wwPDB X-ray Structure Validation Summary Report (i)

Oct 15, 2024 – 04:04 pm BST

PDB ID	:	9GGI
Title	:	Crystal structure of argininosuccinate lyase from Arabidopsis thaliana (AtASL)
Authors	:	Nielipinski, M.; Pietrzyk-Brzezinska, A.J.; Krzeszewska, D.; Sekula, B.
Deposited on	:	2024-08-13
Resolution	:	1.55 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 (i) 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 (i)) were used in the production of this report:

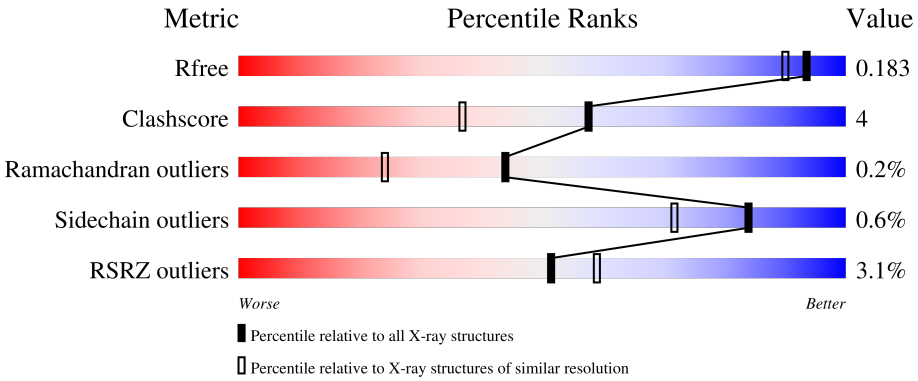
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 1.55 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	1935 (1.56-1.56)
Clashscore	180529	2073 (1.56-1.56)
Ramachandran outliers	177936	2037 (1.56-1.56)
Sidechain outliers	177891	2034 (1.56-1.56)
RSRZ outliers	164620	1935 (1.56-1.56)

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	465	4% 85% 11%
1	B	465	3% 92% 5%
1	C	465	3% 89% 7%
1	D	465	4% 89% 8%
1	E	465	3% 91% 6%

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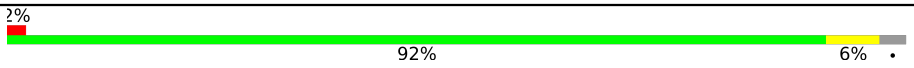
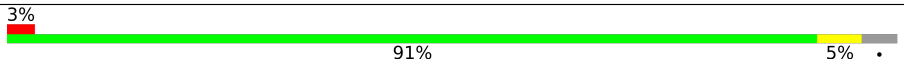
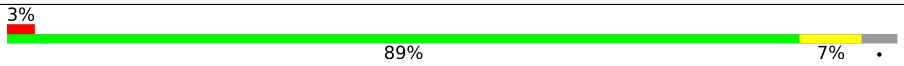
Mol	Chain	Length	Quality of chain
1	F	465	
1	G	465	
1	H	465	

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	SO4	A	604	-	-	X	-
3	GOL	E	607	-	-	X	-
3	GOL	E	608	-	-	X	-
3	GOL	H	607	-	-	X	-

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 33706 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 Argininosuccinate lyase, chloroplastic.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	450	Total	C	N	O	S	0	23	0
			3642	2308	613	699	22			
1	B	453	Total	C	N	O	S	0	15	0
			3632	2298	621	692	21			
1	C	448	Total	C	N	O	S	0	15	0
			3584	2268	611	685	20			
1	D	448	Total	C	N	O	S	0	15	0
			3584	2269	609	686	20			
1	E	451	Total	C	N	O	S	0	17	0
			3616	2289	614	693	20			
1	F	453	Total	C	N	O	S	0	19	0
			3651	2315	619	696	21			
1	G	448	Total	C	N	O	S	0	15	0
			3583	2268	610	685	20			
1	H	448	Total	C	N	O	S	0	16	0
			3586	2272	608	686	20			

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	53	SER	-	expression tag	UNP Q9LEU8
A	54	ASN	-	expression tag	UNP Q9LEU8
A	55	ALA	-	expression tag	UNP Q9LEU8
B	53	SER	-	expression tag	UNP Q9LEU8
B	54	ASN	-	expression tag	UNP Q9LEU8
B	55	ALA	-	expression tag	UNP Q9LEU8
C	53	SER	-	expression tag	UNP Q9LEU8
C	54	ASN	-	expression tag	UNP Q9LEU8
C	55	ALA	-	expression tag	UNP Q9LEU8
D	53	SER	-	expression tag	UNP Q9LEU8
D	54	ASN	-	expression tag	UNP Q9LEU8
D	55	ALA	-	expression tag	UNP Q9LEU8
E	53	SER	-	expression tag	UNP Q9LEU8

