



# wwPDB X-ray Structure Validation Summary Report ⓘ

Jan 31, 2016 – 07:45 PM GMT

PDB ID : 1GT7  
Title : L-rhamnulose-1-phosphate aldolase from Escherichia coli  
Authors : Kroemer, M.; Schulz, G.E.  
Deposited on : 2002-01-14  
Resolution : 2.70 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](mailto:validation@mail.wwpdb.org)  
A user guide is available at  
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

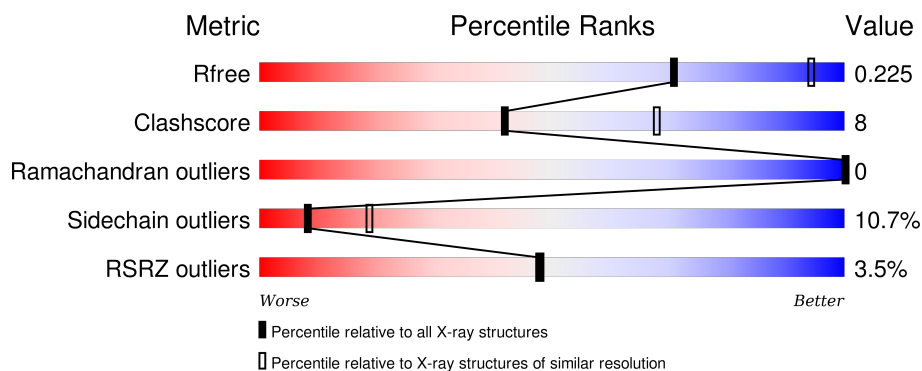
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.70 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))
$R_{free}$	91344	2103 (2.70-2.70)
Clashscore	102246	2422 (2.70-2.70)
Ramachandran outliers	100387	2382 (2.70-2.70)
Sidechain outliers	100360	2382 (2.70-2.70)
RSRZ outliers	91569	2107 (2.70-2.70)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	274	<div> <div>75%</div> <div>19%</div> <div>5%</div> </div>
1	B	274	<div> <div>76%</div> <div>20%</div> <div>•</div> </div>
1	C	274	<div> <div>75%</div> <div>19%</div> <div>6%</div> </div>
1	D	274	<div> <div>76%</div> <div>18%</div> <div>5%</div> </div>
1	E	274	<div> <div>76%</div> <div>18%</div> <div>5%</div> </div>

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Mol	Chain	Length	Quality of chain
1	F	274	
1	G	274	
1	H	274	
1	I	274	
1	J	274	
1	K	274	
1	L	274	
1	M	274	
1	N	274	
1	O	274	
1	P	274	
1	Q	274	
1	R	274	
1	S	274	
1	T	274	

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
3	PGH	C	300	-	X	-	-
3	PGH	G	300	-	X	-	X
3	PGH	H	300	-	X	-	-
3	PGH	J	300	-	X	-	-
3	PGH	L	300	-	X	-	-
3	PGH	M	300	-	X	-	-
3	PGH	Q	300	-	X	-	-
3	PGH	T	300	-	X	-	-

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 46180 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 RHAMNULOSE-1-PHOSPHATE ALDOLASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	B	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	C	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	D	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	E	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	F	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	G	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	H	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	I	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	J	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	K	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	L	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	M	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	N	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	O	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			
1	P	274	Total	C	N	O	S	0	0	0
			2124	1358	361	394	11			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	Q	274	Total 2124	C 1358	N 361	O 394	S 11	0	0	0
1	R	274	Total 2124	C 1358	N 361	O 394	S 11	0	0	0
1	S	274	Total 2124	C 1358	N 361	O 394	S 11	0	0	0
1	T	274	Total 2124	C 1358	N 361	O 394	S 11	0	0	0

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

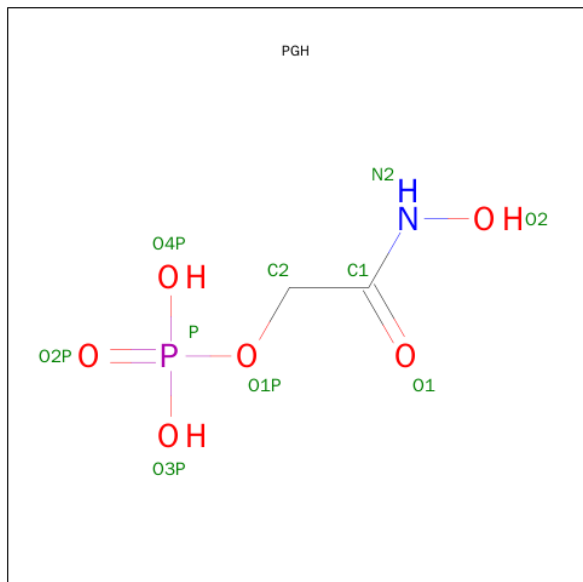
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	P	1	Total 1	Zn 1	0	0
2	G	1	Total 1	Zn 1	0	0
2	J	1	Total 1	Zn 1	0	0
2	Q	1	Total 1	Zn 1	0	0
2	D	1	Total 1	Zn 1	0	0
2	K	1	Total 1	Zn 1	0	0
2	E	1	Total 1	Zn 1	0	0
2	H	1	Total 1	Zn 1	0	0
2	B	1	Total 1	Zn 1	0	0
2	I	1	Total 1	Zn 1	0	0
2	C	1	Total 1	Zn 1	0	0
2	A	1	Total 1	Zn 1	0	0
2	T	1	Total 1	Zn 1	0	0
2	N	1	Total 1	Zn 1	0	0
2	O	1	Total 1	Zn 1	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	R	1	Total	Zn	0	0
			1	1		
2	L	1	Total	Zn	0	0
			1	1		
2	S	1	Total	Zn	0	0
			1	1		
2	F	1	Total	Zn	0	0
			1	1		
2	M	1	Total	Zn	0	0
			1	1		

- Molecule 3 is PHOSPHOGLYCOLOHYDROXAMIC ACID (three-letter code: PGH) (formula:  $C_2H_6NO_6P$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	B	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	C	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	D	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	E	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	F	1	Total	C	N	O	P	0	0
			10	2	1	6	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	G	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	H	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	I	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	J	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	K	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	L	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	M	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	N	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	O	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	P	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	Q	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	R	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	S	1	Total	C	N	O	P	0	0
			10	2	1	6	1		
3	T	1	Total	C	N	O	P	0	0
			10	2	1	6	1		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	177	Total	O	0	0
			177	177		
4	B	174	Total	O	0	0
			174	174		
4	C	173	Total	O	0	0
			173	173		
4	D	173	Total	O	0	0
			173	173		
4	E	179	Total	O	0	0
			179	179		

