

Measuring Retinal Blood Flow and Blood-Retinal Barrier as Novel Tools for the Diagnosis of Retinopathies

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The retina is the nervous tissue in the eyes allowing the transformation of visual stimuli into nerve impulses which are transferred to the brain. The blood supply to the retina comprises of distinct vessels which are separated from the retinal extracellular space by the blood-retinal barrier (BRB). Changes in retinal blood flow and BRB properties accompany common diseases of the retina including that frequently found in diabetes mellitus, retinal vein occlusion and age related macular degeneration. Changes in the retinal blood circulation often precede the development of functional impairments (e.g. loss of vision), thus serving as an indication for treatment. The retinal blood system is routinely assessed by eye doctors using the Fluorescein Angiography examination. In this examination a fluorescent tracer is injected into a peripheral vein and retinal vessels are visualized for analysis of blood flow and leakage of the tracer outside the vessels. Abnormalities in blood flow and/or vessel permeability correspond with the stage of the disease, predict functional deterioration and serve as the main guide for treatment. Repeated studies are often performed as the most efficient tool for following-up disease progress. Although fluorescein angiography is extensively used for following-up patients' disease, at present there are no objective, quantitative methods available for the evaluation of blood flow and permeability in retinal blood vessels.

The Technology

We have developed an image analysis method to accurately quantify and assess both blood flow and permeability in specific vessels within the retina during fluorescent angiography. The method is based on robust classification of the anatomical regions according to the change of fluorescent intensity with time. This classification allows the detection of leaky vessels and extraction of important arterial and venous blood flow characteristics.

Applications

Early and accurate diagnosis of common retinal disorders.

Improve treatment of retinal disorders


Guide ophthalmologists in choosing appropriate treatment - medication or laser

Follow up on treatment efficiency

Patent Status

Patent filed

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