WORLDWIDE PDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Jun 11, 2024 – 06:21 PM EDT

PDB ID	:	1L7D
Title	:	Crystal Structure of R. rubrum Transhydrogenase Domain I without Bound NAD(H)
Authors	:	Prasad, G.S.; Wahlberg, M.; Sridhar, V.; Yamaguchi, M.; Hatefi, Y.; Stout, C.D.
Deposited on	:	2002-03-14
Resolution	:	1.81 Å(reported)

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

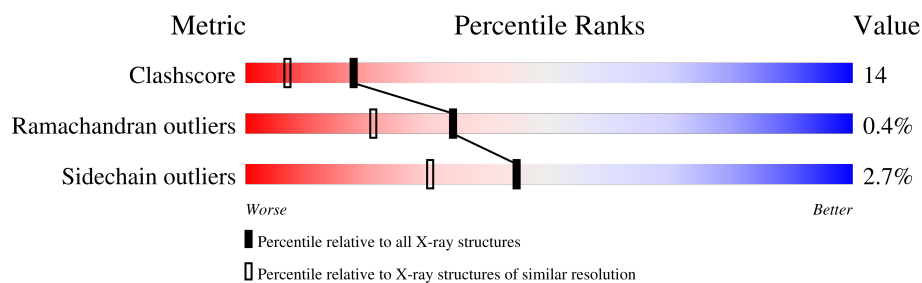|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 1.81 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	Percentile Ranks	Value
Clashscore		14
Ramachandran outliers		0.4%
Sidechain outliers		2.7%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	8401 (1.84-1.80)
Ramachandran outliers	138981	8290 (1.84-1.80)
Sidechain outliers	138945	8290 (1.84-1.80)

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 <=5%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	384	70% 20% •• 8%
1	B	384	73% 19% • 7%
1	C	384	69% 20% • 8%
1	D	384	70% 21% • 8%

2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 11344 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 nicotinamide nucleotide Transhydrogenase, subunit alpha 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	354	Total	C	N	O	S	0	0	0
			2589	1638	448	487	16			
1	B	358	Total	C	N	O	S	0	0	0
			2620	1656	454	494	16			
1	C	355	Total	C	N	O	S	0	0	0
			2604	1648	451	489	16			
1	D	353	Total	C	N	O	S	0	0	0
			2592	1640	449	487	16			

- Molecule 2 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	184	Total	O	0	0
			184	184		
2	B	243	Total	O	0	0
			243	243		
2	C	291	Total	O	0	0
			291	291		
2	D	221	Total	O	0	0
			221	221		

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. 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.
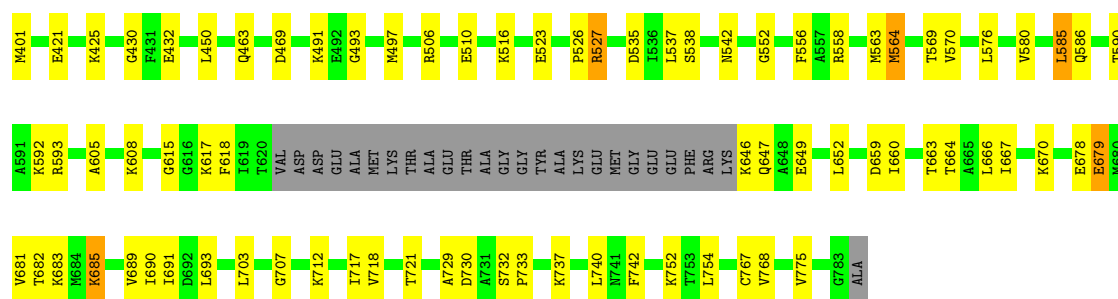
Note EDS was not executed.

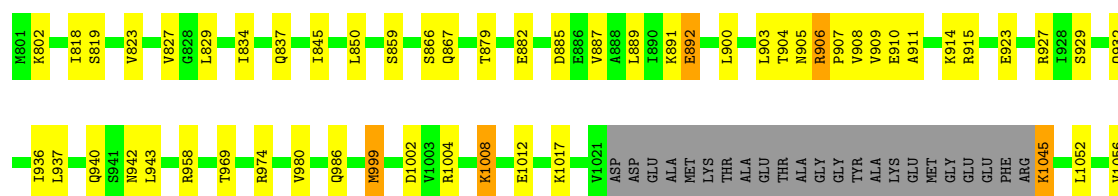• Molecule 1: nicotinamide nucleotide Transhydrogenase, subunit alpha 1

