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Microfluidic wound healing & migration assay: automated, miniaturized and integrated screening platform

Despite the wide-spread use of migration and wound healing assays, to date no satisfactory technological solutions are available that allow for the automated, miniaturized and integrated induction of highly reproducible wounds. We therefore developed a lab-on-a-chip capable of mechanically inducing circular cell-free areas within confluent cell layers using a pneumatically-controlled membrane deflection/compression method.

REFERENCE: M059/15

KEYWORDS: Lab-on-a-chip Wound healing assay Cell migration assay

APPLICATIONS:

- Toxicity tests
- ADME studies
- Compound screening
- Drug development

IPR:
EP Patent Appl.
EP16165229.2

DEVELOPMENT STATUS:
Alpha prototype ready

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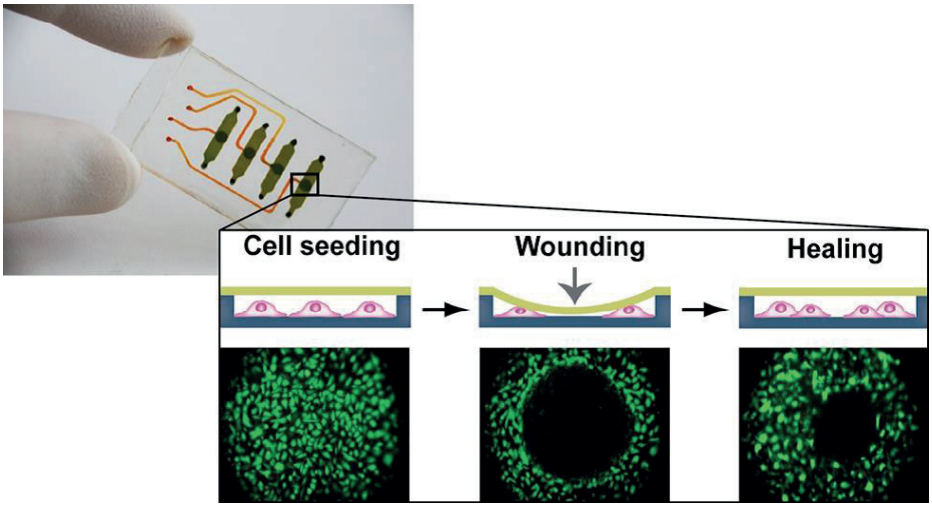
BACKGROUND

All cell migration and wound healing assays are based on the inherent ability of adherent cells to move into adjacent cell-free areas, thus providing information on cell culture viability, cellular mechanisms and multicellular movements. Despite their widespread use for toxicological screening, biomedical research and pharmaceutical studies, to date no satisfactory technological solutions are available for the automated, miniaturized and integrated induction of defined wound areas. To bridge this technological gap, we have developed a lab-on-a-chip capable of mechanically inducing circular cell-free areas within confluent cell layers. The microdevices were fabricated using off-stoichiometric thiol-eneepoxy polymer resulting in hard-polymer devices that are robust, cost-effective and disposable.



FURTHER READING

Sticker, D.; Lechner, S.; Jungreuthmayer, C.; and Ertl P "Microfluidic migration and wound healing assay based on mechanically inducing injuries of defined and highly reproducible areas" *Anal Chem*, 2017, 89 (4), 2326-2333

BENEFITS

- Automated mechanically inducing wounds
- Creation of high reproducibility cell-free areas
- Repeatable wounding without ECM removal
- Reduction of injured cells along the wound edge
- Removal of cell debris during perfusion of ECM coating

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