Full wwPDB EM Validation Report ⓘ

May 4, 2025 – 02:06 PM EDT

PDB ID	:	8DGC / pdb_00008dgc
EMDB ID	:	EMD-27421
Title	:	Avs3 bound to phage PhiV-1 terminase
Authors	:	Wilkinson, M.E.; Gao, L.; Strecker, J.; Makarova, K.S.; Macrae, R.K.; Koonin, E.V.; Zhang, F.
Deposited on	:	2022-06-23
Resolution	:	3.40 Å(reported)

This is a Full wwPDB EM 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/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:

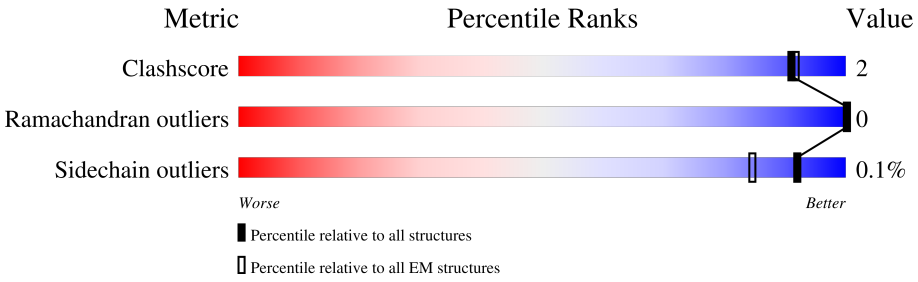
EMDB validation analysis	:	0.0.1.dev118
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0rc1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.40 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)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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 <=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	A	2092	66% 94%
1	B	2092	65% 91%
1	C	2092	66% 94%
1	D	2092	65% 91%
2	E	586	92% 87% 8%
2	F	586	92% 87% 5% 8%
2	G	586	92% 86% 5% 8%
2	H	586	92% 86% 5% 8%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 81600 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.

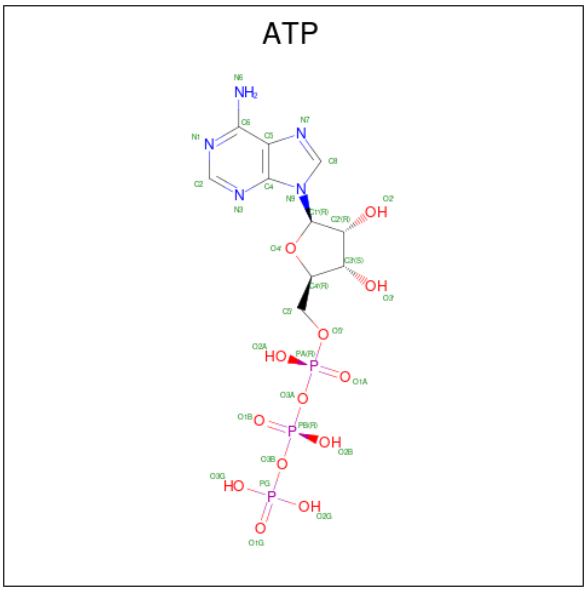
- Molecule 1 is a protein called SeAvs3.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	2028	Total 16152	C 10199	N 2840	O 3056	S 57	0	0
1	B	2004	Total 15974	C 10095	N 2809	O 3014	S 56	0	0
1	C	2028	Total 16152	C 10199	N 2840	O 3056	S 57	0	0
1	D	2004	Total 15974	C 10095	N 2809	O 3014	S 56	0	0

- Molecule 2 is a protein called Terminase, large subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	E	538	Total 4273	C 2717	N 741	O 796	S 19	0	0
2	F	538	Total 4273	C 2717	N 741	O 796	S 19	0	0
2	G	538	Total 4273	C 2717	N 741	O 796	S 19	0	0
2	H	538	Total 4273	C 2717	N 741	O 796	S 19	0	0

- Molecule 3 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
3	A	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	B	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	C	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	D	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	E	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	F	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	G	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	H	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
4	A	1	Total	Mg	0
			1	1	
4	B	1	Total	Mg	0
			1	1	
4	C	1	Total	Mg	0
			1	1	

Continued on next page...

Continued from previous page...

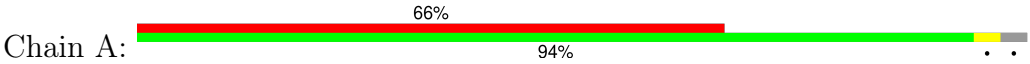
Mol	Chain	Residues	Atoms	AltConf
4	D	1	Total Mg 1 1	0
4	E	1	Total Mg 1 1	0
4	F	1	Total Mg 1 1	0
4	G	1	Total Mg 1 1	0
4	H	1	Total Mg 1 1	0

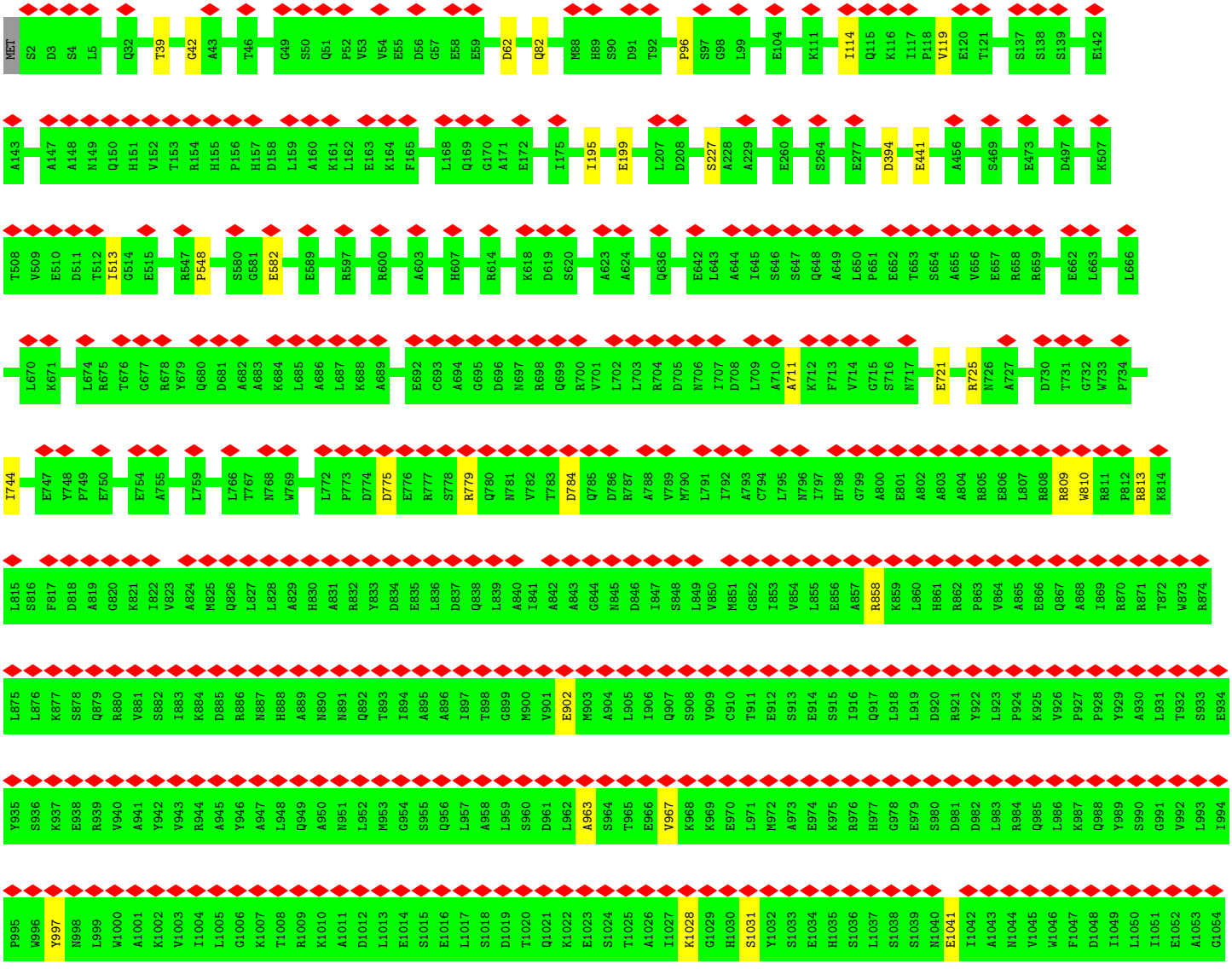
3 Residue-property plots (i)

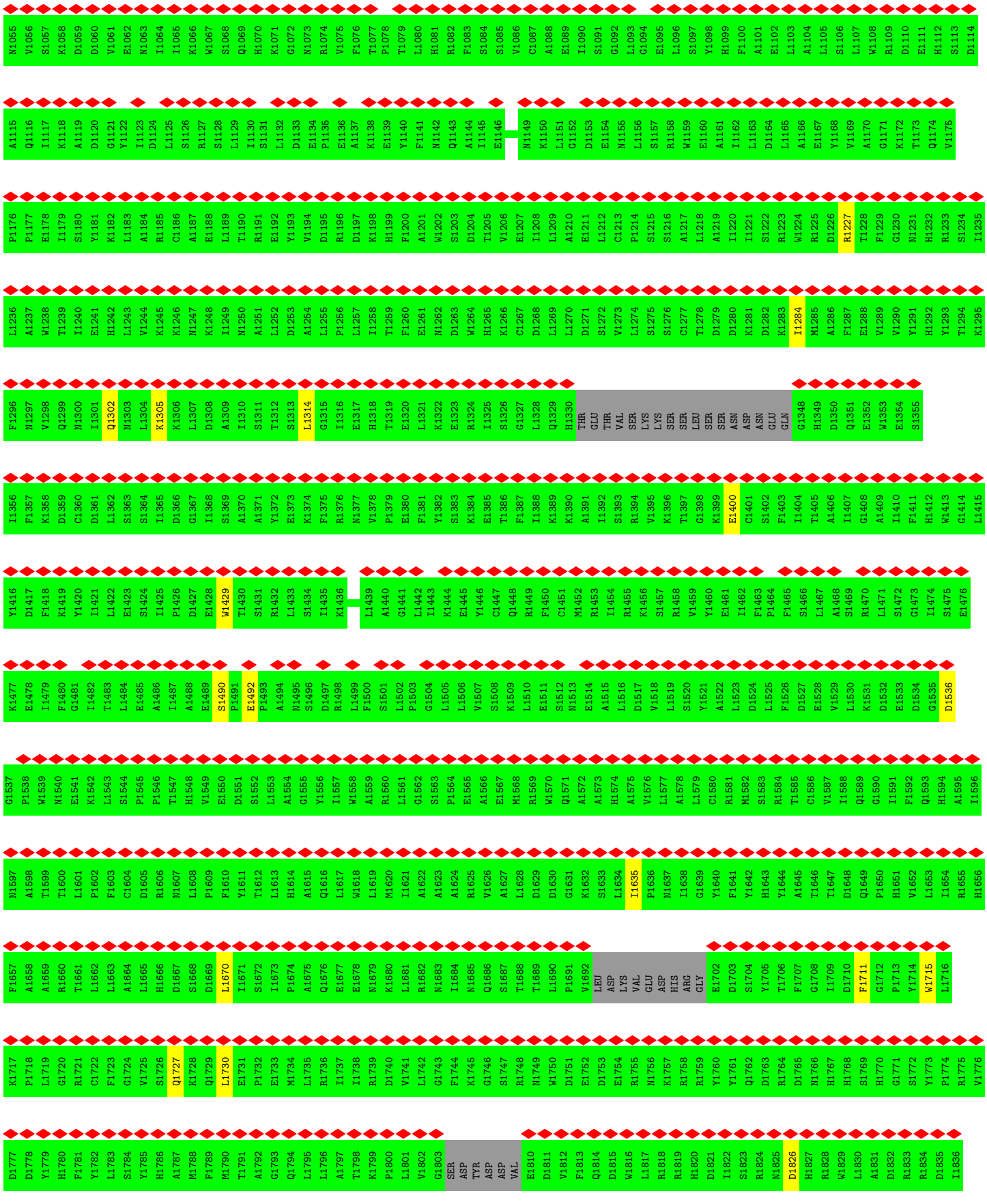
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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.

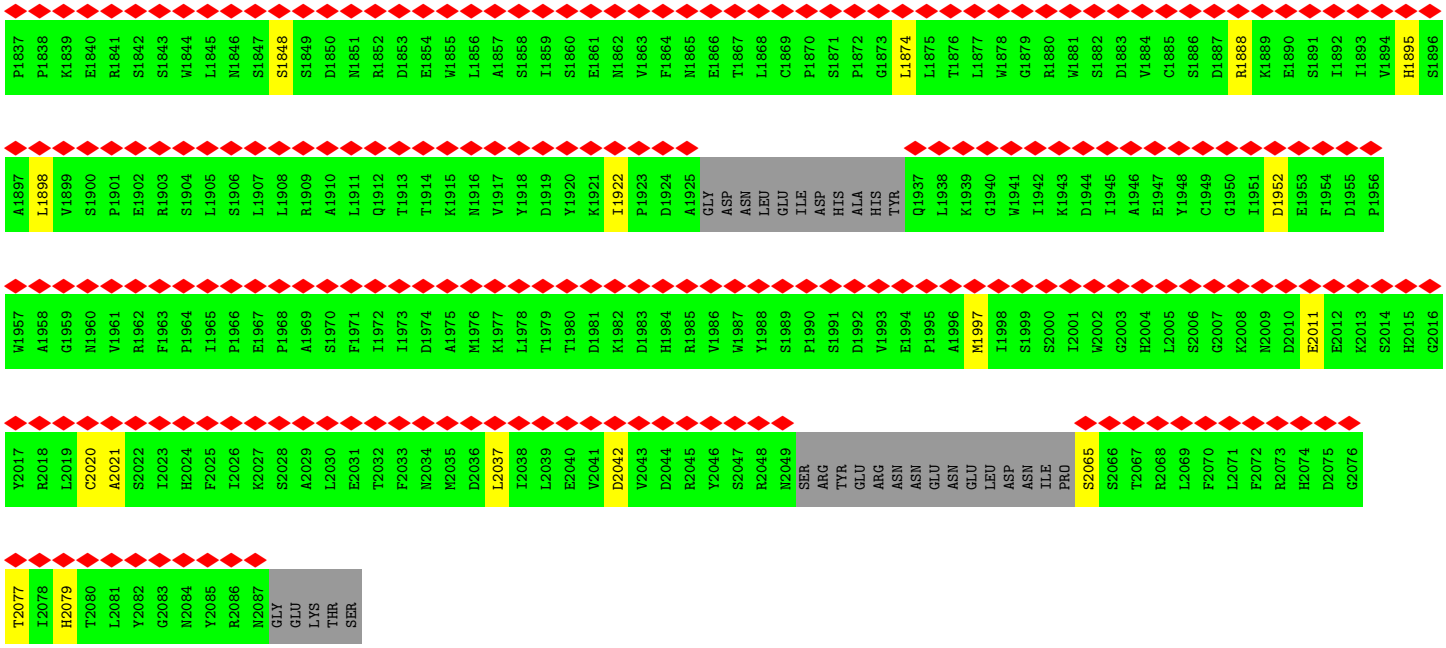
- Molecule 1: SeAvs3

Chain A:



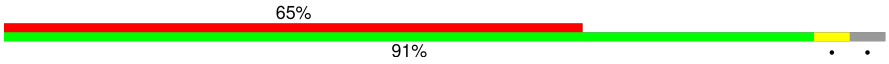


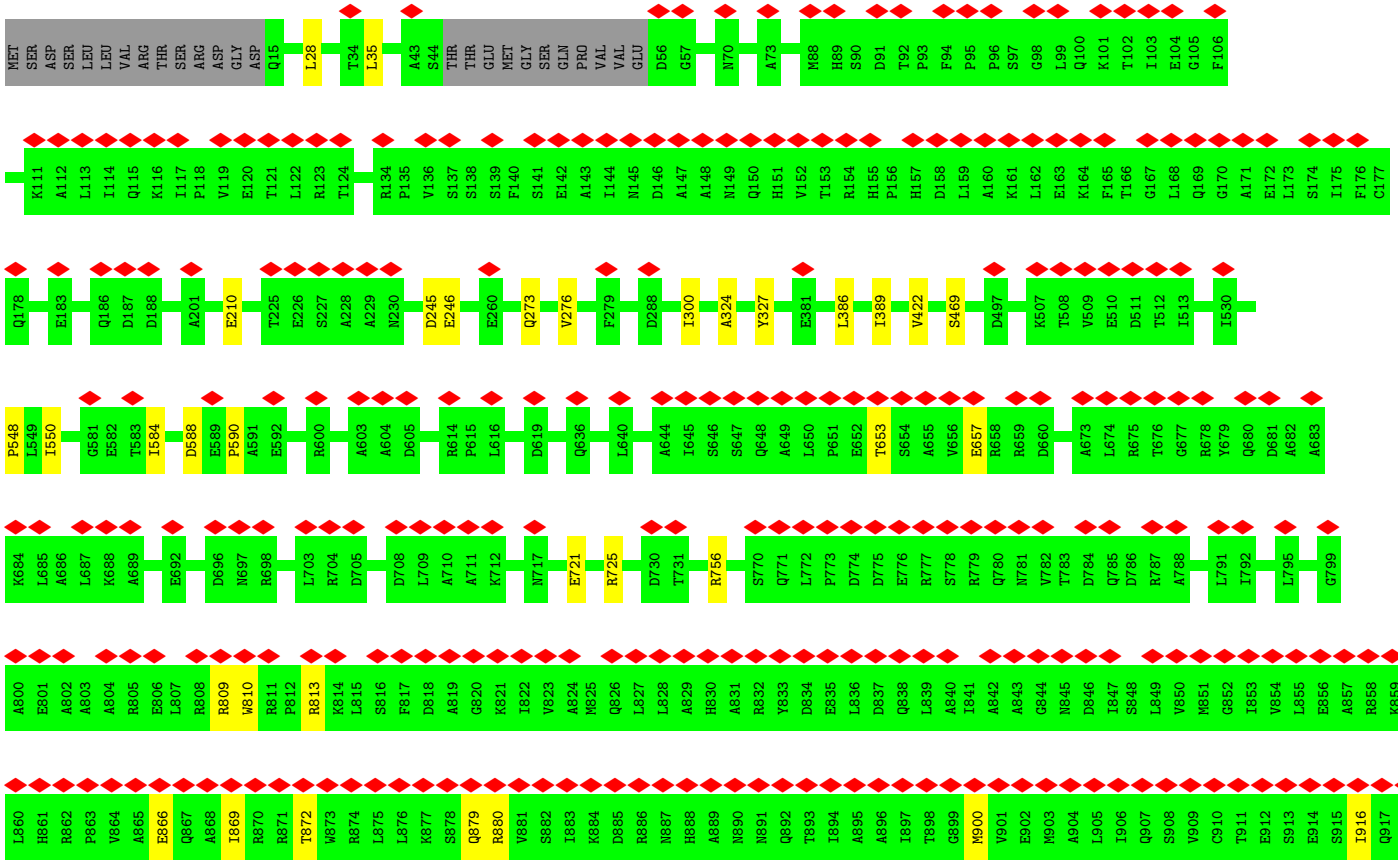

N1055 V1056 S1057 K1058 D1059 D1060 V1061 E1062 N1063 I1064 I1065 K1066 W1067 S1068 Q1069 H1070 K1071 G1072 N1073 R1074 V1075 F1076 T1077 P1078 T1079 L1080 H1081 R1082 F1083 S1084 S1085 V1086 C1087 A1088 E1089 I1090 S1091 G1092 L1093 G1094 E1095 L1096 S1097 Y1098 H1099 F1100 A1101 E1102 L1103 A1104 L1105 S1106 L1107 W1108 R1109 D1110 E1111 H1112 S1113 D1114
A1115 Q1116 I1117 K1118 A1119 D1120 G1121 Y1122 I1123 D1124 L1125 S1126 R1127 S1128 L1129 I1130 S1131 L1132 D1133 E1134 P1135 E1136 A1137 K1138 E1139 Y1140 F1141 N1142 Q1143 A1144 I1145 E1146 N1149 K1150 L1151 G1152 D1153 E1154 N1155 L1156 S1157 R1158 W1159 E1160 A1161 I1162 L1163 D1164 L1165 A1166 E1167 Y1168 V1169 A1170 G1171 K1172 T1173 Q1174 V1175
P1176 P1177 E1178 I1179 S1180 Y1181 K1182 L1183 A1184 R1185 C1186 A1187 E1188 L1189 T1190 R1191 E1192 Y1193 V1194 A1254 P1135 D1195 R1196 D1197 K1198 H1199 F1200 A1201 W1202 S1203 D1204 T1205 V1206 E1207 I1208 L1209 A1210 E1211 L1212 C1213 P1214 S1215 S1216 A1217 L1218 A1219 I1220 I1221 S1222 R1223 W1224 R1225 D1226 R1227 T1228 F1229 G1230 N1231 H1232 R1233 S1234 I1235
L1236 A1237 W1238 T1239 I1240 E1241 H1242 L1243 V1244 K1245 K1246 N1247 K1248 I1249 N1250 A1251 L1252 D1253 A1254 L1255 P1256 L1257 I1258 T1259 F1260 E1261 N1262 D1263 W1264 H1265 K1266 C1267 D1268 L1269 L1270 D1271 S1272 V1273 L1274 S1275 S1276 C1277 T1278 D1279 D1280 K1281 D1282 K1283 I1284 M1285 A1286 F1287 E1288 V1289 V1290 Y1291 H1292 Y1293 T1294 K1295
F1296 N1297 V1298 Q1299 N1300 I1301 Q1302 N1303 L1304 K1305 K1306 L1307 D1308 A1309 I1310 S1311 T1312 S1313 L1314 G1315 I1316 E1317 H1318 T1319 E1320 L1321 K1322 E1323 R1324 I1325 S1326 G1327 L1328 Q1329 H1330 THR GLU THR VAL SER LYS LYS SER SER LEU SER SER ASN ASP ASN GLU GLN G1348 H1349 D1350 Q1351 E1352 W1353 E1354 S1355
I1356 F1357 K1358 D1359 C1360 D1361 L1362 S1363 S1364 I1365 D1366 G1367 I1368 S1369 A1370 A1371 Y1372 E1373 K1374 F1375 R1376 N1377 V1378 P1379 E1380 F1381 Y1382 S1383 K1384 E1385 T1386 F1387 I1388 K1389 K1390 A1391 I1392 S1393 R1394 V1395 K1396 T1397 G1398 K1399 E1400 C1401 S1402 F1403 I1404 T1405 A1406 I1407 G1408 A1409 I1410 F1411 H1412 W1413 G1414 L1415
Y1416 D1417 F1418 K1419 Y1420 I1421 L1422 E1423 S1424 I1425 P1426 D1427 E1428 W1429 T1430 S1431 R1432 L1433 S1434 I1435 K1436 L1439 A1440 G1441 L1442 I1443 K1444 E1445 Y1446 C1447 Q1448 R1449 F1450 C1451 M1452 R1453 I1454 R1455 K1456 S1457 R1458 V1459 Y1460 E1461 I1462 F1463 P1464 F1465 S1466 L1467 A1468 S1469 R1470 L1471 S1472 G1473 I1474 S1475 E1476
K1477 E1478 I1479 F1480 G1481 I1482 T1483 L1484 E1485 A1486 I1487 A1488 E1489 S1490 P1491 E1492 P1493 A1494 N1495 S1496 D1497 R1498 L1499 F1500 S1501 L1502 P1503 G1504 L1505 L1506 V1507 S1508 K1509 L1510 E1511 S1512 N1513 E1514 A1515 L1516 D1517 V1518 L1519 S1520 Y1521 A1522 L1523 D1524 L1525 F1526 D1527 E1528 V1529 L1530 K1531 D1532 E1533 D1534 G1535 D1536
G1537 P1538 W1539 N1540 E1541 K1542 L1543 S1544 P1545 P1546 T1547 H1548 V1549 E1550 D1551 S1552 L1553 A1554 G1555 Y1556 I1557 W1558 A1559 R1560 L1561 G1562 S1563 P1564 E1565 A1566 E1567 M1568 R1569 W1570 Q1571 A1572 A1573 H1574 A1575 V1576 L1577 A1578 L1579 C1580 R1581 M1582 S1583 R1584 T1585 C1586 V1587 I1588 Q1589 G1590 I1591 F1592 Q1593 H1594 A1595 I1596
N1597 A1598 T1599 T1600 L1601 P1602 F1603 C1604 D1605 R1606 N1607 L1608 P1609 F1610 Y1611 T1612 L1613 H1614 A1615 Q1616 L1617 W1618 L1619 M1620 I1621 A1622 A1623 A1624 R1625 V1626 A1627 L1628 D1629 D1630 G1631 K1632 S1633 L1634 I1635 P1636 N1637 I1638 G1639 Y1640 F1641 Y1642 H1643 Y1644 A1645 T1646 T1647 D1648 Q1649 P1650 H1651 V1652 L1653 I1654 R1655 H1656
F1657 A1658 A1659 R1660 T1661 L1662 L1663 A1664 L1665 H1666 D1667 S1668 D1669 L1670 I1671 S1672 I1673 P1674 A1675 Q1676 E1677 E1678 N1679 K1680 L1681 R1682 N1683 I1684 N1685 Q1686 S1687 T1688 T1689 L1690 P1691 V1692 LEU ASP LYS VAL GLU ASP HIS ARG GLY E1702 D1703 S1704 Y1705 T1706 F1707 G1708 I1709 D1710 F1711 G1712 P1713 Y1714 W1715 L1716
K1717 P1718 L1719 G1720 R1721 C1722 F1723 G1724 V1725 S1726 Q1727 K1728 Q1729 L1730 E1731 P1732 E1733 M1734 L1735 R1736 I1737 I1738 R1739 D1740 V1741 L1742 G1743 F1744 K1745 G1746 S1747 R1748 N1749 W1750 D1751 E1752 D1763 E1754 R1755 N1756 K1757 R1758 R1759 Y1760 Y1761 Q1762 D1763 R1764 D1765 N1766 H1767 H1768 S1769 H1770 G1771 S1772 Y1773 P1774 R1775 V1776
D1777 D1778 Y1779 H1780 F1781 Y1782 L1783 S1784 Y1785 H1786 A1787 M1788 F1789 M1790 T1791 A1792 G1793 Q1794 L1795 L1796 A1797 T1798 K1799 P1800 L1801 V1802 G1803 SER ASP TYR ASP ASP VAL E1810 D1811 V1812 F1813 Q1814 D1815 W1816 L1817 R1818 R1819 H1820 D1821 I1822 S1823 R1824 N1825 D1826 H1827 R1828 W1829 L1830 A1831 D1832 R1833 R1834 D1835 I1836

