Full wwPDB X-ray Structure Validation Report (i)

Oct 31, 2021 – 01:30 AM EDT

PDB ID	:	1S1W
Title	:	Crystal structure of V106A mutant HIV-1 reverse transcriptase in complex with UC-781
Authors	:	Ren, J.; Nichols, C.E.; Chamberlain, P.P.; Stammers, D.K.
Deposited on	:	2004-01-07
Resolution	:	2.70 Å(reported)

The following versions of software and data (see references (i)) 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 2.70 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.
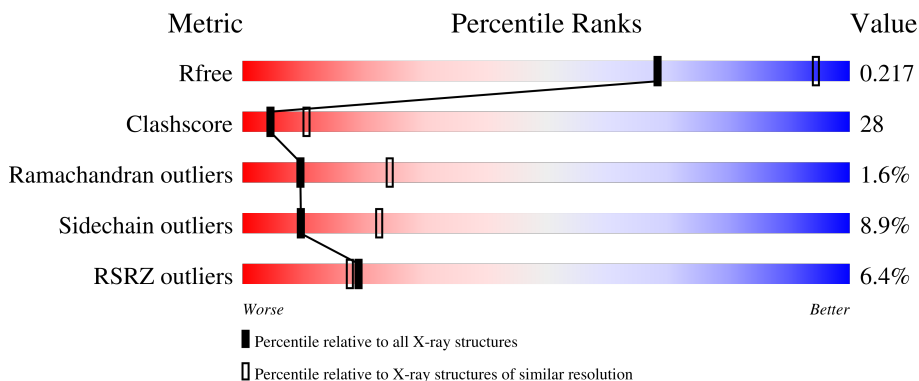
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% 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	560	4% / 45% / 42% / 7% / 6%
2	B	440	8% / 48% / 40% / · / 8%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 7740 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.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	525	Total	C	N	O	S	0	0	0
			4308	2790	714	796	8			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	106	ALA	VAL	engineered mutation	UNP P04585
A	280	CSD	CYS	modified residue	UNP P04585

- Molecule 2 is a protein called Reverse transcriptase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	404	Total	C	N	O	S	0	0	0
			3344	2184	549	604	7			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	106	ALA	VAL	engineered mutation	UNP P04585

- Molecule 3 is 2-METHYL-FURAN-3-CARBOTHIOIC ACID [4-CHLORO-3-(3-METHYL-BUT-2-ENYLOXY)-PHENYL]-AMIDE (three-letter code: UC1) (formula: $C_{17}H_{18}ClNO_2S$).
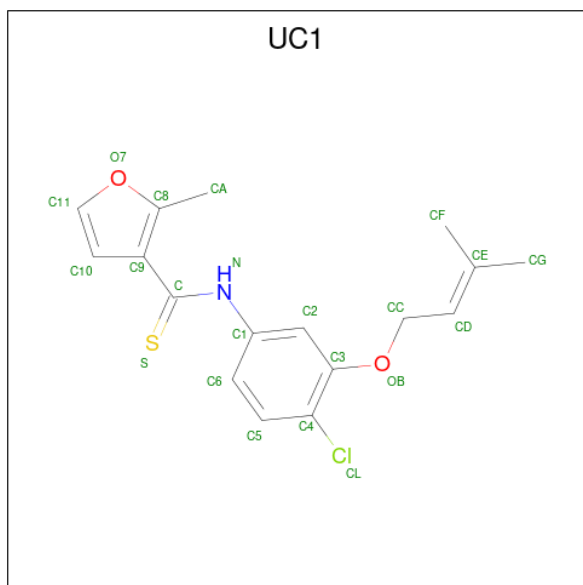
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total	C	Cl	N	O	S	0	0
			22	17	1	1	2	1		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	49	Total	O	0	0
			49	49		
4	B	17	Total	O	0	0
			17	17		

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

Chain A:
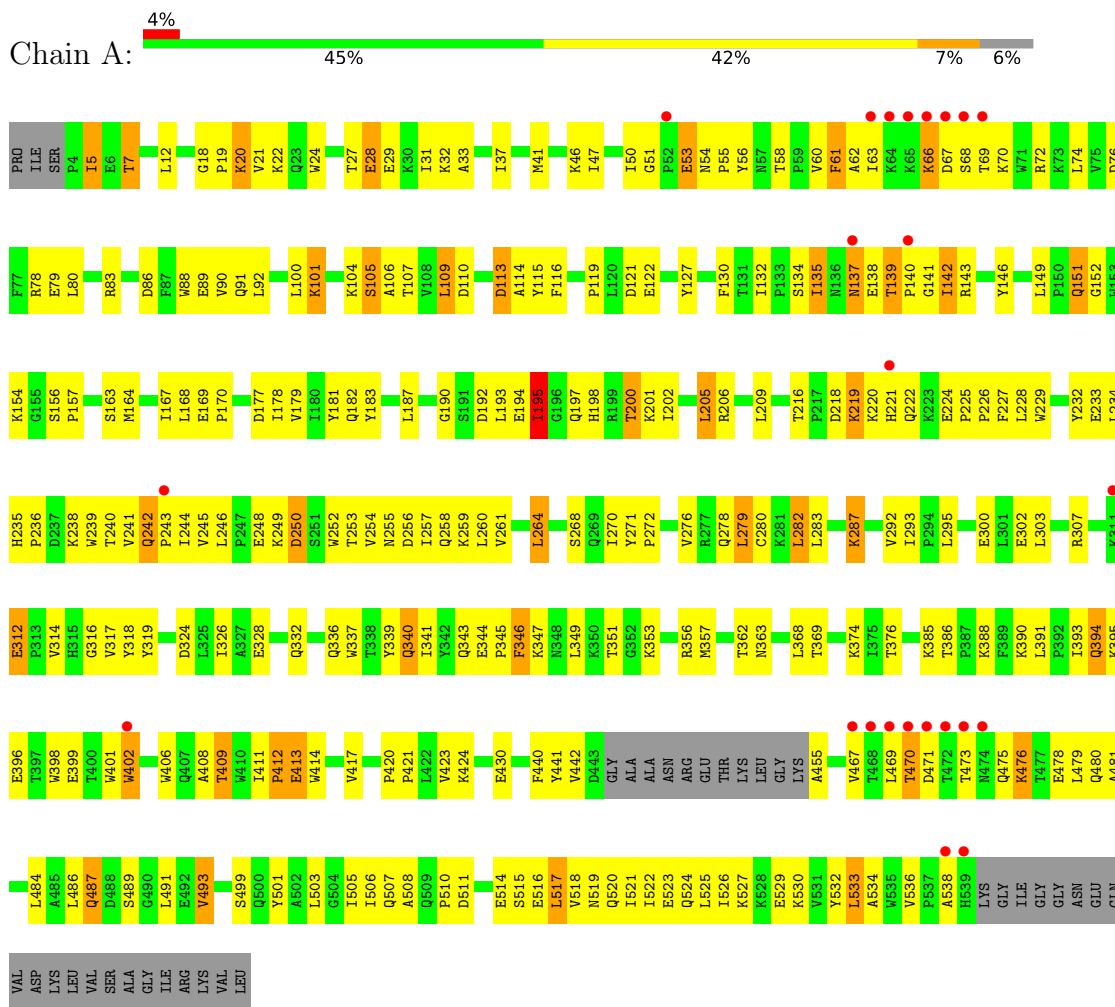
• Molecule 2: Reverse transcriptase

