



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 08:04 AM UTC

PDB ID : 2LJR / pdb_00002ljr
Title : GLUTATHIONE TRANSFERASE APO-FORM FROM HUMAN
Authors : Rossjohn, J.; Mckinstry, W.J.; Oakley, A.J.; Verger, D.; Flanagan, J.; Chelvanayagam, G.; Tan, K.L.; Board, P.G.; Parker, M.W.
Deposited on : 1998-03-08
Resolution : 3.20 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)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

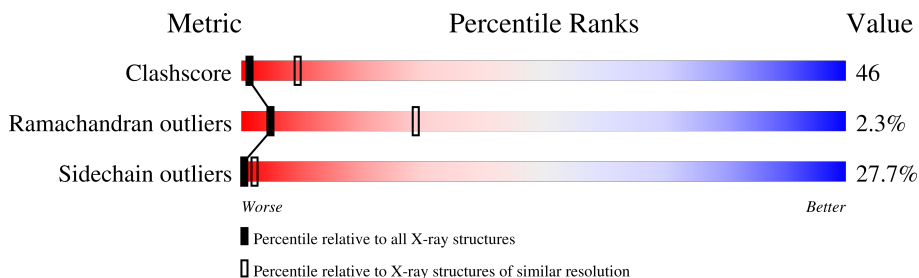
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.20 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))
Clashscore	190562	1573 (3.20-3.20)
Ramachandran outliers	187476	1548 (3.20-3.20)
Sidechain outliers	187428	1547 (3.20-3.20)

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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	244	
1	B	244	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 3882 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 GLUTATHIONE S-TRANSFERASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	244	Total	C	N	O	S	0	0	0
			1940	1253	331	348	8			
1	B	244	Total	C	N	O	S	0	0	0
			1940	1253	331	348	8			

- Molecule 2 is water.

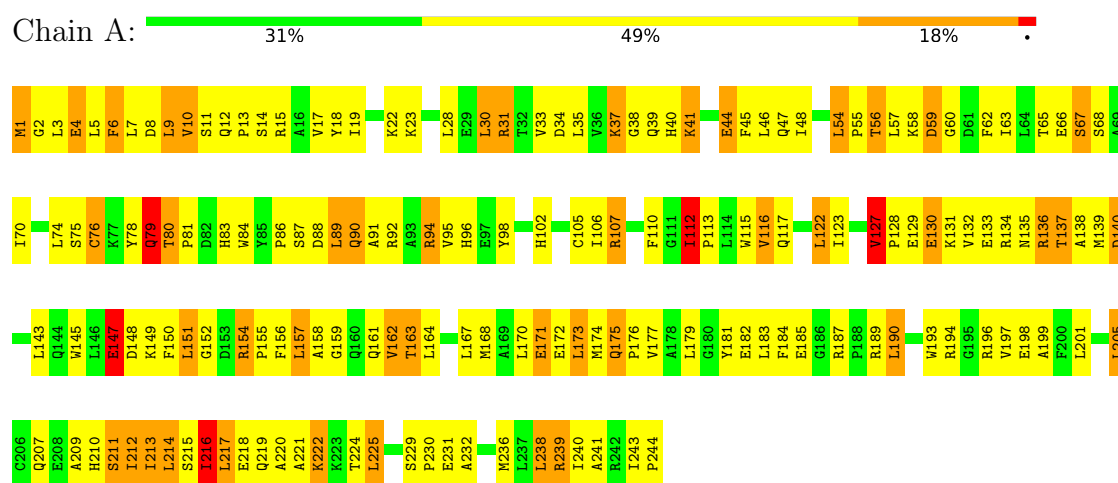
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	O	0	0
			1	1		
2	B	1	Total	O	0	0
			1	1		

3 Residue-property plots [i](#)

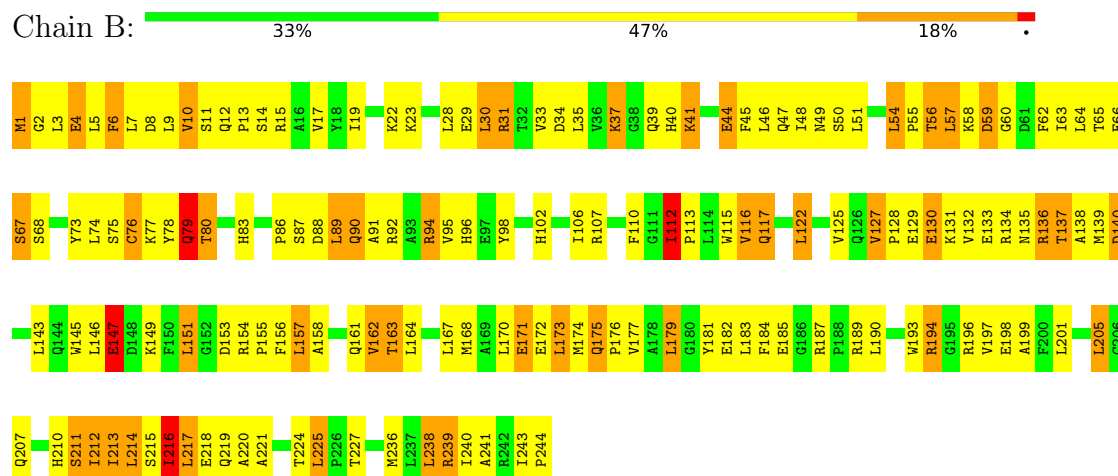
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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. 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.

