Full wwPDB X-ray Structure Validation Report ⓘ

Dec 15, 2024 – 04:38 PM EST

PDB ID	:	1N94
Title	:	Aryl Tetrahydropyridine Inhbitors of Farnesyltransferase: Glycine, Phenylalanine and Histidine Derivates
Authors	:	Gwaltney II, S.L.; O'Connor, S.J.; Nelson, L.T.; Sullivan, G.M.; Imade, H.; Wang, W.; Hasvold, L.; Li, Q.; Cohen, J.; Gu, W.Z.
Deposited on	:	2002-11-22
Resolution	:	3.50 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 types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

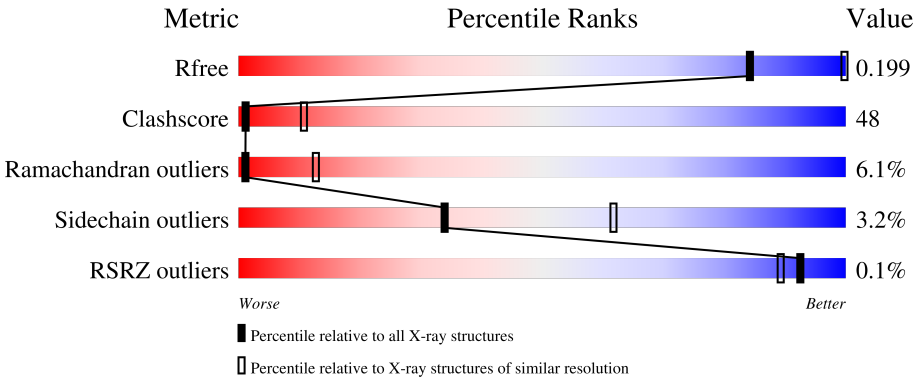
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.21
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 3.50 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}	164625	1094 (3.56-3.44)
Clashscore	180529	1045 (3.54-3.46)
Ramachandran outliers	177936	1032 (3.54-3.46)
Sidechain outliers	177891	1033 (3.54-3.46)
RSRZ outliers	164620	1093 (3.56-3.44)

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	315	33% 60% 7%
2	B	397	39% 54% 6%

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
3	HFP	A	501	X	-	X	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 5873 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.

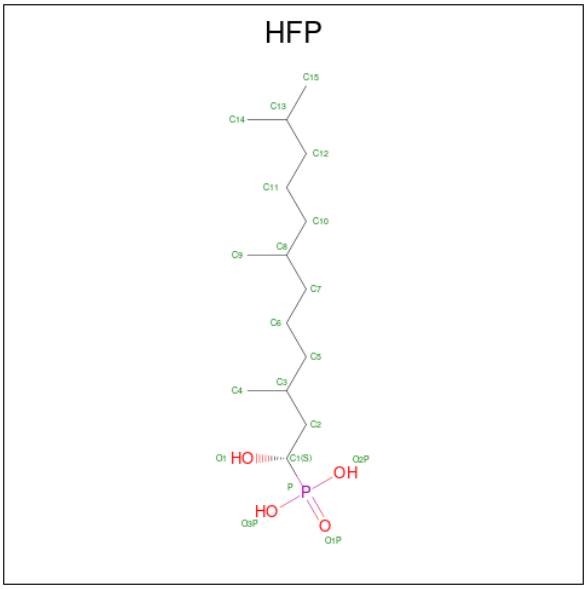
- Molecule 1 is a protein called Protein farnesyltransferase alpha subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	315	Total	C	N	O	S	0	0	0
			2689	1712	473	499	5			

- Molecule 2 is a protein called Protein farnesyltransferase beta subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	397	Total	C	N	O	S	0	0	0
			3125	1995	539	568	23			

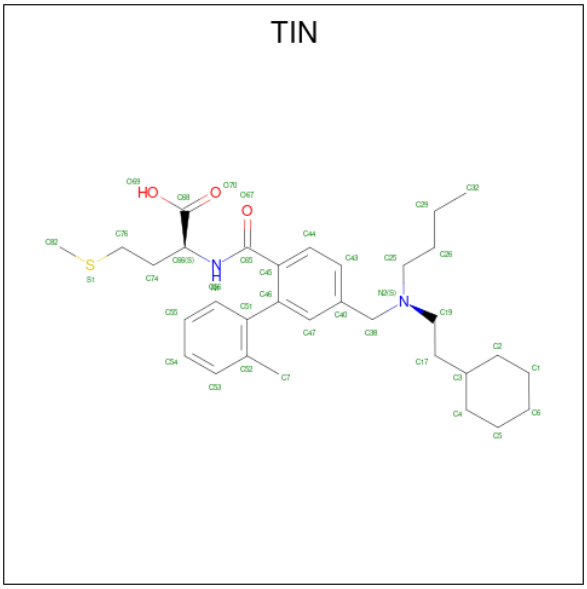
- Molecule 3 is ALPHA-HYDROXYFARNESYLPHOSPHONIC ACID (three-letter code: HFP) (formula: $C_{15}H_{33}O_4P$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	O	P	0	0
			20	15	4	1		

- Molecule 4 is 2-{(5-{[BUTYL-(2-CYCLOHEXYL-ETHYL)-AMINO]-METHYL}-2'-ME

THYL-BIPHENYL-2-CARBONYL)-AMINO]-4-METHYLSULFANYL-BUTYRIC ACID (three-letter code: TIN) (formula: $C_{32}H_{46}N_2O_3S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	S	0	0
			38	32	2	3	1		

- Molecule 5 is ZINC ION (three-letter code: ZN) (formula: Zn).

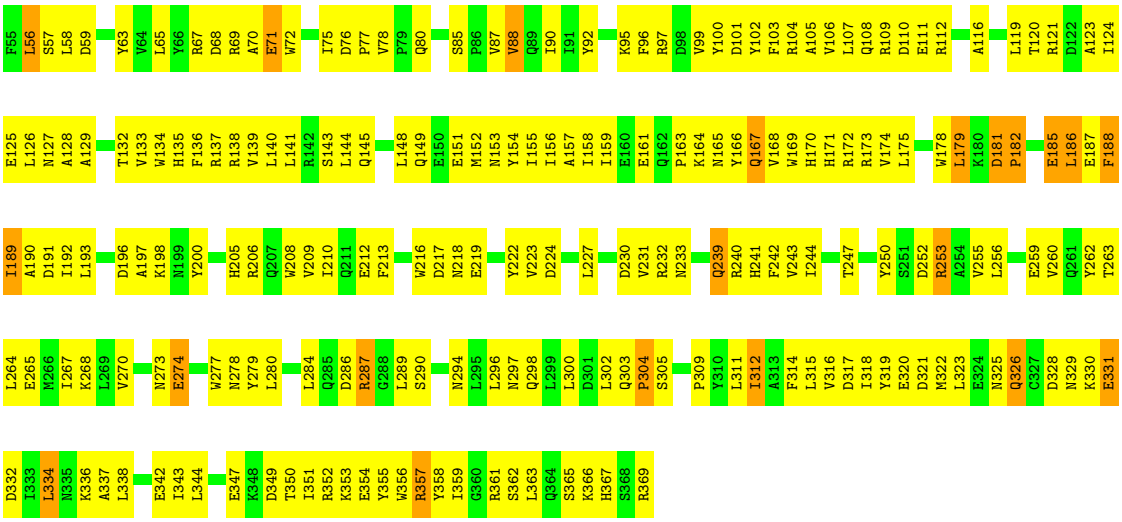
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	1	Total	Zn	0	0
			1	1		

3 Residue-property plots (i)

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.

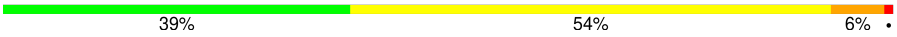
• Molecule 1: Protein farnesyltransferase alpha subunit

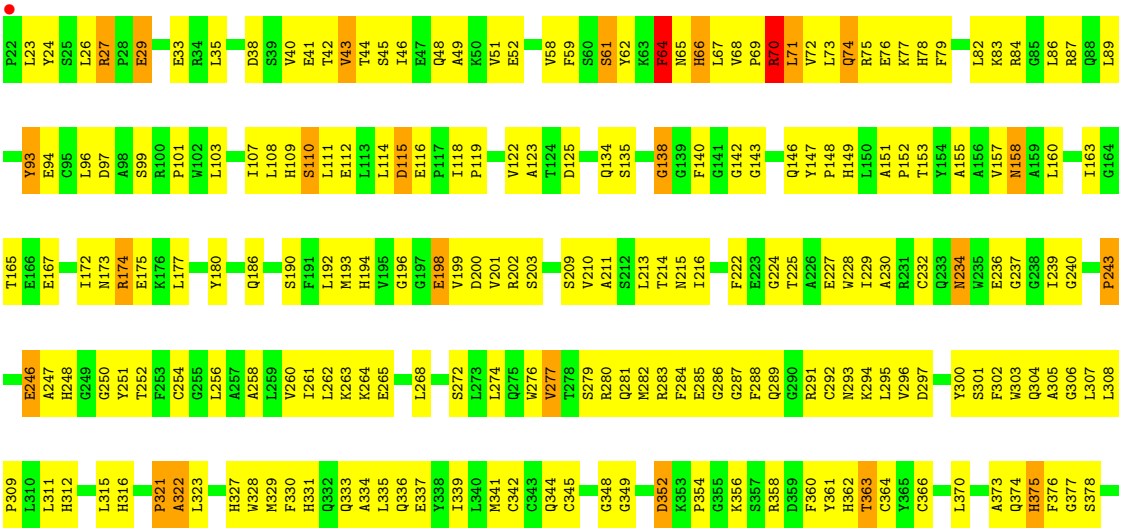
Chain A:

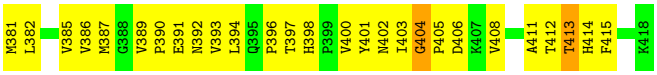


• Molecule 2: Protein farnesyltransferase beta subunit

Chain B:






M381
L382
V385
V386
M387
G388
V389
P390
E391
N392
V393
L394
Q395
P396
T397
H398
P399
V400
Y401
N402
I403
G404
P405
D406
K407
V408
A411
T412
T413
H414
F415
K418

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 61	Depositor
Cell constants a, b, c, α, β, γ	172.11Å 172.11Å 69.40Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	33.94 – 3.50 33.94 – 3.50	Depositor EDS
% Data completeness (in resolution range)	(Not available) (33.94-3.50) 87.3 (33.94-3.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.26 (at 3.18Å)	Xtriage
Refinement program	X-PLOR 3.1	Depositor
R, R_{free}	0.295 , 0.296 0.199 , 0.199	Depositor DCC
R_{free} test set	1342 reflections (9.56%)	wwPDB-VP
Wilson B-factor (Å^2)	59.8	Xtriage
Anisotropy	0.118	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 73.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.46$, $< L^2 > = 0.29$	Xtriage
Estimated twinning fraction	0.056 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	5873	wwPDB-VP
Average B, all atoms (Å^2)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.18% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, HFP, TIN

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	0.40	0/2755	0.65	0/3738
2	B	0.42	0/3208	0.70	0/4353
All	All	0.41	0/5963	0.68	0/8091

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
2	B	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	93	TYR	Sidechain

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2689	0	2614	283	0
2	B	3125	0	3058	287	0
3	A	20	0	28	21	0
4	A	38	0	45	10	0
5	B	1	0	0	0	0
All	All	5873	0	5745	553	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 48.

