

# Image Based Flow Analysis Of Blood Cells For Malaria Diagnostics

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## Introduction

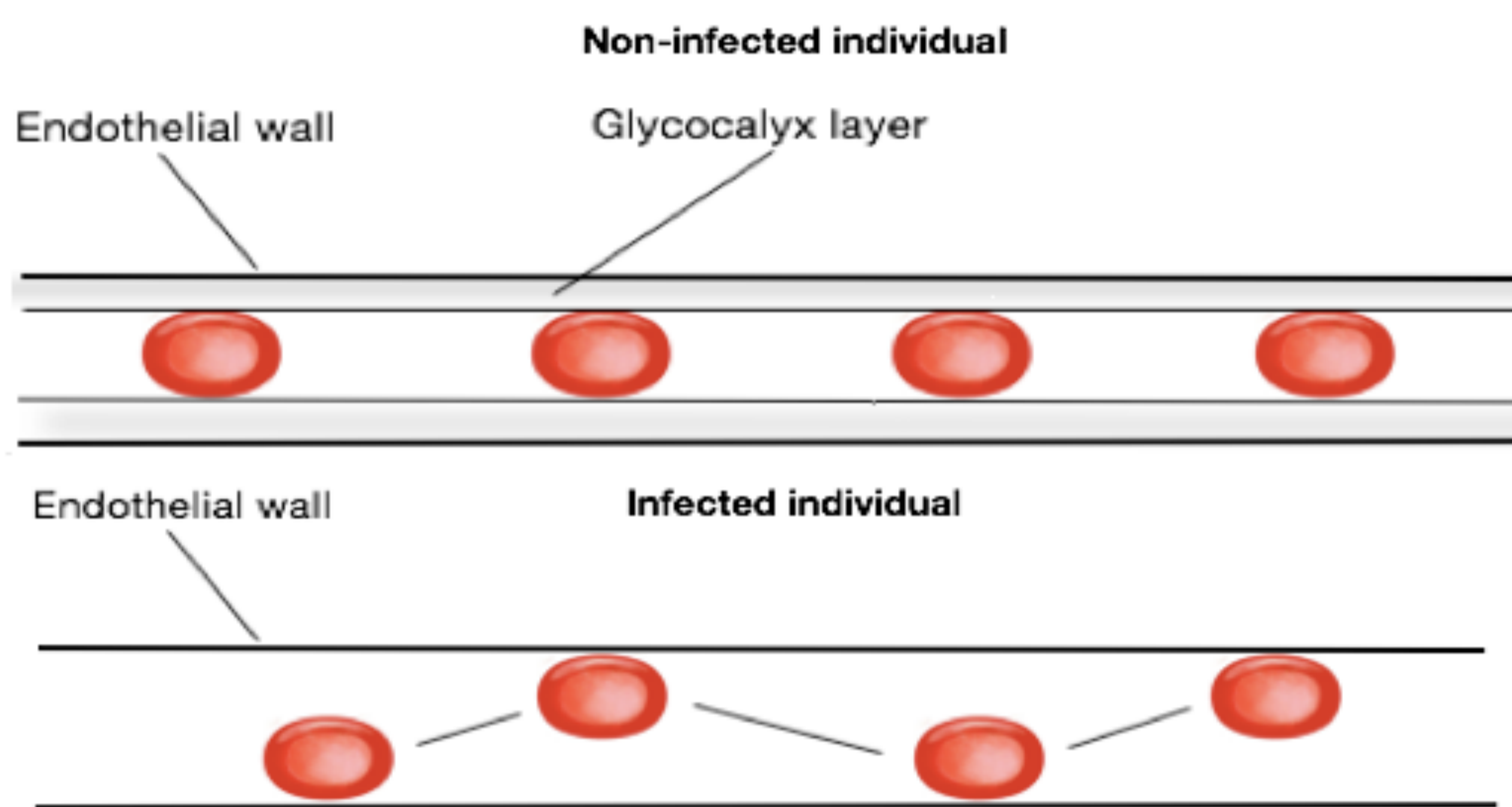
Half of the world population is at risk of being infected with malaria, and in 2015, 492.000 died due to malaria. The majority of the deaths occurred in Africa and in South-East Asia. Malaria is an infection caused by a parasite and it is clinically diagnosed by investigating a drop of blood taken from the patient. Working with blood samples and using invasive methods comes with a risk of transmitting diseases. By using a hand held camera called CytoCam-IDF it is possible to capture the movement of the red blood cells in the microcirculation.



