Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 08:48 PM UTC

PDB ID	:	6EHV / pdb_00006ehv
Title	:	scFv AbVance: increasing our knowledge of antibody structural space to enable faster and better decision making in drug discovery
Authors	:	Hargreaves, D.
Deposited on	:	2017-09-15
Resolution	:	2.54 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*
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:

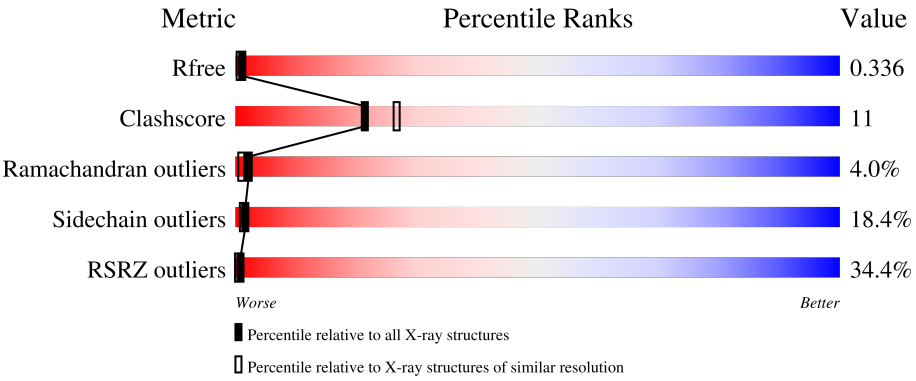
MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.54 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}	180053	1091 (2.54-2.54)
Clashscore	190562	1120 (2.54-2.54)
Ramachandran outliers	187476	1106 (2.54-2.54)
Sidechain outliers	187428	1106 (2.54-2.54)
RSRZ outliers	180081	1091 (2.54-2.54)

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 <=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	X	254	31% 56% 26% 5% • 11%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 1848 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 scFv AbVance: increasing our knowledge of antibody structural space to enable faster and better decision making in drug discovery.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	X	227	1776	1121	305	343	7	0	0	0

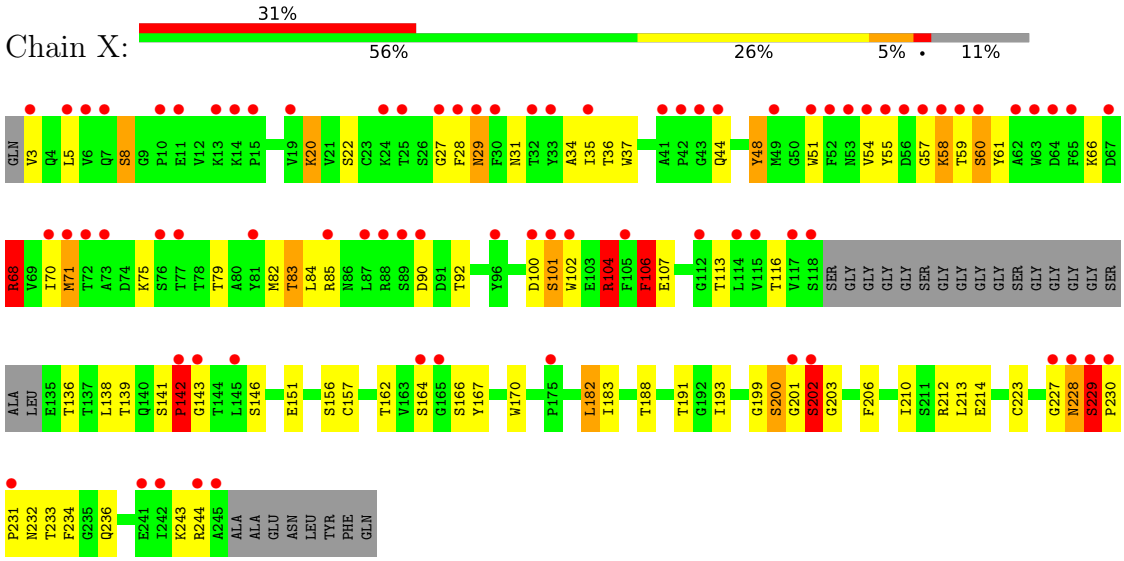
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
2	X	72	72	72	0	0

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: scFv AbVance: increasing our knowledge of antibody structural space to enable faster and better decision making in drug discovery



4 Data and refinement statistics (i)

Property	Value	Source
Space group	I 41 2 2	Depositor
Cell constants a, b, c, α, β, γ	132.90Å 132.90Å 80.75Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	38.84 – 2.54 38.84 – 2.54	Depositor EDS
% Data completeness (in resolution range)	99.0 (38.84-2.54) 98.9 (38.84-2.54)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.84 (at 2.54Å)	Xtriage
Refinement program	BUSTER 2.11.6	Depositor
R, R_{free}	0.275 , 0.314 0.287 , 0.336	Depositor DCC
R_{free} test set	598 reflections (4.94%)	wwPDB-VP
Wilson B-factor (Å^2)	57.4	Xtriage
Anisotropy	0.006	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 82.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.89	EDS
Total number of atoms	1848	wwPDB-VP
Average B, all atoms (Å^2)	61.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.66% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

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	X	0.87	0/1821	1.40	18/2473 (0.7%)

There are no bond length outliers.

