



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 14, 2024 – 09:36 AM EST

PDB ID : 3LVH  
Title : Crystal structure of a clathrin heavy chain and clathrin light chain complex  
Authors : Wilbur, J.D.; Hwang, P.K.; Ybe, J.A.; Lane, M.; Sellers, B.D.; Jacobson, M.P.;  
Fletterick, R.J.; Brodsky, F.M.  
Deposited on : 2010-02-20  
Resolution : 9.00 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

---

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

MolProbity : 4.02b-467  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

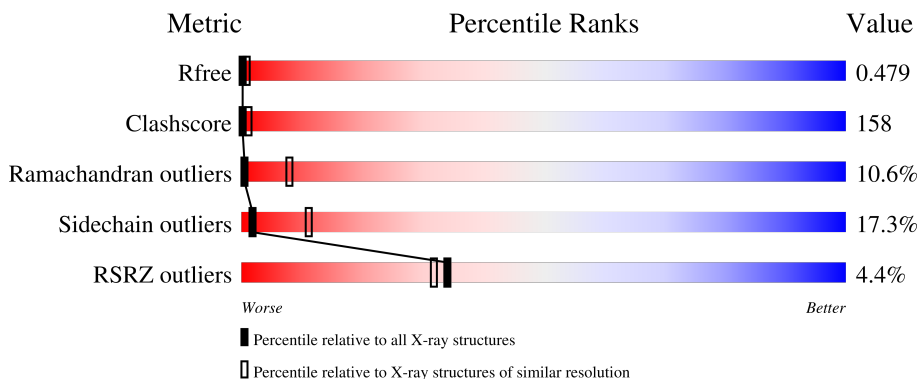
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 9.00 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



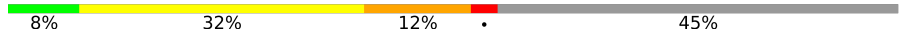
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1005 (11.50-3.90)
Clashscore	141614	1070 (11.50-3.90)
Ramachandran outliers	138981	1003 (11.50-3.90)
Sidechain outliers	138945	1003 (11.50-3.86)
RSRZ outliers	127900	1004 (9.50-3.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	624	
1	B	624	
1	C	624	
2	D	205	
2	E	205	

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Length	Quality of chain
2	F	205	 8% 32% 12% . 45%

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 16020 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Clathrin heavy chain 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	554	4550	2901	768	856	25	0	0	0
1	B	554	4550	2901	768	856	25	0	0	0
1	C	554	4550	2901	768	856	25	0	0	0

There are 66 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1052	MET	-	expression tag	UNP P49951
A	1053	GLY	-	expression tag	UNP P49951
A	1054	SER	-	expression tag	UNP P49951
A	1055	SER	-	expression tag	UNP P49951
A	1056	HIS	-	expression tag	UNP P49951
A	1057	HIS	-	expression tag	UNP P49951
A	1058	HIS	-	expression tag	UNP P49951
A	1059	HIS	-	expression tag	UNP P49951
A	1060	HIS	-	expression tag	UNP P49951
A	1061	HIS	-	expression tag	UNP P49951
A	1062	SER	-	expression tag	UNP P49951
A	1063	SER	-	expression tag	UNP P49951
A	1064	GLY	-	expression tag	UNP P49951
A	1065	LEU	-	expression tag	UNP P49951
A	1066	VAL	-	expression tag	UNP P49951
A	1067	PRO	-	expression tag	UNP P49951
A	1068	ARG	-	expression tag	UNP P49951
A	1069	GLY	-	expression tag	UNP P49951
A	1070	SER	-	expression tag	UNP P49951
A	1071	HIS	-	expression tag	UNP P49951
A	1072	MET	-	expression tag	UNP P49951
A	1073	LEU	-	expression tag	UNP P49951
B	1052	MET	-	expression tag	UNP P49951