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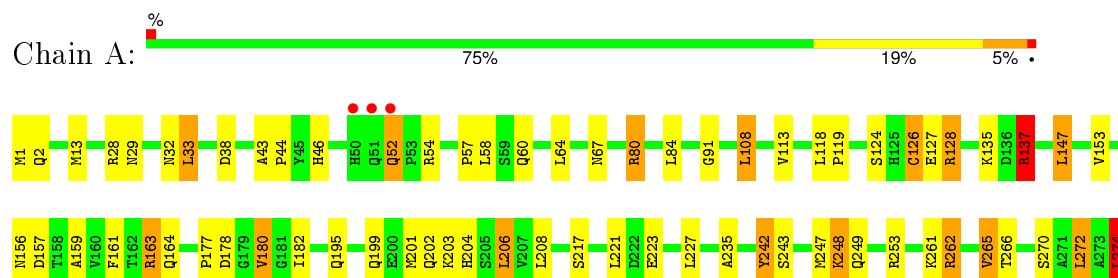
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	F	174	Total 174	O 174	0	0
4	G	176	Total 176	O 176	0	0
4	H	171	Total 171	O 171	0	0
4	I	177	Total 177	O 177	0	0
4	J	178	Total 178	O 178	0	0
4	K	177	Total 177	O 177	0	0
4	L	167	Total 167	O 167	0	0
4	M	183	Total 183	O 183	0	0
4	N	170	Total 170	O 170	0	0
4	O	175	Total 175	O 175	0	0
4	P	167	Total 167	O 167	0	0
4	Q	176	Total 176	O 176	0	0
4	R	172	Total 172	O 172	0	0
4	S	171	Total 171	O 171	0	0
4	T	170	Total 170	O 170	0	0



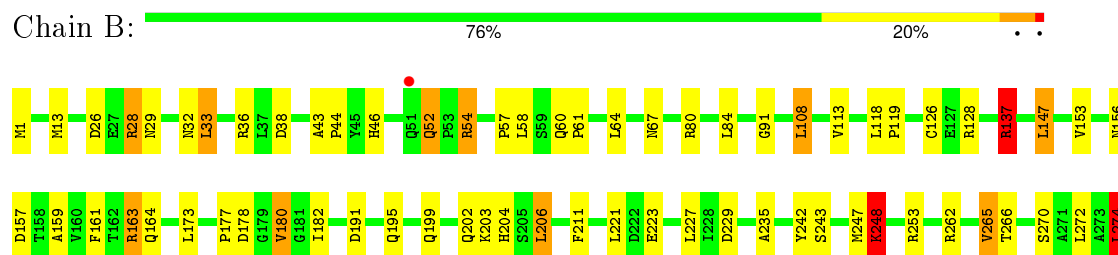
### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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 ( $\text{RSRZ} > 2$ ). 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.

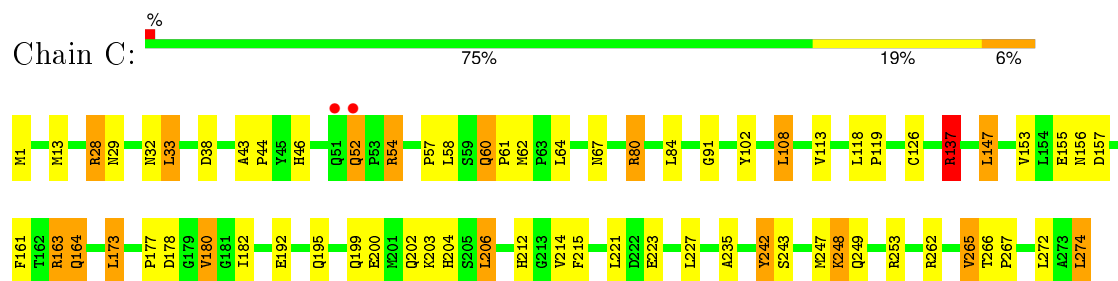
#### • Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE



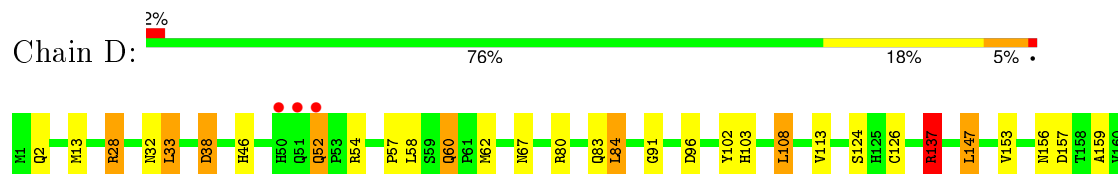
#### • Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE

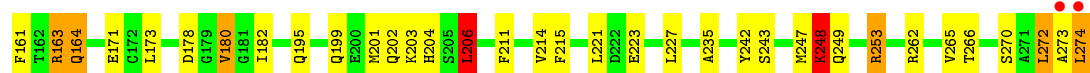


#### • Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE



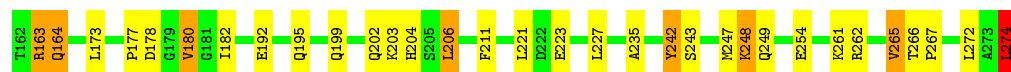
#### • Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE





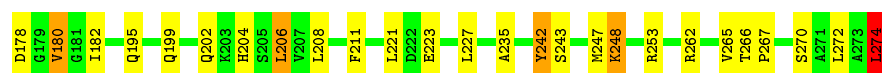
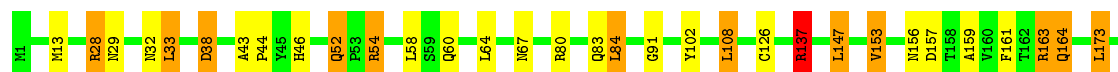
• Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE