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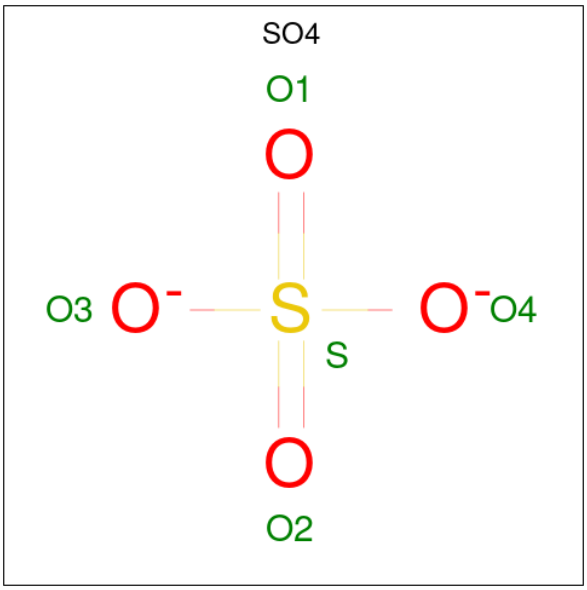
Chain	Residue	Modelled	Actual	Comment	Reference
E	54	ASN	-	expression tag	UNP Q9LEU8
E	55	ALA	-	expression tag	UNP Q9LEU8
F	53	SER	-	expression tag	UNP Q9LEU8
F	54	ASN	-	expression tag	UNP Q9LEU8
F	55	ALA	-	expression tag	UNP Q9LEU8
G	53	SER	-	expression tag	UNP Q9LEU8
G	54	ASN	-	expression tag	UNP Q9LEU8
G	55	ALA	-	expression tag	UNP Q9LEU8
H	53	SER	-	expression tag	UNP Q9LEU8
H	54	ASN	-	expression tag	UNP Q9LEU8
H	55	ALA	-	expression tag	UNP Q9LEU8

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



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

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	1	Total O S 5 4 1	0	0
2	B	1	Total O S 5 4 1	0	0
2	B	1	Total O S 5 4 1	0	0
2	C	1	Total O S 5 4 1	0	0
2	C	1	Total O S 5 4 1	0	0
2	C	1	Total O S 5 4 1	0	0
2	D	1	Total O S 5 4 1	0	0
2	D	1	Total O S 5 4 1	0	0
2	D	1	Total O S 5 4 1	0	0
2	D	1	Total O S 5 4 1	0	0
2	D	1	Total O S 5 4 1	0	0
2	D	1	Total O S 5 4 1	0	0
2	D	1	Total O S 5 4 1	0	0
2	E	1	Total O S 5 4 1	0	0
2	E	1	Total O S 5 4 1	0	0
2	E	1	Total O S 5 4 1	0	0
2	F	1	Total O S 5 4 1	0	0
2	F	1	Total O S 5 4 1	0	0
2	F	1	Total O S 5 4 1	0	0
2	F	1	Total O S 5 4 1	0	0
2	F	1	Total O S 5 4 1	0	0

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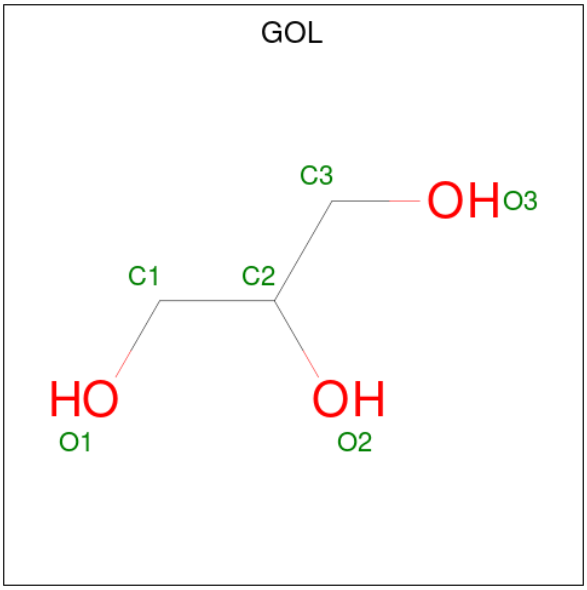
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	F	1	Total O S 5 4 1	0	0
2	F	1	Total O S 5 4 1	0	0
2	G	1	Total O S 5 4 1	0	0
2	G	1	Total O S 5 4 1	0	0
2	G	1	Total O S 5 4 1	0	0
2	G	1	Total O S 5 4 1	0	0
2	G	1	Total O S 5 4 1	0	0
2	G	1	Total O S 5 4 1	0	0
2	H	1	Total O S 5 4 1	0	0
2	H	1	Total O S 5 4 1	0	0
2	H	1	Total O S 5 4 1	0	0
2	H	1	Total O S 5 4 1	0	0

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	C	1	Total C O 6 3 3	0	0
3	C	1	Total C O 6 3 3	0	0
3	C	1	Total C O 6 3 3	0	0
3	C	1	Total C O 6 3 3	0	0
3	D	1	Total C O 6 3 3	0	0
3	D	1	Total C O 6 3 3	0	0
3	E	1	Total C O 6 3 3	0	0
3	E	1	Total C O 6 3 3	0	0
3	E	1	Total C O 6 3 3	0	0
3	F	1	Total C O 6 3 3	0	0
3	F	1	Total C O 6 3 3	0	0
3	F	1	Total C O 6 3 3	0	0
3	G	1	Total C O 6 3 3	0	0
3	G	1	Total C O 6 3 3	0	0
3	H	1	Total C O 6 3 3	0	0
3	H	1	Total C O 6 3 3	0	0
3	H	1	Total C O 6 3 3	0	0

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	C	2	Total Cl 2 2	0	0
4	D	1	Total Cl 1 1	0	0
4	E	2	Total Cl 2 2	0	0
4	G	1	Total Cl 1 1	0	0

- Molecule 5 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	C	1	Total Na 1 1	0	0

- Molecule 6 is water.