*Continued on next page...*

*Continued from previous page...*

Chain	Residue	Modelled	Actual	Comment	Reference
B	1053	GLY	-	expression tag	UNP P49951
B	1054	SER	-	expression tag	UNP P49951
B	1055	SER	-	expression tag	UNP P49951
B	1056	HIS	-	expression tag	UNP P49951
B	1057	HIS	-	expression tag	UNP P49951
B	1058	HIS	-	expression tag	UNP P49951
B	1059	HIS	-	expression tag	UNP P49951
B	1060	HIS	-	expression tag	UNP P49951
B	1061	HIS	-	expression tag	UNP P49951
B	1062	SER	-	expression tag	UNP P49951
B	1063	SER	-	expression tag	UNP P49951
B	1064	GLY	-	expression tag	UNP P49951
B	1065	LEU	-	expression tag	UNP P49951
B	1066	VAL	-	expression tag	UNP P49951
B	1067	PRO	-	expression tag	UNP P49951
B	1068	ARG	-	expression tag	UNP P49951
B	1069	GLY	-	expression tag	UNP P49951
B	1070	SER	-	expression tag	UNP P49951
B	1071	HIS	-	expression tag	UNP P49951
B	1072	MET	-	expression tag	UNP P49951
B	1073	LEU	-	expression tag	UNP P49951
C	1052	MET	-	expression tag	UNP P49951
C	1053	GLY	-	expression tag	UNP P49951
C	1054	SER	-	expression tag	UNP P49951
C	1055	SER	-	expression tag	UNP P49951
C	1056	HIS	-	expression tag	UNP P49951
C	1057	HIS	-	expression tag	UNP P49951
C	1058	HIS	-	expression tag	UNP P49951
C	1059	HIS	-	expression tag	UNP P49951
C	1060	HIS	-	expression tag	UNP P49951
C	1061	HIS	-	expression tag	UNP P49951
C	1062	SER	-	expression tag	UNP P49951
C	1063	SER	-	expression tag	UNP P49951
C	1064	GLY	-	expression tag	UNP P49951
C	1065	LEU	-	expression tag	UNP P49951
C	1066	VAL	-	expression tag	UNP P49951
C	1067	PRO	-	expression tag	UNP P49951
C	1068	ARG	-	expression tag	UNP P49951
C	1069	GLY	-	expression tag	UNP P49951
C	1070	SER	-	expression tag	UNP P49951
C	1071	HIS	-	expression tag	UNP P49951
C	1072	MET	-	expression tag	UNP P49951

*Continued on next page...*

*Continued from previous page...*

Chain	Residue	Modelled	Actual	Comment	Reference
C	1073	LEU	-	expression tag	UNP P49951

- Molecule 2 is a protein called Clathrin light chain B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	113	Total	C	N	O	S	0	0	0
			811	489	160	161	1			
2	E	102	Total	C	N	O	S	0	0	0
			753	455	149	148	1			
2	F	112	Total	C	N	O	S	0	0	0
			806	486	159	160	1			