Chain E: 76% 18% 5%



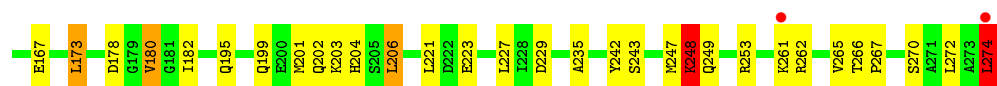
• Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE

Chain F: 79% 15% 6%



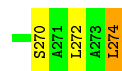
• Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE

Chain G: 77% 18%



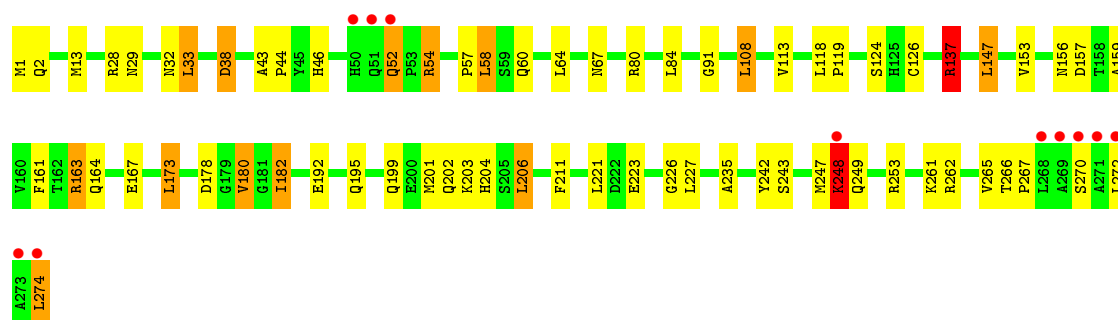
• Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE

Chain H: 74% 19% 6%

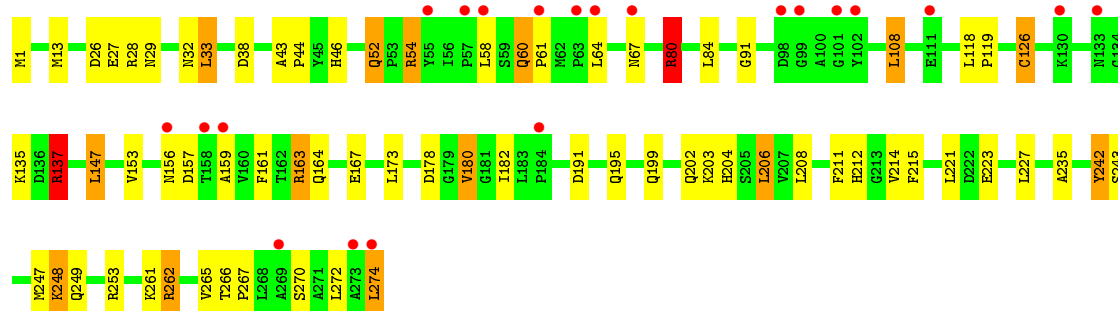


• Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE

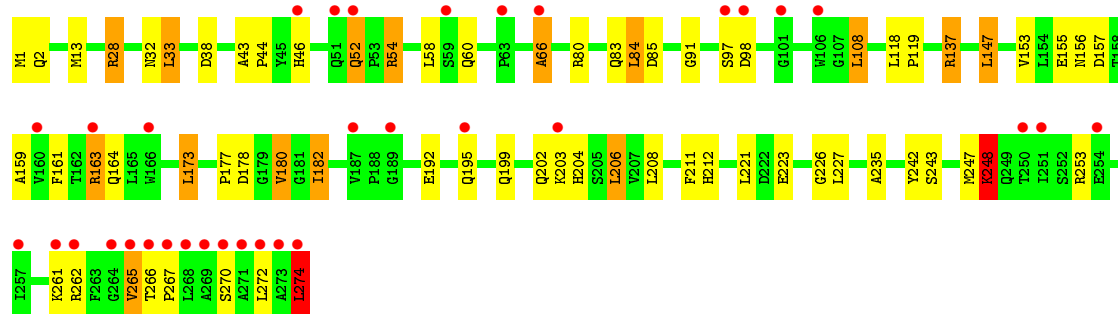
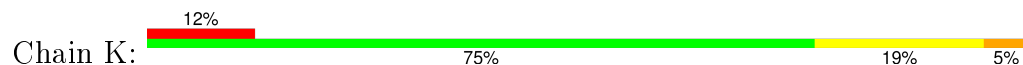
Chain I: 4% 75% 20% 5%



