



Full wwPDB NMR Structure Validation Report ⓘ

Mar 3, 2022 – 09:28 AM EST

PDB ID : 2HYM
Title : NMR based Docking Model of the Complex between the Human Type I Interferon Receptor and Human Interferon alpha-2
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Deposited on : 2006-08-07

This is a Full wwPDB NMR Structure Validation 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/NMRValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
RCI : v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV : Wang et al. (2010)
ShiftChecker : 2.27
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.27

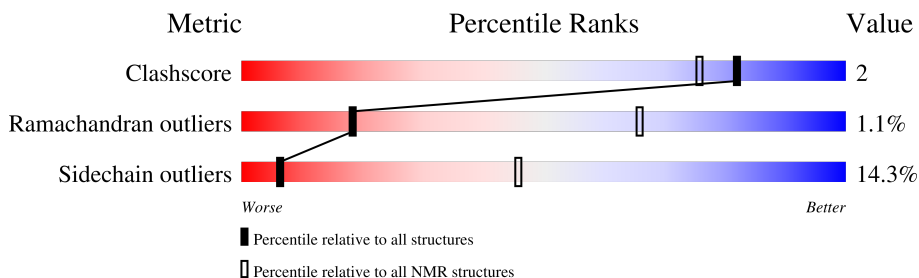
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment was not calculated.

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)	NMR archive (#Entries)
Clashscore	158937	12864
Ramachandran outliers	154571	11451
Sidechain outliers	154315	11428

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and 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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	212	
2	B	165	

2 Ensemble composition and analysis

This entry contains 10 models. Model 6 is the overall representative, medoid model (most similar to other models).

The following residues are included in the computation of the global validation metrics.

Well-defined (core) protein residues			
Well-defined core	Residue range (total)	Backbone RMSD (Å)	Medoid model
1	A:1-A:212, B:1-B:165 (377)	0.41	6

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 2 clusters and 1 single-model cluster was found.

Cluster number	Models
1	1, 2, 3, 5, 6, 8, 10
2	7, 9
Single-model clusters	4

3 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 6063 atoms, of which 3002 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Soluble IFN alpha/beta receptor.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	212	3363	1094	1653	270	336	10	0

- Molecule 2 is a protein called Interferon alpha-2.

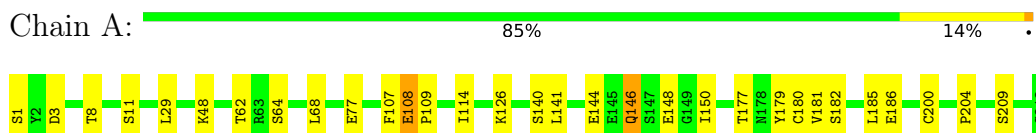
Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
2	B	165	2700	860	1349	227	255	9	0

4 Residue-property plots

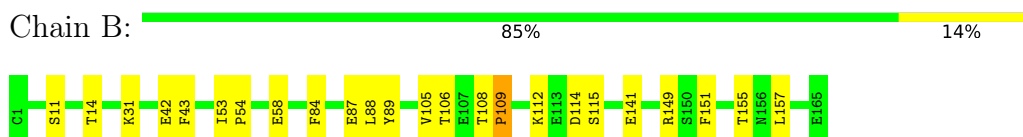
4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-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. Stretches of 2 or more consecutive residues without any outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

- Molecule 1: Soluble IFN alpha/beta receptor



- Molecule 2: Interferon alpha-2

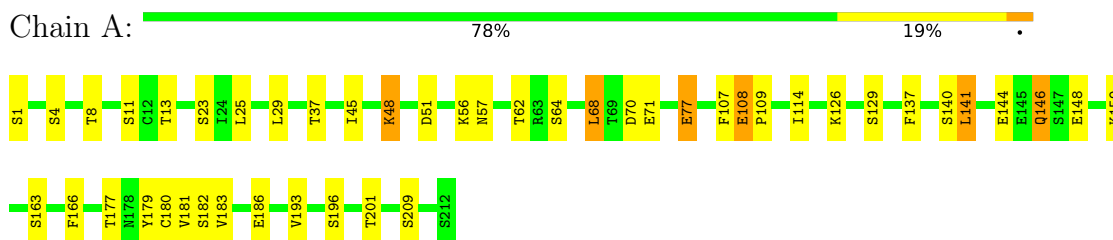


4.2 Scores per residue for each member of the ensemble

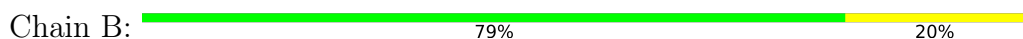
Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