Note EDS was not executed.

• Molecule 1: GLUTATHIONE S-TRANSFERASE



• Molecule 1: GLUTATHIONE S-TRANSFERASE



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	93.62Å 93.62Å 120.34Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	15.00 – 3.20	Depositor
% Data completeness (in resolution range)	89.2 (15.00-3.20)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.11	Depositor
Refinement program	X-PLOR 3.8	Depositor
R, R_{free}	0.200 , 0.291	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3882	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

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	0.51	0/1985	1.00	5/2692 (0.2%)
1	B	0.52	0/1985	1.00	4/2692 (0.1%)
All	All	0.52	0/3970	1.00	9/5384 (0.2%)

There are no bond length outliers.

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	10	VAL	N-CA-C	-6.24	104.22	113.39
1	B	10	VAL	N-CA-C	-6.14	104.37	113.39
1	B	112	ILE	CB-CA-C	-5.73	108.25	113.70
1	A	112	ILE	CB-CA-C	-5.63	108.35	113.70
1	A	127	VAL	N-CA-C	5.62	113.46	108.63
1	B	95	VAL	N-CA-C	-5.47	105.28	110.42
1	B	127	VAL	N-CA-C	5.26	113.16	108.63
1	A	105	CYS	N-CA-C	5.17	119.67	112.90
1	A	216	ILE	N-CA-C	5.06	119.86	109.34

There are no chirality outliers.

There are no planarity outliers.

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	1940	0	1978	182	0
1	B	1940	0	1978	187	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	1	0	0	0	0
2	B	1	0	0	1	0
All	All	3882	0	3956	362	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 46.

