Full wwPDB X-ray Structure Validation Report ⓘ

Jan 12, 2023 – 12:26 pm GMT

PDB ID	:	7NE7
Title	:	oligopeptidase B from S. proteomaculans with modified hinge region in complex with N-[(1S)-5-amino-1-(chloroacetyl)pentyl]-4-methylbenzenesulfonamide
Authors	:	Petrenko, D.E.; Nikolaeva, A.Y.; Lazarenko, V.A.; Dorovatovskiy, P.V.; Vlaskina, A.V.; Mikhailova, A.G.; Rakitina, T.V.; Timofeev, V.I.
Deposited on	:	2021-02-03
Resolution	:	2.30 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 (1)) were used in the production of this report:

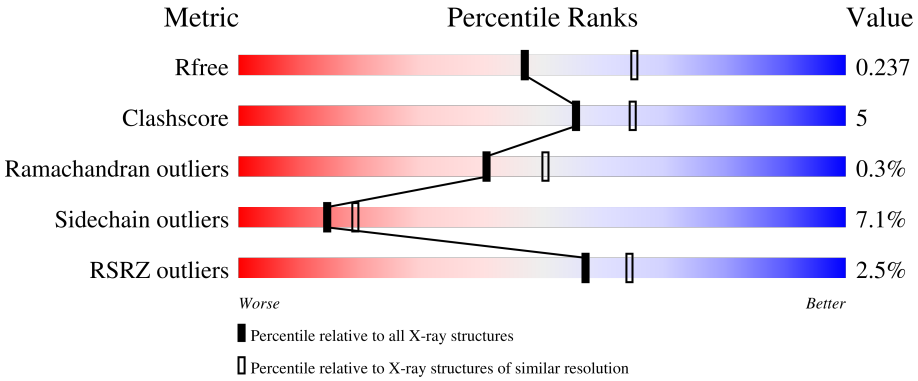
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.31.3
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.3

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 2.30 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	677	3% 84% 14% .

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 6017 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.

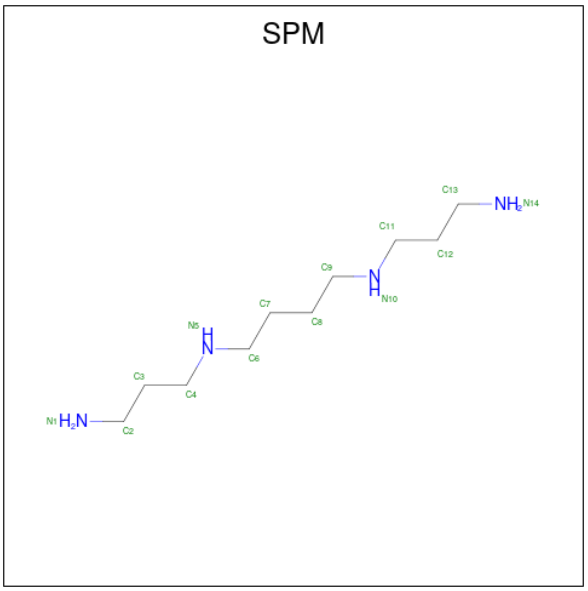
- Molecule 1 is a protein called Oligopeptidase B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	677	Total	C	N	O	S	0	3	0
			5565	3534	935	1083	13			

There are 7 discrepancies between the modelled and reference sequences:

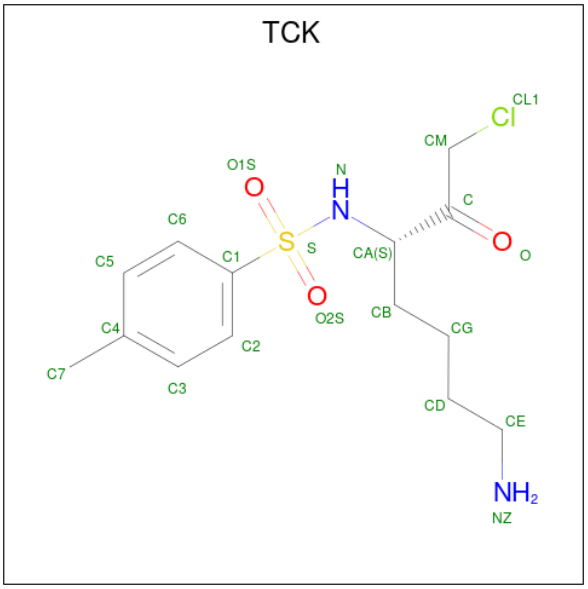
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	HIS	-	expression tag	UNP B3VI58
A	71	GLU	ILE	conflict	UNP B3VI58
A	72	ASN	PRO	conflict	UNP B3VI58
A	73	LEU	GLN	conflict	UNP B3VI58
A	74	TYR	GLN	conflict	UNP B3VI58
A	75	PHE	GLU	conflict	UNP B3VI58
A	76	GLN	HIS	conflict	UNP B3VI58

