



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2018 – 12:27 pm GMT

PDB ID : 5NV4
Title : UDP-Glucose Glycoprotein Glucosyltransferase from *Chaetomium thermophilum* double mutant D611C:G1050C
Authors : Roversi, P.; Caputo, A.T.; Hill, J.; Alonzi, D.S.; Zitzmann, N.
Deposited on : 2017-05-03
Resolution : 2.78 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 : 1.7.3 (157068), CSD as539be (2018)
Xtriage (Phenix) : 1.13
EDS : trunk30967
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Refmac : 5.8.0158
CCP4 : 7.0 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk30967

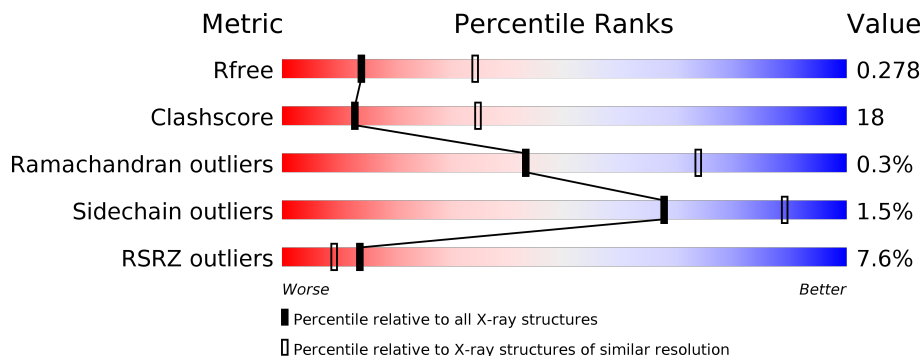
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.78 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}	111664	3577 (2.80-2.76)
Clashscore	122126	4033 (2.80-2.76)
Ramachandran outliers	120053	3968 (2.80-2.76)
Sidechain outliers	120020	3970 (2.80-2.76)
RSRZ outliers	108989	3494 (2.80-2.76)

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. 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	1494	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	NAG	A	1601	-	-	-	X

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 11198 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 UDP-glucose-glycoprotein glucosyltransferase-like protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	1377	11066	7080	1884	2068	34	0	0	0

There are 14 discrepancies between the modelled and reference sequences:

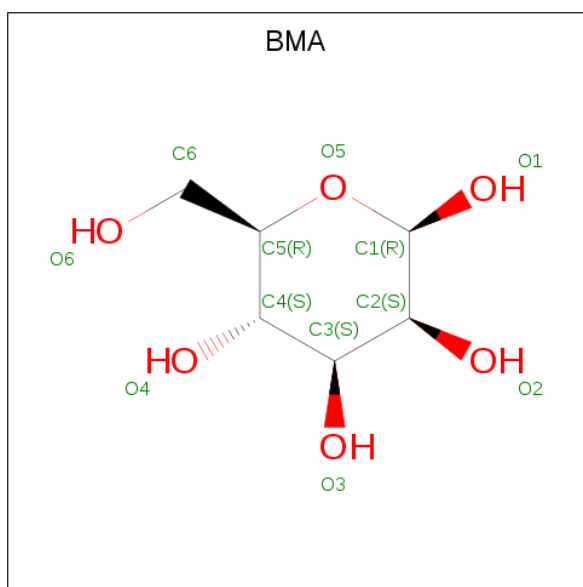
Chain	Residue	Modelled	Actual	Comment	Reference
A	21	GLU	-	expression tag	UNP G0SB58
A	22	THR	-	expression tag	UNP G0SB58
A	23	GLY	-	expression tag	UNP G0SB58
A	611	CYS	ASP	engineered mutation	UNP G0SB58
A	1050	CYS	GLY	engineered mutation	UNP G0SB58
A	1506	GLY	-	expression tag	UNP G0SB58
A	1507	THR	-	expression tag	UNP G0SB58
A	1508	LYS	-	expression tag	UNP G0SB58
A	1509	HIS	-	expression tag	UNP G0SB58
A	1510	HIS	-	expression tag	UNP G0SB58
A	1511	HIS	-	expression tag	UNP G0SB58
A	1512	HIS	-	expression tag	UNP G0SB58
A	1513	HIS	-	expression tag	UNP G0SB58
A	1514	HIS	-	expression tag	UNP G0SB58

- Molecule 2 is N-ACETYL-D-GLUCOSAMINE (three-letter code: NAG) (formula: C₈H₁₅NO₆).



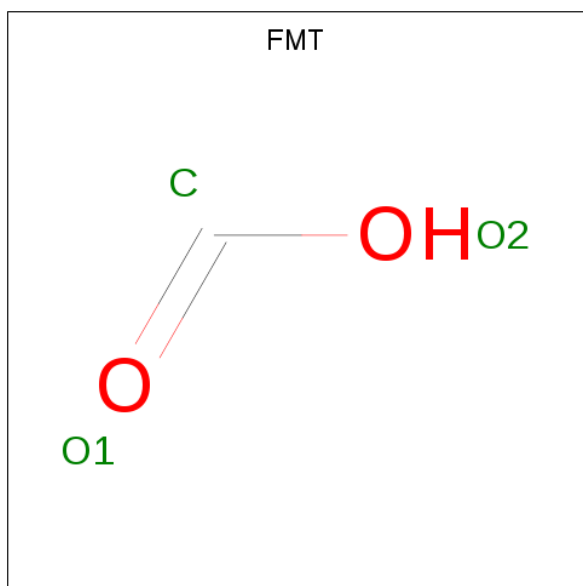
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0

- Molecule 3 is BETA-D-MANNOSE (three-letter code: BMA) (formula: $C_6H_{12}O_6$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			11	6	5		

- Molecule 4 is FORMIC ACID (three-letter code: FMT) (formula: CH₂O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			3	1	2		

