Luis Miguel Flores

2015-01835

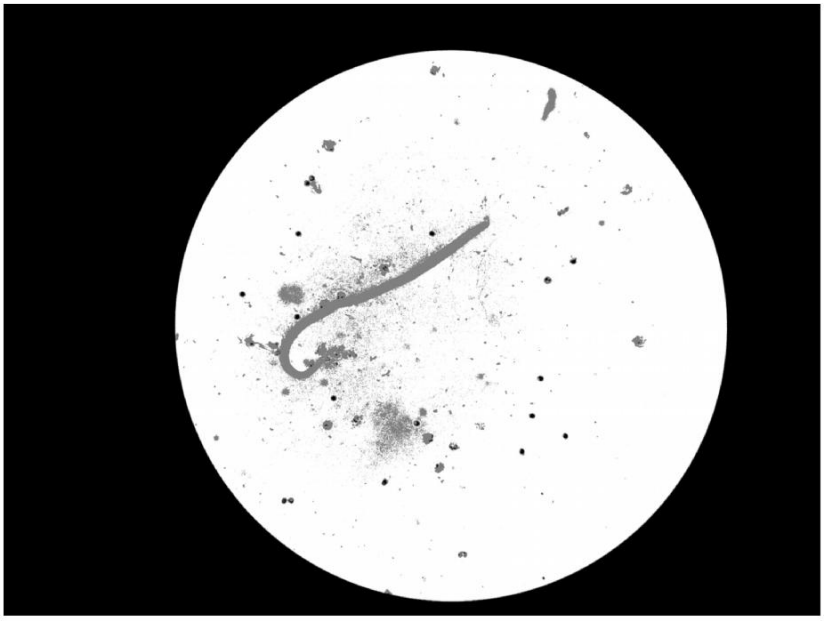
CS 180 WFV

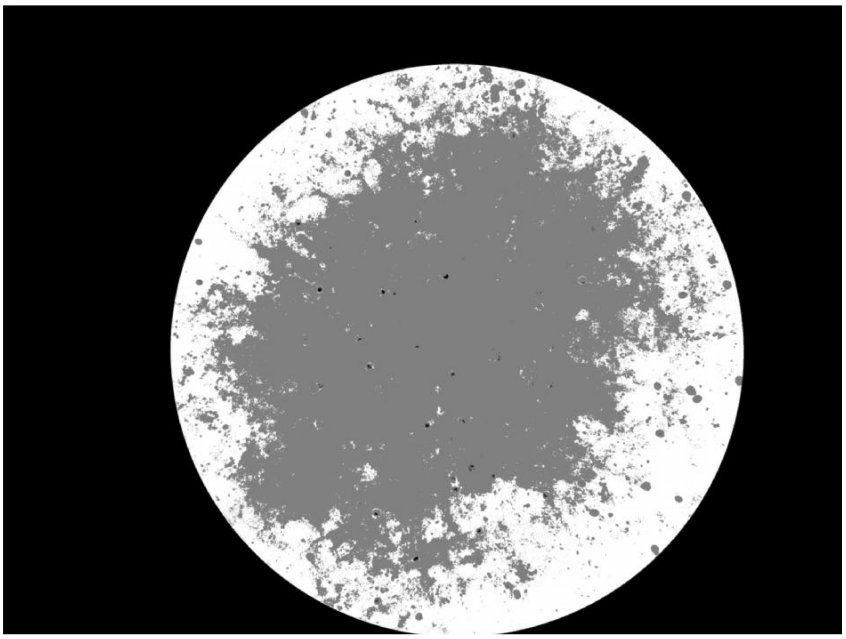
MP 2 Analysis

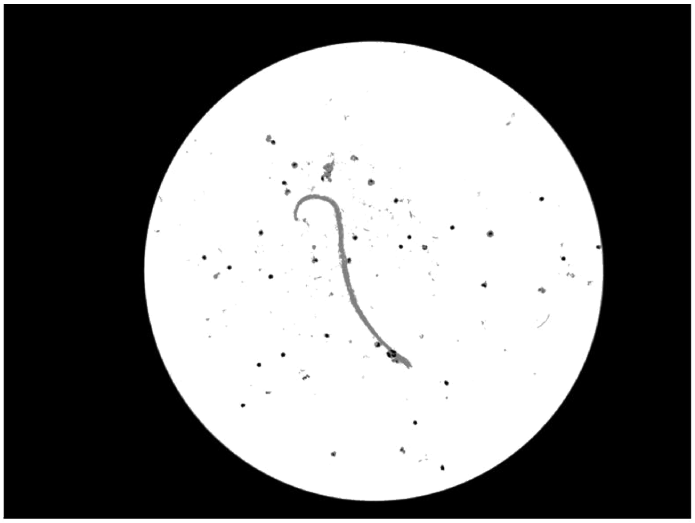
Images are shown here in order, samples taken from the output images.

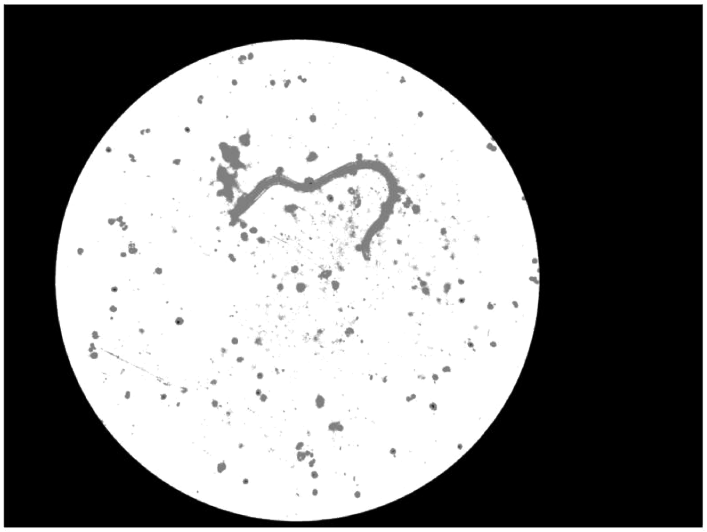
1. 2 Random Centroids (+1 for Filaria and Schistosoma because black area)

