



wwPDB EM Validation Summary Report ⓘ

Jan 5, 2026 – 05:45 pm GMT

PDB ID : 9QCS / pdb_00009qcs
EMDB ID : EMD-53026
Title : Ku80 mediated DNA-PK dimer bound to 153 bp H2AX nucleosome
Authors : Hall, C.; Chaplin, A.K.
Deposited on : 2025-03-05
Resolution : 4.38 Å(reported)

This is a wwPDB EM Validation Summary 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/EMValidationReportHelp>

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:

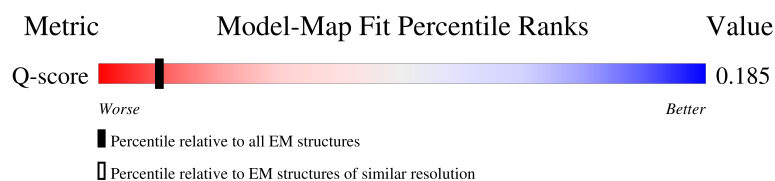
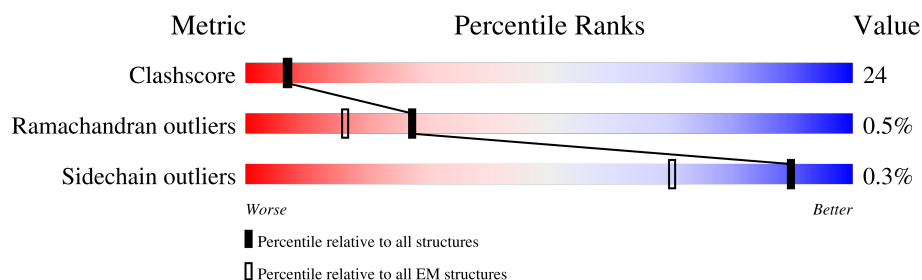
EMDB validation analysis : 0.0.1.dev129
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.47

1 Overall quality at a glance

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 4.38 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.



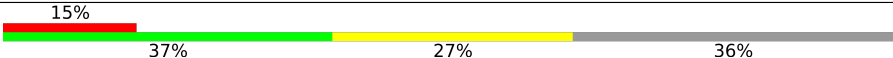
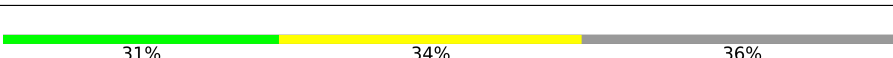
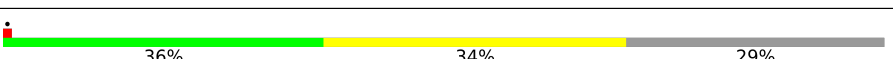
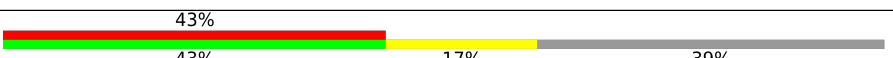
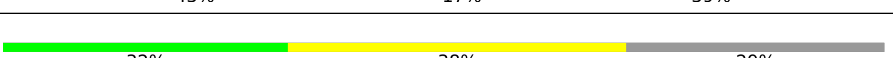
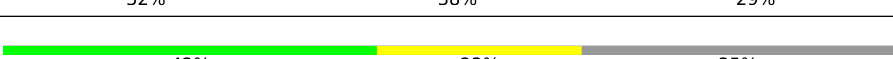
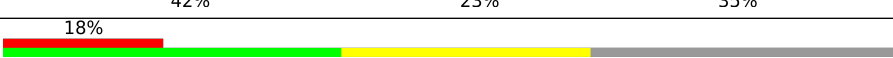
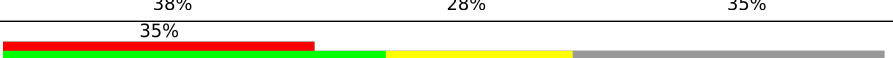
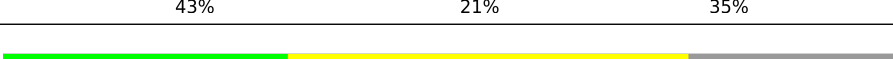
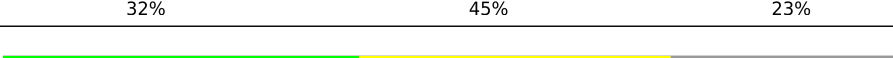
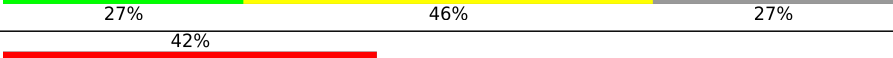
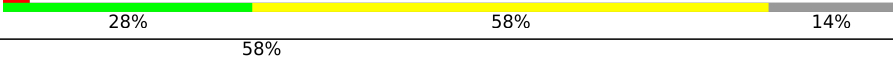
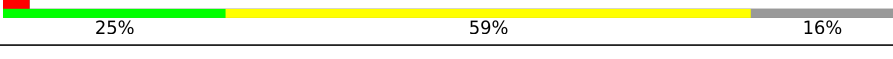
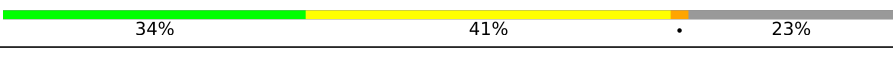
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	3702 (3.88 - 4.88)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	O	4128	43% 42% 15%
1	o	4128	47% 38% 15%
2	D	126	39% 35% 26%
2	H	126	23% 38% 36% 26%

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Mol	Chain	Length	Quality of chain
2	d	126	
2	h	126	
3	C	143	
3	G	143	
3	c	143	
3	g	143	
4	A	136	
4	E	136	
4	a	136	
4	e	136	
5	B	103	
5	F	103	
5	b	103	
5	f	103	
6	I	153	
6	i	153	
7	J	153	
7	j	153	
8	K	609	
8	M	609	
9	L	732	
9	N	732	

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 94128 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 DNA-dependent protein kinase catalytic subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	O	3510	Total	C	N	O	S	0	0
			27567	17688	4624	5079	176		
1	o	3506	Total	C	N	O	S	0	0
			27886	17906	4702	5095	183		

- Molecule 2 is a protein called Histone H2B type 1-J.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	D	93	Total	C	N	O	S	0	0
			714	451	126	135	2		
2	H	93	Total	C	N	O	S	0	0
			717	452	127	136	2		
2	d	92	Total	C	N	O	S	0	0
			698	437	125	134	2		
2	h	92	Total	C	N	O	S	0	0
			698	438	123	135	2		

- Molecule 3 is a protein called Histone H2AX.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	C	92	Total	C	N	O	0	0
			702	442	138	122		
3	G	92	Total	C	N	O	0	0
			703	442	138	123		
3	c	101	Total	C	N	O	0	0
			761	479	147	135		
3	g	87	Total	C	N	O	0	0
			652	411	127	114		

- Molecule 4 is a protein called Histone H3.1.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	A	96	Total	C	N	O	S	0	0
			794	500	154	136	4		
4	E	88	Total	C	N	O	S	0	0
			711	451	132	124	4		
4	a	89	Total	C	N	O	S	0	0
			732	462	139	127	4		
4	e	88	Total	C	N	O	S	0	0
			709	450	129	126	4		

- Molecule 5 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	B	79	Total	C	N	O		0	0
			624	394	122	108			
5	F	77	Total	C	N	O	S	0	0
			612	385	119	107	1		
5	b	75	Total	C	N	O	S	0	0
			590	375	113	101	1		
5	f	76	Total	C	N	O	S	0	0
			610	387	118	104	1		

- Molecule 6 is a DNA chain called 153 bp DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	i	131	Total	C	N	O	P	0	0
			2691	1275	504	783	129		
6	I	131	Total	C	N	O	P	0	0
			2691	1275	504	783	129		

- Molecule 7 is a DNA chain called 153 bp DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	j	129	Total	C	N	O	P	0	0
			2624	1247	481	769	127		
7	J	129	Total	C	N	O	P	0	0
			2624	1247	481	769	127		

- Molecule 8 is a protein called X-ray repair cross-complementing protein 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	K	471	Total	C	N	O	S	0	0
			3705	2379	609	699	18		

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Mol	Chain	Residues	Atoms					AltConf	Trace
8	M	471	Total	C	N	O	S	0	0
			3742	2395	626	703	18		

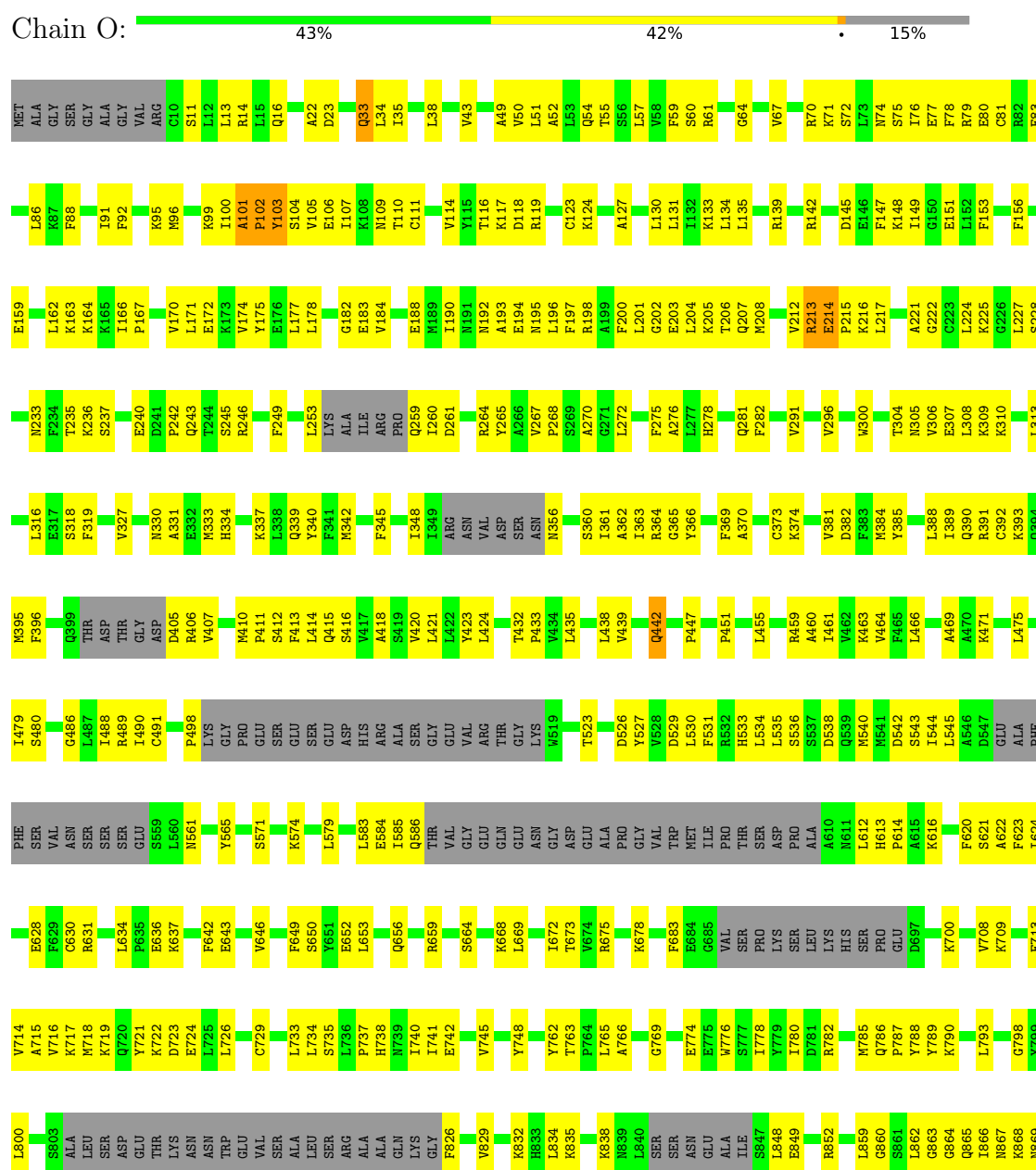
- Molecule 9 is a protein called X-ray repair cross-complementing protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	L	614	Total	C	N	O	S	0	0
			4774	3043	796	909	26		
9	N	612	Total	C	N	O	S	0	0
			4797	3062	793	916	26		

3 Residue-property plots

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 atom inclusion in map 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 diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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: DNA-dependent protein kinase catalytic subunit