Chain B:
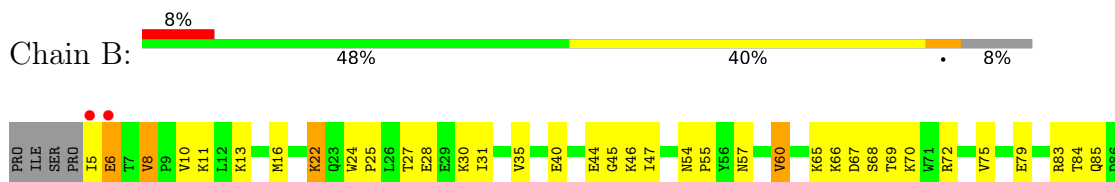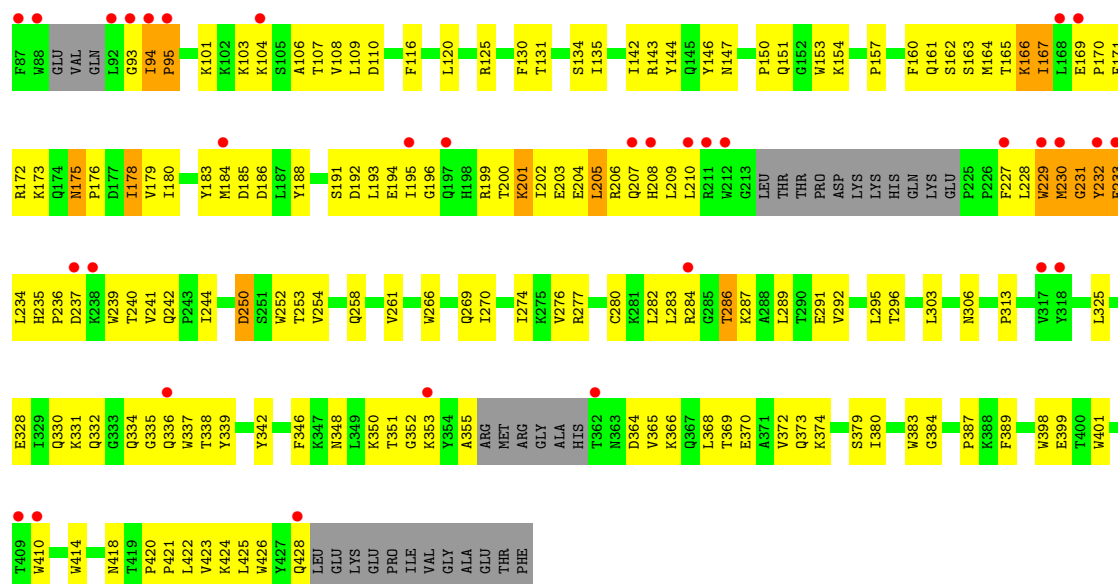
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	137.54Å 114.69Å 65.26Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.74 – 2.70 29.74 – 2.71	Depositor EDS
% Data completeness (in resolution range)	97.1 (29.74-2.70) 97.3 (29.74-2.71)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.50 (at 2.72Å)	Xtriage
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.206 , 0.280 0.200 , 0.217	Depositor DCC
R_{free} test set	1359 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å^2)	68.0	Xtriage
Anisotropy	0.183	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 69.3	EDS
L-test for twinning[2]	$< \lvert L \rvert > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	7740	wwPDB-VP
Average B, all atoms (Å^2)	75.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.83% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< \lvert L \rvert >$, $< L^2 >$ 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: UC1, CSD

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	0.54	0/4415	0.75	3/6002 (0.0%)
2	B	0.53	0/3441	0.76	3/4675 (0.1%)
All	All	0.54	0/7856	0.75	6/10677 (0.1%)

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	229	TRP	CA-CB-CG	-7.51	99.44	113.70
1	A	141	GLY	N-CA-C	7.44	131.69	113.10
1	A	140	PRO	N-CA-C	5.98	127.66	112.10
2	B	231	GLY	N-CA-C	-5.46	99.45	113.10
1	A	67	ASP	N-CA-C	5.32	125.37	111.00
2	B	229	TRP	CA-C-N	-5.18	105.81	117.20

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	4308	0	4339	252	0
2	B	3344	0	3368	191	0
3	A	22	0	18	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	49	0	0	3	0
4	B	17	0	0	3	0
All	All	7740	0	7725	435	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 28.

