UNIVERSITY OF LIVERPOOL

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Next Generation Optical Coherence Tomography Device

A device to obtain high quality images of the cornea and retina to facilitate diagnosis and management of corneal and retinal diseases

Please note, header image is purely illustrative. Source: RevivingStars, Pixabay, CC0

IP Status

Patent application submitted

Seeking

Development partner, Commercial partner, Licensing

About **University of Liverpool**

By facilitating access to our expertise, facilities and networks, the University of Liverpool offers the means to transform ideas into creative solutions, improved performance, new technologies, strategies, applications, products or skills.

Background

The diagnosis of many sight-threatening corneal diseases, such as Keratoconus (KC) and Fuchs Endothelial Corneal Dystrophy (FECD) is subjective and requires a large number of tests to be carried out. Optical Coherence Tomography (OCT) is a method of obtaining cross-sectional 3D scans of semi-transparent tissue such as the cornea and retina of the eye, revealing vital pathological clues. OCT is one of the most promising modalities for retinal imaging. However, development of corneal OCT has fallen considerably behind and existing devices have significant limitations for imaging the cornea, particularly in relation to disease diagnosis and treatment planning. In order to diagnose corneal diseases sufficiently early and prescribe treatment, it is vital to accurately assess the internal structure of the cornea, which consists of layers as thin as 5 microns. Existing devices have insufficient ability to achieve this. Current clinical devices are also unsuitable for many patients. Elderly patients and those suffering with co-existing conditions including Parkinson's Disease and Downs Syndrome, find it difficult to remain still for the exam, resulting in blurred data or failed scans. Access to existing devices is currently impractical for overweight and disabled patients, particularly those in wheelchairs.

Tech Overview

Researchers at the University of Liverpool are developing a novel OCT device to obtain high quality and high-resolution images of the cornea and retina with the potential to facilitate both earlier diagnosis and improved management of corneal and retinal diseases, while reducing the current demand for the many tests necessary for diagnosis to only one.

Benefits

This device offers a combination of improvements over existing devices:

- Higher resolution**,** which is necessary for examining every layer of the cornea for disease and not possible with existing clinical devices.
- A scan speed up to1000 times faster than current commercial OCT machines, which is important for achieving good quality scans from many patients.
- A set of fast, precise and accurate fully automated analysis tools allow the cornea to be measured in detail at point of care.
- A more ergonomically designed device than those currently available, which allows access to all patients, including those in wheelchairs.

Applications

This device offers the potential for early diagnosis of corneal diseases, which is not currently possible and improved disease management, potentially enhancing patient outcomes considerably. The device allows accurate scans to be captured from patients for whom this is not currently possible, and makes the scan a shorter and more comfortable experience.

While this device has been developed particularly for hospital ophthalmology clinics, it also has potential to be taken up by optometrists who are starting to acquire OCT and for whom incorrect referral to hospital ophthalmology clinics is an issue. The particular nature of OCT and the unique analysis algorithms of this technology can help to reduce this problem.

The researchers are also considering the potential to adapt this device for industry applications such as measuring pharmaceutical tablet coatings and car paint systems as well as for other clinical conditions such as cancer and cardiovascular disease.

Opportunity

The researchers have been awarded i4i funding of £1.3Million to develop two clinic ready devices, which will be used in Phase I studies in the coming months. The team are working towards CE Marking of the device and are eager to engage with companies who can help bring the technology to market.

The team are considering the possibility of developing a partnership with an established company with market presence.

Patents

- Patent Application, WO2017168181A1, with priority date, 01/04/2016, has been filed.