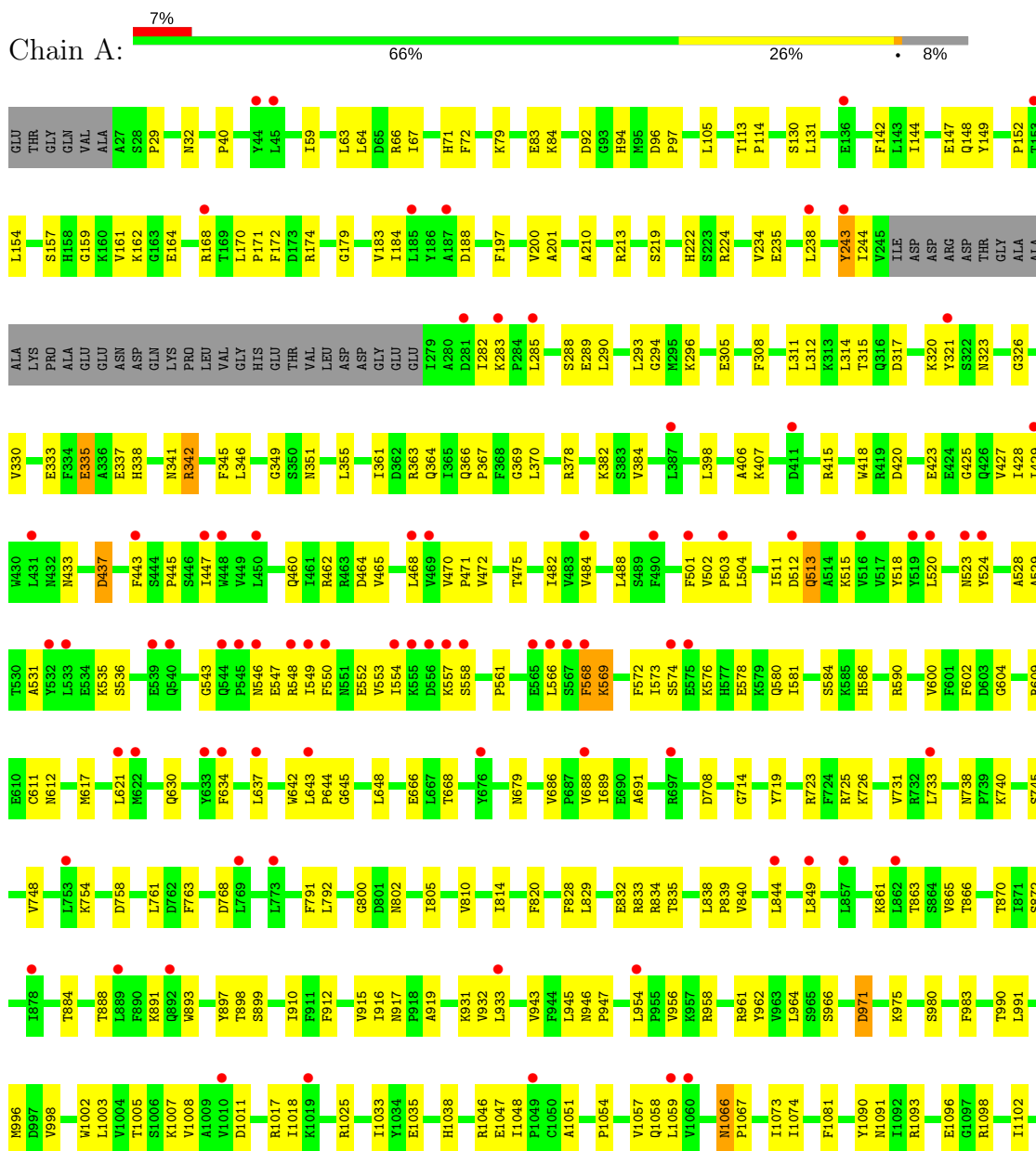
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	34	Total 34	O 34	0	0

3 Residue-property plots

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: UDP-glucose-glycoprotein glucosyltransferase-like protein



V1108	GLU
K1111	ALA
G1112	THR
W1113	LYS
I1116	S1191
D1119	E1199
T1122	I1202
E1123	F1203
W1124	L1210
V1125	L1217
L1134	M1223
R1137	H1224
E1146	H1225
E1147	T1226
D1148	M1227
V1149	H1228
L1150	T1229
E1151	V1230
F1152	K1231
SER	F1232
THR	W1233
LYS	F1234
SER	I1235
GLY	E1236
GLU	Q1237
GLU	F1238
SER	L1239
GLY	I1247
ALA	P1248
ARG	Y1254
ASN	Y1258
LEU	K1264
VAL	W1265
SER	P1266
ARG	L1269
GLY	R1270
ILE	K1275
LYS	E1278
PHE	L1287
ALA	L1293
GLU	S1294
LEU	L1295
GLY	W1298
ASN	I1306
LYS	
ALA	
ALA	
V1307	V1307
R1308	R1308
T1309	T1309
D1310	D1310
M1311	M1311
Y1312	Y1312
D1313	D1313
L1314	L1314
V1315	V1315
Y1324	Y1324
G1325	G1325
F1326	F1326
M1329	M1329
C1330	C1330
R1333	R1333
W1334	W1334
Y1339	Y1339
R1340	R1340
F1341	F1341
M1342	M1342
K1343	K1343
T1344	T1344
G1345	G1345
M1349	M1349
V1350	V1350
L1351	L1351
K1354	K1354
P1355	P1355
I1358	I1358
L1361	L1361
Y1362	Y1362
V1363	V1363
W1364	W1364
D1365	D1365
L1366	L1366
Q1367	Q1367
R1368	R1368
F1369	F1369
R1370	R1370
E1371	E1371
Q1381	Q1381
S1386	S1386
L1393	L1393
N1394	N1394
L1395	L1395
D1396	D1396
M1403	M1403
Q1404	Q1404
F1405	F1405
I1409	I1409
Q1414	Q1414
L1417	L1417
W1418	W1418
C1419	C1419
E1420	E1420
T1421	T1421
M1422	M1422
C1423	C1423
T1427	T1427
L1428	L1428
K1429	K1429
D1430	D1430
A1431	A1431
R1432	R1432
T1433	T1433
C1437	C1437
M1438	M1438
N1439	N1439
F1440	F1440
M1441	M1441
T1442	T1442
K1443	K1443
E1444	E1444
P1445	P1445
D1448	D1448
R1449	R1449
R1452	R1452
Q1453	Q1453
W1457	W1457
Y1460	Y1460
I1464	I1464
E1474	E1474
LYS	LYS
PRO	PRO
LYS	LYS
LYS	LYS
LYS	LYS
GLU	GLU
GLU	GLU
GLU	GLU
VAL	VAL
GLN	GLN
LYS	LYS
ASN	ASN
PRO	PRO
LYS	LYS
SER	SER
THR	THR
LYS	LYS
GLY	GLY
GLU	GLU
GLU	GLU
SER	SER
GLY	GLY
GLY	GLY
ALA	ALA
ARG	ARG
ASN	ASN
LEU	LEU
VAL	VAL
SER	SER
ARG	ARG
GLY	GLY
ILE	ILE
LYS	LYS
PHE	PHE
ALA	ALA
GLU	GLU
GLY	GLY
LEU	LEU
LEU	LEU
GLY	GLY
ARG	ARG
GLY	GLY
ASN	ASN
LYS	LYS
ALA	ALA
ALA	ALA

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	78.23Å 142.16Å 186.09Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	77.85 – 2.78 77.85 – 2.78	Depositor EDS
% Data completeness (in resolution range)	97.8 (77.85-2.78) 97.8 (77.85-2.78)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.38 (at 2.77Å)	Xtrriage
Refinement program	BUSTER 2.10.3	Depositor
R, R_{free}	0.239 , 0.245 0.265 , 0.278	Depositor DCC
R_{free} test set	2526 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å ²)	90.7	Xtrriage
Anisotropy	0.421	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 65.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	11198	wwPDB-VP
Average B, all atoms (Å ²)	109.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.65% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: FMT, BMA, NAG

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	0.41	0/11331	0.73	3/15369 (0.0%)

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	2

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	568	PHE	C-N-CA	8.46	142.84	121.70
1	A	305	GLU	C-N-CA	8.08	141.90	121.70
1	A	243	TYR	C-N-CA	5.96	136.59	121.70

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1439	ASN	Mainchain
1	A	335	GLU	Peptide

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	11066	0	10936	392	0
2	A	84	0	76	0	0
3	A	11	0	10	0	0
4	A	3	0	2	0	0
5	A	34	0	0	0	0
All	All	11198	0	11024	392	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 18.

