



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 12, 2017 – 12:28 AM EST

PDB ID : 4PV2  
Title : Crystal structure of potassium-dependent plant-type L-asparaginase from *Phaseolus vulgaris* in complex with K<sup>+</sup> and Na<sup>+</sup> cations  
Authors : Bejger, M.; Gilski, M.; Imiolczyk, B.; Clavel, D.; Jaskolski, M.  
Deposited on : unknown  
Resolution : 1.79 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](mailto:validation@mail.wwpdb.org)

A user guide is available at

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.7.2 (RC1), CSD as538be (2017)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20030345  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20030345

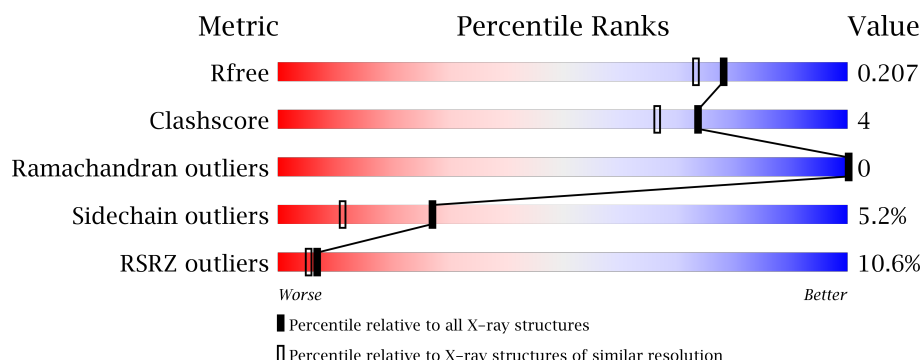
# 1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.79 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))
$R_{free}$	100719	4827 (1.80-1.80)
Clashscore	112137	5742 (1.80-1.80)
Ramachandran outliers	110173	5676 (1.80-1.80)
Sidechain outliers	110143	5675 (1.80-1.80)
RSRZ outliers	101464	4906 (1.80-1.80)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	197	<div> <div>12%</div> <div>72%</div> <div>7%</div> <div>21%</div> </div>
1	C	197	<div> <div>5%</div> <div>74%</div> <div>6%</div> <div>20%</div> </div>
2	B	131	<div> <div>16%</div> <div>89%</div> <div>11%</div> <div>.</div> </div>
2	D	131	<div> <div>5%</div> <div>92%</div> <div>8%</div> <div>.</div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria.

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	NA	A	201[A]	-	-	-	X
4	K	A	203[B]	-	-	-	X
4	K	A	204[B]	-	-	-	X
4	K	C	203[B]	-	-	-	X
5	NO3	A	207	-	-	-	X
5	NO3	B	401	-	-	-	X
5	NO3	B	402	-	-	X	X
5	NO3	C	205	-	-	-	X
5	NO3	C	206	-	-	-	X
5	NO3	C	208	-	-	-	X
5	NO3	C	209	-	-	-	X
5	NO3	C	210	-	-	-	X
5	NO3	C	211	-	-	-	X
5	NO3	D	401	-	-	-	X
5	NO3	D	402	-	-	-	X
5	NO3	D	404	-	-	-	X
5	NO3	D	405	-	-	-	X
5	NO3	D	407	-	-	-	X

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 4799 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 L-ASPARAGINASE ALPHA SUBUNIT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	155	Total	C	N	O	S	0	1	0
			1166	728	204	228	6			
1	C	158	Total	C	N	O	S	0	3	0
			1198	746	211	235	6			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	EXPRESSION TAG	UNP V7CU13
A	0	ALA	-	EXPRESSION TAG	UNP V7CU13
A	17	THR	ASN	SEE REMARK 999	UNP V7CU13
C	-1	GLY	-	EXPRESSION TAG	UNP V7CU13
C	0	ALA	-	EXPRESSION TAG	UNP V7CU13
C	17	THR	ASN	SEE REMARK 999	UNP V7CU13

- Molecule 2 is a protein called L-ASPARAGINASE BETA SUBUNIT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	131	Total	C	N	O	S	0	5	0
			965	596	170	185	14			
2	D	131	Total	C	N	O	S	0	3	0
			957	588	170	184	15			

