

**Supplementary Table 2: Negative training set used for ApicoAMP development**

BBOV_IV007730	B. bovis	cysteine protease 2	Confirmed localization: erythrocyte cytoplasm and middle-rear, Apiloc
BBOV_I001630	B. bovis	hypothetical protein, conserved	Ortholog to confirmed protein PVX_117880 (OG5_142870), Apiloc
BBOV_II005100	B. bovis	surface protein precursor (TaSP), putative	Ortholog to confirmed protein TA17315 (OG5_139232), Apiloc
BBOV_IV011230	B. bovis	apical merozoite antigen 1	Ortholog to confirmed proteins PVX_092275,PY01581 (OG5_147452), Apiloc
BBOV_III010070	B. bovis	cysteine protease 2	Ortholog to confirmed protein XP_001610695.1 (OG5_129645), Apiloc
NCLIV_022970	N. caninum	microneme protein 2, putative	Confirmed localization: microneme, Apiloc
NCLIV_025140	N. caninum	surface protein precursor (TaSP), putative	Ortholog to confirmed protein TA17315 (OG5_139232), Apiloc
NCLIV_033690	N. caninum	microneme protein 2, putative	Ortholog to confirmed proteins NCLIV_022970,PBANKA_041290 (OG5_138427), Apiloc
NCLIV_064590	N. caninum	apical merozoite antigen 1	Ortholog to confirmed proteins PVX_092275,PY01581 (OG5_147452), Apiloc
NCLIV_064620	N. caninum	hypothetical protein, conserved	Ortholog to confirmed protein PVX_117880 (OG5_142870), Apiloc
PBANKA_030250	P. berghei	hexose transporter	Confirmed localization: cytoplasm, parasite plasma membrane, Apiloc
PBANKA_040320	P. berghei	circumsporozoite (CS) protein	Confirmed localization: nucleus, parasite plasma membrane, Apiloc
PBANKA_051500	P. berghei	25 kDa ookinete surface antigen precursor	Confirmed localization: cytoplasm, parasite plasma membrane, Apiloc
PBANKA_091560	P. berghei	aquaglyceroporin	Confirmed localization: parasite plasma membrane, Apiloc
PBANKA_110220	P. berghei	merozoite surface protein 8	Confirmed localization: food vacuole, parasitophorous vacuole, Apiloc
PBANKA_134980	P. berghei	thrombospondin-related anonymous protein	Confirmed localization: apical, cytoplasm, Apiloc
PBANKA_020160	P. berghei	early transcribed membrane protein (ETRAMP)	Ortholog to confirmed protein PCHAS_000190 (OG5_194730), Apiloc
PBANKA_130290	P. berghei	surface protein precursor (TaSP), putative	Ortholog to confirmed protein TA17315 (OG5_139232), Apiloc
PBANKA_133270	P. berghei	erythrocyte binding protein (alpha)	Ortholog to confirmed proteins PKH_062300,PVX_110810 (OG5_148188), Apiloc
PCHAS_000190	P. chabaudi	early transcribed membrane protein	Confirmed localization: apical, parasitophorous vacuole, Apiloc

