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Quantitative Evaluation of Metastatic Potential of Human Colorectal Cancer Organoids by Deformation Analysis

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Organoid, which is a miniaturized and simplified version of organs cultured *in vitro*, is often used in the diagnosis of cancer by morphological and histopathological evaluation after xenotransplantation, but a classification of the metastatic potential of cancer from their shape using static images is challenging.

In this study, we quantified the time development of the degree of anisotropic deformation of human colorectal cancer organoids driven by a non-equilibrium process of organoid growth in order to discern a difference between metastatic and non-metastatic potentials of human colorectal cancer. Some quantitative characteristics related to the temporal change of the anisotropic deformation and the growth of organoids were defined. Using statistical analysis and machine learning, we showed that the metastatic potential of organoids can be classified by the spatiotemporal characteristics of organoid formation.