All (435) 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)
2:B:227:PHE:CB	2:B:231:GLY:HA2	1.74	1.16
2:B:227:PHE:HB3	2:B:231:GLY:CA	1.78	1.12
1:A:242:GLN:HB2	1:A:243:PRO:HD2	1.34	1.08
2:B:167:ILE:HD11	2:B:209:LEU:HD23	1.37	1.03
2:B:227:PHE:HB3	2:B:231:GLY:HA2	1.02	1.02
1:A:27:THR:HG22	1:A:29:GLU:H	1.24	1.02
1:A:395:LYS:H	1:A:395:LYS:HD2	1.23	1.00
2:B:353:LYS:NZ	2:B:428:GLN:HG3	1.76	1.00
1:A:195:ILE:HD13	1:A:195:ILE:H	1.27	0.97
2:B:166:LYS:HE3	2:B:166:LYS:HA	1.46	0.96
2:B:5:ILE:HG22	2:B:6:GLU:H	1.30	0.93
2:B:103:LYS:HE2	2:B:179:VAL:HG23	1.52	0.91
1:A:206:ARG:NH1	1:A:218:ASP:HA	1.85	0.91
2:B:172:ARG:O	2:B:176:PRO:HG3	1.74	0.86
2:B:353:LYS:HZ3	2:B:428:GLN:HG3	1.38	0.85
2:B:206:ARG:NH2	2:B:227:PHE:CG	2.46	0.83
1:A:242:GLN:HB2	1:A:243:PRO:CD	2.08	0.83
2:B:93:GLY:O	2:B:95:PRO:HD3	1.79	0.83
2:B:230:MET:C	2:B:232:TYR:H	1.77	0.82
1:A:517:LEU:HA	1:A:520:GLN:HE21	1.43	0.82
2:B:175:ASN:ND2	2:B:201:LYS:HD3	1.94	0.82
1:A:61:PHE:CE2	1:A:74:LEU:HB3	2.15	0.81
2:B:379:SER:OG	2:B:387:PRO:HG3	1.80	0.81
2:B:203:GLU:HG3	2:B:207:GLN:HE22	1.47	0.80
1:A:195:ILE:HD13	1:A:195:ILE:N	1.96	0.79
1:A:469:LEU:HD21	1:A:480:GLN:HG2	1.63	0.79
1:A:89:GLU:OE1	1:A:92:LEU:HB2	1.81	0.78
1:A:135:ILE:H	1:A:135:ILE:HD12	1.48	0.78
1:A:388:LYS:HG2	1:A:413:GLU:OE1	1.85	0.77
2:B:332:GLN:HB3	2:B:428:GLN:HE22	1.49	0.77
1:A:279:LEU:HA	1:A:282:LEU:HD22	1.67	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:173:LYS:HA	2:B:176:PRO:HG3	1.66	0.77
1:A:406:TRP:CH2	2:B:418:ASN:HA	2.20	0.76
2:B:229:TRP:HA	2:B:229:TRP:CE3	2.18	0.76
1:A:206:ARG:HH12	1:A:218:ASP:HA	1.50	0.75
1:A:260:LEU:HG	1:A:264:LEU:HD22	1.69	0.75
2:B:142:ILE:H	2:B:142:ILE:HD12	1.52	0.74
2:B:60:VAL:HG12	2:B:75:VAL:HG22	1.67	0.74
2:B:227:PHE:CB	2:B:231:GLY:CA	2.52	0.74
2:B:261:VAL:HG13	2:B:276:VAL:HG11	1.69	0.74
1:A:340:GLN:HB3	1:A:351:THR:HG22	1.70	0.74
1:A:249:LYS:HZ3	1:A:256:ASP:CG	1.91	0.74
1:A:63:ILE:HD13	1:A:74:LEU:HB2	1.69	0.73
2:B:169:GLU:HG2	2:B:170:PRO:HD3	1.71	0.73
2:B:154:LYS:O	2:B:157:PRO:HD2	1.89	0.73
1:A:151:GLN:HE21	1:A:152:GLY:N	1.86	0.73
1:A:200:THR:HG22	1:A:201:LYS:N	2.04	0.73
2:B:353:LYS:HZ2	2:B:428:GLN:HG3	1.50	0.73
1:A:442:VAL:HB	1:A:481:ALA:HB1	1.71	0.72
2:B:151:GLN:HB3	2:B:185:ASP:OD1	1.89	0.72
2:B:66:LYS:CG	2:B:230:MET:HA	2.20	0.71
1:A:61:PHE:CD1	1:A:63:ILE:HD11	2.26	0.71
1:A:218:ASP:OD2	1:A:220:LYS:HB2	1.90	0.71
2:B:229:TRP:HZ2	2:B:373:GLN:OE1	1.74	0.70
1:A:395:LYS:HD2	1:A:395:LYS:N	2.02	0.70
2:B:65:LYS:HB2	2:B:68:SER:HB3	1.72	0.70
2:B:206:ARG:NH2	2:B:227:PHE:CD2	2.58	0.70
2:B:175:ASN:N	2:B:176:PRO:HD3	2.07	0.70
1:A:27:THR:HG22	1:A:29:GLU:N	2.03	0.70
2:B:169:GLU:N	2:B:170:PRO:HD2	2.07	0.70
2:B:284:ARG:O	2:B:287:LYS:NZ	2.24	0.70
1:A:151:GLN:HE21	1:A:151:GLN:C	1.96	0.69
1:A:195:ILE:H	1:A:195:ILE:CD1	2.04	0.69
2:B:175:ASN:HD21	2:B:201:LYS:HD3	1.58	0.68
1:A:58:THR:HG23	1:A:76:ASP:O	1.94	0.68
1:A:475:GLN:HB3	1:A:501:TYR:CE2	2.28	0.68
1:A:28:GLU:HG3	1:A:135:ILE:HG22	1.75	0.67
2:B:103:LYS:O	2:B:236:PRO:HG2	1.94	0.67
2:B:201:LYS:HE3	2:B:201:LYS:HA	1.76	0.67
1:A:169:GLU:HB3	1:A:170:PRO:HD3	1.76	0.67
2:B:5:ILE:HG22	2:B:6:GLU:N	2.08	0.66
2:B:266:TRP:O	2:B:269:GLN:HG2	1.95	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:230:MET:HB2	2:B:232:TYR:HB2	1.78	0.66
1:A:151:GLN:NE2	1:A:152:GLY:N	2.44	0.66
2:B:202:ILE:HG21	2:B:227:PHE:CZ	2.31	0.66
2:B:195:ILE:O	2:B:199:ARG:HG3	1.96	0.66
2:B:230:MET:C	2:B:232:TYR:N	2.49	0.66
2:B:167:ILE:HG13	2:B:167:ILE:O	1.94	0.66
2:B:420:PRO:O	2:B:423:VAL:HG12	1.95	0.65
2:B:40:GLU:O	2:B:44:GLU:HG3	1.96	0.65
2:B:116:PHE:CZ	2:B:151:GLN:HG3	2.32	0.65
1:A:76:ASP:OD2	1:A:78:ARG:HG3	1.97	0.65
2:B:103:LYS:HE2	2:B:179:VAL:CG2	2.26	0.65
2:B:191:SER:HB2	2:B:193:LEU:HD13	1.79	0.65
2:B:66:LYS:HG2	2:B:230:MET:HA	1.77	0.64
1:A:524:GLN:HA	1:A:524:GLN:OE1	1.96	0.64
2:B:207:GLN:HA	2:B:210:LEU:HB2	1.79	0.64
1:A:399:GLU:HG3	1:A:402:TRP:CZ3	2.33	0.64
1:A:413:GLU:HA	4:A:1034:HOH:O	1.97	0.63
2:B:22:LYS:HD3	4:B:1052:HOH:O	1.97	0.63
2:B:69:THR:HG23	2:B:70:LYS:NZ	2.13	0.63
2:B:229:TRP:CZ2	2:B:373:GLN:OE1	2.51	0.63
2:B:163:SER:O	2:B:167:ILE:HG22	1.97	0.63
2:B:169:GLU:CG	2:B:170:PRO:HD3	2.29	0.63
1:A:132:ILE:HB	1:A:142:ILE:HG12	1.80	0.63
1:A:440:PHE:CE1	1:A:489:SER:HB3	2.32	0.63
2:B:342:TYR:HB3	2:B:348:ASN:HA	1.79	0.63
2:B:295:LEU:N	2:B:295:LEU:HD12	2.13	0.63
1:A:363:ASN:HA	1:A:511:ASP:CG	2.19	0.62
2:B:106:ALA:O	2:B:234:LEU:HB2	2.00	0.62
1:A:61:PHE:N	1:A:61:PHE:CD2	2.66	0.62
1:A:167:ILE:O	1:A:170:PRO:HD2	1.99	0.62
1:A:411:ILE:O	1:A:412:PRO:O	2.17	0.62
1:A:105:SER:HB2	1:A:198:HIS:CG	2.35	0.61
1:A:218:ASP:O	1:A:222:GLN:HG3	2.01	0.60
1:A:491:LEU:O	1:A:529:GLU:HB2	2.01	0.60
2:B:107:THR:HG21	2:B:227:PHE:CE1	2.37	0.60
1:A:399:GLU:HG3	1:A:402:TRP:CE3	2.36	0.60
1:A:105:SER:HB2	1:A:198:HIS:CD2	2.37	0.59
2:B:109:LEU:HD11	2:B:227:PHE:CE1	2.37	0.59
2:B:195:ILE:HD11	2:B:233:GLU:HG2	1.84	0.59
1:A:255:ASN:O	1:A:259:LYS:HD3	2.02	0.59
1:A:134:SER:OG	1:A:139:THR:O	2.16	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:236:PRO:HA	3:A:999:UC1:H5	1.83	0.59
1:A:374:LYS:HG2	4:A:1031:HOH:O	2.03	0.59
2:B:28:GLU:HB2	2:B:135:ILE:HD11	1.83	0.59
2:B:69:THR:HG23	2:B:70:LYS:HZ2	1.68	0.59
1:A:270:ILE:O	1:A:272:PRO:HD3	2.03	0.59
2:B:27:THR:OG1	2:B:30:LYS:HG2	2.01	0.59
2:B:142:ILE:HD12	2:B:142:ILE:N	2.18	0.59
1:A:61:PHE:N	1:A:61:PHE:HD2	2.01	0.58
1:A:163:SER:O	1:A:167:ILE:HG13	2.03	0.58
1:A:343:GLN:HG3	1:A:349:LEU:HD11	1.85	0.58
1:A:5:ILE:HD12	1:A:119:PRO:HD2	1.85	0.58
1:A:61:PHE:CE1	1:A:63:ILE:HD11	2.39	0.58
2:B:109:LEU:HD11	2:B:227:PHE:HE1	1.66	0.58
1:A:398:TRP:NE1	1:A:411:ILE:HD12	2.17	0.58
1:A:249:LYS:NZ	1:A:256:ASP:CG	2.57	0.58
1:A:72:ARG:HH11	1:A:72:ARG:HG2	1.69	0.58
1:A:104:LYS:NZ	1:A:104:LYS:HB3	2.18	0.58
2:B:428:GLN:HG2	2:B:428:GLN:O	2.04	0.58
1:A:369:THR:HG21	1:A:409:THR:HG21	1.86	0.57
2:B:202:ILE:HG21	2:B:227:PHE:HZ	1.69	0.57
1:A:523:GLU:O	1:A:527:LYS:HG2	2.04	0.57
1:A:101:LYS:HE3	1:A:101:LYS:N	2.19	0.57
1:A:135:ILE:HD12	1:A:135:ILE:N	2.17	0.57
1:A:79:GLU:OE2	1:A:83:ARG:NH1	2.37	0.57
2:B:57:ASN:HD22	2:B:143:ARG:NH1	2.03	0.57
1:A:200:THR:CG2	1:A:201:LYS:N	2.67	0.57
1:A:399:GLU:HA	1:A:402:TRP:HE3	1.68	0.57
1:A:135:ILE:H	1:A:135:ILE:CD1	2.07	0.56
2:B:108:VAL:HG22	2:B:188:TYR:CD2	2.40	0.56
2:B:230:MET:HE3	2:B:232:TYR:HD1	1.69	0.56
1:A:28:GLU:OE1	1:A:31:ILE:HD12	2.05	0.56
2:B:24:TRP:CD1	2:B:25:PRO:HD2	2.41	0.56
