

Electronic Supplementary Information

Modeling metabolism and stage-specific growth of *Plasmodium falciparum* HB3 during the intraerythrocytic developmental cycle

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Supplemental Table S1: List of pyridoxal 5-phosphate-dependent enzymes in *Plasmodium falciparum*.

The enzymes and related genes are listed by Kronenberger et al.³⁸ For each of these enzymes, we estimated the peak time of its abundance by adding the peak time of the related gene expression⁹ and the time delay of proteomics data compared to the corresponding transcriptomics data³⁶ (see Experimental Section for the details of how to calculate the time delays). An enzyme is considered to be active during the ring, trophozoite, or schizont stage if its proteomics peak time is during 0–18, 18–30, or 30–48 hours, respectively.⁹ EC-#, Enzyme Commission number.

Index	EC-#	Enzyme annotation	Gene	Gene in metabolic network? ¹⁶	Peak time in gene expression ⁹ (hour)	Time delay ³⁶	Estimated peak time for proteomics (hour)	Estimated stage
1	2.1.2.1	Serine hydroxymethyltransferase	PFL1720w	Yes	30–35	11	41–46	Schizont
2	2.3.1.37	ALA synthase (aminolevulinate synthase)	PFL2210w	Yes	15–20	11	26–31	Trophozoite
3	2.6.1.1	Aspartate aminotransferase	PFB0200c	Yes	10–20	11	21–31	Trophozoite
4	2.6.1.13	Ornithine aminotransferase	PFF0435w	Yes	No data	–	–	–
5	2.6.1.57	Aspartate aminotransferase	PFB0200c	Yes	10–20	11	21–31	Trophozoite

6	4.1.1.17	S-adenosylmethionine decarboxylase/ornithine decarboxylase (bifunctional)	PF10_0322	Yes	10–15	8	18–23	Trophozoite
7	4.1.3.38	p-aminobenzoic acid synthetase, putative	PFI1100w	Yes	20–25	11	31–36	Schizont
8	2.3.1.50	Serine C-palmitoyltransferase	PF14_0155	Yes	No data	–	–	–
9	2.6.1.42	Conserved plasmodium protein	PF14_0557	Yes	10–25	11	21–31	Trophozoite
10	2.8.1.7	Cysteine desulfurase, putative	PF07_0068	Yes	20–25	11	31–36	Schizont
11	2.8.1.7	Cysteine desulfurase, putative	MAL7P1.150	Yes	three spots: 5–10 5–10 4–10	11	15/16–21	Ring
12	4.1.1.18	Lysine decarboxylase, putative	PFD0285c	Yes	15–25	11	26–36	Trophozoite-Schizont
13	4.1.1.18	Lysine decarboxylase, putative	PFD0670c	No	25–35	11	36–46	Schizont

Supplemental Table S2: List of allowed metabolite uptakes and secretions in the metabolic network of *Plasmodium falciparum*.

	Metabolites	Literature evidence or rationale
Uptake	Glucose	Ref. 58
	Hemoglobin	Ref. 30
	Isoleucine	Ref. 59
	Purine nucleobases and nucleosides	Ref. 60
	Choline	Ref. 61
	Phosphate	Ref. 62
	Pantothenate	Ref. 63
	Nicotinamide	Ref. 8
	Folate	Ref. 64
	Iron	Ref. 65
	Fatty acids	Ref. 66
	Oxygen	Ref. 67
	Riboflavin	Ref. 69
	Thiamine	Ref. 70
	Glycerol	Ref. 68
Sulfate	Added to avoid a zero biomass production rate	
H ₂ O, H ⁺	Assumed to be freely taken up	
Secretion	Lactate	Ref. 58
	Amino acids except isoleucine	Ref. 30
	Glutathione conjugates	Ref. 48
	Ornithine	Ref. 8
	Formate	Ref. 68
	Glycerol	Ref. 68
	Urea	Added to avoid a zero biomass production rate
	H ₂ O, H ⁺ , CO ₂	Assumed to be freely secreted