



# Full wwPDB X-ray Structure Validation Report ⓘ

May 13, 2020 – 08:14 am BST

PDB ID : 1IID  
Title : Crystal Structure of Saccharomyces cerevisiae N-myristoyltransferase with Bound S-(2-oxo)pentadecylCoA and the Octapeptide GLYASKLA  
Authors : Farazi, T.A.; Gordon, J.I.; Waksman, G.  
Deposited on : 2001-04-22  
Resolution : 2.50 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](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) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

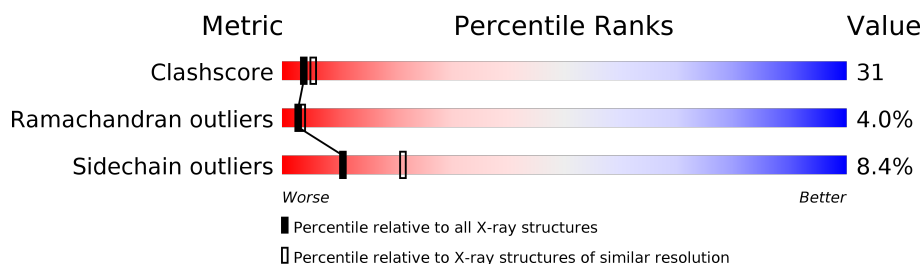
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.50 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))
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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  $\leq 5\%$ .

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	422	
2	O	8	

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 3638 atoms, of which 1 is hydrogen 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 Peptide N-myristoyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	422	Total	C	N	O	S	0	0	0
			3394	2196	564	624	10			

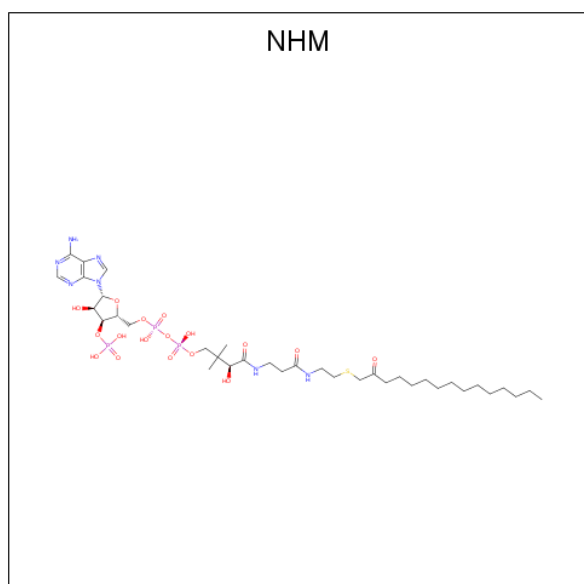
- Molecule 2 is a protein called Octapeptide GLYASKLA.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	O	8	Total	C	N	O	0	0	0
			54	35	9	10			

- Molecule 3 is NICKEL (II) ION (three-letter code: NI) (formula: Ni).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total	Ni	0	0
			2	2		

- Molecule 4 is S-(2-OXO)PENTADECYLCOA (three-letter code: NHM) (formula: C<sub>36</sub>H<sub>64</sub>N<sub>7</sub>O<sub>17</sub>P<sub>3</sub>S).



Mol	Chain	Residues	Atoms							ZeroOcc	AltConf
4	A	1	Total	C	H	N	O	P	S	0	0
			64	35	1	7	17	3	1		

- Molecule 5 is water.