PRO
GLN
PRO
GLY
SER
PHE
GLY
TYR
SER
MET

Molecule 1: Clathrin heavy chain 1

Chain B: 12% 52% 20% 5% 11%

MET	GLY	PRO	SER	PHE	GLY	TYR	SER	MET	K1113	K1114	Q1115	L1116	Q1117	V1121	K1122	E1123	A1124	I1125	S1126	S1127	Y1128	I1129	K1130	A1131	D1132	GLY	S1133	P1134	S1135	S1136	Y1137	M1138	E1139	V1140	V1141	Q1142	A1143	A1144	A1081	V1082	Q1083	V1084	L1085	I1086	E1087	H1088	I1089	G1090	M1091	L1092	D1093	R1094	A1095	Y1096	E1097	F1098	R1101	C1102	M1103	E1104	P1105	A1106	Y1107	V1108	S1109	Q1110	L1111	I1112
K1113	K1114	Q1115	L1116	Q1117	V1121	K1122	E1123	A1124	I1125	S1126	S1127	Y1128	I1129	K1130	A1131	D1132	GLY	S1133	P1134	S1135	S1136	Y1137	M1138	E1139	V1140	V1141	Q1142	A1143	A1144	A1081	V1082	Q1083	V1084	L1085	I1086	E1087	H1088	I1089	G1090	M1091	L1092	D1093	R1094	A1095	Y1096	E1097	F1098	R1101	C1102	M1103	E1104	P1105	A1106	Y1107	V1108	S1109	Q1110	L1111	I1112									
F1175	A1176	L1177	A1178	K1179	M1181	L1182	L1183	A1184	E1185	E1186	E1188	F1189	I1190	M1191	E1192	P1193	M1194	N1195	M1196	A1197	H1197	I1198	Q1199	Q1200	V1201	F1204	C1205	A1206	D1207	E1208	M1209	M1210	Y1211	D1212	A1213	A1214	K1215	L1216	L1217	Y1218	N1219	N1220	V1221	N1223	F1224	G1225	R1226	L1227	A1228	S1229	T1230	L1231	V1232	H1233	L1234	G1235												
E1236	Y1237	Q1238	A1239	V1240	D1242	G1243	A1244	R1245	T1250	E1251	T1252	M1253	K1254	M1255	V1256	C1257	F1258	A1259	C1260	V1261	D1262	Q1263	K1264	E1265	F1266	R1267	L1268	A1269	D1270	M1271	C1272	G1273	L1274	H1275	I1276	V1277	D1278	H1279	A1280	D1281	E1282	L1283	E1284	L1285	L1286	I1287	M1288	Y1289	Q1291	D1292	R1293	G1294	Y1295	F1296	E1297	E1298												
L1299	L1300	L1301	M1302	L1303	E1304	L1307	R1310	R1311	A1312	H1313	M1314	G1315	M1316	F1317	T1318	E1319	L1320	L1323	Y1324	S1325	K1326	F1327	K1328	F1329	Q1330	L1331	M1332	R1333	E1334	H1335	L1336	E1337	L1338	F1339	M1340	S1341	R1342	V1343	L1344	L1345	R1346	K1347	L1348	L1349	R1350	A1351	A1352	E1353	Q1354	A1355	H1356	L1357	M1358	A1359	E1360	L1361												
V1362	F1363	L1364	Y1365	D1366	K1367	Y1368	E1369	I370	D1371	D1372	M1373	A1374	L1375	L1376	T1377	M1378	M1379	M1380	H1381	R1382	L1383	D1384	A1385	M1386	K1387	E1388	G1389	Q1390	L1391	A1392	D1393	L1394	L1395	T1396	K1397	V1398	A1399	M1400	E1401	E1402	L1403	Y1404	Y1405	R1406	A1407	I1408	Q1409	F1410	Y1411	L1412	E1413	F1414	E1415	F1416	D1417	L1418	L1419	M1420	D1421									
L1422	L1423	M1424	V1425	L1426	S1427	P1428	R1429	L1430	D1431	H1432	T1433	R1434	A1435	V1436	M1437	Y1438	F1439	S1440	K1441	V1442	K1443	Q1444	L1445	P1446	L1447	V1448	K1449	P1450	A1451	L1452	R1453	S1454	V1455	Q1456	M1457	H1458	N1459	R1460	K1461	S1462	V1463	N1464	E1465	S1466	L1467	N1468	M1469	L1470	F1471	L1472	T1473	E1474	E1475	A1476	D1477	Q1478	A1479	L1480	R1481									
T1482	S1483	L1484	D1485	Y1486	Y1487	D1488	M1489	F1490	D1491	M1492	L1493	S1494	L1495	A1496	Q1497	R1498	L1499	H1500	L1501	L1504	E1505	E1506	F1507	R1508	R1509	L1510	A1511	A1512	Y1513	L1514	F1515	K1516	G1517	M1518	M1519	R1520	M1521	K1522	Q1523	S1524	V1525	E1526	L1527	C1528	K1529	D1530	D1531	S1532	L1533	Y1534	K1535	E1536	M1537	K1538	L1539	F1540	E1541	D1546										
T1547	E1548	L1549	E1552	L1553	L1554	Q1555	F1556	F1557	E1561	K1562	R1563	E1564	C1565	F1566	G1567	A1568	C1569	L1570	F1571	T1572	C1573	Y1574	D1575	L1576	L1577	R1578	P1579	D1580	Y1581	E1582	L1583	E1584	G1517	T1585	A1586	M1587	R1588	H1589	M1590	I1591	M1592	D1593	F1594	A1595	M1596	P1597	Y1598	F1599	I1600	Q1601	V1602	M1603	K1604	A1605	M1606	L1607	T1608	L1609										
V1610	D1611	K1612	L1613	D1614	A1615	S1616	E1617	S1618	R1620	K1621	E1622	E1623	E1624	Q1625	R1626	T1629	Q1630	PRO	ILE	VAL	TYR	GLY	GLN	PRO	GLN	LEU	MET	LEU	LEU	THR	ALA	GLY	PRO	SER	VAL	ALA	VAL	PRO	PRO	GLN	ALA	PRO	GLY	TYR	TYR	ALA	PRO	ALA	TYR	GLY	GLN	PRO	PRO	GLY	GLY													

