



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 11, 2021 – 02:22 PM EDT

PDB ID : 2OPR  
Title : Crystal Structure of K101E Mutant HIV-1 Reverse Transcriptase in Complex with GW420867X.  
Authors : Ren, J.; Nichols, C.E.; Chamberlain, P.P.; Weaver, K.L.; Short, S.A.; Chan, J.H.; Kleim, J.; Stammers, D.K.  
Deposited on : 2007-01-30  
Resolution : 2.90 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](mailto: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.

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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 : 2.23.2  
buster-report : 1.1.7 (2018)  
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) : 2.23.2

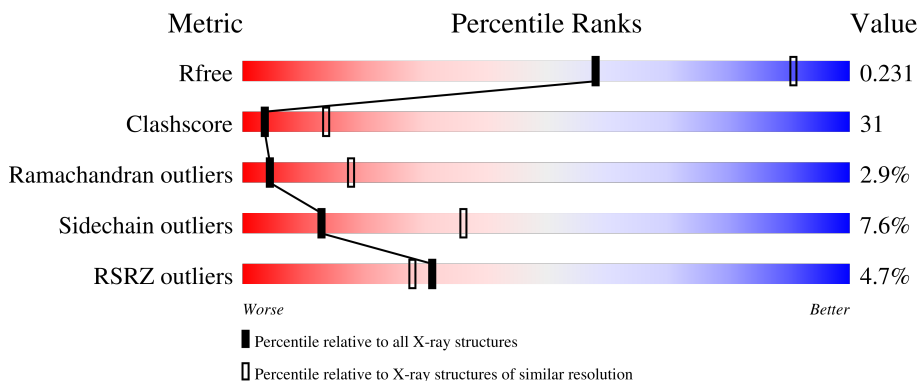
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.90 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	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (2.90-2.90)

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  $\geq 3$ , 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	547	 4% 41% 50% 7%
2	B	426	 5% 45% 46% 6%

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 7734 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 Reverse transcriptase/ribonuclease H.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	539	4401	2845	733	815	8	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	101	GLU	LYS	engineered mutation	UNP P04585
A	280	CSD	CYS	modified residue	UNP P04585

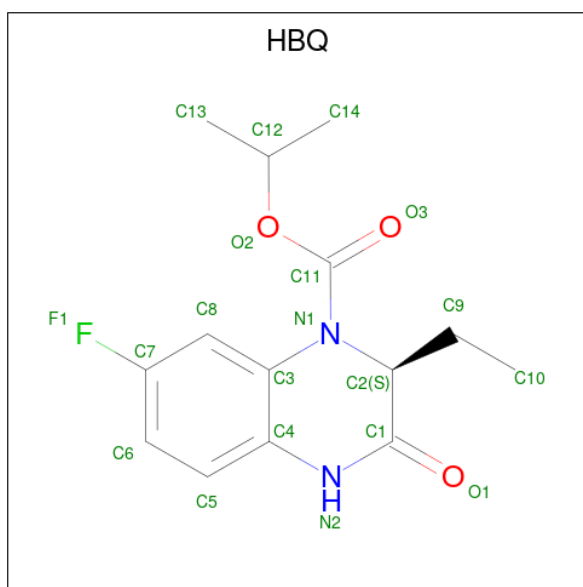
- Molecule 2 is a protein called p51 RT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	400	3313	2151	551	604	7	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	101	GLU	LYS	engineered mutation	UNP P04585

- Molecule 3 is ISOPROPYL (2S)-2-ETHYL-7-FLUORO-3-OXO-3,4-DIHYDROQUINOXALINE-1(2H)-CARBOXYLATE (three-letter code: HBQ) (formula: C<sub>14</sub>H<sub>17</sub>FN<sub>2</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	F	N	O		
3	A	1	20	14	1	2	3	0	0

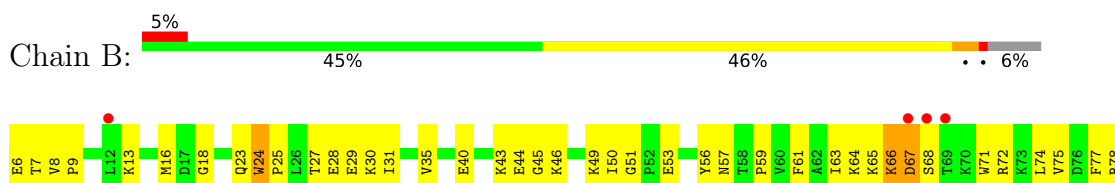
### 3 Residue-property plots

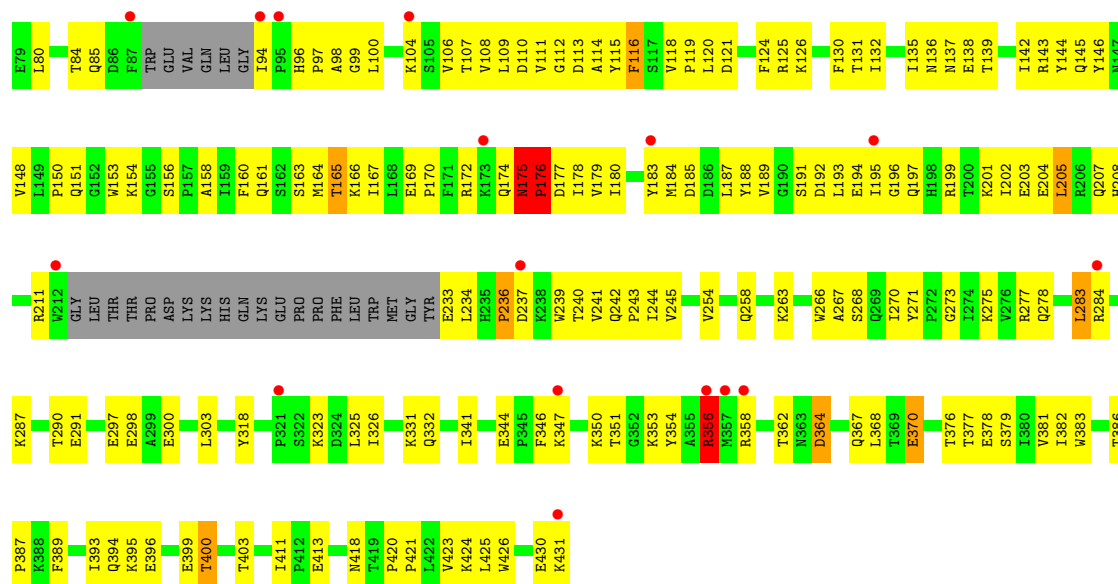
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

#### • Molecule 1: Reverse transcriptase/ribonuclease H



#### • Molecule 2: p51 RT





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	138.00Å 109.30Å 72.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.48 – 2.90 29.48 – 2.90	Depositor EDS
% Data completeness (in resolution range)	96.2 (29.48-2.90) 96.3 (29.48-2.90)	Depositor EDS
$R_{merge}$	0.05	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.22 (at 2.90Å)	Xtrriage
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.232 , 0.303 0.219 , 0.231	Depositor DCC
$R_{free}$ test set	1160 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	81.2	Xtrriage
Anisotropy	0.493	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 99.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	7734	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	92.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.05% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>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: CSD, HBQ

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	0.57	0/4506	0.77	0/6123
2	B	0.57	0/3404	0.78	3/4620 (0.1%)
All	All	0.57	0/7910	0.77	3/10743 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	175	ASN	C-N-CD	-7.82	103.40	120.60
2	B	241	VAL	N-CA-C	-5.43	96.33	111.00
2	B	67	ASP	N-CA-C	5.07	124.67	111.00

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	4401	0	4429	320	1
2	B	3313	0	3342	182	1
3	A	20	0	17	5	0
All	All	7734	0	7788	487	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 31.