T1924	E1925	MET	ALA	GLY	ASN	F1778	Q1779	THR	A1619	GLY	H1477	M1403	K1334	C1286	K1193	L1111	R1026	T946	L870
E1925	ALA	GLY	ASN	THR	GLY	F1782	Q1779	GLY	T1620	SER	S1478	K1404	V1337	Y1267	F1194	A1112	R1026	Q947	LEU
MET	ALA	GLY	ASN	THR	GLY	F1782	Q1779	GLY	T1621	SER	V1479	A1405	V1338	M1288	P1196	A1113	R1034	Q948	THR
ALA	GLY	ASN	THR	THR	GLY	F1783	Q1779	GLY	T1622	SER	L1483	A1406	V1339	I1271	L1197	A1114	R1039	A955	THR
GLY	ASN	THR	THR	THR	GLY	F1784	Q1779	SER	T1623	VAL	L1486	M1408	R1340	R1274	R1202	A1116	S1040	P956	SER
ASN	THR	THR	THR	THR	GLY	F1785	Q1779	VAL	H1625	ILE	L1487	A1409	I1341	T1275	R1202	A1117	S1040	P957	SER
GLN	THR	THR	THR	THR	GLY	F1786	Q1779	ILE	H1626	ILE	Y1488	P1410	E1342	T1276	R1202	A1118	S1040	P958	ASP
LEU	THR	THR	THR	THR	GLY	F1787	Q1779	THR	K1627	THR	K1489	A1412	E1343	T1277	R1202	A1119	S1040	P959	GLU
LEU	THR	THR	THR	THR	GLY	F1788	Q1779	THR	C1629	THR	K1490	A1413	E1344	T1278	R1202	A1120	S1040	P960	MET
E1935	E1935	GLY	ASN	THR	GLY	F1789	Q1779	THR	H1632	THR	I1491	A1414	T1346	A1278	R1202	A1121	S1040	P961	THR
Y1940	Y1940	GLY	ASN	THR	GLY	F1790	Q1779	THR	H1633	THR	A1492	A1415	T1347	V1281	R1202	A1122	S1040	P962	THR
M1946	M1946	GLY	ASN	THR	GLY	F1791	Q1779	THR	H1634	THR	PRO	A1416	L1349	L1282	R1202	A1123	S1040	P963	THR
I1949	I1949	GLY	ASN	THR	GLY	F1792	Q1779	THR	K1642	THR	GLY	A1417	M1350	Q1287	R1202	A1124	S1040	P964	THR
S1950	S1950	GLY	ASN	THR	GLY	F1793	Q1779	THR	K1643	THR	ASP	A1418	T1351	T1287	R1202	A1125	S1040	P965	THR
V1951	V1951	GLY	ASN	THR	GLY	F1794	Q1779	THR	K1644	THR	GLU	A1419	S1352	S1288	R1202	A1126	S1040	P966	THR
C1953	C1953	GLY	ASN	THR	GLY	F1795	Q1779	THR	K1645	THR	ARG	A1420	L1357	S1289	R1202	A1127	S1040	P967	THR
C1954	C1954	GLY	ASN	THR	GLY	F1796	Q1779	THR	K1646	THR	GLN	A1421	L1358	S1290	R1202	A1128	S1040	P968	THR
V1955	V1955	GLY	ASN	THR	GLY	F1797	Q1779	THR	K1647	THR	CYS	A1422	L1359	S1291	R1202	A1129	S1040	P969	THR
F1956	F1956	GLY	ASN	THR	GLY	F1798	Q1779	THR	K1648	THR	LEU	A1423	L1360	S1292	R1202	A1130	S1040	P970	THR
F1961	F1961	GLY	ASN	THR	GLY	F1799	Q1779	THR	K1649	THR	PRO	A1424	L1361	S1293	R1202	A1131	S1040	P971	THR
Y1962	Y1962	GLY	ASN	THR	GLY	F1800	Q1779	THR	K1650	THR	PRO	A1425	L1362	S1294	R1202	A1132	S1040	P972	THR
Q1963	Q1963	GLY	ASN	THR	GLY	F1801	Q1779	THR	K1651	THR	PRO	A1426	L1363	S1295	R1202	A1133	S1040	P973	THR
PHE	PHE	GLY	ASN	THR	GLY	F1802	Q1779	THR	K1652	THR	D1504	S1427	C1364	S1296	R1202	A1134	S1040	P974	THR
LEU	LEU	GLY	ASN	THR	GLY	F1803	Q1779	THR	K1653	THR	L1505	T1428	M1365	F1297	R1202	A1135	S1040	P975	THR
PHE	PHE	GLY	ASN	THR	GLY	F1804	Q1779	THR	K1654	THR	S1506	T1429	T1366	S1298	R1202	A1136	S1040	P976	THR
PHE	PHE	GLY	ASN	THR	GLY	F1805	Q1779	THR	K1655	THR	C1507	A1431	H1367	S1299	R1202	A1137	S1040	P977	THR
GLY	GLY	GLY	ASN	THR	GLY	F1806	Q1779	THR	K1656	THR	L1508	A1432	L1368	S1300	R1202	A1138	S1040	P978	THR
GLY	GLY	GLY	ASN	THR	GLY	F1807	Q1779	THR	K1657	THR	Q1509	V1434	M1369	S1301	R1202	A1139	S1040	P979	THR
GLY	GLY	GLY	ASN	THR	GLY	F1808	Q1779	THR	K1658	THR	L1510	A1435	R1370	S1302	R1202	A1140	S1040	P980	THR
GLY	GLY	GLY	ASN	THR	GLY	F1809	Q1779	THR	K1659	THR	A1511	Y1437	V1371	S1303	R1202	A1141	S1040	P981	THR
GLY	GLY	GLY	ASN	THR	GLY	F1810	Q1779	THR	K1660	THR	S1512	D1440	L1372	S1304	R1202	A1142	S1040	P982	THR
GLY	GLY	GLY	ASN	THR	GLY	F1811	Q1779	THR	K1661	THR	L1513	D1441	Q1373	S1305	R1202	A1143	S1040	P983	THR
GLY	GLY	GLY	ASN	THR	GLY	F1812	Q1779	THR	K1662	THR	L1514	D1442	Q1374	S1306	R1202	A1144	S1040	P984	THR
GLY	GLY	GLY	ASN	THR	GLY	F1813	Q1779	THR	K1663	THR	L1515	D1443	T1375	S1307	R1202	A1145	S1040	P985	THR
GLY	GLY	GLY	ASN	THR	GLY	F1814	Q1779	THR	K1664	THR	L1516	D1444	L1376	S1308	R1202	A1146	S1040	P986	THR
GLY	GLY	GLY	ASN	THR	GLY	F1815	Q1779	THR	K1665	THR	L1517	D1445	C1377	S1309	R1202	A1147	S1040	P987	THR
GLY	GLY	GLY	ASN	THR	GLY	F1816	Q1779	THR	K1666	THR	F1521	S1446	E1378	S1310	R1202	A1148	S1040	P988	THR
GLY	GLY	GLY	ASN	THR	GLY	F1817	Q1779	THR	K1667	THR	L1524	A1449	P1379	S1311	R1202	A1149	S1040	P989	THR
GLY	GLY	GLY	ASN	THR	GLY	F1818	Q1779	THR	K1668	THR	L1525	V1452	A1380	F1311	R1202	A1150	S1040	P990	THR
GLY	GLY	GLY	ASN	THR	GLY	F1819	Q1779	THR	K1669	THR	F1526	S1453	E1379	F1312	R1202	A1151	S1040	P991	THR
GLY	GLY	GLY	ASN	THR	GLY	F1820	Q1779	THR	K1670	THR	A1527	A1454	A1381	F1313	R1202	A1152	S1040	P992	THR
GLY	GLY	GLY	ASN	THR	GLY	F1821	Q1779	THR	K1671	THR	L1528	C1455	E1380	F1314	R1202	A1153	S1040	P993	THR
GLY	GLY	GLY	ASN	THR	GLY	F1822	Q1779	THR	K1672	THR	V1529	C1456	E1381	F1315	R1202	A1154	S1040	P994	THR
GLY	GLY	GLY	ASN	THR	GLY	F1823	Q1779	THR	K1673	THR	L1530	C1457	E1382	F1316	R1202	A1155	S1040	P995	THR
GLY	GLY	GLY	ASN	THR	GLY	F1824	Q1779	THR	K1674	THR	L1531	C1458	E1383	F1317	R1202	A1156	S1040	P996	THR
GLY	GLY	GLY	ASN	THR	GLY	F1825	Q1779	THR	K1675	THR	L1532	C1459	E1384	F1318	R1202	A1157	S1040	P997	THR
GLY	GLY	GLY	ASN	THR	GLY	F1826	Q1779	THR	K1676	THR	L1533	C1460	E1385	F1319	R1202	A1158	S1040	P998	THR
GLY	GLY	GLY	ASN	THR	GLY	F1827	Q1779	THR	K1677	THR	L1534	C1461	E1386	F1320	R1202	A1159	S1040	P999	THR
GLY	GLY	GLY	ASN	THR	GLY	F1828	Q1779	THR	K1678	THR	L1535	C1462	E1387	F1321	R1202	A1160	S1040	P1000	THR
GLY	GLY	GLY	ASN	THR	GLY	F1829	Q1779	THR	K1679	THR	L1536	C1463	E1388	F1322	R1202	A1161	S1040	P1001	THR
GLY	GLY	GLY	ASN	THR	GLY	F1830	Q1779	THR	K1680	THR	L1537	C1464	E1389	F1323	R1202	A1162	S1040	P1002	THR
GLY	GLY	GLY	ASN	THR	GLY	F1831	Q1779	THR	K1681	THR	L1538	C1465	E1390	F1324	R1202	A1163	S1040	P1003	THR
GLY	GLY	GLY	ASN	THR	GLY	F1832	Q1779	THR	K1682	THR	L1539	C1466	E1391	F1325	R1202	A1164	S1040	P1004	THR
GLY	GLY	GLY	ASN	THR	GLY	F1833	Q1779	THR	K1683	THR	L1540	C1467	E1392	F1326	R1202	A1165	S1040	P1005	THR
GLY	GLY	GLY	ASN	THR	GLY	F1834	Q1779	THR	K1684	THR	L1541	C1468	E1393	F1327	R1202	A1166	S1040	P1006	THR
GLY	GLY	GLY	ASN	THR	GLY	F1835	Q1779	THR	K1685	THR	L1542	C1469	E1394	F1328	R1202	A1167	S1040	P1007	THR
GLY	GLY	GLY	ASN	THR	GLY	F1836	Q1779	THR	K1686	THR	L1543	C1470	E1395	F1329	R1202	A1168	S1040	P1008	THR
GLY	GLY	GLY	ASN	THR	GLY	F1837	Q1779	THR	K1687	THR	L1544	C1471	E1396	F1330	R1202	A1169	S1040	P1009	THR
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GLY	GLY	GLY	ASN	THR	GLY	F1840	Q1779	THR	K1690	THR	L1547	C1474	E1399	F1333	R1202	A1172	S1040	P1012	THR
GLY	GLY	GLY	ASN	THR	GLY	F1841	Q1779	THR	K1691	THR	L1548	C1475	E1400	F1334	R1202	A1173	S1040	P1013	THR
GLY	GLY	GLY	ASN	THR	GLY	F1842	Q1779	THR	K1692	THR	L1549	C1476	E1401	F1335	R1202	A1174	S1040	P1014	THR
GLY	GLY	GLY	ASN	THR	GLY	F1843	Q1779	THR	K1693	THR	L1550	C1477	E1402	F1336	R1202	A1175	S1040	P1015	THR
GLY	GLY	GLY	ASN	THR	GLY	F1844	Q1779	THR	K1694	THR	L1551	C1478	E1403	F1337	R1202	A1176	S1040	P1016	THR
GLY	GLY	GLY	ASN	THR	GLY	F1845	Q1779	THR	K1695	THR	L1552	C1479	E1404	F1338	R1202	A1177	S1040	P1017	THR
GLY	GLY	GLY	ASN	THR	GLY	F1846	Q1779	THR	K1696	THR	L1553	C1480	E1405	F1339	R1202	A1178	S1040	P1018	THR
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GLY	GLY	GLY	ASN	THR	GLY	F1848	Q1779	THR	K1698	THR	L1555	C1482	E1407	F1341	R1202	A1180	S1040	P1020	THR
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GLY	GLY	GLY	ASN	THR	GLY	F1851	Q1779	THR	K1701	THR	L1558	C1485	E1410	F1344	R1202	A1183	S1040	P1023	THR
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GLY	GLY	GLY	ASN	THR	GLY	F1854	Q1779	THR	K1704	THR	L1561	C1488	E1413	F1347	R1202				



W4108	G3947	Y3859	L3788	P3713	K3559	V3490	A3417	E3353	K3270	K3131
D4109	S3948	K3860	R3789	E3714	S3580	P3491	D3418	E3353	D3271	V3132
P4114	A3949	T3867	T3790	Y3715	K3561	C3492	F3419	R3357	W3272	T3136
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T4120	F3795	R3872	F3795	F3722	Q3569	I3499	E3428	E3361	Q3278	L3145
G4123	M3796	R3874	M3796	R3723	S3500	S3500	E3429	E3361	S3279	L3146
W4124	S3797	S3876	S3797	E3725	H3501	M3502	ALA	S3363	L3282	K3147
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W4127	V3878	V3878	L3800	V3726	K3574	A3504	VAL	SER	H3285	SER
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			T3803	R3733	Q3577	D3507			S3288	ARG
			W3805	R3737	E3582	K3508	ALA		S3370	S3152
			L3806	I3738	L3583	Q3510	ALA		S3370	S3152
				I3739	L3584	A3511	GLN		K3372	K3153
			T3809	R3740	F3585	V3512			K3372	K3154
			T3810	R3741	D3587	V3514			E3295	V3155
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			K3813	H3743	N3588	V3518			A3375	K3158
			D3814	E3745	S3589	V3518			Q3375	R3159
			L3815	R3746	K3590	V3518			V3297	L3160
				E3747	R3593	V3518			V3297	L3161
			T3819	H3748	GLU	N3524			V3300	
			K3820	F3749	LEU	P3526			L3301	
			E3824	F3750	ALA	Q3527			K3302	
				L3751	THR	A3528			L3306	
				V3752	VAL	V3529			L3307	
			Y3828	E3756	PRO	Y3531			D3308	
			L3829	D3757	VAL	F3533			N3311	
			D3830	L3758	THR	I3534			V3312	
			P3832	L3758	THR	P3532			S3313	
			R3833	Q3762	S3602	I3535			S3314	
			A3834	R3763	T3606	S3536			V3315	
			P3835	Q3766	E3607	S3536			L3316	
			P3836	Q3766	K3608	E3394			S3317	
			C3837	Q3766	M3609	E3395			K3318	
			E3838	M3771	E3611	ASP			N3319	
			Y3839	N3772	K3612	TYR			R3324	
			K3840	G3773	M3613	PHE			D3325	
			W3842	I3774	Y3614	LYS			Q3326	
			L3843	L3775	S3545	ASP			N3327	
			THR	A3776	S3546	TRP			S3328	
			LYS	Q3777	T3547	CYS			L3329	
			LYS	D3778	G3548	PRO			T3332	
			MET	S3779	H3549	ALA			T3333	
			GLY	A3780	K3550	A3407			G3408	
			LYS	C3781	N3551	V3409			K3192	
			LYS	D3786	K3552	I3410			H3263	
			HIS	R3708	E3554	T3484			K3264	
			D3851	G3709	V3555	K3485			E3265	
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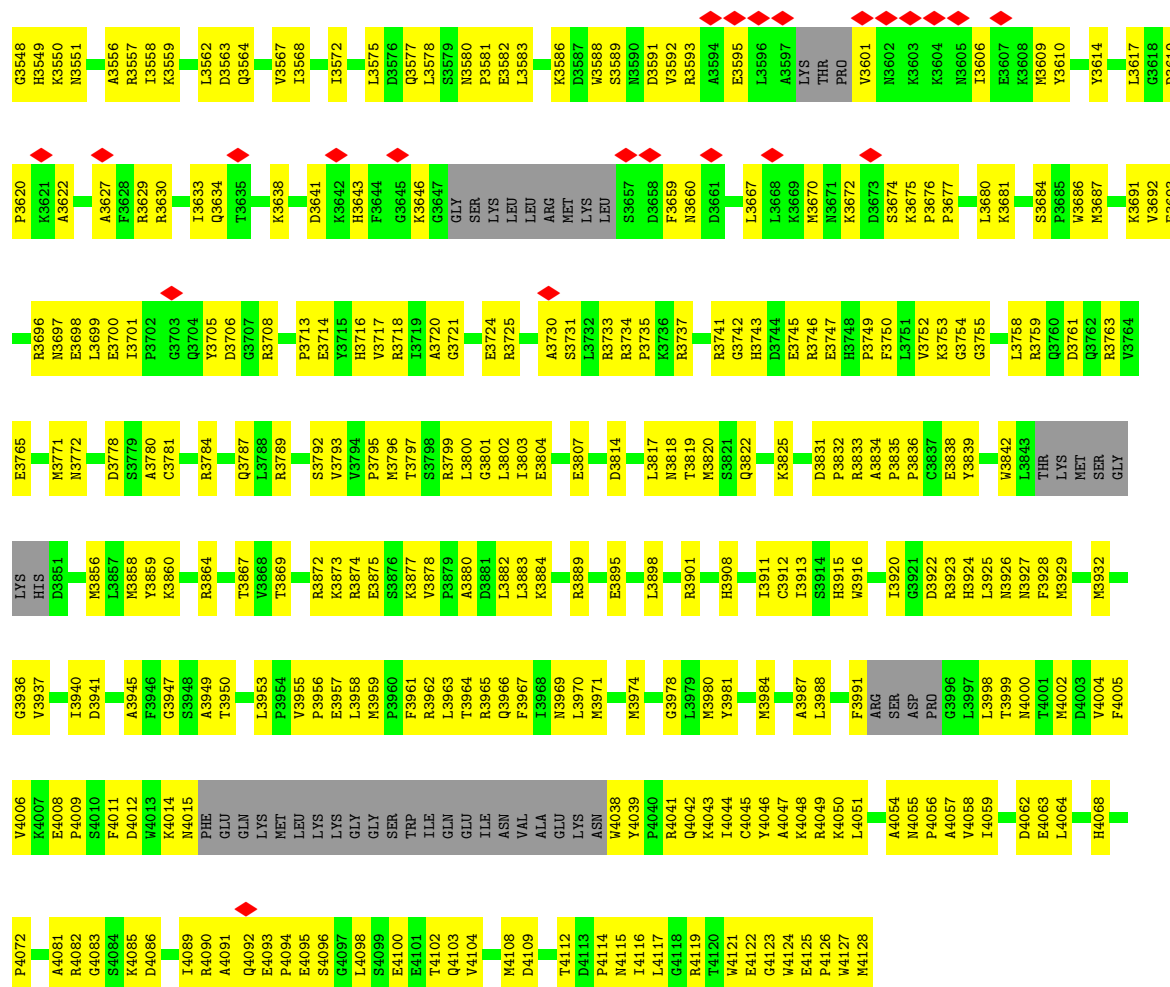
● Molecule 1: DNA-dependent protein kinase catalytic subunit

