



wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 29, 2023 – 04:45 AM EDT

PDB ID : 3N2C
Title : Crystal structure of prolidase eah89906 complexed with n-methylphosphonat e-l-proline
Authors : Patskovsky, Y.; Xu, C.; Sauder, J.M.; Burley, S.K.; Raushel, F.M.; Almo, S.C.; New York SGX Research Center for Structural Genomics (NYSGXRC)
Deposited on : 2010-05-17
Resolution : 2.81 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtrriage (Phenix) : 1.13
EDS : 2.35
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) : 2.35

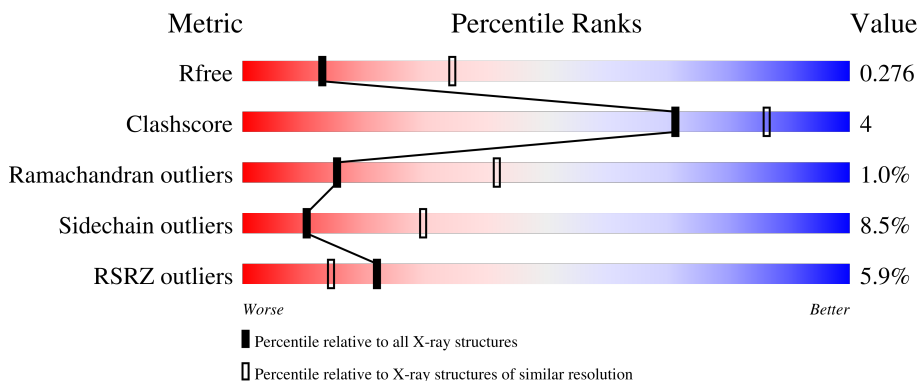
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.81 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	3617 (2.84-2.80)
Clashscore	141614	4060 (2.84-2.80)
Ramachandran outliers	138981	3978 (2.84-2.80)
Sidechain outliers	138945	3980 (2.84-2.80)
RSRZ outliers	127900	3552 (2.84-2.80)

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 $\leq 5\%$. 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	423	 2% 80% 14% . .
1	B	423	 % 82% 14% .
1	C	423	 4% 79% 16% . .
1	D	423	 % 83% 14% .
1	E	423	 3% 82% 14% .

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Mol	Chain	Length	Quality of chain
1	F	423	 2% 83% 12% . .
1	G	423	 5% 83% 14% .
1	H	423	 2% 83% 12% . .
1	I	423	 10% 81% 14% . .
1	J	423	 12% 82% 14% .
1	K	423	 8% 80% 14% . .
1	L	423	 12% 81% 15% . .
1	M	423	 9% 82% 13% . .
1	N	423	 8% 77% 18% . .
1	O	423	 6% 81% 14% . .
1	P	423	 5% 81% 14% . .

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 48752 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.

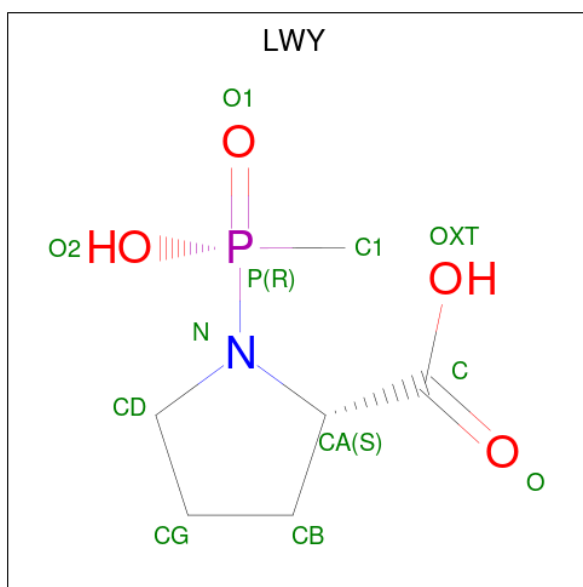
- Molecule 1 is a protein called PROLIDASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	408	3033	1887	549	582	15	0	0	0
1	B	408	3033	1887	549	582	15	0	0	0
1	C	408	3033	1887	549	582	15	0	0	0
1	D	408	3033	1887	549	582	15	0	0	0
1	E	408	3033	1887	549	582	15	0	0	0
1	F	408	3033	1887	549	582	15	0	0	0
1	G	408	3033	1887	549	582	15	0	0	0
1	H	408	3033	1887	549	582	15	0	0	0
1	I	408	3033	1887	549	582	15	0	0	0
1	J	408	3033	1887	549	582	15	0	0	0
1	K	408	3033	1887	549	582	15	0	0	0
1	L	408	3033	1887	549	582	15	0	0	0
1	M	408	3033	1887	549	582	15	0	0	0
1	N	408	3033	1887	549	582	15	0	0	0
1	O	408	3033	1887	549	582	15	0	0	0
1	P	408	3033	1887	549	582	15	0	0	0

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total 2	Zn 2	0	0
2	B	2	Total 2	Zn 2	0	0
2	C	2	Total 2	Zn 2	0	0
2	D	2	Total 2	Zn 2	0	0
2	E	2	Total 2	Zn 2	0	0
2	F	2	Total 2	Zn 2	0	0
2	G	2	Total 2	Zn 2	0	0
2	H	2	Total 2	Zn 2	0	0
2	I	2	Total 2	Zn 2	0	0
2	J	2	Total 2	Zn 2	0	0
2	K	2	Total 2	Zn 2	0	0
2	L	2	Total 2	Zn 2	0	0
2	M	2	Total 2	Zn 2	0	0
2	N	2	Total 2	Zn 2	0	0
2	O	2	Total 2	Zn 2	0	0
2	P	2	Total 2	Zn 2	0	0

- Molecule 3 is 1-[(R)-hydroxy(methyl)phosphoryl]-L-proline (three-letter code: LWY) (formula: C₆H₁₂NO₄P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	B	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	C	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	D	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	E	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	F	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	G	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	H	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	I	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	J	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	K	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	L	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	M	1	Total 12	C 6	N 1	O 4	P 1	0	0
3	N	1	Total 12	C 6	N 1	O 4	P 1	0	0