All (362) 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:133:GLU:HA	1:A:136:ARG:HD2	1.37	1.07
1:B:133:GLU:HA	1:B:136:ARG:HD2	1.38	1.05
1:B:147:GLU:HG3	1:B:190:LEU:HG	1.42	1.01
1:B:158:ALA:HB3	1:B:163:THR:HG21	1.44	0.97
1:A:33:VAL:HB	1:A:54:LEU:HD11	1.46	0.95
1:A:158:ALA:HB3	1:A:163:THR:HG21	1.48	0.94
1:B:12:GLN:HG2	1:B:13:PRO:HD3	1.50	0.94
1:B:33:VAL:HB	1:B:54:LEU:HD11	1.48	0.93
1:B:214:LEU:H	1:B:214:LEU:HD23	1.35	0.92
1:A:12:GLN:HG2	1:A:13:PRO:HD3	1.55	0.88
1:A:214:LEU:HD23	1:A:214:LEU:H	1.41	0.84
1:B:174:MET:HG3	1:B:210:HIS:NE2	1.93	0.82
1:B:193:TRP:HA	1:B:196:ARG:NH1	1.95	0.82
1:A:174:MET:HG3	1:A:210:HIS:NE2	1.95	0.81
1:B:107:ARG:HG3	1:B:107:ARG:HH11	1.45	0.81
1:A:107:ARG:HH11	1:A:107:ARG:HG3	1.46	0.79
1:B:210:HIS:HB3	1:B:214:LEU:HD21	1.62	0.79
1:B:143:LEU:HD11	1:B:183:LEU:HB3	1.66	0.78
1:B:158:ALA:HB3	1:B:163:THR:CG2	2.14	0.78
1:A:6:PHE:HA	1:A:31:ARG:O	1.84	0.77
1:A:143:LEU:HD11	1:A:183:LEU:HB3	1.67	0.77
1:A:220:ALA:HA	1:A:225:LEU:CD2	2.15	0.77
1:B:193:TRP:O	1:B:197:VAL:HG23	1.84	0.76
1:A:229:SER:HB2	1:A:231:GLU:OE1	1.86	0.76
1:A:210:HIS:HB3	1:A:214:LEU:HD21	1.68	0.74
1:A:145:TRP:O	1:A:149:LYS:HB3	1.88	0.74
1:B:6:PHE:HA	1:B:31:ARG:O	1.87	0.74
1:A:6:PHE:HD1	1:A:6:PHE:H	1.35	0.73
1:A:158:ALA:HB3	1:A:163:THR:CG2	2.16	0.73
1:B:145:TRP:O	1:B:149:LYS:HB3	1.88	0.73
1:B:6:PHE:HD1	1:B:6:PHE:H	1.36	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:12:GLN:HG2	1:B:13:PRO:CD	2.19	0.71
1:A:193:TRP:O	1:A:197:VAL:HG23	1.90	0.70
1:B:140:ASP:HA	1:B:143:LEU:HB2	1.71	0.70
1:A:182:GLU:HB3	1:A:185:GLU:HG2	1.74	0.69
1:A:196:ARG:O	1:A:199:ALA:HB3	1.93	0.69
1:A:90:GLN:HG3	1:B:62:PHE:CE1	2.28	0.68
1:B:213:ILE:O	1:B:216:ILE:HG22	1.94	0.68
1:A:106:ILE:HG22	1:A:172:GLU:HG2	1.75	0.68
1:A:210:HIS:O	1:A:212:ILE:N	2.28	0.67
1:A:128:PRO:O	1:A:132:VAL:HG23	1.94	0.67
1:A:214:LEU:H	1:A:214:LEU:CD2	2.07	0.67
1:A:131:LYS:HD3	1:A:243:ILE:HG22	1.74	0.67
1:B:182:GLU:HB3	1:B:185:GLU:HG2	1.76	0.67
1:B:214:LEU:H	1:B:214:LEU:CD2	2.04	0.67
1:A:149:LYS:HD2	1:A:149:LYS:O	1.94	0.67
1:B:92:ARG:HG2	1:B:96:HIS:CD2	2.30	0.66
1:A:12:GLN:HG2	1:A:13:PRO:CD	2.24	0.66
1:A:65:THR:O	1:A:66:GLU:HB2	1.95	0.66
1:B:161:GLN:O	1:B:163:THR:HG22	1.96	0.66
1:B:67:SER:HB2	1:B:168:MET:HE1	1.78	0.66
1:B:149:LYS:HD2	1:B:149:LYS:O	1.95	0.66
1:B:106:ILE:HG22	1:B:172:GLU:HG2	1.76	0.66
1:B:110:PHE:CD2	1:B:139:MET:HE3	2.31	0.65
1:A:140:ASP:HA	1:A:143:LEU:HB2	1.79	0.65
1:B:196:ARG:O	1:B:199:ALA:HB3	1.96	0.65
1:B:30:LEU:N	1:B:30:LEU:HD23	2.11	0.65
1:A:161:GLN:O	1:A:163:THR:HG22	1.96	0.65
1:B:217:LEU:O	1:B:220:ALA:HB3	1.97	0.65
1:B:194:ARG:HH11	1:B:198:GLU:CD	2.05	0.65
1:B:151:LEU:O	1:B:154:ARG:HG2	1.97	0.65
1:B:236:MET:O	1:B:240:ILE:HG13	1.96	0.64
1:B:7:LEU:HA	1:B:54:LEU:HD13	1.79	0.64
1:A:89:LEU:HD21	1:B:76:CYS:HB3	1.79	0.64
1:B:65:THR:O	1:B:66:GLU:HB2	1.97	0.64
1:B:1:MET:CE	1:B:3:LEU:HB2	2.28	0.63
1:B:8:ASP:HB3	1:B:35:LEU:CD1	2.28	0.63
1:A:6:PHE:CD1	1:A:6:PHE:N	2.66	0.63
1:B:67:SER:HB2	1:B:168:MET:CE	2.29	0.63
1:A:98:TYR:CE2	1:A:102:HIS:HB2	2.34	0.63
1:A:8:ASP:HB3	1:A:35:LEU:CD1	2.29	0.63
1:A:23:LYS:HE2	1:A:201:LEU:HA	1.80	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:187:ARG:HB3	1:A:190:LEU:HB2	1.80	0.62
1:B:6:PHE:CD1	1:B:6:PHE:N	2.66	0.62
1:B:23:LYS:HE2	1:B:201:LEU:HA	1.80	0.62
1:A:92:ARG:HG2	1:A:96:HIS:CD2	2.35	0.62
1:A:113:PRO:HB3	1:A:181:TYR:CE1	2.33	0.62
1:A:218:GLU:O	1:A:221:ALA:N	2.32	0.62
1:B:133:GLU:O	1:B:136:ARG:HG2	1.99	0.62
1:A:236:MET:O	1:A:240:ILE:HG13	2.00	0.61
1:A:217:LEU:O	1:A:220:ALA:HB3	2.01	0.61
1:B:129:GLU:HB3	1:B:130:GLU:OE2	2.00	0.61
1:B:83:HIS:CD2	1:B:162:VAL:HG12	2.35	0.61
1:B:131:LYS:HD3	1:B:243:ILE:HG22	1.82	0.61
1:A:107:ARG:HG3	1:A:107:ARG:NH1	2.13	0.61
1:B:33:VAL:HG13	1:B:39:GLN:HB3	1.82	0.61
1:B:210:HIS:O	1:B:212:ILE:N	2.34	0.61
1:A:6:PHE:HA	1:A:31:ARG:HB3	1.83	0.60
1:A:67:SER:HB2	1:A:168:MET:HE1	1.83	0.60
1:A:110:PHE:CD2	1:A:139:MET:HE3	2.36	0.60
