

Phylogenetic relationship of *Plasmodium*
falciparum within the clade of mammalian
malarial parasites

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January 20, 2009

Controversy about *P. falciparum* origin

- ▶ Bird parasites origin: [Waters et al., 1991, Waters et al., 1993, Escalante et al., 1997, McCutchan et al., 1996, Escalante and Ayala, 1995, Escalante et al., 1998, Rathore et al., 2001, Kedzierski et al., 2002, Kissinger et al., 2002, Vargas-Serrato et al., 2003, Hagner et al., 2007]
- ▶ Mammalian parasites origin: [Martinsen et al., 2007, Roy and Irimia, 2008].

Malaria: Plasmodium parasites, Vertebrate hosts, Mosquito vectors

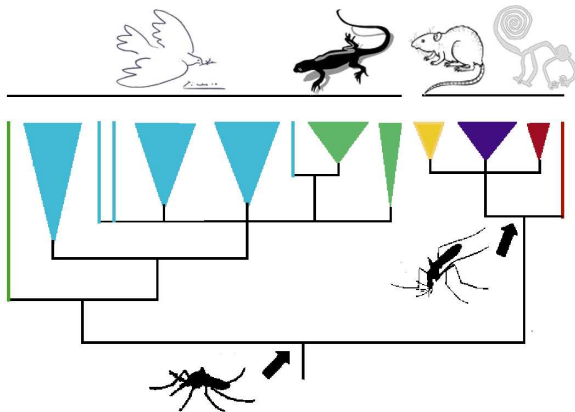


Figure: From [Martinsen et al., 2007].

Basal position of *P. falciparum* ?

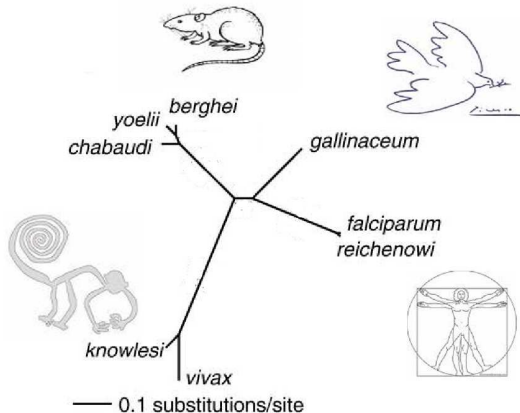


Figure: Topology supported by $> \frac{1}{3}$ of 104 genes [Davalos and Perkins, 2008].

P falciparum close to primate parasites ?

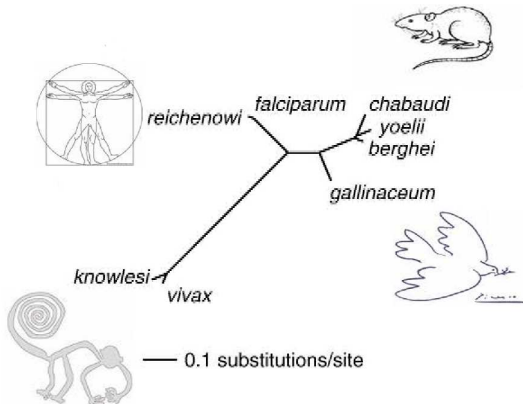


Figure: Topology supported by $\approx \frac{1}{3}$ of 104 genes [Davalos and Perkins, 2008].

P. falciparum close to rodent parasites ?

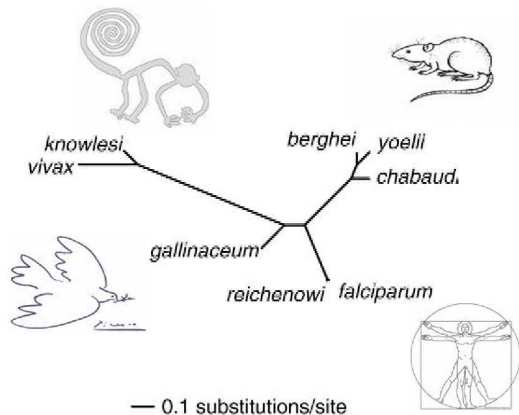


Figure: Topology supported by $< \frac{1}{3}$ of 104 genes [Davalos and Perkins, 2008].

In this work: data filtering strategies

Data:

- ▶ 24 taxa, 3 mitochondrial genes (no missing data),
- ▶ 76 taxa, 3 mitochondrial genes (missing data),
- ▶ 8 taxa, 104 genes.

