Functional screening of gene therapy and CRISPR gene editing therapy in patient-derived rectal organoids

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SCOPE OF THE METHOD

The Method relates to	Human health
The Method is situated in	Basic Research, Translational - Applied Research
Type of method	In vitro - Ex vivo
Specify the type of cells/tissues/organs	rectal organoids

DESCRIPTION

Method keywords

Patient-derived

organoids

CRISPR-Cas9

CrispR

CRISPR/Cas

AI

screening

forskolin-induced swelling

Scientific area keywords

cystic fibrosis

CRISPR

gene therapy

Method description

The DETECTOR algorithm allows to functionally screen genetic strategies for Cystic Fibrosis in patient-derived rectal organoids. DETECTOR is a machine-learning based software that takes frames from forskolin-induced swelling (FIS) assay on organoids as input and gives the number of functionally corrected organoids as output. The DETECTOR tool for automated organoid analysis is freely accessible from Dataverse (https://doi.org/10.7910/DVN/OZZRPG) and Github https://github.com/RL-arch/detector.

Lab equipment

The algorithm runs on any regular computer. Acquiring FIS data requires experience with organoid culture and a confocal microscope with robotics to capture images of 96 well plates at fixed intervals.

Method status

Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

The software allows to screen in primary human organoids in medium throughput and gives an per-organoid analysis.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

References

Bulcaen et al., Cell Reports Medicine, 2024 https://organoids-3dmodels.gbiomed.kuleuven.be/info/adult-stem-cell-derived-rectal-organoid-models

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