Academic Medical Center
University of Amsterdam

Licensing Opportunity

LIFE SCIENCES CENTER AMSTERDAM

New treatment for Port Wine Stains

- **Pharmacological modulation of the biological response to laser therapy**
- **Combination of liposomal drug delivery of pharmaceuticals with innovative targeting methods**
- **Hyperthrombosis resulting in full occlusion and subsequent removal of target vasculature**

Therapy | Laser therapy and targeted drug delivery 2011

Background

Port wine stains (PWS) are prominent birthmarks often located in the face and neck and impose a heavy emotional and physical burden on the patient. Currently, laser treatment of PWS is effective in approximately half of the PWS patients. Site-specific pharmaco-laser therapy (SSPLT) is a development-stage laser-based modality designed to treat recalcitrant or suboptimally responding PWS.

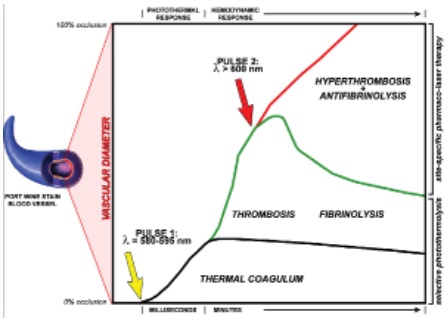
Port Wine Stains

Roughly 2 to 3 out of every 1000 individuals are born with a PWS. These prominent birthmarks are most often located in the face and characterized by hyperdilated blood vessels in the skin, creating red-to-purple discoloration of the skin. When untreated, approximately 60% of these lesions develop nodules, causing asymmetry and deformity.

The most widely used treatment of PWS is pulsed dye laser treatment. Pulsed light in the 580-595-nm range is used to specifically target hemoglobin in the PWS vasculature, resulting in thermal coagulation of blood (photothermal response) and subsequent necrosis of (peri-)vascular tissue (known as selective photothermolysis). The aim is to fully occlude the blood vessel, as this is associated with complete clearance of the PWS. Unfortunately, clinical studies have shown that the photothermal response often leads only to partial photo-occlusion, which is associated with poor responsiveness to therapy. Laser therapy is effective in only ~50% of PWS patients.

The Technology

The key to effectively treating PWS is the complete occlusion of PWS vasculature. We have shown in animal experiments that, in response to the formation of a thermal coagulum, a hemodynamic response is initiated, resulting in thrombosis and subsequent fibrinolysis. In contrast to a thermal coagulum, a thrombus is very dynamic and can contribute to further occlusion of the vascular lumen.



SSPLT combines selective photothermolysis with prior systemic administration of a targeted liposomal drug delivery system containing prothrombotic and antifibrinolytic drugs. SSPLT comprises five steps:

1. Systemic administration of liposomes containing prothrombotic and antifibrinolytic drugs;
2. Selective photothermolysis, triggering a photo-dynamic and hemodynamic response;
3. Binding of liposomes to activated platelets in the developing thrombi in laser-treated target vasculature;
4. Laser pulse activation of prothrombotic and antifibrinolytic drugs;
5. Hyperthrombosis and antifibrinolysis, resulting in full occlusion and subsequent removal of target vasculature

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R&D Status

Completed in vitro and in vivo experiments have shown promising results. In vivo studies are planned to further validate the technology. A full pre-clinical and clinical product development and regulatory plan is under development.

Intellectual Property

A PCT application has been filed in 2010 on treating aberrant vasculature by SSPLT using light-activatable liposome delivery of prothrombotic and/or antifibrinolytic agents.

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