



# **CURRICULUM VITAE**

## ***Andi Wijaya***

**Tempat / Tanggal Lahir**

**: Klaten, 2 Juli 1936**

**Pendidikan**

- 1. Sarjana Farmasi / Apoteker (ITB / 1963)**
- 2. Ph.D. (Biologi Molekuler) (University of Munster/ Jerman/ 1978).-**
- 3. MBA (UCLA/USA/1986).-**

**Jabatan / Pekerjaan**

- 1. Mantan Dosen Kimia Klinik ITB, UNPAD (1980-2001).-**
- 2. Mantan Ketua Program Studi Biomedik Pascasarjana UNHAS (2003-2011).-**
- 3. Komisaris Utama PT Prodia Group. (2003-sekarang).-**

**Penghargaan**

- 1. Golden Academy Award dari National Academy of Clinical Biochemistry USA (1987).-**
- 2. DR (HC) in Biomedical Science dari University of Birmingham UK(1991)**
- 3. Gold Record of Achievement in Science dari NACCCA, USA (1994).-**
- 4. Satya Karya Bhakti Pendidikan dari UNPAD (2002).-**
- 5. Ganesha Widya Jasa Utama dari ITB (2012).-**
- 6. Premium Gold Heart Award in Basic CVD-Sc dari AHA USA, 2018.-**
- 7. Lifetime Achievement Award dari UNPAD – Universitas Groningen Belanda (2018).-**



# ***Organoid : iPSC – Based Disease Modeling.-***

Liver Organoid

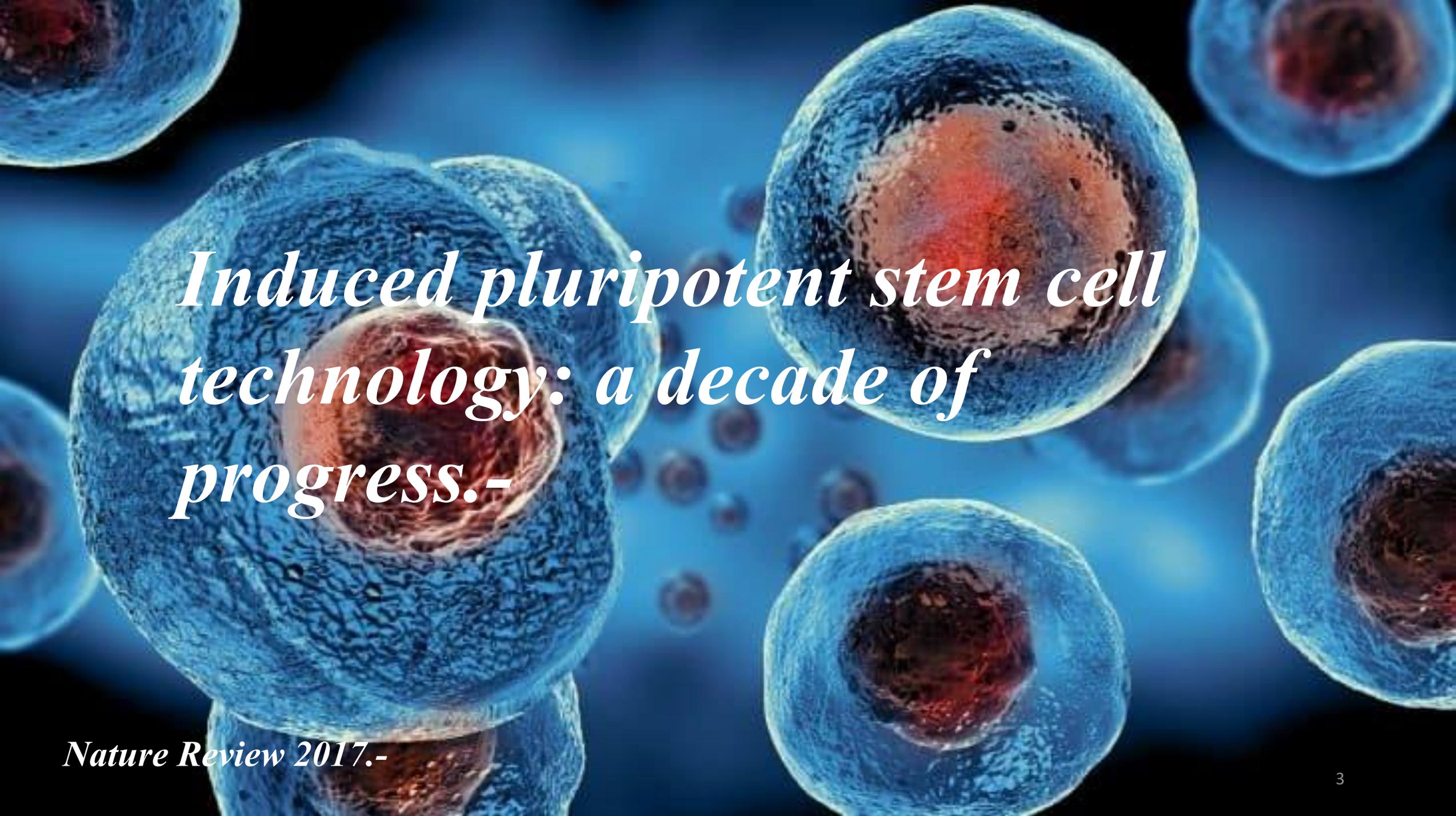
Intestine Organoid

Stomach Organoid

Mammary Organoid

Lung Organoid

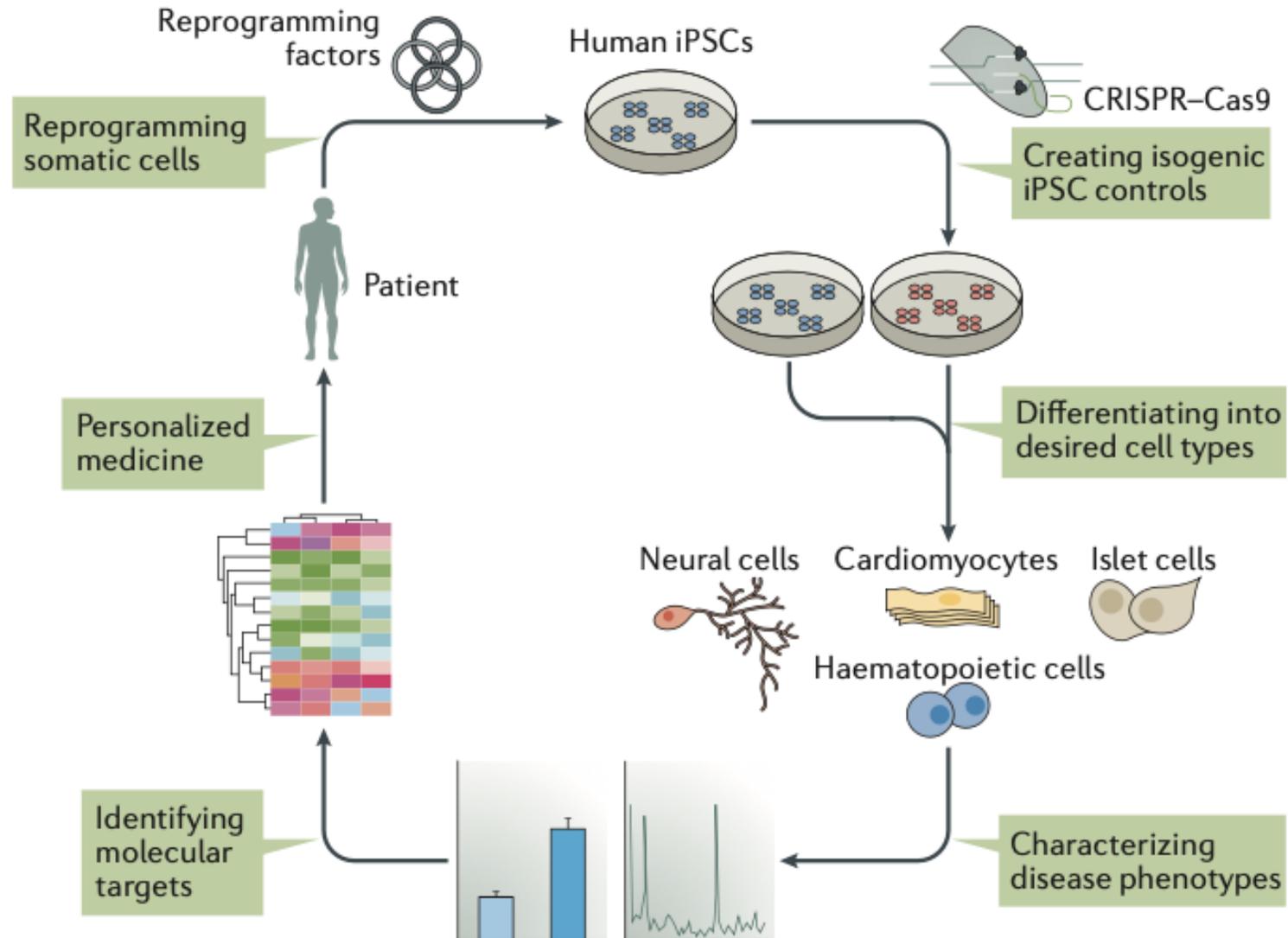
***Andi Wijaya 2025.-***



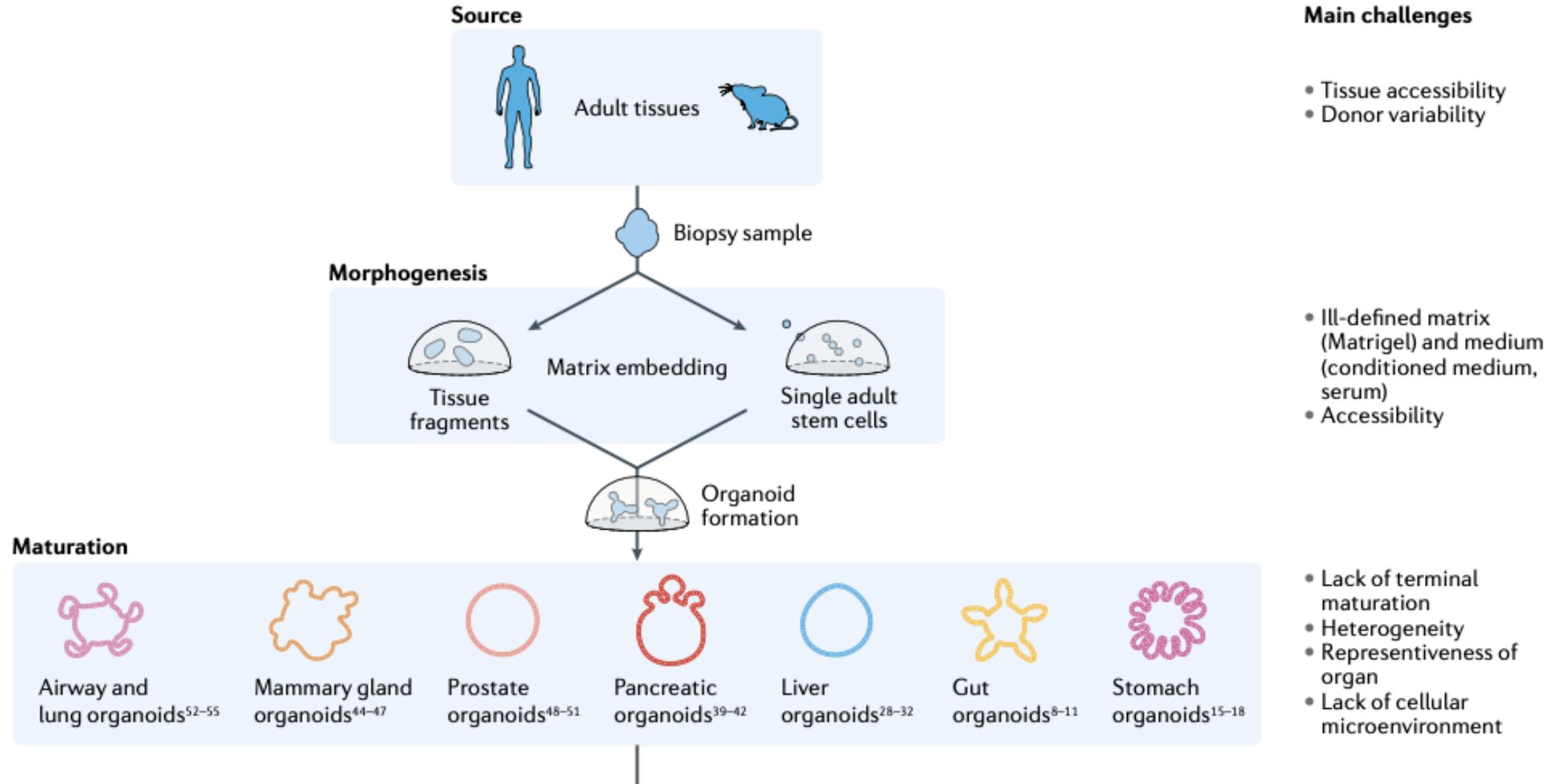
*Induced pluripotent stem cell  
technology: a decade of  
progress.-*