1:A:175:GLN:HB3	1:A:176:PRO:HD3	1.83	0.60
1:A:7:LEU:HA	1:A:54:LEU:HD13	1.84	0.60
1:B:175:GLN:HB3	1:B:176:PRO:HD3	1.84	0.60
1:B:214:LEU:CD2	1:B:214:LEU:N	2.65	0.60
1:A:3:LEU:HD23	1:A:28:LEU:HD23	1.84	0.59
1:A:154:ARG:HG3	1:A:159:GLY:O	2.02	0.59
1:B:107:ARG:HG3	1:B:107:ARG:NH1	2.13	0.59
1:B:10:VAL:HA	1:B:213:ILE:HG22	1.84	0.59
1:A:133:GLU:O	1:A:134:ARG:C	2.45	0.59
1:A:170:LEU:O	1:A:170:LEU:HD12	2.02	0.59
1:B:128:PRO:O	1:B:132:VAL:HG23	2.02	0.59
1:B:14:SER:HA	1:B:55:PRO:HG3	1.84	0.59
1:A:232:ALA:O	1:A:236:MET:HG3	2.02	0.59
1:A:1:MET:O	1:A:3:LEU:N	2.36	0.58
1:B:1:MET:O	1:B:3:LEU:N	2.36	0.58
1:B:143:LEU:HD22	1:B:190:LEU:HD11	1.85	0.58
1:B:170:LEU:HD12	1:B:170:LEU:O	2.03	0.58
1:A:152:GLY:HA2	1:A:189:ARG:NH1	2.19	0.58
1:A:34:ASP:O	1:A:39:GLN:HB2	2.02	0.58
1:B:193:TRP:HA	1:B:196:ARG:HH12	1.67	0.58
1:A:10:VAL:HA	1:A:213:ILE:HG22	1.85	0.58
1:A:147:GLU:OE2	1:A:189:ARG:HB2	2.03	0.58
1:A:173:LEU:O	1:A:176:PRO:HD2	2.03	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:30:LEU:N	1:A:30:LEU:HD23	2.19	0.58
1:A:135:ASN:O	1:A:138:ALA:HB3	2.05	0.57
1:A:187:ARG:HG2	1:A:187:ARG:HH11	1.69	0.57
1:A:83:HIS:CD2	1:A:162:VAL:HG12	2.39	0.57
1:B:5:LEU:O	1:B:7:LEU:HD22	2.05	0.57
1:B:98:TYR:CE2	1:B:102:HIS:HB2	2.40	0.57
1:A:116:VAL:HA	1:A:127:VAL:HG21	1.85	0.57
1:B:34:ASP:O	1:B:39:GLN:HB2	2.05	0.56
1:A:10:VAL:HG22	1:A:212:ILE:HG22	1.87	0.56
1:A:224:THR:HG22	1:A:224:THR:O	2.04	0.56
1:B:173:LEU:O	1:B:176:PRO:HD2	2.05	0.56
1:A:112:ILE:HD13	1:A:243:ILE:HG12	1.88	0.56
1:B:6:PHE:HA	1:B:31:ARG:HB3	1.88	0.56
1:A:14:SER:HA	1:A:55:PRO:HG3	1.87	0.56
1:B:155:PRO:HG2	1:B:156:PHE:HD1	1.71	0.56
1:A:122:LEU:HD22	1:A:122:LEU:O	2.05	0.56
1:B:3:LEU:HD23	1:B:28:LEU:HD23	1.88	0.56
1:B:34:ASP:HB3	1:B:37:LYS:HB3	1.88	0.56
1:A:67:SER:HB2	1:A:168:MET:CE	2.37	0.55
1:A:213:ILE:O	1:A:216:ILE:HG22	2.05	0.55
1:B:218:GLU:O	1:B:221:ALA:N	2.39	0.55
1:A:177:VAL:HA	1:A:181:TYR:O	2.06	0.55
1:B:45:PHE:CZ	1:B:56:THR:HG21	2.41	0.55
1:A:134:ARG:NH1	1:A:244:PRO:O	2.39	0.55
1:B:113:PRO:HB3	1:B:181:TYR:CE1	2.41	0.55
1:A:34:ASP:HB3	1:A:37:LYS:HB3	1.89	0.55
1:A:62:PHE:CE1	1:B:90:GLN:HG3	2.41	0.55
1:A:133:GLU:O	1:A:136:ARG:HG2	2.06	0.55
1:A:211:SER:OG	1:A:212:ILE:N	2.37	0.55
1:A:75:SER:HA	1:A:80:THR:OG1	2.08	0.54
1:B:187:ARG:HD3	1:B:190:LEU:HD12	1.90	0.54
1:A:214:LEU:CD2	1:A:214:LEU:N	2.70	0.54
1:B:187:ARG:HG2	1:B:187:ARG:HH11	1.73	0.54
1:A:76:CYS:HB3	1:B:89:LEU:HD21	1.89	0.53
1:B:15:ARG:O	1:B:19:ILE:HG13	2.08	0.53
1:A:175:GLN:O	1:A:179:LEU:HD23	2.08	0.53
1:B:147:GLU:OE2	1:B:189:ARG:HB2	2.08	0.53
1:A:10:VAL:HG22	1:A:212:ILE:CG2	2.38	0.53
1:B:155:PRO:O	1:B:196:ARG:NH1	2.42	0.53
1:A:218:GLU:O	1:A:219:GLN:C	2.51	0.53
1:B:13:PRO:O	1:B:17:VAL:HG23	2.07	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:215:SER:OG	1:A:216:ILE:N	2.41	0.53
1:B:133:GLU:O	1:B:134:ARG:C	2.51	0.53
1:B:10:VAL:HG22	1:B:212:ILE:HG22	1.91	0.53
1:B:211:SER:OG	1:B:212:ILE:N	2.41	0.53
1:A:45:PHE:CZ	1:A:56:THR:HG21	2.44	0.52
1:A:210:HIS:HB3	1:A:214:LEU:CD2	2.39	0.52
1:B:45:PHE:HZ	1:B:56:THR:CG2	2.22	0.52
1:B:174:MET:HE2	1:B:210:HIS:CD2	2.44	0.52
1:A:15:ARG:HB2	1:A:171:GLU:HG3	1.91	0.52
1:B:11:SER:HB3	1:B:14:SER:OG	2.08	0.52
1:A:149:LYS:HD2	1:A:149:LYS:C	2.34	0.52
1:B:116:VAL:HG12	1:B:117:GLN:NE2	2.25	0.52
1:A:5:LEU:O	1:A:7:LEU:HD22	2.10	0.51
1:A:211:SER:N	1:A:214:LEU:HD21	2.26	0.51
1:B:218:GLU:O	1:B:219:GLN:C	2.53	0.51
1:B:75:SER:HA	1:B:80:THR:OG1	2.11	0.51
1:A:130:GLU:O	1:A:131:LYS:C	2.54	0.51
1:B:45:PHE:HZ	1:B:56:THR:HG21	1.75	0.51
1:B:154:ARG:HB2	1:B:155:PRO:HD2	1.92	0.51
1:A:33:VAL:HG13	1:A:39:GLN:HB3	1.92	0.51
1:B:1:MET:HE1	1:B:3:LEU:HB2	1.93	0.51
1:B:214:LEU:HD23	1:B:214:LEU:N	2.14	0.51
1:A:4:GLU:OE1	1:A:31:ARG:NH2	2.44	0.50
1:B:1:MET:HE3	1:B:3:LEU:HB2	1.91	0.50
1:B:122:LEU:O	1:B:122:LEU:HD22	2.12	0.50
1:B:177:VAL:HA	1:B:181:TYR:O	2.11	0.50
1:B:187:ARG:HB3	1:B:190:LEU:HB2	1.92	0.50
1:A:13:PRO:O	1:A:17:VAL:HG23	2.11	0.50
1:B:149:LYS:HD2	1:B:149:LYS:C	2.36	0.50