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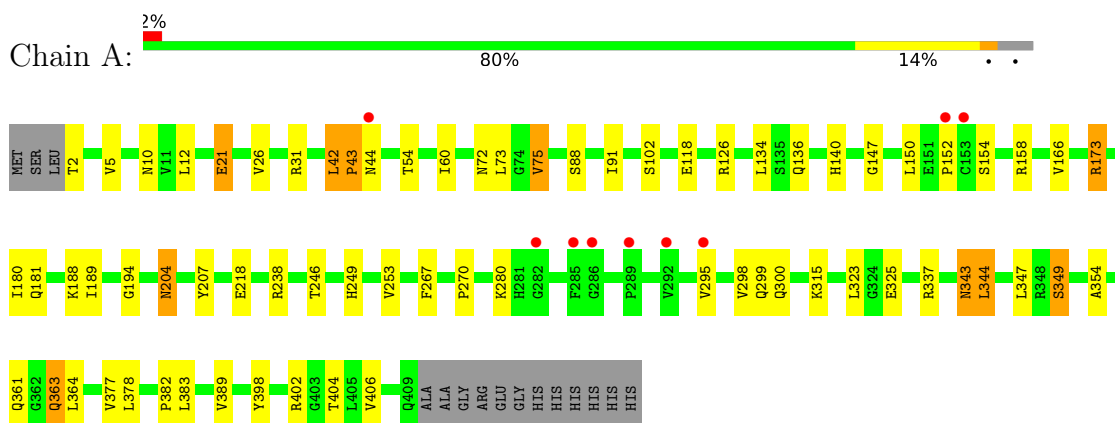
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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	O	1	Total	C	N	O	P	0	0
			12	6	1	4	1		
3	P	1	Total	C	N	O	P	0	0
			12	6	1	4	1		

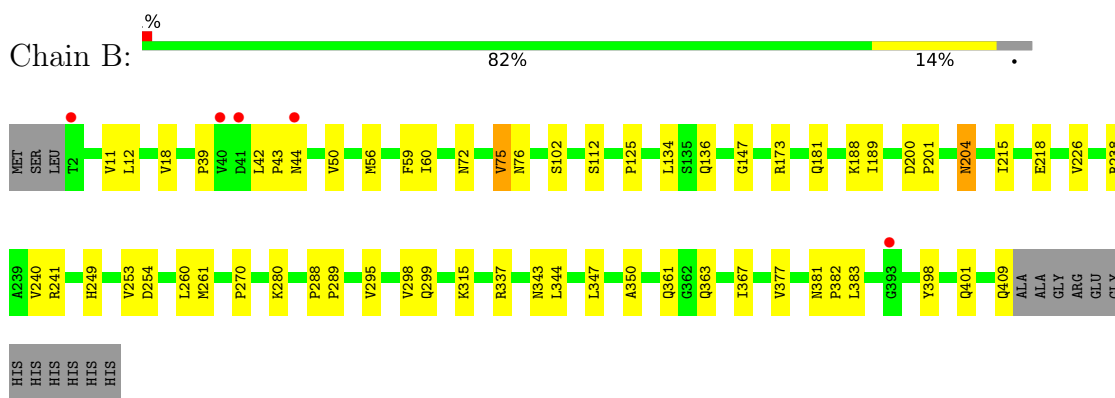
3 Residue-property plots [i](#)

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.

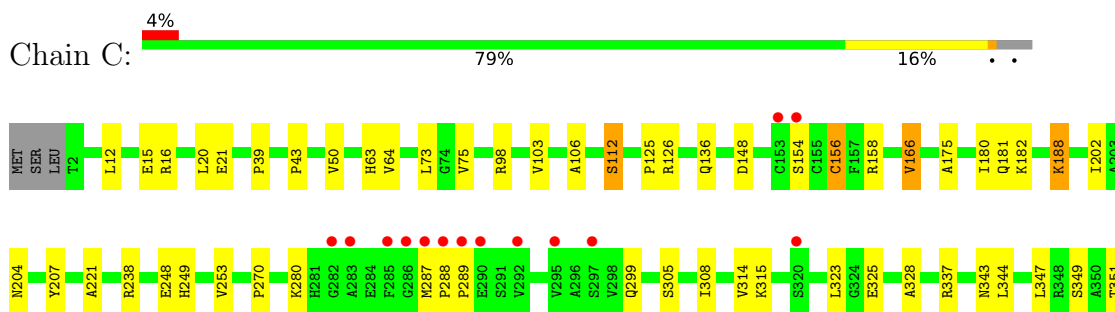
• Molecule 1: PROLIDASE



• Molecule 1: PROLIDASE

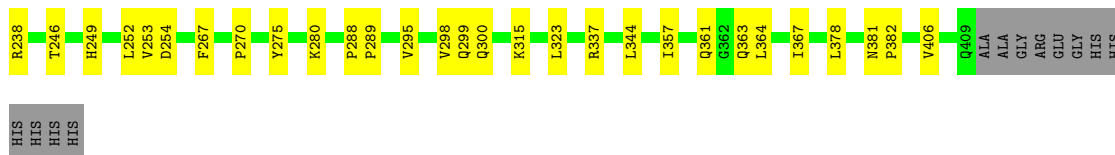
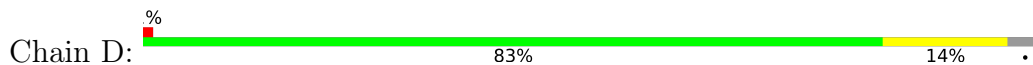


• Molecule 1: PROLIDASE

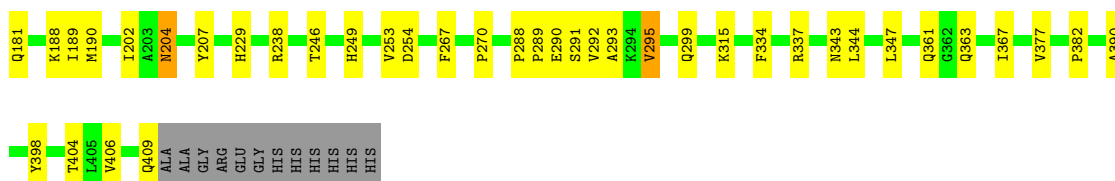
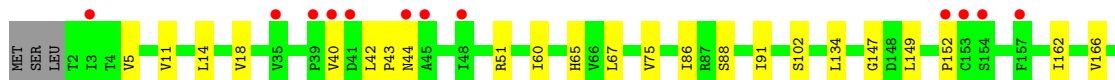
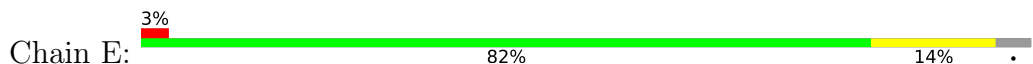




