A functional phenomics approach reveals the exchange of material between breast cancer and endothelial cells at single-cell resolution in a 3D co-culture system - **Background**

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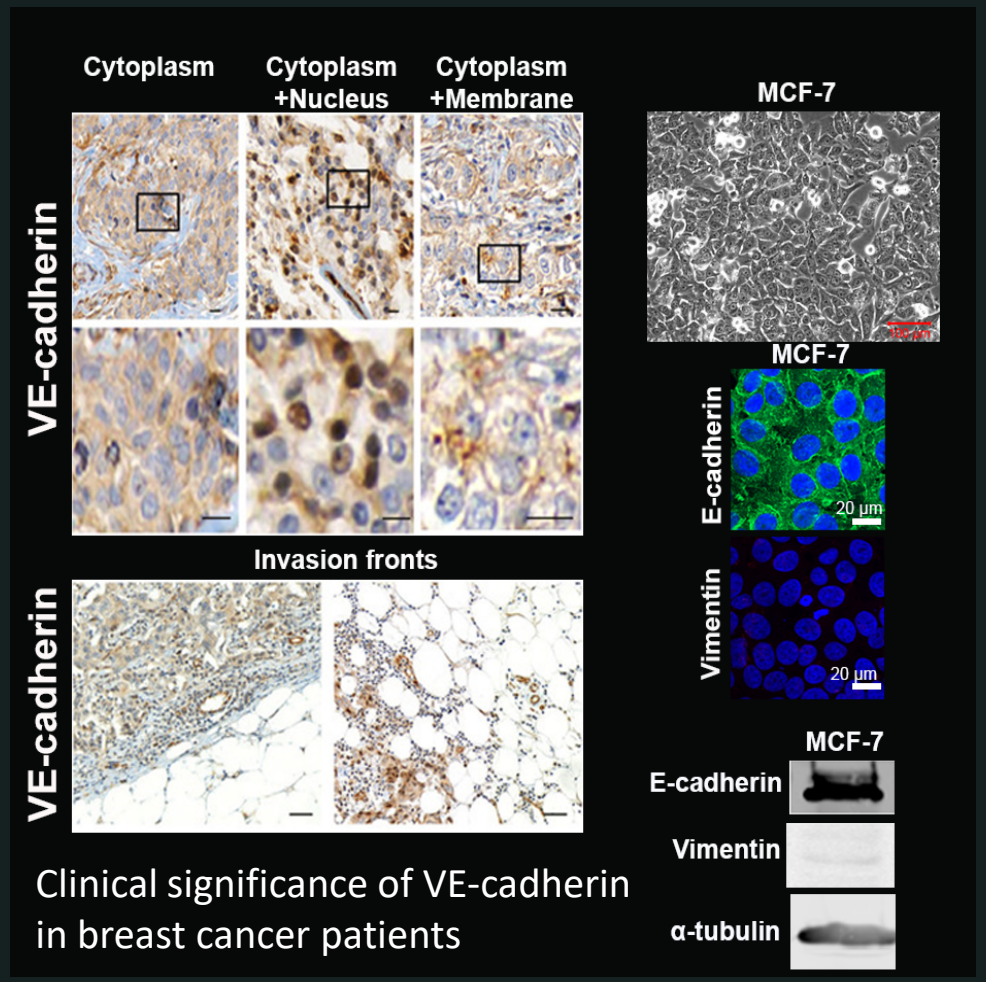
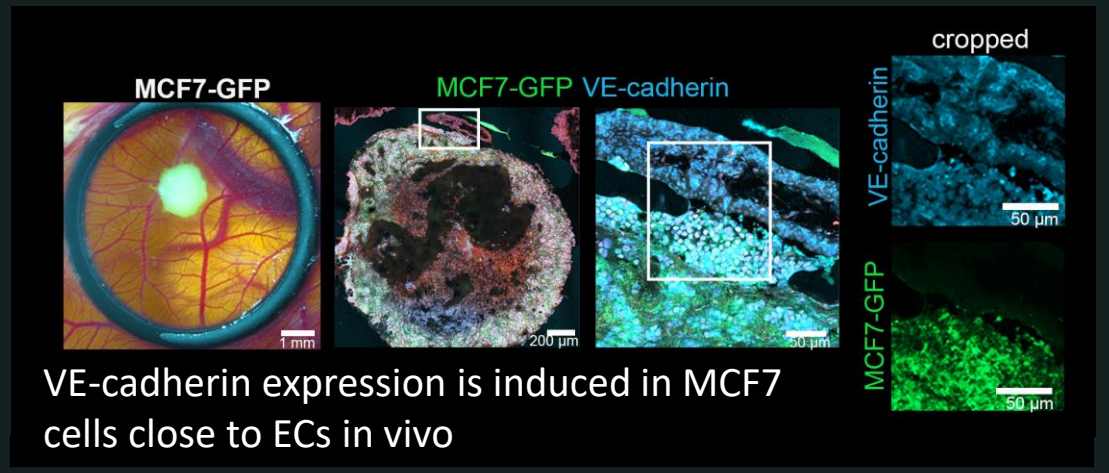
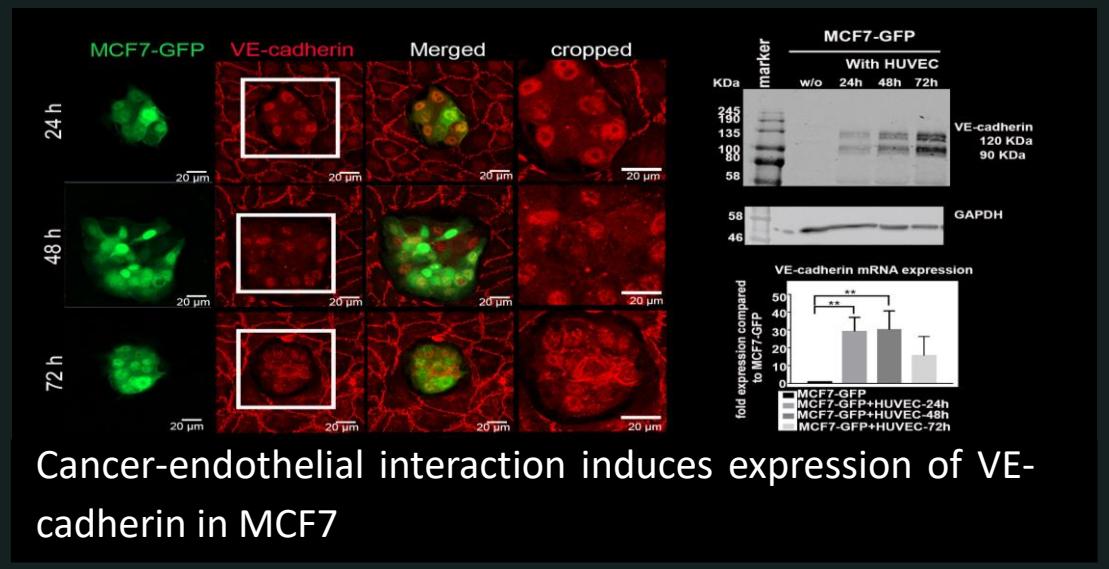