All (487) 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:175:ASN:HB3	1:A:178:ILE:HD12	1.32	1.09
1:A:5:ILE:HD13	1:A:5:ILE:H	1.24	1.02
2:B:197:GLN:HB3	2:B:201:LYS:HE2	1.48	0.94
2:B:350:LYS:HE3	2:B:378:GLU:OE1	1.68	0.93
1:A:57:ASN:HD22	1:A:143:ARG:NH2	1.68	0.89
1:A:57:ASN:HD21	1:A:131:THR:HG22	1.36	0.89
1:A:277:ARG:NH1	1:A:277:ARG:HB2	1.90	0.87
2:B:163:SER:O	2:B:167:ILE:HG23	1.75	0.86
2:B:195:ILE:HD11	2:B:199:ARG:NH2	1.91	0.85
1:A:451:LYS:O	1:A:471:ASP:N	2.11	0.84
2:B:239:TRP:HB3	2:B:350:LYS:HE2	1.60	0.84
1:A:94:ILE:HD13	1:A:94:ILE:H	1.44	0.81
1:A:501:TYR:CE2	1:A:505:ILE:HD12	2.17	0.80
1:A:277:ARG:HB2	1:A:277:ARG:HH11	1.46	0.79
1:A:57:ASN:HD22	1:A:143:ARG:HH21	1.29	0.79
1:A:277:ARG:HH11	1:A:277:ARG:CB	1.96	0.79
1:A:169:GLU:HB3	1:A:170:PRO:HD3	1.63	0.78
1:A:181:TYR:HD1	3:A:999:HBQ:H12	1.47	0.78
1:A:123:ASP:O	1:A:126:LYS:HE2	1.84	0.78
2:B:108:VAL:HG22	2:B:188:TYR:CE1	2.19	0.77
1:A:543:GLY:HA3	2:B:283:LEU:O	1.83	0.77
2:B:240:THR:O	2:B:350:LYS:HG3	1.83	0.77
1:A:5:ILE:H	1:A:5:ILE:CD1	1.93	0.77
1:A:211:ARG:HG2	1:A:211:ARG:HH11	1.49	0.77
1:A:451:LYS:HE3	1:A:471:ASP:OD2	1.85	0.77
1:A:356:ARG:HG3	1:A:356:ARG:HH11	1.49	0.76
1:A:340:GLN:HB3	1:A:351:THR:HG22	1.64	0.76
2:B:194:GLU:OE1	2:B:197:GLN:HG3	1.86	0.75
2:B:267:ALA:HB2	2:B:426:TRP:CH2	2.21	0.74
2:B:267:ALA:HB2	2:B:426:TRP:CZ3	2.21	0.74
2:B:114:ALA:HB1	2:B:160:PHE:CZ	2.22	0.73
1:A:180:ILE:HG12	1:A:189:VAL:HG13	1.70	0.73
1:A:149:LEU:HD21	1:A:159:ILE:CG2	2.18	0.73
1:A:241:VAL:HG21	1:A:270:ILE:HG21	1.71	0.72
1:A:23:GLN:HG3	1:A:133:PRO:HG3	1.69	0.72
1:A:501:TYR:CD2	1:A:505:ILE:HD12	2.24	0.72
1:A:443:ASP:OD2	1:A:548:VAL:HB	1.89	0.72
2:B:57:ASN:HD22	2:B:143:ARG:NH1	1.86	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:436:GLY:O	1:A:461:ARG:NH2	2.23	0.72
1:A:206:ARG:NH1	1:A:216:THR:HB	2.04	0.71
1:A:106:VAL:HG23	1:A:236:PRO:HB3	1.72	0.71
2:B:180:ILE:HG12	2:B:189:VAL:HG12	1.72	0.70
2:B:197:GLN:HB3	2:B:201:LYS:CE	2.21	0.70
1:A:454:LYS:HA	1:A:467:VAL:O	1.91	0.70
2:B:239:TRP:CE3	2:B:378:GLU:HG3	2.26	0.70
1:A:447:ASN:HB3	1:A:450:THR:OG1	1.91	0.70
1:A:380:ILE:HG22	2:B:25:PRO:HB2	1.72	0.69
1:A:58:THR:HG23	1:A:76:ASP:O	1.93	0.69
1:A:270:ILE:HG22	1:A:314:VAL:HG11	1.75	0.69
1:A:409:THR:O	2:B:364:ASP:HB2	1.92	0.69
2:B:31:ILE:O	2:B:35:VAL:HG23	1.93	0.68
2:B:424:LYS:HD2	2:B:425:LEU:HD12	1.75	0.68
1:A:18:GLY:HA3	1:A:56:TYR:CD1	2.28	0.68
2:B:108:VAL:HG22	2:B:188:TYR:CD1	2.28	0.68
1:A:50:ILE:O	1:A:143:ARG:HB2	1.93	0.68
1:A:270:ILE:CG2	1:A:314:VAL:HG11	2.23	0.68
1:A:33:ALA:HB1	1:A:71:TRP:HB2	1.77	0.67
1:A:443:ASP:CB	1:A:548:VAL:HG11	2.23	0.67
2:B:172:ARG:O	2:B:176:PRO:HD3	1.94	0.67
1:A:12:LEU:HD11	1:A:127:TYR:CE1	2.30	0.67
1:A:156:SER:HB2	1:A:157:PRO:HD3	1.76	0.67
2:B:239:TRP:O	2:B:240:THR:HG23	1.95	0.67
2:B:344:GLU:HB2	2:B:347:LYS:HD2	1.75	0.67
1:A:57:ASN:HD21	1:A:131:THR:CG2	2.08	0.67
1:A:57:ASN:ND2	1:A:131:THR:HG22	2.09	0.67
1:A:58:THR:HG23	1:A:59:PRO:HD2	1.76	0.67
1:A:57:ASN:ND2	1:A:143:ARG:HH21	1.94	0.66
2:B:29:GLU:OE1	2:B:71:TRP:CZ2	2.48	0.66
1:A:244:ILE:HB	1:A:310:LEU:CD1	2.26	0.66
2:B:84:THR:HB	2:B:154:LYS:HE2	1.77	0.66
1:A:5:ILE:HD13	1:A:5:ILE:N	2.07	0.65
2:B:179:VAL:O	2:B:189:VAL:HA	1.97	0.65
1:A:451:LYS:HA	1:A:472:THR:O	1.96	0.65
2:B:24:TRP:CZ3	2:B:403:THR:HG21	2.31	0.65
1:A:406:TRP:CH2	2:B:418:ASN:HA	2.31	0.65
1:A:340:GLN:CB	1:A:351:THR:HG22	2.27	0.65
1:A:493:VAL:HG22	1:A:494:ASN:N	2.12	0.65
2:B:29:GLU:OE1	2:B:71:TRP:HZ2	1.79	0.65
2:B:287:LYS:HD3	2:B:291:GLU:OE1	1.96	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:115:TYR:CD1	2:B:156:SER:HB3	2.32	0.65
2:B:195:ILE:HD11	2:B:199:ARG:CZ	2.25	0.65
1:A:100:LEU:HD23	2:B:138:GLU:OE1	1.97	0.65
2:B:325:LEU:HD21	2:B:383:TRP:CE3	2.32	0.64
1:A:4:PRO:HB2	1:A:5:ILE:HD13	1.78	0.64
1:A:79:GLU:O	1:A:83:ARG:HD2	1.97	0.64
2:B:104:LYS:HB3	2:B:192:ASP:HA	1.78	0.64
1:A:175:ASN:CB	1:A:178:ILE:HD12	2.20	0.64
1:A:91:GLN:HG3	1:A:93:GLY:O	1.98	0.64
1:A:239:TRP:CE2	1:A:316:GLY:HA3	2.33	0.64
1:A:181:TYR:CD1	3:A:999:HBQ:H12	2.31	0.63
1:A:349:LEU:HD12	1:A:383:TRP:CZ2	2.34	0.63
1:A:301:LEU:C	1:A:301:LEU:HD23	2.18	0.63
1:A:518:VAL:O	1:A:522:ILE:HG13	1.98	0.63
1:A:540:LYS:HB3	1:A:542:ILE:HG13	1.80	0.63
2:B:244:ILE:HD12	2:B:430:GLU:HG2	1.81	0.63
2:B:421:PRO:O	2:B:425:LEU:HD13	1.99	0.63
1:A:107:THR:HG22	1:A:108:VAL:H	1.63	0.63
1:A:116:PHE:CZ	1:A:151:GLN:HB2	2.34	0.63
1:A:443:ASP:HB2	1:A:548:VAL:HG11	1.80	0.63
1:A:505:ILE:O	1:A:510:PRO:CD	2.47	0.63
2:B:239:TRP:HE3	2:B:382:ILE:HD11	1.64	0.62
1:A:370:GLU:O	1:A:373:GLN:HG3	1.99	0.62
1:A:478:GLU:O	1:A:481:ALA:HB3	1.98	0.62
2:B:332:GLN:NE2	2:B:424:LYS:HE2	2.15	0.62
1:A:38:CYS:HB3	1:A:144:TYR:CE1	2.34	0.62
1:A:136:ASN:O	1:A:138:GLU:N	2.33	0.62
1:A:229:TRP:CD1	1:A:230:MET:HG2	2.35	0.62
1:A:346:PHE:N	1:A:346:PHE:CD2	2.67	0.62
2:B:254:VAL:O	2:B:258:GLN:HG3	2.00	0.61
1:A:247:PRO:O	1:A:307:ARG:NH2	2.29	0.61
1:A:379:SER:HB3	1:A:383:TRP:CE3	2.35	0.61
2:B:174:GLN:O	2:B:174:GLN:HG2	2.00	0.61
1:A:206:ARG:HH11	1:A:216:THR:HB	1.65	0.61
1:A:107:THR:HG22	1:A:108:VAL:N	2.15	0.61
1:A:380:ILE:O	1:A:384:GLY:HA2	2.01	0.61
1:A:5:ILE:O	1:A:119:PRO:HG3	2.01	0.61
1:A:132:ILE:HB	1:A:142:ILE:HB	1.83	0.60
2:B:278:GLN:HG3	2:B:298:GLU:HB3	1.83	0.60
2:B:396:GLU:O	2:B:400:THR:HG23	2.02	0.60
1:A:514:GLU:HG3	1:A:515:SER:N	2.17	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3:SER:OG	1:A:4:PRO:HD2	2.02	0.60