Chain o: 47% 38% 15%



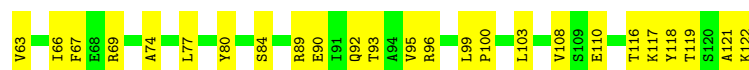
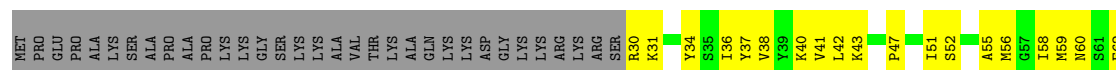
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E2338	D2269	I2189	ASP	SER	PHE	K1918	L1850	E1768	H1687	E1565	A1494	P1396	GLY	ARG
L2341	N2270	V2190	SER	TYR	SER	L1851	L1851	E1769	L1688	T1566	A1495	D1397	ASN	GLY
L2344	L2274	I2193	VAL	SER	PRO	D1921	K1852	Q1771	V1693	I1567	A1496	C1398	PRO	PHE
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V2346	L2276	T2201	GLN	GLN	VAL	E1925	ARG	E1775	L1697	T1569	A1498	V1401	GLN	L1250
Q2347	L2277	T2202	ASP	ASP	VAL	N1926	PHE	E1776	P1697	L1572	A1499	L1402	CYS	L1254
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V2350	V2280	K2206	ALA	ALA	MET	GLU	LEU	Q1779	THR	E1582	A1502	L1407	ASP	L1261
Q2351	K2281	K2207	GLU	GLU	GLU	ASN	ASN	Q1779	SER	M1583	A1503	L1408	GLY	A1262
A2352	A2282	D2208	GLY	GLY	ARG	GLN	GLU	F1762	LEU	E1584	A1504	K1409	GLY	A1263
H2353	H2283	E2209	ARG	ARG	LYS	ASN	SER	E1763	THR	E1585	A1505	L1410	GLY	E1264
Q2354	Q2284	L2213	LEU	LEU	LYS	LEU	THR	R1764	GLY	E1586	A1506	M1403	GLY	L1265
L2355	L2285	L2137	TYR	TYR	TYR	E1934	D1864	R1784	L1707	M1592	A1507	R1329	GLY	E1266
F2356	F2286	I2137	ILE	ILE	ILE	E1935	F1863	E1785	SER	E1593	A1508	V1337	GLY	E1267
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Q2358	Q2288	N2141	ILE	ILE	ILE	R1937	Q1866	R1787	L1707	V1596	A1510	V1339	GLY	I1271
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N2361	N2291	L2144	GLU	GLU	GLU	H1941	L1877	M1804	E1715	H1612	A1513	M1342	GLY	R1274
C2362	C2292	L2145	ALA	ALA	ALA	C1942	D1878	F1805	Q1716	Q1614	A1514	E1343	GLY	R1275
L2363	L2293	A2147	ARG	ARG	ARG	N1946	L1879	F1806	L1717	L1623	A1515	T1345	GLY	A1278
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Q2365	Q2295	L2149	ASN	ASN	ASN	A1948	R1883	LYS	P1723	H1625	A1517	T1347	GLY	L1282
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F2369	F2299	R2157	SER	SER	SER	F1961	ASP	LEU	E1728	E1629	A1521	L1357	GLY	Q1287
N2370	N2300	R2158	GLY	GLY	GLY	Y1962	VAL	PHE	F1729	W1632	A1522	L1358	GLY	S1288
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L2374	L2304	E2163	SER	SER	SER	LEU	GLU	F1819	G1733	R1447	A1526	V1294	GLY	V1294
A2375	A2305	V2164	LEU	LEU	LEU	PHE	SER	E1820	P1734	V1645	A1527	C1364	GLY	A1295
D2376	D2306	W2164	GLY	GLY	GLY	LEU	SER	D1821	R1735	A1450	A1528	N1365	GLY	F1296
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F2378	F2308	L2168	GLY	GLY	GLY	LYS	ASN	L1823	N1738	T1652	A1530	H1367	GLY	L1298
N2379	N2309	L2169	PRO	PRO	PRO	PRO	GLN	L1824	D1741	L1653	A1531	L1368	GLY	E1299
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L2381	L2311	K2162	MET	MET	MET	PHE	GLU	T1826	K1744	E1665	A1533	R1370	GLY	I1301
A2382	A2312	E2163	SER	SER	SER	LEU	SER	L1827	H1665	G1666	A1534	V1371	GLY	M1302
F2383	F2313	W2164	LEU	LEU	LEU	GLY	GLY	H1828	A1749	E1670	A1535	L1372	GLY	M1303
L2384	L2314	L2171	ASN	ASN	ASN	ILE	CYS	H1829	P1756	V1671	A1536	H1373	GLY	H1304
F2385	F2315	A2172	GLY	GLY	GLY	GLU	THR	C1831	M1757	E1671	A1537	L1376	GLY	H1305
L2386	L2316	P2167	LEU	LEU	LEU	ASN	GLY	S1832	G1757	V1671	A1538	E1378	GLY	I1307
P2387	P2317	L2168	TYR	TYR	TYR	LEU	GLN	L1833	E1760	T1674	A1539	A1308	GLY	A1309
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L2392	L2322	A2173	GLY	GLY	GLY	LEU	GLY	L1838	L1684	L1684	A1544	V1487	GLY	GLY
L2393	L2323	A2173	GLY	GLY	GLY	LEU	GLY	L1839	L1684	L1684	A1545	V1487	GLY	GLY
L2394	L2324	S2174	GLY	GLY	GLY	LEU	GLY	L1840	L1684	L1684	A1546	V1487	GLY	GLY
L2395	L2325	E2175	GLY	GLY	GLY	LEU	GLY	L1841	L1684	L1684	A1547	V1487	GLY	GLY
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Y3475	A3391	ASP	S3143	I3045	A2961	H2865	K2786	T2722	SER	R2722	PRO	F2413
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S3517	I3348	A3255	I3182	R3099	A3006	ARG	M2820	SER	ILE	ILE	ILE	R2452
V3518	L3348	M3256	I3183	K3100	E3007	ARG	T2825	GLU	VAL	ARG	ARG	E2453
I3521	D3354	K3257	T3184	F3101	W3008	L2916	K2824	LEU	GLY	ALA	ALA	R2454
T3522	K3355	K3260	N3185	Y3102	K3009	D2919	E2828	LYS	PRO	THR	THR	L2454
Q3527	A3356	E3261	R3186	I3103	S3010	V2920	K2829	MET	ASP	GLN	GLN	L2455
A3528	R3358	L3262	C3187	L3107	L3011	W2923	T2833	GLN	GLY	GLN	GLY	E2460
I3529	I3359	S3266	I3190	N3113	E3022	ASN	L2837	ASP	LYS	HIS	LYS	F2461
V3530	L3360	D3271	I3193	Y3114	ASN	PRO	Y2936	THR	ARG	PHE	ARG	H2464
P3532	E3361	W3272	L3197	Y3117	PRO	PRO	D2937	VAL	LEU	THR	LEU	P2465
I3535	Q3364	L3273	THR	I3117	ASP	ASP	L2844	L2771	GLY	LEU	THR	T2467
S3536	SER	V3274	PRO	I3118	LEU	LEU	F2850	R2772	PRO	GLN	THR	R2470
S3539	SER	Q3278	PRO	Y3119	ASN	ASN	F2851	Y2773	GLY	THR	THR	S2569
TYR	D3368	S3279	GLU	S3124	I3030	I3036	P2852	S2774	ASP	ALA	ALA	P2570
SER	D3369	Y3280	R3125	R3125	W3031	W3031	P2853	Y2775	GLU	GLY	GLY	K2473
PHE	A3461	C3281	K3128	K3128	ASP	ASP	P2854	R2776	VAL	THR	THR	Y2474
LYS	R3462	R3282	ASN	ASN	S3032	S3032	S2856	H2777	ASP	ARG	ARG	N2475
ASP	L3463	H3285	MET	Q3130	P3034	P3034	C2857	Q2778	ASN	SER	SER	P2575
T3545	K3464	C3286	ASN	L3135	Q3037	Q3037	Q2859	D2779	LYS	SER	PHE	L2477
S3546	R3467	R3289	VAL	L3135	L3041	L3041	L2861	L2780	VAL	SER	THR	H2478
T3547			GLN		P3042	P3042	S2862	P2781	GLY	TRP	TRP	W2479
								L2782	ALA	LEU	LEU	H2481
								12783				



