



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 08:52 AM GMT

PDB ID : 3GCL
Title : Mode of ligand binding and assignment of subsites in mammalian peroxidases: crystal structure of lactoperoxidase complexes with acetyl salicylic acid, salicylhydroxamic acid and benzylhydroxamic acid
Authors : Singh, A.K.; Singh, N.; Sinha, M.; Bhushan, A.; Kaur, P.; Sharma, S.; Singh, T.P.
Deposited on : 2009-02-22
Resolution : 2.50 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
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

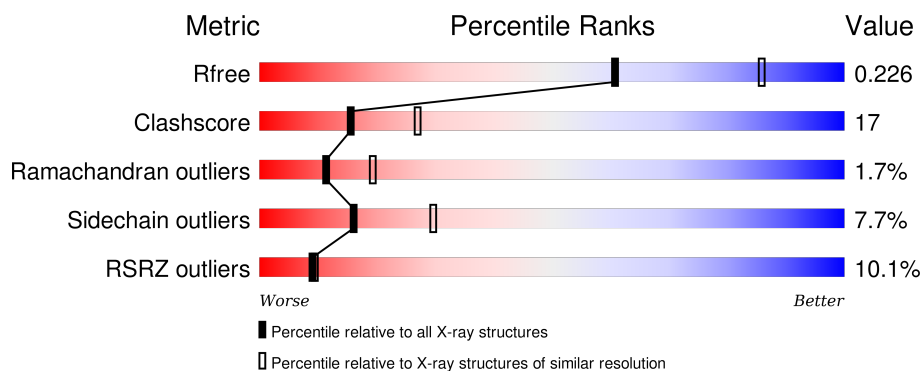
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	3553 (2.50-2.50)
Clashscore	102246	4242 (2.50-2.50)
Ramachandran outliers	100387	4156 (2.50-2.50)
Sidechain outliers	100360	4158 (2.50-2.50)
RSRZ outliers	91569	3562 (2.50-2.50)

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. 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	595	<div> <div>10%</div> <div>67%</div> <div>28%</div> <div>..</div> </div>

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
4	NAG	A	596	-	-	-	X

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
7	AIN	A	609	-	-	X	X

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 5296 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 Lactoperoxidase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	595	Total	C	N	O	P	S	0	0	0
			4774	3037	847	863	1	26			

- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Ca	0	0
			1	1		

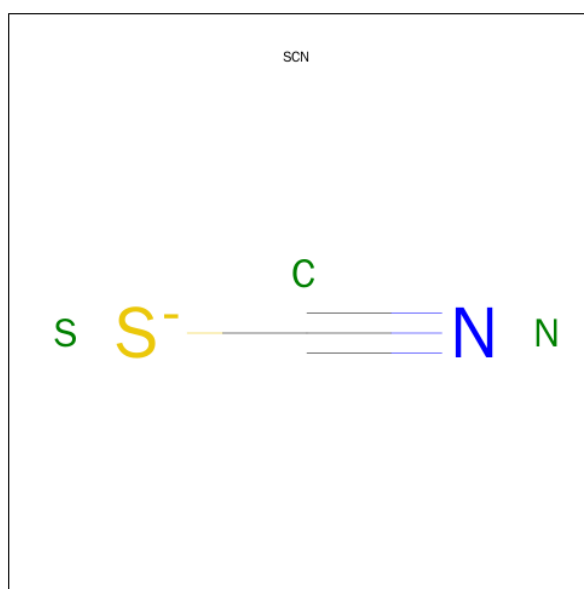
- Molecule 4 is a polymer of unknown type called SUGAR (3-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	3	Total	C	N	O	0	0
			39	22	2	15		
4	A	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 5 is a polymer of unknown type called SUGAR (2-MER).