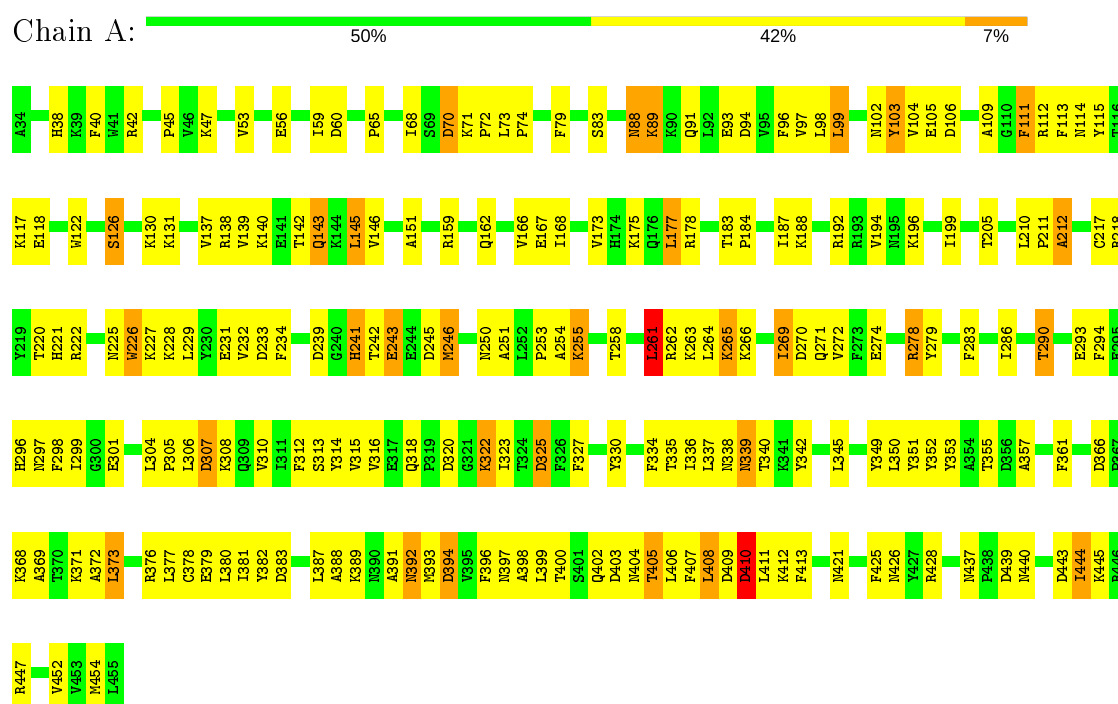
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	123	Total	O	0	0
			123	123		
5	O	1	Total	O	0	0
			1	1		

### 3 Residue-property plots [i](#)

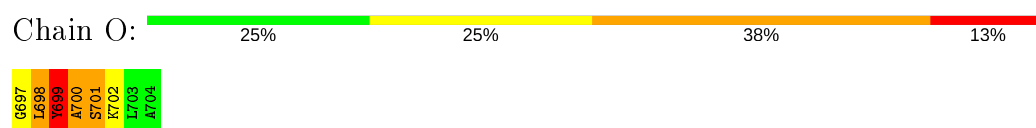
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according 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. 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.

Note EDS was not executed.

- Molecule 1: Peptide N-myristoyltransferase



- Molecule 2: Octapeptide GLYASKLA



## 4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	75.13 Å 97.06 Å 141.81 Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.72 – 2.50	Depositor
% Data completeness (in resolution range)	95.9 (29.72-2.50)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	5.40	Depositor
Refinement program	CNS 0.9	Depositor
R, $R_{free}$	0.242 , 0.288	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3638	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	55.0	wwPDB-VP

## 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: NHM, NI

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	A	0.41	0/3482	0.72	2/4727 (0.0%)
2	O	0.70	0/54	1.44	1/71 (1.4%)
All	All	0.42	0/3536	0.74	3/4798 (0.1%)

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	O	0	1

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
2	O	699	TYR	N-CA-C	8.18	133.09	111.00
1	A	290	THR	N-CA-C	-5.24	96.84	111.00
1	A	106	ASP	N-CA-C	5.13	124.85	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	O	699	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	3394	0	3300	208	0
2	O	54	0	52	15	0
3	A	2	0	0	0	0
4	A	63	1	55	2	0
5	A	123	0	0	7	0
5	O	1	0	0	0	0
All	All	3637	1	3407	213	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 31.