PHE
GLY
TYR
MET

Molecule 1: Clathrin heavy chain 1

Chain C: 13% 52% 20% 5% 11%

MET	GLY	PRO	SER	PHE	GLY	TYR	SER	MET	K1101	C1102	M1103	E1104	P1105	A1106	Y1107	V1108	S1109	Q1110	L1111	I1112
MET	GLY	PRO	SER	PHE	GLY	TYR	SER	MET	K1101	C1102	M1103	E1104	P1105	A1106	Y1107	V1108	S1109	Q1110	L1111	I1112



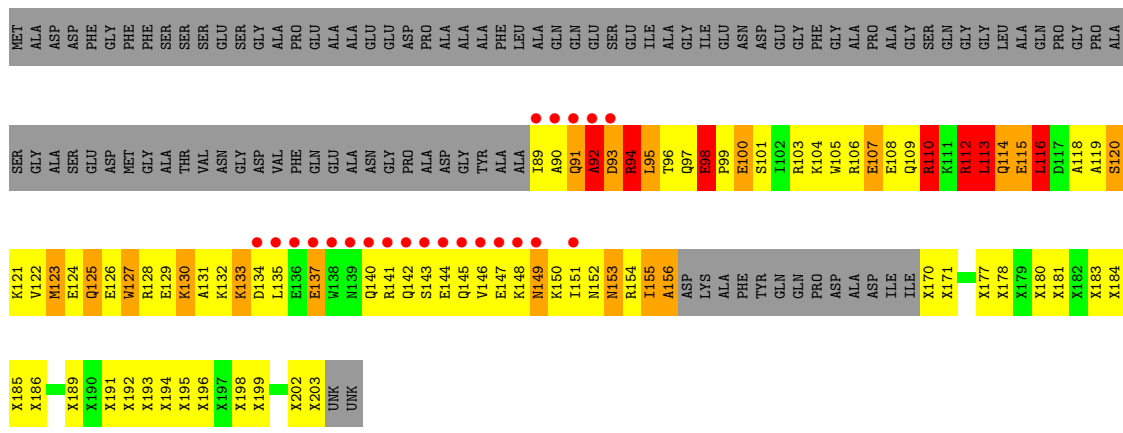
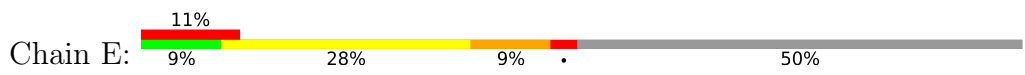
K1113	F1175	Y1237	T1301	F1363	L1423	S1483	E1548	D1611	PHE	SER	K121	X184
A1114	A1176	Q1238	M1302	L1364	M1424	I1484	L1549	K1612	GLY	GLY	V122	X185
Q1115	L1177	A1239	L1303	Y1365	V1426	D1486	E1552	D1613	TYR	ASP	M123	X186
L1116	A1178	A1240	E1304	D1366	L1426	A1486	L1553	D1614	SER	ASP	E124	X187
Q1117	K1179	V1241	A1305	K1367	S1427	Y1487	L1554	A1615	GLY	PHE	Q125	X188
	T1180	D1242	A1306	Y1368	P1428	D1488	L1555	S1616	GLY	ASP	E126	X189
	M1181	G1243	L1307	E1369	R1429	N1489	Q1555	E1617	PHE	MET	M127	X190
	R1182	A1244	E1310	E1370	L1430	F1490	W1556	S1618	PHE	GLY	R128	X191
	L1183	R1245	E1311	Y1371	D1431	D1491	F1557	L1619	ALA	ALA	E129	X192
	A1184	E1184	R1311	D1372	H1431	N1492	N1492	K1620	THR	THR	K130	X193
	E1185	E1185	M1312	M1373	T1433	I1493	E1561	K1621	VAL	VAL	A131	X196
	L1186	L1186	R1313	R1374	R1434	S1494	K1562	E1622	ASN	ASN	K132	X197
	S1127	E1187	H1314	A1374	A1435	I1495	L1563	E1623	GLY	GLY	K133	X201
	Y1128	E1188	G1315	I1376	V1436	A1496	E1564	E1624	SER	SER	D134	X202
	I1129	F1189	M1316	T1377	M1437	Q1497	C1565	Q1625	ALA	ALA	L136	X203
	I1190	I1190	F1317	M1378	F1438	R1498	F1566	E1626	PRO	PHE	E137	X204
	M1191	G1192	E1255	M1379	F1439	M1379	G1567	T1627	GLU	GLU	E137	X204
	P1193	G1193	E1256	E1319	S1440	L1499	C1567	T1628	ALA	ALA	E137	X204
	P1194	P1194	L1320	M1380	H1381	H1502	C1569	T1629	ALA	ALA	R141	X205
	M1195	M1195	L1320	H1381	V1442	E1503	L1570	Q1630	GLU	GLU	Q142	X205
	A1196	C1260	L1323	P1382	V1442	L1503	L1571	PRO	GLY	GLY	S143	X205
	H1197	V1261	Y1324	T1383	Q1444	E1505	F1571	ILE	ALA	ALA	E144	X205
	M1198	D1262	S1325	D1384	Q1444	I1505	T1572	ILE	GLN	LEU	Q145	X205
	Q1199	K1263	R1326	A1385	L1445	E1506	C1573	VAL	PRO	PRO	A146	X205
	Q1200	G1264	K1327	W1386	P1446	F1507	Y1574	TYR	ALA	ALA	E147	X205
	V1201	E1285	K1328	E1388	V1448	R1508	D1575	GLY	ALA	ALA	K148	X205