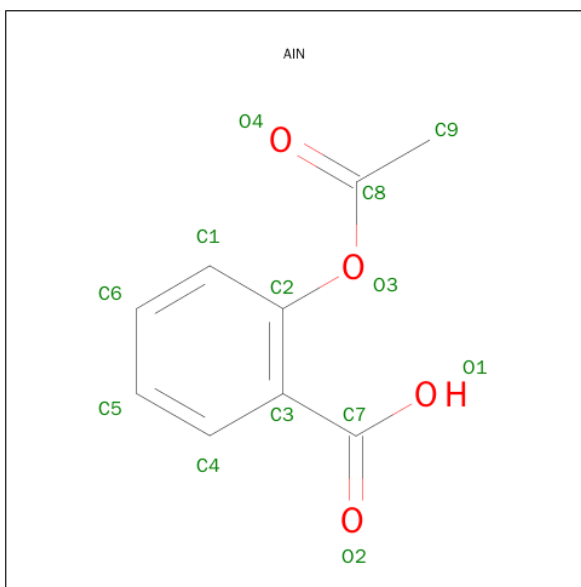
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	2	Total	C	N	O	0	0
			28	16	2	10		
5	A	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 6 is THIOCYANATE ION (three-letter code: SCN) (formula: CNS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	N	S	0	0
			3	1	1	1		

- Molecule 7 is 2-(ACETYLOXY)BENZOIC ACID (three-letter code: AIN) (formula: C₉H₈O₄).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			13	9	4		

- Molecule 8 is IODIDE ION (three-letter code: IOD) (formula: I).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	8	Total	I	0	0
			8	8		

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	320	Total	O	0	0
			320	320		

3 Residue-property plots [i](#)

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 ($RSRZ > 2$). 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: Lactoperoxidase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	54.66Å 80.52Å 77.97Å 90.00° 102.65° 90.00°	Depositor
Resolution (Å)	19.44 – 2.50 19.44 – 2.50	Depositor EDS
% Data completeness (in resolution range)	98.7 (19.44-2.50) 98.8 (19.44-2.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.85 (at 2.49Å)	Xtriage
Refinement program	CNS 0.9	Depositor
R, R_{free}	0.201 , 0.223 0.200 , 0.226	Depositor DCC
R_{free} test set	1161 reflections (5.41%)	DCC
Wilson B-factor (Å ²)	31.8	Xtriage
Anisotropy	0.218	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 72.3	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Outliers	0 of 22614 reflections	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	5296	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.80% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: SCN, NAG, SEP, CA, AIN, HEM, IOD, MAN

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	0.46	0/4891	0.77	6/6634 (0.1%)

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	145	PRO	CA-N-CD	-7.88	100.47	111.50
1	A	424	PRO	CA-C-N	-6.39	103.15	117.20
1	A	174	SER	N-CA-C	5.91	126.97	111.00
1	A	147	ASN	CA-CB-CG	5.42	125.32	113.40
1	A	119	LEU	N-CA-CB	5.24	120.88	110.40
1	A	232	LYS	N-CA-C	5.05	124.63	111.00

There are no chirality outliers.

There are no planarity outliers.

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	4774	0	4686	161	0
2	A	43	0	30	3	0
3	A	1	0	0	0	0
4	A	78	0	68	5	0
5	A	56	0	50	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	A	3	0	0	0	0
7	A	13	0	7	7	0
8	A	8	0	0	1	0
9	A	320	0	0	25	0
All	All	5296	0	4841	169	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 17.