All (213) 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:143:GLN:HA	1:A:143:GLN:HE21	1.24	1.01
1:A:258:THR:HG22	1:A:383:ASP:OD1	1.63	0.97
1:A:47:LYS:O	1:A:212:ALA:HB2	1.68	0.91
1:A:98:LEU:HD22	1:A:145:LEU:HD23	1.54	0.90
1:A:349:TYR:OH	2:O:699:TYR:HB3	1.74	0.86
1:A:143:GLN:HA	1:A:143:GLN:NE2	1.87	0.85
1:A:262:ARG:HG2	1:A:263:LYS:H	1.40	0.85
1:A:307:ASP:OD1	1:A:308:LYS:HG3	1.81	0.81
1:A:241:HIS:O	1:A:245:ASP:HB2	1.82	0.80
1:A:73:LEU:HD11	1:A:188:LYS:HB3	1.64	0.79
1:A:221:HIS:CE1	2:O:701:SER:HB3	2.18	0.78
1:A:366:ASP:OD1	1:A:368:LYS:HG2	1.81	0.78
1:A:316:VAL:HB	1:A:325:ASP:HB2	1.66	0.78
1:A:105:GLU:HG2	1:A:178:ARG:HH12	1.48	0.78
1:A:40:PHE:HE1	1:A:188:LYS:HE3	1.48	0.78
1:A:222:ARG:HH11	1:A:222:ARG:HG2	1.49	0.78
1:A:99:LEU:O	1:A:103:TYR:HB2	1.85	0.77
1:A:40:PHE:CE1	1:A:188:LYS:HE3	2.21	0.75
1:A:146:VAL:CG2	1:A:177:LEU:HD22	2.17	0.73
1:A:283:PHE:CE2	1:A:402:GLN:HA	2.24	0.73
1:A:88:ASN:ND2	1:A:91:GLN:H	1.86	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:290:THR:H	1:A:293:GLU:CG	2.03	0.72
1:A:405:THR:HG22	1:A:447:ARG:HG2	1.71	0.70
1:A:391:ALA:O	1:A:392:ASN:HB2	1.91	0.69
1:A:262:ARG:CG	1:A:263:LYS:H	2.05	0.69
1:A:146:VAL:HG21	1:A:177:LEU:HD22	1.73	0.68
1:A:187:ILE:HG23	4:A:500:NHM:H8M2	1.77	0.67
1:A:232:VAL:O	1:A:233:ASP:HB2	1.94	0.66
1:A:373:LEU:HD12	1:A:406:LEU:HD12	1.76	0.66
1:A:73:LEU:HD11	1:A:188:LYS:CB	2.24	0.66
1:A:93:GLU:O	1:A:97:VAL:HG23	1.96	0.66
1:A:325:ASP:OD2	1:A:380:LEU:HD21	1.96	0.65
1:A:322:LYS:HE3	1:A:322:LYS:HA	1.78	0.65
1:A:283:PHE:HE2	1:A:402:GLN:HA	1.59	0.64
1:A:151:ALA:HB1	1:A:166:VAL:HG11	1.80	0.64
1:A:378:CYS:O	1:A:382:TYR:HB2	1.98	0.64
1:A:265:LYS:HA	1:A:265:LYS:CE	2.28	0.63
1:A:334:PHE:CE1	2:O:700:ALA:HB2	2.32	0.63
1:A:315:VAL:CG2	1:A:323:ILE:HG23	2.29	0.63
1:A:334:PHE:CE1	2:O:700:ALA:CB	2.81	0.63
1:A:349:TYR:CE2	2:O:699:TYR:CD1	2.87	0.63
1:A:104:VAL:O	1:A:175:LYS:NZ	2.32	0.62
1:A:325:ASP:OD2	1:A:380:LEU:HD11	1.98	0.62
1:A:265:LYS:NZ	1:A:265:LYS:HA	2.15	0.61
1:A:255:LYS:HD2	1:A:255:LYS:O	2.00	0.61
1:A:334:PHE:CZ	2:O:700:ALA:HB2	2.35	0.61
2:O:698:LEU:O	2:O:699:TYR:HB2	2.01	0.61
1:A:211:PRO:O	1:A:212:ALA:HB3	2.01	0.60
1:A:405:THR:CG2	1:A:447:ARG:HG2	2.31	0.60
1:A:143:GLN:CA	1:A:143:GLN:HE21	2.08	0.60
1:A:59:ILE:HD11	1:A:428:ARG:HB2	1.82	0.60
1:A:217:CYS:HB3	1:A:399:LEU:O	2.02	0.59
1:A:398:ALA:HB3	1:A:408:LEU:HD11	1.83	0.59
1:A:404:ASN:HA	1:A:407:PHE:CE2	2.37	0.59
1:A:398:ALA:CB	1:A:408:LEU:HD11	2.32	0.59
2:O:697:GLY:N	2:O:699:TYR:HH	2.01	0.58
1:A:59:ILE:HB	1:A:426:ASN:HD22	1.68	0.58
1:A:226:TRP:CD1	1:A:250:ASN:ND2	2.72	0.58
1:A:38:HIS:O	1:A:42:ARG:HB2	2.04	0.58
1:A:194:VAL:HG13	1:A:199:ILE:HB	1.85	0.58
1:A:294:PHE:O	1:A:298:PHE:HD1	1.86	0.57
1:A:335:THR:O	1:A:336:ILE:HD12	2.04	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:336:ILE:HG23	1:A:337:LEU:N	2.19	0.57
1:A:228:LYS:HE3	1:A:342:TYR:CD2	2.40	0.57
1:A:278:ARG:HG2	1:A:278:ARG:HH11	1.70	0.57
1:A:220:THR:HG21	1:A:408:LEU:HD23	1.86	0.56
1:A:290:THR:H	1:A:293:GLU:HG2	1.69	0.56
1:A:71:LYS:HG3	1:A:72:PRO:HD2	1.88	0.56
1:A:373:LEU:HD12	1:A:406:LEU:CD1	2.34	0.56
1:A:146:VAL:HG22	1:A:177:LEU:HD22	1.87	0.56
