Full wwPDB X-ray Structure Validation Report ⓘ

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PDB ID	:	2V13 / pdb_00002v13
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 ⓘ 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:

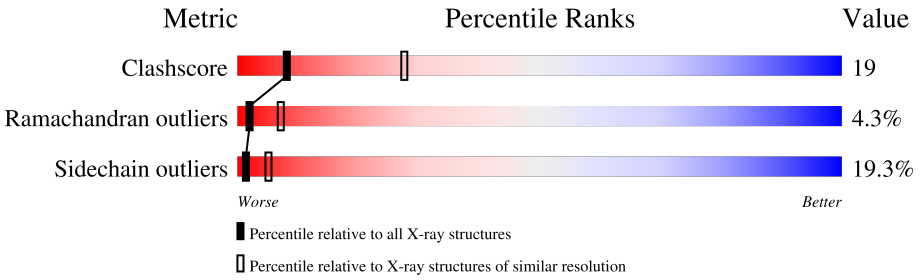
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

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	190562	4276 (2.80-2.80)
Ramachandran outliers	187476	4196 (2.80-2.80)
Sidechain outliers	187428	4198 (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	31% 42% 21%

2 Entry composition

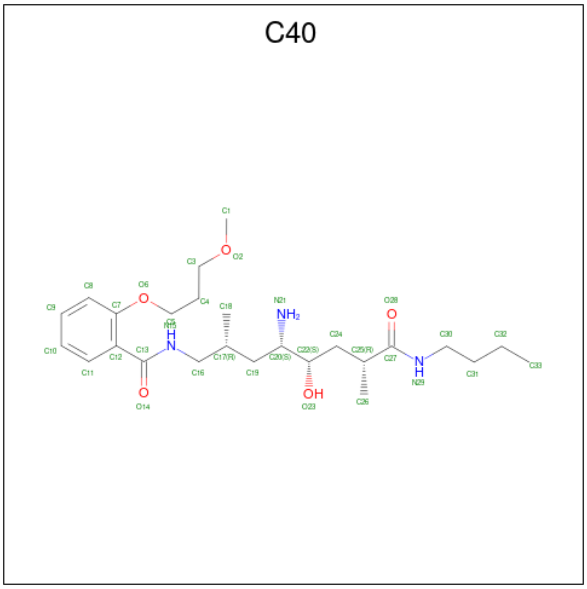
There are 2 unique types of molecules in this entry. The entry contains 2533 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 (CCD ID: 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

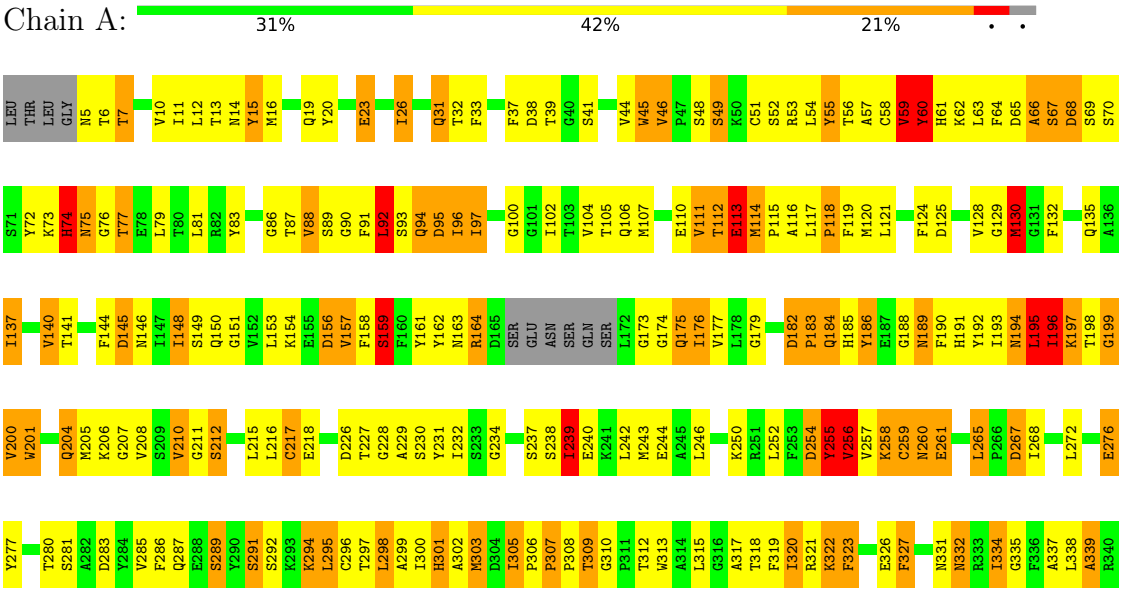
3 Residue-property plots (i)