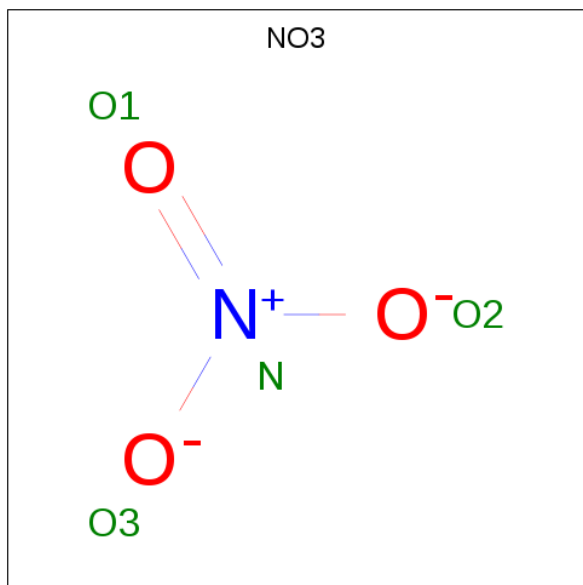
- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total	Na	0	2
			2	2		
3	C	2	Total	Na	0	2
			2	2		

- Molecule 4 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	K	0	2
			2	2		
4	C	2	Total	K	0	2
			2	2		

- Molecule 5 is NITRATE ION (three-letter code: NO3) (formula: NO<sub>3</sub>).



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

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	C	1	Total	N	O	0	0
			4	1	3		
5	C	1	Total	N	O	0	0
			4	1	3		
5	C	1	Total	N	O	0	0
			4	1	3		
5	D	1	Total	N	O	0	0
			4	1	3		
5	D	1	Total	N	O	0	0
			4	1	3		
5	D	1	Total	N	O	0	0
			4	1	3		
5	D	1	Total	N	O	0	0
			4	1	3		
5	D	1	Total	N	O	0	0
			4	1	3		
5	D	1	Total	N	O	0	0
			4	1	3		

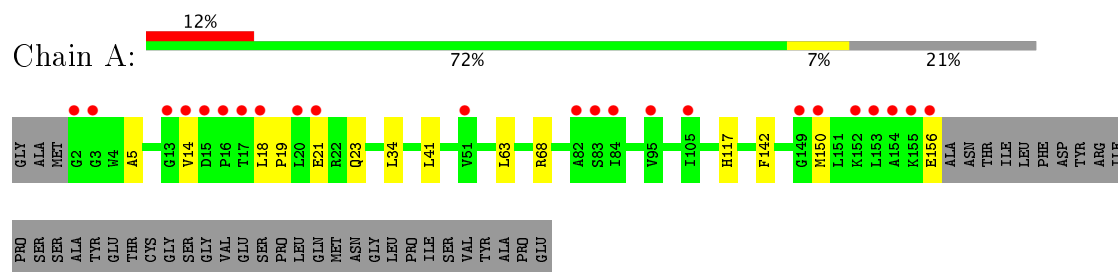
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	127	Total	O	0	1
			127	127		
6	B	50	Total	O	0	2
			50	50		
6	C	166	Total	O	0	3
			166	166		
6	D	78	Total	O	0	2
			78	78		

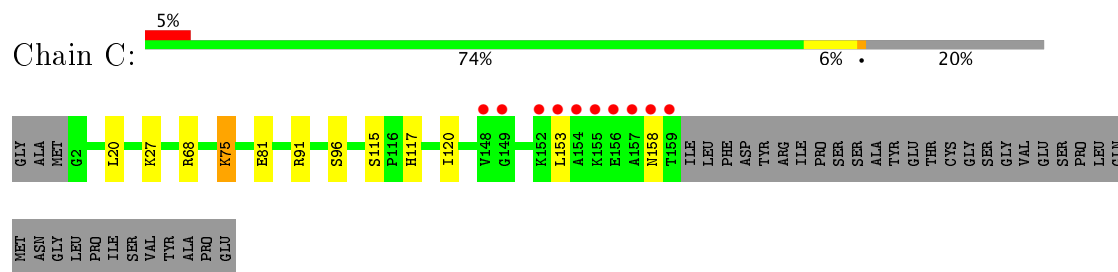
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

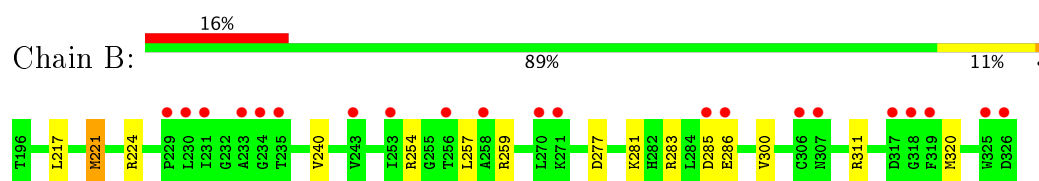
#### • Molecule 1: L-ASPARAGINASE ALPHA SUBUNIT



