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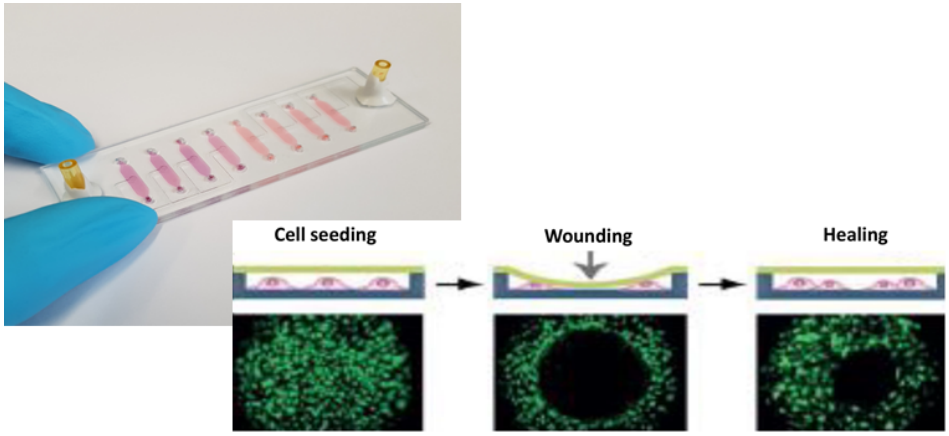
Microfluidic wound healing & migration assay: automated, miniaturized and integrated screening platform

Despite of the physiological three-dimensional nature of wounds, to date no satisfactory migration and wound healing assays are available where defined three-dimensional wounds are induced in tissue-engineered microtissues. To bridge this technological gap, TU Wien developed a lab-on-a-chip capable to mechanically induce tissue trauma upon 3D vascular tissue models and to engineer such microtissues from a co-culture of primary endothelial with mesenchymal stem cells.

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

REFERENCE:

M059/2015, M035/2017

KEYWORDS:

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

APPLICATIONS:

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

IPR:

EU Patent granted

US pending

DEVELOPMENT STATUS:

Alpha prototype ready

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