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

5.1 Standard geometry

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	1.64	27/2559 (1.1%)	2.44	177/3481 (5.1%)

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
1	A	0	3

All (27) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	232	ILE	CA-CB	-7.96	1.45	1.54
1	A	201	TRP	CA-CB	-7.48	1.43	1.52
1	A	164	ARG	C-N	-6.73	1.24	1.33
1	A	15	TYR	CA-CB	-6.14	1.44	1.53
1	A	177	VAL	CA-CB	-6.09	1.47	1.54
1	A	176	ILE	CA-CB	-6.01	1.47	1.54
1	A	297	THR	CA-CB	-5.94	1.44	1.53
1	A	104	VAL	CA-CB	-5.90	1.46	1.55
1	A	162	TYR	CA-CB	-5.77	1.44	1.53
1	A	186	TYR	CA-CB	-5.77	1.43	1.53
1	A	88	VAL	CA-CB	-5.65	1.45	1.55
1	A	150	GLN	CA-CB	5.62	1.61	1.53
1	A	46	VAL	CA-CB	-5.57	1.47	1.54
1	A	60	TYR	CA-CB	5.47	1.61	1.53
1	A	298	LEU	CA-CB	-5.45	1.45	1.53
1	A	125	ASP	CA-CB	-5.43	1.43	1.54
1	A	102	ILE	CA-CB	-5.29	1.47	1.54
1	A	144	PHE	CA-CB	-5.28	1.45	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	61	HIS	CD2-NE2	-5.23	1.32	1.37
1	A	62	LYS	CA-CB	-5.22	1.44	1.53
1	A	191	HIS	CD2-NE2	-5.18	1.32	1.37
1	A	185	HIS	CD2-NE2	-5.17	1.32	1.37
1	A	323	PHE	CA-CB	-5.16	1.45	1.53
1	A	68	ASP	CA-CB	5.12	1.59	1.52
1	A	301	HIS	CD2-NE2	-5.06	1.32	1.37
1	A	267	ASP	CA-CB	-5.04	1.45	1.53
1	A	300	ILE	CA-CB	-5.02	1.47	1.54