	R1204	F1266	P1329	E1389	V1448	R1509	L1576	GLN	ALA	ALA	M149	X205
	C1205	R1267	Q1330	G1389	L1449	I1510	L1577	PRO	PHE	ALA	K150	X205
	Y1206	L1268	K1331	Q1390	P1450	A1511	R1578	GLN	ALA	ALA	I151	X205
	D1207	A1269	M1332	K1391	Y1451	E1512	P1579	LEU	ALA	ALA	M152	X205
	E1208	Q1270	R1333	F1392	L1452	M1513	D1580	MET	ALA	ALA	M153	X205
	M1210	M1271	E1334	D1393	R1453	L1514	V1581	LEU	ALA	ALA	M153	X205
	Y1211	C1272	H1336	I1395	S1454	F1515	Y1582	THR	ALA	ALA	A154	X205
	H1212	I1276	E1337	I1396	V1455	G1517	L1583	ALA	ALA	ALA	A155	X205
	A1213	M1277	L1338	T1397	Q1456	H1518	E1584	PRO	GLY	GLY	A156	X205
	A1214	V1278	F1339	A1399	M1457	R1519	T1585	GLY	ALA	ALA	T96	X205
	K1215	H1279	M1340	N1400	M1459	R1520	W1587	SER	ALA	ALA	Q97	X205
	L1216	H1279	S1342	V1401	H1461	K1521	R1588	VAL	ALA	ALA	E98	X205
	L1217	E1285	E1342	E1402	S1462	K1522	H1589	VAL	ALA	ALA	P99	X205
	Y1218	L1283	M1344	L1403	V1463	Q1523	M1590	PRO	ASN	ASN	E100	X205
	V1221	E1284	R1345	Y1405	M1464	S1524	I1591	PRO	ASP	ASP	S101	X205
	M1222	E1284	R1345	E1406	E1465	E1526	M1592	GLN	GLU	GLU	I102	X205
	F1224	E1285	M1288	R1406	S1466	L1527	D1593	ALA	PHE	PHE	R103	X205
	G1225	L1287	N1288	A1407	L1467	C1528	F1594	PRO	GLY	GLY	K104	X205
	G1226	E1288	M1288	I1408	L1467	K1529	A1596	PHE	GLY	GLY	W105	X205
	R1227	E1288	Y1289	I1408	M1469	R1529	F1597	GLY	ALA	ALA	R106	X205
	A1228	R1293	Y1290	Q1354	F1414	K1530	P1597	TYR	PRO	PRO	E107	X205
	S1167	S1229	R1293	L1354	F1414	D1536	M1596	TYR	ALA	ALA	E108	X205
	Y1168	T1230	G1294	A1355	D1475	E1536	F1597	TYR	ALA	ALA	Q109	X205
	Y1169	T1230	G1294	H1356	D1476	A1537	Y1599	TYR	GLY	GLY	R110	X205
	E1170	V1232	E1295	L1357	F1471	M1538	L1600	THR	GLY	GLY	K111	X205
	T1171	V1232	E1296	X1558	I1477	Q1539	Q1601	ALA	GLN	GLN	R112	X205
	E1172	H1233	E1297	A1359	A1479	Y1540	V1602	PRO	ALA	ALA	L113	X205
	L1173	G1235	E1298	A1360	L1419	Y1540	M1603	PRO	GLY	GLY	L114	X205
	E1236	G1235	E1299	L1361	L1420	D1546	K1604	PRO	GLY	GLY	L115	X205
				L1362	D1421	T1547	E1605	PRO	GLY	GLY	L116	X205
					L1482		L1607	PRO	GLN	GLN	D117	X205
							T1608	GLN	PRO	PRO	A118	X205
							K1609	PRO	PRO	PRO	A119	X205
							V1610	GLY	ALA	ALA	S120	X205

