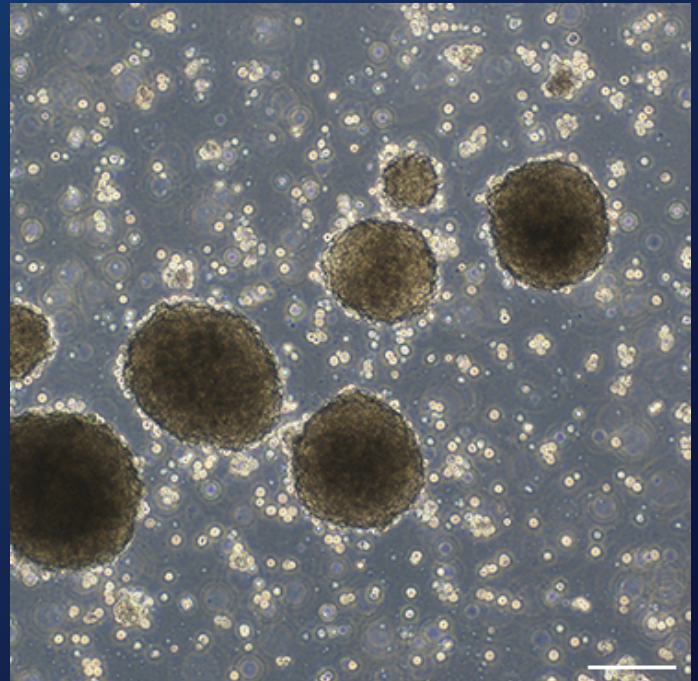
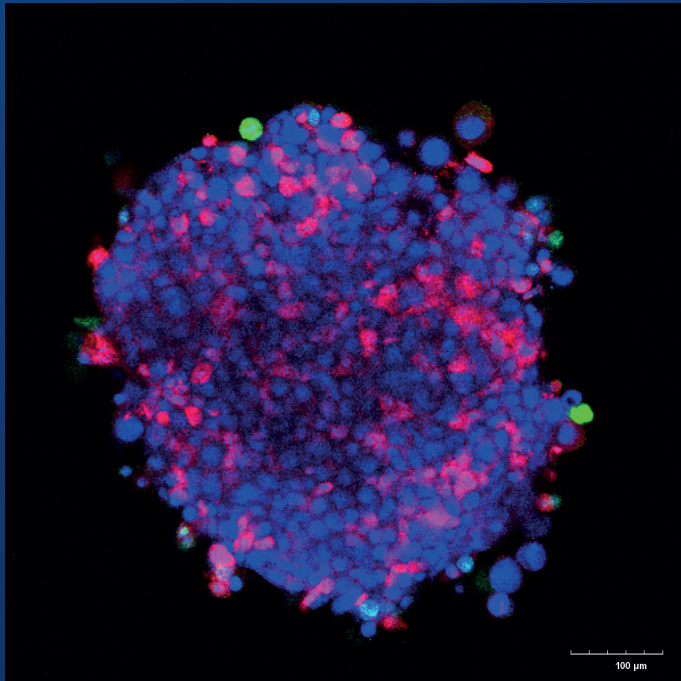