All (392) 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:1329:MET:SD	1:A:1358:ILE:HD11	1.60	1.42
1:A:337:GLU:OE1	1:A:897:TYR:HD2	1.03	1.32
1:A:337:GLU:OE1	1:A:897:TYR:CD2	1.93	1.21
1:A:1295:LEU:HD21	1:A:1298:VAL:CG2	1.71	1.20
1:A:1225:HIS:ND1	1:A:1308:ARG:HA	1.54	1.19
1:A:149:TYR:CE1	1:A:157:SER:HB3	1.77	1.17
1:A:67:ILE:HG22	1:A:72:PHE:HD2	1.11	1.11
1:A:524:TYR:OH	1:A:566:LEU:HD22	1.50	1.09
1:A:554:ILE:HG21	1:A:568:PHE:HE1	1.18	1.08
1:A:1149:VAL:HG13	1:A:1371:GLU:O	1.52	1.07
1:A:1329:MET:SD	1:A:1358:ILE:CD1	2.43	1.06
1:A:67:ILE:HG22	1:A:72:PHE:CD2	1.89	1.06
1:A:1225:HIS:CE1	1:A:1308:ARG:HA	1.90	1.05
1:A:149:TYR:HE1	1:A:157:SER:HB3	1.11	1.05
1:A:524:TYR:HE2	1:A:558:SER:HG	1.04	1.02
1:A:72:PHE:CE1	1:A:84:LYS:HG3	1.95	1.01
1:A:338:HIS:O	1:A:341:ASN:HB2	1.61	1.00
1:A:482:ILE:HD12	1:A:609:ARG:HH22	1.25	0.98
1:A:546:ASN:HB3	1:A:549:ILE:HG22	1.42	0.98
1:A:554:ILE:HG21	1:A:568:PHE:CE1	2.00	0.96
1:A:1324:TYR:CD1	1:A:1326:PHE:HE1	1.82	0.95
1:A:1048:ILE:HD11	1:A:1137:ARG:HD2	1.49	0.94
1:A:338:HIS:HD2	1:A:898:THR:HG23	1.32	0.93
1:A:67:ILE:CG2	1:A:72:PHE:HD2	1.83	0.90
1:A:243:TYR:O	1:A:285:LEU:HG	1.70	0.90
1:A:566:LEU:HD13	1:A:568:PHE:CD2	2.06	0.90