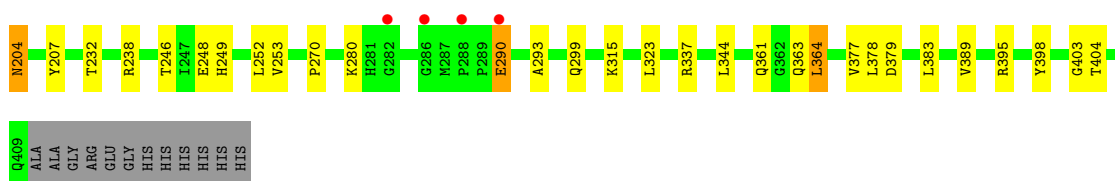
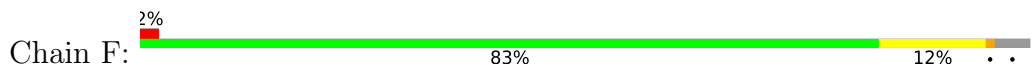
• Molecule 1: PROLIDASE



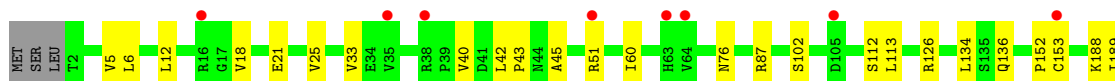
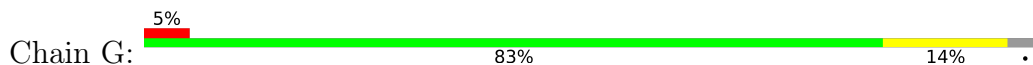
• Molecule 1: PROLIDASE

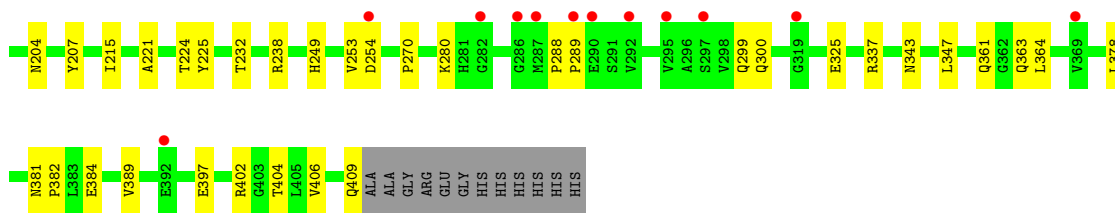


• Molecule 1: PROLIDASE

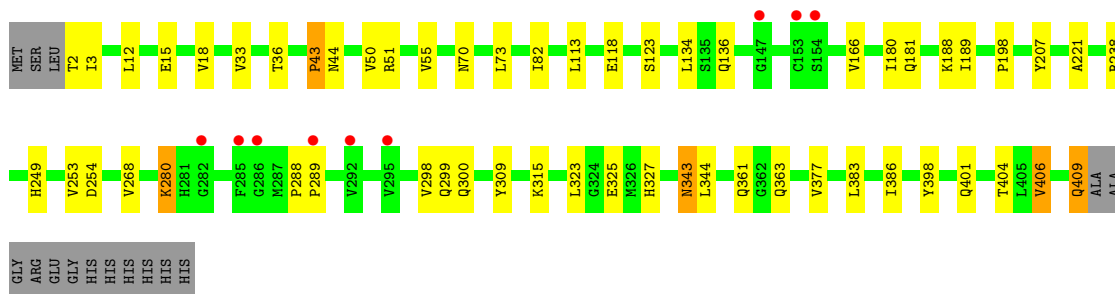
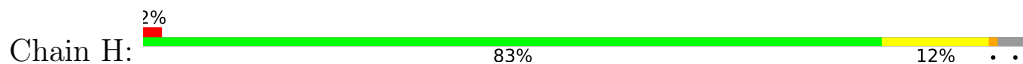


• Molecule 1: PROLIDASE

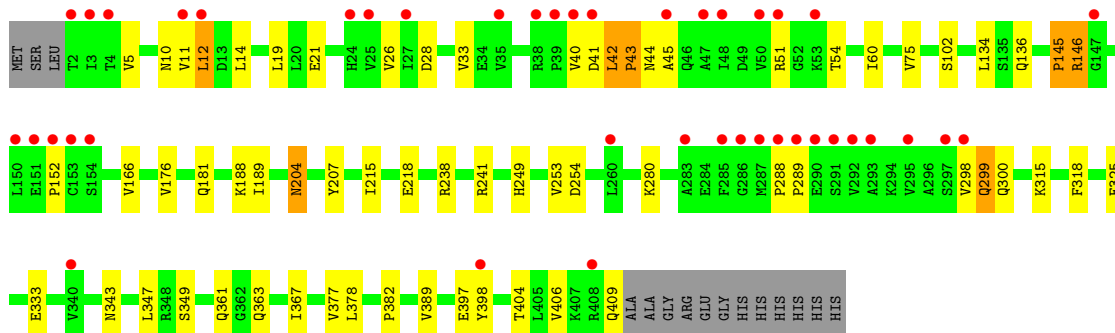
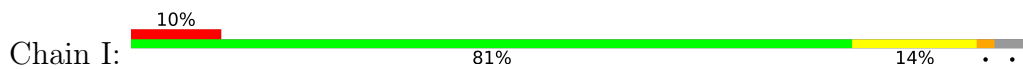




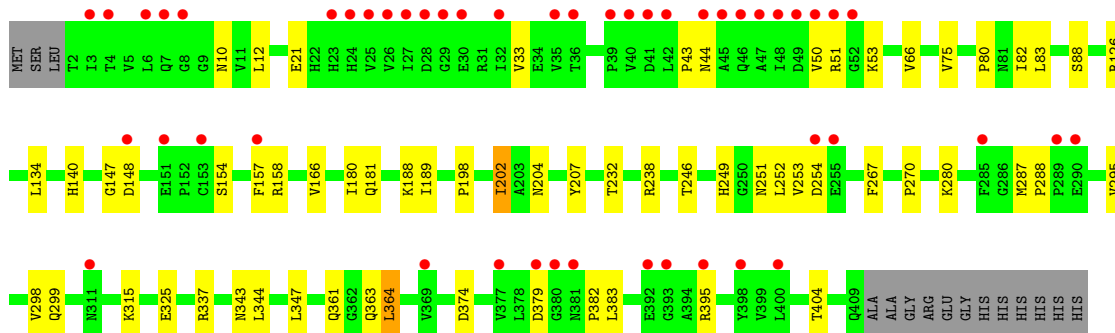
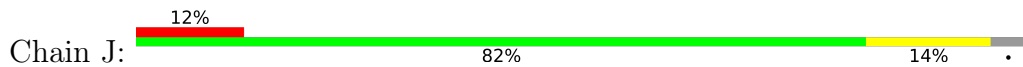
- Molecule 1: PROLIDASE



