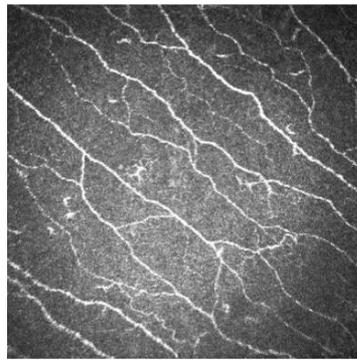


PRESS RELEASE

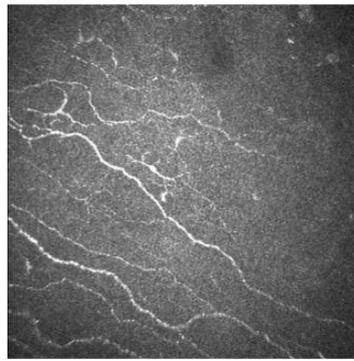
Simple, non-invasive eye test can replace skin biopsy for diagnosing small nerve fiber loss and evaluating the efficacy of therapeutics

September 18, 2013 — The lead article in the first issue of the new journal *Technology* reports that results of a simple, non-invasive test to quantify nerve fiber length and density in the cornea correlates with invasive skin biopsy results, and predicts the severity of symptoms of painful small fiber neuropathy in patients with sarcoidosis. Symptoms of small fiber neuropathy are very common, affecting an estimated 2–3% of the adult US population. These include burning and shooting pain, numbness, intolerance to touch and tingling, as well autonomic disorders such as sweating abnormalities, diarrhea/constipation, sexual dysfunction, blurry vision, and orthostatic hypotension, among many others. In addition to sarcoidosis, other diseases such as diabetes are responsible for small fiber nerve loss and damage resulting in similar symptoms. Reliable and reproducible methods for quantifying these disparate symptoms are lacking, thus confounding diagnosis and impeding evaluation of potential therapies. Using a corneal confocal microscope to photograph nerve fibers in layers of the cornea followed by computerized image analysis, the researchers found that corneal nerve fiber number and length correlate strongly with intra-epidermal nerve fiber density obtained by skin biopsy from the leg, as well correlate strongly with the score of a patient questionnaire on symptoms of neuropathy. Skin biopsy, the current gold standard, is invasive, labor intensive to evaluate, of variable outcome depending on location, non-repeatable at the same site, and relatively insensitive for diagnosing small nerve fiber loss. The cornea has the highest density of nerve fibers of any tissue in the body, and repeat measurements without discomfort to the patient can be used to gain significantly more information on nerve fiber damage. The correlation identified using this technique with patient reported symptoms therefore provides a rapid and simple way of diagnosing neuropathy resulting from small nerve fiber loss and damage in sarcoidosis patients and also offers a way to objectively evaluate the effects of therapeutic interventions on a notoriously difficult disease to follow.

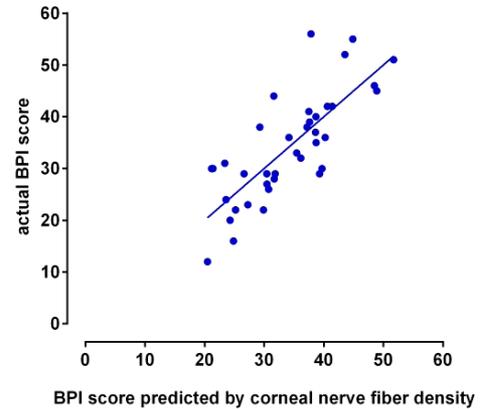
"We were quite surprised and pleased to discover that by using corneal confocal microscopy, the amount of useful information on the patient's neuropathic condition could be obtained that surpasses other diagnostic methods, even those that are much more traumatic for the patient. Additionally, we can essentially diagnose disease objectively, without relying on subjective information provided by the patient," said Dr. Anthony Cerami, senior author and CEO of Araim Pharmaceuticals, Inc. "Curative therapies for small nerve fiber loss and damage are lacking, and we anticipate that use of this technique will permit us and others to assess therapeutics that promote nerve regrowth in the cornea that is reflective of nerve regrowth in other target tissues of neuropathy."



normal



sarcoidosis



Corneal confocal microscopy reveals small nerve fiber loss in the cornea of a patient with sarcoidosis (middle), compared to a normal individual (left), and the strong correlation between the corneal data and score in a neuropathy questionnaire (right).

Dr. Michael Brines, lead author, described the clinical study conducted at Leiden University Medical Center in which the correlation was identified. Sarcoidosis patients were screened for corneal nerve fiber density and then re-evaluated after 28 days, without any change to their medication regimen, as part of a larger study that evaluated a therapeutic intervention, the results of which will be reported at a later date. Dr. Brines commented, "We anticipate that once the correlation between corneal nerve fiber status and objective measurements is firmly established, this non-invasive method can be used as a valid surrogate endpoint for small fiber neuropathy. The holy grail of therapeutic intervention in chronic disease is disease modification, and if the correlation holds up, the eye provides a lens, so to speak, on what's going on in tissues affected by the disease process and responsible for the poor quality of life of its victims."

Co-authors Brines, Ann Dunne, and Anthony Cerami are from Araim Pharmaceuticals, a privately-held company engaged in developing novel treatments for devastating injuries and chronic diseases underserved by current therapies. Authors Maarten Swartjes, Martijn Tannemat, Monique van Velzen, Paolo Proto, Marianne Niesters and Albert Dahan are at Leiden University Medical Center in the Netherlands, where the clinical study was undertaken. Elske Hoitsma is at Diaconessenhuis, Leiden, the Netherlands, and Ioannis Petropoulos, Xin Chen, and Rayaz Malik are at the University of Manchester, Great Britain.

This work was funded by Araim Pharmaceuticals, Inc. and a grant from the Dutch government to the Netherlands Institute of Regenerative Medicine (NIRM, grant no. FES0908).

For more information on Araim Pharmaceuticals, Inc., please visit www.araimpharma.com.

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