1:A:211:ARG:HG2	1:A:211:ARG:NH1	2.16	0.60
2:B:233:GLU:HA	2:B:233:GLU:OE2	2.01	0.60
1:A:110:ASP:O	1:A:217:PRO:HD3	2.02	0.60
1:A:451:LYS:HB3	1:A:472:THR:N	2.16	0.59
1:A:402:TRP:CH2	2:B:362:THR:HA	2.37	0.59
2:B:7:THR:HG22	2:B:119:PRO:HG2	1.85	0.59
1:A:94:ILE:H	1:A:94:ILE:CD1	2.16	0.59
1:A:159:ILE:HG22	1:A:160:PHE:N	2.16	0.59
2:B:191:SER:HB2	2:B:193:LEU:HD12	1.85	0.59
2:B:195:ILE:HG23	2:B:196:GLY:N	2.18	0.59
1:A:377:THR:O	1:A:381:VAL:HG23	2.02	0.59
2:B:195:ILE:HG23	2:B:196:GLY:H	1.66	0.59
1:A:23:GLN:CG	1:A:133:PRO:HG3	2.33	0.59
1:A:218:ASP:N	1:A:221:HIS:HD2	2.00	0.59
2:B:354:TYR:OH	2:B:370:GLU:HB3	2.03	0.58
1:A:102:LYS:HG3	1:A:237:ASP:HA	1.85	0.58
1:A:335:GLY:O	1:A:356:ARG:HA	2.04	0.58
2:B:344:GLU:CB	2:B:347:LYS:HD2	2.34	0.58
1:A:503:LEU:O	1:A:507:GLN:HB3	2.04	0.57
2:B:267:ALA:CB	2:B:426:TRP:CH2	2.87	0.57
2:B:350:LYS:CE	2:B:378:GLU:OE1	2.49	0.57
1:A:23:GLN:OE1	1:A:60:VAL:HG12	2.04	0.57
1:A:149:LEU:HD21	1:A:159:ILE:HG21	1.85	0.57
1:A:218:ASP:H	1:A:221:HIS:HD2	1.52	0.57
2:B:74:LEU:HD12	2:B:75:VAL:N	2.18	0.57
1:A:51:GLY:HA2	1:A:143:ARG:HD3	1.87	0.57
1:A:475:GLN:OE1	1:A:501:TYR:CZ	2.58	0.57
1:A:505:ILE:O	1:A:510:PRO:HG2	2.04	0.57
2:B:6:GLU:HG2	2:B:6:GLU:O	2.04	0.57
1:A:324:ASP:O	1:A:343:GLN:HG2	2.03	0.57
1:A:441:TYR:CD2	1:A:544:GLY:HA3	2.40	0.57
2:B:94:ILE:HG13	2:B:94:ILE:O	2.05	0.57
2:B:120:LEU:HD23	2:B:125:ARG:HG2	1.85	0.57
1:A:239:TRP:CZ2	1:A:316:GLY:HA3	2.40	0.57
1:A:443:ASP:HB3	1:A:548:VAL:CG1	2.35	0.57
1:A:443:ASP:HB3	1:A:548:VAL:HG11	1.87	0.57
1:A:500:GLN:NE2	1:A:535:TRP:CZ2	2.73	0.57
1:A:501:TYR:CE2	1:A:505:ILE:CD1	2.86	0.56
2:B:197:GLN:O	2:B:201:LYS:HG3	2.05	0.56
1:A:446:ALA:HB2	1:A:477:THR:HG21	1.87	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:516:GLU:O	1:A:519:ASN:HB2	2.05	0.56
2:B:74:LEU:HD12	2:B:75:VAL:H	1.70	0.56
2:B:266:TRP:HZ3	2:B:426:TRP:CD1	2.24	0.56
1:A:379:SER:HB3	1:A:383:TRP:HE3	1.71	0.56
1:A:122:GLU:H	1:A:122:GLU:CD	2.09	0.56
2:B:376:THR:CG2	2:B:386:THR:HG22	2.35	0.56
1:A:184:MET:HA	1:A:184:MET:CE	2.36	0.56
1:A:246:LEU:O	1:A:307:ARG:NH1	2.38	0.56
2:B:64:LYS:HE2	2:B:71:TRP:CE2	2.41	0.56
2:B:118:VAL:HG13	2:B:119:PRO:HD2	1.87	0.56
1:A:255:ASN:O	1:A:259:LYS:HG2	2.05	0.56
1:A:149:LEU:HD21	1:A:159:ILE:HG22	1.89	0.55
1:A:452:LEU:HD21	1:A:470:THR:HG22	1.87	0.55
1:A:295:LEU:HB2	1:A:300:GLU:OE1	2.06	0.55
2:B:50:ILE:HG21	2:B:145:GLN:HB3	1.88	0.55
2:B:263:LYS:HE3	2:B:425:LEU:HB3	1.88	0.55
2:B:268:SER:HA	2:B:271:TYR:O	2.06	0.55
2:B:270:ILE:HG12	2:B:346:PHE:HB3	1.87	0.55
1:A:228:LEU:HD22	1:A:242:GLN:OE1	2.07	0.55
1:A:19:PRO:O	1:A:56:TYR:HA	2.07	0.54
1:A:208:HIS:O	1:A:212:TRP:HD1	1.90	0.54
1:A:301:LEU:HD23	1:A:302:GLU:N	2.22	0.54
1:A:357:MET:HE2	1:A:374:LYS:HE3	1.89	0.54
1:A:59:PRO:HG2	1:A:76:ASP:HB3	1.87	0.54
1:A:241:VAL:HG23	1:A:314:VAL:O	2.07	0.54
1:A:78:ARG:O	1:A:82:LYS:HG3	2.07	0.54
2:B:151:GLN:HB3	2:B:185:ASP:OD1	2.08	0.54
1:A:519:ASN:O	1:A:523:GLU:HG2	2.07	0.54
1:A:257:ILE:O	1:A:261:VAL:HG23	2.08	0.54
1:A:540:LYS:H	1:A:545:ASN:ND2	2.05	0.54
1:A:169:GLU:O	1:A:173:LYS:HG3	2.09	0.53
2:B:266:TRP:CZ3	2:B:426:TRP:CD1	2.96	0.53
1:A:371:ALA:O	1:A:375:ILE:HG13	2.09	0.53
2:B:64:LYS:HG3	2:B:71:TRP:CE3	2.44	0.53
2:B:266:TRP:CZ3	2:B:426:TRP:CG	2.96	0.53
1:A:516:GLU:O	1:A:520:GLN:HG3	2.08	0.53
1:A:97:PRO:HD3	1:A:229:TRP:HD1	1.74	0.53
2:B:65:LYS:NZ	2:B:110:ASP:OD1	2.42	0.53
2:B:234:LEU:HD13	2:B:381:VAL:HG21	1.91	0.53
1:A:465:LYS:HG2	1:A:466:VAL:N	2.24	0.52
2:B:146:TYR:CD2	2:B:150:PRO:HB3	2.44	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:161:GLN:O	1:A:164:MET:HB3	2.09	0.52
1:A:277:ARG:NH1	1:A:277:ARG:CB	2.62	0.52
2:B:57:ASN:ND2	2:B:143:ARG:NH1	2.56	0.52
2:B:379:SER:CB	2:B:387:PRO:HD3	2.38	0.52
1:A:27:THR:O	1:A:31:ILE:HG13	2.09	0.52
1:A:451:LYS:CE	1:A:471:ASP:OD2	2.55	0.52
1:A:226:PRO:HB3	1:A:235:HIS:ND1	2.24	0.52
2:B:326:ILE:O	2:B:341:ILE:HA	2.09	0.52
1:A:26:LEU:HD12	1:A:133:PRO:HG2	1.91	0.52
1:A:229:TRP:O	1:A:230:MET:C	2.47	0.52
1:A:493:VAL:CG2	1:A:494:ASN:N	2.73	0.52
1:A:31:ILE:O	1:A:35:VAL:HG23	2.10	0.52
1:A:114:ALA:HA	1:A:117:SER:HB2	1.92	0.52
1:A:244:ILE:HD12	1:A:310:LEU:HD13	1.91	0.52
1:A:357:MET:CE	1:A:374:LYS:HE3	2.40	0.52
2:B:277:ARG:NH2	2:B:278:GLN:OE1	2.43	0.51
1:A:522:ILE:O	1:A:526:ILE:HG13	2.10	0.51
1:A:254:VAL:HB	1:A:289:LEU:O	2.10	0.51
1:A:329:ILE:HG22	1:A:330:GLN:N	2.25	0.51
1:A:44:GLU:OE1	1:A:46:LYS:HE2	2.10	0.51
1:A:505:ILE:O	1:A:510:PRO:CG	2.58	0.51
2:B:97:PRO:O	2:B:99:GLY:N	2.44	0.51
1:A:497:THR:O	1:A:535:TRP:HA	2.10	0.51
1:A:545:ASN:HA	1:A:548:VAL:HG22	1.93	0.51
2:B:161:GLN:O	2:B:165:THR:HG22	2.11	0.51
1:A:181:TYR:HB3	1:A:188:TYR:HB2	1.92	0.51
1:A:408:ALA:O	2:B:393:ILE:HG13	2.11	0.51
1:A:417:VAL:O	1:A:417:VAL:HG13	2.11	0.50
1:A:452:LEU:HA	1:A:469:LEU:O	2.11	0.50
1:A:356:ARG:HH11	1:A:356:ARG:CG	2.21	0.50
1:A:503:LEU:O	1:A:507:GLN:CB	2.59	0.50
2:B:57:ASN:HD22	2:B:143:ARG:HH12	1.58	0.50
2:B:142:ILE:HG22	2:B:144:TYR:CE2	2.47	0.50
2:B:245:VAL:HG13	2:B:431:LYS:HB2	1.92	0.50
1:A:136:ASN:C	1:A:138:GLU:N	2.62	0.50
1:A:433:PRO:HA	1:A:532:TYR:CD2	2.46	0.50
2:B:57:ASN:ND2	2:B:131:THR:OG1	2.45	0.50
2:B:387:PRO:HG2	2:B:389:PHE:CE1	2.46	0.50
2:B:175:ASN:N	2:B:176:PRO:CD	2.75	0.49
1:A:168:LEU:O	1:A:169:GLU:C	2.51	0.49
