



# Full wwPDB X-ray Structure Validation Report i

Feb 27, 2014 – 07:42 AM GMT

PDB ID : 1PBQ  
Title : CRYSTAL STRUCTURE OF THE NR1 LIGAND BINDING CORE IN COM-  
PLEX WITH 5,7-DICHLOROKYNURENICACID (DCKA) AT 1.90  
ANGSTROMS RESOLUTION  
Authors : Furukawa, H.; Gouaux, E.  
Deposited on : 2003-05-14  
Resolution : 1.90 Å(reported)

This is a full wwPDB 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/ValidationPDFNotes.html>

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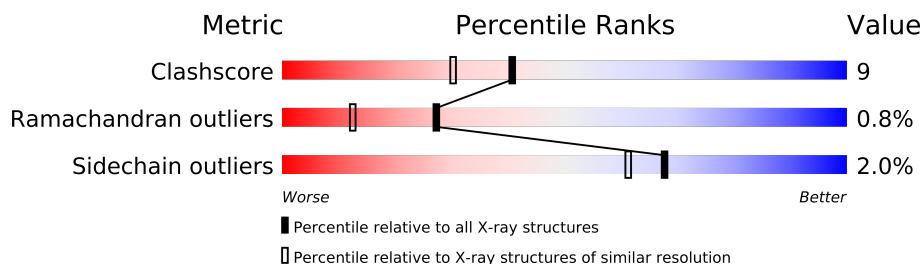
The following versions of software and data (see [references](#)) were used in the production of this report:

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 1.90 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	4465 (1.90-1.90)
Ramachandran outliers	78287	4413 (1.90-1.90)
Sidechain outliers	78261	4414 (1.90-1.90)

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	292	
1	B	292	

## 2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 4613 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.

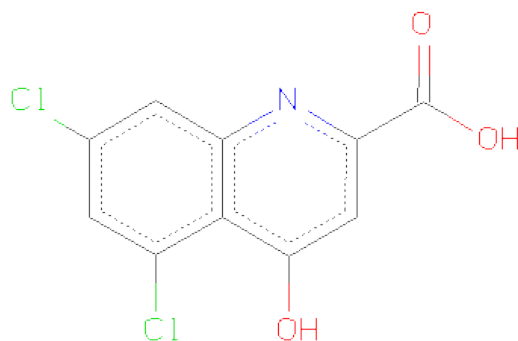
- Molecule 1 is a protein called N-methyl-D-aspartate Receptor Subunit 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	274	Total	C	N	O	S	0	0	0
			2065	1320	347	382	16			
1	B	266	Total	C	N	O	S	0	0	0
			2005	1281	339	369	16			

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	GLY	GLN	CLONING ARTIFACT	UNP P35439
A	153	GLY	-	SEE REMARK 999	UNP P35439
A	154	THR	-	SEE REMARK 999	UNP P35439

- Molecule 2 is 5,7-DICHLORO-4-HYDROXYQUINOLINE-2-CARBOXYLICACID (three-letter code: DK1) (formula: C<sub>10</sub>H<sub>5</sub>Cl<sub>2</sub>NO<sub>3</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 16	C 10	Cl 2	N 1	O 3	0	0
2	B	1	Total 16	C 10	Cl 2	N 1	O 3	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	254	Total 254	O 254	0	0
3	B	257	Total 257	O 257	0	0

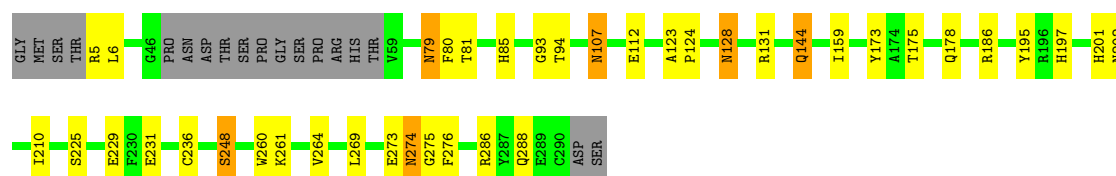
### 3 Residue-property plots

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.

