Supplementary Tables T1 and T2 summarizes relevant information of all TRAP and TRP family members. Accession numbers are from PiroplasmaDB database except those with (a) which indicate NCBI accession numbers. b. See reference of TRAP-2 *of B. orientalis* (7). c. ID obtained from genome annotation. Abbreviation of domains (SP, vWFA, etc.) is explained in the main text.

N/A: not available.

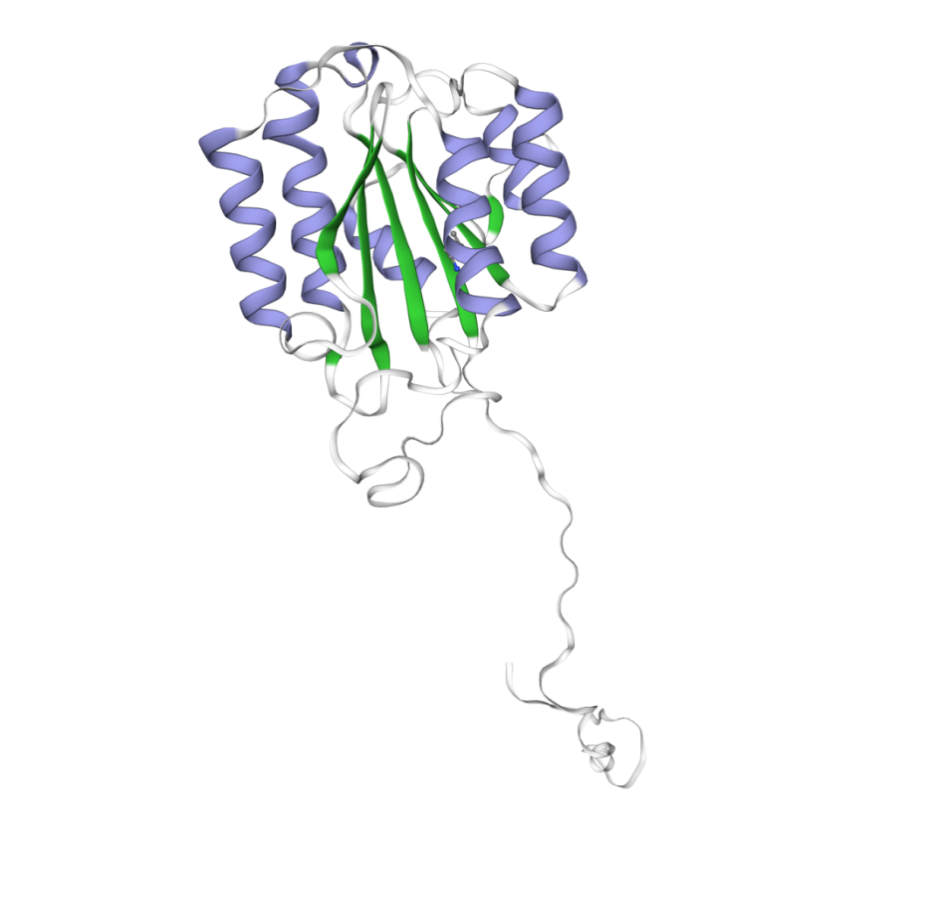
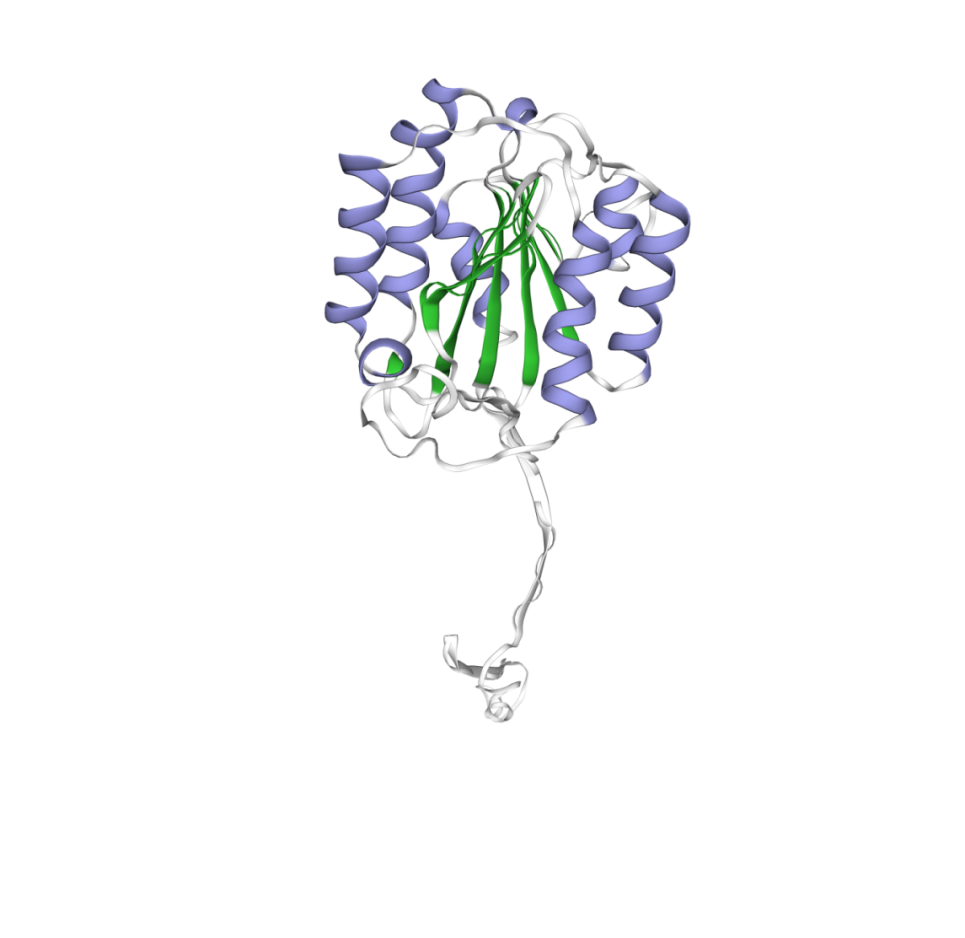
**Supplementary Table T1**

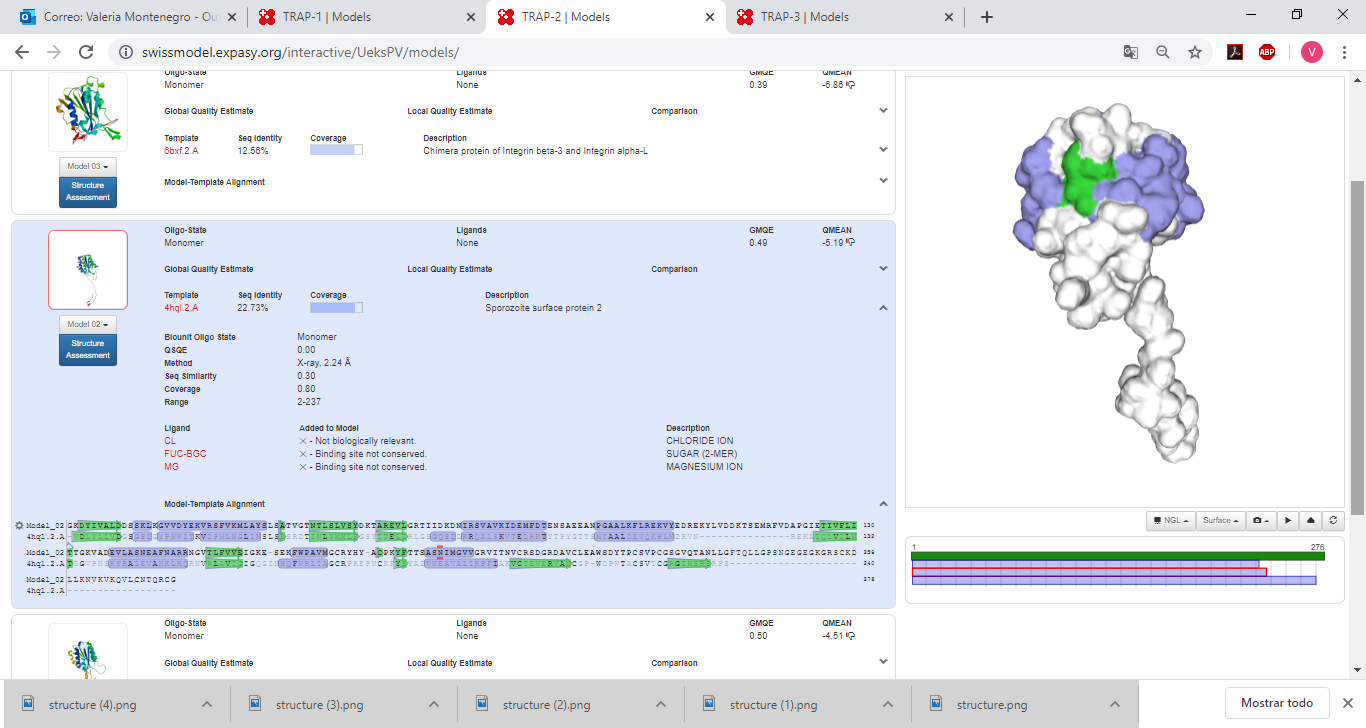
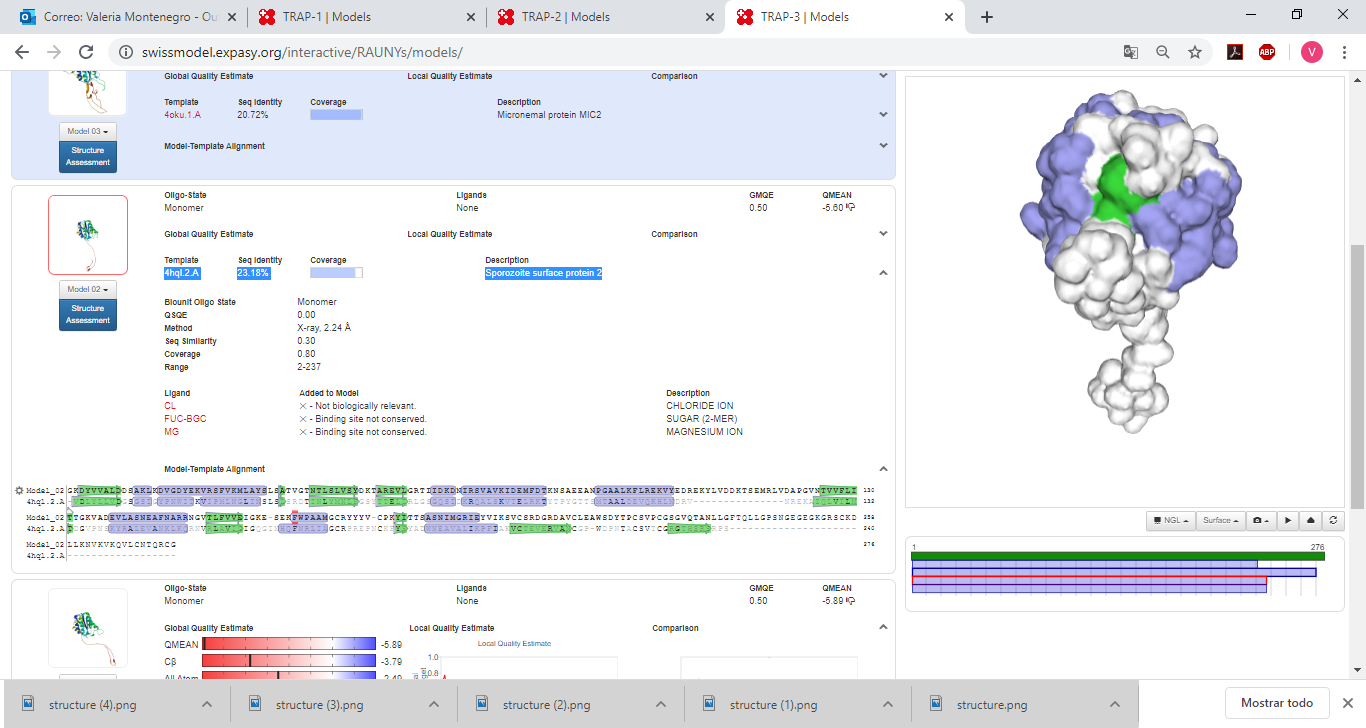
|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **TRAP Family** | **Accession numbers** | **SP** | **vWFA** | **TSP-1** | **TM** | **acidic CTD** | **W** | **Orthology group** |
| *B. bigemina* | TRAP-1 | BBBOND\_0202740 | Yes | 1 | 1 | Yes | Yes | Yes | OG6\_115645 |
| TRAP-2 | [BBBOND\_0202800](https://piroplasmadb.org/piro/app/record/gene/BBBOND_0202800) | Yes | 1 | 1 | Yes | Yes | Yes | OG6\_194574 |
