**Table S1:** The coatomer alpha homologues of apicomplexan parasites with their characteristics.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene Name | Organism | Location(chr.no./position) | Size (protein)aa/KDa  | Exon (no.) | Intron (no.) |
| Pf Alpha | PF3D7\_0606700 | coatomer alpha subunit, putative | *Plasmodium falciparum* | 6/ 282,049-287,017 | 1512/176.95 | 4 | 3 |
| Pk Alpha | PKNH\_1143500 | coatomer alpha subunit, putative | *Plasmodium knowlesi* | 11/ 2022333 – 2027014 | 1365/ 156.85894 | 5 | 4 |
| Pv Alpha | PVX\_113505 | coatomer alpha subunit, putative | *Plasmodium vivax* | 11/1,747,148-1,751,978 | 1398/158.74 | 5 | 4 |
| Py Alpha | PY17X\_0106900 | coatomer alpha subunit, putative | *Plasmodium yoelii yoelii* | 01/264,465- 268,973 | 1380/ 160.18 | 4 | 3 |
| Pc Alpha | PCHAS\_0106000 | coatomer alpha subunit, putative | *Plasmodium chabaudi chabaudi* | 01/ 229953 - 234466 | 1386/ 160.34 | 4 | 3 |
| Pb Alpha | PBANKA\_0105400 | coatomer alpha subunit, putative | *Plasmodium berghei* | 1/203,081-207,619 | 1383/ 160.58 | 4 | 3 |
| Tg Alpha | TGGT1\_240650 | putative coatomer protein complex, subunit alpha | *Toxoplasma gondii* | VI/1,326,973-1,343,296 | 1300/142.95 | 20 | 19 |
| Cp Alpha | cgd8\_860 | coatomer protein complex subunit alpha, putative | *Cryptosporidium parvum* | 8/236,497-240,645 | 1382/ 156.34 | 1 | 0 |
| Bb Alpha | BBOV\_III009950 | WD domain, G-beta repeat domain containing protein | *Babesia bovis* | 3/ 2,133,139-2,136,976 | 1266/143.80 | 2 | 1 |
| Ta Alpha | TA­11660 | coatomer alpha subunit, putative | *Theileria annulata* | 02/1651257-1655437 | 1279/147.71 | 7 | 6 |
| Nc Alpha | NCLIV\_016850 | AT3G15980 protein, related | *Neospora caninum* | VI/1159952-1171542 | 1239/136.42 | 17 | 16 |
| Et Alpha | ETH\_00021415 | coatomer alpha subunit, putative | *Eimeria tenella* | Scaff 21/ 60293-69363 | 1206/132.53 | 20 | 19 |
| Tp Alpha | TP02\_0162 | coatomer alpha subunit, putative | *Theileria parva* | 2/ 317,561- 322,406 | 1358 /155.90 | 1 | 0 |

**Table S2:** The coatomer Beta homologues of apicomplexan parasite.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene Name | Organisms | Location(chr.no./position) | Size(protein)aa/KDa | Exon (no.) | Intron (no.) |
| Pf Beta | PF3D7\_1429800 | coatamer beta subunit, putative | *Plasmodium falciparum* | 14/ 1,170,829-1,175,293 | 1370/159.97 | 3 | 2 |
| Pc Beta | PCHAS\_1015700 | coatamer protein, beta subunit, putative | *Plasmodium chabaudi chabaudi* | 10/ 638694 - 642630 | 1229/ 141.64 | 3 | 2 |
| Pb Beta | PBANKA\_1014900 | coatamer protein, beta subunit, putative | *Plasmodium berghei* | 10/ 654,009 to 657,996 | 1256/ 145.62 | 1 | 0 |
| Pk Beta | PKNH\_1328900 | coatamer protein, beta subunit, putative | *Plasmodium knowlesi* | 13/ 1329415 - 1333671 | 1325/ 149.13557 | 3 | 2 |
| Pv Beta | PVX\_085050 | coatamer protein, beta subunit, putative | *Plasmodium vivax* | 13/ 870,150-74,849 | 1311/ 146.49 | 3 | 2 |
| Py Beta | PY17X\_1016400 | coatamer protein, beta subunit, putative | *Plasmodium yoelii yoelii* | 10/660,686- 64,977 | 1286/ 148.48 | 3 | 2 |
| Tg Beta | TGGT1\_266990 | beta-COP | *Toxoplasma gondii* | IX/ 687,782-98,362 | 1103/121.98 | 19 | 18 |
| Cp Beta | cgd6\_273 | Coatomer\_beta\_subunit | *Cryptosporidium parvum* | 6/ 68,282-70,221 | 645/74.23 | 1 | 0 |
| cgd6\_0263 | Coatomer\_beta | *Cryptosporidium parvum* | 6/ 65,859-68,190 | 651/70.21 | 1 | 0 |
| Bb Beta | BBOV\_IV010410 | coatamer beta subunit, putative | *Babesia bovis* | 1,422,438- ,425,522 | 993/110.89 | 4 | 3 |
| Ta Beta | TA02765 | coatamer, beta subunit, putative | *Theileria**annulata* | 1/ 1179883-185333 |  992/111.48 | 7 | 6 |
| Nc Beta | NCLIV\_039080 | Adaptin N terminal region family protein, related | *Neospora caninum* | IX/ 572225-581678 |  1117/123.26 | 19 | 18 |
| Tp Beta | TP01\_0687 | Coatomer Beta subunt | *Theileria parva* | 1/1,444,309 to 1,448,884 | 923/105.86 | 10 | 9 |
| Et Beta | ETH\_00026095 | coatomer beta subunit, putative | *Eimeria tenella* | scaff449/12-7351 | 753/79.86 | 13 | 12 |

**Table S3:** The coatomer Beta’ homologues of apicomplexan parasites.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene name | Organism | Location(chr.no./position) | Size(protein) aa/KDa | Exon (no.) | Intron (no) |
| Pf Beta’ | PF3D7\_0905900 | coatomer subunit beta, putative  | *Plasmodium falciparum* | 9/ 293,585 to 296,617 | 1010/118.25 | 1 | 0 |
| Pc Beta’ | PCHAS\_0416400 | coatomer subunit beta, putative  | *Plasmodium chabaudi chabaudi* | 04/ 584,651 to 587,599 | 982/113.88 | 1 | 0 |
| Pb Beta’ | PBANKA\_0415500 | coatomer subunit beta, putative  | *Plasmodium berghei* | 04/ 552,926 to 555,925 | 999/116.60 | 1 | 0 |
| Pk Beta’ | PKNH\_0703600 | beta subunit of coatomer complex, putative  | *Plasmodium knowlesi* | 07/ 210,205 to 213,231 | 1008/116.41 | 1 | 0 |
| Pv Beta’ | PVX\_098735 | coatomer complex beta subunit, putative  | *Plasmodium vivax* | 07/ 199,603 to 202,644 | 1013/116.13 | 1 | 0 |
| Py Beta’ | PY17X\_0418300 | coatomer subunit beta, putative  | *Plasmodium yoelii yoelii* | 04/657,212 to 660,211 | 999/116.38 | 1 | 0 |
| Cp beta’ | cgd7\_5010 | coatomer complex beta | *Cryptosporidium parvum* | 07/1,155,257 to 1,158,730 | 1157/131.94 | 1 | 0 |
| Tg Beta’ | TGGT1\_235020 | putative COPI protein | *Toxoplasma gondii* | X/4,501,792 to 4,518,157 | 1256/137.08 | 22 | 21 |
| Bb Beta’ | BBOV\_IV005890 | coatomer beta subunit, putative | *Babesia bovis* | Not Assigned/461,510 to 464,180 | 873/98.32 | 1 | 1 |
| Ta Beta’ | TA20925 | beta subunit of coatomer complex, putative | *Theileria annulata* | chr01.contig1/1805252-1808387 | 940/106.69 | 6 | 5 |
| Et Beta’ | ETH\_00041840 | coatomer protein complex subunit beta, putative | *Eimeria tenella* | scaff3923/172-2928 | 376/40.05 | 8 | 7 |
| ETH\_00016825 | hypothetical protein | *Eimeria tenella* | HG673814:40,043-41,375 | 212/23.23 | 3 | 2 |
| Nc Beta’ | NCLIV\_049710 | Hypothetical protein | *Neospora caninum* | chrX/ 4210551-4222994 | 1299/ 140.89 | 22 | 21 |
| Tp Beta’ | TP01\_0394 | coatomer beta subunit, putative | *Theileria parva* | 1/801,477 to 804,522 | 911/103.34 | 5 | 4 |