All (553) 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:164:LYS:HD3	3:A:501:HFP:O1P	1.18	1.30
1:A:164:LYS:CD	3:A:501:HFP:O1P	1.80	1.28
1:A:200:TYR:CB	3:A:501:HFP:H43	1.86	1.04
1:A:200:TYR:CG	3:A:501:HFP:H43	1.93	1.03
2:B:280:ARG:HH12	2:B:292:CYS:HA	1.21	1.00
1:A:165:ASN:ND2	1:A:168:VAL:H	1.61	0.99
2:B:158:ASN:HD21	2:B:403:ILE:HG21	1.30	0.96
2:B:74:GLN:HB3	2:B:77:LYS:HB2	1.48	0.95
2:B:308:LEU:HD12	2:B:330:PHE:HD1	1.29	0.94
1:A:239:GLN:HE21	1:A:239:GLN:HA	1.34	0.92
2:B:386:VAL:HG21	2:B:393:VAL:HG22	1.52	0.92
1:A:200:TYR:CG	3:A:501:HFP:C4	2.54	0.90
2:B:291:ARG:HH21	2:B:294:LYS:HE2	1.36	0.90
2:B:336:GLN:NE2	2:B:374:GLN:HG2	1.85	0.90
2:B:336:GLN:HE21	2:B:374:GLN:HG2	1.38	0.89
1:A:164:LYS:NZ	4:A:1:TIN:H321	1.88	0.88
2:B:158:ASN:ND2	2:B:403:ILE:HG21	1.89	0.87
2:B:280:ARG:HH12	2:B:292:CYS:CA	1.88	0.86
1:A:270:VAL:HG22	2:B:40:VAL:HG21	1.58	0.85
2:B:158:ASN:HD21	2:B:403:ILE:CG2	1.90	0.84
2:B:87:ARG:NH1	2:B:122:VAL:HG12	1.93	0.83
2:B:281:GLN:HE22	2:B:331:HIS:HB3	1.42	0.82
2:B:73:LEU:HA	2:B:344:GLN:HE22	1.44	0.82
2:B:119:PRO:O	2:B:122:VAL:HG22	1.80	0.81
2:B:59:PHE:HA	2:B:341:MET:HE1	1.62	0.80
2:B:64:PHE:HD1	2:B:65:ASN:H	1.30	0.80
1:A:253:ARG:HE	1:A:253:ARG:HA	1.47	0.80
1:A:164:LYS:HD2	3:A:501:HFP:O1P	1.82	0.80
2:B:234:ASN:ND2	2:B:236:GLU:H	1.81	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:286:ASP:HB2	1:A:287:ARG:HH21	1.46	0.79
2:B:280:ARG:NH1	2:B:292:CYS:HA	1.97	0.78
2:B:134:GLN:HE22	2:B:173:ASN:H	1.31	0.78
2:B:86:LEU:HB2	2:B:107:ILE:HG21	1.66	0.77
2:B:308:LEU:HD12	2:B:330:PHE:CD1	2.18	0.77
2:B:200:ASP:OD1	2:B:202:ARG:HB3	1.85	0.77
1:A:165:ASN:HD21	1:A:167:GLN:HG2	1.50	0.76
2:B:386:VAL:CG2	2:B:393:VAL:HG22	2.15	0.76
2:B:386:VAL:HG21	2:B:393:VAL:CG2	2.15	0.76
1:A:156:ILE:HG12	1:A:172:ARG:HH12	1.51	0.75
1:A:96:PHE:HA	1:A:126:LEU:HD13	1.68	0.75
1:A:208:TRP:NE1	1:A:212:GLU:HG3	2.02	0.75
1:A:289:LEU:HD13	1:A:318:ILE:HG12	1.68	0.75
1:A:167:GLN:H	1:A:167:GLN:NE2	1.85	0.74
2:B:186:GLN:HB2	2:B:190:SER:O	1.87	0.74
2:B:59:PHE:HD1	2:B:341:MET:HE2	1.51	0.74
1:A:156:ILE:HG23	1:A:188:PHE:CE1	2.23	0.74
1:A:165:ASN:HD22	1:A:168:VAL:HG12	1.51	0.74
1:A:189:ILE:HD11	1:A:205:HIS:HD2	1.52	0.73
1:A:329:ASN:HB3	1:A:332:ASP:HB3	1.71	0.72
1:A:263:THR:HG21	1:A:280:LEU:HB2	1.71	0.72
1:A:200:TYR:CD2	3:A:501:HFP:H43	2.24	0.72
1:A:268:LYS:HE3	1:A:302:LEU:HD21	1.71	0.72
1:A:344:LEU:HD13	1:A:356:TRP:CE2	2.25	0.72
2:B:109:HIS:O	2:B:112:GLU:HG2	1.88	0.72
1:A:151:GLU:HG3	1:A:175:LEU:HD11	1.70	0.72
2:B:38:ASP:O	2:B:40:VAL:HG23	1.89	0.72
1:A:164:LYS:HZ3	4:A:1:TIN:H321	1.55	0.71
2:B:306:GLY:O	2:B:309:PRO:HD2	1.91	0.71
1:A:92:TYR:HB2	1:A:97:ARG:HB2	1.72	0.71
2:B:79:PHE:CZ	2:B:83:LYS:HD2	2.26	0.70
1:A:167:GLN:H	1:A:167:GLN:CD	1.94	0.70
2:B:174:ARG:HD2	2:B:415:PHE:CD1	2.26	0.70
1:A:323:LEU:HB3	1:A:367:HIS:NE2	2.07	0.70
2:B:321:PRO:HG2	2:B:322:ALA:H	1.57	0.69
1:A:256:LEU:HD23	1:A:256:LEU:O	1.92	0.69
2:B:396:PRO:HB2	2:B:405:PRO:HG2	1.74	0.69
1:A:189:ILE:HD11	1:A:205:HIS:CD2	2.26	0.69
2:B:175:GLU:CD	2:B:175:GLU:H	1.94	0.69
1:A:96:PHE:HA	1:A:126:LEU:CD1	2.21	0.69
1:A:329:ASN:C	1:A:331:GLU:H	1.96	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:501:HFP:H62	2:B:248:HIS:NE2	2.08	0.69
2:B:280:ARG:NH1	2:B:292:CYS:CA	2.55	0.69
1:A:121:ARG:NH1	1:A:121:ARG:HB3	2.07	0.68
1:A:159:ILE:HG13	1:A:168:VAL:HG22	1.74	0.68
1:A:240:ARG:HD3	1:A:259:GLU:OE2	1.94	0.68
2:B:101:PRO:HD3	2:B:142:GLY:O	1.93	0.68
1:A:175:LEU:O	1:A:179:LEU:HD23	1.93	0.68
2:B:192:LEU:HA	2:B:199:VAL:HG12	1.76	0.67
1:A:165:ASN:HD22	1:A:168:VAL:CG1	2.07	0.67
1:A:200:TYR:CD2	3:A:501:HFP:C4	2.77	0.67
1:A:166:TYR:OH	4:A:1:TIN:HC44	1.95	0.67
2:B:33:GLU:HB3	2:B:283:ARG:O	1.94	0.67
1:A:317:ASP:HA	1:A:320:GLU:OE1	1.94	0.66
1:A:334:LEU:HD21	1:A:367:HIS:O	1.95	0.66
1:A:200:TYR:HB2	3:A:501:HFP:H43	1.78	0.66
3:A:501:HFP:H153	2:B:254:CYS:SG	2.36	0.66
2:B:404:GLY:O	2:B:408:VAL:HG23	1.96	0.65
1:A:200:TYR:HB3	3:A:501:HFP:H43	1.78	0.65
1:A:328:ASP:O	1:A:329:ASN:HB2	1.95	0.65
2:B:315:LEU:HB2	2:B:323:LEU:HD11	1.78	0.65
2:B:412:THR:C	2:B:414:HIS:H	1.99	0.65
2:B:73:LEU:HD12	2:B:344:GLN:NE2	2.11	0.65
2:B:345:CYS:HB3	2:B:348:GLY:O	1.96	0.65
2:B:69:PRO:C	2:B:71:LEU:H	2.01	0.65
2:B:64:PHE:HD1	2:B:65:ASN:N	1.95	0.64
2:B:149:HIS:O	2:B:152:PRO:HG2	1.97	0.64
1:A:58:LEU:HD11	1:A:95:LYS:HD3	1.79	0.64
1:A:294:ASN:HB3	1:A:298:GLN:HE22	1.63	0.64
2:B:23:LEU:HB3	2:B:337:GLU:OE1	1.98	0.64
1:A:112:ARG:O	1:A:144:LEU:HD11	1.98	0.64
2:B:177:LEU:HD21	2:B:210:VAL:CG1	2.27	0.64
1:A:116:ALA:O	1:A:119:LEU:HB3	1.98	0.63
1:A:355:TYR:O	1:A:358:TYR:HB3	1.97	0.63
2:B:288:PHE:CE1	2:B:305:ALA:HB2	2.34	0.63
1:A:232:ARG:CZ	2:B:45:SER:HB2	2.29	0.63
1:A:344:LEU:HD13	1:A:356:TRP:CZ2	2.34	0.63
1:A:149:GLN:NE2	1:A:149:GLN:HA	2.13	0.63
1:A:358:TYR:HB2	1:A:361:ARG:HH21	1.62	0.63
2:B:201:VAL:HG21	2:B:251:TYR:HB3	1.79	0.63
1:A:165:ASN:HD22	1:A:168:VAL:CB	2.12	0.63
1:A:165:ASN:HD22	1:A:168:VAL:H	1.43	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:46:ILE:O	2:B:49:ALA:HB3	1.99	0.63
2:B:335:LEU:HD23	2:B:373:ALA:HB2	1.81	0.62
2:B:214:THR:O	2:B:216:ILE:HG23	1.99	0.62
2:B:300:TYR:HA	2:B:303:TRP:HB2	1.81	0.62
1:A:224:ASP:HA	1:A:227:LEU:HD12	1.80	0.62
2:B:73:LEU:O	2:B:75:ARG:N	2.33	0.62
1:A:312:ILE:O	1:A:316:VAL:HG23	2.00	0.62
1:A:351:ILE:HD11	2:B:281:GLN:HE21	1.65	0.62
3:A:501:HFP:H102	2:B:250:GLY:HA3	1.82	0.61
2:B:370:LEU:O	2:B:374:GLN:HG3	2.01	0.61
2:B:301:SER:O	2:B:305:ALA:HB3	2.00	0.61
1:A:58:LEU:CD1	1:A:95:LYS:HD3	2.31	0.61
2:B:59:PHE:HD1	2:B:341:MET:CE	2.14	0.61
1:A:88:VAL:HG23	1:A:88:VAL:O	2.01	0.61
1:A:260:VAL:CG2	1:A:284:LEU:HD21	2.31	0.60
2:B:114:LEU:O	2:B:115:ASP:HB3	2.01	0.60
1:A:56:LEU:HD12	1:A:56:LEU:H	1.66	0.60
1:A:164:LYS:HZ2	4:A:1:TIN:H321	1.65	0.60
1:A:319:TYR:O	1:A:323:LEU:HG	2.01	0.60
2:B:73:LEU:HA	2:B:344:GLN:NE2	2.16	0.60
1:A:153:ASN:HD22	1:A:153:ASN:N	2.00	0.60
1:A:69:ARG:HB3	1:A:71:GLU:OE2	2.01	0.59
1:A:165:ASN:ND2	1:A:168:VAL:N	2.41	0.59
2:B:303:TRP:HA	2:B:303:TRP:CE3	2.36	0.59
1:A:87:VAL:O	1:A:88:VAL:C	2.41	0.59
1:A:356:TRP:C	1:A:358:TYR:H	2.03	0.59
2:B:24:TYR:HB3	2:B:337:GLU:OE2	2.03	0.59
2:B:413:THR:O	2:B:413:THR:HG22	2.02	0.59
2:B:42:THR:O	2:B:45:SER:N	2.36	0.59
2:B:163:ILE:HG22	2:B:165:THR:HG23	1.85	0.59
1:A:329:ASN:HA	1:A:331:GLU:OE2	2.03	0.59
1:A:200:TYR:CB	3:A:501:HFP:C4	2.72	0.59
2:B:89:LEU:CD1	2:B:103:LEU:HD13	2.33	0.59
1:A:296:LEU:O	1:A:300:LEU:HG	2.03	0.59
2:B:59:PHE:HA	2:B:341:MET:CE	2.31	0.59
2:B:214:THR:HA	2:B:415:PHE:CD2	2.38	0.59
1:A:159:ILE:CG1	1:A:168:VAL:HG22	2.33	0.58
2:B:109:HIS:ND1	2:B:112:GLU:OE1	2.35	0.58
1:A:80:GLN:HB2	1:A:104:ARG:CZ	2.33	0.58
2:B:265:GLU:OE1	2:B:265:GLU:N	2.29	0.58
2:B:87:ARG:HH12	2:B:122:VAL:HG12	1.67	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:277:VAL:HG22	2:B:307:LEU:HD13	1.84	0.58
1:A:165:ASN:HD21	1:A:168:VAL:H	1.51	0.58
1:A:200:TYR:N	3:A:501:HFP:O2P	2.37	0.58
2:B:59:PHE:CD1	2:B:341:MET:HE2	2.36	0.58
2:B:302:PHE:O	2:B:306:GLY:HA3	2.04	0.58
1:A:58:LEU:HD21	1:A:126:LEU:CD2	2.34	0.58
1:A:253:ARG:HA	1:A:253:ARG:NE	2.15	0.58
3:A:501:HFP:H142	2:B:202:ARG:CD	2.34	0.58
2:B:222:PHE:HB3	2:B:225:THR:HB	1.85	0.58
2:B:281:GLN:HE22	2:B:331:HIS:CB	2.14	0.58
1:A:97:ARG:HG3	1:A:97:ARG:HH11	1.69	0.57
2:B:251:TYR:O	2:B:254:CYS:HB2	2.04	0.57
1:A:164:LYS:HD2	4:A:1:TIN:C29	2.34	0.57
1:A:366:LYS:HG3	1:A:367:HIS:ND1	2.20	0.57
2:B:213:LEU:HD21	2:B:401:TYR:CE1	2.39	0.57
1:A:206:ARG:NH2	1:A:222:TYR:CD2	2.72	0.57
2:B:27:ARG:HB3	2:B:29:GLU:OE2	2.04	0.57
2:B:211:ALA:HA	2:B:216:ILE:HG12	1.87	0.57
2:B:247:ALA:O	2:B:291:ARG:HG2	2.05	0.57
2:B:279:SER:HB3	2:B:280:ARG:HH21	1.70	0.57
2:B:134:GLN:HB2	2:B:140:PHE:CE2	2.40	0.57
1:A:332:ASP:O	1:A:336:LYS:HB2	2.05	0.56
2:B:291:ARG:HB2	2:B:294:LYS:HD3	1.87	0.56
2:B:328:TRP:CZ2	2:B:376:PHE:HA	2.40	0.56
1:A:239:GLN:HA	1:A:239:GLN:NE2	2.14	0.56
1:A:65:LEU:O	1:A:69:ARG:HG3	2.04	0.56
1:A:70:ALA:O	1:A:72:TRP:N	2.38	0.56
1:A:167:GLN:NE2	1:A:167:GLN:N	2.53	0.56
1:A:287:ARG:N	1:A:287:ARG:NE	2.52	0.56
2:B:377:GLY:HA2	2:B:382:LEU:HD23	1.86	0.56
2:B:256:LEU:O	2:B:260:VAL:HG23	2.05	0.56
