-C1	-6.44	1.43	1.52
2	A	601	TLA	C2-C1	-5.60	1.45	1.52
6	D	601	KVM	PAG-OAI	5.55	1.58	1.49
6	D	601	KVM	PAG-OAJ	-4.59	1.47	1.54
2	C	703	TLA	C3-C4	-4.29	1.46	1.52
6	D	601	KVM	PAG-OAH	4.18	1.61	1.54
6	F	703	KVM	PAG-OAH	3.92	1.61	1.54
6	F	703	KVM	PAG-OAJ	3.85	1.61	1.54
6	E	602	KVM	CAK-NAC	-3.77	1.32	1.37
2	A	601	TLA	O11-C1	-3.69	1.18	1.30
6	F	703	KVM	PAG-CAF	3.41	1.86	1.81
6	D	601	KVM	CAK-NAC	-3.35	1.33	1.37
6	E	602	KVM	PAG-OAJ	-2.73	1.50	1.54
6	F	703	KVM	CAK-NAC	-2.62	1.34	1.37
2	B	501	TLA	O11-C1	-2.23	1.23	1.30
2	B	501	TLA	O3-C3	2.20	1.46	1.42
2	C	703	TLA	O41-C4	-2.04	1.23	1.30

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	D	601	KVM	OAD-NAC-CAB	10.56	134.06	121.99
6	F	703	KVM	OAD-NAC-CAB	7.86	130.97	121.99
6	D	601	KVM	OAD-NAC-CAK	-7.71	116.00	122.14
2	B	501	TLA	O2-C2-C1	-7.55	94.85	110.66
6	D	601	KVM	OAA-CAB-CAE	-5.58	119.12	127.24
6	E	602	KVM	OAD-NAC-CAB	4.95	127.65	121.99
2	B	501	TLA	O2-C2-C3	4.62	119.40	110.23
6	F	703	KVM	OAA-CAB-CAE	-4.45	120.76	127.24
2	A	601	TLA	O2-C2-C1	-4.07	102.13	110.66
2	A	601	TLA	O2-C2-C3	3.77	117.73	110.23
6	E	602	KVM	PAG-CAF-CAK	3.55	121.88	114.55
6	D	601	KVM	OAJ-PAG-OAI	-3.52	104.61	113.45
6	F	703	KVM	OAD-NAC-CAK	-3.51	119.34	122.14
6	D	601	KVM	OAL-CAK-NAC	-3.41	121.26	124.48
6	E	602	KVM	OAJ-PAG-OAH	3.14	116.07	107.64
2	B	501	TLA	O3-C3-C2	3.08	116.36	110.23
6	E	602	KVM	CAE-CAF-CAK	3.03	105.23	103.68
2	C	703	TLA	C2-C3-C4	-3.01	103.15	109.87
6	E	602	KVM	OAA-CAB-CAE	-2.92	122.98	127.24
2	C	703	TLA	O2-C2-C3	-2.67	104.93	110.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	F	703	KVM	OAL-CAK-NAC	-2.58	122.04	124.48
6	E	602	KVM	OAH-PAG-OAI	-2.56	107.02	113.45
2	A	601	TLA	O41-C4-C3	2.53	120.10	113.27
2	B	501	TLA	O1-C1-C2	-2.35	115.45	121.63
2	C	703	TLA	O3-C3-C4	-2.31	105.82	110.66
2	B	501	TLA	O11-C1-O1	2.24	129.17	124.09
6	F	703	KVM	CAE-CAF-CAK	-2.23	102.54	103.68
6	D	601	KVM	OAH-PAG-OAI	-2.13	108.10	113.45

There are no chirality outliers.

