



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:20 PM UTC

PDB ID : 1JA3 / pdb_00001ja3
Title : Crystal Structure of the Murine NK Cell Inhibitory Receptor Ly-49I
Authors : Dimasi, N.; Sawicki, W.M.; Reineck, L.A.; Li, Y.; Natarajan, K.; Murgulies, D.H.; Mariuzza, A.R.
Deposited on : 2001-05-29
Resolution : 3.00 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

<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

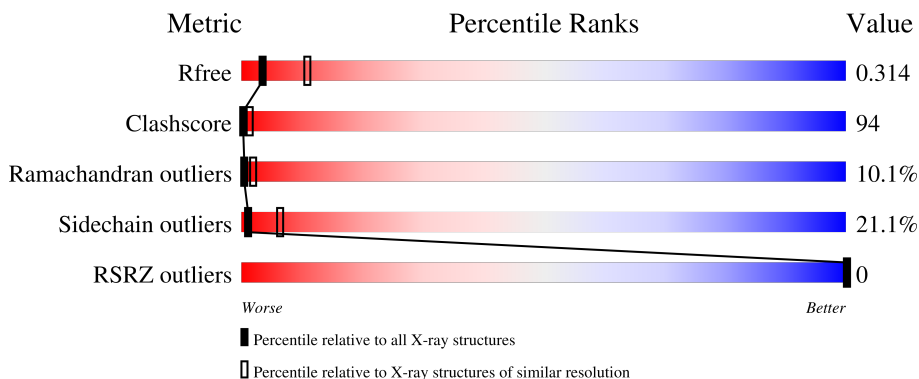
1 Overall quality at a glance

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	127	
1	B	127	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 1920 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.

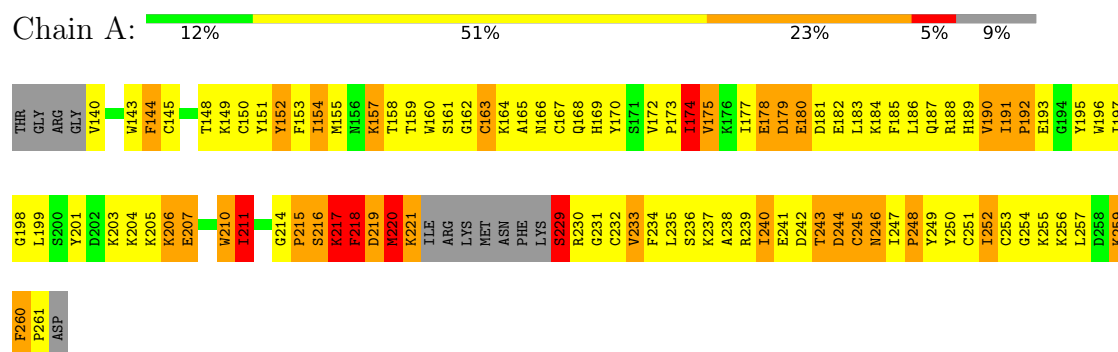
- Molecule 1 is a protein called MHC class I recognition receptor Ly49I.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	115	Total	C	N	O	S	0	0	0
			962	629	155	168	10			
1	B	113	Total	C	N	O	S	0	0	0
			958	629	154	165	10			

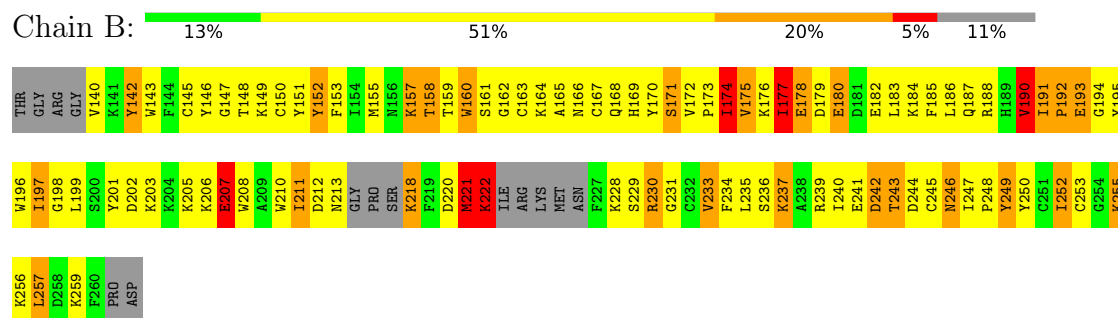
3 Residue-property plots

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: MHC class I recognition receptor Ly49I



- Molecule 1: MHC class I recognition receptor Ly49I



4 Data and refinement statistics

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, α , β , γ	91.73Å 91.73Å 89.58Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	29.72 – 3.00 29.72 – 3.01	Depositor EDS
% Data completeness (in resolution range)	91.9 (29.72-3.00) 92.1 (29.72-3.01)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.97 (at 3.00Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.333 , 0.308 0.325 , 0.314	Depositor DCC
R_{free} test set	297 reflections (5.58%)	wwPDB-VP
Wilson B-factor (Å ²)	72.1	Xtriage
Anisotropy	0.279	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.24 , 87.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.52$, $\langle L^2 \rangle = 0.35$	Xtriage
Estimated twinning fraction	0.488 for h,-h-k,-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	1920	wwPDB-VP
Average B, all atoms (Å ²)	73.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.51% 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

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	0.62	0/992	1.26	11/1335 (0.8%)
1	B	0.66	0/986	1.21	10/1322 (0.8%)
All	All	0.64	0/1978	1.24	21/2657 (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	A	0	1

There are no bond length outliers.