2:B:167:ILE:CD1	2:B:209:LEU:HD23	2.26	0.56
1:A:489:SER:HB2	1:A:493:VAL:HG13	1.88	0.56
2:B:108:VAL:C	2:B:109:LEU:HD12	2.25	0.56
1:A:249:LYS:NZ	1:A:256:ASP:OD2	2.38	0.56
1:A:194:GLU:HG2	1:A:197:GLN:HB2	1.88	0.56
1:A:62:ALA:C	1:A:63:ILE:HD12	2.27	0.55
2:B:173:LYS:O	2:B:176:PRO:HD3	2.06	0.55
2:B:203:GLU:O	2:B:206:ARG:HB2	2.06	0.55
1:A:319:TYR:HA	1:A:349:LEU:HD21	1.87	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:13:LYS:HB2	2:B:16:MET:SD	2.45	0.55
1:A:376:THR:HG23	1:A:386:THR:HG22	1.88	0.55
1:A:206:ARG:CZ	1:A:218:ASP:HA	2.37	0.55
1:A:137:ASN:O	1:A:139:THR:N	2.40	0.55
2:B:120:LEU:HD23	2:B:125:ARG:HG2	1.88	0.55
1:A:61:PHE:CZ	1:A:74:LEU:HD23	2.41	0.55
1:A:107:THR:HG22	1:A:109:LEU:HD13	1.87	0.55
2:B:66:LYS:HG2	2:B:230:MET:HG3	1.89	0.55
2:B:173:LYS:HA	2:B:176:PRO:CG	2.37	0.55
1:A:480:GLN:HA	1:A:480:GLN:OE1	2.08	0.54
1:A:69:THR:O	1:A:69:THR:HG22	2.07	0.54
1:A:257:ILE:O	1:A:261:VAL:HG23	2.06	0.54
2:B:369:THR:HG22	2:B:398:TRP:CH2	2.43	0.54
1:A:398:TRP:CE2	1:A:411:ILE:HD12	2.43	0.54
1:A:12:LEU:HD11	1:A:127:TYR:CE1	2.43	0.54
1:A:254:VAL:O	1:A:258:GLN:HG3	2.08	0.54
1:A:328:GLU:O	1:A:339:TYR:HA	2.08	0.54
1:A:440:PHE:CZ	1:A:489:SER:HB3	2.43	0.54
1:A:28:GLU:CG	1:A:135:ILE:HG22	2.37	0.54
1:A:478:GLU:OE2	1:A:499:SER:OG	2.25	0.54
2:B:5:ILE:CG2	2:B:6:GLU:H	2.12	0.54
1:A:61:PHE:CZ	1:A:74:LEU:HB3	2.43	0.53
2:B:331:LYS:HB2	2:B:337:TRP:CZ3	2.44	0.53
1:A:24:TRP:HZ3	1:A:61:PHE:HB3	1.73	0.53
1:A:27:THR:CG2	1:A:29:GLU:HB3	2.38	0.53
1:A:72:ARG:HG2	1:A:72:ARG:NH1	2.22	0.53
2:B:94:ILE:HG13	2:B:94:ILE:O	2.08	0.53
2:B:104:LYS:HA	2:B:237:ASP:HB2	1.90	0.53
2:B:332:GLN:HB3	2:B:428:GLN:NE2	2.20	0.53
2:B:169:GLU:HG2	2:B:170:PRO:CD	2.38	0.53
2:B:252:TRP:CD1	2:B:295:LEU:HD11	2.44	0.53
1:A:142:ILE:N	1:A:142:ILE:HD13	2.24	0.52
1:A:241:VAL:O	1:A:242:GLN:O	2.27	0.52
1:A:225:PRO:HG3	1:A:227:PHE:CE2	2.44	0.52
2:B:380:ILE:O	2:B:384:GLY:N	2.42	0.52
1:A:56:TYR:O	1:A:143:ARG:NH2	2.39	0.52
1:A:363:ASN:HA	1:A:511:ASP:OD1	2.10	0.52
2:B:172:ARG:NH2	2:B:180:ILE:O	2.42	0.52
1:A:518:VAL:O	1:A:522:ILE:HG13	2.10	0.52
2:B:103:LYS:HD3	2:B:192:ASP:OD1	2.10	0.52
1:A:63:ILE:CD1	1:A:74:LEU:HB2	2.37	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:340:GLN:HA	1:A:351:THR:HA	1.92	0.51
1:A:481:ALA:O	1:A:484:LEU:HB2	2.11	0.51
1:A:486:LEU:CD1	1:A:521:ILE:HG23	2.41	0.51
2:B:161:GLN:HE21	2:B:165:THR:HG23	1.76	0.51
1:A:368:LEU:HD13	1:A:368:LEU:C	2.31	0.51
2:B:101:LYS:O	2:B:236:PRO:HB2	2.10	0.51
2:B:227:PHE:HB3	2:B:231:GLY:C	2.30	0.51
2:B:236:PRO:HA	2:B:239:TRP:CE2	2.46	0.51
2:B:374:LYS:NZ	4:B:1064:HOH:O	2.44	0.51
1:A:18:GLY:HA3	1:A:127:TYR:CD1	2.46	0.51
1:A:100:LEU:HD12	1:A:318:TYR:CE1	2.45	0.50
2:B:28:GLU:CB	2:B:135:ILE:HD11	2.40	0.50
2:B:169:GLU:N	2:B:170:PRO:CD	2.73	0.50
1:A:279:LEU:HD22	1:A:302:GLU:OE1	2.12	0.50
2:B:79:GLU:O	2:B:83:ARG:HG3	2.11	0.50
2:B:353:LYS:HZ3	2:B:428:GLN:CG	2.17	0.50
1:A:393:ILE:HB	1:A:423:VAL:HG22	1.93	0.50
2:B:169:GLU:CG	2:B:170:PRO:CD	2.89	0.50
2:B:173:LYS:C	2:B:176:PRO:HD3	2.31	0.50
2:B:369:THR:HG22	2:B:398:TRP:CZ3	2.47	0.50
1:A:86:ASP:HA	1:A:154:LYS:HZ1	1.77	0.50
1:A:395:LYS:H	1:A:395:LYS:CD	1.96	0.49
1:A:244:ILE:O	1:A:244:ILE:HG23	2.12	0.49
1:A:268:SER:CB	1:A:353:LYS:HE2	2.42	0.49
1:A:18:GLY:HA3	1:A:127:TYR:HD1	1.77	0.49
1:A:63:ILE:HD12	1:A:63:ILE:N	2.27	0.49
1:A:151:GLN:HE21	1:A:151:GLN:CA	2.26	0.49
2:B:254:VAL:O	2:B:258:GLN:HG3	2.12	0.49
1:A:104:LYS:HB2	1:A:192:ASP:HA	1.94	0.49
2:B:186:ASP:OD1	2:B:228:LEU:HD12	2.13	0.49
2:B:365:VAL:HG11	2:B:401:TRP:HB2	1.94	0.49
2:B:178:ILE:HD11	2:B:201:LYS:HG2	1.95	0.49
2:B:194:GLU:HG3	2:B:196:GLY:H	1.78	0.49
2:B:330:GLN:HB2	2:B:338:THR:OG1	2.13	0.49
2:B:160:PHE:O	2:B:160:PHE:CD1	2.65	0.49
2:B:200:THR:O	2:B:204:GLU:HG3	2.13	0.49
2:B:241:VAL:HG11	2:B:313:PRO:HG3	1.95	0.49
1:A:100:LEU:HD12	1:A:318:TYR:HE1	1.78	0.49
1:A:507:GLN:HE22	2:B:421:PRO:HB3	1.77	0.49
1:A:476:LYS:CD	1:A:517:LEU:HD12	2.43	0.49
2:B:173:LYS:CA	2:B:176:PRO:HG3	2.41	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:350:LYS:HG3	2:B:351:THR:H	1.76	0.49
1:A:486:LEU:HD12	1:A:521:ILE:HG23	1.95	0.48
2:B:125:ARG:HH11	2:B:147:ASN:HD22	1.61	0.48
1:A:205:LEU:HD22	1:A:209:LEU:HG	1.94	0.48
2:B:372:VAL:HG13	2:B:389:PHE:CE2	2.48	0.48
1:A:104:LYS:HB3	1:A:104:LYS:HZ2	1.78	0.48
1:A:197:GLN:HA	1:A:197:GLN:NE2	2.29	0.48
2:B:195:ILE:HD11	2:B:233:GLU:CG	2.43	0.48
1:A:279:LEU:CA	1:A:282:LEU:HD22	2.42	0.48
1:A:455:ALA:HB3	1:A:467:VAL:O	2.13	0.48
2:B:366:LYS:O	2:B:370:GLU:HG3	2.14	0.48
1:A:319:TYR:OH	1:A:385:LYS:HE2	2.13	0.48
1:A:357:MET:SD	1:A:514:GLU:OE1	2.72	0.48
2:B:236:PRO:HA	2:B:239:TRP:CD2	2.49	0.48
2:B:282:LEU:HD21	2:B:296:THR:HG23	1.96	0.48
1:A:522:ILE:O	1:A:526:ILE:HG13	2.15	0.47
2:B:206:ARG:NH2	2:B:227:PHE:CD1	2.80	0.47
1:A:469:LEU:HD21	1:A:480:GLN:CG	2.39	0.47
1:A:60:VAL:HG21	1:A:130:PHE:CD1	2.50	0.47
1:A:137:ASN:C	1:A:139:THR:H	2.18	0.47
1:A:229:TRP:O	1:A:232:TYR:HD1	1.97	0.47
1:A:264:LEU:HB3	1:A:276:VAL:CG1	2.44	0.47
1:A:51:GLY:C	1:A:53:GLU:H	2.17	0.47
1:A:200:THR:HG22	1:A:201:LYS:H	1.80	0.47
1:A:506:ILE:HG21	1:A:533:LEU:HD12	1.95	0.47
1:A:249:LYS:HZ2	1:A:252:TRP:HA	1.79	0.47
1:A:507:GLN:NE2	2:B:421:PRO:HB3	2.30	0.47
1:A:202:ILE:O	1:A:206:ARG:HG3	2.15	0.47
2:B:142:ILE:H	2:B:142:ILE:CD1	2.24	0.47
2:B:125:ARG:NH1	2:B:147:ASN:HD22	2.13	0.47
1:A:346:PHE:N	1:A:346:PHE:CD1	2.82	0.46
2:B:332:GLN:HB2	2:B:336:GLN:O	2.15	0.46
1:A:268:SER:HB3	1:A:353:LYS:HE2	1.98	0.46
2:B:66:LYS:HD2	2:B:67:ASP:H	1.79	0.46
1:A:110:ASP:O	1:A:216:THR:HG22	2.15	0.46
1:A:253:THR:HG22	1:A:292:VAL:HG22	1.97	0.46
1:A:178:ILE:HG22	1:A:179:VAL:N	2.30	0.46
1:A:295:LEU:HD12	1:A:300:GLU:OE2	2.16	0.46
1:A:470:THR:O	1:A:471:ASP:HB2	2.16	0.46
1:A:517:LEU:HA	1:A:520:GLN:NE2	2.23	0.46
2:B:350:LYS:HG3	2:B:351:THR:N	2.30	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:193:LEU:HB3	1:A:197:GLN:HG3	1.97	0.46
1:A:430:GLU:CG	1:A:530:LYS:HB3	2.46	0.46
2:B:166:LYS:HA	2:B:166:LYS:CE	2.26	0.46
1:A:47:ILE:HG22	1:A:146:TYR:HA	1.98	0.46
1:A:115:TYR:HB3	1:A:149:LEU:HB2	1.98	0.46
1:A:194:GLU:HG2	1:A:197:GLN:CB	2.45	0.46
1:A:328:GLU:HG3	1:A:390:LYS:HB2	1.98	0.46
2:B:11:LYS:O	2:B:85:GLN:HB3	2.16	0.46
2:B:66:LYS:HD2	2:B:67:ASP:N	2.31	0.46
1:A:12:LEU:HD11	1:A:127:TYR:CZ	2.51	0.46
1:A:24:TRP:CZ3	1:A:61:PHE:HB3	2.50	0.46
1:A:106:ALA:HB1	1:A:227:PHE:HE2	1.80	0.46
1:A:401:TRP:HH2	1:A:508:ALA:O	1.98	0.46
1:A:515:SER:O	1:A:519:ASN:ND2	2.49	0.46
