The diverged function in malaria parasites of the DNA binding complex NF-Y

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Malaria is a devastating disease responsible for almost 700 000 deaths annually. Young children in sub-Saharan Africa are most affected, while the disease is also present in South-East Asia. Malaria also negatively influences economic development in the poor countries where it is endemic. Malaria was very common in temperate areas of the world, including Mediterranean countries, until early '70s, when it was eradicated due to huge efforts led by WHO. However, the mosquitoes transmitting the disease are still present in Europe and climate change combined with migration and economic factors may lead to the reappearance of the disease in our area of the world. Difficulties to control the disease are hampered by the increase in of resistance of the parasite to drugs and in the mosquitoes to insecticides. No effective vaccine is available. Thus, there is an urgent need for new strategies to combat this serious threat to global health.

Malaria is caused by a protozoan parasite, *Plasmodium,* which is transmitted by female *Anopheles* mosquitoes when taking a blood meal. The malaria lab at IMBB studies the molecular mechanisms of parasite transmission and development in the mosquito. The parasite is taken up by the mosquito when it takes a bloodmeal from an infected human. Once in the midgut of the mosquito a complex series of developmental changes take place over the next roughly three weeks. The sexual phase including fertilization takes place here, eventually leading to the formation of the so called oocyst in which thousands of the infectious sporozoites are generated and released upon rupture of the wall of the oocyst. The sporozoites then travel to the mosquito salivary glands waiting to be injected in humans' trough a new mosquito bite.

Our efforts focus on understanding some of the crucial events taking place during mosquito development with the long-term goal to develop novel methods to block malaria transmission. Towards this aim, we study a protein complex with similarities to the DNA binding complex NF-Y of higher eukaryotes. Our results reveal that in the parasite this complex is essential for rupture of the oocyst and sporozoite release. Interfering with this process leads to a block transmission of the parasite and thus understanding the function and structure of the complex can help us design intervention strategies against the disease.