All (36) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	605	GOL	O1-C1-C2-C3
5	C	705	GOL	O1-C1-C2-C3
5	C	705	GOL	C1-C2-C3-O3
5	C	705	GOL	O2-C2-C3-O3
5	D	605	GOL	C1-C2-C3-O3
6	D	601	KVM	CAE-CAF-PAG-OAH
6	D	601	KVM	CAK-CAF-PAG-OAH
6	D	601	KVM	CAE-CAF-PAG-OAI
6	D	601	KVM	CAK-CAF-PAG-OAI
6	D	601	KVM	CAE-CAF-PAG-OAJ
6	D	601	KVM	CAK-CAF-PAG-OAJ
6	F	703	KVM	CAE-CAF-PAG-OAH
6	F	703	KVM	CAK-CAF-PAG-OAH
6	F	703	KVM	CAE-CAF-PAG-OAI
6	F	703	KVM	CAK-CAF-PAG-OAI
6	F	703	KVM	CAE-CAF-PAG-OAJ
6	F	703	KVM	CAK-CAF-PAG-OAJ
2	A	601	TLA	O1-C1-C2-O2
2	A	601	TLA	O11-C1-C2-O2
2	C	703	TLA	O2-C2-C3-C4
2	B	501	TLA	O11-C1-C2-O2
2	C	703	TLA	C1-C2-C3-C4
2	B	501	TLA	O1-C1-C2-O2
2	C	703	TLA	O2-C2-C3-O3
5	A	605	GOL	O1-C1-C2-O2
2	C	703	TLA	C1-C2-C3-O3
5	A	605	GOL	O2-C2-C3-O3
5	C	705	GOL	O1-C1-C2-O2
5	D	605	GOL	O2-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
2	C	703	TLA	O11-C1-C2-O2
2	B	501	TLA	O1-C1-C2-C3
2	C	703	TLA	O11-C1-C2-C3
5	A	605	GOL	C1-C2-C3-O3
2	C	703	TLA	O1-C1-C2-C3
2	B	501	TLA	O11-C1-C2-C3
2	C	703	TLA	O1-C1-C2-O2

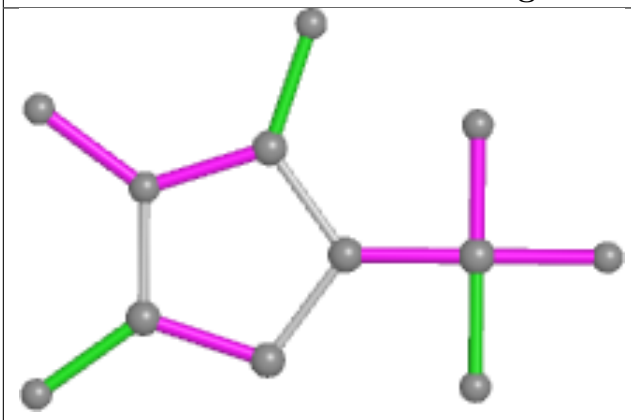
There are no ring outliers.

5 monomers are involved in 8 short contacts:

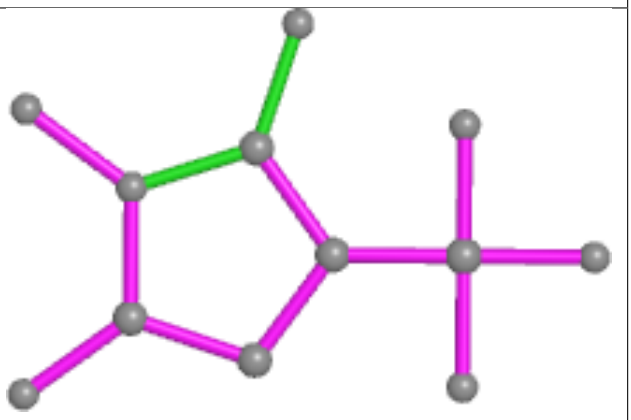
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	E	602	KVM	1	0
6	D	601	KVM	1	0
2	C	703	TLA	4	0
3	D	603	SO4	1	0
6	F	703	KVM	1	0

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.