1:A:228:LYS:HD3	1:A:394:ASP:OD1	2.05	0.56
1:A:228:LYS:HG3	1:A:342:TYR:CE2	2.40	0.56
1:A:258:THR:HG23	1:A:261:LEU:HB2	1.87	0.56
1:A:59:ILE:H	1:A:426:ASN:ND2	2.04	0.55
1:A:111:PHE:HD1	1:A:111:PHE:H	1.54	0.55
1:A:266:LYS:O	1:A:269:ILE:HG12	2.06	0.55
1:A:366:ASP:OD1	1:A:368:LYS:CG	2.55	0.55
1:A:183:THR:HB	1:A:184:PRO:HD3	1.88	0.54
1:A:306:LEU:HD21	1:A:391:ALA:HA	1.90	0.54
1:A:271:GLN:NE2	1:A:323:ILE:HD13	2.22	0.54
1:A:255:LYS:HD2	1:A:255:LYS:C	2.28	0.54
1:A:316:VAL:O	1:A:323:ILE:HA	2.08	0.54
1:A:225:ASN:HB2	1:A:394:ASP:HB3	1.90	0.54
1:A:53:VAL:HG13	1:A:428:ARG:HG2	1.90	0.53
1:A:109:ALA:HB3	1:A:111:PHE:CE1	2.43	0.53
1:A:56:GLU:OE1	1:A:159:ARG:HD2	2.08	0.53
1:A:444:ILE:HD12	1:A:444:ILE:C	2.29	0.53
1:A:410:ASP:C	1:A:412:LYS:H	2.12	0.53
1:A:126:SER:HA	1:A:296:HIS:CD2	2.44	0.52
1:A:293:GLU:O	1:A:297:ASN:HB2	2.10	0.52
1:A:444:ILE:O	1:A:444:ILE:HD12	2.10	0.52
1:A:274:GLU:O	1:A:278:ARG:HB2	2.10	0.52
1:A:318:GLN:OE1	1:A:318:GLN:HA	2.10	0.52
1:A:262:ARG:CG	1:A:263:LYS:N	2.73	0.51
1:A:226:TRP:O	1:A:229:LEU:N	2.41	0.51
1:A:222:ARG:HG2	1:A:222:ARG:NH1	2.22	0.50
1:A:122:TRP:CE3	1:A:310:VAL:HG11	2.46	0.50
1:A:336:ILE:CG2	1:A:337:LEU:N	2.74	0.50
1:A:265:LYS:HE2	1:A:265:LYS:HA	1.94	0.50
1:A:112:ARG:HG2	1:A:112:ARG:HH11	1.77	0.50
1:A:437:ASN:ND2	1:A:443:ASP:HB2	2.26	0.49
1:A:73:LEU:HB3	1:A:74:PRO:HD2	1.92	0.49
1:A:145:LEU:HB3	5:A:557:HOH:O	2.11	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:72:PRO:HA	1:A:192:ARG:NE	2.28	0.49
1:A:88:ASN:HD22	1:A:88:ASN:C	2.16	0.49
1:A:355:THR:HG23	1:A:357:ALA:H	1.78	0.48
1:A:439:ASP:HA	5:A:539:HOH:O	2.13	0.48
1:A:151:ALA:HB1	1:A:166:VAL:CG1	2.43	0.48
1:A:269:ILE:O	1:A:270:ASP:C	2.50	0.48
1:A:290:THR:OG1	1:A:293:GLU:HG2	2.13	0.48
1:A:404:ASN:HD22	1:A:404:ASN:N	2.10	0.48
1:A:278:ARG:CG	1:A:278:ARG:HH11	2.26	0.48
1:A:305:PRO:HG2	1:A:308:LYS:HB2	1.96	0.48
1:A:383:ASP:O	1:A:387:LEU:HG	2.14	0.48
1:A:60:ASP:H	1:A:426:ASN:HD21	1.61	0.48
2:O:698:LEU:O	2:O:699:TYR:CD2	2.67	0.48
1:A:361:PHE:CD1	1:A:361:PHE:N	2.81	0.48
1:A:243:GLU:HA	1:A:246:MET:HG2	1.95	0.47
1:A:320:ASP:OD2	1:A:322:LYS:HD2	2.15	0.47
1:A:65:PRO:O	1:A:68:ILE:HB	2.14	0.47
1:A:353:TYR:HE2	1:A:404:ASN:HD21	1.62	0.47
1:A:60:ASP:H	1:A:426:ASN:ND2	2.13	0.47
1:A:264:LEU:O	1:A:265:LYS:HE2	2.15	0.47
1:A:269:ILE:HA	1:A:272:VAL:HG12	1.96	0.47
2:O:698:LEU:O	2:O:699:TYR:CB	2.63	0.47
1:A:228:LYS:O	1:A:232:VAL:HG22	2.14	0.47
1:A:53:VAL:CG1	1:A:428:ARG:HG2	2.45	0.47
1:A:194:VAL:CG1	1:A:199:ILE:HB	2.45	0.47
1:A:269:ILE:HD11	1:A:299:ILE:HD11	1.96	0.47
1:A:338:ASN:O	1:A:338:ASN:CG	2.53	0.47
1:A:279:TYR:OH	1:A:403:ASP:OD1	2.29	0.47
1:A:334:PHE:HE1	2:O:700:ALA:CB	2.26	0.46
1:A:139:VAL:HB	1:A:142:THR:OG1	2.15	0.46
1:A:388:ALA:O	1:A:393:MET:HG2	2.14	0.46
1:A:437:ASN:ND2	5:A:524:HOH:O	2.43	0.46
1:A:294:PHE:O	1:A:298:PHE:CD1	2.67	0.46
1:A:94:ASP:HB3	5:A:557:HOH:O	2.15	0.46
1:A:137:VAL:O	1:A:146:VAL:HG12	2.16	0.46
1:A:404:ASN:O	1:A:408:LEU:HB2	2.16	0.46
1:A:366:ASP:HB3	1:A:369:ALA:CB	2.46	0.46
1:A:315:VAL:HG22	1:A:323:ILE:HG23	1.98	0.45
1:A:168:ILE:HG13	4:A:500:NHM:H9M1	1.97	0.45
1:A:298:PHE:HE2	1:A:352:TYR:HB2	1.82	0.45