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	206	LYS	N-CA-C	-12.33	96.52	114.39
1	B	221	MET	N-CA-C	12.15	127.06	108.96
1	B	221	MET	CA-C-N	10.24	140.14	121.70
1	B	221	MET	C-N-CA	10.24	140.14	121.70
1	A	219	ASP	N-CA-C	-10.12	97.90	110.65
1	A	174	ILE	N-CA-C	-8.15	97.87	110.09
1	B	222	LYS	CA-C-O	8.12	134.59	120.80
1	A	218	PHE	N-CA-C	7.86	127.53	110.80
1	B	207	GLU	N-CA-C	7.68	121.77	109.79
1	A	216	SER	N-CA-C	-7.66	99.49	110.59
1	A	220	MET	N-CA-C	6.49	119.35	111.82
1	B	174	ILE	N-CA-C	-6.30	101.42	109.80
1	A	207	GLU	N-CA-C	5.94	118.55	110.35
1	B	249	TYR	N-CA-C	5.94	116.94	108.74
1	A	163	CYS	N-CA-C	-5.68	105.00	111.07
1	B	242	ASP	N-CA-C	5.65	119.11	110.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	179	ASP	N-CA-C	5.30	116.26	107.73
1	A	240	ILE	N-CA-C	-5.26	102.20	109.46
1	B	193	GLU	N-CA-C	5.18	115.18	107.88
1	B	175	VAL	N-CA-C	5.09	119.93	109.34
1	A	245	CYS	N-CA-C	-5.00	107.23	113.38

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	229	SER	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	962	0	930	181	0
1	B	958	0	929	178	0
All	All	1920	0	1859	355	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 94.

All (355) 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:216:SER:HA	1:A:217:LYS:NZ	1.27	1.43
1:A:216:SER:CA	1:A:217:LYS:HE3	1.51	1.39
1:A:216:SER:C	1:A:217:LYS:HE3	1.56	1.29
1:A:216:SER:CA	1:A:217:LYS:CE	2.14	1.24
1:A:216:SER:HA	1:A:217:LYS:CE	1.66	1.24
1:A:221:LYS:HZ1	1:A:229:SER:N	1.38	1.22
1:A:221:LYS:C	1:A:221:LYS:CE	2.13	1.22
1:A:221:LYS:C	1:A:221:LYS:CD	2.11	1.20
1:B:222:LYS:C	1:B:222:LYS:CE	2.19	1.16