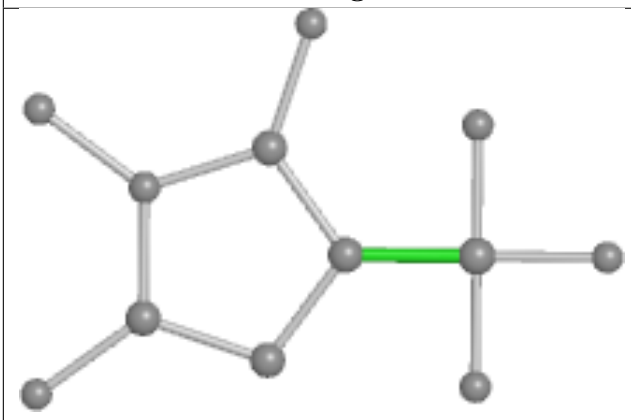
Ligand KVM E 602



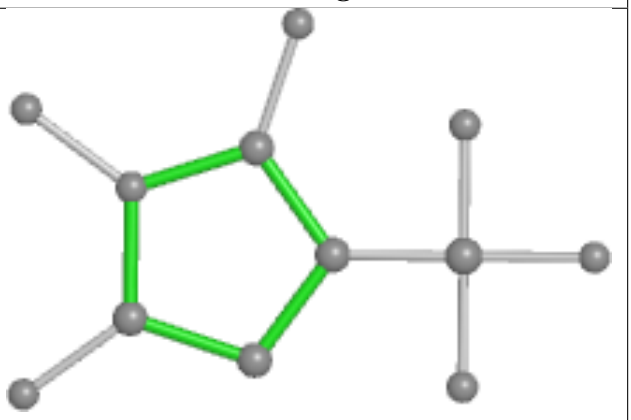
Bond lengths



Bond angles

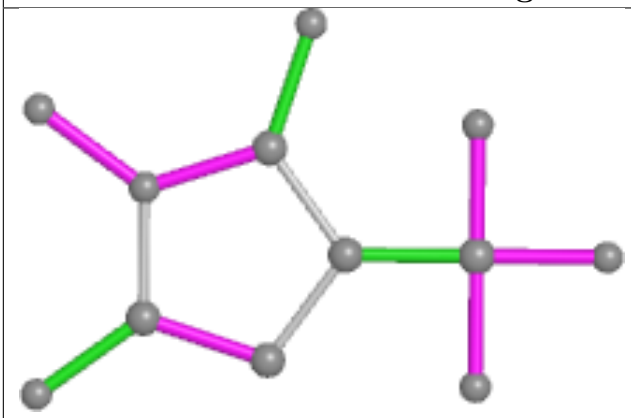


Torsions

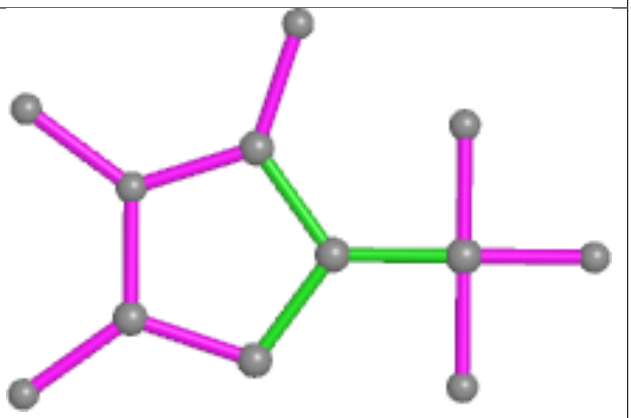


Rings

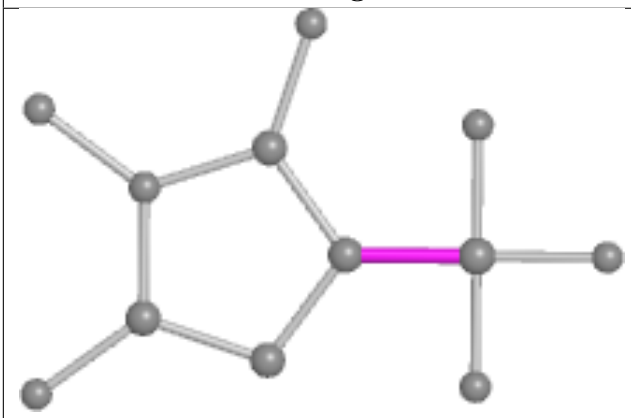
Ligand KVM D 601



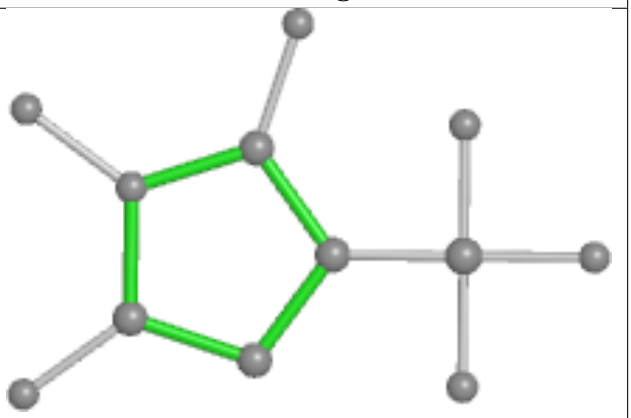
Bond lengths



Bond angles

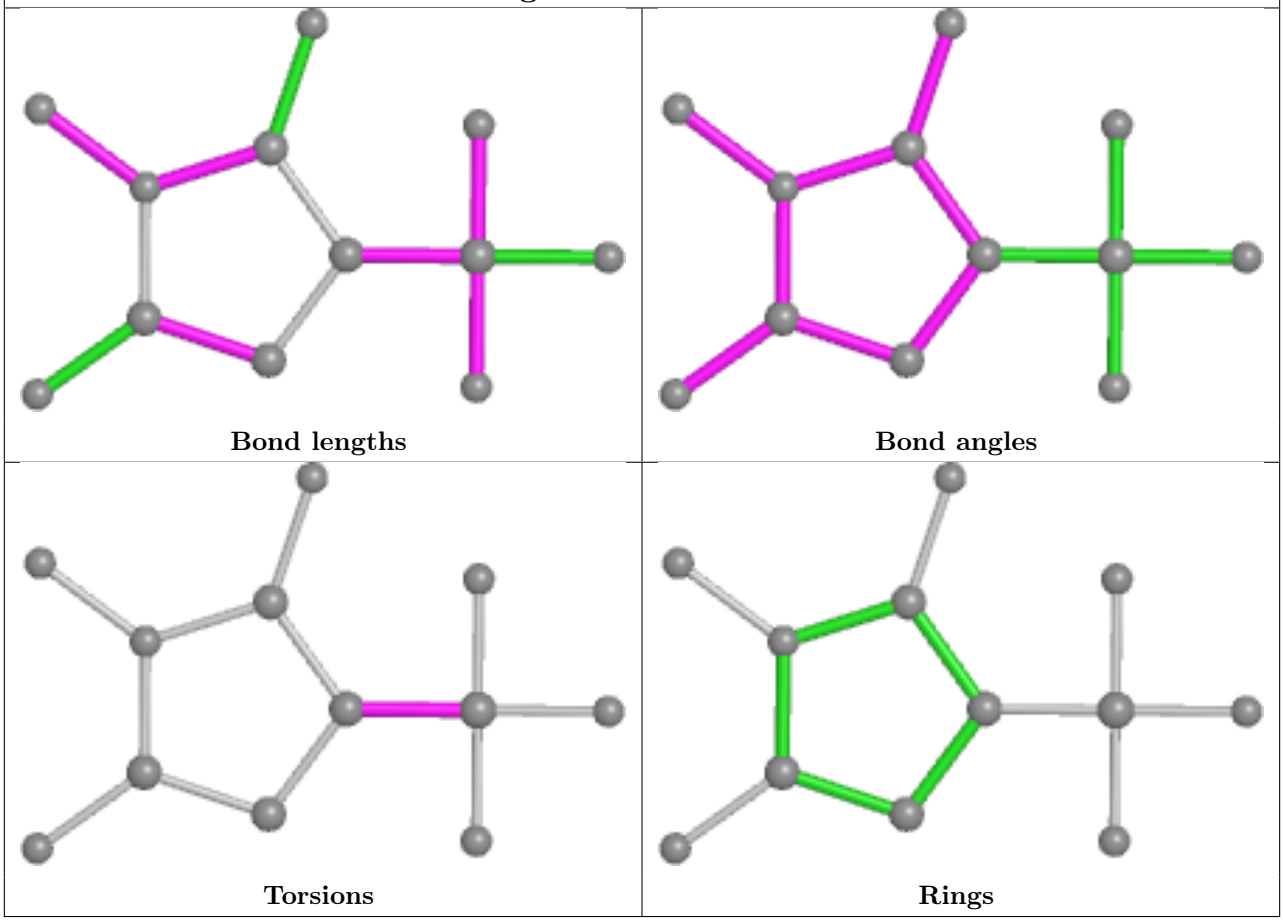


Torsions



Rings

Ligand KVM F 703



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	438/449 (97%)	0.25	8 (1%) 68 66	28, 41, 66, 109	0
1	B	436/449 (97%)	0.30	11 (2%) 57 53	31, 45, 70, 98	0
1	C	438/449 (97%)	0.16	3 (0%) 87 86	29, 42, 68, 113	0
1	D	432/449 (96%)	0.38	20 (4%) 32 28	30, 48, 84, 128	0
1	E	426/449 (94%)	0.58	35 (8%) 11 9	34, 59, 91, 106	0
1	F	434/449 (96%)	0.35	12 (2%) 53 49	33, 50, 78, 104	0