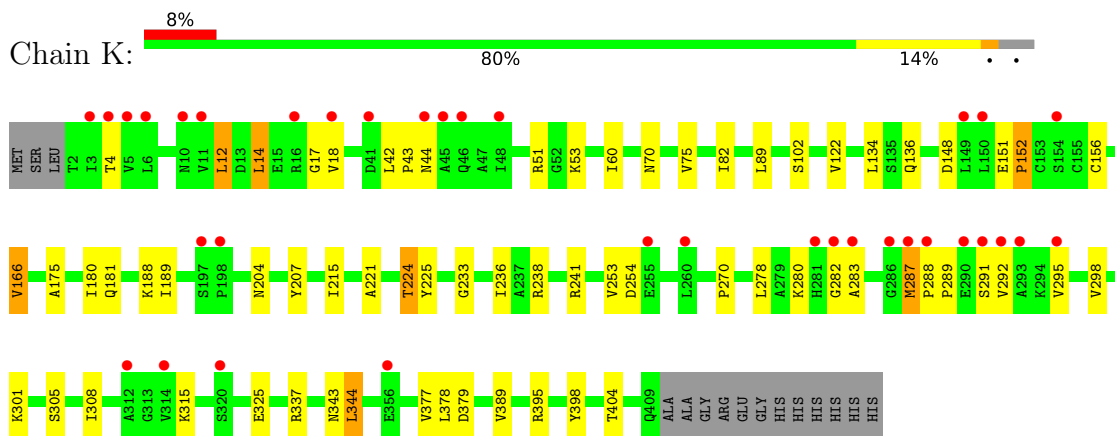
- Molecule 1: PROLIDASE



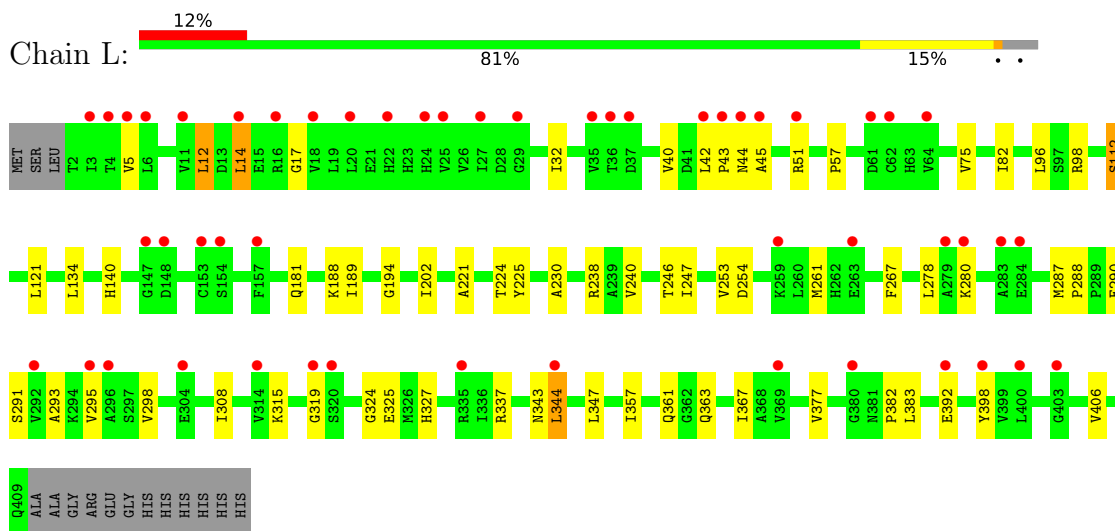
- Molecule 1: PROLIDASE



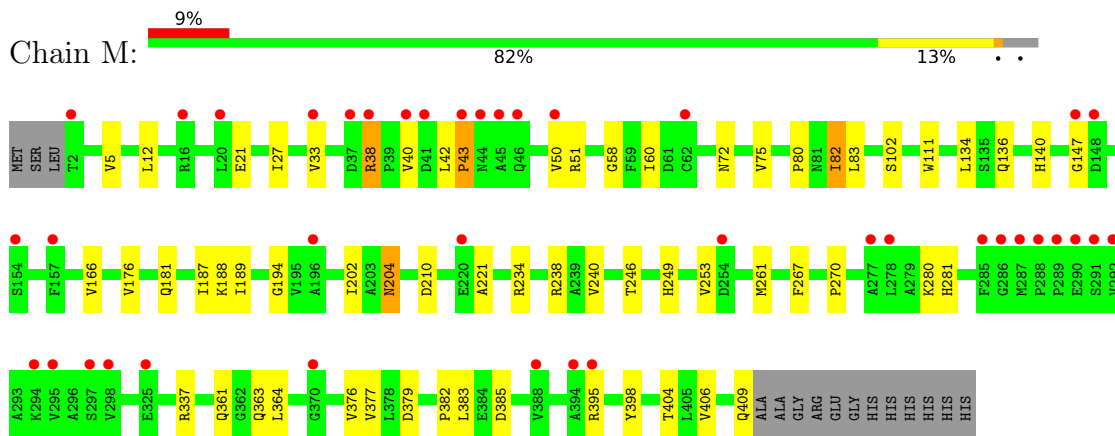
- Molecule 1: PROLIDASE



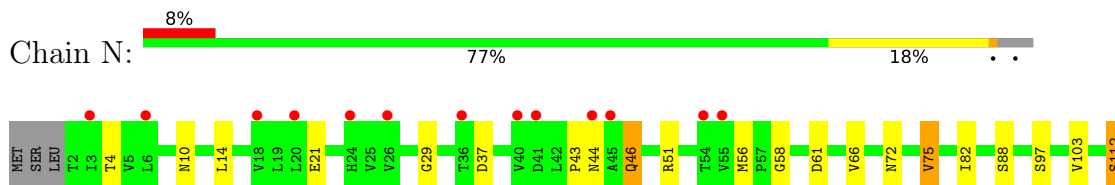
- Molecule 1: PROLIDASE

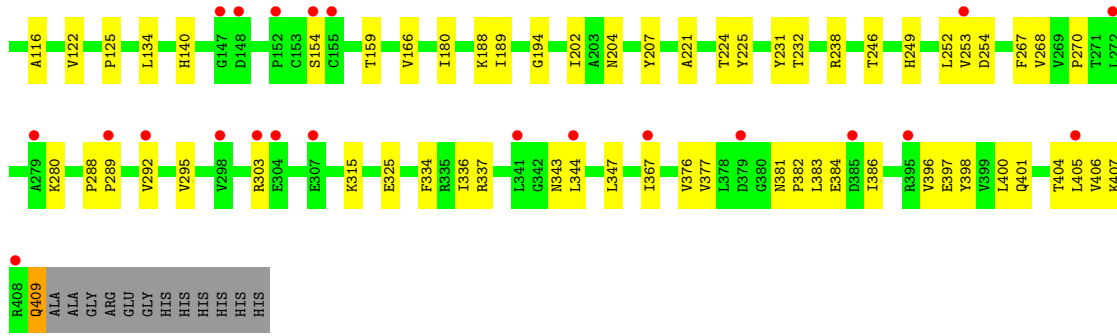


- Molecule 1: PROLIDASE

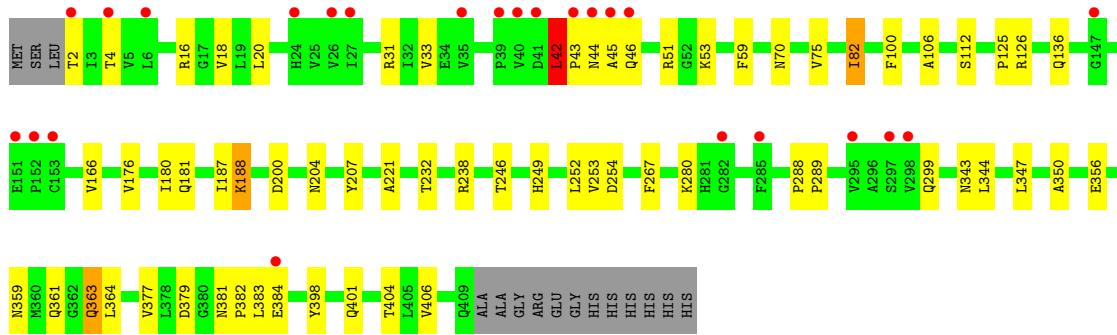
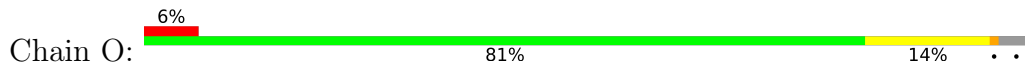


- Molecule 1: PROLIDASE

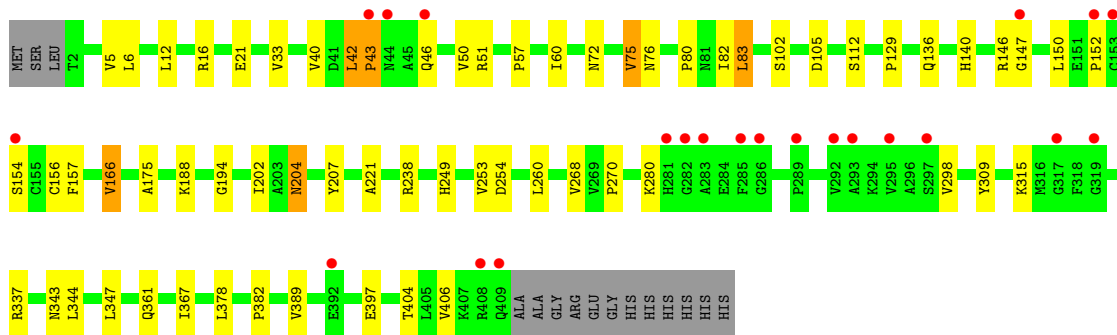
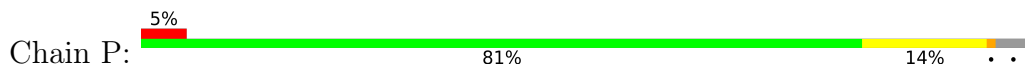




• Molecule 1: PROLIDASE



• Molecule 1: PROLIDASE



4 Data and refinement statistics i

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	113.19Å 108.03Å 170.77Å 81.32° 80.47° 73.76°	Depositor
Resolution (Å)	40.00 – 2.81 40.07 – 2.81	Depositor EDS
% Data completeness (in resolution range)	89.9 (40.00-2.81) 89.9 (40.07-2.81)	Depositor EDS
R_{merge}	0.18	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.02 (at 2.81Å)	Xtrriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.220 , 0.273 0.229 , 0.276	Depositor DCC
R_{free} test set	5054 reflections (3.02%)	wwPDB-VP