1:A:19:PRO:HD3	1:A:80:LEU:HD13	1.98	0.45
1:A:399:GLU:HA	1:A:402:TRP:CE3	2.50	0.45
2:B:24:TRP:CG	2:B:25:PRO:HD2	2.50	0.45
1:A:105:SER:O	1:A:190:GLY:HA2	2.16	0.45
1:A:279:LEU:HA	1:A:282:LEU:CD2	2.41	0.45
2:B:146:TYR:CG	2:B:150:PRO:HB3	2.51	0.45
2:B:350:LYS:CG	2:B:351:THR:N	2.79	0.45
1:A:324:ASP:O	1:A:343:GLN:HG2	2.16	0.45
1:A:28:GLU:OE1	1:A:135:ILE:HG22	2.17	0.45
1:A:90:VAL:O	1:A:92:LEU:N	2.50	0.45
1:A:233:GLU:HB3	1:A:240:THR:HG23	1.99	0.45
1:A:250:ASP:OD2	1:A:250:ASP:N	2.46	0.45
2:B:47:ILE:HD12	2:B:144:TYR:CD1	2.52	0.45
2:B:85:GLN:O	2:B:85:GLN:HG3	2.16	0.45
1:A:72:ARG:NH1	1:A:74:LEU:HD12	2.31	0.45
1:A:287:LYS:NZ	4:A:1026:HOH:O	2.46	0.45
2:B:241:VAL:HG13	2:B:351:THR:OG1	2.16	0.45
2:B:274:ILE:HA	2:B:306:ASN:OD1	2.17	0.45
1:A:88:TRP:HB2	2:B:54:ASN:O	2.17	0.45
2:B:45:GLY:HA2	4:B:1056:HOH:O	2.17	0.45
2:B:380:ILE:O	2:B:384:GLY:HA2	2.17	0.45
1:A:50:ILE:HD12	1:A:54:ASN:HB3	1.99	0.44
2:B:110:ASP:HB2	2:B:228:LEU:HG	1.99	0.44
2:B:205:LEU:HD23	2:B:208:HIS:HB3	1.99	0.44
1:A:532:TYR:CE2	1:A:534:ALA:HB2	2.53	0.44
2:B:104:LYS:O	2:B:235:HIS:HA	2.17	0.44
1:A:20:LYS:HD2	1:A:55:PRO:O	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:425:LEU:HD22	2:B:426:TRP:CD1	2.52	0.44
1:A:225:PRO:HA	1:A:226:PRO:C	2.37	0.44
1:A:268:SER:OG	1:A:353:LYS:HE2	2.18	0.44
1:A:279:LEU:O	1:A:282:LEU:HB2	2.18	0.44
2:B:205:LEU:HD22	2:B:209:LEU:HG	1.99	0.44
2:B:325:LEU:HD21	2:B:383:TRP:CE3	2.53	0.44
1:A:28:GLU:O	1:A:32:LYS:HG3	2.18	0.44
1:A:50:ILE:HD12	1:A:54:ASN:CB	2.47	0.44
1:A:246:LEU:HB2	1:A:307:ARG:NH1	2.33	0.44
2:B:103:LYS:HD2	2:B:191:SER:CA	2.48	0.44
1:A:536:VAL:HG12	2:B:258:GLN:HB3	2.00	0.44
2:B:183:TYR:CD1	2:B:184:MET:HG2	2.53	0.44
2:B:365:VAL:O	2:B:369:THR:HG23	2.18	0.44
1:A:101:LYS:N	1:A:101:LYS:CE	2.81	0.44
1:A:312:GLU:O	1:A:312:GLU:HG2	2.18	0.44
1:A:181:TYR:CE1	1:A:183:TYR:HB2	2.52	0.43
1:A:193:LEU:HD13	1:A:197:GLN:HG3	1.99	0.43
1:A:253:THR:O	1:A:254:VAL:C	2.56	0.43
2:B:328:GLU:O	2:B:339:TYR:HA	2.18	0.43
2:B:423:VAL:HG13	2:B:424:LYS:N	2.32	0.43
1:A:33:ALA:O	1:A:37:ILE:HG13	2.18	0.43
1:A:226:PRO:HA	1:A:234:LEU:O	2.18	0.43
1:A:420:PRO:HA	1:A:421:PRO:C	2.37	0.43
2:B:8:VAL:O	2:B:8:VAL:HG22	2.18	0.43
2:B:31:ILE:O	2:B:35:VAL:HG23	2.18	0.43
2:B:295:LEU:N	2:B:295:LEU:CD1	2.81	0.43
1:A:27:THR:HG21	1:A:29:GLU:HB3	1.99	0.43
1:A:408:ALA:HB1	2:B:364:ASP:HB3	1.99	0.43
1:A:417:VAL:O	1:A:417:VAL:HG13	2.18	0.43
1:A:501:TYR:CE1	1:A:505:ILE:HD11	2.54	0.43
1:A:516:GLU:O	1:A:519:ASN:N	2.51	0.43
2:B:24:TRP:CE2	2:B:399:GLU:HB3	2.53	0.43
2:B:339:TYR:CZ	2:B:352:GLY:HA3	2.53	0.43
1:A:115:TYR:HD1	1:A:151:GLN:HA	1.84	0.43
1:A:248:GLU:HG3	1:A:248:GLU:O	2.19	0.43
1:A:394:GLN:H	1:A:394:GLN:HG2	1.57	0.43
1:A:259:LYS:N	1:A:259:LYS:HD2	2.33	0.43
2:B:57:ASN:ND2	2:B:131:THR:OG1	2.51	0.43
1:A:409:THR:O	2:B:364:ASP:HB2	2.19	0.43
1:A:505:ILE:O	1:A:510:PRO:HD3	2.18	0.43
2:B:195:ILE:HD11	2:B:233:GLU:CD	2.38	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:156:SER:HB2	1:A:157:PRO:HD3	2.01	0.43
1:A:264:LEU:HD12	1:A:264:LEU:HA	1.88	0.43
1:A:332:GLN:HB3	1:A:336:GLN:HB3	2.01	0.43
2:B:84:THR:HB	2:B:154:LYS:HE2	2.00	0.43
2:B:230:MET:HE3	2:B:232:TYR:CD1	2.53	0.43
1:A:228:LEU:HA	1:A:232:TYR:O	2.19	0.42
2:B:202:ILE:HG21	2:B:227:PHE:CE1	2.53	0.42
2:B:270:ILE:HG12	2:B:346:PHE:HB3	2.01	0.42
1:A:295:LEU:HD12	1:A:300:GLU:CD	2.39	0.42
1:A:218:ASP:OD1	1:A:221:HIS:ND1	2.53	0.42
2:B:227:PHE:HB2	2:B:231:GLY:HA2	1.85	0.42
2:B:253:THR:HA	2:B:292:VAL:HA	2.01	0.42
1:A:68:SER:C	1:A:70:LYS:H	2.23	0.42
1:A:137:ASN:C	1:A:139:THR:N	2.73	0.42
1:A:393:ILE:O	1:A:414:TRP:CZ3	2.72	0.42
2:B:22:LYS:HE3	2:B:22:LYS:HB2	1.88	0.42
2:B:161:GLN:O	2:B:164:MET:HB3	2.20	0.42
1:A:5:ILE:H	1:A:5:ILE:HG13	1.73	0.42
1:A:487:GLN:HA	1:A:524:GLN:NE2	2.35	0.42
2:B:103:LYS:HD2	2:B:191:SER:HA	2.02	0.42
1:A:27:THR:HG22	1:A:29:GLU:HB3	2.00	0.42
2:B:60:VAL:HG11	2:B:130:PHE:CD1	2.54	0.42
1:A:187:LEU:HD12	1:A:187:LEU:HA	1.90	0.42
1:A:239:TRP:NE1	1:A:316:GLY:HA3	2.35	0.42
1:A:317:VAL:HG22	1:A:318:TYR:H	1.85	0.42
1:A:525:LEU:HD23	1:A:525:LEU:HA	1.92	0.41
2:B:274:ILE:HG23	2:B:306:ASN:CG	2.41	0.41
1:A:121:ASP:O	1:A:122:GLU:C	2.59	0.41
1:A:517:LEU:HD23	1:A:520:GLN:HE21	1.85	0.41
1:A:115:TYR:N	1:A:115:TYR:CD2	2.89	0.41
1:A:194:GLU:O	1:A:197:GLN:N	2.54	0.41
1:A:271:TYR:CE1	1:A:314:VAL:HG13	2.54	0.41
1:A:278:GLN:NE2	1:A:278:GLN:HA	2.36	0.41
2:B:244:ILE:HD13	2:B:266:TRP:CZ3	2.55	0.41
2:B:335:GLY:O	2:B:355:ALA:HA	2.21	0.41
1:A:164:MET:HG3	1:A:168:LEU:HD22	2.03	0.41
1:A:344:GLU:O	1:A:347:LYS:HB2	2.21	0.41
2:B:70:LYS:HA	2:B:70:LYS:HD3	1.85	0.41
2:B:171:PHE:O	2:B:175:ASN:HB2	2.20	0.41
2:B:242:GLN:O	2:B:242:GLN:HG3	2.21	0.41
1:A:110:ASP:O	1:A:216:THR:HA	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:24:TRP:HZ3	1:A:61:PHE:CG	2.38	0.41
1:A:66:LYS:HA	1:A:66:LYS:HD3	1.91	0.41
1:A:337:TRP:CH2	1:A:368:LEU:HB2	2.56	0.41
1:A:37:ILE:O	1:A:41:MET:HG3	2.20	0.41
1:A:46:LYS:NZ	1:A:113:ASP:OD2	2.54	0.41
1:A:486:LEU:HA	1:A:486:LEU:HD23	1.89	0.41
1:A:489:SER:CB	1:A:493:VAL:CG1	2.99	0.41
1:A:224:GLU:OE2	1:A:225:PRO:HD2	2.21	0.41
1:A:293:ILE:N	1:A:293:ILE:HD12	2.36	0.41
2:B:57:ASN:HD22	2:B:143:ARG:HH12	1.68	0.41
2:B:175:ASN:H	2:B:176:PRO:HD3	1.81	0.41
2:B:276:VAL:O	2:B:277:ARG:C	2.59	0.41
1:A:228:LEU:HD23	1:A:233:GLU:HA	2.03	0.41
1:A:245:VAL:HG13	1:A:245:VAL:O	2.21	0.41
1:A:264:LEU:HB3	1:A:276:VAL:HG11	2.02	0.41
2:B:227:PHE:C	2:B:231:GLY:HA2	2.41	0.41
1:A:134:SER:CB	1:A:139:THR:O	2.69	0.40
1:A:218:ASP:O	1:A:219:LYS:C	2.60	0.40
1:A:7:THR:HG21	1:A:121:ASP:HA	2.03	0.40
1:A:60:VAL:CG2	1:A:130:PHE:HB2	2.50	0.40
1:A:116:PHE:CZ	1:A:151:GLN:HB2	2.57	0.40
1:A:132:ILE:HB	1:A:142:ILE:CG1	2.50	0.40
1:A:235:HIS:HB2	1:A:238:LYS:O	2.20	0.40
1:A:326:ILE:O	1:A:341:ILE:HA	2.22	0.40
1:A:391:LEU:C	1:A:417:VAL:HG12	2.41	0.40
2:B:175:ASN:N	2:B:176:PRO:CD	2.80	0.40
2:B:227:PHE:HB2	2:B:231:GLY:CA	2.46	0.40
1:A:19:PRO:CD	1:A:80:LEU:HD13	2.52	0.40
1:A:151:GLN:NE2	1:A:151:GLN:CA	2.84	0.40
1:A:401:TRP:CH2	1:A:508:ALA:O	2.75	0.40
1:A:441:TYR:CD1	2:B:286:THR:HG22	2.56	0.40
2:B:46:LYS:CE	2:B:116:PHE:HB3	2.52	0.40
2:B:287:LYS:HD3	2:B:291:GLU:OE2	2.20	0.40
2:B:422:LEU:O	2:B:425:LEU:HB3	2.22	0.40
2:B:10:VAL:HG11	2:B:153:TRP:CZ2	2.57	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	520/560 (93%)	476 (92%)	34 (6%)	10 (2%)	8	20
2	B	396/440 (90%)	357 (90%)	34 (9%)	5 (1%)	12	30
All	All	916/1000 (92%)	833 (91%)	68 (7%)	15 (2%)	9	24