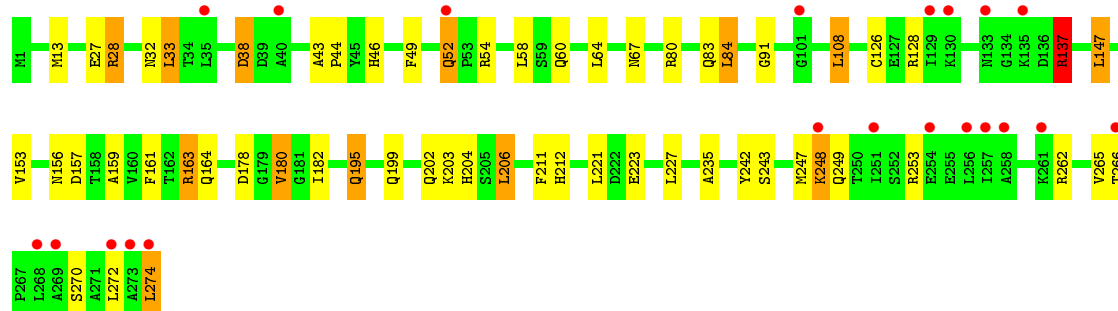
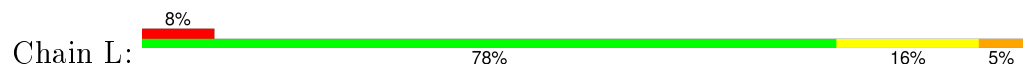
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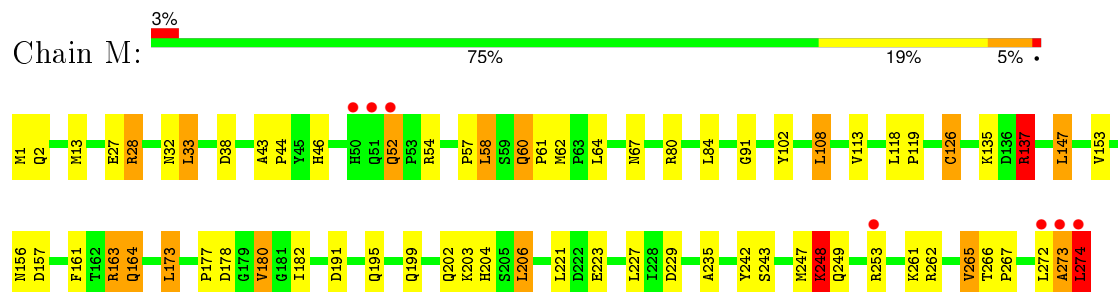
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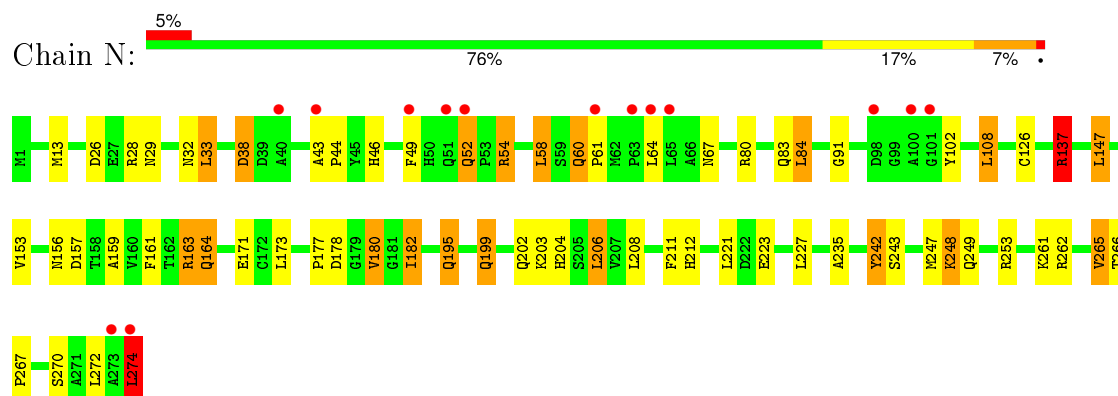
• Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE



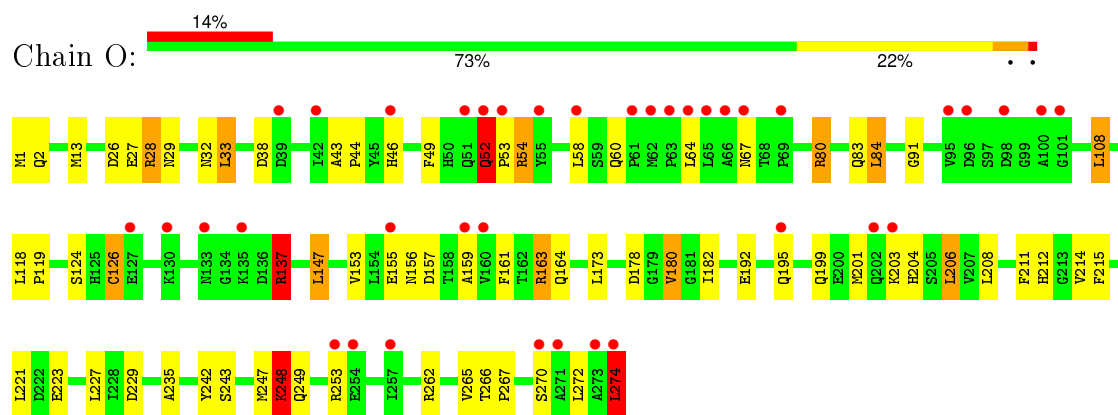
- Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE



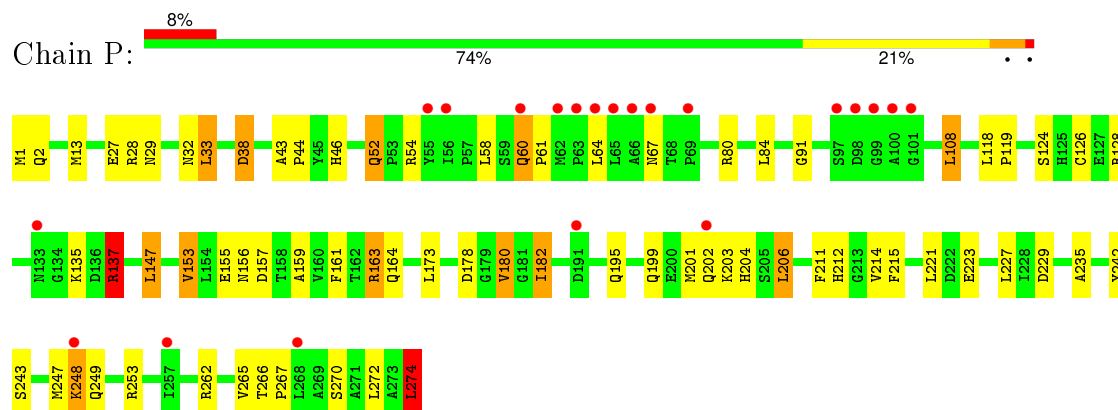
- Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE



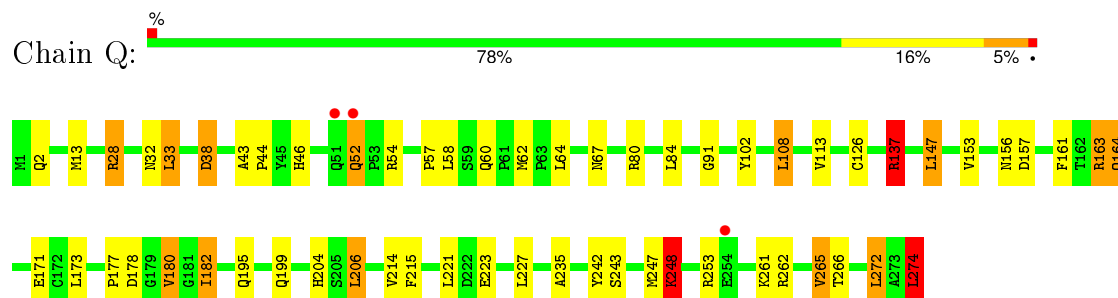
- Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE



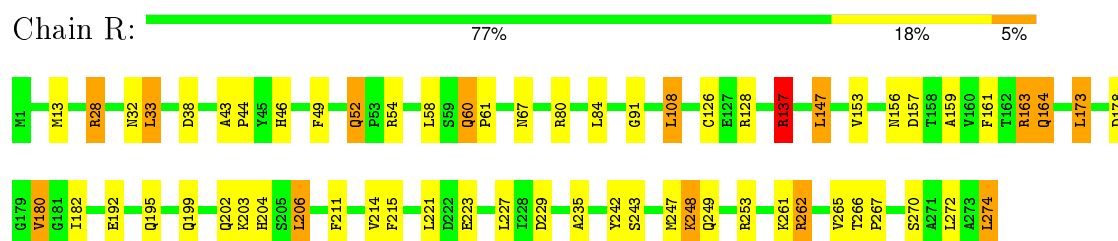
- Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE



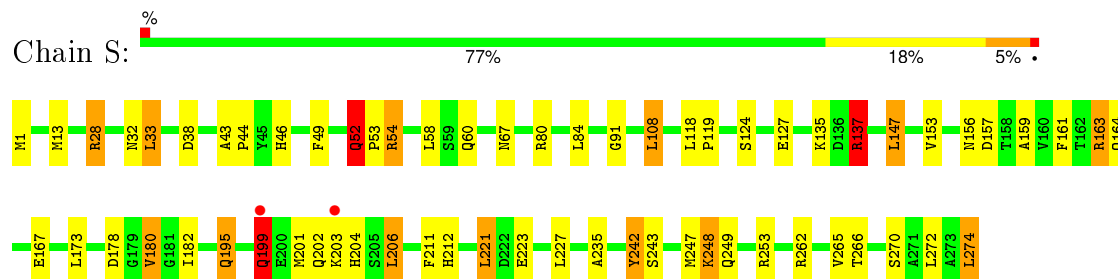
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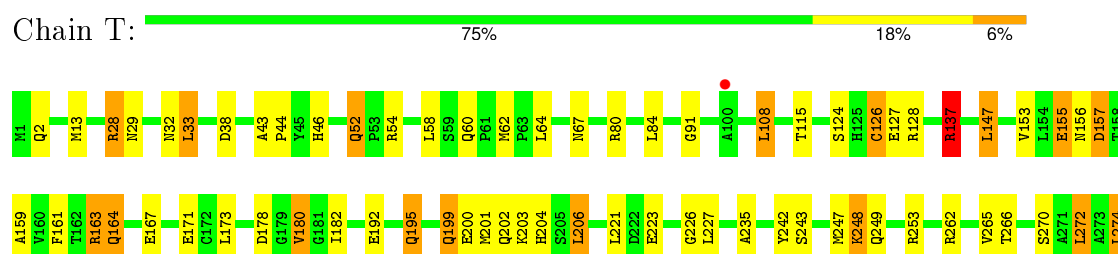
- Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE



- Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE



- Molecule 1: RHAMNULOSE-1-PHOSPHATE ALDOLASE



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	225.76Å 225.76Å 285.64Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	44.00 – 2.70 44.28 – 2.70	Depositor EDS
% Data completeness (in resolution range)	90.3 (44.00-2.70) 90.3 (44.28-2.70)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.46 (at 2.69Å)	Xtriage
Refinement program	REFMAC	Depositor
R, $R_{free}$	0.233 , 0.235 0.219 , 0.225	Depositor DCC
$R_{free}$ test set	1036 reflections (0.50%)	DCC
Wilson B-factor (Å <sup>2</sup> )	38.6	Xtriage
Anisotropy	0.548	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 34.8	EDS
Estimated twinning fraction	0.003 for -h,-k,l	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.52$ , $\langle L^2 \rangle = 0.36$	Xtriage
Outliers	0 of 207385 reflections	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	46180	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.69% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup> Intensities estimated from amplitudes.

<sup>2</sup> Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 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: ZN, PGH

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	0.80	1/2178 (0.0%)	1.44	21/2966 (0.7%)
1	B	0.79	1/2178 (0.0%)	1.41	24/2966 (0.8%)
1	C	0.78	0/2178	1.47	27/2966 (0.9%)
1	D	0.81	1/2178 (0.0%)	1.47	24/2966 (0.8%)
1	E	0.77	1/2178 (0.0%)	1.37	21/2966 (0.7%)
1	F	0.76	1/2178 (0.0%)	1.40	24/2966 (0.8%)
1	G	0.76	1/2178 (0.0%)	1.40	21/2966 (0.7%)
1	H	0.82	2/2178 (0.1%)	1.46	30/2966 (1.0%)
1	I	0.81	0/2178	1.37	18/2966 (0.6%)
1	J	0.85	0/2178	1.40	21/2966 (0.7%)
1	K	0.98	1/2178 (0.0%)	1.41	20/2966 (0.7%)
1	L	0.93	0/2178	1.42	18/2966 (0.6%)
1	M	0.80	2/2178 (0.1%)	1.45	23/2966 (0.8%)
1	N	0.85	1/2178 (0.0%)	1.38	23/2966 (0.8%)
1	O	0.98	1/2178 (0.0%)	1.40	23/2966 (0.8%)
1	P	0.91	2/2178 (0.1%)	1.35	20/2966 (0.7%)
1	Q	0.81	1/2178 (0.0%)	1.43	24/2966 (0.8%)
1	R	0.78	0/2178	1.39	24/2966 (0.8%)
1	S	0.77	0/2178	1.39	23/2966 (0.8%)
1	T	0.78	0/2178	1.41	25/2966 (0.8%)
All	All	0.83	16/43560 (0.0%)	1.41	454/59320 (0.8%)

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	D	0	1
1	F	0	1
1	I	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
1	L	0	1
1	N	0	1
1	P	0	1
1	Q	0	1
All	All	0	7

The worst 5 of 16 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	O	274	LEU	C-OXT	10.31	1.43	1.23
1	P	274	LEU	C-OXT	10.03	1.42	1.23
1	B	274	LEU	C-OXT	9.77	1.42	1.23
1	N	274	LEU	C-OXT	9.67	1.41	1.23
1	K	274	LEU	C-OXT	9.05	1.40	1.23

The worst 5 of 454 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	M	163	ARG	NE-CZ-NH1	20.91	130.76	120.30
1	C	163	ARG	NE-CZ-NH2	-19.36	110.62	120.30
1	D	163	ARG	NE-CZ-NH2	-18.05	111.27	120.30
1	Q	253	ARG	NE-CZ-NH1	17.83	129.22	120.30
1	M	163	ARG	NE-CZ-NH2	-16.75	111.92	120.30

There are no chirality outliers.