*Nature Review 2017.-*

# A schematic for human iPSC-based disease modelling.

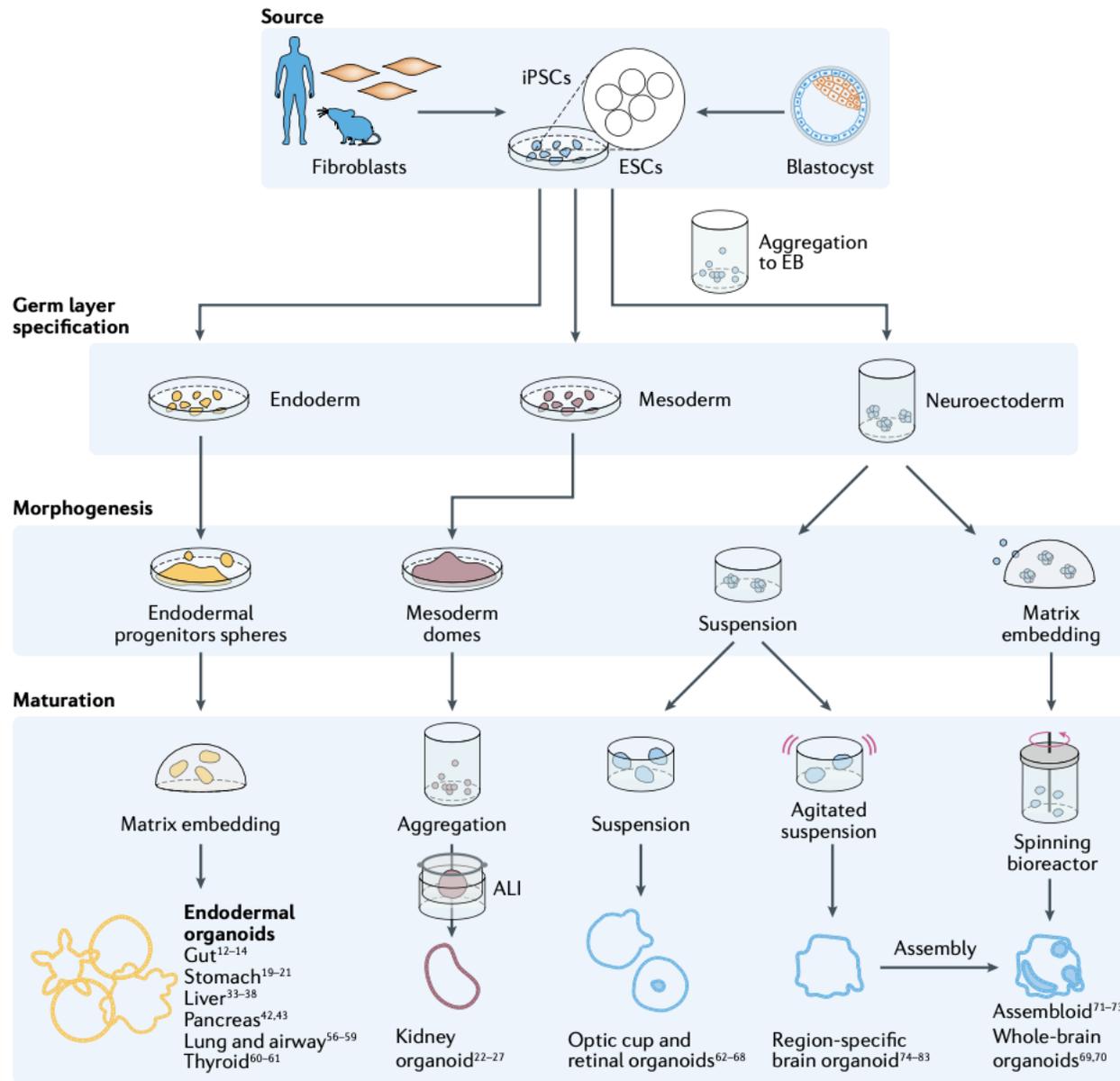


# Tissue-derived organoids.



*Nature 2021.-*

# Pluripotent stem-cell-derived organoids.



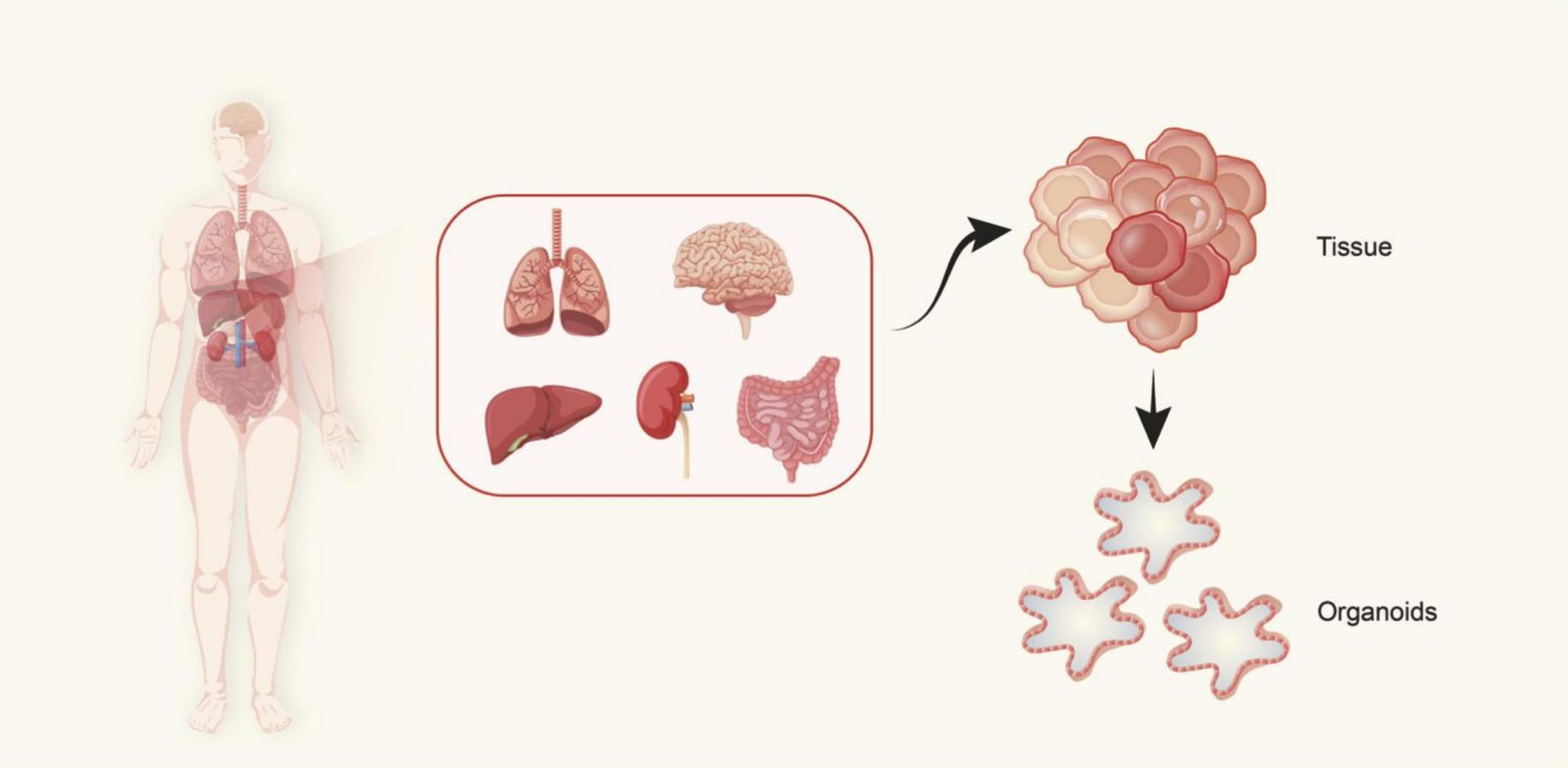
## Main challenges

- Laborious derivation

- Complex protocols
- Lack of standardization

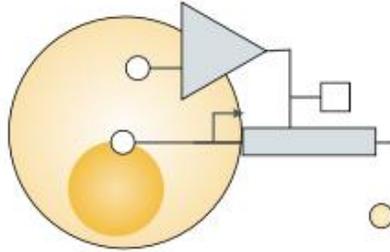
- Maturation beyond fetal-like phenotype
- Limited possibility of passaging

# Derivation of organoids from organs



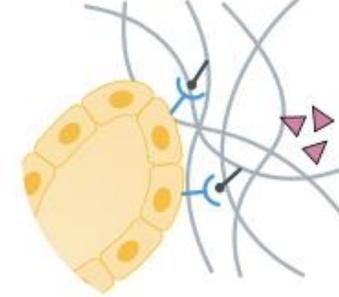
# Engineering approaches for organoids.

## Engineering the cell



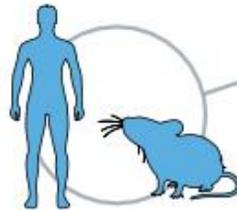
- Cell–cell and cell–matrix adhesion
- Reprogramming cellular responses to (external) stimuli
- Artificial cell–cell communication circuits
- Genetically engineered fate choices

## Engineering the niche



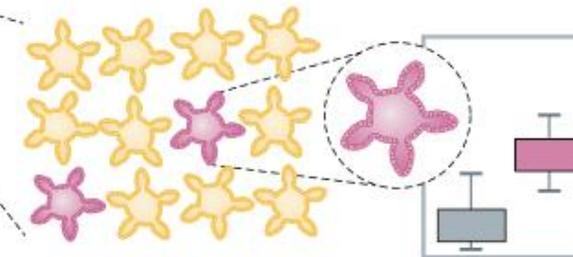
- Extracellular matrix composition
- Control of cell adhesion
- Soluble growth factors and metabolites
- Physical parameters and geometrical constraints

## Engineering the context



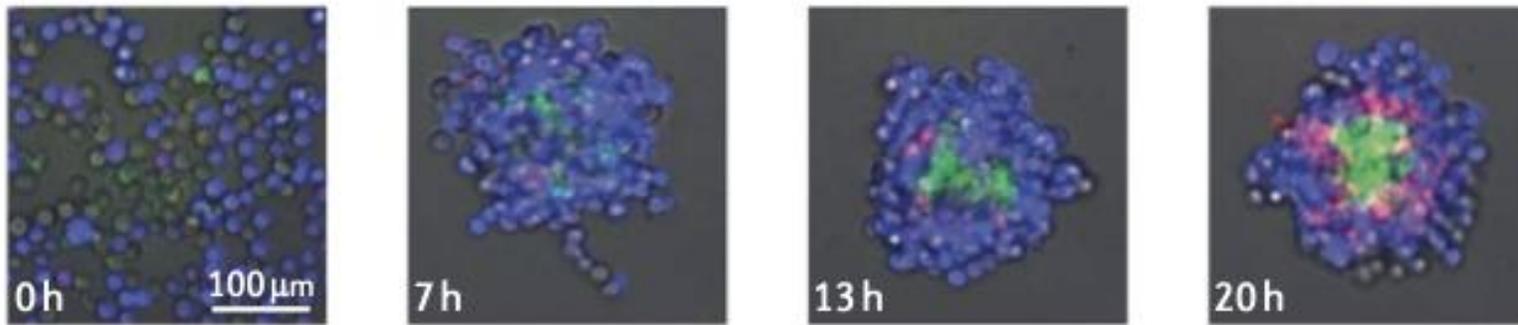
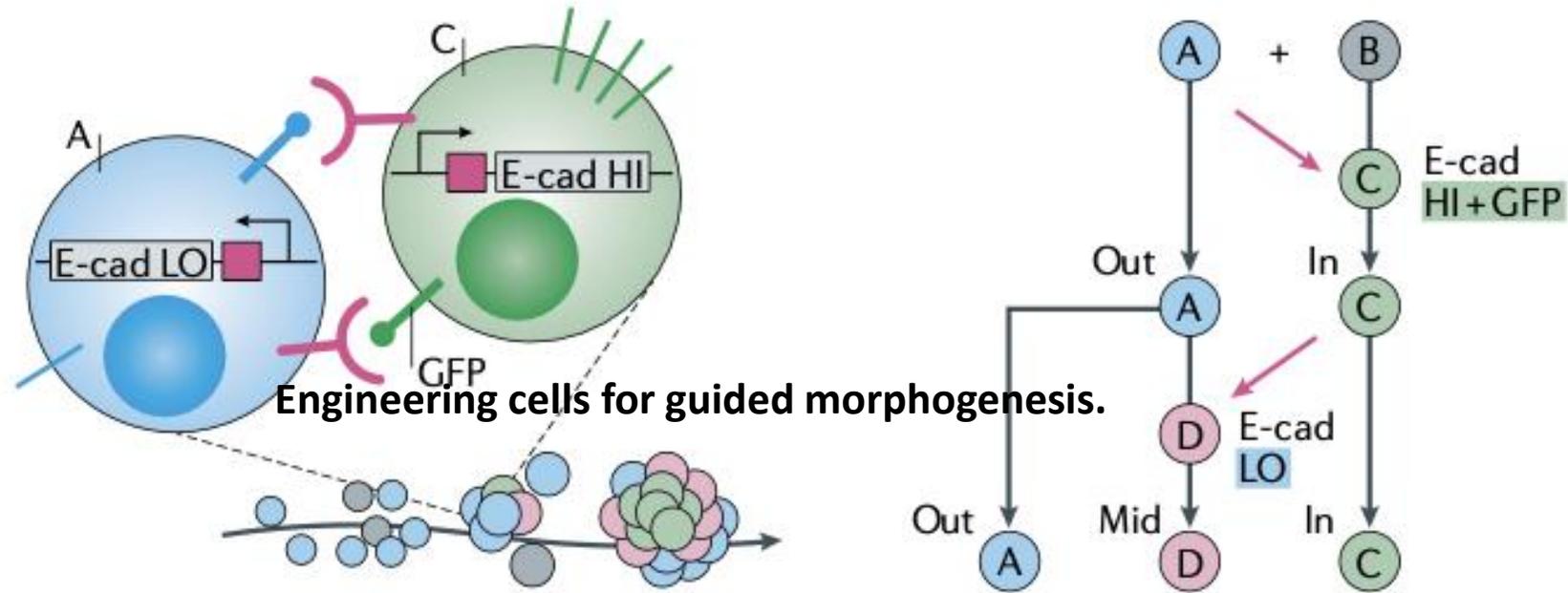
- Systemic physiological parameters (pH, flow, movement)
- Control over different functional compartments
- Multi-tissue and multi-organ interactions

## Engineering enhanced readouts

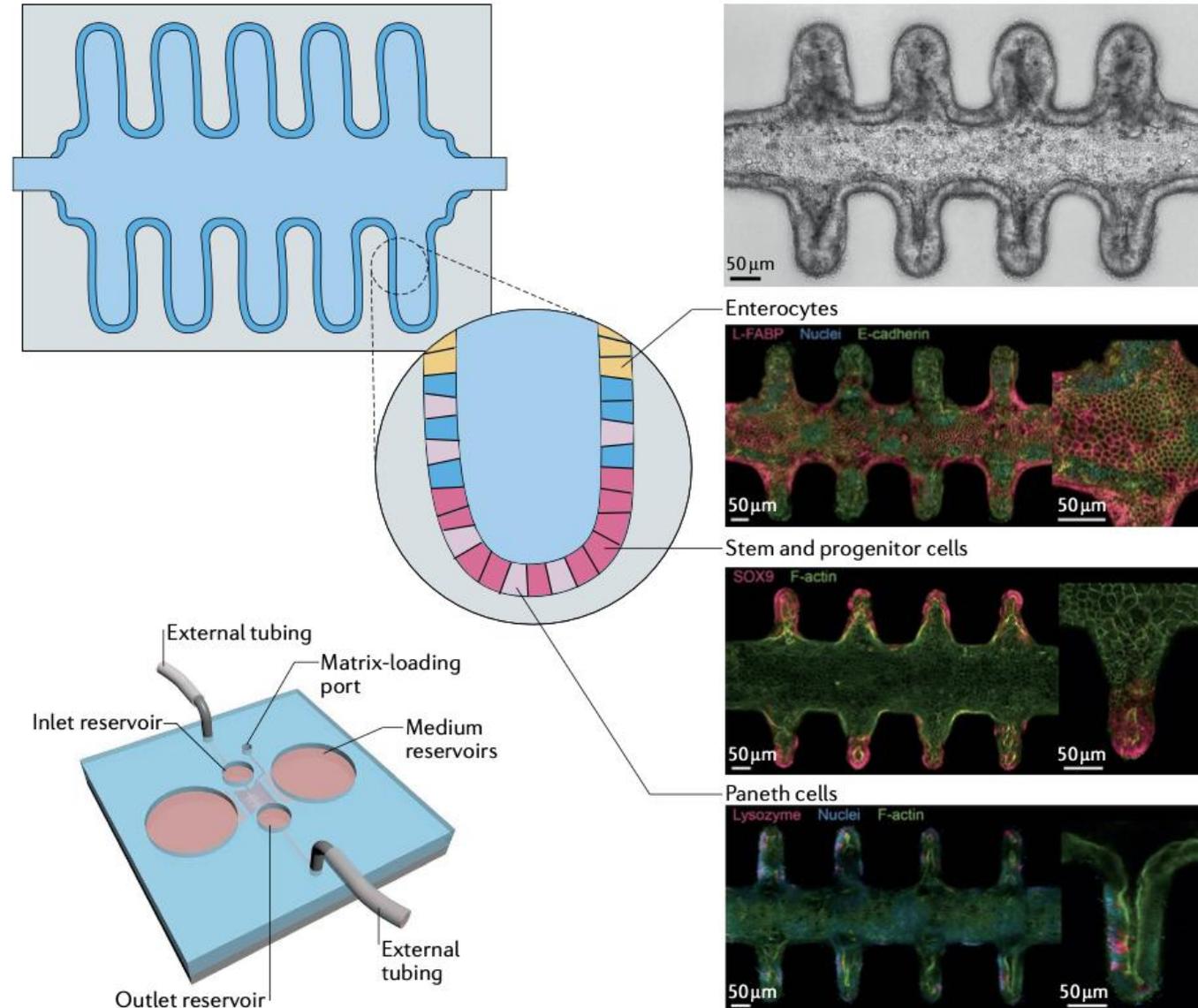


- Controlled imaging with automated analysis
- Miniaturized electrochemical probing
- Parallelization and high throughput