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:445:PRO:HG3	1:A:462:ARG:NH2	1.88	0.89
1:A:72:PHE:HE1	1:A:84:LYS:HG3	1.27	0.88
1:A:561:PRO:HG3	1:A:566:LEU:HD23	1.55	0.88
1:A:1058:GLN:HG2	1:A:1073:ILE:HG22	1.55	0.88
1:A:311:LEU:O	1:A:315:THR:HG22	1.75	0.86
1:A:1059:LEU:HD11	1:A:1074:ILE:HD11	1.56	0.85
1:A:513:GLN:NE2	1:A:543:GLY:O	2.08	0.85
1:A:482:ILE:HD12	1:A:609:ARG:NH2	1.89	0.85
1:A:445:PRO:HG3	1:A:462:ARG:HH21	1.43	0.84
1:A:554:ILE:HG23	1:A:558:SER:HB2	1.58	0.84
1:A:1225:HIS:ND1	1:A:1308:ARG:CA	2.40	0.83
1:A:1007:LYS:HG3	1:A:1035:GLU:HB2	1.60	0.83
1:A:524:TYR:HE2	1:A:558:SER:OG	1.62	0.83
1:A:1324:TYR:CD1	1:A:1326:PHE:CE1	2.67	0.83
1:A:686:VAL:O	1:A:754:LYS:HE2	1.79	0.82
1:A:244:ILE:HD11	1:A:954:LEU:HD13	1.60	0.82
1:A:546:ASN:HB3	1:A:549:ILE:CG2	2.09	0.82
1:A:244:ILE:HA	1:A:285:LEU:HB3	1.64	0.80
1:A:67:ILE:CG2	1:A:72:PHE:CD2	2.63	0.79
1:A:346:LEU:HD12	1:A:893:TRP:CH2	2.18	0.78
1:A:566:LEU:HD13	1:A:568:PHE:CE2	2.17	0.78
1:A:1295:LEU:HD21	1:A:1298:VAL:HG23	1.63	0.78
1:A:1428:LEU:HD12	1:A:1431:ALA:HB3	1.64	0.78
1:A:243:TYR:HD1	1:A:285:LEU:HD23	1.46	0.78
1:A:523:ASN:OD1	1:A:566:LEU:HA	1.85	0.77
1:A:346:LEU:CD1	1:A:893:TRP:HH2	1.97	0.77
1:A:1295:LEU:HD21	1:A:1298:VAL:HG22	1.66	0.77
1:A:346:LEU:HD12	1:A:893:TRP:HH2	1.49	0.77
1:A:433:ASN:O	1:A:437:ASP:HB2	1.84	0.77
1:A:475:THR:HA	1:A:543:GLY:HA3	1.68	0.76
1:A:96:ASP:HB2	1:A:97:PRO:HD2	1.66	0.76
1:A:130:SER:O	1:A:161:VAL:HG13	1.85	0.76
1:A:546:ASN:CB	1:A:549:ILE:HG22	2.15	0.76
1:A:282:ILE:HG13	1:A:990:THR:HG22	1.68	0.75
1:A:1324:TYR:CE1	1:A:1326:PHE:HE1	2.04	0.75
1:A:296:LYS:HE2	1:A:330:VAL:HG13	1.68	0.75
1:A:566:LEU:O	1:A:566:LEU:HD12	1.87	0.75
1:A:384:VAL:HG23	1:A:865:VAL:HG11	1.67	0.74
1:A:142:PHE:HE1	1:A:197:PHE:HD2	1.34	0.74
1:A:1048:ILE:HD11	1:A:1137:ARG:HB3	1.70	0.74
1:A:515:LYS:CG	1:A:581:ILE:HD11	2.17	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:515:LYS:HG3	1:A:581:ILE:HD11	1.70	0.73
1:A:835:THR:O	1:A:839:PRO:HD2	1.87	0.73
1:A:554:ILE:HG23	1:A:558:SER:CB	2.18	0.72
1:A:338:HIS:CD2	1:A:898:THR:HG23	2.20	0.72
1:A:1307:VAL:HG13	1:A:1433:THR:HG22	1.71	0.72
1:A:1295:LEU:HD21	1:A:1298:VAL:HG21	1.69	0.71
1:A:243:TYR:CD1	1:A:285:LEU:HD23	2.25	0.71
1:A:29:PRO:HB2	1:A:1018:ILE:HD13	1.72	0.71
1:A:547:GLU:HA	1:A:550:PHE:HB3	1.73	0.71
1:A:1314:LEU:HG	1:A:1363:VAL:CG2	2.21	0.71
1:A:384:VAL:CG2	1:A:865:VAL:HG11	2.21	0.71
1:A:1199:GLU:HB2	1:A:1229:THR:O	1.91	0.70
1:A:1324:TYR:CE1	1:A:1326:PHE:CE1	2.79	0.70
1:A:535:LYS:HE2	1:A:552:GLU:OE1	1.91	0.70
1:A:573:ILE:HB	1:A:576:LYS:HB3	1.71	0.70
1:A:872:SER:HB2	1:A:884:THR:OG1	1.90	0.70
1:A:66:ARG:O	1:A:71:HIS:HB3	1.92	0.70
1:A:420:ASP:HB3	1:A:425:GLY:HA2	1.74	0.70
1:A:524:TYR:HE2	1:A:558:SER:CB	2.04	0.69
1:A:244:ILE:HG12	1:A:285:LEU:HD12	1.73	0.69
1:A:152:PRO:HB3	1:A:200:VAL:HG21	1.74	0.69
1:A:1295:LEU:CD2	1:A:1298:VAL:CG2	2.63	0.69
1:A:1422:TRP:HZ3	1:A:1437:CYS:HB2	1.59	0.68
1:A:1108:VAL:HG12	1:A:1134:LEU:HD22	1.73	0.68
1:A:188:ASP:OD1	1:A:219:SER:HB3	1.93	0.68
1:A:326:GLY:HA2	1:A:330:VAL:HG11	1.74	0.68
1:A:1438:ASN:HA	1:A:1449:ARG:HH22	1.59	0.68
1:A:600:VAL:CG2	1:A:609:ARG:HG2	2.24	0.68
1:A:1354:LYS:HD2	1:A:1404:GLN:HG3	1.76	0.67
1:A:1048:ILE:CD1	1:A:1137:ARG:HB3	2.24	0.67
1:A:1366:LEU:O	1:A:1370:ARG:HG3	1.95	0.67
1:A:345:PHE:HB3	1:A:893:TRP:CZ2	2.29	0.67
1:A:834:ARG:O	1:A:839:PRO:HD3	1.94	0.66
1:A:142:PHE:CE1	1:A:197:PHE:HD2	2.13	0.66
1:A:149:TYR:CE1	1:A:157:SER:CB	2.70	0.66
1:A:482:ILE:CD1	1:A:609:ARG:NH2	2.57	0.66
1:A:1329:MET:CG	1:A:1358:ILE:HD11	2.24	0.66
1:A:600:VAL:HG23	1:A:609:ARG:CG	2.25	0.66
1:A:170:LEU:HD11	1:A:172:PHE:CE1	2.30	0.66
1:A:238:LEU:HD13	1:A:283:LYS:HE2	1.76	0.66
1:A:420:ASP:OD1	1:A:427:VAL:CG1	2.44	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:524:TYR:OH	1:A:566:LEU:CD2	2.39	0.66
1:A:512:ASP:HA	1:A:515:LYS:HE3	1.78	0.66
1:A:470:VAL:HG23	1:A:600:VAL:HG22	1.78	0.66
1:A:1418:TRP:HE1	1:A:1427:THR:HB	1.59	0.65
1:A:1247:ILE:HG13	1:A:1248:PRO:HD3	1.79	0.65
1:A:420:ASP:OD1	1:A:427:VAL:HG12	1.97	0.65
1:A:1003:LEU:HD21	1:A:1264:LYS:HB2	1.79	0.65
1:A:1098:ARG:HH21	1:A:1102:ILE:HD11	1.63	0.64