Chain A:
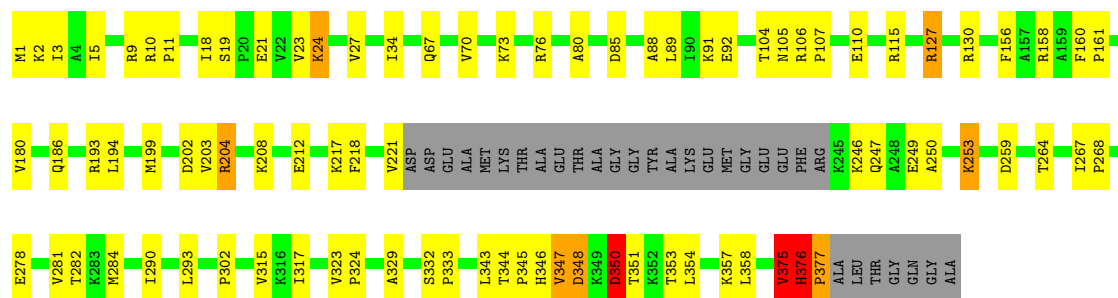
• Molecule 1: nicotinamide nucleotide Transhydrogenase, subunit alpha 1

Chain B:

• Molecule 1: nicotinamide nucleotide Transhydrogenase, subunit alpha 1

Chain C:

T1063 G1069 K1070 T1077 E1078 E1079 M1080 V1081 T1082 I1091 D1092 L1093 N1100 L1103 K1112 H1113 I1117 V1118 G1119 H1120 T1121 S1132 P1133 L1143 T1144 V1147 D1148 K1149 D1150 T1151 K1152 K1157 L1158 E1159 V1168 I1174 V1175 H1176 P1177 A1178 LEU THR GLY GLN GLY ALA

• Molecule 1: nicotinamide nucleotide Transhydrogenase, subunit alpha 1

Chain D:

70%　　　　21%　　•　8%

M1201 K1202 I1203 R1209 I1218 S1219 V1223 G1230 F1231 E1232 L1250 W1272 M1278 E1286 L1289 L1300 N1305 R1306 P1307 V1308 V1309 E1310 A1311 L1312 T1313 K1314 A1319 I1336 L1337 Y1346 I1350 F1356 A1357 R1358 M1363 M1364 T1369 V1370 V1375 V1380

Q1386 R1393 M1399 D1402 V1403 R1404 T1407 K1408 E1409 Q1410 V1411 E1412 K1417 F1418 I1419 T1420 VAL ASP ASP GLU ALA MET LYS THR ALA GLU THR ALA GLY GLY TYR ALA LYS GLU MET GLY GLU GLU PHE ARG K1445 L1452 V1456 D1459 I1460 T1464 A1465 L1475 I1476

T1477 E1478 E1479 T1482 K1483 M1484 K1485 S1488 L1493 P1502 L1503 K1512 V1523 P1524 A1529 S1532 P1533 D1548 K1549 D1550 T1551 K1552 T1553 L1554 K1557 L1558 E1559 V1568 D1571 G1572 A1573 I1574 V1575 H1576 P1577 ALA LEU THR GLY GLN GLY ALA

4 Data and refinement statistics (i)

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

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	66.96Å 117.13Å 94.23Å 90.00° 108.26° 90.00°	Depositor
Resolution (Å)	50.00 – 1.81	Depositor
% Data completeness (in resolution range)	(Not available) (50.00-1.81)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.08	Depositor
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.220 , 0.262	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	11344	wwPDB-VP
Average B, all atoms (Å^2)	23.0	wwPDB-VP

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	0.49	4/2623 (0.2%)	0.76	8/3560 (0.2%)
1	B	0.32	0/2654	0.62	1/3600 (0.0%)
1	C	0.37	2/2638 (0.1%)	0.69	5/3578 (0.1%)
1	D	0.35	1/2626 (0.0%)	0.66	4/3561 (0.1%)
All	All	0.38	7/10541 (0.1%)	0.69	18/14299 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	3	6
1	B	1	0
All	All	4	6

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	348	ASP	CA-C	-10.05	1.26	1.52
1	A	348	ASP	C-N	8.76	1.54	1.34
1	A	377	PRO	N-CD	6.40	1.56	1.47
1	C	1150	ASP	C-N	5.68	1.47	1.34
1	A	347	VAL	C-N	-5.62	1.21	1.34
1	C	1147	VAL	C-N	-5.30	1.21	1.34
1	D	1577	PRO	N-CD	5.17	1.55	1.47

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	348	ASP	CA-C-N	-10.66	93.76	117.20
1	A	348	ASP	O-C-N	9.64	138.13	122.70
1	D	1576	HIS	C-N-CD	9.34	148.01	128.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	377	PRO	CA-N-CD	-8.41	99.72	111.50
1	C	1150	ASP	O-C-N	7.55	134.78	122.70
1	A	376	HIS	C-N-CD	7.53	144.21	128.40
1	C	1150	ASP	CB-CG-OD1	7.07	124.66	118.30
1	A	377	PRO	N-CA-CB	6.76	111.42	103.30
1	D	1577	PRO	CA-N-CD	-6.17	102.86	111.50
1	A	376	HIS	O-C-N	-6.05	109.61	121.10
1	C	1113	HIS	O-C-N	-5.82	113.31	123.20
1	D	1575	VAL	O-C-N	-5.82	113.39	122.70
1	B	432	GLU	N-CA-C	-5.53	96.08	111.00
1	A	375	VAL	CA-CB-CG2	5.50	119.15	110.90
1	C	1150	ASP	CA-C-N	-5.50	105.11	117.20
1	D	1232	GLU	N-CA-C	-5.41	96.38	111.00
1	C	1113	HIS	CA-C-O	5.29	131.22	120.10
1	A	376	HIS	N-CA-CB	5.14	119.86	110.60

