wwPDB X-ray Structure Validation Summary Report ⓘ

May 26, 2020 – 10:37 pm BST

PDB ID	:	4GO3
Title	:	Crystal structure of PnpE from Pseudomonas sp. WBC-3
Authors	:	Su, J.; Zhang, C.; Liu, S.; Zhu, D.; Gu, L.
Deposited on	:	2012-08-18
Resolution	:	2.70 Å(reported)

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

|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.11
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)	:	2.11

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.
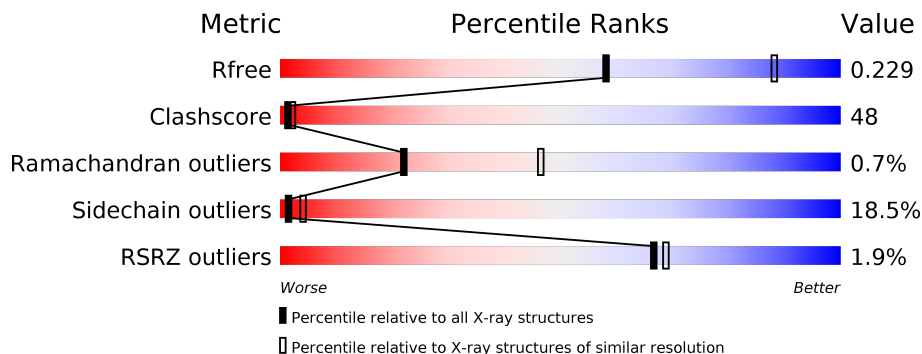
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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 >=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	495	41% 47% 11% •
1	B	495	% 44% 42% 12% ••
1	C	495	44% 42% 12% •
1	D	495	% 44% 45% 10% •
1	E	495	2% 42% 44% 11% •
1	F	495	2% 36% 50% 12% •

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Mol	Chain	Length	Quality of chain
1	G	495	4% / 36% / 48% / 13%
1	H	495	5% / 44% / 42% / 12%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 29686 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 Putative gamma-hydroxymuconic semialdehyde dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	487	Total	C	N	O	S	0	0	0
			3685	2333	652	684	16			
1	B	487	Total	C	N	O	S	0	1	0
			3692	2338	654	684	16			
1	C	487	Total	C	N	O	S	0	1	0
			3691	2337	652	686	16			
1	D	487	Total	C	N	O	S	0	0	0
			3685	2333	652	684	16			
1	E	485	Total	C	N	O	S	0	0	0
			3665	2321	646	682	16			
1	F	487	Total	C	N	O	S	0	0	0
			3685	2333	652	684	16			
1	G	487	Total	C	N	O	S	0	0	0
			3685	2333	652	684	16			
1	H	487	Total	C	N	O	S	0	0	0
			3685	2333	652	684	16			

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	426	ASN	SER	ENGINEERED MUTATION	UNP C1I208
A	484	HIS	TYR	ENGINEERED MUTATION	UNP C1I208
A	488	LEU	-	EXPRESSION TAG	UNP C1I208
A	489	GLY	-	EXPRESSION TAG	UNP C1I208
A	490	HIS	-	EXPRESSION TAG	UNP C1I208
A	491	HIS	-	EXPRESSION TAG	UNP C1I208
A	492	HIS	-	EXPRESSION TAG	UNP C1I208
A	493	HIS	-	EXPRESSION TAG	UNP C1I208
A	494	HIS	-	EXPRESSION TAG	UNP C1I208
A	495	HIS	-	EXPRESSION TAG	UNP C1I208
B	426	ASN	SER	ENGINEERED MUTATION	UNP C1I208
B	484	HIS	TYR	ENGINEERED MUTATION	UNP C1I208
B	488	LEU	-	EXPRESSION TAG	UNP C1I208

