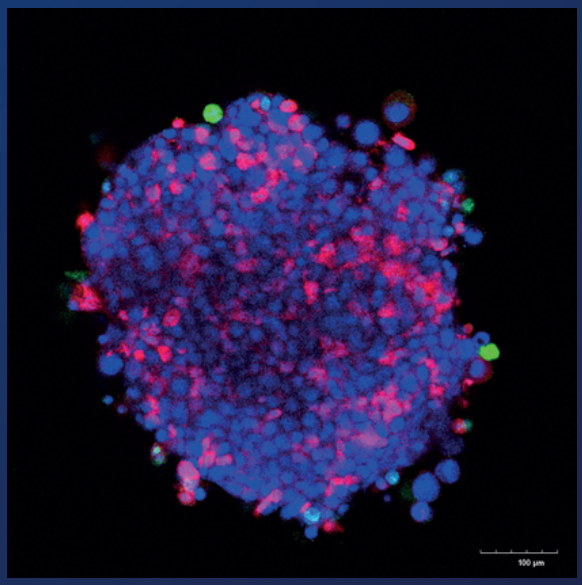
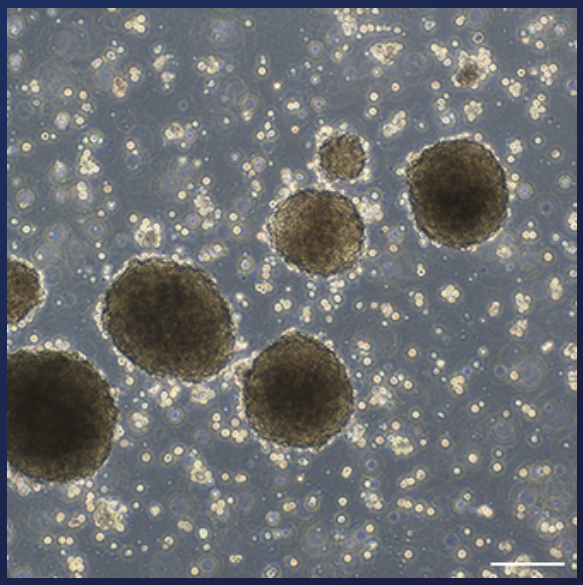
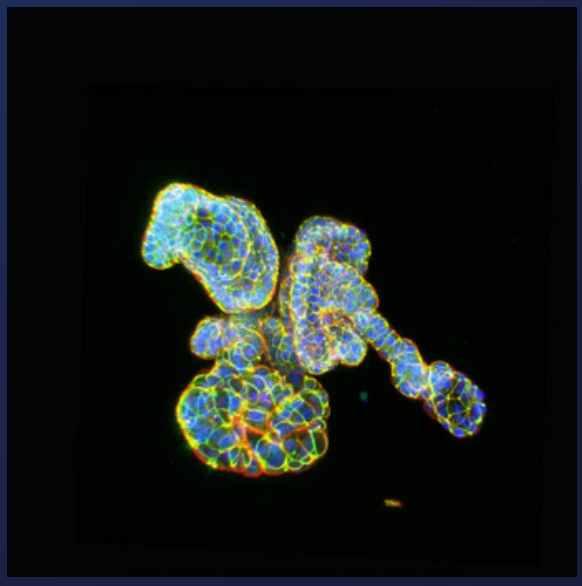
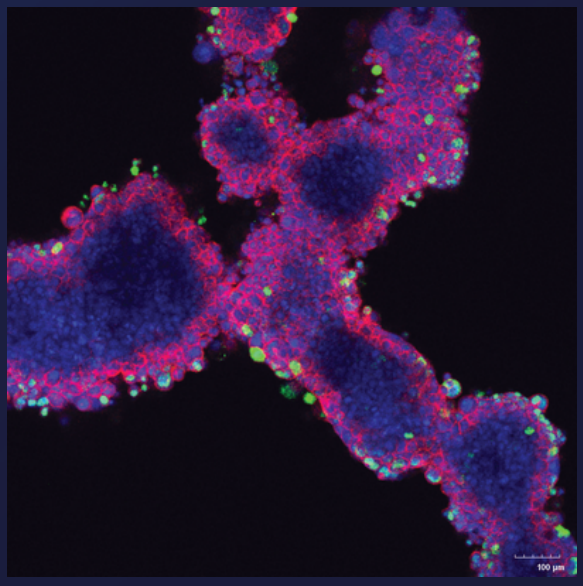
PATIENT-DERIVED TUMOUR ORGANOIDS