- Molecule 1: Soluble IFN alpha/beta receptor



- Molecule 2: Interferon alpha-2

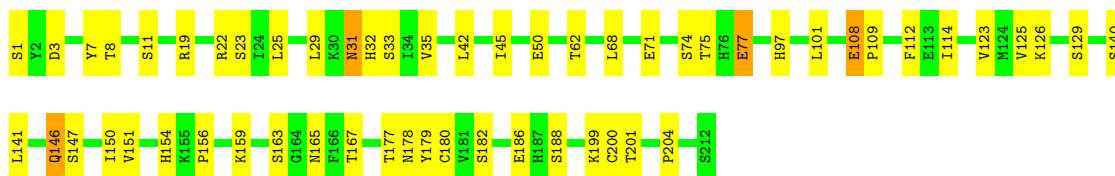




4.2.2 Score per residue for model 2

- Molecule 1: Soluble IFN alpha/beta receptor

Chain A: 74% 25%



- Molecule 2: Interferon alpha-2

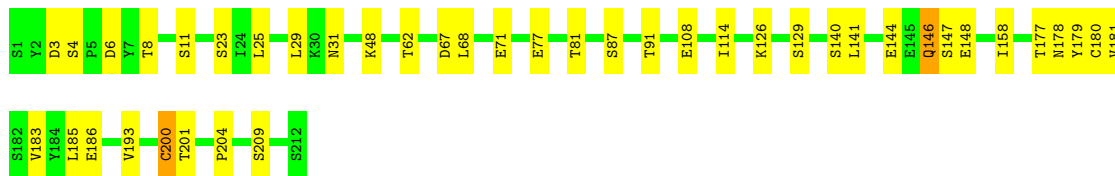
Chain B: 82% 17%



4.2.3 Score per residue for model 3

- Molecule 1: Soluble IFN alpha/beta receptor

Chain A: 80% 19%



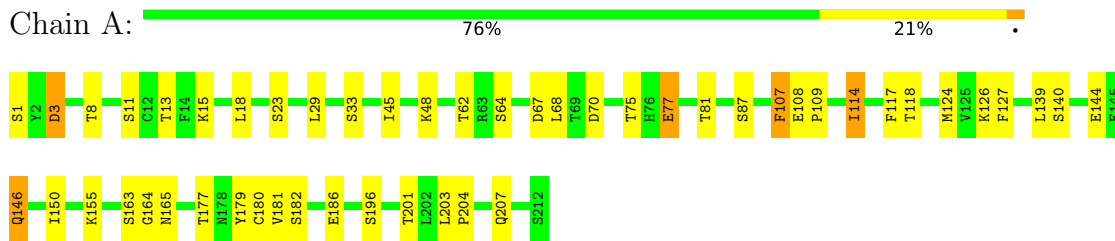
- Molecule 2: Interferon alpha-2

Chain B: 84% 15%

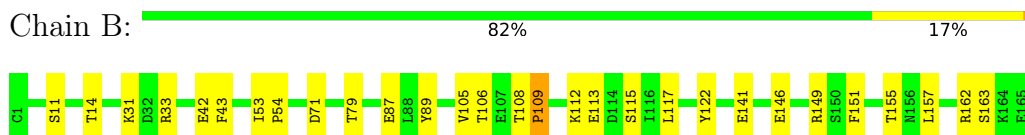


4.2.4 Score per residue for model 4

- Molecule 1: Soluble IFN alpha/beta receptor

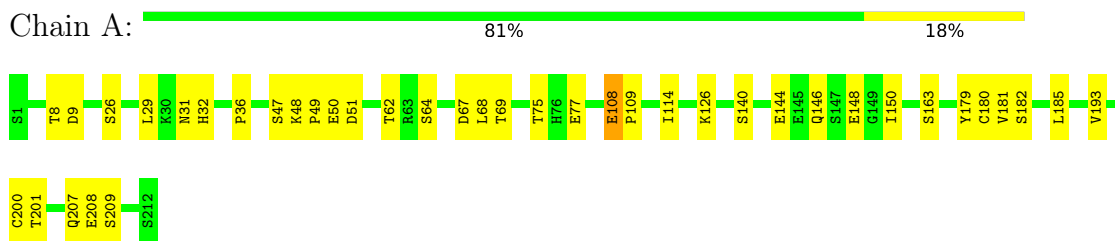


- Molecule 2: Interferon alpha-2

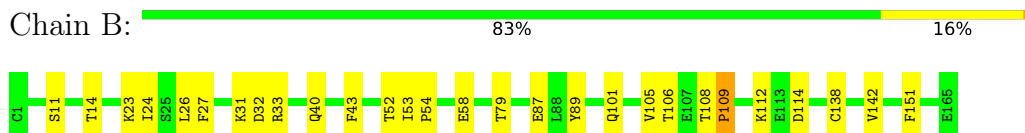