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Chain	Residue	Modelled	Actual	Comment	Reference
B	489	GLY	-	EXPRESSION TAG	UNP C1I208
B	490	HIS	-	EXPRESSION TAG	UNP C1I208
B	491	HIS	-	EXPRESSION TAG	UNP C1I208
B	492	HIS	-	EXPRESSION TAG	UNP C1I208
B	493	HIS	-	EXPRESSION TAG	UNP C1I208
B	494	HIS	-	EXPRESSION TAG	UNP C1I208
B	495	HIS	-	EXPRESSION TAG	UNP C1I208
C	426	ASN	SER	ENGINEERED MUTATION	UNP C1I208
C	484	HIS	TYR	ENGINEERED MUTATION	UNP C1I208
C	488	LEU	-	EXPRESSION TAG	UNP C1I208
C	489	GLY	-	EXPRESSION TAG	UNP C1I208
C	490	HIS	-	EXPRESSION TAG	UNP C1I208
C	491	HIS	-	EXPRESSION TAG	UNP C1I208
C	492	HIS	-	EXPRESSION TAG	UNP C1I208
C	493	HIS	-	EXPRESSION TAG	UNP C1I208
C	494	HIS	-	EXPRESSION TAG	UNP C1I208
C	495	HIS	-	EXPRESSION TAG	UNP C1I208
D	426	ASN	SER	ENGINEERED MUTATION	UNP C1I208
D	484	HIS	TYR	ENGINEERED MUTATION	UNP C1I208
D	488	LEU	-	EXPRESSION TAG	UNP C1I208
D	489	GLY	-	EXPRESSION TAG	UNP C1I208
D	490	HIS	-	EXPRESSION TAG	UNP C1I208
D	491	HIS	-	EXPRESSION TAG	UNP C1I208
D	492	HIS	-	EXPRESSION TAG	UNP C1I208
D	493	HIS	-	EXPRESSION TAG	UNP C1I208
D	494	HIS	-	EXPRESSION TAG	UNP C1I208
D	495	HIS	-	EXPRESSION TAG	UNP C1I208
E	426	ASN	SER	ENGINEERED MUTATION	UNP C1I208
E	484	HIS	TYR	ENGINEERED MUTATION	UNP C1I208
E	488	LEU	-	EXPRESSION TAG	UNP C1I208
E	489	GLY	-	EXPRESSION TAG	UNP C1I208
E	490	HIS	-	EXPRESSION TAG	UNP C1I208
E	491	HIS	-	EXPRESSION TAG	UNP C1I208
E	492	HIS	-	EXPRESSION TAG	UNP C1I208
E	493	HIS	-	EXPRESSION TAG	UNP C1I208
E	494	HIS	-	EXPRESSION TAG	UNP C1I208
E	495	HIS	-	EXPRESSION TAG	UNP C1I208
F	426	ASN	SER	ENGINEERED MUTATION	UNP C1I208
F	484	HIS	TYR	ENGINEERED MUTATION	UNP C1I208
F	488	LEU	-	EXPRESSION TAG	UNP C1I208
F	489	GLY	-	EXPRESSION TAG	UNP C1I208
F	490	HIS	-	EXPRESSION TAG	UNP C1I208

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Chain	Residue	Modelled	Actual	Comment	Reference
F	491	HIS	-	EXPRESSION TAG	UNP C1I208
F	492	HIS	-	EXPRESSION TAG	UNP C1I208
F	493	HIS	-	EXPRESSION TAG	UNP C1I208
F	494	HIS	-	EXPRESSION TAG	UNP C1I208
F	495	HIS	-	EXPRESSION TAG	UNP C1I208
G	426	ASN	SER	ENGINEERED MUTATION	UNP C1I208
G	484	HIS	TYR	ENGINEERED MUTATION	UNP C1I208
G	488	LEU	-	EXPRESSION TAG	UNP C1I208
G	489	GLY	-	EXPRESSION TAG	UNP C1I208
G	490	HIS	-	EXPRESSION TAG	UNP C1I208
G	491	HIS	-	EXPRESSION TAG	UNP C1I208
G	492	HIS	-	EXPRESSION TAG	UNP C1I208
G	493	HIS	-	EXPRESSION TAG	UNP C1I208
G	494	HIS	-	EXPRESSION TAG	UNP C1I208
G	495	HIS	-	EXPRESSION TAG	UNP C1I208
H	426	ASN	SER	ENGINEERED MUTATION	UNP C1I208
H	484	HIS	TYR	ENGINEERED MUTATION	UNP C1I208
H	488	LEU	-	EXPRESSION TAG	UNP C1I208
H	489	GLY	-	EXPRESSION TAG	UNP C1I208
H	490	HIS	-	EXPRESSION TAG	UNP C1I208
H	491	HIS	-	EXPRESSION TAG	UNP C1I208
H	492	HIS	-	EXPRESSION TAG	UNP C1I208
H	493	HIS	-	EXPRESSION TAG	UNP C1I208
H	494	HIS	-	EXPRESSION TAG	UNP C1I208
H	495	HIS	-	EXPRESSION TAG	UNP C1I208

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	29	Total 29	O 29	0	0
2	B	29	Total 29	O 29	0	0
2	C	31	Total 31	O 31	0	0
2	D	24	Total 24	O 24	0	0
2	E	30	Total 30	O 30	0	0
2	F	34	Total 34	O 34	0	0
2	G	23	Total 23	O 23	0	0