**Table S4:** The coatomer Gamma homologues of apicomplexan parasites.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene Name | Organisms | Location(chr.no./position) | Size(protein)aa/KDa | Exon (no.) | Intron (no.) |
| Pf Gamma | PF3D7\_1145100 | coatomer subunit gamma, putative | *Plasmodium falciparum* | 11/1,783,357-1,786,563 | 1068/124.37 | 1 | 0 |
| Pc Gamma | PCHAS\_0705100 | coatomer subunit gamma, putative  | *Plasmodium chabaudi chabaudi* | 7/ 211638 - 214646 | 1002/ 115.41 | 1 | 0 |
| Pb Gamma | PBANKA\_0903900 | coatomer subunit gamma, putative | *Plasmodium berghei* | 9/174,480-177,419 | 979/113.49 | 1 | 0 |
| Pk Gamma | PKNH\_0943000 | coatomer gamma subunit, putative | *Plasmodium knowlesi* | 9/ 1938298 - 1941297 | 999/ 113.97588 | 1 | 0 |
| Pv Gamma | PVX\_092860 | coatomer subunit gamma, putative | *Plasmodium vivax* | 9/1,767,103-1,770,135 | 1010/ 114.53 | 1 | 0 |
| Py Gamma | PY17X\_0905300 | coatomer subunit gamma, putative | *Plasmodium yoelii yoelii* | 9/220,598-223,624 | 1008/115.86 | 1 | 0 |
| Tg Gamma | TGGT1\_273370 | putative coatomer gamma 2-subunit protein | *Toxoplasma gondii* | VIII/ 3,554,530- 3,558,659 | 1044/112.28 | 2 | 1 |
| Cp Gamma | cgd7\_1910 | Coatomer\_gamma\_subunit/\_adaptor\_appendage/Ig-like\_subdomain\_containng\_protein | *Cryptosporidium parvum* | 7/480,221- 483,031 | 936/104.80 | 1 | 0 |
| Bb Gamma | BBOV\_II002960 | adaptin N terminal region family protein | *Babesia bovis* | 2/690,094-692,865 | 923/103.34 | 1 | 0 |
| Ta Gamma | TA07695 | coatamer, gamma subunit, putative | *Theileria annulata* | 04/594309-597080 | 923/104.68 | 1 | 0 |
| Et Gamma | ETH\_00041395 | coatomer gamma 2-subunit protein, putative | *Eimeria tenella* | scaff3712/350-1080 | 178/17.89 | 2 | 1 |
| Nc Gamma | NCLIV\_034270 | coatomer gamma 2-subunit protein, putative | *Neospora caninum* | VIII/3360706-3364262 | 1032/110.57 | 2 | 1 |
| Tp Gamma | TP04\_0297 | coatomer gamma subunit, putative | *Theileria parva* | Not Assigned/584,436 to 587,219 | 927/105.00 | 1 | 0 |

**Table S5:** The coatomer Delta homologues of apicomlexan parasites.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene Name | Organisms | Location(chr.no./position) | Size(protein)aa/KDa | Exon (no.) | Intron (no.) |
| Pf Delta | PF3D7\_1134800 | coatomer subunit delta | *Plasmodium falciparum* | 11/ 1,367,186-1,368,809 | 487/56.84 | 2 | 1 |
| Pk Delta | PKNH\_0933000 | coatomer subunit delta, putative | *Plasmodium knowlesi* | 9/1465466 – 1467019 | 517/59.82926 | 2 | 0 |
| Pv Delta | PVX\_092350 | coatomer delta subunit, putative | *Plasmodium vivax* | 9/1,303,942-1,305,498 | 518/59.19 | 1 | 0 |
| Py Delta | PY17X\_0915200 | coatomer subunit delta, putative | *Plasmodium yoelii yoelii* | 9/709340-710824 | 494/57.42 | 1 | 0 |
| Pc Delta | PCHAS\_0932300 | coatomer subunit delta, putative | *Plasmodium chabaudi chabaudi* | 09/ 1176825 - 1178309 | 494/ 57.40 | 1 | 0 |
| Pb Delta | PBANKA\_0913700 | coatomer subunit delta, putative | *Plasmodium berghei* | 09/ 517253 - 518737 | 494/ 57.50 | 1 | 0 |
| Tg Delta | TGGT1\_221522 | adaptor complexes medium subunit family protein | *Toxoplasma gondii* | 2/ 393,309- 399,736 | 571/61.16 | 10 | 9 |
| Cp Delta | Cgd7\_2940 | Coatomer complex delta chain | *Cryptosporidium parvum* | 7/ 694862 - 696469 | 535/ 60.71 | 1 | 0 |
| Bb Delta | BBOV\_II001990 | conserved hypothetical protein | *Babesia bovis* | 2/478,905-480,602 | 498/56.12 | 6 | 5 |
| Ta Delta | TA07885 | coatomer delta subunit, putative | *Theileria annulata* | 4/ 660975-663005 | 496/57.28 | 9 | 8 |
| Et Delta | ETH\_00011140 | coatomer delta subunit, putative | *Eimeria tenella* | scaff5/ 458114-461520 | 551 /60.53 | 10 | 9 |
| Nc Delta | NCLIV\_005050 | coatomer delta subunit, putative | *Neospora caninum* | 2/407193-412395 | 634 /68.35 | 8 | 7 |
| Tp delta | TP04\_0332 | Hypothetical protein  | *Theileria pava* | Not Assigned/ 644455 - 645059 | 159/17.91 | 2 | 1 |
| TP04\_0333 | Hypothetical protein  | *Theileria pava* | Not Assigned/ 645198 - 646060 | 254/ 29.56 | 4 | 3 |

**Table S6:** The coatomer Epsilon homologues of apicomplexan parasites.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene Name | Organisms | Location(chr.no./position) | Size(protein)aa/KDa | Exon(no.) | Intron(no.) |
| Pf Epsilon | PF3D7\_0808400 | coatomer subunit epsilon, putative | *Plasmodium falciparum* | 8/423,527-424,536 | 278/33.09 | 2 | 1 |
| Pc Epsilon | PCHAS\_1222900 | coatomer subunit epsilon, putative | *Plasmodium chabaudi chabaudi* | 12/820,117- 821,060 | 283/33.52 | 2 | 1 |
| Pb Epsilon | PBANKA\_1222300 | coatomer subunit epsilon, putative | *Plasmodium berghei* | 12/ 821,778 | 283/33.67 | 2 | 1 |
| Pk Epsilon | PKNH\_0110300 | coatomer subunit epsilon, putative | *Plasmodium knowlesi* | 1/485311 – 486339 | 291/ 34.23 | 2 | 1 |
| Pv Epsilon | PVX\_088115 | coatomer epsilon subunit, putative | *Plasmodium vivax* | 1/440,314-441,364 | 290/33.56 | 2 | 1 |
| Py Epsilon | PY17X\_1225500 | coatomer subunit epsilon, putative | *Plasmodium yoelii yoelii* | 12/945,423-946,927 | 283/33.82 | 2 | 1 |
| Cp Epsilon | cgd4\_4100 | coatomer epsilon subunit | *Cryptosporidium parvum* | 4/1,004,816-1,005,754 | 312/36.29 | 1 | 0 |
| Tg Epsilon | TGGT1\_244390 | coatomer epsilon subunit protein | *Toxoplasma gondii* | VI/3,145,659- 3,150,988 | 309/33.93 | 9 | 8 |
| Et Epsilon | ETH\_00011095 | coatomer epsilon subunit, putative | *Eimeria tenella* | scaff5/375709-378972 |  306 /32.83 | 9 | 8 |
| Nc Epsilon | NCLIV\_018950 | putative coatomer epsilon subunit | *Neospora caninum* | VI/ 2951632-2955986 | 276/30.60 | 8 | 7 |

