



Full wwPDB X-ray Structure Validation Report ⓘ

May 29, 2020 – 05:03 pm BST

PDB ID : 2XAZ
Title : Ribonucleotide reductase Y730NO2Y and C439S modified R1 subunit of E. coli
Authors : Yokoyama, K.; Uhlin, U.; Stubbe, J.
Deposited on : 2010-04-01
Resolution : 2.60 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.11
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

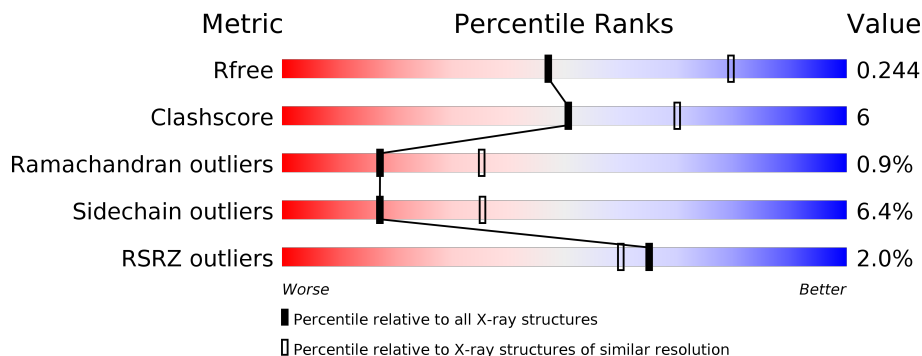
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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}	130704	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria 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	761	
1	B	761	
1	C	761	
2	D	20	
2	E	20	
2	F	20	

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Mol	Chain	Length	Quality of chain
2	P	20	 10% 5% 85%

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 18144 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 RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE 1 SUBUNIT ALPHA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	728	5807	3688	996	1100	23	0	0	0
1	B	728	5807	3688	996	1100	23	0	0	0
1	C	728	5807	3688	996	1100	23	0	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	439	SER	CYS	engineered mutation	UNP P00452
B	439	SER	CYS	engineered mutation	UNP P00452
C	439	SER	CYS	engineered mutation	UNP P00452

- Molecule 2 is a protein called RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE 1 SUBUNIT BETA.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	D	11	89	54	13	22	0	0	0
2	E	16	129	77	19	33	0	0	0
2	F	16	129	77	19	33	0	0	0
2	P	3	27	20	3	4	0	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	85	Total	O	0	0
			85	85		

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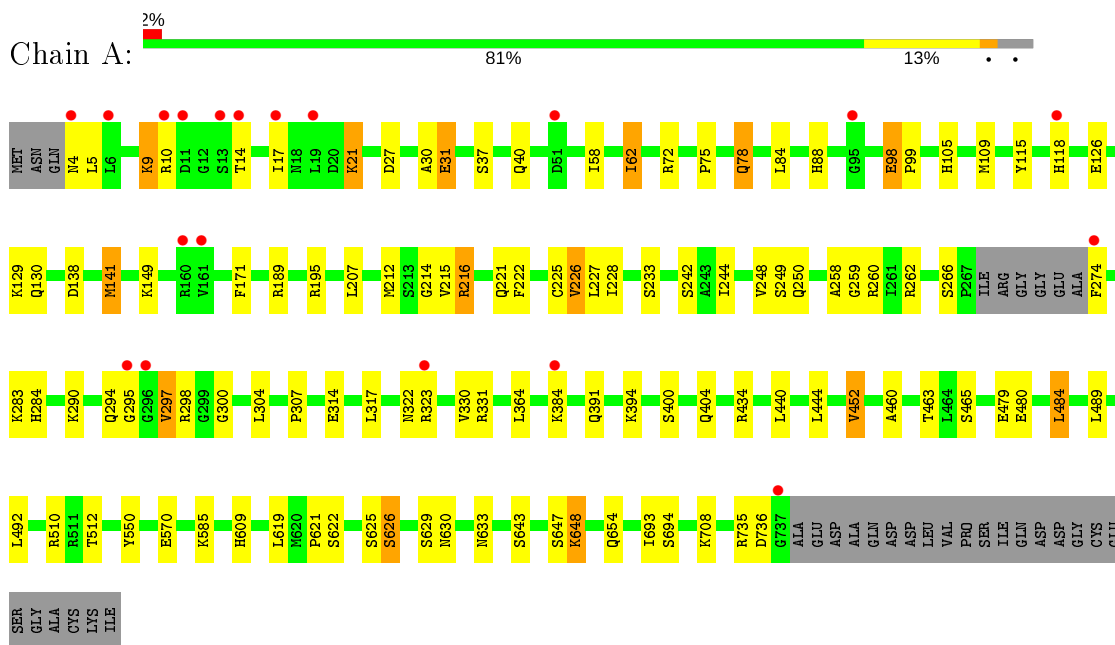
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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	97	Total O 97 97	0	0
3	C	163	Total O 163 163	0	0
3	F	1	Total O 1 1	0	0
3	P	3	Total O 3 3	0	0