Wilson B-factor (Å ²)	72.7	Xtrriage
Anisotropy	0.079	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 54.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	0.014 for -k,-h,-l	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	48752	wwPDB-VP
Average B, all atoms (Å ²)	85.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.73% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

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: KCX, ZN, LWY

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	0.35	0/3064	0.56	0/4156
1	B	0.35	0/3064	0.57	0/4156
1	C	0.35	0/3064	0.57	0/4156
1	D	0.36	0/3064	0.56	0/4156
1	E	0.37	0/3064	0.56	0/4156
1	F	0.35	0/3064	0.56	0/4156
1	G	0.35	0/3064	0.57	0/4156
1	H	0.36	0/3064	0.58	0/4156
1	I	0.36	0/3064	0.56	1/4156 (0.0%)
1	J	0.36	0/3064	0.57	0/4156
1	K	0.36	0/3064	0.56	0/4156
1	L	0.36	0/3064	0.56	0/4156
1	M	0.37	0/3064	0.56	0/4156
1	N	0.36	0/3064	0.57	0/4156
1	O	0.35	0/3064	0.56	1/4156 (0.0%)
1	P	0.35	0/3064	0.58	0/4156
All	All	0.36	0/49024	0.57	2/66496 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	O	42	LEU	CA-CB-CG	5.83	128.71	115.30
1	I	42	LEU	CA-CB-CG	5.10	127.04	115.30