1:A:19:ILE:HG23	1:A:205:LEU:HD13	1.92	0.50
1:A:45:PHE:HZ	1:A:56:THR:CG2	2.24	0.50
1:B:112:ILE:HD13	1:B:243:ILE:HG12	1.94	0.50
1:A:11:SER:C	1:A:13:PRO:HD2	2.37	0.49
1:A:163:THR:O	1:A:164:LEU:C	2.56	0.49
1:A:90:GLN:O	1:A:94:ARG:HG2	2.13	0.49
1:A:210:HIS:CB	1:A:214:LEU:HD21	2.38	0.49
1:B:15:ARG:HB2	1:B:171:GLU:HG3	1.95	0.49
1:B:135:ASN:O	1:B:138:ALA:HB3	2.13	0.49
1:A:88:ASP:HB3	1:A:91:ALA:HB3	1.95	0.49
1:A:6:PHE:CE2	1:A:48:ILE:HD13	2.47	0.48
1:A:89:LEU:HD13	1:B:73:TYR:CE1	2.48	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:116:VAL:HG22	1:B:127:VAL:HB	1.95	0.48
1:B:174:MET:O	1:B:177:VAL:HB	2.12	0.48
1:A:98:TYR:CZ	1:A:102:HIS:HB2	2.48	0.48
1:A:78:TYR:O	1:A:79:GLN:C	2.56	0.48
1:B:10:VAL:HG22	1:B:212:ILE:CG2	2.44	0.48
1:B:41:LYS:HA	1:B:46:LEU:HD21	1.96	0.48
1:A:218:GLU:C	1:A:220:ALA:N	2.69	0.48
1:B:211:SER:N	1:B:214:LEU:HD21	2.29	0.48
1:A:41:LYS:HA	1:A:46:LEU:HD21	1.95	0.48
1:B:210:HIS:CB	1:B:214:LEU:HD21	2.38	0.48
1:A:11:SER:HB3	1:A:14:SER:OG	2.14	0.47
1:B:88:ASP:HB3	1:B:91:ALA:HB3	1.96	0.47
1:A:106:ILE:CG2	1:A:172:GLU:HG2	2.43	0.47
1:B:78:TYR:O	1:B:79:GLN:C	2.57	0.47
1:B:147:GLU:O	1:B:151:LEU:HB3	2.14	0.47
1:B:19:ILE:CG2	1:B:167:LEU:HD11	2.45	0.47
1:B:130:GLU:OE2	1:B:130:GLU:N	2.48	0.47
1:B:134:ARG:NH1	1:B:244:PRO:O	2.47	0.47
1:A:183:LEU:O	1:A:187:ARG:HD2	2.14	0.47
1:B:130:GLU:O	1:B:131:LYS:C	2.56	0.47
1:B:163:THR:O	1:B:164:LEU:C	2.57	0.47
1:B:194:ARG:NH1	1:B:198:GLU:OE2	2.47	0.47
1:B:224:THR:O	1:B:224:THR:CG2	2.62	0.47
1:A:133:GLU:O	1:A:137:THR:HG23	2.15	0.47
1:A:78:TYR:O	1:A:80:THR:N	2.48	0.47
1:A:38:GLY:CA	1:A:232:ALA:HB2	2.45	0.47
1:A:112:ILE:HG12	1:A:239:ARG:HH22	1.79	0.47
1:A:12:GLN:N	1:A:13:PRO:HD2	2.29	0.46
1:A:140:ASP:N	1:A:140:ASP:OD1	2.46	0.46
1:B:218:GLU:C	1:B:220:ALA:N	2.70	0.46
1:A:115:TRP:CZ2	1:A:239:ARG:HG2	2.51	0.46
1:A:174:MET:HE2	1:A:210:HIS:CD2	2.50	0.46
1:B:4:GLU:OE1	1:B:31:ARG:NH2	2.49	0.46
1:B:78:TYR:O	1:B:80:THR:N	2.48	0.46
1:B:112:ILE:CD1	1:B:239:ARG:NH2	2.79	0.46
1:B:133:GLU:O	1:B:137:THR:HG23	2.15	0.46
1:B:213:ILE:CD1	1:B:214:LEU:HD22	2.46	0.46
1:A:45:PHE:HZ	1:A:56:THR:HG21	1.81	0.46
1:A:136:ARG:HG2	1:A:137:THR:H	1.80	0.46
1:A:155:PRO:HG2	1:A:156:PHE:HD1	1.81	0.46
1:B:130:GLU:N	1:B:130:GLU:CD	2.72	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:238:LEU:O	1:B:241:ALA:N	2.48	0.46
1:A:193:TRP:O	1:A:196:ARG:HB3	2.16	0.46
1:B:184:PHE:CE2	1:B:194:ARG:HB2	2.50	0.46
1:B:215:SER:OG	1:B:216:ILE:N	2.48	0.46
1:B:7:LEU:CA	1:B:54:LEU:HD13	2.43	0.46
1:B:106:ILE:CG2	1:B:172:GLU:HG2	2.44	0.46
1:B:112:ILE:HB	1:B:113:PRO:HD3	1.97	0.46
1:B:1:MET:HE1	1:B:3:LEU:HD13	1.97	0.46
1:B:11:SER:C	1:B:13:PRO:HD2	2.41	0.46
1:B:30:LEU:N	1:B:30:LEU:CD2	2.79	0.46
1:B:220:ALA:HA	1:B:225:LEU:HD22	1.97	0.46
1:A:19:ILE:CG2	1:A:167:LEU:HD11	2.46	0.45
1:A:4:GLU:OE1	1:A:31:ARG:CZ	2.65	0.45
1:B:12:GLN:N	1:B:13:PRO:HD2	2.30	0.45
1:A:8:ASP:OD1	1:A:10:VAL:HG23	2.15	0.45
1:A:220:ALA:HA	1:A:225:LEU:HD22	1.97	0.45
1:B:112:ILE:HG12	1:B:239:ARG:HH22	1.80	0.45
1:A:136:ARG:HG2	1:A:137:THR:N	2.31	0.45
1:A:70:ILE:O	1:A:74:LEU:HD13	2.17	0.45
1:B:83:HIS:O	1:B:86:PRO:HD3	2.17	0.45
1:A:9:LEU:HD13	1:A:209:ALA:O	2.17	0.45
1:A:187:ARG:HG2	1:A:187:ARG:NH1	2.31	0.45
1:B:210:HIS:HB3	1:B:214:LEU:CD2	2.40	0.45
1:A:151:LEU:O	1:A:152:GLY:C	2.60	0.45
1:A:174:MET:O	1:A:177:VAL:HB	2.16	0.44
1:B:102:HIS:CD2	1:B:106:ILE:HB	2.52	0.44
1:B:158:ALA:CB	1:B:163:THR:HG21	2.30	0.44
1:A:3:LEU:HD12	1:A:59:ASP:HB2	2.00	0.44
1:A:8:ASP:HB3	1:A:35:LEU:HD11	1.97	0.44
1:A:147:GLU:O	1:A:151:LEU:HB3	2.17	0.44
1:B:15:ARG:NH1	1:B:213:ILE:HG21	2.33	0.44
1:A:75:SER:HA	1:A:80:THR:HG1	1.83	0.44
1:B:146:LEU:HD11	1:B:157:LEU:HD22	1.98	0.44
1:B:155:PRO:HG2	1:B:156:PHE:CD1	2.51	0.44
1:B:197:VAL:O	1:B:198:GLU:C	2.61	0.44
1:A:3:LEU:HD22	1:A:78:TYR:OH	2.18	0.44
1:A:184:PHE:CE2	1:A:190:LEU:HD13	2.53	0.44
1:B:58:LYS:HE3	1:B:60:GLY:O	2.18	0.44
1:B:143:LEU:HD22	1:B:190:LEU:CD1	2.48	0.44