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:222:LYS:C	1:B:222:LYS:HE2	1.70	1.16
1:A:221:LYS:C	1:A:221:LYS:HD3	1.65	1.15
1:A:217:LYS:N	1:A:217:LYS:HD2	1.46	1.14
1:B:197:ILE:HD11	1:B:233:VAL:HG13	1.25	1.12
1:A:217:LYS:N	1:A:217:LYS:CD	2.13	1.11
1:A:140:VAL:HG12	1:A:155:MET:HG2	1.32	1.11
1:A:221:LYS:C	1:A:221:LYS:HE2	1.72	1.11
1:B:222:LYS:C	1:B:222:LYS:CD	2.24	1.10
1:B:222:LYS:HD3	1:B:222:LYS:O	1.52	1.09
1:A:259:LYS:HB3	1:A:261:PRO:HD2	1.36	1.07
1:B:246:ASN:N	1:B:246:ASN:HD22	1.49	1.06
1:B:222:LYS:C	1:B:222:LYS:HD3	1.81	1.05
1:B:208:TRP:HE1	1:B:228:LYS:HG3	1.20	1.04
1:B:208:TRP:NE1	1:B:228:LYS:HG3	1.75	1.01
1:A:175:VAL:HB	1:A:252:ILE:O	1.61	1.01
1:A:216:SER:HA	1:A:217:LYS:HZ2	1.19	1.00
1:A:216:SER:C	1:A:217:LYS:CE	2.29	1.00
1:A:217:LYS:HD2	1:A:217:LYS:H	1.25	1.00
1:B:246:ASN:HD22	1:B:246:ASN:H	1.06	0.98
1:A:216:SER:CA	1:A:217:LYS:NZ	2.21	0.98
1:B:230:ARG:HG3	1:B:231:GLY:N	1.80	0.91
1:B:237:LYS:HD3	1:B:237:LYS:H	1.34	0.90
1:B:174:ILE:HG23	1:B:211:ILE:CD1	2.01	0.89
1:A:215:PRO:O	1:A:217:LYS:CE	2.21	0.89
1:A:230:ARG:HG3	1:A:231:GLY:N	1.86	0.89
1:A:221:LYS:NZ	1:A:229:SER:N	2.19	0.89
1:B:199:LEU:HD23	1:B:233:VAL:HG11	1.56	0.88
1:A:215:PRO:O	1:A:217:LYS:HE2	1.72	0.87
1:A:140:VAL:HG12	1:A:155:MET:CG	2.04	0.86
1:A:191:ILE:HG13	1:A:192:PRO:HD2	1.56	0.86
1:A:140:VAL:HB	1:A:155:MET:HB2	1.57	0.85
1:A:216:SER:HA	1:A:217:LYS:HZ1	1.33	0.85
1:A:260:PHE:H	1:A:261:PRO:HD2	1.42	0.85
1:A:237:LYS:O	1:A:237:LYS:HD3	1.76	0.84
1:A:140:VAL:CG1	1:A:155:MET:CG	2.56	0.83
1:B:246:ASN:N	1:B:246:ASN:ND2	2.22	0.82
1:A:193:GLU:HG2	1:A:250:TYR:CE1	2.14	0.82
1:B:175:VAL:HB	1:B:252:ILE:O	1.79	0.81
1:A:216:SER:N	1:A:217:LYS:HE3	1.95	0.81
1:B:222:LYS:CD	1:B:222:LYS:O	2.25	0.81
1:B:230:ARG:HG3	1:B:231:GLY:H	1.44	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:174:ILE:HG23	1:B:211:ILE:HD13	1.63	0.79
1:B:218:LYS:O	1:B:218:LYS:HD3	1.83	0.79
1:A:186:LEU:O	1:A:190:VAL:HB	1.82	0.79
1:A:260:PHE:N	1:A:261:PRO:HD2	1.98	0.79
1:A:157:LYS:HG3	1:A:250:TYR:CE2	2.17	0.78
1:A:242:ASP:O	1:A:243:THR:HB	1.83	0.78
1:A:218:PHE:HB3	1:A:220:MET:HG2	1.63	0.78
1:A:140:VAL:CG1	1:A:155:MET:HG2	2.12	0.78
1:A:205:LYS:HD3	1:A:207:GLU:HB2	1.66	0.78
1:A:157:LYS:HA	1:A:249:TYR:O	1.85	0.77
1:A:167:CYS:HB3	1:A:172:VAL:O	1.85	0.77
1:A:160:TRP:HB3	1:A:245:CYS:HB3	1.66	0.76
1:A:244:ASP:HB3	1:A:246:ASN:OD1	1.85	0.76
1:A:165:ALA:HA	1:A:168:GLN:HE21	1.49	0.76
1:B:208:TRP:CD1	1:B:228:LYS:HG3	2.21	0.76
1:B:185:PHE:HA	1:B:188:ARG:HD3	1.68	0.75
1:B:197:ILE:HD11	1:B:233:VAL:CG1	2.13	0.75
1:A:216:SER:C	1:A:217:LYS:CD	2.57	0.75
1:A:203:LYS:C	1:A:205:LYS:H	1.94	0.74
1:B:203:LYS:C	1:B:205:LYS:H	1.96	0.74
1:B:203:LYS:NZ	1:B:230:ARG:HH12	1.86	0.74
1:B:247:ILE:HD12	1:B:248:PRO:HD2	1.67	0.74
1:B:174:ILE:HG23	1:B:211:ILE:HD11	1.69	0.74
1:B:203:LYS:HZ1	1:B:230:ARG:HH12	1.34	0.73
1:B:195:TYR:O	1:B:235:LEU:N	2.20	0.73
1:A:215:PRO:C	1:A:217:LYS:HE3	2.14	0.73
1:A:163:CYS:O	1:A:164:LYS:C	2.32	0.72
1:B:186:LEU:O	1:B:190:VAL:HB	1.89	0.72