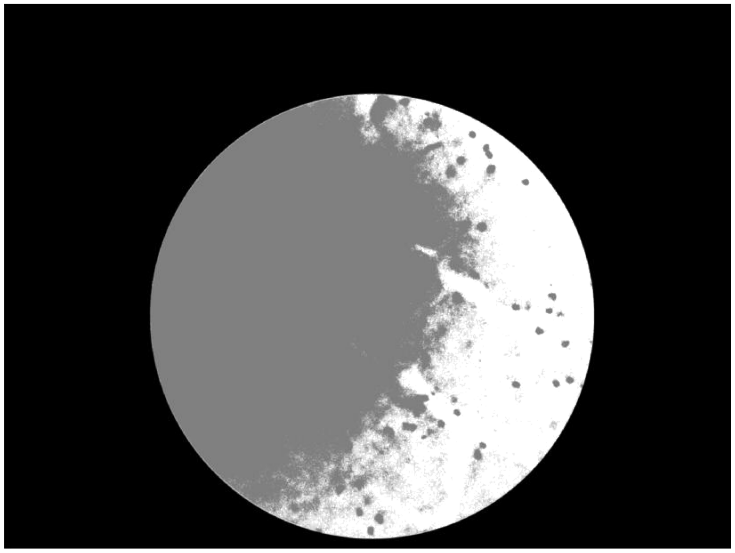
Filaria

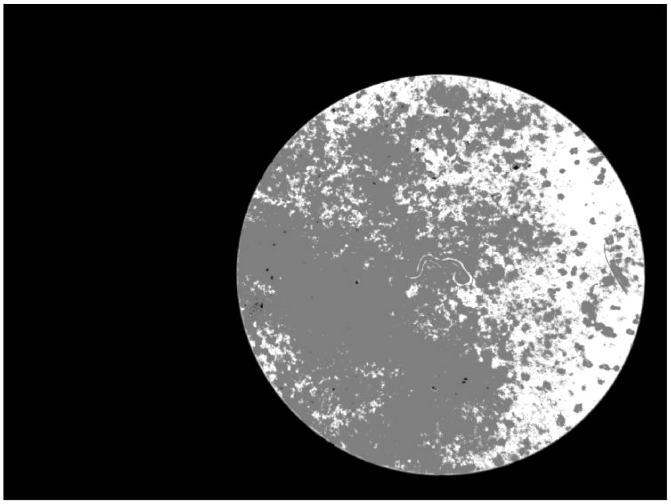


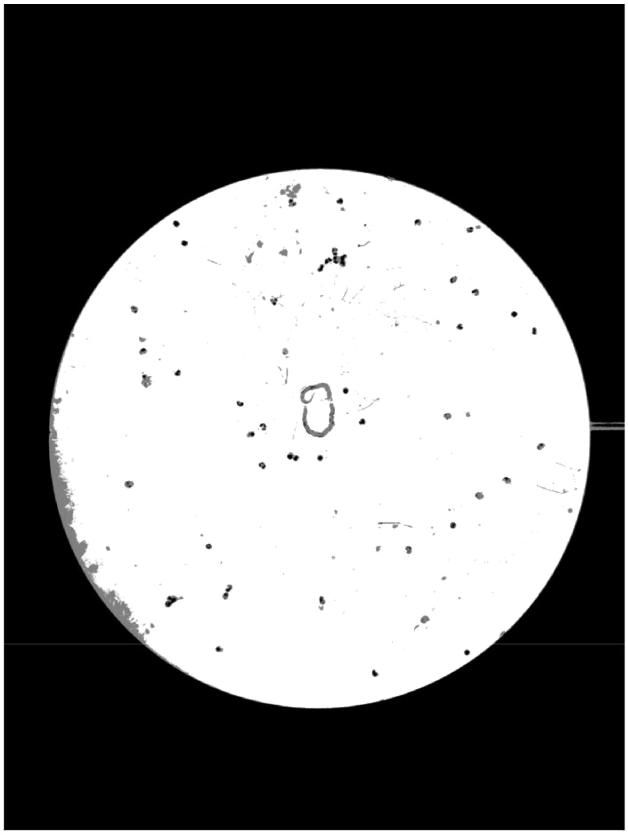


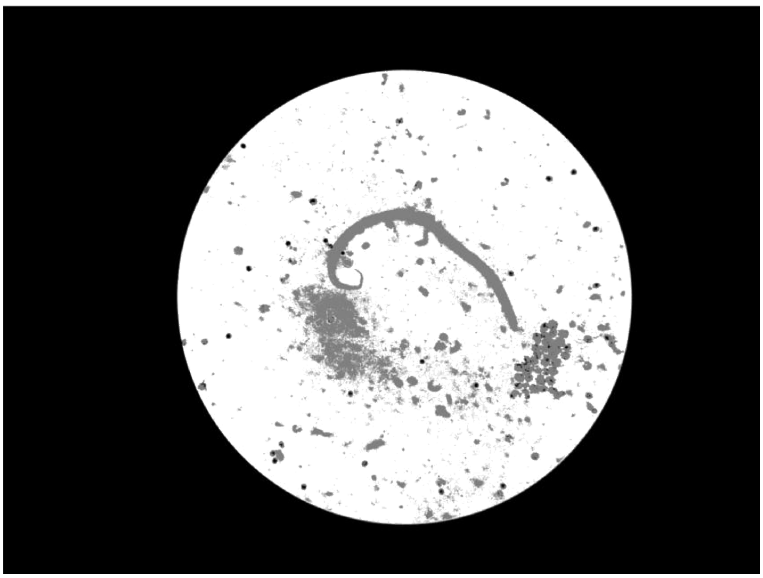


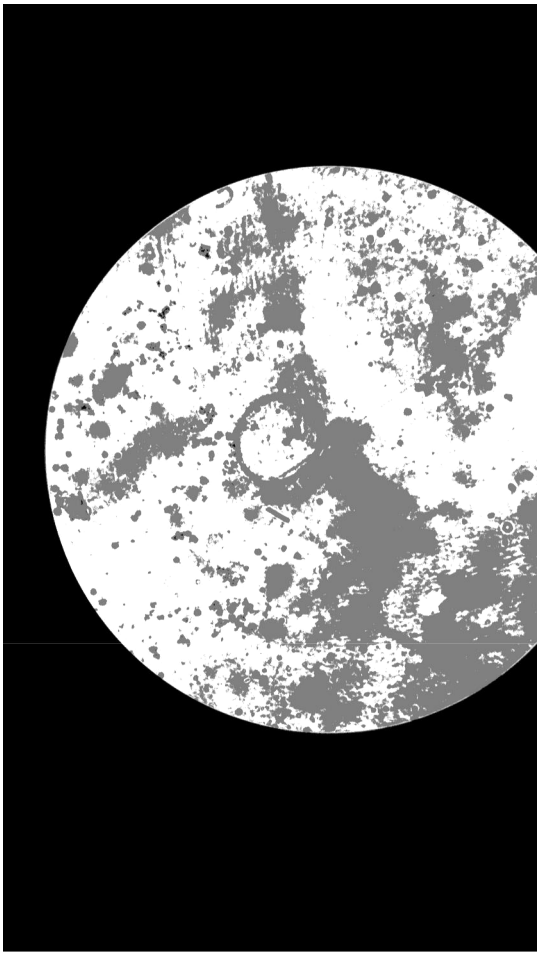




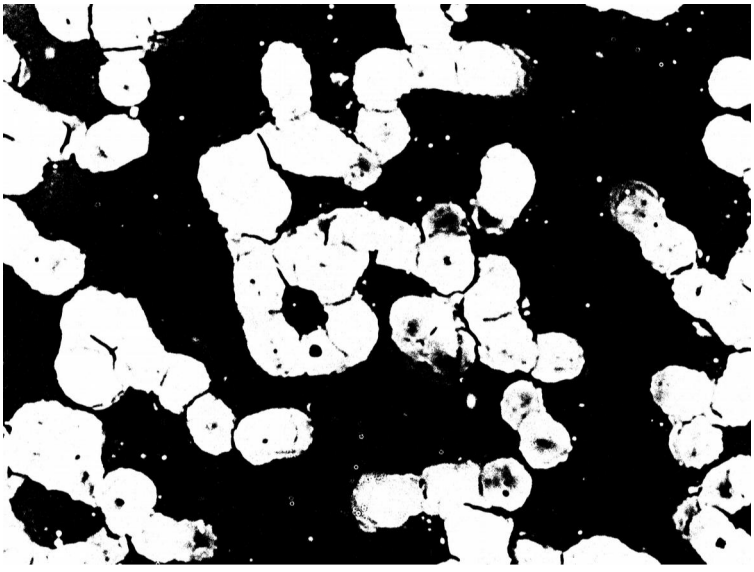


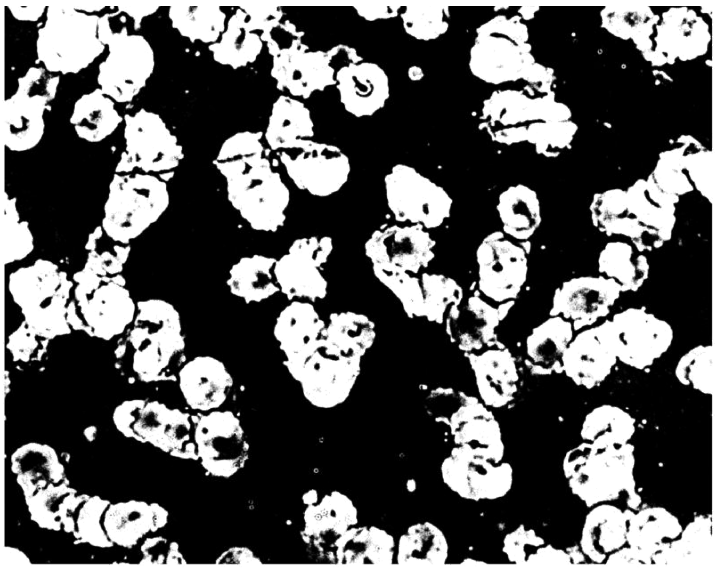


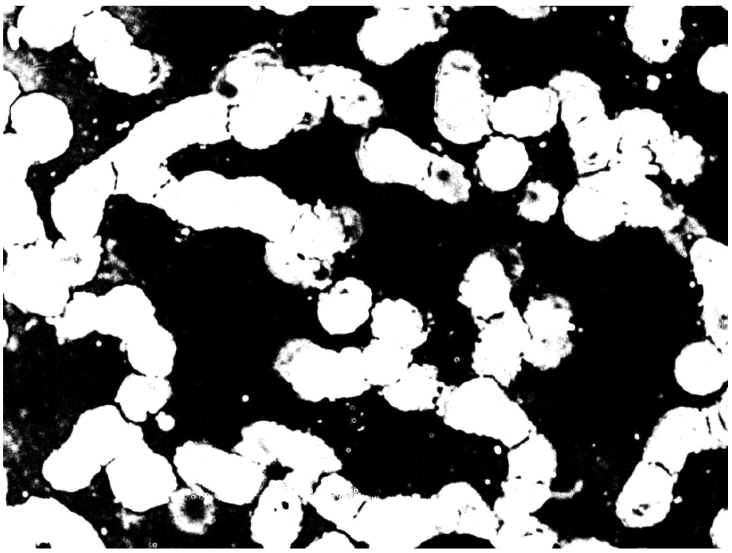


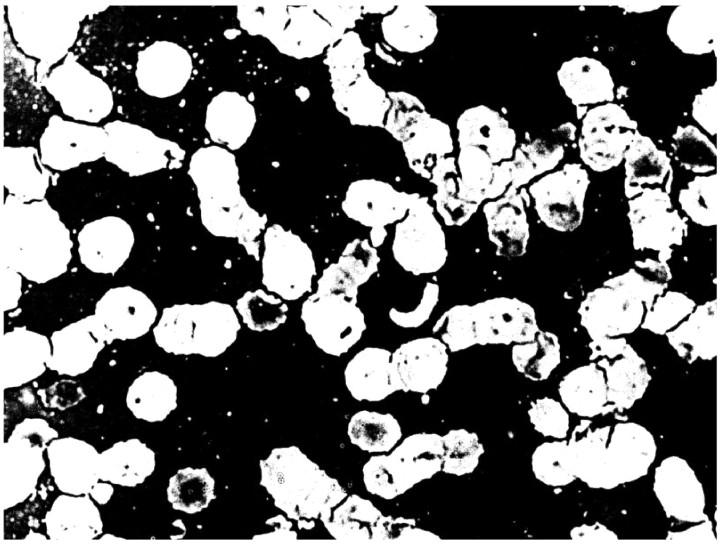


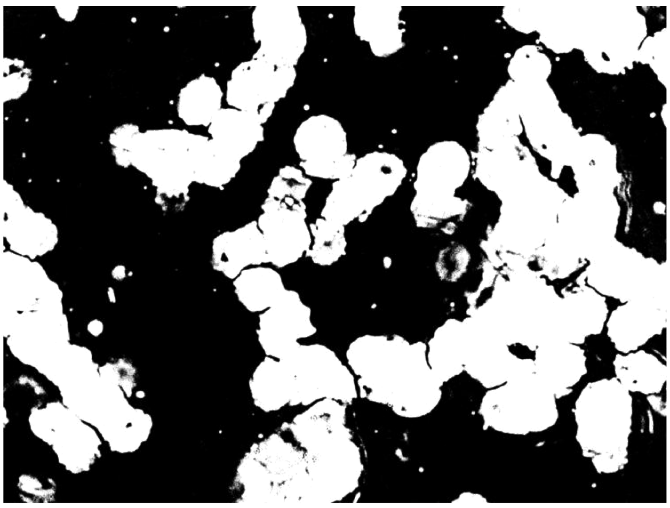
Plasmodium

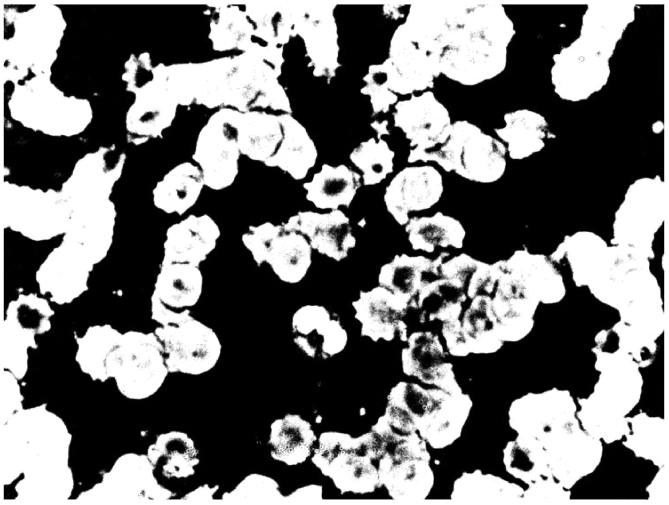


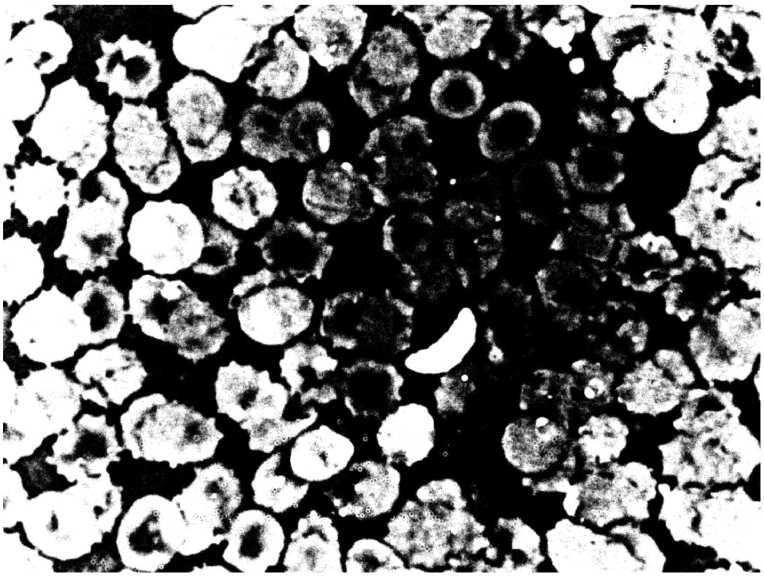


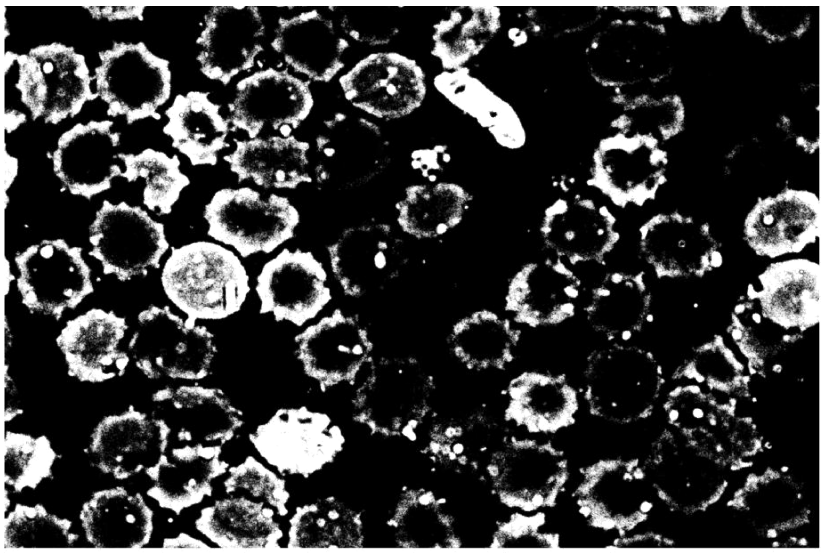


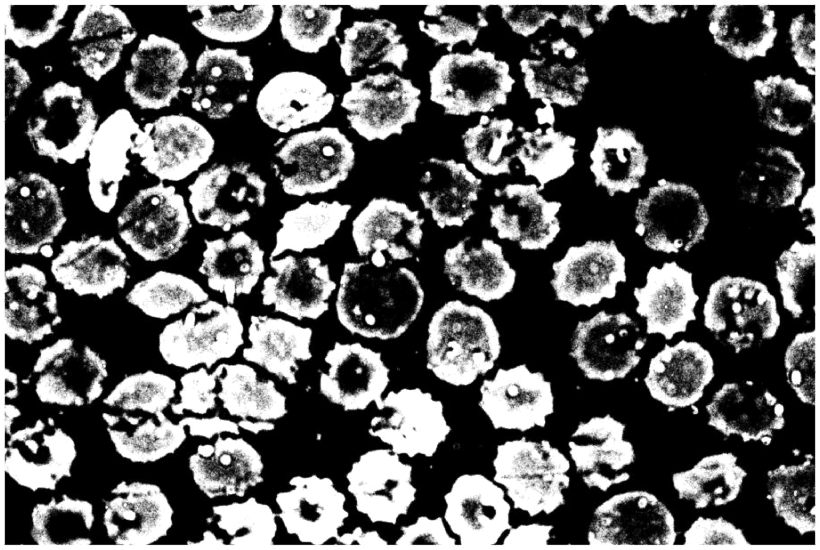


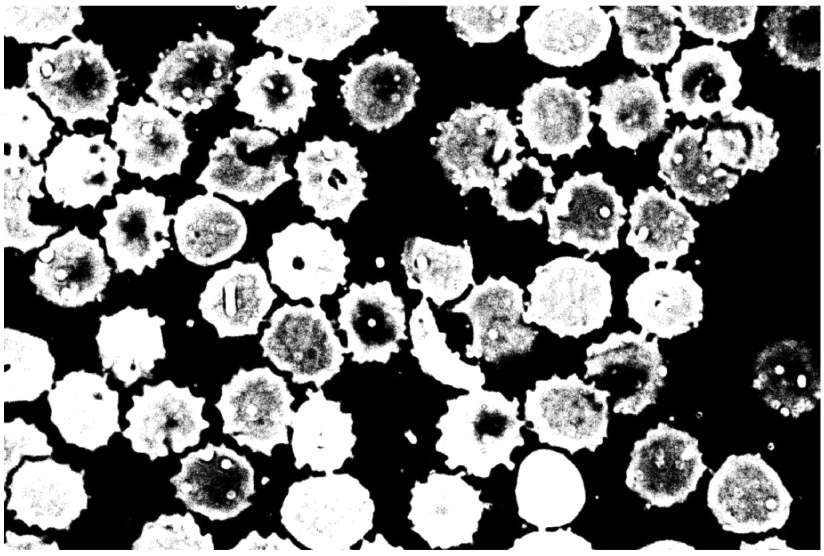




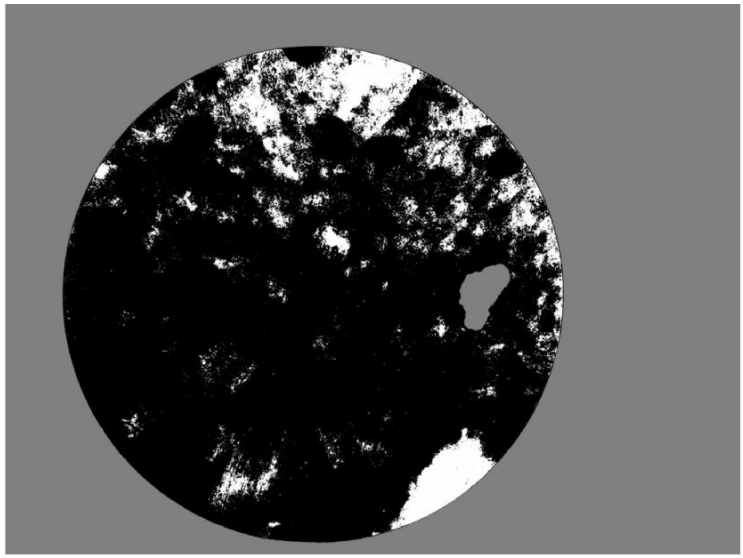


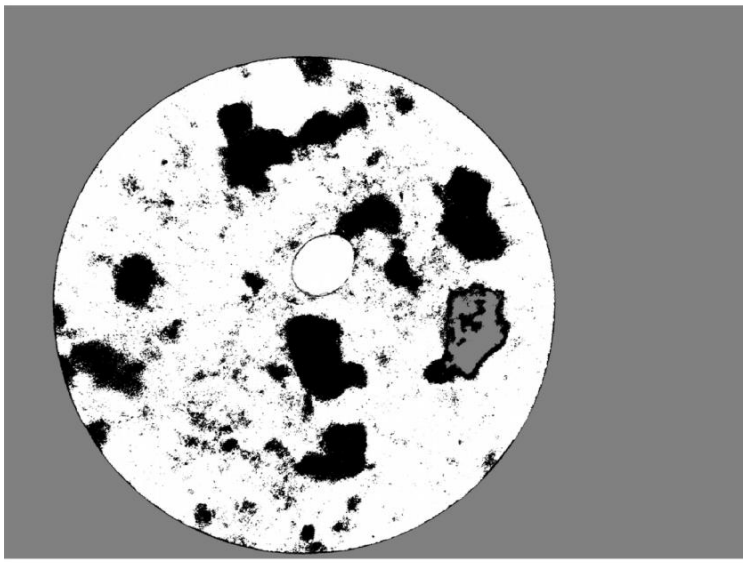


