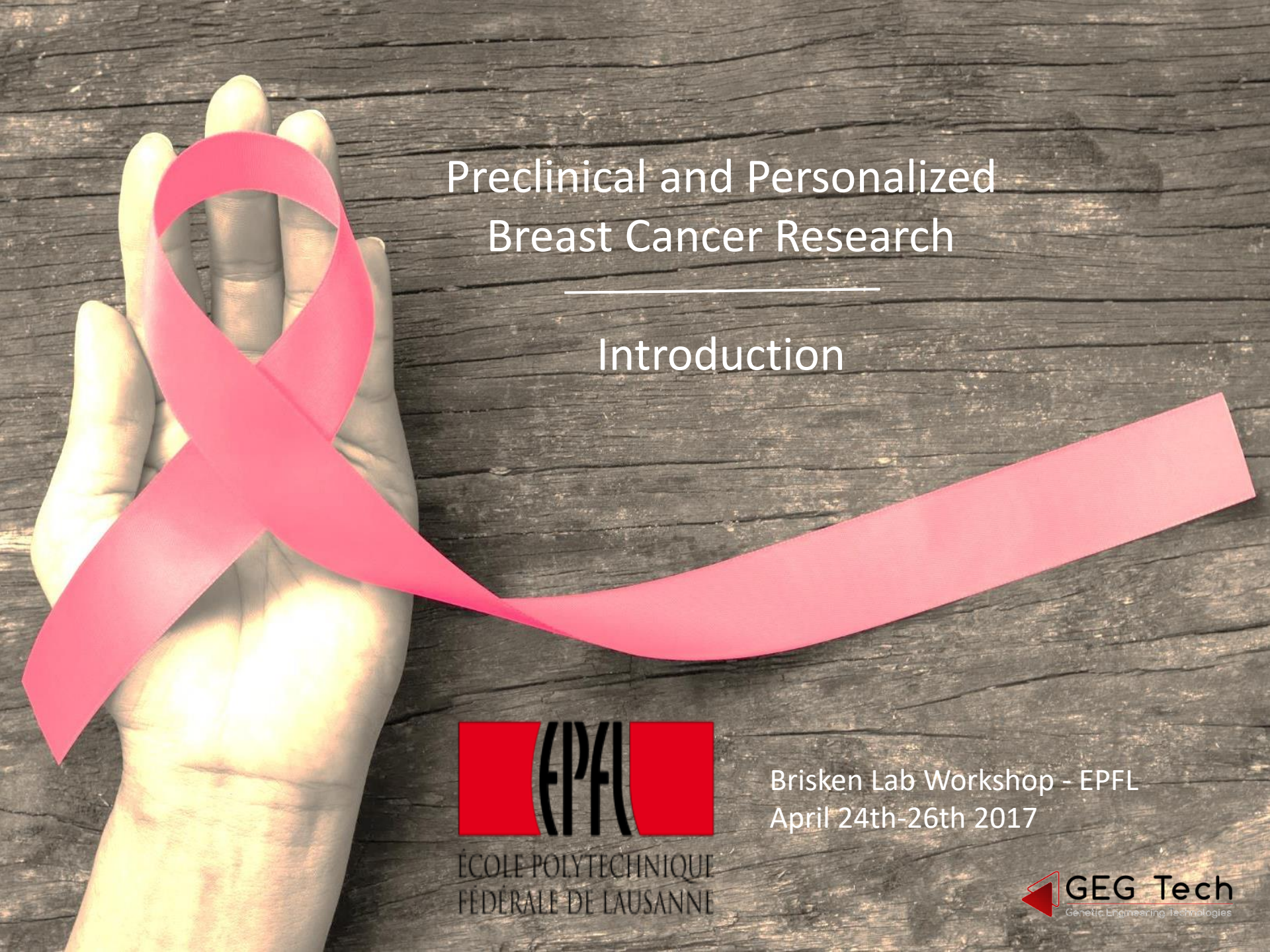

Preclinical and Personalized Breast Cancer Research

Introduction

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Brisken Lab Workshop - EPFL
April 24th-26th 2017

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BREAST CANCER

- About **95%** of potential oncology **drugs fail** in clinical trials in part because the preclinical models used to test them do not adequately reflect their clinical counterparts.
- Breast cancer is the **leading cause of cancer related death** among women worldwide.
- About **70%** of breast cancers are **estrogen-receptor α positive**.
- The **lack of a clinically relevant models** hampers progress in understanding how hormones, increasingly recognized as important factors in breast carcinogenesis, impinge on disease progression and therapy.