2:B:395:LYS:O	2:B:399:GLU:HG3	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:63:ILE:N	1:A:63:ILE:HD12	2.27	0.49
1:A:96:HIS:O	1:A:97:PRO:C	2.51	0.49
1:A:271:TYR:CE1	1:A:314:VAL:HG23	2.47	0.49
2:B:65:LYS:HE2	2:B:72:ARG:HD2	1.94	0.49
1:A:109:LEU:HD23	1:A:216:THR:HG21	1.95	0.49
1:A:244:ILE:HB	1:A:310:LEU:HD12	1.93	0.49
1:A:94:ILE:HD13	1:A:94:ILE:N	2.18	0.49
1:A:218:ASP:HB2	1:A:221:HIS:CD2	2.47	0.49
1:A:335:GLY:HA2	1:A:367:GLN:OE1	2.13	0.49
2:B:239:TRP:CD1	2:B:239:TRP:N	2.79	0.49
2:B:424:LYS:HD2	2:B:425:LEU:CD1	2.41	0.49
1:A:136:ASN:C	1:A:138:GLU:H	2.16	0.49
1:A:465:LYS:CG	1:A:466:VAL:N	2.76	0.49
2:B:106:VAL:CG1	2:B:107:THR:N	2.75	0.49
1:A:405:TYR:O	2:B:331:LYS:HD3	2.13	0.49
2:B:379:SER:OG	2:B:387:PRO:HD3	2.13	0.49
1:A:498:ASP:HA	1:A:536:VAL:O	2.13	0.48
1:A:546:GLU:OE1	2:B:284:ARG:HG2	2.13	0.48
2:B:136:ASN:HB3	2:B:138:GLU:HG3	1.94	0.48
1:A:28:GLU:O	1:A:32:LYS:HG3	2.13	0.48
1:A:62:ALA:C	1:A:63:ILE:HD12	2.34	0.48
1:A:94:ILE:CD1	1:A:94:ILE:N	2.76	0.48
2:B:158:ALA:C	2:B:160:PHE:N	2.66	0.48
1:A:540:LYS:C	1:A:542:ILE:H	2.15	0.48
2:B:23:GLN:OE1	2:B:59:PRO:HA	2.13	0.48
2:B:239:TRP:CZ3	2:B:378:GLU:HG3	2.48	0.48
1:A:427:TYR:C	1:A:427:TYR:CD2	2.87	0.48
1:A:206:ARG:HH11	1:A:206:ARG:HG2	1.78	0.48
2:B:24:TRP:HH2	2:B:61:PHE:CD2	2.32	0.48
2:B:193:LEU:HD22	2:B:201:LYS:HE3	1.95	0.48
1:A:8:VAL:O	1:A:121:ASP:HB2	2.14	0.48
1:A:23:GLN:CD	1:A:60:VAL:HG12	2.34	0.48
1:A:97:PRO:HD3	1:A:229:TRP:CD1	2.48	0.48
2:B:396:GLU:O	2:B:400:THR:CG2	2.61	0.47
2:B:175:ASN:H	2:B:176:PRO:HD3	1.79	0.47
1:A:356:ARG:HG3	1:A:356:ARG:NH1	2.22	0.47
1:A:378:GLU:O	1:A:382:ILE:HG12	2.14	0.47
2:B:51:GLY:HA3	2:B:53:GLU:OE1	2.14	0.47
2:B:242:GLN:HA	2:B:242:GLN:OE1	2.14	0.47
1:A:355:ALA:O	1:A:357:MET:N	2.48	0.47
2:B:108:VAL:O	2:B:109:LEU:HD23	2.13	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:136:ASN:OD1	1:A:139:THR:HG23	2.15	0.47
1:A:430:GLU:HB2	1:A:532:TYR:HB2	1.96	0.47
2:B:203:GLU:O	2:B:207:GLN:HG2	2.15	0.47
2:B:130:PHE:CZ	2:B:144:TYR:HB2	2.49	0.47
1:A:337:TRP:CZ3	1:A:368:LEU:HD13	2.49	0.47
2:B:18:GLY:HA3	2:B:56:TYR:CD1	2.49	0.47
1:A:84:THR:HB	1:A:154:LYS:HD3	1.96	0.47
1:A:475:GLN:OE1	1:A:501:TYR:CE1	2.68	0.47
1:A:233:GLU:HG3	1:A:242:GLN:HG2	1.97	0.47
1:A:450:THR:O	1:A:451:LYS:HB2	2.14	0.47
2:B:24:TRP:CH2	2:B:61:PHE:CD2	3.03	0.47
2:B:24:TRP:HZ3	2:B:403:THR:HG21	1.76	0.47
2:B:120:LEU:O	2:B:121:ASP:C	2.53	0.47
1:A:246:LEU:O	1:A:247:PRO:O	2.32	0.46
1:A:509:GLN:N	1:A:510:PRO:HD3	2.30	0.46
2:B:108:VAL:CG2	2:B:188:TYR:CE1	2.97	0.46
1:A:118:VAL:HG13	1:A:119:PRO:HD2	1.96	0.46
1:A:179:VAL:HG12	3:A:999:HBQ:H103	1.96	0.46
1:A:542:ILE:HG23	2:B:283:LEU:HD23	1.98	0.46
2:B:49:LYS:HA	2:B:143:ARG:O	2.15	0.46
2:B:78:ARG:HD3	2:B:411:ILE:HG22	1.98	0.46
1:A:50:ILE:HD12	1:A:50:ILE:HA	1.83	0.46
1:A:84:THR:O	1:A:154:LYS:NZ	2.43	0.46
1:A:94:ILE:HB	1:A:95:PRO:HD2	1.97	0.46
1:A:356:ARG:CG	1:A:356:ARG:NH1	2.79	0.46
2:B:142:ILE:N	2:B:142:ILE:HD12	2.29	0.46
1:A:209:LEU:O	1:A:214:LEU:HB2	2.15	0.46
1:A:344:GLU:O	1:A:345:PRO:C	2.54	0.46
1:A:426:TRP:HB3	1:A:526:ILE:CD1	2.46	0.46
1:A:241:VAL:HG11	1:A:270:ILE:HD12	1.98	0.46
1:A:402:TRP:CG	1:A:403:THR:N	2.84	0.46
1:A:443:ASP:CB	1:A:548:VAL:CG1	2.93	0.46
2:B:165:THR:HG23	2:B:166:LYS:H	1.81	0.46
1:A:401:TRP:HB2	1:A:425:LEU:HD21	1.98	0.46
1:A:7:THR:HG22	1:A:119:PRO:HB2	1.98	0.46
1:A:325:LEU:HD11	1:A:383:TRP:CG	2.51	0.46
1:A:545:ASN:HA	1:A:548:VAL:CG2	2.46	0.46
2:B:112:GLY:O	2:B:115:TYR:HD2	1.98	0.46
2:B:376:THR:HG22	2:B:386:THR:HG22	1.98	0.46
2:B:61:PHE:CE1	2:B:74:LEU:HD23	2.51	0.45
2:B:243:PRO:HG2	2:B:431:LYS:HB3	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:245:VAL:CG1	2:B:431:LYS:HB2	2.46	0.45
1:A:109:LEU:HB3	1:A:216:THR:CG2	2.45	0.45
1:A:194:GLU:HB2	1:A:197:GLN:HG3	1.98	0.45
1:A:536:VAL:HG12	2:B:258:GLN:HB3	1.98	0.45
2:B:356:ARG:CB	2:B:367:GLN:HG2	2.46	0.45
1:A:23:GLN:HG2	1:A:131:THR:O	2.16	0.45
1:A:330:GLN:HB2	1:A:338:THR:OG1	2.16	0.45
1:A:389:PHE:HB2	1:A:414:TRP:HB3	1.99	0.45
1:A:417:VAL:O	1:A:417:VAL:CG1	2.65	0.45
1:A:540:LYS:HB2	1:A:542:ILE:HD12	1.98	0.45
2:B:27:THR:OG1	2:B:30:LYS:HG3	2.16	0.45
2:B:242:GLN:HB3	2:B:243:PRO:HD2	1.98	0.45
1:A:116:PHE:HZ	1:A:151:GLN:HB2	1.79	0.45
1:A:426:TRP:O	1:A:427:TYR:HB3	2.17	0.45
1:A:451:LYS:HB3	1:A:472:THR:H	1.81	0.45
2:B:109:LEU:N	2:B:187:LEU:O	2.49	0.45
2:B:118:VAL:O	2:B:148:VAL:HA	2.17	0.45
1:A:129:ALA:HA	1:A:144:TYR:O	2.17	0.45
1:A:540:LYS:HB3	1:A:542:ILE:CG1	2.47	0.45
2:B:63:ILE:HD13	2:B:74:LEU:HD22	1.98	0.45
2:B:146:TYR:CG	2:B:150:PRO:HB3	2.52	0.45
1:A:55:PRO:HD2	1:A:56:TYR:CE2	2.52	0.45
1:A:246:LEU:HD22	1:A:260:LEU:HD11	1.98	0.45
1:A:452:LEU:CD2	1:A:470:THR:HG22	2.47	0.45
1:A:544:GLY:CA	1:A:547:GLN:HG2	2.46	0.45
2:B:50:ILE:CG1	2:B:143:ARG:HB3	2.47	0.45
2:B:273:GLY:O	2:B:275:LYS:HG3	2.17	0.45
2:B:413:GLU:HA	2:B:413:GLU:OE2	2.17	0.45
1:A:253:THR:O	1:A:256:ASP:HB2	2.17	0.44
1:A:138:GLU:OE1	1:A:138:GLU:HA	2.17	0.44
1:A:216:THR:HG22	1:A:217:PRO:CD	2.48	0.44
1:A:408:ALA:HB3	2:B:393:ILE:HB	2.00	0.44
2:B:96:HIS:ND1	2:B:97:PRO:HD2	2.33	0.44
2:B:135:ILE:HD12	2:B:135:ILE:H	1.82	0.44
2:B:201:LYS:O	2:B:204:GLU:HB3	2.17	0.44
1:A:3:SER:OG	1:A:4:PRO:CD	2.64	0.44
1:A:11:LYS:O	1:A:85:GLN:HB3	2.17	0.44
1:A:311:LYS:O	1:A:312:GLU:C	2.55	0.44
2:B:132:ILE:HB	2:B:142:ILE:HB	1.99	0.44
2:B:158:ALA:C	2:B:160:PHE:H	2.21	0.44