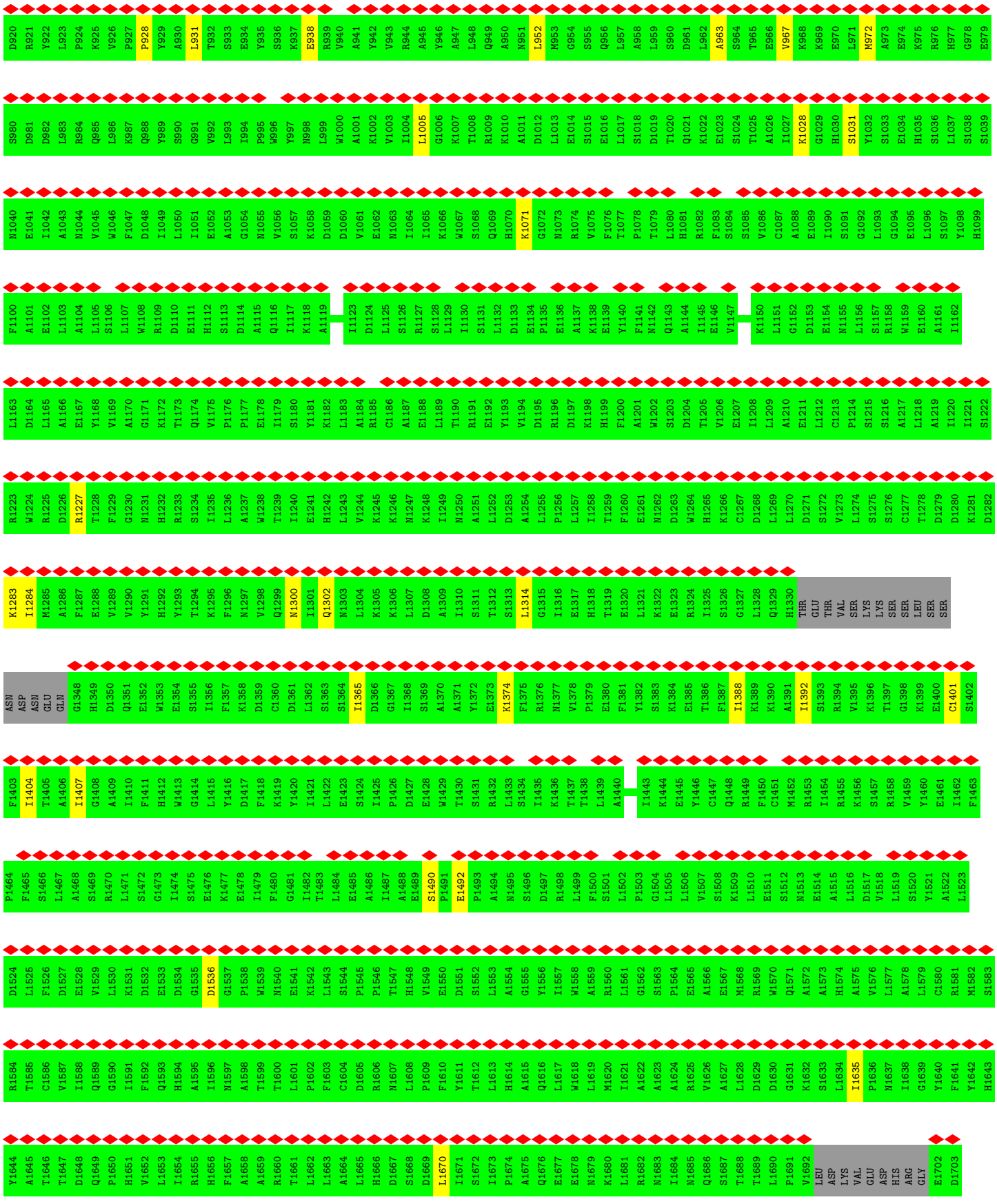


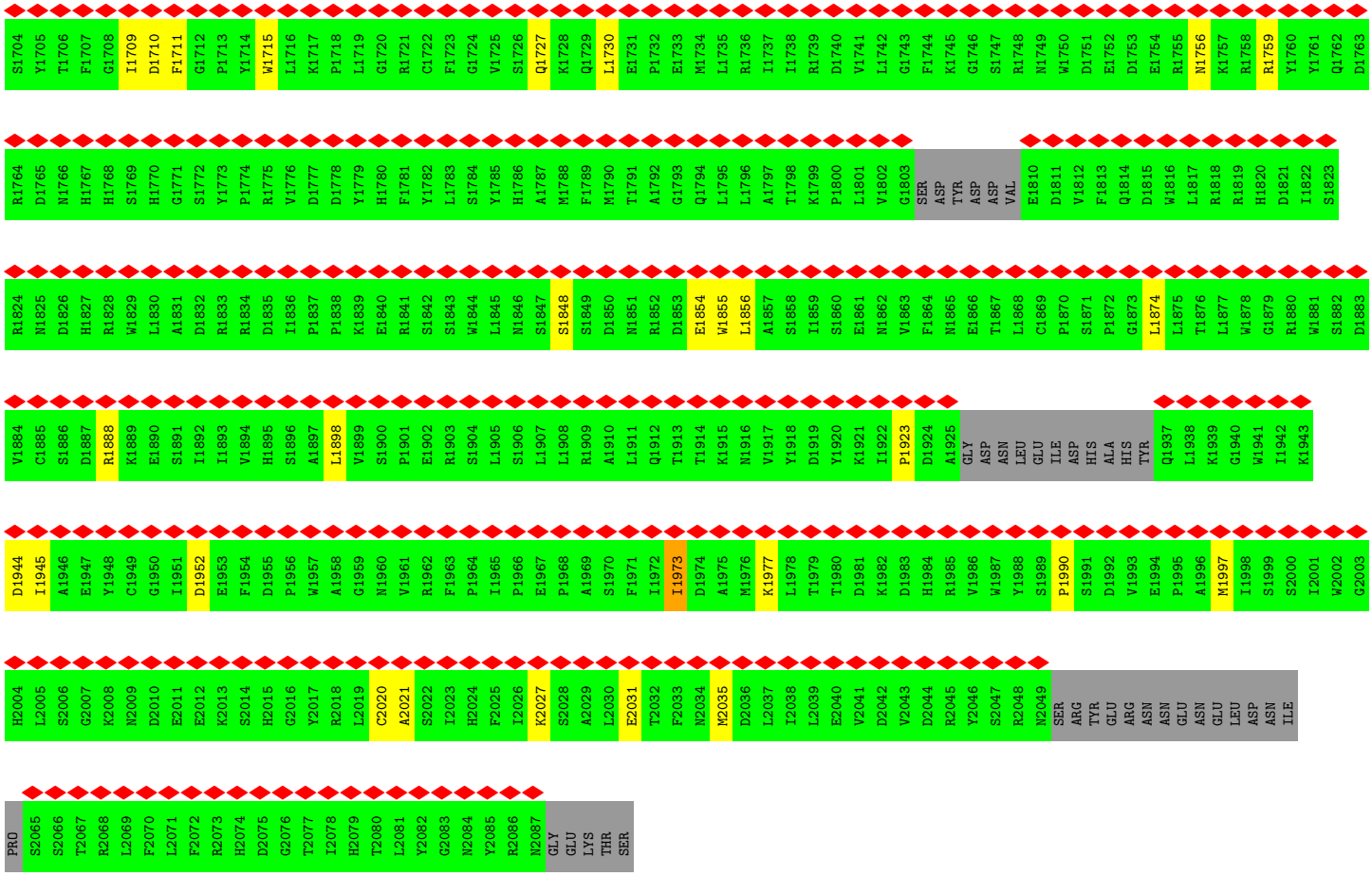
- Molecule 1: SeAvs3

Chain B:



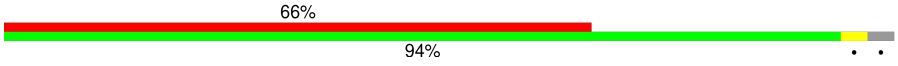


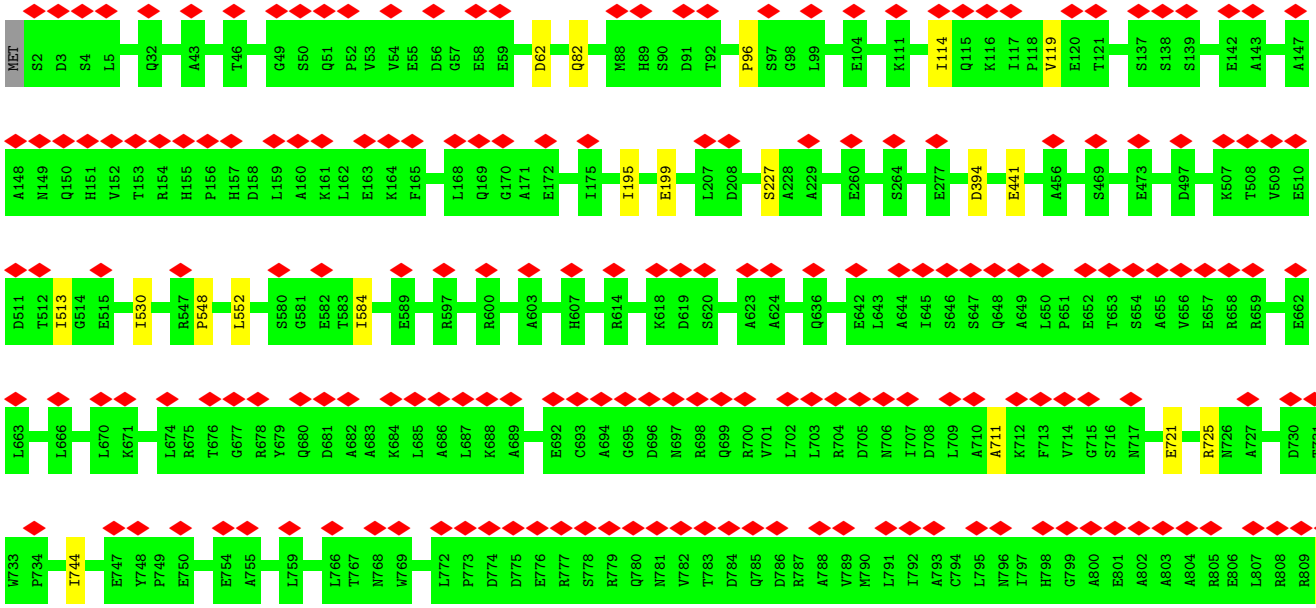

D920 R921 Y922 L923 P924 K925 V926 P927 P928 Y929 A930 L931 T932 S933 E934 Y935 S936 K937 E938 R939 V940 A941 Y942 V943 R944 A945 Y946 A947 L948 Q949 A950 N951 L952 M953 G954 S955 Q956 L957 A958 L959 S960 D961 L962 A963 S964 T965 E966 V967 K968 K969 E970 L971 M972 A973 E974 K975 R976 H977 G978 E979
S980 D981 D982 L983 R984 Q985 L986 K987 Q988 Y989 S990 G991 V992 L993 I994 P995 W996 Y997 N998 L999 W1000 A1001 K1002 V1003 I1004 L1005 G1006 K1007 T1008 R1009 K1010 A1011 D1012 L1013 E1014 S1015 E1016 L1017 S1018 D1019 T1020 Q1021 K1022 E1023 S1024 T1025 A1026 I1027 K1028 G1029 H1030 S1031 Y1032 S1033 E1034 H1035 S1036 L1037 S1038 S1039
N1040 E1041 I1042 A1043 N1044 V1045 W1046 F1047 D1048 I1049 L1050 I1051 E1052 A1053 G1054 N1055 V1056 S1057 K1058 D1059 D1060 V1061 E1062 N1063 I1064 I1065 K1066 W1067 S1068 Q1069 H1070 K1071 G1072 N1073 R1074 V1075 F1076 T1077 P1078 T1079 L1080 H1081 R1082 F1083 S1084 S1085 V1086 C1087 A1088 E1089 I1090 S1091 G1092 L1093 G1094 E1095 L1096 S1097 Y1098 H1099
F1100 A1101 E1102 L1103 A1104 L1105 S1106 L1107 W1108 R1109 D1110 E1111 H1112 S1113 D1114 A1115 Q1116 I1117 K1118 A1119 I1123 D1124 L1125 S1126 R1127 S1128 L1129 I1130 S1131 L1132 D1133 E1134 P1135 E1136 A1137 K1138 E1139 Y1140 F1141 N1142 Q1143 A1144 I1145 E1146 V1147 K1150 L1151 G1152 D1153 E1154 N1155 L1156 S1157 R1158 W1159 E1160 A1161 I1162
L1163 D1164 L1165 A1166 E1167 Y1168 V1169 A1170 G1171 K1172 T1173 Q1174 V1175 P1176 P1177 E1178 I1179 S1180 Y1181 K1182 L1183 A1184 R1185 C1186 A1187 E1188 L1189 T1190 R1191 E1192 Y1193 V1194 D1195 R1196 D1197 K1198 H1199 F1200 A1201 W1202 S1203 D1204 T1205 V1206 E1207 I1208 L1209 A1210 E1211 L1212 C1213 P1214 S1215 S1216 A1217 L1218 A1219 I1220 I1221 S1222
R1223 W1224 R1225 D1226 R1227 T1228 F1229 G1230 N1231 H1232 R1233 S1234 I1235 L1236 A1237 W1238 T1239 I1240 E1241 H1242 L1243 V1244 K1245 K1246 N1247 K1248 I1249 N1250 A1251 L1252 D1253 A1254 L1255 P1256 L1257 I1258 T1259 F1260 E1261 N1262 D1263 W1264 H1265 K1266 C1267 D1268 L1269 L1270 D1271 S1272 V1273 L1274 S1275 S1276 C1277 T1278 D1279 D1280 K1281 D1282
K1283 I1284 M1285 A1286 F1287 E1288 V1289 V1290 Y1291 H1292 Y1293 T1294 K1295 F1296 N1297 V1298 Q1299 N1300 I1301 Q1302 N1303 L1304 K1305 K1306 L1307 D1308 A1309 I1310 S1311 T1312 S1313 L1314 G1315 I1316 E1317 H1318 T1319 E1320 L1321 K1322 E1323 R1324 I1325 S1326 G1327 L1328 Q1329 H1330 THR GLU THR VAL SER LYS LYS SER SER LEU SER SER
ASN ASP ASN GLU GLN G1348 H1349 D1350 Q1351 E1352 W1353 E1354 S1355 I1356 F1357 K1358 D1359 C1360 D1361 L1362 S1363 S1364 I1365 D1366 G1367 I1368 S1369 A1370 A1371 Y1372 E1373 K1374 F1375 R1376 N1377 V1378 P1379 E1380 F1381 Y1382 S1383 K1384 E1385 T1386 F1387 I1388 K1389 K1390 A1391 I1392 S1393 R1394 V1395 K1396 T1397 G1398 K1399 E1400 C1401 S1402
F1403 I1404 T1405 A1406 I1407 G1408 A1409 I1410 F1411 H1412 W1413 G1414 L1415 Y1416 D1417 F1418 K1419 Y1420 I1421 L1422 E1423 S1424 I1425 P1426 D1427 E1428 W1429 T1430 S1431 R1432 L1433 S1434 I1435 K1436 N1437 T1438 L1439 A1440 I1443 K1444 E1445 Y1446 C1447 Q1448 R1449 F1450 C1451 M1452 R1453 I1454 R1455 K1456 S1457 R1458 V1459 Y1460 E1461 I1462 F1463
P1464 F1465 S1466 L1467 A1468 S1469 R1470 L1471 S1472 G1473 I1474 S1475 E1476 K1477 E1478 I1479 F1480 G1481 I1482 T1483 L1484 E1485 A1486 I1487 A1488 E1489 S1490 P1491 E1492 P1493 A1494 N1495 S1496 D1497 R1498 L1499 F1500 S1501 L1502 P1503 G1504 L1505 L1506 Y1507 S1508 K1509 L1510 E1511 S1512 N1513 M1452 R1453 E1514 A1515 L1516 D1517 V1518 L1519 S1520 Y1521 A1522 L1523
D1524 L1525 F1526 D1527 E1528 V1529 L1530 K1531 D1532 E1533 D1534 G1535 D1536 G1537 P1538 W1539 N1540 E1541 K1542 L1543 S1544 P1545 P1546 T1547 H1548 V1549 E1550 D1551 S1552 L1553 A1554 G1555 Y1556 I1557 W1558 A1559 R1560 L1561 G1562 S1563 P1564 E1565 A1566 E1567 M1568 R1569 W1570 Q1571 A1572 A1573 H1574 A1575 V1576 L1577 A1578 L1579 C1580 R1581 M1582 S1583
R1584 T1585 C1586 V1587 I1588 Q1589 G1590 I1591 F1592 Q1593 H1594 A1595 I1596 N1597 A1598 T1599 T1600 L1601 T1602 F1603 C1604 D1605 R1606 N1607 L1608 P1609 F1610 Y1611 T1612 L1613 H1614 A1615 Q1616 L1617 E1677 E1678 N1679 K1680 L1681 R1682 N1683 I1684 N1685 Q1686 S1687 T1688 T1689 L1690 P1691 V1692 LEU ASP LYS VAL GLU ASP HIS ARG GLY E1702 D1703
Y1644 A1645 T1646 T1647 D1648 Q1649 P1650 H1651 V1652 L1653 I1654 R1655 H1656 F1657 A1658 A1659 R1660 T1661 L1662 L1663 A1664 L1665 H1666 D1667 S1668 D1669 L1670 I1671 S1672 I1673 P1674 A1675 A1676 E1677 E1678 N1679 K1680 L1681 R1682 N1683 I1684 N1685 Q1686 S1687 T1688 T1689 L1690 P1691 V1692 LEU ASP LYS VAL GLU ASP HIS ARG GLY E1702 D1703

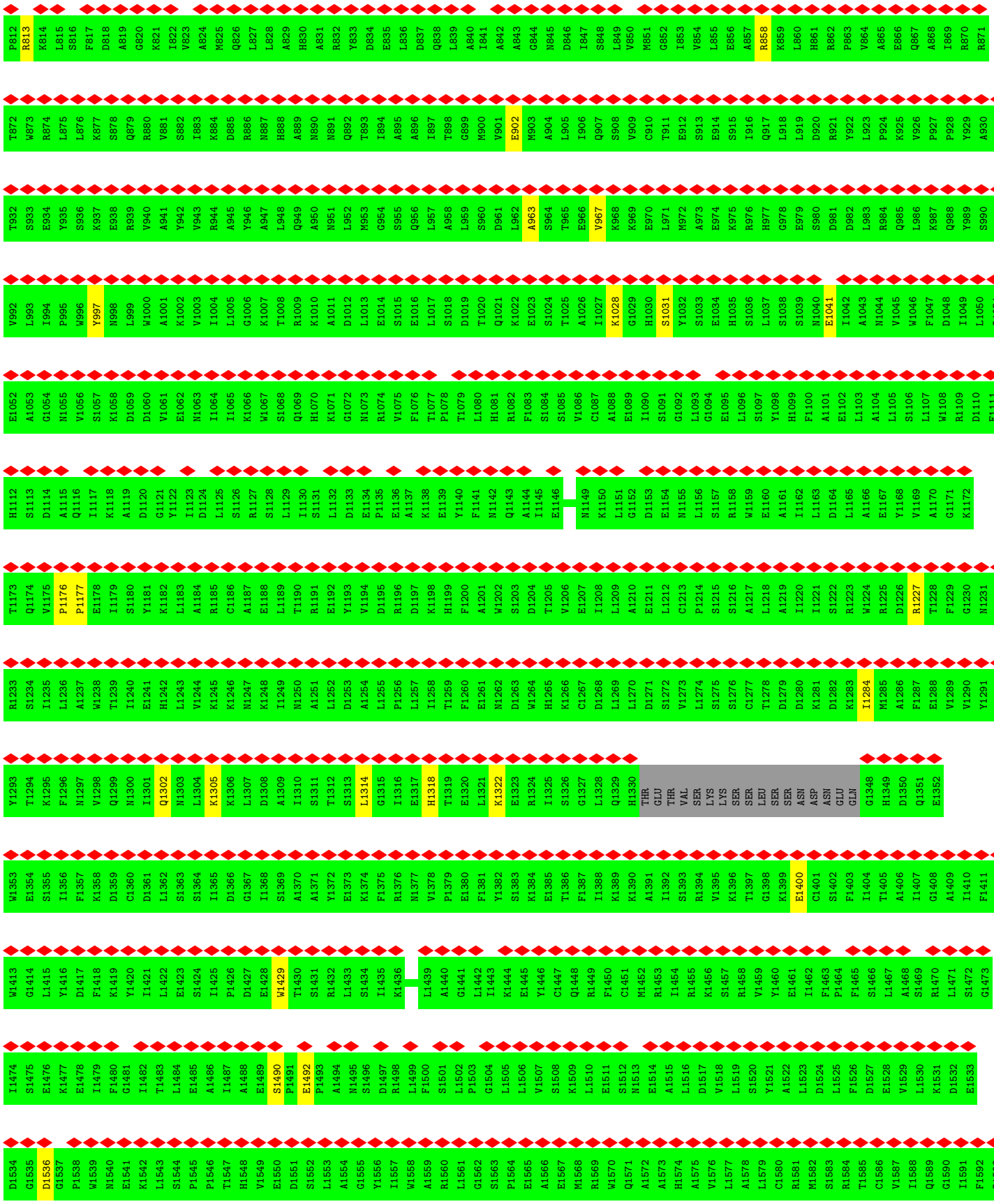


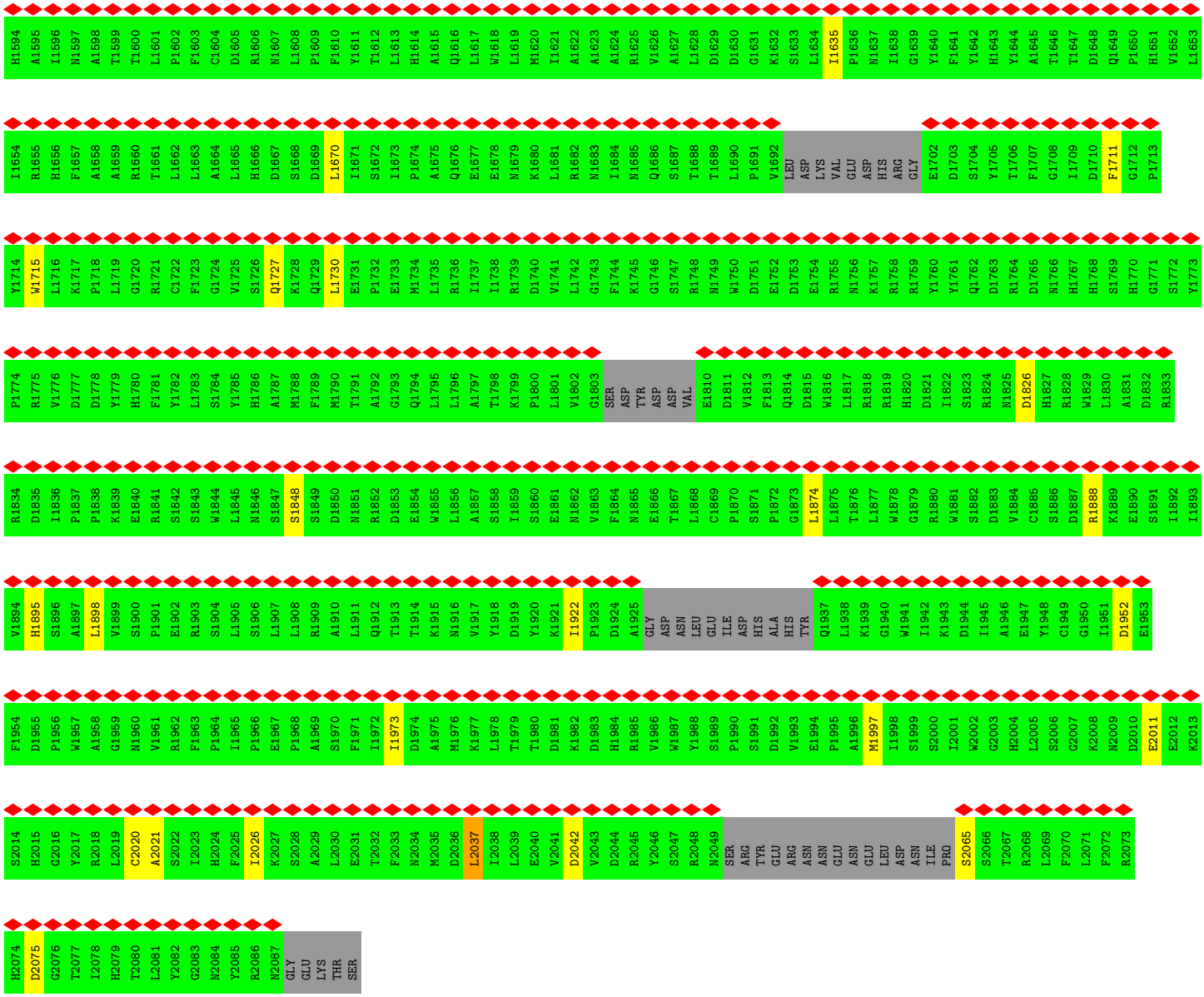
• Molecule 1: SeAvs3

Chain C:



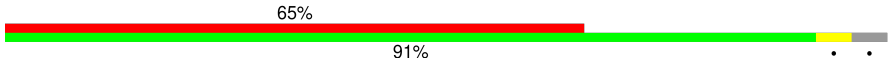


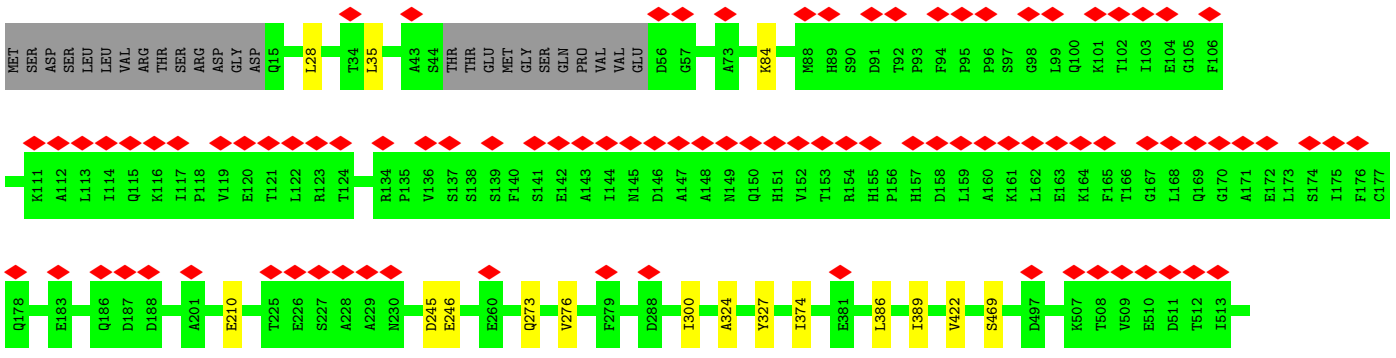

P812 R813 K814 L815 S816 F817 D818 A819 G820 K821 I822 V823 A824 M825 Q826 L827 L828 A829 H830 A831 R832 Y833 D834 E835 L836 D837 Q838 L839 A840 I841 A842 A843 G844 N845 D846 I847 S848 L849 V850 M851 G852 I853 V854 L855 E856 A857 R858 K859 L860 H861 R862 P863 V864 A865 E866 Q867 A868 I869 R870 R871
T872 W873 R874 L875 L876 K877 S878 Q879 R880 V881 S882 I883 K884 D885 R886 N887 H888 A889 N890 N891 Q892 T893 I894 A895 A896 I897 T898 G899 M900 V901 E902 M903 A904 L905 I906 Q907 S908 V909 C910 T911 E912 S913 E914 S915 I916 Q917 L918 L919 D920 R921 Y922 L923 P924 K925 V926 P927 P928 Y929 A930 L931
T932 S933 E934 Y935 S936 K937 E938 R939 V940 A941 V942 V943 R944 A945 Y946 A947 L948 Q949 A950 N951 L952 M953 G954 S955 Q956 L957 A958 L959 S960 D961 L962 A963 S964 T965 E966 V967 K968 K969 E970 L971 M972 A973 E974 K975 R976 H977 G978 E979 S980 D981 D982 L983 R984 Q985 L986 K987 Q988 Y989 S990 G991
V992 L993 I994 P995 W996 Y997 N998 L999 W1000 A1001 K1002 V1003 I1004 L1005 G1006 K1007 T1008 R1009 K1010 A1011 D1012 L1013 E1014 S1015 E1016 L1017 S1018 D1019 T1020 Q1021 K1022 E1023 S1024 T1025 A1026 I1027 K1028 G1029 H1030 S1031 Y1032 S1033 E1034 H1035 S1036 L1037 S1038 S1039 N1040 E1041 I1042 A1043 N1044 V1045 W1046 F1047 D1048 I1049 L1050 I1051
E1052 A1053 G1054 N1055 V1056 S1057 K1058 D1059 D1060 V1061 E1062 N1063 I1064 I1065 K1066 W1067 S1068 Q1069 H1070 K1071 G1072 N1073 R1074 V1075 F1076 T1077 P1078 T1079 L1080 H1081 R1082 F1083 S1084 S1085 V1086 C1087 A1088 E1089 I1090 S1091 G1092 L1093 G1094 E1095 L1096 S1097 Y1098 H1099 F1100 A1101 E1102 L1103 A1104 L1105 S1106 L1107 W1108 R1109 D1110 E1111
H1112 S1113 D1114 A1115 Q1116 I1117 K1118 A1119 D1120 G1121 Y1122 I1123 D1124 L1125 S1126 R1127 S1128 L1129 I1130 S1131 L1132 D1133 E1134 P1135 E1136 A1137 K1138 E1139 Y1140 F1141 N1142 Q1143 A1144 I1145 E1146 N1149 K1150 L1151 G1152 D1153 E1154 N1155 L1156 S1157 R1158 W1159 E1160 A1161 I1162 L1163 D1164 L1165 A1166 E1167 Y1168 V1169 A1170 G1171 K1172
T1173 Q1174 V1175 P1176 P1177 E1178 I1179 S1180 Y1181 K1182 L1183 A1184 R1185 C1186 A1187 E1188 L1189 T1190 R1191 E1192 Y1193 V1194 D1195 R1196 D1197 K1198 H1199 F1200 A1201 W1202 S1203 D1204 T1205 V1206 E1207 I1208 L1209 A1210 E1211 L1212 C1213 P1214 S1215 S1216 A1217 L1218 A1219 I1220 I1221 S1222 R1223 W1224 R1225 D1226 R1227 T1228 F1229 G1230 N1231 H1232
R1233 S1234 I1235 L1236 A1237 W1238 T1239 I1240 E1241 H1242 L1243 V1244 K1245 K1246 N1247 K1248 I1249 N1250 A1251 L1252 D1253 A1254 L1255 P1256 L1257 I1258 T1259 F1260 E1261 N1262 D1263 W1264 H1265 K1266 C1267 D1268 L1269 L1270 D1271 S1272 V1273 L1274 S1275 S1276 C1277 T1278 D1279 D1280 K1281 D1282 K1283 I1284 M1285 A1286 F1287 E1288 V1289 V1290 Y1291 H1292
Y1293 T1294 K1295 F1296 N1297 V1298 Q1299 N1300 I1301 Q1302 N1303 L1304 K1305 K1306 L1307 D1308 A1309 I1310 S1311 T1312 S1313 L1314 G1315 I1316 E1317 H1318 T1319 E1320 L1321 K1322 E1323 R1324 I1325 S1326 G1327 L1328 Q1329 H1330 THR GLU THR VAL SER LYS LYS SER SER LEU SER SER ASN ASP ASN GLU GLN G1348 H1349 D1350 Q1351 E1352
W1353 E1354 S1355 I1356 F1357 K1358 D1359 C1360 D1361 L1362 S1363 S1364 I1365 D1366 G1367 I1368 S1369 A1370 A1371 Y1372 E1373 K1374 F1375 R1376 N1377 V1378 P1379 E1380 F1381 Y1382 S1383 K1384 E1385 T1386 F1387 I1388 K1389 K1390 A1391 I1392 S1393 R1394 V1395 K1396 T1397 G1398 K1399 E1400 C1401 S1402 F1403 I1404 T1405 A1406 I1407 G1408 A1409 I1410 F1411 H1412
W1413 G1414 L1415 Y1416 D1417 F1418 K1419 Y1420 I1421 L1422 E1423 S1424 I1425 P1426 D1427 E1428 W1429 T1430 S1431 R1432 L1433 S1434 I1435 K1436 L1439 A1440 G1441 L1442 I1443 K1444 E1445 Y1446 C1447 Q1448 R1449 F1450 C1451 M1452 R1453 I1454 R1455 K1456 S1457 R1458 V1459 Y1460 E1461 I1462 F1463 P1464 F1465 S1466 L1467 A1468 S1469 R1470 L1471 S1472 G1473
I1474 S1475 E1476 K1477 E1478 I1479 F1480 G1481 I1482 T1483 L1484 E1485 A1486 I1487 A1488 E1489 S1490 P1491 E1492 P1493 A1494 N1495 S1496 D1497 R1498 L1499 F1500 S1501 L1502 P1503 G1504 L1505 L1506 V1507 S1508 K1509 L1510 E1511 S1512 N1513 E1514 A1515 L1516 D1517 V1518 L1519 S1520 Y1521 A1522 L1523 D1524 L1525 F1526 D1527 E1528 V1529 L1530 K1531 D1532 E1533
D1534 G1535 D1536 G1537 P1538 W1539 N1540 E1541 K1542 L1543 S1544 P1545 P1546 T1547 H1548 V1549 E1550 D1551 S1552 L1553 A1554 G1555 Y1556 I1557 W1558 A1559 R1560 L1561 G1562 S1563 P1564 E1565 A1566 E1567 M1568 R1569 W1570 Q1571 A1572 A1573 H1574 A1575 V1576 L1577 A1578 L1579 C1580 R1581 M1582 S1583 R1584 T1585 C1586 V1587 I1588 Q1589 G1590 I1591 F1592 Q1593

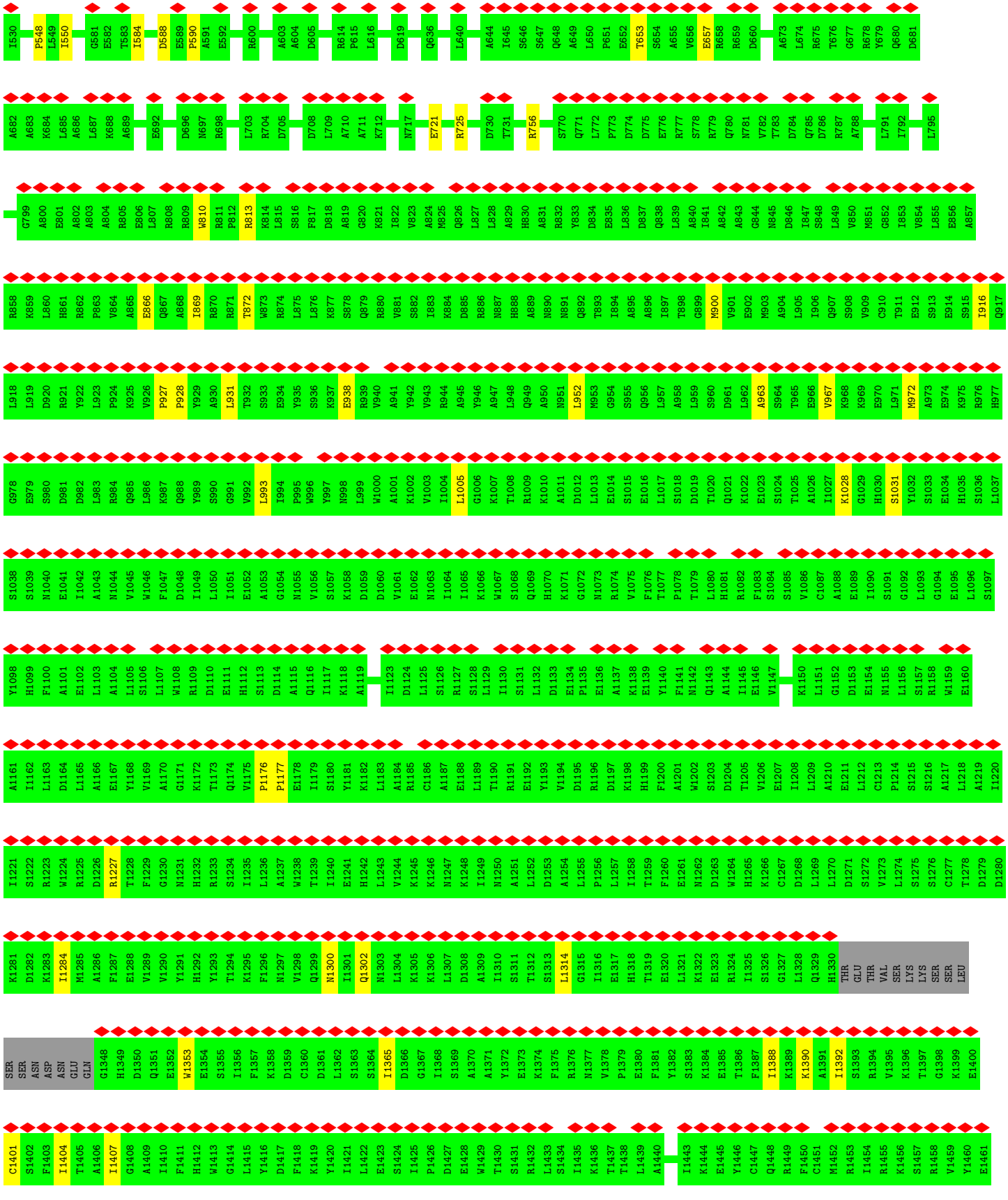


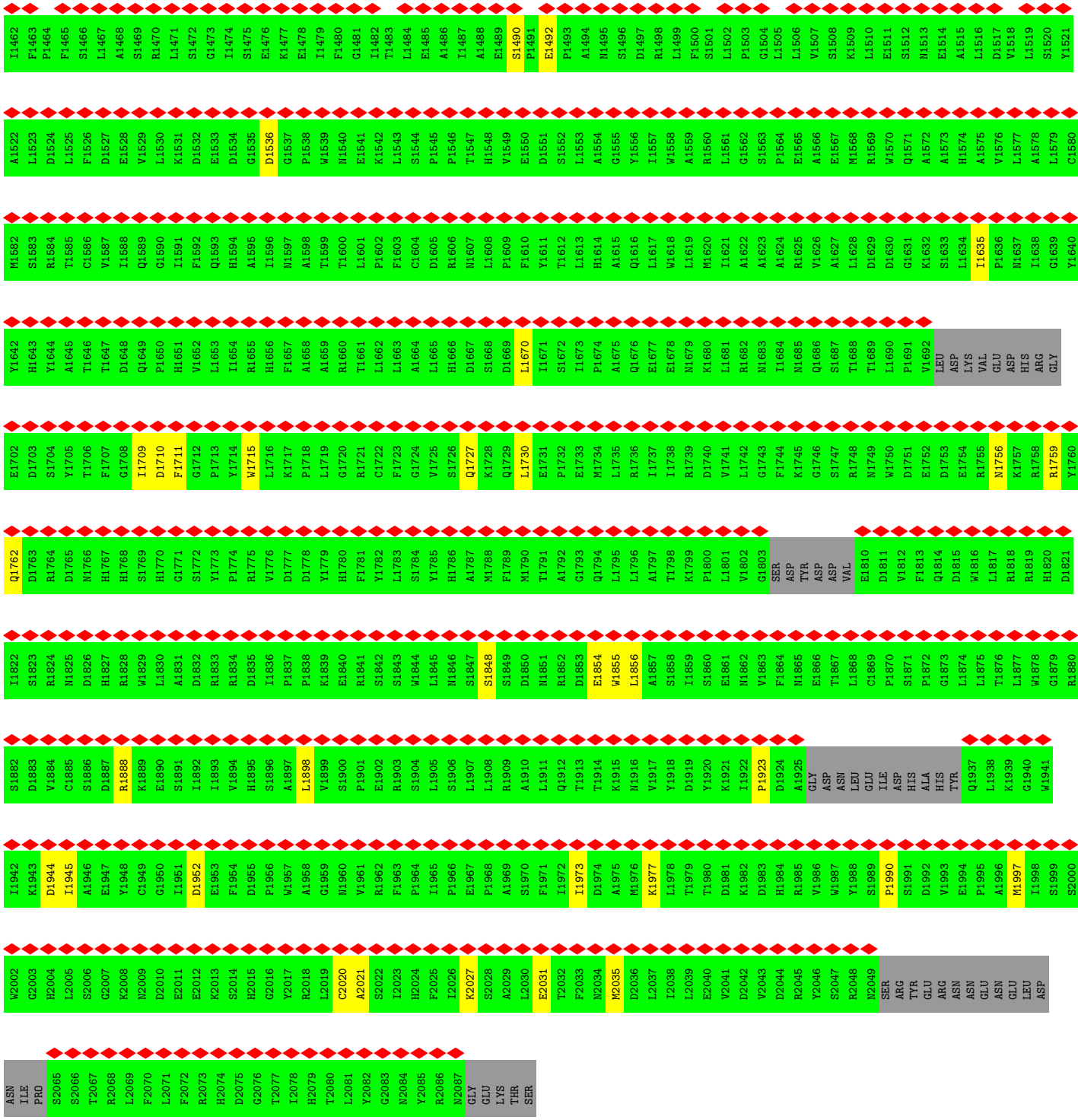
- Molecule 1: SeAvs3

Chain D:



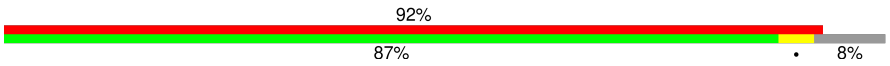


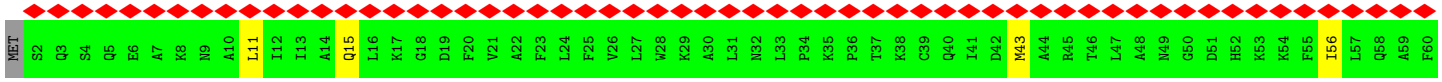

I530 P548 L549 I550 G581 E582 T583 I584 D588 E589 P590 A591 E592 R600 A603 A604 D605 R614 P615 L616 D619 Q636 L640 A644 I645 S646 S647 Q648 A649 L650 P651 E652 T653 S654 A655 V656 E657 R658 R659 D660 A673 L674 R675 T676 G677 R678 Y679 Q680 D681
A682 A683 K684 L685 A686 L687 K688 A689 E692 D696 N697 R698 L703 R704 D705 D708 L709 A710 A711 K712 N717 E721 R725 D730 T731 R756 S770 Q771 L772 P773 D774 D775 E776 R777 S778 R779 Q780 N781 V782 T783 D784 Q785 D786 R787 A788 L791 I792 L795
G799 A800 E801 A802 A803 A804 R805 E806 L807 R808 R809 W810 R811 P812 R813 K814 L815 S816 F817 D818 A819 G820 K821 I822 V823 A824 M825 Q826 L827 L828 A829 H830 A831 R832 Y833 D834 E835 L836 D837 Q838 L839 A840 I841 A842 A843 G844 N845 D846 I847 S848 L849 V850 M851 G852 I853 V854 L855 E856 A857
R858 K859 L860 H861 R862 P863 V864 A865 E866 Q867 A868 I869 R870 R871 T872 W873 R874 L875 L876 K877 S878 Q879 R880 V881 S882 I883 K884 D885 R886 N887 H888 A889 N890 N891 Q892 T893 I894 A895 A896 I897 T898 G899 M900 V901 E902 M903 A904 L905 I906 Q907 S908 V909 C910 T911 E912 S913 E914 S915 I916 Q917
L918 L919 D920 R921 Y922 L923 P924 K925 V926 P927 P928 Y929 A930 L931 T932 S933 E934 Y935 S936 K937 E938 R939 V940 A941 Y942 V943 R944 A945 Y946 A947 L948 Q949 A950 N951 L952 M953 G954 S955 Q956 L957 A958 L959 S960 D961 L962 A963 S964 T965 E966 V967 K968 K969 E970 L971 M972 A973 E974 K975 R976 H977
G978 E979 S980 D981 D982 L983 R984 Q985 L986 K987 Q988 Y989 S990 G991 V992 L993 I994 P995 W996 Y997 N998 L999 W1000 A1001 K1002 V1003 I1004 L1005 G1006 K1007 T1008 R1009 K1010 A1011 D1012 L1013 E1014 S1015 E1016 L1017 S1018 D1019 T1020 Q1021 K1022 E1023 S1024 T1025 A1026 I1027 K1028 G1029 H1030 S1031 Y1032 S1033 E1034 H1035 S1036 L1037
S1038 S1039 N1040 E1041 I1042 A1043 N1044 V1045 W1046 F1047 D1048 I1049 L1050 I1051 E1052 A1053 G1054 N1055 V1056 S1057 K1058 D1059 D1060 V1061 E1062 N1063 I1064 I1065 K1066 W1067 S1068 Q1069 H1070 K1071 G1072 N1073 R1074 V1075 F1076 T1077 P1078 T1079 L1080 H1081 R1082 F1083 S1084 S1085 V1086 C1087 A1088 E1089 I1090 S1091 G1092 L1093 G1094 E1095 L1096 S1097
Y1098 H1099 F1100 A1101 E1102 L1103 A1104 L1105 S1106 L1107 W1108 R1109 D1110 E1111 H1112 S1113 D1114 A1115 Q1116 I1117 K1118 A1119 I1123 D1124 L1125 S1126 R1127 S1128 L1129 I1130 S1131 L1132 D1133 E1134 P1135 E1136 A1137 K1138 E1139 Y1140 F1141 N1142 Q1143 A1144 I1145 E1146 V1147 K1150 L1151 G1152 D1153 E1154 N1155 L1156 S1157 R1158 W1159 E1160
A1161 I1162 L1163 D1164 L1165 A1166 E1167 Y1168 V1169 A1170 G1171 K1172 T1173 Q1174 V1175 P1176 P1177 E1178 I1179 S1180 Y1181 K1182 L1183 A1184 R1185 C1186 A1187 E1188 L1189 T1190 R1191 E1192 Y1193 V1194 D1195 R1196 D1197 K1198 H1199 F1200 A1201 W1202 S1203 D1204 T1205 V1206 E1207 I1208 L1209 A1210 E1211 L1212 C1213 P1214 S1215 S1216 A1217 L1218 A1219 I1220
I1221 S1222 R1223 W1224 R1225 D1226 R1227 T1228 F1229 G1230 N1231 H1232 R1233 S1234 I1235 L1236 A1237 W1238 T1239 I1240 E1241 H1242 L1243 V1244 K1245 K1246 N1247 K1248 I1249 N1250 A1251 L1252 D1253 A1254 L1255 P1256 L1257 I1258 T1259 F1260 E1261 N1262 D1263 W1264 H1265 K1266 C1267 D1268 L1269 L1270 D1271 S1272 V1273 L1274 S1275 S1276 C1277 T1278 D1279 D1280
K1281 D1282 K1283 I1284 M1285 A1286 F1287 E1288 V1289 V1290 Y1291 H1292 Y1293 T1294 K1295 F1296 N1297 V1298 Q1299 N1300 I1301 Q1302 N1303 L1304 K1305 K1306 L1307 D1308 A1309 I1310 S1311 T1312 S1313 L1314 G1315 I1316 E1317 H1318 T1319 E1320 L1321 K1322 E1323 R1324 I1325 S1326 G1327 L1328 Q1329 H1330 THR GLU THR VAL SER LYS LYS SER SER LEU
SER SER ASN ASP ASN GLU GLN G1348 H1349 D1350 Q1351 E1352 W1353 E1354 S1355 I1356 F1357 K1358 D1359 C1360 D1361 L1362 S1363 S1364 I1365 D1366 G1367 I1368 S1369 A1370 A1371 Y1372 E1373 K1374 F1375 R1376 N1377 V1378 P1379 E1380 F1381 Y1382 S1383 K1384 E1385 T1386 F1387 I1388 K1389 K1390 A1391 I1392 S1393 R1394 V1395 K1396 T1397 G1398 K1399 E1400
C1401 S1402 F1403 I1404 T1405 A1406 I1407 G1408 A1409 I1410 F1411 H1412 W1413 G1414 L1415 Y1416 D1417 F1418 K1419 Y1420 I1421 L1422 E1423 S1424 I1425 P1426 D1427 E1428 W1429 T1430 S1431 R1432 L1433 S1434 I1435 K1436 T1437 T1438 L1439 A1440 I1443 K1444 E1445 Y1446 C1447 Q1448 R1449 F1450 C1451 M1452 R1453 I1454 R1455 K1456 S1457 R1458 V1459 Y1460 E1461

