

**Pathology of Placental Malaria in Baboons (*Papio anubis*) Experimentally Infected
with *Plasmodium knowlesi***

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ABSTRACT

Pregnant women are more susceptible to malaria than non-pregnant women. This susceptibility is highest in first and second pregnancies of continuous malaria exposure. Placental malaria leads to poor birth outcomes and poor maternal outcomes which include low birth weight (LBW), intrauterine growth retardation (IUGR), abortions, still births, anaemia and mortality. This study set out to characterize placental pathological changes in baboons infected with *Plasmodium knowlesi* parasites in order to develop a model that can be used to study placental malaria. Third trimester placentas were collected via caesarean section (CS) from four pregnant *P. knowlesi* infected and three pregnant-non infected baboons (*Papio anubis*). The placentas from all the animals were examined for gross pathology and histopathology. Findings of the study revealed that parasitaemia was six to eight folds higher in the placenta compared to peripheral blood of the same baboon. Gross pathology revealed that placentas were intact and had normal morphological features except in one baboon which showed slight fibrinoids. Histopathological findings showed that placentas from the control baboons had intact villi, good tissue perfusion and no aggregation of erythrocytes. The placentas from infected baboons on the other hand showed massive congestion of various layers, disruption of the villi, aggregation of erythrocytes, inflammatory cell infiltration, presence of infected erythrocytes and malaria pigment (haemozoin). The placental tissues from the infected baboons had significantly more pathological changes as compared to those obtained from the non infected baboons. This was evident when the median scores were compared for each parameter using the Mann-Whitney U test. *Plasmodium knowlesi* infected placentas had significantly higher scores for damage (MedI = 22.5) compared to

the controls (MedC=13; $p < 0.05$). Negative correlation was observed between placental damage and infant weight ($r = -0.14$, $p > 0.05$) when tested by Spearman's Rank correlation test. This study demonstrates that *P. knowlesi* sequesters in the placenta of baboons and damages it just like *P. falciparum* does in the placenta of humans. Consequently, the baboon model of malaria is expected to gain prominence in the study of control measures against placental malaria.

Key Words: *Papio anubis*, *Plasmodium knowlesi*, placental malaria, histopathology.