



# Full wwPDB X-ray Structure Validation Report ⓘ

May 13, 2020 – 12:10 am BST

PDB ID : 4P5T  
Title : 14.C6 TCR complexed with MHC class II I-Ab/3K peptide  
Authors : Trenh, P.; Stadinski, B.; Huseby, E.S.; Stern, L.J.  
Deposited on : 2014-03-19  
Resolution : 3.26 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

<https://www.wwpdb.org/validation/2017/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  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

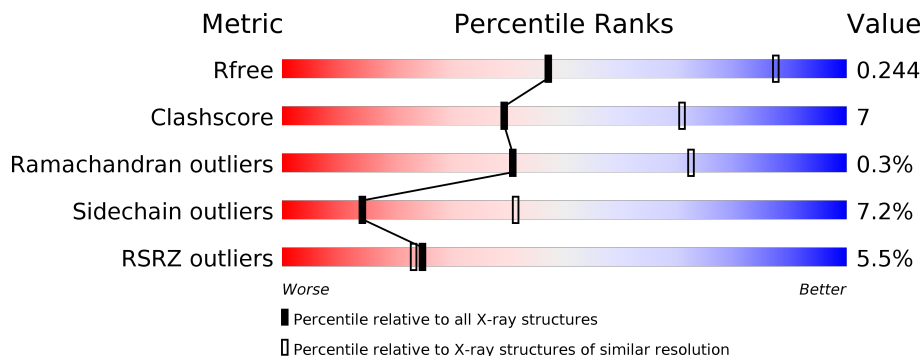
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.26 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))
$R_{free}$	130704	1191 (3.30-3.22)
Clashscore	141614	1251 (3.30-3.22)
Ramachandran outliers	138981	1229 (3.30-3.22)
Sidechain outliers	138945	1228 (3.30-3.22)
RSRZ outliers	127900	1154 (3.30-3.22)

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 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  $\leq 5\%$ . 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	206	
1	E	206	
2	B	241	
2	F	241	
3	C	182	
3	G	182	

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Mol	Chain	Length	Quality of chain
4	D	217	 <p>71% 18% • 8%</p>
4	H	217	 <p>2% 69% 19% • 8%</p>

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 12366 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 TRA protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	197	1488	948	241	292	7	0	0	0
1	E	188	1403	902	223	272	6	0	0	0

- Molecule 2 is a protein called Human nkt tcr beta chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	238	1815	1146	318	345	6	0	0	0
2	F	229	1725	1091	300	328	6	0	0	0

- Molecule 3 is a protein called H-2 class II histocompatibility antigen, A-B alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	179	1381	897	215	266	3	0	0	0
3	G	179	1377	895	214	265	3	0	0	0

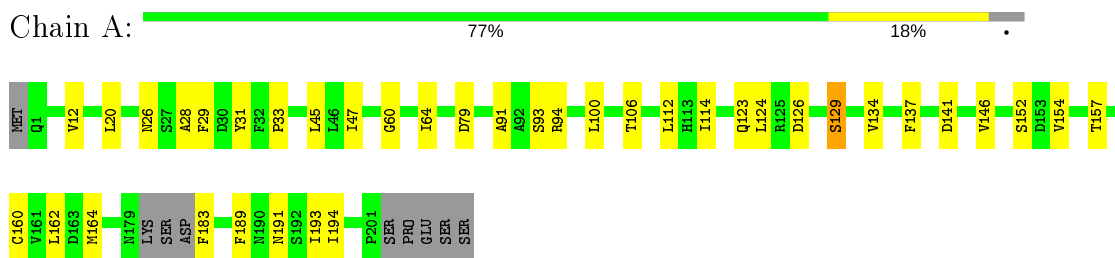
- Molecule 4 is a protein called protein of 3K peptide (FEAQKAKANKAVD), Linker region - GGGGSLVPRGSGGGG, H-2 class II histocompatibility antigen, A beta chain, H-2 class II histocompatibility antigen, A beta chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	199	1593	1001	279	307	6	0	0	0
4	H	199	1584	997	275	306	6	0	0	0