- Molecule 2 is SPERMINE (three-letter code: SPM) (formula: $C_{10}H_{26}N_4$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C N 14 10 4	0	0
2	A	1	Total C N 14 10 4	0	0
2	A	1	Total C N 14 10 4	0	0
2	A	1	Total C N 14 10 4	0	0
2	A	1	Total C N 14 10 4	0	0
2	A	1	Total C N 14 10 4	0	0

- Molecule 3 is N-[(1S)-5-amino-1-(chloroacetyl)pentyl]-4-methylbenzenesulfonamide (three-letter code: TCK) (formula: $C_{14}H_{21}ClN_2O_3S$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O S 20 14 2 3 1	0	0
3	A	1	Total C N O S 20 14 2 3 1	0	0

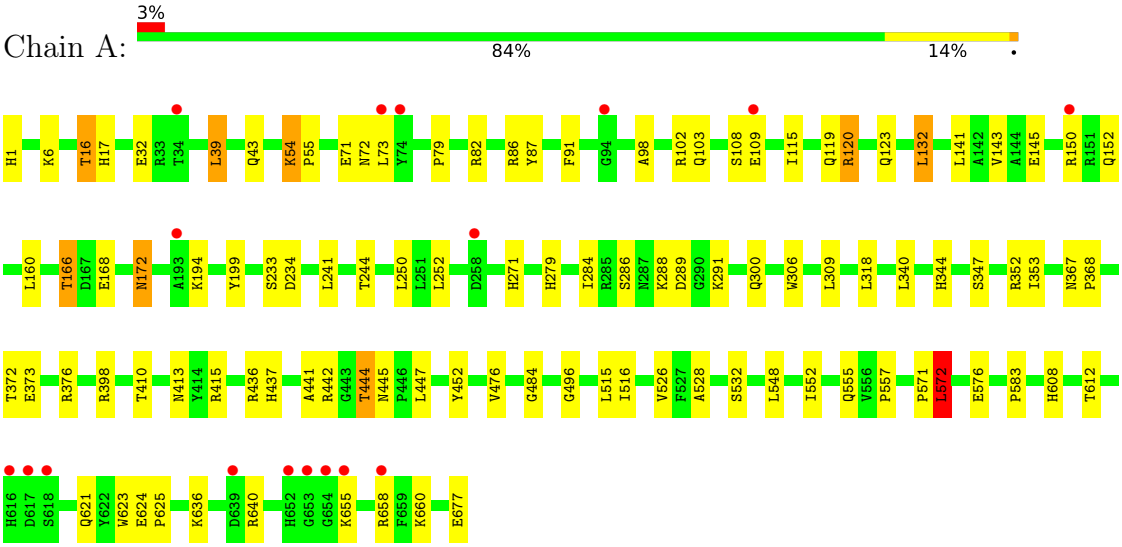
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	328	Total O 328 328	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 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: Oligopeptidase B



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	73.32Å 101.10Å 108.76Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.98 – 2.30 19.98 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.7 (19.98-2.30) 99.9 (19.98-2.30)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.68 (at 2.30Å)	Xtriage
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.188 , 0.234 0.195 , 0.237	Depositor DCC
R_{free} test set	1825 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	26.2	Xtriage
Anisotropy	0.084	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 30.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	6017	wwPDB-VP
Average B, all atoms (Å^2)	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.21% 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: SPM, TCK

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	0.67	0/5717	0.87	2/7771 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	398	ARG	NE-CZ-NH1	-5.09	117.75	120.30
1	A	436	ARG	NE-CZ-NH2	-5.06	117.77	120.30

There are no chirality outliers.

There are no planarity outliers.

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	5565	0	5275	51	0
2	A	84	0	156	5	0
3	A	40	0	38	2	0
4	A	328	0	0	5	0
All	All	6017	0	5469	57	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 5.