| TRAP-3 | [BBBOND\_0202760](https://piroplasmadb.org/piro/app/record/gene/BBBOND_0202760) | Yes | 2 | 2 | Yes | Yes | Yes | OG6\_194574 |
| *B. bovis* | TRAP-1 | BBOV\_II002650 | Yes | 1 | 1 | Yes | Yes | Yes | OG6\_115645 |
| TRAP-2 | BBOV\_II002890 | Yes | 2 | 2 | Yes | Yes | Yes | OG6\_194574 |
| TRAP-3 | BBOV\_II002630 | Yes | 2 | 2 | Yes | Yes | Yes | OG6\_194574 |
| TRAP-4 | BBOV\_II002870 | Yes | 1 | No | Yes | Yes | Yes | OG6\_194574 |
| *B. canis* | TRAP-2 | Bc-CHIPZ-H002772c | Yes | 1 | 1 | No | No | No | OG6\_194574 |
| *B. orientalis* | TRAP-1 | AYJ18799.1a | Yes | 1 | 1 | Yes | Yes | Yes | OG6\_115645 |
| TRAP-2 | See referenceb | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| *B. gibsoni* | TRAP-2 | BAI66064.1a | No | 1 | 1 | Yes | Yes | Yes | OG6\_194574 |
| TRAP-3 | BAB68553.2a | Yes | 1 | 1 | Yes | Yes | Yes | OG6\_194574 |
| *B. divergens* | TRAP-1 | Bdiv\_010490 | Yes | 1 | 1 | Yes | Yes | Yes | OG6\_115645 |
| TRAP-2 | Bdiv\_010470 | Yes | 1 | 1 | Yes | Yes | Yes | OG6\_194574 |