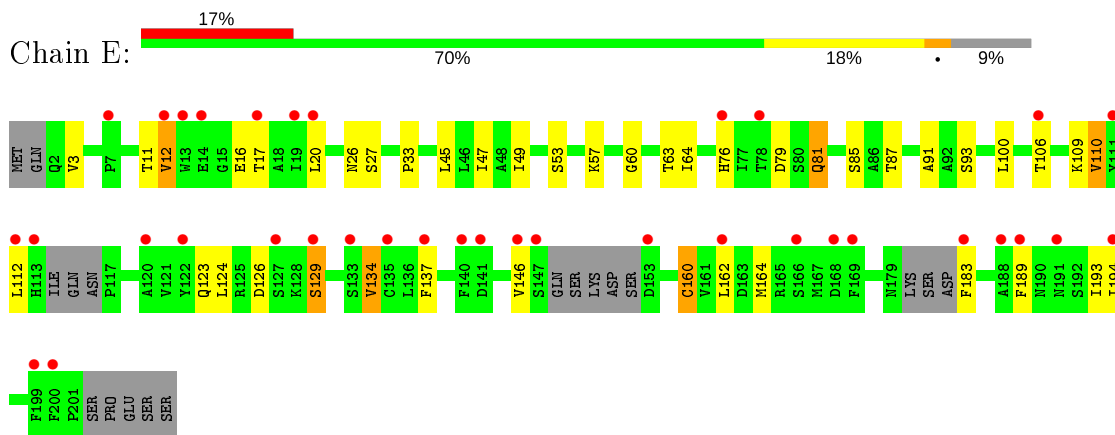
### 3 Residue-property plots [i](#)

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.

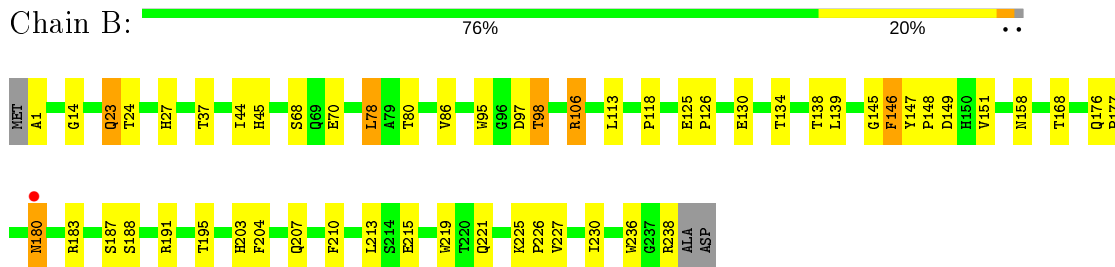
- Molecule 1: TRA protein



- Molecule 1: TRA protein

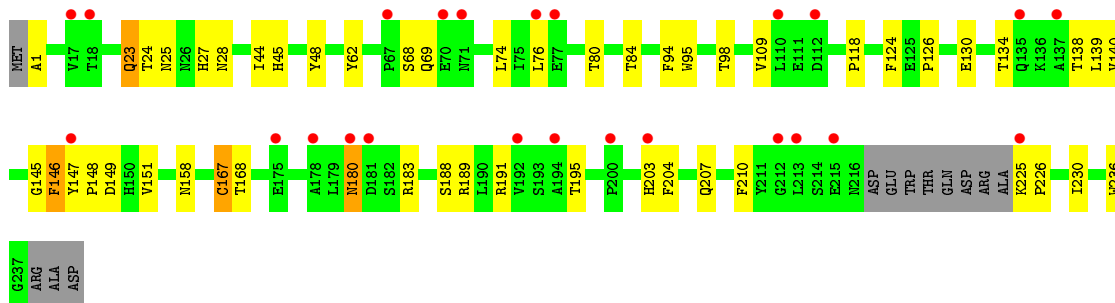


- Molecule 2: Human nkt tcr beta chain



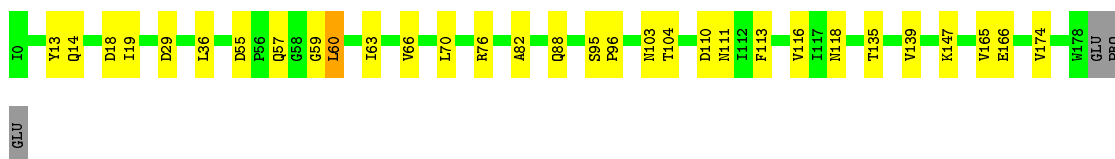
- Molecule 2: Human nkt tcr beta chain





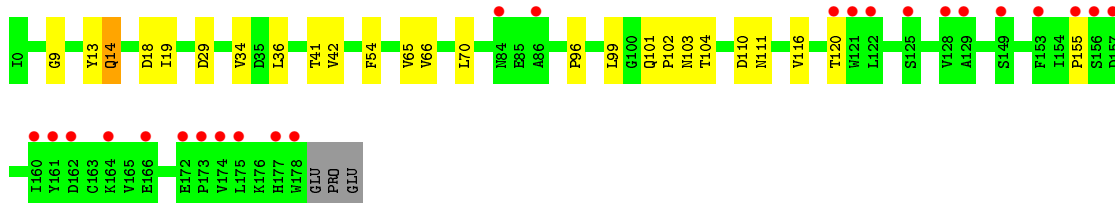
- Molecule 3: H-2 class II histocompatibility antigen, A-B alpha chain

Chain C: 81% 16% ..