1:A:1333:ARG:HG2	1:A:1423:CYS:C	2.17	0.64
1:A:445:PRO:CG	1:A:462:ARG:HH21	2.11	0.64
1:A:418:TRP:HE1	1:A:648:LEU:HD11	1.62	0.64
1:A:335:GLU:HA	1:A:337:GLU:HG2	1.79	0.64
1:A:294:GLY:HA3	1:A:947:PRO:HB3	1.80	0.63
1:A:829:LEU:O	1:A:833:ARG:HB2	1.98	0.63
1:A:511:ILE:HG23	1:A:581:ILE:HD13	1.79	0.63
1:A:234:VAL:HG22	1:A:996:MET:CE	2.29	0.62
1:A:630:GLN:O	1:A:634:PHE:HD1	1.82	0.62
1:A:554:ILE:O	1:A:558:SER:HB3	1.98	0.62
1:A:835:THR:O	1:A:839:PRO:CD	2.47	0.62
1:A:553:VAL:O	1:A:557:LYS:HB2	2.01	0.61
1:A:398:LEU:CD2	1:A:866:THR:HG22	2.30	0.61
1:A:465:VAL:HG22	1:A:643:LEU:CD1	2.31	0.61
1:A:1091:ASN:OD1	1:A:1122:THR:HG23	2.00	0.61
1:A:524:TYR:CE1	1:A:566:LEU:HB3	2.36	0.61
1:A:1199:GLU:HG3	1:A:1229:THR:OG1	2.01	0.60
1:A:738:ASN:HD22	1:A:792:LEU:HD11	1.66	0.60
1:A:296:LYS:HE2	1:A:330:VAL:CG1	2.32	0.60
1:A:1339:TYR:HE2	1:A:1441:MET:SD	2.23	0.60
1:A:296:LYS:HG2	1:A:330:VAL:HG22	1.82	0.60
1:A:1058:GLN:CG	1:A:1073:ILE:HG22	2.30	0.60
1:A:600:VAL:HG23	1:A:609:ARG:HG2	1.82	0.60
1:A:289:GLU:OE1	1:A:289:GLU:HA	2.01	0.59
1:A:554:ILE:HD13	1:A:568:PHE:CE1	2.37	0.59
1:A:1048:ILE:HD11	1:A:1137:ARG:CD	2.30	0.59
1:A:406:ALA:HB2	1:A:839:PRO:HG2	1.84	0.59
1:A:572:PHE:O	1:A:572:PHE:CD1	2.55	0.59
1:A:805:ILE:HG12	1:A:810:VAL:HG22	1.84	0.59
1:A:40:PRO:HB3	1:A:224:ARG:HD2	1.85	0.58
1:A:899:SER:HA	1:A:943:VAL:O	2.02	0.58
1:A:1324:TYR:HD1	1:A:1326:PHE:CE1	2.20	0.58
1:A:1225:HIS:HE1	1:A:1308:ARG:HG2	1.68	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:554:ILE:O	1:A:558:SER:CB	2.52	0.58
1:A:536:SER:HA	1:A:549:ILE:HD13	1.86	0.58
1:A:472:VAL:O	1:A:503:PRO:HA	2.04	0.58
1:A:311:LEU:O	1:A:315:THR:CG2	2.51	0.57
1:A:998:VAL:HG22	1:A:1002:TRP:HB2	1.86	0.57
1:A:600:VAL:CG2	1:A:609:ARG:CG	2.81	0.57
1:A:1054:PRO:HB2	1:A:1057:VAL:HG21	1.87	0.57
1:A:520:LEU:HD23	1:A:529:ALA:HA	1.86	0.57
1:A:1339:TYR:CE2	1:A:1441:MET:SD	2.98	0.57
1:A:283:LYS:HZ3	1:A:285:LEU:HD11	1.70	0.57
1:A:465:VAL:HG22	1:A:643:LEU:HB2	1.87	0.57
1:A:1058:GLN:HG2	1:A:1073:ILE:CG2	2.31	0.56
1:A:524:TYR:CD2	1:A:558:SER:HA	2.39	0.56
1:A:915:VAL:HG12	1:A:946:ASN:ND2	2.20	0.56
1:A:283:LYS:NZ	1:A:285:LEU:HD21	2.20	0.56
1:A:1011:ASP:CG	1:A:1025:ARG:HH22	2.08	0.56
1:A:844:LEU:HD12	1:A:849:LEU:HB2	1.85	0.56
1:A:561:PRO:CG	1:A:566:LEU:HD23	2.31	0.56
1:A:566:LEU:CD1	1:A:568:PHE:CE2	2.89	0.56
1:A:1199:GLU:HG3	1:A:1229:THR:H	1.70	0.55
1:A:468:LEU:HD11	1:A:600:VAL:CG1	2.35	0.55
1:A:1247:ILE:HD12	1:A:1258:TYR:CD2	2.40	0.55
1:A:428:ILE:HA	1:A:502:VAL:HG12	1.88	0.55
1:A:600:VAL:HG23	1:A:609:ARG:HG3	1.88	0.55
1:A:398:LEU:HD23	1:A:866:THR:HG22	1.87	0.55
1:A:142:PHE:HE1	1:A:197:PHE:CD2	2.21	0.55
1:A:961:ARG:HG2	1:A:983:PHE:CE2	2.42	0.55
1:A:1247:ILE:HD12	1:A:1258:TYR:CE2	2.41	0.54
1:A:546:ASN:O	1:A:549:ILE:HG22	2.06	0.54
1:A:919:ALA:O	1:A:956:VAL:HG23	2.07	0.54
1:A:283:LYS:HZ2	1:A:285:LEU:HD21	1.73	0.54
1:A:234:VAL:HG22	1:A:996:MET:HE1	1.88	0.54
1:A:515:LYS:HG2	1:A:581:ILE:HD11	1.88	0.54
1:A:147:GLU:HA	1:A:159:GLY:O	2.07	0.54
1:A:142:PHE:HE2	1:A:201:ALA:HB2	1.72	0.54
1:A:144:ILE:HG12	1:A:183:VAL:HG12	1.89	0.54
1:A:468:LEU:HD11	1:A:600:VAL:HG12	1.90	0.54
1:A:991:LEU:HD23	1:A:1017:ARG:HG3	1.89	0.54
1:A:370:LEU:HD13	1:A:933:LEU:HD11	1.89	0.54
1:A:1309:THR:HG22	1:A:1310:ASP:O	2.08	0.54
1:A:1314:LEU:HG	1:A:1363:VAL:HG22	1.90	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:644:PRO:O	1:A:648:LEU:HD13	2.08	0.53
1:A:465:VAL:CG2	1:A:643:LEU:CD1	2.87	0.53
1:A:745:SER:O	1:A:748:VAL:HG22	2.08	0.53
1:A:1199:GLU:CG	1:A:1229:THR:OG1	2.57	0.53
1:A:341:ASN:OD1	1:A:893:TRP:CD1	2.61	0.53
1:A:991:LEU:HG	1:A:1017:ARG:HD2	1.90	0.53
1:A:535:LYS:C	1:A:549:ILE:HD11	2.28	0.53
1:A:92:ASP:HB2	1:A:94:HIS:CD2	2.43	0.53
1:A:174:ARG:O	1:A:213:ARG:HB3	2.09	0.53
1:A:840:VAL:HG21	1:A:863:THR:HA	1.91	0.53
1:A:1059:LEU:CD1	1:A:1074:ILE:HD11	2.33	0.53
1:A:1381:GLN:HG3	1:A:1403:MET:SD	2.48	0.53
1:A:282:ILE:HG13	1:A:990:THR:CG2	2.37	0.52
1:A:1098:ARG:HG3	1:A:1148:ASP:OD1	2.09	0.52
1:A:1306:ILE:HD11	1:A:1457:TRP:HD1	1.73	0.52
1:A:1439:ASN:HD22	1:A:1443:LYS:HA	1.73	0.52
1:A:566:LEU:CD1	1:A:568:PHE:CD2	2.89	0.52
1:A:235:GLU:HB2	1:A:958:ARG:HD2	1.91	0.52