3D *in vitro* multicellular models that recapitulate characteristics of tumours in the human body









Built by and for cancer researchers

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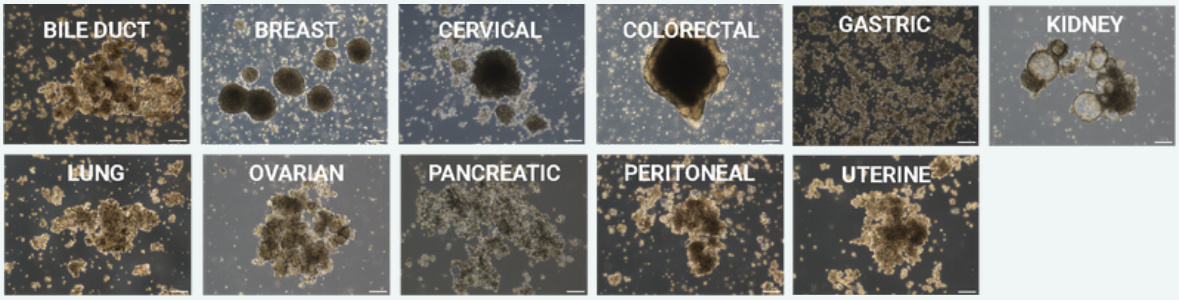
Cancer patient-derived organoids for:

- Disease modelling
- Anticancer agents discovery and development
- Immuno-oncology assays
- Compounds' safety and toxicity testing



Organoids are unique self-organising 3D microscopic structures derived from cells that represent a physiologically relevant *in vitro* model systems as they preserve the genomic, physiological characteristics and multicellularity of the equivalent *in vivo* tissue.

Their use in disease modelling, anticancer agents discovery, development and toxicity testing can complement existing experimental models. They can be employed prior to using high-cost and time-consuming *in vivo* models such as patient derived xenografts (PDXs).

The cancer patient derived organoids (F-PDOs) were developed in Fukushima from a range of human tumour tissues. These F-PDOs better recapitulate human tumours compared to conventional compared to conventional cancer cell lines. The protocol does not involve enzyme treatment of the clinical material or use of extracellular matrix – these F-PDOs are cultured in suspension.

Characterisation tests, such as comprehensive gene expression, whole-exome sequencing and morphological analyses, confirm these F-PDOs retain parental tissue characteristics for extended period of time in culture and after cryopreservation.

KEY FEATURES

Preserve parental tissue genetic profile

Amenable to extended culture duration

Suspension culture

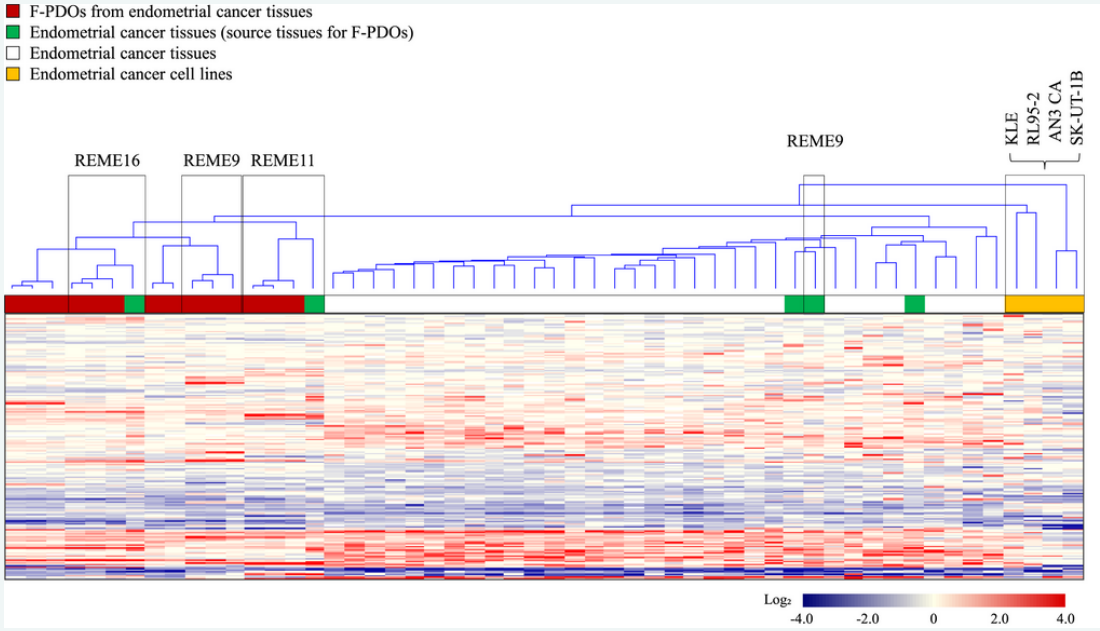
In vivo tumorigenesis: suitable for PDX mouse development