1:A:143:LEU:HD23	1:A:143:LEU:HA	1.77	0.44
1:B:35:LEU:HD21	1:B:54:LEU:HD12	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:64:LEU:HG	1:B:65:THR:N	2.33	0.44
1:B:8:ASP:HB3	1:B:35:LEU:HD11	1.98	0.43
1:B:19:ILE:HG21	1:B:167:LEU:HD11	2.00	0.43
1:A:210:HIS:O	1:A:211:SER:C	2.61	0.43
1:B:6:PHE:CE2	1:B:48:ILE:HD13	2.53	0.43
1:B:35:LEU:HD21	1:B:54:LEU:CG	2.47	0.43
1:B:185:GLU:OE1	1:B:185:GLU:HA	2.18	0.43
1:B:224:THR:O	1:B:224:THR:HG22	2.18	0.43
1:A:185:GLU:OE1	1:A:185:GLU:HA	2.17	0.43
1:A:230:PRO:HD2	1:A:231:GLU:OE1	2.18	0.43
1:B:115:TRP:CZ2	1:B:239:ARG:HG2	2.53	0.43
1:B:127:VAL:HG13	1:B:128:PRO:HD2	1.99	0.43
1:A:220:ALA:HA	1:A:225:LEU:HD23	1.96	0.43
1:B:128:PRO:HB2	1:B:131:LYS:HG3	2.00	0.43
1:B:213:ILE:HD13	1:B:214:LEU:CD2	2.49	0.43
1:B:75:SER:HA	1:B:80:THR:HG1	1.83	0.43
1:B:136:ARG:HG2	1:B:137:THR:H	1.84	0.43
1:B:183:LEU:O	1:B:187:ARG:HD2	2.19	0.43
1:A:197:VAL:O	1:A:198:GLU:C	2.60	0.42
1:A:83:HIS:CG	1:A:84:TRP:N	2.87	0.42
1:A:218:GLU:HG2	1:A:222:LYS:HD2	2.01	0.42
1:B:171:GLU:O	1:B:174:MET:HB2	2.19	0.42
1:A:89:LEU:HD11	1:B:77:LYS:HB2	2.02	0.42
1:B:140:ASP:OD1	1:B:140:ASP:N	2.53	0.42
1:A:35:LEU:HD21	1:A:54:LEU:HD12	2.01	0.42
1:B:90:GLN:O	1:B:94:ARG:HG2	2.19	0.42
1:A:15:ARG:O	1:A:19:ILE:HG13	2.20	0.42
1:A:83:HIS:O	1:A:86:PRO:HD3	2.20	0.42
1:A:58:LYS:HE3	1:A:60:GLY:O	2.20	0.42
1:A:112:ILE:HB	1:A:113:PRO:HD3	2.02	0.42
1:A:89:LEU:HD13	1:B:73:TYR:CD1	2.55	0.42
1:A:95:VAL:O	1:A:96:HIS:C	2.62	0.42
1:A:127:VAL:HG12	1:A:128:PRO:HD2	2.00	0.42
1:B:19:ILE:HG23	1:B:205:LEU:HD13	2.02	0.42
1:B:154:ARG:HB2	1:B:155:PRO:CD	2.50	0.42
1:A:162:VAL:C	1:A:163:THR:HG22	2.45	0.41
1:B:3:LEU:HD12	1:B:59:ASP:HB2	2.02	0.41
1:B:4:GLU:OE1	1:B:31:ARG:CZ	2.68	0.41
1:B:175:GLN:O	1:B:179:LEU:HD22	2.20	0.41
1:B:198:GLU:O	1:B:199:ALA:C	2.63	0.41
1:A:17:VAL:O	1:A:18:TYR:C	2.63	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:4:GLU:HA	1:B:29:GLU:HB2	2.01	0.41
1:B:155:PRO:C	1:B:156:PHE:CD1	2.98	0.41
1:A:112:ILE:CD1	1:A:239:ARG:NH2	2.83	0.41
1:A:30:LEU:N	1:A:30:LEU:CD2	2.84	0.41
1:A:115:TRP:CE2	1:A:239:ARG:HG2	2.55	0.41
1:A:157:LEU:H	1:A:157:LEU:HG	1.60	0.41
1:A:198:GLU:O	1:A:199:ALA:C	2.62	0.41
1:B:157:LEU:H	1:B:157:LEU:HG	1.64	0.41
1:B:189:ARG:NH1	1:B:189:ARG:HG3	2.35	0.41
1:A:116:VAL:HA	1:A:127:VAL:CG2	2.50	0.41
1:A:130:GLU:N	1:A:130:GLU:CD	2.78	0.41
1:A:148:ASP:HA	1:A:189:ARG:NH1	2.35	0.41
1:B:49:ASN:C	1:B:51:LEU:N	2.78	0.41
1:B:136:ARG:HG2	1:B:137:THR:N	2.36	0.41
1:A:7:LEU:CA	1:A:54:LEU:HD13	2.50	0.41
1:A:238:LEU:O	1:A:241:ALA:N	2.52	0.41
1:A:44:GLU:O	1:A:47:GLN:HB2	2.21	0.41
1:A:81:PRO:HB2	1:A:83:HIS:CE1	2.55	0.41
1:B:98:TYR:CZ	1:B:102:HIS:HB2	2.55	0.41
1:B:238:LEU:O	1:B:239:ARG:C	2.64	0.41
1:A:19:ILE:HG21	1:A:167:LEU:HD11	2.02	0.41
1:A:170:LEU:HD12	1:A:170:LEU:C	2.42	0.41
1:B:44:GLU:H	1:B:44:GLU:HG2	1.45	0.41
1:B:136:ARG:HH21	1:B:181:TYR:HE2	1.68	0.41
1:B:187:ARG:HG2	1:B:187:ARG:NH1	2.34	0.41
1:A:40:HIS:ND1	1:A:40:HIS:N	2.68	0.41
1:A:130:GLU:N	1:A:130:GLU:OE2	2.54	0.41
1:A:133:GLU:HA	1:A:136:ARG:CD	2.28	0.41
1:A:149:LYS:HG3	1:A:150:PHE:CD1	2.56	0.41
1:A:1:MET:HE2	1:A:3:LEU:CB	2.51	0.41
1:B:40:HIS:ND1	1:B:40:HIS:N	2.67	0.41
1:B:170:LEU:HD12	1:B:170:LEU:C	2.44	0.41
1:A:213:ILE:CD1	1:A:214:LEU:HD22	2.51	0.40
1:B:205:LEU:HD23	1:B:205:LEU:HA	1.83	0.40
1:A:44:GLU:H	1:A:44:GLU:HG2	1.48	0.40
1:A:127:VAL:H	1:A:127:VAL:HG23	1.63	0.40
1:A:8:ASP:HB3	1:A:35:LEU:HD12	2.04	0.40
1:A:40:HIS:O	1:A:45:PHE:HD2	2.04	0.40
1:A:74:LEU:O	1:A:75:SER:C	2.63	0.40
1:B:5:LEU:HD13	1:B:57:LEU:HB2	2.04	0.40
1:B:49:ASN:O	1:B:50:SER:C	2.65	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:239:ARG:NH1	2:B:245:HOH:O	2.54	0.40
1:A:158:ALA:CB	1:A:163:THR:HG21	2.34	0.40
1:A:171:GLU:OE1	1:A:171:GLU:HA	2.17	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	242/244 (99%)	187 (77%)	50 (21%)	5 (2%)	5	31
1	B	242/244 (99%)	188 (78%)	48 (20%)	6 (2%)	4	27
All	All	484/488 (99%)	375 (78%)	98 (20%)	11 (2%)	5	29

