Full wwPDB X-ray Structure Validation Report (i)

Jun 16, 2024 – 10:05 AM EDT

PDB ID	:	2V13
Title	:	Crystal Structure of Renin with Inhibitor 7
Authors	:	Rahuel, J.; Rasetti, V.; Maibaum, J.; Rueger, H.; Goschke, R.; Cohen, N.C.; Stutz, S.; Cumin, F.; Fuhrer, W.; Wood, J.M.; Grutter, M.G.
Deposited on	:	2007-05-21
Resolution	:	2.80 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 (i) 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 (1)) were used in the production of this report:

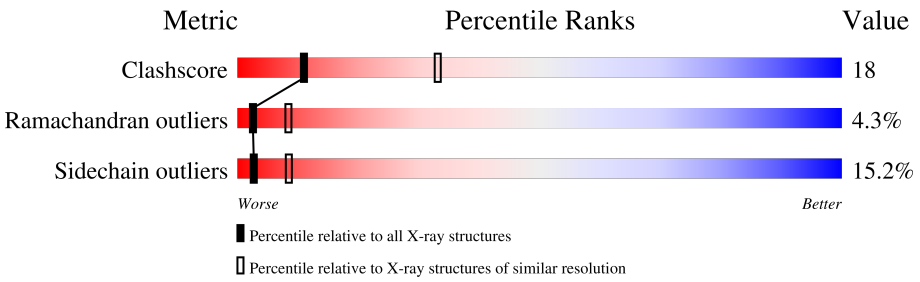
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 2.80 Å.

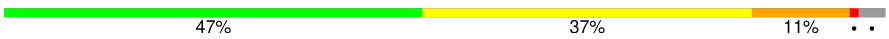
Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)

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%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	340	

2 Entry composition (i)

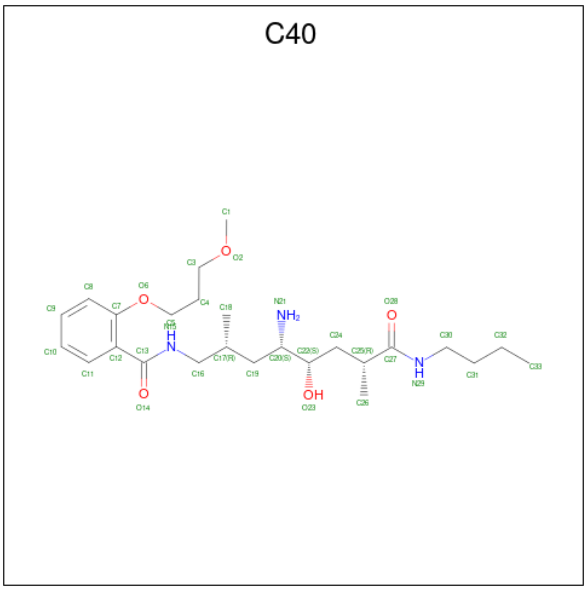
There are 2 unique types of molecules in this entry. The entry contains 2533 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 RENIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	330	2500	1601	398	487	14	0	0	1

- Molecule 2 is N-[(2R,4S,5S,7R)-4-AMINO-8-(BUTYLAMINO)-5-HYDROXY-2,7-DIMETHYL-8-OXOOCTYL]-2-(3-METHOXYPROPOXY)BENZAMIDE (three-letter code: C40) (formula: $C_{25}H_{43}N_3O_5$).



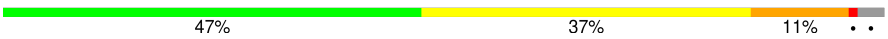
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	33	25	3	5	0	0