All (169) 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:A:119:LEU:HG	1:A:119:LEU:O	1.46	1.08
1:A:167:CYS:HB3	1:A:168:PRO:HD2	1.35	1.06
1:A:196:GLU:HB3	1:A:198:SEP:O2P	1.56	1.04
1:A:255:ARG:CG	7:A:609:AIN:H1	1.87	1.03
1:A:255:ARG:HG2	7:A:609:AIN:C1	1.91	0.99
1:A:169:THR:HG23	1:A:170:PRO:CD	1.92	0.98
1:A:169:THR:HG23	1:A:170:PRO:HD2	1.44	0.97
1:A:173:GLN:HG2	1:A:174:SER:H	1.31	0.96
1:A:8:ALA:HB3	1:A:9:PRO:CD	1.96	0.95
1:A:235:SER:HB3	1:A:238:GLU:HG2	1.48	0.95
1:A:146:LYS:HE2	9:A:872:HOH:O	1.68	0.94
1:A:255:ARG:HG2	7:A:609:AIN:H1	0.96	0.92
1:A:106:ILE:HD11	1:A:265:ALA:HB1	1.47	0.92
1:A:227:LEU:HD23	1:A:270:LEU:HD22	1.51	0.92
1:A:197:PRO:HD2	1:A:198:SEP:O3P	1.71	0.91
1:A:32:ARG:HH11	1:A:32:ARG:HB3	1.36	0.87
1:A:167:CYS:CB	1:A:168:PRO:HD2	2.04	0.87
1:A:123:GLU:HG3	1:A:125:SER:H	1.37	0.86
1:A:8:ALA:HB3	1:A:9:PRO:HD3	1.61	0.83
1:A:551:ARG:HD3	1:A:584:LYS:HA	1.62	0.80
1:A:282:LYS:HD3	9:A:847:HOH:O	1.82	0.78
1:A:424:PRO:CG	7:A:609:AIN:H4	2.13	0.78
1:A:173:GLN:CG	1:A:174:SER:H	1.97	0.77
1:A:169:THR:HG23	1:A:170:PRO:HD3	1.68	0.76
1:A:167:CYS:HB3	1:A:168:PRO:CD	2.13	0.75
1:A:106:ILE:HD11	1:A:265:ALA:CB	2.17	0.74
1:A:8:ALA:HB3	1:A:9:PRO:HD2	1.67	0.73
1:A:120:GLY:O	1:A:126:LYS:HE2	1.89	0.72
1:A:10:VAL:HG21	1:A:41:ARG:NH2	2.05	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:565:HIS:HB3	8:A:617:IOD:I	2.62	0.70
1:A:130:GLU:HG3	1:A:159:PRO:HG3	1.71	0.70
1:A:519:PHE:CD1	1:A:522:ILE:HD11	2.27	0.70
1:A:52:GLU:HG2	1:A:65:LYS:HE3	1.74	0.69
1:A:4:VAL:O	1:A:4:VAL:HG13	1.93	0.69
1:A:319:SER:HB3	9:A:921:HOH:O	1.92	0.68
1:A:123:GLU:HG3	1:A:125:SER:N	2.08	0.68
1:A:348:ARG:HH11	1:A:437:ASN:ND2	1.91	0.68
2:A:605:HEM:HMB1	2:A:605:HEM:HBB2	1.75	0.68
1:A:8:ALA:CB	1:A:9:PRO:CD	2.67	0.66
1:A:175:LEU:HD23	1:A:176:ALA:H	1.62	0.65
1:A:62:THR:HG22	1:A:64:ARG:HG2	1.78	0.65
1:A:407:MET:HB3	1:A:501:MET:CE	2.27	0.65
1:A:213:MET:HG2	1:A:273:HIS:CD2	2.32	0.64
1:A:274:ASN:O	1:A:278:ARG:HG2	1.99	0.63
1:A:426:HIS:HB3	9:A:778:HOH:O	1.99	0.61
1:A:360:ARG:NH1	1:A:372:ALA:HA	2.16	0.61
1:A:32:ARG:NH1	1:A:32:ARG:HB3	2.12	0.61
1:A:424:PRO:CD	7:A:609:AIN:H4	2.31	0.61
1:A:530:TRP:CE2	1:A:531:GLU:HG3	2.36	0.60
1:A:169:THR:CG2	1:A:170:PRO:HD2	2.24	0.60
1:A:173:GLN:CG	1:A:174:SER:N	2.65	0.59
1:A:10:VAL:HG12	1:A:40:ASN:O	2.01	0.59
1:A:170:PRO:HB3	1:A:171:PRO:HD2	1.85	0.59
1:A:10:VAL:HG23	1:A:10:VAL:O	2.03	0.58
1:A:541:ARG:O	1:A:545:GLN:HG3	2.03	0.57