1:B:148:THR:O	1:B:257:LEU:HB2	1.88	0.72
1:B:246:ASN:H	1:B:246:ASN:ND2	1.83	0.72
1:A:154:ILE:HD12	1:A:154:ILE:N	2.04	0.72
1:A:220:MET:CE	1:A:240:ILE:HD11	2.20	0.72
1:A:159:THR:O	1:A:162:GLY:N	2.23	0.71
1:B:160:TRP:C	1:B:162:GLY:H	1.98	0.71
1:B:239:ARG:HH11	1:B:239:ARG:HG2	1.56	0.71
1:A:220:MET:HE1	1:A:240:ILE:HD11	1.72	0.71
1:B:174:ILE:HD11	1:B:197:ILE:C	2.17	0.70
1:B:193:GLU:HG3	1:B:194:GLY:H	1.56	0.70
1:B:160:TRP:CH2	1:B:164:LYS:HD2	2.27	0.70
1:A:160:TRP:C	1:A:162:GLY:H	1.98	0.69
1:A:185:PHE:O	1:A:189:HIS:HB3	1.92	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:149:LYS:HG3	1:A:256:LYS:HD2	1.75	0.69
1:A:214:GLY:C	1:A:216:SER:H	1.99	0.68
1:A:230:ARG:HG3	1:A:231:GLY:H	1.57	0.68
1:A:260:PHE:HE1	1:B:143:TRP:HB2	1.57	0.68
1:A:259:LYS:CB	1:A:261:PRO:HD2	2.18	0.68
1:A:148:THR:O	1:A:257:LEU:HB2	1.94	0.67
1:B:242:ASP:O	1:B:243:THR:HB	1.93	0.67
1:A:187:GLN:HE22	1:A:239:ARG:HA	1.58	0.67
1:B:165:ALA:HA	1:B:168:GLN:HE21	1.60	0.67
1:A:191:ILE:CG1	1:A:192:PRO:HD2	2.25	0.67
1:A:199:LEU:HD23	1:A:233:VAL:HG11	1.77	0.67
1:B:237:LYS:H	1:B:237:LYS:CD	2.06	0.67
1:A:140:VAL:CG1	1:A:155:MET:HG3	2.24	0.66
1:B:222:LYS:CE	1:B:222:LYS:O	2.43	0.66
1:A:140:VAL:HG11	1:A:155:MET:HG3	1.76	0.66
1:A:255:LYS:HG2	1:A:256:LYS:H	1.59	0.66
1:B:157:LYS:HG2	1:B:249:TYR:HA	1.77	0.66
1:B:159:THR:HB	1:B:246:ASN:HA	1.77	0.66
1:B:235:LEU:HD23	1:B:236:SER:N	2.11	0.66
1:A:218:PHE:CB	1:A:220:MET:HG2	2.26	0.65
1:B:169:HIS:C	1:B:171:SER:H	2.05	0.65
1:B:199:LEU:CD2	1:B:233:VAL:HG11	2.27	0.65
1:A:230:ARG:CG	1:A:231:GLY:N	2.60	0.65
1:B:199:LEU:HB3	1:B:233:VAL:CG1	2.27	0.65
1:B:193:GLU:HG2	1:B:250:TYR:CE1	2.30	0.65
1:B:186:LEU:HD12	1:B:186:LEU:H	1.61	0.65
1:B:160:TRP:CZ3	1:B:164:LYS:HD2	2.32	0.65
1:B:167:CYS:HB3	1:B:172:VAL:O	1.97	0.65
1:B:175:VAL:HG22	1:B:176:LYS:N	2.13	0.64
1:A:172:VAL:HG13	1:A:255:LYS:HB2	1.80	0.63
1:A:233:VAL:HG23	1:A:241:GLU:H	1.61	0.63
1:A:177:ILE:HA	1:A:182:GLU:OE1	1.98	0.63
1:B:230:ARG:CG	1:B:231:GLY:N	2.57	0.63
1:A:259:LYS:HA	1:A:259:LYS:NZ	2.14	0.63
1:B:175:VAL:HG12	1:B:197:ILE:HA	1.80	0.63
1:A:201:TYR:HE1	1:A:206:LYS:O	1.82	0.62
1:B:201:TYR:HE1	1:B:228:LYS:HD2	1.64	0.62
1:A:172:VAL:CG1	1:A:173:PRO:HD2	2.30	0.62
1:A:198:GLY:O	1:A:210:TRP:HA	2.00	0.62
1:A:153:PHE:CE2	1:A:190:VAL:HG23	2.34	0.61
1:A:161:SER:HA	1:A:164:LYS:CD	2.30	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:163:CYS:O	1:B:164:LYS:C	2.42	0.61
1:A:166:ASN:O	1:A:170:TYR:HD1	1.83	0.61
1:A:214:GLY:O	1:A:216:SER:N	2.24	0.61
1:B:187:GLN:HE22	1:B:239:ARG:HA	1.65	0.61
1:B:239:ARG:HG2	1:B:239:ARG:NH1	2.15	0.60
1:A:193:GLU:HG2	1:A:250:TYR:CD1	2.35	0.60
1:A:199:LEU:HB3	1:A:233:VAL:CG1	2.32	0.60
1:A:260:PHE:N	1:A:261:PRO:CD	2.64	0.60
1:A:166:ASN:O	1:A:169:HIS:HB3	2.01	0.60
1:B:159:THR:O	1:B:162:GLY:N	2.35	0.60
1:B:196:TRP:NE1	1:B:249:TYR:HB2	2.17	0.60
1:A:187:GLN:NE2	1:A:239:ARG:HA	2.17	0.59
1:B:191:ILE:CD1	1:B:192:PRO:HD2	2.33	0.59
1:B:164:LYS:O	1:B:168:GLN:HG2	2.03	0.59