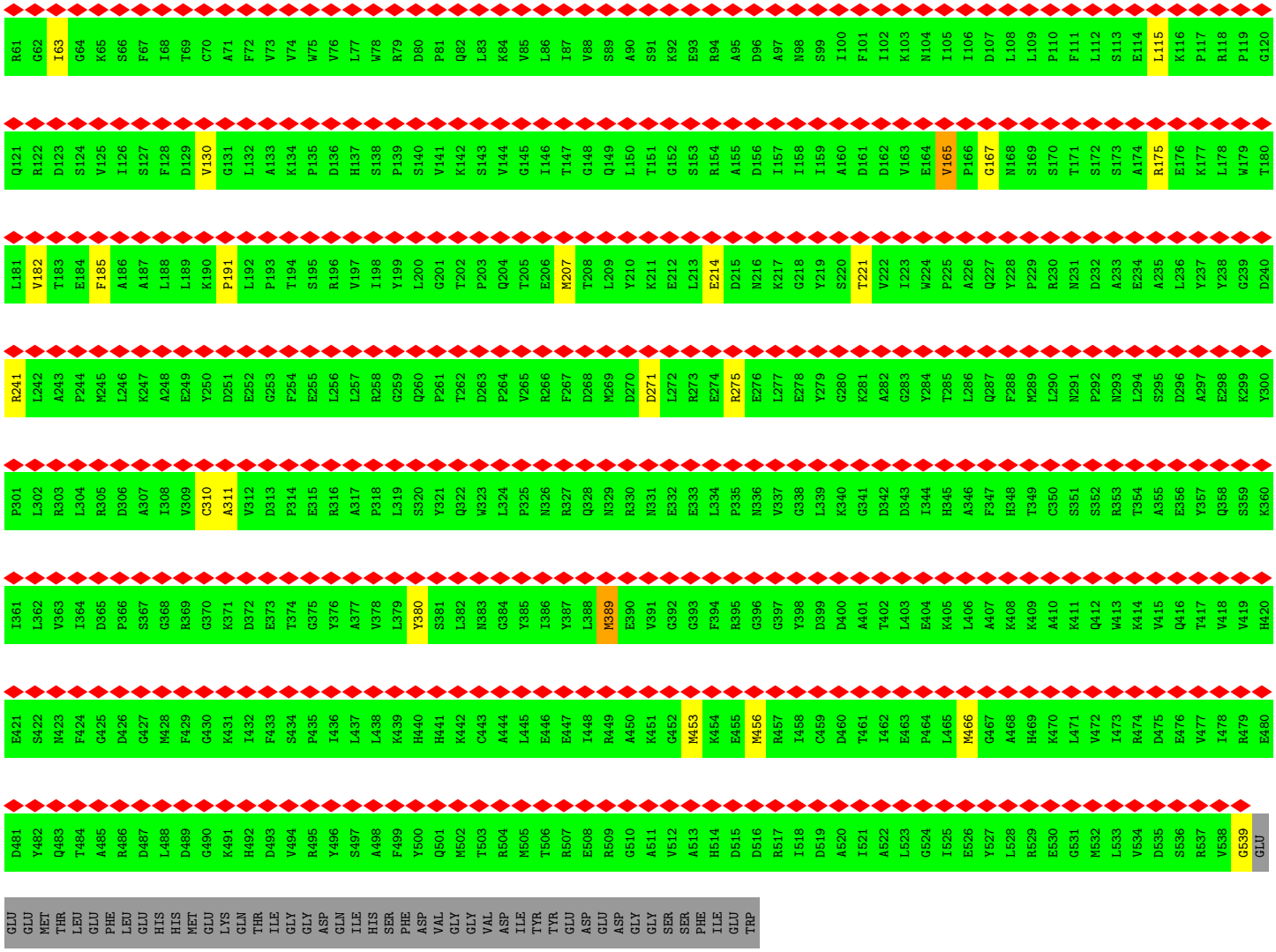


• Molecule 2: Terminase, large subunit

Chain E:

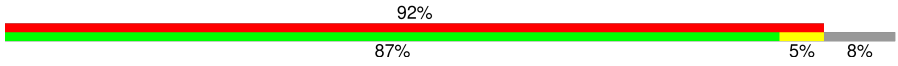


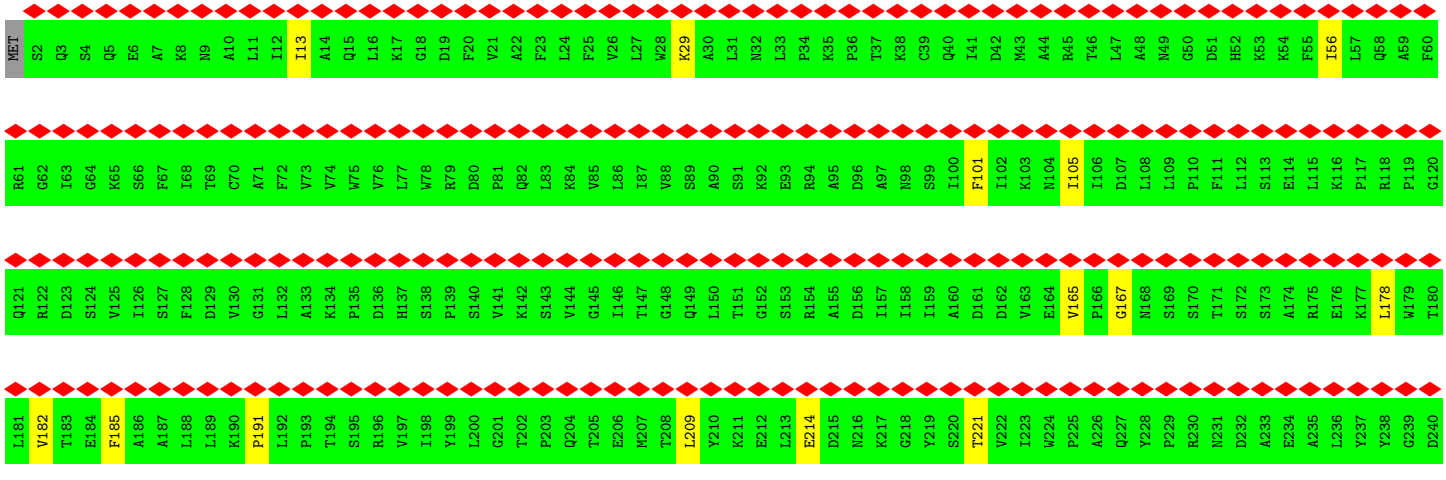


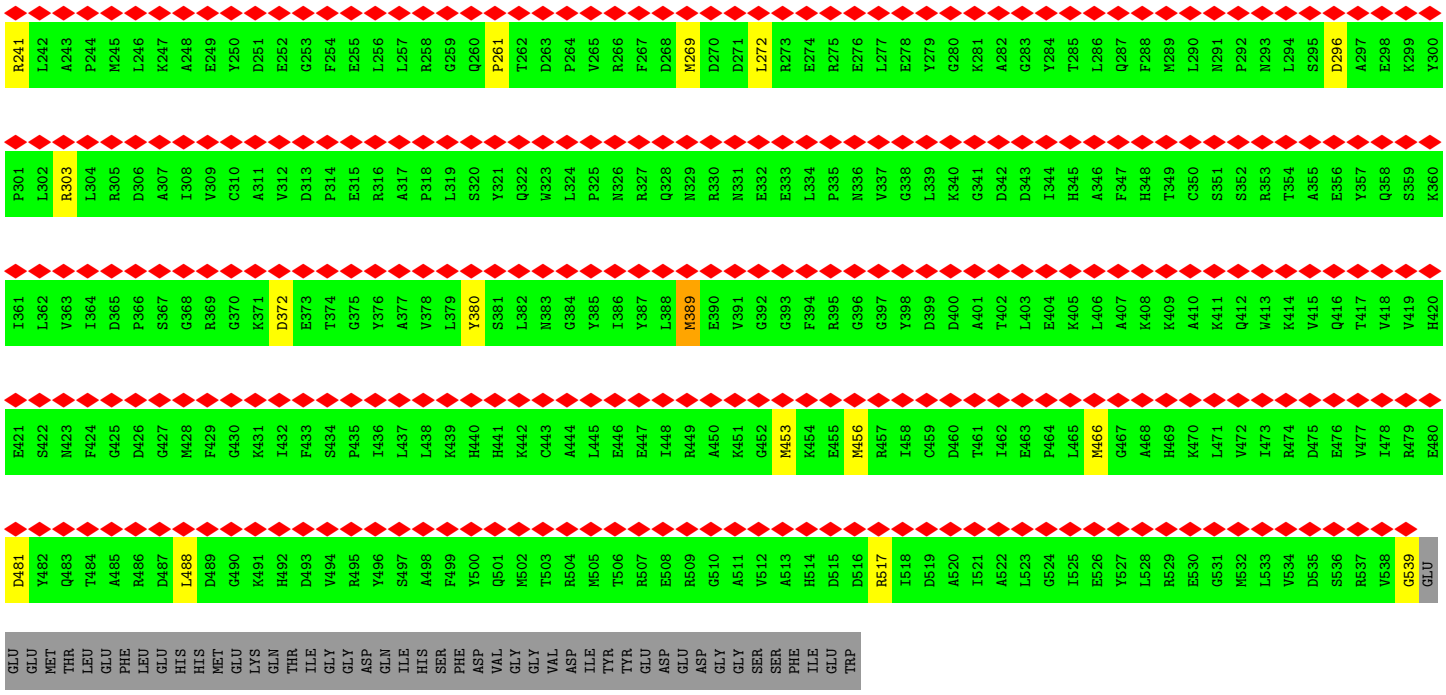


• Molecule 2: Terminase, large subunit

Chain F:

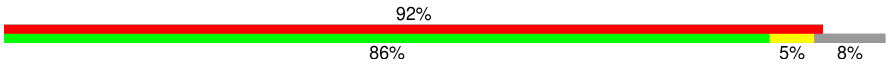


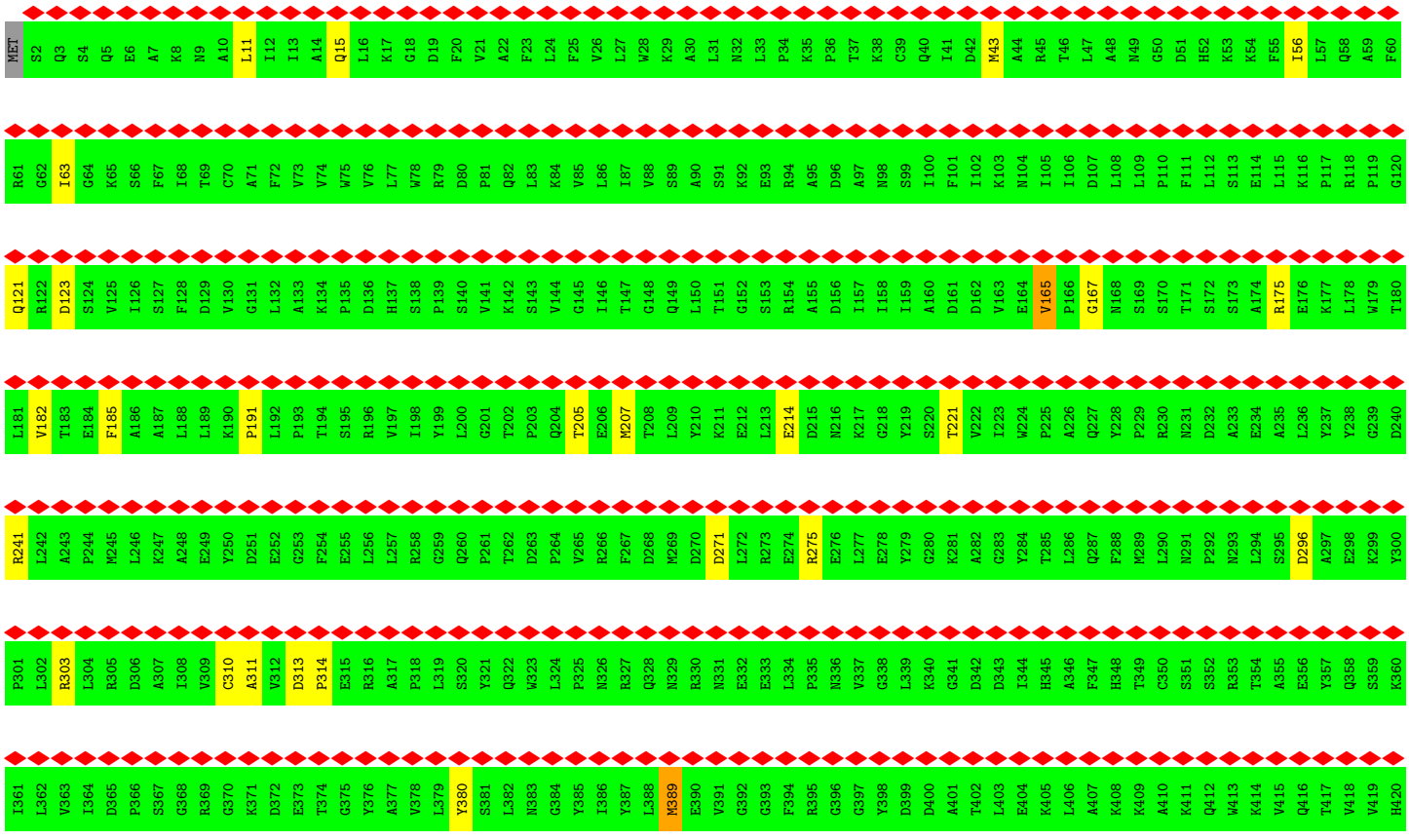




• Molecule 2: Terminase, large subunit

Chain G:





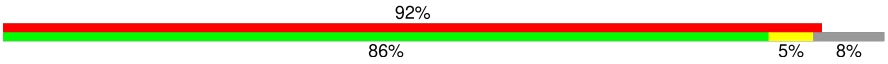
E421 S422 N423 F424 G425 D426 G427 M428 F429 G430 K431 I432 F433 S434 P435 I436 L437 L438 K439 H440 H441 K442 C443 A444 L445 E446 E447 I448 R449 A450 K451 G452 M453 K454 E455 M456 R457 I458 C459 D460 T461 I462 E463 P464 L465 M466 G467 A468 H469 K470 L471 V472 I473 R474 D475 E476 V477 I478 R479 E480

D481 Y482 Q483 T484 A485 R486 D487 L488 D489 G490 K491 H492 D493 V494 R495 Y496 S497 A498 F499 Y500 Q501 M502 T503 R504 M505 T506 R507 E508 R509 G510 A511 V512 A513 H514 D515 D516 R517 I518 D519 A520 I521 A522 L523 G524 I525 E526 Y527 L528 R529 E530 G531 M532 L533 V534 D535 S536 R537 V538 G539 GLU

GLU GLU MET THR LEU GLU PHE LEU GLU HIS HIS MET GLU LYS GLN THR ILE GLY GLY ASP GLN ILE HIS SER PHE ASP VAL GLY GLY VAL ASP ILE TYR TYR GLU ASP GLU ASP GLY GLY SER SER PHE ILE GLU TRP

- Molecule 2: Terminase, large subunit

Chain H:



MET S2 Q3 S4 Q5 E6 A7 K8 N9 A10 L11 I12 I13 A14 Q15 L16 K17 G18 D19 F20 V21 A22 F23 L24 F25 V26 L27 W28 K29 A30 L31 N32 L33 P34 K35 P36 T37 K38 C39 Q40 I41 D42 M43 A44 R45 T46 L47 A48 N49 G50 D51 H52 K53 K54 F55 I56 L57 Q58 A59 F60

R61 G62 I63 G64 K65 S66 F67 I68 T69 C70 A71 F72 V73 V74 W75 V76 L77 W78 R79 D80 P81 Q82 L83 K84 V85 L86 I87 V88 S89 A90 S91 K92 E93 R94 A95 D96 A97 N98 S99 I100 F101 I102 K103 N104 I105 I106 D107 L108 L109 P110 F111 L112 S113 E114 L115 K116 P117 R118 P119 G120

Q121 R122 D123 S124 V125 I126 S127 F128 D129 V130 G131 L132 A133 K134 P135 D136 H137 S138 P139 S140 V141 K142 S143 V144 G145 I146 T147 G148 Q149 L150 T151 G152 S153 R154 A155 D156 I157 I158 I159 A160 D161 D162 V163 E164 V165 P166 G167 N168 S169 S170 T171 S172 S173 A174 R175 E176 K177 L178 W179 T180

L181 V182 T183 E184 F185 A186 A187 L188 L189 K190 P191 L192 P193 T194 S195 R196 V197 I198 Y199 L200 G201 T202 P203 Q204 T205 E206 M207 T208 L209 Y210 K211 E212 L213 E214 D215 N216 K217 G218 Y219 S220 T221 V222 I223 W224 P225 A226 Q227 Y228 P229 R230 N231 D232 A233 E234 A235 L236 Y237 Y238 G239 D240

R241 L242 A243 P244 M245 L246 K247 A248 E249 Y250 D251 E252 G253 F254 E255 L256 L257 R258 G259 Q260 P261 T262 D263 P264 V265 R266 F267 D268 M269 D270 D271 L272 R273 E274 R275 E276 L277 E278 Y279 G280 K281 A282 G283 Y284 T285 L286 Q287 F288 M289 L290 N291 P292 N293 L294 S295 D296 A297 E298 K299 Y300

P301 L302 R303 L304 R305 D306 A307 I308 V309 C310 A311 V312 D313 P314 E315 R316 A317 P318 L319 S320 Y321 Q322 W323 L324 P325 N326 R327 Q328 N329 R330 N331 E332 E333 L334 P335 N336 V337 G338 L339 K340 G341 D342 D343 I344 H345 A346 F347 H348 T349 C350 S351 S352 R353 T354 A355 E356 Y357 Q358 S359 K360

I361 L362 V363 I364 D365 P366 S367 G368 R369 G370 K371 D372 E373 T374 G375 Y376 A377 V378 Y379 Y380 S381 L382 N383 G384 Y385 I386 Y387 L388 M389 E390 V391 G392 G393 F394 R395 G396 G397 Y398 D399 D400 A401 T402 L403 E404 K405 L406 A407 K408 K409 A410 K411 Q412 W413 K414 V415 Q416 T417 V418 V419 H420

E421 S422 N423 F424 G425 D426 G427 M428 F429 G430 K431 I432 F433 S434 P435 I436 L437 L438 K439 H440 H441 K442 C443 A444 L445 E446 E447 I448 R449 A450 K451 G452 M453 K454 E455 M456 R457 I458 C459 D460 T461 I462 E463 P464 L465 M466 G467 A468 H469 K470 L471 V472 I473 R474 D475 E476 V477 I478 R479 E480

D481 Y482 Q483 T484 A485 R486 D487 L488 D489 G490 K491 H492 D493 V494 R495 Y496 S497 A498 F499 Y500 Q501 M502 T503 R504 M505 T506 R507 E508 R509 G510 A511 V512 A513 H514 D515 D516 R517 I518 D519 A520 I521 A522 L523 G524 I525 E526 Y527 L528 R529 E530 G531 M532 L533 V534 D535 S536 R537 V538 G539 GLU

GLU GLU MET THR LEU GLU PHE LEU GLU HIS HIS MET GLU LYS GLN THR ILE GLY GLY ASP GLN ILE HIS SER PHE ASP VAL GLY GLY VAL ASP ILE TYR TYR GLU ASP GLU ASP GLY GLY SER SER PHE ILE GLU TRP

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	44479	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	30	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.043	Depositor
Minimum map value	-0.022	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.008	Depositor
Map size (Å)	313.092, 313.092, 313.092	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8697, 0.8697, 0.8697	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ATP, MG

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	0.25	0/16499	0.54	1/22369 (0.0%)
1	B	0.25	0/16319	0.56	2/22123 (0.0%)
1	C	0.25	0/16499	0.54	1/22369 (0.0%)
1	D	0.25	0/16319	0.56	4/22123 (0.0%)
2	E	0.23	0/4363	0.57	4/5899 (0.1%)
2	F	0.24	0/4363	0.57	2/5899 (0.0%)
2	G	0.24	0/4363	0.58	4/5899 (0.1%)
2	H	0.23	0/4363	0.57	1/5899 (0.0%)
All	All	0.25	0/83088	0.56	19/112580 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	1
1	C	0	1
1	D	0	1
All	All	0	4

There are no bond length outliers.

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	1923	PRO	CA-N-CD	-12.23	94.87	112.00
1	B	1923	PRO	CA-N-CD	-12.21	94.90	112.00
2	F	191	PRO	CA-N-CD	-8.65	99.89	112.00
2	H	191	PRO	CA-N-CD	-8.62	99.93	112.00

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	G	191	PRO	CA-N-CD	-8.61	99.94	112.00
2	E	191	PRO	CA-N-CD	-8.59	99.98	112.00
1	A	96	PRO	N-CD-CG	-7.22	92.38	103.20
1	C	96	PRO	N-CD-CG	-7.20	92.41	103.20
1	D	993	LEU	CA-C-N	6.20	124.14	120.24
1	D	993	LEU	C-N-CA	6.20	124.14	120.24
2	E	165	VAL	N-CA-C	-5.67	104.54	109.19
2	G	165	VAL	N-CA-C	-5.61	104.59	109.19
1	D	1923	PRO	N-CD-CG	-5.35	95.17	103.20
1	B	1923	PRO	N-CD-CG	-5.34	95.19	103.20
2	G	389	MET	CG-SD-CE	-5.34	89.15	100.90
2	E	389	MET	CG-SD-CE	-5.32	89.20	100.90
2	F	389	MET	CG-SD-CE	-5.32	89.21	100.90
2	E	191	PRO	N-CD-CG	-5.05	95.63	103.20
2	G	191	PRO	N-CD-CG	-5.02	95.67	103.20

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	548	PRO	Peptide
1	B	548	PRO	Peptide
1	C	548	PRO	Peptide
1	D	548	PRO	Peptide

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	16152	0	15975	37	0
1	B	15974	0	15804	52	0
1	C	16152	0	15975	37	0
1	D	15974	0	15804	51	0
2	E	4273	0	4283	15	0
2	F	4273	0	4283	19	0
2	G	4273	0	4283	18	0
2	H	4273	0	4283	17	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	31	0	12	0	0
3	B	31	0	12	0	0
3	C	31	0	12	0	0
3	D	31	0	12	0	0
3	E	31	0	12	0	0
3	F	31	0	12	0	0
3	G	31	0	12	0	0
3	H	31	0	12	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
4	E	1	0	0	0	0
4	F	1	0	0	0	0
4	G	1	0	0	0	0
4	H	1	0	0	0	0
All	All	81600	0	80786	244	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 2.

