



Full wwPDB X-ray Structure Validation Report

Feb 27, 2014 – 07:23 AM GMT

PDB ID : 3O64
Title : Crystal structure of catalytic domain of TACE with 2-(2-Aminothiazol-4-yl)pyrrolidine-Based Tartrate Diamides
Authors : Orth, P.
Deposited on : 2010-07-28
Resolution : 1.88 Å (reported)

This is a full wwPDB validation report for a publicly released PDB entry.
We welcome your comments at validation@mail.wwpdb.org
A user guide is available at <http://wwpdb.org/ValidationPDFNotes.html>

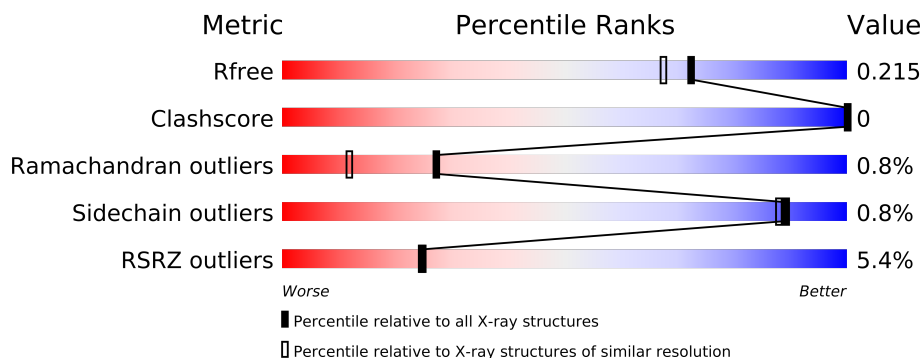
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity	:	4.02b-467
Mogul	:	1.15 2013
Xtriage (Phenix)	:	dev-1323
EDS	:	stable22639
Percentile statistics	:	21963
Refmac	:	5.8.0049
CCP4	:	6.3.0 (Settle)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP)	:	stable22683

1 Overall quality at a glance



The reported resolution of this entry is 1.88 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}	66092	5260 (1.90-1.86)
Clashscore	79885	6268 (1.90-1.86)
Ramachandran outliers	78287	6195 (1.90-1.86)
Sidechain outliers	78261	6196 (1.90-1.86)
RSRZ outliers	66119	5262 (1.90-1.86)

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 ≥ 3 , 2, 1 and 0 types of geometric quality criteria. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	270	
1	B	270	

The following table lists non-polymeric compounds that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Geometry	Electron density
2	IPA	B	502	-	X
2	IPA	B	503	-	X
2	IPA	B	505	-	X
5	CA	A	504	-	X

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 4250 atoms, of which 0 are hydrogen and 0 are deuterium.

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.

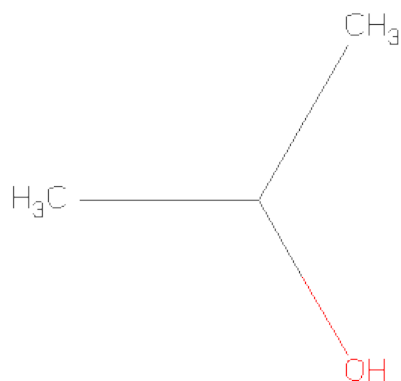
- Molecule 1 is a protein called TACE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	252	Total	C	N	O	S	0	0	0
			1961	1236	330	382	13			
1	B	253	Total	C	N	O	S	0	1	0
			1911	1209	320	369	13			

There are 22 discrepancies between the modelled and reference sequences:

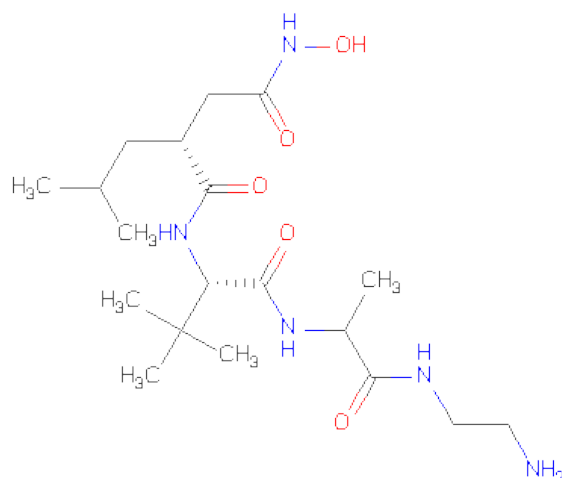
Chain	Residue	Modelled	Actual	Comment	Reference
A	266	ALA	SER	ENGINEERED MUTATION	UNP P78536
A	353	GLY	VAL	ENGINEERED MUTATION	UNP P78536
A	452	GLN	ASN	ENGINEERED MUTATION	UNP P78536
A	477	GLY	-	EXPRESSION TAG	UNP P78536
A	478	SER	-	EXPRESSION TAG	UNP P78536
A	479	HIS	-	EXPRESSION TAG	UNP P78536
A	480	HIS	-	EXPRESSION TAG	UNP P78536
A	481	HIS	-	EXPRESSION TAG	UNP P78536
A	482	HIS	-	EXPRESSION TAG	UNP P78536
A	483	HIS	-	EXPRESSION TAG	UNP P78536
A	484	HIS	-	EXPRESSION TAG	UNP P78536
B	266	ALA	SER	ENGINEERED MUTATION	UNP P78536
B	353	GLY	VAL	ENGINEERED MUTATION	UNP P78536
B	452	GLN	ASN	ENGINEERED MUTATION	UNP P78536
B	477	GLY	-	EXPRESSION TAG	UNP P78536
B	478	SER	-	EXPRESSION TAG	UNP P78536
B	479	HIS	-	EXPRESSION TAG	UNP P78536
B	480	HIS	-	EXPRESSION TAG	UNP P78536
B	481	HIS	-	EXPRESSION TAG	UNP P78536
B	482	HIS	-	EXPRESSION TAG	UNP P78536
B	483	HIS	-	EXPRESSION TAG	UNP P78536
B	484	HIS	-	EXPRESSION TAG	UNP P78536

- Molecule 2 is ISOPROPYL ALCOHOL (three-letter code: IPA) (formula: C₃H₈O).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			4	3	1		
2	B	1	Total	C	O	0	0
			4	3	1		
2	B	1	Total	C	O	0	0
			4	3	1		
2	B	1	Total	C	O	0	0
			4	3	1		
2	B	1	Total	C	O	0	0
			4	3	1		

- Molecule 3 is N-{(2R)-2-[2-(HYDROXYAMINO)-2-OXOETHYL]-4-METHYLPENTANOYL}-3-METHYL-L-VALYL-N-(2-AMINOETHYL)-L-ALANINAMIDE (three-letter code: INN) (formula: C₁₉H₃₇N₅O₅).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	1
			29	19	5	5		

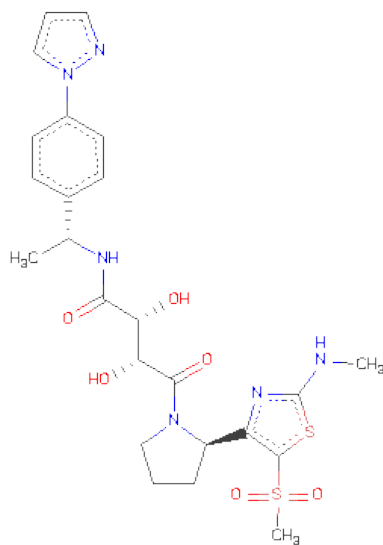
- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	1	Total	Zn	0	0
			1	1		
4	A	1	Total	Zn	0	0
			1	1		

- Molecule 5 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Ca	0	0
			1	1		

- Molecule 6 is (2R,3R)-2,3-DIHYDROXY-4-[(2R)-2-[2-(METHYLAMINO)-5-(METHYLSULFONYL)-1,3-THIAZOL-4-YL]PYRROLIDIN-1-YL]-4-OXO-N-[(1R)-1-[4-(1H-PYRAZOL-1-YL)PHENYL]ETHYL]BUTANAMIDE (three-letter code: 786) (formula: C₂₄H₃₀N₆O₆S₂).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	B	1	Total	C	N	O	S	0	0
			38	24	6	6	2		

- Molecule 7 is water.

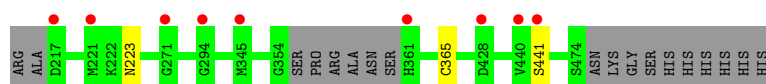
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	166	Total	O	0	0
			166	166		
7	B	122	Total	O	0	0
			122	122		

3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

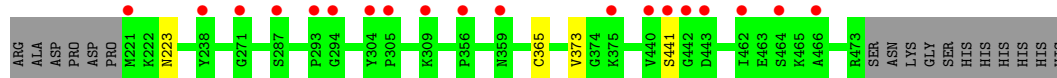
• Molecule 1: TACE

Chain A: 