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	X	143	GLY	N-CA-C	9.32	126.80	110.95
1	X	142	PRO	CA-C-N	8.27	129.77	120.42
1	X	142	PRO	C-N-CA	8.27	129.77	120.42
1	X	199	GLY	CA-C-N	8.13	137.06	121.54
1	X	199	GLY	C-N-CA	8.13	137.06	121.54
1	X	244	ARG	CA-C-N	7.29	134.82	121.70
1	X	244	ARG	C-N-CA	7.29	134.82	121.70
1	X	104	ARG	CA-C-N	6.64	130.59	120.82
1	X	104	ARG	C-N-CA	6.64	130.59	120.82
1	X	233	THR	N-CA-C	6.05	119.80	110.42
1	X	141	SER	CA-C-O	-6.00	115.03	121.27
1	X	243	LYS	N-CA-C	5.56	117.46	110.24
1	X	106	PHE	CA-CB-CG	5.50	119.30	113.80
1	X	199	GLY	N-CA-C	5.40	122.21	112.54
1	X	142	PRO	N-CA-C	5.28	123.34	112.47
1	X	29	ASN	CA-C-N	5.15	127.69	120.28
1	X	29	ASN	C-N-CA	5.15	127.69	120.28
1	X	234	PHE	CA-CB-CG	5.11	118.91	113.80

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	X	1776	0	1708	38	0
2	X	72	0	0	0	0
All	All	1848	0	1708	38	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 11.

All (38) 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:X:162:THR:HG23	1:X:203:GLY:HA3	1.71	0.73
1:X:201:GLY:O	1:X:202:SER:HB2	1.94	0.67
1:X:3:VAL:HA	1:X:27:GLY:HA3	1.76	0.67
1:X:162:THR:HG23	1:X:203:GLY:CA	2.24	0.66
1:X:142:PRO:HG3	1:X:156:SER:H	1.61	0.66
1:X:61:TYR:HB2	1:X:66:LYS:HD2	1.79	0.65
1:X:70:ILE:HB	1:X:83:THR:HG23	1.80	0.64
1:X:228:ASN:HD22	1:X:229:SER:H	1.47	0.63
1:X:8:SER:HB3	1:X:22:SER:HB2	1.84	0.58
1:X:31:ASN:HA	1:X:54:VAL:HG11	1.86	0.58
1:X:55:TYR:HB2	1:X:58:LYS:HB2	1.87	0.56
1:X:92:THR:HG23	1:X:116:THR:HA	1.88	0.56
1:X:20:LYS:HG2	1:X:83:THR:HB	1.86	0.55
1:X:139:THR:CG2	1:X:223:CYS:SG	2.96	0.54
1:X:151:GLU:O	1:X:213:LEU:HB2	2.08	0.53
1:X:167:TYR:CG	1:X:227:GLY:HA3	2.42	0.53
1:X:31:ASN:HA	1:X:54:VAL:CG1	2.41	0.50
1:X:51:TRP:CD1	1:X:101:SER:HB2	2.49	0.47
1:X:142:PRO:HD3	1:X:156:SER:O	2.15	0.47
1:X:136:THR:HA	1:X:231:PRO:HG2	1.97	0.46
1:X:34:ALA:HB3	1:X:100:ASP:HA	1.97	0.46
1:X:101:SER:HA	1:X:106:PHE:CE1	2.52	0.45
1:X:100:ASP:HB3	1:X:104:ARG:HG3	1.97	0.44
1:X:68:ARG:HA	1:X:85:ARG:HD2	2.00	0.44
1:X:167:TYR:CD2	1:X:227:GLY:HA3	2.52	0.44
1:X:139:THR:HG23	1:X:157:CYS:SG	2.59	0.43
1:X:51:TRP:HD1	1:X:101:SER:OG	2.02	0.43
1:X:106:PHE:HD1	1:X:106:PHE:N	2.17	0.43
1:X:106:PHE:N	1:X:106:PHE:CD1	2.87	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:X:8:SER:O	1:X:113:THR:HG21	2.18	0.42
1:X:37:TRP:HD1	1:X:71:MET:CE	2.32	0.42
1:X:157:CYS:HB3	1:X:206:PHE:HB2	2.01	0.42
1:X:102:TRP:HZ2	1:X:230:PRO:HA	1.84	0.42
1:X:182:LEU:HD12	1:X:193:ILE:HD12	2.01	0.42
1:X:170:TRP:HB2	1:X:183:ILE:HB	2.02	0.42
1:X:55:TYR:C	1:X:57:GLY:H	2.29	0.41
1:X:48:TYR:CD2	1:X:232:ASN:HB3	2.56	0.41
1:X:51:TRP:O	1:X:59:THR:O	2.39	0.41