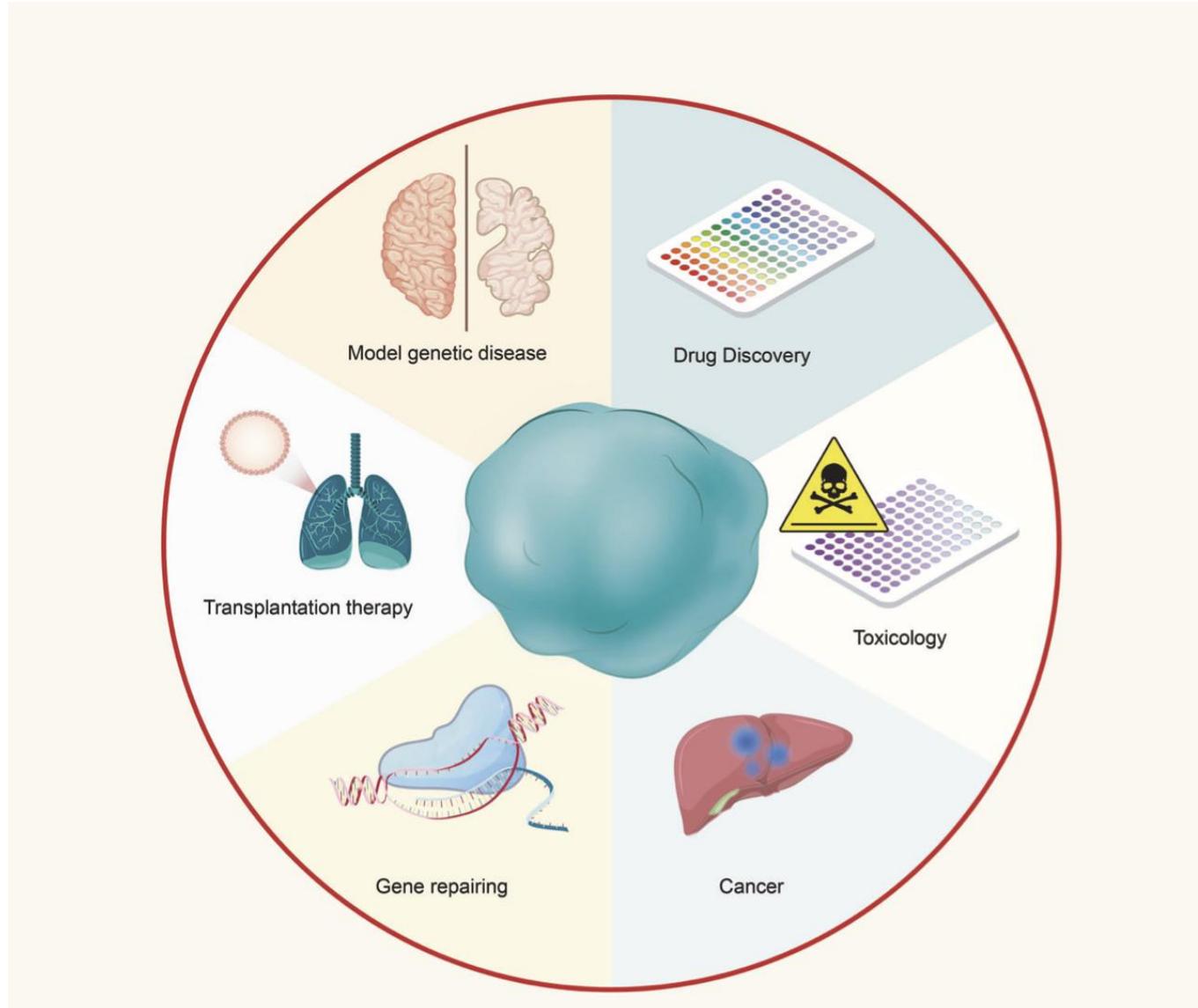
# Engineering cells for guided morphogenesis.



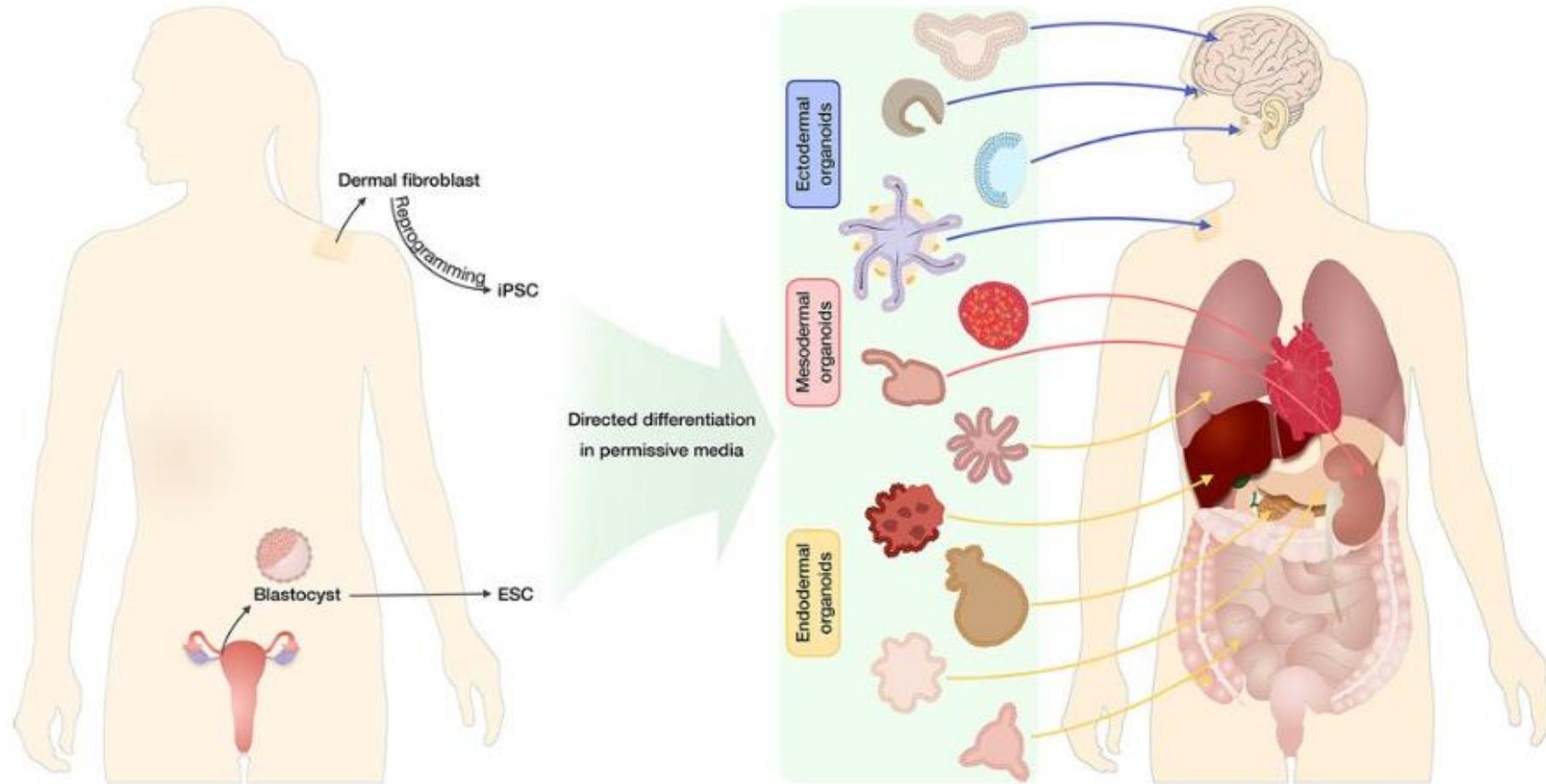
# Engineering the niche



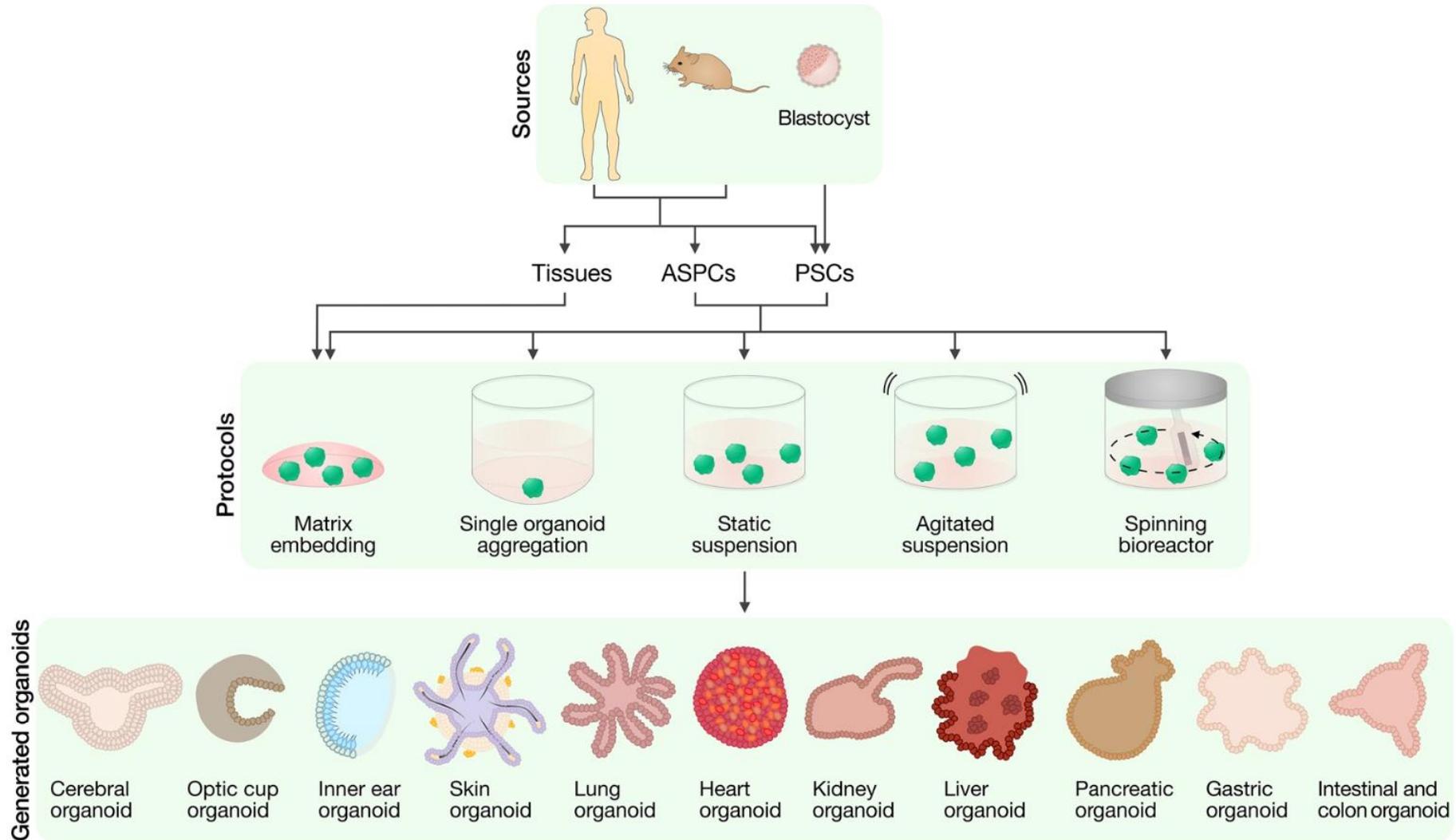
# Various applications of organoid technology.



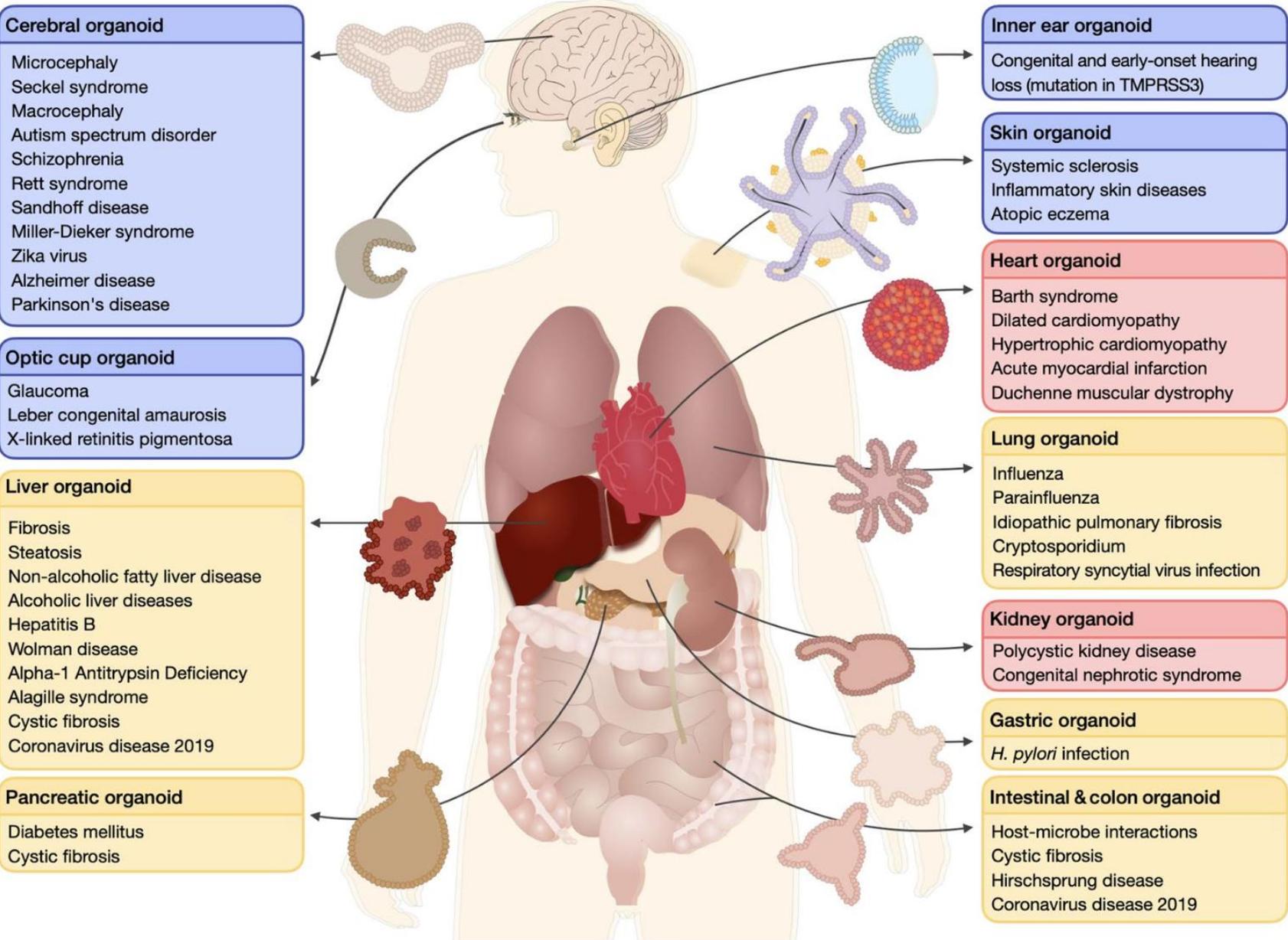
# Organoid · Germ layer · Disease modeling · Drug screening