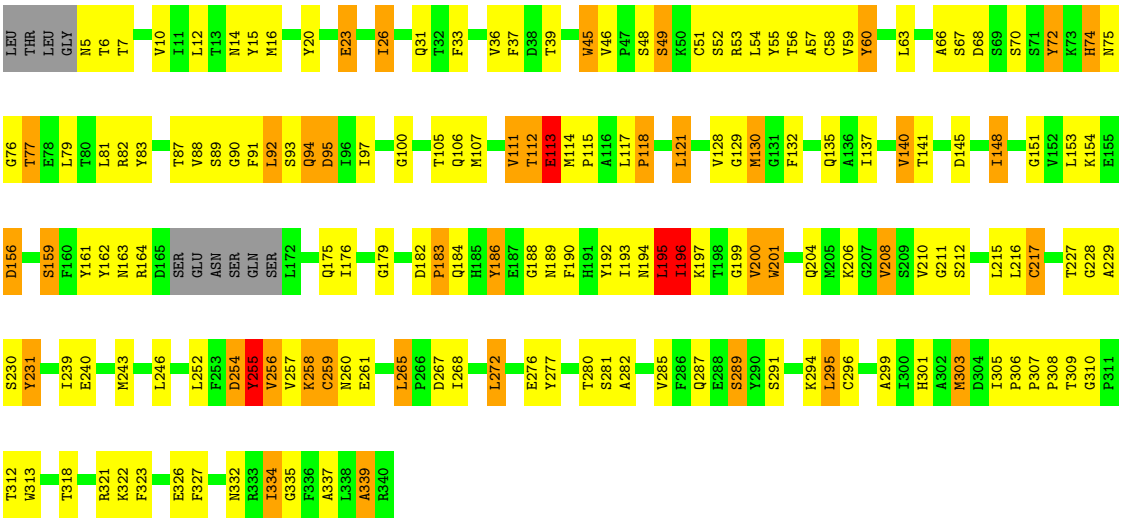
3 Residue-property plots (i)

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. 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: RENIN

Chain A: 



4 Data and refinement statistics (i)

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

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α, β, γ	98.40Å 98.40Å 95.60Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	10.00 – 2.80	Depositor
% Data completeness (in resolution range)	98.0 (10.00-2.80)	Depositor
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, R_{free}	0.228 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2533	wwPDB-VP
Average B, all atoms (Å^2)	15.0	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: C40

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	1.29	2/2559 (0.1%)	1.97	58/3481 (1.7%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	240	GLU	CB-CG	5.22	1.62	1.52
1	A	45	TRP	CG-CD2	-5.03	1.35	1.43

All (58) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	303	MET	CA-CB-CG	-10.70	95.11	113.30
1	A	162	TYR	CB-CG-CD2	-9.51	115.30	121.00
1	A	82	ARG	NE-CZ-NH2	-9.44	115.58	120.30
1	A	5	ASN	CA-C-N	-9.28	96.79	117.20
1	A	267	ASP	CB-CG-OD2	-9.10	110.11	118.30
1	A	201	TRP	CD1-CG-CD2	8.38	113.00	106.30
1	A	16	MET	CA-CB-CG	-8.37	99.06	113.30
1	A	303	MET	CG-SD-CE	-8.32	86.88	100.20
1	A	313	TRP	CD1-CG-CD2	7.93	112.65	106.30
1	A	201	TRP	CE2-CD2-CG	-7.37	101.41	107.30
1	A	258	LYS	CA-CB-CG	7.31	129.48	113.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	111	VAL	CA-CB-CG2	-7.15	100.18	110.90
1	A	45	TRP	CD1-CG-CD2	6.93	111.85	106.30
1	A	162	TYR	CB-CG-CD1	6.93	125.16	121.00
1	A	282	ALA	CB-CA-C	-6.87	99.80	110.10
1	A	14	ASN	CA-C-N	6.82	132.21	117.20
1	A	7	THR	N-CA-CB	-6.72	97.54	110.30
1	A	217	CYS	CA-CB-SG	-6.63	102.07	114.00
1	A	313	TRP	CE2-CD2-CG	-6.62	102.00	107.30
1	A	72	TYR	CB-CG-CD2	-6.57	117.06	121.00
1	A	45	TRP	CE2-CD2-CG	-6.54	102.07	107.30
1	A	196	ILE	N-CA-C	-6.48	93.52	111.00
1	A	36	VAL	CG1-CB-CG2	-6.44	100.59	110.90
1	A	113	GLU	N-CA-C	-6.31	93.97	111.00
1	A	140	VAL	CA-CB-CG1	-6.30	101.45	110.90
1	A	77	THR	CA-CB-OG1	-6.22	95.94	109.00
1	A	201	TRP	CG-CD2-CE3	6.21	139.49	133.90
1	A	45	TRP	CA-CB-CG	6.06	125.21	113.70
1	A	186	TYR	CB-CG-CD1	-6.04	117.37	121.00
1	A	229	ALA	O-C-N	-6.01	113.08	122.70
1	A	156	ASP	CB-CG-OD2	5.91	123.62	118.30
1	A	211	GLY	N-CA-C	-5.90	98.35	113.10
1	A	276	GLU	CA-CB-CG	-5.87	100.50	113.40
1	A	26	ILE	CA-CB-CG2	-5.84	99.22	110.90
1	A	255	TYR	CB-CG-CD2	-5.82	117.51	121.00
1	A	201	TRP	CB-CG-CD1	-5.81	119.45	127.00
1	A	23	GLU	CA-CB-CG	-5.68	100.91	113.40
1	A	206	LYS	CA-CB-CG	5.63	125.80	113.40
1	A	128	VAL	N-CA-C	-5.59	95.90	111.00
1	A	94	GLN	CA-CB-CG	-5.50	101.29	113.40
1	A	231	TYR	CB-CG-CD2	-5.45	117.73	121.00
1	A	208	VAL	CA-CB-CG2	-5.42	102.77	110.90
1	A	201	TRP	CG-CD1-NE1	-5.39	104.71	110.10
1	A	200	VAL	CA-C-N	5.36	128.99	117.20
1	A	272	LEU	CA-C-N	-5.30	105.60	116.20
1	A	334	ILE	N-CA-C	-5.30	96.69	111.00
1	A	280	THR	CA-CB-CG2	5.29	119.81	112.40
1	A	321	ARG	CB-CA-C	-5.28	99.84	110.40
1	A	254	ASP	CB-CG-OD2	-5.26	113.57	118.30
1	A	105	THR	N-CA-CB	-5.23	100.36	110.30
1	A	77	THR	CA-CB-CG2	5.21	119.69	112.40
1	A	111	VAL	CA-CB-CG1	5.18	118.67	110.90
1	A	66	ALA	CB-CA-C	-5.14	102.39	110.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	294	LYS	CB-CG-CD	5.12	124.91	111.60
1	A	7	THR	OG1-CB-CG2	5.10	121.73	110.00
1	A	121	LEU	CA-CB-CG	5.10	127.03	115.30
1	A	321	ARG	CA-C-N	5.05	128.30	117.20
1	A	148	ILE	CA-C-N	5.04	128.29	117.20