All (57) 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:132:LEU:CD2	1:A:141:LEU:HD11	1.85	1.05
3:A:904:TCK:CM	3:A:904:TCK:O2S	2.06	1.04
1:A:166:THR:HG23	1:A:168:GLU:OE2	1.67	0.95
1:A:516:ILE:HD11	1:A:526:VAL:HG21	1.54	0.89
1:A:441:ALA:O	1:A:444:THR:HB	1.78	0.83
2:A:906:SPM:HN41	2:A:908:SPM:H131	1.45	0.81
1:A:367:ASN:HD21	1:A:376:ARG:H	1.31	0.79
1:A:166:THR:CG2	1:A:168:GLU:OE2	2.33	0.75
2:A:906:SPM:HN41	2:A:908:SPM:C13	2.04	0.70
1:A:624:GLU:HB2	1:A:625:PRO:HD3	1.74	0.69
1:A:571:PRO:O	1:A:572:LEU:HB2	1.92	0.68
1:A:132:LEU:HD21	1:A:141:LEU:HD11	1.80	0.62
1:A:132:LEU:HD23	1:A:141:LEU:HD11	1.77	0.62
1:A:271:HIS:HE1	1:A:286:SER:OG	1.82	0.62
1:A:115:ILE:HD11	1:A:120:ARG:HD2	1.81	0.61
1:A:120:ARG:HD3	1:A:145:GLU:OE1	2.03	0.58
1:A:441:ALA:H	1:A:445:ASN:HD21	1.49	0.58
1:A:132:LEU:HD22	1:A:141:LEU:HD11	1.78	0.57
1:A:447:LEU:HD12	1:A:476:VAL:HB	1.86	0.56
2:A:907:SPM:H92	2:A:907:SPM:N14	2.23	0.53
1:A:82:ARG:HG3	1:A:368:PRO:HB2	1.91	0.52
1:A:271:HIS:CE1	1:A:286:SER:OG	2.64	0.51
1:A:572:LEU:O	1:A:576:GLU:HG2	2.11	0.51
1:A:39:LEU:HD22	1:A:43:GLN:NE2	2.27	0.50
1:A:233:SER:O	1:A:234:ASP:HB2	2.13	0.49
1:A:86:ARG:HD2	1:A:103:GLN:HE21	1.78	0.49
1:A:410:THR:HB	1:A:413:ASN:ND2	2.29	0.48
1:A:340:LEU:HB2	1:A:353:ILE:HG12	1.96	0.48
1:A:120:ARG:CD	1:A:145:GLU:OE1	2.62	0.47
1:A:16:THR:CG2	4:A:1144:HOH:O	2.63	0.47
1:A:115:ILE:CD1	1:A:143:VAL:HG11	2.45	0.47
1:A:279:HIS:HE1	4:A:1055:HOH:O	1.99	0.46
1:A:17:HIS:HE1	1:A:583:PRO:O	1.99	0.46
1:A:79:PRO:HA	1:A:87:TYR:O	2.16	0.46
1:A:621:GLN:HG3	1:A:623:TRP:CH2	2.51	0.46
1:A:452:TYR:OH	3:A:904:TCK:O	2.23	0.45
1:A:279:HIS:HD2	4:A:1188:HOH:O	2.00	0.45
1:A:415:ARG:HD2	1:A:437:HIS:HB2	1.99	0.45
1:A:91:PHE:CZ	1:A:98:ALA:HB2	2.52	0.44
1:A:555:GLN:HA	1:A:612:THR:OG1	2.17	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:621:GLN:HB3	1:A:623:TRP:CZ3	2.52	0.44
1:A:608:HIS:ND1	1:A:640:ARG:HB3	2.32	0.43
1:A:16:THR:HG23	4:A:1144:HOH:O	2.18	0.43
1:A:54:LYS:N	1:A:55:PRO:CD	2.81	0.43
1:A:528:ALA:HB3	1:A:552:ILE:HD13	2.00	0.43
1:A:284:ILE:HG21	1:A:306:TRP:CH2	2.53	0.43
2:A:906:SPM:C12	2:A:908:SPM:H112	2.48	0.43
2:A:906:SPM:H122	2:A:908:SPM:H112	2.01	0.43
1:A:557:PRO:HD2	1:A:625:PRO:HG3	2.01	0.42
1:A:86:ARG:O	1:A:102:ARG:HA	2.19	0.41
1:A:152:GLN:OE1	1:A:172[A]:ASN:ND2	2.53	0.41
1:A:344:HIS:HD2	1:A:347:SER:H	1.69	0.41
1:A:344:HIS:HE1	4:A:1062:HOH:O	2.03	0.41
1:A:288:LYS:NZ	1:A:289:ASP:OD2	2.54	0.41
1:A:115:ILE:HD13	1:A:143:VAL:HG11	2.04	0.40
1:A:484:GLY:N	1:A:496:GLY:HA3	2.36	0.40
1:A:608:HIS:CE1	1:A:640:ARG:HG2	2.57	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	678/677 (100%)	652 (96%)	24 (4%)	2 (0%)	41 50