All (4) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	A	374	ILE	CB
1	A	375	VAL	CA
1	A	376	HIS	CA
1	B	401	MET	CA

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	347	VAL	Mainchain
1	A	350	ASP	Mainchain
1	A	375	VAL	Mainchain,Peptide
1	A	376	HIS	Mainchain,Peptide

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	2589	0	2714	85	1

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	2620	0	2754	67	0
1	C	2604	0	2744	80	0
1	D	2592	0	2730	68	0
2	A	184	0	0	3	0
2	B	243	0	0	5	1
2	C	291	0	0	7	0
2	D	221	0	0	1	0
All	All	11344	0	10942	291	1

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 14.

All (291) 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:127:ARG:H	1:A:127:ARG:HH21	1.11	0.94
1:B:401:MET:N	1:B:469:ASP:OD2	2.07	0.85
1:C:837:GLN:HE21	1:C:859:SER:HA	1.41	0.84
1:D:1286:GLU:HA	1:D:1289:LEU:HD23	1.60	0.83
1:D:1308:VAL:O	1:D:1312:LEU:HD23	1.79	0.82
1:B:542:ASN:HD21	1:B:586:GLN:HE21	1.23	0.81
1:A:351:THR:CB	1:A:353:THR:HG22	2.11	0.81
1:B:678:GLU:O	1:B:681:VAL:HG12	1.82	0.80
1:C:923:GLU:HA	1:C:937:LEU:HD11	1.65	0.78
1:A:127:ARG:H	1:A:127:ARG:NH2	1.81	0.78
1:B:401:MET:HE1	1:B:754:LEU:N	2.00	0.77
1:C:942:ASN:HD21	1:C:986:GLN:HE21	1.32	0.76
1:C:958:ARG:HG3	1:D:1529:ALA:HB3	1.67	0.75
1:B:421:GLU:OE1	1:B:737:LYS:HE2	1.87	0.74
1:B:526:PRO:HA	1:B:527:ARG:HH21	1.53	0.73
1:A:284:MET:HE3	1:A:315:VAL:HG11	1.68	0.73
1:D:1364:MET:HA	1:D:1369:THR:HG22	1.71	0.72
1:D:1306:ARG:O	1:D:1310:GLU:HG3	1.90	0.72
1:B:691:ILE:HD13	1:B:718:VAL:CG1	2.20	0.71
1:A:253:LYS:HE2	1:A:253:LYS:HA	1.74	0.70
1:D:1306:ARG:N	1:D:1307:PRO:HD2	2.05	0.70
1:A:1:MET:HE1	1:A:354:LEU:N	2.07	0.70
1:C:1077:THR:HG23	1:C:1080:MET:HE3	1.73	0.70
1:C:911:ALA:O	1:C:914:LYS:HG3	1.92	0.70
1:A:329:ALA:HB3	1:B:558:ARG:HG3	1.74	0.70
1:B:401:MET:HE1	1:B:754:LEU:H	1.57	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:221:VAL:CG1	1:A:250:ALA:HB2	2.23	0.69
1:C:999:MET:HE3	1:C:1017:LYS:HD3	1.75	0.68
1:B:497:MET:HE1	1:B:742:PHE:HD1	1.59	0.68
1:B:605:ALA:O	1:B:608:LYS:HG2	1.94	0.67
1:A:346:HIS:ND1	1:A:357:LYS:HG2	2.10	0.67
1:A:80:ALA:CA	1:A:85:ASP:HB3	2.25	0.66
1:A:2:LYS:HD2	1:A:34:ILE:HD11	1.76	0.66
1:C:906:ARG:H	1:C:907:PRO:CD	2.09	0.66
1:B:691:ILE:HD13	1:B:718:VAL:HG11	1.78	0.65
1:C:903:LEU:HD12	1:C:904:THR:HG23	1.78	0.65
1:D:1557:LYS:HE3	1:D:1559:GLU:OE1	1.96	0.64
1:B:732:SER:HB2	1:B:733:PRO:HD3	1.78	0.64
1:C:802:LYS:HD3	1:C:834:ILE:HD12	1.79	0.64
1:B:690:ILE:HD12	1:B:717:ILE:HD12	1.79	0.63
1:D:1380:VAL:HG22	1:D:1402:ASP:CB	2.28	0.63
1:D:1568:VAL:HA	1:D:1576:HIS:HB2	1.81	0.63
1:D:1408:LYS:HE2	1:D:1412:GLU:OE2	1.99	0.63
1:B:527:ARG:HE	1:B:527:ARG:N	1.97	0.62
1:C:923:GLU:HA	1:C:937:LEU:CD1	2.29	0.62
1:B:563:MET:HB2	1:B:570:VAL:HB	1.82	0.61