2:B:362:HIS:O	2:B:364:CYS:N	2.38	0.56
1:A:262:TYR:O	1:A:265:GLU:HB2	2.05	0.56
2:B:331:HIS:CE1	2:B:333:GLN:HB3	2.41	0.56
2:B:339:ILE:HD12	2:B:370:LEU:HD13	1.86	0.56
1:A:244:ILE:HD12	1:A:250:TYR:OH	2.05	0.56
2:B:284:PHE:HB3	2:B:285:GLU:OE1	2.06	0.56
2:B:234:ASN:HD21	2:B:236:GLU:HB2	1.71	0.56
1:A:170:HIS:O	1:A:174:VAL:HG23	2.06	0.55
2:B:352:ASP:HB3	2:B:356:LYS:HD3	1.88	0.55
1:A:56:LEU:HD12	1:A:56:LEU:N	2.21	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:334:LEU:O	1:A:338:LEU:HD12	2.06	0.55
2:B:291:ARG:NH2	2:B:294:LYS:HE2	2.15	0.55
2:B:58:VAL:HG12	2:B:341:MET:HE2	1.89	0.55
2:B:201:VAL:HG23	2:B:202:ARG:N	2.20	0.55
2:B:79:PHE:CE2	2:B:83:LYS:HD2	2.41	0.55
2:B:151:ALA:HB3	2:B:152:PRO:CD	2.36	0.55
2:B:78:HIS:ND1	2:B:349:GLY:N	2.55	0.55
2:B:376:PHE:CZ	2:B:378:SER:HB3	2.42	0.55
2:B:361:TYR:O	2:B:364:CYS:HB3	2.07	0.55
1:A:165:ASN:HB3	1:A:168:VAL:HG12	1.87	0.54
1:A:196:ASP:C	1:A:198:LYS:H	2.10	0.54
2:B:62:TYR:HE2	2:B:341:MET:CE	2.20	0.54
1:A:289:LEU:CD1	1:A:318:ILE:HG12	2.36	0.54
1:A:323:LEU:HB3	1:A:367:HIS:CD2	2.43	0.54
1:A:351:ILE:CD1	2:B:281:GLN:HE21	2.19	0.54
1:A:144:LEU:HD12	1:A:144:LEU:N	2.23	0.54
2:B:70:ARG:C	2:B:72:VAL:H	2.10	0.54
2:B:333:GLN:HG3	2:B:387:MET:SD	2.48	0.54
1:A:253:ARG:HE	1:A:253:ARG:CA	2.18	0.54
1:A:175:LEU:O	1:A:178:TRP:HB2	2.08	0.53
1:A:344:LEU:HB3	1:A:356:TRP:CD1	2.44	0.53
1:A:164:LYS:HD2	4:A:1:TIN:H291	1.88	0.53
1:A:280:LEU:HD23	1:A:314:PHE:CE2	2.44	0.53
2:B:224:GLY:O	2:B:227:GLU:HB2	2.09	0.53
1:A:112:ARG:HA	1:A:140:LEU:CD2	2.39	0.53
2:B:26:LEU:O	2:B:27:ARG:O	2.27	0.53
2:B:62:TYR:HE2	2:B:341:MET:HE1	1.73	0.53
1:A:314:PHE:O	1:A:317:ASP:HB2	2.08	0.53
2:B:376:PHE:CD1	2:B:376:PHE:C	2.82	0.53
2:B:48:GLN:O	2:B:52:GLU:HG3	2.08	0.52
1:A:256:LEU:HD23	1:A:256:LEU:C	2.30	0.52
1:A:65:LEU:CD1	1:A:67:ARG:HH21	2.23	0.52
1:A:70:ALA:C	1:A:72:TRP:H	2.13	0.52
1:A:75:ILE:HD13	1:A:109:ARG:NH1	2.24	0.52
1:A:112:ARG:HA	1:A:140:LEU:HD21	1.91	0.52
1:A:230:ASP:CG	2:B:42:THR:HB	2.30	0.52
2:B:84:ARG:HG3	2:B:84:ARG:HH11	1.74	0.52
1:A:127:ASN:HD22	2:B:97:ASP:HB3	1.75	0.52
2:B:192:LEU:HD23	2:B:199:VAL:CG1	2.40	0.52
2:B:398:HIS:CE1	2:B:400:VAL:HB	2.45	0.52
1:A:223:VAL:HG11	1:A:240:ARG:HB2	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:339:ILE:HD12	2:B:370:LEU:CD1	2.40	0.52
1:A:232:ARG:NH1	2:B:45:SER:HB2	2.25	0.52
1:A:90:ILE:HB	1:A:92:TYR:CE1	2.44	0.51
3:A:501:HFP:C10	2:B:250:GLY:HA3	2.40	0.51
2:B:26:LEU:HD23	2:B:59:PHE:HB3	1.92	0.51
1:A:137:ARG:O	1:A:141:LEU:HD13	2.09	0.51
1:A:138:ARG:HG3	1:A:138:ARG:HH11	1.76	0.51
2:B:67:LEU:HG	2:B:68:VAL:HG23	1.91	0.51
2:B:258:ALA:O	2:B:262:LEU:HG	2.10	0.51
2:B:397:THR:HG22	2:B:402:ASN:HA	1.92	0.51
1:A:124:ILE:O	1:A:128:ALA:N	2.43	0.51
1:A:205:HIS:O	1:A:209:VAL:HG23	2.10	0.51
2:B:315:LEU:CD1	2:B:323:LEU:HD21	2.40	0.51
2:B:331:HIS:HE1	2:B:333:GLN:HB3	1.76	0.51
2:B:412:THR:C	2:B:414:HIS:N	2.63	0.51
1:A:85:SER:HB3	2:B:125:ASP:OD1	2.11	0.51
1:A:196:ASP:O	1:A:198:LYS:N	2.44	0.51
1:A:358:TYR:HA	1:A:361:ARG:HE	1.76	0.51
2:B:165:THR:C	2:B:167:GLU:N	2.63	0.51
1:A:358:TYR:HB2	1:A:361:ARG:NH2	2.25	0.51
2:B:381:MET:O	2:B:382:LEU:HD23	2.09	0.51
1:A:159:ILE:O	1:A:163:PRO:HG3	2.11	0.51
2:B:78:HIS:O	2:B:82:LEU:HG	2.10	0.51
2:B:398:HIS:N	2:B:405:PRO:HG3	2.26	0.51
1:A:153:ASN:N	1:A:153:ASN:ND2	2.59	0.51
2:B:134:GLN:NE2	2:B:173:ASN:H	2.05	0.51
2:B:143:GLY:N	2:B:146:GLN:NE2	2.58	0.51
2:B:280:ARG:NH1	2:B:292:CYS:N	2.59	0.51
2:B:315:LEU:CB	2:B:323:LEU:HD11	2.39	0.50
1:A:100:TYR:HE1	1:A:126:LEU:HD12	1.75	0.50
1:A:239:GLN:O	1:A:242:PHE:HB3	2.12	0.50
1:A:244:ILE:HB	1:A:250:TYR:OH	2.11	0.50
1:A:354:GLU:HG2	2:B:328:TRP:O	2.12	0.50
2:B:74:GLN:HB3	2:B:77:LYS:CB	2.31	0.50
2:B:264:LYS:O	2:B:265:GLU:C	2.49	0.50
1:A:67:ARG:HG3	1:A:68:ASP:OD1	2.11	0.50
1:A:173:ARG:HG3	1:A:208:TRP:CZ3	2.46	0.50
1:A:241:HIS:ND1	1:A:241:HIS:O	2.44	0.50
1:A:297:ASN:HA	1:A:300:LEU:HD12	1.92	0.50
1:A:323:LEU:HB3	1:A:367:HIS:HE2	1.74	0.50
2:B:23:LEU:HB2	2:B:26:LEU:HD12	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:190:SER:HB3	2:B:228:TRP:CD2	2.46	0.50
1:A:314:PHE:O	1:A:318:ILE:HG13	2.10	0.50
2:B:303:TRP:HA	2:B:303:TRP:HE3	1.76	0.50
2:B:116:GLU:O	2:B:118:ILE:HD12	2.12	0.50
2:B:348:GLY:O	2:B:358:ARG:HD2	2.12	0.50
2:B:174:ARG:HH11	2:B:174:ARG:HB2	1.76	0.50
1:A:164:LYS:HZ2	4:A:1:TIN:C32	2.23	0.49
1:A:210:ILE:HD11	1:A:219:GLU:OE1	2.12	0.49
2:B:82:LEU:HD21	2:B:363:THR:HG21	1.94	0.49
2:B:327:HIS:O	2:B:376:PHE:CE2	2.65	0.49
2:B:396:PRO:O	2:B:405:PRO:HD3	2.12	0.49
1:A:70:ALA:C	1:A:72:TRP:N	2.66	0.49
2:B:234:ASN:ND2	2:B:236:GLU:N	2.57	0.49
2:B:362:HIS:C	2:B:364:CYS:N	2.65	0.49
2:B:389:VAL:HG22	2:B:392:ASN:HD21	1.78	0.49
1:A:287:ARG:NE	1:A:287:ARG:H	2.10	0.49
1:A:289:LEU:HD12	1:A:318:ILE:HA	1.94	0.49
1:A:231:VAL:HG13	1:A:273:ASN:ND2	2.28	0.49
2:B:175:GLU:CD	2:B:175:GLU:N	2.64	0.49
1:A:325:ASN:O	1:A:326:GLN:C	2.49	0.49
1:A:137:ARG:HG2	1:A:141:LEU:HD11	1.95	0.49
2:B:64:PHE:CD1	2:B:65:ASN:OD1	2.66	0.49
2:B:237:GLY:HA3	2:B:272:SER:O	2.12	0.49
2:B:403:ILE:O	2:B:404:GLY:C	2.49	0.49
1:A:311:LEU:O	1:A:312:ILE:C	2.50	0.49
2:B:73:LEU:HD12	2:B:344:GLN:HE21	1.75	0.49
2:B:76:GLU:O	2:B:79:PHE:HB3	2.13	0.49
1:A:58:LEU:HD21	1:A:126:LEU:HD23	1.95	0.48
1:A:165:ASN:HB3	1:A:168:VAL:CG1	2.43	0.48
2:B:276:TRP:O	2:B:277:VAL:C	2.50	0.48
1:A:351:ILE:HG12	2:B:281:GLN:NE2	2.28	0.48
2:B:70:ARG:C	2:B:72:VAL:N	2.67	0.48
2:B:84:ARG:HG3	2:B:84:ARG:NH1	2.29	0.48
2:B:316:HIS:N	2:B:323:LEU:HD11	2.29	0.48
2:B:412:THR:O	2:B:414:HIS:N	2.46	0.48
2:B:111:LEU:O	2:B:115:ASP:N	2.40	0.48
2:B:336:GLN:HG2	2:B:370:LEU:HD12	1.95	0.48
2:B:279:SER:CB	2:B:280:ARG:HH21	2.26	0.48
1:A:165:ASN:HD22	1:A:168:VAL:HB	1.78	0.48
1:A:362:SER:O	1:A:366:LYS:HG2	2.13	0.48
1:A:96:PHE:CD1	1:A:96:PHE:C	2.87	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:289:LEU:N	1:A:321:ASP:OD2	2.47	0.48
2:B:93:TYR:CD2	2:B:96:LEU:HD12	2.49	0.48
1:A:158:ILE:HG22	1:A:168:VAL:HG21	1.95	0.48
1:A:188:PHE:CZ	1:A:192:ILE:HD11	2.48	0.48
1:A:319:TYR:CD2	1:A:337:ALA:HB2	2.49	0.48
1:A:252:ASP:HB3	1:A:255:VAL:CG2	2.44	0.48
1:A:290:SER:OG	1:A:322:MET:HA	2.14	0.48
1:A:58:LEU:HD12	1:A:63:TYR:CZ	2.49	0.47
1:A:106:VAL:O	1:A:109:ARG:N	2.43	0.47
2:B:26:LEU:O	2:B:27:ARG:C	2.52	0.47
2:B:239:ILE:HG22	2:B:240:GLY:N	2.27	0.47
2:B:280:ARG:HG3	2:B:304:GLN:NE2	2.29	0.47
1:A:87:VAL:HG12	1:A:88:VAL:N	2.29	0.47
1:A:188:PHE:O	1:A:191:ASP:N	2.47	0.47
1:A:100:TYR:CE1	1:A:126:LEU:HD12	2.48	0.47
1:A:127:ASN:C	1:A:129:ALA:H	2.17	0.47
1:A:173:ARG:HG3	1:A:208:TRP:CH2	2.49	0.47
1:A:316:VAL:O	1:A:320:GLU:HG3	2.14	0.47
1:A:58:LEU:HD21	1:A:126:LEU:HD21	1.96	0.47
1:A:200:TYR:HB2	3:A:501:HFP:C4	2.40	0.47
1:A:344:LEU:HD13	1:A:356:TRP:CD2	2.48	0.47
2:B:140:PHE:O	2:B:148:PRO:HA	2.14	0.47
2:B:158:ASN:ND2	2:B:158:ASN:O	2.47	0.47
2:B:327:HIS:O	2:B:376:PHE:HE2	1.96	0.47
1:A:77:PRO:HB3	1:A:102:TYR:CE1	2.49	0.47
1:A:165:ASN:ND2	1:A:168:VAL:HG12	2.25	0.47
1:A:317:ASP:O	1:A:320:GLU:HB2	2.15	0.47
3:A:501:HFP:H142	2:B:202:ARG:HD2	1.97	0.47
2:B:69:PRO:C	2:B:71:LEU:N	2.68	0.47
2:B:87:ARG:HH11	2:B:122:VAL:HG12	1.77	0.47
2:B:109:HIS:O	2:B:112:GLU:N	2.48	0.47
2:B:287:GLY:HA2	2:B:335:LEU:CD1	2.44	0.47
2:B:296:VAL:HG22	2:B:297:ASP:N	2.30	0.47
1:A:104:ARG:O	1:A:105:ALA:C	2.53	0.47
1:A:148:LEU:O	1:A:151:GLU:HB3	2.15	0.47
1:A:250:TYR:O	1:A:256:LEU:HB2	2.15	0.47
2:B:276:TRP:O	2:B:279:SER:N	2.47	0.47
2:B:396:PRO:HG2	2:B:405:PRO:HD2	1.97	0.47
2:B:209:SER:O	2:B:213:LEU:HG	2.15	0.47
2:B:328:TRP:NE1	2:B:375:HIS:O	2.48	0.47
1:A:152:MET:O	1:A:155:ILE:HG22	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:265:GLU:OE2	1:A:265:GLU:HA	2.15	0.46
1:A:268:LYS:HE3	1:A:302:LEU:CD2	2.42	0.46
1:A:369:ARG:HG3	1:A:369:ARG:O	2.15	0.46
2:B:174:ARG:NH1	2:B:174:ARG:CB	2.78	0.46
1:A:138:ARG:HG3	1:A:138:ARG:NH1	2.30	0.46
1:A:165:ASN:O	1:A:169:TRP:HD1	1.98	0.46
1:A:350:THR:O	1:A:353:LYS:HB3	2.16	0.46
2:B:66:HIS:CE1	2:B:69:PRO:CG	2.98	0.46
2:B:234:ASN:ND2	2:B:234:ASN:C	2.66	0.46
2:B:401:TYR:N	2:B:401:TYR:CD2	2.84	0.46
2:B:149:HIS:ND1	2:B:152:PRO:HD2	2.30	0.46
2:B:165:THR:C	2:B:167:GLU:H	2.19	0.46
2:B:225:THR:O	2:B:229:ILE:HG13	2.15	0.46
