



# wwPDB X-ray Structure Validation Summary Report

Feb 28, 2014 – 12:18 PM GMT

PDB ID : 1T5G  
Title : Arginase-F2-L-Argininecomplex  
Authors : Cama, E.; Pethe, S.; Boucher, J.-L.; Han, S.; Emig, F.A.; Ash, D.E.; Viola, R.E.; Mansuy, D.; Christianson, D.W.  
Deposited on : 2004-05-04  
Resolution : 2.40 Å(reported)

This is a wwPDB validation summary 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/ValidationPDFNotes.html>

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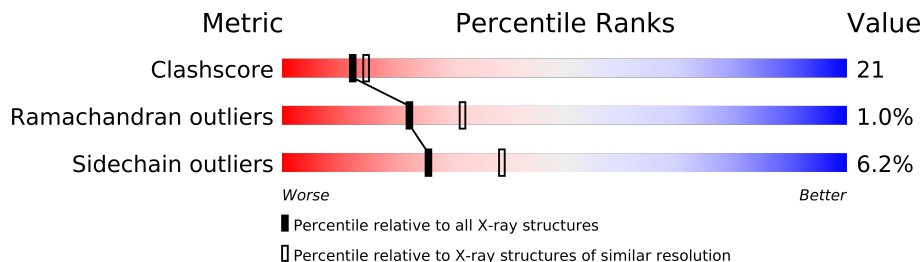
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.15 2013  
Xtriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 21963  
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 2.40 Å.




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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	79885	2789 (2.40-2.40)
Ramachandran outliers	78287	2736 (2.40-2.40)
Sidechain outliers	78261	2737 (2.40-2.40)

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. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	314	
1	B	314	
1	C	314	

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 7300 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 Arginase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	314	Total	C	N	O	S	0	0	0
			2384	1523	402	455	4			
1	B	314	Total	C	N	O	S	0	0	0
			2384	1523	402	455	4			
1	C	314	Total	C	N	O	S	0	0	0
			2384	1523	402	455	4			

There are 15 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	19	CYS	GLN	ENGINEERED	UNP P07824
A	119	ALA	CYS	ENGINEERED	UNP P07824
A	141	ALA	HIS	ENGINEERED	UNP P07824
A	168	ALA	CYS	ENGINEERED	UNP P07824
A	303	ALA	CYS	ENGINEERED	UNP P07824
B	19	CYS	GLN	ENGINEERED	UNP P07824
B	119	ALA	CYS	ENGINEERED	UNP P07824
B	141	ALA	HIS	ENGINEERED	UNP P07824
B	168	ALA	CYS	ENGINEERED	UNP P07824
B	303	ALA	CYS	ENGINEERED	UNP P07824
C	19	CYS	GLN	ENGINEERED	UNP P07824
C	119	ALA	CYS	ENGINEERED	UNP P07824
C	141	ALA	HIS	ENGINEERED	UNP P07824
C	168	ALA	CYS	ENGINEERED	UNP P07824
C	303	ALA	CYS	ENGINEERED	UNP P07824

- Molecule 2 is FLUORIDE ION (three-letter code: F) (formula: F).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	2	Total	F	0	0
			2	2		

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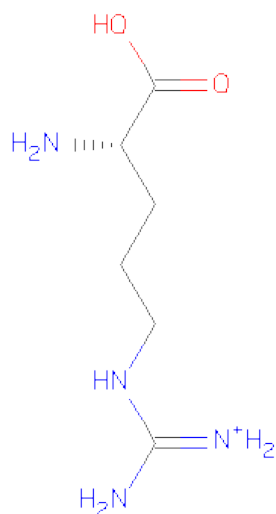
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	F	0	0
			2	2		
2	C	2	Total	F	0	0
			2	2		

- Molecule 3 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

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

- Molecule 4 is ARGININE (three-letter code: ARG) (formula: C<sub>6</sub>H<sub>15</sub>N<sub>4</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			12	6	4	2		
4	B	1	Total	C	N	O	0	0
			12	6	4	2		
4	C	1	Total	C	N	O	0	0
			12	6	4	2		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	30	Total 30	O 30	0	0
5	B	32	Total 32	O 32	0	0
5	C	38	Total 38	O 38	0	0

### 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.

Note EDS was not executed.

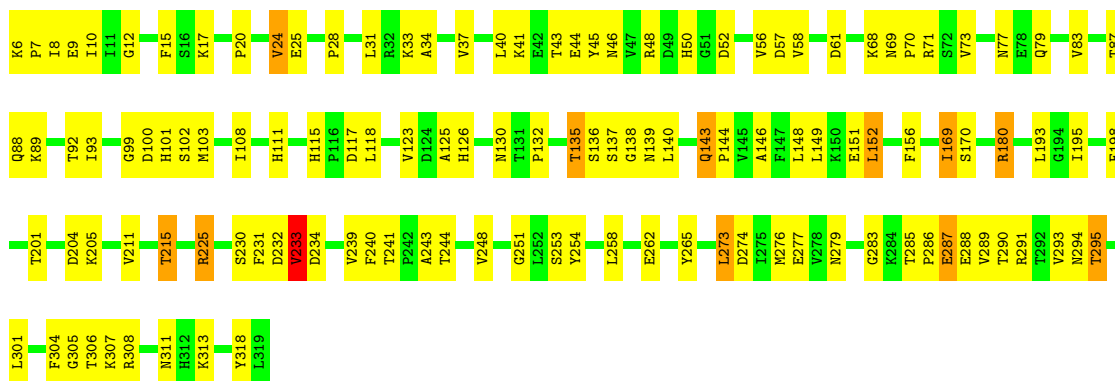
#### • Molecule 1: Arginase 1

Chain A: 