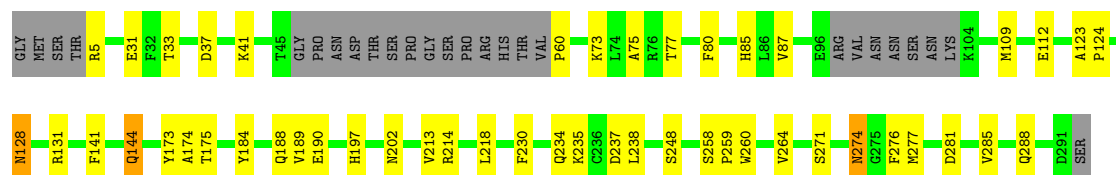
#### • Molecule 1: N-methyl-D-aspartate Receptor Subunit 1

Chain A: 



#### • Molecule 1: N-methyl-D-aspartate Receptor Subunit 1

Chain B: 



## 4 Data and refinement statistics

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

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	85.70Å 65.30Å 124.30Å 90.00° 98.10° 90.00°	Depositor
Resolution (Å)	9.99 – 1.90	Depositor
% Data completeness (in resolution range)	87.4 (9.99-1.90)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	CNS 1.0	Depositor
R, $R_{free}$	0.231 , 0.270	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	4613	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	28.0	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: DK1

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	0.34	0/2111	0.56	0/2867
1	B	0.33	0/2048	0.56	0/2779
All	All	0.34	0/4159	0.56	0/5646

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	2065	0	1914	35	0
1	B	2005	0	1871	38	0
2	A	16	0	3	0	0
2	B	16	0	3	0	0
3	A	254	0	0	3	0
3	B	257	0	0	2	0
All	All	4613	0	3791	73	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 9.

All (73) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:128:ASN:C	1:A:128:ASN:HD22	1.89	0.76
1:A:94:THR:H	1:A:107:ASN:ND2	1.84	0.75
1:B:128:ASN:HD22	1:B:128:ASN:C	1.89	0.74
1:B:173:TYR:H	1:B:197:HIS:HE1	1.33	0.74
1:B:128:ASN:ND2	1:B:131:ARG:H	1.86	0.74
1:A:128:ASN:ND2	1:A:131:ARG:H	1.88	0.72
1:A:173:TYR:H	1:A:197:HIS:HE1	1.41	0.69
1:A:286:ARG:HH11	1:A:286:ARG:HG3	1.60	0.66
1:B:128:ASN:HD21	1:B:131:ARG:H	1.43	0.66
1:A:94:THR:H	1:A:107:ASN:HD21	1.44	0.65
1:A:274:ASN:ND2	1:A:276:PHE:H	1.95	0.65
1:B:184:TYR:O	1:B:188:GLN:HG2	1.97	0.64
1:B:281:ASP:OD1	1:B:285:VAL:HG21	1.99	0.62
1:A:128:ASN:HD21	1:A:131:ARG:H	1.46	0.62
1:A:107:ASN:C	1:A:107:ASN:HD22	2.03	0.61
1:A:85:HIS:HE1	1:A:112:GLU:OE1	1.84	0.60
1:B:85:HIS:HE1	1:B:112:GLU:OE1	1.85	0.59
1:A:85:HIS:HD2	3:A:1080:HOH:O	1.84	0.58
1:A:210:ILE:HD13	1:A:231:GLU:HG3	1.84	0.58
1:A:269:LEU:O	1:A:273:GLU:HG3	2.04	0.57
1:A:225:SER:O	1:A:229:GLU:HG3	2.05	0.57
1:A:274:ASN:C	1:A:274:ASN:HD22	2.09	0.56
1:B:274:ASN:ND2	1:B:276:PHE:H	2.04	0.56
1:A:260:TRP:O	1:A:264:VAL:HG23	2.08	0.54
1:A:175:THR:H	1:A:202:ASN:ND2	2.05	0.54
1:B:60:PRO:N	3:B:1014:HOH:O	2.40	0.54
1:B:274:ASN:C	1:B:274:ASN:HD22	2.11	0.52
1:A:286:ARG:NH1	1:A:286:ARG:HG3	2.25	0.52
1:B:175:THR:H	1:B:202:ASN:ND2	2.08	0.51
1:B:141:PHE:HB2	1:B:277:MET:CE	2.40	0.51
1:A:123:ALA:HB1	1:A:124:PRO:HD2	1.93	0.51
1:B:5:ARG:HG2	1:B:5:ARG:HH11	1.75	0.51
1:A:128:ASN:C	1:A:128:ASN:ND2	2.62	0.50
1:B:128:ASN:C	1:B:128:ASN:ND2	2.62	0.50
1:A:274:ASN:HD22	1:A:275:GLY:N	2.11	0.49
1:B:214:ARG:HD3	1:B:235:LYS:HD3	1.95	0.49
1:B:141:PHE:HB2	1:B:277:MET:HE1	1.95	0.47
1:B:31:GLU:CD	1:B:41:LYS:HZ1	2.17	0.47
1:A:79:ASN:HD22	1:A:79:ASN:C	2.17	0.47
1:B:144:GLN:HE21	1:B:248:SER:HB3	1.80	0.47
1:A:236:CYS:HB2	3:A:1010:HOH:O	2.15	0.47
1:B:189:VAL:HG23	1:B:190:GLU:N	2.30	0.47