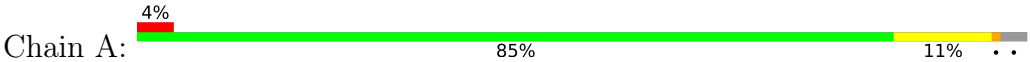
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	542	Total O 542 542	0	0
6	B	554	Total O 554 554	0	0
6	C	589	Total O 590 590	0	1
6	D	561	Total O 562 562	0	1
6	E	553	Total O 554 554	0	1
6	F	564	Total O 565 565	0	1
6	G	571	Total O 571 571	0	0
6	H	556	Total O 556 556	0	0

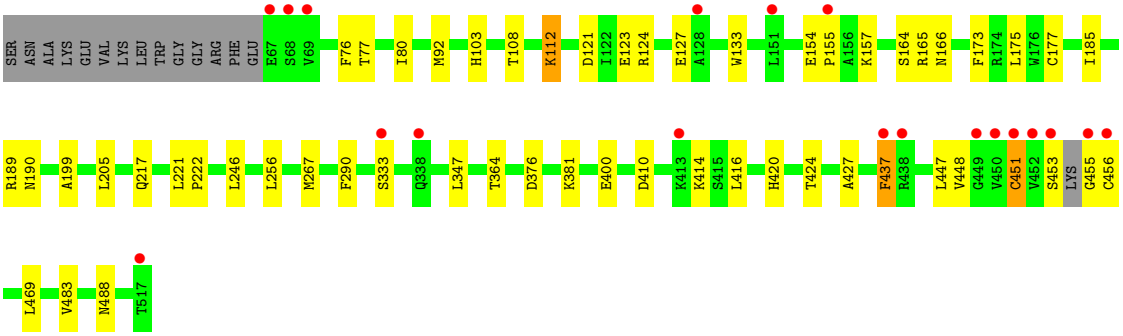
3 Residue-property plots (i)

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: Argininosuccinate lyase, chloroplastic

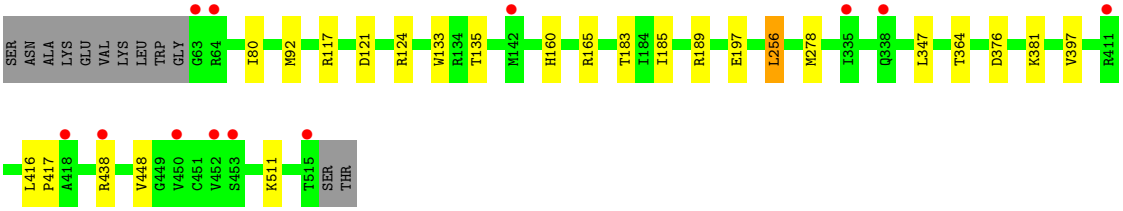
Chain A:





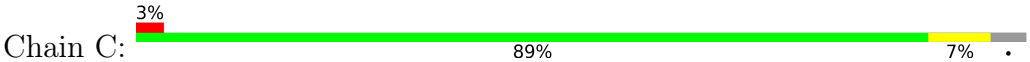
• Molecule 1: Argininosuccinate lyase, chloroplastic

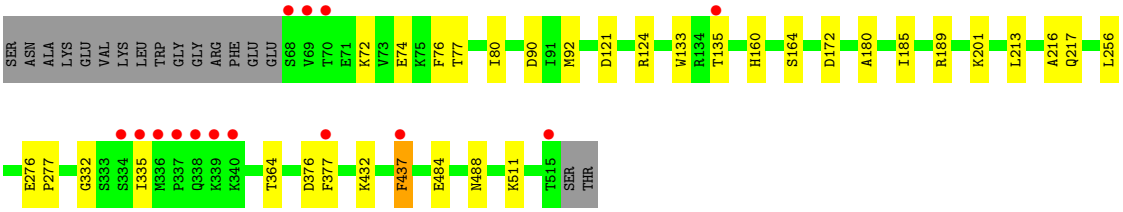
Chain B:



• Molecule 1: Argininosuccinate lyase, chloroplastic

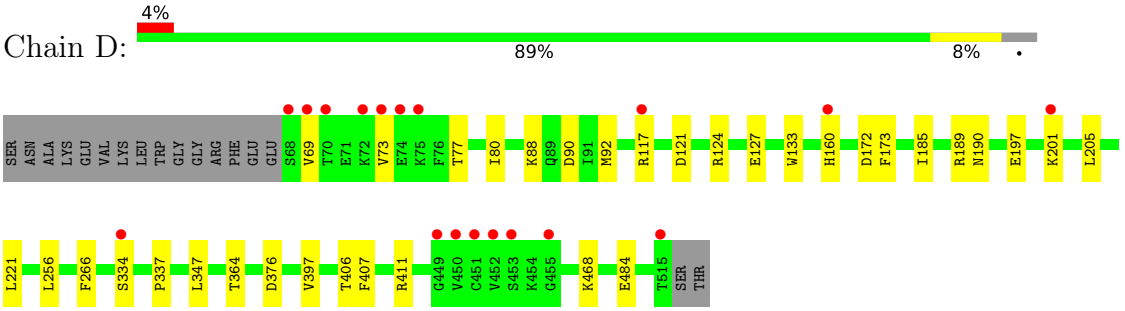
Chain C:





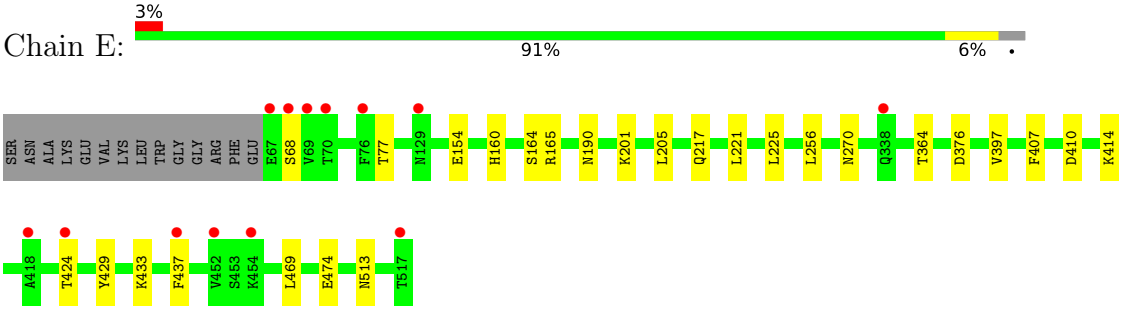
• Molecule 1: Argininosuccinate lyase, chloroplastic

Chain D:



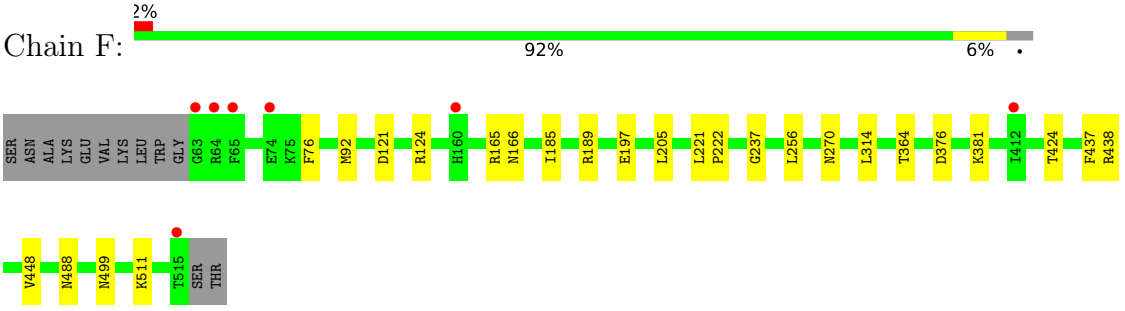
• Molecule 1: Argininosuccinate lyase, chloroplastic

Chain E:



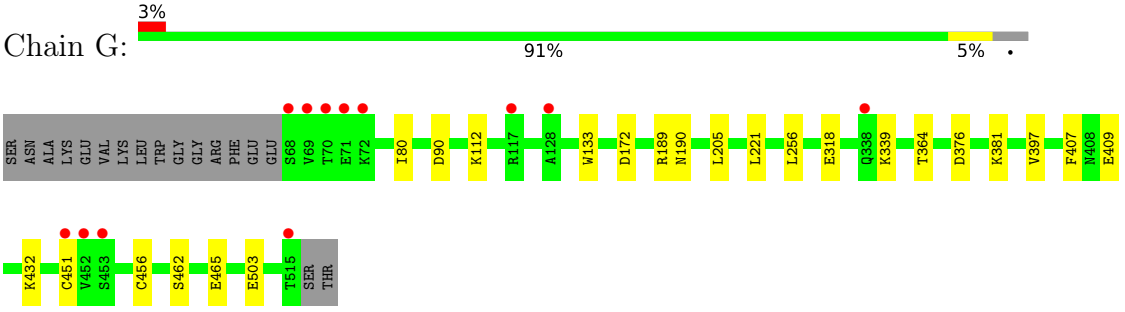
• Molecule 1: Argininosuccinate lyase, chloroplastic

Chain F:



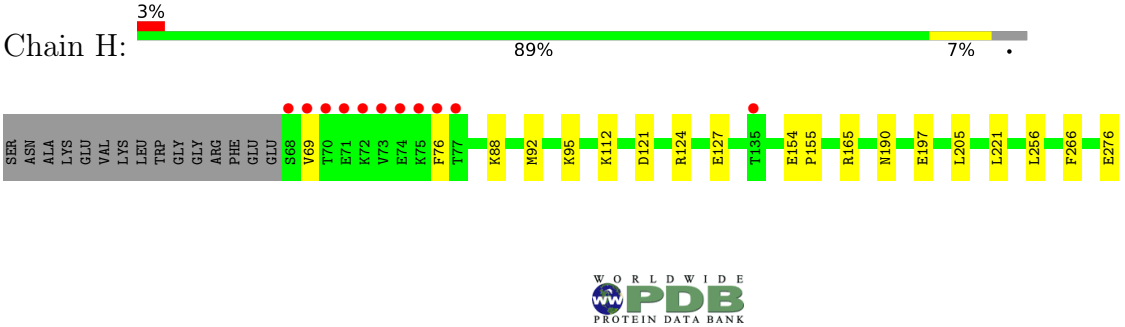
• Molecule 1: Argininosuccinate lyase, chloroplastic