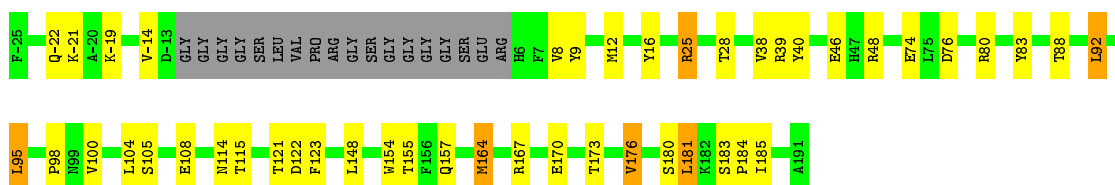
- Molecule 3: H-2 class II histocompatibility antigen, A-B alpha chain

Chain G: 13% 85% 13% ..



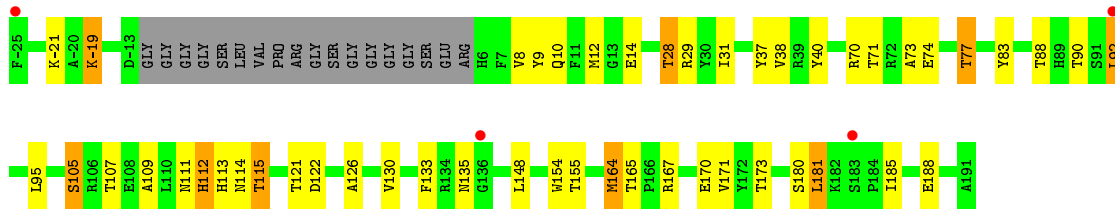
- Molecule 4: protein of 3K peptide (FEAQKAKANKAVD), Linker region - GGGSLVPRGSGGGG, H-2 class II histocompatibility antigen, A beta chain, H-2 class II histocompatibility antigen, A beta chain

Chain D: 71% 18% 8%



- Molecule 4: protein of 3K peptide (FEAQKAKANKAVD), Linker region - GGGSLVPRGSGGGG, H-2 class II histocompatibility antigen, A beta chain, H-2 class II histocompatibility antigen, A beta chain

Chain H: 2% 69% 19% 8%



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	66.01Å 74.14Å 259.29Å 90.00° 92.00° 90.00°	Depositor
Resolution (Å)	47.05 – 3.26 48.78 – 3.26	Depositor EDS
% Data completeness (in resolution range)	99.0 (47.05-3.26) 99.0 (48.78-3.26)	Depositor EDS
$R_{merge}$	0.15	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.42 (at 3.25Å)	Xtrriage
Refinement program	PHENIX (phenix.refine: 1.8.4_1496)	Depositor
R, $R_{free}$	0.186 , 0.236 0.201 , 0.244	Depositor DCC
$R_{free}$ test set	1957 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	49.4	Xtrriage
Anisotropy	0.433	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 66.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	0.024 for h,-k,-l	Xtrriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	12366	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	65.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.45% 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](#)

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	0.26	0/1525	0.40	0/2078
1	E	0.24	0/1438	0.38	0/1960
2	B	0.25	0/1868	0.44	0/2558
2	F	0.23	0/1775	0.41	0/2432
3	C	0.25	0/1425	0.40	0/1957
3	G	0.22	0/1420	0.38	0/1949
4	D	0.24	0/1632	0.40	0/2225
4	H	0.24	0/1623	0.40	0/2214
All	All	0.24	0/12706	0.40	0/17373

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	1488	0	1353	18	0
1	E	1403	0	1255	17	0
2	B	1815	0	1654	36	0
2	F	1725	0	1561	41	0
3	C	1381	0	1263	18	0
3	G	1377	0	1256	15	0
4	D	1593	0	1471	30	0
4	H	1584	0	1456	28	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	12366	0	11269	174	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 7.