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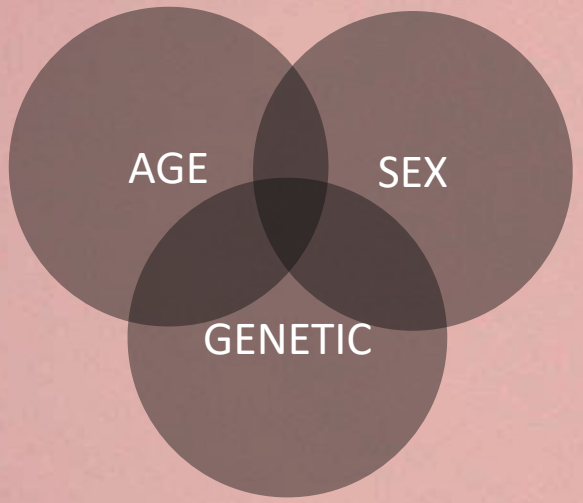
BREAST CANCER RISK FACTORS

Non-hormonal risk factors



Hormonal risk factors

Exposure to endogenous sex hormones	Exposure to exogenous sex hormones	Exposure to endoctine disruptors
Early Menarche, Late Menopause	Oral Contraceptives, Hormone Replacement Therapy	E.g. BPA, DDT, Phthalates

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EX VIVO MODEL: PRIMARY HUMAN BREAST EPITHELIAL CELLS

LIMIT
Loss of hormone receptors upon culturing

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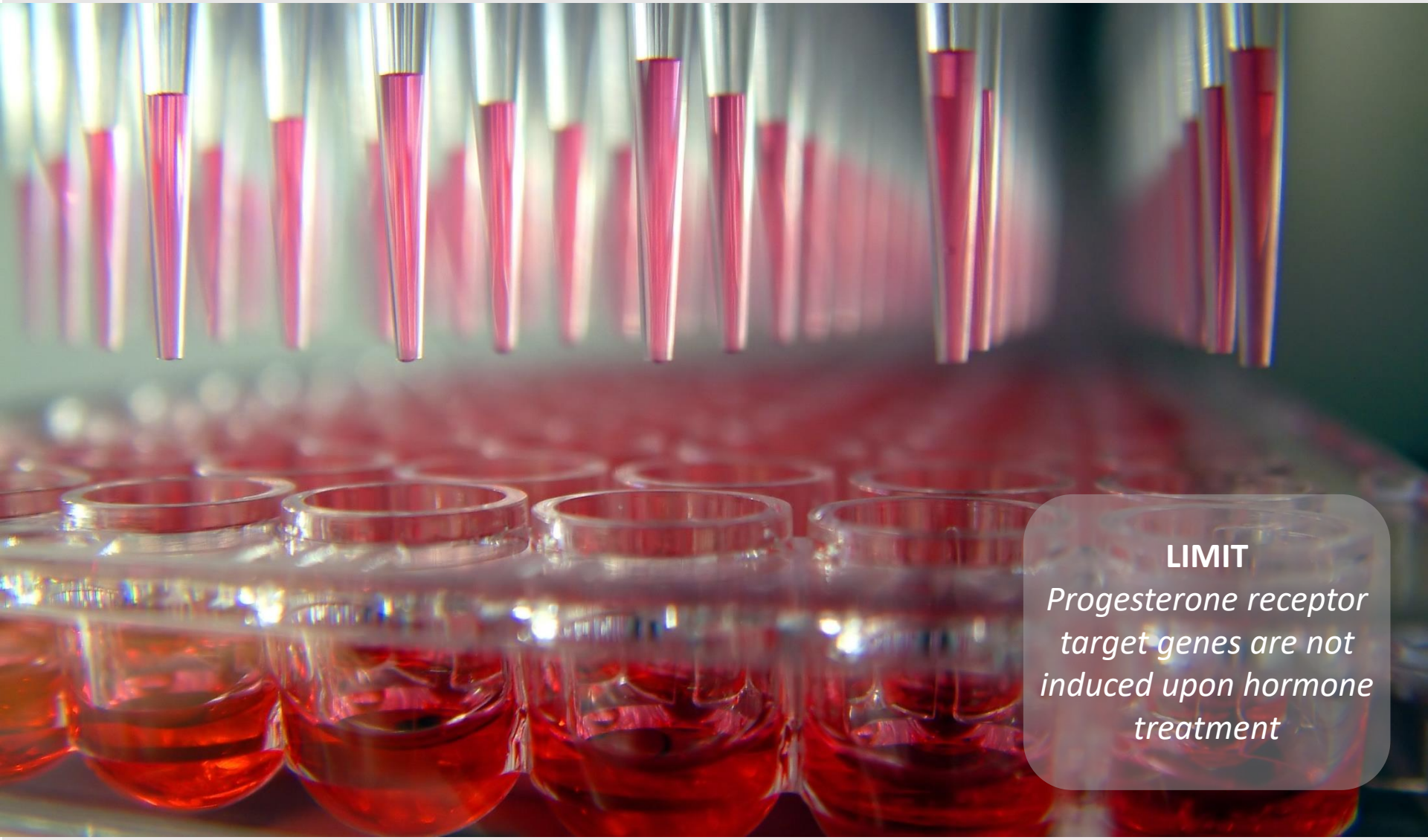
EX VIVO MODEL: 3D MATRIGEL PRIMARY BREAST EPITHELIAL