1:A:158:ARG:HG2	1:B:729:ALA:HB3	1.82	0.61
1:A:348:ASP:OD2	1:A:350:ASP:HB2	2.00	0.61
1:D:1230:GLY:HA3	1:D:1552:LYS:HD2	1.81	0.60
1:D:1386:GLN:HE22	1:D:1393:ARG:HH12	1.48	0.60
1:B:690:ILE:HD12	1:B:717:ILE:CD1	2.31	0.59
1:A:375:VAL:HG23	1:A:376:HIS:HB3	1.83	0.59
1:C:1069:GLY:O	1:C:1070:LYS:HG3	2.01	0.59
1:A:21:GLU:HG3	1:C:1159:GLU:OE1	2.03	0.58
1:D:1356:PHE:CE2	1:D:1358:ARG:HB2	2.39	0.58
1:D:1375:VAL:HG22	1:D:1460:ILE:HB	1.85	0.58
1:B:678:GLU:O	1:B:682:THR:HG23	2.03	0.58
1:C:923:GLU:CA	1:C:937:LEU:HD11	2.33	0.57
1:D:1311:ALA:HA	1:D:1314:LYS:HE2	1.86	0.57
1:C:1149:LYS:HA	1:C:1152:LYS:HA	1.86	0.57
1:A:284:MET:CE	1:A:290:ILE:HD11	2.35	0.56
1:D:1380:VAL:HG23	1:D:1407:THR:HG21	1.87	0.56
1:C:906:ARG:H	1:C:907:PRO:HD2	1.71	0.56
1:A:221:VAL:HG13	1:A:250:ALA:HB2	1.86	0.56
1:C:1147:VAL:HG22	1:C:1148:ASP:N	2.21	0.56
1:B:497:MET:CE	1:B:742:PHE:HD1	2.19	0.56
1:C:1178:ALA:HB2	2:C:1713:HOH:O	2.06	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:592:LYS:HE2	1:B:615:GLY:O	2.06	0.55
1:A:158:ARG:HD2	1:B:730:ASP:OD1	2.06	0.55
1:C:936:ILE:HG13	1:C:937:LEU:HD12	1.87	0.55
1:A:332:SER:HB2	1:A:333:PRO:HD3	1.89	0.55
1:B:491:LYS:HE3	2:B:2460:HOH:O	2.07	0.55
1:C:845:ILE:HG22	1:C:850:LEU:HD21	1.89	0.55
1:C:845:ILE:HG22	1:C:850:LEU:CD2	2.37	0.55
1:C:1157:LYS:NZ	1:C:1157:LYS:HB3	2.21	0.55
1:D:1201:MET:HE3	1:D:1554:LEU:N	2.22	0.54
1:B:667:ILE:HD11	1:B:670:LYS:HG2	1.89	0.54
1:A:186:GLN:HE22	1:A:193:ARG:HH12	1.54	0.54
1:A:348:ASP:OD2	1:A:351:THR:N	2.37	0.54
1:A:2:LYS:HD2	1:A:34:ILE:CD1	2.36	0.54
1:C:900:LEU:CD2	1:C:1168:VAL:HG21	2.38	0.54
1:C:999:MET:HG3	2:C:2387:HOH:O	2.07	0.54
1:C:1063:THR:CB	1:C:1100:ASN:HD22	2.20	0.54
1:B:691:ILE:HA	1:B:718:VAL:HG13	1.90	0.54
1:D:1452:LEU:HD23	1:D:1452:LEU:O	2.08	0.54
1:B:580:VAL:HG12	1:B:580:VAL:O	2.09	0.53
1:C:802:LYS:HZ3	1:C:834:ILE:HD11	1.73	0.53
1:C:1149:LYS:HA	1:C:1152:LYS:CA	2.38	0.53
1:B:523:GLU:HB2	1:B:537:LEU:HD11	1.89	0.53
1:C:1148:ASP:HB3	1:C:1150:ASP:HB2	1.89	0.53
1:A:76:ARG:HG2	1:A:76:ARG:HH21	1.73	0.53
1:A:88:ALA:C	1:A:115:ARG:NH1	2.62	0.53
1:A:278:GLU:O	1:A:282:THR:HG23	2.08	0.53
1:A:329:ALA:CB	1:B:558:ARG:HG3	2.39	0.53
1:A:106:ARG:N	1:A:107:PRO:CD	2.72	0.53
1:D:1550:ASP:OD1	1:D:1551:THR:HG23	2.09	0.53
1:A:221:VAL:HG22	1:A:247:GLN:HE22	1.74	0.53
1:D:1311:ALA:HA	1:D:1314:LYS:CE	2.39	0.53
1:A:21:GLU:HG3	1:C:1159:GLU:CD	2.29	0.52
1:C:837:GLN:HE21	1:C:859:SER:CA	2.17	0.52
1:C:1120:HIS:HD2	2:C:2118:HOH:O	1.92	0.52
1:D:1459:ASP:CB	1:D:1460:ILE:HD12	2.39	0.52
1:D:1346:TYR:O	1:D:1350:ILE:HD13	2.10	0.52
1:A:80:ALA:N	1:A:85:ASP:HB3	2.25	0.52
1:A:264:THR:HG22	1:A:293:LEU:HD12	1.92	0.52
1:A:221:VAL:HG22	1:A:247:GLN:NE2	2.24	0.52
1:C:1144:THR:O	1:C:1147:VAL:HG12	2.08	0.52