4.2.5 Score per residue for model 5

- Molecule 1: Soluble IFN alpha/beta receptor

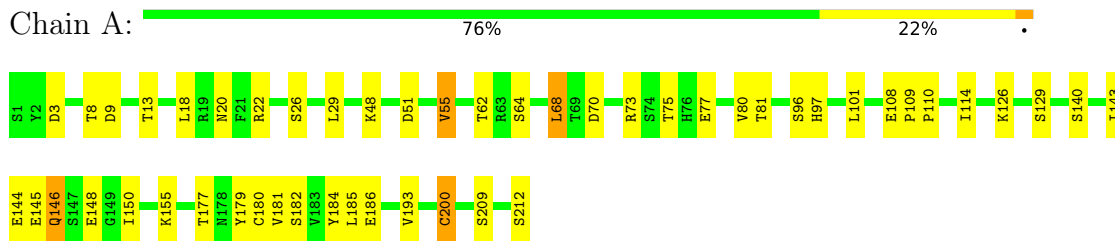


- Molecule 2: Interferon alpha-2

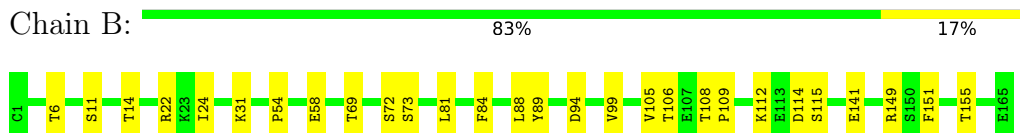


4.2.6 Score per residue for model 6 (medoid)

- Molecule 1: Soluble IFN alpha/beta receptor

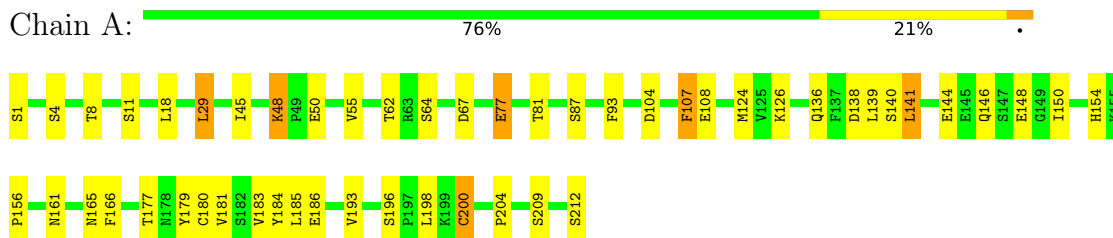


- Molecule 2: Interferon alpha-2

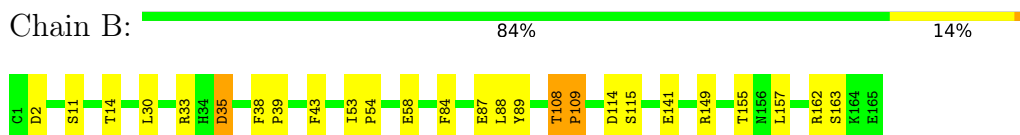


4.2.7 Score per residue for model 7

- Molecule 1: Soluble IFN alpha/beta receptor

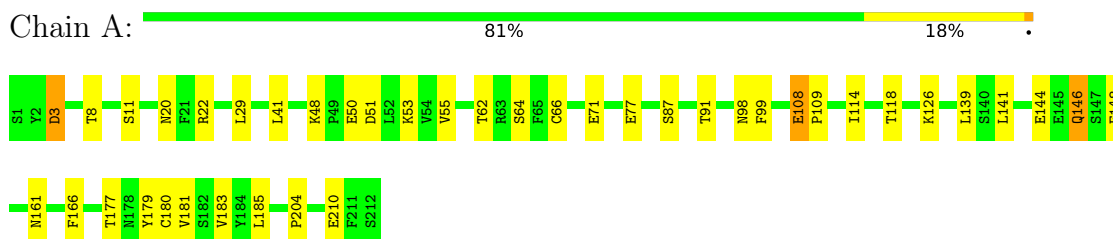


- Molecule 2: Interferon alpha-2

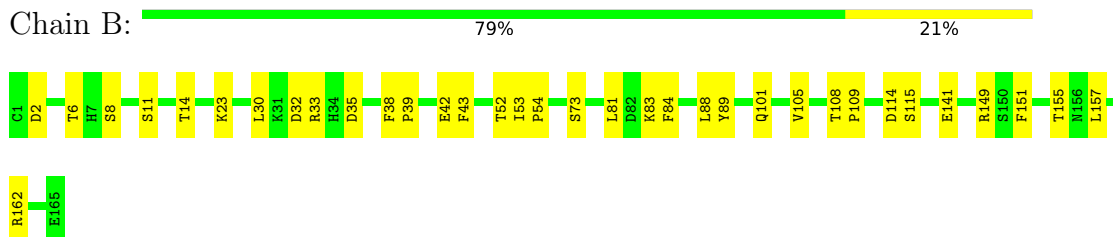


4.2.8 Score per residue for model 8

- Molecule 1: Soluble IFN alpha/beta receptor

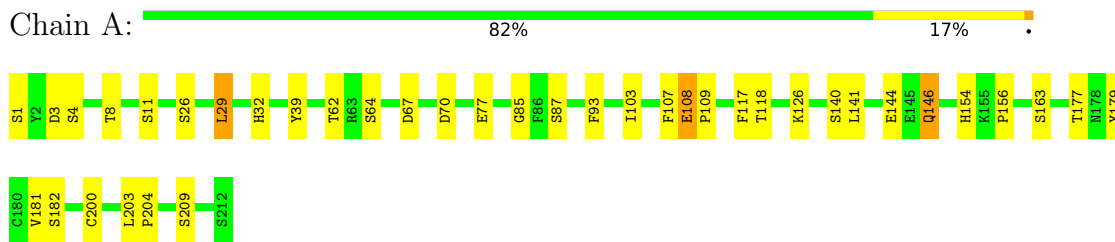


- Molecule 2: Interferon alpha-2