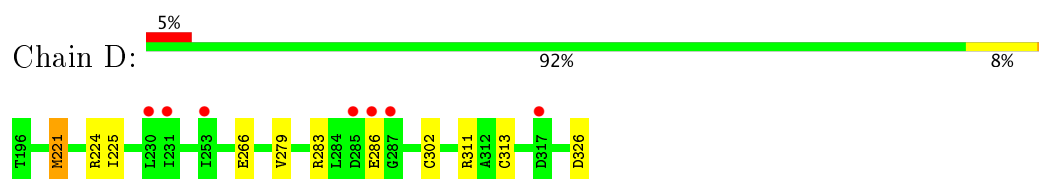
#### • Molecule 1: L-ASPARAGINASE ALPHA SUBUNIT



#### • Molecule 2: L-ASPARAGINASE BETA SUBUNIT



#### • Molecule 2: L-ASPARAGINASE BETA SUBUNIT



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	56.88Å 102.63Å 123.75Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	38.77 – 1.79 38.77 – 1.79	Depositor EDS
% Data completeness (in resolution range)	99.1 (38.77-1.79) 99.1 (38.77-1.79)	Depositor EDS
$R_{merge}$	0.05	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.81 (at 1.79Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8.1_1168)	Depositor
R, $R_{free}$	0.164 , 0.207 0.163 , 0.207	Depositor DCC
$R_{free}$ test set	1231 reflections (1.80%)	DCC
Wilson B-factor (Å <sup>2</sup> )	25.0	Xtriage
Anisotropy	0.369	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.40 , 50.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	4799	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	31.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.84% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: NA, K, NO3

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	0.52	0/1188	0.64	0/1610
1	C	0.57	0/1228	0.67	0/1664
2	B	0.53	0/995	0.70	0/1338
2	D	0.59	0/979	0.70	0/1315
All	All	0.55	0/4390	0.68	0/5927

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 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	1166	0	1167	10	0
1	C	1198	0	1197	10	0
2	B	965	0	959	13	0
2	D	957	0	945	8	0
3	A	2	0	0	0	0
3	C	2	0	0	0	0
4	A	2	0	0	0	0
4	C	2	0	0	0	0
5	A	12	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	B	12	0	0	2	0
5	C	28	0	0	0	0
5	D	32	0	0	2	0
6	A	127	0	0	0	0
6	B	50	0	0	0	0
6	C	166	0	0	1	0
6	D	78	0	0	1	0
All	All	4799	0	4268	33	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.

All (33) 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)
2:B:224[B]:ARG:HG3	1:C:117[B]:HIS:CG	2.19	0.77
1:A:5:ALA:HB1	2:B:300[A]:VAL:HG22	1.76	0.67
2:D:302[A]:CYS:SG	6:D:516:HOH:O	2.54	0.66
1:A:117[B]:HIS:CG	2:D:224[B]:ARG:HG3	2.34	0.62
2:B:221[A]:MET:HE1	1:C:117[A]:HIS:HD1	1.64	0.62
1:A:5:ALA:HB1	2:B:300[A]:VAL:CG2	2.31	0.61
1:A:68:ARG:HG3	1:A:142:PHE:HA	1.83	0.60
2:B:285:ASP:OD2	2:B:286:GLU:N	2.34	0.55
1:A:68:ARG:NH1	5:A:207:NO3:O1	2.44	0.51
2:B:224[B]:ARG:HG3	1:C:117[B]:HIS:CD2	2.46	0.51
2:B:221[A]:MET:HE2	5:B:402:NO3:O3	2.12	0.49
1:A:21:GLU:CD	1:A:21:GLU:H	2.16	0.48
1:C:27:LYS:NZ	5:D:402:NO3:O2	2.28	0.47
1:A:117[A]:HIS:CD2	2:D:224[A]:ARG:HB3	2.50	0.47
2:B:224[A]:ARG:HD2	1:C:120:ILE:HG23	1.95	0.46
2:B:221[A]:MET:HB2	2:B:224[A]:ARG:CZ	2.46	0.46
1:C:81:GLU:HB3	1:C:96:SER:HA	1.97	0.46
5:B:402:NO3:O1	1:C:115:SER:HA	2.18	0.43
1:A:18:LEU:HA	1:A:19:PRO:HD3	1.92	0.42
2:D:224[B]:ARG:HG2	2:D:225:ILE:N	2.33	0.42
1:C:68[B]:ARG:NH1	6:C:453[B]:HOH:O	2.51	0.42
1:C:75:LYS:H	1:C:75:LYS:HD3	1.85	0.41
2:D:313:CYS:SG	5:D:407:NO3:N	2.92	0.41
2:D:221[A]:MET:HB2	2:D:224[A]:ARG:CZ	2.50	0.41
2:D:279:VAL:O	2:D:283:ARG:HB3	2.21	0.41
2:B:221[A]:MET:SD	2:B:224[A]:ARG:HG2	2.61	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:18:LEU:HD23	1:A:23:GLN:HG2	2.03	0.41
1:C:91:ARG:HD2	1:C:91:ARG:HH11	1.77	0.40
1:A:41:LEU:HD23	1:A:41:LEU:HA	1.93	0.40
2:B:254:ARG:HH12	2:B:286:GLU:HB2	1.86	0.40
2:B:283:ARG:HD3	2:B:283:ARG:HA	1.84	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	154/197 (78%)	151 (98%)	3 (2%)	0	100	100
1	C	159/197 (81%)	156 (98%)	3 (2%)	0	100	100
2	B	134/131 (102%)	127 (95%)	7 (5%)	0	100	100
2	D	132/131 (101%)	126 (96%)	6 (4%)	0	100	100
All	All	579/656 (88%)	560 (97%)	19 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 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	127/160 (79%)	122 (96%)	5 (4%)	37	20

