Novel Topical Therapeutic for Retinal Vascular Disease

The retinal therapeutics market is estimated at $3 billion (2012); it is a high growth market with significant unmet need. The dramatic entry of Lucentis (anti-VEGF antibody intravitreal drug) into the market in 2007 and the success of anti-angiogenic drugs have highlighted the opportunity for products in the retinal disease market. The entry of topical or slow release preparations into the market would eliminate the current practice of repeated intravitreal injections and the associated safety risks and clinical burden. In addition, there is a cohort of patients unresponsive to current treatments, underscoring the need for new therapeutics.

UCD has developed novel, small molecule, anti-angiogenic compounds to offer patients and clinicians cost-effective, easily administered, safe and sustainable therapeutics to prevent blindness from retinal vascular diseases.

Technology Description

Dr Breandán Kennedy and his research team have discovered novel anti-angiogenic compounds using a zebrafish in-vivo screen. Figure 1 shows that a UCD lead compound (identified from screening a small molecule library) is effective in inhibiting neovascularisation in the eye, compared to control. This inhibition occurred without significant effects on gross / retinal morphology or visual function. The candidate compounds have a dual mechanism of action, anti-angiogenic and anti-inflammatory, distinct from VEGF-targeted approaches and potentially more effective alone or in combination therapy. They have potential to be administered as eye drops as their physicochemical properties facilitates corneal / conjunctival absorption.

The lead compounds have proven effective in in vitro measures of angiogenesis (inhibiting endothelial cell tube formation in matrigel) and in an in vivo mouse model (the mouse model of oxygen induced retinopathy (OIR)). The lead compound is well tolerated intravitreally and has been shown to significantly inhibit retinal neovascularisation in the mouse OIR model.

Dissected lenses show results of screening of the UCD lead compound; significant inhibition of developmental angiogenesis (b) of the hyaloid vasculature (green) in the eye (zebrafish model) compared to control (a).
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