All (174) 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:F:84:THR:HG22	2:F:109:VAL:H	1.46	0.80
1:E:45:LEU:HD22	2:F:98:THR:HG22	1.69	0.74
2:B:130:GLU:OE2	2:B:191:ARG:NH1	2.20	0.74
2:F:130:GLU:OE2	2:F:191:ARG:NH1	2.20	0.74
2:F:145:GLY:HA2	2:F:183:ARG:HD3	1.71	0.73
2:B:145:GLY:HA2	2:B:183:ARG:HD3	1.72	0.71
3:G:34:VAL:HG22	3:G:41:THR:HG22	1.74	0.69
3:C:139:VAL:HG11	4:D:12:MET:HE1	1.75	0.68
1:E:49:ILE:HD13	1:E:57:LYS:HB2	1.75	0.68
4:H:14:GLU:OE1	4:H:29:ARG:NH1	2.26	0.68
3:C:118:ASN:HB2	3:C:166:GLU:HB2	1.79	0.64
4:D:46:GLU:OE2	4:D:48:ARG:NH1	2.30	0.64
4:D:114:ASN:HB3	4:D:164:MET:HE1	1.80	0.62
1:E:93:SER:HB2	1:E:100:LEU:HD23	1.82	0.61
3:C:14:GLN:HG2	4:D:8:VAL:HG22	1.82	0.61
4:H:113:HIS:H	4:H:165:THR:HG23	1.66	0.61
4:H:111:ASN:OD1	4:H:167:ARG:NH1	2.34	0.60
4:D:95:LEU:HG	4:D:180:SER:HA	1.83	0.60
4:D:100:VAL:HG21	4:D:176:VAL:HG11	1.84	0.60
3:G:103:ASN:OD1	3:G:104:THR:N	2.34	0.59
3:G:13:TYR:OH	3:G:18:ASP:OD1	2.20	0.59
2:B:1:ALA:H3	2:B:24:THR:HB	1.68	0.58
2:F:180:ASN:N	2:F:180:ASN:OD1	2.34	0.57
1:A:20:LEU:HD22	1:A:106:THR:HG21	1.87	0.56
1:A:94:ARG:NH2	3:C:55:ASP:OD2	2.38	0.56
4:H:37:TYR:CD2	4:H:38:VAL:HG23	2.40	0.56
3:C:70:LEU:HD13	4:D:9:TYR:HB2	1.87	0.56
4:D:76:ASP:OD1	4:D:80:ARG:NH1	2.39	0.56
4:H:114:ASN:HB3	4:H:164:MET:HE1	1.87	0.55
1:A:114:ILE:HG13	1:A:141:ASP:HA	1.88	0.55
2:F:23:GLN:HG2	2:F:25:ASN:H	1.71	0.55
2:B:68:SER:OG	2:B:70:GLU:OE1	2.25	0.55
1:E:49:ILE:HD11	1:E:53:SER:HB2	1.88	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:225:LYS:HG2	2:B:227:VAL:HG13	1.88	0.55
2:F:158:ASN:HA	2:F:203:HIS:CE1	2.42	0.55
2:F:28:ASN:ND2	2:F:48:TYR:O	2.40	0.54
1:A:28:ALA:O	4:D:-22:GLN:NE2	2.41	0.54
1:E:134:VAL:HB	2:F:124:PHE:CD2	2.41	0.54
1:A:33:PRO:HG2	1:A:91:ALA:HB3	1.89	0.53
2:B:158:ASN:HA	2:B:203:HIS:CE1	2.42	0.53
2:B:95:TRP:CE2	4:D:-19:LYS:HB2	2.43	0.53
2:F:1:ALA:N	2:F:25:ASN:OD1	2.43	0.52
2:B:180:ASN:N	2:B:180:ASN:OD1	2.36	0.52
4:H:10:GLN:HB3	4:H:31:ILE:HB	1.91	0.52
3:G:110:ASP:OD1	3:G:111:ASN:N	2.39	0.51
3:G:41:THR:HG21	3:G:54:PHE:HD2	1.75	0.51
1:E:47:ILE:HG23	1:E:64:ILE:HD11	1.92	0.51
2:B:23:GLN:OE1	2:B:27:HIS:N	2.42	0.51
2:B:147:TYR:HD2	2:B:148:PRO:HA	1.76	0.51
2:F:147:TYR:CD2	2:F:148:PRO:HA	2.46	0.51
4:D:28:THR:HB	4:D:40:TYR:HB3	1.93	0.51
4:H:173:THR:HG23	4:H:188:GLU:HG2	1.92	0.51
2:F:147:TYR:HD2	2:F:148:PRO:HA	1.76	0.50
2:F:68:SER:OG	2:F:69:GLN:N	2.44	0.50
1:A:152:SER:C	1:A:154:VAL:H	2.14	0.50
2:B:147:TYR:CD2	2:B:148:PRO:HA	2.46	0.50
3:C:110:ASP:OD1	3:C:111:ASN:N	2.38	0.50
4:D:121:THR:HG22	4:D:157:GLN:HG3	1.93	0.50
4:H:122:ASP:HA	4:H:155:THR:HB	1.93	0.50
4:D:122:ASP:HA	4:D:155:THR:HB	1.93	0.50
1:E:162:LEU:HB3	2:F:167:CYS:HB3	1.94	0.49
1:E:126:ASP:HA	2:F:124:PHE:HD1	1.77	0.49
2:B:146:PHE:HE1	2:B:151:VAL:HG21	1.78	0.49
2:B:146:PHE:H	2:B:146:PHE:HD2	1.60	0.49
2:F:94:PHE:CG	3:G:65:VAL:HG22	2.47	0.49
2:F:146:PHE:HE1	2:F:151:VAL:HG21	1.78	0.48
2:F:203:HIS:HB3	2:F:236:TRP:CE3	2.47	0.48
2:B:203:HIS:HB3	2:B:236:TRP:CE3	2.47	0.48
3:C:165:VAL:HB	3:C:174:VAL:HG12	1.95	0.48
2:F:27:HIS:O	2:F:69:GLN:NE2	2.46	0.48
2:B:86:VAL:HG22	2:B:106:ARG:HD3	1.95	0.48
4:D:16:TYR:HB2	4:D:25:ARG:HB3	1.96	0.48
2:F:146:PHE:H	2:F:146:PHE:HD2	1.60	0.48
1:A:47:ILE:HG23	1:A:64:ILE:HD11	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:126:ASP:HB3	1:E:129:SER:O	2.14	0.48
1:A:93:SER:HB2	1:A:100:LEU:HD23	1.95	0.47
3:C:135:THR:O	3:C:147:LYS:HE3	2.14	0.47
4:D:176:VAL:HG13	4:D:185:ILE:HB	1.95	0.47
2:B:44:ILE:HG22	2:B:45:HIS:CD2	2.48	0.47
2:F:23:GLN:HG2	2:F:24:THR:N	2.30	0.47
2:B:168:THR:HG23	2:B:188:SER:HB2	1.97	0.47
2:F:168:THR:HG23	2:F:188:SER:HB2	1.96	0.47
2:F:158:ASN:HA	2:F:203:HIS:HE1	1.81	0.46
4:H:167:ARG:O	4:H:170:GLU:HG2	2.15	0.46
1:E:20:LEU:HD22	1:E:106:THR:HG21	1.97	0.46
2:F:23:GLN:OE1	2:F:27:HIS:N	2.40	0.46
3:C:66:VAL:HG13	4:D:9:TYR:CD2	2.51	0.46
1:A:126:ASP:HB3	1:A:129:SER:O	2.16	0.46
2:B:158:ASN:HA	2:B:203:HIS:HE1	1.81	0.46
3:C:96:PRO:HD3	4:D:121:THR:HG21	1.98	0.46
3:C:82:ALA:HB1	3:C:113:PHE:CE2	2.51	0.46
4:D:-19:LYS:HG2	4:D:74:GLU:OE1	2.16	0.46
4:D:181:LEU:HD22	4:D:185:ILE:HG13	1.97	0.45