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:107:ASN:C	1:A:107:ASN:ND2	2.66	0.46
1:B:144:GLN:NE2	1:B:248:SER:HB3	2.31	0.46
1:A:186:ARG:HB2	1:A:195:TYR:CE2	2.50	0.46
1:B:174:ALA:HB1	1:B:202:ASN:HD22	1.81	0.45
1:B:213:VAL:HA	1:B:218:LEU:O	2.16	0.45
1:B:235:LYS:HE2	3:B:1166:HOH:O	2.15	0.45
1:B:214:ARG:HD2	1:B:237:ASP:OD2	2.17	0.45
1:B:274:ASN:HD22	1:B:276:PHE:H	1.65	0.45
1:B:5:ARG:HG2	1:B:5:ARG:NH1	2.33	0.44
1:A:178:GLN:NE2	1:A:178:GLN:HA	2.33	0.44
1:A:144:GLN:NE2	1:A:248:SER:HB3	2.31	0.44
1:B:123:ALA:HB1	1:B:124:PRO:HD2	1.99	0.44
1:A:79:ASN:C	1:A:79:ASN:ND2	2.71	0.43
1:B:271:SER:HA	1:B:274:ASN:HD21	1.82	0.43
1:A:6:LEU:HD12	1:A:80:PHE:CD1	2.53	0.43
1:A:274:ASN:HD22	1:A:276:PHE:H	1.65	0.43
1:B:260:TRP:O	1:B:264:VAL:HG23	2.18	0.43
1:A:93:GLY:HA2	1:A:107:ASN:ND2	2.33	0.43
1:B:73:LYS:O	1:B:77:THR:HG23	2.18	0.43
1:B:230:PHE:CE2	1:B:234:GLN:NE2	2.88	0.42
1:B:144:GLN:HB3	1:B:144:GLN:HE21	1.70	0.42
1:B:87:VAL:HB	1:B:109:MET:HG2	2.02	0.42
1:B:258:SER:HA	1:B:259:PRO:HD3	1.78	0.42
1:A:175:THR:H	1:A:202:ASN:HD22	1.67	0.41
1:B:75:ALA:HA	1:B:80:PHE:CE2	2.55	0.41
1:B:33:THR:HG23	1:B:37:ASP:O	2.20	0.41
1:A:5:ARG:HG2	1:A:81:THR:OG1	2.20	0.41
1:B:235:LYS:HD2	1:B:238:LEU:HD12	2.02	0.41
1:B:173:TYR:H	1:B:197:HIS:CE1	2.23	0.41
1:A:159:ILE:HG13	1:A:159:ILE:O	2.22	0.40
1:A:201:HIS:HD2	3:A:1224:HOH:O	2.03	0.40