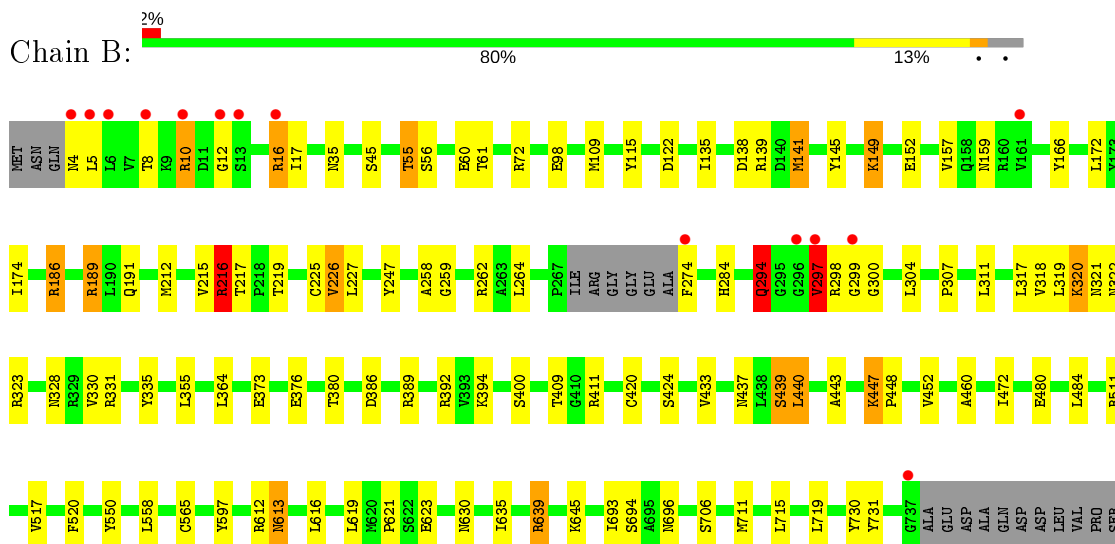
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of 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: RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE 1 SUBUNIT ALPHA

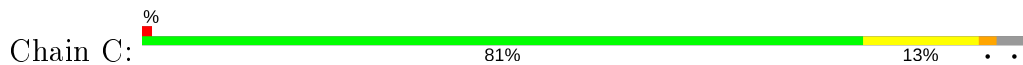


• Molecule 1: RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE 1 SUBUNIT ALPHA



ILE
GLN
ASP
ASP
GLY
CYS
GLU
SER
GLY
ALA
CYS
LYS
ILE

- Molecule 1: RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE 1 SUBUNIT ALPHA



NET ASN GLN
M4
L5
K9
R10
D11
G12
E15
R16
I17
M18
L19
D20
K21
R24
S39
R44
S45
H46
D61
T65
S56
H59
E60
T61
I62
E98
M109
V110
E111
Y115
D122
K129
D138
M141
R160
V161
F171
I174

P186 R186
E187
T188
R189
R195
K204
L207
M212
V215
R216
T217
P218
T219
R220
C225
V226
L227
I254
G259
R260
P267
ILE
ARG
GLY
GLU
ALA
F274
K283
Q294
G295
V297
R298
G299
G300
A301
A302
P307
L311
L317
R320
N321
N322

R323
N328
R329
V330
R331
Q338
I339
K349
G350
E351
I355
L364
F369
K381
K384
D385
D386
Q391
K394
E397
L398
R411
V417
I430
V433
R434
L440
A443
P448
V452
E458
I459
A460
M474
E480
L484

L489
K504
E510
L513
L558
E570
R612
L616
R639
S643
R644
R648
D658
H661
H663
K708
K723
T728
G737
ALA
GLU
ASP
ALA
GLN
ASP
ASP
LEU
VAL
PRO
SER
ILE
GLN
ASP
ASP
GLY
CYS
GLU
SER
GLY
ALA
CYS
LYS

ILE

- Molecule 2: RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE 1 SUBUNIT BETA



TYR
LEU
VAL
GLY
GLN
ILE
ASP
SER
GLU
V365
T367
D368
D369
N372
F373
Q374
L375

- Molecule 2: RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE 1 SUBUNIT BETA



TYR
LEU
VAL
GLY
Q360
I361
D362
S363
E364
V365
T367
D368
D369
L370
N372
L375

- Molecule 2: RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE 1 SUBUNIT BETA



TYR
LEU
VAL
GLY
Q360
I361
T367
Q374
L375

- Molecule 2: RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE 1 SUBUNIT BETA