**Table S7:** The coatomer Zeta homologues of apicomplexan parasites.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene Name | Organisms | Location(chr.no./position) | Size(protein)aa/KDa | Exon(no.) | Intron(no.) |
| Pf Zeta | PF3D7\_0415400 | coatomer subunit zeta, putative | *Plasmodium falciparum* | 4/686,414- 687,040 | 208/23.79 | 1 | 0 |
| Pc Zeta | PCHAS\_0726500 | coatomer subunit zeta, putative | *Plasmodium chabaudi chabaudi* | 7/ 944,245-944,901 |  218/24.88 | 1 | 0 |
| Pb Zeta | PBANKA\_0717400 | coatomer subunit zeta, putative | *Plasmodium berghei* | 7/598,462- 599,121 | 219/ 25.25 | 1 | 0 |
| Pk Zeta | PKNH\_0507000 | coatomer subunit zeta, putative | *Plasmodium knowlesi* | 5/ 274428 - 275054 | 208/ 23.47872 | 1 | 0 |
| Pv Zeta | PVX\_089725 | coatomer subunit zeta, putative | *Plasmodium vivax* | 5/ 790,309-790,935 | 208/ 23.62 | 1 | 0 |
| Py Zeta | PY17X\_0717600 | coatomer subunit zeta, putative | *Plasmodium yoelii yoelii* | 7/635,488- 636,129 | 213/24.52 | 1 | 0 |
| Cp Zeta | cgd7\_4180 | hypothetical protein | *Cryptosporidium parvum* | 7/940,557- 941,145 | 176/19.32 | 2 | 1 |
| Tg Zeta | TGGT1\_280550 | clathrin adaptor complex small chain subfamily protein | *Toxoplasma gondii* | VIIa/287,174-289,721 | 207/21.61 | 5 | 4 |
| Bb Zeta | BBOV\_III000560 | nonclathrin coat protein zeta2-cop-related protein, putative | *Babesia bovis* | 3/132165-133127 | 191/21.21 | 5 | 4 |
| Ta Zeta | TA18095 | Clathrin adapter complex-related protein, putative | *Theileria annulata* | 03/1627610-1629312 | 370/ 43.64 | 11 | 10 |
| Et Zeta | ETH\_00027025 | coatomer zeta-2 subunit, putative | *Eimeria tenella* | supercontig Eth\_scaff109/ 83623-84369 | 144/16.98 | 2 | 1 |
| Nc Zeta | NCLIV\_019600 | hypothetical protein | *Neospora caninum* | VIIa/274146-276724 | 214/22.11 | 5 | 4 |
| Tp Zeta | TP03\_0756 | nonclathrin coat protein, putative | *Theileria parva* | Not Assigned/ 286394 - 287154 | 190/ 21825.23 | 4 | 3 |

**Table S8:** Coatomer sec13 homologues of apicomplexan parasites.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene Name | Organisms | Location(chr.no./position) | Size(protein)aa/KDa | Exon(no.) | Intron(no.) |
| Pf sec13 | PF3D7\_1230700 | protein transport protein SEC13, putative  | *Plasmodium falciparum* | 12/1,259,620-1,262,088 | 822/90.75 | 1 | 0 |
| Pc sec13 | PCHAS\_1447600 | protein transport protein SEC13, putative  | *Plasmodium chabaudi chabaudi* | 14/1737169-1739426 | 722/80.29 | 2 | 1 |
| Pb sec13 | PBANKA\_1445400 | protein transport protein SEC13, putative  | *Plasmodium berghei* | 14/1739873-1742022 | 687/76.70 | 2 | 1 |
| Pk sec13 | PKNH\_1450100 | protein transport protein SEC13, putative | *Plasmodium knowlesi* | 14/2166583-2168829 | 748/79.96 | 1 | 0 |
| Pv sec13 | PVX\_124175 | protein transport protein SEC13, putative  | *Plasmodium vivax* | 14/ 2,108,558-2,110,849 | 763/81.08 | 1 | 0 |
| Py sec13 | PY17X\_1447900 | protein transport protein SEC13, putative  | *Plasmodium yoelii yoelii* | 14/1875827-1877993 | 690/ 77.38 | 2 | 1 |
| Tg sec13 | TGGT1\_201700 | WD domain, G-beta repeat-containing protein | *Toxoplasma gondii* | VIIa/3,740,764-3,744,193 | 654/67.41 | 5 | 4 |
| Cp sec13 | cgd8\_4110 | hypothetical protein | *Cryptosporidium parvum* | 8/1,029,493- 1,031,298 | 601/63.72 | 1 | 0 |
| Bb sec13 | Absent |  | *Babesia bovis* |  |  |  |  |
| Ta sec13 | Absent |  | *Theileria annulata* |  |  |  |  |
| Et sec13 | ETH\_00020090 | sec 13, putative | *Eimeria tenella* | supercontig Eth\_scaff106/18821-20341 | 385/40.87 | 1 | 0 |
| Nc sec13 | NCLIV\_023040 | Hypothetical protein | *Neospora caninum* | VIIa/3,326,636..3,329,857 | 645/66.24 | 4 | 3 |
| Tp | Absent |  | *Theileria parva* |  |  |  |  |

**Table S9:** The Coatomer sec31 Homologues of apicomplexan parasites.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene name | Organisms | Location(chr.no./position) | Size(protein)aa/KDa | Exon(no.) | Intron(no.) |
| Pf sec31 | PF3D7\_0214100 | protein transport protein SEC31  | *Plasmodium falciparum* | 2/ 568,529 to 573,315 | 1471/166.71 | 4 | 3 |
| Pc sec31 | PCHAS\_031310 | protein transport protein SEC31, putative  | *Plasmodium chabaudi chabaudi* | 3/447,870 to 452,460 | 1394/ 155.87 | 4 | 3 |
| Pb sec31 | PBANKA\_0311000 | protein transport protein SEC31, putative  | *Plasmodium berghei* | 3/ 381,422 to 385,971 | 1388/156.64 | 4 | 3 |
| Pk sec31 | PKNH\_0406700 | protein transport protein Sec31, putative  | *Plasmodium knowlesi* | 4/266225-270958 | 1416/156.25 | 4 | 3 |
| Pv sec31 | PVX\_002830 | protein transport protein SEC31, putative  | *Plasmodium vivax* | 4/307,397 to 312,265 | 1438/ 154.85 | 4 | 3 |
| Py sec31 | PY17X\_0311500 | protein transport protein SEC31, putative  | *Plasmodium yoelii yoelii* | 3/411,411 to 415,980 | 1393/157.18 | 4 | 3 |
| Tg sec31 | TGGT1\_311400 | WD domain, G-beta repeat-containing protein | *Toxoplasma gondii* | XI/ 2010353 - 2023624 | 1585/ 165.58 | 16 | 15 |
| Cp sec31 | cgd4\_260 | WD repeat protein | *Cryptosporidium parvum* | 4/ 68336 - 72415 | 1359/ 148.68 | 1 | 0 |
| Bb sec31 | BBOV\_IV008580 | Conserved hypothetical protein | *Babesia bovis* | Not Assigned/ 1038037 – 1041143 | 1002/ 109.19 | 1 | 0 |
| Ta sec31 | TA06395 | Hypothetical protein, conserved | *Theileria annulata* | 1/ 1942712 - 1946688 | 1296/ 140.93 | 2 | 1 |
| Et sec31 | ETH\_00026970 | Hypothetical protein, conserved | *Eimeria tenella* | Not Assigned/213452 - 221762 | 1431/ 152.95 | 18 | 17 |
| Nc sec31 | NCLIV\_055300 | Hypothetical protein | *Neospora caninum* | XI/ 1812763 - 1824017 | 1484/ 155.07 | 15 | 14 |
| Tp sec31 | TP01\_0918 | Hypothetical protein | *Theileria parva* | 1/ 1896840 - 1900874 | 1310/ 141.76 | 2 | 1 |