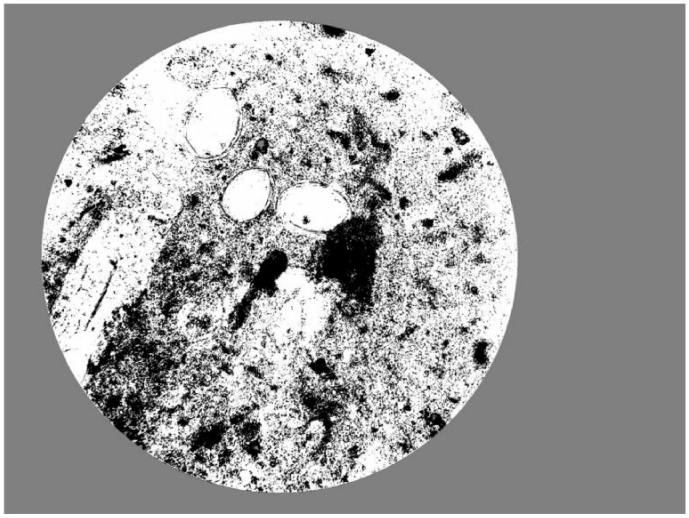


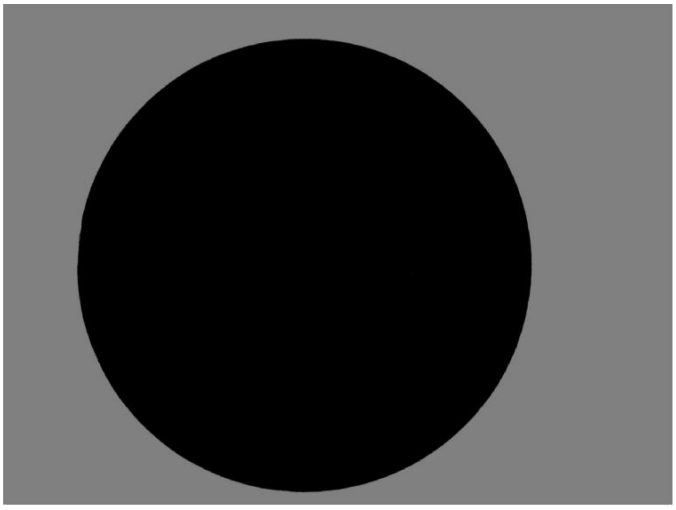


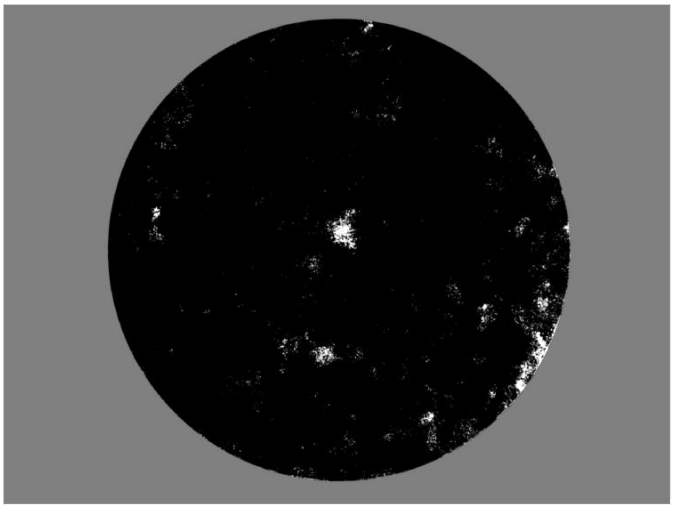
Schistosoma

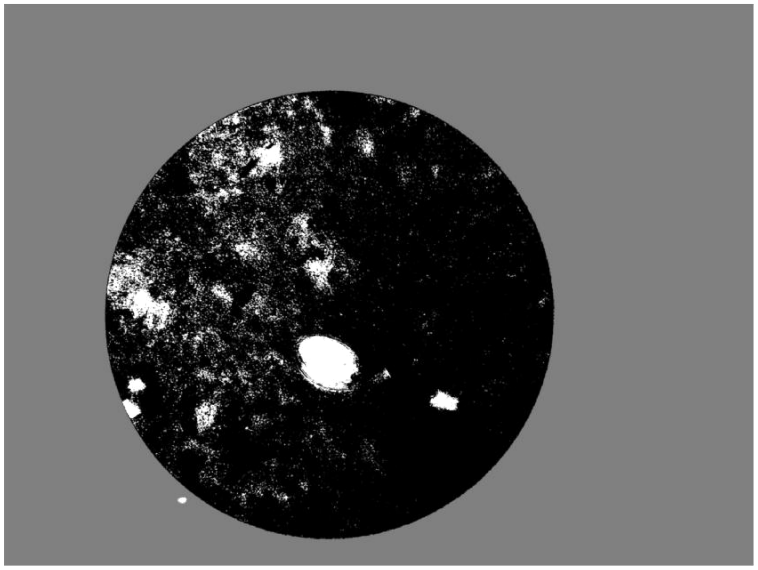


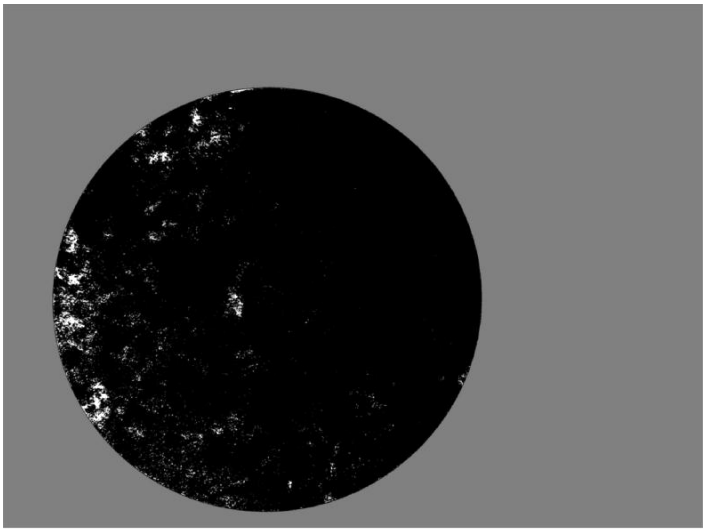


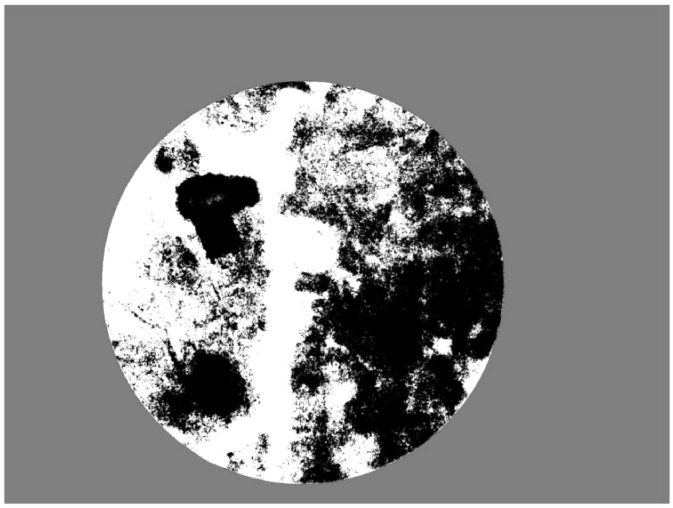


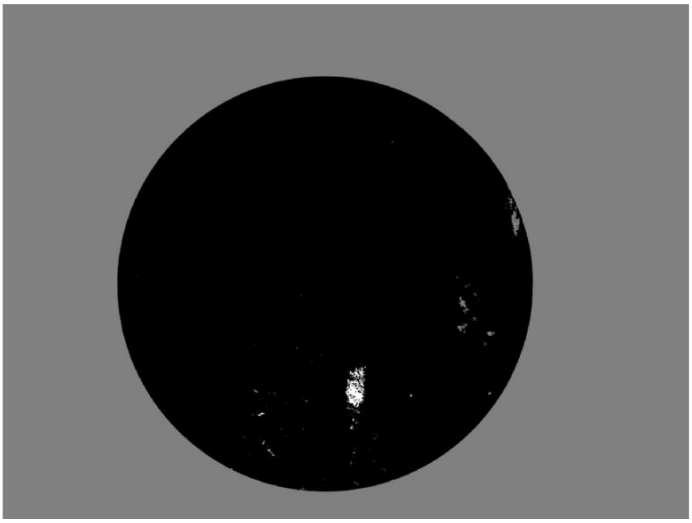


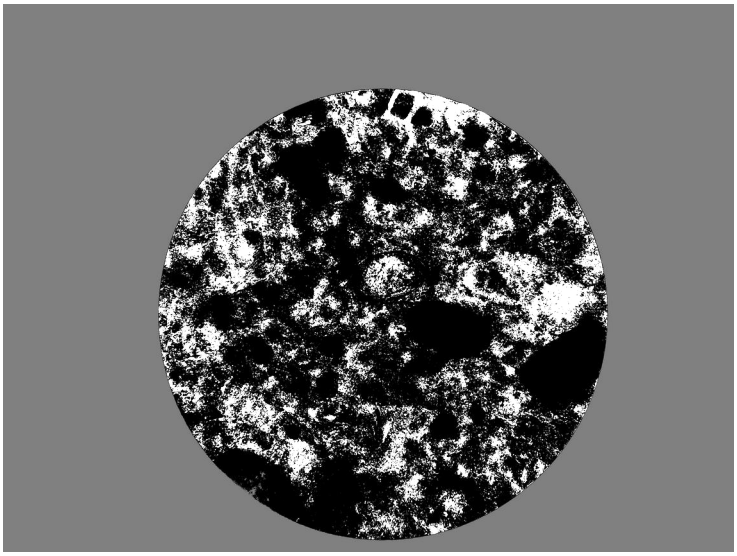








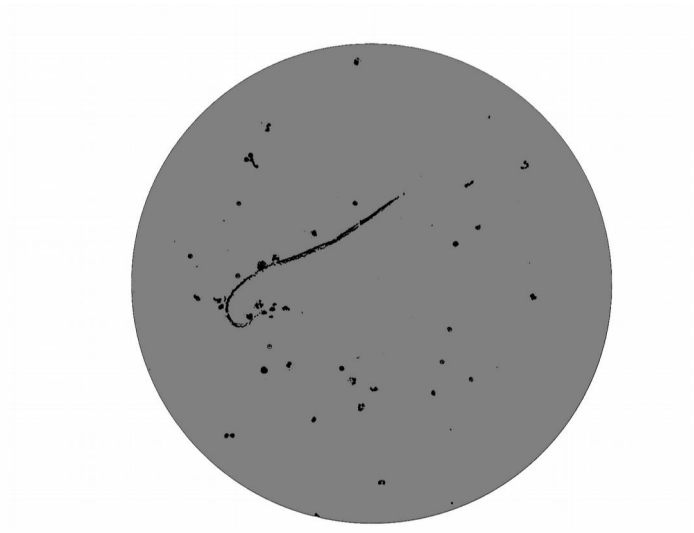


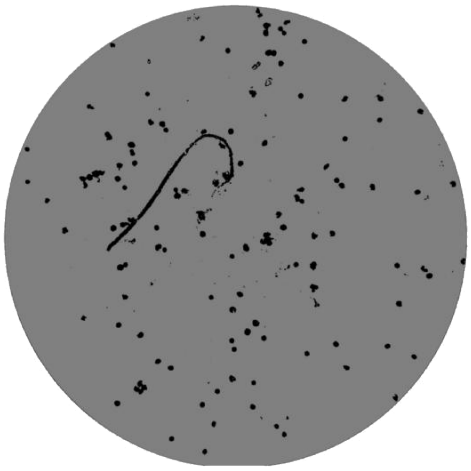


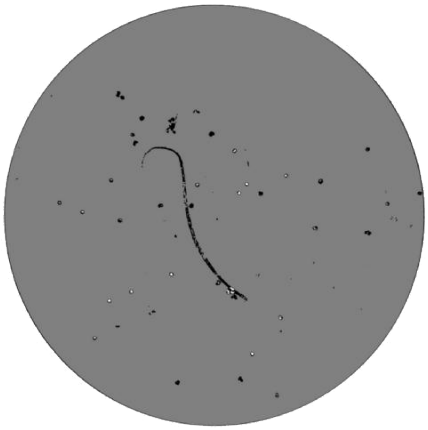
2. Manually selected centroids

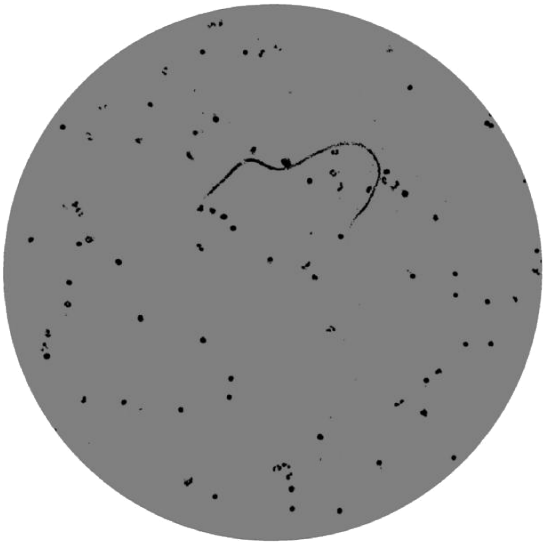
Manually selecting centroids is better compared to random centroids at capturing filaria and plasmodium, but there is no significant difference in terms of effectiveness at capturing schistosoma.