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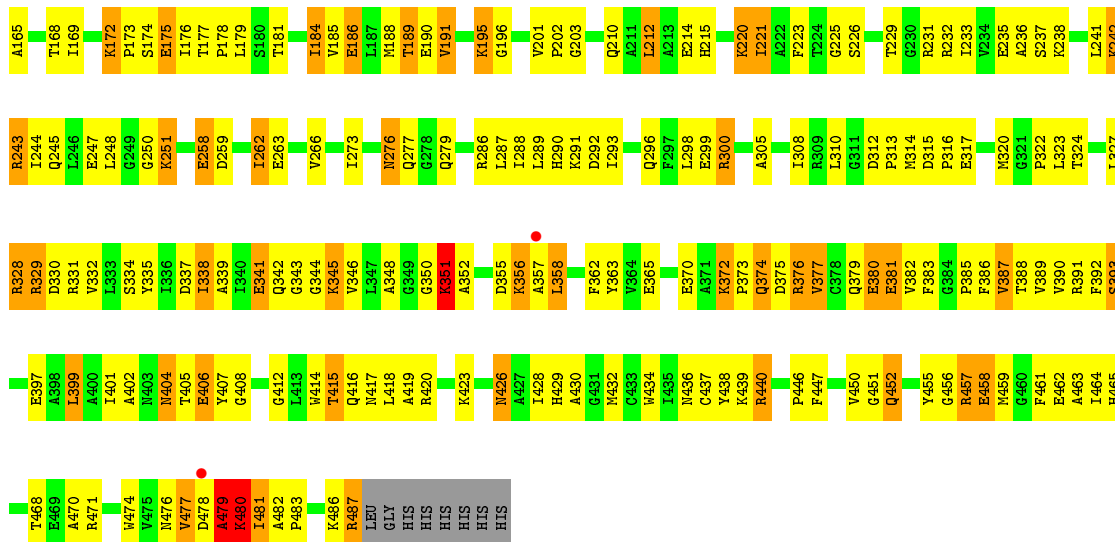| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	H	13	Total 13	O 13	0	0

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 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: Putative gamma-hydroxymuconic semialdehyde dehydrogenase

Chain A:

- Molecule 1: Putative gamma-hydroxymuconic semialdehyde dehydrogenase

Chain B:

• Molecule 1: Putative gamma-hydroxymuconic semialdehyde dehydrogenase

Chain C:

• Molecule 1: Putative gamma-hydroxymuconic semialdehyde dehydrogenase

Chain D:

• Molecule 1: Putative gamma-hydroxymuconic semialdehyde dehydrogenase

Chain E:
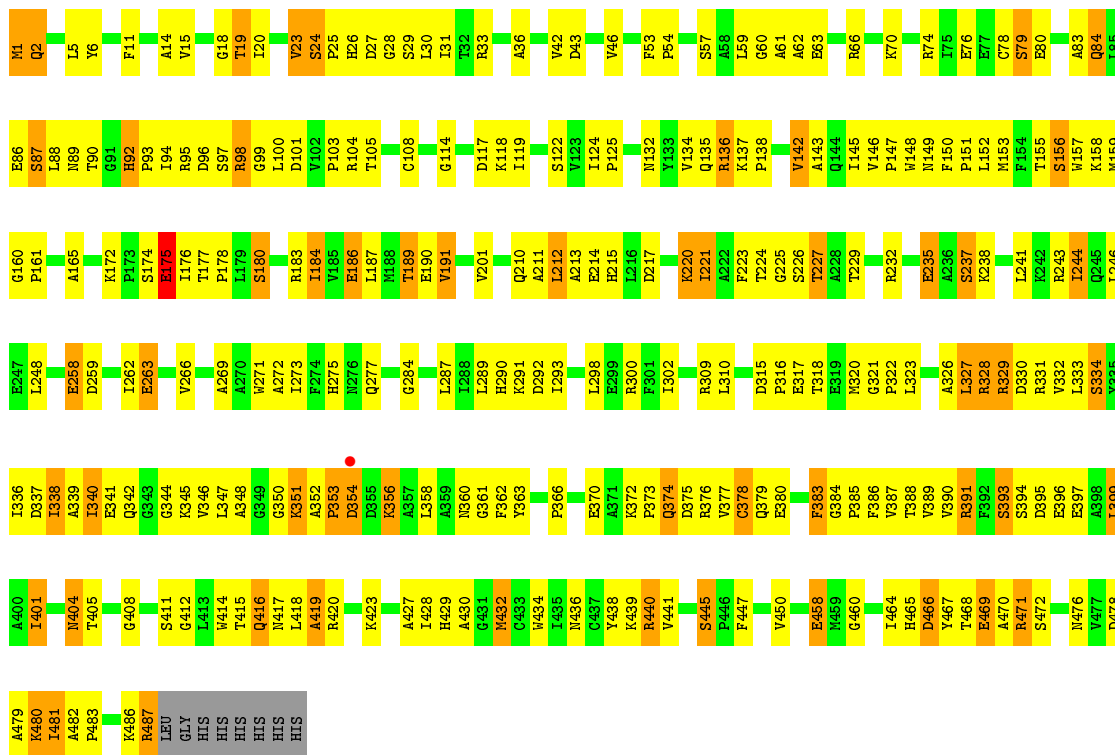

• Molecule 1: Putative gamma-hydroxymuconic semialdehyde dehydrogenase

Chain F:

● Molecule 1: Putative gamma-hydroxymuconic semialdehyde dehydrogenase
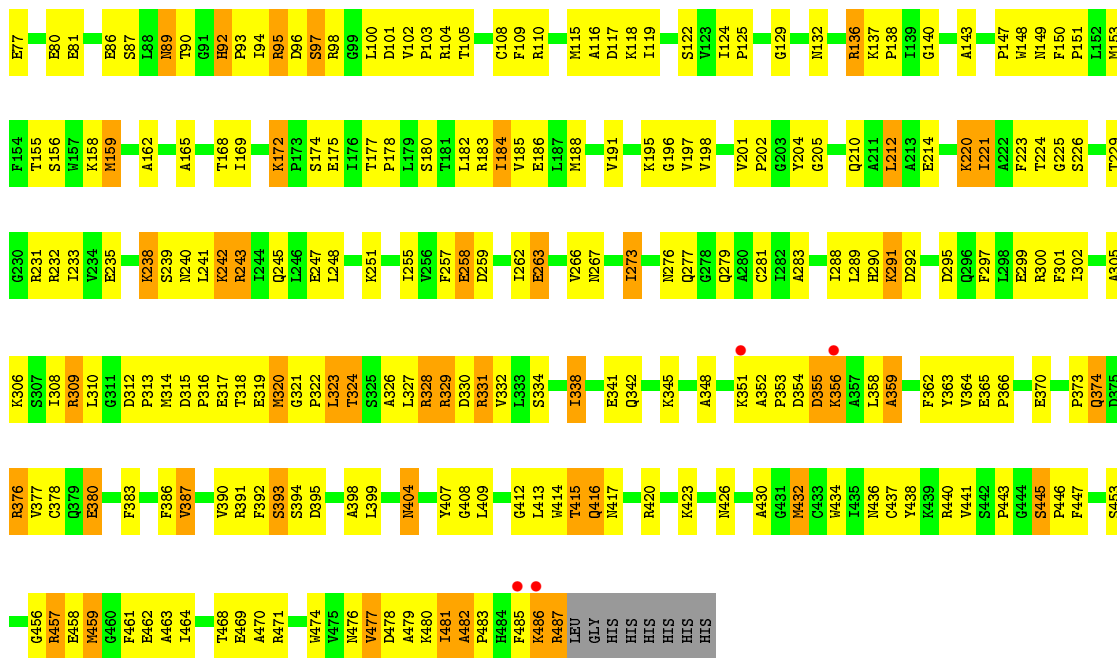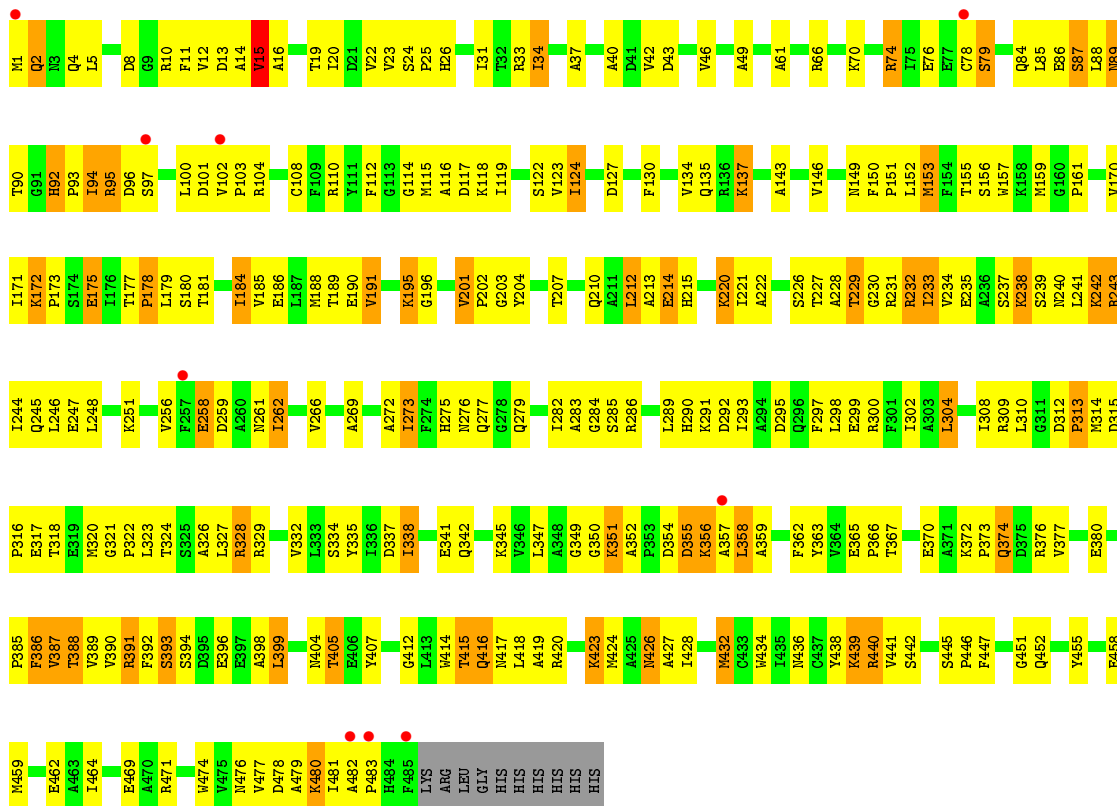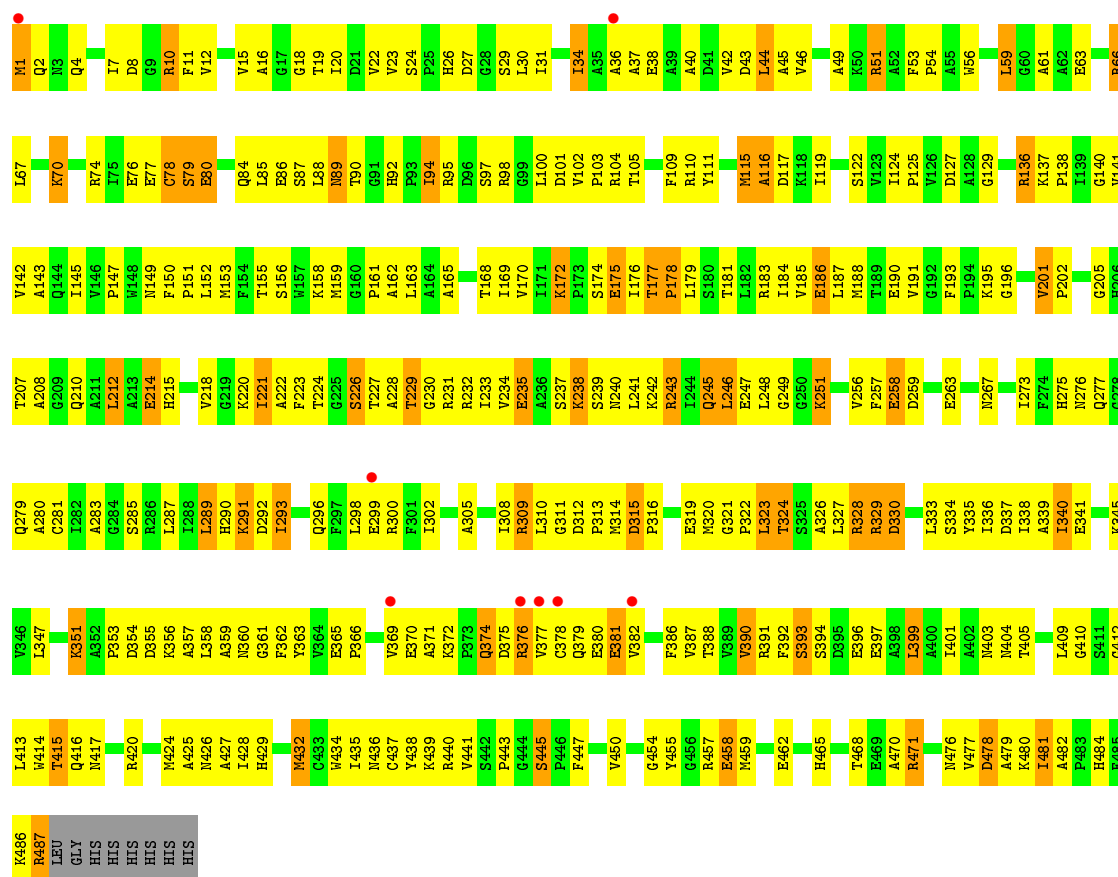