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	270/292 (92%)	258 (96%)	9 (3%)	3 (1%)	21	7
1	B	260/292 (89%)	251 (96%)	8 (3%)	1 (0%)	43	29
All	All	530/584 (91%)	509 (96%)	17 (3%)	4 (1%)	27	12

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	288	GLN
1	A	288	GLN
1	A	248	SER
1	A	261	LYS

### 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	207/260 (80%)	202 (98%)	5 (2%)	61	53
1	B	202/260 (78%)	199 (98%)	3 (2%)	76	73
All	All	409/520 (79%)	401 (98%)	8 (2%)	68	61

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	79	ASN
1	A	107	ASN
1	A	128	ASN
1	A	144	GLN
1	A	274	ASN
1	B	128	ASN
1	B	144	GLN
1	B	274	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	79	ASN
1	A	85	HIS
1	A	100	ASN
1	A	102	ASN
1	A	107	ASN
1	A	117	GLN
1	A	128	ASN
1	A	129	ASN
1	A	144	GLN
1	A	178	GLN
1	A	197	HIS
1	A	201	HIS
1	A	202	ASN
1	A	263	ASN
1	A	274	ASN
1	B	85	HIS
1	B	117	GLN
1	B	128	ASN
1	B	129	ASN
1	B	144	GLN
1	B	188	GLN
1	B	197	HIS
1	B	202	ASN
1	B	234	GLN
1	B	274	ASN

### 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 ⓘ

2 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	DK1	A	1001	-	17,17,17	1.99	5 (29%)	25,25,25	1.88	8 (32%)
2	DK1	B	1002	-	17,17,17	2.11	5 (29%)	25,25,25	1.84	7 (28%)

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	DK1	A	1001	-	-	0/4/4/4	0/0/2/2
2	DK1	B	1002	-	-	0/4/4/4	0/0/2/2

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1002	DK1	O3-C4	-4.32	1.24	1.35
2	A	1001	DK1	O3-C4	-4.04	1.25	1.35
2	B	1002	DK1	C3-C4	3.21	1.47	1.38
2	B	1002	DK1	C4-C5	3.20	1.50	1.43
2	B	1002	DK1	O1-C2	-3.18	1.20	1.30
2	A	1001	DK1	O1-C2	-3.05	1.20	1.30
2	A	1001	DK1	C4-C5	3.01	1.49	1.43
2	A	1001	DK1	C3-C4	2.72	1.45	1.38
2	A	1001	DK1	O2-C2	2.38	1.30	1.23
2	B	1002	DK1	O2-C2	2.24	1.29	1.23

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1002	DK1	C1-N1-C10	3.78	123.23	117.73
2	A	1001	DK1	C3-C4-C5	-3.57	116.24	120.53
2	A	1001	DK1	O2-C2-C1	-3.53	113.50	121.09
2	A	1001	DK1	C4-C3-C1	3.50	121.73	119.09
2	B	1002	DK1	C3-C4-C5	-3.26	116.62	120.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1002	DK1	O2-C2-C1	-3.12	114.37	121.09
2	A	1001	DK1	C1-N1-C10	3.11	122.27	117.73
2	A	1001	DK1	O1-C2-C1	2.93	121.38	114.68
2	B	1002	DK1	C3-C1-C2	2.92	124.92	119.55
2	B	1002	DK1	C4-C3-C1	2.85	121.24	119.09
2	B	1002	DK1	O1-C2-C1	2.80	121.07	114.68
2	A	1001	DK1	C3-C1-C2	2.46	124.08	119.55
2	B	1002	DK1	C9-C10-C5	2.44	122.95	119.78
2	A	1001	DK1	C8-C9-C10	-2.24	117.50	119.54
2	A	1001	DK1	C9-C10-C5	2.15	122.57	119.78

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.