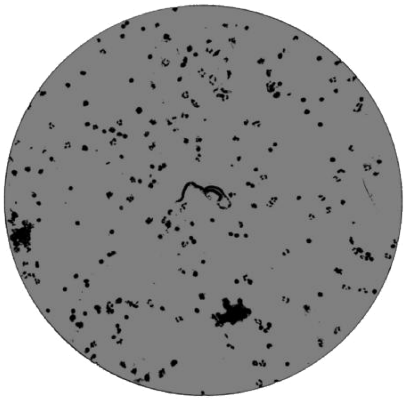
Filaria

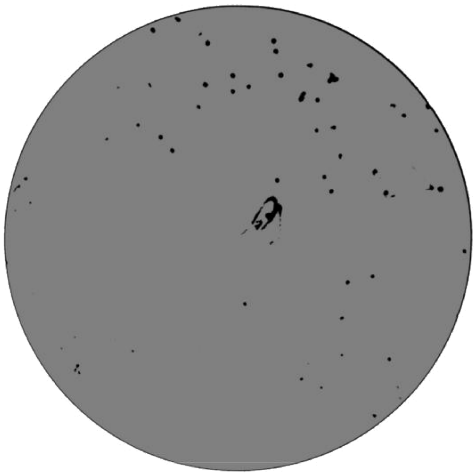


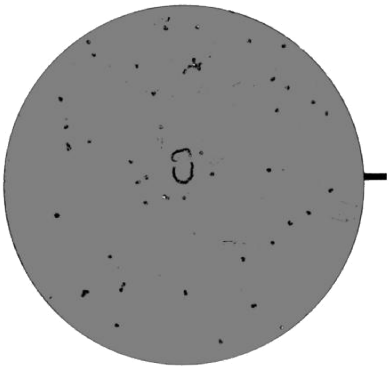


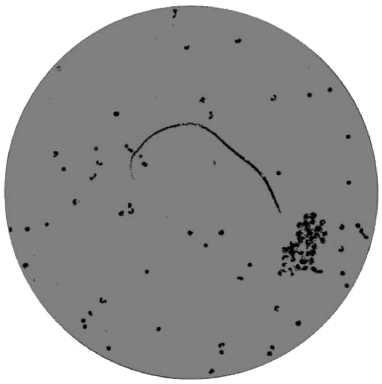


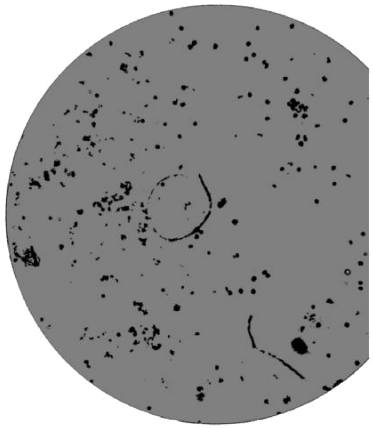




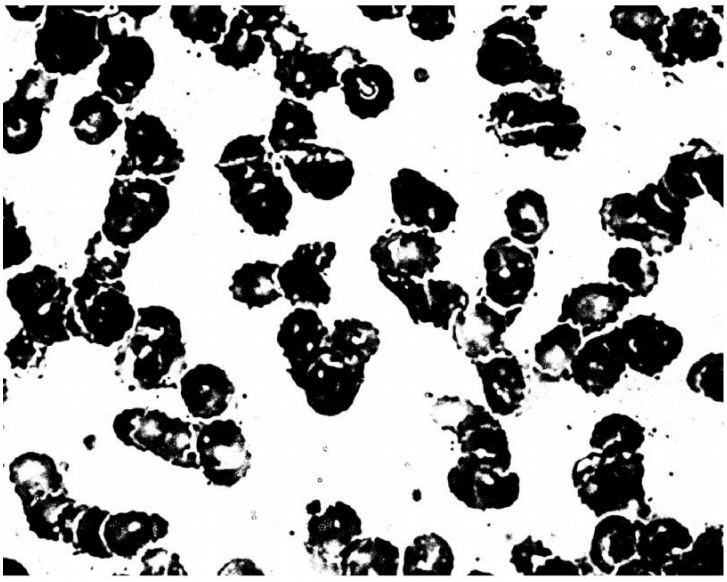


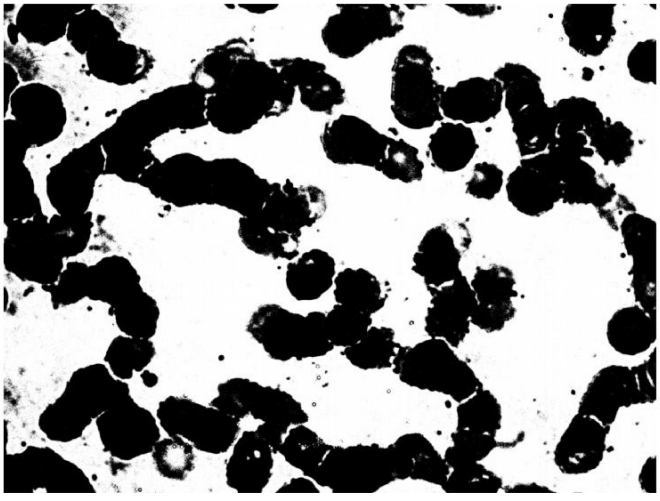


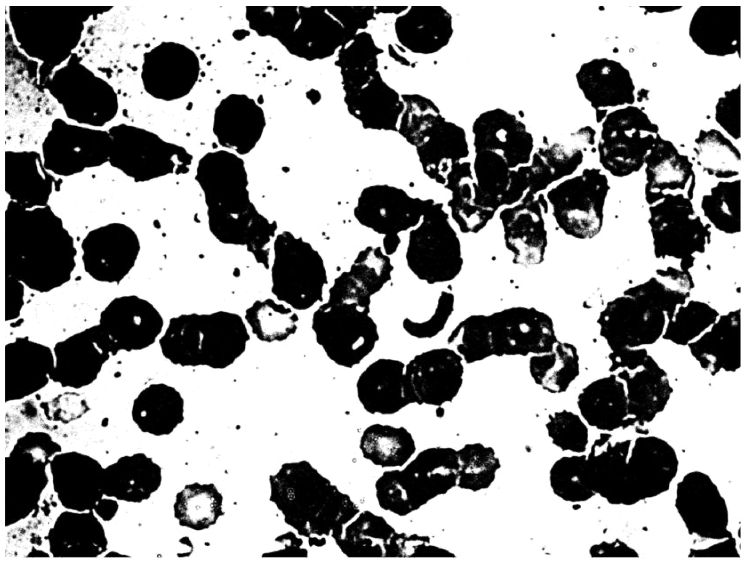


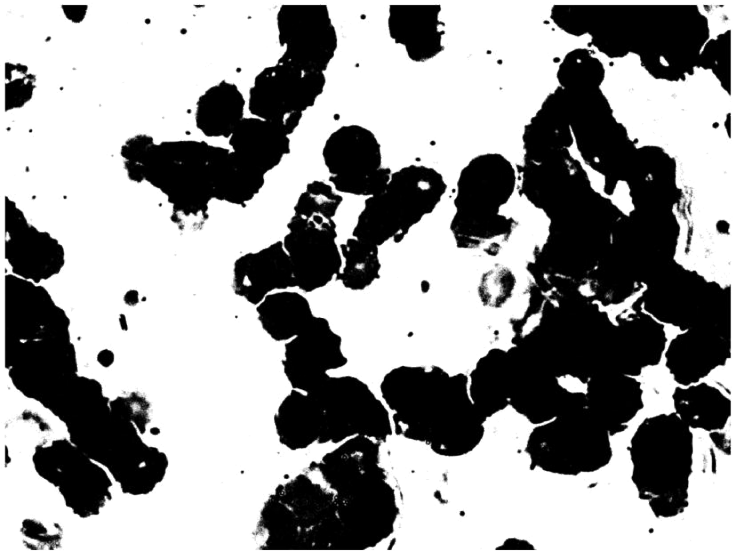


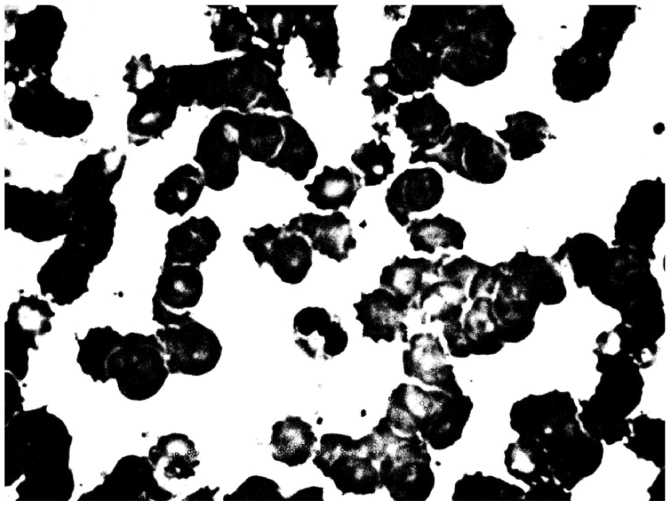
Plasmodium

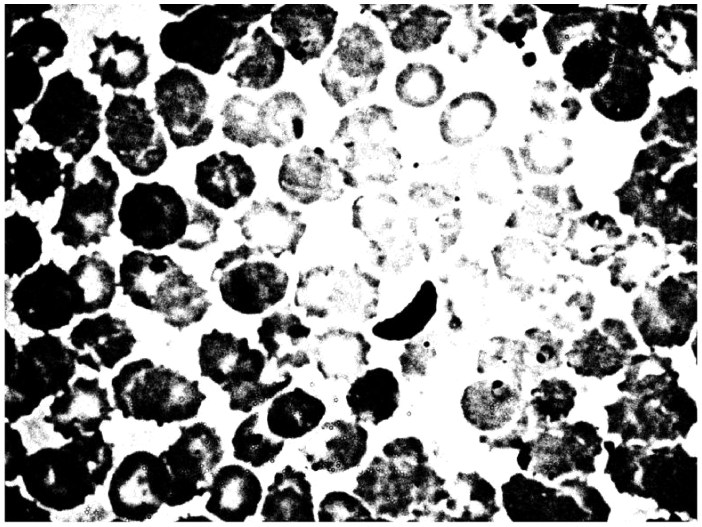


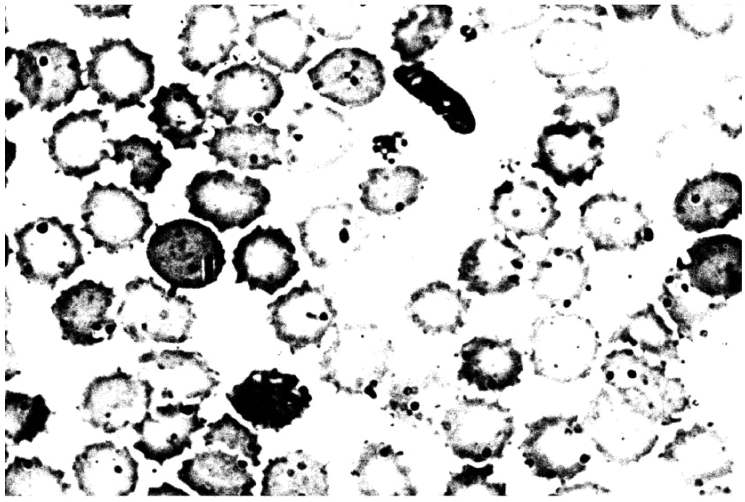


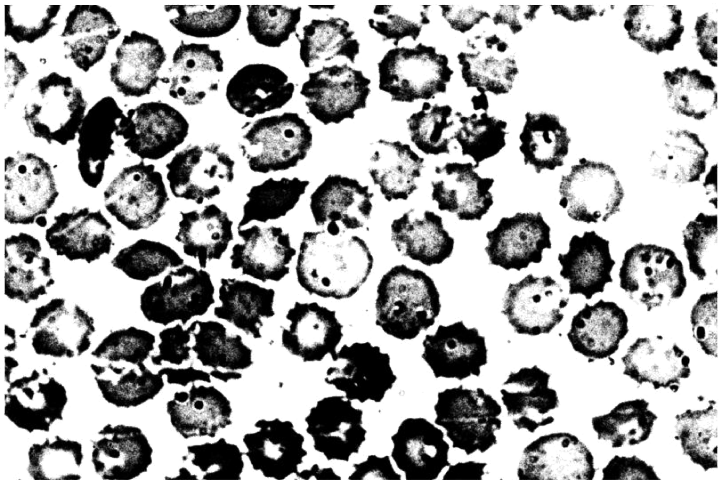


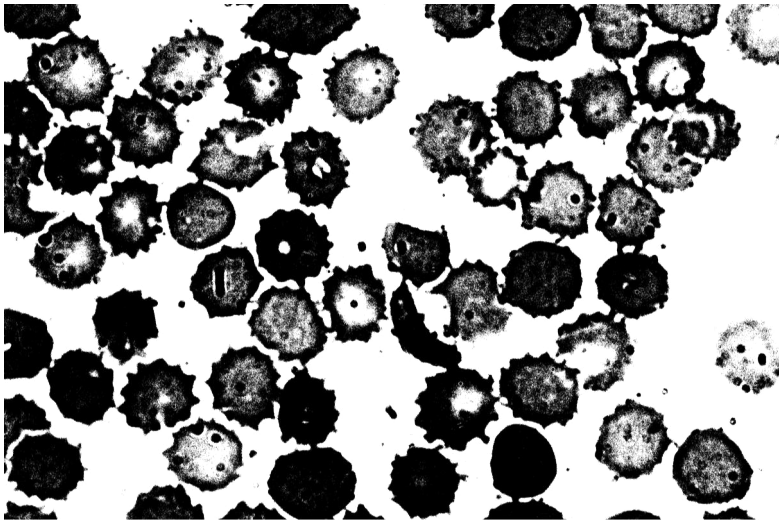




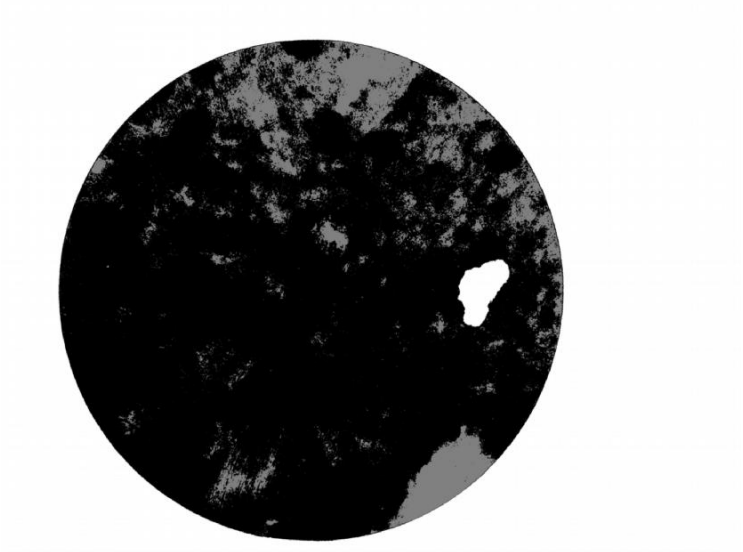


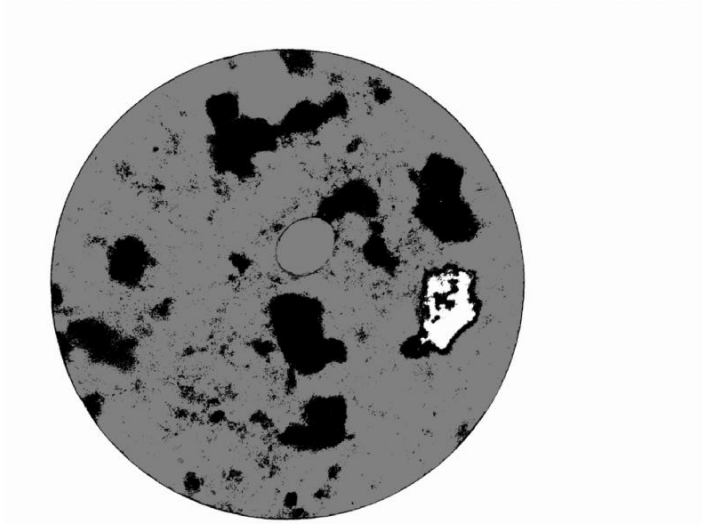


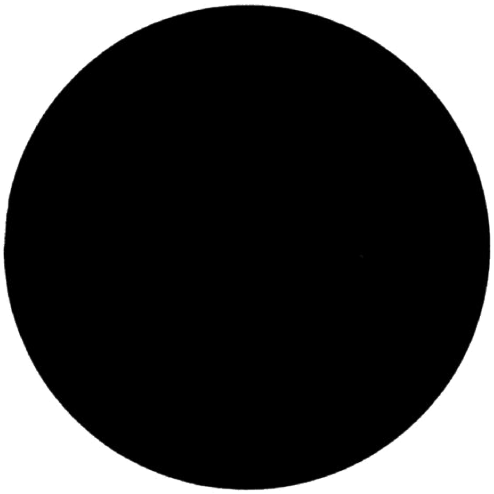


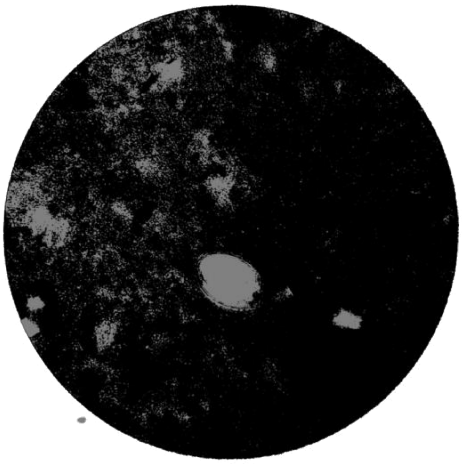


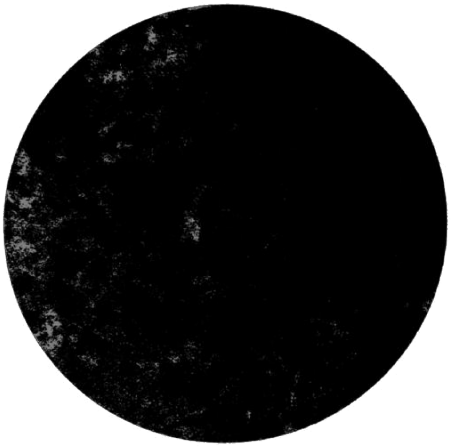
Schistosoma

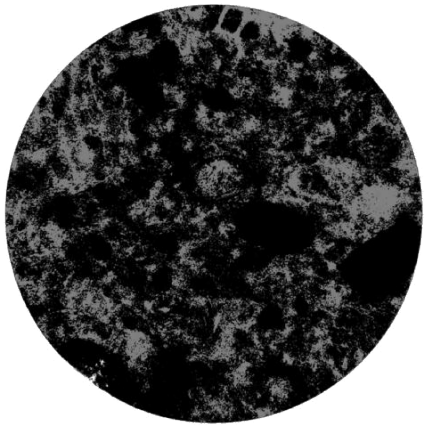








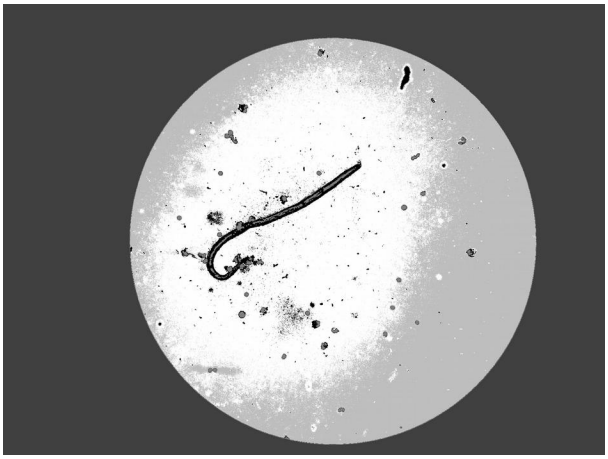


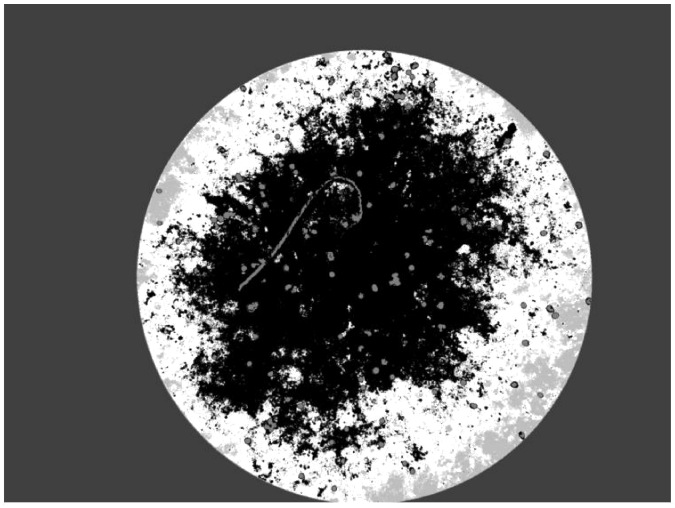


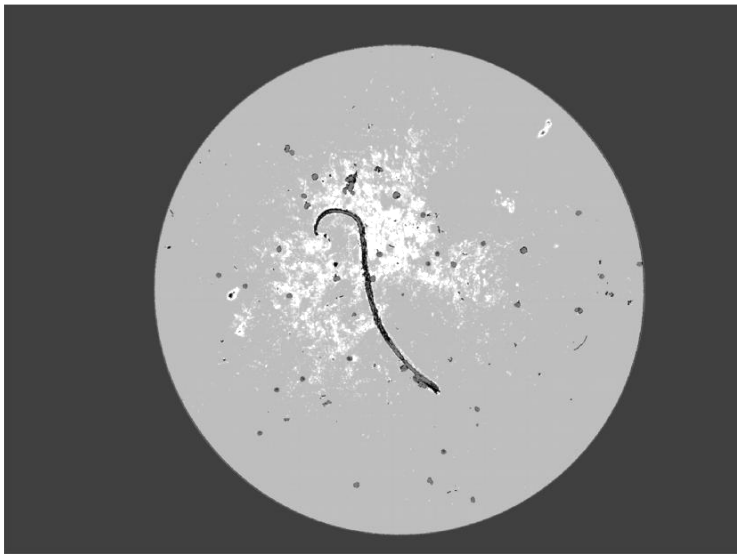
3. More than two centroids (4 centroids +1 for Filaria and Schistosoma)

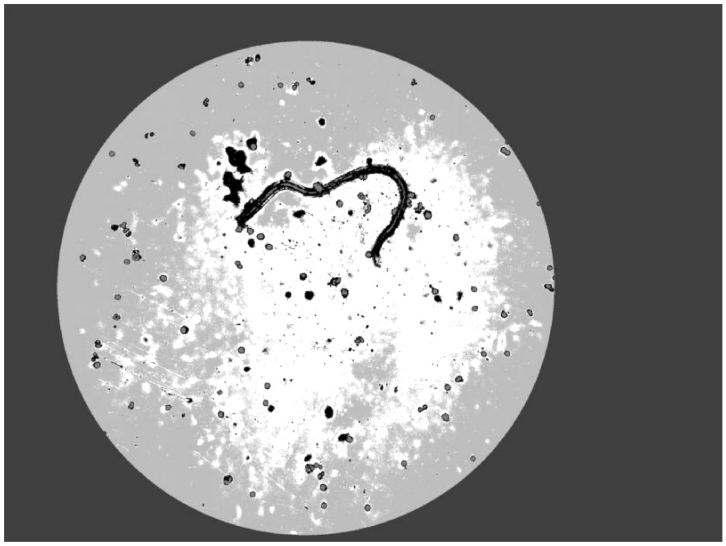
This is more effective than using only two centroids, especially for schistosoma. This is less evident for Filaria and Plasmodium