1:B:165:ALA:HA	1:B:168:GLN:NE2	2.18	0.59
1:A:248:PRO:O	1:A:249:TYR:HD2	1.85	0.59
1:B:142:TYR:H	1:B:142:TYR:HD2	1.48	0.59
1:B:235:LEU:HD23	1:B:235:LEU:C	2.28	0.59
1:B:190:VAL:HG22	1:B:195:TYR:CE2	2.37	0.59
1:B:234:PHE:C	1:B:234:PHE:CD2	2.81	0.59
1:A:152:TYR:HB2	1:A:253:CYS:HB2	1.85	0.58
1:A:153:PHE:HE2	1:A:190:VAL:HG23	1.68	0.58
1:A:190:VAL:HG22	1:A:195:TYR:CE2	2.38	0.58
1:B:160:TRP:C	1:B:162:GLY:N	2.61	0.58
1:B:166:ASN:O	1:B:169:HIS:HB3	2.03	0.58
1:B:177:ILE:HA	1:B:182:GLU:OE1	2.03	0.58
1:B:191:ILE:HD13	1:B:192:PRO:HD2	1.85	0.58
1:A:260:PHE:H	1:A:261:PRO:CD	2.11	0.58
1:B:203:LYS:HG2	1:B:230:ARG:HH22	1.68	0.58
1:A:217:LYS:CE	1:A:217:LYS:N	2.58	0.58
1:A:255:LYS:HG2	1:A:256:LYS:N	2.17	0.57
1:A:260:PHE:CE1	1:B:143:TRP:HB2	2.37	0.57
1:B:182:GLU:O	1:B:183:LEU:C	2.47	0.57
1:A:203:LYS:O	1:A:205:LYS:N	2.38	0.57
1:B:157:LYS:HA	1:B:249:TYR:O	2.05	0.56
1:B:234:PHE:HE2	1:B:236:SER:HB3	1.69	0.56
1:B:197:ILE:HG12	1:B:199:LEU:H	1.69	0.56
1:A:195:TYR:O	1:A:235:LEU:N	2.38	0.56
1:B:248:PRO:O	1:B:249:TYR:CD2	2.58	0.56
1:A:149:LYS:HG2	1:A:256:LYS:HA	1.86	0.56
1:B:218:LYS:HD3	1:B:218:LYS:N	2.19	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:160:TRP:O	1:B:162:GLY:N	2.39	0.56
1:B:185:PHE:HA	1:B:188:ARG:CD	2.37	0.55
1:A:193:GLU:HG2	1:A:250:TYR:HE1	1.67	0.55
1:A:199:LEU:HB3	1:A:233:VAL:HG13	1.89	0.55
1:B:182:GLU:O	1:B:185:PHE:N	2.39	0.55
1:B:206:LYS:O	1:B:228:LYS:NZ	2.38	0.55
1:A:205:LYS:HB3	1:A:207:GLU:H	1.73	0.54
1:A:159:THR:HB	1:A:246:ASN:HA	1.89	0.54
1:A:177:ILE:HD11	1:A:197:ILE:CG2	2.37	0.54
1:B:205:LYS:HG2	1:B:207:GLU:OE2	2.08	0.54
1:A:175:VAL:HG23	1:A:254:GLY:HA3	1.90	0.54
1:B:255:LYS:HG3	1:B:256:LYS:O	2.07	0.54
1:B:190:VAL:HG13	1:B:195:TYR:HE2	1.73	0.54
1:A:256:LYS:HG3	1:A:257:LEU:H	1.72	0.53
1:B:244:ASP:O	1:B:247:ILE:HG22	2.07	0.53
1:A:216:SER:CA	1:A:217:LYS:HZ2	2.03	0.53
1:A:177:ILE:HD12	1:A:197:ILE:HD12	1.90	0.53
1:A:215:PRO:C	1:A:217:LYS:CE	2.78	0.53
1:A:160:TRP:C	1:A:162:GLY:N	2.64	0.52
1:A:214:GLY:C	1:A:216:SER:N	2.67	0.52
1:B:201:TYR:CE1	1:B:228:LYS:HD2	2.44	0.52
1:A:203:LYS:C	1:A:205:LYS:N	2.63	0.52
1:A:165:ALA:O	1:A:168:GLN:HG2	2.09	0.52
1:B:165:ALA:CA	1:B:168:GLN:HE21	2.22	0.52
1:B:203:LYS:CG	1:B:230:ARG:HH22	2.23	0.52
1:B:193:GLU:HG2	1:B:250:TYR:CD1	2.44	0.51
1:B:176:LYS:HE3	1:B:178:GLU:OE2	2.11	0.51
1:B:193:GLU:HG3	1:B:194:GLY:N	2.25	0.51
1:B:236:SER:HB2	1:B:237:LYS:NZ	2.25	0.51
1:A:201:TYR:CE1	1:A:206:LYS:O	2.64	0.51
1:B:199:LEU:HB3	1:B:233:VAL:HG11	1.91	0.51
1:A:242:ASP:O	1:A:243:THR:CB	2.56	0.51
1:A:149:LYS:CG	1:A:256:LYS:HD2	2.40	0.51
1:A:151:TYR:OH	1:A:182:GLU:HG3	2.10	0.51
1:B:201:TYR:CE1	1:B:206:LYS:O	2.64	0.51
1:A:143:TRP:HB3	1:A:152:TYR:CD1	2.46	0.51
1:A:178:GLU:O	1:A:179:ASP:HB3	2.10	0.51
1:B:199:LEU:CG	1:B:233:VAL:HG11	2.41	0.50
1:A:154:ILE:N	1:A:154:ILE:CD1	2.73	0.50
1:A:240:ILE:O	1:A:241:GLU:HB2	2.11	0.50
1:B:159:THR:O	1:B:160:TRP:C	2.54	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:186:LEU:HD12	1:B:186:LEU:N	2.25	0.50