1:A:1102:ILE:HD13	1:A:1146:GLU:HB2	1.91	0.52
1:A:1270:ARG:HD2	1:A:1386:SER:OG	2.09	0.52
1:A:415:ARG:HA	1:A:604:GLY:O	2.08	0.52
1:A:691:ALA:HB2	1:A:731:VAL:C	2.30	0.52
1:A:1324:TYR:CE1	1:A:1409:ILE:HG12	2.45	0.51
1:A:342:ARG:NE	1:A:342:ARG:O	2.33	0.51
1:A:290:LEU:HA	1:A:293:LEU:HD13	1.92	0.51
1:A:536:SER:HA	1:A:549:ILE:CD1	2.41	0.51
1:A:518:TYR:HB3	1:A:580:GLN:OE1	2.11	0.51
1:A:763:PHE:HD1	1:A:768:ASP:HB3	1.76	0.51
1:A:1368:ARG:O	1:A:1368:ARG:HD3	2.10	0.50
1:A:511:ILE:HG22	1:A:515:LYS:HE2	1.92	0.50
1:A:312:LEU:HD22	1:A:931:LYS:HD3	1.93	0.50
1:A:445:PRO:HD3	1:A:462:ARG:HH21	1.76	0.50
1:A:234:VAL:HG22	1:A:996:MET:HE2	1.94	0.50
1:A:429:ILE:HD11	1:A:501:PHE:CZ	2.46	0.50
1:A:548:ARG:O	1:A:552:GLU:HG3	2.12	0.50
1:A:1344:THR:HG22	1:A:1345:GLY:N	2.26	0.50
1:A:465:VAL:HG22	1:A:643:LEU:HD12	1.93	0.50
1:A:932:VAL:HG11	1:A:964:LEU:HG	1.94	0.50
1:A:415:ARG:HG2	1:A:415:ARG:HH11	1.77	0.50
1:A:484:VAL:O	1:A:488:LEU:HD12	2.11	0.50
1:A:149:TYR:CD2	1:A:154:LEU:CD1	2.95	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:79:LYS:O	1:A:83:GLU:HG2	2.11	0.50
1:A:349:GLY:HA2	1:A:917:ASN:HB2	1.94	0.50
1:A:668:THR:HG23	1:A:810:VAL:HB	1.94	0.49
1:A:915:VAL:HG12	1:A:946:ASN:HD22	1.77	0.49
1:A:1005:THR:HG21	1:A:1236:GLU:HG2	1.95	0.49
1:A:59:ILE:O	1:A:63:LEU:HG	2.13	0.49
1:A:546:ASN:O	1:A:549:ILE:CG2	2.61	0.49
1:A:174:ARG:O	1:A:213:ARG:CB	2.61	0.49
1:A:566:LEU:C	1:A:566:LEU:HD12	2.32	0.49
1:A:1247:ILE:CG1	1:A:1248:PRO:HD3	2.43	0.49
1:A:471:PRO:HA	1:A:502:VAL:O	2.12	0.49
1:A:1247:ILE:CD1	1:A:1258:TYR:CE2	2.95	0.49
1:A:420:ASP:OD1	1:A:427:VAL:HG13	2.13	0.49
1:A:447:ILE:HD11	1:A:637:LEU:HB3	1.95	0.49
1:A:1295:LEU:CD2	1:A:1298:VAL:HG23	2.38	0.49
1:A:427:VAL:CG2	1:A:584:SER:HA	2.43	0.49
1:A:524:TYR:CE2	1:A:558:SER:HA	2.48	0.48
1:A:290:LEU:O	1:A:293:LEU:HD13	2.13	0.48
1:A:1329:MET:SD	1:A:1358:ILE:CG1	3.01	0.48
1:A:1395:LEU:HD12	1:A:1396:ASP:N	2.27	0.48
1:A:468:LEU:HD22	1:A:617:MET:SD	2.54	0.48
1:A:1108:VAL:CG1	1:A:1134:LEU:HD22	2.40	0.48
1:A:66:ARG:O	1:A:71:HIS:CB	2.60	0.48
1:A:465:VAL:CG2	1:A:643:LEU:HD13	2.44	0.48
1:A:351:ASN:HA	1:A:915:VAL:O	2.13	0.48
1:A:1054:PRO:O	1:A:1074:ILE:CG2	2.62	0.48
1:A:1234:PHE:HB3	1:A:1239:LEU:HD11	1.95	0.48
1:A:130:SER:HB3	1:A:162:LYS:O	2.13	0.48
1:A:1422:TRP:HZ3	1:A:1437:CYS:CB	2.27	0.48
1:A:1444:GLU:OE2	1:A:1452:ARG:NH2	2.47	0.48
1:A:285:LEU:HA	1:A:285:LEU:HD13	1.76	0.48
1:A:691:ALA:HA	1:A:725:ARG:HH21	1.78	0.47
1:A:443:PHE:CD1	1:A:460:GLN:HB3	2.49	0.47
1:A:691:ALA:HB2	1:A:731:VAL:O	2.15	0.47
1:A:445:PRO:CD	1:A:462:ARG:HH21	2.27	0.47
1:A:423:GLU:CD	1:A:590:ARG:HH11	2.18	0.47
1:A:726:LYS:HE3	1:A:761:LEU:HB2	1.95	0.47
1:A:170:LEU:HB2	1:A:171:PRO:HD2	1.96	0.47
1:A:511:ILE:HG22	1:A:515:LYS:CE	2.44	0.47
1:A:1344:THR:HG22	1:A:1345:GLY:H	1.80	0.47
1:A:1008:VAL:HB	1:A:1033:ILE:HB	1.96	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1422:TRP:CZ3	1:A:1437:CYS:HB2	2.44	0.46
1:A:991:LEU:CD2	1:A:1017:ARG:HG3	2.45	0.46
1:A:645:GLY:HA2	1:A:648:LEU:HB2	1.96	0.46
1:A:164:GLU:HB3	1:A:168:ARG:HH12	1.80	0.46
1:A:520:LEU:CD2	1:A:529:ALA:HA	2.46	0.46
1:A:838:LEU:HD23	1:A:838:LEU:HA	1.75	0.46
1:A:1307:VAL:HG22	1:A:1433:THR:CG2	2.46	0.46
1:A:465:VAL:HG22	1:A:643:LEU:CB	2.45	0.46
1:A:105:LEU:HD13	1:A:966:SER:HA	1.97	0.46
1:A:1330:CYS:HA	1:A:1414:GLN:OE1	2.16	0.46
1:A:763:PHE:HD1	1:A:768:ASP:CB	2.29	0.46
1:A:1111:LYS:HG3	1:A:1119:ASP:HB3	1.98	0.46
1:A:296:LYS:HG2	1:A:330:VAL:CG2	2.45	0.46
1:A:548:ARG:O	1:A:552:GLU:OE2	2.34	0.46
1:A:916:ILE:O	1:A:945:LEU:HA	2.16	0.46
1:A:170:LEU:HD11	1:A:172:PHE:CZ	2.51	0.45
1:A:406:ALA:CB	1:A:839:PRO:HG2	2.45	0.45
1:A:861:LYS:O	1:A:865:VAL:HG23	2.17	0.45
1:A:361:ILE:HG13	1:A:364:GLN:HG3	1.98	0.45
1:A:1312:TYR:O	1:A:1315:VAL:N	2.49	0.45
1:A:708:ASP:O	1:A:714:GLY:HA3	2.16	0.45
1:A:740:LYS:HB2	1:A:800:GLY:HA3	1.99	0.45
1:A:998:VAL:HG23	1:A:1002:TRP:CE3	2.52	0.45
1:A:1333:ARG:NH2	1:A:1420:GLU:HG2	2.31	0.45
1:A:317:ASP:O	1:A:320:LYS:HB3	2.17	0.45
1:A:355:LEU:HD11	1:A:910:ILE:HG23	1.98	0.45
1:A:131:LEU:HD11	1:A:148:GLN:OE1	2.16	0.45
1:A:1439:ASN:OD1	1:A:1439:ASN:N	2.50	0.45
1:A:1046:ARG:NH2	1:A:1113:TRP:O	2.50	0.45