**Table S10:** The coatomer sec23 homologues of apicomplexan parasites.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene Name | Organisms | Location(chr.no./position) | Size(protein)aa/KDa | Exon(no.) | Intron(no.) |
| Pf sec23 | PF3D7\_0822600 | protein transport protein SEC23 | *Plasmodium falciparum* | 08/ 997055 - 999529 | 759/ 86.17 | 2 | 1 |
| Pc sec23 | PCHAS\_0717300 | protein transport protein SEC23, putative | *Plasmodium chabaudi chabaudi* | 07/ 645966 - 648473 | 759/ 86.25 | 2 | 1 |
| Pb sec23 | PBANKA\_0708000 | protein transport protein SEC23, putative | *Plasmodium berghei* | 07/ 330576 - 332985 | 759/ 86.14 | 2 | 1 |
| Pk sec23 | PKNH\_1316600 | protein transport protein SEC23, putative | *Plasmodium knowlesi* | 13/ 750662 - 753125 | 759/ 86.20 | 2 | 1 |
| Pv sec23 | PVX\_089235 | protein transport protein SEC23, putative | *Plasmodium vivax* | 05/ 403416 - 405866 | 759/ 86.22 | 2 | 1 |
| Py sec23 |

|  |  |
| --- | --- |
| PY17X\_0708300 |  |

 | protein transport protein SEC23, putative | *Plasmodium yoelii yoelii* | 07/ 322116 - 324515 | 759/ 86.24 | 2 | 1 |
| Tg sec23 | TGGT1\_291680 | Sec23/Sec24 trunk domain-containing protein | *Toxoplasma gondii* | IX/ 4131104 - 4145209 | 791/ 87.60 | 15 | 14 |
| Cp sec23 | Cgd3\_1820 | putative Sec23 | *Cryptosporidium parvum* | 3/ 487048 – 489324 | 758/ 84.85 | 1 | 0 |
| Bb sec23 | BBOV\_II007590 | sec23 protein | *Babesia bovis* | 2/1682162-1684669 | 770/86.13 | 2 | 1 |
| Ta sec23 | TA14650 | protein transport protein (SEC23 homologue), putative | *Theileria annulata* | 2/594494-596934 | 774/86.57 | 2 | 1 |
| Et sec23 | ETH\_00006120 | protein transport protein Sec23, putative | *Eimeria tenella* | Not Assigned/ 142743 - 153812 | 874/ 96.72 | 18 | 17 |
| Nc sec23 | NCLIV\_043180 | hypothetical protein | *Neospora caninum* | IX/ 3950453 - 3959154 | 795/ 88.00 | 15 | 14 |
| TP sec13 | TP02\_0701 | Sec23, putative | *Theileria parva* | 2/1398233-1400989 | 774/86.32 | 2 | 1 |

**Table S11:** The coatomer sec24A homologues of apicomplexan parasites.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene Name | Organisms | Location(chr.no./position) | Size(protein)aa/KDa | Exon(no.) | Intron(no.) |
| Pb SEC24A | PBANKA\_1137200 | protein transport protein Sec24A, putative | *Plasmodium berghei* | 11/ 1405856 - 1409543 | 942/ 106.43 | 5 | 4 |
| Pc SEC24A | PCHAS\_1136700 | protein transport protein Sec24A, putative | *Plasmodium chabaudi* | 11/ 1333916 - 1337573 | 941/ 106.03 | 5 | 4 |
| Pf SEC24A | PF3D7\_1361100 | protein transport protein Sec24A | *Plasmodium falciparum* | 13/ 2450461 - 2453760 | 940/ 106.68 | 5 | 4 |
| Pk SEC24A | PKNH\_1110300 | protein transport protein Sec24A, putative | *Plasmodium knowlesi* | 11/ 431927 - 435605 | 933/ 104.28 | 5 | 4 |
| Pv SEC24A | PVX\_115015 | protein transport protein Sec24A, putative | *Plasmodium vivax* | 11/ 392868 - 396525 | 935/ 104.31 | 5 | 4 |
| Py SEC24A | PY17X\_1138600 | protein transport protein Sec24A, putative | *Plasmodium yoelii* | 11/ 1588641-1592317 | 942/ 106.25 | 5 | 4 |
| Tg sec24A | TGGT1\_277000 | putative transport protein Sec24 | *Toxoplasma gondii* | XII/ 6,701,488 to 6,710,271 | 1019/108.03 | 9 | 8 |
| Cp sec24A | cgd8\_4470 | hypothetical protein | *Cryptosporidium parvum* | 8/1,102,950 to 1,105,636 | 874/97.38 | 2 | 1 |
| Bb sec24A | BBOV\_IV000740 | Sec 24 protein transport protein, putative | *Babesia bovis* | 175,794 to 178,516 | 835/ 91.33 | 1 | 0 |
| Ta sec24A | TA20050 | protein transport protein sec24-like, putative | *Theileria annulata* | chr01.contig1/2376580-2379863 | 905/100.34 | 11 | 10 |
| Et sec24A | ETH\_00007535 | transport protein Sec24, putative | *Eimeria tenella* | Eth\_scaff381/474-6220 | 706/73.41 | 7 | 6 |
| Nc sec24A | NCLIV\_068580 | hypothetical protein | *Neospora caninum* | XII/ 6387494 - 6393091 | 603/ 64.85 | 10 | 9 |
| Tp sec24A | TP01\_0099 | vesicle transport protein, putative | *Theileria parva* | 1/ 201664 - 205011 | 899/ 99.72 | 11 | 10 |

**Table S12:** The coatomer sec24B homologues of apicomplexan parasites.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene Name | Organism | Location(chr.no./position) | Size(protein) aa/KDa | Exon (no.) | Intron (no.) |
| Pb Sec24B | PBANKA\_1002800 | protein transport protein Sec24B, putative | *Plasmodium berghei* | 10/ 171451 - 176105 | 1381/ 158.42 | 5 | 4 |
| Pc Sec24B | PCHAS\_1003700 | protein transport protein Sec24B, putative | *Plasmodium chabaudi chabaudi* | 10/ 164409 - 169072 | 1381/ 157.41 | 5 | 4 |
| Pf Sec24B | PF3D7\_0405100 | protein transport protein Sec24B | *Plasmodium falciparum* | 04/ 272255 - 276824 | 1350/ 155.94 | 5 | 4 |
| Pk Sec24B | PKNH\_0303200 | protein transport protein Sec24B, putative | *Plasmodium knowlesi* | 03/ 161971 - 167246 | 1532/ 170.91 | 5 | 4 |
| Pv Sec24B | PVX\_000985 | protein transport protein Sec24B, putative | *Plasmodium vivax* | 03/ 133637 - 139052 | 1554/ 170.64 | 5 | 4 |
| Py Sec24B | PY17X\_1004200 | protein transport protein Sec24B, putative | *Plasmodium yoelii* | 10/ 279869-284506 | 1372/ 157.13 | 5 | 4 |
| Tg sec24B | TGGT1\_226510 | Sec23/Sec24 trunk domain-containing protein | *Toxoplasma gondii* | X/ 1468057 - 1478151 | 1540/ 165.25 | 14 | 13 |
| Cp sec24B | cgd8\_1250 | SEC24C-like component of COPII coatamer of ER-golgi vesicles | *Cryptosporidium parvum* | 8/ 338832 - 342284 | 1150/ 127.84 | 1 | 0 |
| Et sec24B | ETH\_00026990 | sec23/Sec24 helical domain-containing protein, putative | *Eimeria tenella* | Not Assigned/ 246448 - 254625 | 1483/ 165.35 | 17 | 16 |
| Nc sec24B | NCLIV\_046450 | putative sec23/Sec24 helical domain-containing protein | *Neospora caninum* | x/ 1386494 - 1395654 | 1517/ 162.51 | 14 | 13 |
| Ta sec24B | TA21015 | protein transport protein sec24-like, putative | *Theileria annulata* | 1/ 760501 - 763736 | 1051/ 118.81 | 2 | 1 |
| Bb sec24B | BBOV\_IV005730 | conserved hypothetical protein | *Babesia bovis* | Not Assigned/ 429141 - 432475 | 1024/ 115.35 | 1 | 0 |
| Tp sec24B | TP01\_0373 | hypothetical protein | *Theileria parva* | 1/ 759455 - 762706 | 1034/ 116.76 | 2 | 1 |