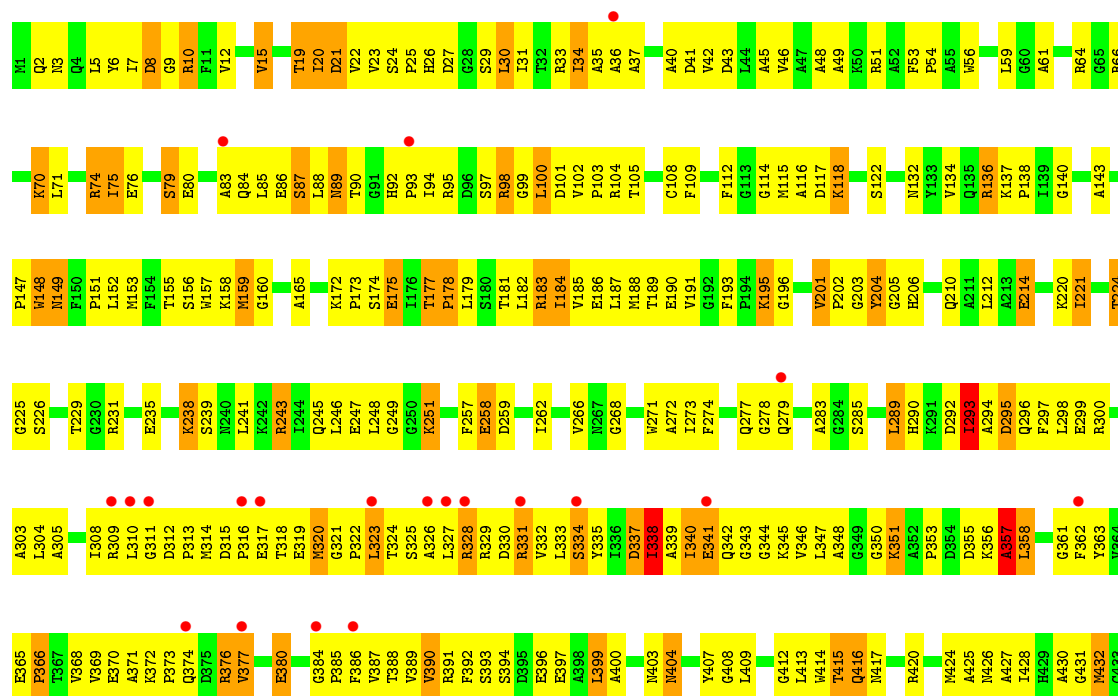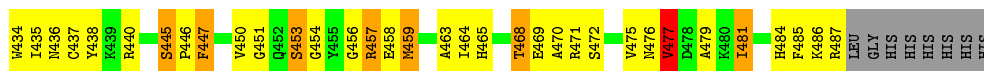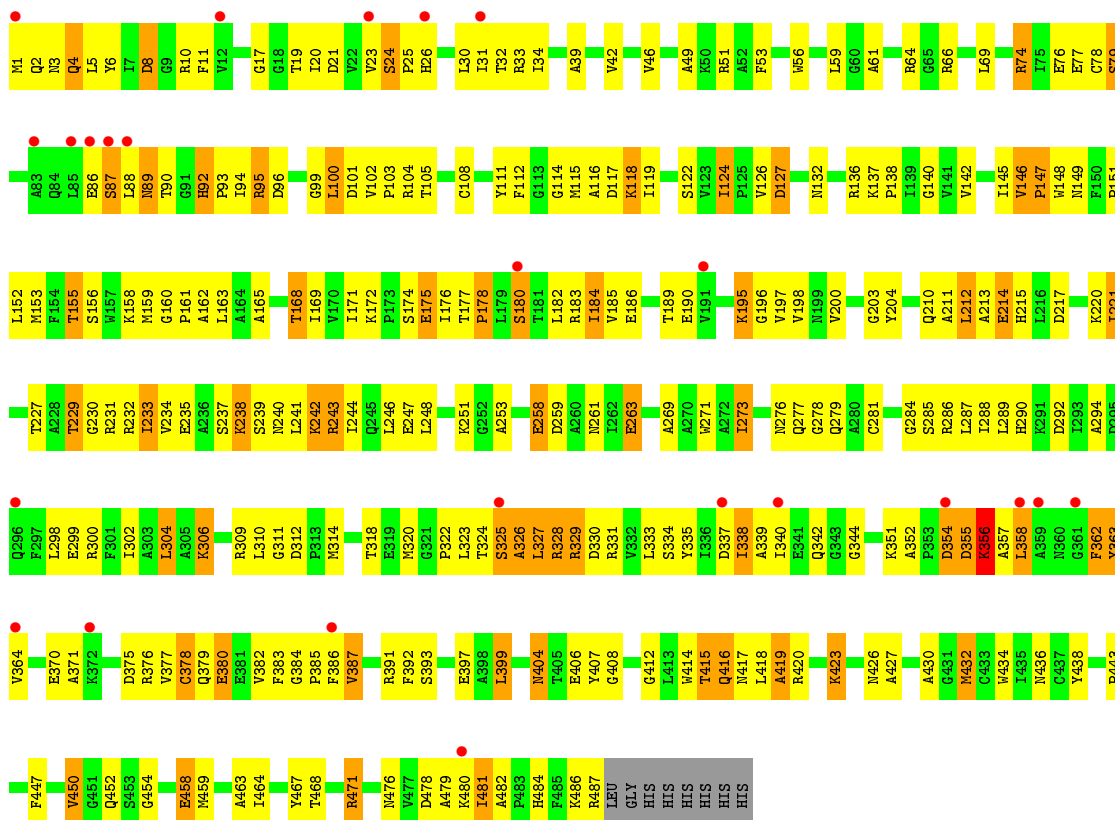
W434 I435 N436 C437 Y438 K439 R440 S445 P446 F447 V450 G451 Q452 G454 Y455 G456 R457 E458 M459 A463 I464 H465 T468 E469 A470 R471 S472 V475 N476 V477 D478 A479 K480 I481 H484 F485 K486 R487 LEU GLY HIS HIS HIS HIS HIS HIS