• Molecule 1: TACE

Chain B: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	74.45Å 76.51Å 103.87Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.50 – 1.88 19.36 – 1.88	Depositor EDS
% Data completeness (in resolution range)	99.6 (19.50-1.88) 99.6 (19.36-1.88)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.04 (at 1.87Å)	Xtriage
Refinement program	BUSTER 2.9.4	Depositor
R, R_{free}	0.188 , 0.218 0.191 , 0.215	Depositor DCC
R_{free} test set	943 reflections (1.97%)	DCC
Wilson B-factor (Å ²)	27.1	Xtriage
Anisotropy	0.137	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 51.9	EDS
Estimated twinning fraction	0.013 for k,h,-l	Xtriage
L-test for twinning	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Outliers	0 of 48697 reflections	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	4250	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.08% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, INN, 786, IPA, CA

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	0.44	0/2005	0.60	0/2710
1	B	0.43	0/1961	0.63	0/2662
All	All	0.43	0/3966	0.61	0/5372

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1961	0	0	0	0
1	B	1911	0	0	0	0
2	A	4	0	0	0	0
2	B	16	0	0	0	0
3	A	29	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
5	A	1	0	0	0	0
6	B	38	0	0	0	0
7	A	166	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	B	122	0	0	0	0
All	All	4250	0	0	0	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 0.

There are no clashes within the asymmetric unit.

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone ⓘ

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	248/270 (92%)	240 (97%)	6 (2%)	2 (1%)	27	12
1	B	252/270 (93%)	243 (96%)	7 (3%)	2 (1%)	27	12
All	All	500/540 (93%)	483 (97%)	13 (3%)	4 (1%)	27	12

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	441	SER
1	B	441	SER
1	A	365	CYS
1	B	365	CYS

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.

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	204/230 (89%)	203 (100%)	1 (0%)	94	93
1	B	191/230 (83%)	189 (99%)	2 (1%)	85	83
All	All	395/460 (86%)	392 (99%)	3 (1%)	89	88

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	223	ASN
1	B	223	ASN
1	B	373	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA ⓘ

There are no RNA chains 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 10 ligands modelled in this entry, 3 are monoatomic - leaving 7 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
2	IPA	A	501	-	3,3,3	0.62	0	3,3,3	1.69	1 (33%)
3	INN	A	502[B]	4	28,28,28	2.10	5 (17%)	38,38,38	2.97	14 (36%)
6	786	B	501	4	41,41,41	1.79	11 (26%)	54,60,60	4.30	22 (40%)
2	IPA	B	502	-	3,3,3	0.61	0	3,3,3	1.39	1 (33%)
2	IPA	B	503	-	3,3,3	0.67	0	3,3,3	1.23	0
2	IPA	B	504	-	3,3,3	0.66	0	3,3,3	1.13	0
2	IPA	B	505	-	3,3,3	0.64	0	3,3,3	1.26	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	IPA	A	501	-	-	0/0/0/0	0/0/0/0
3	INN	A	502[B]	4	-	0/40/40/40	0/0/0/0
6	786	B	501	4	-	0/28/50/50	0/4/4/4
2	IPA	B	502	-	-	0/0/0/0	0/0/0/0
2	IPA	B	503	-	-	0/0/0/0	0/0/0/0
2	IPA	B	504	-	-	0/0/0/0	0/0/0/0
2	IPA	B	505	-	-	0/0/0/0	0/0/0/0

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	502[B]	INN	C0-C	-6.02	1.41	1.51
3	A	502[B]	INN	O3-C13	-5.20	1.13	1.23
3	A	502[B]	INN	O4-N	-4.84	1.31	1.39
6	B	501	786	C26-C25	3.85	1.47	1.37
6	B	501	786	N24-N22	3.52	1.43	1.36
6	B	501	786	C17-C16	3.48	1.45	1.39
6	B	501	786	O14-C9	3.46	1.49	1.42
6	B	501	786	C6-N2	-2.95	1.28	1.34
3	A	502[B]	INN	C6-C5	2.76	1.59	1.55
6	B	501	786	C9-C8	2.67	1.57	1.53
3	A	502[B]	INN	C11-C13	-2.62	1.45	1.52
6	B	501	786	C20-C21	2.40	1.43	1.38
6	B	501	786	C29-N32	2.21	1.38	1.35
6	B	501	786	C27-C26	-2.20	1.32	1.37
6	B	501	786	O7-C6	2.16	1.26	1.22
6	B	501	786	C21-C16	2.06	1.42	1.39