		(ETRAMP)	
PCHAS_050120	P. chabaudi	early transcribed membrane protein	Ortholog to confirmed protein PBANKA_052480 (OG5_180086), Apiloc
PCHAS_091760	P. chabaudi	circumsporozoite-related antigen	Ortholog to confirmed proteins PBANKA_092670,PY04421 (OG5_167197), Apiloc
PCHAS_093100	P. chabaudi	apical merozoite antigen 1	Ortholog to confirmed proteins PVX_092275,PY01581 (OG5_147452), Apiloc
PCHAS_133730	P. chabaudi	erythrocyte binding protein (alpha)	Ortholog to confirmed proteins PKH_062300,PVX_110810 (OG5_148188), Apiloc
PCHAS_135440	P. chabaudi	thrombospondin-related anonymous protein	Ortholog to confirmed proteins PBANKA_134980,PY03052 (OG5_144162), Apiloc
PCHAS_143560	P. chabaudi	thrombospondin-related protein 3 precursor, putative	Ortholog to confirmed protein PVX_123575 (OG5_167477), Apiloc
MAL13P1.130	P. falciparum	glideosome associated protein with multiple membrane spans 1	Confirmed localization: inner membrane complex, Apiloc
MAL13P1.206	P. falciparum	sodium-dependent phosphate transporter	Confirmed localization: parasite plasma membrane, Apiloc
MAL13P1.413	P. falciparum	membrane associated histidine-rich protein	Confirmed localization: parasitophorous vacuole, Apiloc
MAL13P1.60	P. falciparum	erythrocyte binding antigen-140	Confirmed localization: microneme, Apiloc
MAL7P1.172	P. falciparum	Plasmodium exported protein (PHISTc), unknown function	Confirmed localization: exported, maurer's cleft, Apiloc
MAL7P1.176	P. falciparum	erythrocyte binding antigen-175	Confirmed localization: parasite plasma membrane, Apiloc
MAL8P1.3	P. falciparum	Plasmodium exported protein (hyp9), unknown function	Confirmed localization: parasite plasma membrane, Apiloc
PF10_0019	P. falciparum	early transcribed membrane protein 10.1	Confirmed localization: parasitophorous vacuole, Apiloc
PF10_0023	P. falciparum	Plasmodium exported protein (hyp16), unknown function	Confirmed localization: exported, maurer's cleft, Apiloc
PF10_0164	P. falciparum	early transcribed membrane protein 10.3	Confirmed localization: parasitophorous vacuole, Apiloc
PF10_0281	P. falciparum	merozoite TRAP-like protein	Confirmed localization: microneme, Apiloc
PF10_0303	P. falciparum	25 kDa ookinete surface antigen	Confirmed localization: parasite plasma membrane, Apiloc

		precursor	
PF10_0323	P. falciparum	early transcribed membrane protein 10.2	Confirmed localization: parasitophorous vacuole, Apiloc
PF10_0374	P. falciparum	Pf11-1 protein	Confirmed localization: exported, erythrocyte, Apiloc
PF10_0395	P. falciparum	stevor	Confirmed localization: exported, maurer's cleft, Apiloc
PF11_0040	P. falciparum	early transcribed membrane protein 11.2	Confirmed localization: exported, erythrocyte, Apiloc
PF11_0162	P. falciparum	cysteine proteinase falcipain 3	Confirmed localization: exported, food vacuole, Apiloc
PF11_0165	P. falciparum	cysteine proteinase falcipain 2a	Confirmed localization: endoplasmic reticulum, food vacuole, golgi apparatus, Apiloc
PF11_0224	P. falciparum	circumsporozoite-related antigen	Confirmed localization: cytoplasm, exported, parasitophorous vacuole, Apiloc
PF11_0338	P. falciparum	aquaglyceroporin	Confirmed localization: cytoplasm and peripheral, Apiloc
PF11_0344	P. falciparum	apical membrane antigen 1	Confirmed localization: microneme, parasite plasma membrane, Apiloc
PF13_0218	P. falciparum	ABC transporter (MDR family), putative	Confirmed localization: food vacuole, parasite plasma membrane, Apiloc
PF13_0247	P. falciparum	6-cysteine protein	Confirmed localization: parasite plasma membrane, Apiloc
PF13_0248	P. falciparum	6-cysteine protein	Confirmed localization: parasite plasma membrane, Apiloc
PF13_0252	P. falciparum	nucleoside transporter 1	Confirmed localization: parasite plasma membrane, Apiloc
PF13_0276	P. falciparum	membrane-associated histidine rich protein 2, (MARHP2)	Confirmed localization: exported, maurer's cleft, Apiloc
PF13_0280	P. falciparum	ER lumen protein retaining receptor	Confirmed localization: golgi apparatus, Apiloc
PF13_0338	P. falciparum	cysteine-rich surface protein	Confirmed localization: apical, parasite plasma membrane, Apiloc
PF14_0016	P. falciparum	early transcribed membrane protein 14.1	Confirmed localization: erythrocyte cytosol, exported, Apiloc
PF14_0065	P. falciparum	glideosome associated protein with multiple membrane spans 3, putative	Confirmed localization: inner membrane complex, Apiloc
PF14_0097	P. falciparum	cytidine diphosphate-diacylglycerol synthase	Confirmed localization: parasitophorous vacuole, Apiloc
PF14_0201	P. falciparum	surface protein, Pf113	Confirmed localization: apical, parasite plasma membrane, Apiloc
PF14_0541	P. falciparum	V-type H( )-translocating pyrophosphatase, putative	Confirmed localization: cytoplasm, parasite plasma membrane, Apiloc