1:A:172:VAL:HG13	1:A:173:PRO:HD2	1.93	0.50
1:B:187:GLN:NE2	1:B:239:ARG:HA	2.26	0.50
1:B:203:LYS:C	1:B:205:LYS:N	2.64	0.50
1:A:177:ILE:HD11	1:A:197:ILE:HG21	1.92	0.50
1:B:157:LYS:HG3	1:B:250:TYR:CE2	2.47	0.49
1:B:176:LYS:HA	1:B:210:TRP:CE3	2.46	0.49
1:B:218:LYS:N	1:B:218:LYS:CD	2.75	0.49
1:A:165:ALA:HA	1:A:168:GLN:NE2	2.24	0.49
1:A:218:PHE:CG	1:A:220:MET:HG2	2.48	0.49
1:B:177:ILE:HG21	1:B:183:LEU:HB2	1.95	0.49
1:A:259:LYS:HA	1:A:259:LYS:HZ3	1.77	0.49
1:A:180:GLU:HA	1:A:183:LEU:HB3	1.94	0.49
1:B:157:LYS:HA	1:B:249:TYR:C	2.38	0.48
1:A:237:LYS:HD3	1:A:237:LYS:C	2.38	0.48
1:A:180:GLU:H	1:A:180:GLU:CD	2.20	0.48
1:B:190:VAL:HG13	1:B:195:TYR:CE2	2.48	0.48
1:B:201:TYR:HE1	1:B:206:LYS:O	1.96	0.48
1:B:233:VAL:HG23	1:B:241:GLU:H	1.78	0.48
1:A:217:LYS:HD2	1:A:218:PHE:H	1.77	0.48
1:B:149:LYS:HG2	1:B:256:LYS:HD2	1.95	0.48
1:A:234:PHE:O	1:A:240:ILE:HA	2.13	0.48
1:B:203:LYS:CE	1:B:230:ARG:HH22	2.27	0.48
1:A:206:LYS:NZ	1:A:207:GLU:HG2	2.29	0.47
1:A:140:VAL:HB	1:A:155:MET:CB	2.36	0.47
1:B:203:LYS:HG2	1:B:230:ARG:NH2	2.29	0.47
1:A:215:PRO:O	1:A:217:LYS:HE3	1.98	0.47
1:A:183:LEU:O	1:A:184:LYS:C	2.56	0.47
1:B:185:PHE:HA	1:B:188:ARG:HG2	1.95	0.47
1:A:161:SER:HA	1:A:164:LYS:HD2	1.97	0.47
1:B:153:PHE:CD1	1:B:153:PHE:N	2.83	0.47
1:A:191:ILE:HD12	1:A:191:ILE:HA	1.75	0.47
1:B:145:CYS:HA	1:B:150:CYS:HA	1.96	0.47
1:A:145:CYS:HA	1:A:150:CYS:HA	1.96	0.47
1:A:178:GLU:O	1:A:215:PRO:HG2	2.15	0.47
1:B:174:ILE:HG12	1:B:198:GLY:HA2	1.95	0.47
1:B:240:ILE:O	1:B:241:GLU:HB2	2.15	0.47
1:B:233:VAL:HA	1:B:242:ASP:HA	1.97	0.47
1:A:157:LYS:HG2	1:A:249:TYR:HA	1.95	0.46
1:B:185:PHE:HA	1:B:188:ARG:CG	2.44	0.46
1:A:256:LYS:HG3	1:A:257:LEU:N	2.30	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:206:LYS:HG3	1:A:207:GLU:N	2.30	0.46
1:B:234:PHE:CE2	1:B:236:SER:HB3	2.49	0.46
1:A:154:ILE:HB	1:A:251:CYS:HB2	1.97	0.46
1:A:160:TRP:N	1:A:245:CYS:O	2.49	0.46
1:A:239:ARG:HG2	1:A:239:ARG:HH11	1.81	0.46
1:B:208:TRP:CD1	1:B:228:LYS:CG	2.97	0.46
1:B:169:HIS:C	1:B:171:SER:N	2.73	0.46
1:B:213:ASN:OD1	1:B:218:LYS:HG3	2.15	0.46
1:B:157:LYS:H	1:B:250:TYR:HE2	1.63	0.46
1:B:175:VAL:HG22	1:B:176:LYS:H	1.79	0.46
1:B:183:LEU:HG	1:B:184:LYS:N	2.29	0.46
1:B:140:VAL:HB	1:B:155:MET:HB2	1.97	0.46
1:B:193:GLU:HG2	1:B:250:TYR:HE1	1.77	0.46
1:B:211:ILE:H	1:B:211:ILE:HG13	1.27	0.46
1:B:180:GLU:H	1:B:180:GLU:HG3	1.40	0.46
1:B:255:LYS:HG3	1:B:256:LYS:N	2.27	0.45
1:A:190:VAL:HG13	1:A:195:TYR:CE2	2.52	0.45
1:B:165:ALA:N	1:B:168:GLN:HE21	2.15	0.45
1:A:186:LEU:HD12	1:A:186:LEU:N	2.32	0.45
1:B:210:TRP:O	1:B:211:ILE:C	2.60	0.45
1:A:259:LYS:HB3	1:A:261:PRO:CD	2.26	0.45
1:B:175:VAL:CG1	1:B:197:ILE:HA	2.45	0.45
1:A:233:VAL:HA	1:A:241:GLU:O	2.17	0.45
1:B:222:LYS:O	1:B:222:LYS:NZ	2.49	0.45
1:B:143:TRP:HB3	1:B:152:TYR:CE1	2.52	0.45
1:B:151:TYR:HB2	1:B:153:PHE:CE1	2.51	0.45
1:B:165:ALA:O	1:B:168:GLN:HG2	2.17	0.45
1:B:187:GLN:HG2	1:B:236:SER:O	2.17	0.45
1:A:221:LYS:C	1:A:221:LYS:NZ	2.73	0.44
1:A:163:CYS:CB	1:A:174:ILE:HD13	2.47	0.44
