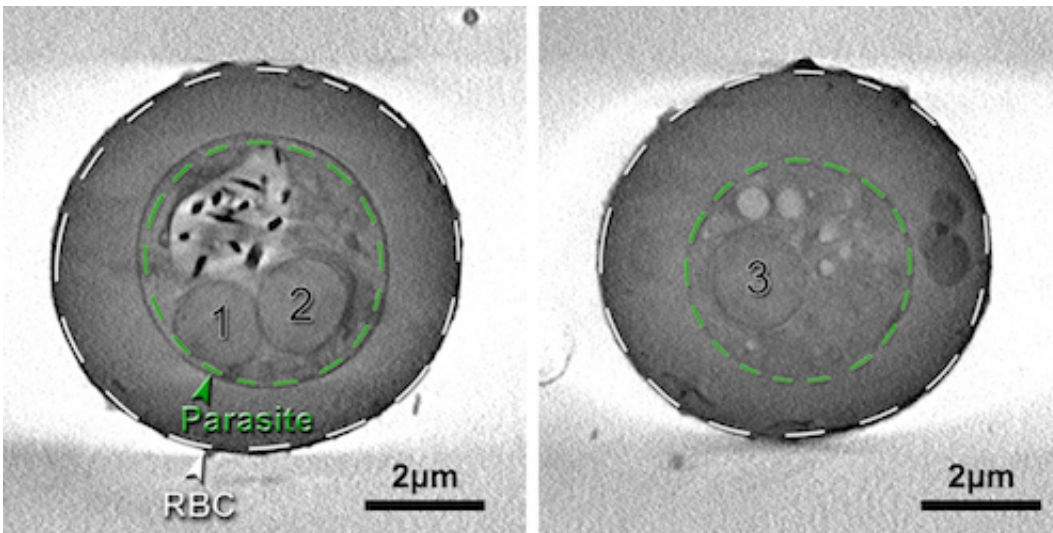


An important step towards new malaria medicine

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On Fig 1. you see two virtual slices. On the left side it is through the parasite. The digestive vacuole is light gray and the hemozoin crystals are black. In addition you see two nuclei. To the right you see a slice behind the vacuole with a third nucleus. The number of nuclei can be used to calculate when the cell was infected. Credit: Niels Bohr Institute

An international research team, led by Sergey Kapishnikov from the X-ray and Neutron Science section at the Niels Bohr Institute, has developed new techniques in analyzing malaria infected red blood cells, an important step towards finding more effective medicine. This amoeba is the biggest killer in the world – earth's most dangerous animal.

The parasite has a complicated life cycle, and during most of the time, the parasite is inside a cell, making it very difficult for the immune system to respond. No patient has been found with permanent immunity, making the probability of developing a vaccine very low.

Dr Kapishnikov's group used advanced technologies to produce virtual cell slices, and examined them with soft and hard x-rays. In particular, they focused on the concentrations of iron, sulfur and potassium, in order to find the concentrations of iron in [hemoglobin](#) and in the hemozoin crystals found inside the [parasites](#). They also found that the potassium concentration in [infected cells](#) was seven times lower than in pristine cells, but that the overall concentration was the same, suggesting that the potassium was absorbed by the parasite.

The parasite digests hemoglobin, using the protein as a nutrient. Heme molecules are formed during the degradation of hemoglobin. Heme is poisonous to the parasite, so it is immediately stored in pairs inside the digestive vacuole as hemozoin crystals. Now they are harmless, so an obvious goal to develop new cures against malaria could be to prevent this hemozoin formation, so that the heme's negative effects would remain.

Provided by Niels Bohr Institute

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