1:A:124:PHE:O	1:A:127:TYR:HD2	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:136:ASN:ND2	1:A:138:GLU:HB2	2.33	0.44
1:A:266:TRP:CH2	1:A:270:ILE:HD11	2.53	0.44
1:A:395:LYS:HD3	1:A:414:TRP:CZ2	2.53	0.44
1:A:488:ASP:OD2	1:A:488:ASP:N	2.50	0.44
1:A:220:LYS:O	1:A:221:HIS:ND1	2.51	0.44
1:A:492:GLU:HA	1:A:530:LYS:O	2.16	0.44
2:B:13:LYS:HB2	2:B:16:MET:HG3	1.99	0.44
2:B:358:ARG:HD3	2:B:358:ARG:HA	1.82	0.44
1:A:91:GLN:OE1	1:A:92:LEU:N	2.51	0.44
1:A:498:ASP:HB2	1:A:538:ALA:HB2	1.99	0.44
1:A:216:THR:HG22	1:A:217:PRO:HD2	2.00	0.44
1:A:543:GLY:HA3	2:B:284:ARG:HA	2.00	0.44
2:B:75:VAL:HG11	2:B:77:PHE:CZ	2.52	0.44
1:A:188:TYR:CG	3:A:999:HBQ:H131	2.53	0.43
2:B:208:HIS:O	2:B:211:ARG:HB2	2.18	0.43
1:A:91:GLN:CD	1:A:93:GLY:H	2.20	0.43
1:A:241:VAL:CG2	1:A:314:VAL:HB	2.47	0.43
1:A:301:LEU:O	1:A:304:ALA:HB3	2.18	0.43
1:A:540:LYS:C	1:A:542:ILE:N	2.71	0.43
1:A:38:CYS:O	1:A:47:ILE:HD11	2.18	0.43
1:A:385:LYS:NZ	1:A:385:LYS:HB3	2.34	0.43
2:B:169:GLU:N	2:B:170:PRO:HD2	2.32	0.43
2:B:239:TRP:HB3	2:B:350:LYS:CE	2.39	0.43
1:A:453:GLY:O	1:A:469:LEU:N	2.39	0.43
2:B:44:GLU:OE1	2:B:46:LYS:HE3	2.18	0.43
1:A:411:ILE:HG22	1:A:412:PRO:O	2.19	0.43
1:A:442:VAL:HG22	1:A:496:VAL:O	2.19	0.43
1:A:380:ILE:CG2	2:B:25:PRO:HB2	2.45	0.43
1:A:41:MET:SD	1:A:73:LYS:HE3	2.59	0.43
1:A:98:ALA:HB2	1:A:349:LEU:O	2.18	0.43
1:A:167:ILE:O	1:A:170:PRO:HD2	2.19	0.43
2:B:18:GLY:HA3	2:B:56:TYR:CE1	2.53	0.43
1:A:260:LEU:O	1:A:264:LEU:HD23	2.19	0.43
1:A:281:LYS:O	1:A:284:ARG:HG3	2.19	0.42
1:A:368:LEU:O	1:A:372:VAL:HG23	2.19	0.42
1:A:400:THR:O	1:A:404:GLU:HG2	2.18	0.42
2:B:233:GLU:OE2	2:B:233:GLU:CA	2.66	0.42
2:B:353:LYS:NZ	2:B:430:GLU:HB2	2.34	0.42
1:A:34:LEU:HB3	1:A:132:ILE:HD12	2.00	0.42
1:A:180:ILE:CG1	1:A:189:VAL:HG13	2.46	0.42
1:A:266:TRP:HZ3	1:A:270:ILE:HD12	1.83	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:451:LYS:O	1:A:471:ASP:CA	2.67	0.42
2:B:106:VAL:HB	2:B:234:LEU:HB2	2.01	0.42
1:A:58:THR:CG2	1:A:76:ASP:O	2.65	0.42
1:A:399:GLU:O	1:A:403:THR:HG22	2.20	0.42
1:A:162:SER:O	1:A:163:SER:C	2.56	0.42
1:A:295:LEU:HD12	1:A:300:GLU:OE1	2.19	0.42
1:A:329:ILE:CG2	1:A:330:GLN:N	2.82	0.42
1:A:451:LYS:O	1:A:472:THR:N	2.50	0.42
2:B:43:LYS:C	2:B:45:GLY:H	2.23	0.42
2:B:85:GLN:O	2:B:154:LYS:HE3	2.20	0.42
1:A:402:TRP:CD1	1:A:402:TRP:C	2.93	0.42
1:A:109:LEU:O	1:A:111:VAL:HG13	2.19	0.42
1:A:317:VAL:HG21	1:A:347:LYS:HE2	2.01	0.42
1:A:426:TRP:HB3	1:A:526:ILE:HD13	2.00	0.42
1:A:457:TYR:CE1	1:A:463:ARG:HD2	2.55	0.42
1:A:543:GLY:CA	2:B:283:LEU:O	2.61	0.42
2:B:27:THR:O	2:B:28:GLU:C	2.56	0.42
2:B:297:GLU:O	2:B:300:GLU:HB3	2.19	0.42
2:B:331:LYS:NZ	2:B:364:ASP:OD1	2.37	0.42
2:B:111:VAL:HG22	2:B:185:ASP:O	2.19	0.42
2:B:420:PRO:HA	2:B:421:PRO:HD3	1.93	0.42
1:A:329:ILE:HD11	1:A:375:ILE:HD12	2.01	0.41
1:A:376:THR:O	1:A:380:ILE:HG12	2.20	0.41
2:B:77:PHE:CD2	2:B:80:LEU:HD23	2.55	0.41
2:B:202:ILE:O	2:B:205:LEU:N	2.53	0.41
1:A:213:GLY:O	1:A:214:LEU:HD23	2.19	0.41
2:B:115:TYR:CE1	2:B:156:SER:C	2.94	0.41
2:B:183:TYR:CE1	2:B:184:MET:HG2	2.54	0.41
1:A:278:GLN:NE2	1:A:281:LYS:HD2	2.35	0.41
1:A:402:TRP:O	1:A:404:GLU:N	2.53	0.41
1:A:473:THR:OG1	1:A:476:LYS:HG3	2.20	0.41
2:B:242:GLN:HG2	2:B:351:THR:O	2.20	0.41
1:A:106:VAL:CG2	1:A:236:PRO:HB3	2.45	0.41
1:A:194:GLU:O	1:A:197:GLN:N	2.53	0.41
1:A:441:TYR:HD2	1:A:544:GLY:HA3	1.84	0.41
2:B:124:PHE:CE2	2:B:153:TRP:CZ2	3.09	0.41
2:B:424:LYS:CD	2:B:425:LEU:HD12	2.47	0.41
1:A:120:LEU:O	1:A:122:GLU:N	2.53	0.41
1:A:247:PRO:O	1:A:307:ARG:NH1	2.51	0.41
2:B:121:ASP:O	2:B:125:ARG:HG3	2.19	0.41
2:B:175:ASN:O	2:B:177:ASP:N	2.40	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:178:ILE:HG12	2:B:191:SER:HB3	2.01	0.41
1:A:214:LEU:HD23	1:A:214:LEU:HA	1.65	0.41
2:B:97:PRO:HG2	2:B:100:LEU:HB2	2.02	0.41
1:A:108:VAL:C	1:A:109:LEU:HD12	2.41	0.41
1:A:125:ARG:HD3	1:A:147:ASN:HA	2.02	0.41
2:B:191:SER:CB	2:B:193:LEU:HD12	2.50	0.41
1:A:61:PHE:HB2	1:A:74:LEU:HB3	2.03	0.41
1:A:108:VAL:HG21	1:A:227:PHE:CE1	2.56	0.41
1:A:149:LEU:N	1:A:149:LEU:HD12	2.36	0.41
1:A:376:THR:HG23	1:A:386:THR:HG23	2.03	0.41
1:A:504:GLY:O	1:A:506:ILE:N	2.54	0.41
1:A:54:ASN:HA	1:A:55:PRO:HD3	1.86	0.41
1:A:218:ASP:H	1:A:221:HIS:CD2	2.36	0.41
1:A:332:GLN:HE21	1:A:332:GLN:HB3	1.57	0.41
1:A:540:LYS:CB	1:A:542:ILE:HD12	2.51	0.41
2:B:126:LYS:HA	2:B:145:GLN:OE1	2.21	0.41
1:A:38:CYS:SG	1:A:132:ILE:HD11	2.61	0.40
1:A:122:GLU:HA	1:A:125:ARG:NE	2.37	0.40
1:A:325:LEU:HD11	1:A:383:TRP:CD2	2.55	0.40
2:B:28:GLU:HA	2:B:135:ILE:HD11	2.02	0.40
2:B:106:VAL:HG12	2:B:107:THR:N	2.35	0.40
1:A:58:THR:CG2	1:A:59:PRO:HD2	2.47	0.40
1:A:100:LEU:HD13	3:A:999:HBQ:C4	2.51	0.40
1:A:266:TRP:CZ3	1:A:270:ILE:CD1	3.04	0.40
1:A:123:ASP:O	1:A:126:LYS:CE	2.62	0.40
1:A:261:VAL:O	1:A:262:GLY:C	2.58	0.40
1:A:301:LEU:C	1:A:301:LEU:CD2	2.88	0.40
1:A:370:GLU:O	1:A:371:ALA:C	2.59	0.40
1:A:542:ILE:O	1:A:545:ASN:HB3	2.21	0.40
1:A:253:THR:O	1:A:257:ILE:HG13	2.20	0.40
1:A:502:ALA:O	1:A:503:LEU:C	2.60	0.40
1:A:506:ILE:HG21	1:A:533:LEU:CD1	2.51	0.40
2:B:116:PHE:C	2:B:118:VAL:H	2.24	0.40
2:B:377:THR:O	2:B:381:VAL:HG23	2.21	0.40
1:A:221:HIS:O	1:A:223:LYS:NZ	2.45	0.40
1:A:451:LYS:C	1:A:472:THR:H	2.24	0.40
2:B:24:TRP:CD1	2:B:24:TRP:N	2.84	0.40
2:B:175:ASN:C	2:B:177:ASP:H	2.21	0.40
2:B:393:ILE:HG12	2:B:394:GLN:N	2.36	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:36:GLU:OE2	2:B:318:TYR:OH[4_446]	2.10	0.10