1:A:199:LEU:CD2	1:A:233:VAL:HG11	2.46	0.44
1:A:247:ILE:HA	1:A:248:PRO:HD3	1.87	0.44
1:B:218:LYS:HD3	1:B:218:LYS:C	2.32	0.44
1:A:233:VAL:HA	1:A:242:ASP:HA	1.98	0.44
1:B:143:TRP:HB3	1:B:152:TYR:CD1	2.52	0.44
1:B:177:ILE:CG2	1:B:183:LEU:HA	2.47	0.44
1:B:234:PHE:O	1:B:240:ILE:HA	2.18	0.44
1:B:184:LYS:HD2	1:B:184:LYS:HA	1.74	0.44
1:B:173:PRO:O	1:B:253:CYS:HB3	2.17	0.43
1:A:169:HIS:ND1	1:A:170:TYR:CE1	2.85	0.43
1:A:190:VAL:HG13	1:A:191:ILE:O	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:220:ASP:C	1:B:221:MET:HG3	2.42	0.43
1:A:240:ILE:HD12	1:A:240:ILE:C	2.43	0.43
1:A:232:CYS:O	1:A:242:ASP:HA	2.18	0.43
1:B:190:VAL:HG13	1:B:191:ILE:O	2.19	0.43
1:B:202:ASP:O	1:B:205:LYS:O	2.35	0.43
1:A:160:TRP:HA	1:A:196:TRP:CD1	2.54	0.43
1:A:219:ASP:O	1:A:219:ASP:CG	2.61	0.43
1:B:210:TRP:C	1:B:212:ASP:N	2.76	0.43
1:A:190:VAL:CG2	1:A:195:TYR:CE2	3.02	0.43
1:B:142:TYR:CE2	1:B:153:PHE:HB2	2.53	0.43
1:B:235:LEU:C	1:B:235:LEU:CD2	2.92	0.43
1:B:255:LYS:HE3	1:B:255:LYS:HB2	1.74	0.43
1:A:182:GLU:O	1:A:183:LEU:C	2.62	0.42
1:B:176:LYS:NZ	1:B:218:LYS:HB3	2.34	0.42
1:A:175:VAL:HG12	1:A:197:ILE:HA	2.01	0.42
1:B:160:TRP:HB3	1:B:245:CYS:HB3	2.00	0.42
1:B:166:ASN:O	1:B:169:HIS:N	2.52	0.42
1:A:251:CYS:C	1:A:252:ILE:HG12	2.45	0.42
1:B:185:PHE:O	1:B:188:ARG:HG2	2.18	0.42
1:B:218:LYS:HE2	1:B:220:ASP:O	2.19	0.42
1:A:159:THR:O	1:A:160:TRP:C	2.63	0.42
1:B:196:TRP:CE2	1:B:249:TYR:HB2	2.54	0.42
1:A:180:GLU:O	1:A:181:ASP:C	2.62	0.42
1:A:236:SER:C	1:A:238:ALA:N	2.75	0.42
1:B:197:ILE:HD13	1:B:197:ILE:N	2.34	0.42
1:A:157:LYS:HG3	1:A:250:TYR:CZ	2.53	0.42
1:A:196:TRP:NE1	1:A:249:TYR:HB2	2.34	0.42
1:B:174:ILE:CG2	1:B:211:ILE:HD11	2.46	0.42
1:A:144:PHE:CZ	1:B:147:GLY:HA2	2.54	0.42
1:A:151:TYR:CD1	1:A:151:TYR:N	2.87	0.42
1:B:175:VAL:CB	1:B:252:ILE:O	2.60	0.42
1:A:157:LYS:HA	1:A:249:TYR:C	2.43	0.41
1:B:164:LYS:O	1:B:168:GLN:N	2.46	0.41
1:A:206:LYS:HZ1	1:A:207:GLU:HG2	1.85	0.41
1:A:210:TRP:O	1:A:211:ILE:HD12	2.20	0.41
1:A:259:LYS:HA	1:A:259:LYS:HZ2	1.84	0.41
1:A:184:LYS:O	1:A:188:ARG:HG2	2.20	0.41
1:B:159:THR:HB	1:B:245:CYS:O	2.20	0.41
1:B:203:LYS:CG	1:B:230:ARG:NH2	2.84	0.41
1:A:149:LYS:NZ	1:A:182:GLU:OE2	2.45	0.41
1:B:248:PRO:O	1:B:249:TYR:HD2	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:140:VAL:CB	1:A:155:MET:HB2	2.39	0.41
1:A:153:PHE:CD1	1:A:153:PHE:N	2.88	0.41
1:A:169:HIS:HD1	1:A:170:TYR:HE1	1.65	0.41
1:A:172:VAL:HG12	1:A:173:PRO:HD2	1.99	0.41
1:A:182:GLU:O	1:A:186:LEU:HD13	2.21	0.41
1:B:159:THR:HG22	1:B:246:ASN:O	2.21	0.41
1:B:167:CYS:O	1:B:168:GLN:C	2.63	0.41
1:B:199:LEU:HD11	1:B:208:TRP:HB3	2.02	0.41
1:B:190:VAL:CG2	1:B:195:TYR:CE2	3.02	0.41
1:B:175:VAL:CG2	1:B:176:LYS:N	2.80	0.40
1:A:143:TRP:HH2	1:B:257:LEU:HB3	1.85	0.40
1:B:158:THR:C	1:B:248:PRO:HA	2.46	0.40
1:B:191:ILE:HD13	1:B:191:ILE:HA	1.84	0.40
1:B:237:LYS:CD	1:B:237:LYS:N	2.77	0.40
1:A:184:LYS:O	1:A:185:PHE:C	2.63	0.40
1:A:255:LYS:HD3	1:A:256:LYS:O	2.22	0.40
1:B:146:TYR:O	1:B:147:GLY:C	2.63	0.40
1:B:197:ILE:HD13	1:B:197:ILE:H	1.86	0.40

