**Scientists at IMBB discover two proteins necessary for transmission of malaria parasites by mosquitoes**

More than half a million people die each year of malaria, mainly in poor countries in Africa and South East Asia. Malaria is caused by protozoan parasites named Plasmodium, which are transmitted by mosquitoes. Interventions against the disease are based on anti-parasitic drugs and the use of insecticides to control the mosquitoes. There is no vaccine available.

The major goal of research in this field is the development of innovative methods that in the long term will contribute to the elimination of the disease worldwide. Dr Chiara Curra working in a team led by Dr Inga Siden-Kiamos at the Institute of Molecular Biology and Biotechnology at the Foundation for Research and Technology – Hellas has made an important discovery which possibly can become the basis for the development of new innovative methods to block the transmission of the parasites from the mosquito to humans.

The research, which is published today in the scientific journal Nature Communications, describes the discovery of two parasite proteins which are necessary for the development of the parasites in the mosquito. In the mosquitoes the parasites live for about three weeks and during this time they change their cellular forms and pass through mosquito tissues. During approximately two weeks the infectious form called sporozoites develop in the midgut (intestine) of the mosquito inside a cyst. After the sporozoites have matured they are released and travel to the salivary glands of the insect. From there they are injected into a new human who will become ill with malaria after a few days. The researchers at IMBB discovered two proteins which are essential for the sporozoites to reach the salivary glands. The cyst in which they develop is encircled by a protective capsule, which must break in order for the sporozoites to be released. The two proteins discovered by the IMBB scientists are necessary for the rupture of this capsule and release of the sporozoites. In parasites where either protein had been genetically removed the sporozoites remained trapped inside the capsule and thus could not reach the salivary gland. This research also explains how the capsule ruptures just in time when the sporozoites have matured in the cyst because at this time the two proteins meet in the capsule and form a complex which leads to rupture of the capsule. Another interesting fact is that the protein domains that that the parasites uses for this mechanism are important factors for regulation of gene expression in other eukaryotic organisms, such as animals or plants. This suggests that the parasite has “hijacked” these protein domains to use for its own very specific purpose.

The results of this research contributes to our understanding of a very important stage in the life cycle of the malaria parasite, of which hitherto very little is known. This knowledge can be used for development of inhibitors against these proteins in the mosquito, which would result in a block in transmission of the parasites through the mosquito. Such a strategy, if successful, could become a very efficient tool for malaria eradication.

*Fig. 1. Midgut (intestine) of a mosquito (green) with parasite cysts (red).*

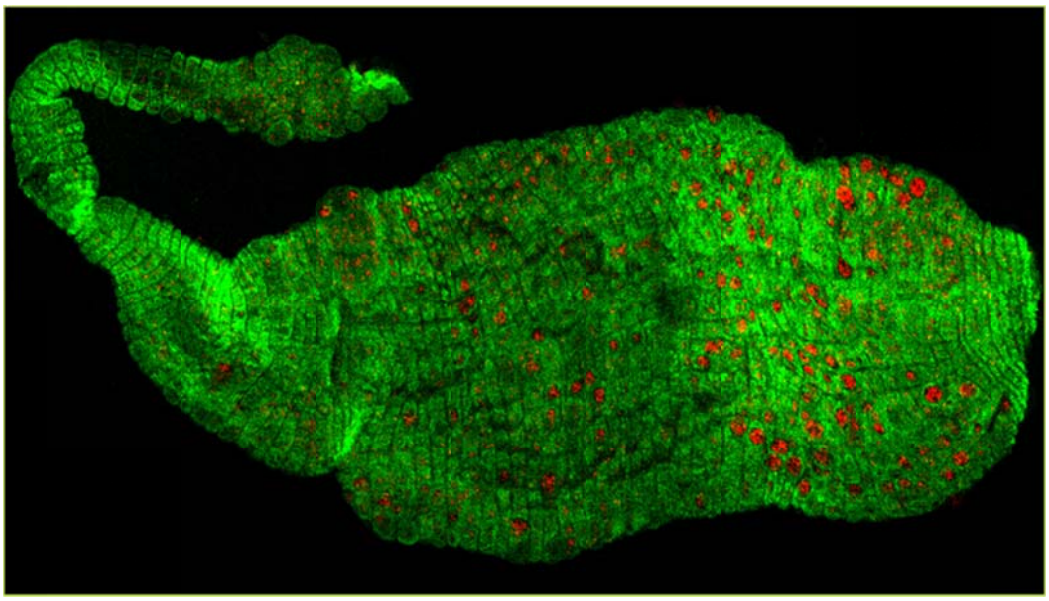

*Fig. 2. A cyst in higher magnification. The capsule of the cyst (red) encloses the sporozoites (green). The DNA of the sporozoites is stained in blue.*