• Molecule 2: Clathrin light chain B

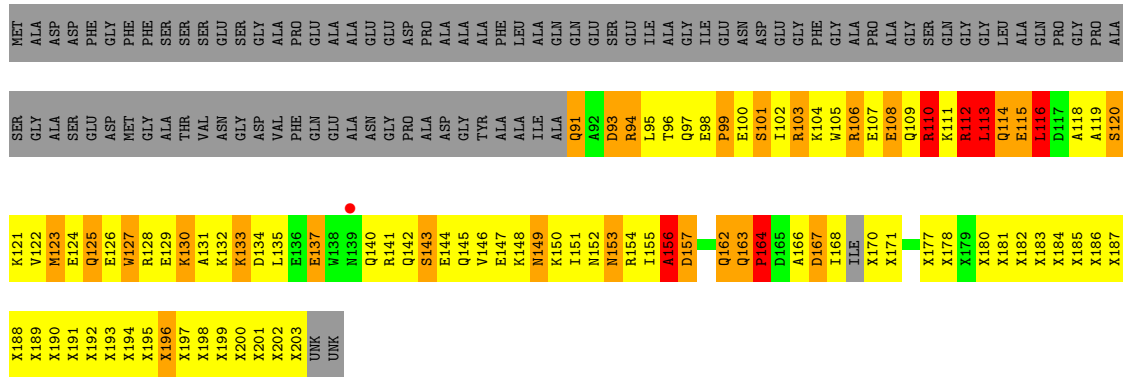
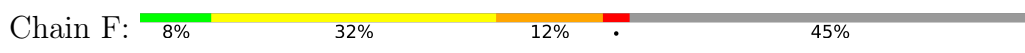