PF14_0543	P. falciparum	signal peptide peptidase	Confirmed localization: apical parasite plasma membrane and microneme, Apiloc
PF14_0607	P. falciparum	conserved Plasmodium membrane protein, unknown function	Confirmed localization: exported, parasitophorous vacuole, Apiloc
PF14_0622	P. falciparum	potassium channel protein	Confirmed localization: erythrocyte cytosol ,exported, Apiloc
PF14_0679	P. falciparum	inorganic anion exchanger, inorganic anion antiporter	Confirmed localization: parasite plasma membrane, Apiloc
PF14_0744	P. falciparum	Plasmodium exported protein, unknown function	Confirmed localization: exported, parasitophorous vacuole, Apiloc
PF14_0748	P. falciparum	Plasmodium exported protein (PHISTa), unknown function	Confirmed localization: exported, parasitophorous vacuole, Apiloc
PF14_0758	P. falciparum	Plasmodium exported protein (hyp17), unknown function	Confirmed localization: erythrocyte cytoplasm, exported, Apiloc
PFA0590w	P. falciparum	ABC transporter, (CT family), putative	Confirmed localization: parasite plasma membrane, Apiloc
PFA0670c	P. falciparum	Plasmodium exported protein (hyp8), unknown function	Confirmed localization: erythrocyte cytosol ,exported, Apiloc
PFA0680c	P. falciparum	Pfmc-2TM Maurer's cleft two transmembrane protein	Confirmed localization: exported, parasitophorous vacuole, Apiloc
PFB0106c	P. falciparum	Plasmodium exported protein, unknown function	Confirmed localization: erythrocyte cytosol ,exported, Apiloc
PFB0120w	P. falciparum	early transcribed membrane protein 2	Confirmed localization: parasitophorous vacuole, Apiloc
PFB0305c-a	P. falciparum	merozoite surface protein 5	Confirmed localization: parasite plasma membrane, Apiloc
PFB0310c	P. falciparum	merozoite surface protein 4	Confirmed localization: parasite plasma membrane, Apiloc
PFC0160w	P. falciparum	palmitoyl transferase	Confirmed localization: golgi apparatus, Apiloc
PFC0210c	P. falciparum	circumsporozoite (CS) protein	Confirmed localization: parasite plasma membrane, Apiloc
PFD0295c	P. falciparum	apical sushi protein	Confirmed localization: rhoptry neck , apical, Apiloc
PFD0310w	P. falciparum	sexual stage-specific protein precursor	Confirmed localization: exported, food vacuole, parasitophorous vacuole, Apiloc
PFD0495c	P. falciparum	conserved Plasmodium protein, unknown function	Confirmed localization: cytoplasm and erythrocyte cytosol, Apiloc
PFD1120c	P. falciparum	early transcribed membrane protein 4	Confirmed localization: parasitophorous vacuole, Apiloc
PFD1165w	P. falciparum	serine/threonine protein kinase, FIKK	Confirmed localization: exported, maurer's cleft, Apiloc

		family	
PFE0060w	P. falciparum	parasite-infected erythrocyte surface protein	Confirmed localization: exported, maurer's cleft, Apiloc
PFE0065w	P. falciparum	skeleton-binding protein 1	Confirmed localization: exported, maurer's cleft, Apiloc
PFE0120c	P. falciparum	merozoite surface protein 8,ring-stage membrane protein 1	Confirmed localization: food vacuole, parasite plasma membrane, Apiloc
PFE0340c	P. falciparum	rhomboid protease ROM4	Confirmed localization: parasite plasma membrane, Apiloc
PFE0395c	P. falciparum	6-cysteine protein	Confirmed localization: apical, merozoite surface, Apiloc
PFF0615c	P. falciparum	6-cysteine protein	Confirmed localization: parasite plasma membrane, Apiloc
PFF0995c	P. falciparum	merozoite surface protein 10	Confirmed localization: apical, parasite plasma membrane, Apiloc
PFI0050c	P. falciparum	rifin	Confirmed localization: endoplasmic reticulum, exported, maurer's cleft, Apiloc
PFI0250c	P. falciparum	conserved Plasmodium membrane protein, unknown function	Confirmed localization: cytoplasm, nucleus, parasitophorous vacuole, Apiloc
PFI0880c	P. falciparum	glideosome-associated protein 50,secreted acid phosphatase	Confirmed localization: endoplasmic reticulum, food vacuole, inner membrane complex, Apiloc
PFI1730w	P. falciparum	cytoadherence linked asexual protein 9	Confirmed localization: apical, rhoptry, Apiloc
PFI1735c	P. falciparum	ring-exported protein 1	Confirmed localization: exported, maurer's cleft, Apiloc
PFI1740c-a	P. falciparum	ring-exported protein 2	Confirmed localization: exported, erythrocyte cytoplasm and maurer's cleft, Apiloc
PFI1755c	P. falciparum	ring-exported protein 3	Confirmed localization: erythrocyte cytoplasm ,exported, Apiloc
PFI1760w	P. falciparum	ring-exported protein 4	Confirmed localization: erythrocyte cytoplasm ,exported, Apiloc
PFI1780w	P. falciparum	Plasmodium exported protein (PHISTc), unknown function	Confirmed localization: erythrocyte cytosol, exported, Apiloc
PFL0870w	P. falciparum	thrombospondin-related apical membrane protein	Confirmed localization: parasite plasma membrane, Apiloc
PFL1315w	P. falciparum	potassium channel protein	Confirmed localization: erythrocyte plasma membrane, exported, Apiloc
PFL1410c	P. falciparum	ABC transporter, (CT family)	Confirmed localization: parasite plasma membrane, Apiloc
PFL1700c	P. falciparum	V-type K -independent H -translocating inorganic pyrophosphatase	Confirmed localization: parasite plasma membrane, Apiloc
PFL2505c	P. falciparum	conserved Plasmodium protein,	Confirmed localization: apical, parasitophorous vacuole, Apiloc