[www.braedius.com/magnoliaPublic/braedius/products.html](http://www.braedius.com/magnoliaPublic/braedius/products.html)

## Hypothesis

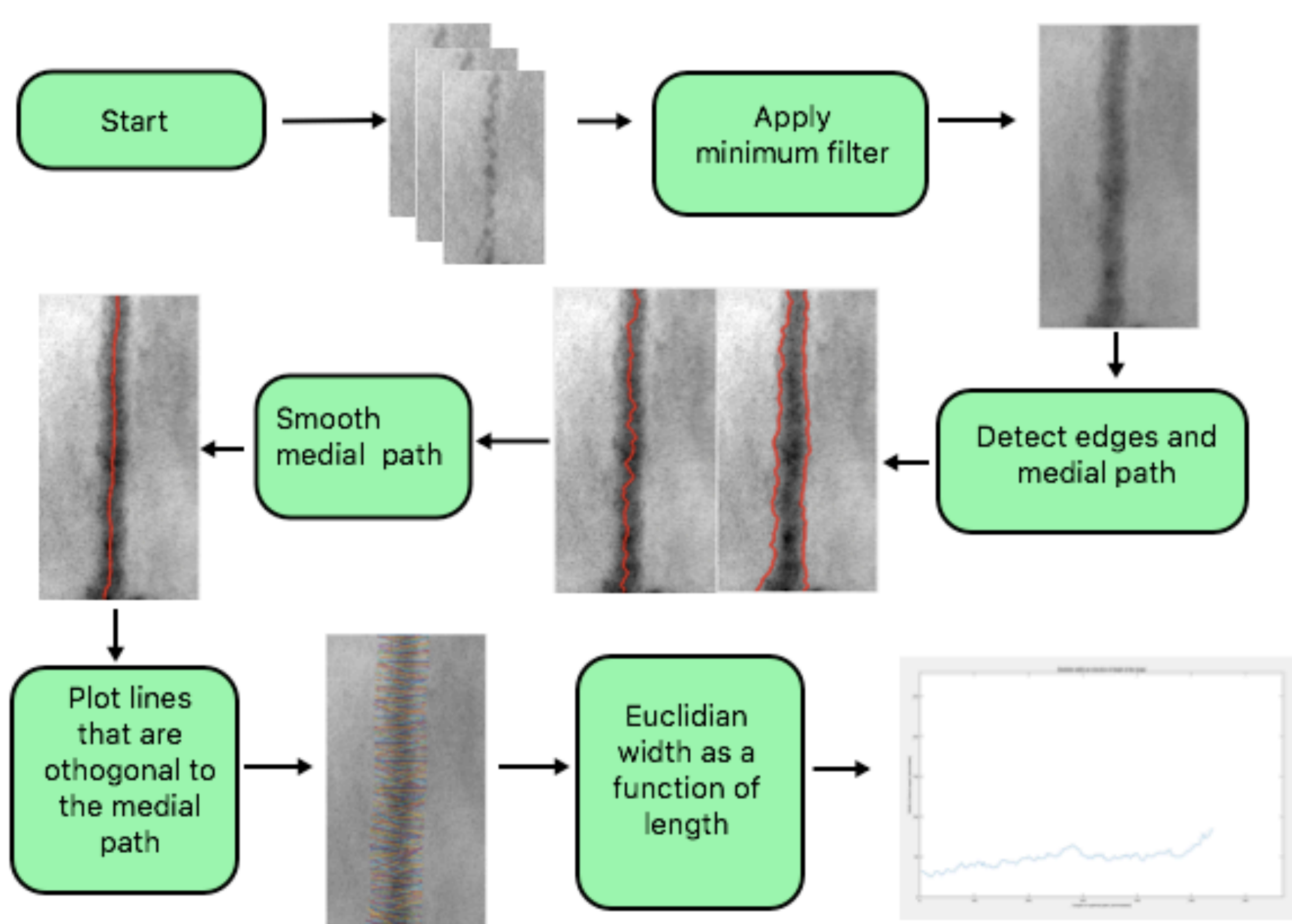
The hypothesis states that changes in the microcirculation is a predictor for malaria. Shedding of glycocalyx introduce a more heterogeneous flow of red blood cells, which can be identified by dark field imaging.