4:H:105:SER:OG	4:H:115:THR:HG23	2.15	0.45
2:F:23:GLN:HB3	2:F:23:GLN:HE21	1.52	0.45
1:A:137:PHE:HB2	1:A:189:PHE:CE2	2.50	0.45
1:A:29:PHE:HD1	1:A:94:ARG:HG2	1.81	0.45
1:E:137:PHE:HB2	1:E:189:PHE:CE2	2.51	0.45
2:F:28:ASN:HA	2:F:69:GLN:HE22	1.82	0.45
2:B:207:GLN:HG3	2:B:230:ILE:HG23	1.99	0.45
4:H:-19:LYS:HG2	4:H:74:GLU:OE1	2.17	0.45
3:G:66:VAL:HG13	4:H:9:TYR:CD2	2.52	0.45
3:G:14:GLN:HG2	3:G:19:ILE:HD12	1.99	0.45
3:C:57:GLN:HA	3:C:60:LEU:HB2	1.98	0.45
2:F:138:THR:HG1	2:F:191:ARG:HH11	1.64	0.45
1:A:31:TYR:OH	2:B:97:ASP:HB2	2.17	0.44
2:F:151:VAL:HG12	2:F:210:PHE:HA	1.99	0.44
4:H:83:TYR:O	4:H:88:THR:HG23	2.17	0.44
2:B:118:PRO:HD3	2:B:226:PRO:HB3	2.00	0.44
2:F:118:PRO:HD3	2:F:226:PRO:HB3	1.99	0.44
2:F:207:GLN:HG3	2:F:230:ILE:HG23	1.99	0.44
1:A:29:PHE:CD1	1:A:94:ARG:HG2	2.53	0.44
2:B:219:TRP:CE2	2:B:221:GLN:HB2	2.52	0.44
2:F:149:ASP:N	2:F:149:ASP:OD1	2.50	0.44
2:B:151:VAL:HG12	2:B:210:PHE:HA	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:225:LYS:HA	2:F:226:PRO:HD3	1.77	0.43
4:D:95:LEU:HA	4:D:95:LEU:HD12	1.83	0.43
4:H:73:ALA:O	4:H:77:THR:OG1	2.37	0.43
2:B:23:GLN:HE21	2:B:23:GLN:HB3	1.62	0.43
3:C:103:ASN:OD1	3:C:104:THR:N	2.45	0.43
2:B:149:ASP:OD1	2:B:149:ASP:N	2.50	0.43
2:B:14:GLY:HA2	2:B:78:LEU:HD23	2.01	0.43
3:G:99:LEU:HA	3:G:155:PRO:HB2	1.99	0.43
3:C:76:ARG:NH2	4:D:-14:VAL:O	2.52	0.43
4:H:28:THR:HG22	4:H:40:TYR:HB3	2.01	0.43
1:A:162:LEU:HD21	2:B:191:ARG:HD3	2.01	0.43
1:E:81:GLN:O	1:E:110:VAL:HG21	2.19	0.43
3:G:70:LEU:HD13	4:H:9:TYR:HB2	2.01	0.42
3:G:29:ASP:HB3	4:H:154:TRP:CE2	2.54	0.42
4:H:135:ASN:ND2	4:H:171:VAL:H	2.17	0.42
4:D:98:PRO:HB3	4:D:123:PHE:HB3	2.01	0.42
1:E:126:ASP:HA	2:F:124:PHE:CD1	2.54	0.42
2:F:62:TYR:HD1	2:F:74:LEU:HD21	1.84	0.42
3:C:29:ASP:HB3	4:D:154:TRP:CE2	2.55	0.42
4:H:181:LEU:HD22	4:H:185:ILE:HG13	2.01	0.42
4:D:183:SER:HA	4:D:184:PRO:HD3	1.89	0.42
3:C:59:GLY:O	3:C:63:ILE:HG12	2.20	0.42
2:F:44:ILE:HG22	2:F:45:HIS:CD2	2.55	0.42
2:B:125:GLU:HA	2:B:126:PRO:HD3	1.96	0.41
1:A:45:LEU:HD22	2:B:98:THR:HG22	2.01	0.41
2:F:140:VAL:HG22	2:F:189:ARG:HG3	2.02	0.41
3:G:96:PRO:HD3	4:H:121:THR:HG21	2.02	0.41
1:A:157:THR:HG21	2:B:187:SER:OG	2.20	0.41
2:B:95:TRP:CD2	4:D:-19:LYS:HB2	2.55	0.41
3:G:9:GLY:O	4:H:12:MET:HA	2.20	0.41
4:H:88:THR:HA	4:H:92:LEU:HB2	2.02	0.41
1:A:152:SER:O	1:A:154:VAL:N	2.51	0.41
3:G:101:GLN:HA	3:G:102:PRO:HD2	1.83	0.41
2:F:146:PHE:N	2:F:146:PHE:CD2	2.88	0.41
2:F:76:LEU:HA	2:F:76:LEU:HD12	1.83	0.41
1:E:26:ASN:OD1	1:E:27:SER:N	2.54	0.41
4:D:12:MET:HB3	4:D:12:MET:HE3	1.92	0.41
4:D:83:TYR:O	4:D:88:THR:HG23	2.21	0.41
3:C:13:TYR:OH	3:C:18:ASP:OD1	2.22	0.41
2:F:126:PRO:HD3	2:F:139:LEU:HG	2.02	0.41
1:A:26:ASN:HB3	1:A:29:PHE:CE2	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:146:PHE:N	2:B:146:PHE:CD2	2.88	0.41
4:D:92:LEU:HA	4:D:92:LEU:HD12	1.88	0.41
4:H:109:ALA:O	4:H:112:HIS:HB2	2.21	0.41
4:H:126:ALA:HB1	4:H:148:LEU:HD21	2.03	0.41
2:B:138:THR:OG1	2:B:191:ARG:HD2	2.21	0.41
1:E:12:VAL:HG13	1:E:16:GLU:HB2	2.03	0.41
1:E:33:PRO:HG2	1:E:91:ALA:HB3	2.03	0.41
2:B:126:PRO:HD3	2:B:139:LEU:HG	2.03	0.40
2:B:176:GLN:HA	2:B:177:PRO:HD2	1.94	0.40
4:D:104:LEU:HD21	4:D:108:GLU:HB2	2.03	0.40
4:D:167:ARG:HB2	4:D:170:GLU:HG3	2.03	0.40
2:B:113:LEU:HD21	2:B:213:LEU:HD21	2.02	0.40
4:H:133:PHE:HB2	4:H:173:THR:HB	2.02	0.40
1:E:160:CYS:HB3	2:F:189:ARG:NH2	2.36	0.40
2:F:95:TRP:CE2	4:H:-19:LYS:HB2	2.57	0.40
3:C:14:GLN:OE1	3:C:116:VAL:HG23	2.21	0.40
4:H:95:LEU:HD23	4:H:180:SER:HA	2.03	0.40
3:G:14:GLN:HB2	4:H:8:VAL:HG22	2.02	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	193/206 (94%)	182 (94%)	9 (5%)	2 (1%)	15	47
1	E	180/206 (87%)	172 (96%)	6 (3%)	2 (1%)	14	46
2	B	236/241 (98%)	225 (95%)	11 (5%)	0	100	100
2	F	225/241 (93%)	213 (95%)	12 (5%)	0	100	100
3	C	177/182 (97%)	172 (97%)	5 (3%)	0	100	100
3	G	175/182 (96%)	168 (96%)	7 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	D	195/217 (90%)	185 (95%)	9 (5%)	1 (0%)	29	62
4	H	195/217 (90%)	189 (97%)	6 (3%)	0	100	100
All	All	1576/1692 (93%)	1506 (96%)	65 (4%)	5 (0%)	41	72