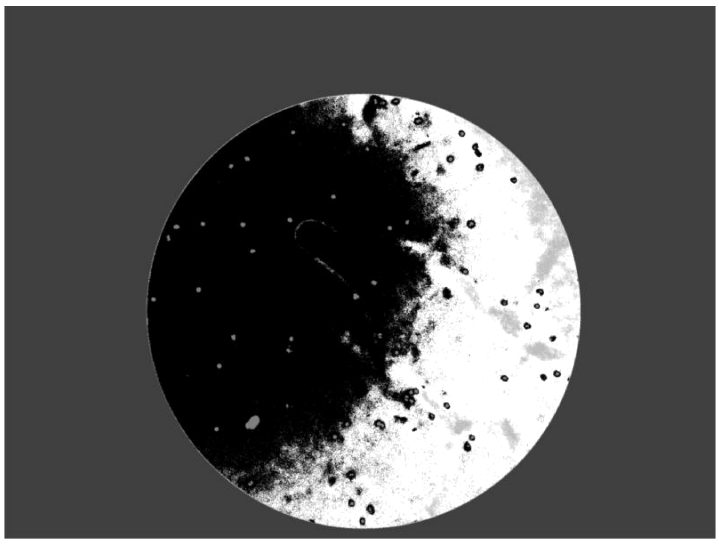
Filaria

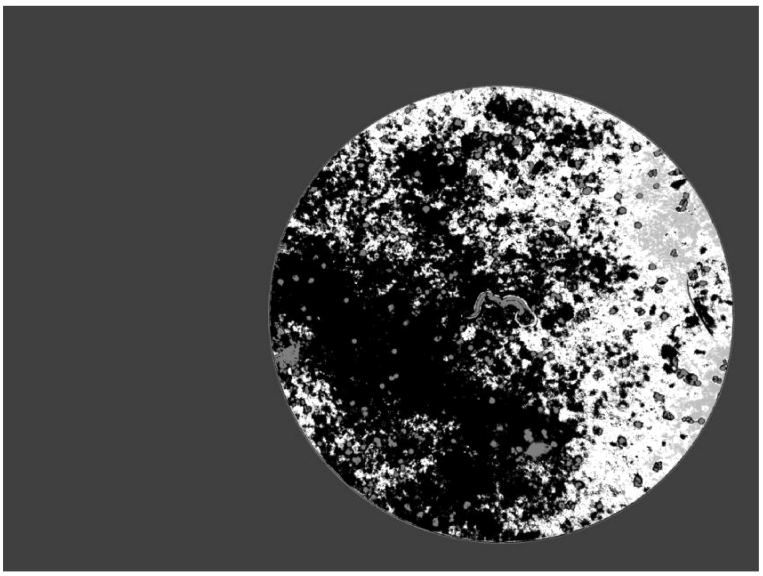


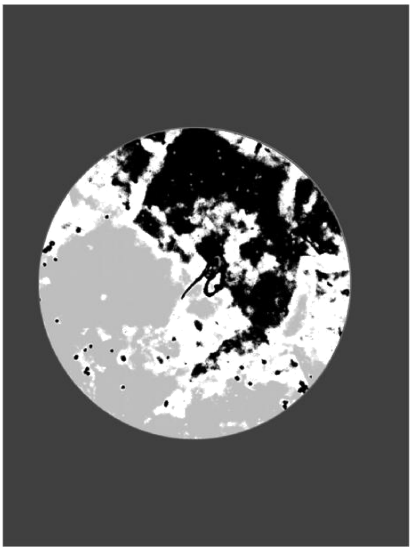


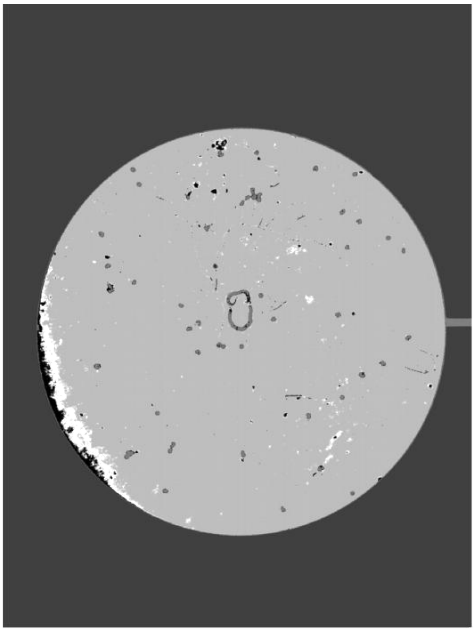


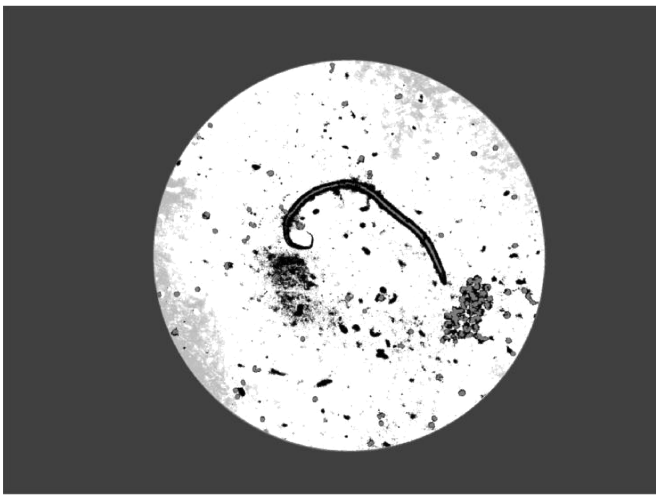


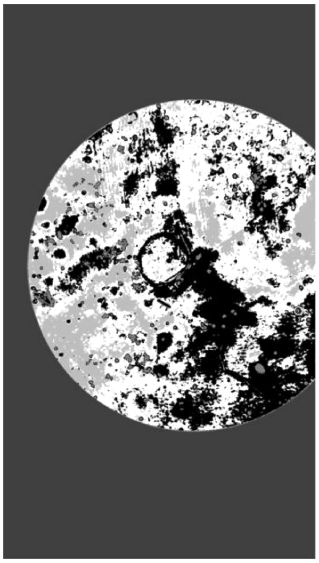




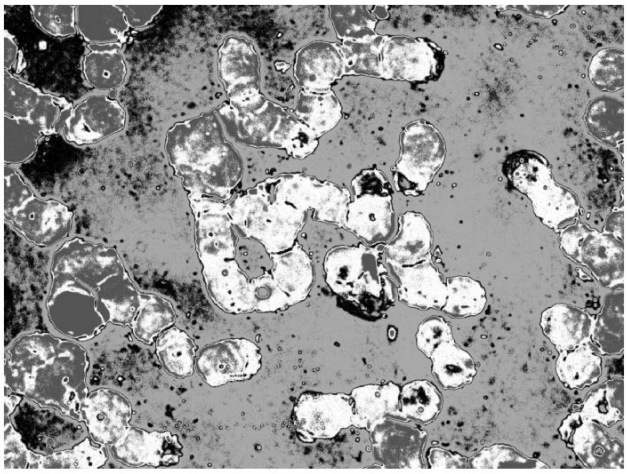


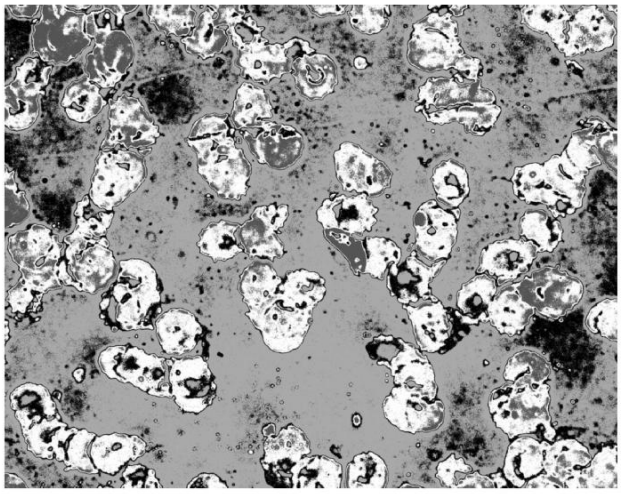


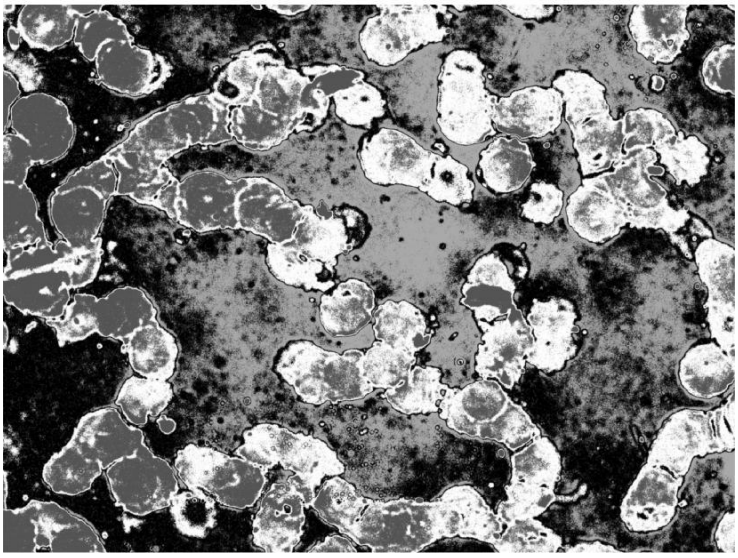


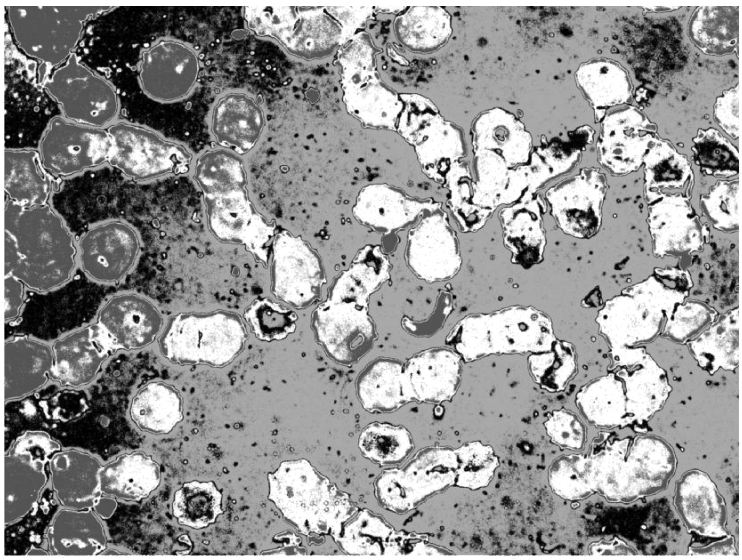


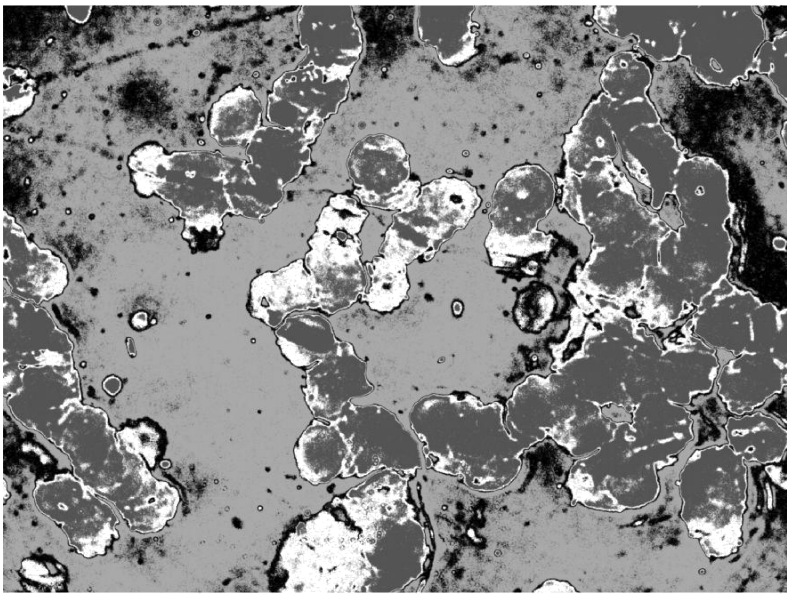
Plasmodium

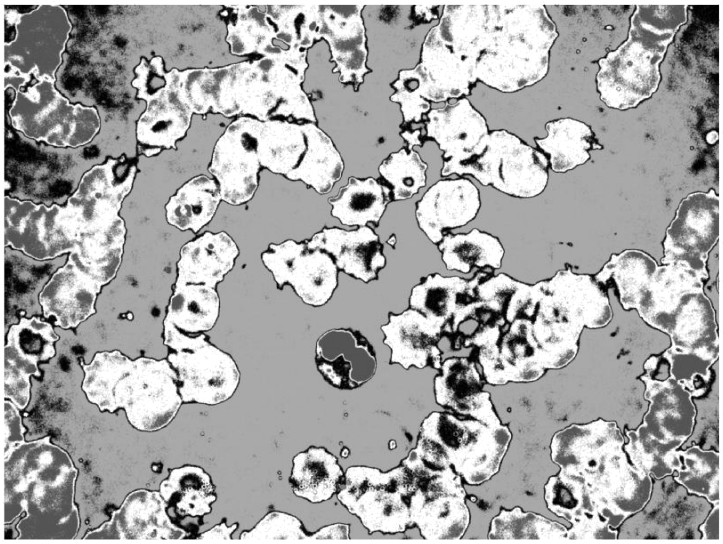


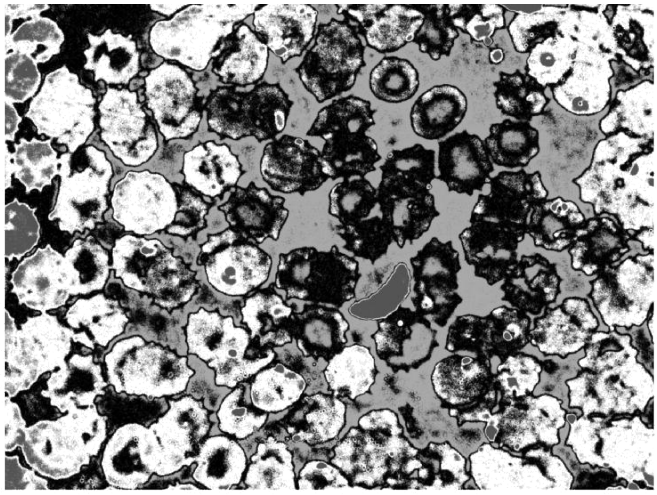


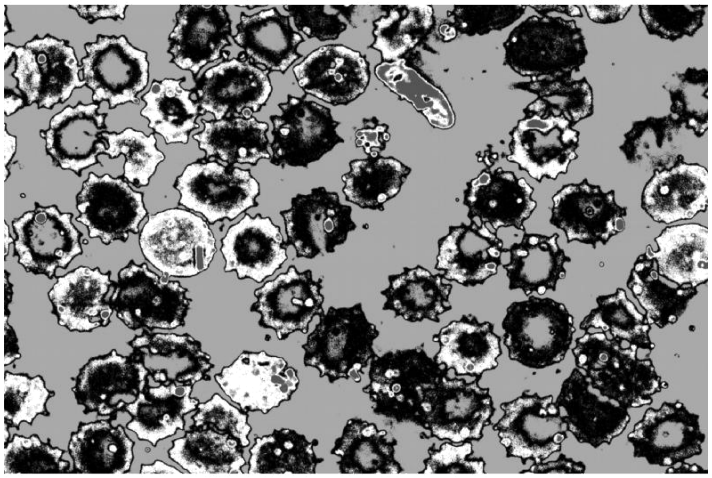


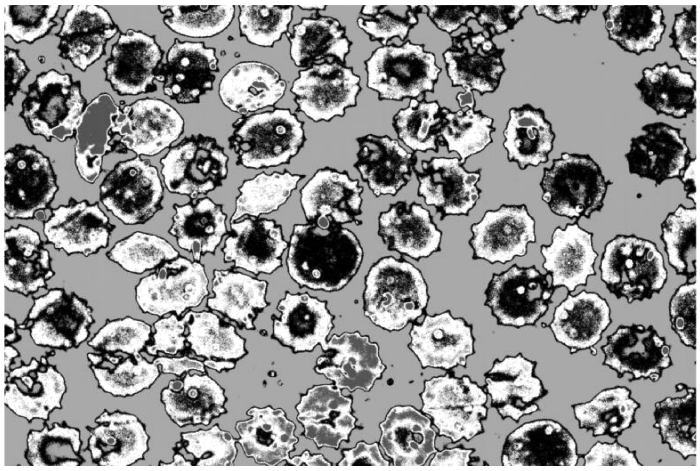


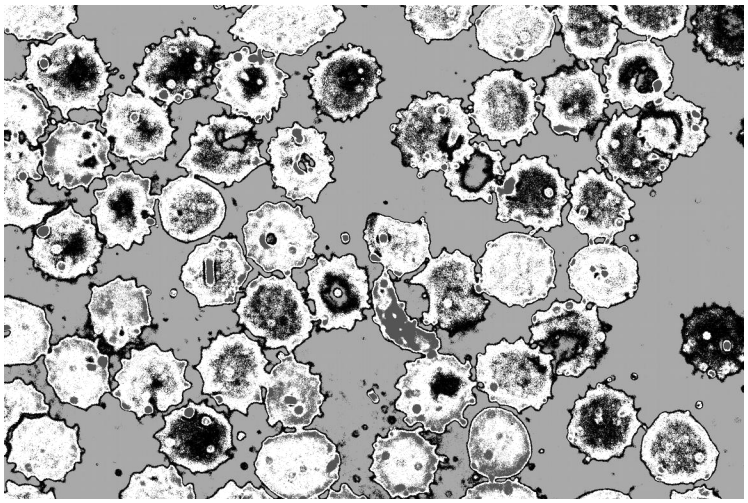




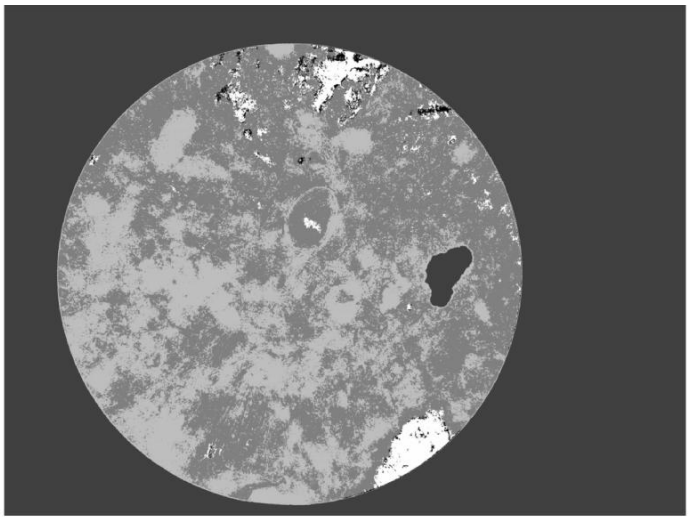


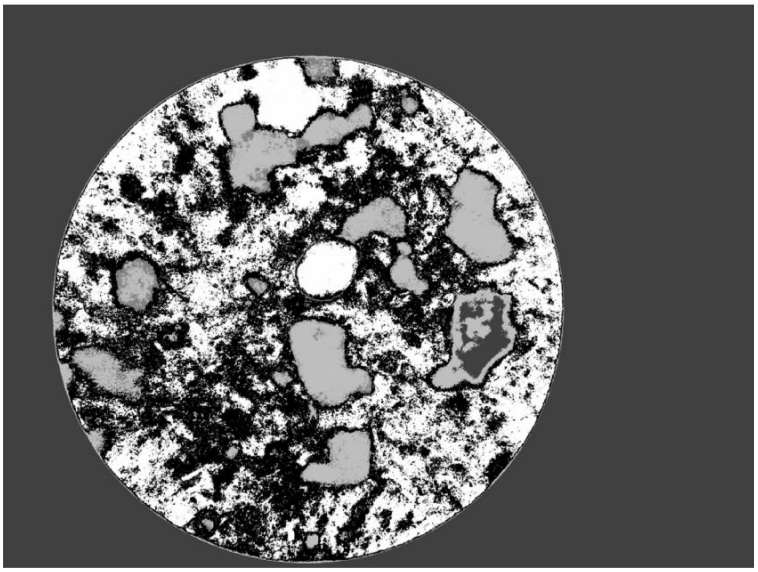






Schistosoma



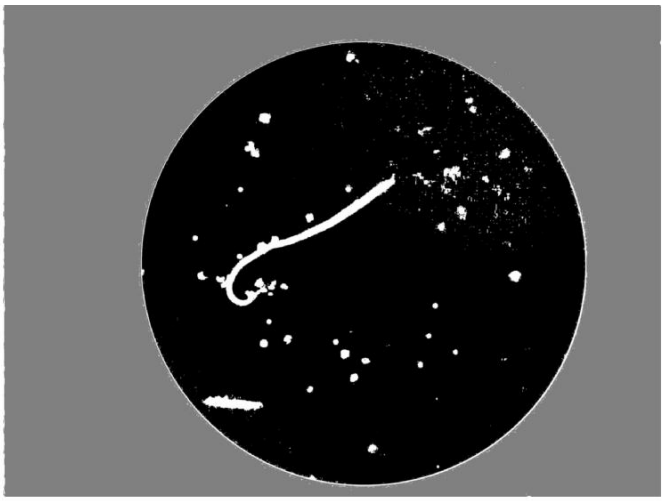


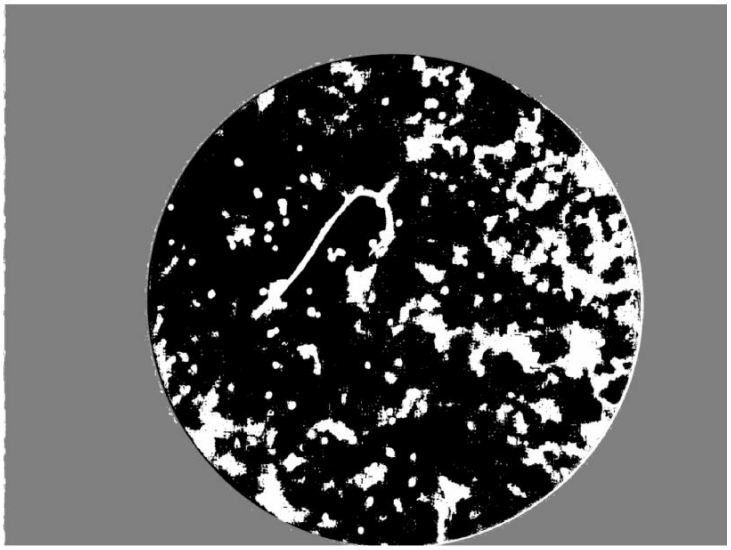
4. HSV

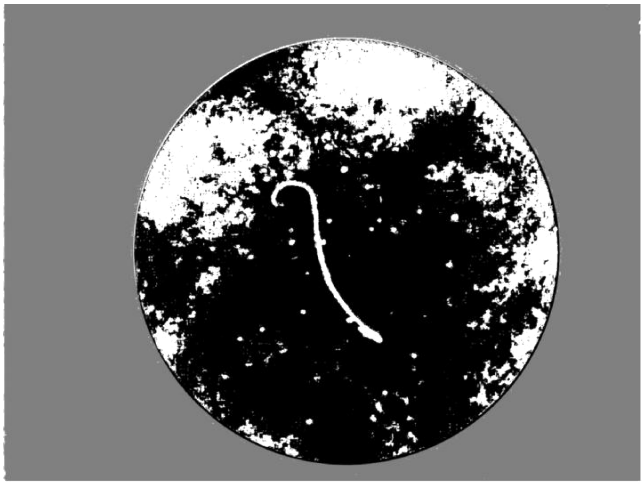
This was more effective for Filaria, but not so much for Schistosoma and Plasmodium.

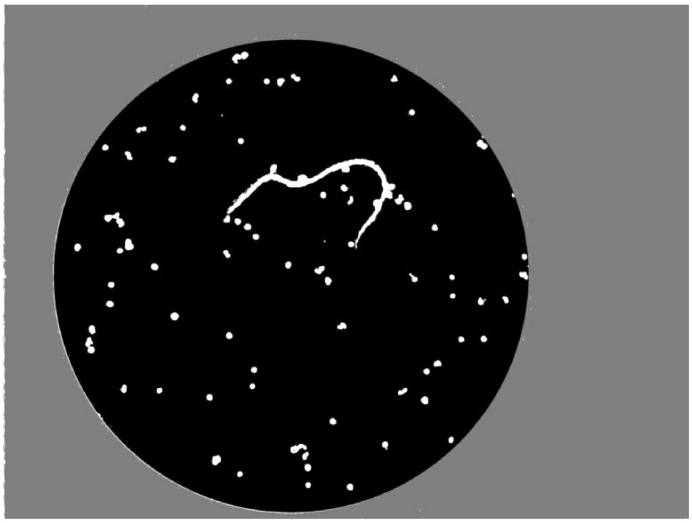
Colors appear more saturated than RGB images.