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	X	223/254 (88%)	186 (83%)	28 (13%)	9 (4%)	2 1

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	X	60	SER
1	X	200	SER
1	X	202	SER
1	X	29	ASN
1	X	68	ARG
1	X	229	SER
1	X	142	PRO
1	X	164	SER
1	X	8	SER

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	X	190/202 (94%)	155 (82%)	35 (18%)	1 1

All (35) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	X	5	LEU
1	X	20	LYS
1	X	28	PHE
1	X	35	ILE
1	X	36	THR
1	X	44	GLN
1	X	48	TYR
1	X	58	LYS
1	X	60	SER
1	X	68	ARG
1	X	71	MET
1	X	75	LYS
1	X	79	THR
1	X	82	MET
1	X	83	THR
1	X	84	LEU
1	X	90	ASP
1	X	101	SER
1	X	104	ARG
1	X	106	PHE
1	X	107	GLU
1	X	138	LEU
1	X	146	SER
1	X	166	SER
1	X	182	LEU
1	X	188	THR
1	X	191	THR
1	X	200	SER
1	X	202	SER
1	X	210	ILE

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Mol	Chain	Res	Type
1	X	212	ARG
1	X	214	GLU
1	X	228	ASN
1	X	229	SER
1	X	236	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	X	29	ASN
1	X	31	ASN
1	X	86	ASN
1	X	108	HIS
1	X	225	GLN
1	X	228	ASN

5.3.3 RNA (i)

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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

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^{th} 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	X	227/254 (89%)	1.67	78 (34%)	1	0	33, 57, 91, 122	0

All (78) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	X	230	PRO	6.8
1	X	63	TRP	6.7
1	X	245	ALA	6.7
1	X	52	PHE	6.4
1	X	58	LYS	5.9
1	X	51	TRP	5.5
1	X	57	GLY	4.8
1	X	229	SER	4.7
1	X	10	PRO	4.7
1	X	228	ASN	4.6
1	X	3	VAL	4.5
1	X	27	GLY	4.1
1	X	142	PRO	4.1
1	X	244	ARG	4.0
1	X	201	GLY	4.0
1	X	54	VAL	4.0
1	X	231	PRO	3.9
1	X	114	LEU	3.8
1	X	118	SER	3.8
1	X	19	VAL	3.8
1	X	6	VAL	3.7
1	X	30	PHE	3.7
1	X	55	TYR	3.7
1	X	32	THR	3.6
1	X	101	SER	3.5
1	X	59	THR	3.5
1	X	241	GLU	3.4

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Mol	Chain	Res	Type	RSRZ
1	X	28	PHE	3.3
1	X	102	TRP	3.2
1	X	202	SER	3.2
1	X	77	THR	3.1
1	X	24	LYS	3.1
1	X	62	ALA	3.1
1	X	65	PHE	3.1
1	X	67	ASP	3.0
1	X	71	MET	3.0
1	X	53	ASN	3.0
1	X	41	ALA	2.9
1	X	164	SER	2.9
1	X	89	SER	2.9
1	X	105	PHE	2.9
1	X	42	PRO	2.8
1	X	25	THR	2.8
1	X	11	GLU	2.8
1	X	90	ASP	2.7
1	X	33	TYR	2.6
1	X	73	ALA	2.6
1	X	72	THR	2.6
1	X	56	ASP	2.6
1	X	14	LYS	2.6
1	X	44	GLN	2.6
1	X	35	ILE	2.5
1	X	70	ILE	2.5
1	X	81	TYR	2.5
1	X	29	ASN	2.5
1	X	43	GLY	2.4
1	X	112	GLY	2.4
1	X	165	GLY	2.4
1	X	87	LEU	2.4
1	X	117	VAL	2.4
1	X	15	PRO	2.3
1	X	88	ARG	2.3
1	X	100	ASP	2.3
1	X	7	GLN	2.3
1	X	227	GLY	2.3
1	X	175	PRO	2.2
1	X	242	ILE	2.2
1	X	76	SER	2.2
1	X	5	LEU	2.2

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Mol	Chain	Res	Type	RSRZ
1	X	64	ASP	2.2
1	X	143	GLY	2.1
1	X	60	SER	2.1
1	X	13	LYS	2.1
1	X	49	MET	2.1
1	X	115	VAL	2.0
1	X	85	ARG	2.0
1	X	145	LEU	2.0
1	X	96	TYR	2.0

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

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

6.3 Carbohydrates (i)

There are no oligosaccharides in this entry.

6.4 Ligands (i)

There are no ligands in this entry.

6.5 Other polymers (i)

There are no such residues in this entry.