LIMIT

Progesterone receptor target genes are not induced upon hormone treatment

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EX VIVO MODEL: HUMAN BREAST TISSUE MICROSTRUCTURES

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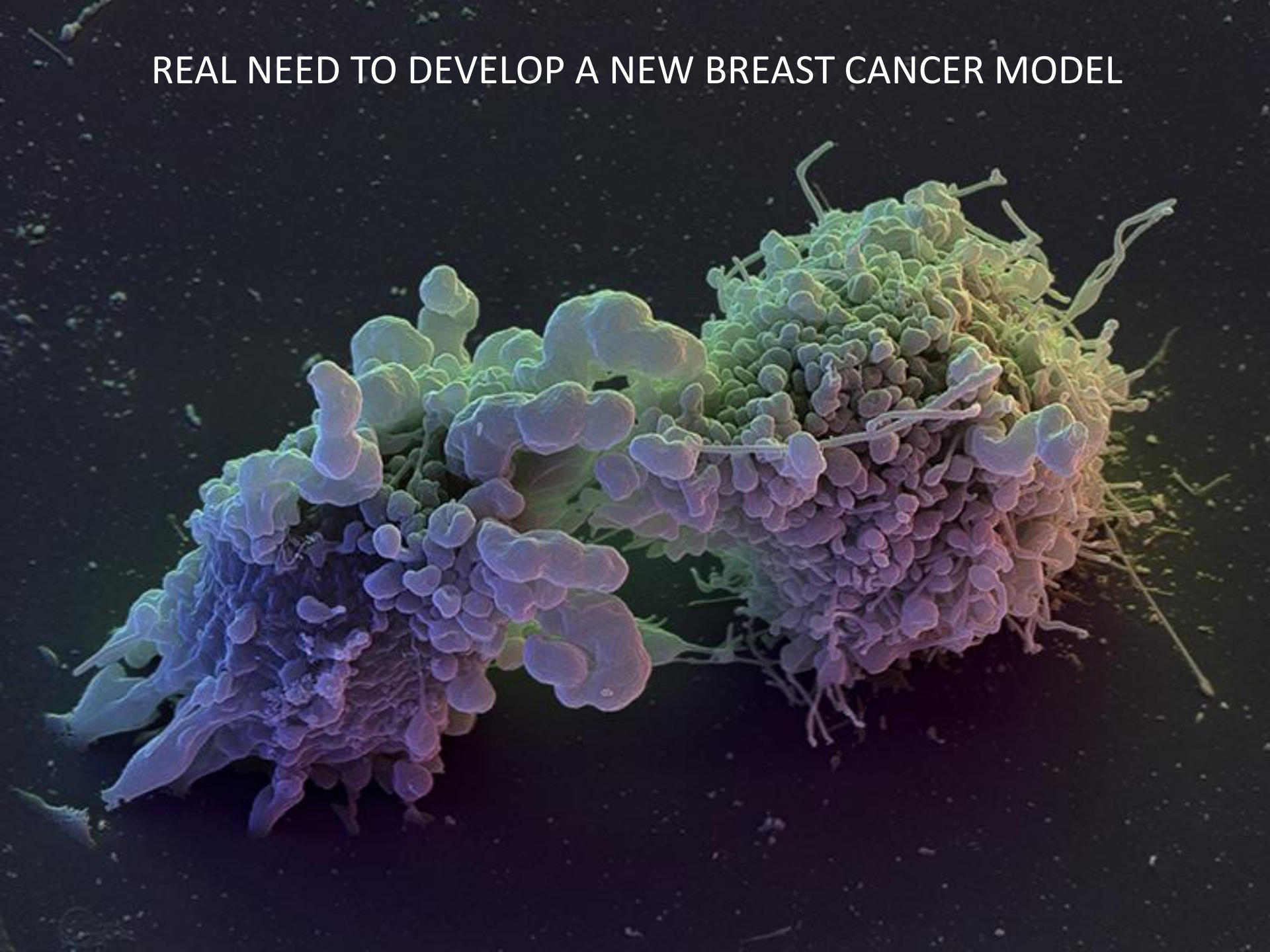
REAL NEED TO DEVELOP A NEW BREAST CANCER MODEL