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	131/160 (82%)	127 (97%)	4 (3%)	45	29
2	B	101/96 (105%)	91 (90%)	10 (10%)	9	2
2	D	99/96 (103%)	93 (94%)	6 (6%)	22	8
All	All	458/512 (90%)	433 (94%)	25 (6%)	27	10

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	14	VAL
1	A	34	LEU
1	A	63	LEU
1	A	150	MET
1	A	156	GLU
2	B	217	LEU
2	B	221[A]	MET
2	B	221[B]	MET
2	B	240	VAL
2	B	257	LEU
2	B	259	ARG
2	B	277	ASP
2	B	281	LYS
2	B	311	ARG
2	B	320	MET
1	C	20	LEU
1	C	75	LYS
1	C	153	LEU
1	C	158	ASN
2	D	221[A]	MET
2	D	221[B]	MET
2	D	266	GLU
2	D	286	GLU
2	D	311	ARG
2	D	326	ASP

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 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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 29 ligands modelled in this entry, 8 are monoatomic - leaving 21 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	$\# Z  > 2$
5	NO3	A	205	-	1,3,3	4.59	1 (100%)	0,3,3	0.00	-
5	NO3	A	206	-	1,3,3	4.62	1 (100%)	0,3,3	0.00	-
5	NO3	A	207	-	1,3,3	4.43	1 (100%)	0,3,3	0.00	-
5	NO3	B	401	-	1,3,3	4.40	1 (100%)	0,3,3	0.00	-
5	NO3	B	402	-	1,3,3	4.05	1 (100%)	0,3,3	0.00	-
5	NO3	B	403	-	1,3,3	4.25	1 (100%)	0,3,3	0.00	-
5	NO3	C	205	-	1,3,3	4.37	1 (100%)	0,3,3	0.00	-
5	NO3	C	206	-	1,3,3	4.45	1 (100%)	0,3,3	0.00	-
5	NO3	C	207	-	1,3,3	4.52	1 (100%)	0,3,3	0.00	-
5	NO3	C	208	-	1,3,3	4.47	1 (100%)	0,3,3	0.00	-
5	NO3	C	209	-	1,3,3	4.58	1 (100%)	0,3,3	0.00	-
5	NO3	C	210	-	1,3,3	4.56	1 (100%)	0,3,3	0.00	-
5	NO3	C	211	-	1,3,3	4.47	1 (100%)	0,3,3	0.00	-
5	NO3	D	401	-	1,3,3	4.14	1 (100%)	0,3,3	0.00	-
5	NO3	D	402	-	1,3,3	4.47	1 (100%)	0,3,3	0.00	-
5	NO3	D	403	-	1,3,3	4.58	1 (100%)	0,3,3	0.00	-
5	NO3	D	404	-	1,3,3	4.52	1 (100%)	0,3,3	0.00	-
5	NO3	D	405	-	1,3,3	4.52	1 (100%)	0,3,3	0.00	-