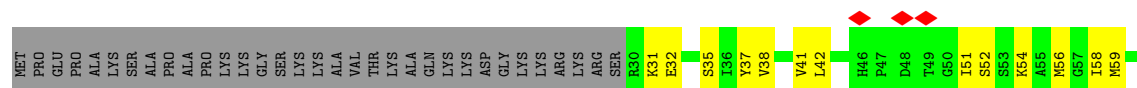
• Molecule 2: Histone H2B type 1-J

Chain D: 39% 35% 26%

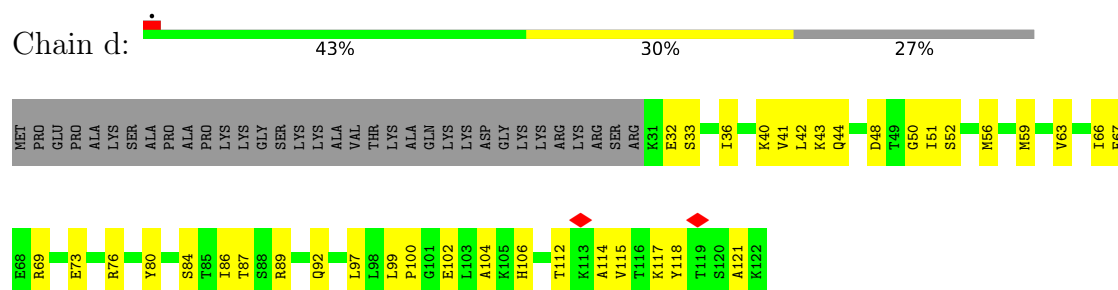


• Molecule 2: Histone H2B type 1-J

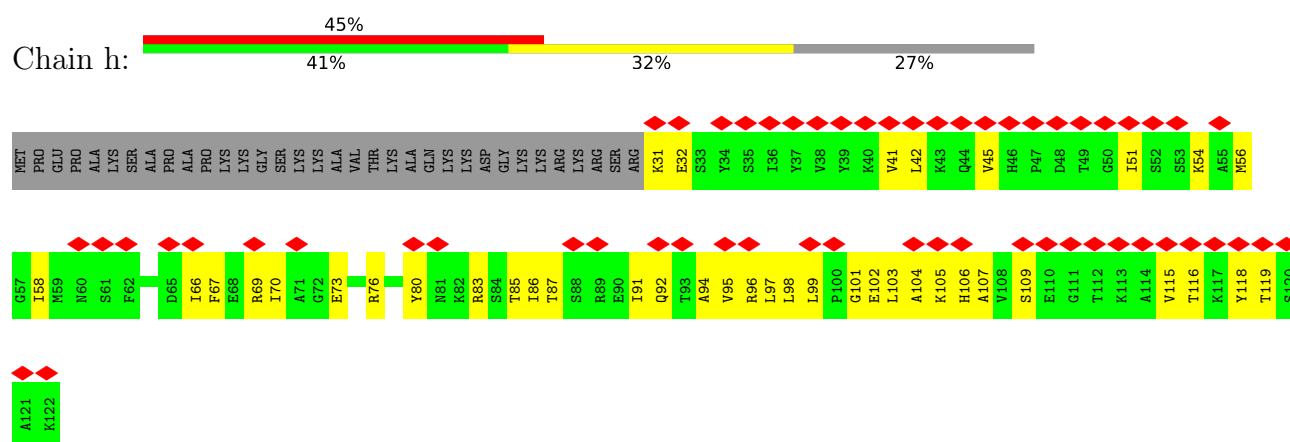
Chain H: 23% 38% 36% 26%



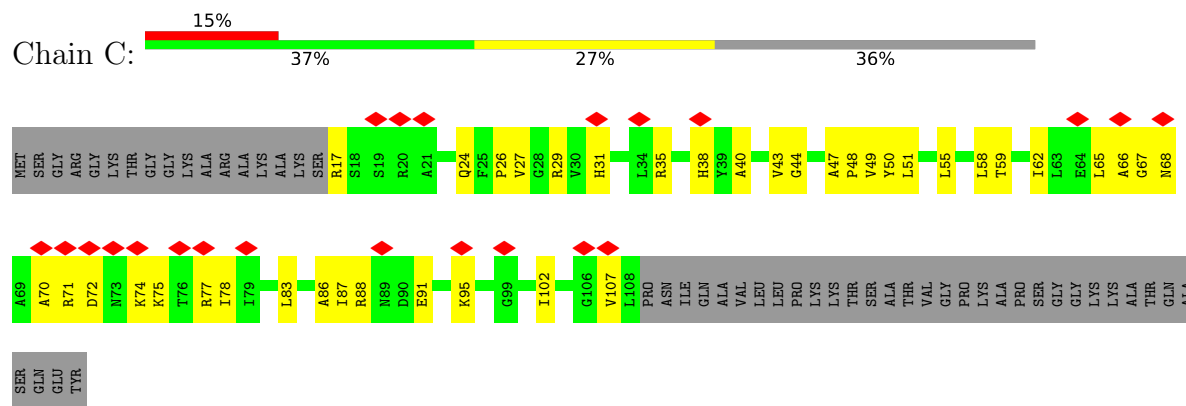
- Molecule 2: Histone H2B type 1-J



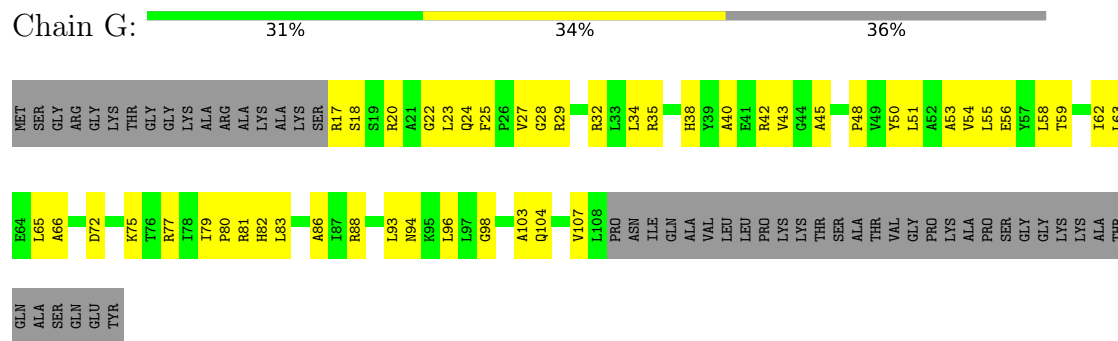
- Molecule 2: Histone H2B type 1-J



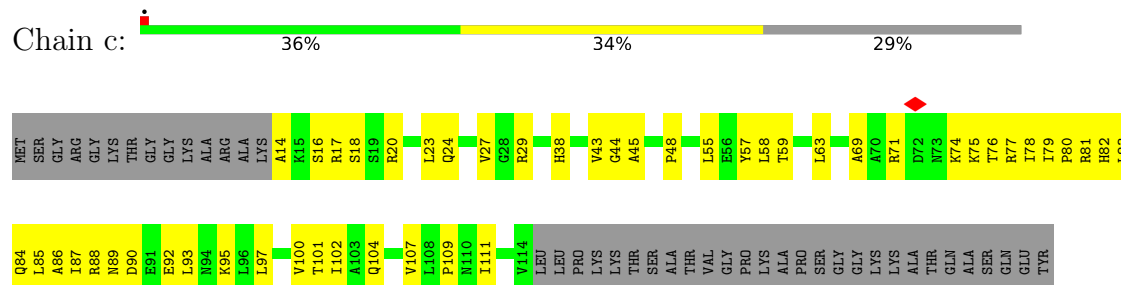
- Molecule 3: Histone H2AX



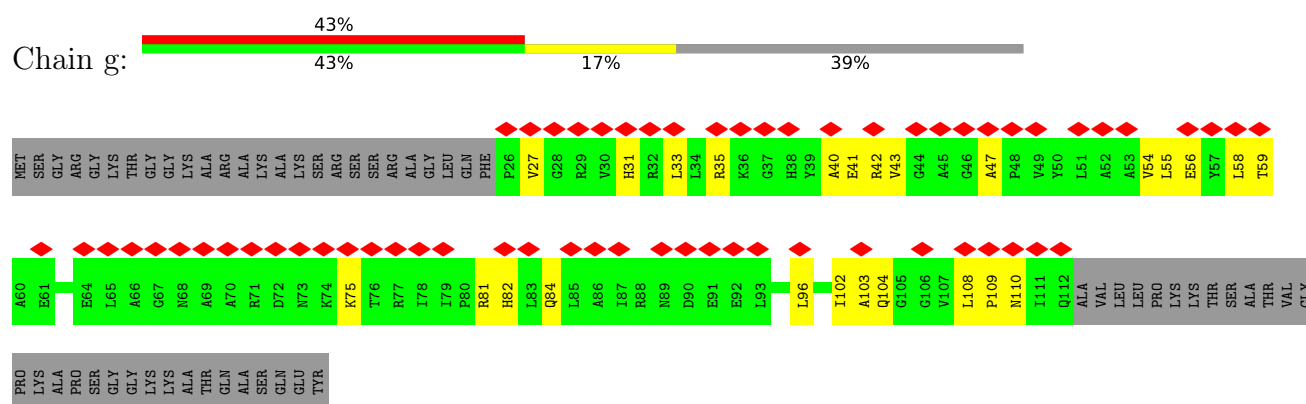
- Molecule 3: Histone H2AX



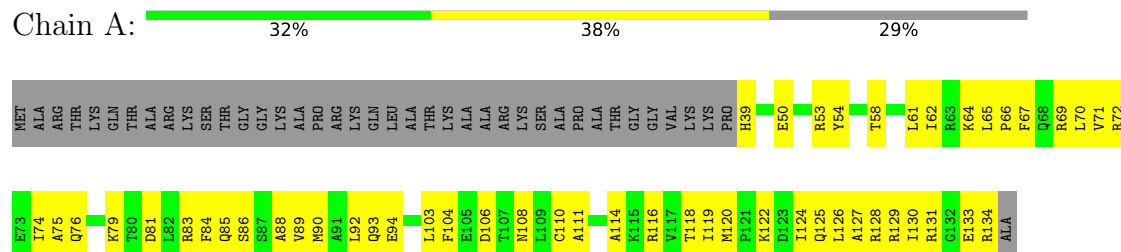
- Molecule 3: Histone H2AX



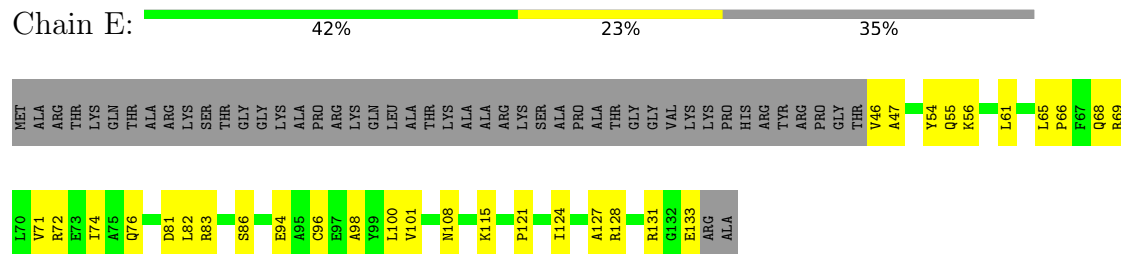
- Molecule 3: Histone H2AX



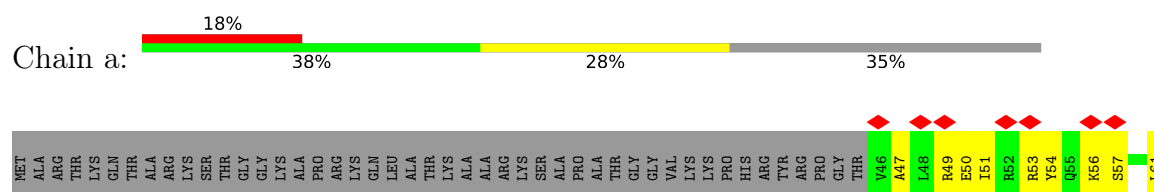
- Molecule 4: Histone H3.1

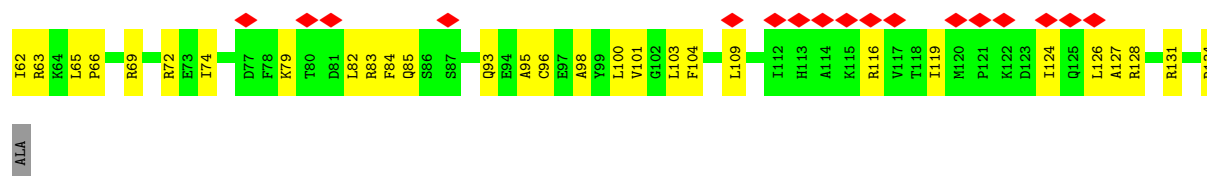


- Molecule 4: Histone H3.1

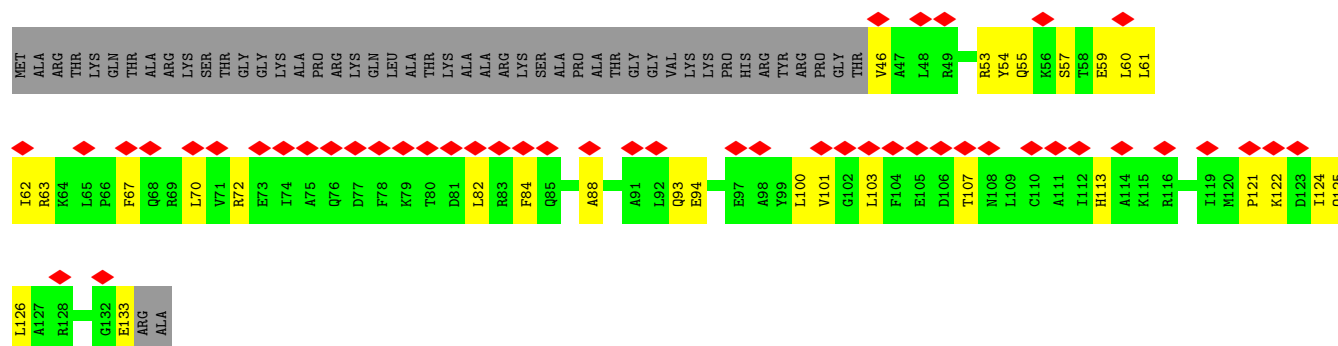
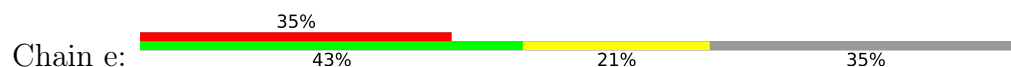


- Molecule 4: Histone H3.1

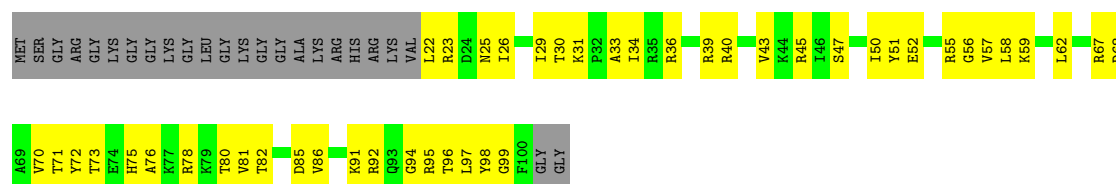




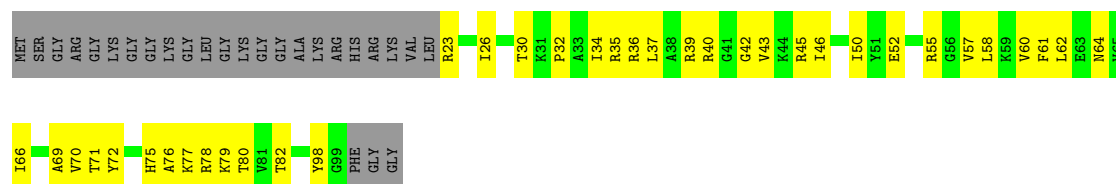
• Molecule 4: Histone H3.1



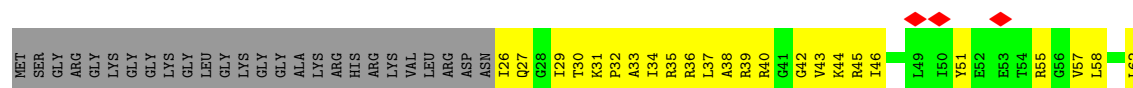
• Molecule 5: Histone H4

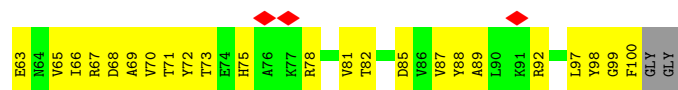


• Molecule 5: Histone H4

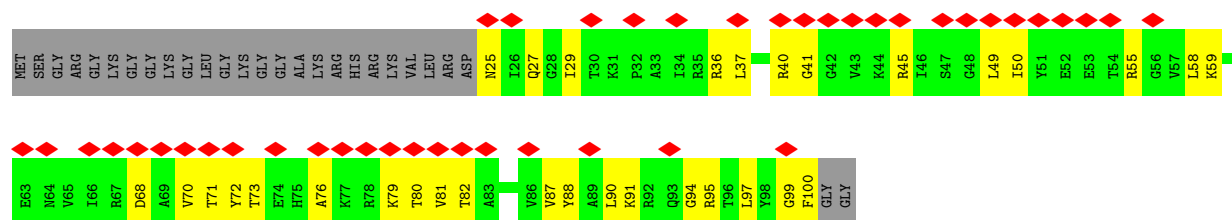
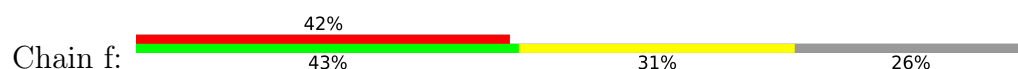