| *B. microti* | TRAP-1 | BmR1\_04g08630 | Yes | 1 | 1 | Yes | Yes | Yes | OG6\_115645 |
| TRAP-2 | BmR1\_04g08640 | No | 1 | 3 | Yes | Yes | Yes | OG6\_106501 |
| *B. ovata* | TRAP-1 | BOVATA\_031530 | Yes | 1 | 1 | Yes | Yes | Yes | OG6\_115645 |
| TRAP-2 | BOVATA\_031480 | Yes | 1 | 1 | Yes | Yes | Yes | OG6\_194574 |
| TRAP-3 | BOVATA\_031510 | Yes | 2 | 2 | Yes | Yes | Yes | OG6\_194574 |
| *T. annulata* | TRAP-1 | TA07755 | No | 1 | 1 | Yes | Yes | Yes | OG6\_109573 |
| TRAP-2 | TA07750 | Yes | 1 | 1 | Yes | Yes | Yes | OG6\_129789 |
| *T. equi* | TRAP-1 | BEWA\_005710 | Yes | 1 | 1 | Yes | Yes | Yes | OG6\_109573 |
| TRAP-2 | BEWA\_005690 | Yes | 1 | No | Yes | Yes | Yes | OG6\_129789 |
| *T. orientalis* | TRAP-1 | TOT\_040000591 | Yes | 1 | 1 | Yes | No | No | OG6\_109573 |
| TRAP-2 | TOT\_040000593 | No | 1 | 1 | No | No | Yes | OG6\_109272 |
| *T. parva* | TRAP-1 | TP04\_0306 | No | 1 | 1 | Yes | No | No | OG6\_109573 |
| TRAP-2 | TP04\_0305 | Yes | 1 | No | Yes | Yes | Yes | OG6\_129789 |

