BIOMEDICAL PROPERTIES OF MALARIAL NANOCRYSTAL HEMOZOIN

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Malaria is still important and potentially deadly infectious disease. Malarial parasite Plasmodium life cycle is one of the most complex and interesting in biology. During the growth parasite is forced to produce the nanocrystal hemozoin (HZ) which consists of heme moieties. This process protects the parasite from the toxicity of free heme derived from hemoglobin digestion in erythrocytes.

In humans during infection hemozoin manifests numerous biomedical properties. The most important is the fate to be recognized by immune system. This recognition develops in different ways: the immediate stimulation of immune cells with subsequent long-lasting immune suppression. HZ remains permanently in phagocytes and it could interfere also with other important physiological activities, as cellular lipid metabolism, oxidative processes and others. Paramagnetic properties of hemozoin are described, and this could be exploit by theragnostics: a combination of therapy and diagnostics. HZ is also interesting for pharmacology, since some important antimalarial drugs target hemozoin formation to interrupt normal parasite growth.

Concluding, bio-nanocrystal HZ, conceived and created by parasite to protect itself, is studied and exploited to fight against malaria parasite. Suggested interventions could have direct effect on parasites or attenuate the long-term consequences of malaria infection.