1:A:314:LEU:HD12	1:A:321:TYR:HD2	1.82	0.45
1:A:802:ASN:HB2	1:A:814:ILE:HB	1.98	0.45
1:A:1223:MET:HG3	1:A:1254:TYR:HB3	1.98	0.45
1:A:1275:LYS:O	1:A:1278:GLU:HB2	2.16	0.45
1:A:1340:ARG:HD3	1:A:1342:TRP:CZ2	2.51	0.45
1:A:423:GLU:OE1	1:A:590:ARG:NH1	2.50	0.45
1:A:524:TYR:CE2	1:A:558:SER:CB	2.94	0.45
1:A:349:GLY:HA2	1:A:946:ASN:O	2.17	0.44
1:A:554:ILE:HD13	1:A:568:PHE:HE1	1.78	0.44
1:A:602:PHE:HZ	1:A:621:LEU:HD13	1.82	0.44
1:A:406:ALA:HB2	1:A:839:PRO:CG	2.47	0.44
1:A:536:SER:N	1:A:549:ILE:HD11	2.33	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1093:ARG:NH1	1:A:1096:GLU:HG3	2.32	0.44
1:A:1306:ILE:HD11	1:A:1457:TRP:CD1	2.51	0.44
1:A:355:LEU:HD13	1:A:912:PHE:CZ	2.53	0.44
1:A:144:ILE:HB	1:A:149:TYR:HE2	1.83	0.44
1:A:738:ASN:HD22	1:A:792:LEU:CD1	2.30	0.44
1:A:998:VAL:CG2	1:A:1002:TRP:HE3	2.31	0.44
1:A:1111:LYS:HB3	1:A:1116:ILE:HD12	2.00	0.44
1:A:971:ASP:HB2	1:A:975:LYS:O	2.18	0.44
1:A:835:THR:O	1:A:839:PRO:HG2	2.17	0.44
1:A:1449:ARG:HB3	1:A:1453:GLN:OE1	2.19	0.43
1:A:465:VAL:CG2	1:A:643:LEU:HD12	2.47	0.43
1:A:471:PRO:HB2	1:A:504:LEU:HD21	1.99	0.43
1:A:465:VAL:HG21	1:A:643:LEU:HD13	2.00	0.43
1:A:888:THR:O	1:A:891:LYS:HG2	2.18	0.43
1:A:142:PHE:HZ	1:A:197:PHE:O	2.02	0.43
1:A:576:LYS:O	1:A:580:GLN:HB2	2.19	0.43
1:A:1005:THR:HG22	1:A:1237:GLN:HA	2.01	0.43
1:A:1417:LEU:HD12	1:A:1417:LEU:HA	1.88	0.43
1:A:346:LEU:HD11	1:A:893:TRP:HH2	1.81	0.43
1:A:1066:ASN:HA	1:A:1067:PRO:HD3	1.70	0.43
1:A:1428:LEU:HD12	1:A:1431:ALA:CB	2.42	0.43
1:A:443:PHE:CE1	1:A:460:GLN:CB	3.02	0.43
1:A:1003:LEU:HD12	1:A:1038:HIS:HB2	1.99	0.43
1:A:113:THR:OG1	1:A:114:PRO:HD3	2.19	0.43
1:A:1266:PRO:HD2	1:A:1269:LEU:HD23	2.00	0.43
1:A:154:LEU:O	1:A:154:LEU:HG	2.19	0.43
1:A:179:GLY:HA3	1:A:210:ALA:HA	2.01	0.43
1:A:828:PHE:O	1:A:832:GLU:HB2	2.18	0.43
1:A:1074:ILE:HD13	1:A:1081:PHE:HB3	2.00	0.43
1:A:1098:ARG:HG2	1:A:1148:ASP:HA	2.01	0.43
1:A:418:TRP:NE1	1:A:648:LEU:HD11	2.30	0.43
1:A:142:PHE:HA	1:A:184:ILE:O	2.19	0.42
1:A:719:TYR:O	1:A:723:ARG:HG3	2.20	0.42
1:A:998:VAL:CG2	1:A:1002:TRP:CE3	3.02	0.42
1:A:335:GLU:HG3	1:A:335:GLU:O	2.19	0.42
1:A:524:TYR:HD2	1:A:558:SER:HA	1.84	0.42
1:A:1231:LYS:HD3	1:A:1233:TRP:CZ2	2.54	0.42
1:A:244:ILE:CG1	1:A:285:LEU:HD12	2.43	0.42
1:A:345:PHE:CD1	1:A:345:PHE:C	2.92	0.42
1:A:679:ASN:ND2	1:A:791:PHE:HB2	2.35	0.42
1:A:1093:ARG:HH12	1:A:1096:GLU:HG3	1.85	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:370:LEU:HD13	1:A:933:LEU:CD1	2.48	0.42
1:A:1054:PRO:HB2	1:A:1057:VAL:CG2	2.50	0.42
1:A:998:VAL:HG23	1:A:1002:TRP:HE3	1.85	0.42
1:A:528:ALA:O	1:A:531:ALA:HB3	2.20	0.41
1:A:961:ARG:HD3	1:A:961:ARG:HA	1.93	0.41
1:A:1309:THR:OG1	1:A:1432:ARG:HB3	2.19	0.41
1:A:573:ILE:HB	1:A:576:LYS:CB	2.46	0.41
1:A:686:VAL:O	1:A:688:VAL:HG23	2.20	0.41
1:A:835:THR:O	1:A:839:PRO:CG	2.69	0.41
1:A:407:LYS:HD2	1:A:870:THR:OG1	2.21	0.41
1:A:243:TYR:CD1	1:A:285:LEU:CD2	2.99	0.41
1:A:366:GLN:CG	1:A:369:GLY:H	2.34	0.41
1:A:378:ARG:O	1:A:382:LYS:HG3	2.21	0.41
1:A:568:PHE:HB3	1:A:569:LYS:H	1.45	0.41
1:A:367:PRO:HD3	1:A:962:TYR:OH	2.20	0.41
1:A:1047:GLU:O	1:A:1051:ALA:HA	2.21	0.41
1:A:1445:PRO:HD2	1:A:1448:ASP:OD2	2.20	0.41
1:A:427:VAL:HG23	1:A:584:SER:HA	2.03	0.41
1:A:1111:LYS:HG3	1:A:1119:ASP:CB	2.49	0.41
1:A:574:SER:O	1:A:578:GLU:HB2	2.21	0.41
1:A:586:HIS:O	1:A:590:ARG:HB2	2.21	0.41
1:A:366:GLN:HG2	1:A:369:GLY:H	1.85	0.41
1:A:691:ALA:HA	1:A:725:ARG:NH2	2.36	0.41
1:A:689:ILE:HD12	1:A:733:LEU:HD23	2.02	0.41
1:A:1226:THR:OG1	1:A:1228:HIS:HB2	2.20	0.41
1:A:1438:ASN:CA	1:A:1449:ARG:HH22	2.29	0.41
1:A:294:GLY:CA	1:A:947:PRO:HB3	2.50	0.41
1:A:1354:LYS:HA	1:A:1355:PRO:HD3	1.94	0.41
1:A:333:GLU:O	1:A:333:GLU:HG2	2.21	0.41
1:A:464:ASP:OD2	1:A:642:TRP:NE1	2.52	0.41
1:A:1090:TYR:HB2	1:A:1124:VAL:HG23	2.02	0.40
1:A:1073:ILE:HG23	1:A:1293:LEU:HD21	2.03	0.40
1:A:1345:GLY:O	1:A:1349:ASN:CG	2.60	0.40
1:A:345:PHE:HB3	1:A:893:TRP:CE2	2.56	0.40
1:A:32:ASN:OD1	1:A:980:SER:HB3	2.22	0.40
1:A:1247:ILE:HG13	1:A:1248:PRO:CD	2.50	0.40
1:A:1460:TYR:O	1:A:1464:ILE:HG12	2.21	0.40
1:A:64:LEU:HA	1:A:64:LEU:HD12	1.92	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	1371/1494 (92%)	1311 (96%)	56 (4%)	4 (0%)	43 74