All (244) 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:165:VAL:HG12	2:F:167:GLY:H	1.55	0.72
2:H:165:VAL:HG12	2:H:167:GLY:H	1.55	0.70
2:G:165:VAL:HG12	2:G:167:GLY:H	1.61	0.65
1:B:1944:ASP:OD2	1:B:1945:ILE:N	2.30	0.65
2:E:165:VAL:HG12	2:E:167:GLY:H	1.61	0.64
1:D:1944:ASP:OD2	1:D:1945:ILE:N	2.30	0.64
1:B:245:ASP:OD2	1:B:246:GLU:N	2.32	0.63
1:D:245:ASP:OD2	1:D:246:GLU:N	2.32	0.63
1:B:1898:LEU:HB3	1:B:2035:MET:HG2	1.81	0.63
1:D:1898:LEU:HB3	1:D:2035:MET:HG2	1.81	0.62
1:A:1028:LYS:HE3	1:A:1031:SER:HB2	1.81	0.62
1:C:1028:LYS:HE3	1:C:1031:SER:HB2	1.82	0.62
1:C:62:ASP:OD2	1:C:82:GLN:NE2	2.33	0.61
1:B:469:SER:OG	1:B:756:ARG:NH1	2.33	0.61
1:C:1635:ILE:HD11	1:C:1670:LEU:HD12	1.82	0.61
1:D:1635:ILE:HD11	1:D:1670:LEU:HD12	1.83	0.61
1:D:469:SER:OG	1:D:756:ARG:NH1	2.33	0.61

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:62:ASP:OD2	1:A:82:GLN:NE2	2.33	0.60
1:B:1635:ILE:HD11	1:B:1670:LEU:HD12	1.83	0.60
1:A:1635:ILE:HD11	1:A:1670:LEU:HD12	1.83	0.60
1:D:963:ALA:HB1	1:D:967:VAL:HG23	1.83	0.60
1:C:1848:SER:O	1:C:1888:ARG:NH2	2.35	0.59
1:B:963:ALA:HB1	1:B:967:VAL:HG23	1.83	0.59
1:A:1490:SER:OG	1:A:1492:GLU:OE1	2.21	0.58
1:A:1848:SER:O	1:A:1888:ARG:NH2	2.35	0.58
1:C:1490:SER:OG	1:C:1492:GLU:OE1	2.21	0.58
2:E:43:MET:HE1	2:E:63:ILE:HD13	1.85	0.57
1:D:1490:SER:OG	1:D:1492:GLU:OE1	2.22	0.56
1:B:1490:SER:OG	1:B:1492:GLU:OE1	2.22	0.56
2:G:43:MET:HE1	2:G:63:ILE:HD13	1.85	0.56
1:B:1388:ILE:HD12	1:B:1407:ILE:HD11	1.88	0.56
1:A:809:ARG:NH2	2:E:539:GLY:O	2.38	0.56
1:D:1388:ILE:HD12	1:D:1407:ILE:HD11	1.87	0.55
1:B:879:GLN:NE2	1:B:880:ARG:O	2.40	0.55
1:D:1388:ILE:O	1:D:1392:ILE:HG13	2.07	0.55
1:D:210:GLU:N	1:D:210:GLU:OE2	2.39	0.54
1:B:210:GLU:N	1:B:210:GLU:OE2	2.39	0.54
1:B:1227:ARG:NH1	1:B:1536:ASP:OD1	2.36	0.54
1:A:2077:THR:OG1	1:A:2079:HIS:NE2	2.41	0.54
1:C:1302:GLN:HA	1:C:1305:LYS:HE3	1.90	0.53
1:D:928:PRO:HD2	1:D:931:LEU:HD23	1.90	0.53
2:G:380:TYR:CG	2:G:389:MET:HE1	2.44	0.53
2:F:261:PRO:HD3	2:F:269:MET:HE3	1.91	0.53
1:D:810:TRP:O	1:D:813:ARG:NH1	2.42	0.53
1:B:1388:ILE:O	1:B:1392:ILE:HG13	2.09	0.53
2:E:380:TYR:CG	2:E:389:MET:HE1	2.44	0.53
1:C:1227:ARG:NH1	1:C:1536:ASP:OD1	2.36	0.52
2:F:182:VAL:HG11	2:F:209:LEU:HD13	1.90	0.52
2:H:182:VAL:HG11	2:H:209:LEU:HD13	1.90	0.52
1:B:1028:LYS:HE3	1:B:1031:SER:HB2	1.92	0.52
1:A:1227:ARG:NH1	1:A:1536:ASP:OD1	2.35	0.52
1:A:1302:GLN:HA	1:A:1305:LYS:HE3	1.90	0.52
1:B:810:TRP:O	1:B:813:ARG:NH1	2.43	0.52
1:D:1762:GLN:N	1:D:1762:GLN:OE1	2.42	0.52
2:F:56:ILE:HB	2:F:221:THR:HG22	1.91	0.51
2:H:56:ILE:HB	2:H:221:THR:HG22	1.92	0.51
1:A:1997:MET:HG2	1:A:2021:ALA:HB2	1.93	0.51
2:E:56:ILE:HB	2:E:221:THR:HG22	1.92	0.51

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1826:ASP:OD1	1:A:1826:ASP:N	2.35	0.51
1:C:711:ALA:HB2	1:C:744:ILE:HG13	1.92	0.51
1:D:1028:LYS:HE3	1:D:1031:SER:HB2	1.92	0.51
1:B:1952:ASP:OD1	1:B:1952:ASP:N	2.43	0.50
1:C:1997:MET:HG2	1:C:2021:ALA:HB2	1.93	0.50
1:B:809:ARG:NH2	2:F:539:GLY:O	2.44	0.50
1:A:711:ALA:HB2	1:A:744:ILE:HG13	1.93	0.50
2:G:121:GLN:HB3	2:G:123:ASP:HB3	1.93	0.50
1:A:2042:ASP:OD2	1:A:2065:SER:OG	2.23	0.50
1:A:1898:LEU:HD23	1:A:2037:LEU:HD13	1.94	0.50
1:C:1400:GLU:HB3	1:C:1429:TRP:CZ3	2.47	0.50
1:C:1898:LEU:HD23	1:C:2037:LEU:HD13	1.93	0.50
2:F:101:PHE:O	2:F:105:ILE:HG12	2.11	0.50
1:A:1400:GLU:HB3	1:A:1429:TRP:CZ3	2.47	0.50
2:F:296:ASP:O	2:F:303:ARG:NH2	2.41	0.50
2:H:101:PHE:O	2:H:105:ILE:HG12	2.12	0.50
1:C:1874:LEU:HB3	1:C:2020:CYS:SG	2.52	0.49
1:C:2042:ASP:OD2	1:C:2065:SER:OG	2.24	0.49
2:H:296:ASP:O	2:H:303:ARG:NH2	2.42	0.49
1:A:1874:LEU:HB3	1:A:2020:CYS:SG	2.52	0.49
2:H:261:PRO:HD3	2:H:269:MET:HE3	1.95	0.49
1:A:1284:ILE:HD13	1:A:1314:LEU:HD23	1.94	0.49
1:A:1727:GLN:HA	1:A:1730:LEU:HG	1.94	0.49
1:D:653:THR:OG1	1:D:657:GLU:OE1	2.30	0.49
1:B:916:ILE:HD11	1:B:952:LEU:HB3	1.94	0.49
1:C:1284:ILE:HD13	1:C:1314:LEU:HD23	1.94	0.49
1:B:550:ILE:HB	1:B:584:ILE:HG22	1.94	0.49
1:B:653:THR:OG1	1:B:657:GLU:OE1	2.30	0.49
1:C:963:ALA:HB1	1:C:967:VAL:HG23	1.95	0.49
1:C:1727:GLN:HA	1:C:1730:LEU:HG	1.94	0.49
1:D:550:ILE:HB	1:D:584:ILE:HG22	1.94	0.49
1:C:227:SER:O	1:C:227:SER:OG	2.28	0.49
1:D:1952:ASP:OD1	1:D:1952:ASP:N	2.43	0.49
1:D:869:ILE:HG13	1:D:900:MET:HE1	1.95	0.48
1:B:869:ILE:HG13	1:B:900:MET:HE1	1.95	0.48
2:G:205:THR:OG1	2:G:207:MET:O	2.28	0.48
1:D:1227:ARG:NH1	1:D:1536:ASP:OD1	2.36	0.48
1:A:775:ASP:O	1:A:779:ARG:NE	2.42	0.48
1:B:721:GLU:OE2	1:B:725:ARG:NH2	2.46	0.48
1:D:386:LEU:HB3	1:D:422:VAL:HG12	1.96	0.48
1:B:1854:GLU:CD	1:B:1854:GLU:H	2.21	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1284:ILE:HD13	1:D:1314:LEU:HD23	1.95	0.48
1:D:1854:GLU:H	1:D:1854:GLU:CD	2.21	0.48
2:G:56:ILE:HB	2:G:221:THR:HG22	1.95	0.48
1:D:721:GLU:OE2	1:D:725:ARG:NH2	2.46	0.48
2:F:481:ASP:OD1	2:F:517:ARG:NH1	2.47	0.48
2:G:11:LEU:O	2:G:15:GLN:HG3	2.14	0.48
2:H:453:MET:HG2	2:H:456:MET:H	1.79	0.48
1:C:997:TYR:OH	1:C:1041:GLU:OE2	2.32	0.47
1:A:721:GLU:OE2	1:A:725:ARG:NH2	2.46	0.47
1:D:916:ILE:HD11	1:D:952:LEU:HB3	1.97	0.47
1:A:963:ALA:HB1	1:A:967:VAL:HG23	1.95	0.47
1:B:1848:SER:O	1:B:1888:ARG:NH2	2.40	0.47
1:A:2011:GLU:OE1	1:A:2011:GLU:N	2.43	0.47
1:B:386:LEU:HB3	1:B:422:VAL:HG12	1.96	0.47
1:D:1401:CYS:HA	1:D:1404:ILE:HD12	1.97	0.47
1:A:195:ILE:O	1:A:199:GLU:HG2	2.15	0.47
1:B:1284:ILE:HD13	1:B:1314:LEU:HD23	1.95	0.47
1:B:1401:CYS:HA	1:B:1404:ILE:HD12	1.97	0.47
1:A:227:SER:O	1:A:227:SER:OG	2.28	0.46
1:D:273:GLN:HA	1:D:276:VAL:HG12	1.98	0.46
1:C:195:ILE:O	1:C:199:GLU:HG2	2.15	0.46
1:B:938:GLU:OE2	1:B:938:GLU:N	2.49	0.46
1:B:1997:MET:HE3	1:B:1997:MET:HB2	1.79	0.46
1:C:721:GLU:OE2	1:C:725:ARG:NH2	2.47	0.46
2:H:178:LEU:O	2:H:182:VAL:HG12	2.16	0.46
1:C:810:TRP:O	1:C:813:ARG:NH1	2.49	0.46
2:E:11:LEU:O	2:E:15:GLN:HG3	2.14	0.46
2:E:214:GLU:CD	2:E:241:ARG:HH12	2.24	0.46
2:F:453:MET:HG2	2:F:456:MET:H	1.80	0.46
2:F:466:MET:HE3	2:F:466:MET:HB2	1.83	0.46
2:H:214:GLU:CD	2:H:241:ARG:HH12	2.24	0.46
1:A:810:TRP:O	1:A:813:ARG:NH1	2.49	0.45
1:B:273:GLN:HA	1:B:276:VAL:HG12	1.98	0.45
2:F:380:TYR:CG	2:F:389:MET:HE1	2.50	0.45
2:H:481:ASP:OD1	2:H:517:ARG:NH1	2.49	0.45
1:A:858:ARG:NH1	1:A:902:GLU:OE2	2.49	0.45
1:B:2027:LYS:O	1:B:2031:GLU:HG2	2.16	0.45
2:E:453:MET:HG2	2:E:456:MET:H	1.80	0.45
2:F:380:TYR:CD2	2:F:389:MET:HE1	2.52	0.45
1:A:1711:PHE:O	1:A:1715:TRP:HB2	2.17	0.45
1:C:1711:PHE:O	1:C:1715:TRP:HB2	2.17	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:938:GLU:OE2	1:D:938:GLU:N	2.50	0.45
2:F:214:GLU:CD	2:F:241:ARG:HH12	2.24	0.45
2:F:178:LEU:O	2:F:182:VAL:HG12	2.16	0.45
1:A:1952:ASP:OD1	1:A:1952:ASP:N	2.43	0.45
1:D:1727:GLN:HA	1:D:1730:LEU:HG	1.99	0.45
2:G:453:MET:HG2	2:G:456:MET:H	1.82	0.44
1:A:1997:MET:HE3	1:A:1997:MET:HB2	1.81	0.44
1:B:588:ASP:OD2	1:B:590:PRO:HD2	2.17	0.44
1:A:394:ASP:OD1	1:A:394:ASP:N	2.51	0.44
1:B:928:PRO:HD2	1:B:931:LEU:HD23	1.99	0.44
1:D:1848:SER:O	1:D:1888:ARG:NH2	2.40	0.44
1:B:1727:GLN:HA	1:B:1730:LEU:HG	1.98	0.44
1:D:1973:ILE:H	1:D:1973:ILE:HG13	1.58	0.44
2:E:175:ARG:HD2	2:E:207:MET:HE2	2.00	0.44
2:H:29:LYS:HA	2:H:29:LYS:HD3	1.80	0.44
2:H:182:VAL:HA	2:H:185:PHE:CE1	2.53	0.44
1:A:114:ILE:HD12	1:A:119:VAL:HG22	1.99	0.44
1:C:858:ARG:NH1	1:C:902:GLU:OE2	2.50	0.44
1:A:441:GLU:N	1:A:441:GLU:OE2	2.51	0.44
2:G:214:GLU:CD	2:G:241:ARG:HH12	2.25	0.44
1:A:582:GLU:N	1:A:582:GLU:OE1	2.50	0.43
1:B:1071:LYS:HE3	1:B:1071:LYS:HB3	1.86	0.43
1:D:588:ASP:OD2	1:D:590:PRO:HD2	2.17	0.43
1:B:1855:TRP:HE3	1:B:1856:LEU:HD23	1.83	0.43
2:F:182:VAL:HA	2:F:185:PHE:CE1	2.53	0.43
1:D:1711:PHE:O	1:D:1715:TRP:HB2	2.19	0.43
2:E:380:TYR:CD2	2:E:389:MET:HE1	2.54	0.43
1:C:114:ILE:HD12	1:C:119:VAL:HG22	1.99	0.43
1:D:866:GLU:HA	1:D:869:ILE:HG22	2.01	0.43
1:D:2027:LYS:O	1:D:2031:GLU:HG2	2.18	0.43
1:C:441:GLU:OE2	1:C:441:GLU:N	2.52	0.43
2:G:466:MET:HE3	2:G:466:MET:HB2	1.85	0.43
1:B:1977:LYS:HB3	1:B:1990:PRO:HG3	2.01	0.43
1:B:1374:LYS:HD3	1:B:1374:LYS:HA	1.81	0.42
1:D:1300:ASN:HD22	1:D:1302:GLN:CD	2.28	0.42
1:D:1977:LYS:HB3	1:D:1990:PRO:HG3	2.01	0.42
2:H:420:HIS:NE2	2:H:447:GLU:OE2	2.44	0.42
1:B:1300:ASN:HD22	1:B:1302:GLN:CD	2.27	0.42
1:B:1973:ILE:H	1:B:1973:ILE:HG13	1.58	0.42
2:E:466:MET:HE3	2:E:466:MET:HB2	1.86	0.42
1:A:784:ASP:OD1	1:A:784:ASP:N	2.50	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1855:TRP:HE3	1:D:1856:LEU:HD23	1.83	0.42
1:A:997:TYR:OH	1:A:1041:GLU:OE2	2.32	0.42
1:B:866:GLU:HA	1:B:869:ILE:HG22	2.01	0.42
1:B:1711:PHE:O	1:B:1715:TRP:HB2	2.19	0.42
1:A:39:THR:OG1	1:A:42:GLY:O	2.32	0.42
1:D:869:ILE:HA	1:D:872:THR:HG22	2.02	0.42
1:C:2011:GLU:OE1	1:C:2011:GLU:N	2.43	0.42
2:E:271:ASP:O	2:E:275:ARG:HG2	2.20	0.42
2:G:380:TYR:CD2	2:G:389:MET:HE1	2.53	0.42
1:B:952:LEU:HD23	1:B:1005:LEU:HD11	2.00	0.42
2:F:13:ILE:HD12	2:F:13:ILE:HA	1.97	0.42
2:G:182:VAL:HA	2:G:185:PHE:CE1	2.55	0.42
1:D:1709:ILE:HG23	1:D:1710:ASP:OD1	2.20	0.41
1:D:1756:ASN:O	1:D:1759:ARG:NH1	2.53	0.41
1:B:300:ILE:HG21	1:B:389:ILE:HD11	2.02	0.41
1:B:869:ILE:HA	1:B:872:THR:HG22	2.02	0.41
1:B:1874:LEU:HB3	1:B:2020:CYS:SG	2.60	0.41
1:B:324:ALA:HA	1:B:327:TYR:CZ	2.55	0.41
1:B:1709:ILE:HG23	1:B:1710:ASP:OD1	2.20	0.41
1:C:1895:HIS:HB2	1:C:1922:ILE:HD13	2.02	0.41
2:E:115:LEU:HD12	2:E:130:VAL:HG11	2.03	0.41
1:D:28:LEU:HD23	1:D:35:LEU:HG	2.01	0.41
1:D:300:ILE:HG21	1:D:389:ILE:HD11	2.02	0.41
1:D:324:ALA:HA	1:D:327:TYR:CZ	2.55	0.41
2:G:271:ASP:O	2:G:275:ARG:HG2	2.20	0.41
1:A:1895:HIS:HB2	1:A:1922:ILE:HD13	2.02	0.41
1:D:927:PRO:HA	1:D:928:PRO:HD3	1.96	0.41
1:C:1826:ASP:OD1	1:C:1826:ASP:N	2.35	0.41
2:E:182:VAL:HA	2:E:185:PHE:CE1	2.55	0.41
1:B:1283:LYS:H	1:B:1283:LYS:HG3	1.68	0.41
1:B:1756:ASN:O	1:B:1759:ARG:NH1	2.53	0.41
2:F:269:MET:HE2	2:F:272:LEU:HD12	2.02	0.41
2:H:101:PHE:CZ	2:H:105:ILE:HD11	2.56	0.41
2:G:296:ASP:O	2:G:303:ARG:NH2	2.51	0.41
1:C:552:LEU:HD21	1:C:584:ILE:HD11	2.02	0.41
1:D:84:LYS:HE2	1:D:84:LYS:HB3	1.94	0.41
1:D:1353:TRP:CD2	1:D:1390:LYS:HE2	2.56	0.41
2:G:451:LYS:O	2:G:457:ARG:NH1	2.54	0.41
2:H:177:LYS:O	2:H:181:LEU:HG	2.21	0.41
2:H:313:ASP:HA	2:H:314:PRO:HD3	1.95	0.41
1:C:1952:ASP:OD1	1:C:1952:ASP:N	2.43	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:29:LYS:HD3	2:F:29:LYS:HA	1.79	0.41
2:F:101:PHE:CZ	2:F:105:ILE:HD11	2.56	0.41
2:G:175:ARG:HD2	2:G:207:MET:HE2	2.03	0.41
2:G:310:CYS:SG	2:G:311:ALA:N	2.94	0.41
1:C:530:ILE:H	1:C:530:ILE:HG12	1.74	0.40
1:C:2026:ILE:HD11	1:C:2037:LEU:HD23	2.03	0.40
1:D:374:ILE:HD12	1:D:374:ILE:HA	1.95	0.40
1:C:2075:ASP:OD1	1:C:2075:ASP:N	2.54	0.40
1:D:1176:PRO:HA	1:D:1177:PRO:HD3	1.96	0.40
1:D:2020:CYS:SG	1:D:2021:ALA:N	2.94	0.40
1:C:394:ASP:OD1	1:C:394:ASP:N	2.51	0.40
1:C:1973:ILE:H	1:C:1973:ILE:HG13	1.61	0.40
2:E:310:CYS:SG	2:E:311:ALA:N	2.95	0.40
2:G:313:ASP:HA	2:G:314:PRO:HD3	1.90	0.40
1:B:28:LEU:HD23	1:B:35:LEU:HG	2.01	0.40
1:D:1388:ILE:HG22	1:D:1392:ILE:HD11	2.03	0.40
2:H:421:GLU:OE1	2:H:449:ARG:HA	2.22	0.40
1:B:1997:MET:HG2	1:B:2021:ALA:HB2	2.04	0.40
1:B:2020:CYS:SG	1:B:2021:ALA:N	2.94	0.40
1:C:1176:PRO:HA	1:C:1177:PRO:HD3	1.96	0.40
1:C:1318:HIS:O	1:C:1322:LYS:HG2	2.22	0.40
1:D:1997:MET:HG2	1:D:2021:ALA:HB2	2.04	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 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	A	2016/2092 (96%)	1980 (98%)	36 (2%)	0	100	100
1	B	1990/2092 (95%)	1953 (98%)	37 (2%)	0	100	100
1	C	2016/2092 (96%)	1980 (98%)	36 (2%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	1990/2092 (95%)	1953 (98%)	37 (2%)	0	100	100
2	E	536/586 (92%)	526 (98%)	10 (2%)	0	100	100
2	F	536/586 (92%)	523 (98%)	13 (2%)	0	100	100
2	G	536/586 (92%)	526 (98%)	10 (2%)	0	100	100
2	H	536/586 (92%)	524 (98%)	12 (2%)	0	100	100
All	All	10156/10712 (95%)	9965 (98%)	191 (2%)	0	100	100

There are no Ramachandran outliers to report.