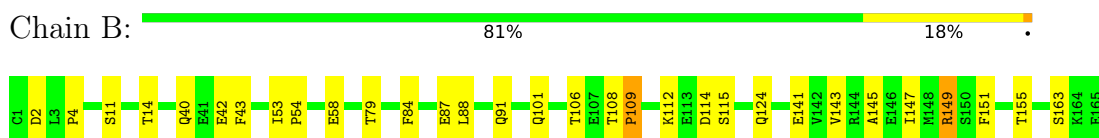


4.2.9 Score per residue for model 9

- Molecule 1: Soluble IFN alpha/beta receptor

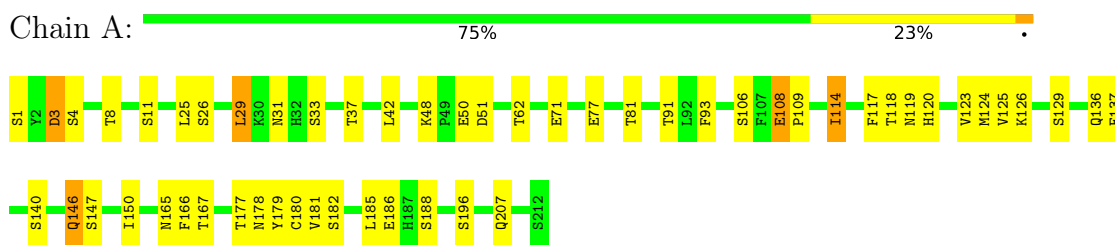


- Molecule 2: Interferon alpha-2

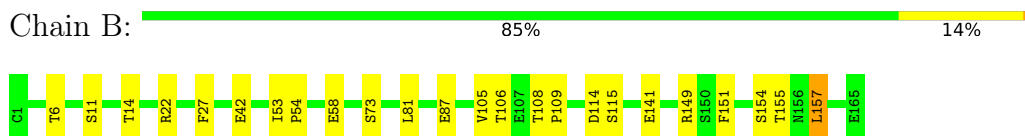


4.2.10 Score per residue for model 10

- Molecule 1: Soluble IFN alpha/beta receptor



- Molecule 2: Interferon alpha-2



5 Refinement protocol and experimental data overview

The models were refined using the following method: *Rigid body docking, semi-flexible simulated annealing, refinement using explicit water.*

Of the 200 calculated structures, 10 were deposited, based on the following criterion: *LOWEST ENERGY STRUCTURES OF LOWEST ENERGY CLUSTER.*

The following table shows the software used for structure solution, optimisation and refinement.

