

Better healing for eardrum injuries? Researchers testing new adhesive structures for medical applications

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Innovative adhesive structures of the INM are examined for their medical suitability for eardrum injuries. Source: Iris Maurer; free within this content. Full size. Credit: Leibniz Institute for New Materials

More than 30 million people worldwide suffer from eardrum injuries every year. If inadequately treated, the resulting hearing loss can severely restrict the patients' quality of life. Smaller injuries can be treated by applying silicone or paper strips—larger cracks even require tissue transplantation. However, the tissues can slip. Inflammation can lead to premature dissolution of the transplants or permanently impair the auditory canal as a result of scarring. Then, subsequent surgery becomes necessary, which puts the patient under renewed strain. In cooperation with the Saarland University Hospital, the INM has developed bioinspired adhesive structures for the treatment of eardrum injuries. The adhesive structures are now to be transferred into a biomedical product.

"In a feasibility study with the University Hospital in Homburg, Germany, we tested our Gecko-inspired adhesive structures on ear drums of mice: They adhered reliably without peeling or slipping," explains Eduard Arzt, head of the Functional Microstructures Program Division and Scientific Director at the INM. "Thanks to the exceptional adhesive properties, the patch can be removed after successful healing without causing new injuries to the eardrum," explains biologist Klaus Kruttwig. The gecko structures not only bridge the cracks, the micropattern is also expected to improve the healing process.

"The new material is soft and adaptable. It is easy and quick to apply to the eardrum. We expect that [hospital](#) stays will be significantly shorter and complications will be rarer," said Professor Schick, Director of the Department of Otorhinolaryngology at the University Hospital. "We are therefore very confident that we will find a market for this product".

For the next step, INM now received an ERC Proof of Concept Grant (PoC): The one-and-a-half year project STICK2HEAL serves to conduct technical and pre-clinical assessments and to prepare the approval of the adhesion structures as a medical product. In addition, potential markets

for [wound dressings](#) are to be analysed and cooperation partners in industry and hospitals identified.

In addition to [eardrum](#) repair, the PoC project opens up a broad field of application when materials are to adhere to the body without glue for a limited period of time.

Provided by Leibniz Institute for New Materials

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