#### • Molecule 1: Arginase 1

Chain B: 



#### • Molecule 1: Arginase 1

Chain C: 



T290	I189	I93
R291	L193	G99
T292	G194	D100
V293	L195	H101
N294	F198	S102
T295	T201	I108
L301	D204	H111
F304	K210	D117
G305	V211	L118
T306	E214	V123
K307	T215	D124
R308	R225	A125
N311	S230	H126
H312	F231	T127
K313	D232	D128
F314	G233	T131
E315	D234	P132
L319	G235	L133
	V239	T134
	F240	T135
	T241	S136
	P242	S137
	A243	G138
	T244	N139
	V248	L140
	S253	Q143
	Y254	P144
	L258	V145
	E262	A146
	Y265	F147
	S271	L148
	G272	L149
	L273	K150
	D274	E151
	M275	L152
	E276	K153
	V277	F156
	N279	P157
	G283	I169
	E287	S170
	E288	L179
	V290	R180
		D183
		P184
		G185
		E186
		H187
		S189

## 4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section will therefore be incomplete.

Property	Value	Source
Space group	P 32	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	87.72Å 87.72Å 104.52Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	27.69 – 2.40	Depositor
% Data completeness (in resolution range)	95.0 (27.69-2.40)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.228 , 0.254	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	7300	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	38.0	wwPDB-VP



## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MN, F

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	0.40	0/2436	0.64	0/3309
1	B	0.40	0/2436	0.65	0/3309
1	C	0.41	0/2436	0.67	1/3309 (0.0%)
All	All	0.41	0/7308	0.65	1/9927 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	153	LYS	CD-CE-NZ	9.65	133.89	111.70

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	2384	0	2412	102	0
1	B	2384	0	2412	109	0
1	C	2384	0	2412	110	0
2	A	2	0	0	1	0
2	B	2	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	2	0	0	1	0
3	A	2	0	0	0	0
3	B	2	0	0	0	0
3	C	2	0	0	0	0
4	A	12	0	12	0	0
4	B	12	0	12	0	0
4	C	12	0	12	0	0
5	A	30	0	0	3	0
5	B	32	0	0	5	0
5	C	38	0	0	6	0
All	All	7300	0	7272	306	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 21.

The worst 5 of 306 close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:C:146:ALA:HA	1:C:152:LEU:HD23	1.55	0.89
1:A:146:ALA:HA	1:A:152:LEU:HD23	1.54	0.88
1:B:146:ALA:HA	1:B:152:LEU:HD23	1.55	0.87
1:C:135:THR:HB	1:C:137:SER:O	1.76	0.85
1:A:135:THR:HB	1:A:137:SER:O	1.77	0.85

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	312/314 (99%)	289 (93%)	21 (7%)	2 (1%)	33	47
1	B	312/314 (99%)	292 (94%)	16 (5%)	4 (1%)	18	24
1	C	312/314 (99%)	291 (93%)	18 (6%)	3 (1%)	22	32
All	All	936/942 (99%)	872 (93%)	55 (6%)	9 (1%)	22	32

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	233	VAL
1	A	44	GLU
1	B	44	GLU
1	B	143	GLN
1	C	44	GLU

### 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.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	259/260 (100%)	244 (94%)	15 (6%)	28	43
1	B	259/260 (100%)	243 (94%)	16 (6%)	26	39
1	C	259/260 (100%)	245 (95%)	14 (5%)	31	47
All	All	777/780 (100%)	732 (94%)	45 (6%)	26	43

5 of 45 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	152	LEU
1	B	273	LEU
1	C	287	GLU
1	B	215	THR
1	B	286	PRO

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 12 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	88	GLN
1	B	115	HIS
1	C	88	GLN
1	B	79	GLN
1	C	79	GLN

### 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 15 ligands modelled in this entry, 12 are monoatomic - leaving 3 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	$\# Z  > 2$
4	ARG	A	1000	-	11,11,11	1.11	1 (9%)	13,13,13	0.62	0
4	ARG	B	1001	-	11,11,11	1.10	0	13,13,13	0.65	0
4	ARG	C	1002	-	11,11,11	1.09	0	13,13,13	0.58	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
4	ARG	A	1000	-	-	0/11/11/11	0/0/0/0
4	ARG	B	1001	-	-	0/11/11/11	0/0/0/0
4	ARG	C	1002	-	-	0/11/11/11	0/0/0/0

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1000	ARG	CD-NE	2.17	1.51	1.46

There are no bond angle outliers.

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 ⓘ

EDS was not executed - this section will therefore be empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

EDS was not executed - this section will therefore be empty.

### 6.3 Carbohydrates ⓘ

EDS was not executed - this section will therefore be empty.

### 6.4 Ligands ⓘ

EDS was not executed - this section will therefore be empty.

### 6.5 Other polymers ⓘ

EDS was not executed - this section will therefore be empty.