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	569	LYS
1	A	288	SER
1	A	1439	ASN
1	A	666	GLU

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	1204/1298 (93%)	1186 (98%)	18 (2%)	67 89

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	222	HIS
1	A	308	PHE
1	A	323	ASN
1	A	342	ARG
1	A	363	ARG
1	A	437	ASP
1	A	513	GLN

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Mol	Chain	Res	Type
1	A	611	CYS
1	A	612	ASN
1	A	758	ASP
1	A	820	PHE
1	A	971	ASP
1	A	1066	ASN
1	A	1123	GLU
1	A	1203	PHE
1	A	1330	CYS
1	A	1437	CYS
1	A	1439	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

8 ligands 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
2	NAG	A	1601	1	14,14,15	0.40	0	17,19,21	0.86	0
2	NAG	A	1602	1	14,14,15	0.31	0	17,19,21	0.68	0
2	NAG	A	1603	1,2	14,14,15	0.34	0	17,19,21	1.11	1 (5%)
2	NAG	A	1604	3,2	14,14,15	0.33	0	17,19,21	0.63	0
3	BMA	A	1605	2	11,11,12	0.35	0	15,15,17	0.36	0
2	NAG	A	1606	1	14,14,15	0.41	0	17,19,21	1.02	1 (5%)
2	NAG	A	1607	1	14,14,15	0.28	0	17,19,21	0.54	0
4	FMT	A	1608	-	0,2,2	0.00	-	0,1,1	0.00	-

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
2	NAG	A	1601	1	-	0/6/23/26	0/1/1/1
2	NAG	A	1602	1	-	0/6/23/26	0/1/1/1
2	NAG	A	1603	1,2	-	0/6/23/26	0/1/1/1
2	NAG	A	1604	3,2	-	0/6/23/26	0/1/1/1
3	BMA	A	1605	2	-	0/2/19/22	0/1/1/1
2	NAG	A	1606	1	-	0/6/23/26	0/1/1/1
2	NAG	A	1607	1	-	0/6/23/26	0/1/1/1
4	FMT	A	1608	-	-	0/0/0/0	0/0/0/0

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1603	NAG	O5-C1-C2	-3.88	106.17	111.52
2	A	1606	NAG	C1-O5-C5	3.70	117.28	112.19

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

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

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	1377/1494 (92%)	0.69	104 (7%) 14 9	61, 103, 155, 264	0

All (104) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	549	ILE	7.3
1	A	519	TYR	5.6
1	A	1351	LEU	5.5
1	A	567	SER	5.3
1	A	524	TYR	5.2
1	A	281	ASP	4.5
1	A	1151	GLU	4.5
1	A	568	PHE	4.3
1	A	450	LEU	4.0
1	A	540	GLN	4.0
1	A	544	GLN	4.0
1	A	546	ASN	3.8
1	A	575	GLU	3.8
1	A	676	TYR	3.8
1	A	1217	ILE	3.7
1	A	574	SER	3.7
1	A	136	GLU	3.6
1	A	484	VAL	3.6
1	A	283	LYS	3.6
1	A	539	GLU	3.5
1	A	1059	LEU	3.4
1	A	1334	VAL	3.4
1	A	1149	VAL	3.4
1	A	1287	LEU	3.1
1	A	550	PHE	3.1
1	A	557	LYS	3.1
1	A	545	PRO	3.1

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Mol	Chain	Res	Type	RSRZ
1	A	1324	TYR	3.1
1	A	753	LEU	3.0
1	A	565	GLU	3.0
1	A	933	LEU	3.0
1	A	849	LEU	2.9
1	A	862	LEU	2.9
1	A	643	LEU	2.9
1	A	548	ARG	2.9
1	A	520	LEU	2.9
1	A	878	ILE	2.8
1	A	769	LEU	2.8
1	A	243	TYR	2.8
1	A	621	LEU	2.8
1	A	637	LEU	2.8
1	A	892	GLN	2.8
1	A	857	LEU	2.7
1	A	469	VAL	2.7
1	A	532	TYR	2.7
1	A	1361	LEU	2.7
1	A	1395	LEU	2.7
1	A	238	LEU	2.7
1	A	1210	LEU	2.7
1	A	468	LEU	2.7
1	A	501	PHE	2.7
1	A	554	ILE	2.6
1	A	633	TYR	2.6
1	A	185	LEU	2.6
1	A	566	LEU	2.6
1	A	954	LEU	2.6
1	A	1358	ILE	2.6
1	A	168	ARG	2.5
1	A	429	ILE	2.5
1	A	1202	ILE	2.5
1	A	387	LEU	2.5
1	A	411	ASP	2.5
1	A	1293	LEU	2.5
1	A	490	PHE	2.5
1	A	1326	PHE	2.5
1	A	1405	PHE	2.5
1	A	523	ASN	2.5
1	A	44	TYR	2.4
1	A	558	SER	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	697	ARG	2.4
1	A	447	ILE	2.4
1	A	516	VAL	2.4
1	A	889	LEU	2.4
1	A	443	PHE	2.4
1	A	503	PRO	2.4
1	A	555	LYS	2.4
1	A	285	LEU	2.3
1	A	688	VAL	2.3
1	A	1364	VAL	2.3
1	A	431	LEU	2.3
1	A	512	ASP	2.3
1	A	556	ASP	2.3
1	A	45	LEU	2.2
1	A	1060	VAL	2.2
1	A	1298	VAL	2.2
1	A	187	ALA	2.2
1	A	321	TYR	2.2
1	A	1342	TRP	2.2
1	A	153	THR	2.2
1	A	1125	VAL	2.1
1	A	1049	PRO	2.1
1	A	622	MET	2.1
1	A	1019	LYS	2.1
1	A	844	LEU	2.1
1	A	1010	VAL	2.1
1	A	448	TRP	2.1
1	A	1307	VAL	2.1
1	A	1430	ASP	2.1
1	A	634	PHE	2.1
1	A	533	LEU	2.1
1	A	1393	ALA	2.0
1	A	733	LEU	2.0
1	A	1464	ILE	2.0
1	A	773	LEU	2.0

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

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

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [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
2	NAG	A	1606	14/15	0.61	0.22	150,155,163,163	0
3	BMA	A	1605	11/12	0.67	0.22	144,147,153,154	0
2	NAG	A	1601	14/15	0.70	0.46	150,155,158,158	0
2	NAG	A	1602	14/15	0.75	0.17	148,153,161,162	0
2	NAG	A	1604	14/15	0.78	0.21	127,131,139,142	0
2	NAG	A	1607	14/15	0.78	0.21	215,221,224,226	0
2	NAG	A	1603	14/15	0.88	0.14	107,111,119,123	0
4	FMT	A	1608	3/3	0.90	0.20	72,72,72,73	0

6.5 Other polymers [i](#)

There are no such residues in this entry.