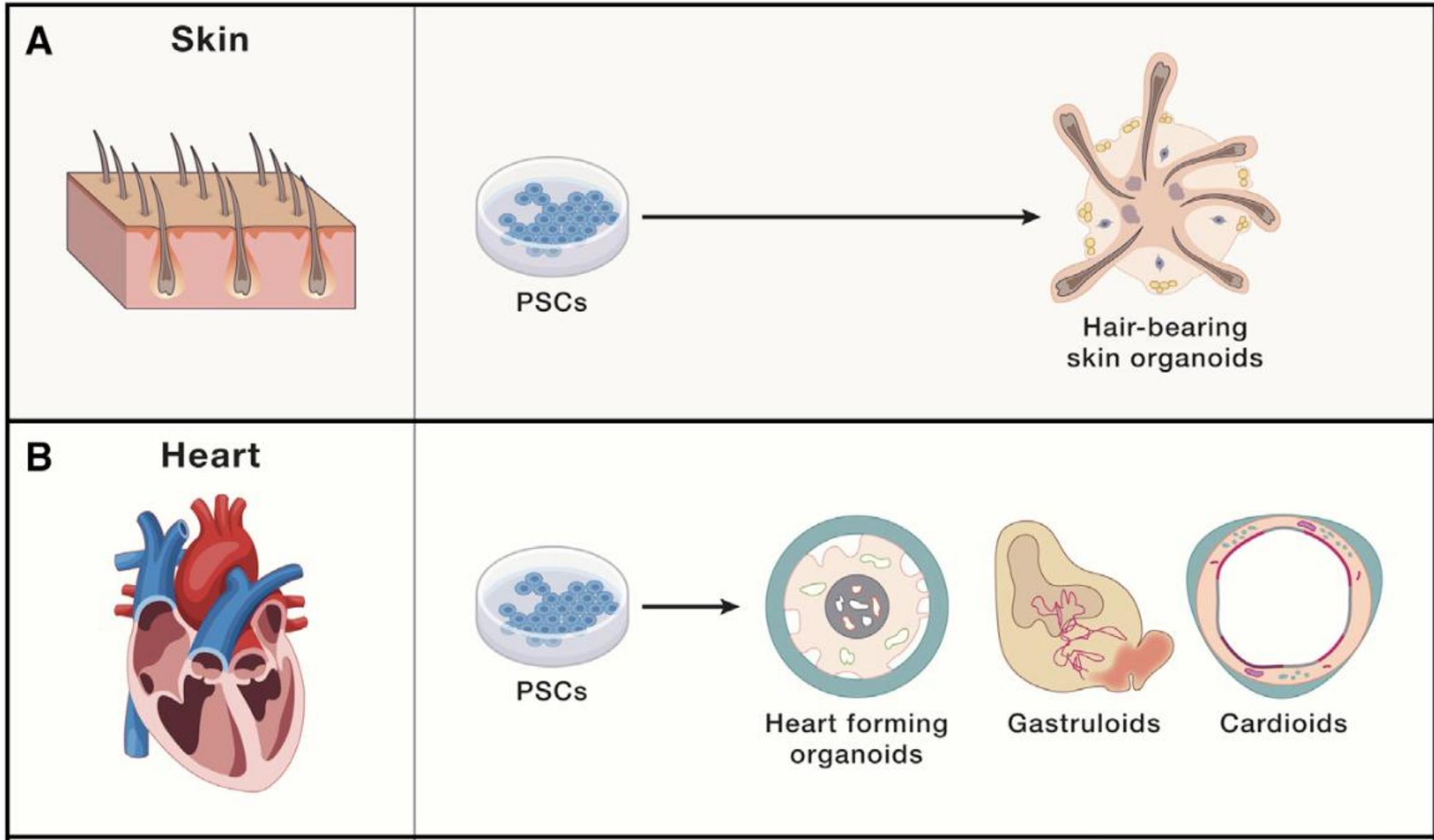
# Different protocols to generate tissue-specific and pluripotent stem-cell-derived organoids