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	15	TYR	Sidechain
1	A	255	TYR	Sidechain
1	A	60	TYR	Sidechain

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	2500	0	2386	90	0
2	A	33	0	43	2	0
All	All	2533	0	2429	90	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 18.

All (90) 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:97:ILE:HD13	1:A:106:GLN:HB3	1.64	0.79
1:A:258:LYS:HA	1:A:295:LEU:HA	1.67	0.76
1:A:159:SER:HB3	1:A:326:GLU:HA	1.68	0.76
1:A:190:PHE:HD2	1:A:337:ALA:HB2	1.52	0.74
1:A:257:VAL:HG11	1:A:265:LEU:HD21	1.74	0.70
1:A:183:PRO:HA	1:A:186:TYR:CE1	2.27	0.69
1:A:51:CYS:SG	1:A:112:THR:O	2.52	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:89:SER:OG	1:A:113:GLU:HB3	1.94	0.68
1:A:196:ILE:HD11	1:A:204:GLN:HB2	1.75	0.67
1:A:246:LEU:HD21	1:A:268:ILE:HD11	1.75	0.67
1:A:51:CYS:HA	1:A:112:THR:HG22	1.76	0.67
1:A:94:GLN:HG3	1:A:107:MET:SD	2.37	0.65
1:A:243:MET:HE1	1:A:246:LEU:HD12	1.79	0.64
1:A:77:THR:HB	1:A:92:LEU:HD11	1.83	0.61
1:A:208:VAL:HB	1:A:216:LEU:HB3	1.83	0.61
1:A:79:LEU:HD12	1:A:137:ILE:HG22	1.81	0.61
1:A:231:TYR:HA	1:A:318:THR:OG1	2.03	0.59
1:A:79:LEU:HD23	1:A:90:GLY:O	2.03	0.59
1:A:190:PHE:HB2	1:A:192:TYR:CE1	2.37	0.59
1:A:259:CYS:SG	1:A:296:CYS:N	2.78	0.57
1:A:190:PHE:CD2	1:A:337:ALA:HB2	2.37	0.55
1:A:195:LEU:HD23	1:A:332:ASN:O	2.07	0.55
1:A:197:LYS:HD2	1:A:200:VAL:HG21	1.89	0.55
1:A:259:CYS:H	1:A:295:LEU:HA	1.72	0.54
1:A:193:ILE:HG22	1:A:194:ASN:O	2.09	0.53
1:A:217:CYS:SG	1:A:217:CYS:O	2.66	0.52
1:A:259:CYS:HB3	1:A:289:SER:O	2.10	0.52
1:A:163:ASN:HD22	1:A:164:ARG:N	2.09	0.51
1:A:258:LYS:HG3	1:A:260:ASN:ND2	2.26	0.51
1:A:307:PRO:HA	1:A:310:GLY:O	2.11	0.51
1:A:272:LEU:HB3	1:A:277:TYR:CE1	2.47	0.50
1:A:164:ARG:HB2	1:A:164:ARG:NH1	2.27	0.50
1:A:255:TYR:O	1:A:256:VAL:HG23	2.12	0.49
1:A:259:CYS:HB2	1:A:291:SER:O	2.11	0.49
1:A:37:PHE:CD1	1:A:176:ILE:HD11	2.48	0.49
1:A:163:ASN:ND2	1:A:164:ARG:N	2.60	0.49
1:A:258:LYS:HA	1:A:295:LEU:CA	2.40	0.48
1:A:310:GLY:HA2	1:A:312:THR:HG22	1.96	0.47
1:A:258:LYS:HA	1:A:295:LEU:HB2	1.96	0.47
1:A:201:TRP:CH2	1:A:327:PHE:HB3	2.50	0.47
1:A:12:LEU:HD21	1:A:176:ILE:HD11	1.97	0.47
1:A:228:GLY:O	2:A:1341:C40:N21	2.47	0.46