**Table S13:** The Coatomer Sar1a homologues of apicomplexan parasites.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein | Gene ID | Gene Name | Organism | Location(chr.no./position) | Size(protein)aa/KDa | Exon(no.) | Intron(no.) |
| Pf sar1a | PF3D7\_0416800 | small GTP-binding protein sar1 | *Plasmodium falciparum* | 4/729,962 to 731,223 | 192/22.02 | 3 | 2 |
| Pc sar1a | PCHAS\_0727900 | small GTP-binding protein sar1, putative | *Plasmodium chabaudi chabaudi* | 7/979,597 to 980,593 | 191/21.90 | 3 | 2 |
| Pb sar1a | PBANKA\_0718800 | small GTP-binding protein sar1, putative  | *Plasmodium berghei* | 7/635,357 to 636,357 | 191/21.92 | 3 | 2 |
| Pk sar1a | PKNH\_0509200 | small GTP-binding protein sar1, putative | *Plasmodium knowlesi* | 5/ 386418 - 387564 | 191/ 21.94 | 3 | 2 |
| Pv sar1a | PVX\_089930 | small GTP-binding protein sar1, putative | *Plasmodium vivax* | 5/946,227 to 947,218 | 191/21.94 | 3 | 2 |
| Py sar1a | PY17X\_0718900 | small GTP-binding protein sar1, putative | *Plasmodium yoelii yoelii* | 7/845224-846284 | 191/ 21.91 | 3 | 2 |
| Tg sar1a | TGGT1\_215060 | putative small GTP-binding protein sar1 | *Toxoplasma gondii* | X/6,612,856 to 6,615,947 | 192/22.14 | 7 | 6 |
| Cp sar1a | cgd7\_2330 | SAR1-like small GTpase | *Cryptosporidium parvum* | 7/ 555,755 to 556,390 | 211/24.13 | 1 | 0 |
| Bb sar1a | BBOV\_II004300 | small GTP-binding protein sar1 | *Babesia bovis* | 2/1,006,991 to 1,008,048 | 197/22.23 | 3 | 2 |
| Ta sar1a | TA08955 | small GTPase, putative | *Theileria annulata* | 4/ 1090292 - 1090945 | 195/22.06 | 2 | 1 |
| Et sar1a | ETH\_00027560 | small GTP-binding protein sar1, putative | *Eimeria tenella* | Not Assigned/ 1834 - 3028 | 116/13.44 | 4 | 3 |
| Nc sar1a | NCLIV\_052070 | hypothetical protein | *Neospora caninum* | X/ 6251955-6254550 | 192/22.14 | 7 | 6 |
| Tp sar1a | TP04\_0542 | GTP-binding protein, putative | *Theileria parva* | Not Assigned/ 1080159 - 1080821 | 195/22.06 | 2 | 1 |

**Table S14:** The domain architecture of the COPI and COPII subunits of apicomplexan parasites in comparison to that of the human homologs. The number of domain(s) are mentioned for the corresponding proteins.

