

# Development of luminescent human iPSC-derived neurospheroids

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# **Contact person**

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# **Organisation**

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**Country** Belgium

Geographical Area Flemish Region

## **SCOPE OF THE METHOD**

The Method relates to	Human health
The Method is situated in	Basic Research
Type of method	In vitro - Ex vivo
Specify the type of cells/tissues/organs	human induced pluripotent stem cell-derived neurospheroids

## **DESCRIPTION**

**Method keywords** 

neurospheroid

Bioluminescence

**IPSC** 

organoid

neurotoxicity

## Scientific area keywords

3D organoid models

Induced pluripotent stem cells

ischemic stroke

## **Method description**

This method relates to the development of highly reproducible human iPSC-derived neurospheroids equipped with intrinsic bioluminescence for an easy and longitudinal follow-up of the viability and growth of these neurospheroids over time. The luminescent neurospheroids have been applied in ischemic stroke research, where this model enabled modeling of neurotoxicity after oxygen-glucose deprivation. The easy neural survival read-out may also enable the evaluation of potential neuroprotective agents (in high-throughput).

#### Lab equipment

- Laminar flow cabinet;
- Shaker;
- Microplate reader (Luminometer).

#### **Method status**

Published in peer reviewed journal

# PROS, CONS & FUTURE POTENTIAL

#### **Advantages**

- Three-dimensional model;
- human-based model;
- longitudinal measurements of neurospheroid viability (i.e. does not require a single endpoint and/or disruption of neurospheroids);
- highly reproducible;
- amenable to high-throughput drug screening.

## **Challenges**

- Maturity of neurospheroids and lack of glial cell types;
- Hypoxic/necrotic core development;
- Potential transgene silencing associated with lentiviral vector transduction.

#### **Modifications**

- Optimization of culture conditions of neurospheroids (i.e. increasing culture time, other media types, use of bioreactors, etc.);
- Addition of microglia-progenitors to neurospheroids;
- Modification of genetic engineering strategy (e.g. CRISPR/Cas9).

#### **Future & Other applications**

- Neurotoxicity, neurotrauma and neurodegenerative disease modeling;
- Evaluation of candidate neuroprotective therapies (in high-throughput).

# REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

#### References

Van Breedam E, Nijak A, Buyle-Huybrecht T, Di Stefano J, Boeren M, Govaerts J, et al. Luminescent Human iPSC-Derived Neurospheroids Enable Modeling of Neurotoxicity After Oxygen-glucose Deprivation. Neurotherapeutics. 2022.

## Links

Luminescent Human iPSC-Derived Neurospheroids Enable Modeling of Neurotoxicity ...