1:A:80:ALA:HB2	1:A:85:ASP:HB3	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:535:ASP:OD2	1:B:538:SER:HB2	2.11	0.51
1:C:1002:ASP:OD1	1:C:1004:ARG:HG2	2.10	0.51
1:D:1203:ILE:HD11	1:D:1272:TRP:CD2	2.45	0.51
1:D:1380:VAL:HG21	1:D:1407:THR:OG1	2.10	0.51
1:A:194:LEU:HA	1:B:593:ARG:HD3	1.91	0.51
1:D:1286:GLU:HA	1:D:1289:LEU:CD2	2.37	0.51
1:C:818:ILE:HG13	1:C:819:SER:N	2.25	0.51
1:C:905:ASN:OD1	1:C:908:VAL:HG12	2.10	0.51
1:A:208:LYS:HG3	1:A:218:PHE:CB	2.40	0.51
1:D:1408:LYS:O	1:D:1412:GLU:HG3	2.10	0.51
1:A:267:ILE:HG23	1:A:268:PRO:HD2	1.93	0.51
1:C:980:VAL:O	1:C:980:VAL:HG12	2.10	0.51
1:C:1132:SER:HB2	1:C:1133:PRO:HD3	1.92	0.51
1:C:1103:LEU:HB3	1:C:1117:ILE:HD13	1.91	0.51
1:A:91:LYS:HD2	1:A:92:GLU:O	2.11	0.50
1:B:608:LYS:HB3	1:B:618:PHE:CD2	2.46	0.50
1:B:617:LYS:HD2	1:C:1174:ILE:HD12	1.94	0.50
1:B:556:PHE:CE2	1:B:558:ARG:HB2	2.46	0.50
1:A:284:MET:HE1	1:A:290:ILE:HD11	1.92	0.50
1:B:425:LYS:CD	1:B:740:LEU:HD21	2.42	0.50
1:D:1399:MET:SD	1:D:1417:LYS:HD2	2.51	0.50
1:A:199:MET:SD	1:A:217:LYS:HB3	2.52	0.50
1:C:892:GLU:O	1:C:915:ARG:O	2.30	0.49
1:D:1300:LEU:HD11	1:D:1319:ALA:HB1	1.94	0.49
1:B:667:ILE:HG13	1:B:670:LYS:HB3	1.93	0.49
1:A:89:LEU:HD22	1:A:89:LEU:N	2.27	0.49
1:C:885:ASP:O	1:C:889:LEU:HD13	2.12	0.49
1:C:1078:GLU:O	1:C:1082:THR:HG23	2.11	0.49
1:C:1120:HIS:HE1	2:C:2279:HOH:O	1.95	0.49
1:D:1459:ASP:HB2	1:D:1460:ILE:HD12	1.95	0.49
1:A:106:ARG:HB2	1:A:107:PRO:HD3	1.94	0.49
1:A:156:PHE:CE2	1:A:158:ARG:HB2	2.47	0.49
1:C:1008:LYS:HD3	1:C:1012:GLU:CD	2.33	0.49
1:D:1464:THR:HG22	1:D:1493:LEU:HD12	1.94	0.49
1:B:768:VAL:C	1:B:775:VAL:HG22	2.33	0.49
1:D:1306:ARG:N	1:D:1307:PRO:CD	2.74	0.49
1:A:18:ILE:HG13	1:A:19:SER:N	2.28	0.48
1:A:180:VAL:HG23	1:A:202:ASP:HB2	1.95	0.48
1:A:317:ILE:N	1:A:317:ILE:HD12	2.29	0.48
1:B:564:MET:CE	1:B:569:THR:HG21	2.43	0.48
1:D:1523:VAL:N	1:D:1524:PRO:HD2	2.28	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:564:MET:HE2	1:B:569:THR:HG21	1.94	0.48
1:D:1532:SER:HB2	1:D:1533:PRO:HD3	1.95	0.48
1:C:1112:LYS:HD2	2:C:2241:HOH:O	2.13	0.48
1:A:302:PRO:HG3	2:A:2119:HOH:O	2.13	0.48
1:B:646:LYS:O	1:B:649:GLU:HB3	2.14	0.48
1:B:667:ILE:CD1	1:B:670:LYS:HG2	2.44	0.48
1:B:678:GLU:HB3	1:B:703:LEU:HD13	1.96	0.48
1:C:1103:LEU:HB3	1:C:1117:ILE:CD1	2.44	0.48
1:B:685:LYS:HG2	2:B:1983:HOH:O	2.13	0.47
1:C:927:ARG:HD2	1:C:927:ARG:N	2.29	0.47
1:A:156:PHE:CZ	1:A:259:ASP:HB3	2.50	0.47
1:D:1305:ASN:O	1:D:1308:VAL:HG12	2.15	0.47
1:B:425:LYS:HD3	1:B:740:LEU:HD21	1.96	0.47
1:B:580:VAL:CG1	1:B:585:LEU:HD13	2.45	0.47
1:C:1063:THR:HB	1:C:1100:ASN:HD22	1.78	0.47
1:C:1143:LEU:C	1:C:1143:LEU:HD23	2.34	0.47
1:A:281:VAL:HA	1:A:284:MET:CE	2.45	0.47
1:A:358:LEU:N	1:A:358:LEU:HD22	2.30	0.47
1:B:556:PHE:CZ	1:B:659:ASP:HB3	2.49	0.47
1:C:1149:LYS:HB2	1:C:1152:LYS:HE3	1.95	0.47