Clinical significance of VE-cadherin in breast cancer patients



VE-cadherin expression is induced in MCF7 cells close to ECs in vivo



Cancer-endothelial interaction induces expression of VE-cadherin in MCF7

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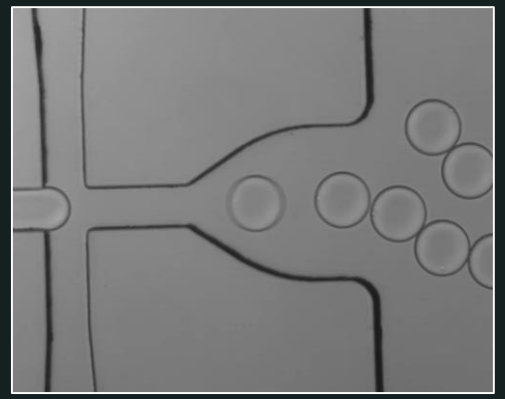
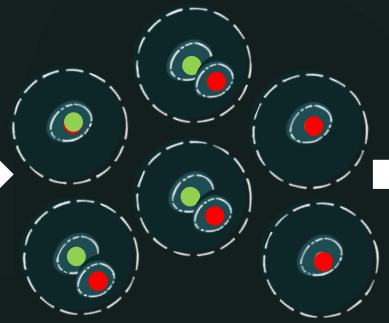
MCF7-mCherry
HUVEC-GFP