All (177) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	119	PHE	CA-CB-CG	-10.39	103.41	113.80
1	A	144	PHE	CA-CB-CG	-10.03	103.77	113.80
1	A	113	GLU	N-CA-C	-9.99	93.97	109.25
1	A	5	ASN	CA-CB-CG	-9.95	102.65	112.60
1	A	200	VAL	CA-C-O	-9.84	110.86	121.28
1	A	303	MET	CA-CB-CG	-9.49	95.11	114.10
1	A	332	ASN	OD1-CG-ND2	-9.24	113.36	122.60
1	A	77	THR	CA-CB-OG1	-9.11	95.94	109.60
1	A	309	THR	N-CA-C	-8.98	101.44	111.14
1	A	226	ASP	CA-CB-CG	8.94	121.54	112.60
1	A	64	PHE	CA-C-O	-8.93	111.15	121.16
1	A	229	ALA	O-C-N	-8.83	113.08	123.41
1	A	197	LYS	N-CA-C	-8.78	98.70	110.55
1	A	7	THR	N-CA-CB	-8.57	97.54	110.90
1	A	331	ASN	CA-CB-CG	8.21	120.81	112.60
1	A	320	ILE	CA-C-O	-8.11	112.83	121.27
1	A	116	ALA	N-CA-C	8.10	120.83	111.11
1	A	334	ILE	N-CA-C	-8.03	96.69	108.89
1	A	291	SER	N-CA-C	8.01	121.80	110.50
1	A	146	ASN	OD1-CG-ND2	-7.99	114.61	122.60
1	A	156	ASP	CA-CB-CG	7.97	120.57	112.60
1	A	184	GLN	N-CA-C	-7.90	102.14	112.41
1	A	19	GLN	OE1-CD-NE2	-7.89	114.71	122.60
1	A	150	GLN	OE1-CD-NE2	-7.84	114.76	122.60
1	A	254	ASP	O-C-N	7.80	130.43	123.41
1	A	258	LYS	CA-CB-CG	7.69	129.48	114.10
1	A	196	ILE	N-CA-C	-7.61	93.52	109.34
1	A	97	ILE	N-CA-C	-7.57	97.57	108.17
1	A	65	ASP	CA-CB-CG	7.53	120.13	112.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	254	ASP	CA-CB-CG	-7.53	105.07	112.60
1	A	16	MET	CA-CB-CG	-7.52	99.06	114.10
1	A	14	ASN	O-C-N	-7.39	114.70	123.27
1	A	307	PRO	N-CA-C	-7.37	103.39	110.47
1	A	315	LEU	CA-C-O	-7.37	112.88	120.54
1	A	130	MET	CA-C-O	7.36	126.89	119.97
1	A	322	LYS	N-CA-C	-7.33	104.49	113.50
1	A	19	GLN	CG-CD-NE2	7.15	127.12	116.40
1	A	239	ILE	N-CA-C	-7.14	103.22	111.00
1	A	7	THR	CA-CB-OG1	-7.13	98.91	109.60
1	A	198	THR	N-CA-C	-7.10	99.41	110.42
1	A	185	HIS	CB-CG-CD2	-7.02	122.07	131.20
1	A	242	LEU	N-CA-C	-7.01	103.57	111.07
1	A	191	HIS	CB-CG-CD2	-6.98	122.13	131.20
1	A	287	GLN	OE1-CD-NE2	-6.92	115.68	122.60
1	A	191	HIS	N-CA-C	-6.90	99.06	110.17
1	A	59	VAL	CA-C-O	-6.89	113.89	121.05
1	A	297	THR	CA-CB-OG1	-6.88	99.28	109.60
1	A	38	ASP	N-CA-C	6.83	119.86	108.73
1	A	14	ASN	CA-C-O	-6.80	113.02	120.30
1	A	276	GLU	CA-CB-CG	-6.80	100.50	114.10
1	A	302	ALA	CA-C-O	-6.79	113.12	120.92
1	A	128	VAL	N-CA-C	-6.75	95.90	107.24
1	A	146	ASN	CB-CG-ND2	6.74	126.51	116.40
1	A	75	ASN	N-CA-C	-6.72	99.11	109.52
1	A	320	ILE	N-CA-C	-6.68	103.35	110.36
1	A	26	ILE	CA-CB-CG2	-6.64	99.22	110.50
1	A	144	PHE	CA-C-O	-6.64	114.06	120.90
1	A	74	HIS	CB-CG-CD2	-6.63	122.58	131.20
1	A	292	SER	CA-CB-OG	-6.62	97.86	111.10
1	A	23	GLU	CA-CB-CG	-6.59	100.91	114.10
1	A	62	LYS	CA-C-O	-6.55	113.98	121.19
1	A	239	ILE	CA-C-O	-6.53	113.73	120.71
1	A	120	MET	N-CA-C	-6.51	104.82	112.89
1	A	137	ILE	N-CA-C	-6.50	101.18	109.30
1	A	212	SER	N-CA-CB	-6.49	104.01	111.79
1	A	317	ALA	CA-C-O	-6.45	114.00	120.90
1	A	144	PHE	N-CA-C	-6.44	103.88	111.03
1	A	66	ALA	O-C-N	6.42	128.93	122.12
1	A	94	GLN	CA-CB-CG	-6.41	101.29	114.10
1	A	174	GLY	CA-C-O	-6.41	115.30	121.83
1	A	137	ILE	O-C-N	6.37	129.62	122.67