5 of 7 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	38	ASP	Mainchain
1	F	38	ASP	Mainchain
1	I	38	ASP	Mainchain
1	L	38	ASP	Mainchain
1	N	38	ASP	Mainchain

## 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	2124	0	2097	39	0
1	B	2124	0	2097	32	0
1	C	2124	0	2097	33	0
1	D	2124	0	2097	36	2
1	E	2124	0	2097	33	1
1	F	2124	0	2097	30	0
1	G	2124	0	2097	35	0
1	H	2124	0	2097	38	1
1	I	2124	0	2097	38	0
1	J	2124	0	2097	37	0
1	K	2124	0	2097	41	8
1	L	2124	0	2097	33	2
1	M	2124	0	2097	40	2
1	N	2124	0	2097	40	0
1	O	2124	0	2097	39	0
1	P	2124	0	2097	37	0
1	Q	2124	0	2097	30	0
1	R	2124	0	2097	32	0
1	S	2124	0	2097	33	9
1	T	2124	0	2097	44	3
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
2	E	1	0	0	0	0
2	F	1	0	0	0	0
2	G	1	0	0	0	0
2	H	1	0	0	0	0
2	I	1	0	0	0	0
2	J	1	0	0	0	0
2	K	1	0	0	0	0
2	L	1	0	0	0	0
2	M	1	0	0	0	0
2	N	1	0	0	0	0
2	O	1	0	0	0	0
2	P	1	0	0	0	0
2	Q	1	0	0	0	0
2	R	1	0	0	0	0
2	S	1	0	0	0	0
2	T	1	0	0	0	0
3	A	10	0	3	0	0
3	B	10	0	3	0	0
3	C	10	0	3	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	D	10	0	3	0	0
3	E	10	0	3	0	0
3	F	10	0	3	0	0
3	G	10	0	3	0	0
3	H	10	0	3	0	0
3	I	10	0	3	0	0
3	J	10	0	3	0	0
3	K	10	0	3	0	0
3	L	10	0	3	0	0
3	M	10	0	3	0	0
3	N	10	0	3	0	0
3	O	10	0	3	0	0
3	P	10	0	3	0	0
3	Q	10	0	3	0	0
3	R	10	0	3	0	0
3	S	10	0	3	0	0
3	T	10	0	3	1	0
4	A	177	0	0	16	0
4	B	174	0	0	14	0
4	C	173	0	0	13	0
4	D	173	0	0	19	0
4	E	179	0	0	15	0
4	F	174	0	0	15	0
4	G	176	0	0	14	0
4	H	171	0	0	18	2
4	I	177	0	0	15	0
4	J	178	0	0	14	0
4	K	177	0	0	22	1
4	L	167	0	0	13	0
4	M	183	0	0	18	0
4	N	170	0	0	16	0
4	O	175	0	0	14	0
4	P	167	0	0	18	0
4	Q	176	0	0	14	0
4	R	172	0	0	15	1
4	S	171	0	0	15	0
4	T	170	0	0	25	0
All	All	46180	0	42000	707	17

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 8.

The worst 5 of 707 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:K:97:SER:CB	4:K:2077:HOH:O	1.66	1.28
1:T:157:ASP:CG	4:T:2105:HOH:O	1.83	1.16
1:K:97:SER:HB3	4:K:2077:HOH:O	1.28	1.15
1:P:163:ARG:NH2	1:P:274:LEU:OXT	1.91	1.03
1:K:163:ARG:NH2	1:K:274:LEU:OXT	1.93	1.02

The worst 5 of 17 symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:97:SER:OG	1:S:203:LYS:CD[1_655]	1.44	0.76
1:D:274:LEU:CD1	1:M:253:ARG:NH2[5_555]	1.65	0.55
1:K:66:ALA:CB	1:S:199:GLN:NE2[1_655]	1.67	0.53
1:L:195:GLN:NE2	1:L:195:GLN:NE2[5_555]	1.75	0.45
1:K:98:ASP:N	1:S:203:LYS:NZ[1_655]	1.77	0.43

## 5.3 Torsion angles ⓘ

### 5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	272/274 (99%)	264 (97%)	8 (3%)	0	100	100
1	B	272/274 (99%)	262 (96%)	10 (4%)	0	100	100
1	C	272/274 (99%)	263 (97%)	9 (3%)	0	100	100
1	D	272/274 (99%)	264 (97%)	8 (3%)	0	100	100
1	E	272/274 (99%)	261 (96%)	11 (4%)	0	100	100
1	F	272/274 (99%)	264 (97%)	8 (3%)	0	100	100
1	G	272/274 (99%)	261 (96%)	11 (4%)	0	100	100
1	H	272/274 (99%)	263 (97%)	9 (3%)	0	100	100
1	I	272/274 (99%)	263 (97%)	9 (3%)	0	100	100
1	J	272/274 (99%)	262 (96%)	10 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	K	272/274 (99%)	263 (97%)	9 (3%)	0	100	100
1	L	272/274 (99%)	263 (97%)	9 (3%)	0	100	100
1	M	272/274 (99%)	261 (96%)	11 (4%)	0	100	100
1	N	272/274 (99%)	263 (97%)	9 (3%)	0	100	100
1	O	272/274 (99%)	262 (96%)	10 (4%)	0	100	100
1	P	272/274 (99%)	265 (97%)	7 (3%)	0	100	100
1	Q	272/274 (99%)	264 (97%)	8 (3%)	0	100	100
1	R	272/274 (99%)	265 (97%)	7 (3%)	0	100	100
1	S	272/274 (99%)	264 (97%)	8 (3%)	0	100	100
1	T	272/274 (99%)	262 (96%)	10 (4%)	0	100	100
All	All	5440/5480 (99%)	5259 (97%)	181 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	228/228 (100%)	204 (90%)	24 (10%)	8	19
1	B	228/228 (100%)	203 (89%)	25 (11%)	8	18
1	C	228/228 (100%)	204 (90%)	24 (10%)	8	19
1	D	228/228 (100%)	203 (89%)	25 (11%)	8	18
1	E	228/228 (100%)	203 (89%)	25 (11%)	8	18
1	F	228/228 (100%)	204 (90%)	24 (10%)	8	19
1	G	228/228 (100%)	204 (90%)	24 (10%)	8	19
1	H	228/228 (100%)	205 (90%)	23 (10%)	9	21
1	I	228/228 (100%)	203 (89%)	25 (11%)	8	18
1	J	228/228 (100%)	203 (89%)	25 (11%)	8	18
1	K	228/228 (100%)	203 (89%)	25 (11%)	8	18