All	All	2604/2694 (96%)	0.33	89 (3%) 45 41	28, 47, 80, 128	0

All (89) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	159	ALA	5.6
1	A	263	GLY	5.3
1	D	258	VAL	4.8
1	A	163	VAL	4.3
1	E	275	PHE	4.1
1	D	297	TRP	3.8
1	D	282	GLN	3.7
1	E	152	ILE	3.6
1	E	363	TYR	3.6
1	D	261	GLY	3.6
1	E	272	PHE	3.4
1	D	257	TYR	3.4
1	D	266	ALA	3.4
1	E	255	GLY	3.4
1	E	45	ARG	3.4
1	B	263	GLY	3.3
1	F	252	TYR	3.3
1	E	251	PHE	3.3
1	D	254	ASP	3.2

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Mol	Chain	Res	Type	RSRZ
1	E	197	LYS	3.2
1	E	307	LEU	3.1
1	E	238	LYS	3.0
1	B	163	VAL	3.0
1	A	162	ASN	3.0
1	E	168	PHE	3.0
1	E	300	PHE	3.0
1	D	256	LYS	2.9
1	E	331	GLU	2.9
1	D	253	LYS	2.9
1	B	255	GLY	2.9
1	E	282	GLN	2.9
1	F	256	LYS	2.8
1	E	44	SER	2.8
1	E	297	TRP	2.7
1	A	253	LYS	2.7
1	B	236	LEU	2.7
1	D	305	LYS	2.7
1	D	267	PHE	2.7
1	E	310	LYS	2.7
1	F	157	GLU	2.6
1	D	264	ASN	2.6
1	E	259	LEU	2.5