1:A:121:SER:HB3	9:A:748:HOH:O	2.04	0.57
1:A:167:CYS:CB	1:A:168:PRO:CD	2.69	0.57
1:A:10:VAL:HG21	1:A:41:ARG:CZ	2.35	0.57
4:A:601:NAG:H62	4:A:602:NAG:C1	2.35	0.57
1:A:549:PHE:O	1:A:553:ILE:HG12	2.05	0.57
1:A:301:GLY:O	1:A:305:GLN:HG3	2.04	0.56
1:A:8:ALA:CB	1:A:9:PRO:HD3	2.32	0.56
1:A:282:LYS:HG2	9:A:782:HOH:O	2.06	0.56
1:A:12:LEU:HB2	9:A:925:HOH:O	2.04	0.55
1:A:302:ALA:O	1:A:306:ILE:HG13	2.06	0.55
1:A:8:ALA:HB1	9:A:838:HOH:O	2.05	0.55
1:A:549:PHE:CE2	1:A:553:ILE:HD11	2.42	0.55
1:A:259:GLN:OE1	1:A:261:LEU:HB2	2.07	0.55
1:A:66:THR:HB	1:A:70:PHE:O	2.06	0.55
1:A:588:SER:OG	1:A:589:PRO:HD3	2.07	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:462:LYS:HD2	9:A:693:HOH:O	2.07	0.54
1:A:169:THR:CG2	1:A:170:PRO:CD	2.78	0.54
1:A:523:ARG:HG3	1:A:529:TRP:CE2	2.43	0.53
1:A:258:GLU:O	1:A:380:PHE:HA	2.07	0.53
1:A:142:ILE:CD1	1:A:436:ILE:HD13	2.38	0.53
1:A:544:LEU:O	1:A:547:VAL:HG13	2.09	0.53
1:A:242:THR:O	1:A:245:ARG:NH2	2.41	0.53
1:A:175:LEU:HA	9:A:848:HOH:O	2.08	0.53
1:A:364:ASN:O	1:A:365:TYR:HB2	2.08	0.53
1:A:392:ILE:O	1:A:396:VAL:HG23	2.09	0.53
1:A:393:ASP:OD1	1:A:557:THR:HB	2.09	0.52
1:A:62:THR:HG21	1:A:64:ARG:NH1	2.25	0.52
1:A:197:PRO:CD	1:A:198:SEP:O3P	2.51	0.52
1:A:12:LEU:O	1:A:13:VAL:HG13	2.10	0.52
1:A:106:ILE:CD1	1:A:265:ALA:HB1	2.33	0.52
1:A:132:TYR:HB3	9:A:857:HOH:O	2.09	0.51
1:A:200:ALA:O	1:A:204:ARG:HG3	2.10	0.51
1:A:519:PHE:HD1	1:A:522:ILE:HD11	1.71	0.51
1:A:62:THR:HG21	1:A:64:ARG:HH11	1.76	0.51
1:A:533:PRO:HB3	9:A:797:HOH:O	2.09	0.51
1:A:476:LEU:HD21	1:A:498:ALA:HB1	1.92	0.51
1:A:221:ASP:HB2	1:A:226:TYR:CZ	2.45	0.51
1:A:461:PRO:HG3	1:A:470:VAL:HG21	1.92	0.51
1:A:173:GLN:HG2	1:A:174:SER:N	2.10	0.51
1:A:432:ASP:O	1:A:436:ILE:HG12	2.10	0.50
1:A:188:ASP:O	1:A:189:ALA:HB3	2.12	0.50
1:A:393:ASP:HB2	1:A:394:PRO:HD3	1.94	0.50
1:A:146:LYS:HE3	9:A:659:HOH:O	2.11	0.50
1:A:10:VAL:CG2	1:A:41:ARG:NH2	2.73	0.50
1:A:551:ARG:NH2	1:A:555:ASP:OD1	2.36	0.50
1:A:122:ASN:N	9:A:807:HOH:O	2.45	0.50
1:A:134:ILE:HD11	9:A:857:HOH:O	2.11	0.49
1:A:119:LEU:CG	1:A:119:LEU:O	2.33	0.49
1:A:235:SER:HB3	1:A:238:GLU:CG	2.32	0.49
1:A:467:LEU:HG	1:A:471:LEU:HD22	1.93	0.49
1:A:175:LEU:CD2	1:A:176:ALA:H	2.26	0.49
1:A:187:LEU:HD13	1:A:305:GLN:HA	1.94	0.49
1:A:582:VAL:HA	9:A:928:HOH:O	2.13	0.49
1:A:550:SER:O	1:A:553:ILE:HB	2.13	0.49
1:A:231:ASN:HB3	9:A:707:HOH:O	2.12	0.49
1:A:10:VAL:HG21	1:A:41:ARG:HH22	1.78	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:424:PRO:HG2	7:A:609:AIN:H4	1.93	0.48