Single-cell suspension

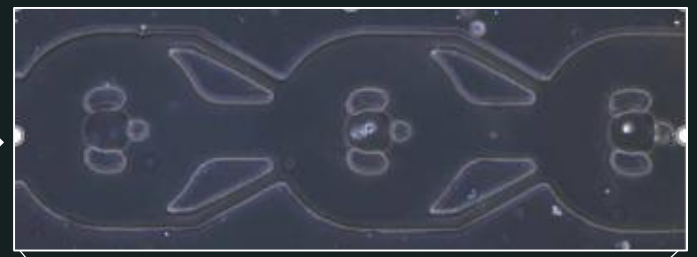
Agarose solution



Cell encapsulation



Cell-laden agarose gel beads



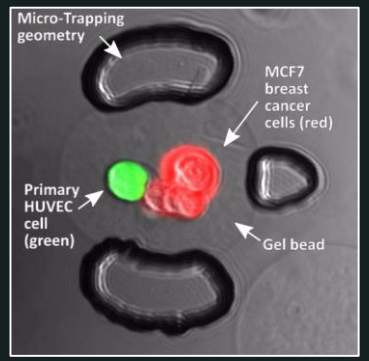
Bead-immobilization

Microscope

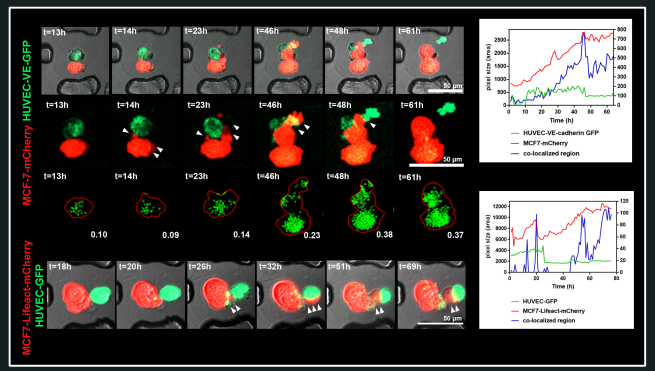
Microfluidic chip

Control unit

Software



3D cultivation and time-lapse imaging



Publication

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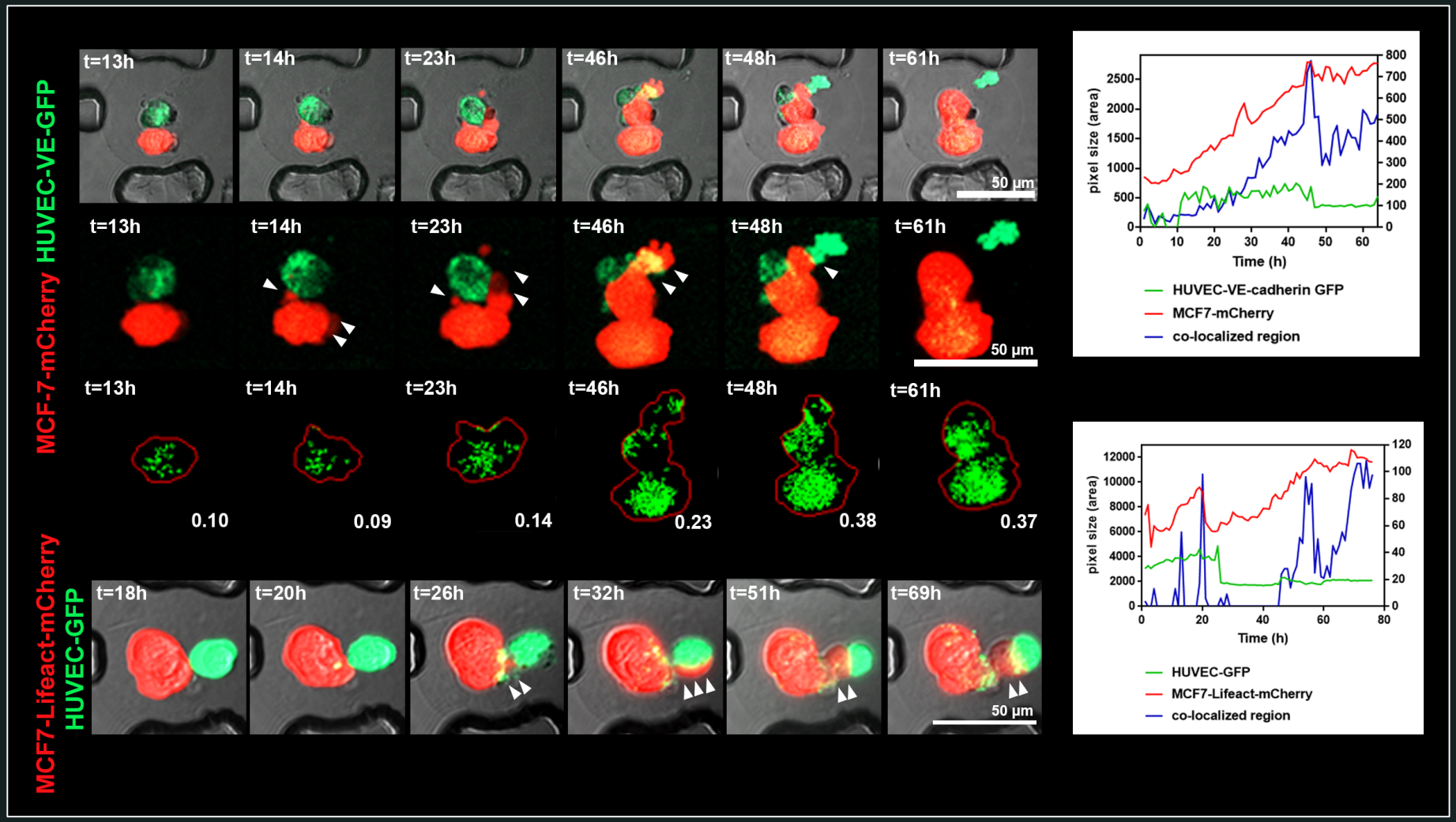
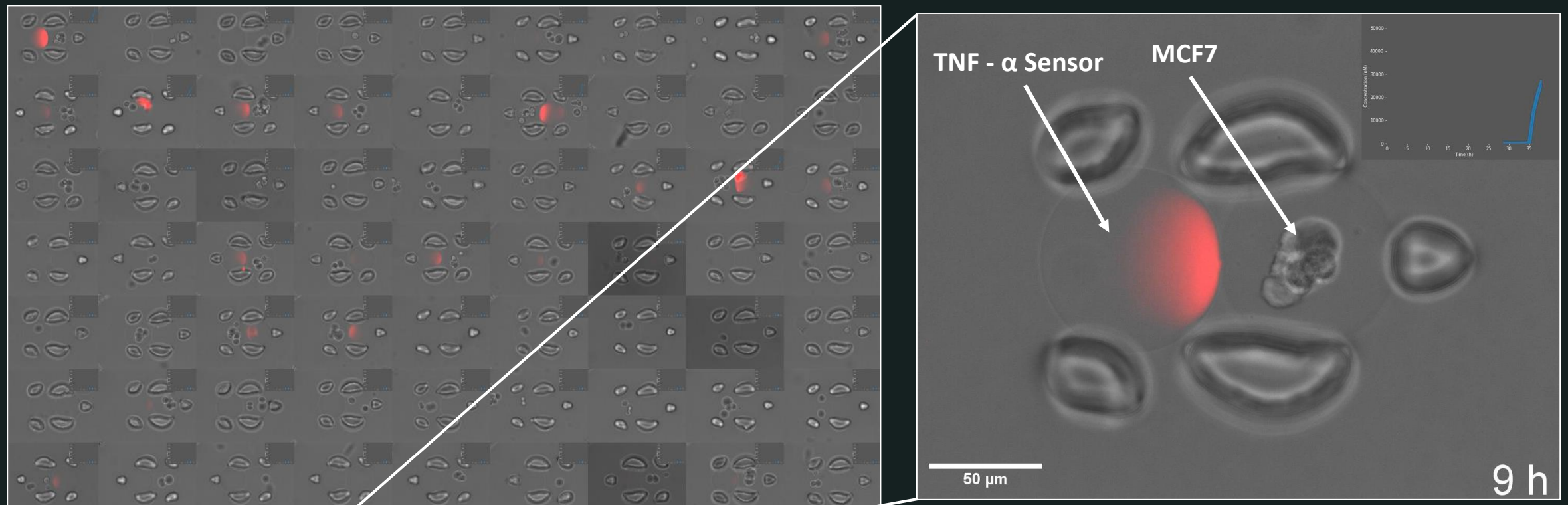
A functional phenomics approach reveals the exchange of material between breast cancer and endothelial cells at single-cell resolution in a 3D co-culture system - **Results**

Live cell analysis of cell-cell interaction at single-cell resolution in 3D environment



- Fluorescent areas of mCherry (MCF7 cells), GFP (HUVEC-expressing VE-cadherin-GFP or cytoplasmic GFP) and of both fluorophores in colocalization were quantified time-dependently.
- MCF7 cancer cells form lamellipodia after 32h of co-culturing for phagocytic clearance
- Area of colocalized mCherry and GFP fluorescence increased over time due to the increasing number of HUVEC-derived, GFP-containing vesicles inside MCF7 cells

A functional phenomics approach reveals the exchange of material between breast cancer and endothelial cells at single-cell resolution in a 3D co-culture system - **Outlook**



- Phagocytic clearance of dying cells (efferocytosis) is a mechanism by which MCF7 cells could take up extracellular vesicles from dying HUVECs
- EVORION Cytokine Sensors could support the hypothesis that TNF-α secretion by MCF7 cells could induce a targeted necroptosis and phagocytic clearance of HUVECs