

## Development of luminescent human iPSC-derived neurospheroids

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### Organisation

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**Country** Belgium

**Geographical Area** Flemish Region

## SCOPE OF THE METHOD

<b>The Method relates to</b>	Human health
<b>The Method is situated in</b>	Basic Research
<b>Type of method</b>	In vitro - Ex vivo
<b>Specify the type of cells/tissues/organs</b>	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 ...](#)

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