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	NO3	D	406	-	1,3,3	4.35	1 (100%)	0,3,3	0.00	-
5	NO3	D	407	-	1,3,3	4.50	1 (100%)	0,3,3	0.00	-
5	NO3	D	408	-	1,3,3	4.64	1 (100%)	0,3,3	0.00	-

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
5	NO3	A	205	-	-	0/0/0/0	0/0/0/0
5	NO3	A	206	-	-	0/0/0/0	0/0/0/0
5	NO3	A	207	-	-	0/0/0/0	0/0/0/0
5	NO3	B	401	-	-	0/0/0/0	0/0/0/0
5	NO3	B	402	-	-	0/0/0/0	0/0/0/0
5	NO3	B	403	-	-	0/0/0/0	0/0/0/0
5	NO3	C	205	-	-	0/0/0/0	0/0/0/0
5	NO3	C	206	-	-	0/0/0/0	0/0/0/0
5	NO3	C	207	-	-	0/0/0/0	0/0/0/0
5	NO3	C	208	-	-	0/0/0/0	0/0/0/0
5	NO3	C	209	-	-	0/0/0/0	0/0/0/0
5	NO3	C	210	-	-	0/0/0/0	0/0/0/0
5	NO3	C	211	-	-	0/0/0/0	0/0/0/0
5	NO3	D	401	-	-	0/0/0/0	0/0/0/0
5	NO3	D	402	-	-	0/0/0/0	0/0/0/0
5	NO3	D	403	-	-	0/0/0/0	0/0/0/0
5	NO3	D	404	-	-	0/0/0/0	0/0/0/0
5	NO3	D	405	-	-	0/0/0/0	0/0/0/0
5	NO3	D	406	-	-	0/0/0/0	0/0/0/0
5	NO3	D	407	-	-	0/0/0/0	0/0/0/0
5	NO3	D	408	-	-	0/0/0/0	0/0/0/0

All (21) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	402	NO3	O1-N	4.05	1.39	1.23
5	D	401	NO3	O1-N	4.14	1.39	1.23
5	B	403	NO3	O1-N	4.25	1.39	1.23
5	D	406	NO3	O1-N	4.35	1.40	1.23
5	C	205	NO3	O1-N	4.37	1.40	1.23
5	B	401	NO3	O1-N	4.40	1.40	1.23
5	A	207	NO3	O1-N	4.43	1.40	1.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	C	206	NO3	O1-N	4.45	1.40	1.23
5	D	402	NO3	O1-N	4.47	1.40	1.23
5	C	208	NO3	O1-N	4.47	1.40	1.23
5	C	211	NO3	O1-N	4.47	1.40	1.23
5	D	407	NO3	O1-N	4.50	1.40	1.23
5	C	207	NO3	O1-N	4.52	1.40	1.23
5	D	404	NO3	O1-N	4.52	1.40	1.23
5	D	405	NO3	O1-N	4.52	1.40	1.23
5	C	210	NO3	O1-N	4.56	1.40	1.23
5	C	209	NO3	O1-N	4.58	1.41	1.23
5	D	403	NO3	O1-N	4.58	1.41	1.23
5	A	205	NO3	O1-N	4.59	1.41	1.23
5	A	206	NO3	O1-N	4.62	1.41	1.23
5	D	408	NO3	O1-N	4.64	1.41	1.23

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
5	A	207	NO3	1	0
5	B	402	NO3	2	0
5	D	402	NO3	1	0
5	D	407	NO3	1	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 ⓘ

### 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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	155/197 (78%)	0.63	23 (14%) 3 2	14, 27, 57, 84	4 (2%)
1	C	158/197 (80%)	0.14	10 (6%) 21 17	12, 23, 53, 90	0
2	B	131/131 (100%)	0.94	21 (16%) 2 1	16, 35, 57, 101	2 (1%)
2	D	131/131 (100%)	0.20	7 (5%) 27 22	13, 23, 43, 67	2 (1%)
All	All	575/656 (87%)	0.47	61 (10%) 7 5	12, 26, 55, 101	8 (1%)

All (61) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	153	LEU	7.8
1	C	159	THR	6.6
1	A	17	THR	6.3
2	D	286	GLU	6.1
1	A	16	PRO	5.7
2	B	230[A]	LEU	5.6
1	C	158	ASN	5.4
1	A	156	GLU	4.9
2	B	326	ASP	4.9
1	C	157	ALA	4.9
1	A	154	ALA	4.8
2	B	317	ASP	4.5
2	B	285	ASP	4.5
1	A	2	GLY	4.2
1	A	152	LYS	4.1
1	C	152	LYS	4.1
1	A	82	ALA	4.0
1	A	18	LEU	3.9
1	A	14	VAL	3.8
1	A	155	LYS	3.8
2	B	319	PHE	3.6