Filters:

- ▶ Ambiguously aligned positions with Gblock [Castresana, 2000].
- ▶ Fast evolving genes.
- ▶ Fast evolving positions.
- ▶ Fast evolving taxa.

Mitochondrial proteins analysis

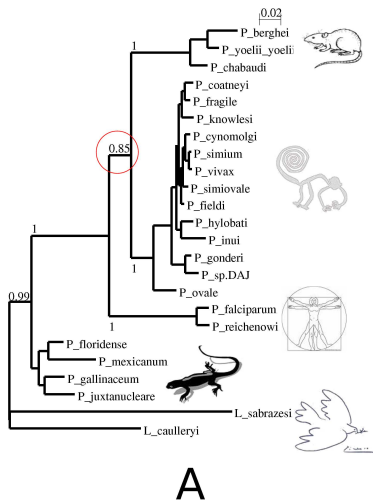


Figure: A: Complete mitochondrial dataset. Within mammalian malarial parasites, *P. falciparum* emerged first.

Mitochondrial proteins analysis

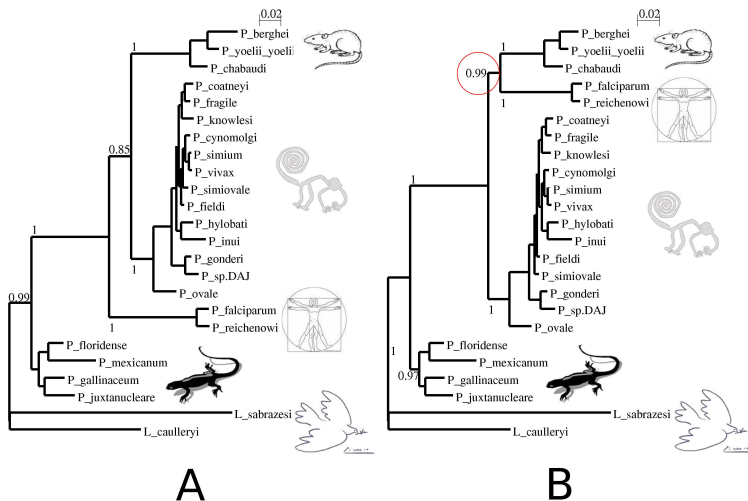
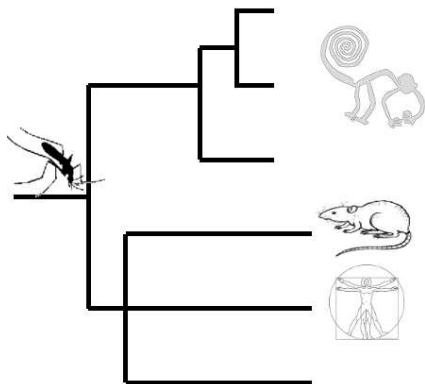


Figure: B: Gblock filtered mitochondrial dataset: Monophyly of *P. falciparum* plus rodent malarial parasites.

Does it make sense ?



Asian

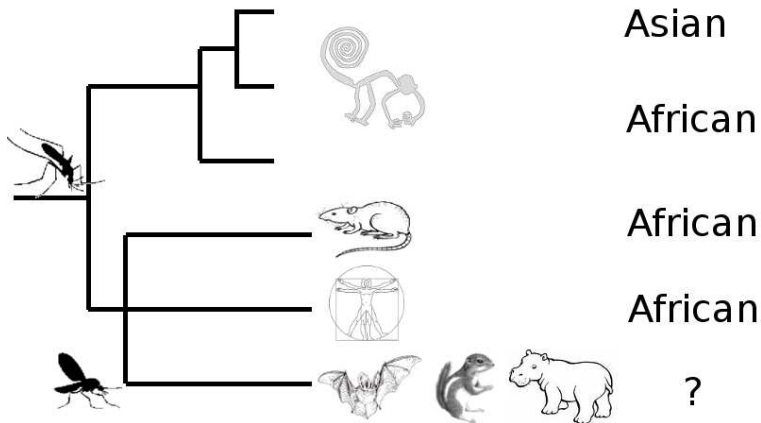
African

African

African

- ▶ Real biodiversity of mammalian hosts ?
- ▶ World repartition of mammalian hosts ?

Hepatocystis could also be related to rodent parasites



- ▶ Real biodiversity of mammalian hosts ?
- ▶ World repartition of mammalian hosts ?

Bibliography



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