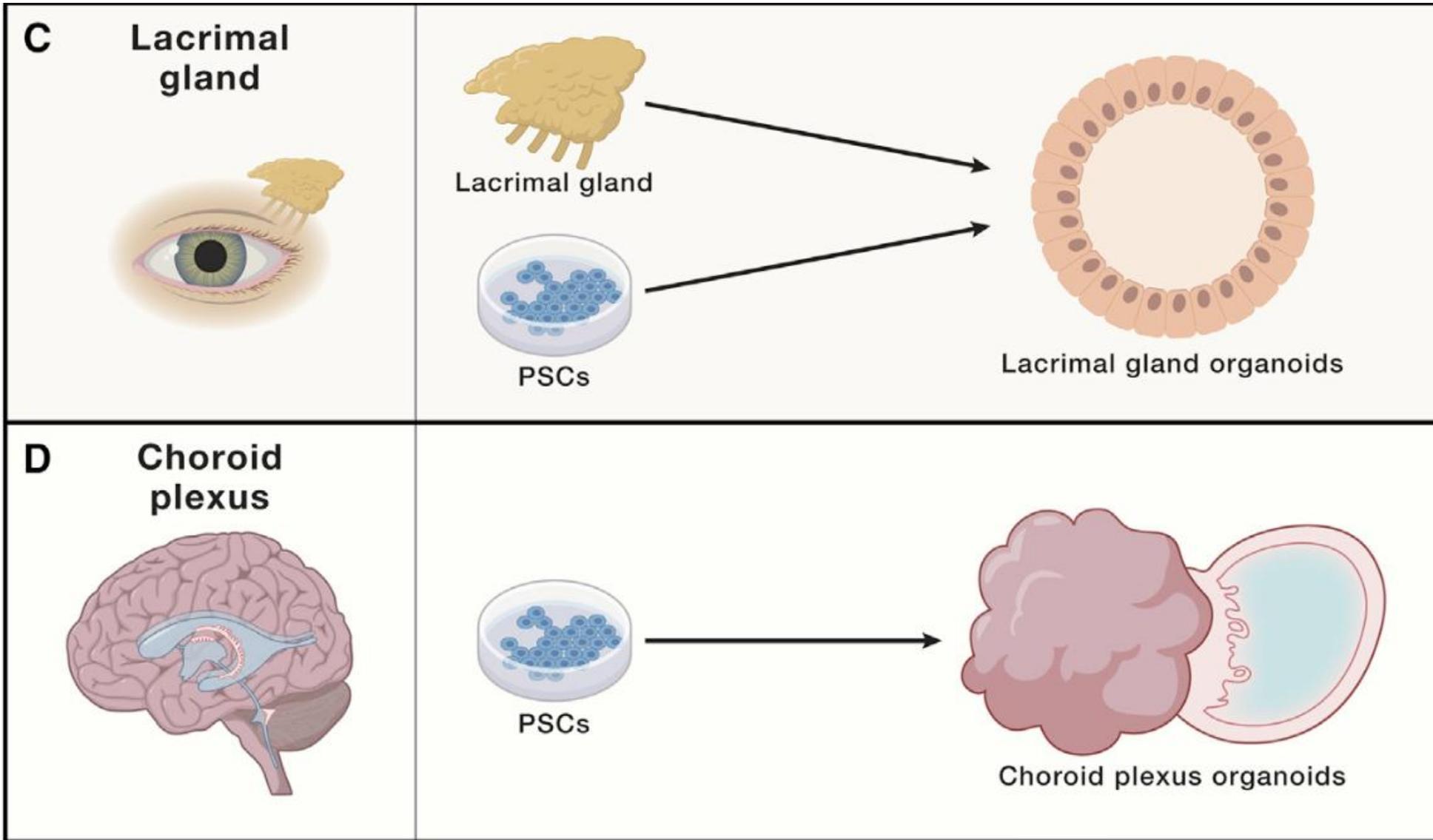


# Summary of generated human organoid disease models

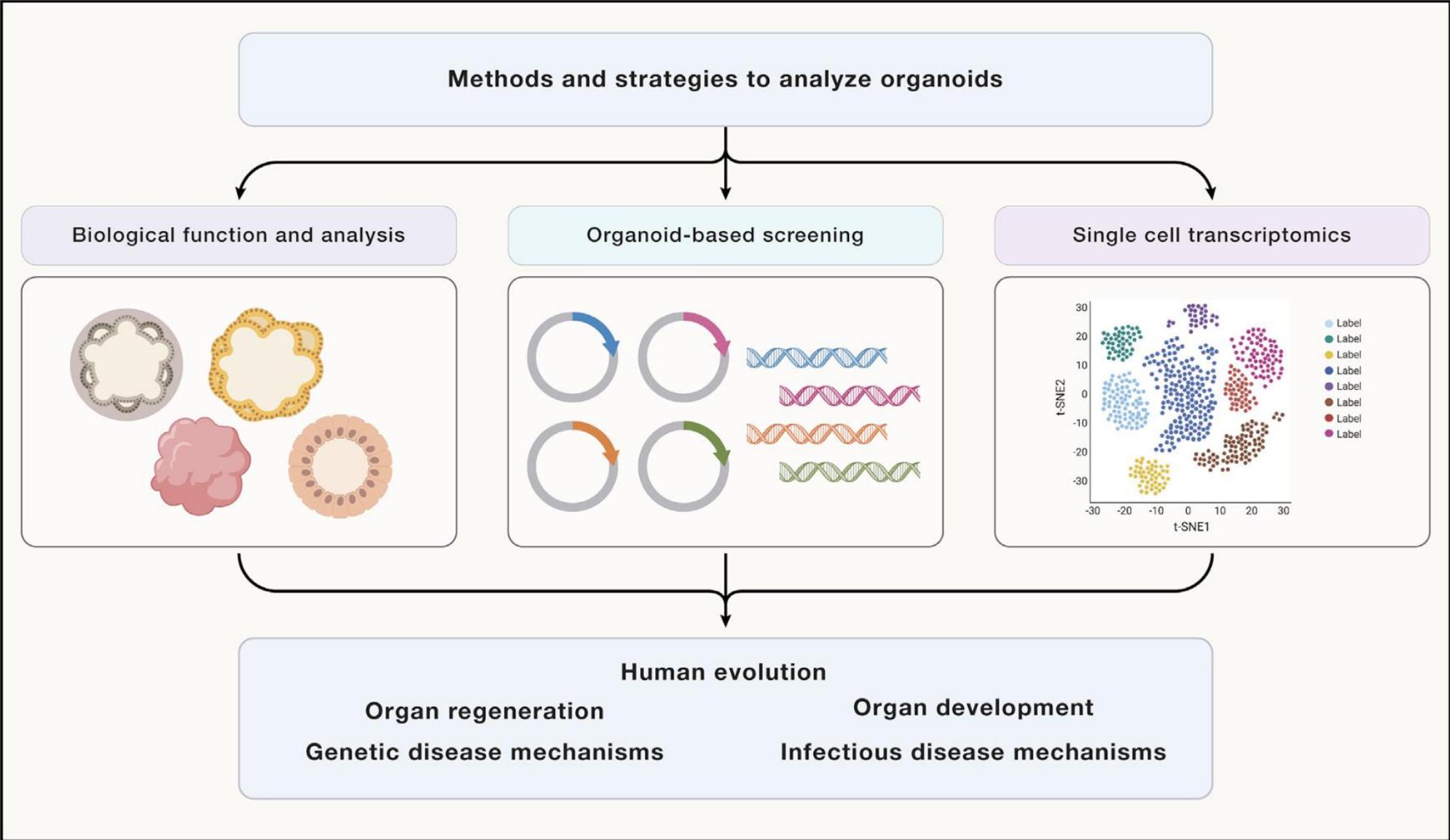


# Examples of recently developed organoid models

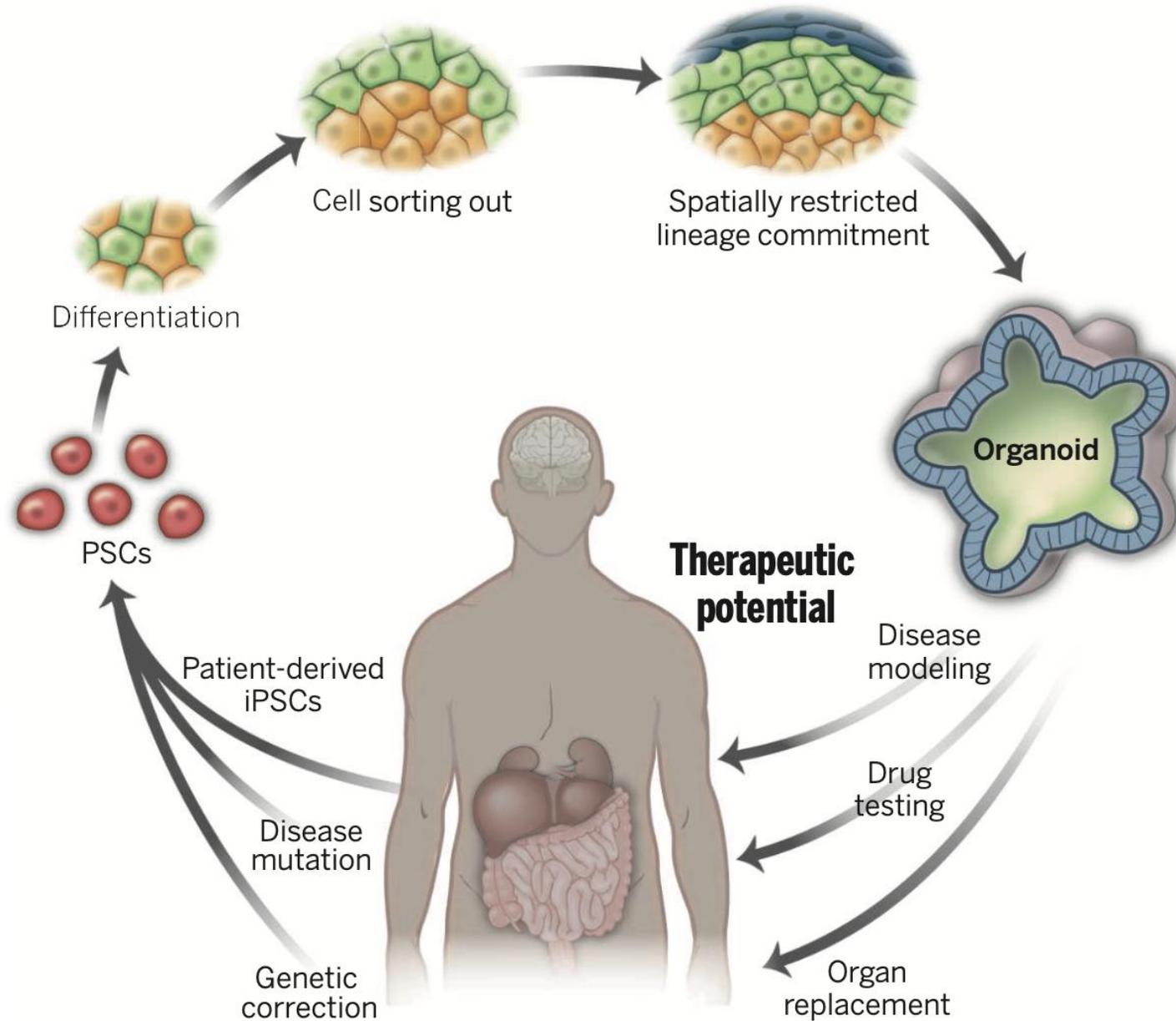




# Methods and strategies to analyze organoids

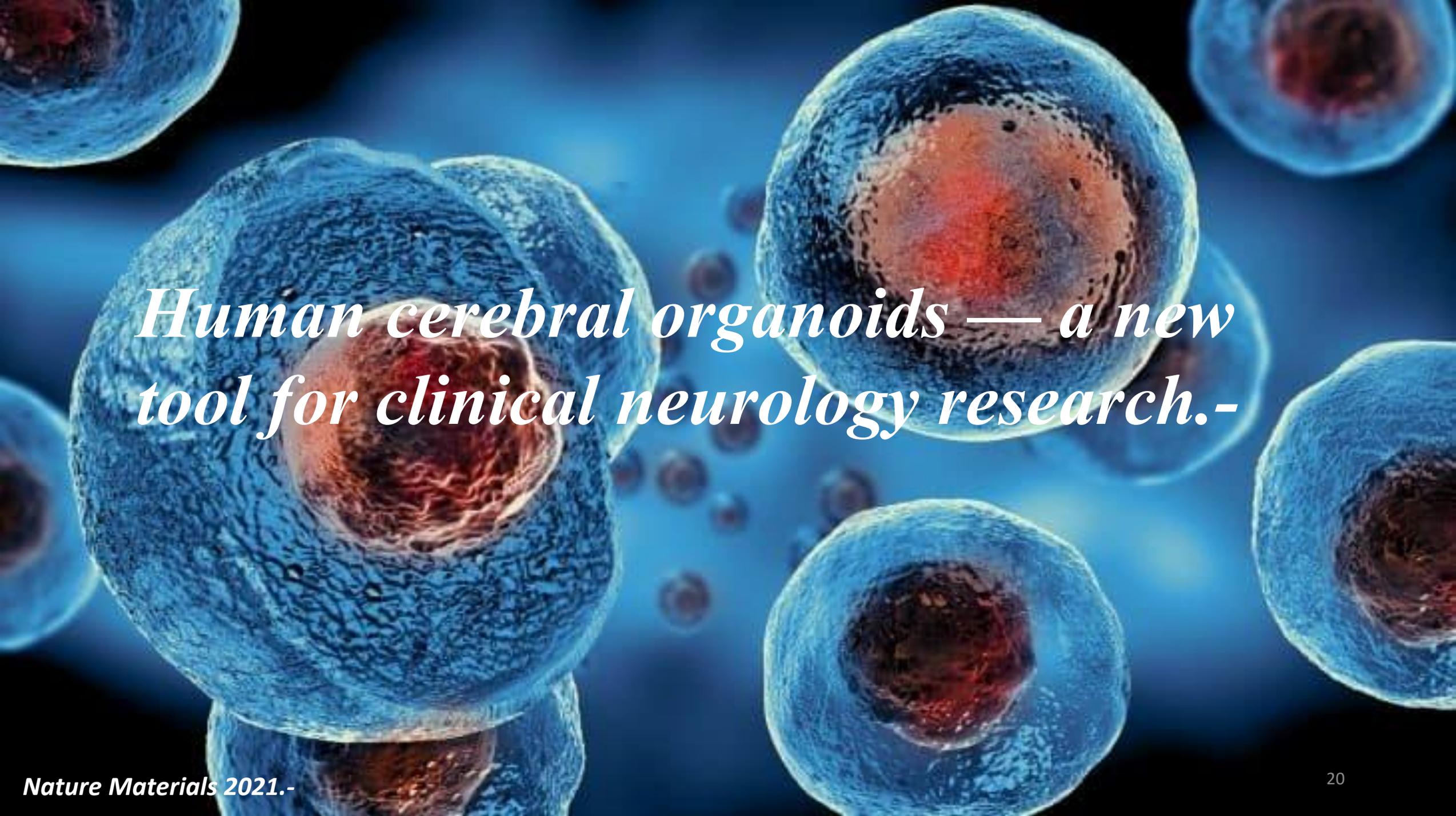


# Organoid generation and therapeutic potential.



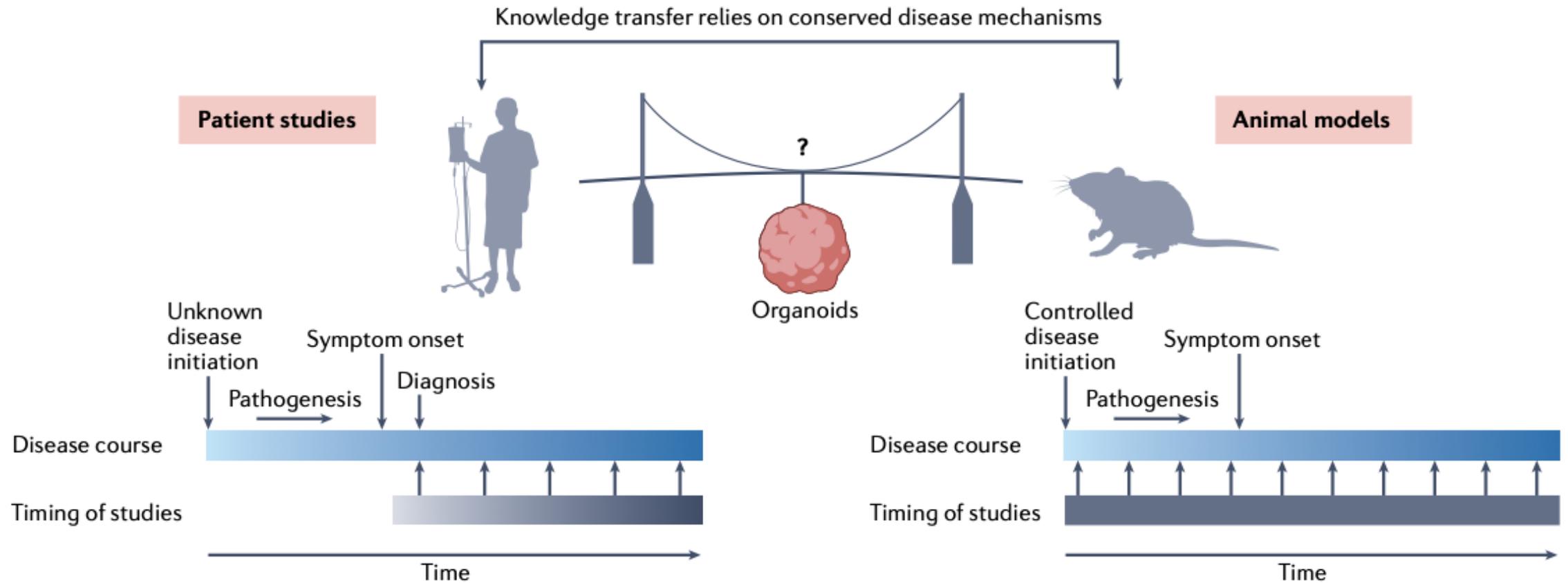


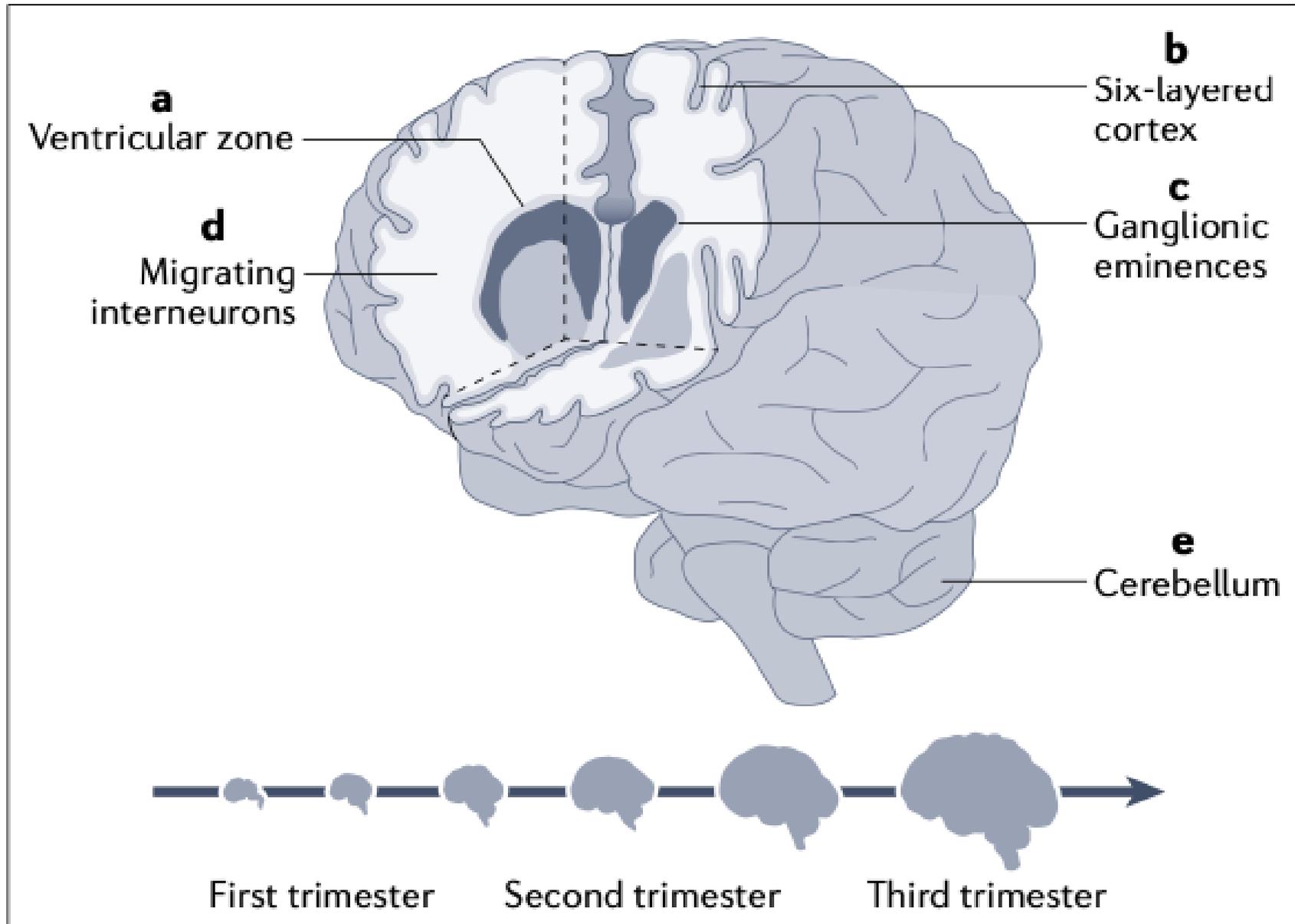
***Organogenesis in a dish:  
Modeling development and  
disease using organoid  
technologies .-***



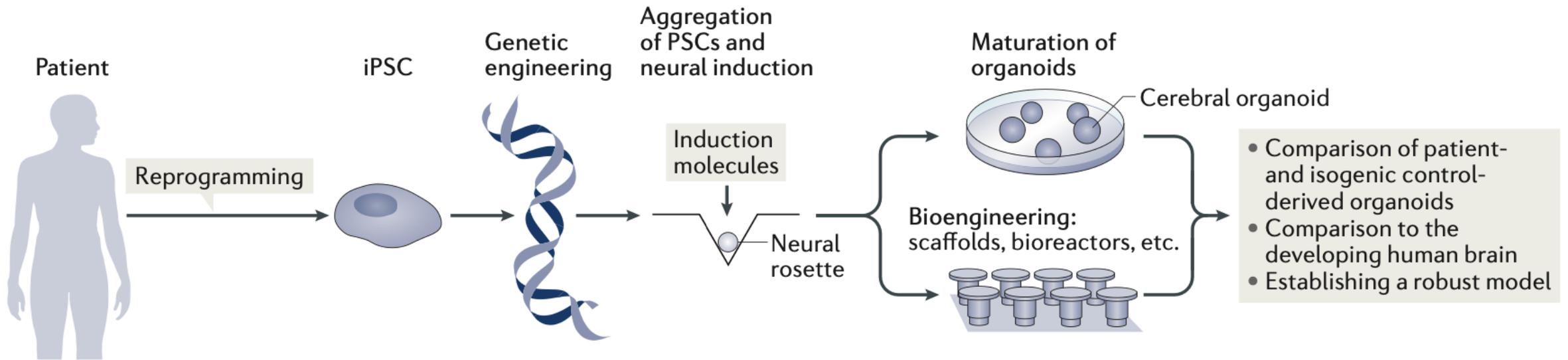
*Human cerebral organoids — a new tool for clinical neurology research.-*