		unknown function	
PKH_062300	P. knowlesi	erythrocyte binding protein (alpha)	Confirmed localization: apical, microneme, Apiloc
PKH_000490	P. knowlesi	erythrocyte binding protein (alpha)	Ortholog to confirmed proteins PKH_062300,PVX_110810 (OG5_148188), Apiloc
PKH_061530	P. knowlesi	25 kDa ookinete surface antigen precursor	Ortholog to confirmed protein PBANKA_051500 (OG5_156053), Apiloc
PKH_083560	P. knowlesi	circumsporozoite (CS) protein	Ortholog to confirmed proteins PBANKA_040320,PY03168 (OG5_159725), Apiloc
PKH_093060	P. knowlesi	aquaglyceroporin	Ortholog to confirmed protein PBANKA_091560 (OG5_126615), Apiloc
PKH_093110	P. knowlesi	apical merozoite antigen 1	Ortholog to confirmed proteins PVX_092275,PY01581 (OG5_147452), Apiloc
PKH_121770	P. knowlesi	thrombospondin-related anonymous protein	Ortholog to confirmed proteins PBANKA_134980,PY03052 (OG5_144162), Apiloc
PVX_110810	P. vivax	Duffy receptor precursor	Confirmed localization: apical, microneme, Apiloc
PVX_123575	P. vivax	thrombospondin-related protein 3 precursor, putative	Confirmed localization: merozoite surface and microneme, Apiloc
PVX_082735	P. vivax	thrombospondin-related anonymous protein	Ortholog to confirmed proteins PBANKA_134980,PY03052 (OG5_144162), Apiloc
PVX_091700	P. vivax	circumsporozoite-related antigen	Ortholog to confirmed proteins PBANKA_092670,PY04421 (OG5_167197), Apiloc
PVX_097625	P. vivax	merozoite surface protein 8	Ortholog to confirmed proteins PBANKA_110220,PY06415 (OG5_166908), Apiloc
PVX_118540	P. vivax	surface protein precursor (TaSP), putative	Ortholog to confirmed protein TA17315 (OG5_139232), Apiloc
PVX_119355	P. vivax	circumsporozoite (CS) protein	Ortholog to confirmed proteins PBANKA_040320,PY03168 (OG5_159725), Apiloc
PY03052	P. yoelii	sporozoite surface protein 2 precursor	Confirmed localization: parasite plasma membrane, Apiloc
PY04421	P. yoelii	U43539 hepatocyte erythrocyte protein 17 kDa	Confirmed localization: parasitophorous vacuole, Apiloc
PY04799	P. yoelii	early transcribed membrane protein	Ortholog to confirmed protein PBANKA_052480 (OG5_180086), Apiloc
TA06510	T. annulata	hypothetical protein	Confirmed localization: parasite plasma membrane, Apiloc
TA17315	T. annulata	surface protein precursor (TaSP),	Confirmed localization: parasite plasma membrane, Apiloc

