



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 7, 2026 – 03:54 AM UTC

PDB ID : 2Y0N / pdb_00002y0n
Title : CRYSTAL STRUCTURE OF THE COMPLEX BETWEEN DOSAGE COMPENSATION FACTORS MSL1 AND MSL3
Authors : Kadlec, J.; Hallacli, E.; Lipp, M.; Holz, H.; Sanchez Weatherby, J.; Cusack, S.; Akhtar, A.
Deposited on : 2010-12-04
Resolution : 3.00 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

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A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

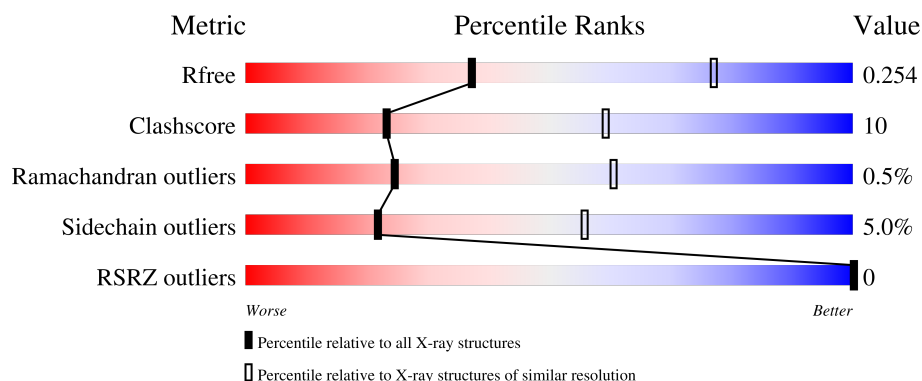
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.00 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}	180053	2672 (3.00-3.00)
Clashscore	190562	2977 (3.00-3.00)
Ramachandran outliers	187476	2877 (3.00-3.00)
Sidechain outliers	187428	2880 (3.00-3.00)
RSRZ outliers	180081	2671 (3.00-3.00)

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 $\leq 5\%$. 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	211	
1	B	211	
1	C	211	
1	D	211	
2	E	56	

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Mol	Chain	Length	Quality of chain
2	F	56	 52% 11% • 36%
2	G	56	 34% 18% 48%
2	H	56	 30% 20% • 48%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 6492 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 MALE-SPECIFIC LETHAL 3 HOMOLOG.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	165	Total	C	N	O	S	0	0	0
			1359	894	216	244	5			
1	B	165	Total	C	N	O	S	0	0	0
			1359	894	216	244	5			
1	C	164	Total	C	N	O	S	0	0	0
			1355	893	215	242	5			
1	D	164	Total	C	N	O	S	0	0	0
			1355	893	215	242	5			