1:A:407:MET:HB3	1:A:501:MET:HE3	1.94	0.48
1:A:370:PRO:HG2	1:A:371:GLU:H	1.79	0.48
1:A:12:LEU:HD22	9:A:925:HOH:O	2.12	0.47
4:A:602:NAG:H4	4:A:603:MAN:H2	1.59	0.47
1:A:588:SER:N	1:A:589:PRO:CD	2.76	0.47
1:A:32:ARG:HH11	1:A:32:ARG:CB	2.18	0.47
4:A:596:NAG:H61	4:A:597:NAG:C1	2.45	0.47
1:A:423:GLN:NE2	7:A:609:AIN:O2	2.48	0.46
1:A:229:PHE:CD1	1:A:247:PRO:HG2	2.50	0.46
1:A:272:GLU:O	1:A:276:LEU:HB2	2.15	0.46
1:A:349:PHE:HA	1:A:497:ASN:HD21	1.80	0.46
4:A:603:MAN:H61	9:A:893:HOH:O	2.16	0.46
1:A:257:SER:O	1:A:381:PHE:HA	2.15	0.46
1:A:174:SER:O	9:A:848:HOH:O	2.21	0.46
2:A:605:HEM:HMC2	2:A:605:HEM:HBC2	1.97	0.46
1:A:46:TRP:CE2	1:A:340:SER:HB3	2.51	0.46
1:A:146:LYS:HG3	1:A:147:ASN:N	2.31	0.45
1:A:4:VAL:O	1:A:4:VAL:CG1	2.64	0.45
1:A:272:GLU:HG3	1:A:276:LEU:HD22	1.99	0.45
1:A:313:LEU:N	1:A:314:PRO:CD	2.80	0.45
1:A:227:LEU:HD11	1:A:266:HIS:HB3	1.99	0.45
1:A:541:ARG:NH2	9:A:711:HOH:O	2.48	0.45
1:A:36:LEU:HG	1:A:337:PRO:HD2	1.99	0.45
1:A:574:HIS:HB2	9:A:840:HOH:O	2.17	0.45
1:A:581:THR:CG2	1:A:581:THR:O	2.64	0.45
1:A:581:THR:O	1:A:581:THR:HG23	2.17	0.44
1:A:57:LEU:HA	1:A:58:PRO:HD3	1.78	0.44
1:A:12:LEU:O	1:A:13:VAL:CG1	2.65	0.44
4:A:601:NAG:C6	4:A:602:NAG:C1	2.95	0.44
1:A:203:LEU:HD21	1:A:252:GLY:HA2	1.98	0.44
1:A:584:LYS:HB3	9:A:870:HOH:O	2.18	0.43
1:A:124:HIS:O	1:A:128:GLN:N	2.40	0.43
1:A:121:SER:O	1:A:122:ASN:HB3	2.19	0.43
1:A:170:PRO:CB	1:A:171:PRO:HD2	2.48	0.43
1:A:419:ASN:O	1:A:430:GLY:HA2	2.19	0.42
1:A:179:GLN:HG2	1:A:444:HIS:CE1	2.54	0.42
1:A:169:THR:CB	9:A:745:HOH:O	2.67	0.42
1:A:236:PRO:HD2	1:A:248:CYS:SG	2.58	0.42
1:A:194:GLY:HA2	1:A:252:GLY:O	2.20	0.42
1:A:212:LEU:HD23	1:A:277:ALA:HB3	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:130:GLU:HG3	1:A:159:PRO:CG	2.44	0.42
1:A:355:PRO:HG2	9:A:728:HOH:O	2.20	0.42
1:A:511:LEU:HA	1:A:511:LEU:HD12	1.81	0.42
1:A:136:GLY:O	1:A:137:ASP:C	2.57	0.42
1:A:291:LYS:O	1:A:295:GLU:HB2	2.20	0.42
1:A:532:ASN:HA	1:A:533:PRO:HD2	1.82	0.41
1:A:123:GLU:CG	1:A:125:SER:H	2.20	0.41
2:A:605:HEM:HBB2	2:A:605:HEM:CMB	2.47	0.41
1:A:385:ARG:O	1:A:389:ASP:HB3	2.20	0.41
1:A:370:PRO:HG2	1:A:371:GLU:HG3	2.02	0.41
1:A:484:TYR:C	1:A:486:THR:H	2.23	0.41
1:A:9:PRO:HG2	1:A:167:CYS:O	2.21	0.40
1:A:324:TRP:O	1:A:326:PRO:HD3	2.21	0.40
1:A:317:LEU:HD23	1:A:321:MET:HA	2.03	0.40
1:A:421:LEU:HD22	1:A:433:LEU:HB2	2.03	0.40
1:A:67:ARG:O	1:A:68:ASN:HB2	2.22	0.40
1:A:53:ASP:OD2	1:A:57:LEU:HD22	2.21	0.40