1	A	153	ILE	2.5
1	E	198	ALA	2.5
1	D	279	LEU	2.5
1	F	264	ASN	2.5
1	E	306	VAL	2.5
1	B	254	ASP	2.5
1	F	272	PHE	2.5
1	E	271	GLU	2.4
1	E	257	TYR	2.4
1	E	288	ILE	2.4
1	C	158	HIS	2.4
1	E	358	ALA	2.4
1	E	427	ILE	2.3
1	B	45	ARG	2.3
1	F	164	ASP	2.3
1	B	257	TYR	2.3
1	E	193	ALA	2.3
1	D	283	TYR	2.3
1	D	262	GLU	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	267	PHE	2.2
1	E	323	THR	2.2
1	F	221	ALA	2.2
1	F	258	VAL	2.2
1	F	263	GLY	2.2
1	E	165	ILE	2.2
1	E	302	TYR	2.2
1	E	267	PHE	2.2
1	F	253	LYS	2.1
1	C	256	LYS	2.1
1	E	242	LEU	2.1
1	F	224	VAL	2.1
1	E	224	VAL	2.1
1	B	41	SER	2.1
1	C	156	GLY	2.1
1	D	255	GLY	2.1
1	D	291	GLY	2.1
1	E	291	GLY	2.1
1	D	302	TYR	2.1
1	D	307	LEU	2.1
1	B	260	ALA	2.0
1	E	244	MET	2.0
1	A	214	ASN	2.0
1	B	162	ASN	2.0
1	D	154	ASN	2.0
1	F	242	LEU	2.0
1	E	283	TYR	2.0
1	A	160	ASP	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,