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 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	A	1754/1814 (97%)	1753 (100%)	1 (0%)	92	97
1	B	1732/1814 (96%)	1729 (100%)	3 (0%)	92	96
1	C	1754/1814 (97%)	1752 (100%)	2 (0%)	92	97
1	D	1732/1814 (96%)	1729 (100%)	3 (0%)	92	96
2	E	458/500 (92%)	458 (100%)	0	100	100
2	F	458/500 (92%)	456 (100%)	2 (0%)	89	93
2	G	458/500 (92%)	458 (100%)	0	100	100
2	H	458/500 (92%)	456 (100%)	2 (0%)	89	93
All	All	8804/9256 (95%)	8791 (100%)	13 (0%)	92	97

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	513	ILE
1	B	972	MET
1	B	1365	ILE
1	B	1973	ILE
1	C	513	ILE

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	C	2037	LEU
1	D	972	MET
1	D	1005	LEU
1	D	1365	ILE
2	F	372	ASP
2	F	488	LEU
2	H	404	GLU
2	H	448	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (70) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	481	ASN
1	A	492	ASN
1	A	907	GLN
1	A	956	GLN
1	A	1070	HIS
1	A	1155	ASN
1	A	1199	HIS
1	A	1589	GLN
1	A	1637	ASN
1	A	1683	ASN
1	A	1827	HIS
1	A	1895	HIS
1	A	2004	HIS
1	B	82	GLN
1	B	149	ASN
1	B	907	GLN
1	B	956	GLN
1	B	1155	ASN
1	B	1292	HIS
1	B	1666	HIS
1	B	1683	ASN
1	B	1770	HIS
1	B	1827	HIS
1	B	2004	HIS
1	C	181	HIS
1	C	481	ASN
1	C	492	ASN
1	C	608	GLN
1	C	907	GLN
1	C	956	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	C	1155	ASN
1	C	1199	HIS
1	C	1589	GLN
1	C	1637	ASN
1	C	1683	ASN
1	C	1827	HIS
1	C	1895	HIS
1	C	2004	HIS
1	D	82	GLN
1	D	149	ASN
1	D	372	GLN
1	D	879	GLN
1	D	887	ASN
1	D	907	GLN
1	D	1155	ASN
1	D	1232	HIS
1	D	1292	HIS
1	D	1666	HIS
1	D	1683	ASN
1	D	1770	HIS
1	D	1827	HIS
1	D	2004	HIS
2	E	5	GLN
2	E	49	ASN
2	E	423	ASN
2	F	5	GLN
2	F	49	ASN
2	F	58	GLN
2	F	227	GLN
2	F	291	ASN
2	G	49	ASN
2	G	58	GLN
2	G	423	ASN
2	H	5	GLN
2	H	15	GLN
2	H	49	ASN
2	H	58	GLN
2	H	227	GLN
2	H	291	ASN
2	H	441	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

Of 16 ligands modelled in this entry, 8 are monoatomic - leaving 8 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	ATP	F	601	4	28,33,33	0.77	0	34,52,52	0.60	1 (2%)
3	ATP	C	2101	4	28,33,33	0.84	1 (3%)	34,52,52	0.60	1 (2%)
3	ATP	E	601	4	28,33,33	0.77	0	34,52,52	0.60	1 (2%)
3	ATP	A	2101	4	28,33,33	0.83	1 (3%)	34,52,52	0.60	1 (2%)
3	ATP	D	2101	4	28,33,33	0.92	1 (3%)	34,52,52	0.78	2 (5%)
3	ATP	B	2101	4	28,33,33	0.91	1 (3%)	34,52,52	0.78	2 (5%)
3	ATP	G	601	4	28,33,33	0.77	0	34,52,52	0.59	1 (2%)
3	ATP	H	601	4	28,33,33	0.76	0	34,52,52	0.60	1 (2%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ATP	F	601	4	-	3/18/38/38	0/3/3/3
3	ATP	C	2101	4	-	2/18/38/38	0/3/3/3
3	ATP	E	601	4	-	2/18/38/38	0/3/3/3
3	ATP	A	2101	4	-	2/18/38/38	0/3/3/3
3	ATP	D	2101	4	-	4/18/38/38	0/3/3/3
3	ATP	B	2101	4	-	4/18/38/38	0/3/3/3
3	ATP	G	601	4	-	3/18/38/38	0/3/3/3
3	ATP	H	601	4	-	2/18/38/38	0/3/3/3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	2101	ATP	PB-O3B	-2.77	1.56	1.59
3	B	2101	ATP	PB-O3B	-2.75	1.56	1.59
3	C	2101	ATP	PB-O3B	-2.31	1.57	1.59
3	A	2101	ATP	PB-O3B	-2.25	1.57	1.59

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	2101	ATP	C4'-O4'-C1'	-2.82	107.34	109.92
3	B	2101	ATP	C4'-O4'-C1'	-2.80	107.36	109.92
3	A	2101	ATP	C5-C6-N6	2.30	123.82	120.31
3	C	2101	ATP	C5-C6-N6	2.29	123.80	120.31
3	B	2101	ATP	C5-C6-N6	2.21	123.67	120.31
3	D	2101	ATP	C5-C6-N6	2.20	123.66	120.31
3	F	601	ATP	C5-C6-N6	2.15	123.59	120.31
3	H	601	ATP	C5-C6-N6	2.14	123.56	120.31
3	E	601	ATP	C5-C6-N6	2.13	123.55	120.31
3	G	601	ATP	C5-C6-N6	2.09	123.49	120.31

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	2101	ATP	O4'-C4'-C5'-O5'
3	D	2101	ATP	O4'-C4'-C5'-O5'
3	F	601	ATP	O4'-C4'-C5'-O5'
3	G	601	ATP	O4'-C4'-C5'-O5'
3	B	2101	ATP	C3'-C4'-C5'-O5'

Continued on next page...

Continued from previous page...

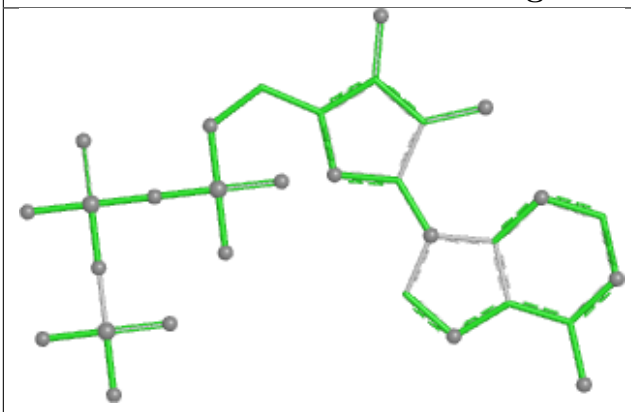
Mol	Chain	Res	Type	Atoms
3	D	2101	ATP	C3'-C4'-C5'-O5'
3	E	601	ATP	O4'-C4'-C5'-O5'
3	H	601	ATP	O4'-C4'-C5'-O5'
3	A	2101	ATP	PA-O3A-PB-O1B
3	C	2101	ATP	PA-O3A-PB-O1B
3	F	601	ATP	C3'-C4'-C5'-O5'
3	G	601	ATP	C3'-C4'-C5'-O5'
3	B	2101	ATP	PA-O3A-PB-O2B
3	D	2101	ATP	PA-O3A-PB-O2B
3	F	601	ATP	C4'-C5'-O5'-PA
3	H	601	ATP	C4'-C5'-O5'-PA
3	E	601	ATP	C4'-C5'-O5'-PA
3	G	601	ATP	C4'-C5'-O5'-PA
3	A	2101	ATP	PA-O3A-PB-O2B
3	C	2101	ATP	PA-O3A-PB-O2B
3	B	2101	ATP	PA-O3A-PB-O1B
3	D	2101	ATP	PA-O3A-PB-O1B

There are no ring outliers.

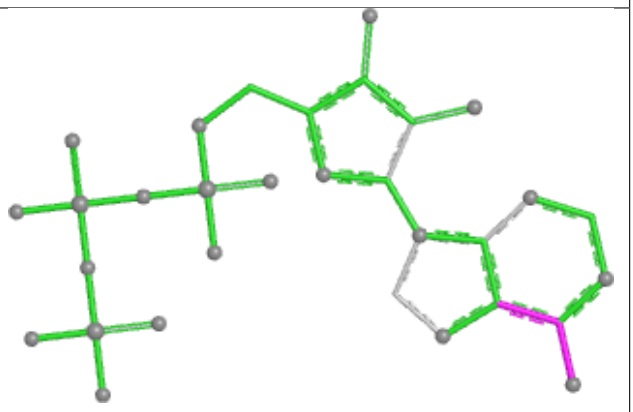
No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