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	303	MET	CG-SD-CE	-6.37	86.88	100.90
1	A	38	ASP	CA-CB-CG	6.35	118.95	112.60
1	A	11	ILE	N-CA-C	-6.30	100.64	109.21
1	A	148	ILE	CA-C-O	-6.26	114.01	120.71
1	A	211	GLY	N-CA-C	-6.26	98.35	113.18
1	A	240	GLU	N-CA-C	-6.25	104.47	111.28
1	A	280	THR	CA-CB-OG1	-6.24	100.23	109.60
1	A	313	TRP	N-CA-C	-6.22	102.32	110.53
1	A	7	THR	OG1-CB-CG2	6.22	121.73	109.30
1	A	105	THR	N-CA-CB	-6.19	100.36	110.21
1	A	320	ILE	CB-CA-C	-6.19	103.96	111.88
1	A	327	PHE	N-CA-C	-6.17	99.18	109.24
1	A	69	SER	N-CA-C	6.14	118.18	107.49
1	A	97	ILE	CA-C-N	-6.14	114.45	123.05
1	A	97	ILE	C-N-CA	-6.14	114.45	123.05
1	A	102	ILE	N-CA-CB	-6.12	103.86	110.53
1	A	45	TRP	CA-CB-CG	6.11	125.21	113.60
1	A	158	PHE	CA-C-O	-6.11	114.15	120.99
1	A	31	GLN	CA-C-O	-6.04	114.26	120.54
1	A	111	VAL	CA-CB-CG2	-6.01	100.18	110.40
1	A	307	PRO	CB-CA-C	5.99	117.02	111.39
1	A	191	HIS	ND1-CG-CD2	5.94	112.04	106.10
1	A	294	LYS	CB-CG-CD	5.92	124.91	111.30
1	A	206	LYS	CA-CB-CG	5.85	125.80	114.10
1	A	182	ASP	CA-CB-CG	5.80	118.40	112.60
1	A	234	GLY	O-C-N	-5.79	117.31	123.45
1	A	88	VAL	N-CA-C	-5.78	99.31	108.90
1	A	207	GLY	CA-C-N	5.78	130.35	123.19
1	A	207	GLY	C-N-CA	5.78	130.35	123.19
1	A	110	GLU	N-CA-C	-5.77	99.32	108.73
1	A	305	ILE	N-CA-C	-5.76	103.66	109.02
1	A	194	ASN	OD1-CG-ND2	-5.75	116.85	122.60
1	A	46	VAL	CA-C-N	5.75	125.70	119.78
1	A	46	VAL	C-N-CA	5.75	125.70	119.78
1	A	13	THR	O-C-N	-5.70	116.55	123.10
1	A	44	VAL	N-CA-C	-5.68	100.16	108.97
1	A	240	GLU	CA-C-O	-5.64	114.57	120.55
1	A	150	GLN	N-CA-C	-5.64	106.30	112.72
1	A	301	HIS	CB-CG-CD2	-5.63	123.89	131.20
1	A	26	ILE	CA-CB-CG1	5.62	119.96	110.40
1	A	96	ILE	CA-CB-CG2	-5.61	100.97	110.50
1	A	201	TRP	CG-CD2-CE3	5.59	139.49	133.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	332	ASN	N-CA-CB	-5.58	103.44	111.70
1	A	256	VAL	CA-C-O	-5.58	113.81	120.78
1	A	286	PHE	CA-CB-CG	-5.58	108.22	113.80
1	A	320	ILE	N-CA-CB	5.56	116.68	110.51
1	A	114	MET	CA-C-N	5.52	125.45	119.76
1	A	114	MET	C-N-CA	5.52	125.45	119.76
1	A	32	THR	CA-C-O	-5.50	115.72	121.99
1	A	260	ASN	N-CA-C	-5.50	104.92	111.69
1	A	217	CYS	N-CA-C	5.48	119.26	111.92
1	A	92	LEU	N-CA-C	5.48	118.01	109.52
1	A	280	THR	CA-CB-CG2	5.47	119.81	110.50
1	A	321	ARG	CB-CA-C	-5.47	99.84	110.46
1	A	149	SER	O-C-N	-5.47	116.32	122.12
1	A	238	SER	CA-CB-OG	-5.46	100.17	111.10
1	A	7	THR	CB-CA-C	5.46	118.59	110.62
1	A	338	LEU	O-C-N	5.45	129.57	122.87
1	A	331	ASN	N-CA-C	5.45	116.98	110.44
1	A	38	ASP	O-C-N	-5.45	117.01	123.22
1	A	334	ILE	O-C-N	-5.44	117.32	122.98
1	A	77	THR	CA-CB-CG2	5.41	119.69	110.50
1	A	256	VAL	N-CA-CB	-5.41	102.31	111.23
1	A	267	ASP	N-CA-C	5.41	117.85	110.55
1	A	250	LYS	CA-C-O	-5.39	115.27	121.47
1	A	61	HIS	CB-CG-CD2	-5.39	124.19	131.20
1	A	217	CYS	CA-CB-SG	-5.36	102.07	114.40
1	A	60	TYR	O-C-N	-5.36	115.52	122.37
1	A	331	ASN	OD1-CG-ND2	-5.35	117.25	122.60
1	A	255	TYR	N-CA-C	-5.33	103.45	110.43
1	A	159	SER	N-CA-C	5.32	117.27	109.24
1	A	31	GLN	N-CA-C	-5.28	99.17	108.20
1	A	140	VAL	CA-CB-CG1	-5.26	101.45	110.40
1	A	332	ASN	N-CA-C	5.26	118.65	111.39
1	A	283	ASP	CA-CB-CG	-5.20	107.40	112.60
1	A	124	PHE	CA-C-O	-5.20	115.53	121.82
1	A	55	TYR	O-C-N	5.20	128.97	122.63
1	A	102	ILE	CA-C-O	-5.19	114.93	120.85
1	A	287	GLN	CG-CD-NE2	5.19	124.19	116.40
1	A	41	SER	CA-C-N	-5.18	113.33	123.13
1	A	41	SER	C-N-CA	-5.18	113.33	123.13
1	A	189	ASN	N-CA-C	5.18	121.83	110.80
1	A	177	VAL	N-CA-CB	-5.18	104.26	111.41
1	A	244	GLU	N-CA-C	-5.18	105.53	111.07