All (38) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	B	501	786	C3-C23-N28	17.85	122.88	120.66
6	B	501	786	C33-N32-C29	-16.17	108.69	122.85
3	A	502[B]	INN	O-C-N	9.36	134.73	123.47
6	B	501	786	C38-S35-C31	9.05	116.67	104.96
6	B	501	786	S30-C29-N28	-8.45	104.34	120.99
3	A	502[B]	INN	C0-C-N	-7.73	109.33	114.69
6	B	501	786	C4-C3-N2	6.49	109.33	101.74
3	A	502[B]	INN	O1-C4-CA	-6.40	115.18	121.89
6	B	501	786	C27-N22-N24	-4.78	108.77	111.93
6	B	501	786	C9-C8-C6	-4.72	103.06	110.19
3	A	502[B]	INN	O3-C13-C11	-4.50	109.80	120.42
6	B	501	786	O37-S35-O36	-4.49	107.66	117.70
3	A	502[B]	INN	C11-C13-N3	4.41	126.34	116.52
6	B	501	786	C4-C3-C23	-4.09	106.09	114.55
3	A	502[B]	INN	O-C-C0	-4.06	115.44	121.24
6	B	501	786	C19-N22-N24	3.97	122.36	118.87
6	B	501	786	C5-C1-N2	3.92	109.14	103.28
6	B	501	786	C25-N24-N22	3.68	106.33	103.70
3	A	502[B]	INN	CB-CA-C0	3.28	117.67	111.76
6	B	501	786	S30-C29-N32	3.24	123.86	121.80
3	A	502[B]	INN	C6-C5-N1	-3.15	109.26	112.29
6	B	501	786	O36-S35-C31	-3.14	103.64	108.11
3	A	502[B]	INN	C7-C6-C8	-3.00	102.83	108.77
3	A	502[B]	INN	C6-C5-C10	2.88	115.79	112.85
3	A	502[B]	INN	C0-CA-C4	-2.85	105.66	110.06
6	B	501	786	C1-N2-C3	-2.83	107.77	112.00
3	A	502[B]	INN	CB-CA-C4	2.74	114.20	109.31
6	B	501	786	C27-N22-C19	2.69	128.87	124.58
6	B	501	786	O14-C9-C8	-2.67	104.66	110.19
6	B	501	786	O36-S35-C38	2.61	113.03	108.62
6	B	501	786	O11-C8-C6	-2.59	104.42	108.53
2	A	501	IPA	O2-C2-C3	-2.55	92.24	110.60
3	A	502[B]	INN	O2-C10-C5	-2.49	117.21	121.05
6	B	501	786	C31-C23-N28	2.10	112.62	108.04
3	A	502[B]	INN	C7-C6-C5	2.09	114.04	109.85
2	B	502	IPA	O2-C2-C3	-2.09	95.56	110.60
6	B	501	786	N32-C29-N28	2.06	131.78	119.95
6	B	501	786	C17-C18-C19	2.02	121.39	119.29

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

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, 95th 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	252/270 (93%)	0.01	9 (3%) 41 41	18, 29, 56, 80	0
1	B	253/270 (93%)	0.32	19 (7%) 14 14	19, 40, 77, 108	0
All	All	505/540 (93%)	0.17	28 (5%) 25 24	18, 35, 65, 108	0

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	441	SER	4.7
1	A	217	ASP	4.5
1	B	356	PRO	4.3
1	B	441	SER	4.0
1	B	440	VAL	3.7
1	B	466	ALA	3.6
1	B	221	MET	3.3
1	A	361	HIS	3.3
1	B	359	ASN	3.1
1	B	294	GLY	2.9
1	A	345	MET	2.9
1	B	238	TYR	2.8
1	A	440	VAL	2.8
1	B	304	TYR	2.7
1	A	428	ASP	2.7
1	A	221	MET	2.6
1	B	442	GLY	2.6
1	B	287	SER	2.5
1	B	305	PRO	2.5
1	A	271	GLY	2.5
1	B	293	PRO	2.4
1	A	294	GLY	2.4
1	B	309	LYS	2.4
1	B	464	SER	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	271	GLY	2.3
1	B	443	ASP	2.2
1	B	375	LYS	2.2
1	B	462	ILE	2.1

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 carbohydrates in this entry.

6.4 Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95th 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	RSR	LLDF	B-factors(Å ²)	Q<0.9
2	IPA	B	503	4/4	0.24	5.66	64,66,66,66	0
2	IPA	B	502	4/4	0.20	4.46	57,58,58,58	0
5	CA	A	504	1/1	0.21	3.95	39,39,39,39	0
2	IPA	B	505	4/4	0.26	3.31	53,54,55,57	0
3	INN	A	502[B]	29/29	0.16	1.21	22,33,56,60	0
6	786	B	501	38/38	0.12	-0.08	22,28,52,55	0
2	IPA	A	501	4/4	0.10	-0.09	32,34,36,37	0
2	IPA	B	504	4/4	0.16	-0.16	57,57,57,58	0
4	ZN	A	503	1/1	0.05	-1.43	22,22,22,22	0
4	ZN	B	506	1/1	0.04	-3.05	24,24,24,24	0

6.5 Other polymers ⓘ

There are no such residues in this entry.