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	194	LYS
1	A	572	LEU

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	594/591 (100%)	549 (92%)	45 (8%)	13 16

All (45) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	HIS
1	A	6	LYS
1	A	16	THR
1	A	32	GLU
1	A	39	LEU
1	A	54	LYS
1	A	71[A]	GLU
1	A	71[B]	GLU
1	A	72	ASN
1	A	73	LEU
1	A	108	SER
1	A	109	GLU
1	A	119[A]	GLN
1	A	119[B]	GLN
1	A	120	ARG
1	A	123	GLN
1	A	132	LEU
1	A	150	ARG
1	A	160	LEU
1	A	166	THR
1	A	172[A]	ASN
1	A	172[B]	ASN
1	A	199	TYR
1	A	241	LEU
1	A	244	THR
1	A	250	LEU
1	A	252	LEU
1	A	291	LYS
1	A	300	GLN
1	A	309	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	318	LEU
1	A	352	ARG
1	A	372	THR
1	A	373	GLU
1	A	442	ARG
1	A	444	THR
1	A	515	LEU
1	A	532	SER
1	A	548	LEU
1	A	572	LEU
1	A	636	LYS
1	A	655	LYS
1	A	658	ARG
1	A	660	LYS
1	A	677	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1	HIS
1	A	17	HIS
1	A	37	GLN
1	A	83	HIS
1	A	103	GLN
1	A	181	ASN
1	A	220	GLN
1	A	271	HIS
1	A	279	HIS
1	A	280	GLN
1	A	344	HIS
1	A	367	ASN
1	A	445	ASN
1	A	518	GLN
1	A	585	GLN

5.3.3 RNA

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)

8 ligands are 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	SPM	A	908	-	13,13,13	0.16	0	12,12,12	0.35	0
2	SPM	A	906	-	13,13,13	0.20	0	12,12,12	0.26	0
3	TCK	A	905	1	20,20,21	2.19	1 (5%)	23,27,28	2.59	5 (21%)
3	TCK	A	904	1	20,20,21	2.20	1 (5%)	23,27,28	5.62	9 (39%)
2	SPM	A	903	-	13,13,13	0.12	0	12,12,12	0.34	0
2	SPM	A	907	-	13,13,13	0.16	0	12,12,12	0.19	0
2	SPM	A	902	-	13,13,13	0.38	0	12,12,12	0.60	0
2	SPM	A	901	-	13,13,13	0.22	0	12,12,12	0.39	0

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	SPM	A	908	-	-	3/11/11/11	-
2	SPM	A	906	-	-	6/11/11/11	-
3	TCK	A	905	1	-	8/19/20/22	0/1/1/1
3	TCK	A	904	1	-	3/19/20/22	0/1/1/1
2	SPM	A	903	-	-	6/11/11/11	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	SPM	A	907	-	-	4/11/11/11	-
2	SPM	A	902	-	-	8/11/11/11	-
2	SPM	A	901	-	-	5/11/11/11	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	904	TCK	C1-S	-9.39	1.61	1.76
3	A	905	TCK	C1-S	-9.27	1.62	1.76

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	904	TCK	C1-S-N	-15.17	86.78	107.78
3	A	904	TCK	O1S-S-N	-12.32	84.57	106.88
3	A	904	TCK	O1S-S-C1	10.98	121.49	107.97
3	A	904	TCK	O2S-S-N	-10.46	87.94	106.88
3	A	905	TCK	O2S-S-O1S	-9.60	107.75	119.55
3	A	904	TCK	O2S-S-C1	7.49	117.19	107.97
3	A	904	TCK	C2-C1-S	4.79	124.98	119.77
3	A	905	TCK	O-C-CM	-3.56	114.82	121.15
3	A	905	TCK	C1-S-N	3.25	112.28	107.78
3	A	905	TCK	CB-CA-N	3.14	115.98	110.21
3	A	904	TCK	C6-C1-S	-3.12	116.38	119.77
3	A	904	TCK	CA-N-S	2.94	127.75	121.33
3	A	905	TCK	O1S-S-C1	2.60	111.17	107.97
3	A	904	TCK	CB-CA-N	-2.40	105.81	110.21

There are no chirality outliers.