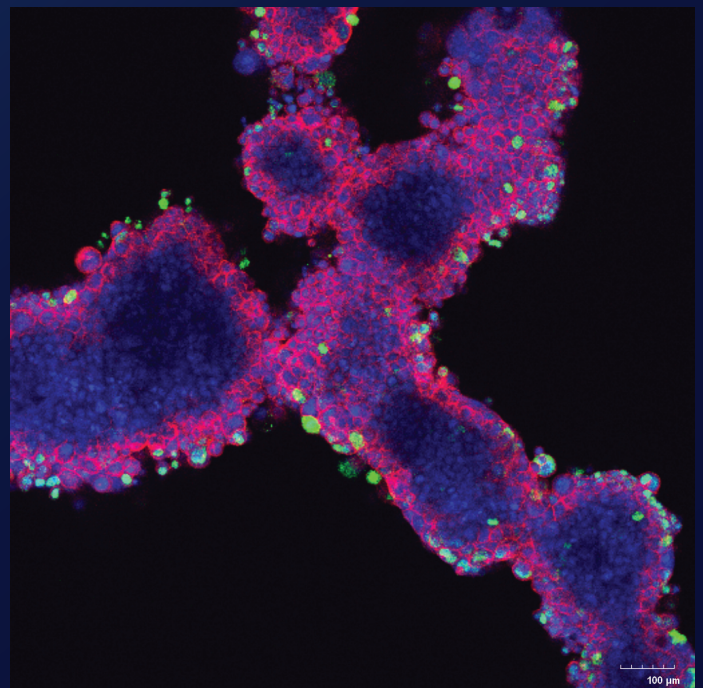
PATIENT-DERIVED TUMOUR ORGANOIDS: SUPERIOR TOOLS FOR CANCER RESEARCH

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

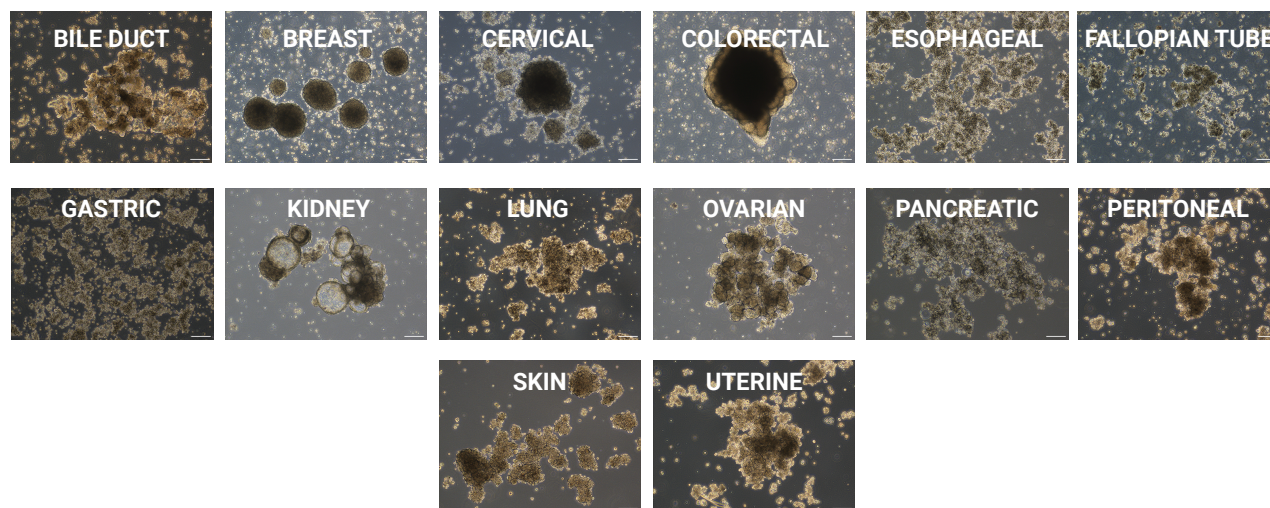


Cancer patient-derived organoids for:

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



Built by and for
cancer researchers



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 available cancer patient-derived organoids were established in Fukushima Medical University (F-PDOs) from a range of human tumour tissues. The well-characterized F-PDOs better recapitulate characteristics of tumours in the human body, compared with 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