MET	SER	X171	X184
ALA	GLY	X172	X185
ASP	TYR	M123	X186
PHE	SER	E124	X187
GLY	ASP	A124	X188
PHE	GLY	Q125	X189
PHE	GLY	E126	X190
PHE	MET	M127	X191
PHE	GLY	A128	X192
SER	ALA	E129	X193
THR	THR	K130	X196
VAL	VAL	A131	X197
ASN	ASN	K132	X201
GLY	GLY	R133	X202
SER	SER	E133	X203
ASP	ASP	D134	X204
VAL	VAL	L136	X205
PRO	PHE	E137	X205
GLU	GLU	E137	X205
ALA	ALA	E137	X205
ALA	ALA	R141	X205
GLU	ASN	Q142	X205
GLY	GLY	S143	X205
PRO	PRO	E144	X205
ASP	ASP	Q145	X205
ALA	ALA	V146	X205
ALA	ALA	E147	X205
ALA	TYR	K148	X205
ALA	ALA	M149	X205
LEU	ALA	K150	X205
ILE	ILE	I151	X205
ALA	ALA	M152	X205
ALA	ALA	M153	X205
Q91	Q91	A154	X205
A92	A92	I155	X205
D93	D93	A156	X205
R94	R94	L157	X205
T96	T96	K158	X205
Q97	Q97	A159	X205
E98	E98	F160	X205
P99	P99	Y161	X205
S101	S101	Q162	X205
I102	I102	P164	X205
R103	R103	D165	X205
K104	K104	A166	X205
W105	W105	I169	X205
R106	R106	UNK	X205
E107	E107	UNK	X205
E108	E108	UNK	X205
Q109	Q109	UNK	X205
R110	R110	X172	X205
K111	K111	X173	X205
R112	R112	X174	X205
L113	L113	X175	X205
L114	L114	X176	X205
L115	L115	X177	X205
L116	L116	X178	X205
L117	L117	X179	X205
D117	D117	X180	X205
A118	A118	X181	X205
A119	A119	X182	X205
S120	S120	X183	X205

• Molecule 2: Clathrin light chain B



• Molecule 2: Clathrin light chain B



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 42 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	229.71Å 229.71Å 512.27Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	500.00 – 9.00 86.66 – 9.00	Depositor EDS
% Data completeness (in resolution range)	78.7 (500.00-9.00) 78.9 (86.66-9.00)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.18	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.66 (at 8.41Å)	Xtrriage
Refinement program	REFMAC 5.2.0019	Depositor
R, $R_{free}$	0.473 , 0.487 0.483 , 0.479	Depositor DCC
$R_{free}$ test set	430 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	604.9	Xtrriage
Anisotropy	0.404	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.09 , -10.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.38$ , $\langle L^2 \rangle = 0.21$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.69	EDS
Total number of atoms	16020	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	103.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 15.04% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality i

### 5.1 Standard geometry i

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z  > 5$	RMSZ	# $ Z  > 5$
1	A	0.48	3/4645 (0.1%)	1.41	104/6276 (1.7%)
1	B	0.36	2/4645 (0.0%)	1.38	101/6276 (1.6%)
1	C	0.36	2/4645 (0.0%)	1.38	101/6276 (1.6%)
2	D	0.74	0/647	1.15	8/866 (0.9%)
2	E	0.69	0/589	1.24	5/785 (0.6%)
2	F	0.77	0/642	1.20	8/859 (0.9%)
All	All	0.46	7/15813 (0.0%)	1.37	327/21338 (1.5%)

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	7
1	B	0	6
1	C	0	6
2	F	0	1
All	All	0	20

The worst 5 of 7 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1196	ALA	C-N	-21.36	0.84	1.34
1	C	1136	SER	C-N	-13.41	1.03	1.34
1	B	1136	SER	C-N	-13.39	1.03	1.34
1	A	1136	SER	C-N	-13.36	1.03	1.34
1	B	1592	MET	C-N	-10.33	1.10	1.34

The worst 5 of 327 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	C	1136	SER	C-N-CA	22.64	178.31	121.70

*Continued on next page...*

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	1136	SER	C-N-CA	22.63	178.27	121.70
1	A	1136	SER	C-N-CA	22.58	178.15	121.70
1	A	1196	ALA	CB-CA-C	21.84	142.86	110.10
1	C	1196	ALA	CB-CA-C	21.79	142.78	110.10

There are no chirality outliers.

5 of 20 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1136	SER	Mainchain
1	A	1196	ALA	Peptide,Mainchain
1	A	1223	ASN	Peptide
1	A	1326	LYS	Peptide
1	A	1429	ARG	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	4550	0	4457	1578	23
1	B	4550	0	4456	1511	40
1	C	4550	0	4461	1420	30
2	D	811	0	641	286	0
2	E	753	0	615	220	0
2	F	806	0	640	345	35
All	All	16020	0	15270	4959	70

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 158.