2:B:342:CYS:O	2:B:354:PRO:HG3	2.16	0.46
1:A:297:ASN:O	1:A:300:LEU:HB2	2.16	0.46
1:A:349:ASP:OD2	1:A:352:ARG:HB2	2.15	0.46
2:B:33:GLU:HA	2:B:33:GLU:OE1	2.15	0.46
1:A:135:HIS:CD2	2:B:147:TYR:CE2	3.04	0.46
1:A:260:VAL:HG21	1:A:284:LEU:HD21	1.98	0.46
2:B:40:VAL:HG12	2:B:41:GLU:N	2.30	0.46
2:B:51:VAL:HG21	2:B:295:LEU:HD13	1.97	0.46
2:B:122:VAL:HG23	2:B:123:ALA:N	2.31	0.46
2:B:135:SER:HB2	2:B:148:PRO:HD3	1.97	0.46
2:B:315:LEU:HD13	2:B:323:LEU:HD21	1.97	0.46
1:A:78:VAL:HG11	1:A:108:GLN:HE22	1.80	0.46
1:A:154:TYR:CE1	1:A:158:ILE:HD11	2.51	0.46
2:B:108:LEU:HD23	2:B:108:LEU:HA	1.75	0.46
2:B:42:THR:O	2:B:43:VAL:C	2.53	0.46
1:A:137:ARG:HG2	1:A:141:LEU:CD1	2.45	0.46
1:A:264:LEU:HD23	1:A:267:ILE:HD12	1.98	0.46
1:A:277:TRP:CZ3	1:A:311:LEU:HA	2.50	0.46
1:A:334:LEU:HD22	1:A:367:HIS:HB3	1.98	0.46
2:B:109:HIS:O	2:B:110:SER:C	2.53	0.46
1:A:264:LEU:O	1:A:267:ILE:HB	2.15	0.46
1:A:355:TYR:CZ	1:A:359:ILE:HD11	2.51	0.46
2:B:198:GLU:CD	2:B:198:GLU:H	2.19	0.46
2:B:411:ALA:O	2:B:414:HIS:HB3	2.16	0.46
1:A:56:LEU:H	1:A:56:LEU:CD1	2.28	0.45
1:A:78:VAL:HG23	1:A:105:ALA:HB2	1.97	0.45
1:A:230:ASP:OD2	1:A:230:ASP:C	2.54	0.45
2:B:122:VAL:O	2:B:123:ALA:C	2.55	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:230:ALA:C	2:B:232:CYS:N	2.68	0.45
2:B:403:ILE:HG13	2:B:408:VAL:HG22	1.97	0.45
1:A:232:ARG:NH1	2:B:42:THR:OG1	2.42	0.45
2:B:64:PHE:CD1	2:B:65:ASN:N	2.82	0.45
1:A:354:GLU:HG3	2:B:329:MET:HA	1.98	0.45
2:B:193:MET:HE2	2:B:203:SER:HB2	1.97	0.45
2:B:232:CYS:CB	2:B:239:ILE:HG23	2.46	0.45
1:A:187:GLU:O	1:A:190:ALA:HB3	2.17	0.45
2:B:152:PRO:HG2	2:B:153:THR:H	1.81	0.45
2:B:321:PRO:O	2:B:323:LEU:N	2.49	0.45
2:B:239:ILE:HB	2:B:252:THR:HA	1.98	0.45
2:B:288:PHE:HB3	2:B:304:GLN:HG3	1.99	0.45
2:B:210:VAL:HG12	2:B:211:ALA:N	2.32	0.45
1:A:95:LYS:O	1:A:99:VAL:HG23	2.17	0.45
1:A:303:GLN:N	1:A:304:PRO:CD	2.79	0.45
1:A:120:THR:O	1:A:121:ARG:C	2.55	0.45
1:A:357:ARG:O	1:A:361:ARG:NE	2.50	0.45
2:B:281:GLN:NE2	2:B:331:HIS:HB3	2.19	0.45
1:A:56:LEU:HB3	1:A:57:SER:H	1.61	0.45
1:A:144:LEU:H	1:A:144:LEU:CD1	2.30	0.45
1:A:156:ILE:CG1	1:A:172:ARG:HH12	2.26	0.45
1:A:121:ARG:HH11	1:A:121:ARG:CB	2.30	0.45
1:A:127:ASN:OD1	1:A:129:ALA:HB3	2.17	0.45
1:A:286:ASP:HB2	1:A:287:ARG:NH2	2.21	0.45
1:A:351:ILE:CG1	2:B:281:GLN:HE21	2.30	0.45
4:A:1:TIN:C47	4:A:1:TIN:H192	2.45	0.45
2:B:149:HIS:CD2	2:B:194:HIS:HB3	2.52	0.45
1:A:134:TRP:CZ3	1:A:171:HIS:CD2	3.05	0.44
2:B:201:VAL:HG21	2:B:251:TYR:CB	2.46	0.44
2:B:232:CYS:HB3	2:B:239:ILE:HG23	1.98	0.44
2:B:74:GLN:HB2	2:B:78:HIS:NE2	2.31	0.44
2:B:201:VAL:CG2	2:B:251:TYR:HD1	2.30	0.44
1:A:97:ARG:HG3	1:A:97:ARG:NH1	2.29	0.44
1:A:343:ILE:O	1:A:347:GLU:N	2.48	0.44
2:B:280:ARG:HA	2:B:280:ARG:NE	2.32	0.44
1:A:123:ALA:HB3	1:A:133:VAL:HG11	2.00	0.44
2:B:403:ILE:HG13	2:B:408:VAL:CG2	2.48	0.44
1:A:274:GLU:O	1:A:274:GLU:HG2	2.18	0.44
1:A:143:SER:C	1:A:145:GLN:H	2.21	0.44
1:A:169:TRP:O	1:A:172:ARG:N	2.42	0.44
1:A:231:VAL:HG22	1:A:273:ASN:ND2	2.32	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:177:LEU:HD21	2:B:210:VAL:HG11	2.00	0.44
1:A:144:LEU:N	1:A:144:LEU:CD1	2.81	0.44
2:B:163:ILE:O	2:B:165:THR:HG23	2.17	0.44
1:A:274:GLU:O	1:A:278:ASN:OD1	2.36	0.43
1:A:315:LEU:O	1:A:318:ILE:N	2.51	0.43
2:B:74:GLN:HB2	2:B:78:HIS:CE1	2.53	0.43
2:B:199:VAL:HG23	2:B:199:VAL:O	2.18	0.43
1:A:260:VAL:HG22	1:A:284:LEU:HD21	1.99	0.43
2:B:152:PRO:O	2:B:155:ALA:HB3	2.18	0.43
1:A:132:THR:HG23	2:B:147:TYR:CD2	2.53	0.43
1:A:137:ARG:O	1:A:141:LEU:CD1	2.65	0.43
2:B:200:ASP:O	2:B:201:VAL:C	2.56	0.43
2:B:280:ARG:NE	2:B:280:ARG:CA	2.81	0.43
3:A:501:HFP:H62	2:B:248:HIS:CE1	2.53	0.43
2:B:230:ALA:C	2:B:232:CYS:H	2.21	0.43
2:B:201:VAL:O	2:B:202:ARG:C	2.56	0.43
1:A:57:SER:HB3	1:A:59:ASP:OD1	2.18	0.43
2:B:322:ALA:O	2:B:323:LEU:C	2.55	0.43
1:A:224:ASP:O	1:A:227:LEU:HB2	2.18	0.43
1:A:286:ASP:HB2	1:A:287:ARG:HE	1.84	0.43
1:A:320:GLU:HG2	1:A:363:LEU:HD21	2.00	0.43
1:A:329:ASN:O	1:A:331:GLU:N	2.52	0.43
1:A:353:LYS:HG3	1:A:354:GLU:N	2.34	0.43
1:A:185:GLU:O	1:A:186:LEU:C	2.57	0.43
1:A:188:PHE:O	1:A:189:ILE:C	2.57	0.43
1:A:334:LEU:O	1:A:338:LEU:CD1	2.66	0.43
2:B:77:LYS:HA	2:B:77:LYS:HD3	1.84	0.43
2:B:174:ARG:HD2	2:B:415:PHE:CE1	2.53	0.43
1:A:135:HIS:O	1:A:139:VAL:HG23	2.19	0.43
1:A:143:SER:C	1:A:145:GLN:N	2.72	0.43
1:A:182:PRO:HD3	1:A:213:PHE:CE2	2.53	0.43
1:A:216:TRP:O	1:A:218:ASN:N	2.52	0.43
2:B:108:LEU:HD22	2:B:118:ILE:HG12	2.00	0.43
2:B:214:THR:O	2:B:215:ASN:C	2.57	0.42
1:A:75:ILE:HD12	1:A:76:ASP:H	1.84	0.42
2:B:302:PHE:O	2:B:306:GLY:CA	2.65	0.42
1:A:152:MET:O	1:A:156:ILE:HG13	2.19	0.42
1:A:315:LEU:O	1:A:316:VAL:C	2.56	0.42
2:B:246:GLU:OE1	2:B:291:ARG:HD2	2.20	0.42
1:A:71:GLU:CD	1:A:71:GLU:H	2.22	0.42
2:B:138:GLY:HA3	2:B:180:TYR:HB2	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:389:VAL:O	2:B:391:GLU:N	2.52	0.42
1:A:243:VAL:O	1:A:247:THR:HG23	2.20	0.42
1:A:262:TYR:CD1	1:A:262:TYR:C	2.92	0.42
2:B:331:HIS:CE1	2:B:334:ALA:H	2.35	0.42
1:A:166:TYR:CZ	4:A:1:TIN:HC44	2.53	0.42
1:A:354:GLU:CG	2:B:329:MET:HA	2.50	0.42
2:B:153:THR:O	2:B:157:VAL:HG23	2.19	0.42
2:B:315:LEU:O	2:B:316:HIS:C	2.57	0.42
1:A:96:PHE:CE2	2:B:94:GLU:HG2	2.55	0.42
1:A:189:ILE:HD13	1:A:206:ARG:HB2	2.00	0.42
2:B:66:HIS:ND1	2:B:69:PRO:HG3	2.35	0.42
2:B:114:LEU:O	2:B:115:ASP:CB	2.65	0.42
2:B:292:CYS:O	2:B:293:ASN:HB2	2.20	0.42
2:B:389:VAL:C	2:B:391:GLU:H	2.23	0.42
1:A:80:GLN:H	1:A:104:ARG:NH1	2.17	0.42
1:A:106:VAL:O	1:A:107:LEU:C	2.58	0.42
2:B:389:VAL:N	2:B:392:ASN:ND2	2.68	0.42
3:A:501:HFP:O1	4:A:1:TIN:H292	2.20	0.42
2:B:42:THR:O	2:B:44:THR:N	2.53	0.42
2:B:201:VAL:CG2	2:B:202:ARG:N	2.83	0.42
1:A:355:TYR:OH	1:A:359:ILE:HD11	2.20	0.41
2:B:48:GLN:HE21	2:B:52:GLU:CG	2.33	0.41
2:B:160:LEU:HD13	2:B:172:ILE:HG13	2.02	0.41
1:A:170:HIS:CE1	2:B:196:GLY:O	2.73	0.41
1:A:193:LEU:HD23	1:A:193:LEU:HA	1.92	0.41
1:A:342:GLU:O	1:A:343:ILE:C	2.59	0.41
2:B:24:TYR:CD2	2:B:334:ALA:HB2	2.56	0.41
1:A:75:ILE:HD13	1:A:109:ARG:HH11	1.84	0.41
1:A:96:PHE:CA	1:A:126:LEU:HD13	2.44	0.41
2:B:174:ARG:HB2	2:B:174:ARG:NH1	2.35	0.41
2:B:297:ASP:OD2	2:B:297:ASP:C	2.58	0.41
1:A:96:PHE:HA	1:A:126:LEU:HD11	1.99	0.41
1:A:109:ARG:O	1:A:111:GLU:N	2.53	0.41
1:A:140:LEU:HD23	1:A:140:LEU:HA	1.91	0.41
1:A:154:TYR:O	1:A:157:ALA:HB3	2.20	0.41
1:A:311:LEU:HD23	1:A:315:LEU:HG	2.02	0.41
1:A:342:GLU:OE1	1:A:342:GLU:HA	2.20	0.41
1:A:100:TYR:O	1:A:101:ASP:C	2.57	0.41
1:A:106:VAL:HG11	1:A:116:ALA:HB1	2.02	0.41
2:B:230:ALA:HA	2:B:268:LEU:CD2	2.50	0.41
1:A:213:PHE:CD1	1:A:213:PHE:N	2.89	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:35:LEU:HB3	2:B:52:GLU:OE1	2.21	0.41
2:B:89:LEU:HD21	2:B:360:PHE:CE2	2.55	0.41
1:A:182:PRO:HG3	1:A:213:PHE:CD2	2.56	0.41
1:A:208:TRP:CE2	1:A:212:GLU:HG3	2.55	0.41
1:A:241:HIS:HB2	1:A:279:TYR:HE1	1.86	0.41
1:A:356:TRP:C	1:A:358:TYR:N	2.71	0.41
2:B:58:VAL:O	2:B:61:SER:HB3	2.21	0.41
2:B:69:PRO:O	2:B:71:LEU:N	2.52	0.41
2:B:261:ILE:O	2:B:263:LYS:HG3	2.21	0.41
2:B:274:LEU:HD13	2:B:311:LEU:HD13	2.03	0.41
2:B:286:GLY:HA3	2:B:334:ALA:O	2.20	0.41
1:A:161:GLU:C	1:A:163:PRO:HD3	2.41	0.41
1:A:287:ARG:N	1:A:287:ARG:HE	2.17	0.41
1:A:309:PRO:HG3	2:B:283:ARG:NH2	2.35	0.41
2:B:114:LEU:HD23	2:B:394:LEU:CD2	2.51	0.41
1:A:87:VAL:HG12	1:A:88:VAL:HG13	2.02	0.40
2:B:158:ASN:HD21	2:B:403:ILE:HG23	1.82	0.40
2:B:282:MET:C	2:B:284:PHE:H	2.25	0.40
1:A:136:PHE:CE2	1:A:140:LEU:HD11	2.57	0.40
1:A:181:ASP:OD1	1:A:181:ASP:C	2.60	0.40
1:A:196:ASP:C	1:A:198:LYS:N	2.73	0.40
2:B:289:GLN:NE2	2:B:294:LYS:H	2.20	0.40
2:B:398:HIS:HE1	2:B:400:VAL:HB	1.85	0.40
1:A:137:ARG:O	1:A:138:ARG:C	2.58	0.40
1:A:253:ARG:NE	1:A:253:ARG:CA	2.83	0.40
1:A:329:ASN:C	1:A:331:GLU:N	2.64	0.40
2:B:109:HIS:CE1	2:B:402:ASN:O	2.75	0.40
2:B:230:ALA:HA	2:B:268:LEU:HD21	2.03	0.40
2:B:362:HIS:C	2:B:364:CYS:H	2.23	0.40
1:A:100:TYR:O	1:A:103:PHE:N	2.55	0.40
1:A:179:LEU:HD22	1:A:179:LEU:N	2.37	0.40
2:B:404:GLY:C	2:B:406:ASP:N	2.74	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	313/315 (99%)	227 (72%)	66 (21%)	20 (6%)	1 12
2	B	395/397 (100%)	276 (70%)	96 (24%)	23 (6%)	1 13
All	All	708/712 (99%)	503 (71%)	162 (23%)	43 (6%)	1 13