|  |
| --- |
| **COPI** |
| **Alpha(Human)** **WD40****ANAPC4\_WD40** F:\Kibria\teaching\thesis\Jannat\Alpha\alpha subunit.png |
|  **Organism** | **WD40** | **ANAPC4\_WD40** | **Coatomer\_WDAD** | **COPI\_C** |
| ***Homo sapience*** | **3 (41-79, 83-121, 125-163)** | **1 (211-303)** | **1 (338-767)** | **1 (815-1224)** |
| ***Arabidopsis thaliana*** | **3 (41-79, 83-121, 125-163)** | **1 (210-303)** | **1 (337-769)** | **1 (815-1216)** |
| ***Saccharomyces cerevisiae*** | **5 (43-81, 85-123, 127-165, 197-237, 243-281)** | **-** | **1 (343-771)** | **1 (816-1201)** |
| ***Plasmodium falciparum*** | **5 (41-79, 83-121, 125-163, 260-298, 304-343)** | **-** | **1 (591-990)** | **1 (1106-1511)** |
| ***Plasmodium knowlesi*** | **5 (41-79, 83-121, 125-163, 236-273, 279-318)** | **-** | **1 (498-890)** | **1 (981-1364)** |
| ***Plasmodium vivax*** | **5 (41-79, 83-121, 125-163, 239-276, 282-321)** | **-** | **1 (535-923)** | **1 (1021-1397)** |
| ***Plasmodium yoelii yoelii*** | **5 (41-79, 83-121, 125-163, 238-276, 282-321)** | **-** | **1 (482-886)** | **1 (961-1379)** |
| ***Plasmodium chabaudi chabaudi*** | **5 (41-79, 83-121, 125-163, 239-276, 282-321)** | **-** | **1 (493-888)** | **1 (992-1385)** |
| ***Plasmodium berghei*** | **5 (41-79, 83-121, 125-163, 238-275, 281-320)** | **-** | **1 (493-888)** | **1 (958-1382)** |
| ***Toxoplasma gondii*** | **6 (5-40, 44-82, 86-124, 128-166, 206-244, 250-288)** | **-** | **1 (444-823)** | **1 (916-1300)** |
| ***Cryptosporidium parvum*** | **5 (41-79, 83-121, 125-163, 204-241, 247-285)** |  | **1 (573-890)** | **1 (1062-1382)** |
| ***Babesia bovis*** | **5 (41-79, 83-121, 125-163, 218-255, 261-300)** | **-** | **1 (448-886)** | **1 (993-1265)** |
| ***Theileria annulata*** | **5 (41-79, 83-121, 125-163, 207-243, 249-285)** | **-** | **1 (478-768)** | **1 (1020-1278)** |
| ***Eimeria tenella*** | **3 (63-110, 135-173, 179-217)** | **-** | **1 (383-735)** | **1 (807-1206)** |
| ***Neospora caninum*** | **4 (5-40, 44-82, 86-124, 128-166, 206-244)** | **1 (223-329)** | **1 (451-817)** | **1 (870-1199)** |
| ***Theileria parva*** | **5 (41-79, 83-121, 125-163, 207-243, 249-285)** | **-** | **1 (554-911)** | **1 (1102-1357)** |
| ***Phytophthora sojae*** | **5 (41-79, 83-121, 125-163, 203-239, 245-283)** | **-** | **1 (344-783)** | **1 (837-1246) (additional STIL\_N domain (1508-1771))** |
| **Beta (Human)** **Coatomer beta C****Coatomer b Cpla** **C:\Users\Jannat BGE\Documents\Human beta.png** |
|  **Organism** | **Adaptin N** | **Coatomer beta C** | **Coatomer b Cpla** |
| ***Homo sapience*** | **1 (18-533)** | **1 (667-807)** | **1 (813-944)** |
| ***Arabidopsis thaliana*** | **1 (15-522)** | **1 (669-808)** | **1 (813-940)** |
| ***Saccharomyces cerevisiae*** | **1 (20-560)** | **1 (684-824)** | **1 (829-958)** |
| ***Plasmodium falciparum*** | **1 (20-547)** | **1 (1029-1192)** | **1 (1197-1359)** |
| ***Plasmodium knowlesi*** | **1 (20-519)** | **1 (978-1146)** | **1 (1151-1313)** |
| ***Plasmodium vivax*** | **1 (20-492)** | **1 (949-1132)** | **1 (1137-1299)** |
| ***Plasmodium yoelii yoelii*** | **1 (21-460)** | **1 (945-1107)** | **1 (1112-1274)** |
| ***Plasmodium chabaudi chabaudi*** | **1 (22-654)** | **1 (888-1050)** | **1 (1055-1217)** |
| ***Plasmodium berghei*** | **1 (20-459)** | **1 (915-1077)** | **1 (1082-1244)** |
| ***Toxoplasma gondii*** | **1 (17-492)** | **1 (766-917)** | **1 (922-1094)** |
| ***Cryptosporidium parvum*** |  | **1 (213-369)** | **2 (397-479, 481-582)** |
| **2 (18-382, 464-591)** |  |  |
| ***Babesia bovis*** | **1 (22-504)** | **1 (667-821)** | **1 (827-984)** |
| ***Theileria annulata*** | **1 (1-348)** | **1 (674-788)** | **1 (794-887)** |
| ***Eimeria tenella*** |  | **1 (414-559)** | **2 (571-672, 661-742)** |
| ***Neospora caninum*** | **1 (17-492)** | **1 (789-930)** | **1 (935-1108)** |
| ***Theileria parva*** | **1 (21-537)** | **1 (621-764)** | **1 (770-915)** |
| ***Phytophthora sojae*** | **1 (24-517)** | **1 (705-846)** | **1 (851-978)** |
|  **Human(beta’)** **WD40** |
| **Organism** | **WD40** | **Coatomer\_WDAD** |
| ***Homo sapience*** | **4 (89-127, 132-171, 175-215, 219-257)** | **1 (319-763)** |
| ***Arabidopsis thaliana*** | **4 (89-127, 132-171, 175-215, 219-257)** | **1 (319-764)** |
| ***Saccharomyces cerevisiae*** | **4 (87-125, 130-169, 174-214, 218-256)** | **1 (325-777)** |
| ***Plasmodium falciparum*** | **5 (47-85, 89-127, 132-170, 180-220, 224-262)** | **1 (323-806)** |
| ***Plasmodium knowlesi*** | **4 (89-127, 132-170, 180-220, 224-262)** | **1 (323-790)** |
| ***Plasmodium vivax*** | **4 (89-127, 132-170, 180-220, 224-262)** | **1 (323-791)** |
| ***Plasmodium yoelii yoelii*** | **4 (89-127, 132-170, 180-220, 224-262)** | **1 (323-785)** |
| ***Plasmodium chabaudi chabaudi*** | **4 (89-127, 132-170, 180-220, 224-262)** | **1 (323-782)** |
| ***Plasmodium berghei*** | **4 (89-127, 132-170, 180-220, 224-262)** | **1 (323-785)** |
| ***Toxoplasma gondii*** | **3 (89-128, 133-171, 192-231)** | **1 (367-825)** |
| ***Cryptosporidium parvum*** | **3 (93-131, 189-229, 233-271)** | **1 (337-836)** |
| ***Babesia bovis*** | **3 (89-127, 187-227, 231-269)** | **1 (331-791)** |
| ***Theileria annulata*** | **4 (89-127, 132-171, 221-261, 265-303)** | **1 (363-870)** |
| ***Eimeria tenella*** | **2 (25-65, 69-111)** | **1 (181-353)** |
| **2 (89-128, 133-171)** |  |
| ***Neospora caninum*** | **3 (87-128, 133-171, 197-236)** | **1 (372-828)** |
| ***Theileria parva*** | **4 (89-127, 132-171, 221-261, 265-303)** | **1 (363-884)** |
| ***Phytophthora sojae*** | **4 (89-127, 132-170, 176-215, 219-257)** | **1 (321-781)** |
| **Gamma(Human)** **Cop-gamma platf Cpla****Coatomer g Cpla** **C:\Users\Jannat BGE\Documents\Human Gamma.png** |
| **Organism** | **Adaptin N** | **Cop-gamma platf** | **Coatomer g cpla** |
| ***Homo sapience*** | **1 (23-539)** | **1 (609-756)** | **1 (758-870)** |
| ***Arabidopsis thaliana*** | **1 (25-543)** | **1 (620-767)** | **1 (769-883)** |
| ***Saccharomyces cerevisiae*** | **1 (19-560)** | **1 (669-819)** | **1 (821-933)** |
| ***Plasmodium falciparum*** | **1 (32-653)** | **1 (781-949)** | **1 (951-1067)** |
| ***Plasmodium knowlesi*** | **1 (32-625)** | **1 (727-880)** | **1 (882-998)** |
| ***Plasmodium vivax*** | **1 (32-630)** | **1 (736-891)** | **1 (893-1009)** |
| ***Plasmodium yoelii yoelii*** | **1 (34-592)** | **1 (704-889)** | **1 (891-1007)** |
| ***Plasmodium chabaudi chabaudi*** | **1 (33-596)** | **1 (716-883)** | **1 (885-1001)** |
| ***Plasmodium berghei*** | **1 (31-596)** | **1 (693-860)** | **1 (862-978)** |
| ***Toxoplasma gondii*** | **1 (37-594)** | **1 (776-924)** | **1 (926-1043)** |
| ***Cryptosporidium parvum*** | **1 (26-558)** | **1 (671-815)** | **1 (817-933)** |
| ***Babesia bovis*** | **1 (19-537)** | **1 (663-799)** | **1 (801-922)** |
| ***Theileria annulata*** | **1 (19-552)** | **1 (680-810)** | **1 (812-922)** |
| ***Eimeria tenella*** |  |  | **1 (52-177)** |
| ***Neospra caninum*** | **1 (36-594)** | **1 (768-913)** | **1 (915-1031)** |
| ***Theileria parva*** | **1 (19-549)** | **1 (676-814)** | **1 (816-926)** |
| ***Phytophthora sojae*** | **1 (51-572)** | **1 (644-793)** | **1 (795-909)** |
|  **Delta(Human)**  **C:\Users\Jannat BGE\Documents\Human Delta.png** |
| **Organism** | **Adap comp sub** |
| ***Homo sapience*** | **1 (174-422)** |
| ***Arabidopsis thaliana*** | **1 (273-526)** |
| ***Saccharomyces cerevisiae*** | **Clat\_adaptor\_s domain 1 (2-156)** |
| ***Plasmodium falciparum*** | **-** |
| ***Plasmodium knowlesi*** | **1 (281-515)** |
| ***Plasmodium vivax*** | **1 (282-516)** |
| ***Plasmodium yoelii yoelii*** | **-** |
| ***Plasmodium chabaudi chabaudi*** | **-** |
| ***Plasmodium berghei*** | **-** |
| ***Toxoplasma gondii*** | **-** |
| ***Cryptosporidium parvum*** | **-** |
| ***Babesia bovis*** | **-** |
| ***Theileria annulata*** | **1 (220-413)** |
| ***Eimeria tenella*** | **1 (310-541)** |
| ***Neospora caninum*** | **1 (335-558)** |
| ***Theileria parva*** | **-** |
| ***Phytophthora sojae*** | **1 (290-536)** |
|  **Epsilon(Human)**  **C:\Users\Jannat BGE\Documents\Human Epsilon.png** |
|  **Organism** | **Coatomer E** |
| ***Homo sapience*** | **1 (15-305)** |
| ***Arabidopsis thaliana*** | **1 (7-293)** |
| ***Saccharomyces cerevisiae*** | **1 (2-293)** |
| ***Plasmodium falciparum*** | **1 (2-278)** |
| ***Plasmodium knowlesi*** | **1 (2-291)** |
| ***Plasmodium vivax*** | **1 (3-290)** |
| ***Plasmodium yoelii yoelii*** | **1 (1-283)** |
| ***Plasmodium chabaudi chabaudi*** | **1 (1-283)** |
| ***Plasmodium berghei*** | **1 (1-283)** |
| ***Toxoplasma gondii*** | **1 (2-297)** |
| ***Cryptosporidium parvum*** | **1 (2-312)** |
| ***Eimeria tenella*** | **1 (68-277)** |
| ***Neospora caninum*** | **1 (2-184)** |
| ***Phytophthora sojae*** | **1 (3-292)** |
|  **Zeta(Human)**  **C:\Users\Jannat BGE\Documents\Human Zeta.png****Clat adaptor S** |
|  **Organism** | **Clat adaptor S** |
| ***Homo sapience*** | **1 (45-185)** |
| ***Arabidopsis thaliana*** | **1 (6-149)** |
| ***Saccharomyces cerevisiae*** | **1 (8-159)** |
| ***Plasmodium falciparum*** | **1 (8-182)** |
| ***Plasmodium knowlesi*** | **1 (8-183)** |
| ***Plasmodium vivax*** | **1 (8-183)** |
| ***Plasmodium yoelii yoelii*** | **1 (47-188)** |
| ***Plasmodium chabaudi chabaudi*** | **1 (47-192)** |
| ***Plasmodium berghei*** | **1 (8-194)** |
| ***Toxoplasma gondii*** | **1 (46-168)** |