All (43) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	904	TCK	CA-N-S-C1
3	A	904	TCK	C-CA-N-S
3	A	905	TCK	O-C-CA-CB
3	A	905	TCK	CM-C-CA-CB
3	A	905	TCK	N-CA-CB-CG
2	A	901	SPM	N5-C6-C7-C8
2	A	902	SPM	C7-C8-C9-N10
2	A	903	SPM	C2-C3-C4-N5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
2	A	902	SPM	N10-C11-C12-C13
2	A	902	SPM	C3-C4-N5-C6
2	A	902	SPM	C2-C3-C4-N5
2	A	903	SPM	N5-C6-C7-C8
2	A	901	SPM	C8-C9-N10-C11
2	A	903	SPM	C7-C6-N5-C4
3	A	904	TCK	CA-CB-CG-CD
2	A	906	SPM	C6-C7-C8-C9
3	A	905	TCK	C-CA-CB-CG
2	A	902	SPM	C6-C7-C8-C9
2	A	906	SPM	N5-C6-C7-C8
3	A	905	TCK	CA-CB-CG-CD
3	A	905	TCK	CA-N-S-O1S
2	A	907	SPM	C7-C8-C9-N10
2	A	902	SPM	C8-C9-N10-C11
2	A	901	SPM	N1-C2-C3-C4
2	A	907	SPM	C11-C12-C13-N14
2	A	901	SPM	C6-C7-C8-C9
2	A	908	SPM	C7-C6-N5-C4
3	A	905	TCK	CE-CD-CG-CB
2	A	906	SPM	C7-C8-C9-N10
2	A	903	SPM	C3-C4-N5-C6
2	A	903	SPM	C7-C8-C9-N10
2	A	906	SPM	N1-C2-C3-C4
2	A	908	SPM	C11-C12-C13-N14
2	A	902	SPM	N5-C6-C7-C8
3	A	905	TCK	CG-CD-CE-NZ
2	A	907	SPM	C3-C4-N5-C6
2	A	903	SPM	C12-C11-N10-C9
2	A	906	SPM	C3-C4-N5-C6
2	A	906	SPM	C12-C11-N10-C9
2	A	901	SPM	C11-C12-C13-N14
2	A	902	SPM	C11-C12-C13-N14
2	A	907	SPM	C8-C9-N10-C11
2	A	908	SPM	C12-C11-N10-C9

There are no ring outliers.

4 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	908	SPM	4	0
2	A	906	SPM	4	0

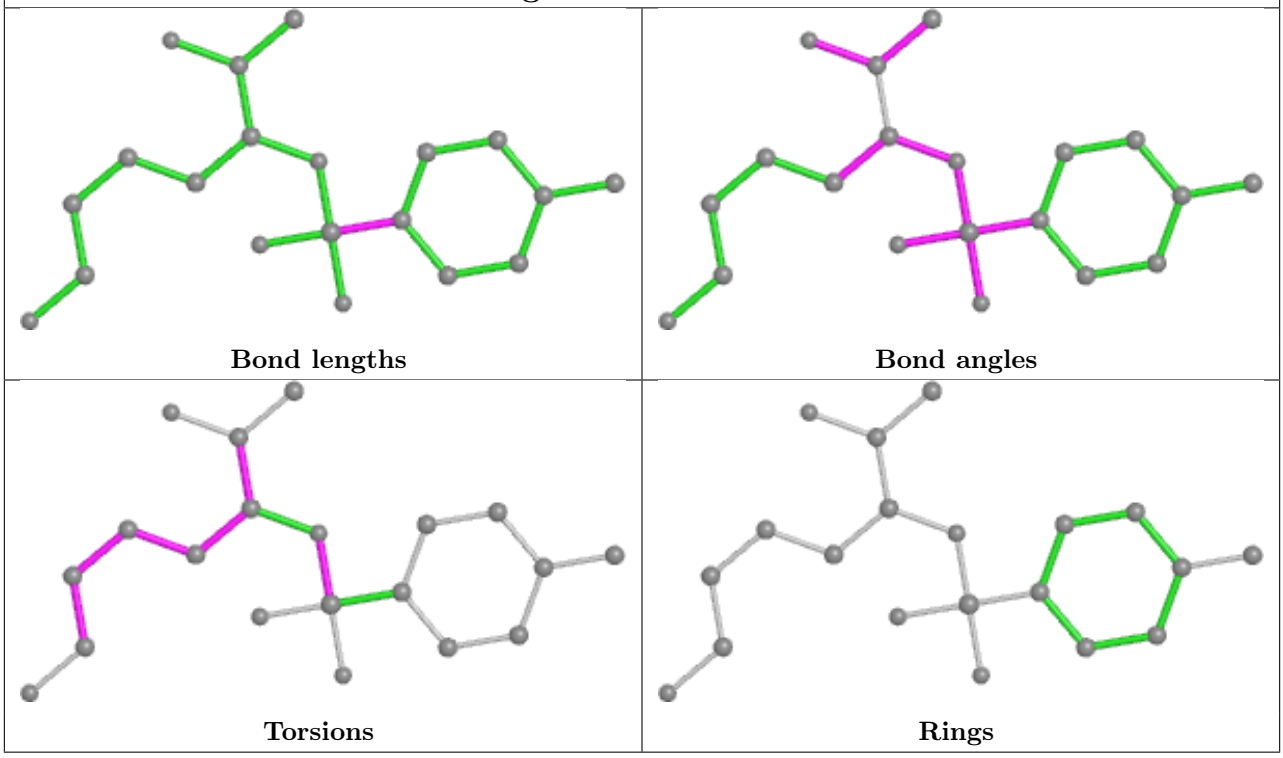
Continued on next page...