● Molecule 1: Putative gamma-hydroxymuconic semialdehyde dehydrogenase

Chain H:

5%

44%　　　　42%　　　12%

M1 Q2 N3 Q4 L5 Y6 I7 D8 G9 R10 F11 V12 G17 G18 T19 I20 D21 V22 V23 S24 P25 H26 L30 I31 T32 R33 I34 A39 V42 V46 A49 K50 R51 A52 F53 W56 L59 G60 A61 R64 G65 R66 L69 R74 I75 E76 E77 C78 S79

A83 Q84 L85 E86 S87 L88 N89 T90 G91 H92 P93 I94 R95 D96 G99 L100 D101 V102 P103 R104 T105 C108 Y111 F112 G113 G114 M115 A116 D117 K118 I119 S122 V123 I124 P125 V126 D127 N132 R136 K137 P138 I139 G140 V141 V142 I145 V146 P147 W148 N149 F150 P151

L152 M153 F154 T155 S156 W157 K158 M159 G160 P161 A162 L163 A164 A165 T168 I169 V170 I171 K172 P173 S174 E175 I176 T177 P178 I179 S180 T181 L182 R183 I184 V185 E186 T189 E190 V191 K195 G196 V197 V198 N199 V200 G203 Y204 Q210 A211 L212 A213 E214 H215 L216 D217 K220 I221

T227 A228 T229 G230 R231 R232 I233 V234 E235 A236 S237 K238 S239 N240 L241 K242 R243 I244 Q245 L246 E247 L248 K251 G252 A253 E258 D259 A260 N261 I262 E263 A269 A270 W271 I272 I273 N276 Q277 Q278 Q279 A280 C281 G284 S285 R286 L287 L288 H290 K291 D292 I293 A294 D295

Q296 F297 L298 E299 R300 F301 I302 A303 L304 A305 K306 R309 L310 G311 D312 P313 M314 T318 E319 M320 G321 P322 L323 T324 S325 A326 L327 R328 R329 D330 R331 V332 L333 S334 Y335 I336 D337 I338 A339 I340 E341 Q342 G343 G344 K351 A352 P353 D354 D355 K356 A357 L358 A359 N360 G361 F362 Y363

V364 E370 A371 K372 D375 R376 V377 C378 Q379 E380 E381 V382 F383 G384 P385 F386 V387 R391 F392 S393 E397 A398 L399 N404 T405 E406 Y407 G408 G412 L413 W414 T415 Q416 N417 L418 A419 R420 K423 N426 A427 A430 G431 M432 C433 W434 I435 N436 C437 Y438 P443

F447 V450 G451 Q452 G454 E458 M459 A463 I464 Y467 T468 R471 N476 V477 D478 A479 K480 I481 A482 P483 H484 F485 K486 R487 LEU GLY HIS HIS HIS HIS HIS HIS

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	83.53Å 144.25Å 138.29Å 90.00° 93.59° 90.00°	Depositor
Resolution (Å)	41.68 – 2.70 50.03 – 2.70	Depositor EDS
% Data completeness (in resolution range)	93.5 (41.68-2.70) 96.4 (50.03-2.70)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	6.12 (at 2.69Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.6.4_486)	Depositor
R, R_{free}	0.223 , 0.237 0.217 , 0.229	Depositor DCC
R_{free} test set	4296 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å^2)	38.6	Xtriage
Anisotropy	0.313	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 41.3	EDS
L-test for twinning[2]	$< |L| > = 0.47$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	29686	wwPDB-VP
Average B, all atoms (Å^2)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.50% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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 ⓘ

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	0.97	2/3761 (0.1%)	0.68	1/5101 (0.0%)
1	B	0.95	1/3772 (0.0%)	0.72	4/5116 (0.1%)
1	C	1.01	2/3770 (0.1%)	0.70	0/5113
1	D	0.98	1/3761 (0.0%)	0.74	5/5101 (0.1%)
1	E	0.98	1/3741 (0.0%)	0.69	1/5076 (0.0%)
1	F	0.90	1/3761 (0.0%)	0.76	7/5101 (0.1%)
1	G	0.90	1/3761 (0.0%)	0.85	8/5101 (0.2%)
1	H	0.92	3/3761 (0.1%)	0.69	1/5101 (0.0%)
All	All	0.95	12/30088 (0.0%)	0.73	27/40810 (0.1%)

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	2
1	G	0	1
All	All	0	3

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	78	CYS	CB-SG	-10.06	1.65	1.82
1	E	78	CYS	CB-SG	-10.06	1.65	1.82
1	H	78	CYS	CB-SG	-10.06	1.65	1.82
1	F	78	CYS	CB-SG	-10.05	1.65	1.82
1	D	378	CYS	CB-SG	-5.91	1.72	1.81

The worst 5 of 27 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	482	ALA	CB-CA-C	16.20	134.40	110.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	479	ALA	CB-CA-C	13.03	129.65	110.10
1	G	477	VAL	CB-CA-C	13.02	136.14	111.40
1	G	315	ASP	CB-CA-C	11.93	134.27	110.40
1	F	115	MET	CB-CA-C	-10.98	88.44	110.40

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	479	ALA	Peptide
1	B	480	LYS	Peptide
1	G	477	VAL	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	3685	0	3676	346	4
1	B	3692	0	3683	426	18
1	C	3691	0	3680	326	2
1	D	3685	0	3678	304	2
1	E	3665	0	3651	373	2
1	F	3685	0	3677	419	10
1	G	3685	0	3678	455	0
1	H	3685	0	3675	336	15
2	A	29	0	0	19	1
2	B	29	0	0	32	0
2	C	31	0	0	34	0
2	D	24	0	0	15	0
2	E	30	0	0	30	0
2	F	34	0	0	21	0
2	G	23	0	0	28	0
2	H	13	0	0	11	0
All	All	29686	0	29398	2820	27

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 48.