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	111/127 (87%)	79 (71%)	21 (19%)	11 (10%)	0	2
1	B	107/127 (84%)	72 (67%)	24 (22%)	11 (10%)	0	2
All	All	218/254 (86%)	151 (69%)	45 (21%)	22 (10%)	0	2

All (22) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	204	LYS
1	A	243	THR
1	A	260	PHE
1	B	157	LYS
1	B	190	VAL
1	B	243	THR
1	A	157	LYS
1	A	211	ILE
1	A	218	PHE
1	B	161	SER
1	B	171	SER
1	A	244	ASP
1	B	192	PRO
1	B	230	ARG
1	A	217	LYS
1	B	160	TRP
1	A	192	PRO
1	B	170	TYR
1	B	252	ILE
1	A	215	PRO
1	A	248	PRO
1	B	177	ILE

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	105/115 (91%)	84 (80%)	21 (20%)	1	7
1	B	104/115 (90%)	81 (78%)	23 (22%)	1	5
All	All	209/230 (91%)	165 (79%)	44 (21%)	1	6

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	144	PHE
1	A	152	TYR

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Mol	Chain	Res	Type
1	A	154	ILE
1	A	158	THR
1	A	174	ILE
1	A	175	VAL
1	A	178	GLU
1	A	180	GLU
1	A	190	VAL
1	A	191	ILE
1	A	210	TRP
1	A	211	ILE
1	A	217	LYS
1	A	218	PHE
1	A	220	MET
1	A	221	LYS
1	A	229	SER
1	A	233	VAL
1	A	246	ASN
1	A	252	ILE
1	A	259	LYS
1	B	142	TYR
1	B	152	TYR
1	B	158	THR
1	B	174	ILE
1	B	177	ILE
1	B	178	GLU
1	B	179	ASP
1	B	180	GLU
1	B	190	VAL
1	B	191	ILE
1	B	197	ILE
1	B	207	GLU
1	B	211	ILE
1	B	218	LYS
1	B	221	MET
1	B	222	LYS
1	B	229	SER
1	B	233	VAL
1	B	237	LYS
1	B	246	ASN
1	B	255	LYS
1	B	257	LEU
1	B	259	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	166	ASN
1	A	168	GLN
1	A	187	GLN
1	B	166	ASN
1	B	168	GLN
1	B	189	HIS
1	B	246	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	115/127 (90%)	-1.41	0 100 100	28, 72, 109, 111	0
1	B	113/127 (88%)	-1.41	0 100 100	26, 72, 109, 123	0
All	All	228/254 (89%)	-1.41	0 100 100	26, 72, 109, 123	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.