Continued from previous page...

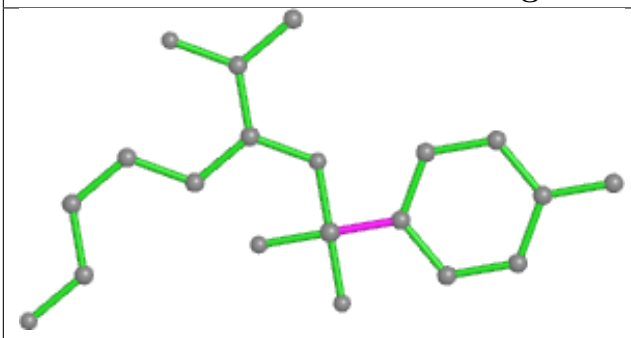
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	904	TCK	2	0
2	A	907	SPM	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

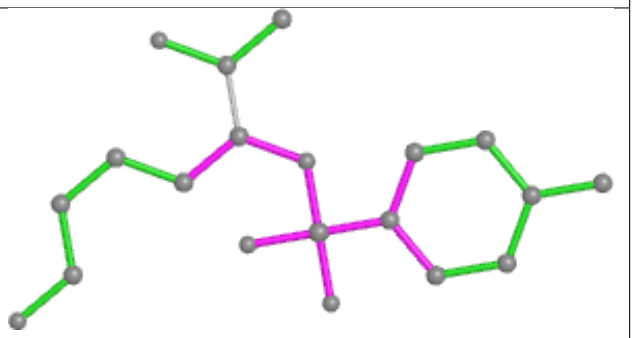
Ligand TCK A 905



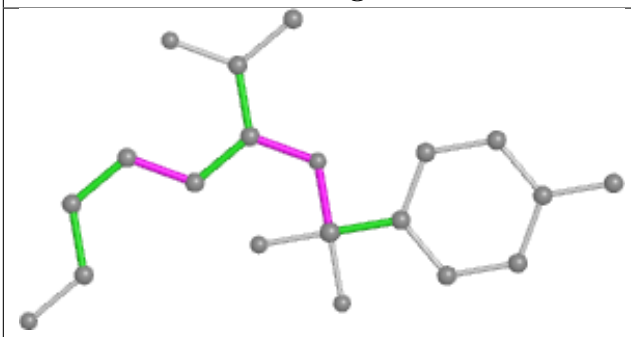
Ligand TCK A 904



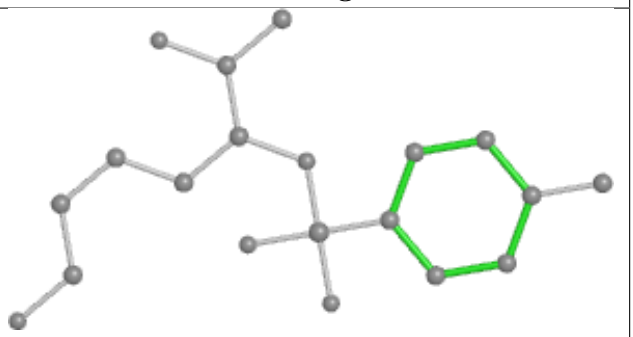
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