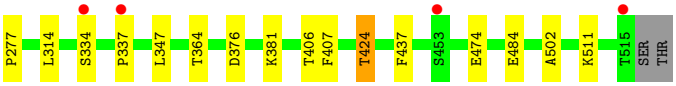
Chain G:



• Molecule 1: Argininosuccinate lyase, chloroplastic

Chain H:




P277
L314
S334
P337
L347
T364
D376
K381
T406
F407
T424
F437
S453
E474
E484
A502
K511
T515
SER
THR

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	106.04Å 229.54Å 111.59Å 90.00° 90.56° 90.00°	Depositor
Resolution (Å)	48.45 – 1.55 48.45 – 1.55	Depositor EDS
% Data completeness (in resolution range)	94.1 (48.45-1.55) 94.1 (48.45-1.55)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.87 (at 1.55Å)	Xtriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.147 , 0.171 0.161 , 0.183	Depositor DCC
R_{free} test set	3603 reflections (0.50%)	wwPDB-VP
Wilson B-factor (Å^2)	16.8	Xtriage
Anisotropy	0.612	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 53.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.002 for l,k,-h 0.018 for h,-k,-l 0.013 for l,-k,h	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	33706	wwPDB-VP
Average B, all atoms (Å^2)	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.48% 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: SO4, GOL, NA, CL

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	0.65	0/3767	0.96	0/5093
1	B	0.60	0/3741	0.92	0/5057
1	C	0.64	0/3692	0.95	0/4990
1	D	0.61	0/3692	0.93	0/4994
1	E	0.65	0/3731	0.95	0/5045
1	F	0.61	0/3773	0.92	0/5101
1	G	0.61	0/3691	0.93	0/4992
1	H	0.64	0/3697	0.94	0/5000
All	All	0.63	0/29784	0.94	0/40272

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	3642	0	3687	62	0
1	B	3632	0	3669	28	0
1	C	3584	0	3624	36	0
1	D	3584	0	3619	38	0
1	E	3616	0	3657	31	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	3651	0	3693	38	0
1	G	3583	0	3619	28	0
1	H	3586	0	3630	39	0
2	A	20	0	0	2	0
2	B	25	0	0	1	0
2	C	15	0	0	1	0
2	D	35	0	0	1	0
2	E	15	0	0	0	0
2	F	35	0	0	0	0
2	G	30	0	0	0	0
2	H	20	0	0	1	0
3	A	12	0	15	5	0
3	B	18	0	24	4	0
3	C	24	0	32	4	0
3	D	12	0	16	0	0
3	E	18	0	24	9	0
3	F	18	0	24	4	0
3	G	12	0	16	1	0
3	H	18	0	24	5	0
4	C	2	0	0	0	0
4	D	1	0	0	0	0
4	E	2	0	0	0	0
4	G	1	0	0	0	0
5	C	1	0	0	0	0
6	A	542	0	0	10	0
6	B	554	0	0	12	0
6	C	590	0	0	14	0
6	D	562	0	0	11	0
6	E	554	0	0	11	0
6	F	565	0	0	11	0
6	G	571	0	0	9	0
6	H	556	0	0	12	0
All	All	33706	0	29373	255	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 4.

The worst 5 of 255 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:92:MET:HE1	6:B:822:HOH:O	1.54	1.08

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:92:MET:HE1	6:F:735:HOH:O	1.59	1.01
1:H:92:MET:HE1	6:H:728:HOH:O	1.61	1.00
1:E:270[B]:ASN:OD1	6:E:701:HOH:O	1.80	0.99
1:A:205[B]:LEU:HD23	1:A:221:LEU:HD22	1.44	0.96

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	469/465 (101%)	460 (98%)	7 (2%)	2 (0%)	30	13
1	B	466/465 (100%)	459 (98%)	6 (1%)	1 (0%)	44	24
1	C	461/465 (99%)	453 (98%)	7 (2%)	1 (0%)	44	24
1	D	461/465 (99%)	452 (98%)	7 (2%)	2 (0%)	30	13
1	E	466/465 (100%)	458 (98%)	6 (1%)	2 (0%)	30	13
1	F	470/465 (101%)	463 (98%)	6 (1%)	1 (0%)	44	24
1	G	461/465 (99%)	454 (98%)	6 (1%)	1 (0%)	44	24
1	H	462/465 (99%)	456 (99%)	5 (1%)	1 (0%)	44	24
All	All	3716/3720 (100%)	3655 (98%)	50 (1%)	11 (0%)	44	18

5 of 11 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	256[A]	LEU
1	A	256[B]	LEU
1	B	256	LEU
1	C	256	LEU
1	D	256[A]	LEU

