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IISER Bhopal develops clear, safe, biomedical adhesive to repair injured tissues

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To seal and cure tissue damage in both dry and wet conditions



From left: Prof. Aasheesh Srivastava, Department of Chemistry, IISER Bhopal; Dr. Aashish Sharma, Associate Professor, School of Medical and Allied Sciences, G.D. Goenka University, Haryana' and Dr. Tanmay Dutta, Postdoctoral Researcher - IISER Bhopal.
Bone pieces joined together using our adhesive can be seen in the hands of Dr. Tanmay Dutta in the center.

A team of researchers at the Indian Institute of Science Education and Research (IISER) Bhopal has developed a clear synthetic biomedical adhesive that can effectively seal and repair injured and dissected tissues. This adhesive, which is biodegradable and biocompatible, is capable of binding different surfaces such as tissues, bones, eggshells, and wood in both air and underwater and requires no additional crosslinking agents or metal ions.

Such biodegradable and biocompatible adhesives find applications in medicine, dentistry, drug delivery, and tissue engineering. These adhesives are also used in orthopedic procedures to enhance bone repair and can even be used as an alternative to sutures, staples, and wires, in wound closures. They could also be used in eco-friendly packaging applications and products, contributing to sustainable practices in various industries.

The researchers used a mixture of oppositely-charged water-soluble polyelectrolytes that are known for their biodegradability and biocompatibility. These polymers have multiple amide groups and thiol residues that lead to strong adhesion due to the formation of hydrogen bonds and disulfide bonds. The resulting adhesive layer is colourless and transparent.

The adhesive formulations developed by the IISER team will find use in cosmetics and biological applications. The researchers are working towards optimising these adhesives for such real-life applications.