Suitable for various assays

Well-characterized with annotation data

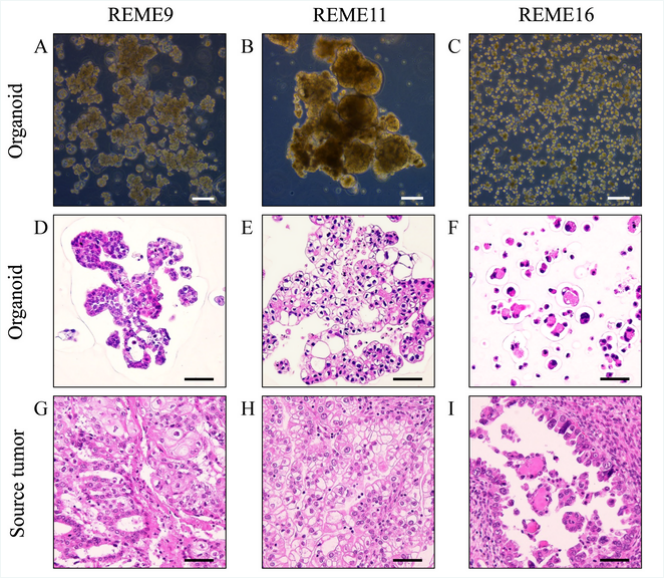
Genome analysis and gene expression profiling

F-PDOs retain mutations and similar gene expression profiles of source tumour tissues, which are closer than those of cancer cell lines.



Gene expression profiles of F-PDOs, endometrial tumours and endometrial cancer cell lines. Expression values (subtracted log ratios) are represented by colour gradients. Red and blue colours indicate high and low expression, respectively. White indicates a log ratio of 0. Adapted from Tamura et al. 2018 [4].

Morphological analysis



F-PDOs form cell clusters with similar morphological features of their source tumours.

Phase-contrast and HE-stained images of the F-PDOs and their source tumours. Tamura et al. 2018 [4].

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Images
Page 1 -Top left image - Lung cancer organoid. Red - HER-2 positive cells fluorescently labelled with an anti-trastuzumab antibody. Green - Ki67 positive cells fluorescently labelled with an anti-Ki67 antibody. Blue - DNA stained with DAPI
Page 1 - Bottom left image - Lung cancer (Cat. #160948) organoid in 3D
Page 1 -Top right image - Breast cancer organoid. Phase-contrast image, scale bar: 200 µm. Credit to: Dr. H.Tamura, FMU
Page 1 - Bottom right image - Lung cancer organoid. Red - EGFR positive cells fluorescently labelled with an anti-cetuximab antibody. Green - Ki67 positive cells fluorescently labelled with an anti-Ki67 antibody. Blue - DNA stained with DAPI
Page 2 - Phase-contrast images of the F-PDOs, the scale bar: 200 µm. Credit to: Dr. H.Tamura, FMU.
Page 2 - Phase-contrast images of the F-PDOs, the scale bar: 200 µm. Credit to: Dr. H.Tamura, FMU

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