All (15) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	66	LYS
1	A	91	GLN
1	A	137	ASN
1	A	195	ILE
1	A	242	GLN
1	A	412	PRO
1	A	538	ALA
2	B	232	TYR
1	A	114	ALA
1	A	138	GLU
2	B	250	ASP
2	B	95	PRO
2	B	162	SER
1	A	345	PRO
2	B	334	GLN

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	472/498 (95%)	423 (90%)	49 (10%)	7	16
2	B	367/399 (92%)	341 (93%)	26 (7%)	14	34
All	All	839/897 (94%)	764 (91%)	75 (9%)	9	22

All (75) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	ILE
1	A	7	THR
1	A	20	LYS
1	A	21	VAL
1	A	22	LYS
1	A	28	GLU
1	A	53	GLU
1	A	61	PHE
1	A	101	LYS
1	A	105	SER
1	A	109	LEU
1	A	113	ASP
1	A	135	ILE
1	A	139	THR
1	A	142	ILE
1	A	151	GLN
1	A	177	ASP
1	A	182	GLN
1	A	195	ILE
1	A	200	THR
1	A	205	LEU
1	A	219	LYS
1	A	250	ASP
1	A	264	LEU
1	A	279	LEU
1	A	282	LEU
1	A	283	LEU
1	A	287	LYS
1	A	303	LEU
1	A	312	GLU
1	A	340	GLN
1	A	346	PHE
1	A	356	ARG
1	A	362	THR
1	A	394	GLN