Y1
L2
V3
GLY
GLN
ILE
ASP
SER
GLU
VAL
ASP
THR
ASP
LEU
SER
ASN
PHE
GLN
LEU

4 Data and refinement statistics

Property	Value	Source
Space group	H 3 2	Depositor
Cell constants a, b, c, α , β , γ	224.81Å 224.81Å 337.13Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	169.03 – 2.60 79.47 – 2.60	Depositor EDS
% Data completeness (in resolution range)	96.4 (169.03-2.60) 94.8 (79.47-2.60)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.21 (at 2.62Å)	Xtrriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.196 , 0.246 0.195 , 0.244	Depositor DCC
R_{free} test set	4755 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	44.6	Xtrriage
Anisotropy	0.058	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 38.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	18144	wwPDB-VP
Average B, all atoms (Å ²)	44.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.76% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² Theoretical 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](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NIY

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	0.47	0/5917	0.59	0/8012
1	B	0.48	0/5917	0.59	0/8012
1	C	0.54	0/5917	0.64	0/8012
2	D	0.44	0/89	0.59	0/119
2	E	0.46	0/129	0.61	0/173
2	F	0.44	0/129	0.58	0/173
2	P	0.81	0/27	0.86	0/36
All	All	0.50	0/18125	0.61	0/24537

There are no bond length outliers.

There are no bond angle outliers.

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	5807	0	5725	63	0
1	B	5807	0	5725	68	0
1	C	5807	0	5726	67	0
2	D	89	0	77	1	0
2	E	129	0	111	4	0
2	F	129	0	111	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	P	27	0	31	1	0
3	A	85	0	0	8	0
3	B	97	0	0	11	0
3	C	163	0	0	12	0
3	F	1	0	0	0	0
3	P	3	0	0	1	0
All	All	18144	0	17506	201	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 6.