There are 44 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	165	MET	-	expression tag	UNP Q8N5Y2
A	166	GLY	-	expression tag	UNP Q8N5Y2
A	290	TYR	-	insertion	UNP Q8N5Y2
A	291	ASP	-	insertion	UNP Q8N5Y2
A	292	ILE	-	insertion	UNP Q8N5Y2
A	293	PRO	-	insertion	UNP Q8N5Y2
A	294	PRO	-	insertion	UNP Q8N5Y2
A	295	THR	-	insertion	UNP Q8N5Y2
A	296	THR	-	insertion	UNP Q8N5Y2
A	440	GLU	-	insertion	UNP Q8N5Y2
A	441	PHE	-	insertion	UNP Q8N5Y2
B	165	MET	-	expression tag	UNP Q8N5Y2
B	166	GLY	-	expression tag	UNP Q8N5Y2
B	290	TYR	-	insertion	UNP Q8N5Y2
B	291	ASP	-	insertion	UNP Q8N5Y2
B	292	ILE	-	insertion	UNP Q8N5Y2
B	293	PRO	-	insertion	UNP Q8N5Y2
B	294	PRO	-	insertion	UNP Q8N5Y2
B	295	THR	-	insertion	UNP Q8N5Y2
B	296	THR	-	insertion	UNP Q8N5Y2
B	440	GLU	-	insertion	UNP Q8N5Y2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	441	PHE	-	insertion	UNP Q8N5Y2
C	165	MET	-	expression tag	UNP Q8N5Y2
C	166	GLY	-	expression tag	UNP Q8N5Y2
C	290	TYR	-	insertion	UNP Q8N5Y2
C	291	ASP	-	insertion	UNP Q8N5Y2
C	292	ILE	-	insertion	UNP Q8N5Y2
C	293	PRO	-	insertion	UNP Q8N5Y2
C	294	PRO	-	insertion	UNP Q8N5Y2
C	295	THR	-	insertion	UNP Q8N5Y2
C	296	THR	-	insertion	UNP Q8N5Y2
C	440	GLU	-	insertion	UNP Q8N5Y2
C	441	PHE	-	insertion	UNP Q8N5Y2
D	165	MET	-	expression tag	UNP Q8N5Y2
D	166	GLY	-	expression tag	UNP Q8N5Y2
D	290	TYR	-	insertion	UNP Q8N5Y2
D	291	ASP	-	insertion	UNP Q8N5Y2
D	292	ILE	-	insertion	UNP Q8N5Y2
D	293	PRO	-	insertion	UNP Q8N5Y2
D	294	PRO	-	insertion	UNP Q8N5Y2
D	295	THR	-	insertion	UNP Q8N5Y2
D	296	THR	-	insertion	UNP Q8N5Y2
D	440	GLU	-	insertion	UNP Q8N5Y2
D	441	PHE	-	insertion	UNP Q8N5Y2

- Molecule 2 is a protein called MALE-SPECIFIC LETHAL 1 HOMOLOG.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	E	39	Total	C	N	O	0	0	0
			314	217	46	51			
2	F	36	Total	C	N	O	0	0	0
			290	201	43	46			
2	G	29	Total	C	N	O	0	0	0
			230	159	35	36			
2	H	29	Total	C	N	O	0	0	0
			230	159	35	36			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	542	GLY	-	expression tag	UNP Q6PDM1
E	543	ALA	-	expression tag	UNP Q6PDM1
E	544	MET	-	expression tag	UNP Q6PDM1

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Chain	Residue	Modelled	Actual	Comment	Reference
F	542	GLY	-	expression tag	UNP Q6PDM1
F	543	ALA	-	expression tag	UNP Q6PDM1
F	544	MET	-	expression tag	UNP Q6PDM1
G	542	GLY	-	expression tag	UNP Q6PDM1
G	543	ALA	-	expression tag	UNP Q6PDM1
G	544	MET	-	expression tag	UNP Q6PDM1
H	542	GLY	-	expression tag	UNP Q6PDM1
H	543	ALA	-	expression tag	UNP Q6PDM1
H	544	MET	-	expression tag	UNP Q6PDM1

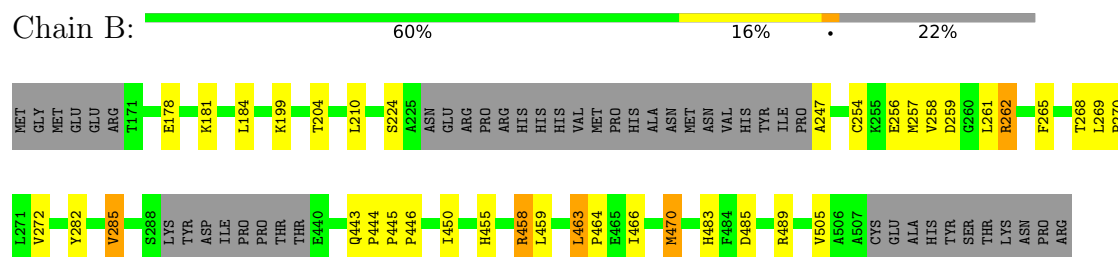
3 Residue-property plots

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.