# Organoids can bridge patient and animal studies to advance our understanding of neurological disease.

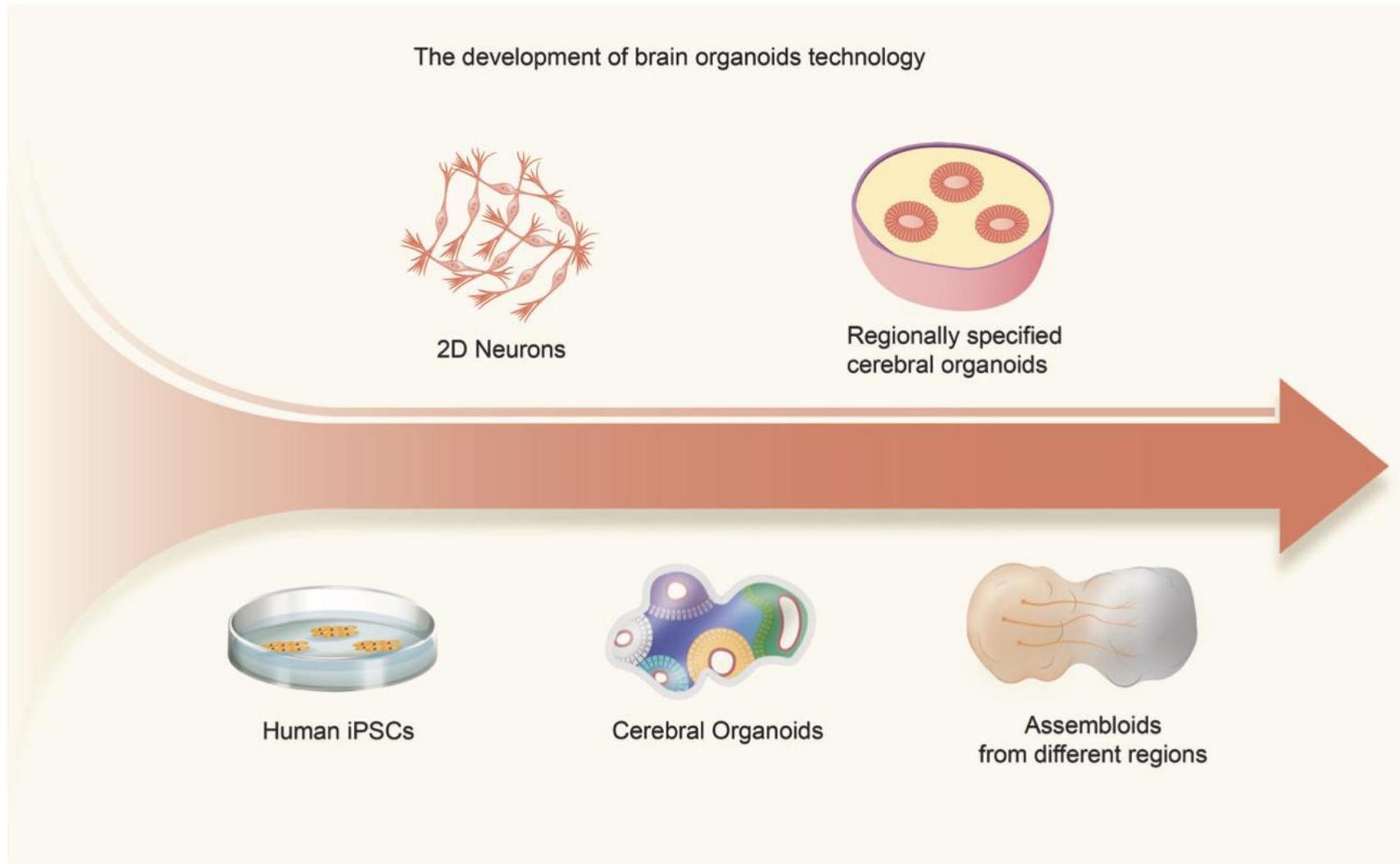




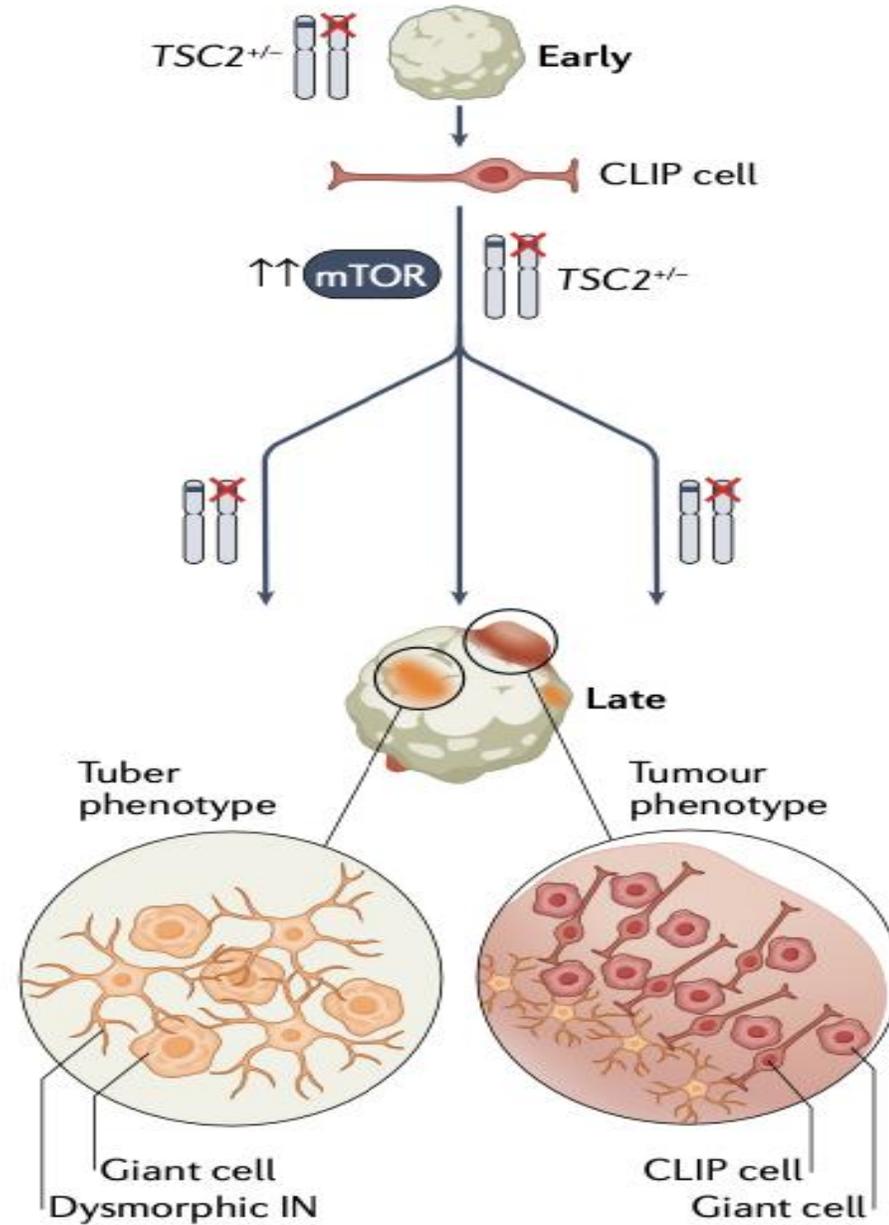
# Generation and characterization of cerebral organoids

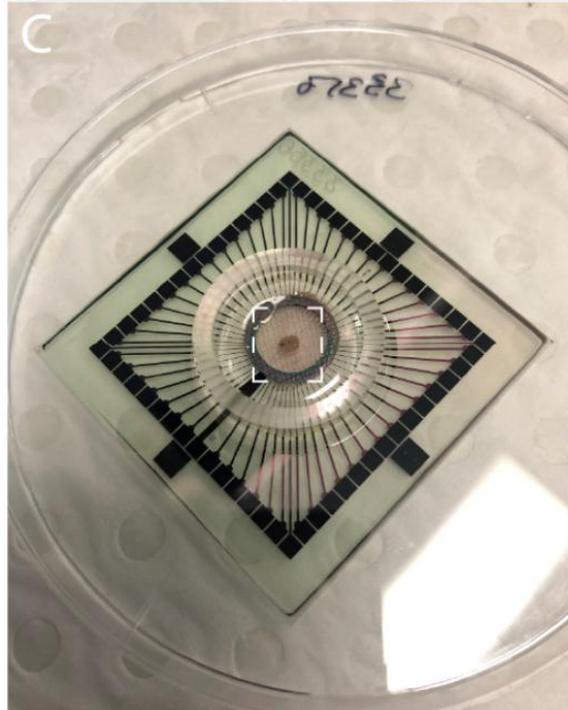
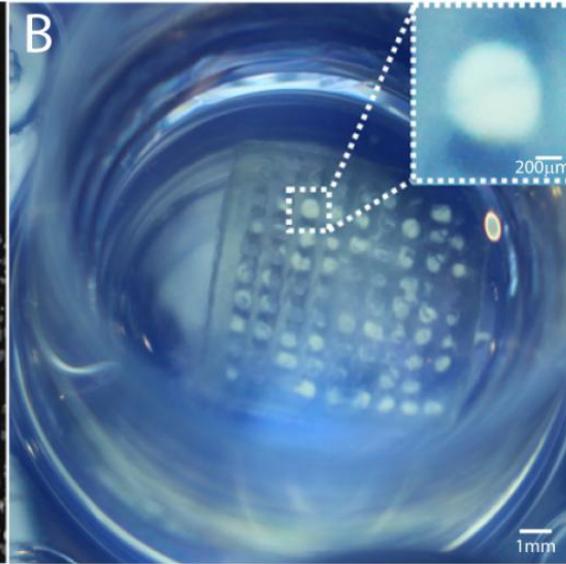
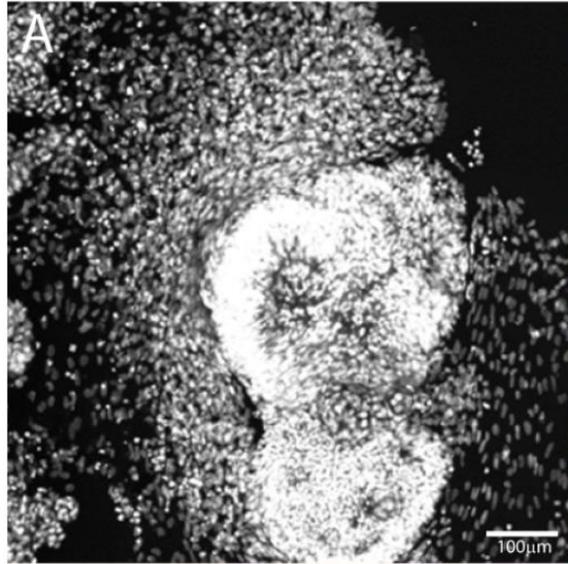