		putative	
TA03725	T. annulata	cysteine protease 2	Ortholog to confirmed protein XP_001610695.1 (OG5_129645), Apiloc
TA03745	T. annulata	cysteine protease 2	Ortholog to confirmed protein XP_001610695.1 (OG5_129645), Apiloc
TGME49_000290	T. gondii	rhomboid family domain-containing protein	Confirmed localization: apical, endoplasmic reticulum, golgi apparatus, Apiloc
TGME49_003310	T. gondii	dense granule protein 7	Confirmed localization: apical, parasitophorous vacuole, Apiloc
TGME49_004340	T. gondii	hypothetical protein	Confirmed localization: apical, microneme, Apiloc
TGME49_007160	T. gondii	SRS49D (= SAG2C)	Confirmed localization: exported, host cell plasma membrane, Apiloc
TGME49_014320	T. gondii	facilitative glucose transporter, putative	Confirmed localization: parasite plasma membrane, Apiloc
TGME49_018520	T. gondii	microneme protein MIC6	Confirmed localization: apical, microneme, Apiloc
TGME49_023920	T. gondii	hypothetical protein	Confirmed localization: apical, rhoptry, Apiloc
TGME49_027280	T. gondii	dense granule protein 3	Confirmed localization: parasitophorous vacuole, Apiloc
TGME49_033450	T. gondii	SRS29A (= SRS1)	Confirmed localization: exported, parasite plasma membrane, Apiloc
TGME49_042720	T. gondii	hypothetical protein	Confirmed localization: golgi apparatus, Apiloc
TGME49_045490	T. gondii	microneme protein 8	Confirmed localization: apical, microneme, Apiloc
TGME49_047540	T. gondii	ABC transporter, putative	Confirmed localization: parasite plasma membrane, parasitophorous vacuole, Apiloc
TGME49_052640	T. gondii	plasma-membrane H <sup>+</sup> -ATPase, putative	Confirmed localization: parasite plasma membrane, Apiloc
TGME49_055260	T. gondii	apical membrane antigen 1, putative	Confirmed localization: apical, inner membrane complex, Apiloc
TGME49_059200	T. gondii	Na <sup>+</sup> /H <sup>+</sup> antiporter, putative	Confirmed localization: parasite plasma membrane, Apiloc
TGME49_060310	T. gondii	ATP-binding cassette protein subfamily B member 1	Confirmed localization: parasite plasma membrane, Apiloc
TGME49_061780	T. gondii	microneme protein 7	Confirmed localization: apical, microneme, Apiloc
TGME49_063290	T. gondii	rhomboid-like protease TgROM2	Confirmed localization: golgi apparatus, parasite plasma membrane, Apiloc
TGME49_068590	T. gondii	rhomboid-like protease 4	Confirmed localization: parasite plasma membrane, Apiloc
TGME49_072500	T. gondii	sugar transporter, putative	Confirmed localization: parasite plasma membrane, Apiloc
TGME49_075440	T. gondii	granule antigen protein GRA6	Confirmed localization: parasite plasma membrane, parasitophorous vacuole, Apiloc

TGME49_077080	T. gondii	microneme TgMIC5 protein	Confirmed localization: apical, microneme, Apiloc
TGME49_086450	T. gondii	dense granule protein 5 precursor	Confirmed localization: parasitophorous vacuole, Apiloc
TGME49_089630	T. gondii	hypothetical protein	Confirmed localization: apical, microneme, Apiloc
TGME49_094690	T. gondii	rhomboid-like protease 5	Confirmed localization: parasite plasma membrane, Apiloc
TGME49_100100	T. gondii	rhoptry neck protein 2	Confirmed localization: exported, inner membrane complex, Apiloc
TGME49_112100	T. gondii	Ca <sup>2+</sup> -ATPase	Confirmed localization: parasite plasma membrane, Apiloc
TGME49_115560	T. gondii	ABC transporter, putative	Confirmed localization: golgi apparatus, parasite plasma membrane, Apiloc
TP01_0939	T. parva	hypothetical protein	Confirmed localization: parasite plasma membrane, Apiloc
TP04_0051	T. parva	polymorphic immunodominant molecule	Confirmed localization: parasite plasma membrane, Apiloc
TP01_0014	T. parva	hypothetical protein, conserved	Ortholog to confirmed protein PVX_117880 (OG5_142870), Apiloc
TP01_0650	T. parva	apical merozoite antigen 1	Ortholog to confirmed proteins PVX_092275, PY01581 (OG5_147452), Apiloc

Note: OGx references refer to OrthoMCL-DB [23] ortholog group numbers.