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	677/677 (100%)	-0.30	17 (2%) 57 64	14, 25, 54, 105	0

All (17) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	74	TYR	4.5
1	A	617	ASP	4.1
1	A	655	LYS	4.1
1	A	652	HIS	3.9
1	A	618	SER	3.2
1	A	658	ARG	3.1
1	A	94	GLY	2.8
1	A	616	HIS	2.7
1	A	639	ASP	2.7
1	A	653	GLY	2.7
1	A	150	ARG	2.5
1	A	193	ALA	2.4
1	A	73	LEU	2.3
1	A	34	THR	2.2
1	A	258	ASP	2.2
1	A	109	GLU	2.1
1	A	654	GLY	2.0

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 (i)

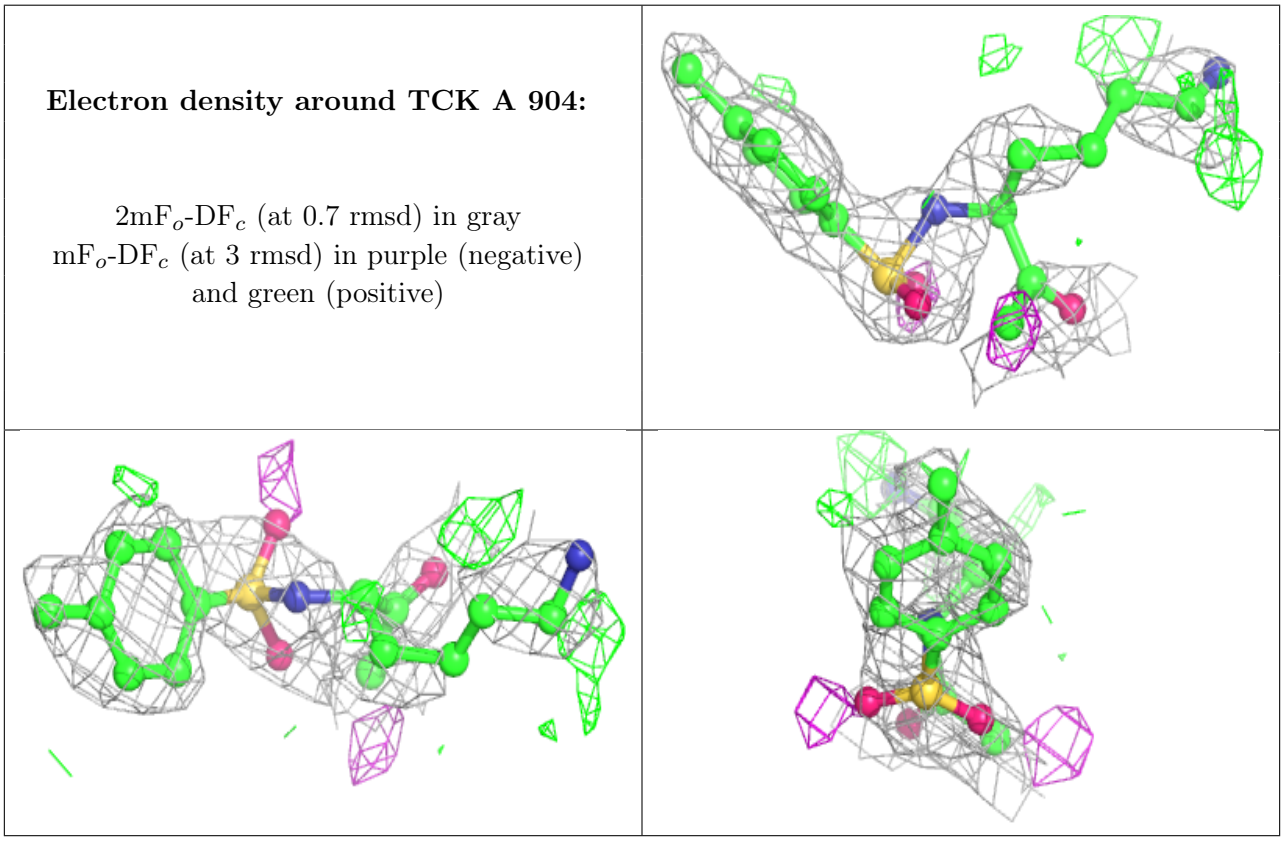
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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
2	SPM	A	906	14/14	0.45	0.37	35,70,82,83	14
2	SPM	A	908	14/14	0.51	0.40	42,44,47,48	14
2	SPM	A	907	14/14	0.65	0.28	49,52,65,67	14
2	SPM	A	901	14/14	0.72	0.19	31,35,57,60	14
3	TCK	A	904	20/21	0.76	0.29	23,30,32,35	20
3	TCK	A	905	20/21	0.80	0.28	34,41,54,62	20
2	SPM	A	903	14/14	0.81	0.18	40,43,46,48	0
2	SPM	A	902	14/14	0.85	0.14	28,35,38,40	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.