• Molecule 5: Histone H4

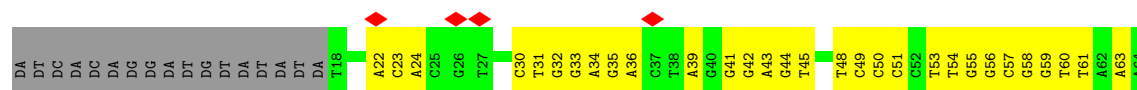




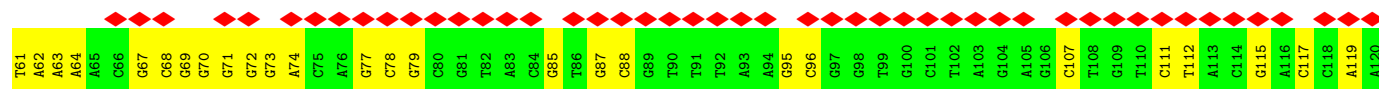
• Molecule 5: Histone H4



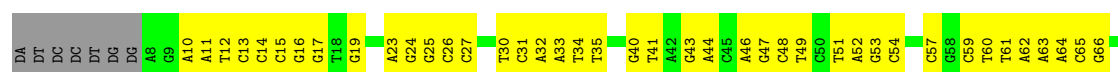
• Molecule 6: 153 bp DNA



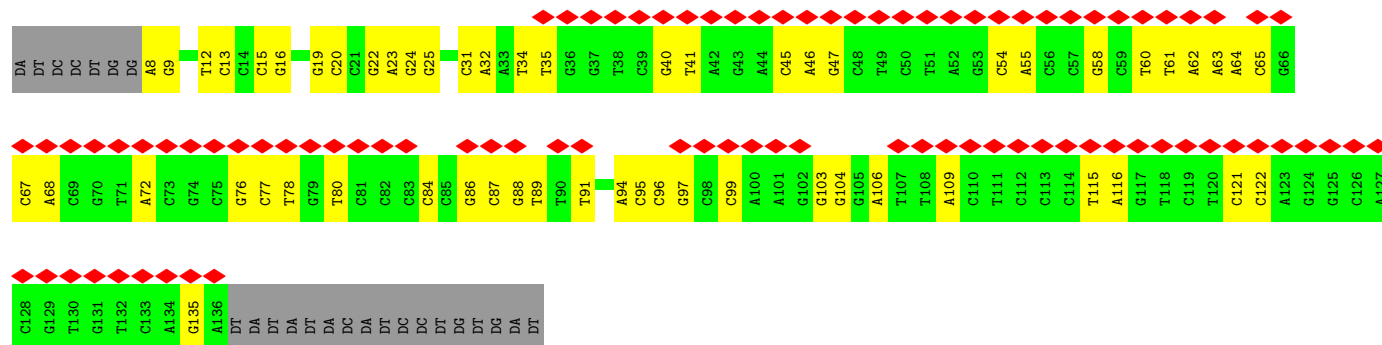
• Molecule 6: 153 bp DNA



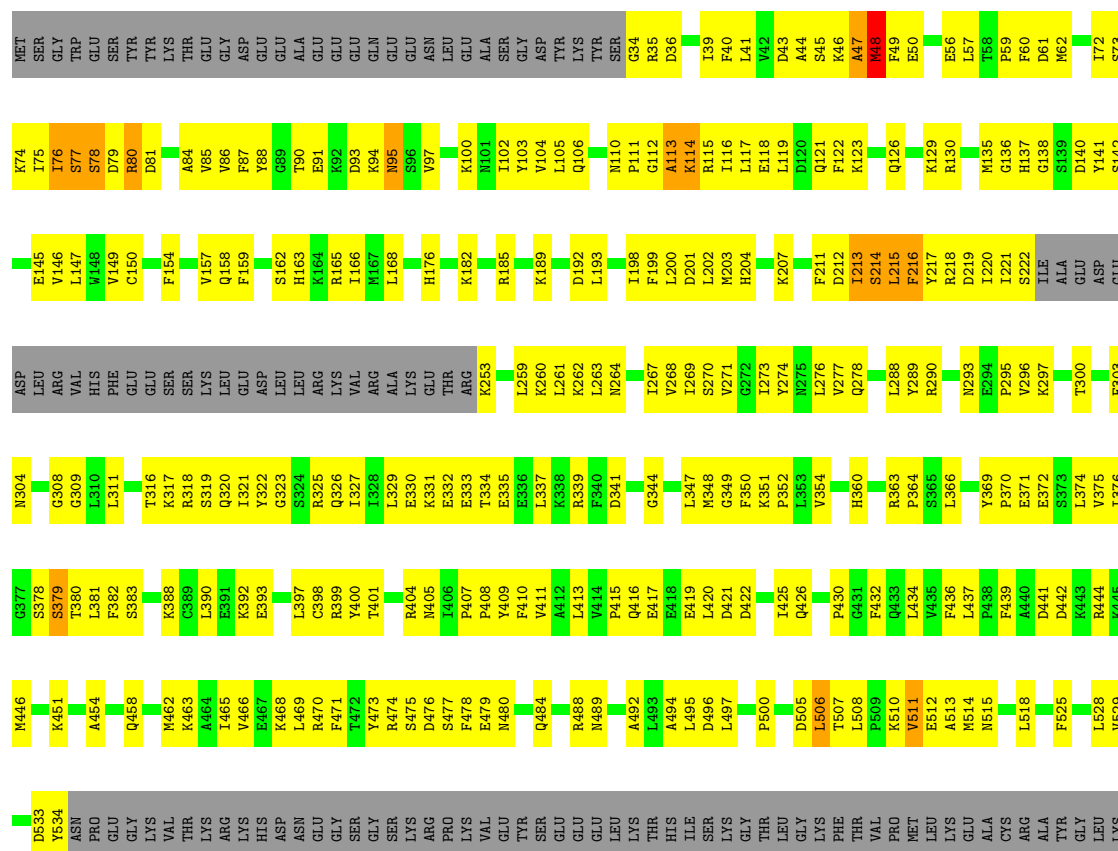
• Molecule 7: 153 bp DNA



- Molecule 7: 153 bp DNA



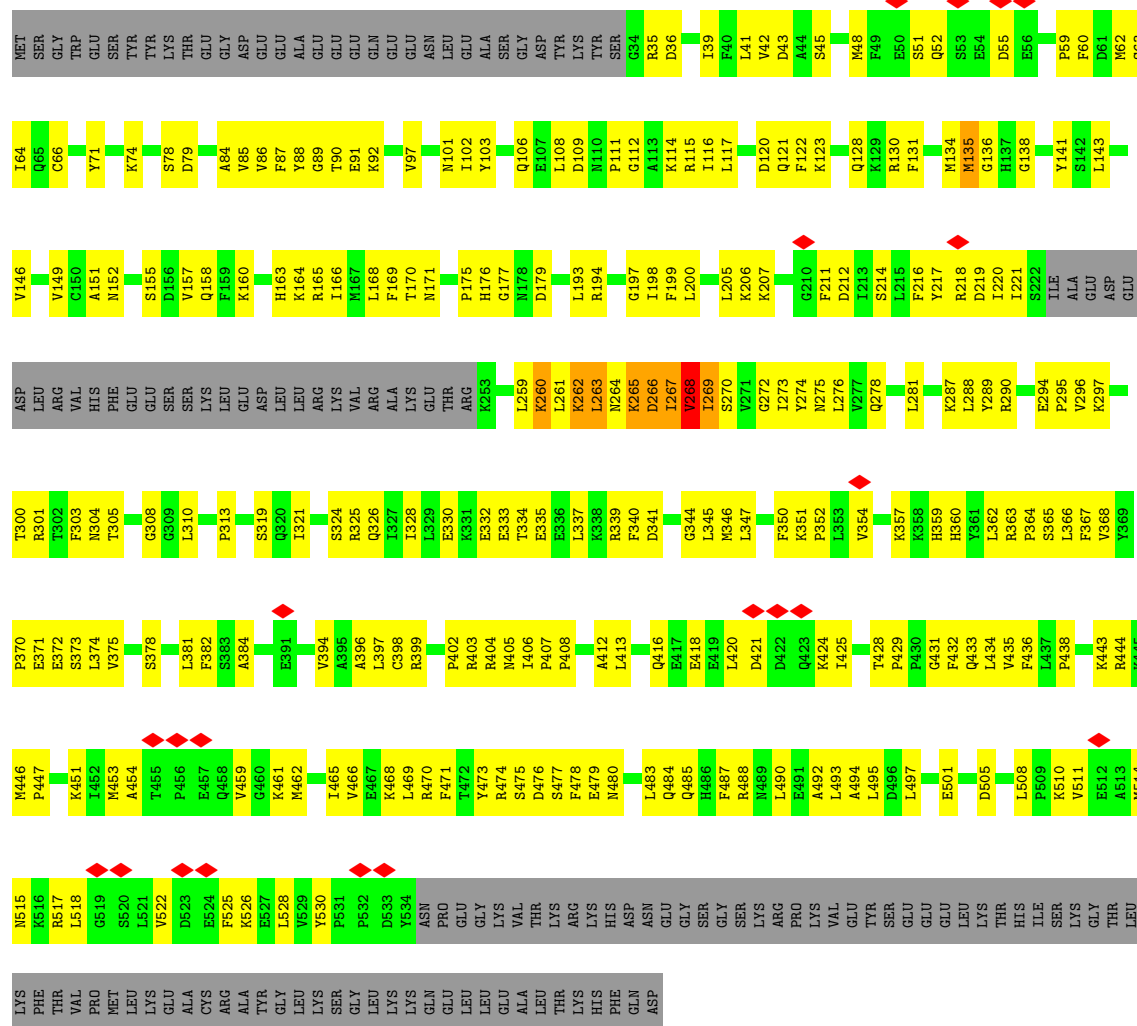
- Molecule 8: X-ray repair cross-complementing protein 6



SER
GLY
LEU
LYS
LYS
GLN
GLU
LEU
LEU
GLU
ALA
THR
LYS
HIS
PHE
GLN
ASP

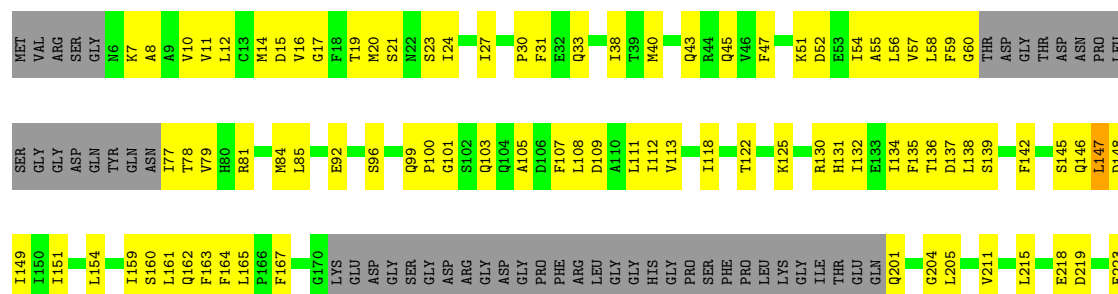
• Molecule 8: X-ray repair cross-complementing protein 6

Chain M:



• Molecule 9: X-ray repair cross-complementing protein 5

Chain L:





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	27712	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	48.59	Depositor
Minimum defocus (nm)	700	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.809	Depositor
Minimum map value	-0.255	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.023	Depositor
Recommended contour level	0.12	Depositor
Map size (Å)	692.16, 692.16, 692.16	wwPDB
Map dimensions	420, 420, 420	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.6479999, 1.6479999, 1.6479999	Depositor

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	O	0.21	0/28108	0.47	0/38054
1	o	0.13	0/28434	0.34	0/38434
2	D	0.14	0/724	0.36	0/973
2	H	0.16	0/727	0.35	0/977
2	d	0.16	0/708	0.40	0/953
2	h	0.15	0/708	0.43	0/953
3	C	0.10	0/711	0.32	0/960
3	G	0.18	0/712	0.32	0/961
3	c	0.11	0/771	0.32	0/1043
3	g	0.11	0/659	0.25	0/891
4	A	0.21	0/805	0.37	0/1079
4	E	0.10	0/719	0.27	0/965
4	a	0.10	0/740	0.31	0/991
4	e	0.11	0/717	0.27	0/963
5	B	0.13	0/631	0.34	0/849
5	F	0.12	0/618	0.36	0/829
5	b	0.14	0/597	0.39	0/803
5	f	0.18	0/617	0.36	0/827
6	I	0.29	0/3020	0.44	0/4661
6	i	0.30	0/3020	0.47	0/4661
7	J	0.30	0/2940	0.44	0/4530
7	j	0.31	0/2940	0.48	0/4530
8	K	0.24	0/3779	0.50	0/5109
8	M	0.23	0/3816	0.47	0/5152
9	L	0.17	0/4855	0.37	0/6561
9	N	0.15	0/4880	0.37	0/6589
All	All	0.20	0/96956	0.41	0/133298

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 ⓘ

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	O	27567	0	27400	1460	0
1	o	27886	0	28085	1238	0
2	D	714	0	733	55	0
2	H	717	0	733	44	0
2	d	698	0	697	41	0
2	h	698	0	702	38	0
3	C	702	0	730	43	0
3	G	703	0	733	46	0
3	c	761	0	791	61	0
3	g	652	0	689	29	0
4	A	794	0	831	58	0
4	E	711	0	744	33	0
4	a	732	0	772	48	0
4	e	709	0	737	32	0
5	B	624	0	647	49	0
5	F	612	0	650	36	0
5	b	590	0	619	63	0
5	f	610	0	653	35	0
6	I	2691	0	1472	61	0
6	i	2691	0	1472	112	0
7	J	2624	0	1449	62	0
7	j	2624	0	1449	126	0
8	K	3705	0	3702	280	0
8	M	3742	0	3760	264	0
9	L	4774	0	4682	272	0
9	N	4797	0	4729	217	0
All	All	94128	0	89661	4356	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 24.