There are no symmetry-related clashes.

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	592/595 (100%)	546 (92%)	36 (6%)	10 (2%)	11	19

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	8	ALA
1	A	167	CYS
1	A	168	PRO
1	A	169	THR

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Mol	Chain	Res	Type
1	A	174	SER
1	A	18	ASN
1	A	170	PRO
1	A	63	GLN
1	A	9	PRO
1	A	370	PRO

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	517/517 (100%)	477 (92%)	40 (8%)	16	30

All (40) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3	GLU
1	A	4	VAL
1	A	6	CYS
1	A	16	ASP
1	A	18	ASN
1	A	32	ARG
1	A	57	LEU
1	A	98	LEU
1	A	118	GLU
1	A	119	LEU
1	A	124	HIS
1	A	145	PRO
1	A	146	LYS
1	A	147	ASN
1	A	153	THR
1	A	169	THR
1	A	173	GLN
1	A	175	LEU
1	A	187	LEU
1	A	203	LEU

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Mol	Chain	Res	Type
1	A	261	LEU
1	A	268	LEU
1	A	276	LEU
1	A	278	ARG
1	A	283	LEU
1	A	292	LEU
1	A	333	ASN
1	A	347	PHE
1	A	360	ARG
1	A	376	LEU
1	A	464	LEU
1	A	465	LYS
1	A	471	LEU
1	A	480	LEU
1	A	511	LEU
1	A	520	GLN
1	A	548	SER
1	A	581	THR
1	A	583	ASP
1	A	594	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	18	ASN
1	A	154	GLN
1	A	217	GLN
1	A	333	ASN
1	A	364	ASN
1	A	423	GLN
1	A	437	ASN
1	A	468	GLN
1	A	497	ASN
1	A	520	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
1	SEP	A	198	1	8,9,10	1.69	2 (25%)	8,12,14	3.41	2 (25%)

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
1	SEP	A	198	1	-	0/6/8/10	0/0/0/0

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	198	SEP	OG-CB	2.62	1.55	1.44
1	A	198	SEP	P-OG	3.15	1.70	1.60

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	198	SEP	OG-P-O1P	2.48	113.44	107.14
1	A	198	SEP	OG-CB-CA	9.04	115.99	108.27

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	198	SEP	3	0

5.5 Carbohydrates ⓘ

10 carbohydrates are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
4	NAG	A	596	1,4	14,14,15	0.59	0	15,19,21	0.94	1 (6%)
4	NAG	A	597	4	14,14,15	0.77	0	15,19,21	0.76	1 (6%)
4	MAN	A	598	4	11,11,12	0.69	0	14,15,17	0.72	0
5	NAG	A	599	1,5	14,14,15	0.52	0	15,19,21	0.77	1 (6%)
5	NAG	A	600	5	14,14,15	0.59	0	15,19,21	0.88	1 (6%)
4	NAG	A	601	1,4	14,14,15	0.50	0	15,19,21	0.80	1 (6%)
4	NAG	A	602	4	14,14,15	0.68	0	15,19,21	1.40	3 (20%)
4	MAN	A	603	4	11,11,12	0.74	0	14,15,17	1.03	1 (7%)
5	NAG	A	604	1,5	14,14,15	0.88	0	15,19,21	0.77	0
5	NAG	A	607	5	14,14,15	1.16	1 (7%)	15,19,21	1.18	1 (6%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	A	596	1,4	-	0/6/23/26	0/1/1/1
4	NAG	A	597	4	-	0/6/23/26	0/1/1/1
4	MAN	A	598	4	-	0/2/19/22	1/1/1/1
5	NAG	A	599	1,5	-	0/6/23/26	0/1/1/1
5	NAG	A	600	5	-	0/6/23/26	0/1/1/1
4	NAG	A	601	1,4	-	0/6/23/26	0/1/1/1
4	NAG	A	602	4	-	0/6/23/26	0/1/1/1
4	MAN	A	603	4	-	0/2/19/22	0/1/1/1
5	NAG	A	604	1,5	-	0/6/23/26	0/1/1/1
5	NAG	A	607	5	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	607	NAG	C1-C2	3.81	1.57	1.52