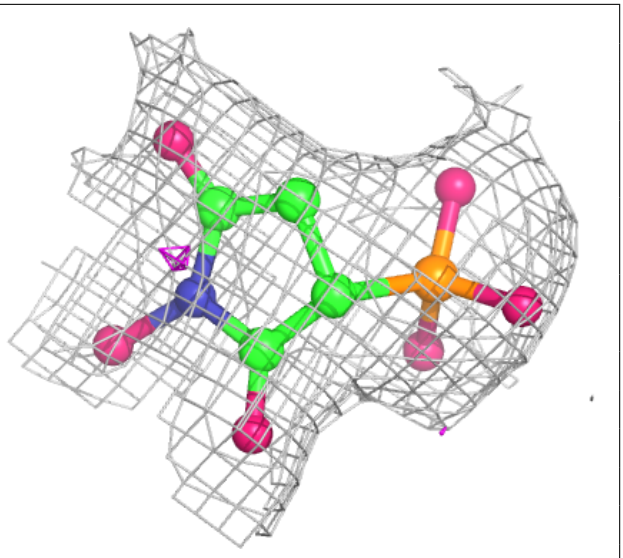
median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

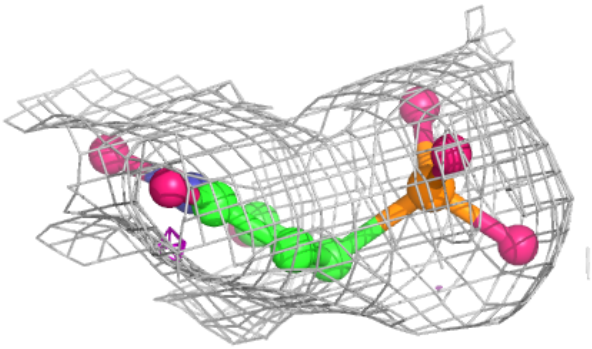
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	SO4	C	704	5/5	0.61	0.32	120,120,133,140	0
5	GOL	A	605	6/6	0.63	0.23	72,80,86,86	0
5	GOL	B	503	6/6	0.67	0.26	94,101,106,108	0
5	GOL	D	605	6/6	0.77	0.27	54,68,72,73	0
3	SO4	B	504	5/5	0.83	0.19	75,89,101,104	0
3	SO4	F	705	5/5	0.87	0.19	78,84,93,93	0
5	GOL	C	705	6/6	0.89	0.30	56,63,66,66	0
3	SO4	D	606	5/5	0.90	0.24	81,90,97,103	0
3	SO4	F	701	5/5	0.91	0.17	63,76,81,94	0
3	SO4	D	603	5/5	0.91	0.14	81,83,93,98	0
3	SO4	F	704	5/5	0.93	0.12	84,103,111,111	0
3	SO4	C	701	5/5	0.95	0.16	49,58,62,63	0
6	KVM	D	601	12/12	0.95	0.15	53,61,70,70	0
4	MG	D	604	1/1	0.96	0.13	39,39,39,39	0
3	SO4	D	602	5/5	0.96	0.14	55,62,63,67	0
2	TLA	C	703	10/10	0.96	0.17	37,41,44,48	0
6	KVM	E	602	12/12	0.96	0.16	64,83,92,97	0
2	TLA	B	501	10/10	0.97	0.13	34,41,45,50	0
4	MG	C	702	1/1	0.97	0.14	25,25,25,25	0
6	KVM	F	703	12/12	0.97	0.15	60,67,79,81	0
2	TLA	A	601	10/10	0.97	0.13	32,35,38,39	0
3	SO4	A	602	5/5	0.98	0.18	62,64,72,73	0
4	MG	F	702	1/1	0.98	0.06	40,40,40,40	0
4	MG	E	601	1/1	0.98	0.10	42,42,42,42	0
4	MG	B	502	1/1	0.98	0.09	30,30,30,30	0
3	SO4	A	604	5/5	0.98	0.09	51,54,61,63	0
4	MG	A	603	1/1	0.99	0.12	21,21,21,21	0