All (43) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	217	ASP
1	A	304	PRO
2	B	64	PHE
2	B	74	GLN
2	B	99	SER
2	B	322	ALA
1	A	56	LEU
1	A	71	GLU
1	A	185	GLU
1	A	197	ALA
1	A	326	GLN
1	A	365	SER
2	B	27	ARG
2	B	43	VAL
2	B	321	PRO
2	B	352	ASP
2	B	363	THR
2	B	413	THR
1	A	110	ASP
1	A	233	ASN
1	A	305	SER
1	A	330	LYS
1	A	334	LEU
1	A	357	ARG
2	B	70	ARG
2	B	115	ASP
2	B	174	ARG
2	B	246	GLU
2	B	404	GLY
2	B	61	SER
2	B	66	HIS

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Mol	Chain	Res	Type
1	A	186	LEU
1	A	188	PHE
1	A	274	GLU
2	B	110	SER
2	B	243	PRO
2	B	390	PRO
2	B	138	GLY
1	A	88	VAL
1	A	312	ILE
2	B	277	VAL
2	B	385	VAL
1	A	189	ILE

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	294/294 (100%)	285 (97%)	9 (3%)	35	63
2	B	335/335 (100%)	324 (97%)	11 (3%)	33	61
All	All	629/629 (100%)	609 (97%)	20 (3%)	34	62