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Mol	Chain	Res	Type
1	A	396	GLU
1	A	402	TRP
1	A	409	THR
1	A	413	GLU
1	A	424	LYS
1	A	470	THR
1	A	473	THR
1	A	476	LYS
1	A	479	LEU
1	A	487	GLN
1	A	493	VAL
1	A	503	LEU
1	A	517	LEU
1	A	533	LEU
2	B	6	GLU
2	B	8	VAL
2	B	22	LYS
2	B	55	PRO
2	B	60	VAL
2	B	72	ARG
2	B	94	ILE
2	B	134	SER
2	B	166	LYS
2	B	167	ILE
2	B	175	ASN
2	B	178	ILE
2	B	201	LYS
2	B	205	LEU
2	B	230	MET
2	B	233	GLU
2	B	240	THR
2	B	250	ASP
2	B	280	CYS
2	B	283	LEU
2	B	286	THR
2	B	289	LEU
2	B	303	LEU
2	B	368	LEU
2	B	410	TRP
2	B	414	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	151	GLN
1	A	197	GLN
1	A	208	HIS
1	A	222	GLN
1	A	235	HIS
1	A	255	ASN
1	A	278	GLN
1	A	475	GLN
1	A	487	GLN
1	A	507	GLN
1	A	509	GLN
1	A	512	GLN
1	A	520	GLN
2	B	57	ASN
2	B	147	ASN
2	B	207	GLN
2	B	242	GLN
2	B	269	GLN
2	B	278	GLN
2	B	330	GLN
2	B	332	GLN
2	B	336	GLN
2	B	340	GLN
2	B	428	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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	0.77	0	1,8,10	6.82	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(^{o})	Ideal(^{o})
1	A	280	CSD	OD1-SG-CB	6.82	118.51	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	UC1	A	999	-	19,23,23	2.48	2 (10%)	21,31,31	1.42	4 (19%)

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	UC1	A	999	-	-	2/10/14/14	0/2/2/2

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	999	UC1	C-N	8.79	1.42	1.34
3	A	999	UC1	CA-C8	2.63	1.52	1.48

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	999	UC1	S-C-N	-3.41	118.62	125.23
3	A	999	UC1	OB-C3-C4	2.72	119.76	116.40
3	A	999	UC1	C3-C4-CL	2.53	122.39	119.43
3	A	999	UC1	C2-C1-N	2.26	127.56	120.18

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	999	UC1	C9-C-N-C1
3	A	999	UC1	S-C-N-C1

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	999	UC1	1	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 then 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.

Ligand UC1 A 999

Bond lengths

Bond angles

Torsions

Rings
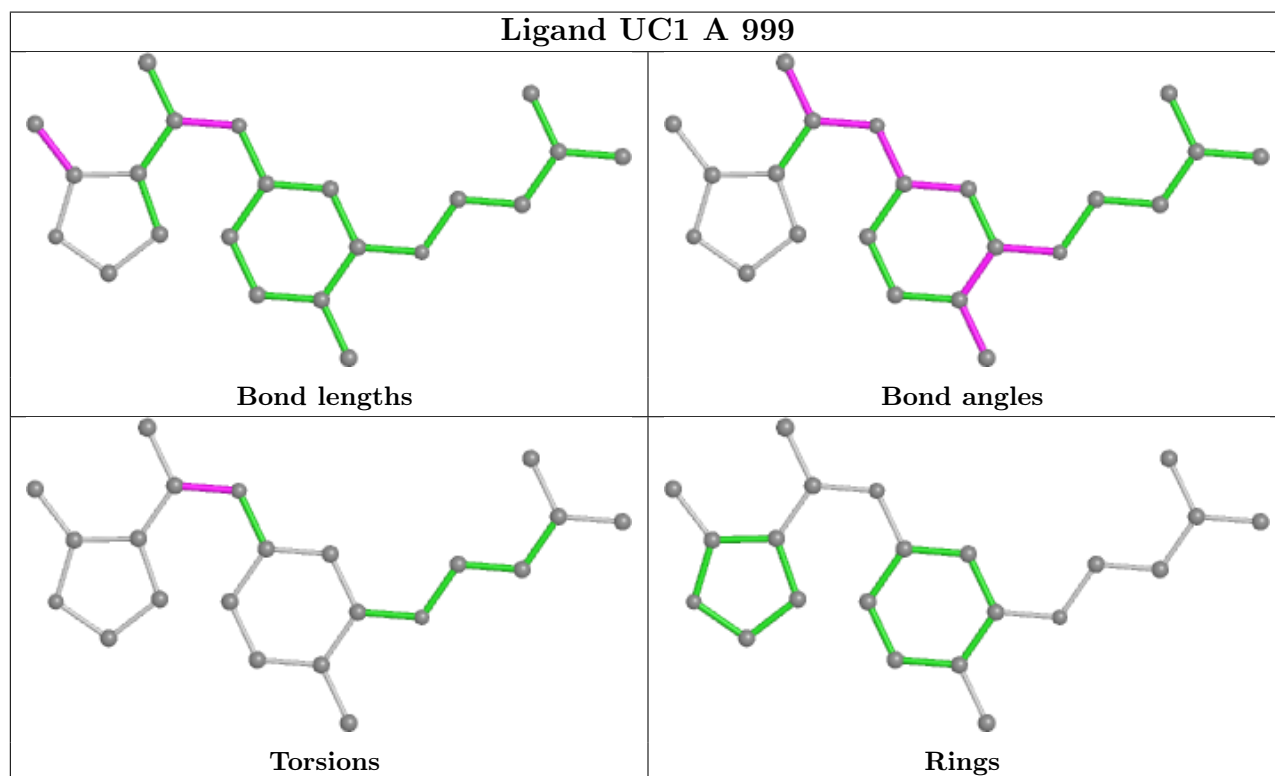
5.7 Other polymers (i)