| ***Cryptosporidium parvum*** | **1 (5-154)** |
| ***Babesia bovis*** | **1 (8-166)** |
| ***Theileria annulata*** | **1 (8-168) with additional AP2 domain (266-324)** |
| ***Eimeria tenella*** | **-** |
| ***Neospora caninum*** | **1 (47-170)** |
| ***Theileria parva*** | **-** |
| ***Phytophthora sojae*** | **1 (8-153)** |
|  |  |
|  |  |
|  **COPII** |
|  **Sec13(Human)**  **F:\Kibria\teaching\thesis\Jannat\COP paper\Dr. Dinesh analyses\COPII\download.png****WD40** |
|  **Organism** | **WD40** |
| ***Homo sapience*** | **5 (4-41, 47-87, 93-131, 202-244, 254-290)** |
| ***Arabidopsis thaliana*** | **5 (2-37, 46-86, 93-133, 140-192, 200-242)** |
| ***Saccharomyces cerevisiae*** | **2 (43-83, 194-235)** |
| ***Plasmodium falciparum*** | **2 (4-40, 47-87)** |
| ***Plasmodium knowlesi*** | **2 (2-40, 47-87)** |
| ***Plasmodium vivax*** | **2 (2-40, 47-87)** |
| ***Plasmodium yoelii yoelii*** | **3 (2-40, 47-87, 145-201)** |
| ***Plasmodium chabaudi chabaudi*** | **3 (3-40, 48-87, 145-201)** |
| ***Plasmodium berghei*** | **3 (2-40, 47-87, 145-201)** |
| ***Toxoplasma gondii*** | **4 (5-43, 61-101, 177-224, 233-283)** |
| ***Cryptosporidium parvum*** | **4 (2-41, 48-87, 140-193, 203-245)** |
| ***Eimeria tenella*** | **4 (3-41, 49-89, 98-137, 147-192)** |
| ***Neospora caninum*** | **4 (4-43, 65-105, 187-232, 240-290)** |
| ***Phytophthora sojae*** | **1 (230-273)** |
| **Sec31(Human)****C:\Users\Jannat BGE\Documents\Human sec31.png** |
| **Organism** | **Sec16 C** |
| ***Homo sapience*** | **1 (573-771)** |
| ***Arabidopsis thaliana*** | **1 WD40 (105-144) 1 Sec16C (503-702)** |
| ***Saccharomyces cerevisiae*** | **2 Wd40 (102-137, 248-286), 1 Sec16C (514-679), 1 Sec31 (899-946), 1 SRA1 (1141-1266)** |
| ***Plasmodium falciparum*** | **1 (734-942)** |
| ***Plasmodium knowlesi*** | **1 (722-928)** |
| ***Plasmodium vivax*** | **-** |
| ***Plasmodium yoelii yoelii*** | **1 (704-909)** |
| ***Plasmodium chabaudi chabaudi*** | **1 (709-922)** |
| ***Plasmodium berghei*** | **1 (703-915)** |
| ***Toxoplasma gondii*** | **-** |
| ***Cryptosporidium parvum*** | **-** |
| ***Babesia bovis*** | **-** |
| ***Theileria annulata*** | **-** |
| ***Eimeria tenella*** | **-** |
| ***Neospora caninum*** | **-** |
| ***Theileria parva*** | **-** |
| ***Phytophthora sojae*** | **1 WD40 (173-211) 1 Sec16C (601-798)** |
|  **Sar1a (Human)**  **C:\Users\Jannat BGE\Documents\Human Sar1a.png**  |
| **Organism** | **Arf** |
| ***Homo sapience*** | **1 (12-197)** |
| ***Arabidopsis thaliana*** | **1 (7-192)** |
| ***Saccharomyces cerevisiae*** | **1 (10-190)** |
| ***Plasmodium falciparum*** | **1 (7-191)** |
| ***Plasmodium knowlesi*** | **1 (7-190)** |
| ***Plasmodium vivax*** | **1 (7-190)** |
| ***Plasmodium yoelii yoelii*** | **1 (7-190)** |
| ***Plasmodium chabaudi chabaudi*** | **1 (7-190)** |
| ***Plasmodium berghei*** | **1 (7-190)** |
| ***Toxoplasma gondii*** | **1 (7-191)** |
| ***Cryptosporidium parvum*** | **1 (25-210)** |
| ***Babesia bovis*** | **1 (8-192)** |
| ***Theileria annulata*** | **1 (8-191)** |
| ***Eimeria tenella*** | **1 (7-112)** |
| ***Neospora caninum*** | **1 (7-191)** |
| ***Theileria parva*** | **1 (8-191)** |
| ***Phytophthora sojae*** | **1 (7-192)** |
|  **Sec23 (Human)**  **C:\Users\ASUS-PC\Downloads\image COPII\canvas.png****Zf Sec23 Sec24****Sec23 BS****Sec23 helical****Gelsolin** |
| **Organism** | **Zf Sec23 Sec24** | **Sec23****trunk** | **Sec23 BS** | **Sec23 helical** | **Gelsolin** |
| ***Homo sapience*** | **1 (58-98)** | **1 (126-392)** | **1 (403-506)** | **1 (520-619)** | **1 (631-720)** |
| ***Arabidopsis thaliana*** | **1 (57-95)** | **1 (124-392)** | **1 (402-508)** | **1 (522-621)** | **1 (633-722)** |
| ***Saccharomyces cerevisiae*** | **1 (53-93)** | **1 (119-388)** | **1 (399-512)** | **1 (524-623)** | **1 (635-724)** |
| ***Plasmodium falciparum*** | **1 (55-93)** | **1 (122-384)** | **1 (394-497)** | **1 (509-608)** | **1 (620-710)** |
| ***Plasmodium knowlesi*** | **1 (55-93)** | **1 (122-383)** | **1 (394-497)** | **1 (509-608)** | **1 (620-710)** |
| ***Plasmodium vivax*** | **1 (55-93)** | **1 (122-383)** | **1 (394-497)** | **1 (509-608)** | **1 (620-710)** |
| ***Plasmodium yoelii yoelii*** | **1 (55-93)** | **1 (122-383)** | **1 (394-497)** | **1 (509-608)** | **1 (620-710)** |
| ***Plasmodium chabaudi chabaudi*** | **1 (55-93)** | **1 (122-383)** | **1 (394-497)** | **1 (509-608)** | **1 (620-710)** |
| ***Plasmodium berghei*** | **1 (55-93)** | **1 (122-383)** | **1 (394-497)** | **1 (509-608)** | **1 (620-710)** |
| ***Toxoplasma gondii*** | **1 (53-91)** | **1 (131-407)** | **1 (418-521)** | **1 (533-632)** | **1 (646-735)** |
| ***Cryptosporidium parvum*** | **1 (54-92)** | **1 (122-383)** | **1 (394-497)** | **1 (509-608)** | **1 (621-710)** |
| ***Babesia bovis*** | **1 (58-96)** | **1 (127-376)** | **1 (387-512)** | **1 (524-623)** | **1 (635-725)** |
| ***Theileria annulata*** | **1 (57-95)** | **1 (126-377)** | **1 (385-516)** | **1 (528-627)** | **1 (639-729)** |
| ***Eimeria tenella*** | **1 (53-91)** | **1 (144-419)** | **1 (427-530)** | **1 (542-641)** | **1 (655-744)** |
| ***Neospora caninum*** | **1 (53-91)** | **1 (133-410)** | **1 (421-524)** | **1 (536-635)** | **1 (649-738)** |
| ***Theileria parva*** | **1 (57-95)** | **1 (126-377)** | **1 (385-516)** | **1 (528-627)** | **1 (639-729)** |
| ***Phytophthora sojae*** | **1 (49-87)** | **1 (116-385)** | **1 (403-507)** | **1 (521-621)** | **1 (633-722)** |
| **Sec24A (Human) C:\Users\SPM HEQEP (CP-3492)\Downloads\sec24.png****Zf Sec23 Sec24****Sec23 BS****Sec23 helical****Gelsolin** |
| **Organism** | **Zf Sec23 Sec24** | **Sec23****trunk** | **Sec23 BS** | **Sec23 helical** | **Gelsolin** |
| ***Homo sapience*** | **1 (428-465)** | **1 (501-739)** | **1 (744-828)** | **1 (839-940)** | **1 (964-1039)** |
| ***Arabidopsis thaliana* (Sec24)** | **1 (368-406)** | **1 (443-680)** | **1 (685-769)** | **1 (780-884)** | **1 (909-980)** |
| ***Saccharomyces cerevisiae*****(Sec24)** | **1 (228-265)** | **1 (301-548)** | **1 (553-636)** | **1 (647-750)** | **1 (780-856)** |
| ***Plasmodium berghei*** | **1 (236-274)** | **1 (311-579)** | **1 (585-669)** | **1 (680-770)** | **1 (794-860)** |
| ***Plasmodium chabaudi******chabaudi*** | **1 (235-273)** | **1 (310-578)** | **1 (584-668)** | **1 (679-769)** | **1 (793-859)** |
| ***Plasmodium falciparum*** | **1 (223-261)** | **1 (298-577)** | **1 (582-666)** | **1 (677-767)** | **1 (791-855)** |
| ***Plasmodium knowlesi*** | **1 (224-262)** | **1 (299-570)** | **1 (576-660)** | **1 (671-759)** | **1 (788-849)** |
| ***Plasmodium vivax*** | **1 (226-264)** | **1 (301-572)** | **1 (578-662)** | **1 (673-763)** | **1 (791-852)** |
| ***Plasmodium yoelii*** | **1 (236-274)** | **1 (311-579)** | **1 (585-669)** | **1 (680-770)** | **1 (794-860)** |
| ***Toxoplasma gondii*** | **1 (228-266)** | **1 (303-527)** | **1 (601-699)** | **1 (710-834)** | **1 (862-916)** |
| ***Cryptosporidium parvum*** | **1 (196-234)** | **1 (271-516)** | **1 (521-607)** | **1 (618-710)** | **1 (732-800)** |
| ***Eimeria tenella*** | **1 (126-157)** | **2 (194-409,** **459-505)** | **1 (510-603)** | **1 (614-706)** |  |
| ***Neospora caninum*** |  | **1 (16-125)** | **1 (189-285)** | **1 (296-420)** |  |
| ***Theileria parva*** | **1 (232-270)** | **1 (306-550)** | **1 (555-645)** |  |  |
| ***Theileria annulata*** | **1 (238-276)** | **1 (312-556)** | **1 (561-651)** |  |  |
| ***Babesia bovis*** | **1 (179-217)** | **1 (251-484)** | **1 (489-573)** | **1 (584-676)** | **1 (698-763)** |
| ***Phytophthora sojae*** | **1 (338-376)** | **1 (413-649)** | **1 (654-738)** | **1 (749-854)** | **1 (888-973)** |
|  |  | **Zf Sec23 Sec24****Sec23 BS****Sec23 helical****Gelsolin** |  |  |  |
| **Human Sec 24B C:\Users\SPM HEQEP (CP-3492)\Downloads\sec24b.png** |
| **Organism** | **Zf Sec23 Sec24** | **Sec23****trunk** | **Sec23 BS** | **Sec23 helical** | **Gelsolin** |
| ***Homo sapience*** | **1 (602-639)** | **1 (675-914)** | **1 (919-1003)** | **1 (1014-1115)** | **1 (1139-1214)** |
| ***Plasmodium berghei*** |  | **1 (754-1019)** | **1 (1025-1113)** | **1 (1124-1222)** |  |
| ***Plasmodium chabaudi******chabaudi*** |  | **1 (754-1019)** | **1 (1025-1113)** | **1 (1124-1222)** |  |
| ***Plasmodium falciparum*** |  | **1 (751-987)** | **1 (993-1081)** | **1 (1092-1190)** |  |
| ***Plasmodium knowlesi*** |  | **1 (926-1169)** | **1 (1176-1264)** | **1 (1275-1373)** |  |
| ***Plasmodium vivax*** |  | **1 (944-1192)** | **1 (1198-1286)** | **1 (1297-1395)** |  |
| ***Plasmodium yoelii*** |  | **1 (745-1010)** | **1 (1016-1104)** | **1 (1115-1213)** |  |
| ***Toxoplasma gondii*** | **1 (682-720)** | **1 (848-1148)** |  | **1 (1268-1366)** |  |
| ***Cryptosporidium parvum*** | **1 (313-351)** | **1 (396-615)** | **1 (687-776)** | **1 (839-912)** |  |
| ***Eimeria tenella*** | **1 (673-711)** | **1 (853-1019)** |  | **1 (1209-1309)** |  |
| ***Neospora caninum*** | **1 (661-699)** | **1 (831-1126)** |  | **1 (1246-1344)** |  |
| ***Theileria parva*** | **1 (292-329)** | **1 (446-669)** | **1 (674-762)** | **1 (773-856)** |  |
| ***Theileria annulata*** | **1 (291-328)** | **1 (451-686)** | **1 (691-779)** | **1 (790-869)** |  |
| ***Babesia bovis*** | **1 (245-281)** | **1 (425-660)** | **1 (665-754)** | **1 (766-853)** |  |
| ***Phytophthora sojae*** | **1 (358-396)** | **1 (433-675)** | **1 (680-770)** | **1 (781-897)** |  |