# Graphical summary of major milestones in the development of brain organoid technologies.

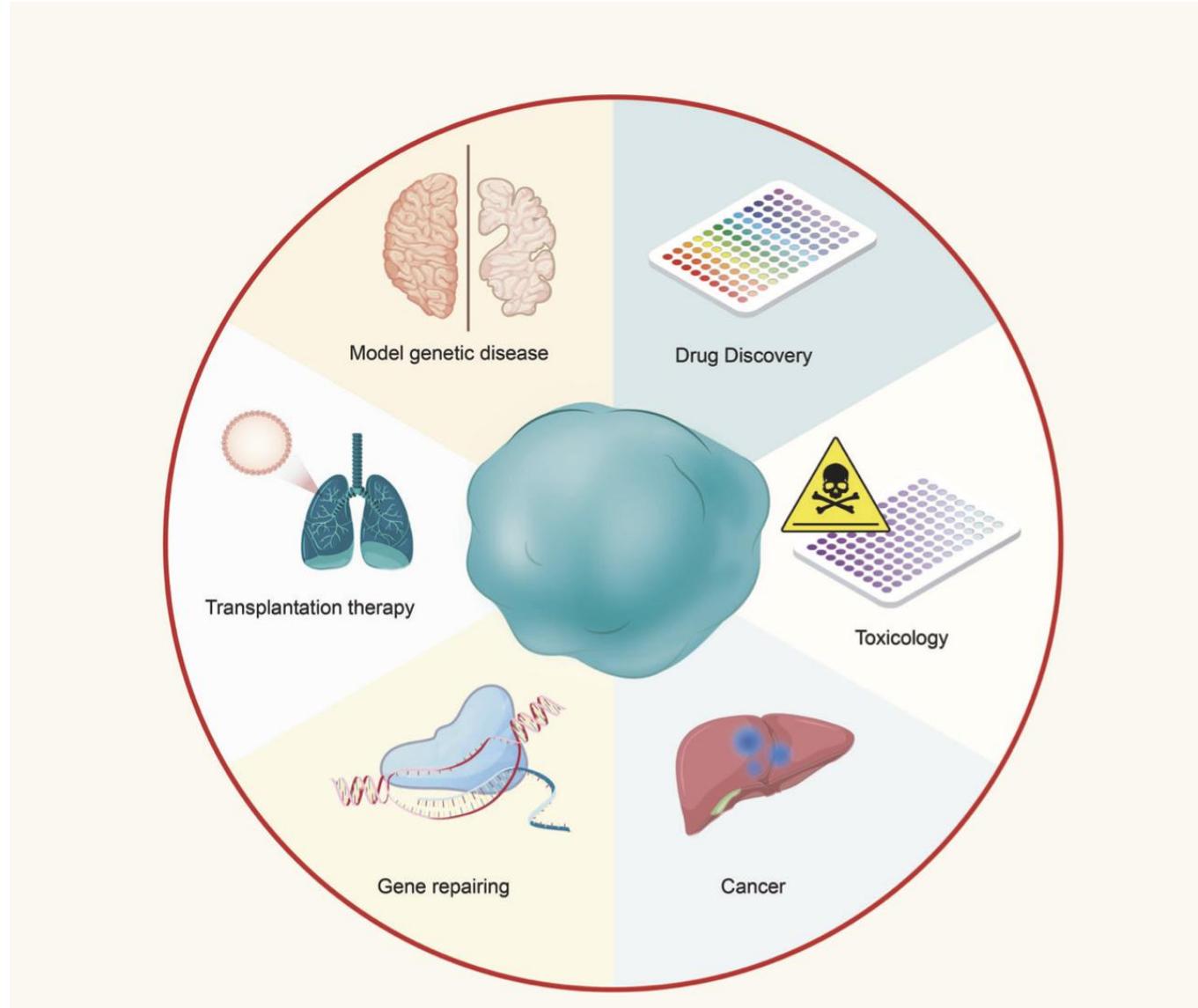


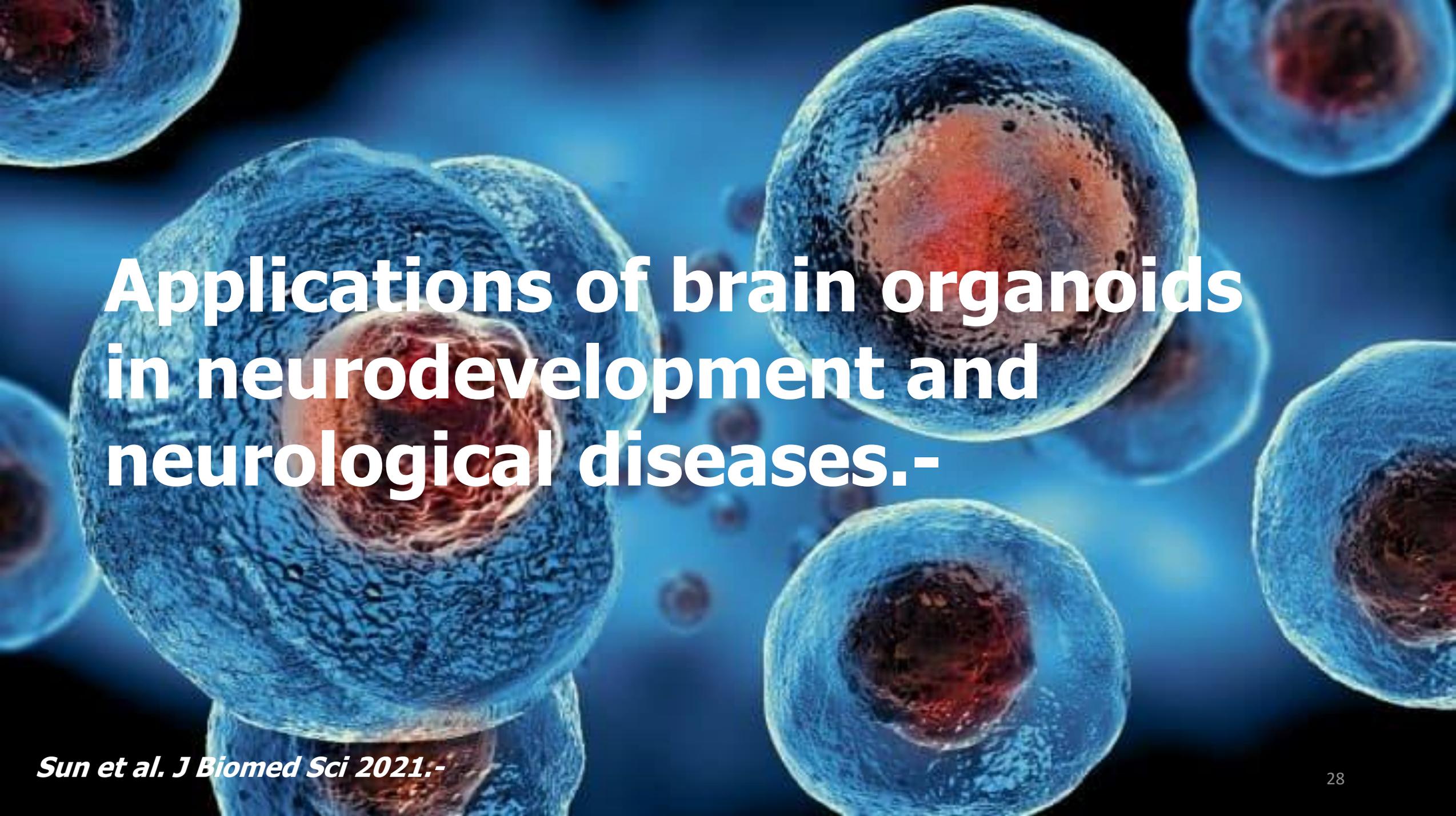
**f Tuberous sclerosis complex**





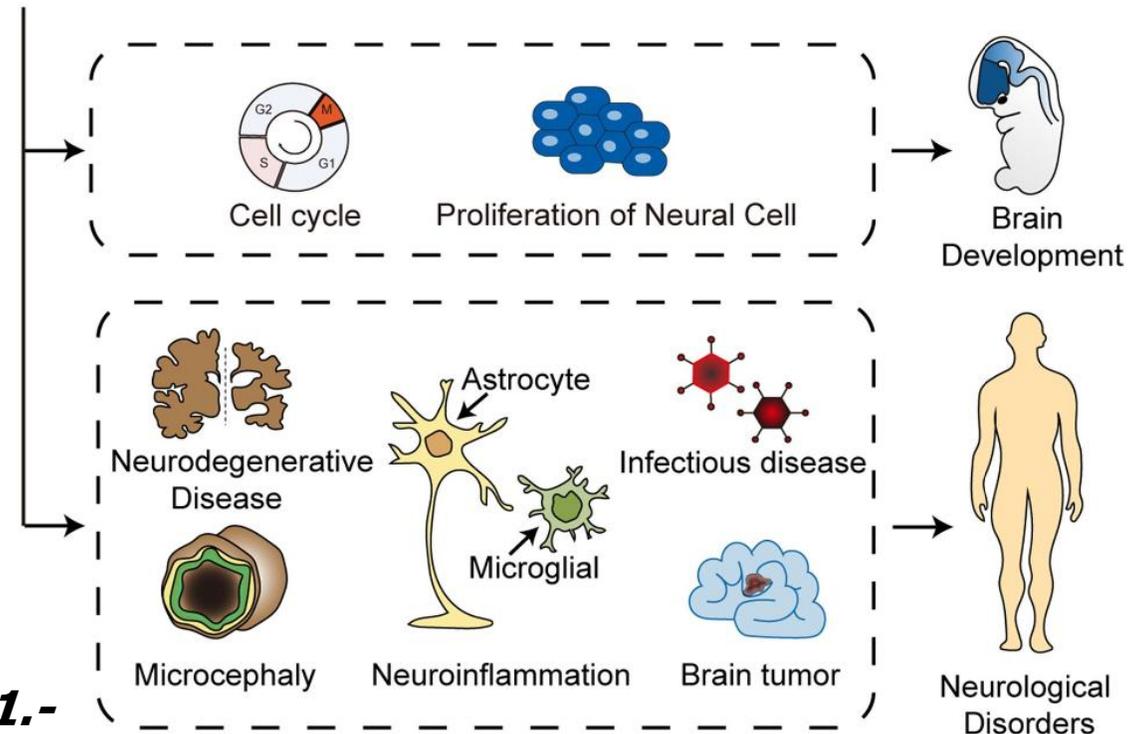
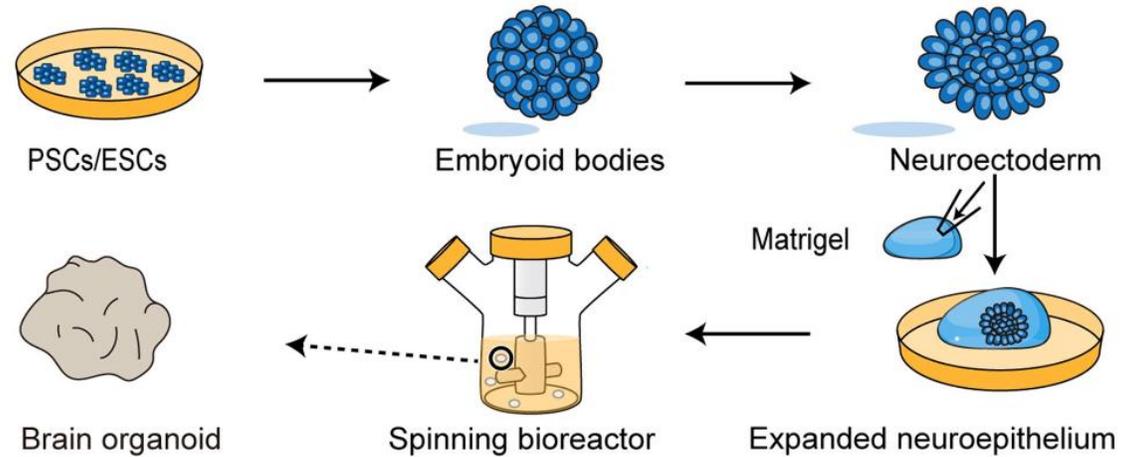
# Various applications of organoid technology.



The background of the slide is a microscopic image of several brain organoids. These are spherical, three-dimensional clusters of cells, appearing as small, textured spheres with a reddish-brown core and a blue outer layer. They are scattered across the frame, with some in sharp focus and others blurred in the background.

# Applications of brain organoids in neurodevelopment and neurological diseases.-

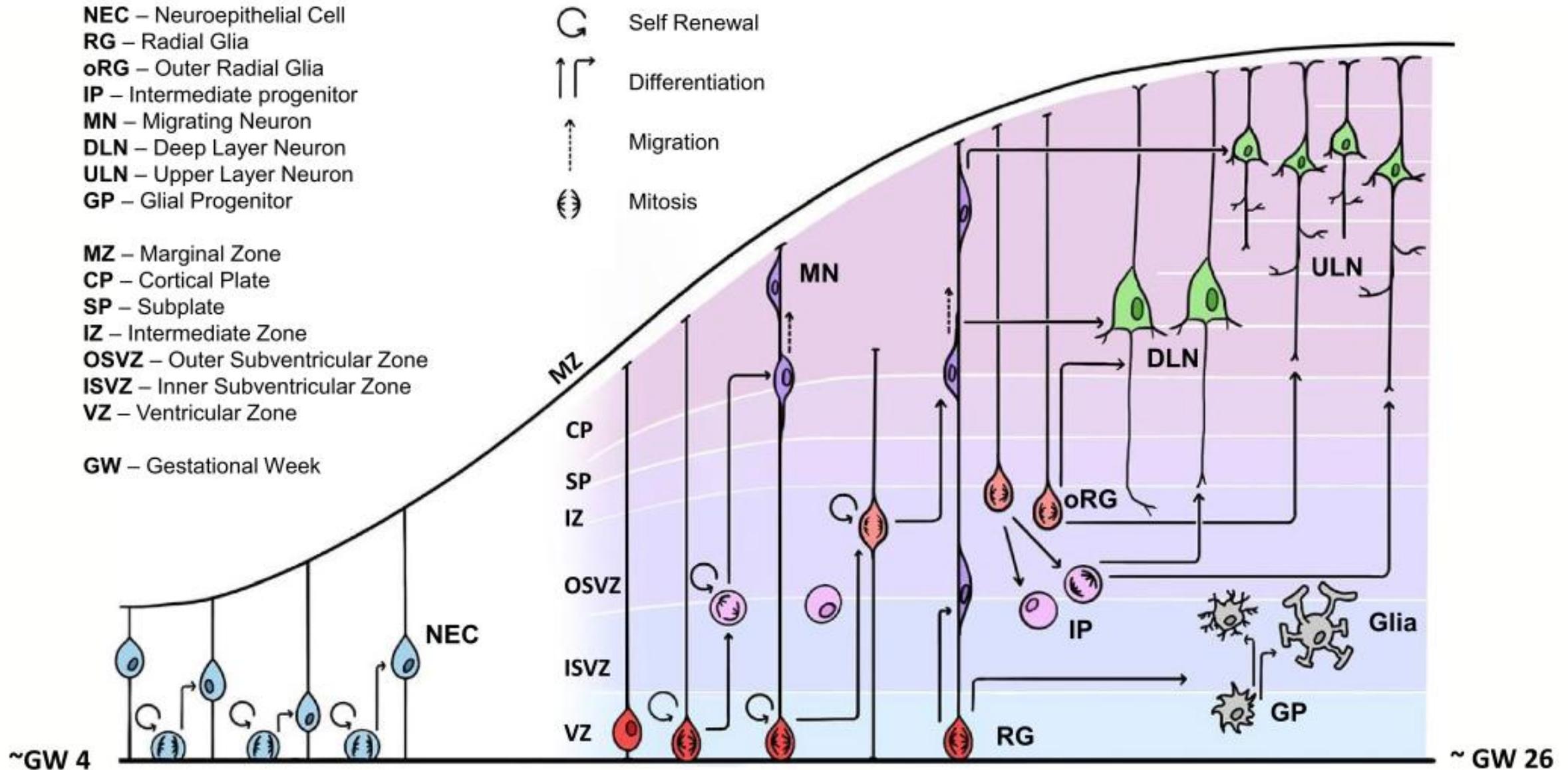
# Schematic of the generation and applications of brain organoids.



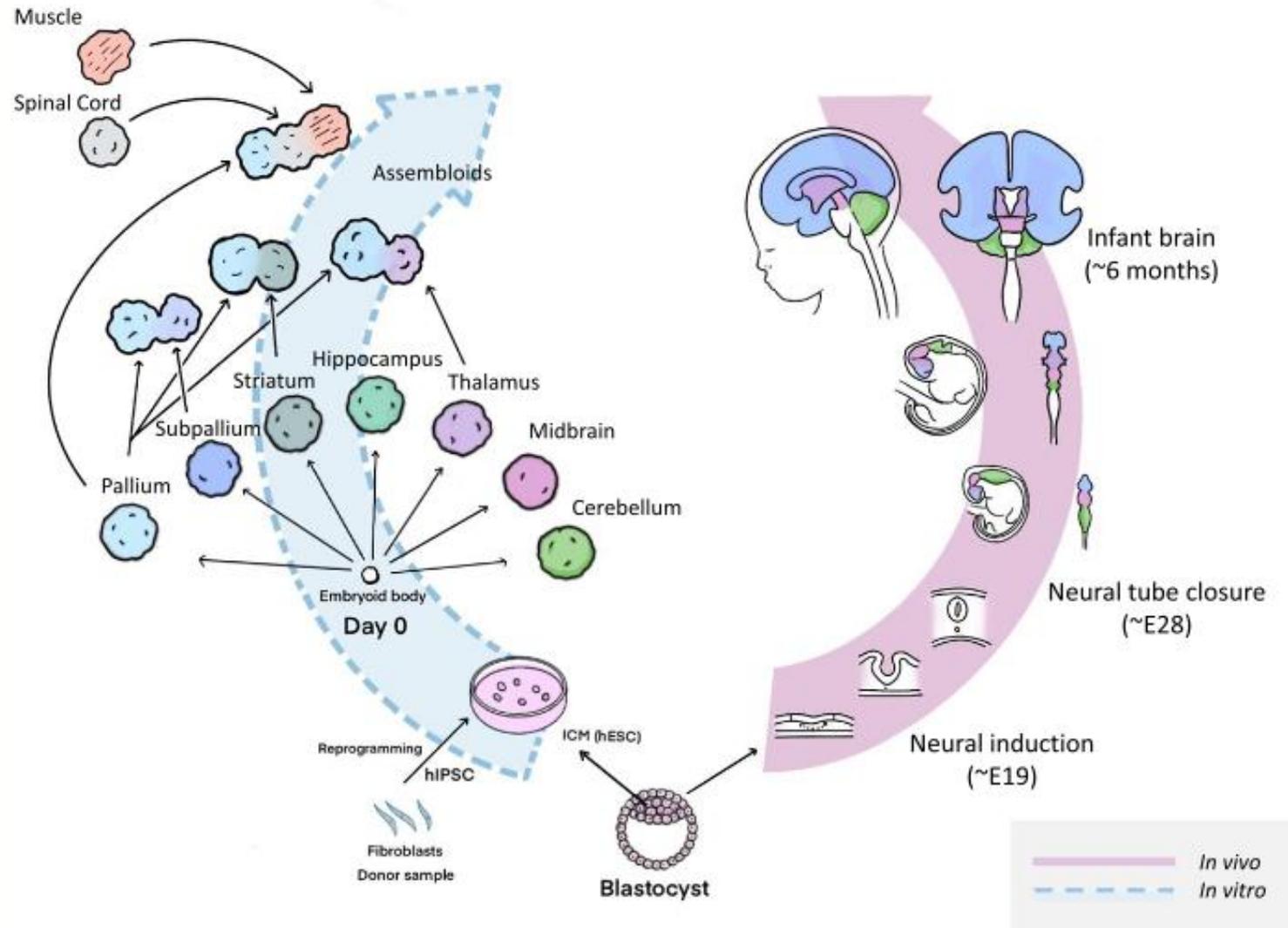


***Using organoids to study human brain development and evolution.-***

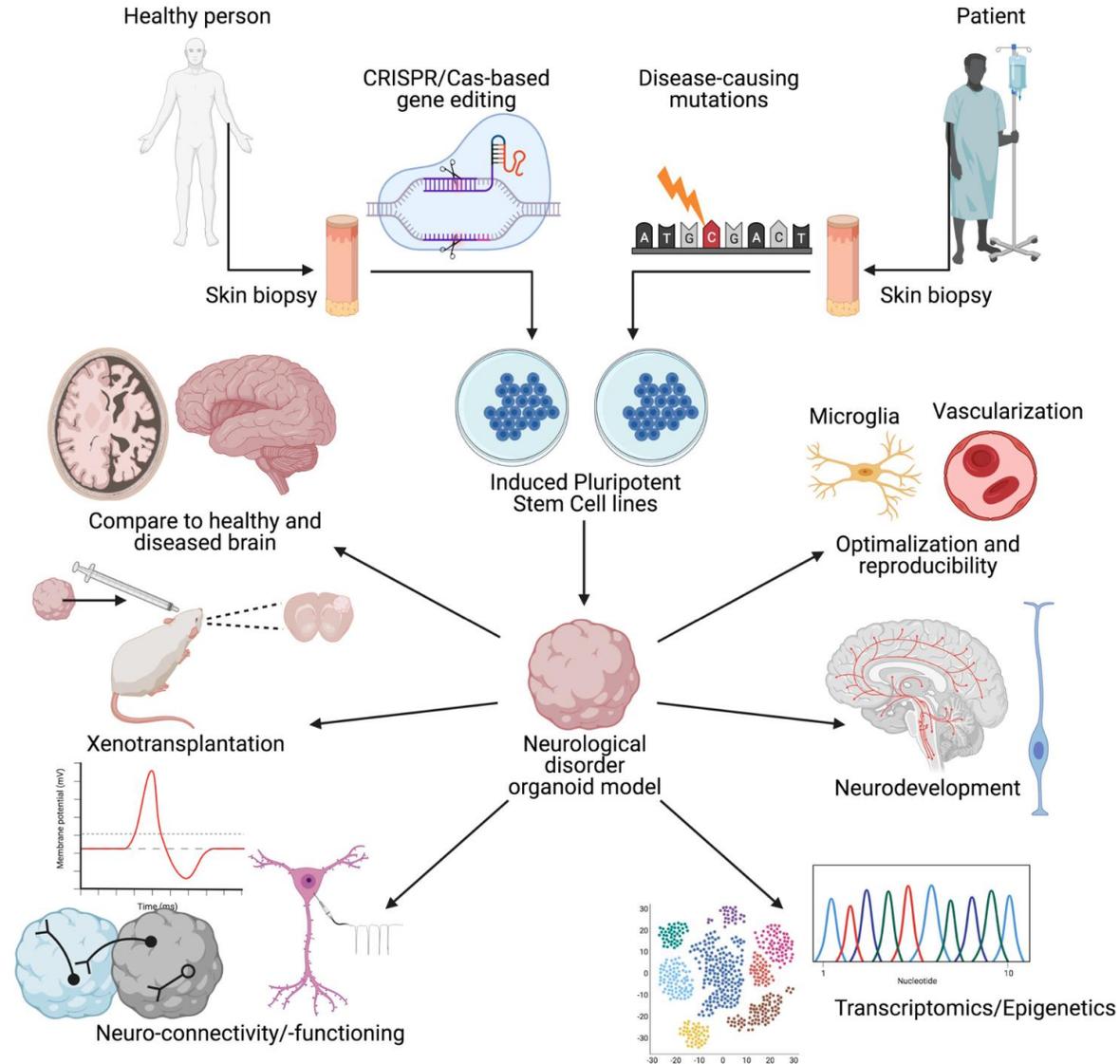
# Cell types involved in corticogenesis.