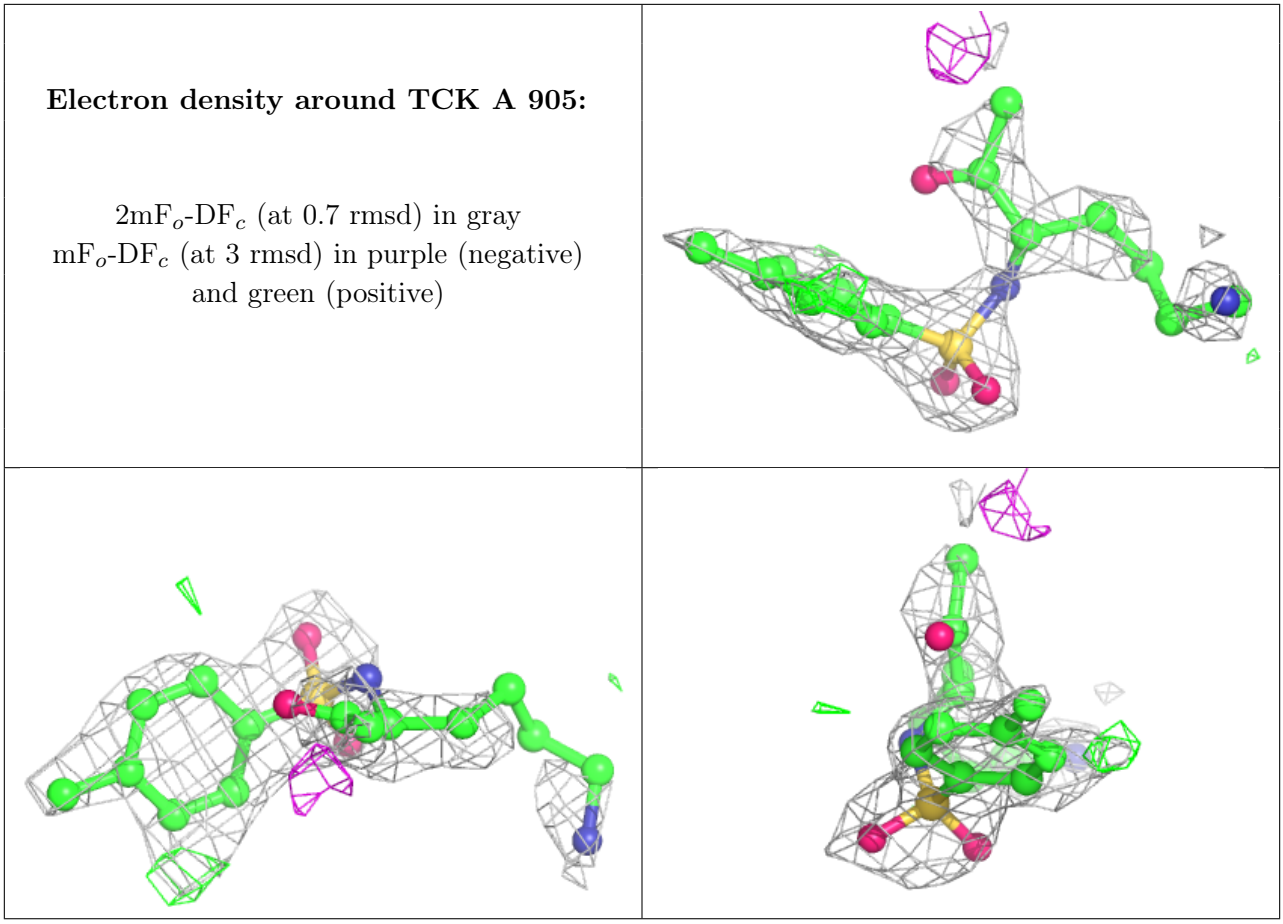
Electron density around TCK A 904:

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



Electron density around TCK A 905:

$2mF_o$-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 (i)

There are no such residues in this entry.