## Method

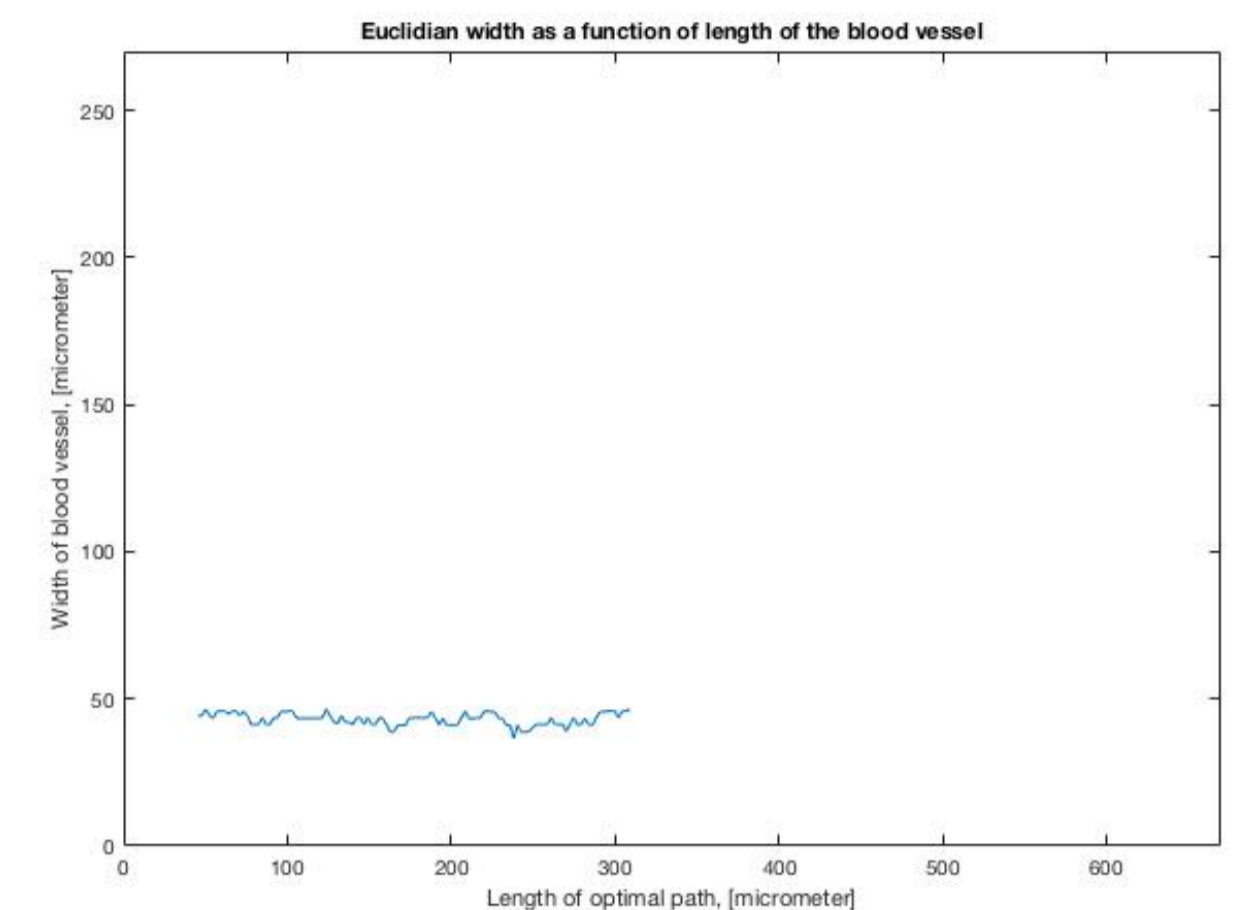
The data have been obtained using the CytoCam-IDF at different locations in the patients mouth and with variable duration. We believe that by identifying the blood vessels boundaries, through the movement of red blood cells, we are able to see a difference between the positive in negative individuals.