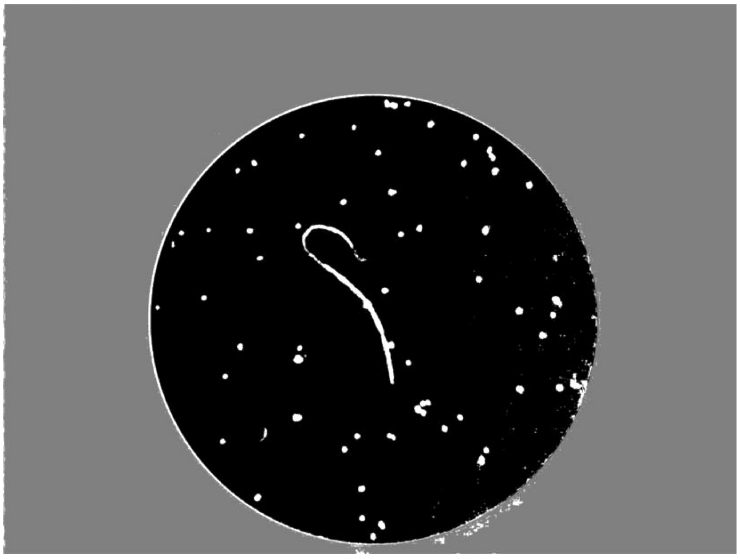
Filaria

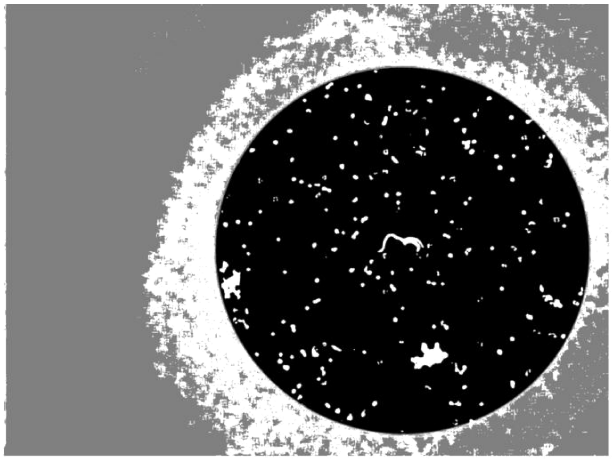


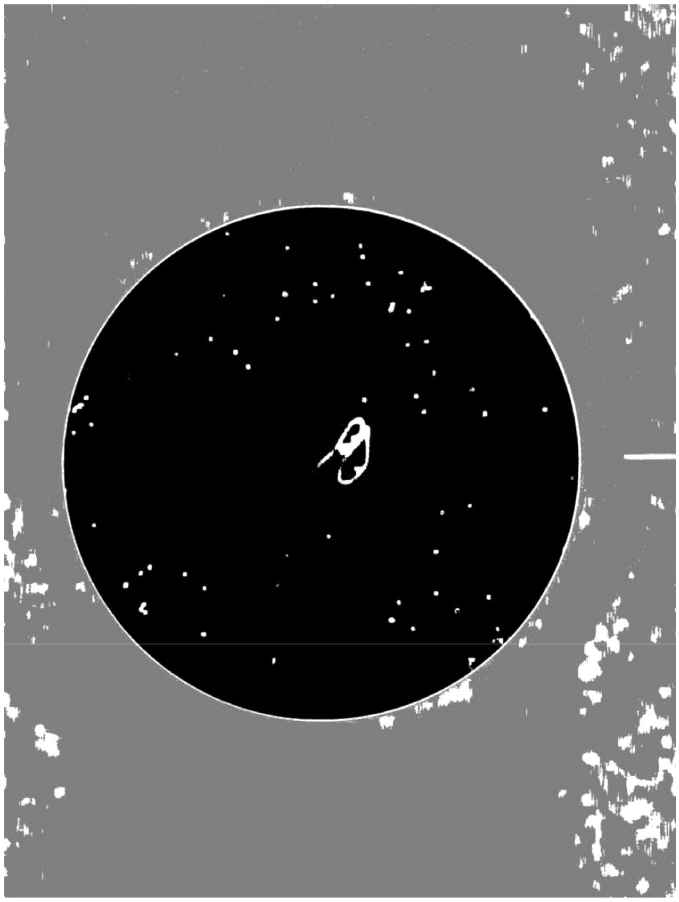


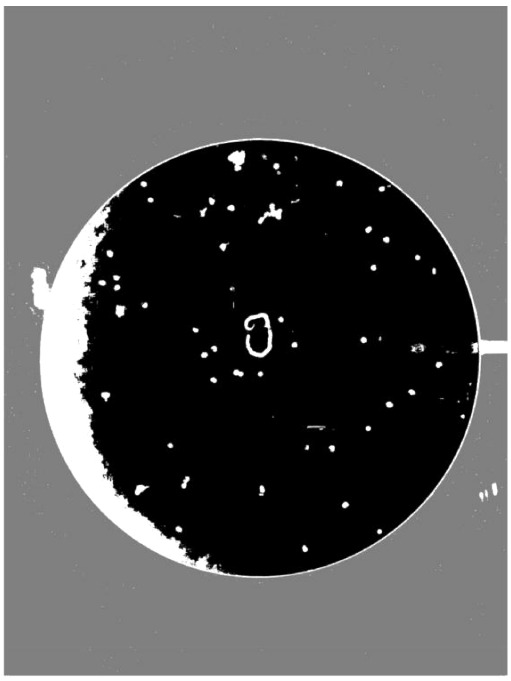


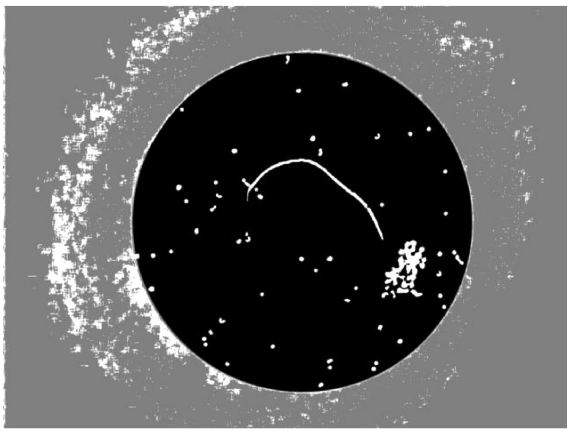


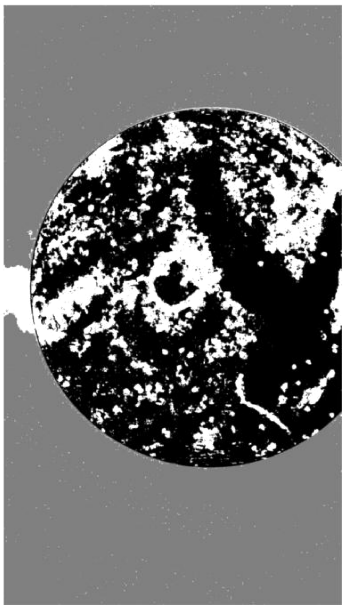




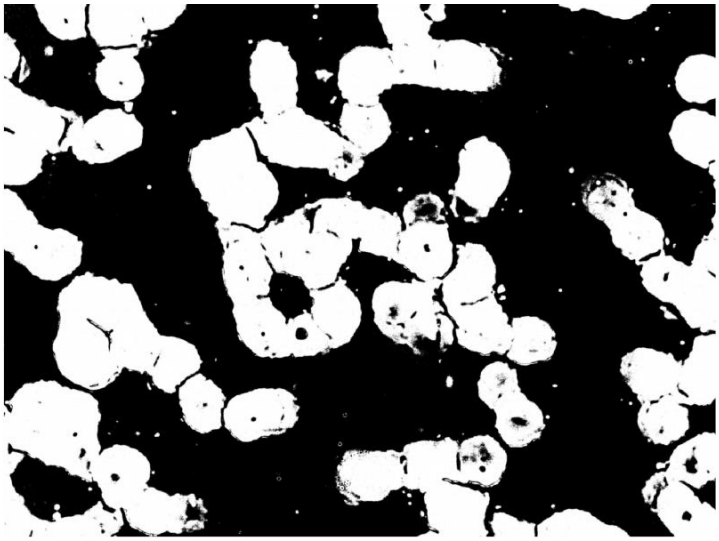


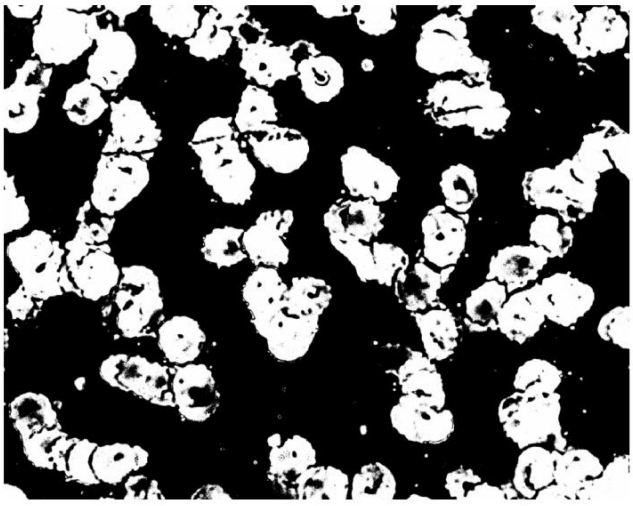


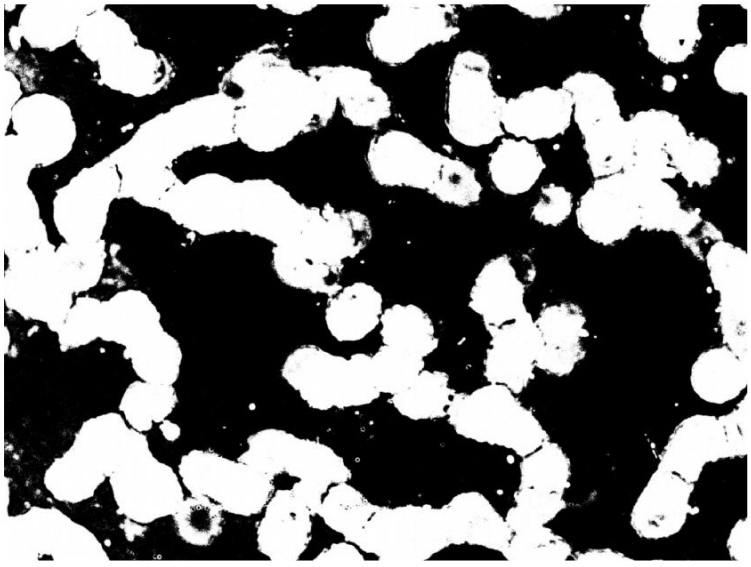


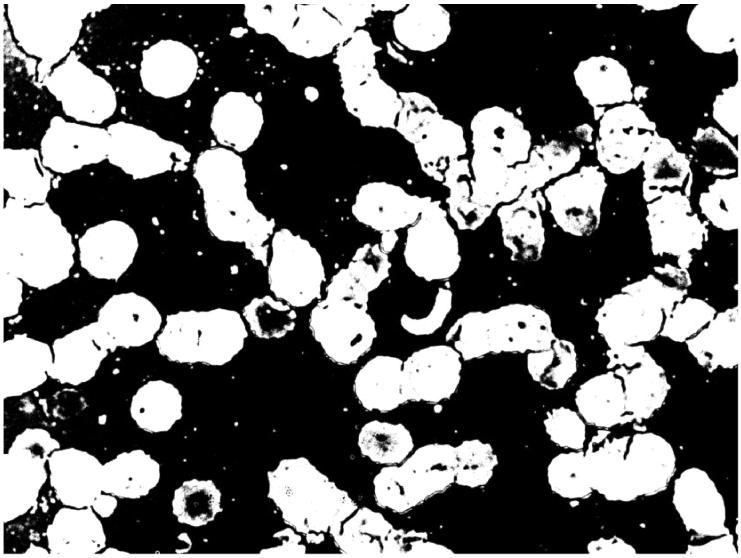


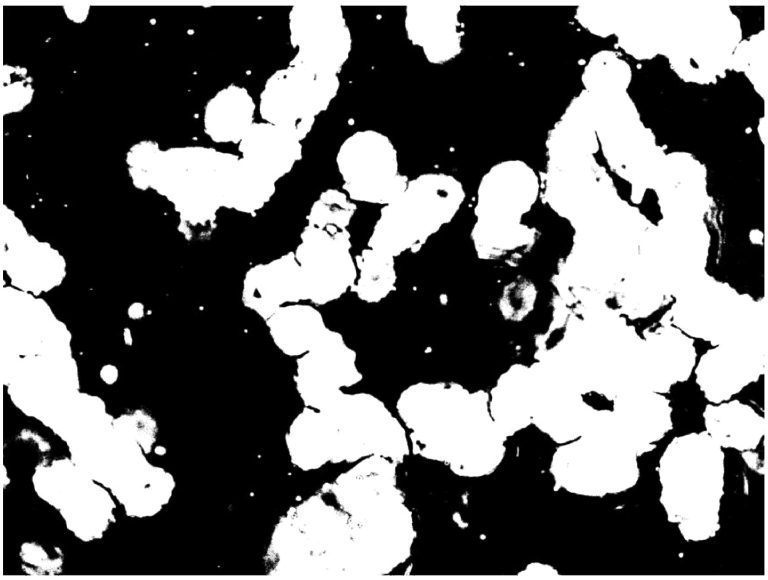
Plasmodium

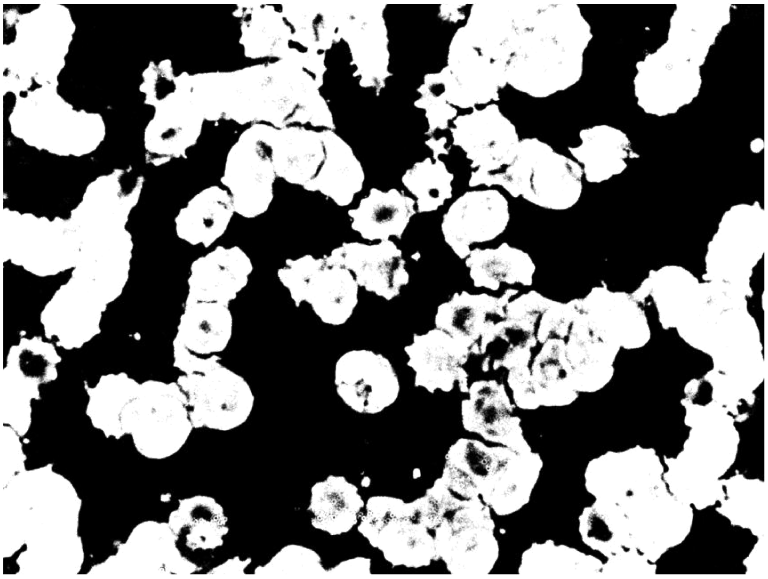


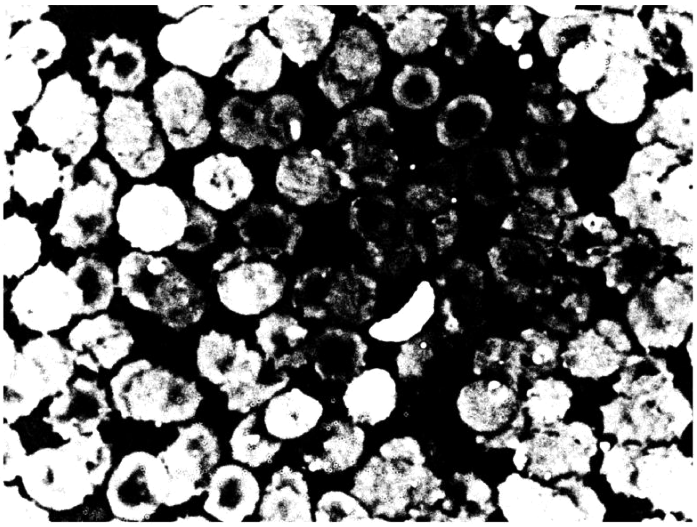


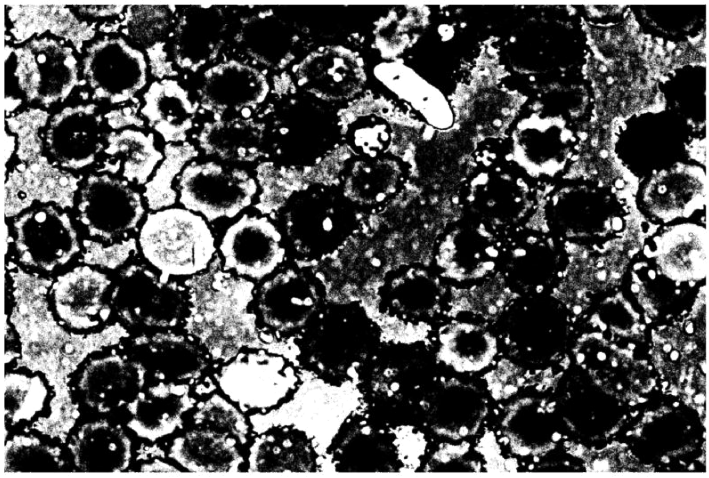


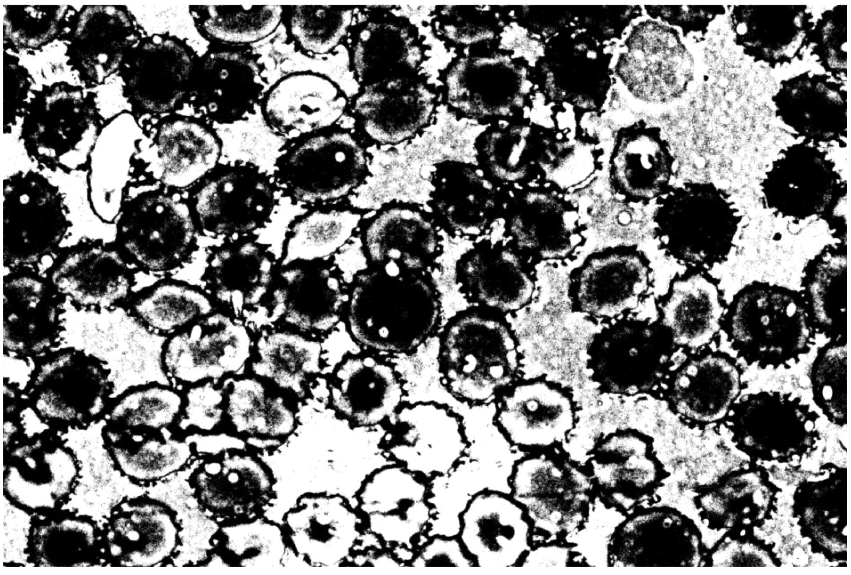


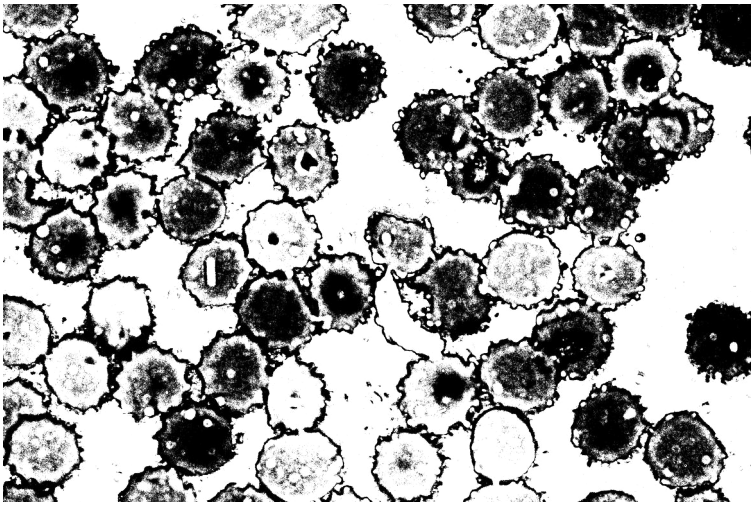




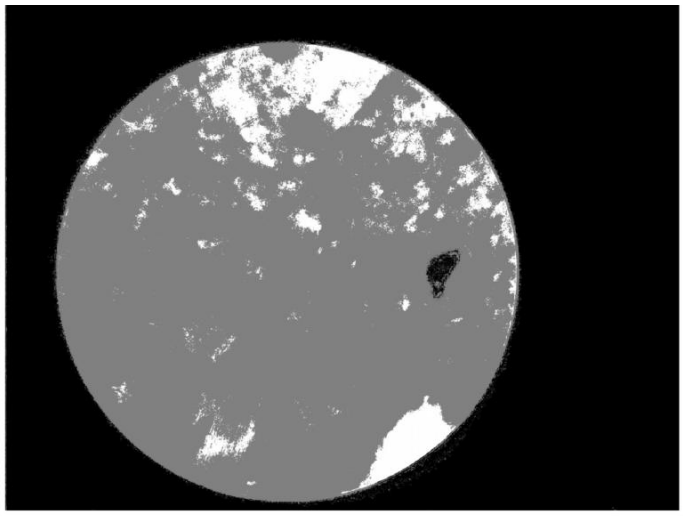


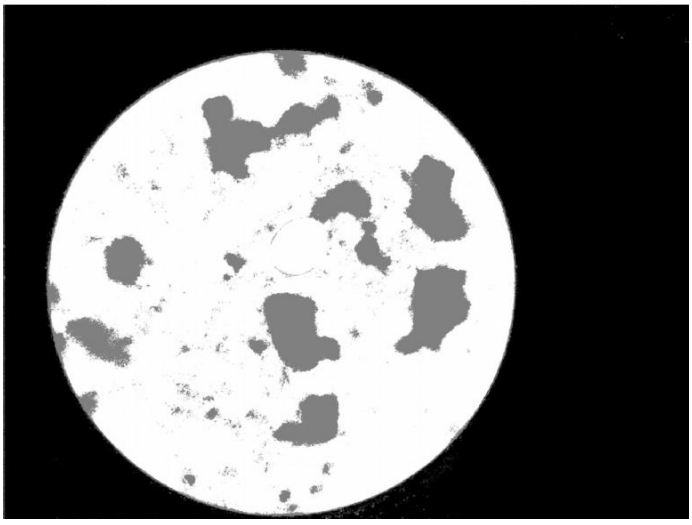


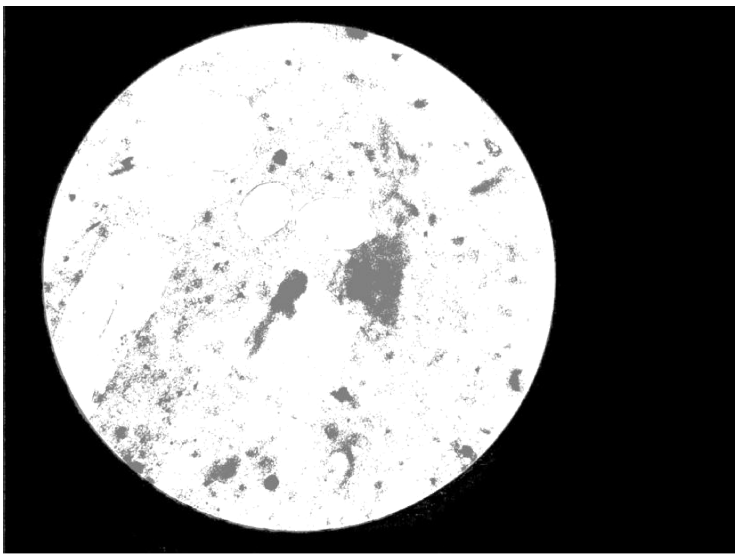


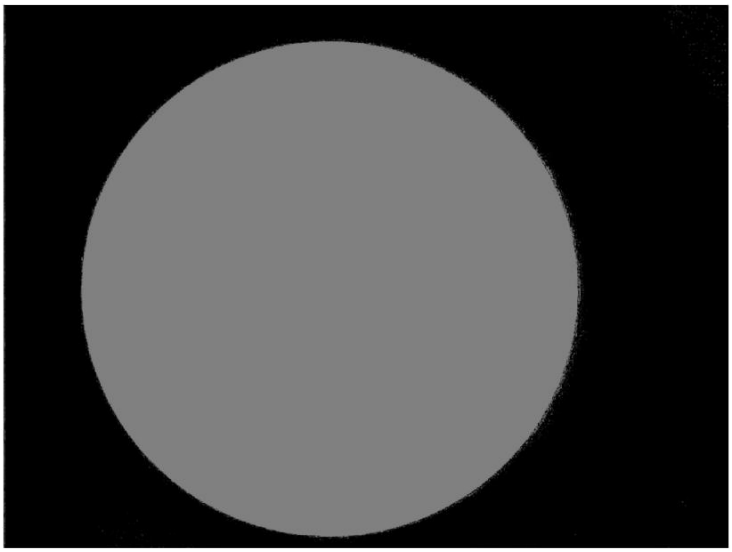


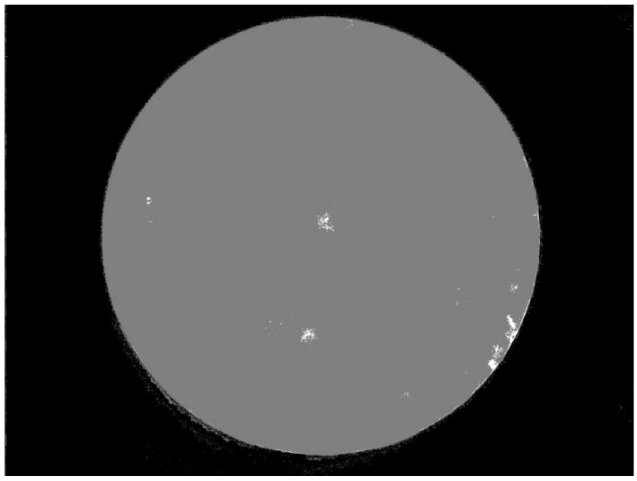
Schistosoma

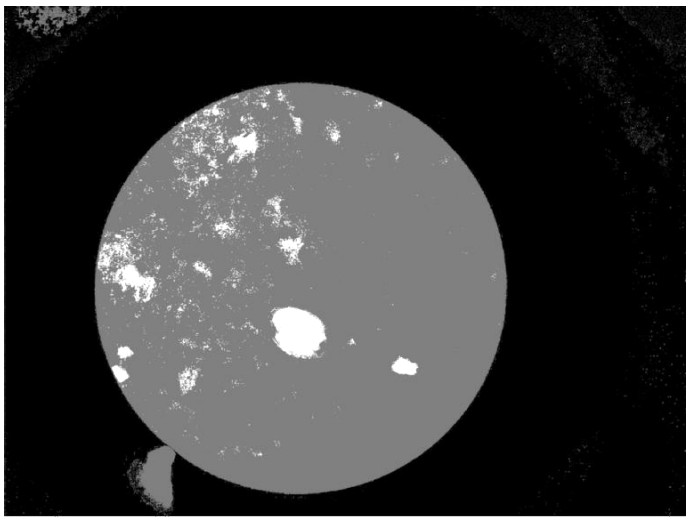


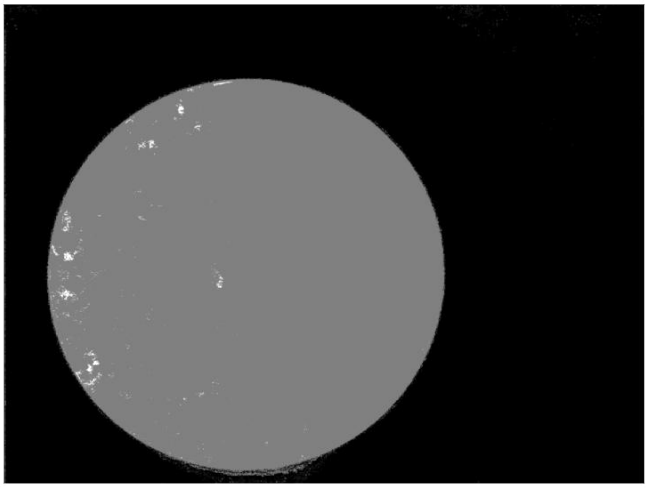


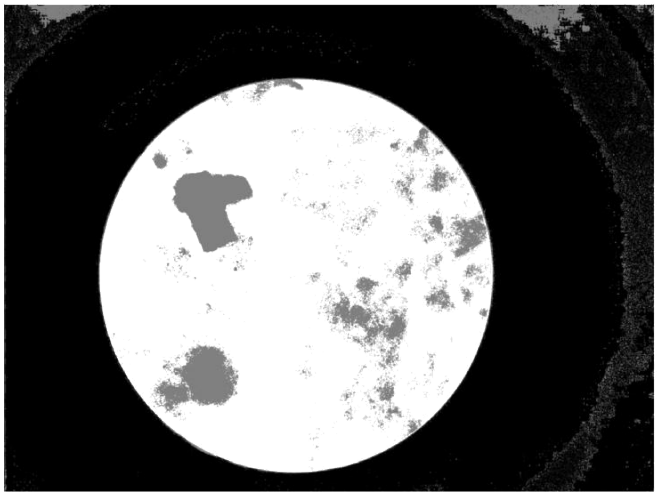


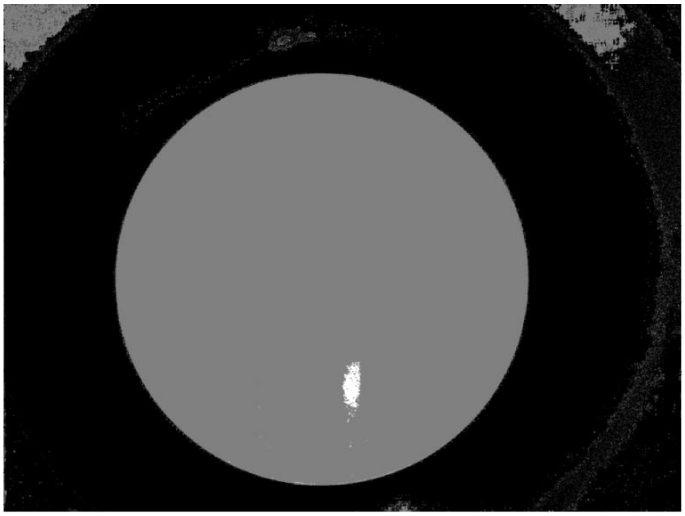


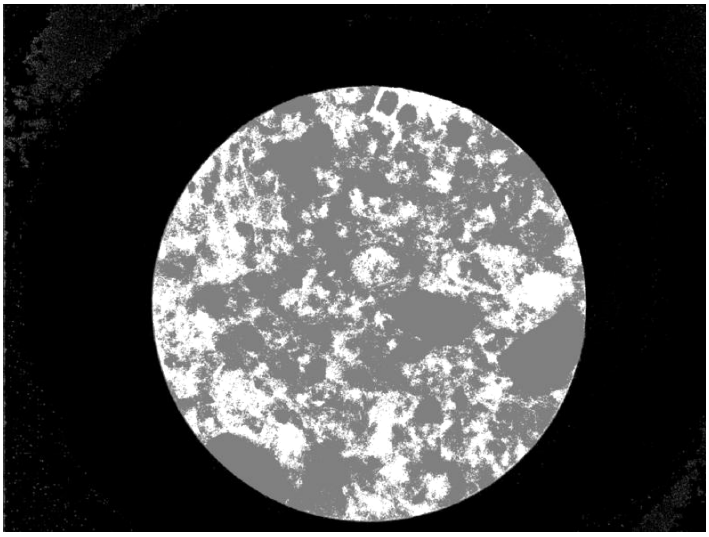






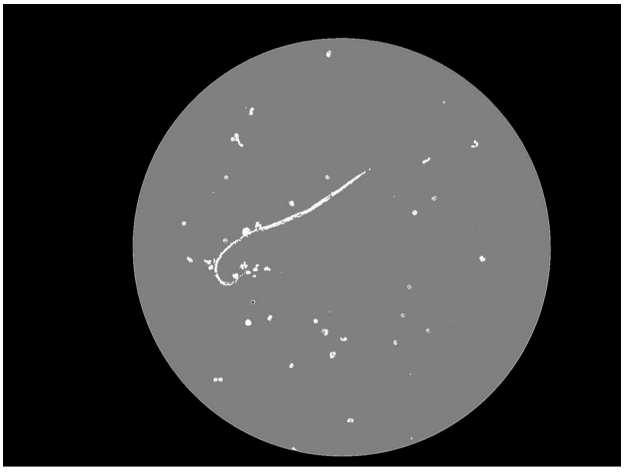


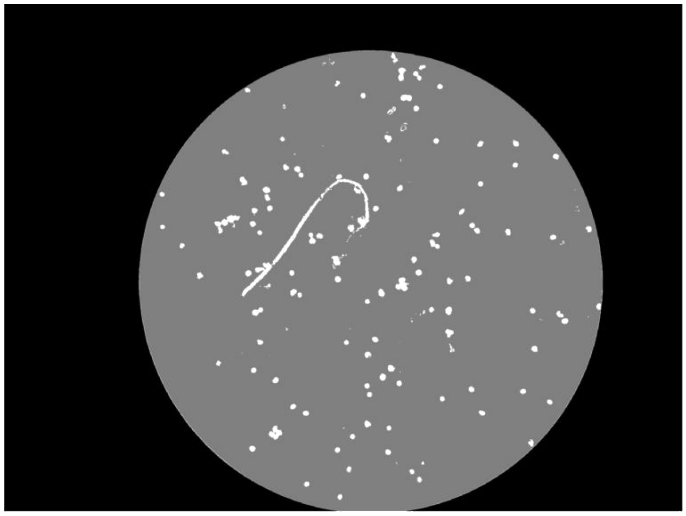


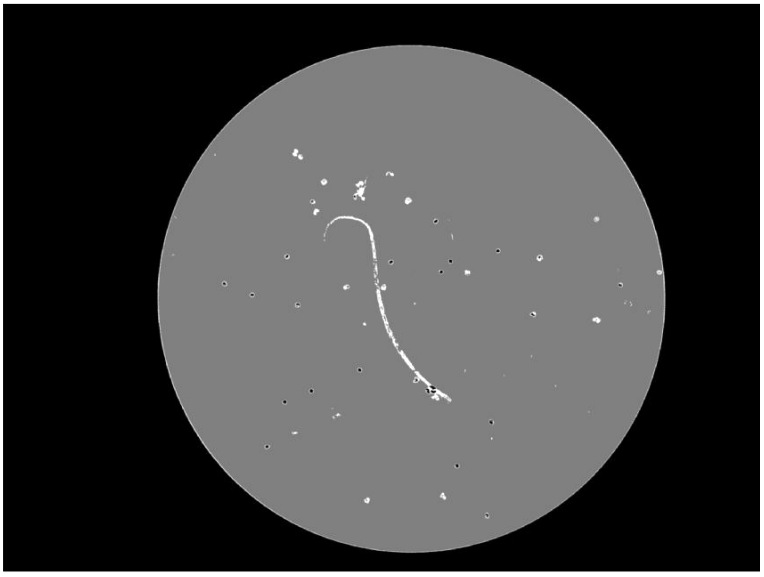


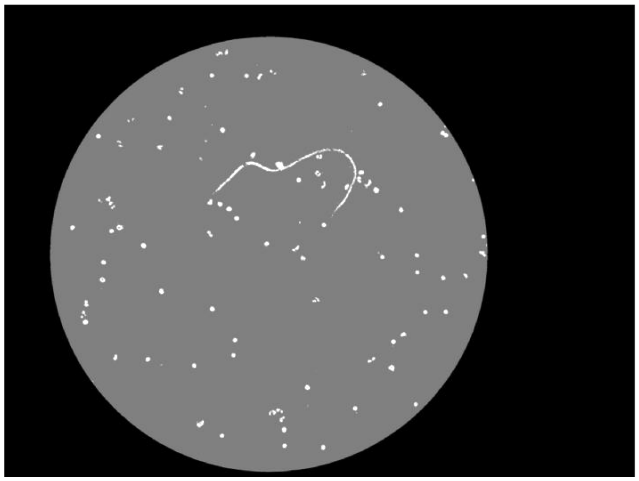
5. Lab

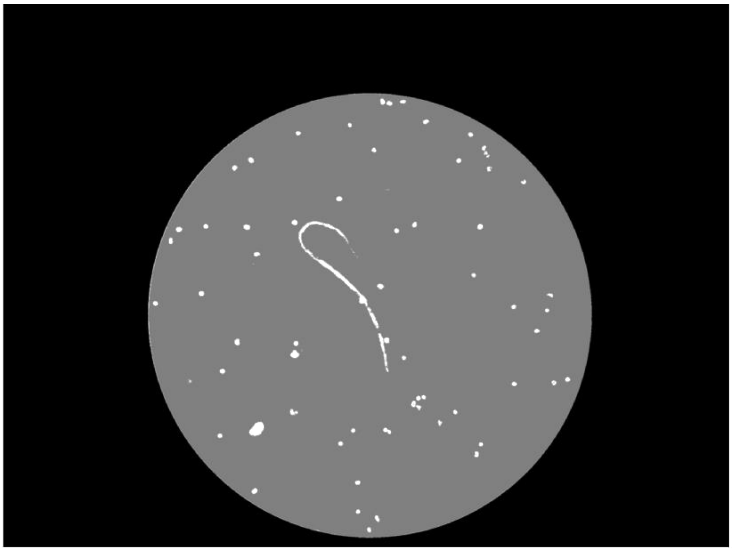