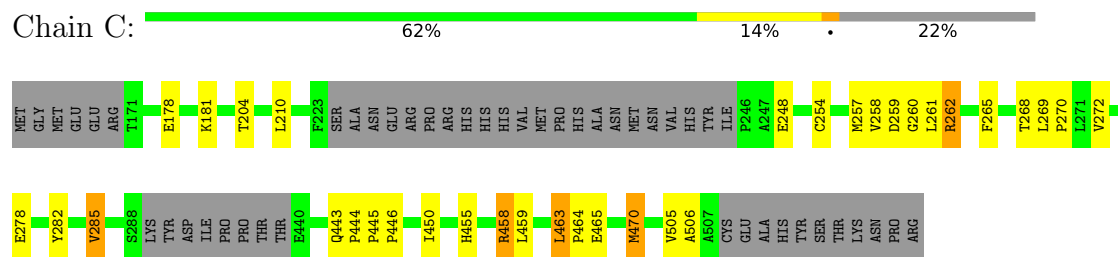
• Molecule 1: MALE-SPECIFIC LETHAL 3 HOMOLOG



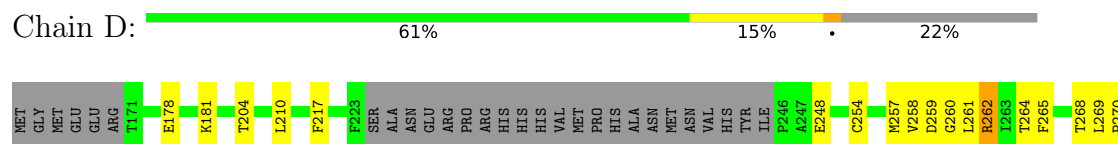
• Molecule 1: MALE-SPECIFIC LETHAL 3 HOMOLOG



• Molecule 1: MALE-SPECIFIC LETHAL 3 HOMOLOG



• Molecule 1: MALE-SPECIFIC LETHAL 3 HOMOLOG

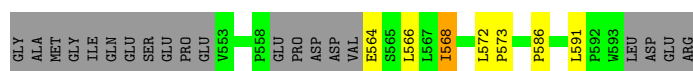




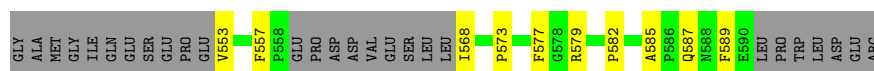
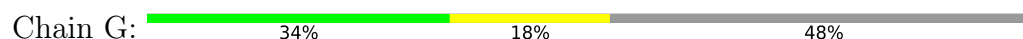
• Molecule 2: MALE-SPECIFIC LETHAL 1 HOMOLOG



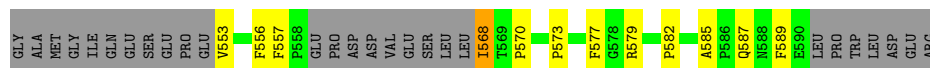
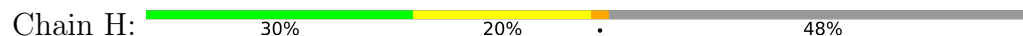
• Molecule 2: MALE-SPECIFIC LETHAL 1 HOMOLOG



• Molecule 2: MALE-SPECIFIC LETHAL 1 HOMOLOG



• Molecule 2: MALE-SPECIFIC LETHAL 1 HOMOLOG



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	76.23Å 127.27Å 79.68Å 90.00° 118.46° 90.00°	Depositor
Resolution (Å)	46.13 – 3.00 46.13 – 3.00	Depositor EDS
% Data completeness (in resolution range)	93.6 (46.13-3.00) 93.6 (46.13-3.00)	Depositor EDS
R_{merge}	0.03	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.07 (at 3.01Å)	Xtriage
Refinement program	REFMAC 5.6.0085	Depositor
R, R_{free}	0.232 , 0.253 0.232 , 0.254	Depositor DCC
R_{free} test set	1260 reflections (4.75%)	wwPDB-VP
Wilson B-factor (Å ²)	99.4	Xtriage
Anisotropy	0.086	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 120.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.468 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	6492	wwPDB-VP
Average B, all atoms (Å ²)	100.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.35% 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, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.52	0/1392	0.86	0/1883
1	B	0.51	0/1392	0.88	0/1883
1	C	0.55	0/1389	0.88	0/1879
1	D	0.53	1/1389 (0.1%)	0.90	1/1879 (0.1%)
2	E	0.62	0/327	0.87	1/449 (0.2%)
2	F	0.59	0/302	0.84	0/415
2	G	0.63	0/239	0.74	0/327
2	H	0.63	0/239	0.74	0/327
All	All	0.54	1/6669 (0.0%)	0.87	2/9042 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	505	VAL	CA-CB	5.03	1.62	1.54