All (201) 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:B:299:GLY:HA3	3:B:2039:HOH:O	1.59	1.02
1:A:294:GLN:HG3	1:A:295:GLY:H	0.90	1.02
1:A:294:GLN:HG3	1:A:295:GLY:N	1.74	0.98
1:C:9:LYS:HD3	1:C:10:ARG:H	1.35	0.91
1:C:480:GLU:HB3	3:C:2039:HOH:O	1.70	0.90
1:A:294:GLN:CG	1:A:295:GLY:H	1.75	0.90
1:C:260:ARG:HH11	1:C:260:ARG:HG2	1.42	0.84
1:B:323:ARG:HB3	1:B:323:ARG:NH1	1.98	0.79
1:A:215:VAL:O	1:A:216:ARG:HB3	1.82	0.78
1:B:323:ARG:HB3	1:B:323:ARG:HH11	1.44	0.78
1:B:274:PHE:HA	3:B:2034:HOH:O	1.82	0.78
1:B:10:ARG:H	1:B:10:ARG:HD2	1.50	0.77
1:A:212:MET:O	1:A:216:ARG:NH2	2.19	0.75
1:B:122:ASP:O	1:B:189:ARG:NH2	2.21	0.73
1:C:9:LYS:HZ3	1:C:10:ARG:HG2	1.51	0.73
1:A:195:ARG:NH1	3:A:2022:HOH:O	2.20	0.73
1:C:212:MET:O	1:C:216:ARG:NH2	2.22	0.72
1:C:320:LYS:HE2	1:C:411:ARG:HG3	1.71	0.72
1:C:9:LYS:NZ	1:C:10:ARG:HG2	2.06	0.70
1:A:233:SER:HA	1:A:274:PHE:HZ	1.55	0.69
1:A:9:LYS:HE3	1:A:10:ARG:H	1.58	0.69
1:C:260:ARG:HG2	1:C:260:ARG:NH1	2.04	0.69
1:A:242:SER:HB2	1:A:452:VAL:HG13	1.76	0.68
1:B:480:GLU:HB3	3:B:2026:HOH:O	1.93	0.68
1:C:24:ARG:HD2	3:C:2003:HOH:O	1.93	0.67
1:C:639:ARG:HD2	3:C:2139:HOH:O	1.93	0.67
1:C:227:LEU:HB2	1:C:460:ALA:HB3	1.77	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:217:THR:OG1	1:B:219:THR:HG22	1.96	0.66
1:A:75:PRO:O	1:A:78:GLN:HB2	1.96	0.66
1:C:122:ASP:O	1:C:189:ARG:NH2	2.28	0.65
1:B:56:SER:O	1:B:60:GLU:HG2	1.96	0.65
1:A:648:LYS:HD2	1:A:648:LYS:H	1.62	0.65
1:B:730:NIY:HD1	3:B:2094:HOH:O	1.96	0.64
1:A:510:ARG:NH2	1:A:570:GLU:OE1	2.32	0.63
1:B:621:PRO:HD3	1:B:694:SER:OG	1.99	0.62
1:B:215:VAL:O	1:B:216:ARG:HB3	1.99	0.62
1:B:10:ARG:H	1:B:10:ARG:CD	2.12	0.61
1:A:88:HIS:ND1	3:A:2010:HOH:O	2.31	0.61
1:C:260:ARG:HH11	1:C:260:ARG:CG	2.11	0.61
1:C:298:ARG:HB3	1:C:298:ARG:HH11	1.66	0.61
1:B:472:ILE:HG13	1:B:472:ILE:O	2.01	0.61
1:B:623:GLU:HG3	3:B:2080:HOH:O	2.00	0.61
1:A:4:ASN:HB2	3:A:2001:HOH:O	2.01	0.60
1:C:195:ARG:HD3	3:C:2040:HOH:O	2.00	0.60
1:B:619:LEU:HD12	1:B:693:ILE:HG12	1.83	0.59
1:B:212:MET:O	1:B:216:ARG:NH2	2.36	0.59
1:A:262:ARG:HG3	1:A:274:PHE:HA	1.84	0.59
1:C:4:ASN:O	1:C:5:LEU:HB2	2.03	0.59
1:C:215:VAL:O	1:C:216:ARG:HB3	2.02	0.59
1:C:283:LYS:HG3	1:C:330:VAL:HG22	1.85	0.58
1:B:696:ASN:ND2	1:B:731:TYR:HB2	2.18	0.58
1:B:55:THR:HG23	3:B:2011:HOH:O	2.02	0.58
1:C:10:ARG:NH1	1:C:56:SER:HB3	2.19	0.58
1:A:619:LEU:HD12	1:A:693:ILE:HG12	1.85	0.57
1:A:233:SER:CA	1:A:274:PHE:HZ	2.17	0.57
1:C:510:ARG:NH2	1:C:570:GLU:OE1	2.38	0.57
1:A:609:HIS:HD2	3:P:2001:HOH:O	1.87	0.56
1:A:58:ILE:O	1:A:62:ILE:HG23	2.06	0.56
1:B:4:ASN:HD22	1:B:16:ARG:CZ	2.19	0.56
1:C:260:ARG:HH21	1:C:448:PRO:HG2	1.70	0.56
1:C:369:PHE:CD2	1:C:434:ARG:HD2	2.41	0.55
1:B:311:LEU:HA	1:B:355:LEU:HB3	1.88	0.55
1:A:633:ASN:HB3	3:A:2074:HOH:O	2.07	0.54
1:A:227:LEU:HB2	1:A:460:ALA:HB3	1.89	0.54
1:B:439:SER:O	1:B:440:LEU:HB2	2.07	0.54
1:C:440:LEU:HD12	1:C:728:THR:HB	1.89	0.54
1:A:233:SER:HA	1:A:274:PHE:CZ	2.39	0.53
1:C:207:LEU:HB2	1:C:212:MET:CE	2.38	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:62:ILE:HD11	1:A:84:LEU:HD22	1.91	0.53
1:C:294:GLN:HB3	3:C:2069:HOH:O	2.09	0.53