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	60	GLY
1	E	60	GLY
1	E	79	ASP
1	A	79	ASP
4	D	105	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	A	157/185 (85%)	144 (92%)	13 (8%)	11	36
1	E	143/185 (77%)	121 (85%)	22 (15%)	2	12
2	B	185/206 (90%)	172 (93%)	13 (7%)	15	43
2	F	175/206 (85%)	167 (95%)	8 (5%)	27	57
3	C	147/163 (90%)	142 (97%)	5 (3%)	37	64
3	G	146/163 (90%)	141 (97%)	5 (3%)	37	64
4	D	168/189 (89%)	156 (93%)	12 (7%)	14	42
4	H	166/189 (88%)	151 (91%)	15 (9%)	9	32
All	All	1287/1486 (87%)	1194 (93%)	93 (7%)	14	41

All (93) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	12	VAL
1	A	112	LEU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	123	GLN
1	A	124	LEU
1	A	129	SER
1	A	134	VAL
1	A	146	VAL
1	A	160	CYS
1	A	164	MET
1	A	183	PHE
1	A	191	ASN
1	A	193	ILE
1	A	194	ILE
2	B	23	GLN
2	B	37	THR
2	B	78	LEU
2	B	80	THR
2	B	98	THR
2	B	106	ARG
2	B	134	THR
2	B	146	PHE
2	B	180	ASN
2	B	195	THR
2	B	204	PHE
2	B	215	GLU
2	B	238	ARG
3	C	19	ILE
3	C	36	LEU
3	C	60	LEU
3	C	88	GLN
3	C	95	SER
4	D	-21	LYS
4	D	25	ARG
4	D	38	VAL
4	D	39	ARG
4	D	92	LEU
4	D	95	LEU
4	D	115	THR
4	D	148	LEU
4	D	164	MET
4	D	173	THR
4	D	176	VAL
4	D	181	LEU
1	E	3	VAL