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	125	GLU
1	A	167	GLN
1	A	179	LEU
1	A	181	ASP
1	A	182	PRO
1	A	239	GLN
1	A	253	ARG
1	A	287	ARG
1	A	331	GLU
2	B	29	GLU
2	B	64	PHE

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Mol	Chain	Res	Type
2	B	70	ARG
2	B	71	LEU
2	B	158	ASN
2	B	198	GLU
2	B	234	ASN
2	B	243	PRO
2	B	312	HIS
2	B	366	CYS
2	B	375	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	80	GLN
1	A	108	GLN
1	A	135	HIS
1	A	149	GLN
1	A	153	ASN
1	A	165	ASN
1	A	171	HIS
1	A	194	ASN
1	A	201	HIS
1	A	239	GLN
1	A	278	ASN
1	A	329	ASN
2	B	48	GLN
2	B	120	GLN
2	B	134	GLN
2	B	158	ASN
2	B	215	ASN
2	B	234	ASN
2	B	281	GLN
2	B	289	GLN
2	B	293	ASN
2	B	312	HIS
2	B	336	GLN
2	B	344	GLN
2	B	417	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

Of 3 ligands modelled in this entry, 1 is monoatomic - leaving 2 for Mogul analysis.

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	HFP	A	501	-	16,19,19	1.81	4 (25%)	20,25,25	2.36	6 (30%)
4	TIN	A	1	-	39,40,40	1.58	10 (25%)	46,52,52	1.57	6 (13%)

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	HFP	A	501	-	2/2/5/5	8/22/22/22	-
4	TIN	A	1	-	-	12/29/41/41	0/3/3/3

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	501	HFP	C2-C3	-4.95	1.34	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	501	HFP	C7-C8	-3.61	1.35	1.52
4	A	1	TIN	C44-C45	3.22	1.44	1.38
4	A	1	TIN	C38-N2	3.07	1.53	1.47
4	A	1	TIN	C44-C43	3.04	1.43	1.38
4	A	1	TIN	C55-C56	2.81	1.42	1.36
4	A	1	TIN	C54-C53	2.76	1.43	1.38
4	A	1	TIN	C43-C40	2.69	1.44	1.38
4	A	1	TIN	C53-C52	2.67	1.42	1.37
4	A	1	TIN	O69-C68	-2.62	1.22	1.30
3	A	501	HFP	C12-C13	-2.48	1.36	1.51
3	A	501	HFP	P-O1P	-2.32	1.46	1.49
4	A	1	TIN	C55-C54	2.22	1.43	1.38
4	A	1	TIN	C47-C40	2.13	1.42	1.37

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	501	HFP	C3-C2-C1	7.51	122.82	115.21
4	A	1	TIN	C66-N1-C65	5.78	135.42	121.56
4	A	1	TIN	C7-C52-C51	4.26	127.70	121.05
4	A	1	TIN	C68-C66-N1	3.35	118.33	110.57
3	A	501	HFP	C4-C3-C2	3.19	120.58	110.84
4	A	1	TIN	C7-C52-C53	-2.89	112.72	120.10
3	A	501	HFP	C2-C3-C5	2.61	120.40	111.86
3	A	501	HFP	C9-C8-C7	2.46	120.03	111.27
3	A	501	HFP	C4-C3-C5	2.17	119.02	111.27
4	A	1	TIN	C40-C38-N2	2.13	117.51	113.15
3	A	501	HFP	C9-C8-C10	2.07	118.64	111.27
4	A	1	TIN	C38-N2-C19	2.02	115.48	111.28

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
3	A	501	HFP	C8
3	A	501	HFP	C3

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	501	HFP	O1-C1-P-O1P
3	A	501	HFP	P-C1-C2-C3
3	A	501	HFP	O1-C1-C2-C3

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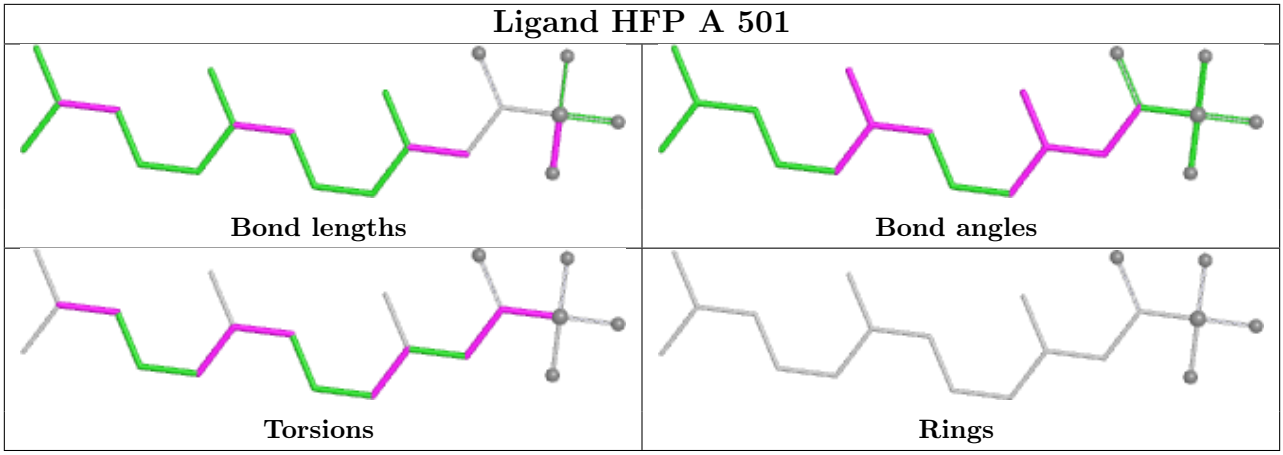
Mol	Chain	Res	Type	Atoms
4	A	1	TIN	C19-C17-C3-C2
4	A	1	TIN	C19-C17-C3-C4
4	A	1	TIN	C45-C65-N1-C66
4	A	1	TIN	C74-C66-N1-C65
4	A	1	TIN	O67-C65-N1-C66
3	A	501	HFP	C6-C7-C8-C9
3	A	501	HFP	C11-C12-C13-C14
4	A	1	TIN	C17-C19-N2-C25
4	A	1	TIN	C17-C19-N2-C38
3	A	501	HFP	C2-C1-P-O1P
4	A	1	TIN	N1-C66-C74-C76
3	A	501	HFP	C11-C10-C8-C9
4	A	1	TIN	C26-C25-N2-C38
3	A	501	HFP	C4-C3-C5-C6
4	A	1	TIN	C40-C38-N2-C19
4	A	1	TIN	C26-C25-N2-C19
4	A	1	TIN	C44-C45-C65-N1