1:A:75:ASN:OD1	1:A:76:GLY:N	2.49	0.46
1:A:137:ILE:HD11	2:A:1341:C40:H331	1.97	0.46
1:A:132:PHE:HB2	1:A:199:GLY:O	2.16	0.46
1:A:77:THR:O	1:A:91:PHE:HA	2.16	0.46
1:A:129:GLY:C	1:A:130:MET:HG2	2.36	0.45
1:A:277:TYR:HD2	1:A:323:PHE:CZ	2.35	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:153:LEU:HD22	1:A:179:GLY:HA3	1.98	0.45
1:A:163:ASN:ND2	1:A:164:ARG:H	2.14	0.45
1:A:59:VAL:HG13	1:A:60:TYR:CD1	2.52	0.45
1:A:322:LYS:O	1:A:339:ALA:HB2	2.17	0.44
1:A:148:ILE:HD13	1:A:148:ILE:HA	1.75	0.44
1:A:45:TRP:HE1	1:A:83:TYR:HH	1.64	0.44
1:A:12:LEU:HD11	1:A:176:ILE:HG13	1.98	0.44
1:A:39:THR:HG23	1:A:227:THR:OG1	2.17	0.44
1:A:93:SER:O	1:A:107:MET:HA	2.17	0.44
1:A:186:TYR:CZ	1:A:190:PHE:CE2	3.06	0.44
1:A:190:PHE:HE1	1:A:326:GLU:OE1	2.00	0.44
1:A:48:SER:OG	1:A:49:SER:N	2.48	0.43
1:A:239:ILE:HD13	1:A:239:ILE:HA	1.84	0.43
1:A:161:TYR:HB3	1:A:175:GLN:H	1.84	0.42
1:A:258:LYS:HA	1:A:295:LEU:CB	2.48	0.42
1:A:258:LYS:HG3	1:A:260:ASN:HD21	1.84	0.42
1:A:10:VAL:HB	1:A:176:ILE:HD12	2.01	0.42
1:A:231:TYR:HB3	1:A:299:ALA:O	2.19	0.42
1:A:81:LEU:O	1:A:87:THR:HA	2.20	0.42
1:A:210:VAL:CG1	1:A:215:LEU:HD23	2.49	0.42
1:A:107:MET:HB2	1:A:140:VAL:HG11	2.01	0.42
1:A:55:TYR:O	1:A:58:CYS:N	2.53	0.42
1:A:192:TYR:O	1:A:193:ILE:HG13	2.20	0.42
1:A:210:VAL:HG11	1:A:215:LEU:HD23	2.02	0.42
1:A:295:LEU:H	1:A:295:LEU:HD23	1.85	0.42
1:A:81:LEU:HD13	1:A:88:VAL:HG23	2.01	0.42
1:A:26:ILE:HG12	1:A:33:PHE:CD1	2.56	0.41
1:A:81:LEU:HB2	1:A:88:VAL:HG23	2.02	0.41
1:A:117:LEU:HA	1:A:118:PRO:HA	1.77	0.41
1:A:246:LEU:O	1:A:265:LEU:HD12	2.20	0.41
1:A:272:LEU:HD12	1:A:272:LEU:HA	1.91	0.41
1:A:192:TYR:HA	1:A:335:GLY:HA2	2.02	0.41
1:A:182:ASP:O	1:A:184:GLN:N	2.51	0.41
1:A:246:LEU:HA	1:A:246:LEU:HD23	1.88	0.41
1:A:281:SER:O	1:A:285:VAL:HG23	2.22	0.40
1:A:196:ILE:HG22	1:A:197:LYS:N	2.36	0.40
1:A:72:TYR:CZ	1:A:74:HIS:HB3	2.57	0.40
1:A:57:ALA:HB1	1:A:114:MET:SD	2.62	0.40
1:A:74:HIS:O	1:A:74:HIS:ND1	2.55	0.40
1:A:94:GLN:O	1:A:95:ASP:HB2	2.21	0.40
1:A:186:TYR:CZ	1:A:190:PHE:HE2	2.39	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:305:ILE:HA	1:A:306:PRO:HD3	1.88	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	326/340 (96%)	272 (83%)	40 (12%)	14 (4%)	2 8

