Washington University in St. Louis
Office of Technology Management

COMBINATION ARTEMISININ AND CHEMILUMINESCENT PHOTODYNAMIC THERAPY FOR TREATMENT OF MALARIA AND CANCER

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Background: Malaria, mainly caused by *Plasmodium falciparum*, results in over 200 million clinical cases a year and approximately 430,000 deaths a year. Tropical and sub-tropical countries have a high incidence of malaria cases because *Anopheles* mosquitoes thrive in warm temperatures and are able to efficiently transmit the disease. Direct costs associated with malaria are estimated to be 12 billion US dollars a year with indirect costs being many times higher.

Technology Description: Researchers at Washington University have developed and validated a method for treating malaria using a novel combination of therapeutics. This method, called Photodynamic Therapy (PDT), integrates artemisinin, a frontline anti-malarial, as an activator with 5-aminolevulinic acid which is a photosensitizer. This combination emits toxic oxygen radicals when exposed to light emitted by luminol in order to kill intra-erythrocytic and blood-stage parasites. Preliminary data indicate potent anti-malarial activity in *ex vivo* cultures of the parasite in red blood cells. Furthermore, 5-aminolevulinic acid has been used as a PDT photosensitizer to treat cancer and the proposed combination could be utilized to treat cancer, especially hematologic cancers.

Key Advantages:

- Low toxicity and low cost
- Decreased dosage amount due to synergy
- Could possibly be used to overcome artemisinin resistance
- Potentially favorable regulatory path
- Useful for deep tissues and hard-to-reach areas
- Targets multiple types of cancer