1:A:366:ASP:OD1	1:A:368:LYS:N	2.41	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:403:ASP:C	1:A:405:THR:H	2.20	0.45
1:A:99:LEU:N	1:A:99:LEU:HD23	2.32	0.45
1:A:79:PHE:O	1:A:140:LYS:HE3	2.17	0.45
1:A:83:SER:HB3	1:A:131:LYS:O	2.17	0.44
1:A:312:PHE:HB3	1:A:314:TYR:CE1	2.52	0.44
1:A:368:LYS:O	1:A:371:LYS:CB	2.65	0.44
1:A:394:ASP:N	1:A:394:ASP:OD2	2.51	0.44
1:A:109:ALA:HB3	1:A:111:PHE:HE1	1.82	0.44
1:A:115:TYR:HA	5:A:522:HOH:O	2.18	0.44
1:A:173:VAL:HG13	1:A:177:LEU:HD23	2.00	0.44
1:A:229:LEU:HA	1:A:232:VAL:HG22	1.99	0.44
1:A:439:ASP:O	1:A:440:ASN:HB2	2.17	0.44
1:A:102:ASN:HA	1:A:175:LYS:HE2	2.00	0.44
1:A:211:PRO:O	1:A:212:ALA:CB	2.66	0.44
1:A:99:LEU:HD13	1:A:103:TYR:CE1	2.53	0.44
1:A:205:THR:HA	1:A:421:ASN:O	2.18	0.44
1:A:312:PHE:HB3	1:A:314:TYR:HE1	1.83	0.44
1:A:339:ASN:HD22	1:A:340:THR:H	1.66	0.44
1:A:102:ASN:O	1:A:178:ARG:NH2	2.51	0.43
1:A:205:THR:CG2	1:A:454:MET:HG3	2.48	0.43
1:A:217:CYS:HB3	1:A:400:THR:HG1	1.83	0.43
1:A:117:LYS:HG2	1:A:118:GLU:OE2	2.18	0.43
1:A:368:LYS:O	1:A:371:LYS:N	2.51	0.43
1:A:408:LEU:HG	1:A:413:PHE:HB2	2.00	0.43
1:A:210:LEU:HA	1:A:210:LEU:HD23	1.84	0.43
1:A:350:LEU:HD12	1:A:351:TYR:N	2.34	0.43
1:A:93:GLU:HA	1:A:96:PHE:CE2	2.53	0.43
1:A:166:VAL:CG1	1:A:167:GLU:N	2.81	0.43
1:A:301:GLU:HB2	1:A:304:LEU:HD11	2.01	0.43
1:A:410:ASP:C	1:A:412:LYS:N	2.72	0.43
1:A:222:ARG:NE	1:A:411:LEU:O	2.51	0.43
1:A:377:LEU:O	1:A:381:ILE:HG12	2.19	0.43
1:A:334:PHE:CZ	2:O:700:ALA:CB	3.01	0.43
1:A:254:ALA:HA	5:A:574:HOH:O	2.19	0.42
1:A:227:LYS:O	1:A:231:GLU:HG2	2.19	0.42
1:A:88:ASN:C	1:A:88:ASN:ND2	2.73	0.42
1:A:323:ILE:N	1:A:323:ILE:HD12	2.34	0.42
1:A:349:TYR:OH	2:O:699:TYR:CB	2.58	0.42
1:A:218:ARG:C	1:A:399:LEU:HD23	2.40	0.42
1:A:405:THR:HB	5:A:579:HOH:O	2.19	0.42
1:A:405:THR:HG23	1:A:444:ILE:HA	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:315:VAL:CG2	1:A:323:ILE:CG2	2.97	0.41
1:A:47:LYS:HB3	1:A:212:ALA:HB1	2.01	0.41
1:A:138:ARG:HH11	1:A:138:ARG:HG2	1.85	0.41
1:A:298:PHE:HB3	1:A:313:SER:OG	2.20	0.41
1:A:327:PHE:HA	1:A:353:TYR:HA	2.02	0.41
1:A:310:VAL:O	1:A:330:TYR:HA	2.20	0.41
1:A:403:ASP:C	1:A:405:THR:N	2.73	0.41
1:A:409:ASP:O	1:A:410:ASP:CB	2.68	0.41
1:A:194:VAL:HG12	1:A:199:ILE:O	2.20	0.41
1:A:226:TRP:O	1:A:227:LYS:C	2.57	0.41
1:A:345:LEU:HD12	1:A:394:ASP:OD1	2.19	0.41
1:A:222:ARG:NH1	1:A:222:ARG:CG	2.83	0.41
1:A:397:ASN:HD22	1:A:397:ASN:N	2.17	0.41
1:A:388:ALA:HB1	1:A:393:MET:HG3	2.03	0.41
1:A:286:ILE:HA	1:A:452:VAL:HG13	2.03	0.41
1:A:70:ASP:HB3	1:A:196:LYS:HE2	2.03	0.41
1:A:361:PHE:HE2	1:A:368:LYS:HG3	1.86	0.41
1:A:406:LEU:HG	1:A:447:ARG:HD3	2.03	0.41
1:A:111:PHE:CD1	1:A:234:PHE:HZ	2.39	0.41
1:A:113:PHE:HZ	2:O:698:LEU:O	2.04	0.41
1:A:379:GLU:O	1:A:382:TYR:HB3	2.21	0.41
1:A:89:LYS:O	1:A:89:LYS:HD2	2.21	0.41
2:O:699:TYR:O	2:O:701:SER:N	2.54	0.40
1:A:45:PRO:HD2	1:A:425:PHE:CZ	2.56	0.40
1:A:376:ARG:O	1:A:379:GLU:HB2	2.22	0.40
1:A:225:ASN:OD1	1:A:389:LYS:HE3	2.21	0.40
1:A:59:ILE:CD1	1:A:428:ARG:HB2	2.50	0.40
1:A:373:LEU:HD13	1:A:377:LEU:HG	2.03	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	420/422 (100%)	364 (87%)	42 (10%)	14 (3%)	4	5
2	O	6/8 (75%)	1 (17%)	2 (33%)	3 (50%)	0	0
All	All	426/430 (99%)	365 (86%)	44 (10%)	17 (4%)	3	3