1:C:311:LEU:HA	1:C:355:LEU:HB3	1.91	0.53
1:B:386:ASP:N	1:B:386:ASP:OD2	2.41	0.52
1:A:207:LEU:HD12	1:A:212:MET:CE	2.39	0.52
1:C:207:LEU:HD12	1:C:212:MET:CE	2.39	0.52
1:B:8:THR:O	1:B:55:THR:HG22	2.10	0.52
1:B:227:LEU:HB2	1:B:460:ALA:HB3	1.92	0.52
1:B:320:LYS:HE2	1:B:411:ARG:HB2	1.91	0.51
1:C:322:ASN:O	1:C:331:ARG:NH1	2.42	0.51
1:B:558:LEU:HD23	1:B:612:ARG:HG2	1.92	0.51
1:C:217:THR:OG1	1:C:219:THR:HG22	2.09	0.51
1:A:258:ALA:HB3	1:A:304:LEU:HD21	1.91	0.51
1:A:207:LEU:HD12	1:A:212:MET:HE3	1.93	0.51
1:B:159:ASN:HB2	1:B:166:TYR:OH	2.11	0.51
1:B:409:THR:O	1:B:411:ARG:HG2	2.11	0.51
1:B:258:ALA:HB3	1:B:304:LEU:HD21	1.92	0.51
1:C:430:ILE:HG21	1:C:570:GLU:HG2	1.93	0.51
1:C:639:ARG:CD	1:C:639:ARG:H	2.24	0.51
1:A:126:GLU:HG3	3:A:2016:HOH:O	2.10	0.50
1:A:294:GLN:CG	1:A:295:GLY:N	2.49	0.50
1:B:262:ARG:HD2	1:B:274:PHE:HB3	1.94	0.50
1:A:480:GLU:O	1:A:484:LEU:HD22	2.12	0.49
1:C:225:CYS:HB2	3:C:2058:HOH:O	2.12	0.49
1:A:259:GLY:HA3	1:A:307:PRO:HD3	1.94	0.49
1:C:658:ASP:OD1	1:C:661:HIS:HD2	1.96	0.49
1:C:558:LEU:HD23	1:C:612:ARG:HG2	1.94	0.49
1:C:207:LEU:HB2	1:C:212:MET:HE3	1.94	0.49
1:A:214:GLY:HA3	1:A:222:PHE:HE1	1.76	0.48
1:B:135:ILE:HD11	1:B:174:ILE:HG21	1.95	0.48
1:C:138:ASP:O	1:C:141:MET:HB2	2.13	0.48
1:C:297:VAL:HG23	1:C:298:ARG:HG3	1.96	0.48
1:B:297:VAL:HG13	3:B:2038:HOH:O	2.13	0.48
1:C:349:LYS:HD3	1:C:351:GLU:OE2	2.14	0.48
1:B:45:SER:HB2	1:B:61:THR:HG22	1.96	0.48
1:A:630:ASN:HD22	1:A:654:GLN:NE2	2.12	0.48
1:A:648:LYS:N	1:A:648:LYS:HD2	2.28	0.48
1:B:433:VAL:HG11	1:B:443:ALA:HB1	1.96	0.47
1:B:373:GLU:O	1:B:376:GLU:HB2	2.13	0.47
1:C:9:LYS:HD3	1:C:10:ARG:N	2.17	0.47
2:E:367:THR:HA	2:E:370:LEU:HD12	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:294:GLN:HG2	1:A:297:VAL:HG23	1.97	0.47
1:A:37:SER:HB3	1:A:40:GLN:HG3	1.96	0.47
1:A:126:GLU:O	1:A:129:LYS:HB2	2.14	0.47
1:C:489:LEU:HB3	1:C:513:LEU:HD22	1.97	0.47
1:C:663:HIS:HD2	3:C:2150:HOH:O	1.97	0.47
1:A:105:HIS:CD2	1:A:171:PHE:CD2	3.03	0.46
1:B:225:CYS:HB2	3:B:2050:HOH:O	2.14	0.46
1:B:565:CYS:HB3	1:B:612:ARG:O	2.16	0.46
1:B:437:ASN:HB2	3:B:2050:HOH:O	2.15	0.46
1:B:321:ASN:C	1:B:323:ARG:H	2.19	0.46
1:B:330:VAL:HB	1:B:335:TYR:OH	2.16	0.46
1:A:225:CYS:HB2	3:A:2034:HOH:O	2.16	0.46
1:B:215:VAL:O	1:B:216:ARG:CB	2.64	0.45
1:B:511:ARG:O	1:B:613:ASN:HB3	2.16	0.45
1:A:510:ARG:HB2	1:A:512:THR:HG23	1.98	0.45
1:A:622:SER:O	1:A:626:SER:OG	2.34	0.45
1:A:215:VAL:O	1:A:216:ARG:CB	2.56	0.45
1:B:138:ASP:O	1:B:141:MET:HB2	2.16	0.45
1:C:558:LEU:CD2	1:C:612:ARG:HG2	2.47	0.45
1:B:639:ARG:NH1	3:B:2085:HOH:O	2.49	0.45
1:B:172:LEU:HD21	1:B:212:MET:HE2	1.98	0.45
1:A:244:ILE:O	1:A:248:VAL:HG22	2.17	0.45
1:C:111:GLU:HG3	2:P:2:LEU:HB2	1.99	0.45
2:D:369:ASP:HA	2:D:372:ASN:ND2	2.32	0.44
1:A:400:SER:O	1:A:404:GLN:HB2	2.17	0.44
1:B:157:VAL:HG23	1:B:216:ARG:NH1	2.33	0.44
1:C:394:LYS:HB2	1:C:397:GLU:OE1	2.18	0.44
1:A:283:LYS:HG3	1:A:330:VAL:HG22	1.99	0.44
1:C:328:ASN:HA	1:C:328:ASN:HD22	1.68	0.44
1:A:331:ARG:HD3	3:A:2043:HOH:O	2.17	0.44
1:A:735:ARG:HG2	1:A:736:ASP:N	2.32	0.44
1:C:46:HIS:HB3	3:C:2009:HOH:O	2.17	0.44