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	79	GLN
1	A	211	SER
1	B	79	GLN
1	B	211	SER
1	A	2	GLY
1	A	147	GLU
1	A	216	ILE
1	B	2	GLY
1	B	147	GLU
1	B	216	ILE
1	B	74	LEU

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	206/206 (100%)	148 (72%)	58 (28%)	0	2
1	B	206/206 (100%)	150 (73%)	56 (27%)	0	2
All	All	412/412 (100%)	298 (72%)	114 (28%)	0	2

All (114) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET
1	A	4	GLU
1	A	6	PHE
1	A	9	LEU
1	A	22	LYS
1	A	30	LEU
1	A	31	ARG
1	A	37	LYS
1	A	41	LYS
1	A	44	GLU
1	A	54	LEU
1	A	56	THR
1	A	57	LEU
1	A	59	ASP
1	A	63	ILE
1	A	67	SER
1	A	68	SER
1	A	76	CYS
1	A	79	GLN
1	A	80	THR
1	A	87	SER
1	A	89	LEU
1	A	90	GLN
1	A	94	ARG
1	A	107	ARG
1	A	112	ILE
1	A	116	VAL

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Mol	Chain	Res	Type
1	A	117	GLN
1	A	122	LEU
1	A	123	ILE
1	A	127	VAL
1	A	129	GLU
1	A	130	GLU
1	A	136	ARG
1	A	137	THR
1	A	140	ASP
1	A	147	GLU
1	A	151	LEU
1	A	154	ARG
1	A	157	LEU
1	A	162	VAL
1	A	163	THR
1	A	171	GLU
1	A	173	LEU
1	A	175	GLN
1	A	190	LEU
1	A	194	ARG
1	A	205	LEU
1	A	207	GLN
1	A	212	ILE
1	A	213	ILE
1	A	214	LEU
1	A	216	ILE
1	A	217	LEU
1	A	222	LYS
1	A	225	LEU
1	A	238	LEU
1	A	239	ARG
1	B	1	MET
1	B	4	GLU
1	B	6	PHE
1	B	9	LEU
1	B	22	LYS
1	B	30	LEU
1	B	31	ARG
1	B	37	LYS
1	B	41	LYS
1	B	44	GLU
1	B	47	GLN