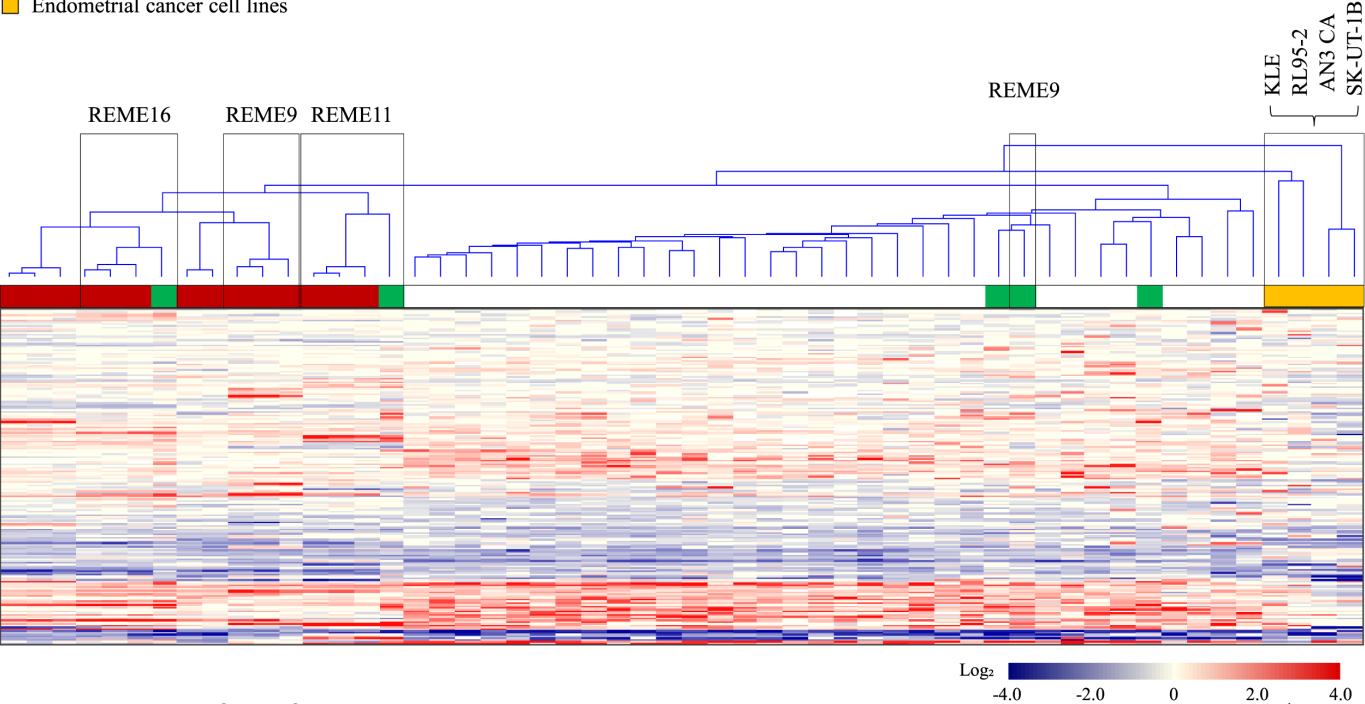
Well-characterized with annotation data



Genome analysis and gene expression profiling

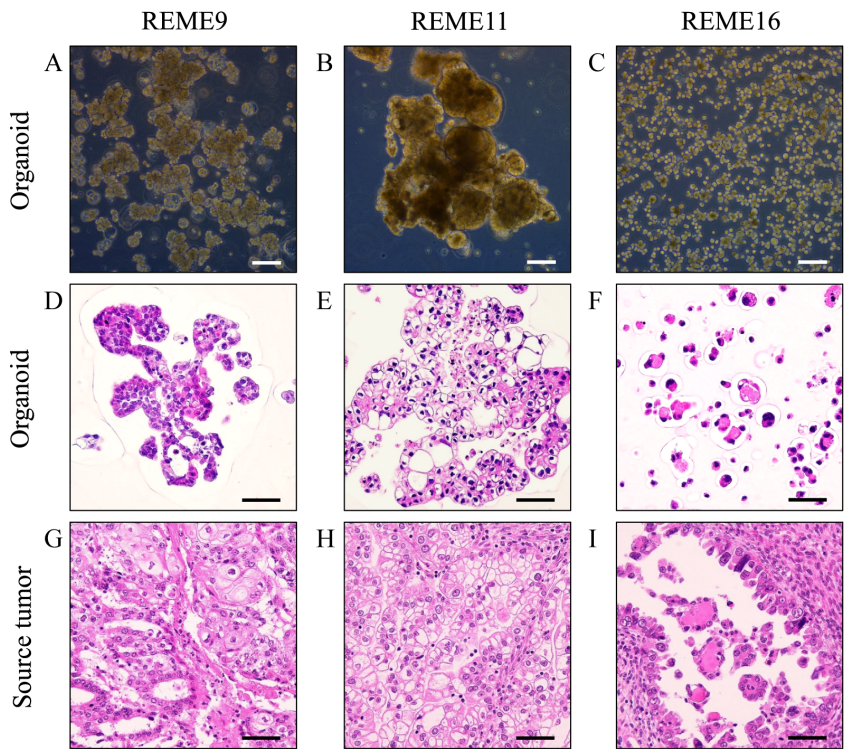
F-PDOs retain mutations and similar gene expression profiles of source tumour tissues, which are closer than those of cancer cell lines.

- F-PDOs from endometrial cancer tissues
- Endometrial cancer tissues (source tissues for F-PDOs)
- Endometrial cancer tissues
- Endometrial 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. Adapted from *Tamura et al. 2018 [4]*.

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United Kingdom

2 Redman Place,
London, E20 1JQ

United States of America

100 Summer Street,
Suite 1600
Boston, MA02110

Contact us

marketing@cancertools.org
www.cancertools.org

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 -Top right image - Breast cancer organoid. Phase-contrast image, scale bar: 200 µm. Credit to: Dr. H.Tamura, FMU

Page 1 - Bottom left 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.

References

- 1.Higa et al. 2021. Journal of visualized experiments.
- 2.Takahashi et al. 2021. Oncology letters 21: 406.
- 3.Takahashi et al. 2019. Cells 20: 481.
- 4.Tamura et al. 2018. Oncology reports 40: 635-646.

