



IDC-like 3D mammary organoids derived from healthy primary luminal cells with invasive potential

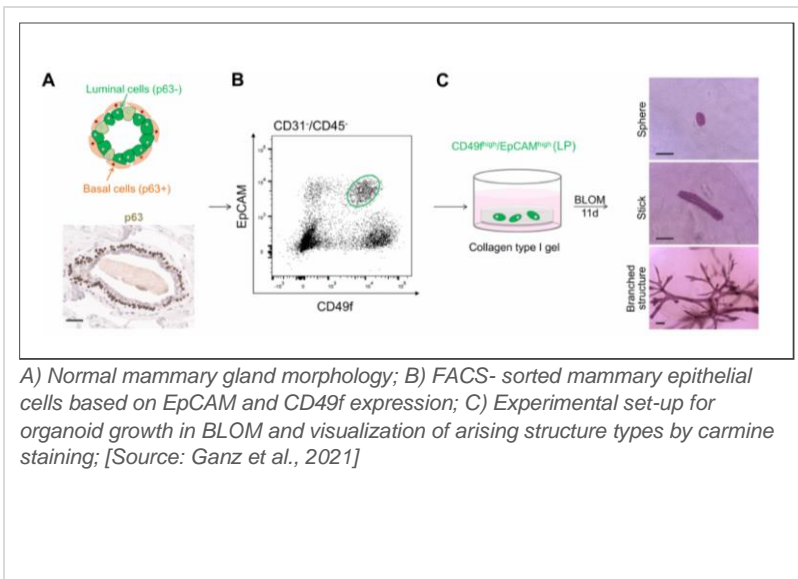
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INVENTION NOVELTY

A mammary 3D organoid model has been developed that enables primary human luminal progenitor cells to form complex branched structures recapitulating the ductal morphology of invasive ductal carcinoma (IDC), also known as low-grade carcinoma of no special type, which comprises over 70% of all breast cancer cases. Invasive morphology of normal luminal cells is elicited solely by specific growth environments determined by a proprietary medium that was termed BLOM (branched luminal organoid medium).

VALUE PROPOSITION

Understanding the mechanisms underlying invasive outgrowth of mammary epithelial cells holds the key to the prevention of invasive breast cancer. Until now it has not been possible to identify universal genetic alterations that can distinguish pre-invasive from invasive carcinomas, indicating that the process of invasion is critically influenced by the microenvironment or tumor stroma. This 3D assay offers a novel platform to investigate the dynamics of luminal cell invasion and the impact of genetic and non-genetic aberrations on invasive morphology.



TECHNOLOGY DESCRIPTION

Invasive IDC-like branching morphogenesis is induced *in vitro* in cultures of primary luminal progenitor cells by applying defined growth conditions during organoid formation.

CRISPR-Cas9 mediated deletion of E-cadherin in normal luminal cells resulted in an organoid morphology with a loss of duct formation under BLOM culture conditions, recapitulating invasive lobular carcinoma (ILC) morphology which is closely resembling clinical samples of the ILC-subtype.

The 3D organoid system offers an approach for unraveling environmental as well as gene-specific effects on invasive IDC- and ILC-like subtype generation and provides a novel assay tool for drug screening purposes to identify new intervention strategies for breast cancer treatment.

COMMERCIAL OPPORTUNITY

The technology is available for licensing or further co-development.

DEVELOPMENT STATUS

Established organoid platform.

PATENT SITUATION

A priority patent application (EP21193574.7) was filed in 2021 followed by a PCT application (PCT/EP2022/073755).

FURTHER READING

Ganz et al., 2021, J. Pathol., DOI: 10.1002/path.5790