All (14) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	189	ASN
1	A	339	ALA
1	A	53	ARG
1	A	151	GLY
1	A	188	GLY
1	A	252	LEU
1	A	95	ASP
1	A	289	SER
1	A	154	LYS
1	A	195	LEU
1	A	259	CYS
1	A	145	ASP
1	A	196	ILE
1	A	100	GLY

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	270/290 (93%)	229 (85%)	41 (15%)	3 8

All (41) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	THR
1	A	20	TYR
1	A	23	GLU
1	A	31	GLN
1	A	46	VAL
1	A	49	SER
1	A	52	SER
1	A	54	LEU
1	A	56	THR
1	A	63	LEU
1	A	67	SER
1	A	68	ASP
1	A	70	SER
1	A	74	HIS
1	A	92	LEU
1	A	111	VAL
1	A	112	THR
1	A	113	GLU
1	A	115	PRO
1	A	118	PRO
1	A	121	LEU
1	A	130	MET
1	A	135	GLN
1	A	141	THR
1	A	156	ASP
1	A	159	SER
1	A	183	PRO
1	A	195	LEU
1	A	212	SER
1	A	230	SER
1	A	254	ASP
1	A	256	VAL
1	A	261	GLU
1	A	265	LEU

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Mol	Chain	Res	Type
1	A	287	GLN
1	A	295	LEU
1	A	301	HIS
1	A	303	MET
1	A	308	PRO
1	A	309	THR
1	A	334	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	5	ASN
1	A	163	ASN
1	A	189	ASN
1	A	202	GLN
1	A	260	ASN
1	A	301	HIS

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

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	$\#\|Z\| > 2$
2	C40	A	1341	-	33,33,33	1.30	2 (6%)	33,41,41	2.06	8 (24%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	C40	A	1341	-	-	15/36/36/36	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1341	C40	C12-C13	-4.58	1.41	1.50
2	A	1341	C40	C19-C20	-3.70	1.47	1.53

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	1341	C40	O23-C22-C20	-5.13	99.73	109.48
2	A	1341	C40	O6-C7-C8	-4.51	114.12	123.95
2	A	1341	C40	O6-C7-C12	4.29	126.40	116.97
2	A	1341	C40	C5-C4-C3	-3.91	101.03	113.67
2	A	1341	C40	O14-C13-N15	-3.09	116.57	122.59
2	A	1341	C40	C24-C25-C27	2.92	115.45	109.84
2	A	1341	C40	C26-C25-C27	-2.91	104.29	109.64
2	A	1341	C40	C7-C12-C13	-2.83	121.13	126.24

There are no chirality outliers.

All (15) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1341	C40	C17-C19-C20-N21
2	A	1341	C40	C19-C20-C22-O23
2	A	1341	C40	C19-C20-C22-C24
2	A	1341	C40	N21-C20-C22-O23
2	A	1341	C40	C12-C13-N15-C16
2	A	1341	C40	C4-C3-O2-C1