**Supplementary Table T2**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **TRP Family** | **Accession numbers** | **SP** | **vWFA** | **TSP-1** | **TM** | **Orthology group** |
| *B. bigemina* | TRP-1 | [BBBOND\_0103660](https://piroplasmadb.org/piro/app/record/gene/BBBOND_0103660) | Yes | No | 4 | Yes | OG6\_130928 |
| TRP-2 | [BBBOND\_0105380](https://piroplasmadb.org/piro/app/record/gene/BBBOND_0105380) | No | No | 1 | No | OG6\_160841 |
| TRP-3 | BBBOND\_0103630 | Yes | No | 1 | Yes | OG6\_171449 |
| *B. bovis* | TRP-1 | BBOV\_II006510 | Yes | No | 3 | Yes | OG6\_130928 |
| TRP-2 | BBOV\_IV008000 | No | No | 1 | No | OG6\_160841 |
| TRP-3 | BBOV\_II006540 | No | No | 2 | Yes | OG6\_171449 |
| *B. divergens* | TRP-1 | Bdiv\_004450 | Yes | No | 3 | Yes | OG6\_130928 |
| TRP-2 | Bdiv\_020650 | No | No | 1 | No | OG6\_160841 |
| TRP-3 | Bdiv\_004480c | Yes | No | 2 | Yes | OG6\_171449 |
| *B. microti* | TRP-1 | BMR1\_03g00437 | Yes | No | 2 | Yes | OG6\_130928 |
| TRP-2 | BmR1\_04g09041 | No | No | 1 | Yes | OG6\_160841 |