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	L	228/228 (100%)	204 (90%)	24 (10%)	8	19
1	M	228/228 (100%)	203 (89%)	25 (11%)	8	18
1	N	228/228 (100%)	204 (90%)	24 (10%)	8	19
1	O	228/228 (100%)	204 (90%)	24 (10%)	8	19
1	P	228/228 (100%)	203 (89%)	25 (11%)	8	18
1	Q	228/228 (100%)	204 (90%)	24 (10%)	8	19
1	R	228/228 (100%)	203 (89%)	25 (11%)	8	18
1	S	228/228 (100%)	202 (89%)	26 (11%)	7	16
1	T	228/228 (100%)	204 (90%)	24 (10%)	8	19
All	All	4560/4560 (100%)	4070 (89%)	490 (11%)	8	19

5 of 490 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	J	52	GLN
1	L	80	ARG
1	S	161	PHE
1	J	137	ARG
1	K	60	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 73 such sidechains are listed below:

Mol	Chain	Res	Type
1	J	156	ASN
1	L	156	ASN
1	S	164	GLN
1	K	164	GLN
1	L	195	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 carbohydrates in this entry.

## 5.6 Ligand geometry ⓘ

Of 40 ligands modelled in this entry, 20 are monoatomic - leaving 20 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	PGH	A	300	2	9,9,9	3.05	5 (55%)	10,12,12	2.20	5 (50%)
3	PGH	B	300	2	9,9,9	3.18	5 (55%)	10,12,12	2.64	6 (60%)
3	PGH	C	300	2	9,9,9	3.33	6 (66%)	10,12,12	2.22	6 (60%)
3	PGH	D	300	2	9,9,9	3.53	5 (55%)	10,12,12	2.44	5 (50%)
3	PGH	E	300	2	9,9,9	3.11	4 (44%)	10,12,12	2.89	6 (60%)
3	PGH	F	300	2	9,9,9	2.89	5 (55%)	10,12,12	2.48	4 (40%)
3	PGH	G	300	2	9,9,9	3.49	7 (77%)	10,12,12	2.15	5 (50%)
3	PGH	H	300	2	9,9,9	3.55	6 (66%)	10,12,12	2.20	6 (60%)
3	PGH	I	300	2	9,9,9	2.98	5 (55%)	10,12,12	2.86	4 (40%)
3	PGH	J	300	2	9,9,9	3.66	6 (66%)	10,12,12	2.96	7 (70%)
3	PGH	K	300	2	9,9,9	3.46	5 (55%)	10,12,12	2.89	5 (50%)
3	PGH	L	300	2	9,9,9	4.10	5 (55%)	10,12,12	2.58	7 (70%)
3	PGH	M	300	2	9,9,9	3.79	5 (55%)	10,12,12	2.75	7 (70%)
3	PGH	N	300	2	9,9,9	3.19	5 (55%)	10,12,12	2.89	6 (60%)
3	PGH	O	300	2	9,9,9	3.92	5 (55%)	10,12,12	2.91	4 (40%)
3	PGH	P	300	2	9,9,9	3.44	7 (77%)	10,12,12	2.38	4 (40%)
3	PGH	Q	300	2	9,9,9	3.35	5 (55%)	10,12,12	2.44	7 (70%)
3	PGH	R	300	2	9,9,9	3.34	5 (55%)	10,12,12	2.05	5 (50%)
3	PGH	S	300	2	9,9,9	3.00	5 (55%)	10,12,12	1.99	3 (30%)
3	PGH	T	300	2	9,9,9	3.72	7 (77%)	10,12,12	2.14	5 (50%)

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	PGH	A	300	2	-	0/8/8/8	0/0/0/0
3	PGH	B	300	2	-	0/8/8/8	0/0/0/0
3	PGH	C	300	2	-	0/8/8/8	0/0/0/0
3	PGH	D	300	2	-	0/8/8/8	0/0/0/0
3	PGH	E	300	2	-	0/8/8/8	0/0/0/0
3	PGH	F	300	2	-	0/8/8/8	0/0/0/0
3	PGH	G	300	2	-	0/8/8/8	0/0/0/0
3	PGH	H	300	2	-	0/8/8/8	0/0/0/0
3	PGH	I	300	2	-	0/8/8/8	0/0/0/0
3	PGH	J	300	2	-	0/8/8/8	0/0/0/0
3	PGH	K	300	2	-	0/8/8/8	0/0/0/0
3	PGH	L	300	2	-	0/8/8/8	0/0/0/0
3	PGH	M	300	2	-	0/8/8/8	0/0/0/0
3	PGH	N	300	2	-	0/8/8/8	0/0/0/0
3	PGH	O	300	2	-	0/8/8/8	0/0/0/0
3	PGH	P	300	2	-	0/8/8/8	0/0/0/0
3	PGH	Q	300	2	-	0/8/8/8	0/0/0/0
3	PGH	R	300	2	-	0/8/8/8	0/0/0/0
3	PGH	S	300	2	-	0/8/8/8	0/0/0/0
3	PGH	T	300	2	-	0/8/8/8	0/0/0/0

The worst 5 of 108 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	L	300	PGH	O1P-C2	-7.89	1.37	1.43
3	O	300	PGH	O1P-C2	-7.39	1.38	1.43
3	T	300	PGH	O1P-C2	-6.74	1.38	1.43
3	D	300	PGH	O1P-C2	-6.41	1.38	1.43
3	M	300	PGH	O1P-C2	-6.21	1.38	1.43