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	602	NAG	C4-C3-C2	-3.22	106.23	111.23
4	A	602	NAG	C2-N2-C7	-2.85	119.37	123.04
4	A	596	NAG	C2-N2-C7	-2.64	119.65	123.04
5	A	600	NAG	C2-N2-C7	-2.45	119.89	123.04
4	A	597	NAG	C2-N2-C7	-2.33	120.05	123.04
4	A	601	NAG	C2-N2-C7	-2.28	120.11	123.04
5	A	599	NAG	C2-N2-C7	-2.10	120.34	123.04
4	A	602	NAG	C1-O5-C5	2.54	115.48	112.25
5	A	607	NAG	C1-O5-C5	2.65	115.62	112.25
4	A	603	MAN	C1-C2-C3	3.52	113.70	109.54

There are no chirality outliers.

There are no torsion outliers.

All (1) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	598	MAN	C1-C2-C3-C4-C5-O5

5 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	596	NAG	1	0
4	A	597	NAG	1	0
4	A	601	NAG	2	0
4	A	602	NAG	3	0
4	A	603	MAN	2	0

5.6 Ligand geometry

Of 12 ligands modelled in this entry, 9 are monoatomic - leaving 3 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
2	HEM	A	605	1,9	30,50,50	2.23	9 (30%)	24,82,82	2.30	7 (29%)
6	SCN	A	608	-	2,2,2	2.55	1 (50%)	1,1,1	0.15	0
7	AIN	A	609	-	10,13,13	3.43	5 (50%)	13,17,17	4.66	3 (23%)

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
2	HEM	A	605	1,9	-	0/10/54/54	0/0/8/8
6	SCN	A	608	-	-	0/0/0/0	0/0/0/0
7	AIN	A	609	-	-	0/4/8/8	0/1/1/1

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	605	HEM	C2C-C1C	-5.38	1.42	1.52
2	A	605	HEM	C3B-C4B	-5.09	1.47	1.51
7	A	609	AIN	O3-C2	-3.22	1.34	1.41
7	A	609	AIN	C9-C8	-2.58	1.40	1.49
2	A	605	HEM	C1A-CHA	-2.14	1.33	1.39
2	A	605	HEM	C1C-NC	2.34	1.38	1.36
2	A	605	HEM	C3C-CAC	3.18	1.57	1.51
2	A	605	HEM	CMC-C2C	3.30	1.60	1.53
7	A	609	AIN	O3-C8	3.48	1.47	1.36
6	A	608	SCN	C-S	3.51	1.86	1.63
2	A	605	HEM	FE-NC	3.80	2.10	1.95
2	A	605	HEM	C3B-CAB	3.86	1.58	1.51
2	A	605	HEM	C4C-NC	4.02	1.41	1.36
7	A	609	AIN	C3-C2	5.93	1.50	1.40
7	A	609	AIN	C4-C3	7.05	1.51	1.39

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	609	AIN	O3-C8-C9	-6.92	95.77	110.90
2	A	605	HEM	CBD-CAD-C3D	-2.86	105.22	113.55
2	A	605	HEM	CAA-CBA-CGA	2.17	116.72	112.75

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	605	HEM	CMD-C2D-C3D	3.02	127.70	114.35
2	A	605	HEM	CMB-C2B-C3B	3.60	125.51	116.53
2	A	605	HEM	CAD-C3D-C4D	4.59	128.67	112.47
2	A	605	HEM	CAD-C3D-C2D	4.70	126.72	113.22
2	A	605	HEM	CMC-C2C-C3C	5.56	130.41	116.53
7	A	609	AIN	O3-C8-O4	8.24	141.58	122.37
7	A	609	AIN	C2-O3-C8	12.37	146.21	117.55

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	605	HEM	3	0
7	A	609	AIN	7	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, 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	594/595 (99%)	0.53	60 (10%) 9 9	13, 30, 76, 100	0