All (17) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	242	THR
1	A	243	GLU
1	A	410	ASP
2	O	699	TYR
2	O	700	ALA
1	A	251	ALA
1	A	177	LEU
1	A	212	ALA
1	A	372	ALA
1	A	392	ASN
2	O	701	SER
1	A	261	LEU
1	A	269	ILE
1	A	226	TRP
1	A	246	MET
1	A	445	LYS
1	A	253	PRO

### 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	364/381 (96%)	335 (92%)	29 (8%)	12	23
2	O	4/5 (80%)	2 (50%)	2 (50%)	0	0
All	All	368/386 (95%)	337 (92%)	31 (8%)	11	21

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	70	ASP
1	A	88	ASN
1	A	89	LYS
1	A	99	LEU
1	A	103	TYR
1	A	111	PHE
1	A	114	ASN
1	A	126	SER
1	A	130	LYS
1	A	143	GLN
1	A	145	LEU
1	A	162	GLN
1	A	239	ASP
1	A	241	HIS
1	A	255	LYS
1	A	261	LEU
1	A	265	LYS
1	A	278	ARG
1	A	307	ASP
1	A	322	LYS
1	A	325	ASP
1	A	339	ASN
1	A	373	LEU
1	A	394	ASP
1	A	396	PHE
1	A	405	THR
1	A	408	LEU
1	A	410	ASP
1	A	444	ILE
2	O	698	LEU
2	O	702	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	88	ASN
1	A	114	ASN
1	A	121	ASN
1	A	143	GLN
1	A	195	ASN
1	A	250	ASN
1	A	339	ASN
1	A	397	ASN