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	413/402 (103%)	407 (98%)	6 (2%)	60 34
1	B	407/402 (101%)	406 (100%)	1 (0%)	92 86
1	C	403/402 (100%)	401 (100%)	2 (0%)	86 76
1	D	403/402 (100%)	401 (100%)	2 (0%)	86 76
1	E	408/402 (102%)	405 (99%)	3 (1%)	81 67
1	F	411/402 (102%)	410 (100%)	1 (0%)	92 86
1	G	403/402 (100%)	402 (100%)	1 (0%)	92 86
1	H	404/402 (100%)	399 (99%)	5 (1%)	67 45
All	All	3252/3216 (101%)	3231 (99%)	21 (1%)	84 72

5 of 21 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	376	ASP
1	H	376	ASP
1	H	437	PHE
1	H	424[A]	THR
1	H	69	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 7 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	202	ASN
1	F	166	ASN
1	H	202	ASN
1	F	202	ASN
1	B	202	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 68 ligands modelled in this entry, 7 are monoatomic - leaving 61 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	GOL	C	609	-	5,5,5	0.09	0	5,5,5	0.33	0
3	GOL	H	606	-	5,5,5	0.18	0	5,5,5	0.64	0
2	SO4	F	605	-	4,4,4	0.45	0	6,6,6	0.07	0
3	GOL	B	608	-	5,5,5	0.45	0	5,5,5	0.57	0
3	GOL	C	606	-	5,5,5	0.14	0	5,5,5	0.46	0
2	SO4	C	604	-	4,4,4	0.71	0	6,6,6	0.31	0
2	SO4	F	603	-	4,4,4	0.41	0	6,6,6	0.41	0
2	SO4	D	602	-	4,4,4	0.22	0	6,6,6	0.11	0
2	SO4	B	604	-	4,4,4	0.37	0	6,6,6	0.32	0
3	GOL	A	606	-	5,5,5	1.05	0	5,5,5	0.38	0
2	SO4	E	603	-	4,4,4	0.46	0	6,6,6	0.34	0
2	SO4	D	605	-	4,4,4	0.37	0	6,6,6	0.62	0
3	GOL	F	609	-	5,5,5	0.08	0	5,5,5	0.32	0
3	GOL	G	608	-	5,5,5	0.11	0	5,5,5	0.31	0
3	GOL	E	607	-	5,5,5	0.45	0	5,5,5	0.63	0
2	SO4	E	604	-	4,4,4	0.30	0	6,6,6	0.15	0
3	GOL	B	606	-	5,5,5	0.06	0	5,5,5	0.29	0
2	SO4	D	603	-	4,4,4	0.52	0	6,6,6	0.10	0
2	SO4	D	607	-	4,4,4	0.44	0	6,6,6	0.05	0
2	SO4	G	603	-	4,4,4	0.46	0	6,6,6	0.04	0
2	SO4	B	602	-	4,4,4	0.27	0	6,6,6	0.41	0
2	SO4	H	603	-	4,4,4	0.39	0	6,6,6	0.23	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	GOL	F	608	-	5,5,5	0.27	0	5,5,5	0.30	0
3	GOL	H	605	-	5,5,5	0.49	0	5,5,5	0.63	0
2	SO4	G	604	-	4,4,4	0.44	0	6,6,6	0.13	0
2	SO4	A	601	-	4,4,4	0.35	0	6,6,6	0.42	0
2	SO4	B	603	-	4,4,4	0.46	0	6,6,6	0.27	0
2	SO4	F	607	-	4,4,4	0.37	0	6,6,6	0.28	0
2	SO4	G	606	-	4,4,4	0.45	0	6,6,6	0.09	0
3	GOL	G	609	-	5,5,5	0.15	0	5,5,5	0.48	0
3	GOL	H	607	-	5,5,5	0.27	0	5,5,5	0.85	0
2	SO4	H	601	-	4,4,4	0.46	0	6,6,6	0.07	0
3	GOL	D	610	-	5,5,5	0.20	0	5,5,5	0.53	0
2	SO4	B	605	-	4,4,4	0.37	0	6,6,6	0.12	0
2	SO4	A	604	-	4,4,4	0.40	0	6,6,6	0.26	0
2	SO4	D	608	-	4,4,4	0.30	0	6,6,6	0.07	0
3	GOL	F	610	-	5,5,5	0.78	0	5,5,5	0.55	0
3	GOL	C	607	-	5,5,5	0.37	0	5,5,5	0.81	0
2	SO4	A	603	-	4,4,4	0.33	0	6,6,6	0.21	0
2	SO4	G	602	-	4,4,4	0.29	0	6,6,6	0.30	0
3	GOL	E	608	-	5,5,5	0.78	0	5,5,5	0.49	0
2	SO4	F	602	-	4,4,4	0.45	0	6,6,6	0.04	0
3	GOL	E	606	-	5,5,5	0.50	0	5,5,5	0.87	0
2	SO4	G	605	-	4,4,4	0.47	0	6,6,6	0.46	0
2	SO4	D	606	-	4,4,4	0.29	0	6,6,6	0.37	0
3	GOL	A	605	-	5,5,5	0.19	0	5,5,5	0.62	0
3	GOL	B	607	-	5,5,5	0.17	0	5,5,5	0.57	0
3	GOL	D	609	-	5,5,5	0.10	0	5,5,5	0.32	0
2	SO4	D	604	-	4,4,4	0.46	0	6,6,6	0.08	0
2	SO4	B	601	-	4,4,4	0.42	0	6,6,6	0.23	0
3	GOL	C	608	-	5,5,5	0.45	0	5,5,5	0.96	0
2	SO4	F	606	-	4,4,4	0.24	0	6,6,6	0.47	0
2	SO4	H	602	-	4,4,4	0.39	0	6,6,6	0.37	0
2	SO4	F	601	-	4,4,4	0.30	0	6,6,6	0.33	0
2	SO4	A	602	-	4,4,4	0.34	0	6,6,6	0.70	0
2	SO4	H	604	-	4,4,4	0.46	0	6,6,6	0.06	0
2	SO4	C	603	-	4,4,4	0.37	0	6,6,6	0.26	0
2	SO4	F	604	-	4,4,4	0.59	0	6,6,6	0.43	0
2	SO4	G	607	-	4,4,4	0.42	0	6,6,6	0.18	0
2	SO4	C	605	-	4,4,4	0.39	0	6,6,6	0.16	0
2	SO4	E	605	-	4,4,4	0.38	0	6,6,6	0.16	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
3	GOL	C	609	-	-	4/4/4/4	-
3	GOL	H	606	-	-	0/4/4/4	-
3	GOL	B	608	-	-	4/4/4/4	-
3	GOL	C	606	-	-	4/4/4/4	-
3	GOL	A	606	-	-	2/4/4/4	-
3	GOL	F	609	-	-	4/4/4/4	-
3	GOL	G	608	-	-	2/4/4/4	-
3	GOL	E	607	-	-	0/4/4/4	-
3	GOL	B	606	-	-	1/4/4/4	-
3	GOL	F	608	-	-	2/4/4/4	-
3	GOL	H	605	-	-	4/4/4/4	-
3	GOL	H	607	-	-	2/4/4/4	-
3	GOL	G	609	-	-	0/4/4/4	-
3	GOL	D	610	-	-	4/4/4/4	-
3	GOL	F	610	-	-	4/4/4/4	-
3	GOL	C	607	-	-	3/4/4/4	-
3	GOL	E	608	-	-	3/4/4/4	-
3	GOL	E	606	-	-	2/4/4/4	-
3	GOL	A	605	-	-	0/4/4/4	-
3	GOL	B	607	-	-	2/4/4/4	-
3	GOL	D	609	-	-	3/4/4/4	-
3	GOL	C	608	-	-	1/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 51 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	606	GOL	O1-C1-C2-O2
3	A	606	GOL	O1-C1-C2-C3
3	B	607	GOL	O1-C1-C2-C3
3	C	606	GOL	O1-C1-C2-C3
3	C	606	GOL	C1-C2-C3-O3