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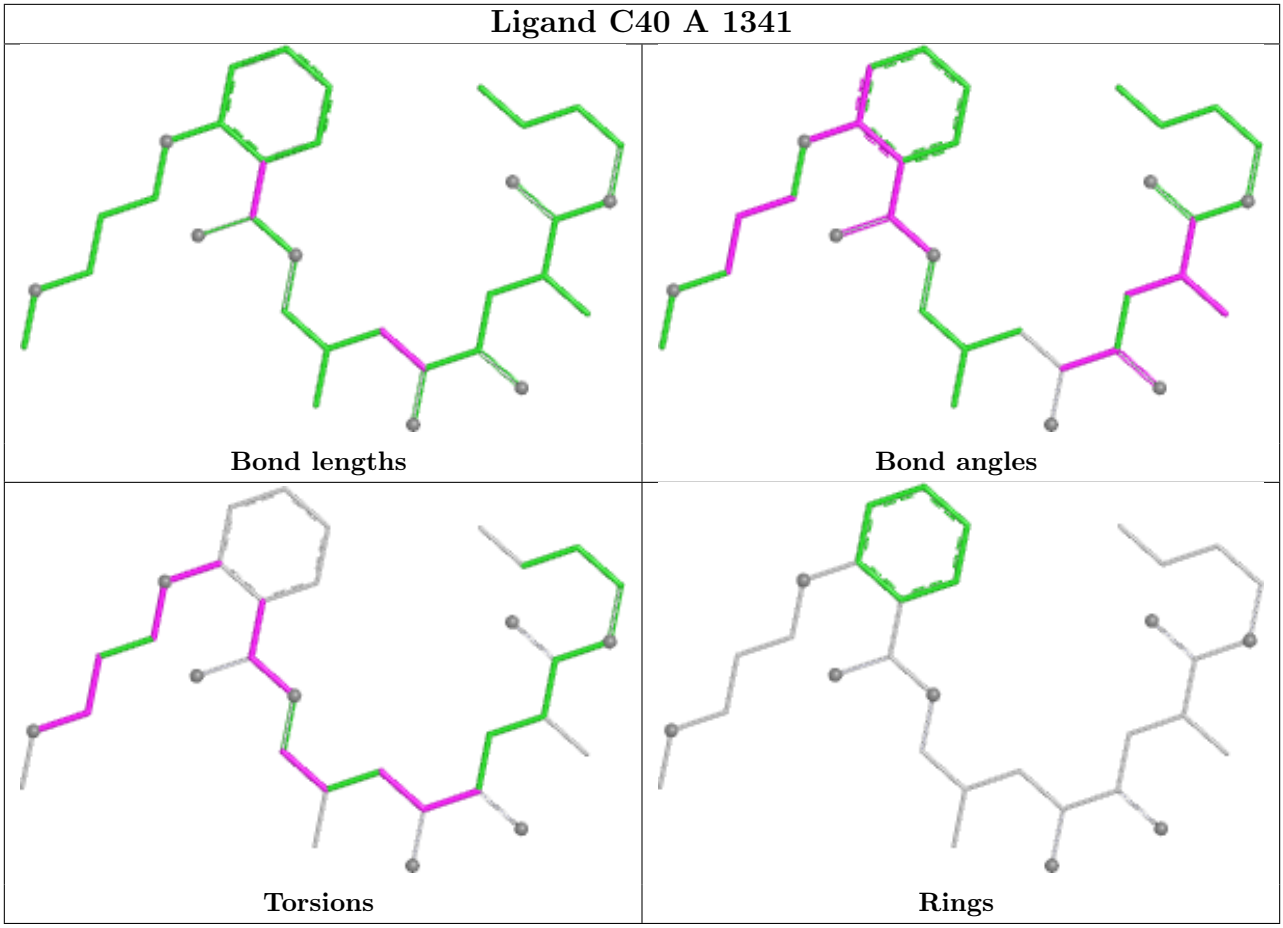
Mol	Chain	Res	Type	Atoms
2	A	1341	C40	C7-C12-C13-O14
2	A	1341	C40	C8-C7-O6-C5
2	A	1341	C40	N15-C16-C17-C18
2	A	1341	C40	N15-C16-C17-C19
2	A	1341	C40	C12-C7-O6-C5
2	A	1341	C40	O2-C3-C4-C5
2	A	1341	C40	N21-C20-C22-C24
2	A	1341	C40	C4-C5-O6-C7
2	A	1341	C40	C7-C12-C13-N15

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1341	C40	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 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 (i)

6.1 Protein, DNA and RNA chains (i)

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains (i)

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates (i)

EDS was not executed - this section is therefore empty.

6.4 Ligands (i)

EDS was not executed - this section is therefore empty.

6.5 Other polymers (i)

EDS was not executed - this section is therefore empty.