2:E:361:ILE:H	2:E:361:ILE:HD13	1.83	0.44
1:B:517:VAL:HG22	1:B:619:LEU:HD22	1.99	0.44
1:B:109:MET:HB2	1:B:115:TYR:CD2	2.53	0.43
1:B:226:VAL:HG11	1:B:247:TYR:CG	2.53	0.43
1:C:219:THR:O	1:C:220:ARG:HD3	2.19	0.43
1:A:463:THR:HG21	1:A:492:LEU:HD23	1.99	0.43
1:A:621:PRO:HD3	1:A:694:SER:OG	2.18	0.43
1:B:145:TYR:CZ	1:B:149:LYS:HD3	2.54	0.43
1:B:298:ARG:HH11	1:B:298:ARG:HB3	1.83	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:18:ASN:ND2	1:C:21:LYS:HB2	2.34	0.43
1:C:639:ARG:HD3	1:C:639:ARG:H	1.84	0.43
1:A:221:GLN:OE1	1:A:250:GLN:HG2	2.19	0.43
1:B:376:GLU:HG2	3:B:2046:HOH:O	2.19	0.42
1:C:17:ILE:HG22	3:C:2001:HOH:O	2.18	0.42
1:B:149:LYS:HE2	1:B:152:GLU:OE1	2.19	0.42
1:B:328:ASN:HA	1:B:328:ASN:HD22	1.73	0.42
1:C:109:MET:HB2	1:C:115:TYR:CD2	2.54	0.42
1:C:381:LYS:HE3	3:C:2090:HOH:O	2.18	0.42
1:C:5:LEU:HA	1:C:51:ASP:OD1	2.18	0.42
2:E:362:ASP:OD1	2:E:364:GLU:HB2	2.18	0.42
1:C:723:LYS:NZ	2:F:374:GLN:O	2.45	0.42
1:C:433:VAL:HG11	1:C:443:ALA:HB1	2.01	0.42
1:A:109:MET:HB2	1:A:115:TYR:CD2	2.55	0.42
1:B:298:ARG:NH1	1:B:298:ARG:HB3	2.34	0.42
1:B:520:PHE:HB3	1:B:635:ILE:HA	2.02	0.42
1:C:259:GLY:HA3	1:C:307:PRO:HD3	2.02	0.42
1:C:338:GLN:HB3	1:C:417:VAL:CG1	2.50	0.42
1:A:479:GLU:HB2	1:A:550:TYR:CE1	2.55	0.42
1:B:319:LEU:HD22	1:B:330:VAL:HG23	2.01	0.42
1:B:715:LEU:O	1:B:719:LEU:HG	2.20	0.42
1:C:17:ILE:HD12	1:C:19:LEU:HD23	2.01	0.42
1:A:260:ARG:HH21	1:A:434:ARG:NH2	2.18	0.41
1:A:242:SER:CB	1:A:452:VAL:HG13	2.48	0.41
1:C:185:PRO:HB2	1:C:187:GLU:HG2	2.01	0.41
1:C:298:ARG:HB3	1:C:298:ARG:NH1	2.35	0.41
1:C:59:HIS:O	1:C:62:ILE:HG12	2.19	0.41
1:A:284:HIS:CE1	1:B:284:HIS:CE1	3.09	0.41
1:B:447:LYS:HD3	1:B:448:PRO:HD2	2.01	0.41
1:B:550:TYR:HH	1:B:597:TYR:HE1	1.68	0.41
1:B:294:GLN:HE22	1:B:297:VAL:HG23	1.85	0.41
1:C:458:GLU:OE2	1:C:510:ARG:HD2	2.21	0.41
1:A:30:ALA:O	1:A:31:GLU:C	2.59	0.41
1:A:444:LEU:HD22	1:A:512:THR:HG21	2.02	0.41
1:B:321:ASN:OD1	1:B:323:ARG:HB2	2.21	0.41
1:C:21:LYS:HD3	3:C:2002:HOH:O	2.19	0.41
1:C:398:LEU:HD12	1:C:398:LEU:HA	1.94	0.41
1:A:98:GLU:HA	1:A:99:PRO:HD3	1.90	0.41
1:B:259:GLY:HA3	1:B:307:PRO:HD3	2.02	0.41
1:A:262:ARG:HD3	1:A:266:SER:HB2	2.02	0.41
1:C:171:PHE:HA	1:C:174:ILE:HG22	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:21:LYS:NZ	3:A:2003:HOH:O	2.53	0.41
1:A:221:GLN:CD	1:A:250:GLN:HG2	2.41	0.40
1:A:226:VAL:C	1:A:227:LEU:HD12	2.42	0.40
1:B:711:MET:HG2	2:E:365:VAL:HG22	2.02	0.40
1:C:254:ILE:O	1:C:302:ALA:HA	2.21	0.40
1:A:465:SER:HB2	1:A:489:LEU:HD11	2.02	0.40
1:B:420:CYS:O	1:B:424:SER:HB2	2.22	0.40
1:C:129:LYS:HG2	3:C:2027:HOH:O	2.21	0.40
1:A:138:ASP:O	1:A:141:MET:HB2	2.21	0.40
1:B:264:LEU:O	1:B:389:ARG:NH2	2.54	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	723/761 (95%)	695 (96%)	24 (3%)	4 (1%)	25	47
1	B	723/761 (95%)	683 (94%)	31 (4%)	9 (1%)	13	27
1	C	723/761 (95%)	692 (96%)	25 (4%)	6 (1%)	19	39
2	D	9/20 (45%)	9 (100%)	0	0	100	100
2	E	14/20 (70%)	11 (79%)	3 (21%)	0	100	100
2	F	14/20 (70%)	14 (100%)	0	0	100	100
2	P	1/20 (5%)	1 (100%)	0	0	100	100
All	All	2207/2363 (93%)	2105 (95%)	83 (4%)	19 (1%)	17	35