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	145	ASP	CA-CB-CG	-5.16	107.44	112.60
1	A	237	SER	CB-CA-C	-5.15	103.03	110.96
1	A	244	GLU	CA-C-O	-5.15	115.41	120.82
1	A	86	GLY	O-C-N	-5.14	118.98	123.92
1	A	261	GLU	CB-CG-CD	-5.12	103.89	112.60
1	A	68	ASP	CA-CB-CG	5.11	117.71	112.60
1	A	254	ASP	CB-CA-C	-5.11	101.24	110.03
1	A	321	ARG	CA-C-O	-5.11	114.48	120.20
1	A	232	ILE	N-CA-C	-5.11	102.99	109.58
1	A	73	LYS	N-CA-C	-5.10	101.84	109.79
1	A	173	GLY	N-CA-C	-5.08	108.37	114.66
1	A	205	MET	CA-C-N	-5.07	115.02	123.33
1	A	205	MET	C-N-CA	-5.07	115.02	123.33
1	A	199	GLY	O-C-N	-5.06	116.93	122.65
1	A	197	LYS	CA-C-N	-5.05	113.55	122.74
1	A	197	LYS	C-N-CA	-5.05	113.55	122.74
1	A	321	ARG	CA-CB-CG	5.05	124.19	114.10
1	A	157	VAL	CA-C-O	-5.03	116.41	121.49
1	A	32	THR	CA-CB-OG1	-5.02	102.07	109.60
1	A	14	ASN	CA-C-N	-5.01	115.99	123.11
1	A	14	ASN	C-N-CA	-5.01	115.99	123.11
1	A	44	VAL	CA-C-O	-5.00	115.13	121.48

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	96	0
2	A	33	0	43	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	2533	0	2429	96	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 19.

All (96) 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
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: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:243:MET:HE2	1:A:246:LEU:HD12	1.84	0.60
1:A:231:TYR:HA	1:A:318:THR:OG1	2.03	0.59
1:A:45:TRP:CD1	1:A:83:TYR:HH	2.20	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:129:GLY:C	1:A:130:MET:HG2	2.36	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
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:243:MET:HE1	1:A:298:LEU:HD23	1.96	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:277:TYR:HD2	1:A:323:PHE:CZ	2.35	0.45
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: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:267:ASP:C	1:A:268:ILE:HD13	2.43	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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
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:66:ALA:O	1:A:67:SER:C	2.63	0.41
1:A:192:TYR:HA	1:A:335:GLY:HA2	2.02	0.41
1:A:319:PHE:O	1:A:320:ILE:C	2.64	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:243:MET:CE	1:A:246:LEU:HD12	2.50	0.40
1:A:72:TYR:CZ	1:A:74:HIS:HB3	2.57	0.40
1:A:243:MET:HE2	1:A:243:MET:HA	2.03	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
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 7

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%)	218 (81%)	52 (19%)	1 5

All (52) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	THR
1	A	7	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	59	VAL
1	A	63	LEU
1	A	67	SER