All (60) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	5	GLY	11.7
1	A	2	TRP	11.2
1	A	8	ALA	9.5
1	A	595	ASN	9.3
1	A	7	GLY	9.3
1	A	170	PRO	8.9
1	A	121	SER	8.7
1	A	4	VAL	8.0
1	A	594	GLU	8.0
1	A	122	ASN	7.6
1	A	119	LEU	7.3
1	A	10	VAL	6.6
1	A	169	THR	6.5
1	A	3	GLU	6.1
1	A	6	CYS	5.6
1	A	593	ARG	5.6
1	A	173	GLN	5.3
1	A	120	GLY	4.8
1	A	63	GLN	4.7
1	A	171	PRO	4.7
1	A	172	TYR	4.6
1	A	231	ASN	4.5
1	A	1	SER	4.4
1	A	118	GLU	4.3
1	A	574	HIS	4.3
1	A	174	SER	4.2
1	A	592	SER	4.1

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Mol	Chain	Res	Type	RSRZ
1	A	124	HIS	4.1
1	A	9	PRO	4.0
1	A	175	LEU	3.9
1	A	15	CYS	3.8
1	A	13	VAL	3.8
1	A	131	GLU	3.8
1	A	147	ASN	3.5
1	A	424	PRO	3.5
1	A	16	ASP	3.3
1	A	168	PRO	3.2
1	A	12	LEU	3.1
1	A	125	SER	3.1
1	A	11	PRO	3.1
1	A	588	SER	3.1
1	A	123	GLU	2.9
1	A	232	LYS	2.7
1	A	117	THR	2.7
1	A	64	ARG	2.7
1	A	14	LYS	2.7
1	A	129	CYS	2.5
1	A	146	LYS	2.5
1	A	128	GLN	2.5
1	A	167	CYS	2.5
1	A	322	GLN	2.4
1	A	288	ASN	2.4
1	A	234	PRO	2.4
1	A	370	PRO	2.3
1	A	366	GLN	2.3
1	A	425	THR	2.2
1	A	89	GLU	2.2
1	A	127	THR	2.2
1	A	17	GLU	2.1
1	A	280	LEU	2.0

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

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, 95th 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(\AA^2)	Q<0.9
1	SEP	A	198	10/11	0.94	0.22	-	31,35,48,51	0

6.3 Carbohydrates

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, 95th 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(\AA^2)	Q<0.9
4	NAG	A	596	14/15	0.83	0.31	3.86	57,61,65,70	0
5	NAG	A	599	14/15	0.90	0.19	0.09	49,52,54,56	0
4	NAG	A	601	14/15	0.89	0.17	-0.48	56,58,60,63	0
5	NAG	A	604	14/15	0.62	0.44	-	61,64,66,70	0
4	MAN	A	603	11/12	0.58	0.57	-	75,76,76,77	0
4	NAG	A	602	14/15	0.76	0.45	-	67,69,71,73	0
5	NAG	A	600	14/15	0.69	0.47	-	58,60,61,61	0
5	NAG	A	607	14/15	0.50	0.59	-	73,75,77,77	0
4	MAN	A	598	11/12	0.53	0.56	-	85,87,87,88	0
4	NAG	A	597	14/15	0.70	0.45	-	75,79,80,83	0

6.4 Ligands

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, 95th 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(\AA^2)	Q<0.9
7	AIN	A	609	13/13	0.77	0.39	2.54	66,69,71,72	0
3	CA	A	606	1/1	0.97	0.17	0.68	17,17,17,17	0
2	HEM	A	605	43/43	0.94	0.15	-0.18	12,17,19,20	0
8	IOD	A	611	1/1	0.99	0.06	-1.60	87,87,87,87	0
6	SCN	A	608	3/3	0.86	0.13	-1.85	34,34,34,37	0
8	IOD	A	613	1/1	0.99	0.09	-2.14	75,75,75,75	0
8	IOD	A	610	1/1	1.00	0.06	-3.02	24,24,24,24	0
8	IOD	A	615	1/1	0.99	0.05	-3.52	69,69,69,69	0
8	IOD	A	614	1/1	0.95	0.05	-4.72	49,49,49,49	1

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(\AA^2)	Q<0.9
8	IOD	A	616	1/1	0.98	0.07	-	74,74,74,74	0
8	IOD	A	617	1/1	0.94	0.08	-	93,93,93,93	1
8	IOD	A	612	1/1	0.96	0.10	-	67,67,67,67	1

6.5 Other polymers [i](#)

There are no such residues in this entry.