## Flowchart

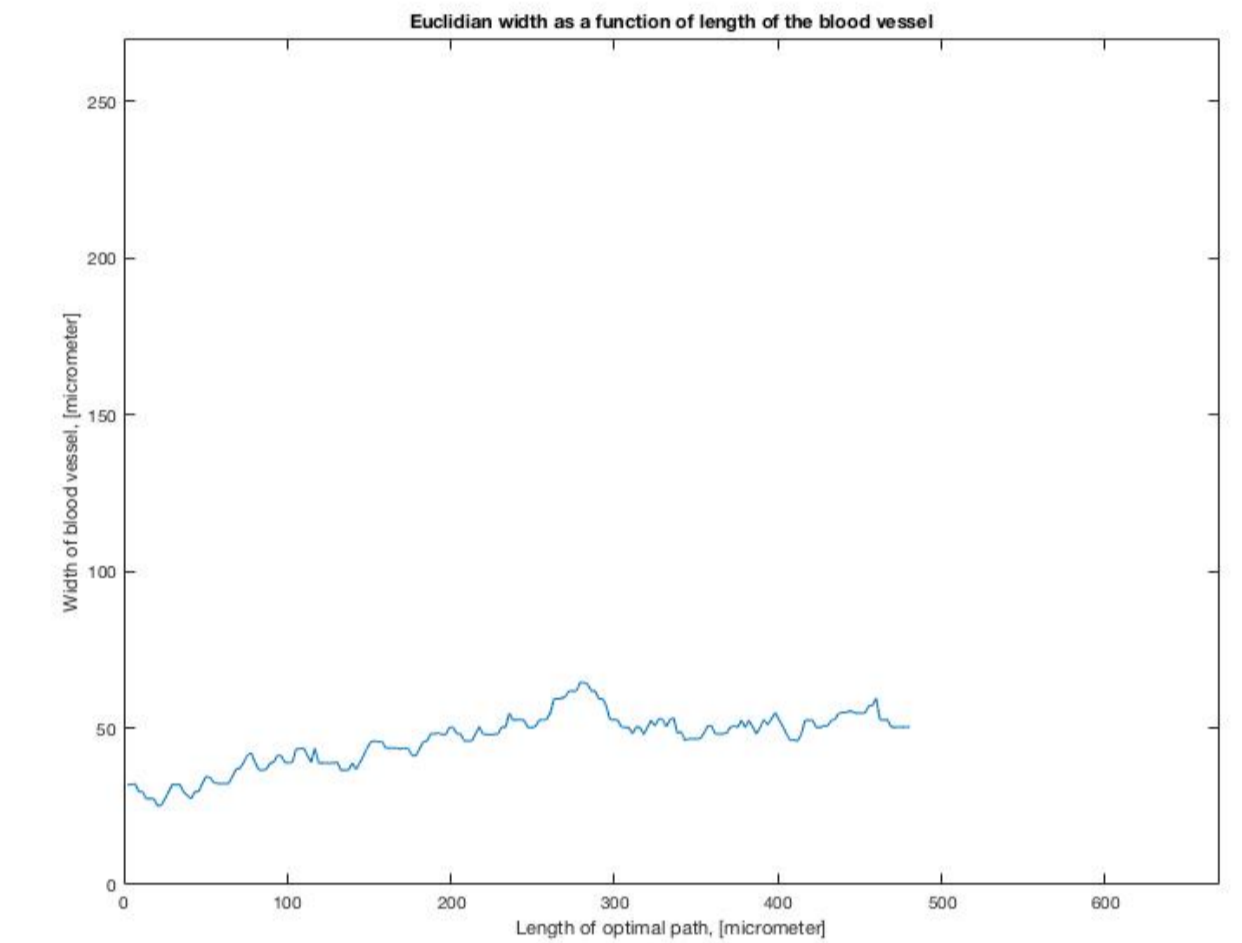


## Results

Negative individual

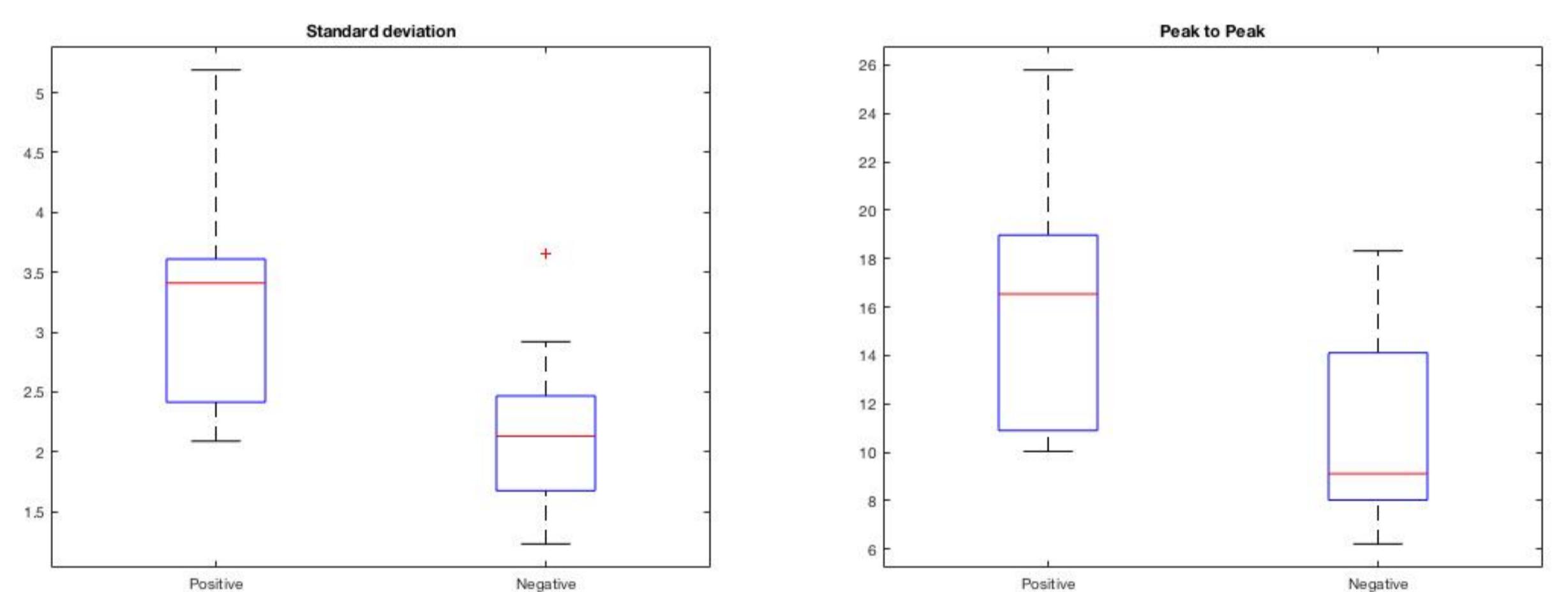


Positive individual



The vessel walls should have a more rough width profile for the positive and a smoother profile for the negatives.

## Pilot results



In order to investigate the width profiles, the data is de-trended and features such as standard deviation and peak to peak are investigated. From the box-plots above there seems to be a difference between the positive and negative participants. The dataset only consist of 11 positive and 15 negative, so more data is needed in order to verify our hypothesis.

## Future Directions

- Collect more data
- Apply machine learning
- Create a classifier that detects malaria



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