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	E	11	THR
1	E	12	VAL
1	E	17	THR
1	E	63	THR
1	E	76	HIS
1	E	81	GLN
1	E	85	SER
1	E	87	THR
1	E	109	LYS
1	E	110	VAL
1	E	112	LEU
1	E	123	GLN
1	E	124	LEU
1	E	129	SER
1	E	134	VAL
1	E	146	VAL
1	E	160	CYS
1	E	164	MET
1	E	183	PHE
1	E	193	ILE
1	E	194	ILE
2	F	23	GLN
2	F	80	THR
2	F	134	THR
2	F	146	PHE
2	F	167	CYS
2	F	180	ASN
2	F	195	THR
2	F	204	PHE
3	G	14	GLN
3	G	36	LEU
3	G	42	VAL
3	G	116	VAL
3	G	120	THR
4	H	-21	LYS
4	H	-19	LYS
4	H	28	THR
4	H	70	ARG
4	H	71	THR
4	H	77	THR
4	H	90	THR
4	H	92	LEU

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Mol	Chain	Res	Type
4	H	105	SER
4	H	107	THR
4	H	112	HIS
4	H	115	THR
4	H	130	VAL
4	H	164	MET
4	H	181	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	69	GLN
4	D	10	GLN
2	F	27	HIS
2	F	69	GLN
4	H	157	GLN

### 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 carbohydrates 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

The following chains have linkage breaks:

Mol	Chain	Number of breaks
3	G	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	G	85:GLU	C	86:ALA	N	3.12