| TRP-3 | BMR1\_03g00451 | No | No | 1 | Yes | OG6\_171449 |
| *B. ovata* | TRP-1 | BOVATA\_022550 | Yes | No | 3 | Yes | OG6\_130928 |
| TRP-3 | BOVATA\_022570 | Yes | No | 3 | Yes | OG6\_171449 |
| *T. annulata* | TRP-1 | TA14200 | Yes | No | 1 | Yes | OG6\_130928 |
| TRP-2 | TA16575 | No | No | 1 | Yes | OG6\_160841 |
| TRP-3 | TA14215 | Yes | No | 1 | Yes | OG6\_171449 |
| *T. equi* | TRP-1 | BEWA\_024230 | Yes | No | 3 | Yes | OG6\_130928 |
| TRP-3 | BEWA\_024280 | No | No | 2 | No | OG6\_171449 |
| *T. orientalis* | TRP-1 | TOT\_020000606 | Yes | No | 1 | No | OG6\_130928 |
| TRP-2 | TOT\_010000937 | No | No | 1 | Yes | OG6\_160841 |
| TRP-3 | TOT\_020000608 | No | No | 2 | Yes | OG6\_171449 |
| *T. parva* | TRP-1 | TP02\_0615 | No | No | 1 | Yes | OG6\_130928 |
| TRP-2 | TP01\_0984 | No | No | 1 | No | OG6\_160841 |
| TRP-3 | TP02\_0622 | No | No | 1 | No | OG6\_171449 |

Supplementary Figure S1: Hypothetical 3D structure of BbiTRAP-1-3 as cartoon and surface structures.

TRAP-1 TRAP-2 TRAP-3