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Supplemental Information

Importance of Erythrocyte Deformability for the Alignment of Malaria Parasite upon Invasion

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SUPPLEMENTARY FIGURES

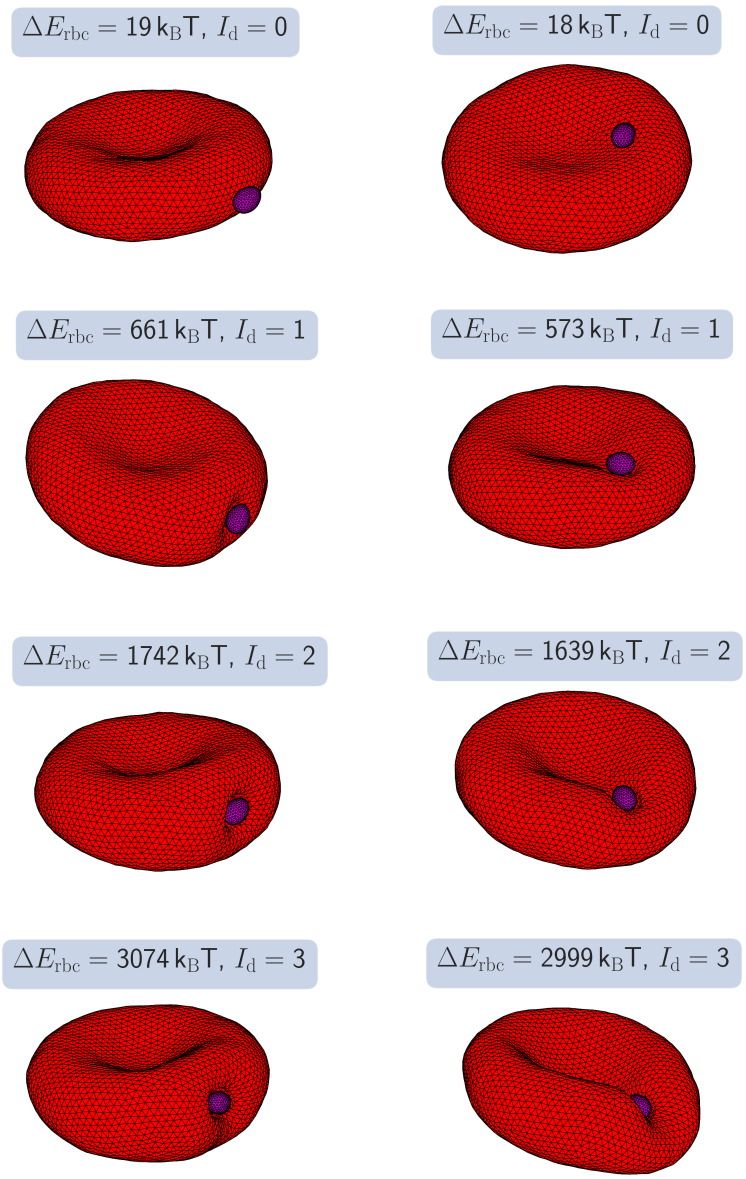

Figure S1. Snapshots of deformed RBCs due to parasite adhesion, including side (left column) and top (right column) contacts. Interaction strengths from top to bottom are $\epsilon_a/k_BT = 1,\ 4,\ 7,\ 10$ for both adhesion contacts. Depending on the interaction strength the parasite induces membrane deformations of various intensity. These deformations are classified visually by a deformation index I_d (see Table 2 in the main text) and quantified by the deformation energy ΔE_{rbc} shown in Fig. S2. The snapshots are for the small parasite with $a = 0$ (homogeneous adhesion).

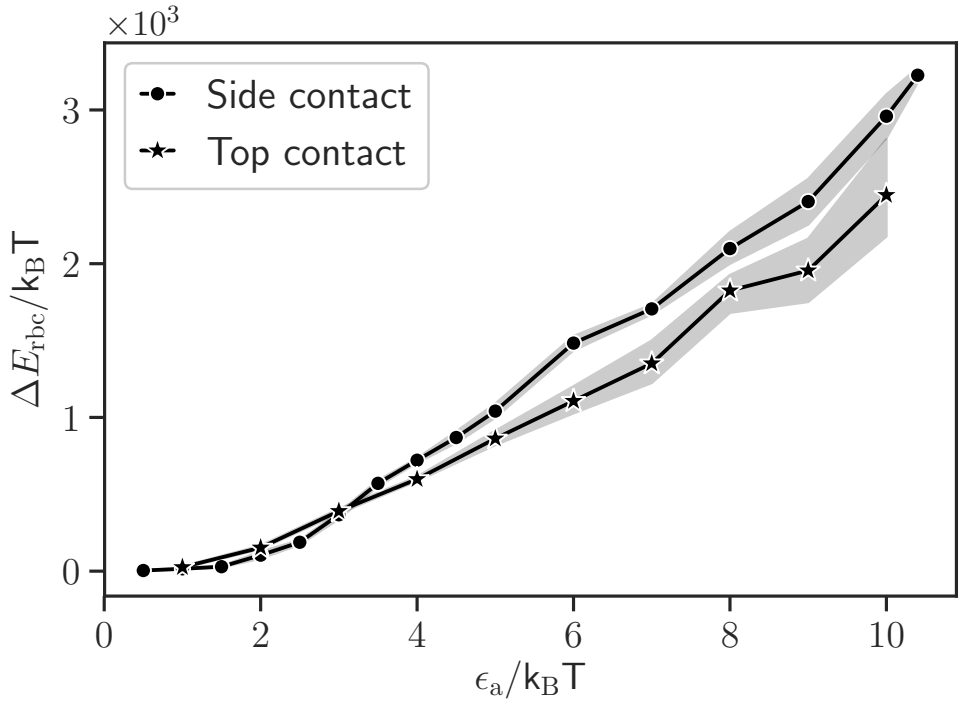

Figure S2. Deformation energy ΔE_{rbc} as a function of the interaction strength ϵ_a for the small parasite, side (circles) and top (stars) contacts, and $a = 0$. The data for both side and top contacts are similar with a difference up to 20 %, which is consistent with the visual observations of RBC deformation in Fig. S1.

SUPPLEMENTARY MOVIES

1) **Movie S1**: Side by side comparison of the adhesion of the small ($\epsilon_a/k_BT = 4$) and large ($\epsilon_a/k_BT = 2$) parasites to RBC membrane with a side contact corresponding to a deformation index $I_d = 1$ (see snapshots in Fig. 2). Here, $a = 0$ (homogeneous adhesion).

2) **Movie S2**: Side by side comparison of the adhesion of the small ($\epsilon_a/k_BT = 10$) and large ($\epsilon_a/k_BT = 5.4$) parasites to RBC membrane with a side contact corresponding to a deformation index $I_d = 3$ (see snapshots in Fig. 2). Here, $a = 0$ (homogeneous adhesion).

3) **Movie S3**: An example of parasite detachment simulation, in order to measure the detachment force F_{ad} (see Fig. 5 A). Here, the small parasite with $a = 0$ and $\epsilon_a/k_BT = 10$ is employed.

4) **Movie S4**: Alignment of the small parasite at a flexible membrane for $a = 0$ and $\epsilon_a/k_BT = 5$ (see Fig. 11 A).

5) **Movie S5**: Alignment of the small parasite at a rigid membrane for $a = 0$ and $\epsilon_a/k_BT = 5$ (see Fig. 11 C).