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	3033	0	3037	34	0
1	B	3033	0	3037	20	0
1	C	3033	0	3037	25	0
1	D	3033	0	3037	19	0
1	E	3033	0	3037	19	0
1	F	3033	0	3037	19	0
1	G	3033	0	3037	21	0
1	H	3033	0	3037	16	0
1	I	3033	0	3037	21	0
1	J	3033	0	3037	18	0
1	K	3033	0	3037	27	0
1	L	3033	0	3037	31	0
1	M	3033	0	3037	22	0
1	N	3033	0	3037	29	0
1	O	3033	0	3037	22	0
1	P	3033	0	3037	19	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
2	E	2	0	0	0	0
2	F	2	0	0	0	0
2	G	2	0	0	0	0
2	H	2	0	0	0	0
2	I	2	0	0	0	0
2	J	2	0	0	0	0
2	K	2	0	0	0	0
2	L	2	0	0	0	0
2	M	2	0	0	0	0
2	N	2	0	0	0	0
2	O	2	0	0	0	0
2	P	2	0	0	0	0
3	A	12	0	10	2	0
3	B	12	0	10	0	0
3	C	12	0	10	0	0
3	D	12	0	10	0	0
3	E	12	0	10	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	F	12	0	10	0	0
3	G	12	0	10	0	0
3	H	12	0	10	0	0
3	I	12	0	10	0	0
3	J	12	0	10	1	0
3	K	12	0	10	0	0
3	L	12	0	10	1	0
3	M	12	0	10	1	0
3	N	12	0	10	0	0
3	O	12	0	10	0	0
3	P	12	0	10	0	0
All	All	48752	0	48752	343	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 4.

The worst 5 of 343 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:L:287:MET:HG3	1:L:288:PRO:HD2	1.34	1.07
1:K:278:LEU:HD22	1:K:287:MET:HE3	1.42	1.01
1:A:343:ASN:ND2	1:A:343:ASN:H	1.50	0.97
1:A:343:ASN:H	1:A:343:ASN:HD22	1.07	0.89
1:K:278:LEU:HD22	1:K:287:MET:CE	2.01	0.89

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	405/423 (96%)	385 (95%)	15 (4%)	5 (1%)	13 37

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	405/423 (96%)	381 (94%)	20 (5%)	4 (1%)	15	42
1	C	405/423 (96%)	380 (94%)	21 (5%)	4 (1%)	15	42
1	D	405/423 (96%)	379 (94%)	21 (5%)	5 (1%)	13	37
1	E	405/423 (96%)	380 (94%)	20 (5%)	5 (1%)	13	37
1	F	405/423 (96%)	379 (94%)	23 (6%)	3 (1%)	22	51
1	G	405/423 (96%)	375 (93%)	26 (6%)	4 (1%)	15	42
1	H	405/423 (96%)	383 (95%)	18 (4%)	4 (1%)	15	42
1	I	405/423 (96%)	377 (93%)	23 (6%)	5 (1%)	13	37
1	J	405/423 (96%)	374 (92%)	26 (6%)	5 (1%)	13	37
1	K	405/423 (96%)	378 (93%)	24 (6%)	3 (1%)	22	51
1	L	405/423 (96%)	377 (93%)	27 (7%)	1 (0%)	47	76
1	M	405/423 (96%)	383 (95%)	19 (5%)	3 (1%)	22	51
1	N	405/423 (96%)	371 (92%)	30 (7%)	4 (1%)	15	42
1	O	405/423 (96%)	375 (93%)	27 (7%)	3 (1%)	22	51
1	P	405/423 (96%)	375 (93%)	25 (6%)	5 (1%)	13	37
All	All	6480/6768 (96%)	6052 (93%)	365 (6%)	63 (1%)	15	42

5 of 63 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	43	PRO
1	C	43	PRO
1	D	43	PRO
1	E	43	PRO
1	F	43	PRO

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	314/325 (97%)	286 (91%)	28 (9%)	9	27

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	314/325 (97%)	289 (92%)	25 (8%)	12	32
1	C	314/325 (97%)	283 (90%)	31 (10%)	8	22
1	D	314/325 (97%)	294 (94%)	20 (6%)	17	44
1	E	314/325 (97%)	290 (92%)	24 (8%)	13	35
1	F	314/325 (97%)	287 (91%)	27 (9%)	10	29
1	G	314/325 (97%)	293 (93%)	21 (7%)	16	41
1	H	314/325 (97%)	283 (90%)	31 (10%)	8	22
1	I	314/325 (97%)	285 (91%)	29 (9%)	9	26
1	J	314/325 (97%)	286 (91%)	28 (9%)	9	27
1	K	314/325 (97%)	282 (90%)	32 (10%)	7	21
1	L	314/325 (97%)	291 (93%)	23 (7%)	14	37
1	M	314/325 (97%)	288 (92%)	26 (8%)	11	31
1	N	314/325 (97%)	286 (91%)	28 (9%)	9	27
1	O	314/325 (97%)	288 (92%)	26 (8%)	11	31
1	P	314/325 (97%)	284 (90%)	30 (10%)	8	24
All	All	5024/5200 (97%)	4595 (92%)	429 (8%)	10	30

5 of 429 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	I	363	GLN
1	K	280	LYS
1	P	12	LEU
1	J	44	ASN
1	J	364	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 81 such sidechains are listed below:

Mol	Chain	Res	Type
1	L	299	GLN
1	O	299	GLN
1	M	299	GLN
1	N	300	GLN
1	O	401	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

16 non-standard protein/DNA/RNA residues 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
1	KCX	J	188	2,1	9,11,12	0.85	0	5,12,14	1.19	1 (20%)
1	KCX	L	188	2,1	9,11,12	0.91	0	5,12,14	1.15	1 (20%)
1	KCX	M	188	2,1	9,11,12	0.83	0	5,12,14	1.22	1 (20%)
1	KCX	G	188	2,1	9,11,12	0.90	0	5,12,14	1.23	1 (20%)
1	KCX	H	188	2,1	9,11,12	0.87	0	5,12,14	1.21	1 (20%)
1	KCX	O	188	2,1	9,11,12	0.87	0	5,12,14	1.29	1 (20%)
1	KCX	K	188	2,1	9,11,12	0.80	0	5,12,14	1.14	1 (20%)
1	KCX	D	188	2,1	9,11,12	0.87	0	5,12,14	1.13	1 (20%)
1	KCX	B	188	2,1	9,11,12	0.87	0	5,12,14	1.19	1 (20%)
1	KCX	F	188	2,1	9,11,12	0.84	0	5,12,14	1.12	1 (20%)
1	KCX	P	188	2,1	9,11,12	0.82	0	5,12,14	1.07	1 (20%)
1	KCX	I	188	2,1	9,11,12	0.86	0	5,12,14	1.28	1 (20%)
1	KCX	E	188	2,1	9,11,12	0.83	0	5,12,14	1.21	1 (20%)
1	KCX	A	188	2,1	9,11,12	0.84	0	5,12,14	1.57	1 (20%)
1	KCX	N	188	2,1	9,11,12	0.89	0	5,12,14	1.17	1 (20%)
1	KCX	C	188	2,1	9,11,12	0.82	0	5,12,14	1.32	1 (20%)

