

Substances found in cornea activate healing of blinding scar tissue

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Doctoral student Marta Słoniecka at the Department of Integrative Medical Biology has found that the neuropeptide substance P and the neurotransmitter acetylcholine activate and enhance healing of the cornea. The two substances are mostly associated with brain neurons, but are also produced naturally by the cells of the cornea's thickest layer.

Corneal opacity is an eye disorder occurring when injury or infection causes scarring of the cornea. It is the fourth most common cause of blindness globally, with 1.5-2 million new cases of unilateral blindness reported every year. The scarring stops light from passing through the cornea to the retina, causing the cornea to appear white or clouded over and may even lead to loss of vision.

With current treatment methods, the scar tissue close to the [corneal surface](#) may be removed surgically with laser. But when the scar penetrates deeper into the cornea, a [corneal transplant](#) is needed. However, a shortage of donor corneas limits the availability of transplantation surgery and potential complications include graft rejection, which can force patients to long-time use of medications and frequent visits to eye clinics.

"While access to corneal transplants is limited in developed countries, the treatment is often unavailable in developing countries. Thus, a new treatment using only locally administered substances could reduce the need for invasive surgical treatments, which would also have a great impact in places where corneal transplants are not available today. More

research is now needed to determine how these neuropeptides and neurotransmitters can be administered to prevent, reduce or perhaps even reverse, [corneal scarring](#)," says Marta Słoniecka.

The findings suggest that treatments using substance P and acetylcholine could activate cellular processes involved in corneal healing. Substance P enhances keratocyte migration, which is an important part of corneal healing, while acetylcholine enhances keratocyte (i.e. cells of the corneal stroma layer) growth and prevents cell death. The next research step will be to further explore possible effects and mechanisms of substance P and acetylcholine on keratocytes, and use other models to further test the findings.

Provided by Umea University

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