1:D:1201:MET:HE2	1:D:1231:PHE:CE2	2.50	0.47
1:D:1201:MET:CE	1:D:1554:LEU:HB2	2.45	0.47
1:C:1052:LEU:HD23	1:C:1052:LEU:O	2.15	0.47
1:A:76:ARG:NE	1:A:105:ASN:OD1	2.47	0.47
1:D:1363:MET:HB2	1:D:1370:VAL:HB	1.96	0.47
1:C:1158:LEU:N	1:C:1158:LEU:HD12	2.31	0.46
1:C:1177:PRO:O	1:C:1178:ALA:HB2	2.15	0.46
1:C:887:VAL:HG12	1:C:915:ARG:HD3	1.98	0.46
1:A:80:ALA:CB	1:A:85:ASP:HB3	2.46	0.46
1:A:203:VAL:HG23	1:A:204:ARG:HD3	1.97	0.46
1:D:1460:ILE:HD12	1:D:1460:ILE:N	2.30	0.46
1:B:430:GLY:HA3	1:B:752:LYS:HG2	1.98	0.46
1:B:712:LYS:HG2	2:B:2342:HOH:O	2.15	0.46
1:C:829:LEU:HD13	1:C:1147:VAL:HG11	1.98	0.46
1:C:929:SER:O	1:C:932:GLN:HG3	2.15	0.46
1:A:2:LYS:NZ	1:A:67:GLN:HE21	2.13	0.46
1:A:104:THR:C	1:A:105:ASN:HD22	2.19	0.46
1:B:463:GLN:NE2	2:B:1925:HOH:O	2.49	0.46
1:C:1045:LYS:N	2:C:1879:HOH:O	2.48	0.46
1:B:506:ARG:O	1:B:510:GLU:HG3	2.15	0.46
1:C:867:GLN:O	1:C:867:GLN:HG3	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:1147:VAL:CG2	1:C:1148:ASP:N	2.79	0.46
1:C:1149:LYS:HB2	1:C:1152:LYS:CE	2.45	0.46
1:C:974:ARG:HD3	2:C:1842:HOH:O	2.15	0.46
1:C:999:MET:CE	1:C:1017:LYS:HB2	2.46	0.46
1:A:104:THR:HG23	2:A:2457:HOH:O	2.15	0.45
1:D:1553:THR:HG22	1:D:1554:LEU:N	2.31	0.45
1:B:647:GLN:HA	1:B:647:GLN:HE21	1.80	0.45
1:B:647:GLN:HA	1:B:647:GLN:NE2	2.31	0.45
1:A:73:LYS:NZ	1:A:73:LYS:HB3	2.31	0.45
1:A:344:THR:HB	1:A:345:PRO:HD3	1.96	0.45
1:D:1218:ILE:HG13	1:D:1219:SER:N	2.32	0.45
1:D:1573:ALA:O	1:D:1575:VAL:HG13	2.16	0.45
1:A:1:MET:HE1	1:A:354:LEU:HB2	1.99	0.45
1:A:246:LYS:CD	1:A:249:GLU:HB2	2.47	0.45
1:A:343:LEU:C	1:A:343:LEU:HD23	2.37	0.45
1:B:652:LEU:HD13	1:B:652:LEU:O	2.17	0.45
1:D:1380:VAL:HG21	1:D:1407:THR:CB	2.46	0.45
1:B:552:GLY:HA2	1:B:691:ILE:HD11	1.99	0.45
1:C:1082:THR:HG22	1:C:1113:HIS:CD2	2.51	0.45
1:C:818:ILE:HG13	1:C:819:SER:H	1.82	0.45
1:C:910:GLU:O	1:C:914:LYS:HG2	2.17	0.45
1:C:1052:LEU:HD23	1:C:1056:VAL:HG13	1.98	0.45
1:D:1350:ILE:HD12	1:D:1350:ILE:N	2.31	0.45
1:D:1503:LEU:HB3	1:D:1512:LYS:HD2	1.99	0.44
1:D:1380:VAL:HG23	1:D:1380:VAL:O	2.18	0.44
1:B:664:THR:HG22	1:B:693:LEU:HD22	1.98	0.44
1:A:357:LYS:HD3	2:A:2477:HOH:O	2.16	0.44
1:D:1408:LYS:HD2	1:D:1418:PHE:CB	2.47	0.44
1:A:358:LEU:HD22	1:A:358:LEU:H	1.83	0.44
1:C:900:LEU:HD23	1:C:1168:VAL:HG21	2.00	0.44
1:C:1063:THR:HB	1:C:1100:ASN:ND2	2.33	0.44
1:C:1168:VAL:HA	1:C:1176:HIS:HB2	2.00	0.44
1:D:1219:SER:O	1:D:1223:VAL:HG23	2.18	0.44
1:D:1479:GLU:OE2	1:D:1483:LYS:HD2	2.17	0.44
1:D:1404:ARG:NH1	2:D:2400:HOH:O	2.50	0.43
1:C:937:LEU:HD12	1:C:937:LEU:N	2.33	0.43
1:A:204:ARG:HG2	1:A:204:ARG:HH21	1.83	0.43
1:B:660:ILE:HD13	1:B:689:VAL:HB	1.99	0.43
1:C:908:VAL:HG13	1:C:909:VAL:N	2.33	0.43
1:A:3:ILE:HA	1:A:70:VAL:O	2.18	0.43