The worst 5 of 107 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	300	PGH	O1P-P-O2P	-3.31	98.71	107.14
3	Q	300	PGH	O4P-P-O1P	-3.13	97.54	106.56
3	B	300	PGH	O1P-P-O2P	-3.01	99.47	107.14
3	H	300	PGH	O4P-P-O1P	-2.85	98.36	106.56
3	A	300	PGH	O1P-P-O2P	-2.82	99.98	107.14

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	T	300	PGH	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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	274/274 (100%)	-0.13	3 (1%) 82 83	23, 37, 60, 84	0
1	B	274/274 (100%)	-0.19	1 (0%) 93 94	23, 37, 60, 84	0
1	C	274/274 (100%)	-0.18	2 (0%) 89 90	23, 37, 60, 84	0
1	D	274/274 (100%)	-0.00	5 (1%) 71 72	23, 37, 60, 84	0
1	E	274/274 (100%)	-0.24	1 (0%) 93 94	23, 37, 60, 84	0
1	F	274/274 (100%)	-0.22	0 100 100	23, 37, 60, 84	0
1	G	274/274 (100%)	-0.15	3 (1%) 82 83	23, 37, 60, 84	0
1	H	274/274 (100%)	-0.05	3 (1%) 82 83	23, 37, 60, 84	0
1	I	274/274 (100%)	-0.00	11 (4%) 42 41	23, 37, 60, 84	0
1	J	274/274 (100%)	0.19	21 (7%) 16 14	23, 37, 60, 84	0
1	K	274/274 (100%)	0.56	34 (12%) 5 4	23, 37, 60, 84	0
1	L	274/274 (100%)	0.43	21 (7%) 16 14	23, 37, 60, 84	0
1	M	274/274 (100%)	-0.29	7 (2%) 59 59	23, 37, 60, 84	0
1	N	274/274 (100%)	0.11	14 (5%) 32 30	23, 37, 60, 84	0
1	O	274/274 (100%)	0.58	38 (13%) 4 3	23, 37, 60, 84	0
1	P	274/274 (100%)	0.30	21 (7%) 16 14	23, 37, 60, 84	0
1	Q	274/274 (100%)	-0.10	3 (1%) 82 83	23, 37, 60, 84	0
1	R	274/274 (100%)	-0.04	0 100 100	23, 37, 60, 84	0
1	S	274/274 (100%)	-0.12	2 (0%) 89 90	23, 37, 60, 84	0
1	T	274/274 (100%)	-0.13	1 (0%) 93 94	23, 37, 60, 84	0
All	All	5480/5480 (100%)	0.02	191 (3%) 48 48	23, 37, 60, 84	0

The worst 5 of 191 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	I	51	GLN	5.7
1	D	51	GLN	5.7
1	O	274	LEU	5.6
1	Q	51	GLN	5.0
1	M	274	LEU	4.9

## 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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
3	PGH	G	300	10/10	0.97	0.17	2.06	50,52,53,54	0
3	PGH	C	300	10/10	0.97	0.20	1.35	50,52,53,54	0
3	PGH	A	300	10/10	0.98	0.18	0.95	50,52,53,54	0
3	PGH	E	300	10/10	0.96	0.16	0.71	50,52,53,54	0
3	PGH	I	300	10/10	0.96	0.14	0.71	50,52,53,54	0
3	PGH	S	300	10/10	0.98	0.16	0.67	50,52,53,54	0
3	PGH	T	300	10/10	0.97	0.17	0.58	50,52,53,54	0
3	PGH	L	300	10/10	0.94	0.16	0.53	50,52,53,54	0
3	PGH	B	300	10/10	0.98	0.15	0.31	50,52,53,54	0
3	PGH	P	300	10/10	0.96	0.14	0.21	50,52,53,54	0
3	PGH	M	300	10/10	0.96	0.13	0.14	50,52,53,54	0
3	PGH	F	300	10/10	0.97	0.16	0.14	50,52,53,54	0
3	PGH	N	300	10/10	0.96	0.13	0.11	50,52,53,54	0
3	PGH	O	300	10/10	0.95	0.15	0.10	50,52,53,54	0
3	PGH	H	300	10/10	0.98	0.16	-0.00	50,52,53,54	0
3	PGH	D	300	10/10	0.98	0.18	-0.01	50,52,53,54	0
3	PGH	J	300	10/10	0.96	0.13	-0.08	50,52,53,54	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
3	PGH	Q	300	10/10	0.97	0.17	-0.13	50,52,53,54	0
3	PGH	R	300	10/10	0.99	0.16	-0.23	50,52,53,54	0
3	PGH	K	300	10/10	0.95	0.14	-0.42	50,52,53,54	0
2	ZN	C	275	1/1	1.00	0.17	-1.01	32,32,32,32	0
2	ZN	R	275	1/1	1.00	0.13	-2.34	32,32,32,32	0
2	ZN	S	275	1/1	0.98	0.11	-2.49	33,33,33,33	0
2	ZN	D	275	1/1	1.00	0.14	-3.83	32,32,32,32	0
2	ZN	J	275	1/1	0.98	0.03	-3.88	35,35,35,35	0
2	ZN	I	275	1/1	0.99	0.04	-4.14	34,34,34,34	0
2	ZN	O	275	1/1	0.97	0.03	-4.45	35,35,35,35	0
2	ZN	K	275	1/1	0.96	0.04	-5.92	35,35,35,35	0
2	ZN	T	275	1/1	0.99	0.14	-	33,33,33,33	0
2	ZN	N	275	1/1	0.98	0.03	-	35,35,35,35	0
2	ZN	M	275	1/1	0.99	0.04	-	33,33,33,33	0
2	ZN	P	275	1/1	0.99	0.05	-	34,34,34,34	0
2	ZN	H	275	1/1	0.99	0.13	-	32,32,32,32	0
2	ZN	Q	275	1/1	1.00	0.14	-	32,32,32,32	0
2	ZN	L	275	1/1	0.99	0.04	-	35,35,35,35	0
2	ZN	B	275	1/1	1.00	0.12	-	32,32,32,32	0
2	ZN	G	275	1/1	0.99	0.08	-	34,34,34,34	0
2	ZN	A	275	1/1	1.00	0.16	-	32,32,32,32	0
2	ZN	F	275	1/1	0.99	0.13	-	34,34,34,34	0
2	ZN	E	275	1/1	0.99	0.11	-	32,32,32,32	0

## 6.5 Other polymers

There are no such residues in this entry.