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Mol	Chain	Res	Type	RSRZ
1	C	149	GLY	3.6
2	B	231	ILE	3.5
2	B	307	ASN	3.5
2	D	285	ASP	3.5
1	A	15	ASP	3.4
1	A	150	MET	3.3
1	A	20	LEU	3.2
1	C	153	LEU	3.1
2	B	306	CYS	3.0
1	A	3	GLY	2.9
2	D	317	ASP	2.9
1	C	154	ALA	2.9
2	B	271	LYS	2.8
2	B	318	GLY	2.8
1	A	105	ILE	2.7
2	B	233	ALA	2.6
2	B	286	GLU	2.6
1	C	155	LYS	2.5
1	C	156	GLU	2.5
2	D	253	ILE	2.5
1	A	149	GLY	2.5
2	B	256[A]	THR	2.4
1	A	51	VAL	2.4
2	D	230	LEU	2.4
2	B	253	ILE	2.4
1	A	13	GLY	2.4
2	B	325	TRP	2.4
2	D	231	ILE	2.4
2	B	229	PRO	2.3
2	B	234	GLY	2.3
2	B	235	THR	2.2
2	D	287	GLY	2.2
2	B	258	ALA	2.2
1	A	95	VAL	2.1
2	B	243	VAL	2.1
1	A	84	ILE	2.1
1	C	148	VAL	2.1
1	A	83	SER	2.1
1	A	21	GLU	2.0
2	B	270	LEU	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 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, 95<sup>th</sup> 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
5	NO3	C	211	4/4	0.87	0.34	29.76	45,56,61,70	0
5	NO3	D	402	4/4	0.79	0.21	20.69	46,57,59,65	0
5	NO3	D	407	4/4	0.52	0.29	11.58	69,69,70,71	0
5	NO3	D	404	4/4	0.83	0.24	9.99	37,56,57,64	0
5	NO3	C	209	4/4	0.87	0.23	7.62	42,45,49,57	0
4	K	C	203[B]	1/1	0.94	0.23	6.88	26,26,26,26	1
4	K	A	203[B]	1/1	0.94	0.30	6.69	36,36,36,36	1
5	NO3	D	405	4/4	0.76	0.35	6.57	54,67,69,79	0
5	NO3	D	401	4/4	0.94	0.22	6.44	35,40,44,54	0
5	NO3	B	402	4/4	0.81	0.43	6.19	46,64,67,70	0
5	NO3	A	207	4/4	0.79	0.21	6.14	43,61,64,66	0
5	NO3	B	401	4/4	0.91	0.20	5.61	46,52,60,64	0
5	NO3	C	210	4/4	0.86	0.40	5.03	59,64,65,66	0
5	NO3	C	205	4/4	0.96	0.24	4.42	40,49,52,53	0
5	NO3	C	206	4/4	0.95	0.14	3.80	26,43,45,50	0
4	K	A	204[B]	1/1	0.98	0.18	3.66	34,34,34,34	1
5	NO3	C	208	4/4	0.88	0.20	3.42	45,54,55,65	0
3	NA	A	201[A]	1/1	0.99	0.17	2.32	18,18,18,18	1
3	NA	C	201[A]	1/1	0.99	0.12	1.91	13,13,13,13	1
5	NO3	A	205	4/4	0.91	0.20	0.82	43,47,50,55	0
3	NA	C	202[A]	1/1	0.96	0.11	0.32	25,25,25,25	1
3	NA	A	202[A]	1/1	0.96	0.07	-1.35	28,28,28,28	1
4	K	C	204[B]	1/1	0.93	0.05	-2.37	47,47,47,47	1
5	NO3	B	403	4/4	0.91	0.23	-	63,65,65,67	0
5	NO3	D	406	4/4	0.94	0.22	-	51,55,58,59	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
5	NO3	A	206	4/4	0.59	0.21	-	48,54,56,59	0
5	NO3	C	207	4/4	0.91	0.22	-	40,48,48,51	0
5	NO3	D	408	4/4	0.68	0.20	-	58,59,62,62	0
5	NO3	D	403	4/4	0.93	0.22	-	38,46,56,57	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.