The worst 5 of 4356 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:O:100:ILE:HG23	1:O:103:TYR:HB2	1.12	1.11

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:O:213:ARG:HB3	1:O:216:LYS:HB2	1.34	1.10
1:o:958:MET:HB2	1:o:961:LEU:HB2	1.34	1.07
1:o:1184:ARG:HH22	1:o:1265:GLU:HB3	1.14	1.06
8:M:261:LEU:HA	8:M:267:ILE:HA	1.09	1.04

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 PDB entries followed by that with respect to all EM 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	O	3434/4128 (83%)	3001 (87%)	414 (12%)	19 (1%)	22	59
1	o	3428/4128 (83%)	3172 (92%)	254 (7%)	2 (0%)	48	83
2	D	91/126 (72%)	82 (90%)	9 (10%)	0	100	100
2	H	91/126 (72%)	84 (92%)	7 (8%)	0	100	100
2	d	90/126 (71%)	78 (87%)	12 (13%)	0	100	100
2	h	90/126 (71%)	70 (78%)	19 (21%)	1 (1%)	12	46
3	C	90/143 (63%)	82 (91%)	8 (9%)	0	100	100
3	G	90/143 (63%)	86 (96%)	3 (3%)	1 (1%)	12	46
3	c	99/143 (69%)	92 (93%)	7 (7%)	0	100	100
3	g	85/143 (59%)	82 (96%)	3 (4%)	0	100	100
4	A	94/136 (69%)	86 (92%)	8 (8%)	0	100	100
4	E	86/136 (63%)	79 (92%)	7 (8%)	0	100	100
4	a	87/136 (64%)	83 (95%)	4 (5%)	0	100	100
4	e	86/136 (63%)	79 (92%)	7 (8%)	0	100	100
5	B	77/103 (75%)	71 (92%)	6 (8%)	0	100	100
5	F	75/103 (73%)	72 (96%)	3 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
5	b	73/103 (71%)	64 (88%)	9 (12%)	0	100	100
5	f	74/103 (72%)	62 (84%)	12 (16%)	0	100	100
8	K	467/609 (77%)	401 (86%)	53 (11%)	13 (3%)	4	25
8	M	467/609 (77%)	385 (82%)	75 (16%)	7 (2%)	8	39
9	L	604/732 (82%)	505 (84%)	94 (16%)	5 (1%)	16	53
9	N	600/732 (82%)	517 (86%)	81 (14%)	2 (0%)	37	72
All	All	10378/12970 (80%)	9233 (89%)	1095 (11%)	50 (0%)	27	63

5 of 50 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	O	1474	ASP
1	O	1478	SER
1	O	3151	LEU
1	o	956	PRO
8	K	113	ALA

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 PDB entries followed by that with respect to all EM 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	O	3005/3671 (82%)	2983 (99%)	22 (1%)	81	87
1	o	3077/3671 (84%)	3076 (100%)	1 (0%)	100	100
2	D	76/105 (72%)	76 (100%)	0	100	100
2	H	76/105 (72%)	76 (100%)	0	100	100
2	d	73/105 (70%)	73 (100%)	0	100	100
2	h	74/105 (70%)	74 (100%)	0	100	100
3	C	68/106 (64%)	68 (100%)	0	100	100
3	G	69/106 (65%)	69 (100%)	0	100	100
3	c	75/106 (71%)	75 (100%)	0	100	100
3	g	64/106 (60%)	64 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	A	84/111 (76%)	84 (100%)	0	100	100
4	E	75/111 (68%)	75 (100%)	0	100	100
4	a	78/111 (70%)	78 (100%)	0	100	100
4	e	75/111 (68%)	75 (100%)	0	100	100
5	B	62/79 (78%)	62 (100%)	0	100	100
5	F	63/79 (80%)	63 (100%)	0	100	100
5	b	59/79 (75%)	59 (100%)	0	100	100
5	f	63/79 (80%)	63 (100%)	0	100	100
8	K	410/548 (75%)	406 (99%)	4 (1%)	73	82
8	M	416/548 (76%)	412 (99%)	4 (1%)	73	82
9	L	514/649 (79%)	514 (100%)	0	100	100
9	N	525/649 (81%)	525 (100%)	0	100	100
All	All	9081/11340 (80%)	9050 (100%)	31 (0%)	90	92

5 of 31 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	O	2410	GLU
8	M	260	LYS
1	O	3146	SER
8	M	268	VAL
8	K	76	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 15 such sidechains are listed below:

Mol	Chain	Res	Type
1	o	3664	ASN
8	M	405	ASN
1	o	3908	HIS
9	N	350	GLN
9	L	517	ASN

5.3.3 RNA ⓘ

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.

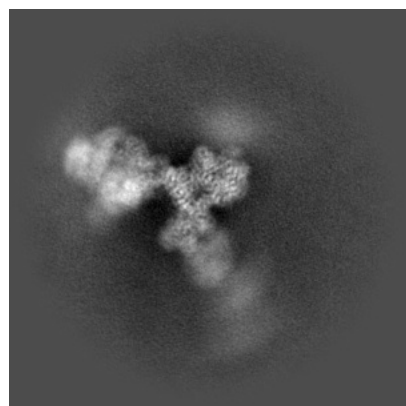
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-53026. These allow visual inspection of the internal detail of the map and identification of artifacts.

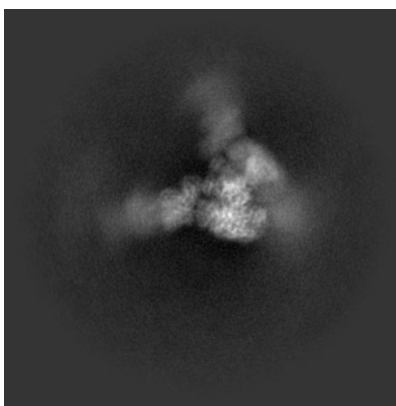
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

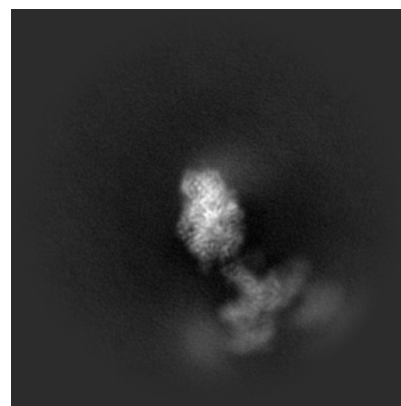
6.1.1 Primary map



X

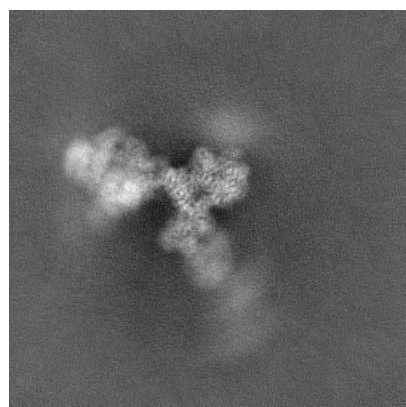


Y

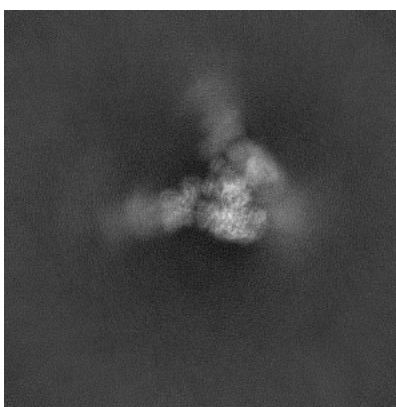


Z

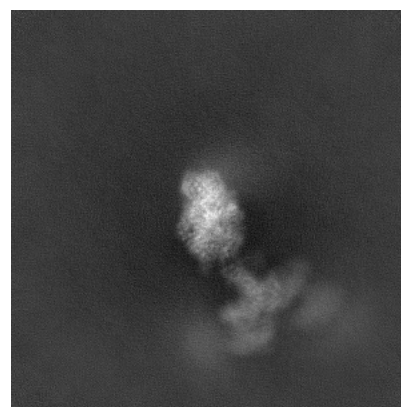
6.1.2 Raw map



X



Y

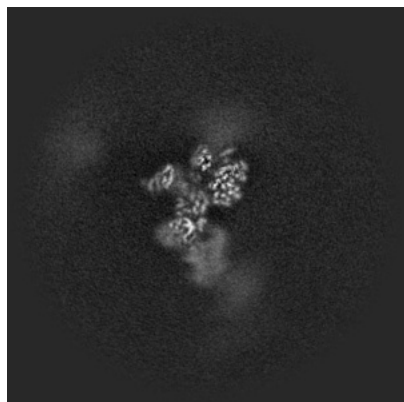


Z

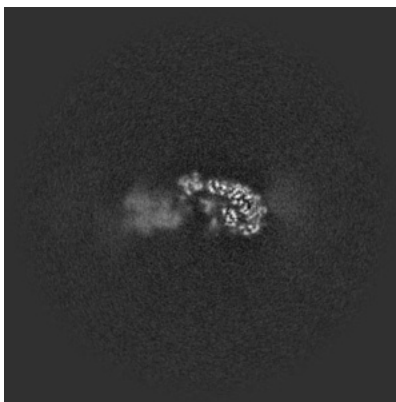
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

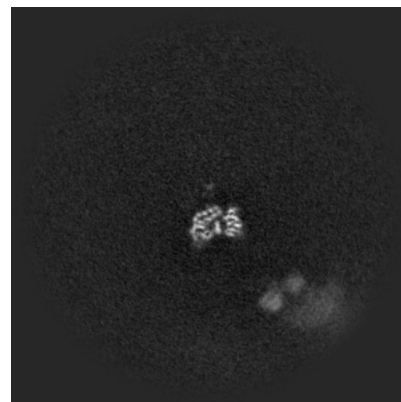
6.2.1 Primary map



X Index: 210

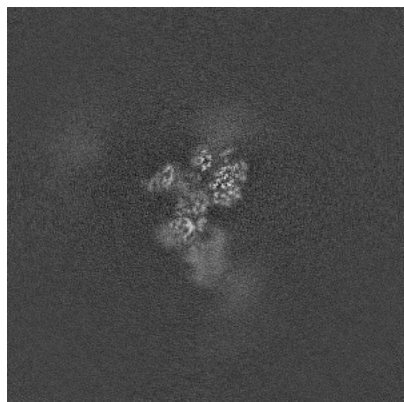


Y Index: 210

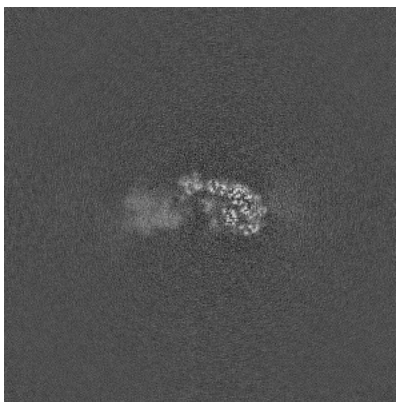


Z Index: 210

6.2.2 Raw map



X Index: 210



Y Index: 210

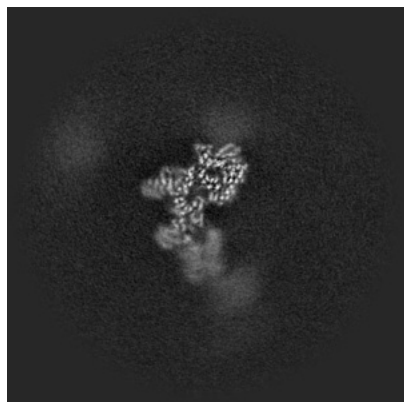


Z Index: 210

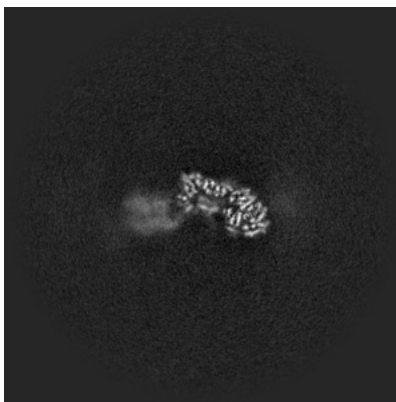
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

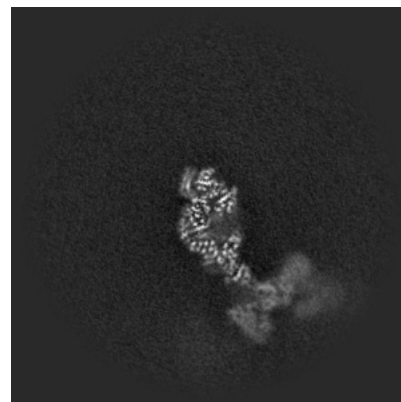
6.3.1 Primary map



X Index: 203



Y Index: 206



Z Index: 238

6.3.2 Raw map



X Index: 202



Y Index: 206

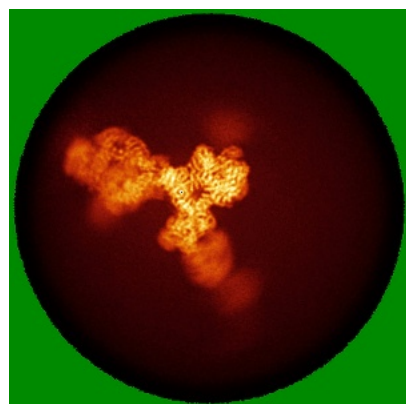


Z Index: 238

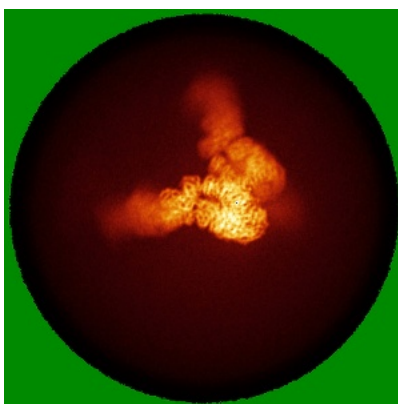
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