Software name	Classification	Version
HADDOCK	refinement	1.3

No chemical shift data was provided.

6 Model quality

6.1 Standard geometry

There are no covalent bond-length or bond-angle outliers.

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

There are no planarity outliers.

6.2 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 each 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 averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	A	1710	1653	1649	10±3
2	B	1351	1349	1347	6±1
All	All	30610	30020	29960	151

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 2.

All unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:141:LEU:HD11	1:A:183:VAL:HG13	0.63	1.70	7	4
1:A:146:GLN:O	1:A:179:TYR:HA	0.62	1.94	9	10
1:A:108:GLU:N	1:A:109:PRO:HD2	0.59	2.12	4	1
2:B:54:PRO:HD3	2:B:105:VAL:HG13	0.55	1.78	10	3
1:A:50:GLU:HB3	2:B:33:ARG:CZ	0.53	2.32	5	2
1:A:29:LEU:HG	1:A:93:PHE:CZ	0.53	2.39	7	3
1:A:108:GLU:H	1:A:109:PRO:CD	0.51	2.19	5	6
1:A:109:PRO:N	1:A:110:PRO:HD2	0.51	2.20	6	1
1:A:144:GLU:O	1:A:181:VAL:HA	0.51	2.06	7	7
1:A:154:HIS:O	1:A:156:PRO:HD3	0.50	2.06	7	3
2:B:109:PRO:O	2:B:112:LYS:HG2	0.50	2.07	9	6
1:A:124:MET:SD	1:A:165:ASN:HB2	0.50	2.47	4	3
1:A:108:GLU:H	1:A:109:PRO:HD2	0.49	1.67	5	4