The worst 5 of 2820 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:H:263:GLU:CG	1:H:300:ARG:NH2	1.68	1.51
1:G:10:ARG:NH1	1:G:12:VAL:CG1	1.73	1.50
1:B:479:ALA:HB1	1:B:480:LYS:CB	1.44	1.47
1:B:479:ALA:HB1	1:B:480:LYS:CG	1.43	1.46
1:B:238:LYS:CE	1:F:235:GLU:HG2	1.50	1.41

The worst 5 of 27 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:B:393:SER:CB	1:H:354:ASP:O[2_545]	0.79	1.41
1:B:356:LYS:NZ	1:F:341:GLU:CB[2_454]	0.88	1.32
1:B:356:LYS:NZ	1:F:341:GLU:CA[2_454]	0.92	1.28
1:A:478:ASP:OD2	1:H:423:LYS:CE[2_445]	1.10	1.10
1:B:393:SER:OG	1:H:354:ASP:O[2_545]	1.14	1.06

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	485/495 (98%)	452 (93%)	31 (6%)	2 (0%)	34	60
1	B	486/495 (98%)	452 (93%)	30 (6%)	4 (1%)	19	43
1	C	486/495 (98%)	440 (90%)	41 (8%)	5 (1%)	15	37
1	D	485/495 (98%)	453 (93%)	31 (6%)	1 (0%)	47	73
1	E	483/495 (98%)	446 (92%)	35 (7%)	2 (0%)	34	60
1	F	485/495 (98%)	443 (91%)	40 (8%)	2 (0%)	34	60
1	G	485/495 (98%)	432 (89%)	45 (9%)	8 (2%)	9	24
1	H	485/495 (98%)	453 (93%)	29 (6%)	3 (1%)	25	50

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	3880/3960 (98%)	3571 (92%)	282 (7%)	27 (1%)	22	46

5 of 27 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	G	178	PRO
1	A	356	LYS
1	C	178	PRO
1	G	341	GLU
1	G	357	ALA

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	376/383 (98%)	308 (82%)	68 (18%)	1	4
1	B	377/383 (98%)	308 (82%)	69 (18%)	1	4
1	C	377/383 (98%)	307 (81%)	70 (19%)	1	4
1	D	376/383 (98%)	308 (82%)	68 (18%)	1	4
1	E	374/383 (98%)	306 (82%)	68 (18%)	1	4
1	F	376/383 (98%)	304 (81%)	72 (19%)	1	4
1	G	376/383 (98%)	303 (81%)	73 (19%)	1	3
1	H	376/383 (98%)	307 (82%)	69 (18%)	1	4
All	All	3008/3064 (98%)	2451 (82%)	557 (18%)	1	4

5 of 557 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	331	ARG
1	E	247	GLU
1	H	212	LEU
1	D	380	GLU
1	E	79	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 74 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	290	HIS
1	E	277	GLN
1	H	215	HIS
1	D	404	ASN
1	D	429	HIS

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no carbohydrates in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	487/495 (98%)	-0.10	2 (0%)	92	93	14, 34, 61, 93	0
1	B	487/495 (98%)	-0.08	3 (0%)	89	91	16, 36, 61, 102	0
1	C	487/495 (98%)	-0.13	1 (0%)	95	96	12, 37, 62, 145	0
1	D	487/495 (98%)	0.04	5 (1%)	82	83	14, 35, 59, 165	0
1	E	485/495 (97%)	0.06	9 (1%)	66	69	16, 37, 61, 113	0
1	F	487/495 (98%)	0.17	8 (1%)	72	74	11, 44, 76, 131	0
1	G	487/495 (98%)	0.24	21 (4%)	35	33	18, 47, 94, 137	0
1	H	487/495 (98%)	0.39	24 (4%)	29	28	16, 45, 79, 148	0
All	All	3894/3960 (98%)	0.07	73 (1%)	66	69	11, 39, 73, 165	0

The worst 5 of 73 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	376	ARG	5.3
1	H	358	LEU	5.0
1	G	341	GLU	4.2
1	E	482	ALA	4.2
1	F	382	VAL	4.0

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 carbohydrates in this entry.

6.4 Ligands (i)

There are no ligands in this entry.

6.5 Other polymers (i)

There are no such residues in this entry.