**Table S15:** The list of proteins identified to have interaction and co-expression for COPI and COPII.

|  |  |
| --- | --- |
| COPI | COPII |
| First shell of interaction | First shell of interaction |
| Interacting protein from String | New ID (Name of the protein) | Interacting protein from String | New ID (Name of the protein) |
| PFD0745c | PF3D7\_0415400 (coatomer subunit zeta, putative) | PF13\_0324 | PF3D7\_1361100 (protein transport protein Sec24A) |
| PFF0330w | PF3D7\_0606700 (coatomer alpha subunit, putative) | Sar1 | PF3D7\_0416800 (small GTP-binding protein sar1) |
| PF11\_0463 | PF3D7\_1145100 (coatomer subunit gamma, putative) | PFL1480w | PF3D7\_1230700 (protein transport protein SEC13) |
| PF14\_0277 | PF3D7\_1429800 (coatomer subunit beta, putative) | Pfsec23 | PF3D7\_0822600 (protein transport protein SEC23) |
| PFI0290c | PF3D7\_0905900 (coatomer subunit beta, putative) | Sec31p | PF3D7\_0214100 (protein transport protein SEC31) |
| PF11\_0359 | PF3D7\_1134800 (coatomer subunit delta) | PFI0250c | PF3D7\_0905100 (nucleoporin NUP100/NSP100, putative) |
| MAL8P1.121 | PF3D7\_0808400 (coatomer subunit epsilon, putative) | PFD0872w | PF3D7\_0418000 (conserved Plasmodium protein, unknown function) |
| PFF0655c | PF3D7\_0613500 (AP-3 complex subunit beta, putative) | PfSec22 | PF3D7\_0320100 (protein transport protein SEC22) |
| PFE1400c | PF3D7\_0528100 (AP-1 complex subunit beta, putative) | PFD0250c | PF3D7\_0405100 (protein transport protein Sec24B, putative) |
| MAL7P1.164 | PF3D7\_0730200 (AP-4 complex subunit beta, putative) | PfSyn5 | PF3D7\_1332000 (syntaxin, Qa-SNARE family) |
| PF08\_0120 | PF3D7\_0804900 (GTPase-activating protein, putative) | ERD2 | PF3D7\_1353600 (ER lumen protein retaining receptor) |
| MAL13P1.163.1 | PF3D7\_1330400 (ER lumen protein retaining receptor 1, putative) | Rab1a | PF3D7\_0513800 (ras-related protein Rab-1A) |
|  |  | Rab1b | PF3D7\_0512600 (ras-related protein Rab-1B) |
| Second shell of interaction | Second shell of interaction |
| PFB0805c | PF3D7\_0217300 (AP-2 complex subunit sigma, putative) | PfVAMP8 | PF3D7\_1303200 (SNARE protein, putative) |
| PFL2425w | PF3D7\_1250500 (AP-3 complex subunit sigma, putative) | PFB0750w | PF3D7\_0216400 (vacuolar protein sorting-associated protein 45, putative) |
| PF14\_0529 | PF3D7\_1455500 (AP-1 complex subunit gamma, putative) | PFE0445c | PF3D7\_0509000 (alpha-soluble NSF attachment protein, putative) |
| PF13\_0062 | PF3D7\_1311400 (AP-1 complex subunit mu-1) | PFC0140c | PF3D7\_0303000 (N-ethylmaleimide-sensitive fusion protein) |
| PFF0830w | PF3D7\_0617100 (AP-2 complex subunit alpha, putative) | Syn16 | PF3D7\_1243000 (syntaxin, Qa-SNARE family) |
| PF11\_0202 | PF3D7\_1119500 (AP-4 complex subunit mu, putative) | Syn17 | PF3D7\_0210700 (syntaxin, Qa-SNARE family) |
| PFL2220w | PF3D7\_1246300 (conserved Plasmodium protein, unknown function) | PFF0665c | PF3D7\_0613700 (syntaxin-binding protein, putative) |
| PFD1090c | PF3D7\_0423100 (AP-4 complex subunit sigma, putative) | PF10\_0331 | PF3D7\_1034000 (Sec1 family protein, putative) |
| PFI0200c | PF3D7\_0904100 (AP-4 complex subunit epsilon, putative) | PfYkt6.1 | PF3D7\_0910600 (SNARE protein) |
| PFL0930w | PF3D7\_1219100 (clathrin heavy chain, putative) | PfYkt6.2 | PF3D7\_1324700 (SNARE protein, putative) |