Filaria

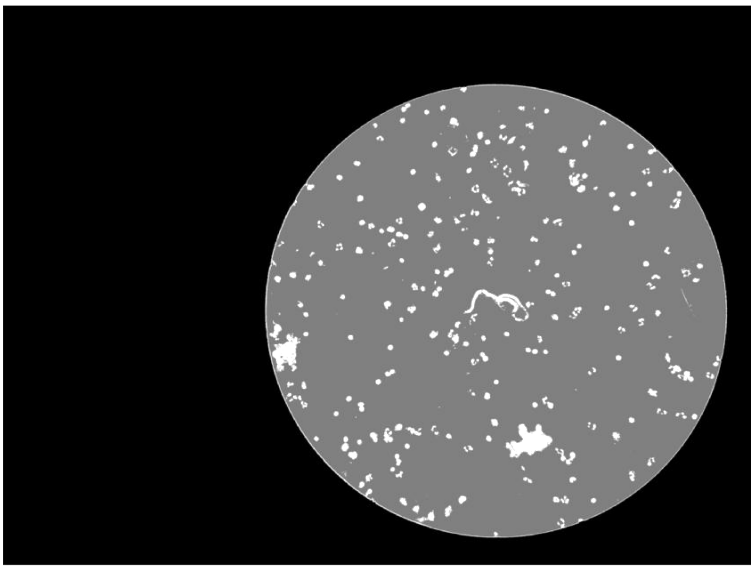


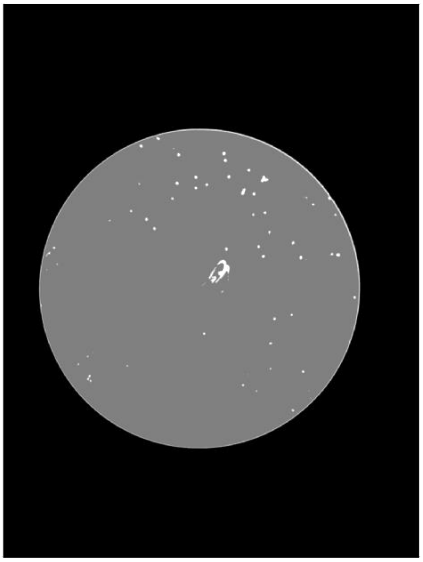


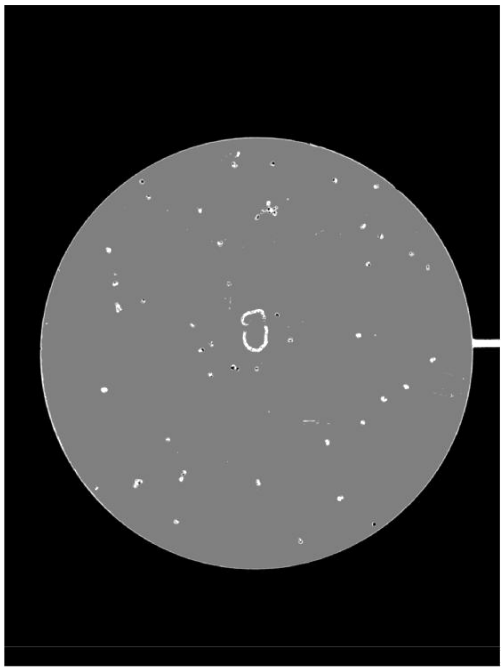


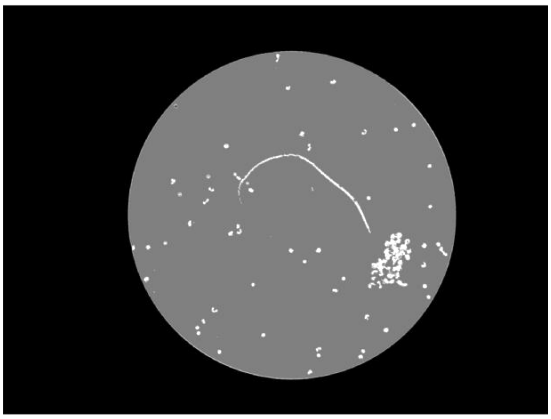


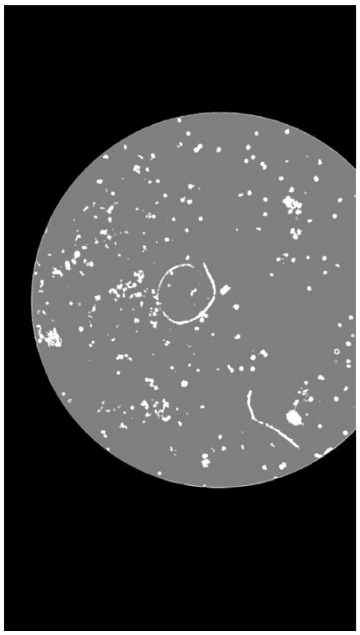




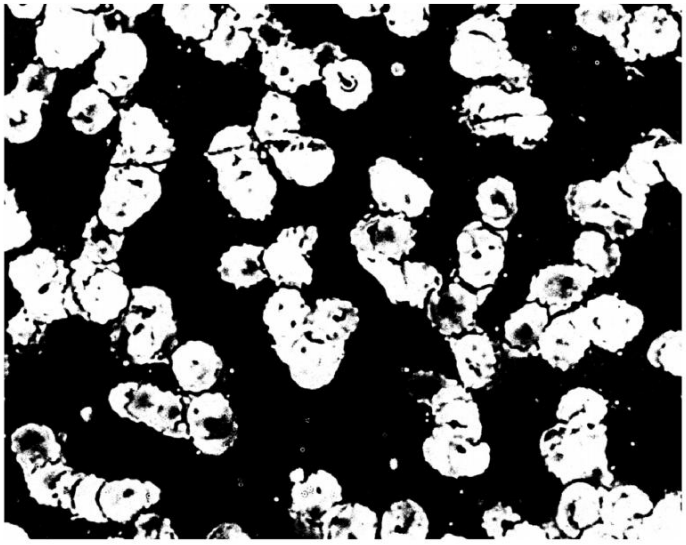


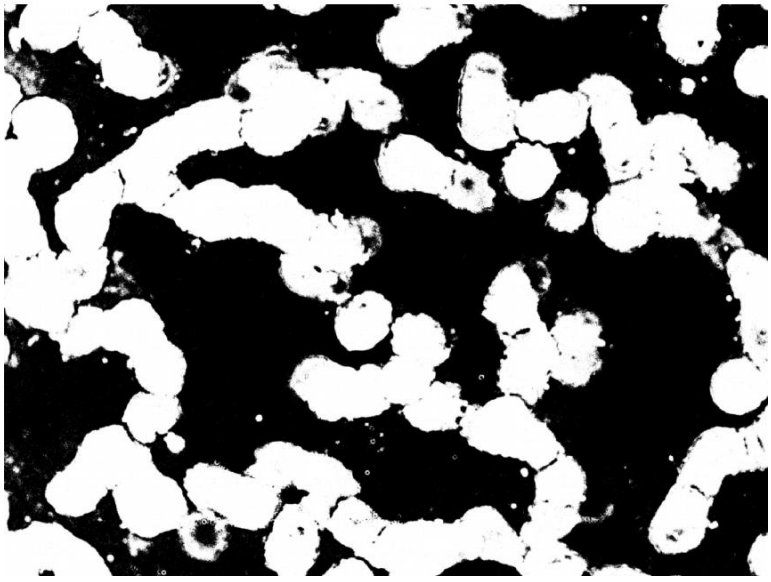


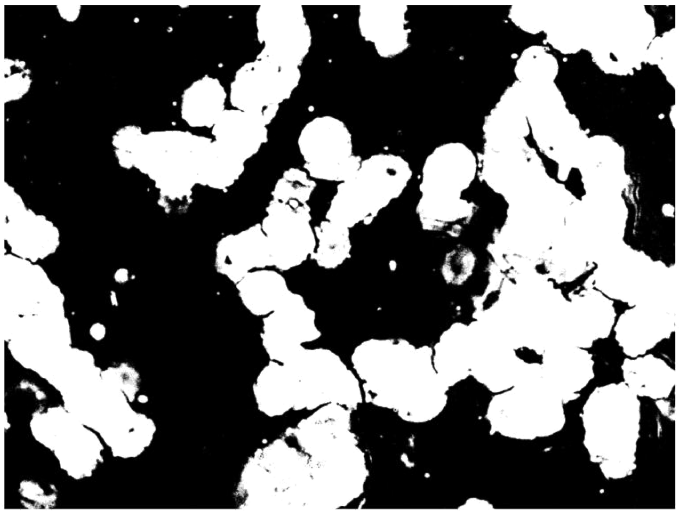


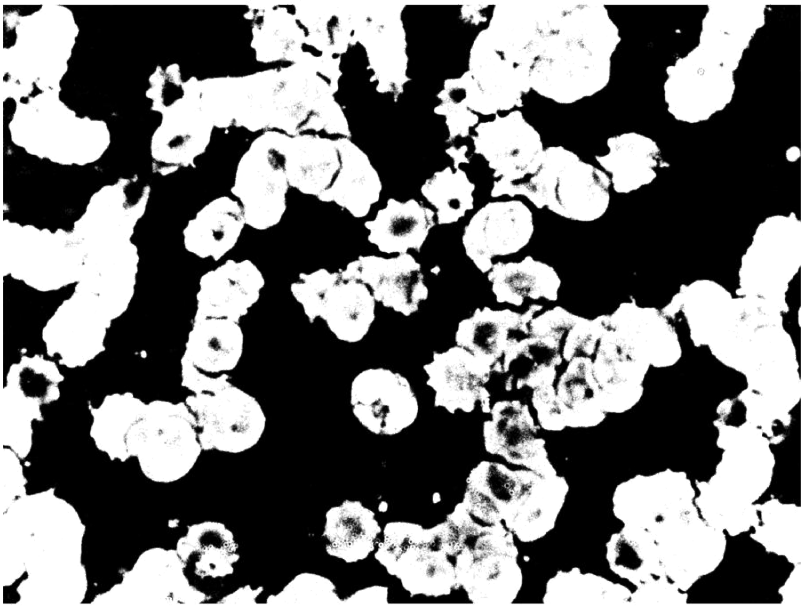


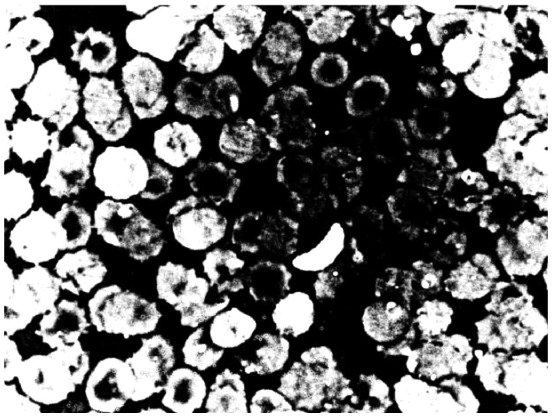
Plasmodium

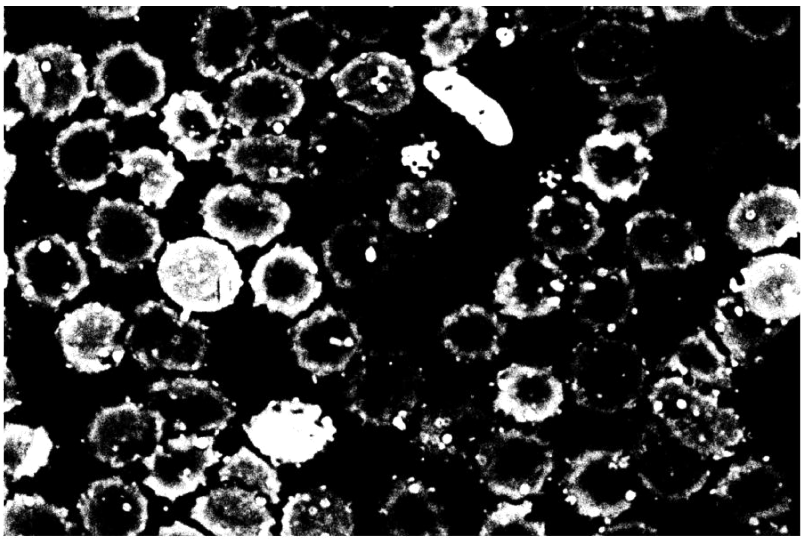


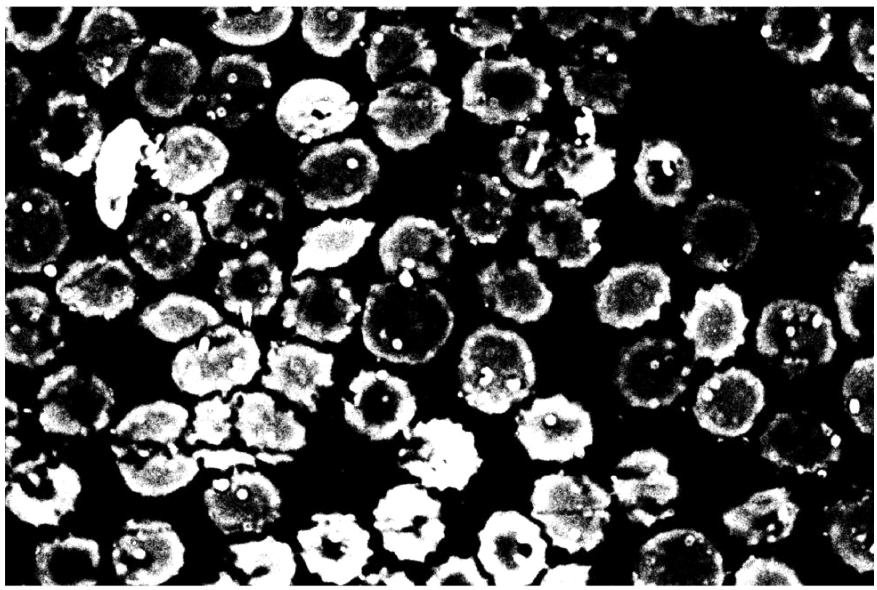


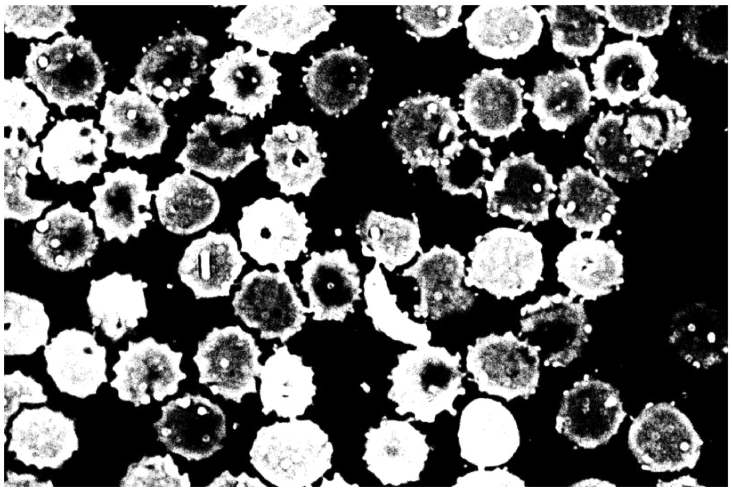




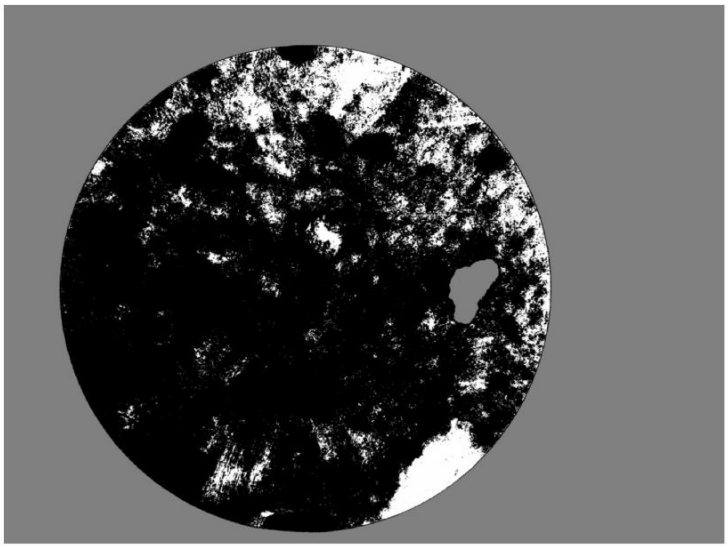


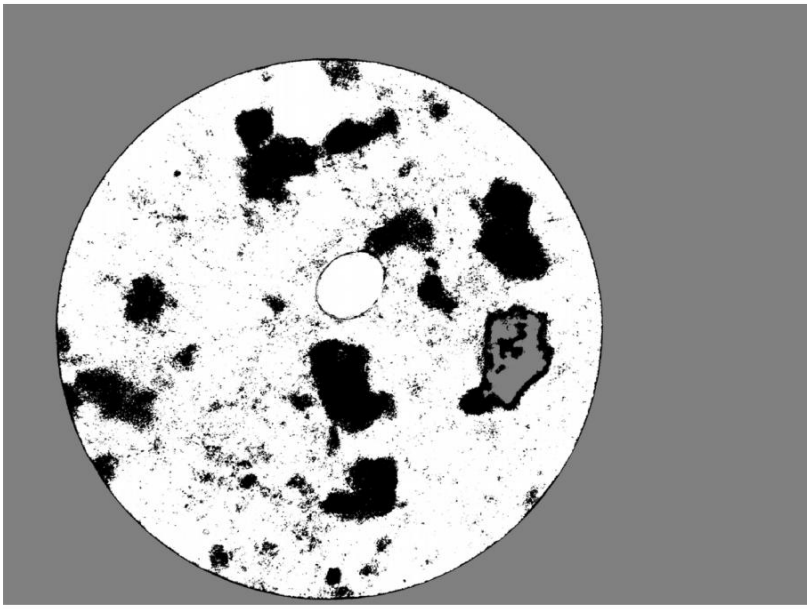


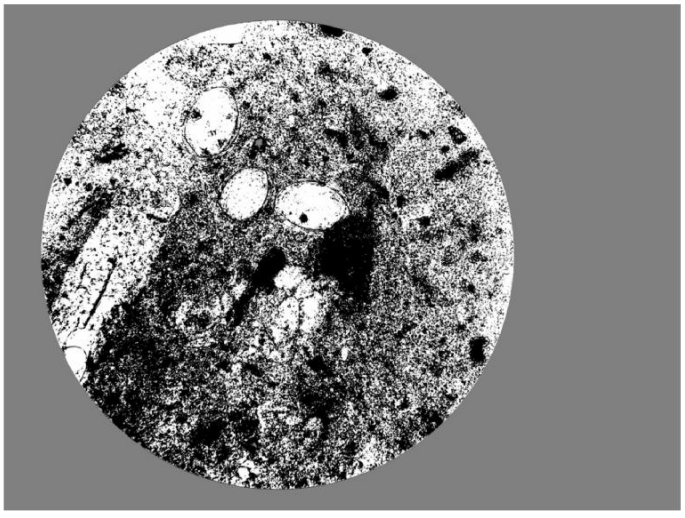


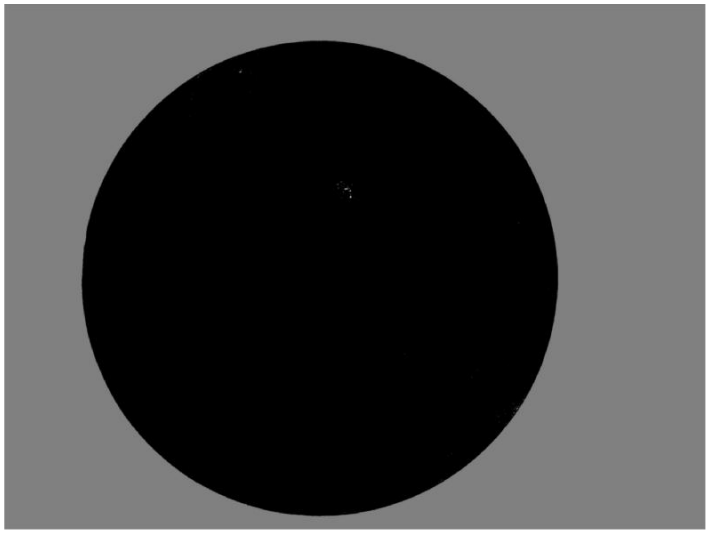


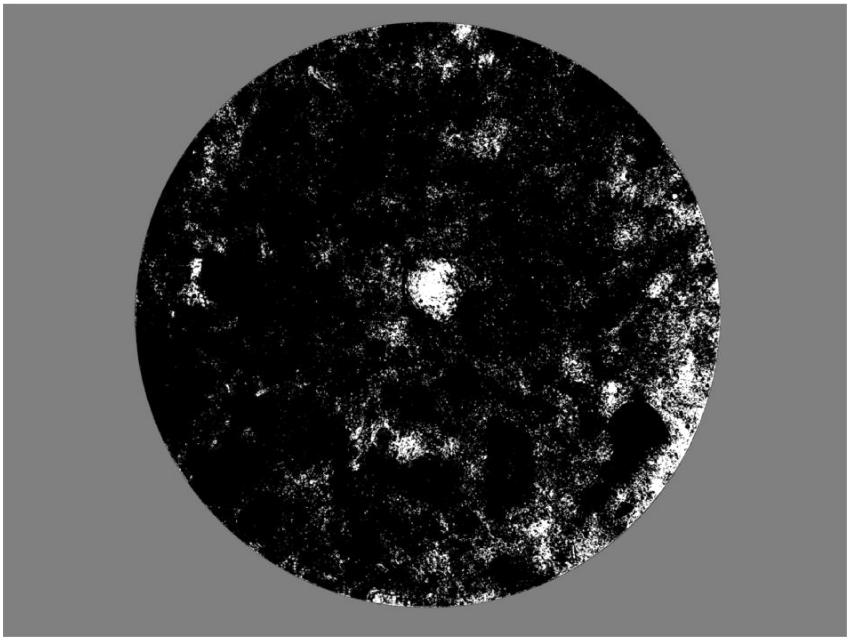
Schistosoma

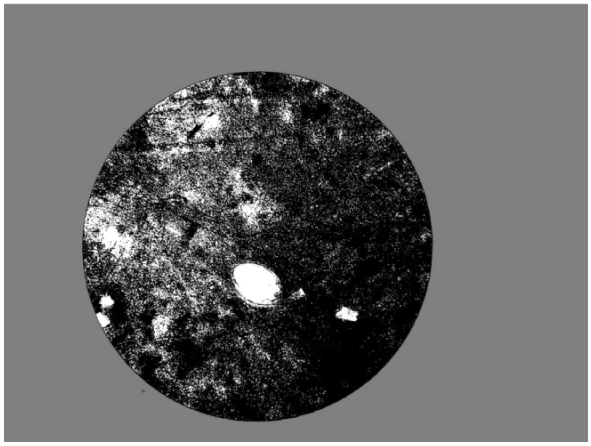


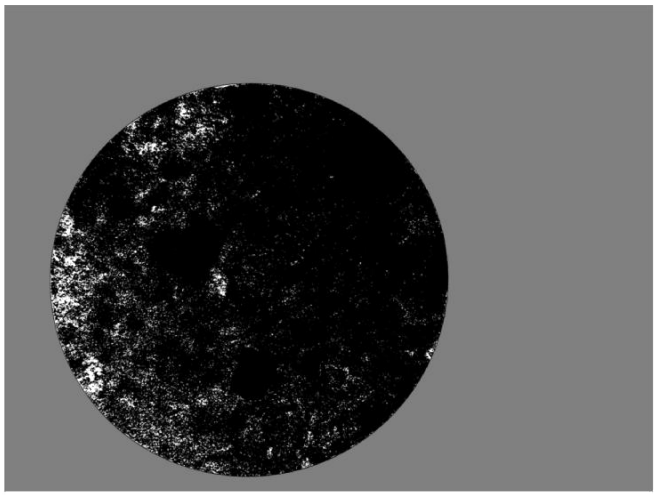


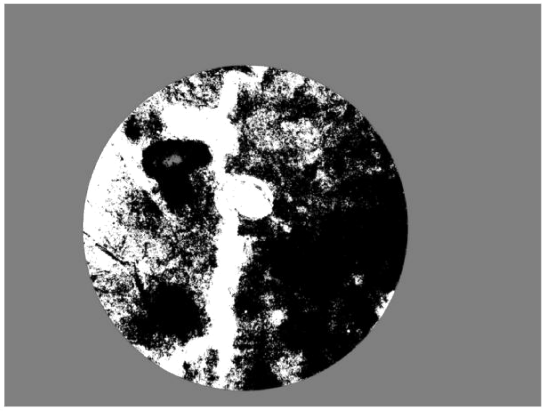


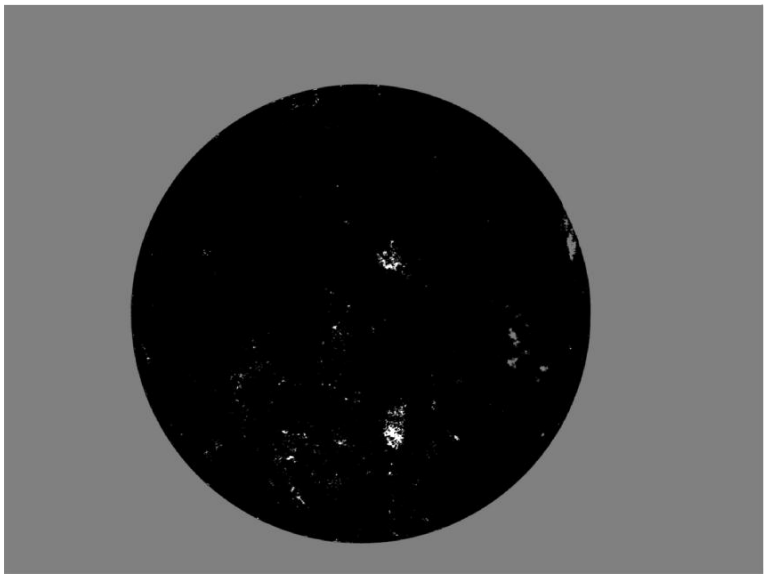


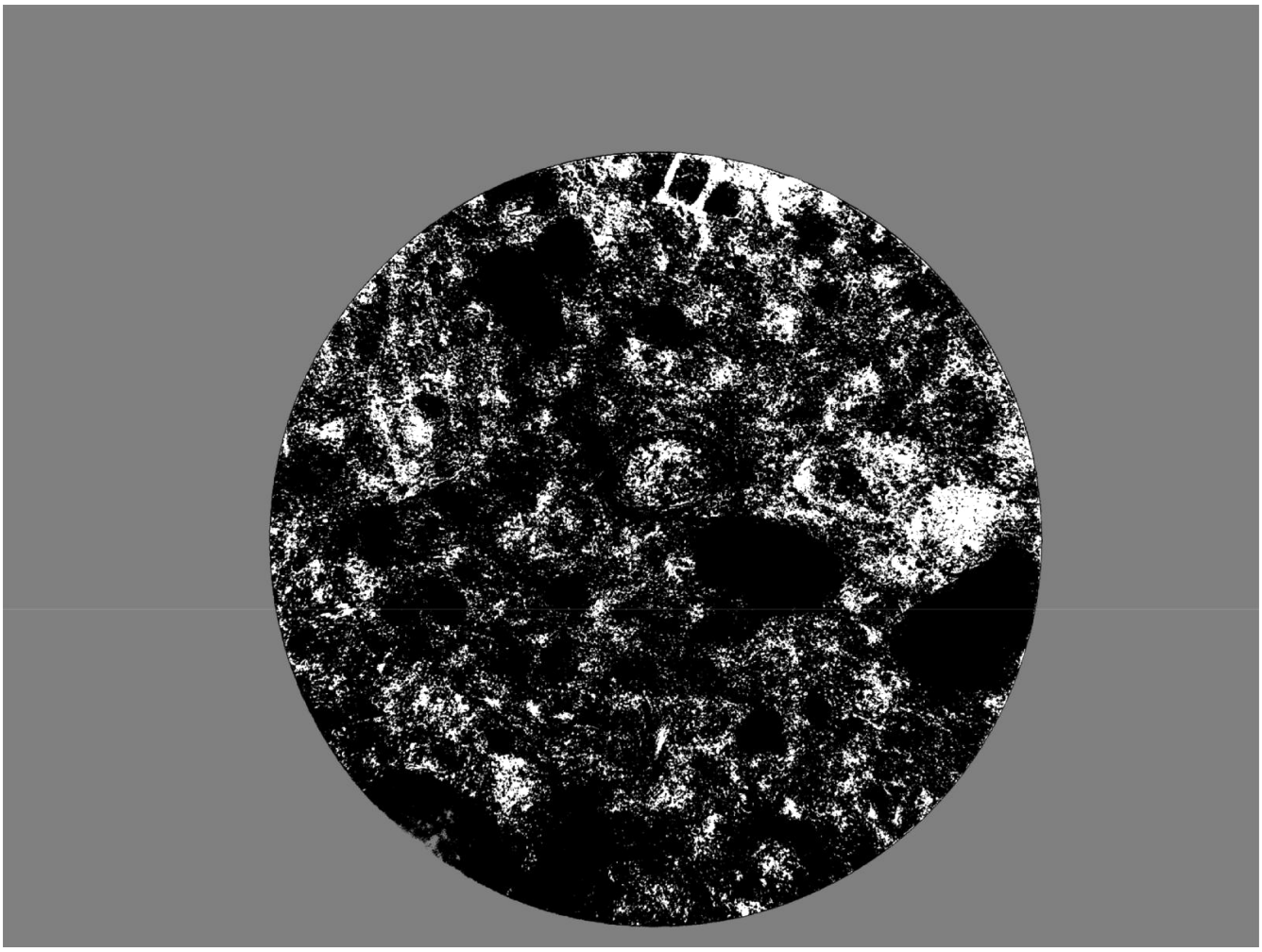












Further Analysis:

When using 2 centroids, there was difficulty in being able to separate the parasites due to the similarity of their color to the surrounding environment. This was particularly evident with Schistosoma where some pictures appeared as a circle of a single color (usually black). Using more than two centroids seemed, for the most part (especially with Schistosoma), to be more efficient in this regard. Using more than 2 centroids also outputted sharper and more detailed images.

Using HSV, the output appeared to be more saturated visually speaking. It was more efficient with Plasmodium where the borders of the bulbous purple objects that make up the parasite's surrounding environment were more outlines, making distinction between them and the paraiste slightly easier.

The difference in using Lab is most evident in the final output for Filaria. HSV and RGB were able to segment one parasite, but Lab was able to segment two. Lab seems to be more efficient at separating relatively dark and light pixels.

The easiest to segment was Filaria. The hardest to segment was Plasmodium though Schistosoma was also difficult to segment. This is perhaps due to how Plasmodium is embedded within its surrounding environment and is of similar shape and color to it. Schistosoma is also of similar color to its surrounding environment, but the shape is distinct. Filaria has a very distinct shape and color in comparison to its surrounding environment.

Note: Due to formatting issues, the images for Schistosoma clustering with more than 2 centroids is incomplete. As it is important in the analysis, I attached in the zipped file the images.