

Biochemists identify how tissue cells detect and perfect

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Scientists have discovered how cells detect tissue damage and modify their repair properties accordingly. The findings, published today [6 October] in the journal *Developmental Cell*, could open up new opportunities for improving tissue repair in patients following illness or surgery.

The Wellcome Trust-funded study, led by biochemists at the University of Bristol, examined the signalling process in damaged tissue cells and identified the [cellular mechanisms](#) responsible for activating effective repair.

In healthy adults the majority of [tissue cells](#) lie dormant unless challenged by wounding, at which point they sense a change in the molecular environment. Plasma leaking from damaged blood vessels and causes fibroblast cells to migrate into the damaged tissue, contract the wound, and plug the gap by depositing a substance such as collagen, which provides the structural support.

Dr Mark Bass, lead author and Research Fellow in the University's School of Biochemistry, said: "Each of these processes requires the turnover of cellular adhesions, and the challenge has been to determine how cells detect tissue damage and modify their adhesive properties accordingly."

Using [atomic force microscopy](#), the team were able to determine how a molecule sensor, syndecan-4, triggers the uptake and redeployment of

adhesive molecules. This novel signalling pathway causes fibroblasts and keratinocytes to migrate in response to the changing [tissue architecture](#) and follow the matrix fibres that make up the skin. Such linear migration towards a damage signal allows the cells to arrive at the wound far more efficiently than if activated cells searched randomly about the tissue, and results in a very efficient healing response.

Dr Bass added: "We find that this signalling cascade is essential for efficient healing, this opens up considerable opportunities for improving [tissue repair](#) in patients."

More information: The Wellcome Trust-funded study, entitled 'A syndecan-4 hair trigger initiates wound healing through caveolin- and RhoG-regulated integrin endocytosis' by Dr Mark Bass is published in the journal *Developmental Cell*.

Provided by University of Bristol

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