The worst 5 of 4959 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:A:1253:TRP:CZ3	1:A:1276:ILE:HG22	1.19	1.67
1:B:1253:TRP:CZ3	1:B:1276:ILE:HG22	1.19	1.67

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:1253:TRP:CZ3	1:C:1276:ILE:HG22	1.19	1.67
2:E:203:UNK:C	2:E:203:UNK:CA	1.76	1.62
1:B:1108:TRP:CH2	1:B:1129:ILE:HB	1.34	1.61

The worst 5 of 70 symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1198:ILE:N	2:F:103:ARG:NH1[5_545]	0.57	1.63
1:B:1199:GLN:N	2:F:103:ARG:NH2[5_545]	0.64	1.56
1:A:1097:GLU:OE1	1:C:1094:ARG:CG[8_465]	0.90	1.30
1:A:1097:GLU:CD	1:C:1094:ARG:CG[8_465]	0.92	1.28
1:B:1198:ILE:CD1	2:F:103:ARG:CB[5_545]	0.98	1.22

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	552/624 (88%)	332 (60%)	164 (30%)	56 (10%)	0	9
1	B	552/624 (88%)	332 (60%)	166 (30%)	54 (10%)	0	10
1	C	552/624 (88%)	332 (60%)	166 (30%)	54 (10%)	0	10
2	D	77/205 (38%)	50 (65%)	16 (21%)	11 (14%)	0	4
2	E	66/205 (32%)	35 (53%)	21 (32%)	10 (15%)	0	4
2	F	76/205 (37%)	42 (55%)	20 (26%)	14 (18%)	0	2
All	All	1875/2487 (75%)	1123 (60%)	553 (30%)	199 (11%)	0	8

5 of 199 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1086	ILE

Continued on next page...

*Continued from previous page...*

Mol	Chain	Res	Type
1	A	1122	LYS
1	A	1193	PRO
1	A	1231	LEU
1	A	1251	ARG

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	486/541 (90%)	410 (84%)	76 (16%)	2	14
1	B	486/541 (90%)	409 (84%)	77 (16%)	2	13
1	C	486/541 (90%)	410 (84%)	76 (16%)	2	14
2	D	62/128 (48%)	45 (73%)	17 (27%)	0	3
2	E	61/128 (48%)	42 (69%)	19 (31%)	0	2
2	F	62/128 (48%)	42 (68%)	20 (32%)	0	2
All	All	1643/2007 (82%)	1358 (83%)	285 (17%)	2	11

5 of 285 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	D	106	ARG
2	D	123	MET
2	E	133	LYS
1	B	1198	ILE
1	B	1175	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 71 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	1468	ASN
1	C	1489	ASN
2	D	149	ASN
1	B	1103	ASN

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	B	1091	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides 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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	3
1	B	2
1	C	2

The worst 5 of 7 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	1592:MET	C	1593:ASP	N	1.10
1	B	1592:MET	C	1593:ASP	N	1.10
1	C	1592:MET	C	1593:ASP	N	1.10
1	A	1136:SER	C	1137:TYR	N	1.03

*Continued on next page...*



*Continued from previous page...*

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	B	1136:SER	C	1137:TYR	N	1.03

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled '#RSRZ > 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q < 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	554/624 (88%)	0.03	43 (7%) 13 15	50, 50, 132, 133	0
1	B	554/624 (88%)	-0.28	2 (0%) 92 87	50, 50, 132, 133	0
1	C	554/624 (88%)	-0.39	11 (1%) 65 58	50, 50, 132, 133	0
2	D	79/205 (38%)	0.13	4 (5%) 28 27	298, 298, 298, 298	0
2	E	68/205 (33%)	1.32	22 (32%) 0 2	314, 314, 314, 314	0
2	F	78/205 (38%)	-0.19	1 (1%) 77 68	339, 339, 339, 339	0
All	All	1887/2487 (75%)	-0.14	83 (4%) 34 32	50, 50, 314, 339	0

The worst 5 of 83 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1313	HIS	6.8
1	A	1306	ALA	6.2
1	A	1341	SER	6.2
1	A	1312	ALA	6.1
1	A	1279	HIS	5.8

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

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

### 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 6.4 Ligands [i](#)

There are no ligands in this entry.

## 6.5 Other polymers [i](#)

There are no such residues in this entry.