All (19) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	216	ARG

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Mol	Chain	Res	Type
1	C	294	GLN
1	B	5	LEU
1	B	216	ARG
1	B	300	GLY
1	B	322	ASN
1	C	216	ARG
1	A	300	GLY
1	B	12	GLY
1	C	5	LEU
1	A	31	GLU
1	B	294	GLN
1	C	161	VAL
1	A	323	ARG
1	B	297	VAL
1	B	630	ASN
1	C	12	GLY
1	B	186	ARG
1	C	300	GLY

5.3.2 Protein sidechains [i](#)

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	625/650 (96%)	586 (94%)	39 (6%)	18	37
1	B	625/650 (96%)	589 (94%)	36 (6%)	20	40
1	C	625/650 (96%)	586 (94%)	39 (6%)	18	37
2	D	11/19 (58%)	9 (82%)	2 (18%)	1	2
2	E	16/19 (84%)	13 (81%)	3 (19%)	1	2
2	F	16/19 (84%)	12 (75%)	4 (25%)	0	1
2	P	3/19 (16%)	3 (100%)	0	100	100
All	All	1921/2026 (95%)	1798 (94%)	123 (6%)	17	35

All (123) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	LEU
1	A	9	LYS
1	A	14	THR
1	A	17	ILE
1	A	21	LYS
1	A	27	ASP
1	A	62	ILE
1	A	72	ARG
1	A	78	GLN
1	A	98	GLU
1	A	118	HIS
1	A	130	GLN
1	A	141	MET
1	A	149	LYS
1	A	189	ARG
1	A	226	VAL
1	A	228	ILE
1	A	249	SER
1	A	290	LYS
1	A	297	VAL
1	A	298	ARG
1	A	314	GLU
1	A	317	LEU
1	A	322	ASN
1	A	364	LEU
1	A	384	LYS
1	A	391	GLN
1	A	394	LYS
1	A	440	LEU
1	A	452	VAL
1	A	484	LEU
1	A	585	LYS
1	A	625	SER
1	A	626	SER
1	A	629	SER
1	A	643	SER
1	A	647	SER
1	A	648	LYS
1	A	708	LYS
1	B	10	ARG
1	B	16	ARG
1	B	17	ILE
1	B	35	ASN

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Mol	Chain	Res	Type
1	B	55	THR
1	B	72	ARG
1	B	98	GLU
1	B	139	ARG
1	B	141	MET
1	B	149	LYS
1	B	186	ARG
1	B	189	ARG
1	B	191	GLN
1	B	216	ARG
1	B	226	VAL
1	B	294	GLN
1	B	297	VAL
1	B	317	LEU
1	B	318	VAL
1	B	320	LYS
1	B	331	ARG
1	B	364	LEU
1	B	380	THR
1	B	392	ARG
1	B	394	LYS
1	B	400	SER
1	B	439	SER
1	B	440	LEU
1	B	447	LYS
1	B	452	VAL
1	B	484	LEU
1	B	613	ASN
1	B	616	LEU
1	B	639	ARG
1	B	645	LYS
1	B	706	SER
1	C	9	LYS
1	C	11	ASP
1	C	15	GLU
1	C	17	ILE
1	C	21	LYS
1	C	39	SER
1	C	44	ARG
1	C	51	ASP
1	C	55	THR
1	C	60	GLU

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Mol	Chain	Res	Type
1	C	98	GLU
1	C	111	GLU
1	C	129	LYS
1	C	160	ARG
1	C	186	ARG
1	C	189	ARG
1	C	204	LYS
1	C	226	VAL
1	C	260	ARG
1	C	317	LEU
1	C	321	ASN
1	C	323	ARG
1	C	339	ILE
1	C	364	LEU
1	C	384	LYS
1	C	386	ASP
1	C	391	GLN
1	C	411	ARG
1	C	440	LEU
1	C	452	VAL
1	C	474	ASN
1	C	484	LEU
1	C	504	LYS
1	C	616	LEU
1	C	639	ARG
1	C	643	SER
1	C	645	LYS
1	C	648	LYS
1	C	708	LYS
2	D	367	THR
2	D	368	ASP
2	E	360	GLN
2	E	361	ILE
2	E	367	THR
2	F	360	GLN
2	F	361	ILE
2	F	367	THR
2	F	374	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	40	GLN
1	A	46	HIS
1	A	150	GLN
1	A	183	ASN
1	A	294	GLN
1	A	609	HIS
1	A	630	ASN
1	A	661	HIS
1	A	696	ASN
1	A	713	GLN
1	B	4	ASN
1	B	183	ASN
1	B	191	GLN
1	B	250	GLN
1	B	328	ASN
1	B	456	ASN
1	B	630	ASN
1	B	696	ASN
1	B	713	GLN
1	C	40	GLN
1	C	250	GLN
1	C	328	ASN
1	C	630	ASN
1	C	633	ASN
1	C	661	HIS
1	C	663	HIS
2	E	360	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](#)