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Mol	Chain	Res	Type
1	A	68	ASP
1	A	70	SER
1	A	74	HIS
1	A	92	LEU
1	A	96	ILE
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	157	VAL
1	A	159	SER
1	A	175	GLN
1	A	183	PRO
1	A	195	LEU
1	A	196	ILE
1	A	204	GLN
1	A	210	VAL
1	A	212	SER
1	A	218	GLU
1	A	230	SER
1	A	239	ILE
1	A	254	ASP
1	A	256	VAL
1	A	261	GLU
1	A	265	LEU
1	A	276	GLU
1	A	294	LYS
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	331	ASN

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 oligosaccharides 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
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

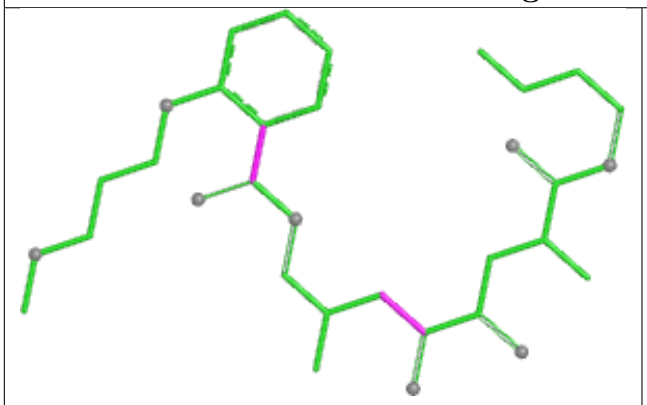
There are no ring outliers.

1 monomer is involved in 2 short contacts:

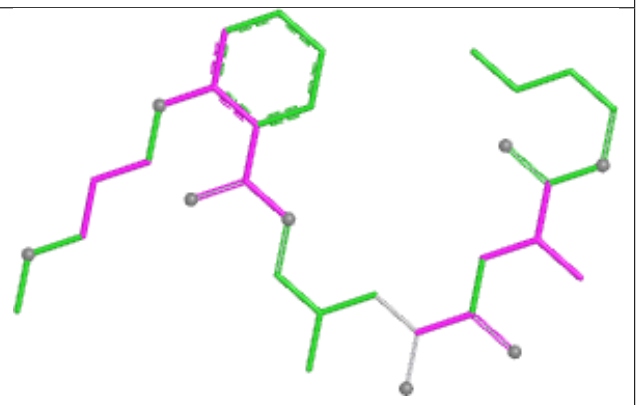
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1341	C40	2	0

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.

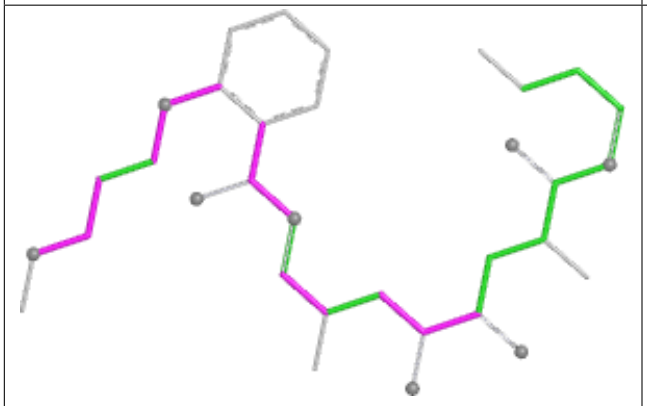
Ligand C40 A 1341



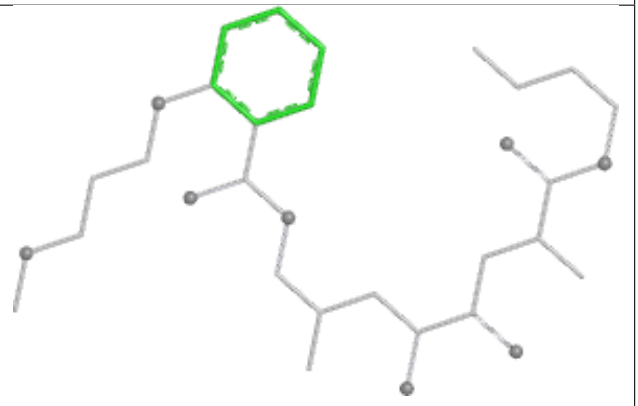
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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.