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Korea proposes use of light to treat wounds, instead of topical ointments

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Photochemical tissue bonding is a newly emerging technique for closing wounds



A team of scientists at the Pohang University of Science and Technology (POSTECH) in South Korea has developed an innovative way to treat wounds with light as opposed to the application of topical ointments.

Ointments and other bio-binding agents that we commonly apply on wounds are still limited in their application due to their weak bonding power. Photochemical tissue bonding (PTB) is a newly emerging technique for closing wounds. PTB demonstrates a comparable level of wound healing efficiency to sutures, while overcoming some of the downsides, namely secondary inflammation and needle puncturing.

The technology utilises light and photosensitisers to reduce inflammation and scarring by promoting collagen crosslinking. Rose Bengal (RB) dye is one of the most commonly used photosensitizers that absorbs energy from green light and interacts with collagen to produce collagen-free radicals. These radicals start to create covalent bonding between collagen molecules. However, light transmission efficiency decreases when the incision closes as the green light attenuates following the depth of tissue penetration. A new material is required to effectively activate RB in the deep tissue and induce collagen crosslinking for efficient PTB.

The research team has developed a controlled ZnS:Ag,Co afterglow luminescent particle (ALP) that has the powerful and sustained green light required for photochemical tissue bonding.

“This study is the first application of afterglow luminescent particles to biochemical tissue bonding. It is anticipated that the use of light in healing wounds could be expanded to the treatments of the brain and other body tissues going forward", said the researchers.