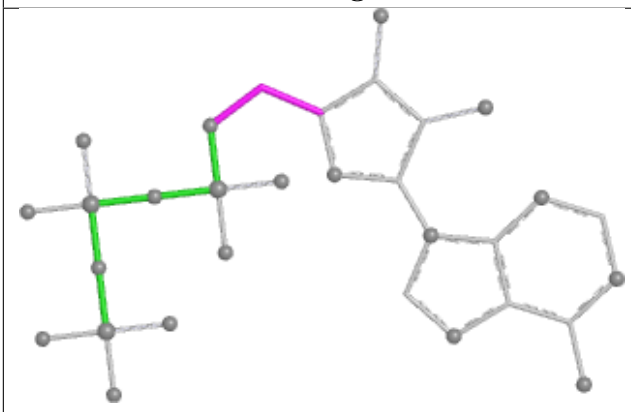
Ligand ATP F 601



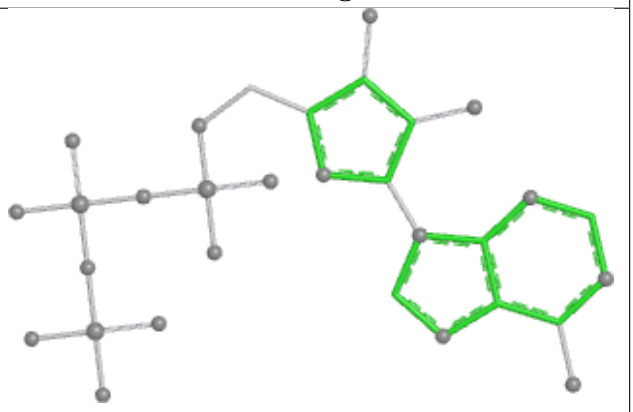
Bond lengths



Bond angles

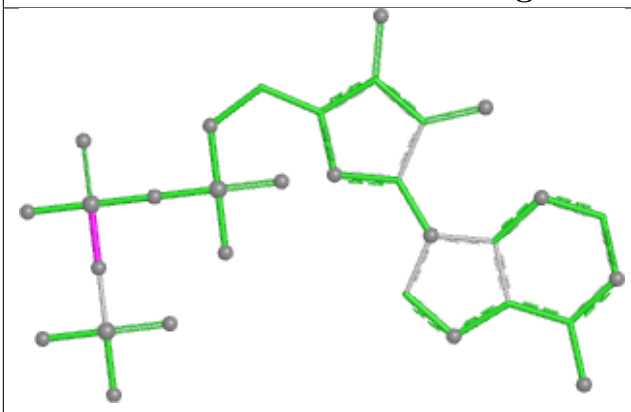


Torsions

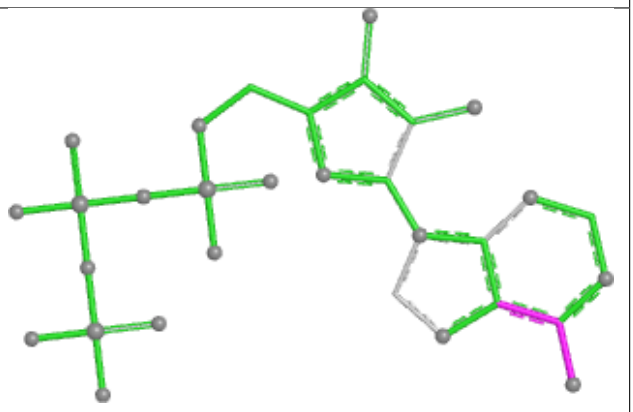


Rings

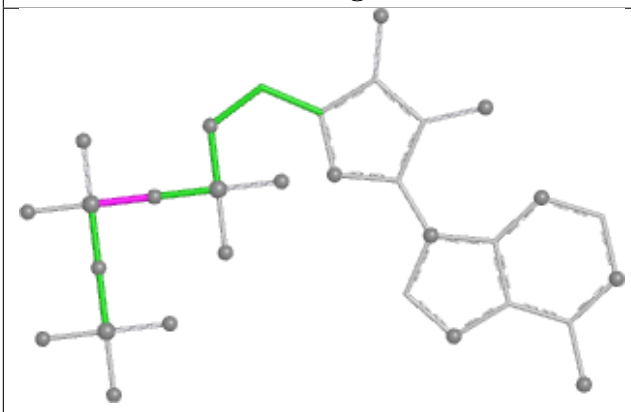
Ligand ATP C 2101



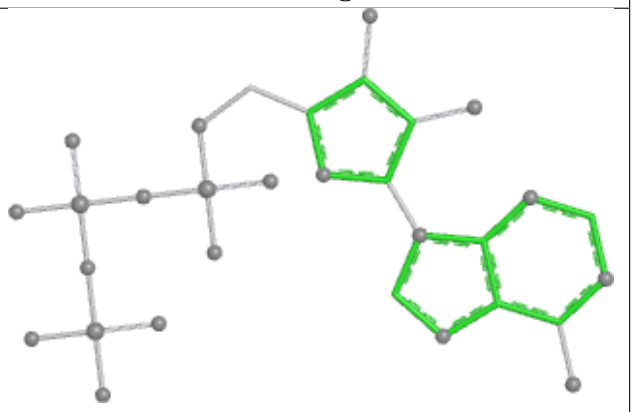
Bond lengths



Bond angles

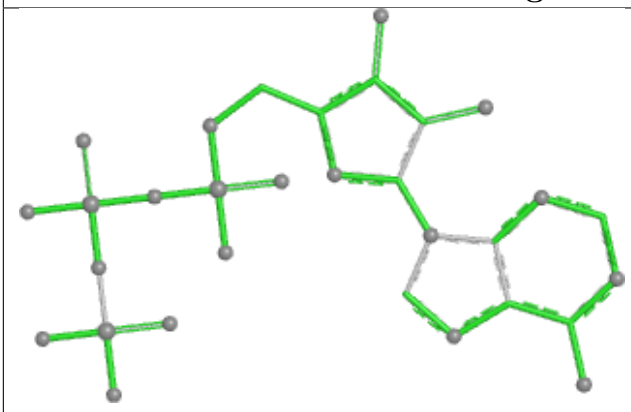


Torsions

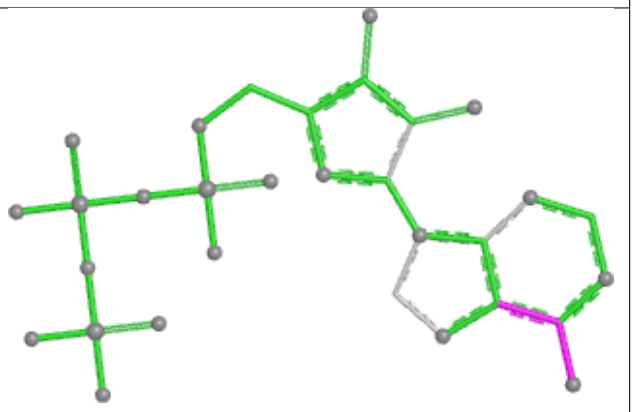


Rings

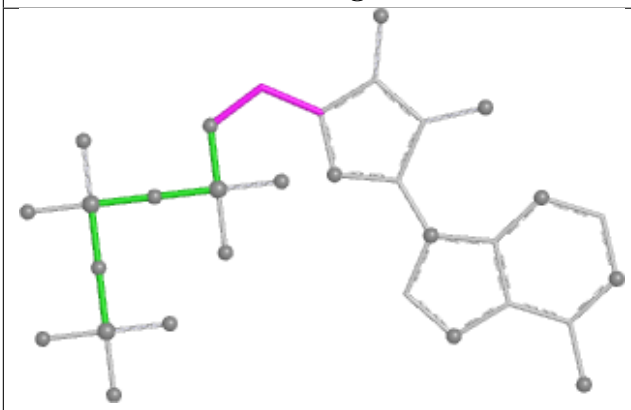
Ligand ATP E 601



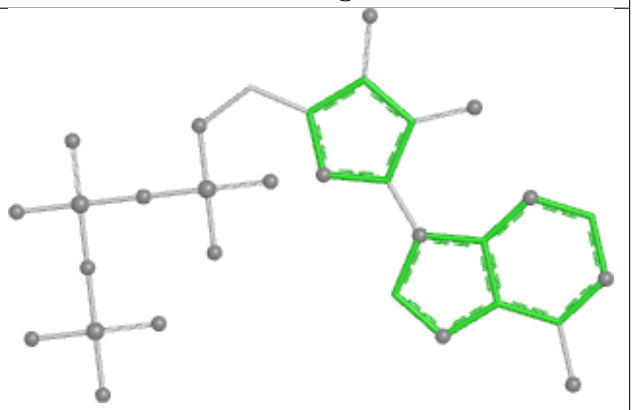
Bond lengths



Bond angles

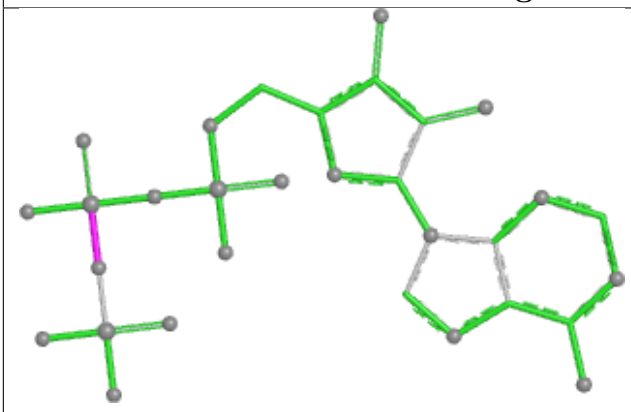


Torsions

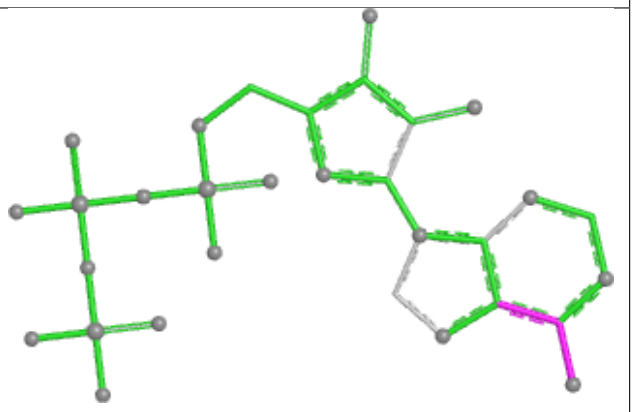


Rings

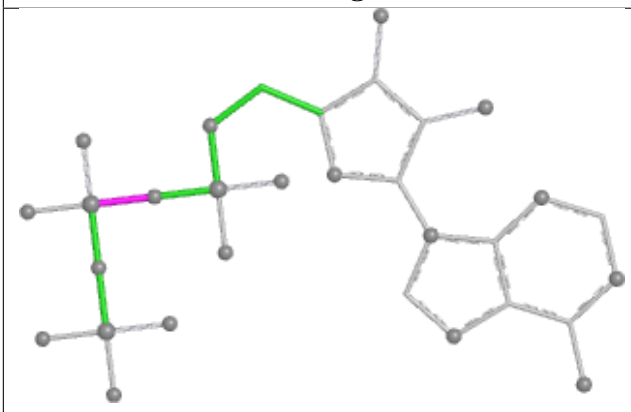
Ligand ATP A 2101



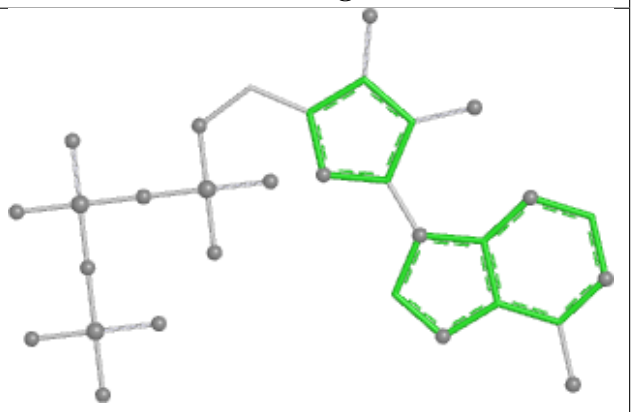
Bond lengths



Bond angles

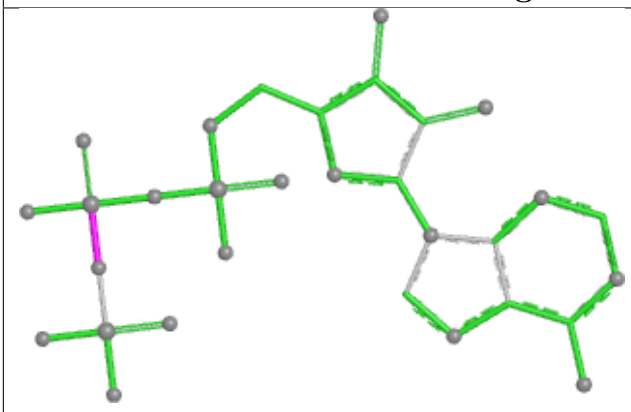


Torsions

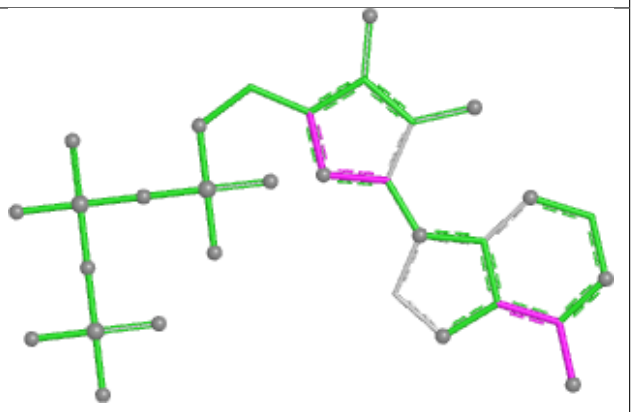


Rings

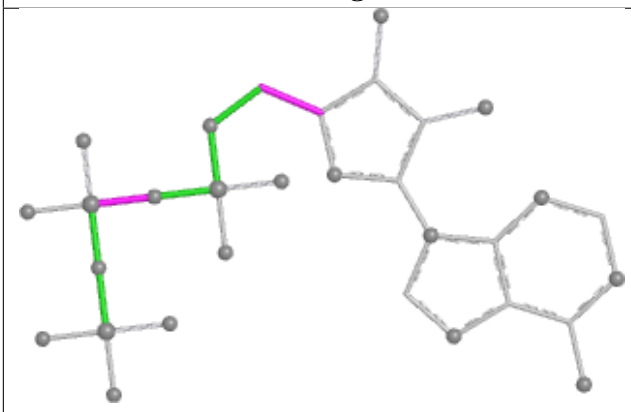
Ligand ATP D 2101



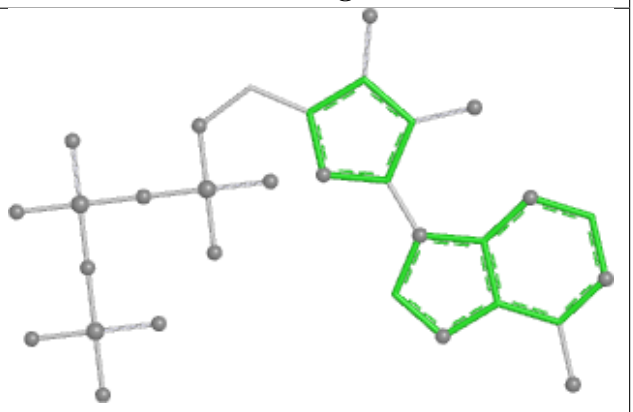
Bond lengths



Bond angles

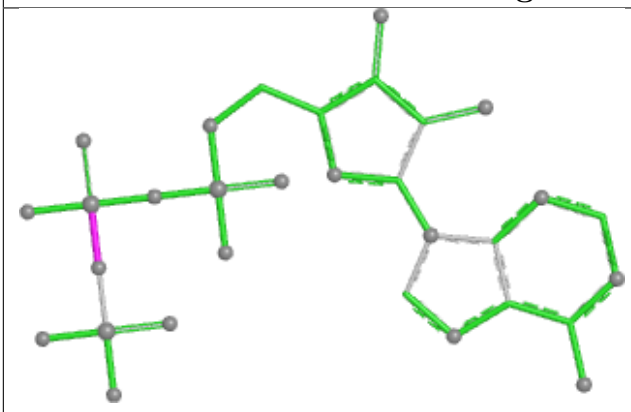


Torsions

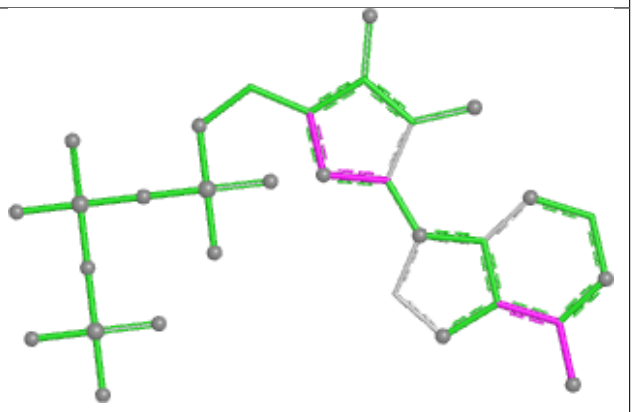


Rings

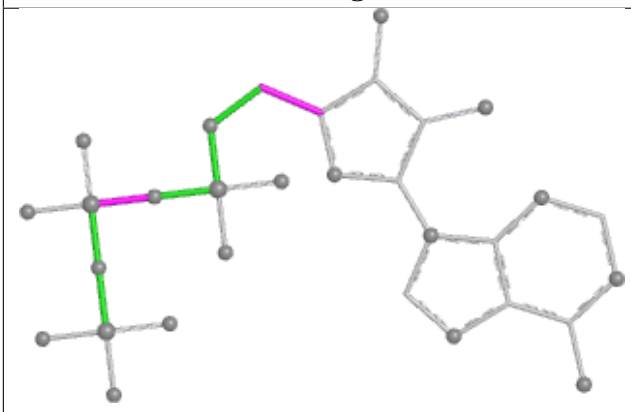
Ligand ATP B 2101



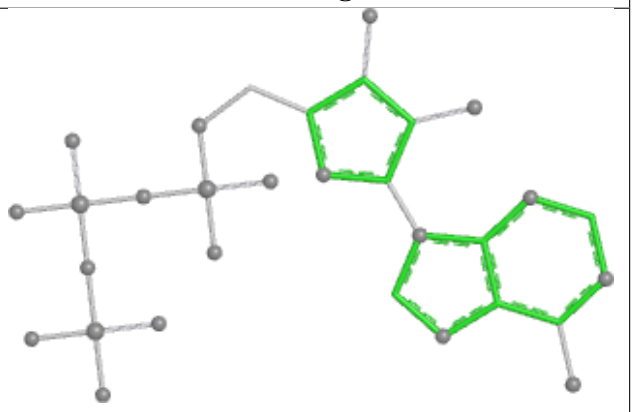
Bond lengths



Bond angles

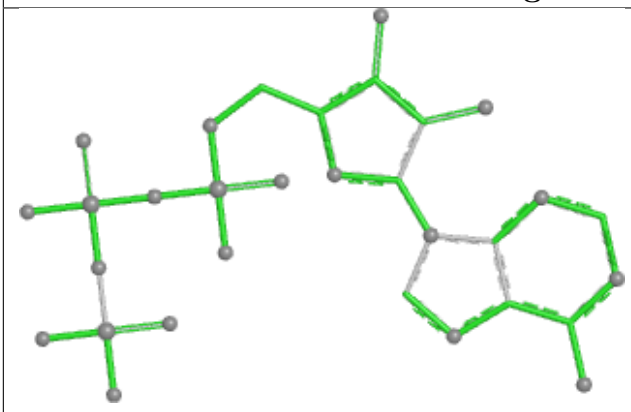


Torsions

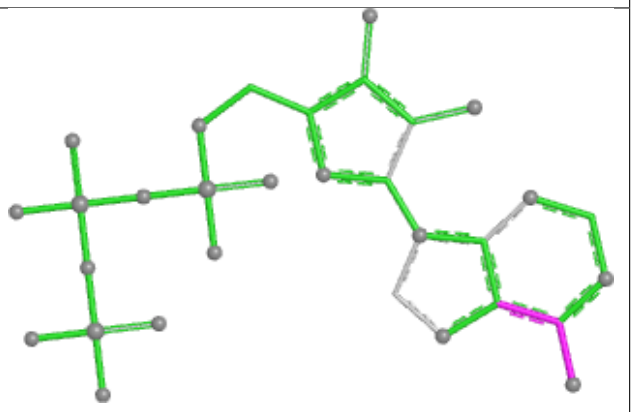


Rings

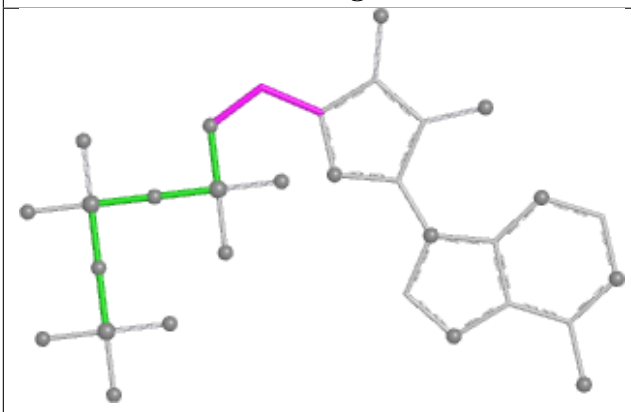
Ligand ATP G 601



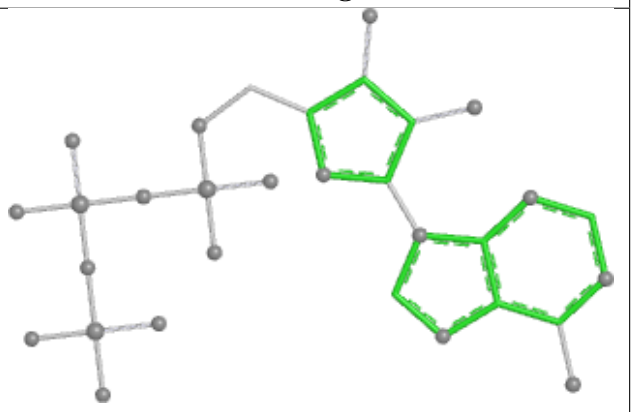
Bond lengths



Bond angles

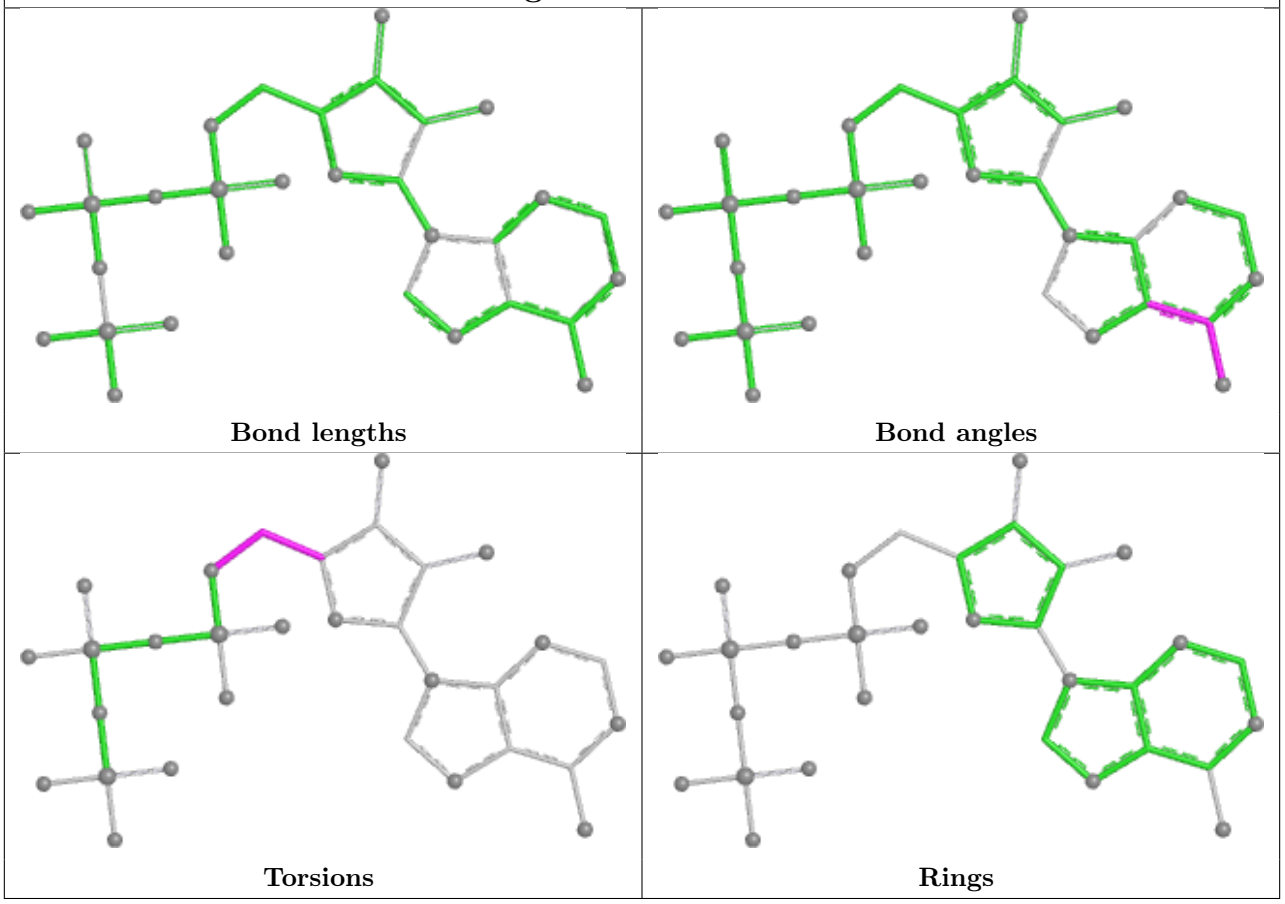


Torsions



Rings

Ligand ATP H 601



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.

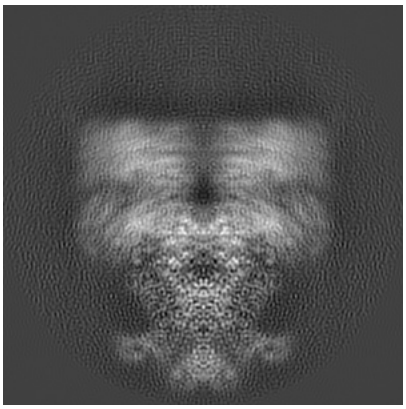
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-27421. These allow visual inspection of the internal detail of the map and identification of artifacts.

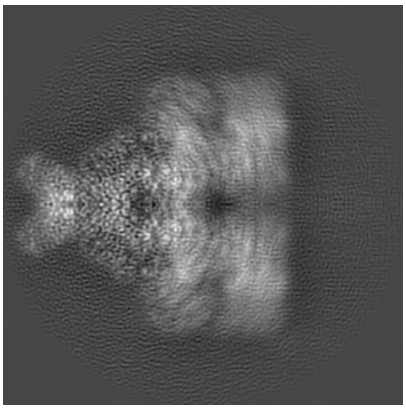
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

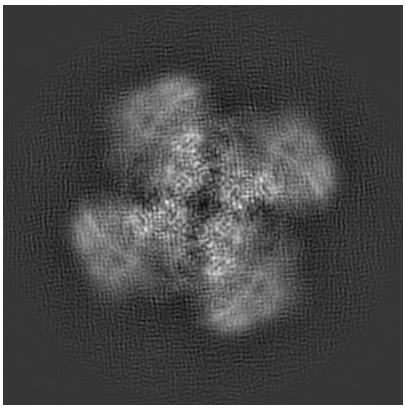
6.1.1 Primary map



X

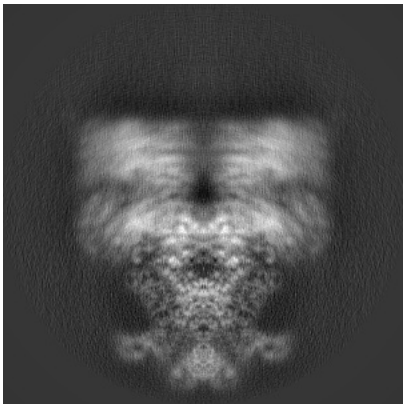


Y

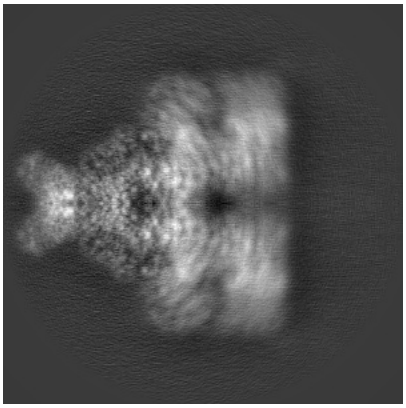


Z

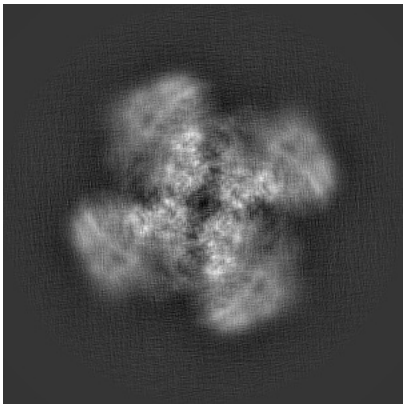
6.1.2 Raw map



X



Y

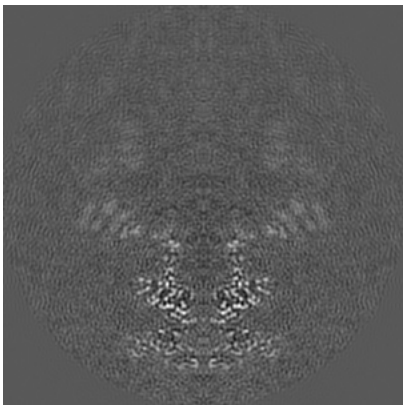


Z

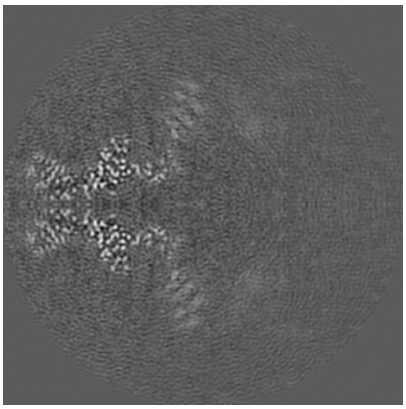
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

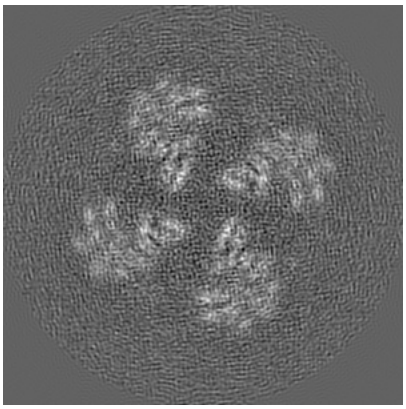
6.2.1 Primary map



X Index: 180

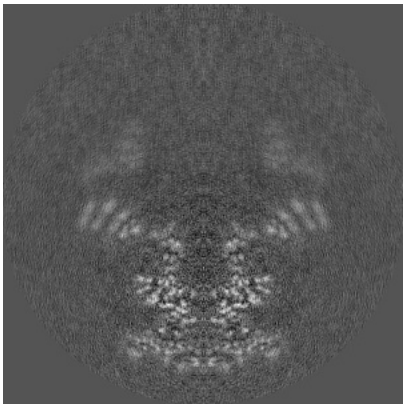


Y Index: 180

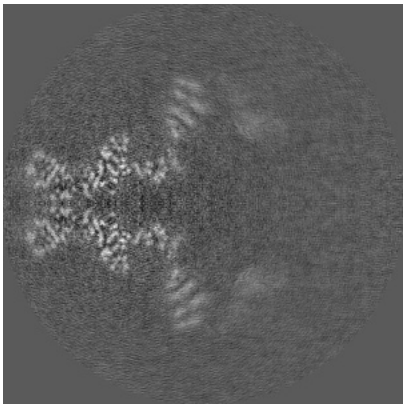


Z Index: 180

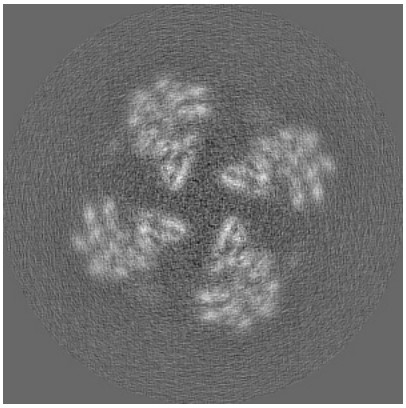
6.2.2 Raw map



X Index: 180



Y Index: 180

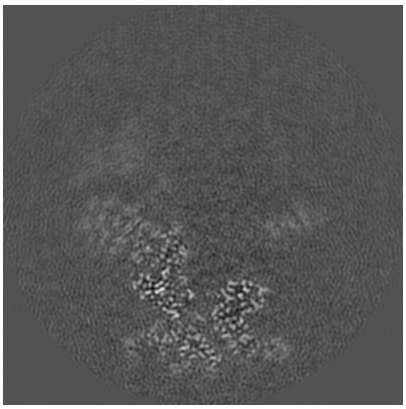


Z Index: 180

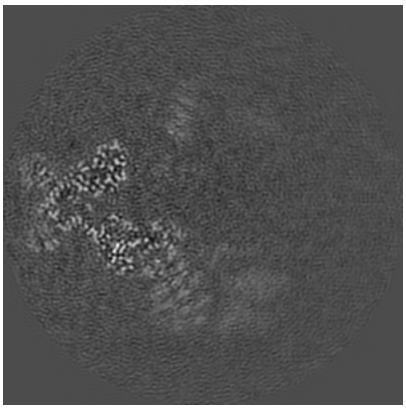
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

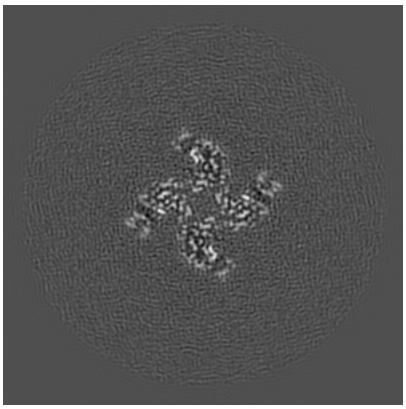
6.3.1 Primary map



X Index: 187

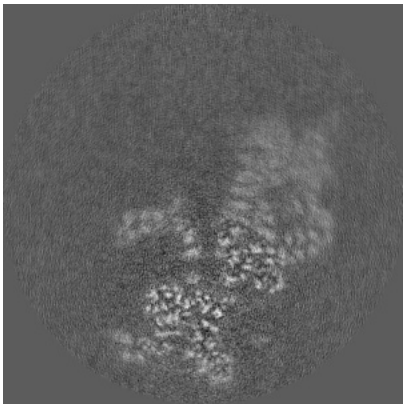


Y Index: 173

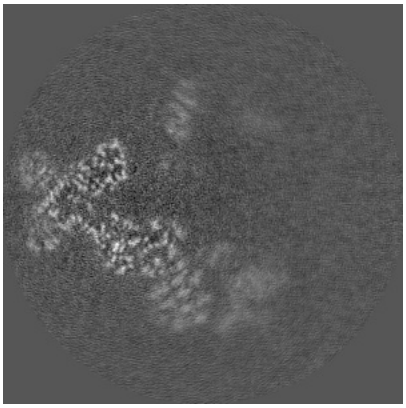


Z Index: 102

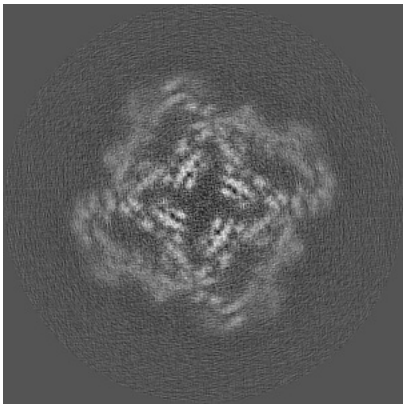
6.3.2 Raw map



X Index: 163



Y Index: 173

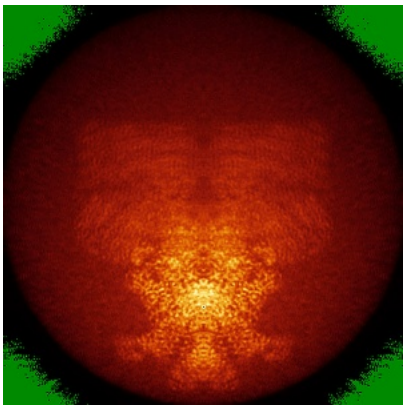


Z Index: 155

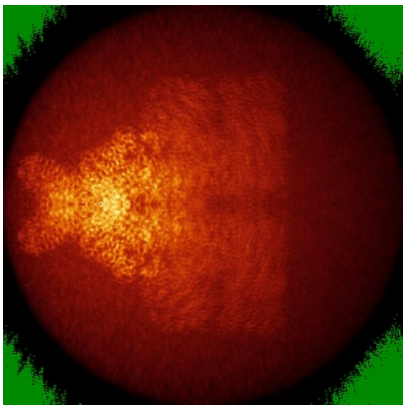
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

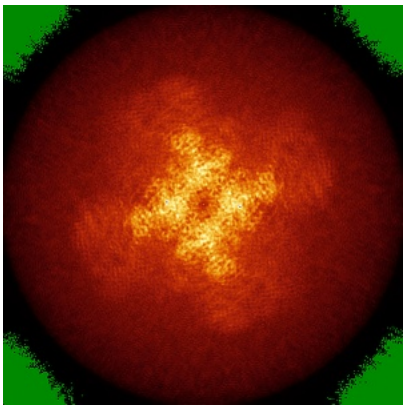
6.4.1 Primary map



X

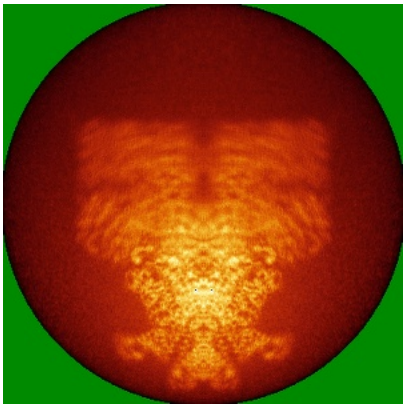


Y

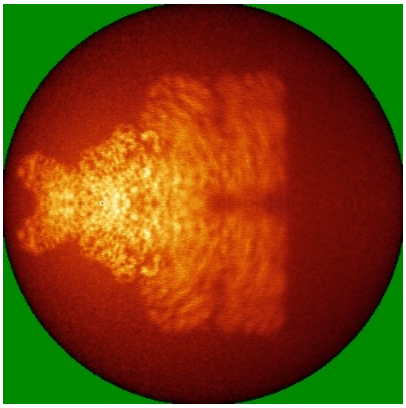


Z

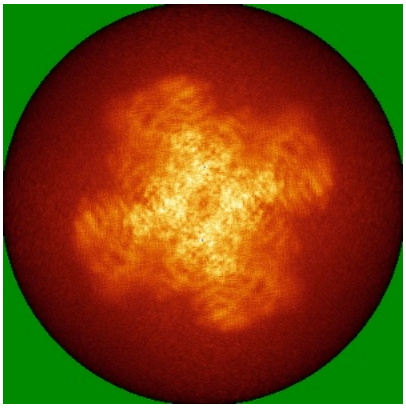
6.4.2 Raw map



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

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.008. 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

X Y Z

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.