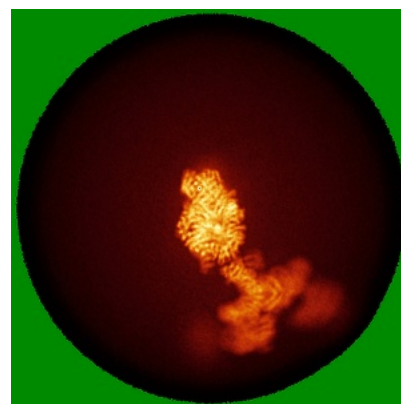
6.4.1 Primary map



X

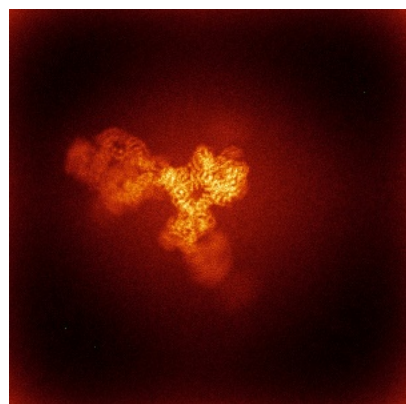


Y

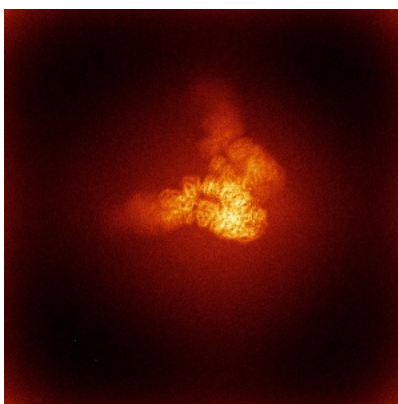


Z

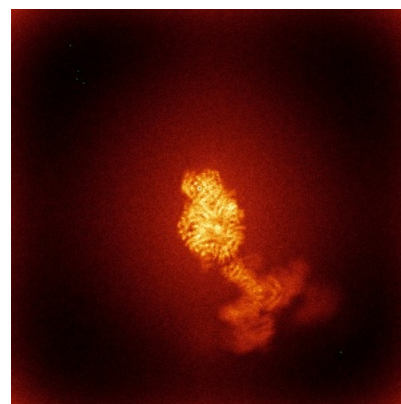
6.4.2 Raw map



X



Y

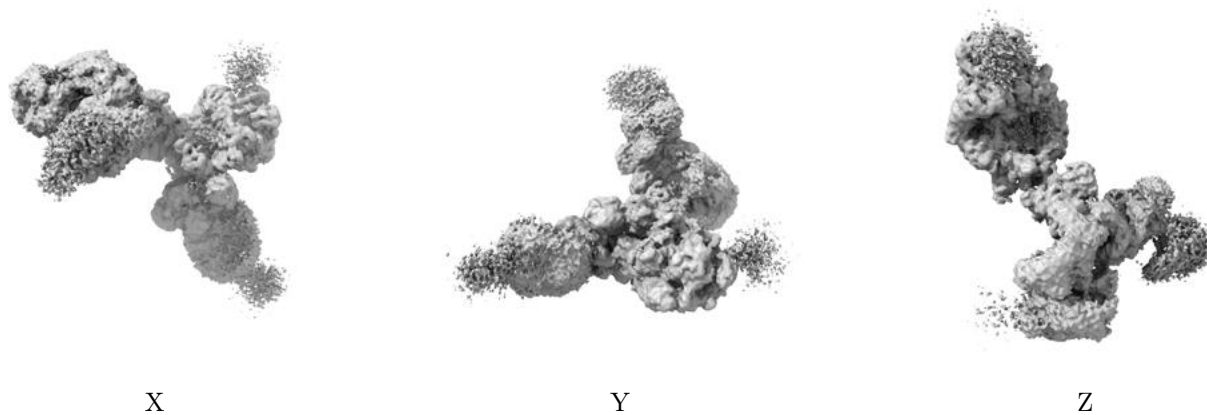


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

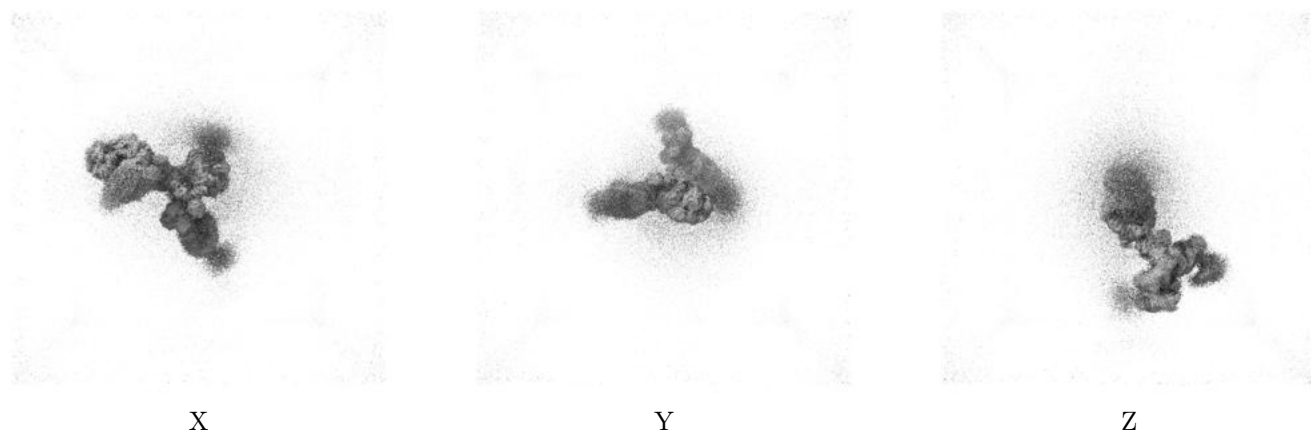
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.12. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

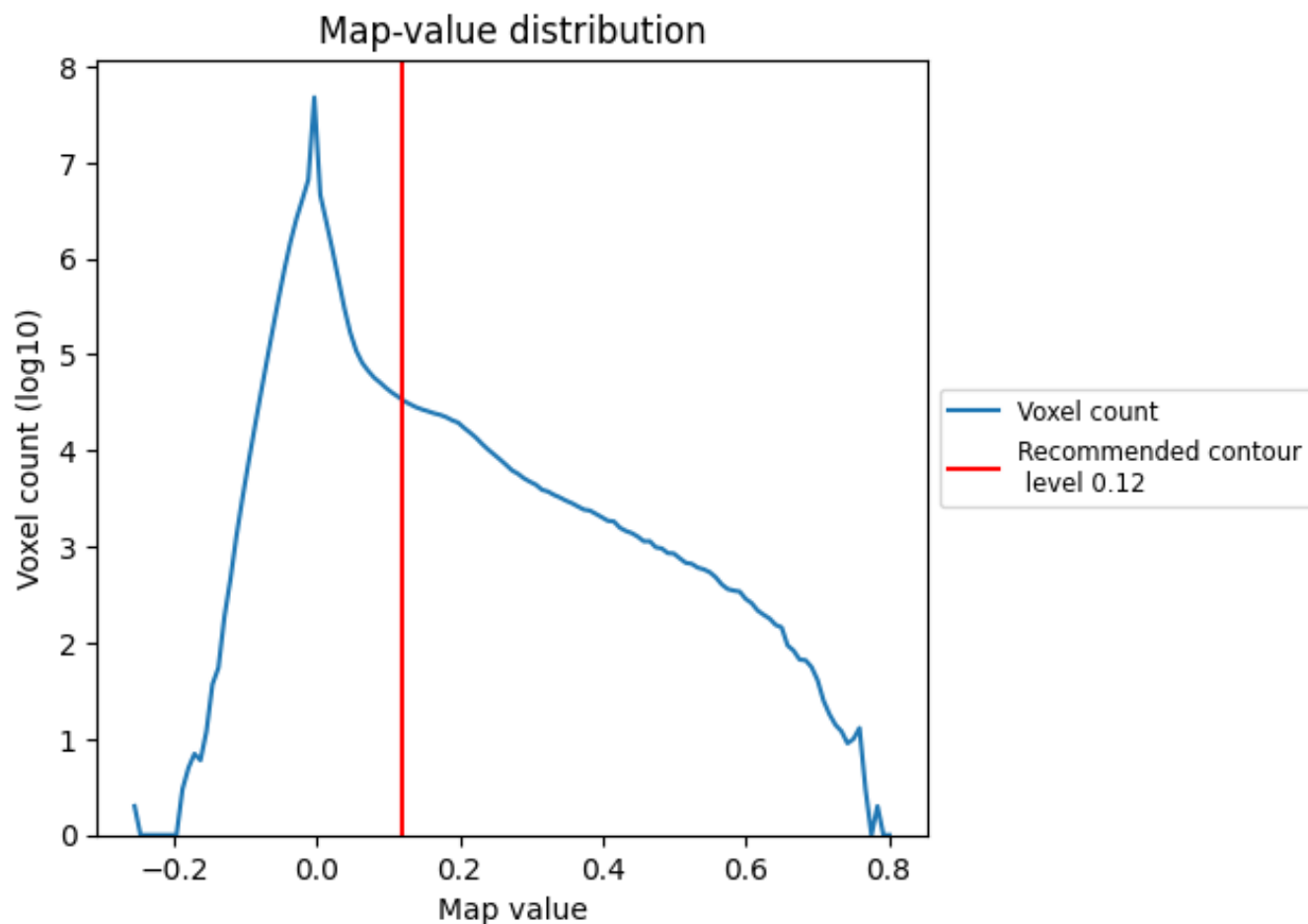
6.6 Mask visualisation [i](#)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis [i](#)

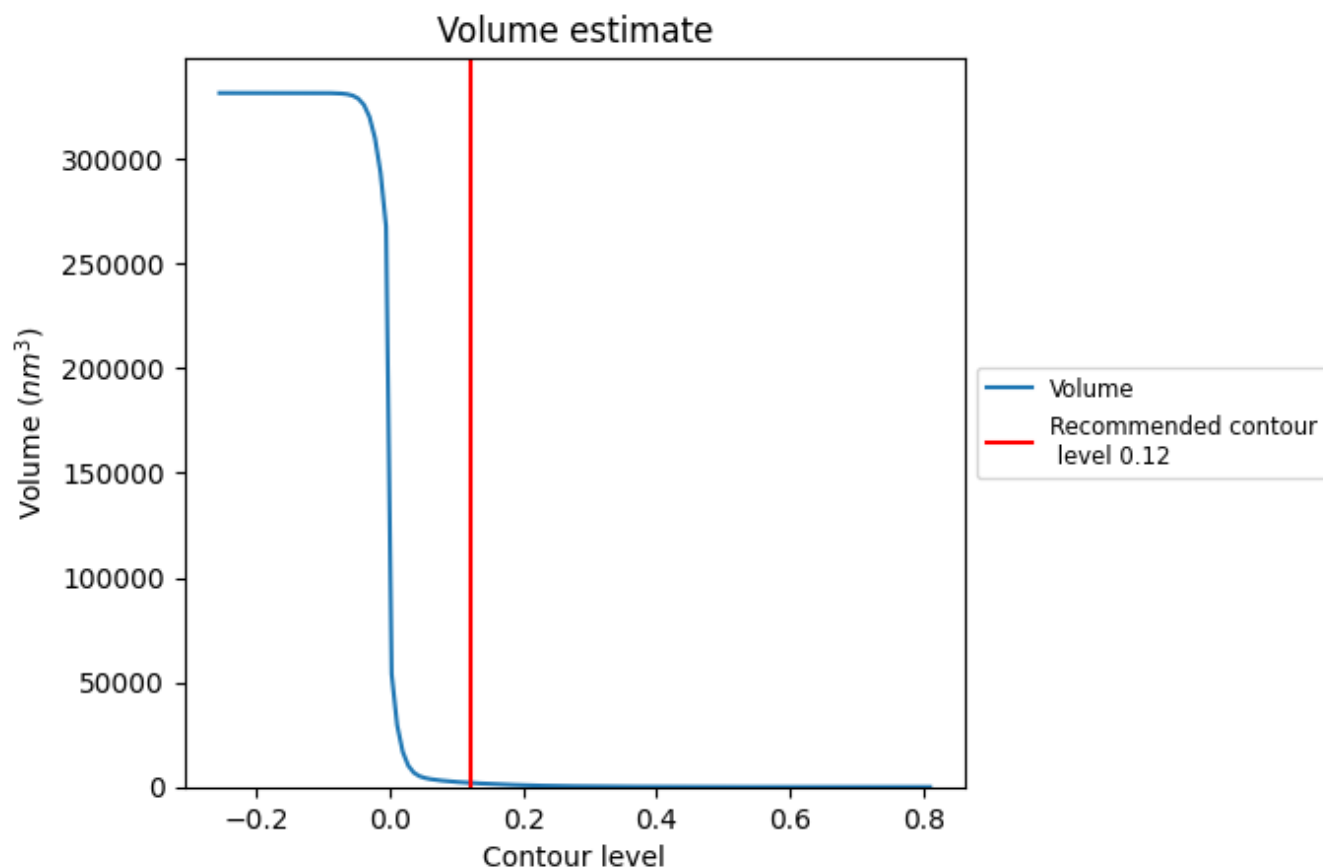
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

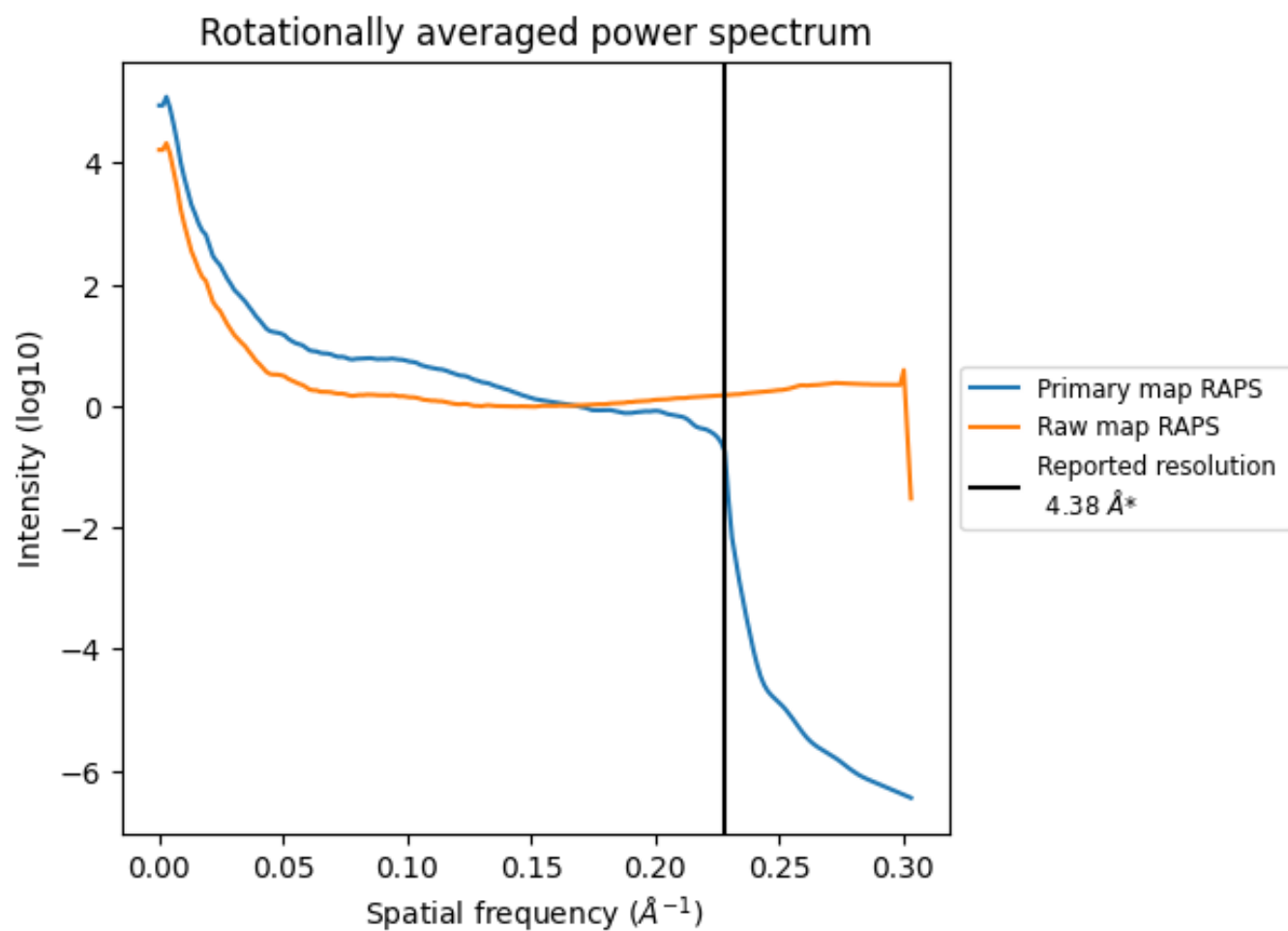
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1965 nm^3 ; this corresponds to an approximate mass of 1775 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ

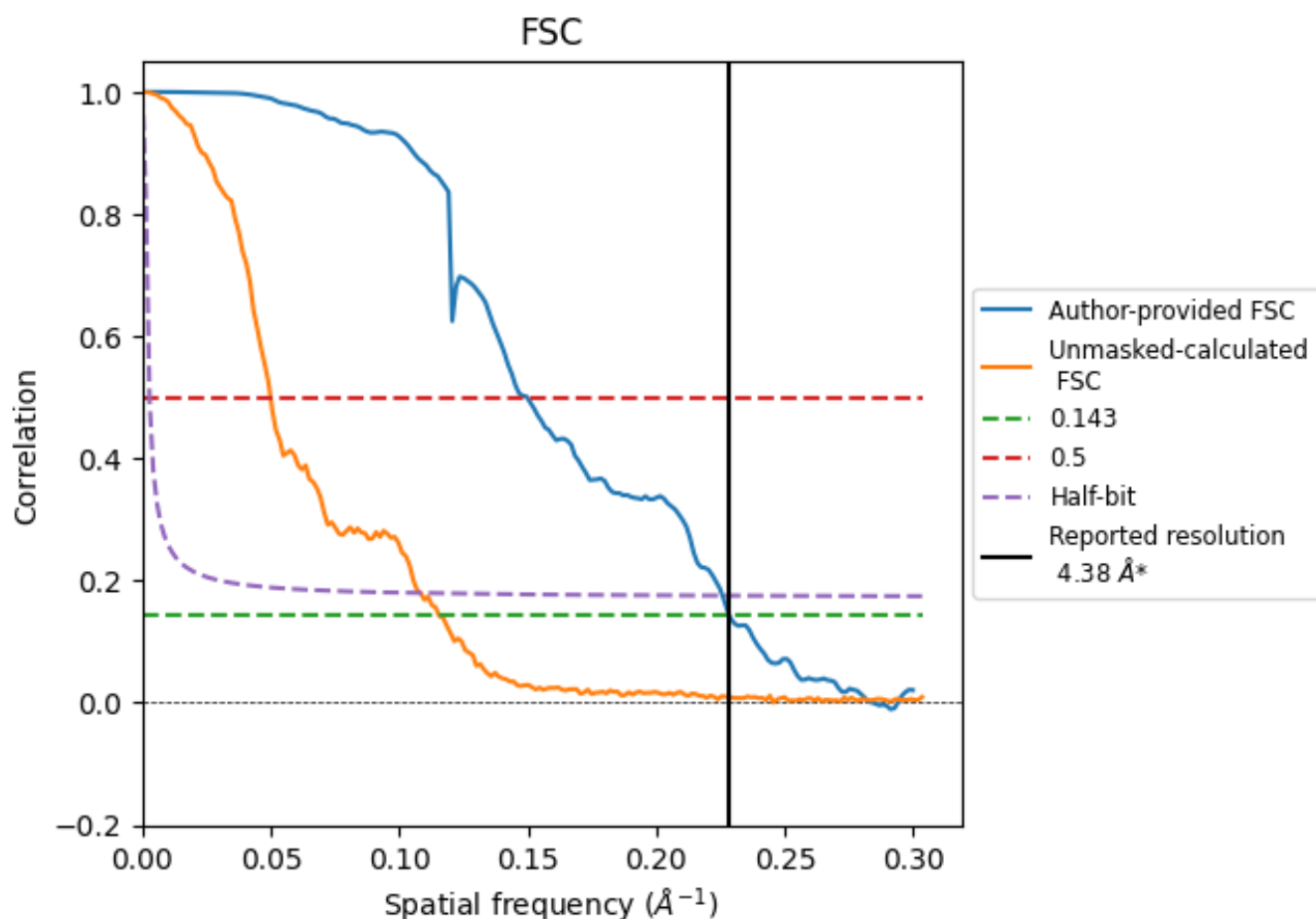


*Reported resolution corresponds to spatial frequency of 0.228 $\text{\AA}^{-1}$

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.228 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

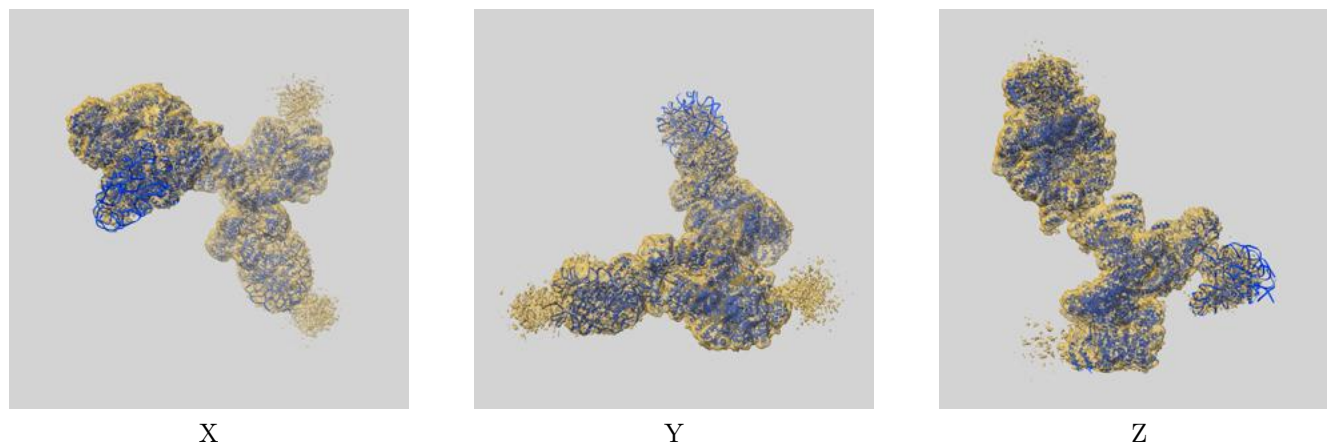
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.38	-	-
Author-provided FSC curve	4.38	6.68	4.43
Unmasked-calculated*	8.67	20.04	9.23

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 8.67 differs from the reported value 4.38 by more than 10 %

9 Map-model fit [i](#)

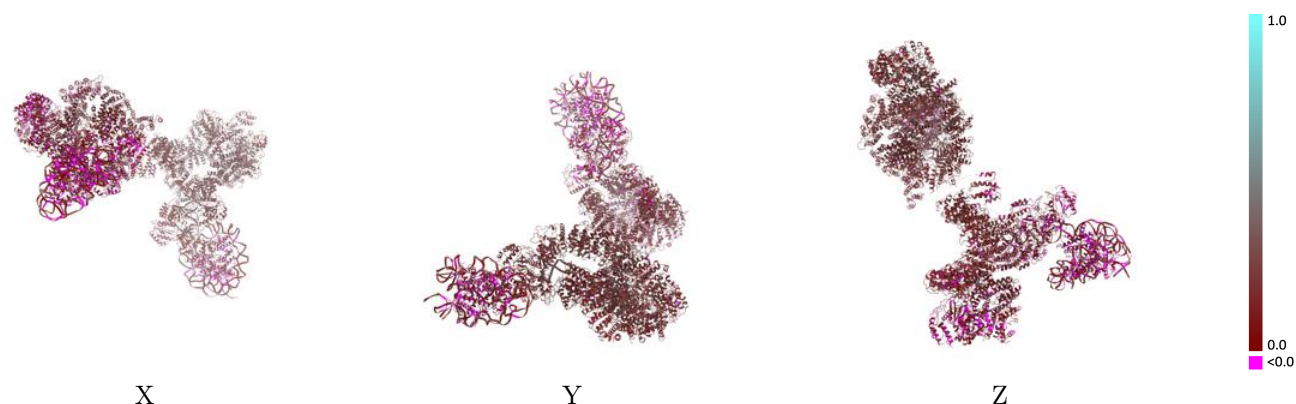
This section contains information regarding the fit between EMDB map EMD-53026 and PDB model 9QCS. Per-residue inclusion information can be found in section [3](#) on page [7](#).

9.1 Map-model overlay [i](#)



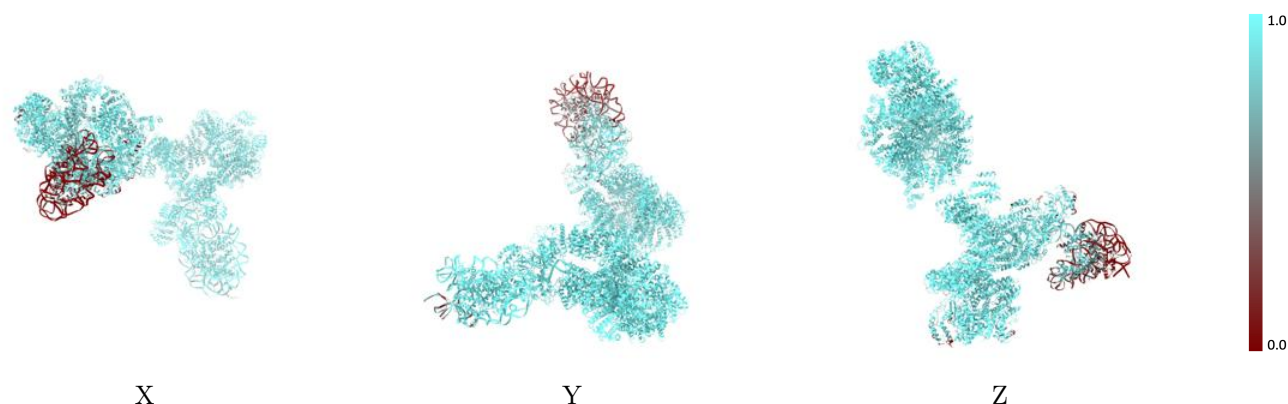
The images above show the 3D surface view of the map at the recommended contour level 0.12 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



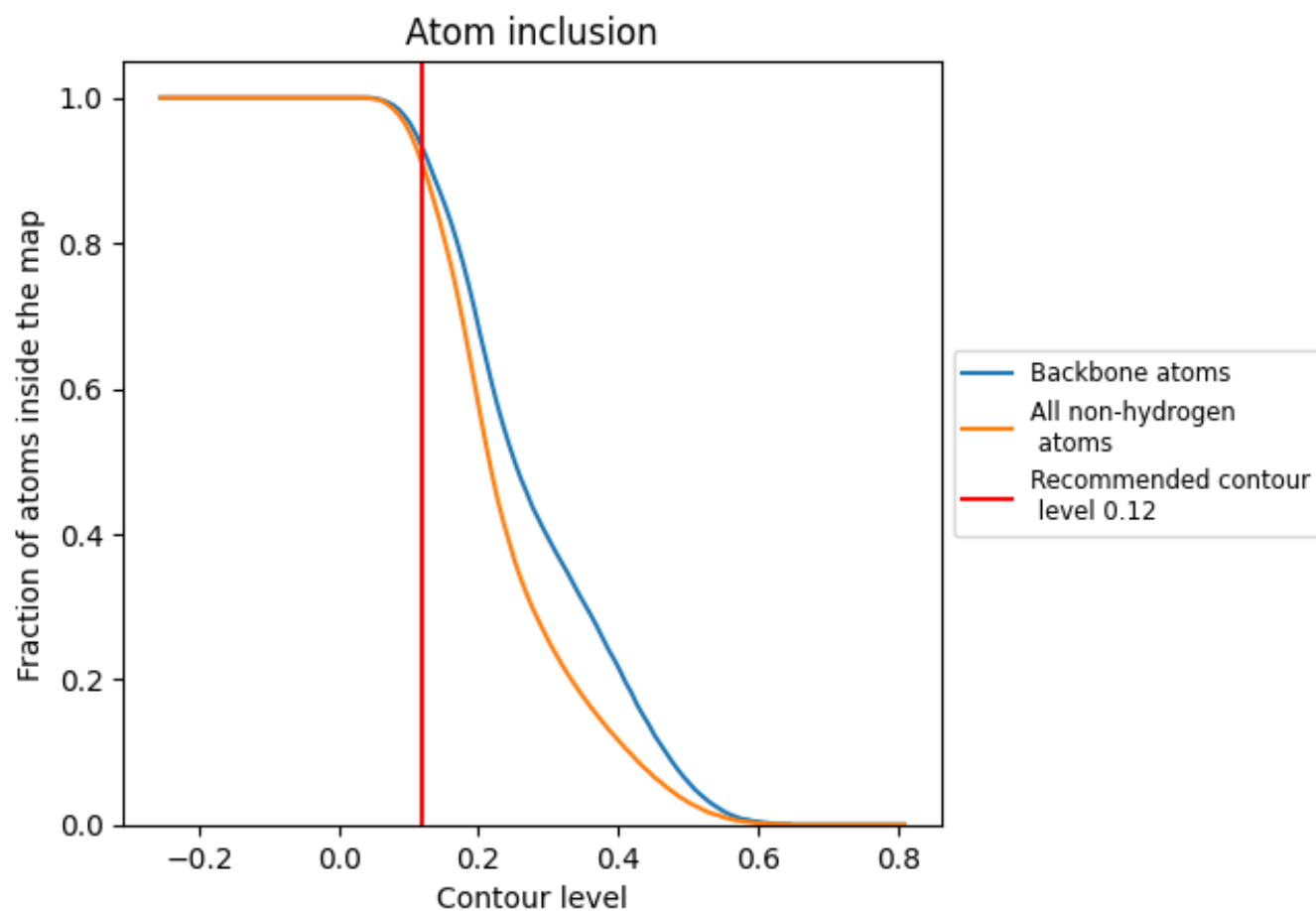
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.12).

9.4 Atom inclusion [i](#)



At the recommended contour level, 93% of all backbone atoms, 91% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.12) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9080	 0.1850
A	 0.9960	 0.1090
B	 1.0000	 0.1320
C	 0.6740	 0.0840
D	 1.0000	 0.1480
E	 1.0000	 0.1000
F	 0.9980	 0.1110
G	 0.9990	 0.1390
H	 0.6470	 0.0800
I	 0.3430	 0.1470
J	 0.3270	 0.1340
K	 0.9960	 0.2520
L	 0.9970	 0.2150
M	 0.9210	 0.1300
N	 0.9070	 0.1360
O	 0.9880	 0.2520
a	 0.6640	 0.0750
b	 0.8460	 0.0750
c	 0.9580	 0.0840
d	 0.9490	 0.0870
e	 0.4060	 0.1060
f	 0.4100	 0.0880
g	 0.2960	 0.0590
h	 0.3350	 0.0820
i	 0.9120	 0.1730
j	 0.9130	 0.1690
o	 0.9670	 0.1660

