

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

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Organisation

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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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