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	217	PHE	N-CA-C	-6.61	104.86	113.12
2	E	568	ILE	N-CA-C	5.56	115.90	108.11

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	1359	0	1374	32	0
1	B	1359	0	1374	32	0
1	C	1355	0	1372	27	0
1	D	1355	0	1372	30	0
2	E	314	0	320	10	0
2	F	290	0	295	5	0
2	G	230	0	234	11	0
2	H	230	0	234	12	0
All	All	6492	0	6575	135	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 10.

The worst 5 of 135 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:D:475:LYS:NZ	2:E:551:PRO:HB3	1.92	0.84
1:A:268:THR:HG22	1:A:272:VAL:HG12	1.69	0.74
1:D:475:LYS:HZ1	2:E:551:PRO:HB3	1.54	0.73
1:D:248:GLU:HG3	1:D:483:HIS:CE1	2.23	0.72
1:D:268:THR:HG22	1:D:272:VAL:HG12	1.73	0.70

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	159/211 (75%)	152 (96%)	7 (4%)	0	100	100
1	B	159/211 (75%)	152 (96%)	6 (4%)	1 (1%)	21	56
1	C	158/211 (75%)	151 (96%)	7 (4%)	0	100	100
1	D	158/211 (75%)	151 (96%)	7 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	E	35/56 (62%)	30 (86%)	3 (9%)	2 (6%)	1	8
2	F	32/56 (57%)	30 (94%)	1 (3%)	1 (3%)	3	19
2	G	25/56 (45%)	23 (92%)	2 (8%)	0	100	100
2	H	25/56 (45%)	23 (92%)	2 (8%)	0	100	100
All	All	751/1068 (70%)	712 (95%)	35 (5%)	4 (0%)	24	60

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	224	SER
2	E	586	PRO
2	F	586	PRO
2	E	592	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	150/193 (78%)	142 (95%)	8 (5%)	20	54
1	B	150/193 (78%)	144 (96%)	6 (4%)	28	62
1	C	150/193 (78%)	142 (95%)	8 (5%)	20	54
1	D	150/193 (78%)	144 (96%)	6 (4%)	28	62
2	E	36/50 (72%)	34 (94%)	2 (6%)	19	52
2	F	33/50 (66%)	30 (91%)	3 (9%)	9	33
2	G	26/50 (52%)	25 (96%)	1 (4%)	29	63
2	H	26/50 (52%)	24 (92%)	2 (8%)	12	40
All	All	721/972 (74%)	685 (95%)	36 (5%)	22	56

5 of 36 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	E	552	GLU
2	H	568	ILE
2	E	568	ILE
2	F	568	ILE
1	B	463	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 9 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	216	HIS
1	D	495	HIS
1	B	192	ASN
1	B	216	HIS
1	B	250	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](#)

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	165/211 (78%)	-1.12	0 100 100	54, 92, 138, 165	0
1	B	165/211 (78%)	-1.15	0 100 100	54, 92, 138, 174	0
1	C	164/211 (77%)	-1.02	0 100 100	56, 107, 168, 200	0
1	D	164/211 (77%)	-1.03	0 100 100	58, 107, 167, 200	0
2	E	39/56 (69%)	-1.16	0 100 100	55, 80, 140, 148	0
2	F	36/56 (64%)	-1.21	0 100 100	56, 78, 120, 133	0
2	G	29/56 (51%)	-1.05	0 100 100	64, 82, 130, 151	0
2	H	29/56 (51%)	-1.03	0 100 100	70, 88, 138, 161	0
All	All	791/1068 (74%)	-1.09	0 100 100	54, 96, 154, 200	0

There are no RSRZ outliers to report.

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 oligosaccharides 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.