1:D:1452:LEU:HD23	1:D:1456:VAL:HG13	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:1158:LEU:N	1:C:1158:LEU:CD1	2.82	0.43
1:D:1202:LYS:HE3	1:D:1202:LYS:HB2	1.87	0.43
1:A:80:ALA:HA	1:A:85:ASP:HB3	1.97	0.43
1:A:253:LYS:HE2	1:A:253:LYS:CA	2.46	0.43
1:A:281:VAL:HA	1:A:284:MET:HE1	2.00	0.43
1:C:906:ARG:HG3	1:C:906:ARG:HH11	1.83	0.43
1:B:693:LEU:N	1:B:693:LEU:HD12	2.34	0.43
1:C:823:VAL:O	1:C:827:VAL:HG23	2.18	0.43
1:D:1465:ALA:CB	1:D:1475:LEU:HD11	2.49	0.42
1:A:221:VAL:HG13	1:A:250:ALA:CB	2.49	0.42
1:A:351:THR:C	1:A:353:THR:N	2.72	0.42
1:B:493:GLY:HA2	1:B:516:LYS:O	2.19	0.42
1:C:1045:LYS:HD2	1:C:1045:LYS:O	2.19	0.42
1:D:1203:ILE:HD11	1:D:1272:TRP:CE2	2.53	0.42
1:D:1409:GLU:HG3	1:D:1410:GLN:N	2.34	0.42
1:D:1459:ASP:C	1:D:1460:ILE:HD12	2.40	0.42
1:A:323:VAL:N	1:A:324:PRO:HD2	2.35	0.42
1:A:91:LYS:HE2	1:A:91:LYS:HB3	1.95	0.42
1:B:767:CYS:O	1:B:775:VAL:CG2	2.68	0.42
1:C:1091:ILE:HA	1:C:1118:VAL:HG22	2.01	0.42
1:D:1363:MET:O	1:D:1369:THR:HA	2.19	0.42
1:D:1478:GLU:O	1:D:1482:THR:HG23	2.19	0.42
1:A:24:LYS:HB2	1:A:24:LYS:NZ	2.34	0.42
1:B:590:THR:HA	1:B:593:ARG:HG2	2.01	0.42
1:C:879:THR:OG1	1:C:882:GLU:HG3	2.20	0.42
1:D:1356:PHE:CZ	1:D:1358:ARG:HB2	2.54	0.42
1:B:527:ARG:HE	1:B:527:ARG:H	1.66	0.42
1:D:1485:LYS:HG2	1:D:1488:SER:OG	2.20	0.42
1:D:1356:PHE:CZ	1:D:1459:ASP:HB3	2.55	0.42
1:D:1548:ASP:HB3	1:D:1551:THR:OG1	2.19	0.42
1:A:160:PHE:N	1:A:161:PRO:HD2	2.35	0.41
1:D:1408:LYS:HD2	1:D:1418:PHE:HB3	2.01	0.41
1:A:88:ALA:HA	1:A:115:ARG:NH1	2.35	0.41
1:A:19:SER:O	1:A:23:VAL:HG23	2.20	0.41
1:D:1380:VAL:HG22	1:D:1402:ASP:HB2	2.02	0.41
1:A:348:ASP:C	1:A:350:ASP:H	2.24	0.41
1:B:666:LEU:O	1:B:666:LEU:HG	2.21	0.41
1:D:1209:ARG:HB2	1:D:1278:MET:HE2	2.03	0.41
1:A:2:LYS:NZ	1:A:67:GLN:NE2	2.68	0.41
1:A:23:VAL:O	1:A:27:VAL:HG23	2.21	0.41
1:A:88:ALA:O	1:A:115:ARG:NH1	2.54	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:106:ARG:O	1:A:110:GLU:HG3	2.21	0.41
1:B:679:GLU:O	1:B:683:LYS:HG3	2.21	0.41
1:B:691:ILE:CD1	1:B:718:VAL:HG11	2.48	0.41
1:C:867:GLN:NE2	1:C:891:LYS:HD3	2.36	0.41
1:D:1201:MET:HE2	1:D:1231:PHE:CZ	2.55	0.41
1:A:5:ILE:HD12	1:A:5:ILE:N	2.35	0.41
1:D:1336:ILE:HG13	1:D:1337:LEU:N	2.35	0.41
1:B:608:LYS:HE2	2:B:1985:HOH:O	2.21	0.40
1:D:1476:ILE:O	1:D:1502:PRO:HD2	2.22	0.40
1:A:208:LYS:O	1:A:212:GLU:HG3	2.22	0.40
1:A:10:ARG:HH21	1:A:76:ARG:HG3	1.86	0.40
1:B:563:MET:O	1:B:569:THR:HA	2.21	0.40
1:C:999:MET:HE2	1:C:1017:LYS:HB2	2.03	0.40
1:D:1465:ALA:HB3	1:D:1475:LEU:HD11	2.03	0.40
1:A:357:LYS:HG2	1:A:357:LYS:H	1.62	0.40
1:B:663:THR:O	1:B:693:LEU:HD13	2.22	0.40
1:B:707:GLY:N	1:B:721:THR:HG23	2.37	0.40
1:C:936:ILE:O	1:C:940:GLN:HG2	2.22	0.40
1:A:10:ARG:HA	1:A:11:PRO:HD3	1.88	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:377:PRO:O	2:B:2379:HOH:O[2_545]	1.71	0.49