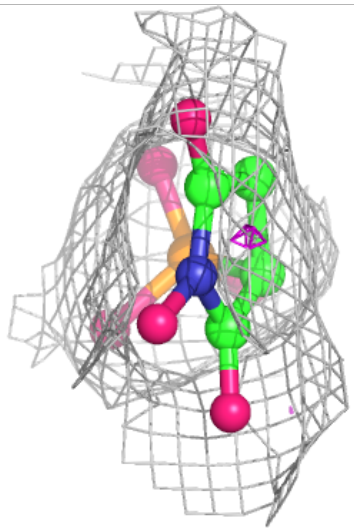
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around KVM 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)

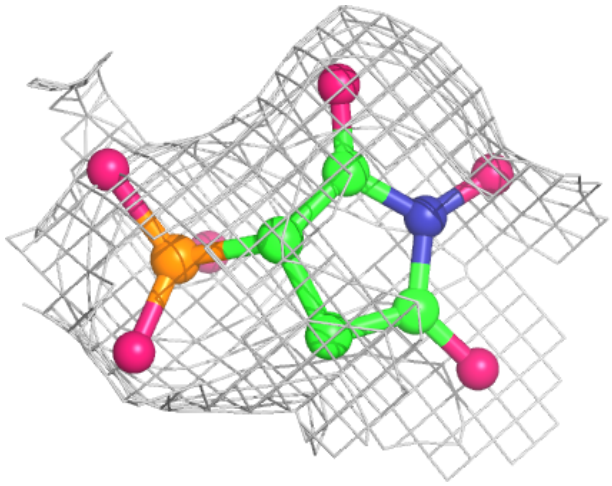


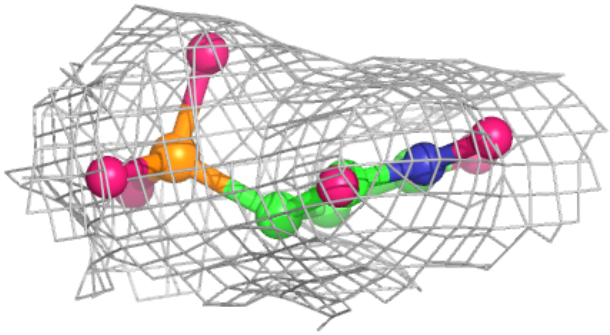


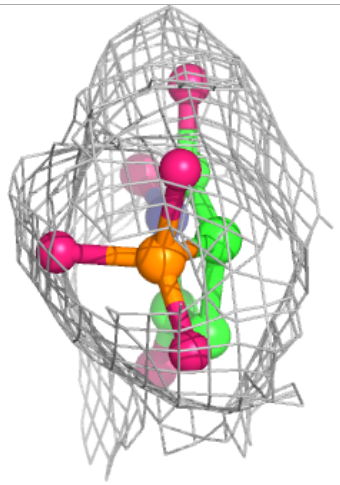


Electron density around KVM E 602:

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

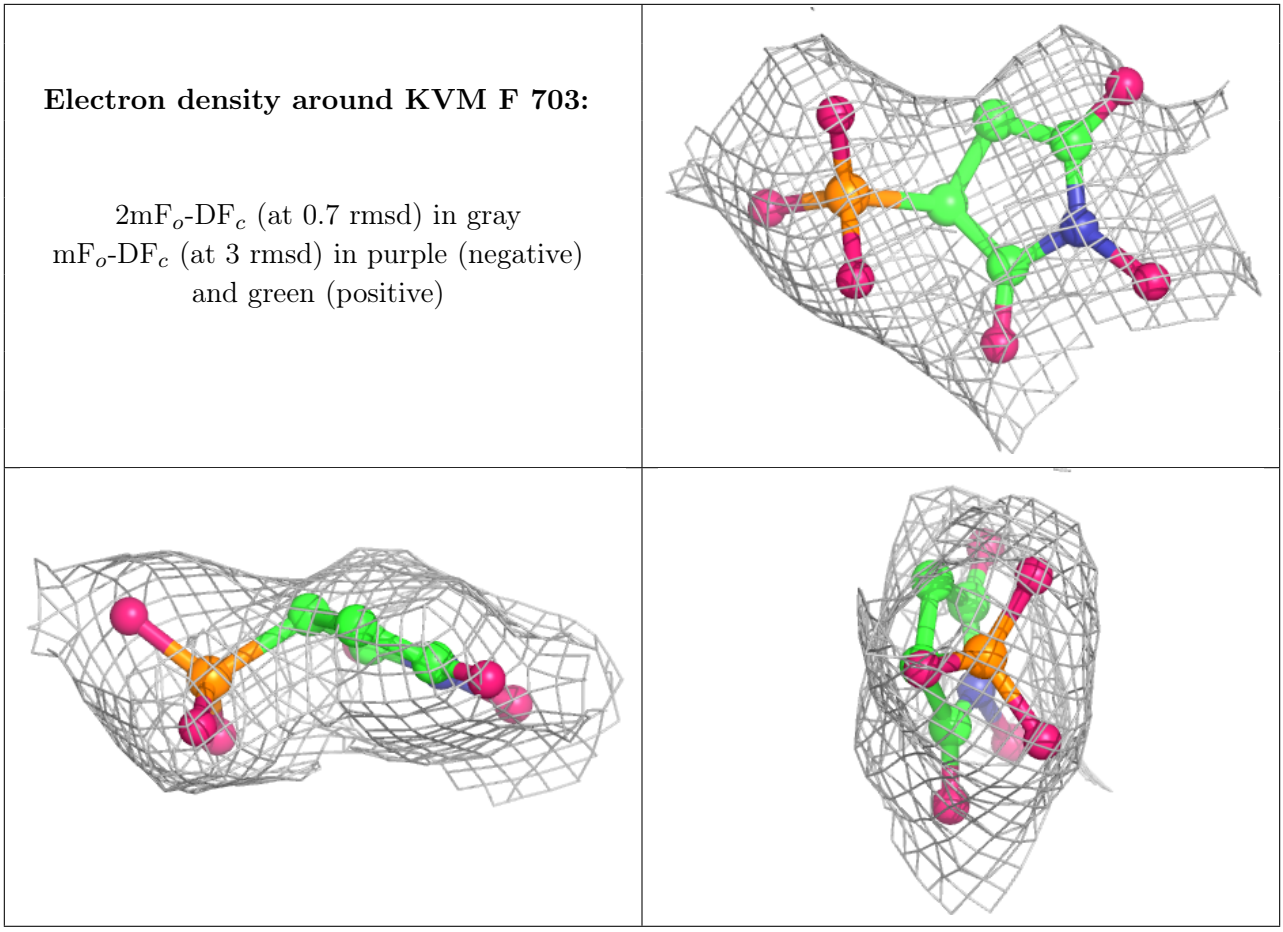






Electron density around KVM F 703:

$2mF_o$-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.