

Neural stimulation offers treatment for 'dry eye'

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Credit: Pixabay 2015

Scientists have developed a device that electronically stimulates tear production, which will offer hope to sufferers of dry eye syndrome, one of the most common eye diseases in the world.

The device, 16 mm long, 3-4 mm wide and 1-2 mm thick, was implanted beneath the inferior lacrimal gland in rabbit eyes. It was activated wirelessly, and shown to increasing the generation of tears by nearly 57%.

The results are published today, Dec. 11, 2015, in the *Journal of Neural Engineering*.

"I've been working on electro-neural interfaces for about a decade, but the idea to stimulate lacrimal gland for tear production came from my postdoctoral fellow, Michael Ackermann." Says Professor Daniel Palanker, an author on the study, from Stanford University.

'Dry eye'—deficiency of the tear film on the surface of the cornea leading to inflammation of the cornea and conjunctiva—is one of the most common eye disease, affecting 5-6% of the population, and nearly 5 million individuals aged over 65 in the United States. Currently it does not have an effective treatment.

The researchers also discovered that the afferent neural pathway—the neural pathway from sensory neurons to the brain which activates the reflex tearing—offered an even more efficient way to enhance tear production.

"Initially we only planned to stimulate the lacrimal gland" continues Palanker. "The biggest surprise for us was discovering that stimulating the afferent neural pathway provided a more potent and long-lasting tear

response."

The next phase of the research will be to evaluate the 'quality' of the tears produced, as in addition to volume, protein and lipid content are important. The [device](#) is currently undertaking clinical trials for FDA approval.

"I hope to see it on the market in the next year" concludes Palanker. "Meanwhile, we're continuing research into the mechanisms of the tearing response, its enhancement and quality of the [tears](#) produced by neural stimulation."

More information: "Electronic enhancement of tear secretion"
Brinton et al, *J. Neural Eng.* 13 016006 Dec. 11, 2015. [DOI: 10.1088/1741-2560/13/1/016006](#)

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