## 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	197/206 (95%)	-0.00	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	22, 40, 83, 109	0
1	E	188/206 (91%)	1.09	36 (19%) <span style="border: 1px solid red; padding: 2px;">1</span> <span style="border: 1px solid red; padding: 2px;">1</span>	62, 99, 133, 142	0
2	B	238/241 (98%)	0.02	1 (0%) <span style="border: 1px solid blue; padding: 2px;">92</span> <span style="border: 1px solid blue; padding: 2px;">92</span>	20, 38, 70, 107	0
2	F	229/241 (95%)	0.91	24 (10%) <span style="border: 1px solid red; padding: 2px;">6</span> <span style="border: 1px solid red; padding: 2px;">6</span>	60, 92, 123, 153	0
3	C	179/182 (98%)	0.09	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	23, 41, 72, 95	0
3	G	179/182 (98%)	0.79	24 (13%) <span style="border: 1px solid red; padding: 2px;">3</span> <span style="border: 1px solid red; padding: 2px;">3</span>	53, 79, 113, 132	0
4	D	199/217 (91%)	-0.04	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	27, 44, 71, 100	0
4	H	199/217 (91%)	0.21	4 (2%) <span style="border: 1px solid blue; padding: 2px;">65</span> <span style="border: 1px solid blue; padding: 2px;">63</span>	54, 73, 96, 114	0
All	All	1608/1692 (95%)	0.38	89 (5%) <span style="border: 1px solid red; padding: 2px;">25</span> <span style="border: 1px solid red; padding: 2px;">23</span>	20, 65, 113, 153	0

All (89) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	146	VAL	4.5
3	G	86	ALA	4.4
2	F	194	ALA	4.1
3	G	173	PRO	4.0
1	E	166	SER	3.9
1	E	147	SER	3.8
1	E	113	HIS	3.8
1	E	111	TYR	3.7
3	G	177	HIS	3.7
1	E	191	ASN	3.6
1	E	153	ASP	3.4
2	F	215	GLU	3.4
2	F	112	ASP	3.3
1	E	168	ASP	3.2
2	F	135	GLN	3.2
1	E	199	PHE	3.1

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	E	112	LEU	3.1
2	F	180	ASN	3.0
2	F	192	VAL	3.0
3	G	157	ASP	2.9
1	E	122	TYR	2.8
3	G	155	PRO	2.8
1	E	141	ASP	2.8
2	F	70	GLU	2.8
3	G	129	ALA	2.8
3	G	84	ASN	2.8
3	G	178	TRP	2.8
1	E	140	PHE	2.8
1	E	7	PRO	2.8
2	F	18	THR	2.7
1	E	135	CYS	2.7
2	F	181	ASP	2.7
3	G	162	ASP	2.7
2	F	203	HIS	2.6
3	G	160	ILE	2.6
3	G	156	SER	2.6
3	G	164	LYS	2.6
3	G	121	TRP	2.6
1	E	129	SER	2.6
1	E	127	SER	2.6
1	E	200	PHE	2.5
1	E	133	SER	2.5
2	F	212	GLY	2.5
3	G	122	LEU	2.5
2	F	17	VAL	2.4
1	E	188	ALA	2.4
2	F	213	LEU	2.4
2	F	200	PRO	2.4
3	G	161	TYR	2.4
2	F	175	GLU	2.4
3	G	172	GLU	2.4
4	H	136	GLY	2.3
3	G	125	SER	2.3
2	F	67	PRO	2.3
1	E	137	PHE	2.3
1	E	189	PHE	2.3
1	E	106	THR	2.3
2	F	147	TYR	2.3

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Mol	Chain	Res	Type	RSRZ
4	H	183	SER	2.2
2	F	110	LEU	2.2
1	E	78	THR	2.2
3	G	166	GLU	2.2
3	G	175	LEU	2.2
1	E	169	PHE	2.2
1	E	162	LEU	2.2
4	H	92	LEU	2.2
1	E	19	ILE	2.2
2	F	178	ALA	2.2
1	E	76	HIS	2.2
3	G	149	SER	2.2
4	H	-25	PHE	2.2
2	F	77	GLU	2.2
1	E	120	ALA	2.1
3	G	120	THR	2.1
2	F	225	LYS	2.1
1	E	14	GLU	2.1
1	E	12	VAL	2.1
1	E	20	LEU	2.1
2	F	71	ASN	2.1
2	F	76	LEU	2.1
1	E	17	THR	2.1
2	F	137	ALA	2.0
1	E	13	TRP	2.0
3	G	174	VAL	2.0
1	E	194	ILE	2.0
3	G	153	PHE	2.0
3	G	128	VAL	2.0
2	B	180	ASN	2.0
1	E	183	PHE	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 carbohydrates in this entry.

## 6.4 Ligands

There are no ligands in this entry.

## 6.5 Other polymers

There are no such residues in this entry.