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Mol	Chain	Res	Type
1	A	404	ASN
1	A	421	ASN
1	A	426	ASN
1	A	437	ASN

### 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 carbohydrates in this entry.

### 5.6 Ligand geometry ⓘ

Of 3 ligands modelled in this entry, 2 are monoatomic - leaving 1 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$
4	NHM	A	500	-	57,65,66	1.83	7 (12%)	69,91,92	0.98	6 (8%)

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
4	NHM	A	500	-	-	17/60/80/81	0/3/3/3



All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	500	NHM	C4A-N3A	10.28	1.49	1.35
4	A	500	NHM	O4X-C1X	3.55	1.46	1.41
4	A	500	NHM	P1A-O2A	3.18	1.62	1.50
4	A	500	NHM	P2A-O4A	3.00	1.61	1.50
4	A	500	NHM	C6A-N6A	2.38	1.42	1.34
4	A	500	NHM	C5A-C4A	2.24	1.46	1.40
4	A	500	NHM	P3X-O9A	2.06	1.57	1.50

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	500	NHM	C4A-C5A-N7A	3.03	112.55	109.40
4	A	500	NHM	CP-C1M-C2M	2.97	121.88	115.52
4	A	500	NHM	P2A-O3A-P1A	-2.90	122.86	132.83
4	A	500	NHM	O1M-C1M-CP	-2.29	118.90	122.17
4	A	500	NHM	C7-C6-C5	2.28	116.16	112.36
4	A	500	NHM	C14-C11-C10	2.25	112.72	108.82

There are no chirality outliers.