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:B:108:THR:HG22	2:B:109:PRO:HD2	0.49	1.83	7	1
2:B:84:PHE:O	2:B:88:LEU:HG	0.49	2.08	6	7
1:A:49:PRO:HG3	2:B:26:LEU:O	0.49	2.07	5	1
1:A:184:TYR:CE1	1:A:193:VAL:HG12	0.49	2.43	6	2
1:A:18:LEU:HD23	1:A:107:PHE:CE2	0.48	2.43	4	2
1:A:45:ILE:HB	1:A:77:GLU:OE2	0.48	2.09	7	4
2:B:53:ILE:N	2:B:54:PRO:HD2	0.48	2.24	1	9
1:A:146:GLN:HA	1:A:150:ILE:O	0.47	2.09	5	6
2:B:154:SER:O	2:B:157:LEU:HB2	0.47	2.10	10	2
2:B:30:LEU:O	2:B:33:ARG:HD3	0.47	2.08	8	1
2:B:54:PRO:HD3	2:B:105:VAL:CG1	0.47	2.40	8	4
1:A:112:PHE:O	1:A:199:LYS:HE3	0.47	2.10	2	1
1:A:20:ASN:O	1:A:22:ARG:HG3	0.47	2.09	6	2
2:B:38:PHE:CD1	2:B:39:PRO:HD2	0.46	2.45	8	3
2:B:113:GLU:O	2:B:117:LEU:HG	0.46	2.09	4	1
1:A:147:SER:HA	1:A:178:ASN:O	0.46	2.11	2	2
1:A:179:TYR:CE1	1:A:201:THR:HB	0.46	2.45	2	1
1:A:123:VAL:O	1:A:167:THR:HA	0.45	2.11	2	2
2:B:22:ARG:HD3	2:B:24:ILE:O	0.45	2.10	6	1
2:B:73:SER:HA	2:B:81:LEU:CD1	0.45	2.42	6	2
1:A:56:LYS:O	1:A:57:ASN:HB3	0.45	2.11	1	1
2:B:99:VAL:HG22	2:B:105:VAL:HG11	0.45	1.89	6	1
1:A:31:ASN:OD1	1:A:35:VAL:HG13	0.45	2.12	2	1
1:A:138:ASP:OD1	2:B:162:ARG:HD3	0.45	2.11	7	1
1:A:179:TYR:O	1:A:200:CYS:HA	0.44	2.13	3	3
1:A:55:VAL:HG11	1:A:68:LEU:HD23	0.44	1.89	6	1
1:A:161:ASN:HB3	1:A:166:PHE:CE2	0.43	2.48	8	1
1:A:161:ASN:HB3	1:A:166:PHE:CD1	0.43	2.47	7	1
1:A:127:PHE:HB2	1:A:164:GLY:O	0.43	2.14	4	1
1:A:68:LEU:CB	1:A:71:GLU:HB2	0.43	2.44	1	1
2:B:127:THR:O	2:B:131:LYS:HG3	0.43	2.14	1	1
2:B:22:ARG:HD3	2:B:144:ARG:CZ	0.43	2.44	1	1
1:A:112:PHE:HB3	1:A:125:VAL:HG13	0.43	1.91	2	1
1:A:48:LYS:HE3	2:B:35:ASP:OD1	0.43	2.13	1	1
1:A:50:GLU:HB2	2:B:30:LEU:O	0.42	2.14	7	2
1:A:179:TYR:CZ	1:A:201:THR:HB	0.42	2.49	5	3
2:B:122:TYR:OH	2:B:146:GLU:HB3	0.42	2.14	4	2
1:A:114:ILE:HD13	1:A:181:VAL:HB	0.42	1.92	10	2
2:B:41:GLU:O	2:B:45:ASN:HB2	0.42	2.15	2	1
1:A:55:VAL:HG11	1:A:66:CYS:SG	0.42	2.54	8	1
2:B:73:SER:HA	2:B:81:LEU:HD13	0.42	1.91	8	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:B:145:ALA:O	2:B:149:ARG:HB2	0.42	2.15	9	1
1:A:117:PHE:O	1:A:203:LEU:HB2	0.42	2.15	9	2
1:A:70:ASP:OD1	1:A:73:ARG:HD3	0.42	2.15	6	1
1:A:85:GLY:HA3	1:A:93:PHE:CZ	0.41	2.49	9	1
1:A:141:LEU:O	1:A:156:PRO:HD2	0.41	2.14	2	1
1:A:8:THR:O	1:A:32:HIS:HB2	0.41	2.14	5	1
1:A:48:LYS:HE2	2:B:35:ASP:OD1	0.41	2.16	7	1
1:A:19:ARG:O	1:A:22:ARG:HB2	0.41	2.15	2	1
2:B:143:VAL:O	2:B:147:ILE:HG12	0.41	2.16	9	1
1:A:125:VAL:HB	1:A:166:PHE:HB3	0.41	1.91	10	1
1:A:117:PHE:HB2	1:A:120:HIS:O	0.41	2.16	10	1
1:A:108:GLU:N	1:A:109:PRO:CD	0.40	2.84	1	1
2:B:138:CYS:O	2:B:142:VAL:HG23	0.40	2.17	5	1
1:A:179:TYR:CE2	1:A:201:THR:HB	0.40	2.51	4	1

6.3 Torsion angles [i](#)

6.3.1 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 PDB entries followed by that with respect to all NMR entries. 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	210/212 (99%)	180±3 (85±1%)	28±3 (13±1%)	3±1 (1±1%)	16	63
2	B	163/165 (99%)	145±2 (89±1%)	16±2 (10±1%)	1±1 (1±0%)	21	69
All	All	3730/3770 (99%)	3248 (87%)	441 (12%)	41 (1%)	18	66

All 12 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	108	GLU	9
2	B	109	PRO	9
1	A	3	ASP	7
1	A	204	PRO	6
2	B	31	LYS	3
1	A	159	LYS	1
1	A	158	ILE	1

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Mol	Chain	Res	Type	Models (Total)
2	B	162	ARG	1
2	B	24	ILE	1
1	A	104	ASP	1
1	A	103	ILE	1
1	A	106	SER	1

6.3.2 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 PDB entries followed by that with respect to all NMR entries. 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	201/201 (100%)	169±4 (84±2%)	32±4 (16±2%)	5	42
2	B	152/152 (100%)	133±2 (88±1%)	19±2 (12±1%)	8	50
All	All	3530/3530 (100%)	3026 (86%)	504 (14%)	6	46