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	350/384 (91%)	329 (94%)	20 (6%)	1 (0%)	41	27

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	354/384 (92%)	340 (96%)	14 (4%)	0	100	100
1	C	351/384 (91%)	332 (95%)	14 (4%)	5 (1%)	11	3
1	D	349/384 (91%)	337 (97%)	12 (3%)	0	100	100
All	All	1404/1536 (91%)	1338 (95%)	60 (4%)	6 (0%)	34	21

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	376	HIS
1	C	1150	ASP
1	C	866	SER
1	C	892	GLU
1	C	906	ARG
1	C	1121	THR

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	274/296 (93%)	266 (97%)	8 (3%)	42	28
1	B	278/296 (94%)	271 (98%)	7 (2%)	47	33
1	C	277/296 (94%)	267 (96%)	10 (4%)	35	19
1	D	276/296 (93%)	271 (98%)	5 (2%)	59	48
All	All	1105/1184 (93%)	1075 (97%)	30 (3%)	44	30

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	9	ARG
1	A	24	LYS
1	A	127	ARG
1	A	130	ARG
1	A	204	ARG

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Mol	Chain	Res	Type
1	A	253	LYS
1	A	350	ASP
1	A	376	HIS
1	B	450	LEU
1	B	527	ARG
1	B	564	MET
1	B	576	LEU
1	B	585	LEU
1	B	679	GLU
1	B	685	LYS
1	C	943	LEU
1	C	969	THR
1	C	999	MET
1	C	1008	LYS
1	C	1045	LYS
1	C	1093	LEU
1	C	1103	LEU
1	C	1118	VAL
1	C	1149	LYS
1	C	1150	ASP
1	D	1250	LEU
1	D	1306	ARG
1	D	1337	LEU
1	D	1548	ASP
1	D	1571	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (33) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	37	GLN
1	A	67	GLN
1	A	142	ASN
1	A	186	GLN
1	A	210	GLN
1	A	247	GLN
1	A	313	HIS
1	A	338	ASN
1	A	341	ASN
1	B	463	GLN
1	B	532	GLN
1	B	542	ASN
1	B	610	GLN

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Mol	Chain	Res	Type
1	B	647	GLN
1	B	720	HIS
1	B	741	ASN
1	B	782	GLN
1	C	837	GLN
1	C	867	GLN
1	C	942	ASN
1	C	1100	ASN
1	C	1120	HIS
1	C	1138	ASN
1	C	1141	ASN
1	D	1237	GLN
1	D	1263	GLN
1	D	1267	GLN
1	D	1332	GLN
1	D	1342	ASN
1	D	1386	GLN
1	D	1410	GLN
1	D	1520	HIS
1	D	1538	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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.