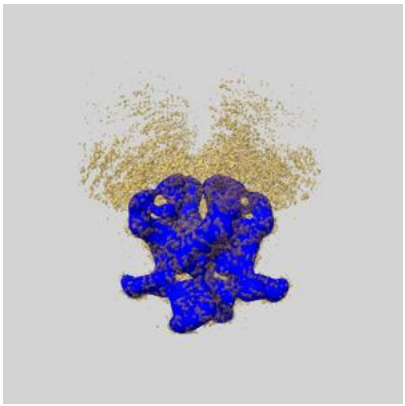
6.6 Mask visualisation

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

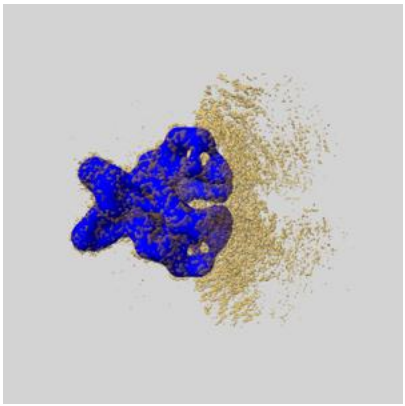
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

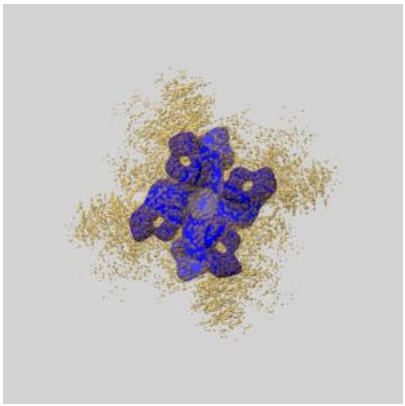
6.6.1 emd_27421_msk_1.map



X



Y

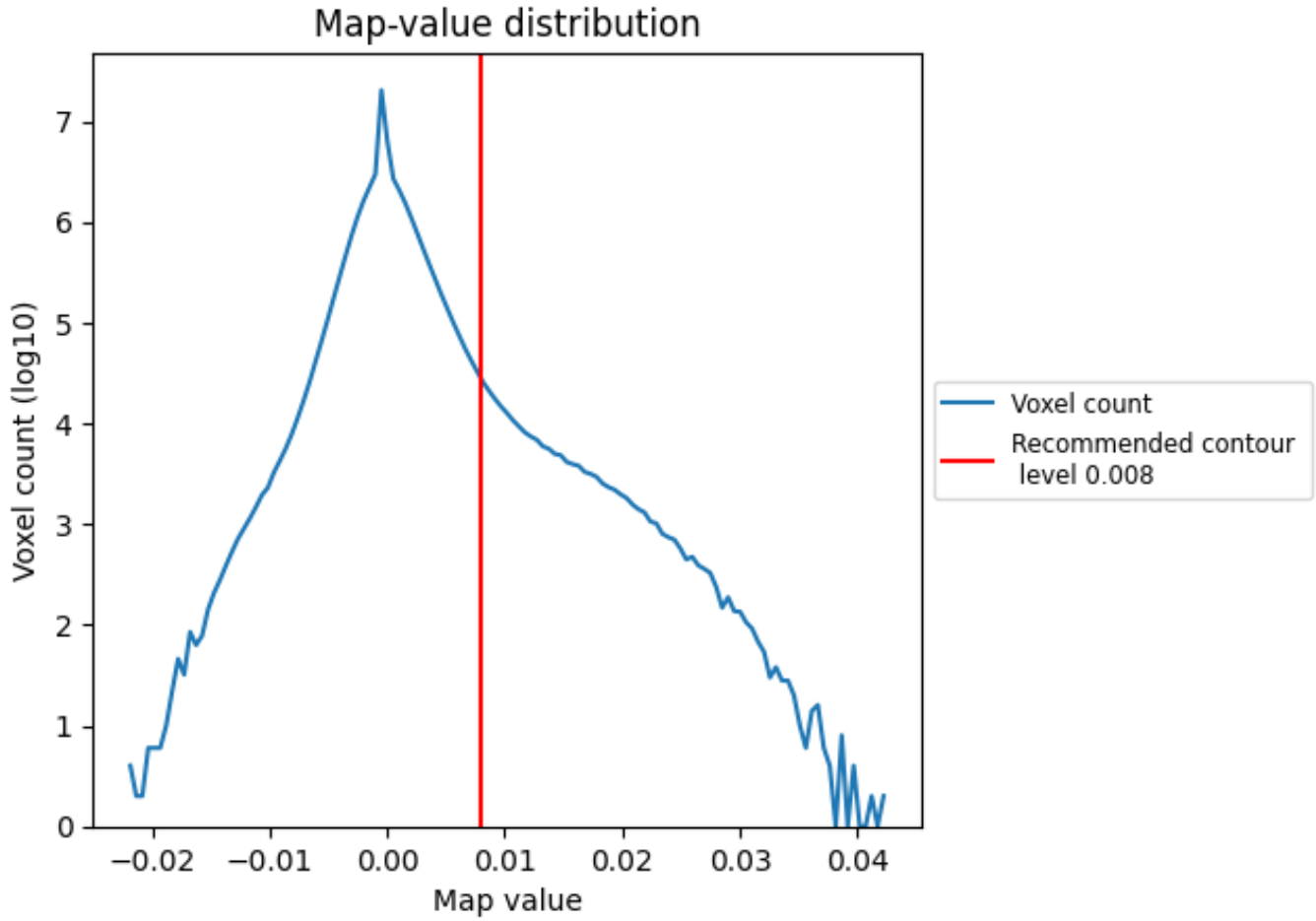


Z

7 Map analysis

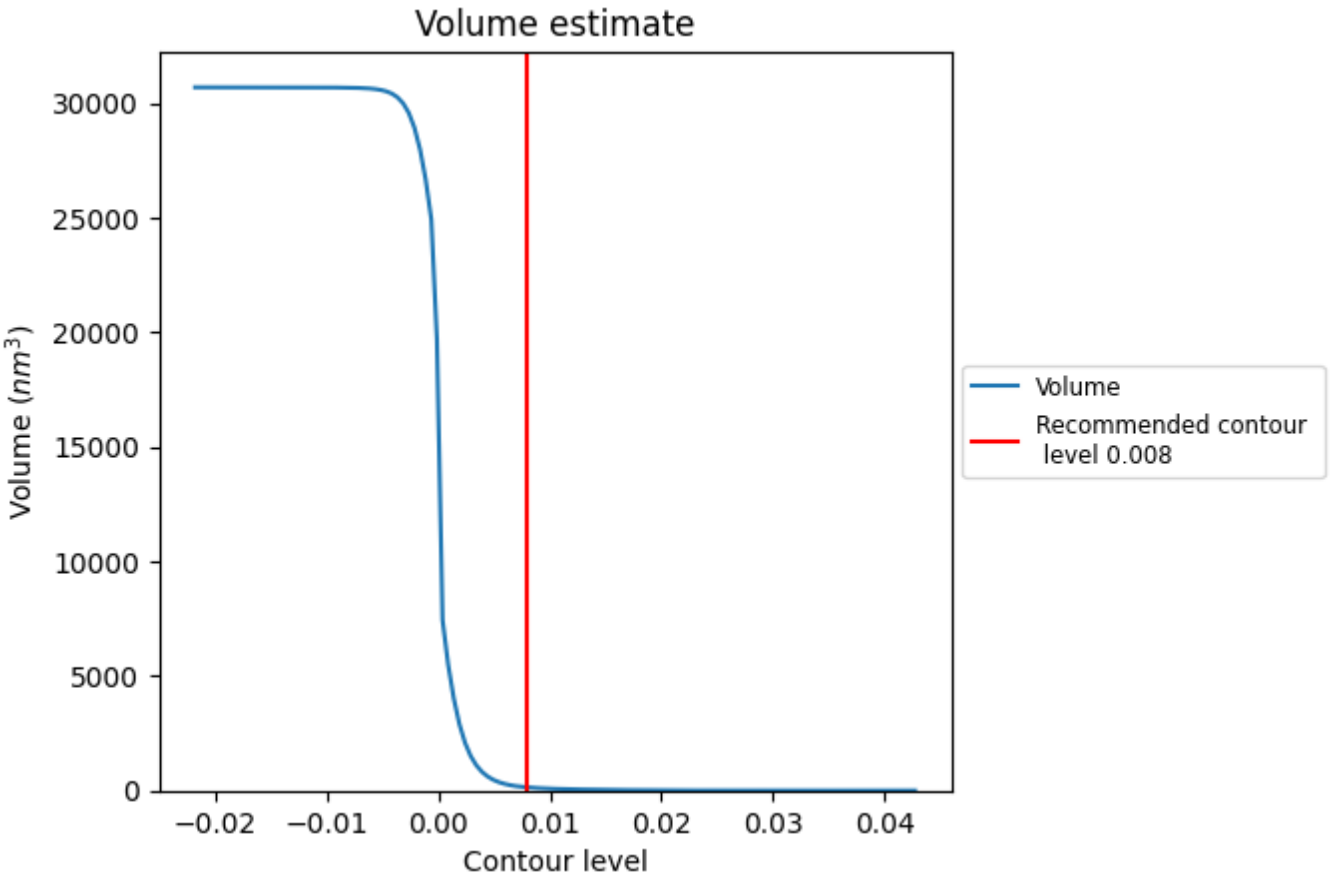
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

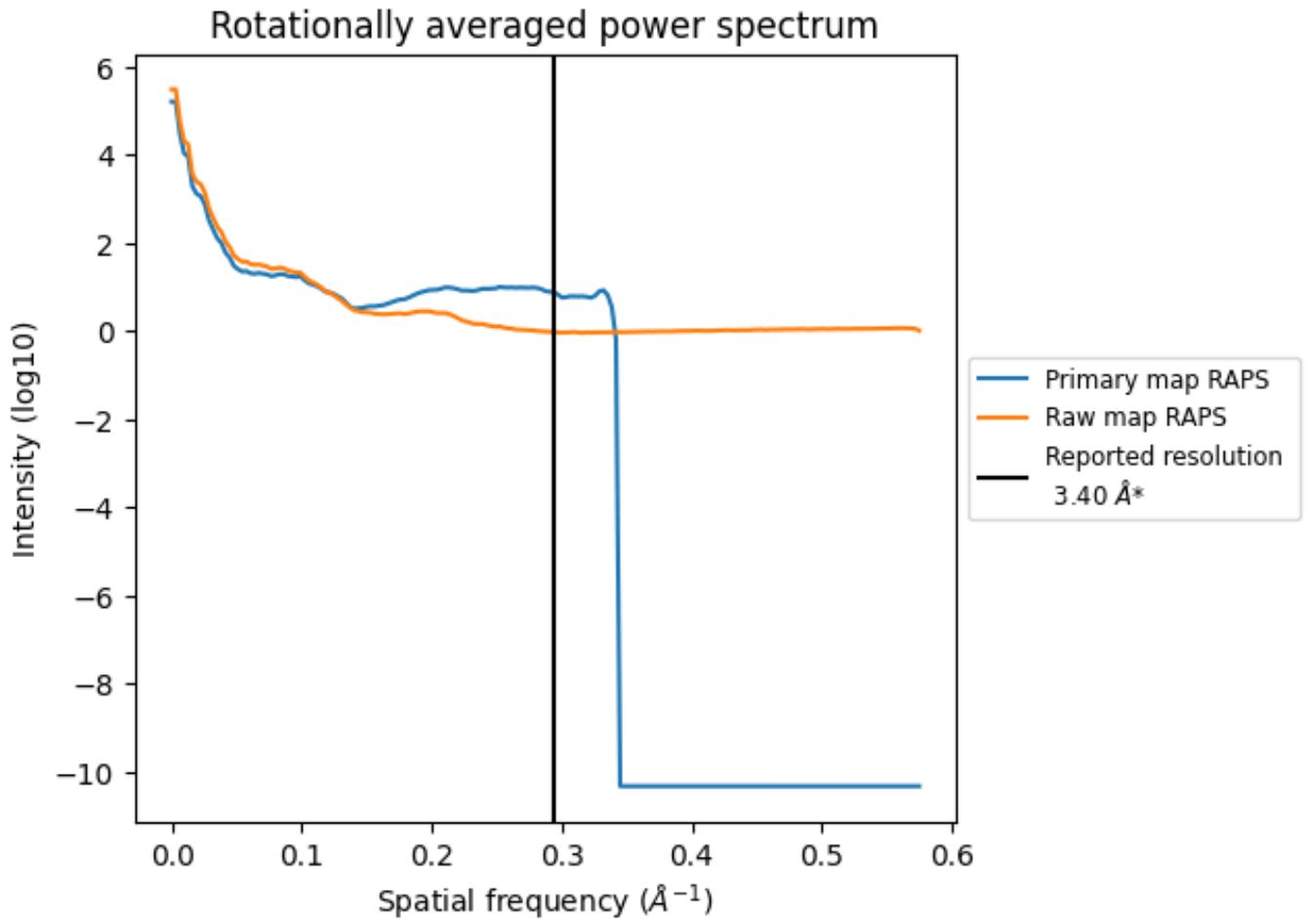
7.2 Volume estimate



The volume at the recommended contour level is 138 nm^3; this corresponds to an approximate mass of 125 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 (i)

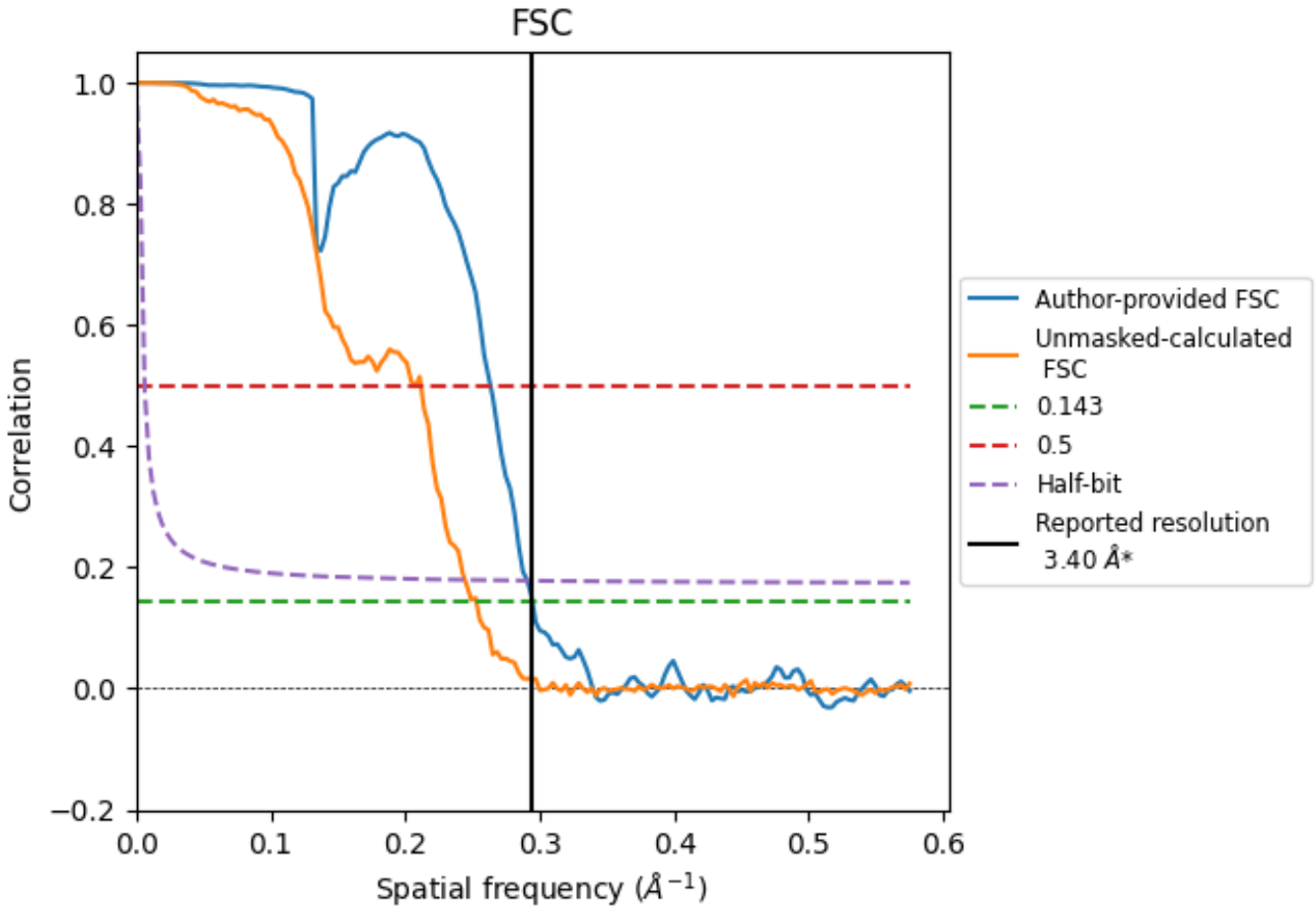


*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.294 $Å^{-1}$

8.2 Resolution estimates (i)

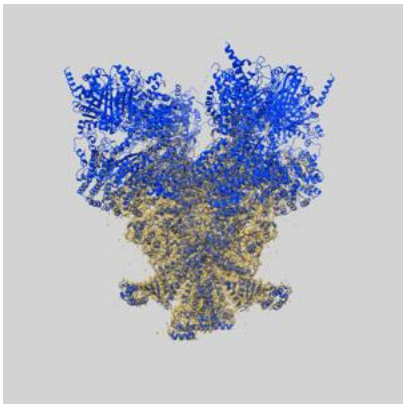
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	3.39	3.80	3.44
Unmasked-calculated*	3.95	4.83	4.09

*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 3.95 differs from the reported value 3.4 by more than 10 %

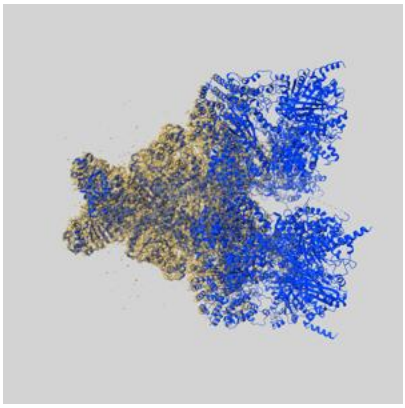
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-27421 and PDB model 8DGC. Per-residue inclusion information can be found in section 3 on page 6.

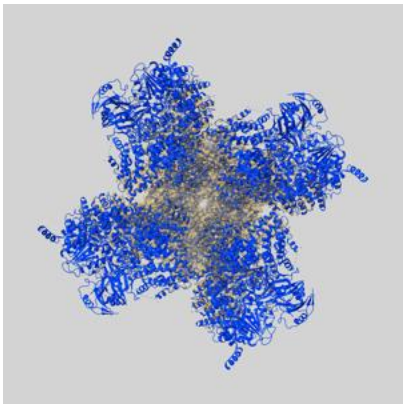
9.1 Map-model overlay



X



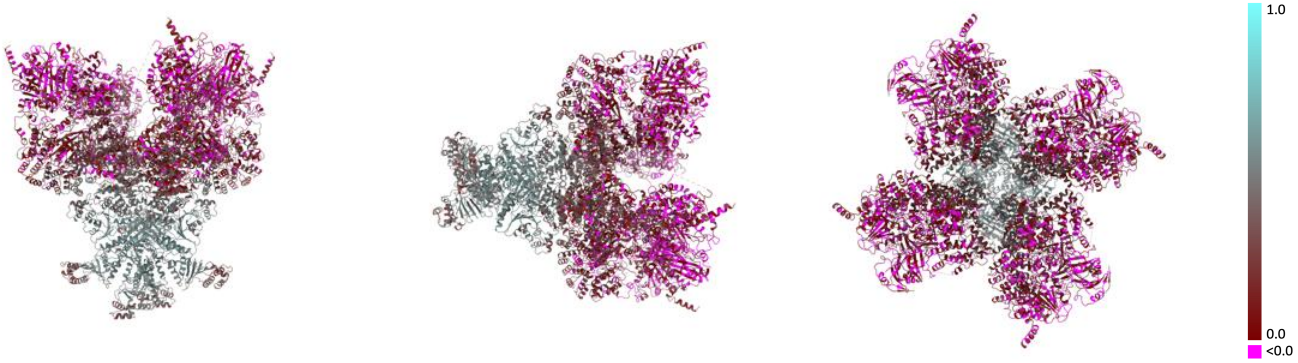
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.008 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.

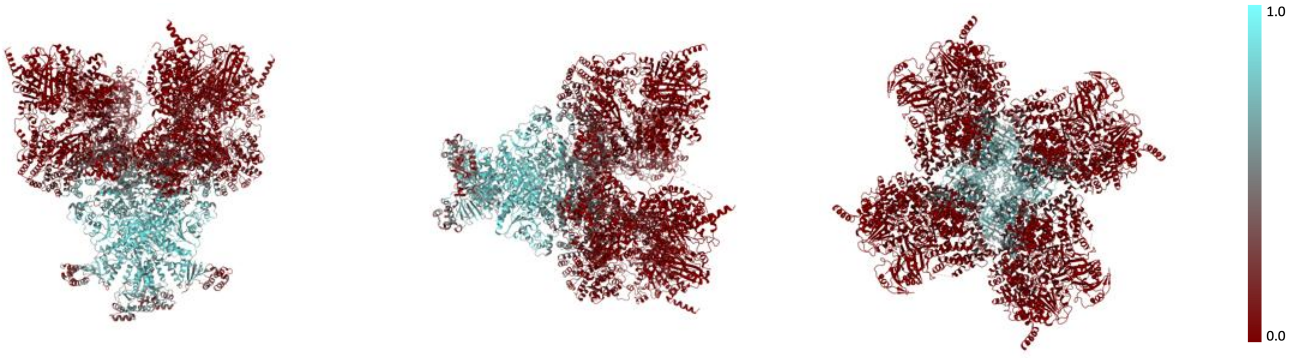
9.2 Q-score mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according 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.

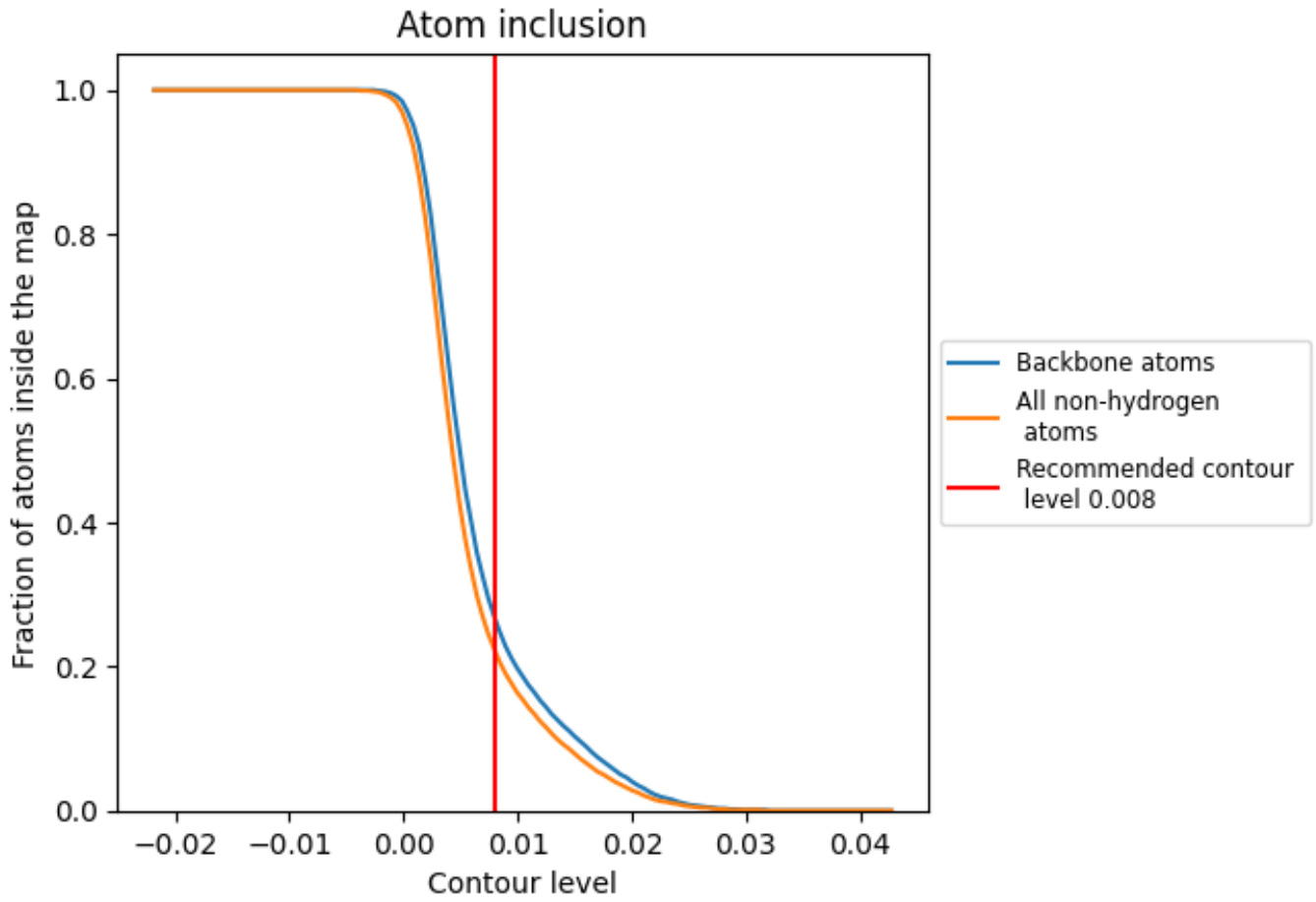
9.3 Atom inclusion mapped to coordinate model



X Y Z

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 (0.008).

9.4 Atom inclusion (i)



At the recommended contour level, 27% of all backbone atoms, 22% 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 (0.008) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.2220	0.2180
A	0.2790	0.2510
B	0.2790	0.2580
C	0.2800	0.2470
D	0.2790	0.2600
E	0.0070	0.0760
F	0.0090	0.0900
G	0.0070	0.0720
H	0.0090	0.0900