All (17) torsion outliers are listed below:

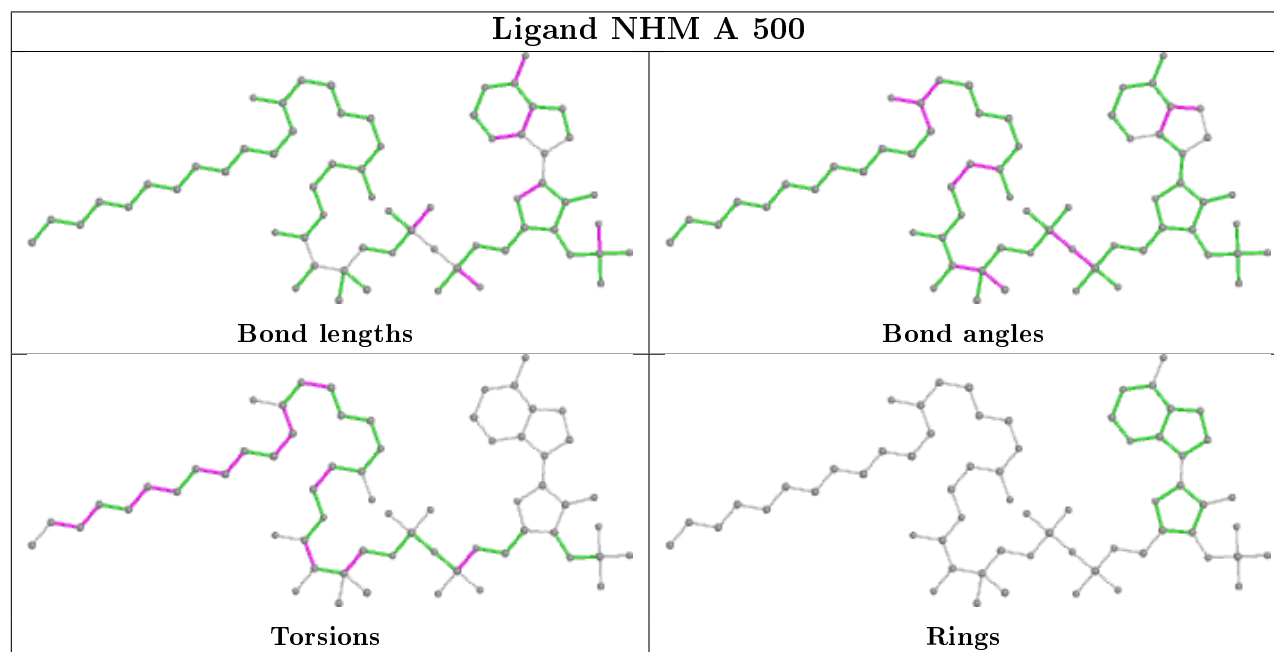
Mol	Chain	Res	Type	Atoms
4	A	500	NHM	C5-C6-C7-N8
4	A	500	NHM	C5X-O5X-P1A-O2A
4	A	500	NHM	C5X-O5X-P1A-O3A
4	A	500	NHM	C1M-C2M-C3M-C4M
4	A	500	NHM	C6M-C7M-C8M-C9M
4	A	500	NHM	C4M-C5M-C6M-C7M
4	A	500	NHM	C7M-C8M-C9M-CAM
4	A	500	NHM	O10-C10-C9-O9
4	A	500	NHM	C9M-CAM-CBM-CCM
4	A	500	NHM	O10-C10-C9-N8
4	A	500	NHM	C3M-C4M-C5M-C6M
4	A	500	NHM	CAM-CBM-CCM-CDM
4	A	500	NHM	O1M-C1M-C2M-C3M
4	A	500	NHM	CP-C1M-C2M-C3M
4	A	500	NHM	C13-C11-C12-O6A
4	A	500	NHM	C14-C11-C12-O6A
4	A	500	NHM	C1M-CP-S1-C2

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	500	NHM	2	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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

### 6.4 Ligands

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers

EDS was not executed - this section is therefore empty.