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
1	KCX	J	188	2,1	-	1/9/10/12	-
1	KCX	L	188	2,1	-	0/9/10/12	-
1	KCX	M	188	2,1	-	0/9/10/12	-
1	KCX	G	188	2,1	-	1/9/10/12	-
1	KCX	H	188	2,1	-	1/9/10/12	-
1	KCX	O	188	2,1	-	0/9/10/12	-
1	KCX	K	188	2,1	-	0/9/10/12	-
1	KCX	D	188	2,1	-	0/9/10/12	-
1	KCX	B	188	2,1	-	0/9/10/12	-
1	KCX	F	188	2,1	-	0/9/10/12	-
1	KCX	P	188	2,1	-	0/9/10/12	-
1	KCX	I	188	2,1	-	1/9/10/12	-
1	KCX	E	188	2,1	-	0/9/10/12	-
1	KCX	A	188	2,1	-	0/9/10/12	-
1	KCX	N	188	2,1	-	1/9/10/12	-
1	KCX	C	188	2,1	-	0/9/10/12	-

There are no bond length outliers.

The worst 5 of 16 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	188	KCX	OQ1-CX-NZ	-3.21	119.99	124.96
1	I	188	KCX	OQ1-CX-NZ	-2.72	120.74	124.96
1	C	188	KCX	OQ1-CX-NZ	-2.70	120.77	124.96
1	O	188	KCX	OQ1-CX-NZ	-2.68	120.80	124.96
1	G	188	KCX	OQ1-CX-NZ	-2.64	120.87	124.96

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	J	188	KCX	CG-CD-CE-NZ
1	N	188	KCX	CG-CD-CE-NZ
1	I	188	KCX	CG-CD-CE-NZ
1	G	188	KCX	CG-CD-CE-NZ
1	H	188	KCX	CG-CD-CE-NZ

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	O	188	KCX	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	C	188	KCX	1	0

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 48 ligands modelled in this entry, 32 are monoatomic - leaving 16 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
3	LWY	O	427	2	9,12,12	1.06	1 (11%)	9,18,18	1.06	0
3	LWY	L	427	2	9,12,12	1.06	1 (11%)	9,18,18	1.11	0
3	LWY	J	427	2	9,12,12	1.07	1 (11%)	9,18,18	1.02	0
3	LWY	H	427	2	9,12,12	1.08	1 (11%)	9,18,18	0.96	0
3	LWY	B	427	2	9,12,12	1.01	1 (11%)	9,18,18	1.18	0
3	LWY	G	427	2	9,12,12	1.09	1 (11%)	9,18,18	1.02	0
3	LWY	F	427	2	9,12,12	1.07	1 (11%)	9,18,18	1.00	0
3	LWY	M	427	2	9,12,12	1.07	1 (11%)	9,18,18	1.04	0
3	LWY	P	427	2	9,12,12	1.09	1 (11%)	9,18,18	0.89	0
3	LWY	K	427	2	9,12,12	1.07	1 (11%)	9,18,18	0.91	0
3	LWY	D	427	2	9,12,12	1.10	1 (11%)	9,18,18	0.96	0
3	LWY	A	427	2	9,12,12	1.06	1 (11%)	9,18,18	1.04	0
3	LWY	N	427	2	9,12,12	1.04	1 (11%)	9,18,18	1.01	0
3	LWY	C	427	2	9,12,12	1.06	1 (11%)	9,18,18	1.01	0
3	LWY	I	427	2	9,12,12	1.02	0	9,18,18	1.10	0
3	LWY	E	427	2	9,12,12	1.08	1 (11%)	9,18,18	1.00	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	LWY	O	427	2	-	0/4/20/20	0/1/1/1
3	LWY	L	427	2	-	0/4/20/20	0/1/1/1
3	LWY	J	427	2	-	0/4/20/20	0/1/1/1
3	LWY	H	427	2	-	0/4/20/20	0/1/1/1
3	LWY	B	427	2	-	0/4/20/20	0/1/1/1
3	LWY	G	427	2	-	0/4/20/20	0/1/1/1
3	LWY	F	427	2	-	0/4/20/20	0/1/1/1
3	LWY	M	427	2	-	0/4/20/20	0/1/1/1
3	LWY	P	427	2	-	0/4/20/20	0/1/1/1
3	LWY	K	427	2	-	0/4/20/20	0/1/1/1
3	LWY	D	427	2	-	0/4/20/20	0/1/1/1
3	LWY	A	427	2	-	0/4/20/20	0/1/1/1
3	LWY	N	427	2	-	0/4/20/20	0/1/1/1
3	LWY	C	427	2	-	0/4/20/20	0/1/1/1
3	LWY	I	427	2	-	0/4/20/20	0/1/1/1
3	LWY	E	427	2	-	0/4/20/20	0/1/1/1

The worst 5 of 15 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	P	427	LWY	P-O2	-2.17	1.50	1.56
3	E	427	LWY	P-O2	-2.12	1.51	1.56
3	F	427	LWY	P-O2	-2.12	1.51	1.56
3	G	427	LWY	P-O2	-2.11	1.51	1.56
3	A	427	LWY	P-O2	-2.09	1.51	1.56

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	L	427	LWY	1	0
3	J	427	LWY	1	0
3	M	427	LWY	1	0
3	A	427	LWY	2	0

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](#)