### 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	532/547 (97%)	457 (86%)	55 (10%)	20 (4%)	3	13
2	B	394/426 (92%)	353 (90%)	34 (9%)	7 (2%)	8	29
All	All	926/973 (95%)	810 (88%)	89 (10%)	27 (3%)	4	18

All (27) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	137	ASN
1	A	356	ARG
2	B	175	ASN
2	B	176	PRO
1	A	121	ASP
1	A	247	PRO
1	A	361	HIS
1	A	505	ILE
2	B	98	ALA
2	B	356	ARG
1	A	158	ALA
1	A	170	PRO
1	A	195	ILE
1	A	403	THR
2	B	66	LYS
1	A	133	PRO
1	A	230	MET
2	B	236	PRO
1	A	159	ILE
1	A	345	PRO

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Mol	Chain	Res	Type
1	A	44	GLU
1	A	139	THR
1	A	97	PRO
2	B	9	PRO
1	A	4	PRO
1	A	156	SER
1	A	312	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	480/488 (98%)	442 (92%)	38 (8%)	12	34
2	B	365/388 (94%)	339 (93%)	26 (7%)	14	40
All	All	845/876 (96%)	781 (92%)	64 (8%)	13	36

All (64) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	ILE
1	A	6	GLU
1	A	46	LYS
1	A	48	SER
1	A	90	VAL
1	A	94	ILE
1	A	97	PRO
1	A	101	GLU
1	A	113	ASP
1	A	115	TYR
1	A	117	SER
1	A	123	ASP
1	A	136	ASN
1	A	138	GLU
1	A	151	GLN
1	A	184	MET