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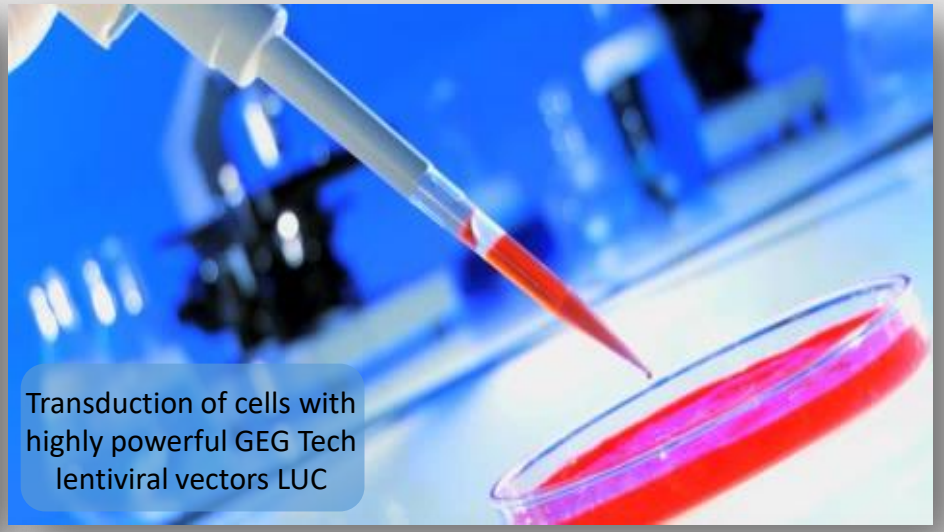
IN VIVO MODEL: HUMANIZED MOUSE MAMMARY GLANDS

Mammoplasty reduction surgery



Transduction of cells with highly powerful GEG Tech lentiviral vectors LUC

Injection of human cells intraductally into mouse mammary gland

In vivo imaging based on luciferase activity

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HUMANIZED MOUSE MAMMARY GLANDS: A HIGH POTENTIAL MODEL

Sflomos G, et al. Cancer Cell 2016

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Brisken Lab & GEG Tech

Brisken Lab - EPFL

Breast cancer strikes one out of eight women in Switzerland. Lab's goal is to understand how hormones interact with developmental signaling pathways in the breast to control growth and differentiation, and how they contribute to breast cancer development. The scientific team seeks to translate the insights into novel approaches to prevent and treat breast cancer.

GEG Tech

GEG Tech scientific team has gained over 10 years a unique know how in the design of highly efficient vectorization systems. Our mission is to enhance R&D with innovative genetic engineering tools. We are happy to bring our expertise in vectorology as a contributor to this promising research on breast cancer.

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