There are no ring outliers.

20 monomers are involved in 38 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	609	GOL	1	0
2	D	602	SO4	1	0
3	A	606	GOL	3	0
3	F	609	GOL	2	0
3	E	607	GOL	4	0
3	B	606	GOL	1	0
3	H	605	GOL	1	0
2	B	603	SO4	1	0
3	G	609	GOL	1	0
3	H	607	GOL	4	0
2	H	601	SO4	1	0
2	A	604	SO4	2	0
3	F	610	GOL	2	0
3	C	607	GOL	1	0
3	E	608	GOL	4	0
3	E	606	GOL	1	0
3	A	605	GOL	2	0
3	B	607	GOL	3	0
3	C	608	GOL	2	0
2	C	603	SO4	1	0

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	450/465 (96%)	0.19	19 (4%)	41	48	9, 20, 47, 79	23 (5%)
1	B	453/465 (97%)	0.01	12 (2%)	57	65	11, 21, 44, 88	15 (3%)
1	C	448/465 (96%)	0.07	14 (3%)	51	59	11, 19, 45, 66	15 (3%)
1	D	448/465 (96%)	0.10	18 (4%)	43	50	11, 20, 44, 65	15 (3%)
1	E	451/465 (96%)	0.07	13 (2%)	54	61	11, 20, 44, 80	17 (3%)
1	F	453/465 (97%)	0.02	7 (1%)	71	79	11, 20, 42, 98	19 (4%)
1	G	448/465 (96%)	0.08	12 (2%)	56	63	11, 20, 43, 61	15 (3%)
1	H	448/465 (96%)	0.15	15 (3%)	49	57	12, 20, 42, 90	16 (3%)
All	All	3599/3720 (96%)	0.08	110 (3%)	51	59	9, 20, 44, 98	135 (3%)

The worst 5 of 110 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	76	PHE	8.5
1	H	69	VAL	6.7
1	G	69	VAL	6.6
1	H	73	VAL	6.0
1	H	68	SER	5.9

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

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

6.3 Carbohydrates

There are no monosaccharides in this entry.