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	205	LEU
1	A	216	THR
1	A	218	ASP
1	A	244	ILE
1	A	308	GLU
1	A	310	LEU
1	A	332	GLN
1	A	340	GLN
1	A	349	LEU
1	A	357	MET
1	A	369	THR
1	A	379	SER
1	A	402	TRP
1	A	424	LYS
1	A	472	THR
1	A	474	ASN
1	A	477	THR
1	A	516	GLU
1	A	517	LEU
1	A	529	GLU
1	A	533	LEU
1	A	540	LYS
2	B	8	VAL
2	B	24	TRP
2	B	40	GLU
2	B	66	LYS
2	B	67	ASP
2	B	68	SER
2	B	113	ASP
2	B	116	PHE
2	B	137	ASN
2	B	139	THR
2	B	164	MET
2	B	165	THR
2	B	176	PRO
2	B	205	LEU
2	B	236	PRO
2	B	237	ASP
2	B	283	LEU
2	B	290	THR
2	B	303	LEU
2	B	323	LYS

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Mol	Chain	Res	Type
2	B	356	ARG
2	B	364	ASP
2	B	368	LEU
2	B	370	GLU
2	B	400	THR
2	B	423	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	57	ASN
1	A	136	ASN
1	A	147	ASN
1	A	161	GLN
1	A	174	GLN
1	A	182	GLN
1	A	207	GLN
1	A	221	HIS
1	A	222	GLN
1	A	278	GLN
1	A	332	GLN
1	A	474	ASN
1	A	480	GLN
1	A	500	GLN
1	A	507	GLN
1	A	545	ASN
2	B	57	ASN
2	B	147	ASN
2	B	174	GLN
2	B	197	GLN
2	B	332	GLN
2	B	394	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](#)

1 non-standard protein/DNA/RNA residue is 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	CSD	A	280	1	3,7,8	1.16	0	1,8,10	2.32	1 (100%)

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	CSD	A	280	1	-	2/2/6/8	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	A	280	CSD	OD1-SG-CB	2.32	109.96	105.54

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	280	CSD	N-CA-CB-SG
1	A	280	CSD	CA-CB-SG-OD1

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates

There are no monosaccharides in this entry.

## 5.6 Ligand geometry

1 ligand is 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
3	HBQ	A	999	-	21,21,21	1.90	6 (28%)	28,30,30	0.92	2 (7%)

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
3	HBQ	A	999	-	-	1/10/26/26	0/2/2/2

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	999	HBQ	C4-C3	4.57	1.45	1.40
3	A	999	HBQ	C3-N1	3.36	1.47	1.42
3	A	999	HBQ	C11-N1	2.98	1.41	1.37
3	A	999	HBQ	O3-C11	2.78	1.25	1.21
3	A	999	HBQ	C2-C1	2.16	1.56	1.51
3	A	999	HBQ	C6-C5	2.03	1.42	1.38

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	999	HBQ	O3-C11-N1	-2.20	120.40	124.09
3	A	999	HBQ	O2-C12-C13	-2.10	101.58	107.14

There are no chirality outliers.

All (1) torsion outliers are listed below:

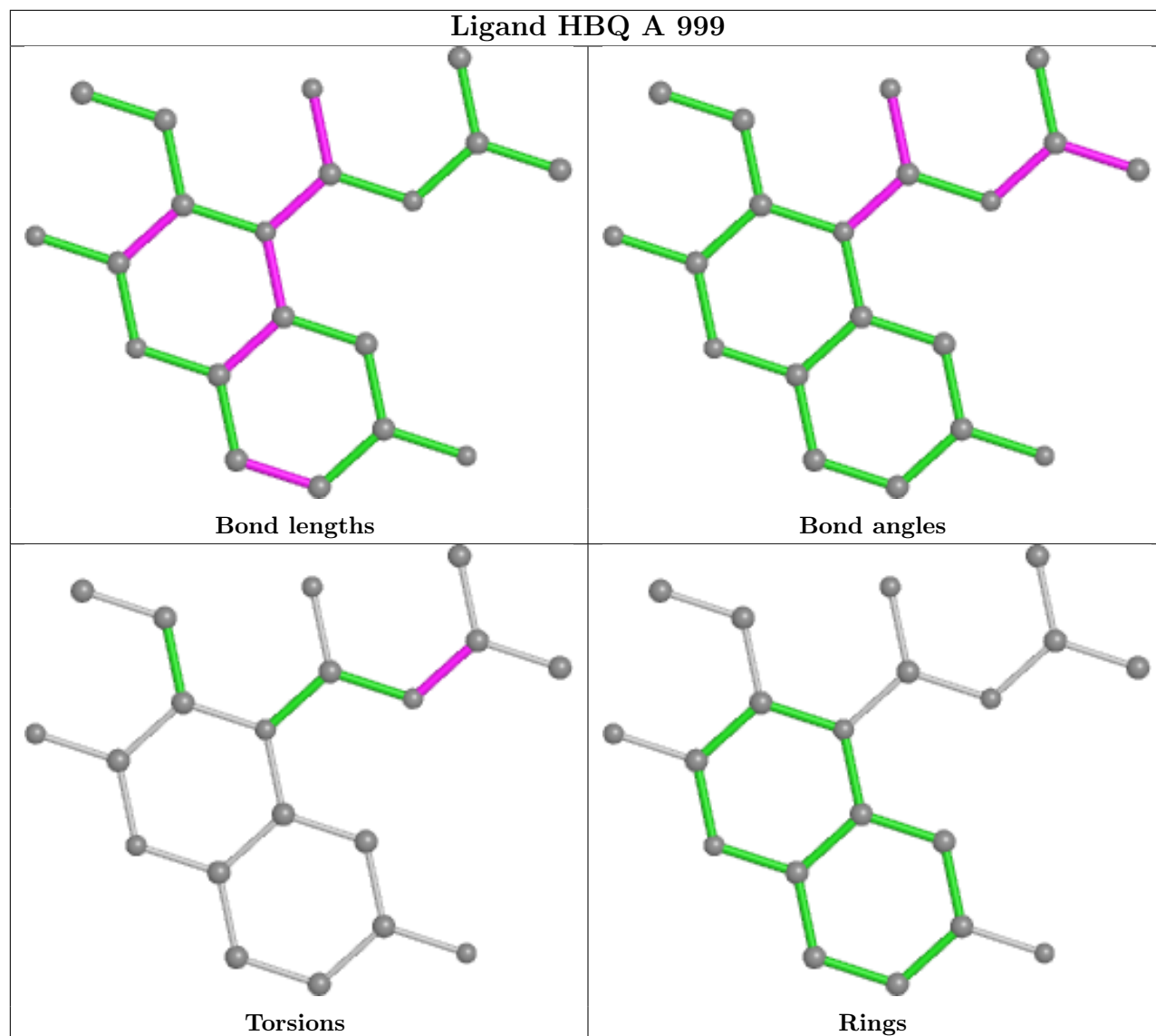
Mol	Chain	Res	Type	Atoms
3	A	999	HBQ	C13-C12-O2-C11

