

Title : Relationship of functional CD235a and infectivity of *Plasmodium falciparum* against K562 human erythroleukemia cell line

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ABSTRACT

Plasmodium falciparum is one of the Plasmodium species that causes malaria symptoms in humans and is of the most extensively studied to date. *Plasmodium falciparum* parasites have a specific host: human red blood cells. This specificity limits the ability to culture the parasite for laboratory studies. The objective of this study is to develop cells that can replace the use of red blood cells in the cultivation of *Plasmodium falciparum* by increasing the expression of the CD235a protein (the main receptor for the parasite's invasion) and stimulating hemoglobin production in the K562 human erythroleukemia cell line (K562 cell line). Following co-cultivation with *Plasmodium falciparum*, the percentage of parasitemia in the cells will be evaluated at three different time points: 24, 45, and 96 hours. The studies showed that the K562 cell line, when enhanced with the expression of the CD235a protein, could produce hemoglobin at a rate of 7.02 ± 4.14 %. Additionally, the results show the percentage of parasitemia at different time points, indicating that the highest percentage of infection occurs within the first 24 hours. However, at 45 and 96

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hours, the infection rate is lower compared to other control conditions with the K562 cell line. It is believed that this is due to the reduced strength of the cells, which allows *Plasmodium falciparum* to invade them more easily, resulting in a higher percentage of parasitemia under control conditions compared to the developed cell line. However, these developed cells cannot replace red blood cells in *Plasmodium falciparum* culture because their infection rate is lower than that of red blood cells in the positive control group at all time points, and no parasite development was observed following invasion. The results of this study provide data and insights for developing more suitable cells to replace red blood cells in future studies.

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