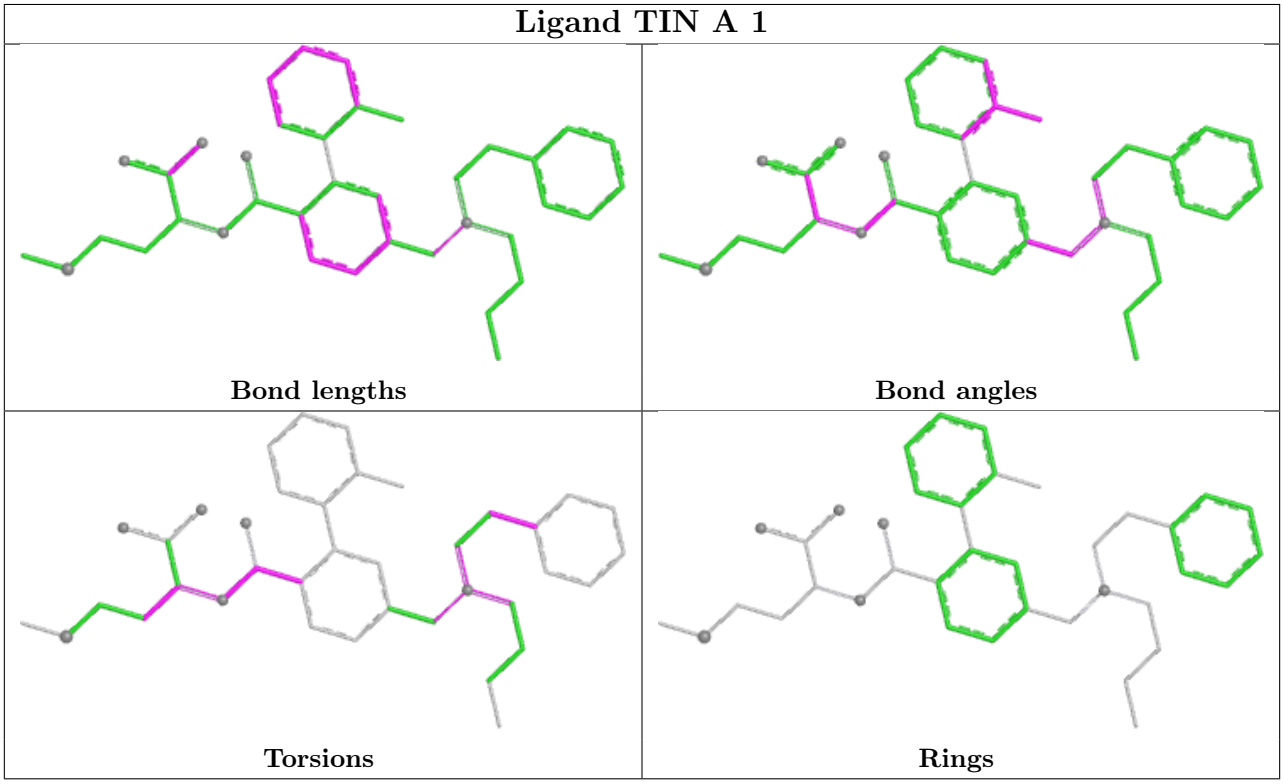
There are no ring outliers.

2 monomers are involved in 30 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	501	HFP	21	0
4	A	1	TIN	10	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.





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^{th} 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	315/315 (100%)	-0.45	0 100 100	5, 36, 85, 99	0
2	B	397/397 (100%)	-0.45	1 (0%) 90 82	5, 32, 82, 99	0
All	All	712/712 (100%)	-0.45	1 (0%) 92 89	5, 34, 84, 99	0

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	22	PRO	2.5

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

There are no monosaccharides in this entry.

6.4 Ligands

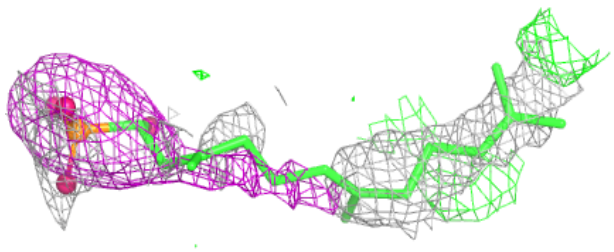
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

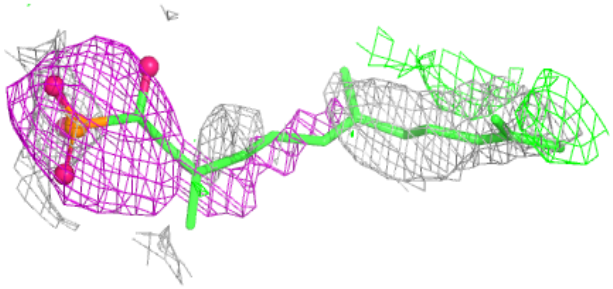
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	HFP	A	501	20/20	0.72	0.31	16,34,48,53	0
4	TIN	A	1	38/38	0.79	0.21	36,36,36,36	0
5	ZN	B	2	1/1	1.00	0.01	15,15,15,15	0

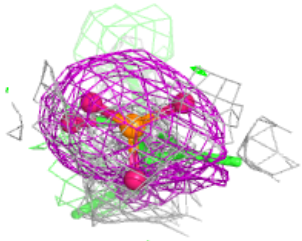
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around HFP A 501:

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

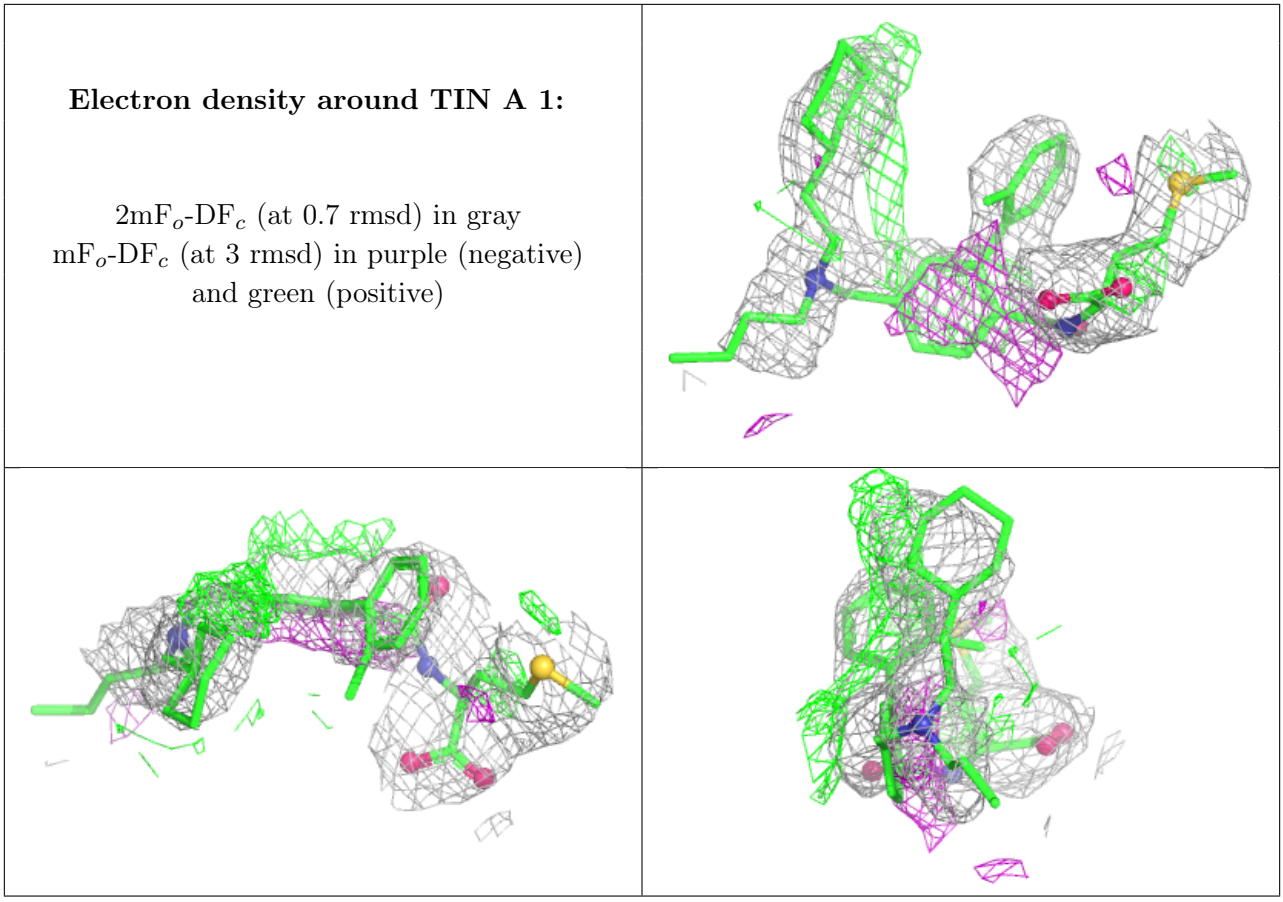






Electron density around TIN A 1:

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



6.5 Other polymers

There are no such residues in this entry.