There are no ring outliers.

1 monomer is involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	999	HBQ	5	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



## 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	538/547 (98%)	0.06	24 (4%) 33 29	27, 90, 137, 150	0
2	B	400/426 (93%)	0.11	20 (5%) 28 25	48, 88, 139, 150	0
All	All	938/973 (96%)	0.08	44 (4%) 31 28	27, 89, 139, 150	0

All (44) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	452	LEU	5.7
1	A	71	TRP	4.5
2	B	357	MET	4.3
1	A	448	ARG	4.0
1	A	450	THR	3.9
1	A	51	GLY	3.8
2	B	69	THR	3.8
2	B	431	LYS	3.8
1	A	2	ILE	3.4
1	A	29	GLU	3.4
1	A	471	ASP	3.3
1	A	92	LEU	3.2
2	B	195	ILE	3.1
1	A	317	VAL	3.1
1	A	447	ASN	3.1
1	A	89	GLU	3.0
2	B	358	ARG	2.9
1	A	140	PRO	2.9
1	A	446	ALA	2.9
2	B	356	ARG	2.9
2	B	87	PHE	2.9
1	A	20	LYS	2.8
2	B	67	ASP	2.7
1	A	32	LYS	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	469	LEU	2.6
2	B	95	PRO	2.6
2	B	284	ARG	2.6
1	A	26	LEU	2.5
1	A	28	GLU	2.4
1	A	54	ASN	2.4
2	B	347	LYS	2.4
1	A	472	THR	2.3
2	B	68	SER	2.3
2	B	173	LYS	2.2
2	B	104	LYS	2.2
2	B	212	TRP	2.2
2	B	12	LEU	2.2
2	B	94	ILE	2.1
2	B	237	ASP	2.1
1	A	546	GLU	2.1
2	B	321	PRO	2.0
2	B	183	TYR	2.0
1	A	468	THR	2.0
1	A	33	ALA	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	CSD	A	280	8/9	0.92	0.20	90,98,116,121	0

## 6.3 Carbohydrates [i](#)

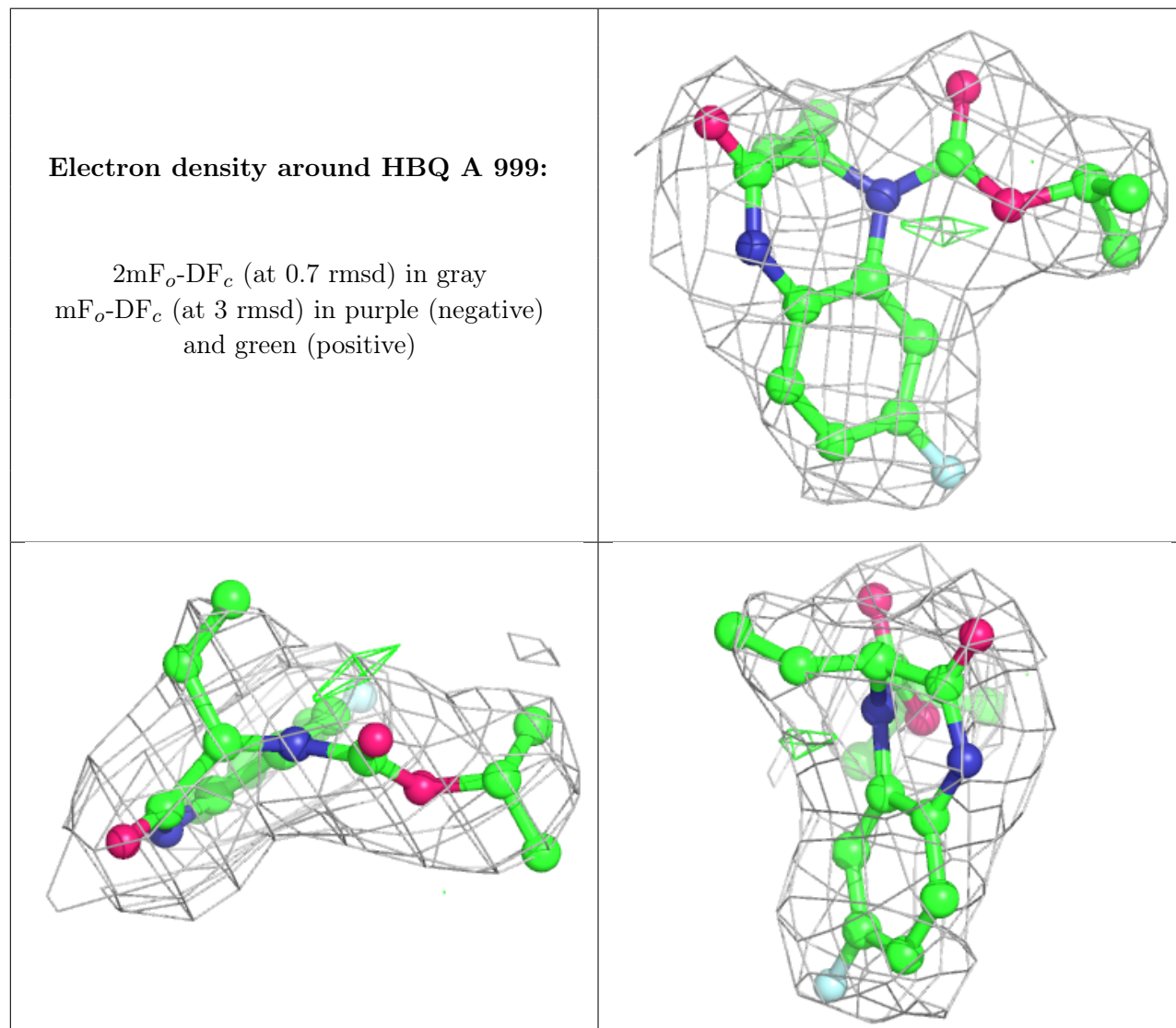
There are no monosaccharides in this entry.

## 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, 95<sup>th</sup> 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( $\text{\AA}^2$ )	Q<0.9
3	HBQ	A	999	20/20	0.97	0.18	47,61,70,87	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.



## 6.5 Other polymers [i](#)

There are no such residues in this entry.