**Determination of Parasitemia**

Determination of parasitemia can be done using both thick and thin smears.

**Thick smears:**
The number of parasites/µl of blood is determined by enumerating the number of parasites in relation to the standard number of WBCs/µl (8000).

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\text{No. Parasites} \times \left(\frac{8000}{\text{No. WBCs counted}}\right) = \text{No. parasites per µL of blood}
\]

**Thin smears:**
The percent of infected RBCs is determined by enumerating the number of infected RBCs in relation to the number of uninfected RBCs. A minimum of 500 RBCs total should be counted.

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\left(\frac{\text{No. infected RBCs}}{\text{Total No. RBCs counted}}\right) \times 100 = \text{Percent Infected RBCs}
\]

**Notes:**
- Multiply-infected RBCs are counted as one.
- Gametocytes are not figured in calculations.
The malaria parasite life cycle involves two hosts. During a blood meal, a malaria-infected female *Anopheles* mosquito inoculates sporozoites into the human host 1. Sporozoites infect liver cells 2 and mature into schizonts 3, which rupture and release merozoites 4. (Of note, in *P. vivax* and *P. ovale* a dormant stage [hypnozoites] can persist in the liver and cause relapses by invading the bloodstream weeks, or even years later.) After this initial replication in the liver (exo-erythrocytic schizogony 5), the parasites undergo asexual multiplication in the erythrocytes (erythrocytic schizogony 6). Merozoites infect red blood cells 7. The ring stage trophozoites mature into schizonts, which rupture releasing merozoites 8. Some parasites differentiate into sexual erythrocytic stages (gametocytes) 9. Blood stage parasites are responsible for the clinical manifestations of the disease.

The gametocytes, male (microgametocytes) and female (macrogametocytes), are ingested by an *Anopheles* mosquito during a blood meal 10. The parasites' multiplication in the mosquito is known as the sporogonic cycle 11. While in the mosquito's stomach, the microgametes penetrate the macrogametes generating zygotes 12. The zygotes in turn become motile and elongated (ookinetes) 13, which invade the midgut wall of the mosquito where they develop into oocysts 14. The oocysts grow, rupture, and release sporozoites 15, which make their way to the mosquito's salivary glands. Inoculation of the sporozoites into a new human host perpetuates the malaria life cycle 16.