3 non-standard protein/DNA/RNA residues are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	NIY	B	730	1	13,15,16	0.89	1 (7%)	13,20,22	1.14	2 (15%)
1	NIY	A	730	1	13,15,16	0.86	1 (7%)	13,20,22	1.40	2 (15%)
1	NIY	C	730	1	13,15,16	1.19	1 (7%)	13,20,22	1.64	2 (15%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	NIY	B	730	1	-	3/7/10/12	0/1/1/1
1	NIY	A	730	1	-	3/7/10/12	0/1/1/1
1	NIY	C	730	1	-	3/7/10/12	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	730	NIY	CE1-NN	-3.36	1.39	1.45
1	B	730	NIY	CE1-NN	-2.57	1.41	1.45
1	A	730	NIY	CE1-NN	-2.40	1.41	1.45

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	730	NIY	CB-CG-CD1	-3.44	114.54	120.44
1	A	730	NIY	CB-CA-C	3.27	117.59	111.47
1	C	730	NIY	CB-CA-C	2.83	116.78	111.47
1	A	730	NIY	CB-CG-CD1	-2.34	116.42	120.44
1	B	730	NIY	CB-CG-CD1	-2.15	116.75	120.44
1	B	730	NIY	CB-CA-C	2.01	115.23	111.47

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	B	730	NIY	O-C-CA-CB
1	A	730	NIY	O-C-CA-CB
1	C	730	NIY	O-C-CA-CB
1	B	730	NIY	CA-CB-CG-CD1
1	B	730	NIY	CA-CB-CG-CD2

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Mol	Chain	Res	Type	Atoms
1	C	730	NIY	CA-CB-CG-CD2
1	A	730	NIY	CA-CB-CG-CD2
1	C	730	NIY	CA-CB-CG-CD1
1	A	730	NIY	CA-CB-CG-CD1

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	B	730	NIY	1	0

5.5 Carbohydrates [i](#)

There are no carbohydrates 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

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	727/761 (95%)	0.08	19 (2%) 56 50	29, 45, 68, 98	0
1	B	727/761 (95%)	0.05	14 (1%) 66 62	31, 45, 67, 93	0
1	C	727/761 (95%)	-0.09	4 (0%) 89 88	21, 33, 56, 80	0
2	D	11/20 (55%)	0.98	2 (18%) 1 0	77, 84, 90, 90	0
2	E	16/20 (80%)	1.36	4 (25%) 0 0	77, 91, 98, 98	0
2	F	16/20 (80%)	1.20	2 (12%) 3 2	69, 88, 97, 97	0
2	P	3/20 (15%)	0.63	0 100 100	37, 37, 40, 44	0
All	All	2227/2363 (94%)	0.04	45 (2%) 65 60	21, 42, 70, 98	0

All (45) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	296	GLY	5.5
1	A	6	LEU	5.4
1	B	296	GLY	5.2
1	A	14	THR	5.2
1	A	274	PHE	5.2
2	E	372	ASN	4.3
2	F	361	ILE	3.9
1	A	13	SER	3.8
1	B	4	ASN	3.8
1	C	737	GLY	3.7
1	A	17	ILE	3.6
1	B	737	GLY	3.5
1	B	274	PHE	3.4
1	A	4	ASN	3.3
1	A	161	VAL	3.3
1	B	297	VAL	3.2
1	A	19	LEU	3.1

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Mol	Chain	Res	Type	RSRZ
2	E	364	GLU	3.0
1	B	13	SER	2.8
1	C	296	GLY	2.8
1	A	323	ARG	2.8
1	A	737	GLY	2.7
1	A	118	HIS	2.6
1	C	297	VAL	2.6
1	B	6	LEU	2.5
2	E	368	ASP	2.5
2	D	372	ASN	2.4
1	B	5	LEU	2.4
1	C	274	PHE	2.4
1	A	295	GLY	2.3
1	B	12	GLY	2.3
1	B	161	VAL	2.3
1	A	160	ARG	2.3
1	A	51	ASP	2.2
1	B	10	ARG	2.2
1	B	299	GLY	2.2
1	A	11	ASP	2.1
1	A	10	ARG	2.1
2	E	367	THR	2.1
2	D	373	PHE	2.1
1	A	384	LYS	2.1
1	B	8	THR	2.1
1	A	95	GLY	2.1
1	B	16	ARG	2.0
2	F	360	GLN	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [\(i\)](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
1	NIY	A	730	15/16	0.91	0.19	43,45,51,51	0
1	NIY	B	730	15/16	0.92	0.16	40,43,48,49	0
1	NIY	C	730	15/16	0.96	0.15	30,34,42,42	0

6.3 Carbohydrates [i](#)

There are no carbohydrates 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.