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Mol	Chain	Res	Type
1	B	54	LEU
1	B	56	THR
1	B	57	LEU
1	B	59	ASP
1	B	63	ILE
1	B	67	SER
1	B	68	SER
1	B	76	CYS
1	B	79	GLN
1	B	80	THR
1	B	87	SER
1	B	89	LEU
1	B	90	GLN
1	B	94	ARG
1	B	112	ILE
1	B	116	VAL
1	B	117	GLN
1	B	122	LEU
1	B	125	VAL
1	B	130	GLU
1	B	136	ARG
1	B	137	THR
1	B	140	ASP
1	B	147	GLU
1	B	151	LEU
1	B	153	ASP
1	B	157	LEU
1	B	162	VAL
1	B	163	THR
1	B	171	GLU
1	B	173	LEU
1	B	175	GLN
1	B	179	LEU
1	B	194	ARG
1	B	205	LEU
1	B	207	GLN
1	B	212	ILE
1	B	213	ILE
1	B	214	LEU
1	B	216	ILE
1	B	217	LEU
1	B	225	LEU

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Mol	Chain	Res	Type
1	B	227	THR
1	B	238	LEU
1	B	239	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	83	HIS
1	A	96	HIS
1	A	102	HIS
1	A	141	GLN
1	A	144	GLN
1	A	160	GLN
1	A	207	GLN
1	B	83	HIS
1	B	96	HIS
1	B	102	HIS
1	B	117	GLN
1	B	141	GLN
1	B	144	GLN
1	B	207	GLN

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

6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.