6.4 Ligands (i)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	SO4	F	604	5/5	0.73	0.16	23,28,39,44	5
3	GOL	B	607	6/6	0.75	0.22	25,35,43,46	0
3	GOL	G	609	6/6	0.75	0.26	56,60,68,70	0
2	SO4	B	605	5/5	0.79	0.12	65,70,91,95	0
2	SO4	D	604	5/5	0.80	0.20	24,32,37,38	5
2	SO4	H	601	5/5	0.80	0.13	48,64,77,92	0
3	GOL	F	609	6/6	0.81	0.19	46,54,59,60	0
3	GOL	G	608	6/6	0.81	0.25	54,62,63,64	0
3	GOL	C	609	6/6	0.81	0.18	22,28,42,43	0
2	SO4	G	603	5/5	0.83	0.15	41,48,50,52	5
3	GOL	E	607	6/6	0.84	0.18	28,30,40,42	0
3	GOL	A	606	6/6	0.84	0.17	23,32,35,41	0
3	GOL	H	607	6/6	0.84	0.16	44,51,58,61	0
3	GOL	E	608	6/6	0.85	0.17	23,26,43,47	0
3	GOL	D	610	6/6	0.85	0.16	45,54,72,96	0
3	GOL	F	610	6/6	0.85	0.17	25,36,38,40	0
2	SO4	D	602	5/5	0.86	0.11	51,57,77,79	0
2	SO4	F	605	5/5	0.86	0.16	20,35,42,43	5
3	GOL	B	608	6/6	0.86	0.16	30,36,43,61	0
2	SO4	H	604	5/5	0.86	0.18	29,38,48,50	5
2	SO4	G	607	5/5	0.87	0.12	51,74,83,86	0
2	SO4	F	607	5/5	0.87	0.14	43,43,47,50	5
2	SO4	D	607	5/5	0.87	0.14	30,43,54,60	5
3	GOL	C	607	6/6	0.87	0.17	38,60,63,63	0
3	GOL	H	605	6/6	0.87	0.15	24,36,42,51	0
3	GOL	F	608	6/6	0.87	0.15	31,46,50,50	0
2	SO4	F	602	5/5	0.88	0.13	34,48,53,58	5
3	GOL	D	609	6/6	0.88	0.18	46,53,59,60	0
2	SO4	A	604	5/5	0.88	0.15	44,52,57,58	5
3	GOL	C	608	6/6	0.88	0.17	20,41,50,51	0
2	SO4	D	605	5/5	0.89	0.14	31,38,39,47	5
2	SO4	G	606	5/5	0.89	0.14	19,30,31,35	5
3	GOL	A	605	6/6	0.89	0.15	29,43,43,53	0
2	SO4	D	608	5/5	0.89	0.12	80,83,85,95	0
2	SO4	D	606	5/5	0.90	0.11	23,30,32,36	5
2	SO4	A	603	5/5	0.90	0.10	47,59,64,67	0
3	GOL	E	606	6/6	0.90	0.14	26,36,40,41	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	GOL	C	606	6/6	0.90	0.16	29,40,47,48	0
2	SO4	C	604	5/5	0.91	0.13	22,33,37,42	5
2	SO4	B	604	5/5	0.91	0.12	41,44,47,48	5
2	SO4	H	602	5/5	0.91	0.10	23,31,34,35	5
2	SO4	F	603	5/5	0.91	0.11	37,38,43,45	5
2	SO4	G	605	5/5	0.91	0.14	28,37,41,45	5
3	GOL	H	606	6/6	0.91	0.15	36,44,51,53	0
2	SO4	C	603	5/5	0.91	0.10	37,38,45,46	5
2	SO4	D	603	5/5	0.92	0.13	52,61,67,69	0
3	GOL	B	606	6/6	0.92	0.14	19,37,45,49	0
2	SO4	H	603	5/5	0.92	0.09	36,38,42,44	5
2	SO4	F	606	5/5	0.93	0.11	23,34,46,52	5
2	SO4	B	603	5/5	0.94	0.13	32,34,44,53	5
2	SO4	E	605	5/5	0.94	0.09	38,40,47,51	5
2	SO4	G	602	5/5	0.94	0.10	36,46,47,51	0
2	SO4	G	604	5/5	0.95	0.09	47,49,57,66	0
2	SO4	C	605	5/5	0.95	0.09	43,45,52,57	5
2	SO4	B	602	5/5	0.95	0.10	43,44,48,61	0
2	SO4	A	602	5/5	0.95	0.10	17,21,30,31	5
2	SO4	F	601	5/5	0.95	0.10	24,28,33,35	5
5	NA	C	610	1/1	0.95	0.08	27,27,27,27	0
2	SO4	E	604	5/5	0.96	0.10	27,35,40,44	5
4	CL	E	601	1/1	0.96	0.11	24,24,24,24	0
2	SO4	B	601	5/5	0.96	0.08	23,27,29,29	5
4	CL	E	602	1/1	0.97	0.11	25,25,25,25	0
2	SO4	E	603	5/5	0.97	0.08	21,30,33,33	0
4	CL	C	601	1/1	0.98	0.06	15,15,15,15	0
2	SO4	A	601	5/5	0.98	0.06	19,23,24,28	5
4	CL	D	601	1/1	0.99	0.06	16,16,16,16	0
4	CL	G	601	1/1	0.99	0.09	16,16,16,16	0
4	CL	C	602	1/1	0.99	0.07	16,16,16,16	0

6.5 Other polymers (i)

There are no such residues in this entry.