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	524/560 (93%)	-0.07	24 (4%)	32	31	38, 70, 122, 150	0
2	B	404/440 (91%)	0.16	35 (8%)	10	8	33, 69, 129, 150	0
All	All	928/1000 (92%)	0.03	59 (6%)	19	18	33, 70, 125, 150	0

All (59) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	230	MET	7.3
2	B	92	LEU	6.0
1	A	469	LEU	5.8
1	A	64	LYS	5.7
1	A	243	PRO	5.2
1	A	67	ASP	5.2
2	B	93	GLY	5.1
1	A	468	THR	5.1
2	B	94	ILE	4.4
2	B	195	ILE	4.3
1	A	538	ALA	4.2
2	B	232	TYR	4.2
1	A	65	LYS	4.0
2	B	238	LYS	3.9
2	B	210	LEU	3.7
1	A	68	SER	3.5
2	B	88	TRP	3.4
2	B	227	PHE	3.3
1	A	472	THR	3.2
1	A	467	VAL	3.2
1	A	66	LYS	3.2
1	A	539	HIS	3.1
2	B	212	TRP	3.0
1	A	63	ILE	3.0

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Mol	Chain	Res	Type	RSRZ
2	B	318	TYR	2.9
2	B	237	ASP	2.9
2	B	229	TRP	2.9
2	B	207	GLN	2.8
1	A	473	THR	2.8
1	A	471	ASP	2.7
2	B	87	PHE	2.7
2	B	410	TRP	2.7
2	B	211	ARG	2.6
2	B	233	GLU	2.6
2	B	317	VAL	2.5
1	A	52	PRO	2.5
2	B	409	THR	2.4
1	A	470	THR	2.4
2	B	169	GLU	2.3
1	A	402	TRP	2.3
1	A	221	HIS	2.3
2	B	362	THR	2.3
1	A	69	THR	2.3
2	B	168	LEU	2.3
2	B	208	HIS	2.3
2	B	336	GLN	2.2
2	B	197	GLN	2.2
2	B	428	GLN	2.2
2	B	184	MET	2.1
2	B	104	LYS	2.1
1	A	137	ASN	2.1
2	B	5	ILE	2.1
1	A	311	LYS	2.1
1	A	140	PRO	2.1
2	B	353	LYS	2.0
1	A	474	ASN	2.0
2	B	6	GLU	2.0
2	B	284	ARG	2.0
2	B	95	PRO	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.

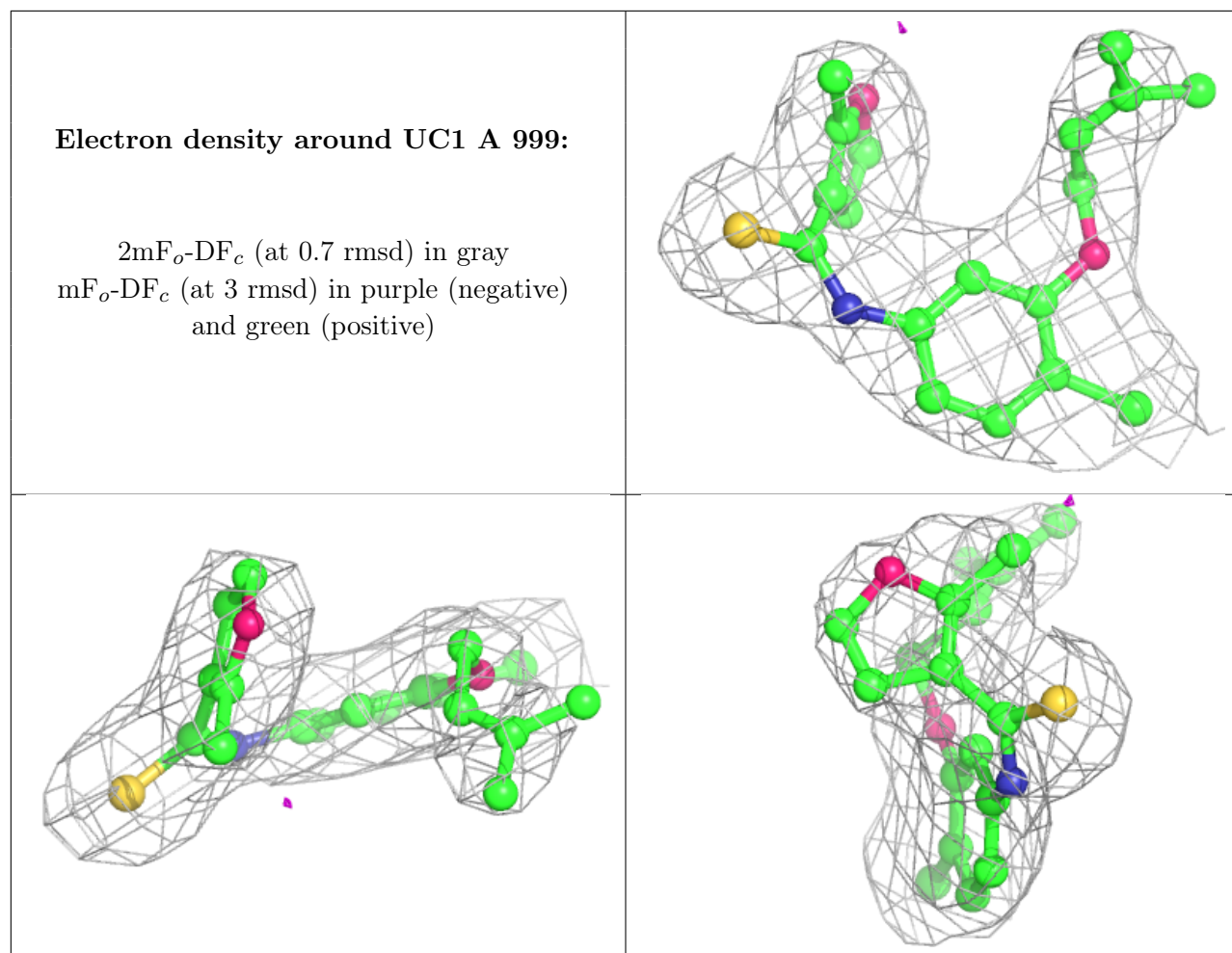| Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
1	CSD	A	280	8/9	0.97	0.12	50,65,85,86	0

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, 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
3	UC1	A	999	22/22	0.97	0.17	42,54,62,74	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.

Electron density around UC1 A 999:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)

6.5 Other polymers (i)

There are no such residues in this entry.