All 134 unique residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	29	LEU	10
1	A	62	THR	10
1	A	77	GLU	10
1	A	126	LYS	10
2	B	11	SER	10
2	B	14	THR	10
2	B	108	THR	10
1	A	8	THR	9
1	A	140	SER	9
1	A	177	THR	9
1	A	180	CYS	9
1	A	11	SER	8
1	A	48	LYS	8
1	A	114	ILE	8
1	A	146	GLN	8
2	B	106	THR	8
2	B	115	SER	8
2	B	141	GLU	8
2	B	149	ARG	8

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Mol	Chain	Res	Type	Models (Total)
2	B	155	THR	8
2	B	114	ASP	8
2	B	151	PHE	8
1	A	64	SER	7
1	A	182	SER	7
1	A	186	GLU	7
2	B	43	PHE	7
2	B	58	GLU	7
2	B	87	GLU	7
2	B	89	TYR	7
1	A	1	SER	6
1	A	68	LEU	6
1	A	148	GLU	6
1	A	209	SER	6
2	B	42	GLU	6
1	A	200	CYS	6
1	A	185	LEU	6
1	A	4	SER	5
1	A	51	ASP	5
1	A	129	SER	5
1	A	163	SER	5
2	B	40	GLN	5
1	A	67	ASP	5
1	A	81	THR	5
1	A	87	SER	5
2	B	157	LEU	5
1	A	23	SER	4
1	A	25	LEU	4
1	A	107	PHE	4
1	A	196	SER	4
2	B	6	THR	4
1	A	31	ASN	4
1	A	71	GLU	4
1	A	75	THR	4
2	B	52	THR	4
2	B	79	THR	4
1	A	118	THR	4
1	A	26	SER	4
1	A	13	THR	3
1	A	70	ASP	3
1	A	141	LEU	3
1	A	193	VAL	3

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Mol	Chain	Res	Type	Models (Total)
2	B	83	LYS	3
2	B	162	ARG	3
1	A	33	SER	3
2	B	31	LYS	3
2	B	32	ASP	3
1	A	91	THR	3
1	A	3	ASP	3
1	A	139	LEU	3
1	A	207	GLN	3
2	B	163	SER	3
2	B	101	GLN	3
2	B	2	ASP	3
1	A	37	THR	2
1	A	137	PHE	2
1	A	32	HIS	2
1	A	42	LEU	2
1	A	97	HIS	2
1	A	101	LEU	2
1	A	188	SER	2
2	B	91	GLN	2
1	A	155	LYS	2
2	B	33	ARG	2
1	A	9	ASP	2
2	B	23	LYS	2
2	B	27	PHE	2
1	A	55	VAL	2
1	A	212	SER	2
1	A	136	GLN	2
2	B	35	ASP	2
1	A	159	LYS	1
1	A	166	PHE	1
2	B	77	ASP	1
2	B	127	THR	1
1	A	7	TYR	1
1	A	74	SER	1
1	A	151	VAL	1
1	A	165	ASN	1
2	B	51	GLU	1
2	B	133	LYS	1
1	A	6	ASP	1
2	B	25	SER	1
2	B	121	LYS	1

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Mol	Chain	Res	Type	Models (Total)
2	B	152	SER	1
1	A	15	LYS	1
1	A	144	GLU	1
2	B	71	ASP	1
1	A	36	PRO	1
1	A	47	SER	1
1	A	69	THR	1
1	A	208	GLU	1
1	A	18	LEU	1
1	A	80	VAL	1
1	A	96	SER	1
1	A	143	ILE	1
1	A	145	GLU	1
2	B	69	THR	1
2	B	72	SER	1
2	B	94	ASP	1
1	A	198	LEU	1
1	A	41	LEU	1
1	A	53	LYS	1
1	A	98	ASN	1
1	A	99	PHE	1
1	A	210	GLU	1
2	B	8	SER	1
1	A	39	TYR	1
2	B	4	PRO	1
2	B	124	GLN	1
1	A	50	GLU	1
1	A	119	ASN	1
1	A	147	SER	1
1	A	178	ASN	1
2	B	22	ARG	1

6.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

There are no non-standard protein/DNA/RNA residues in this entry.

6.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.6 Ligand geometry [i](#)

There are no ligands in this entry.

6.7 Other polymers [i](#)

There are no such molecules in this entry.

6.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

7 Chemical shift validation

No chemical shift data were provided