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	407/423 (96%)	-0.07	9 (2%) 62 52	50, 78, 119, 133	0
1	B	407/423 (96%)	-0.14	5 (1%) 79 73	32, 67, 107, 137	0
1	C	407/423 (96%)	0.04	16 (3%) 39 29	48, 73, 114, 142	0
1	D	407/423 (96%)	-0.22	3 (0%) 87 84	42, 63, 97, 154	0
1	E	407/423 (96%)	-0.04	12 (2%) 51 41	42, 70, 112, 142	0
1	F	407/423 (96%)	-0.04	9 (2%) 62 52	49, 73, 113, 134	0
1	G	407/423 (96%)	0.18	20 (4%) 29 20	48, 81, 118, 145	0
1	H	407/423 (96%)	-0.13	9 (2%) 62 52	39, 64, 107, 140	0
1	I	407/423 (96%)	0.39	42 (10%) 6 3	58, 94, 134, 150	0
1	J	407/423 (96%)	0.47	49 (12%) 4 2	64, 96, 140, 154	0
1	K	407/423 (96%)	0.43	35 (8%) 10 5	59, 99, 137, 153	0
1	L	407/423 (96%)	0.56	51 (12%) 3 2	67, 106, 136, 150	0
1	M	407/423 (96%)	0.38	40 (9%) 7 4	52, 96, 132, 155	0
1	N	407/423 (96%)	0.41	35 (8%) 10 5	51, 97, 134, 160	0
1	O	407/423 (96%)	0.19	24 (5%) 22 14	40, 86, 126, 154	0
1	P	407/423 (96%)	0.11	22 (5%) 25 17	45, 76, 121, 142	0
All	All	6512/6768 (96%)	0.16	381 (5%) 22 14	32, 82, 128, 160	0

The worst 5 of 381 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	K	18	VAL	8.4
1	M	289	PRO	7.2
1	J	44	ASN	6.5
1	N	45	ALA	6.2
1	J	45	ALA	6.2

6.2 Non-standard residues in protein, DNA, RNA chains [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, 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	RSCC	RSR	B-factors(Å ²)	Q<0.9
1	KCX	C	188	12/13	0.93	0.26	48,63,78,85	0
1	KCX	H	188	12/13	0.94	0.21	51,59,94,107	0
1	KCX	L	188	12/13	0.94	0.26	76,91,120,127	0
1	KCX	D	188	12/13	0.95	0.18	48,54,72,82	0
1	KCX	B	188	12/13	0.95	0.19	41,46,88,89	0
1	KCX	K	188	12/13	0.95	0.25	75,89,99,100	0
1	KCX	A	188	12/13	0.95	0.18	64,77,107,111	0
1	KCX	O	188	12/13	0.95	0.14	41,61,79,94	0
1	KCX	J	188	12/13	0.96	0.19	62,79,108,108	0
1	KCX	N	188	12/13	0.96	0.18	68,78,133,140	0
1	KCX	I	188	12/13	0.96	0.15	61,74,110,111	0
1	KCX	F	188	12/13	0.97	0.23	52,61,115,124	0
1	KCX	M	188	12/13	0.97	0.15	67,75,92,103	0
1	KCX	G	188	12/13	0.97	0.21	55,64,92,97	0
1	KCX	E	188	12/13	0.97	0.14	48,52,78,86	0
1	KCX	P	188	12/13	0.97	0.19	52,64,90,93	0

6.3 Carbohydrates [i](#)

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, 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	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	ZN	K	425	1/1	0.92	0.15	125,125,125,125	0
2	ZN	M	425	1/1	0.93	0.10	114,114,114,114	0
3	LWY	K	427	12/12	0.95	0.23	127,133,135,135	0
3	LWY	L	427	12/12	0.95	0.15	101,111,114,115	0
3	LWY	G	427	12/12	0.96	0.20	85,91,95,97	0
2	ZN	M	426	1/1	0.96	0.10	103,103,103,103	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	LWY	C	427	12/12	0.96	0.20	89,94,98,100	0
3	LWY	M	427	12/12	0.96	0.21	103,113,116,116	0
3	LWY	B	427	12/12	0.97	0.13	73,77,81,83	0
2	ZN	C	425	1/1	0.97	0.17	90,90,90,90	0
2	ZN	K	426	1/1	0.97	0.09	110,110,110,110	0
2	ZN	E	426	1/1	0.97	0.12	84,84,84,84	0
2	ZN	H	425	1/1	0.97	0.14	89,89,89,89	0
3	LWY	A	427	12/12	0.97	0.16	95,103,107,108	0
3	LWY	O	427	12/12	0.97	0.14	81,90,93,95	0
2	ZN	O	425	1/1	0.98	0.12	92,92,92,92	0
2	ZN	P	426	1/1	0.98	0.12	94,94,94,94	0
2	ZN	I	426	1/1	0.98	0.07	115,115,115,115	0
2	ZN	J	425	1/1	0.98	0.14	102,102,102,102	0
2	ZN	J	426	1/1	0.98	0.13	101,101,101,101	0
3	LWY	D	427	12/12	0.98	0.16	63,71,80,81	0
3	LWY	E	427	12/12	0.98	0.17	81,88,90,90	0
3	LWY	F	427	12/12	0.98	0.16	97,98,101,106	0
2	ZN	A	425	1/1	0.98	0.10	86,86,86,86	0
3	LWY	H	427	12/12	0.98	0.14	77,81,88,88	0
3	LWY	I	427	12/12	0.98	0.14	102,106,112,113	0
3	LWY	J	427	12/12	0.98	0.15	90,105,106,107	0
2	ZN	D	425	1/1	0.98	0.16	73,73,73,73	0
2	ZN	L	425	1/1	0.98	0.15	102,102,102,102	0
2	ZN	A	426	1/1	0.98	0.10	99,99,99,99	0
3	LWY	N	427	12/12	0.98	0.19	109,111,112,115	0
2	ZN	B	426	1/1	0.98	0.10	84,84,84,84	0
3	LWY	P	427	12/12	0.98	0.13	74,87,89,92	0
2	ZN	G	426	1/1	0.99	0.15	95,95,95,95	0
2	ZN	L	426	1/1	0.99	0.10	108,108,108,108	0
2	ZN	B	425	1/1	0.99	0.12	78,78,78,78	0
2	ZN	H	426	1/1	0.99	0.12	92,92,92,92	0
2	ZN	N	426	1/1	0.99	0.11	95,95,95,95	0
2	ZN	I	425	1/1	0.99	0.08	100,100,100,100	0
2	ZN	P	425	1/1	0.99	0.13	87,87,87,87	0
2	ZN	D	426	1/1	0.99	0.11	72,72,72,72	0
2	ZN	E	425	1/1	0.99	0.16	79,79,79,79	0
2	ZN	C	426	1/1	0.99	0.16	91,91,91,91	0
2	ZN	F	425	1/1	0.99	0.17	96,96,96,96	0
2	ZN	G	425	1/1	0.99	0.15	84,84,84,84	0
2	ZN	F	426	1/1	1.00	0.16	89,89,89,89	0
2	ZN	N	425	1/1	1.00	0.12	90,90,90,90	0
2	ZN	O	426	1/1	1.00	0.13	93,93,93,93	0

6.5 Other polymers [i](#)

There are no such residues in this entry.