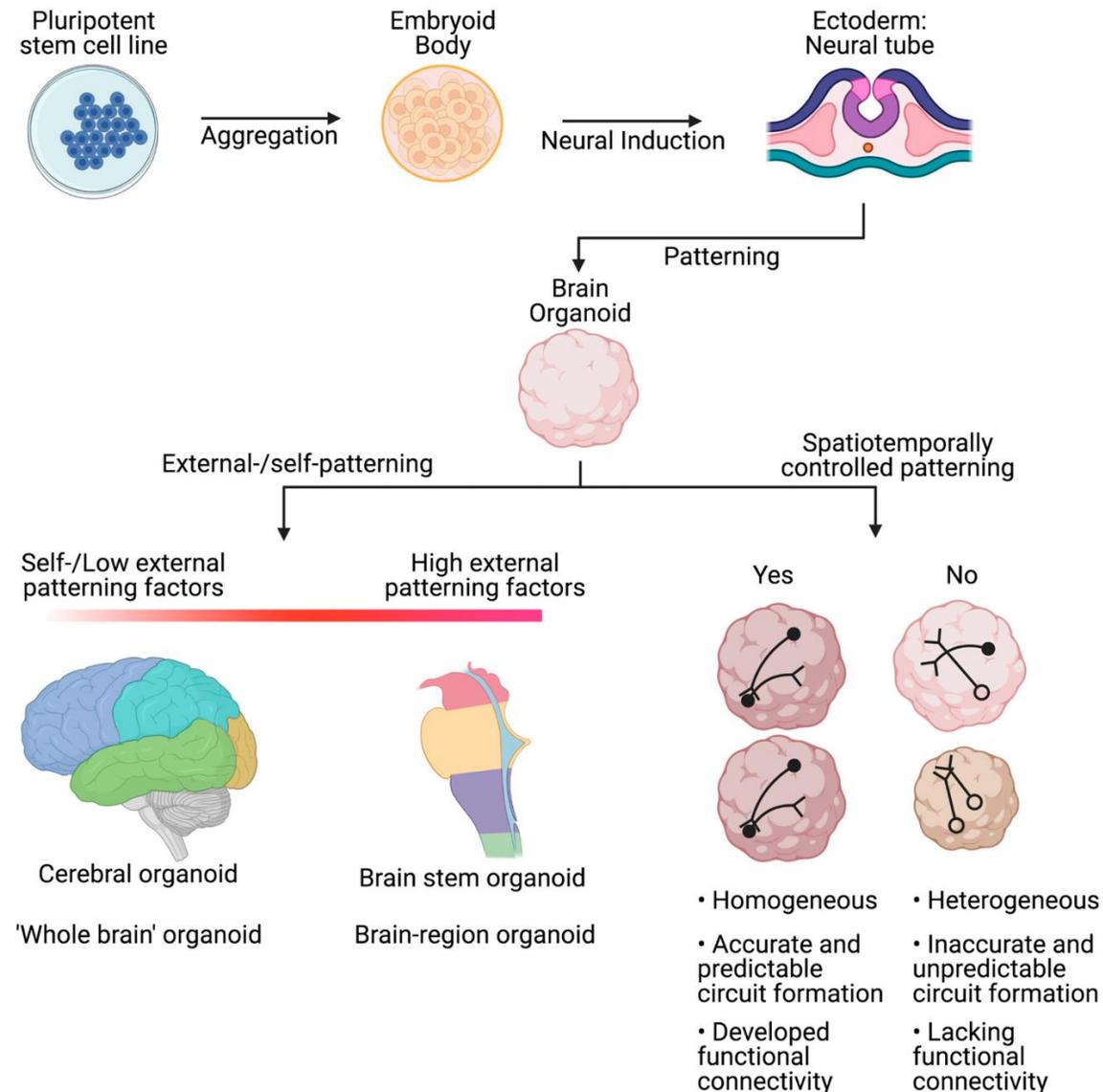
# Generation of region-specific brain organoids to model regional interactions of the human brain.



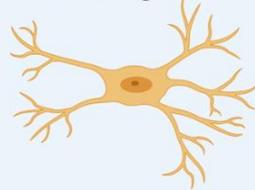
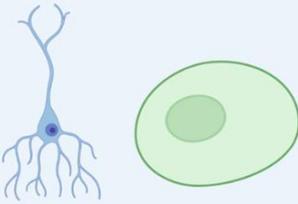
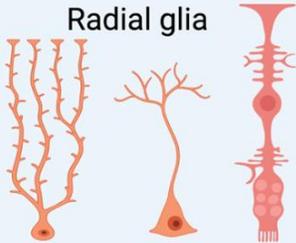
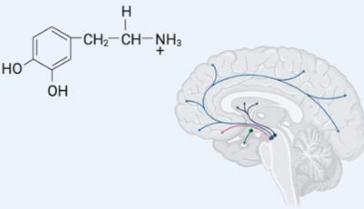
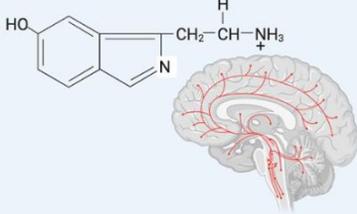
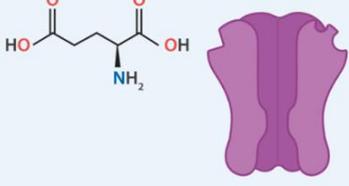
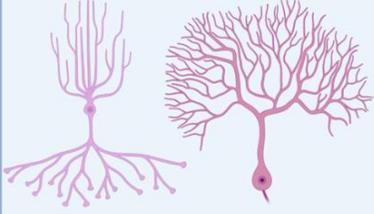
# A schematic overview of the creation of and uses for organoid models of neurological disorders.



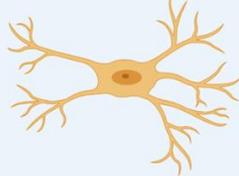
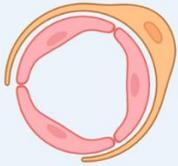
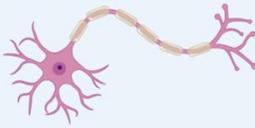
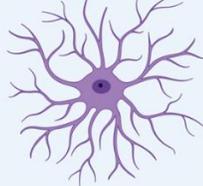
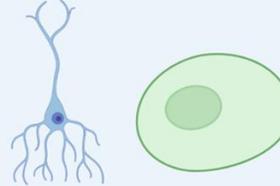
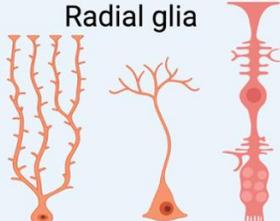
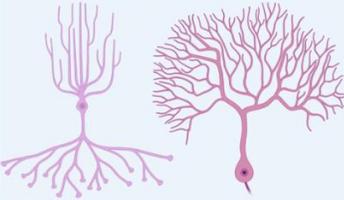
# Schematic overview of the differentiation progress of organoids with patterning factors.



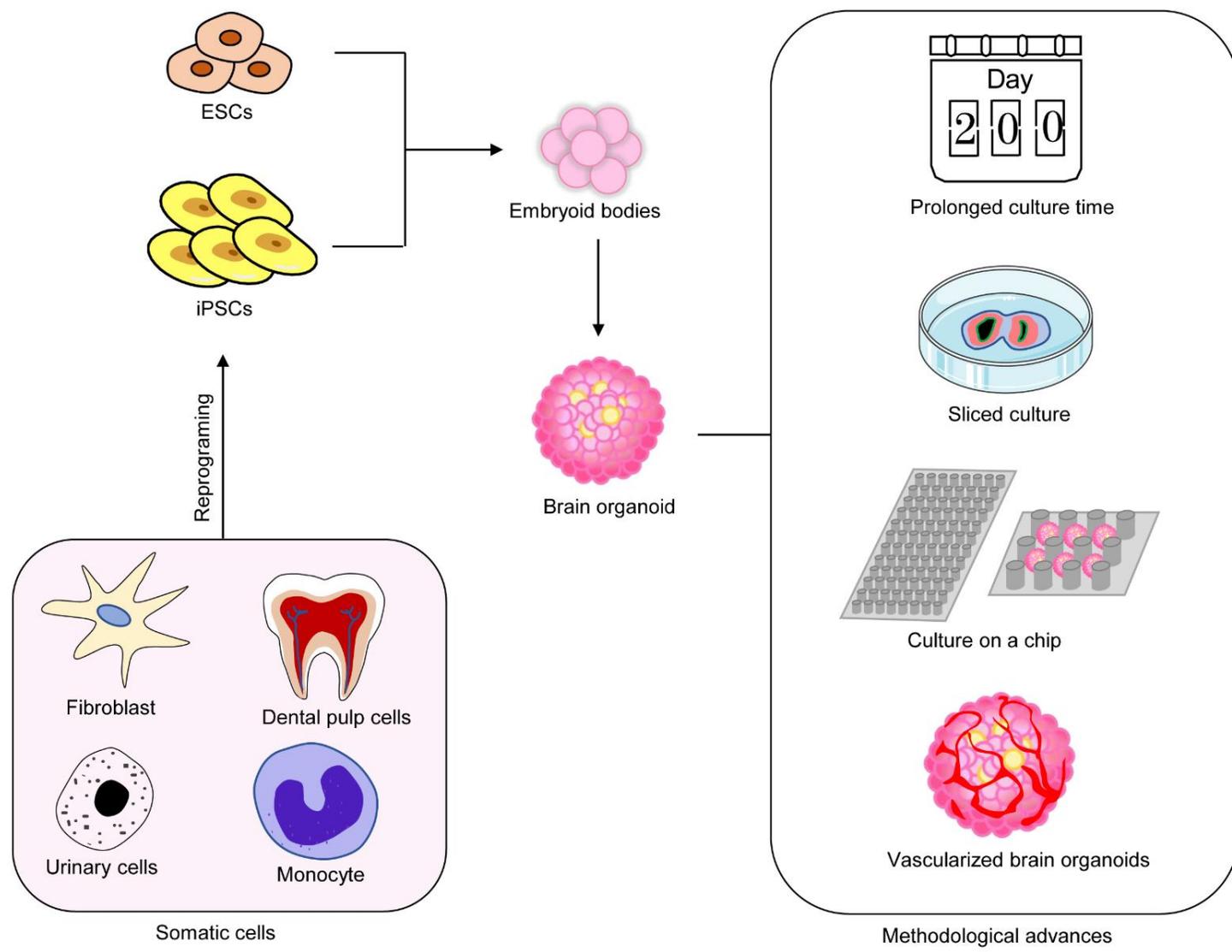
# Non-exhaustive schematic overview of the different types of cells found in different organoid models.

Cell types found in brain organoid models		
<p>Microglia</p> 	<p>Pericytes and Vasculature</p> 	<p>Motor neurons</p> 
<p>Astrocytes</p> 	<p>Neural stem cells (NSCs)</p> 	<p>Sensory neurons</p> 
<p>Oligodendrocytes</p> 	<p>Radial glia</p> 	<p>Dopaminergic neurons</p>  <chem>Nc1ccc(O)c(O)c1CCN</chem>
<p>Serotonergic neurons</p>  <chem>Nc1ccc2c(c1)c(O)cnc2CCN</chem>	<p>Glutamatergic neurons</p>  <chem>NC(CC(=O)O)CC(=O)O</chem>	<p>GABA neurons</p> 

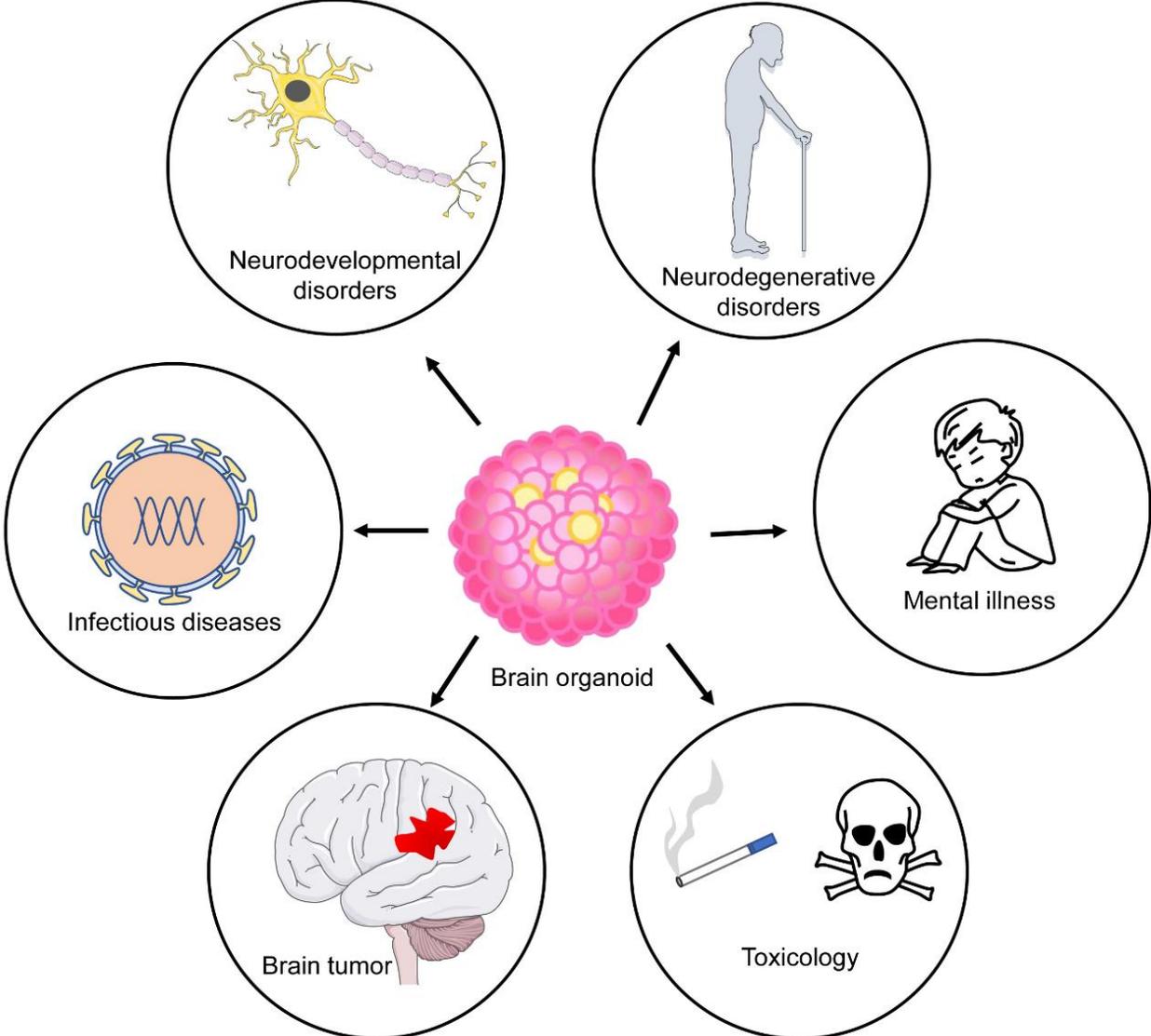
# The Application of Brain Organoids: From Neuronal Development to Neurological Diseases

Cell types found in brain organoid models		
<p>Microglia</p> 	<p>Pericytes and Vasculature</p> 	<p>Motor neurons</p> 
<p>Astrocytes</p> 	<p>Neural stem cells (NSCs)</p> 	<p>Sensory neurons</p> 
<p>Oligodendrocytes</p> 	<p>Radial glia</p> 	<p>Dopaminergic neurons</p> <chem>Oc1ccc(O)cc1CC(N)=[NH3+]</chem> 
<p>Serotonergic neurons</p> <chem>Oc1ccc2c(c1)c(c[nH]2)CC(N)=[NH3+]</chem> 	<p>Glutamatergic neurons</p> <chem>NC(CCC(=O)O)C(=O)O</chem> 	<p>GABA neurons</p> 

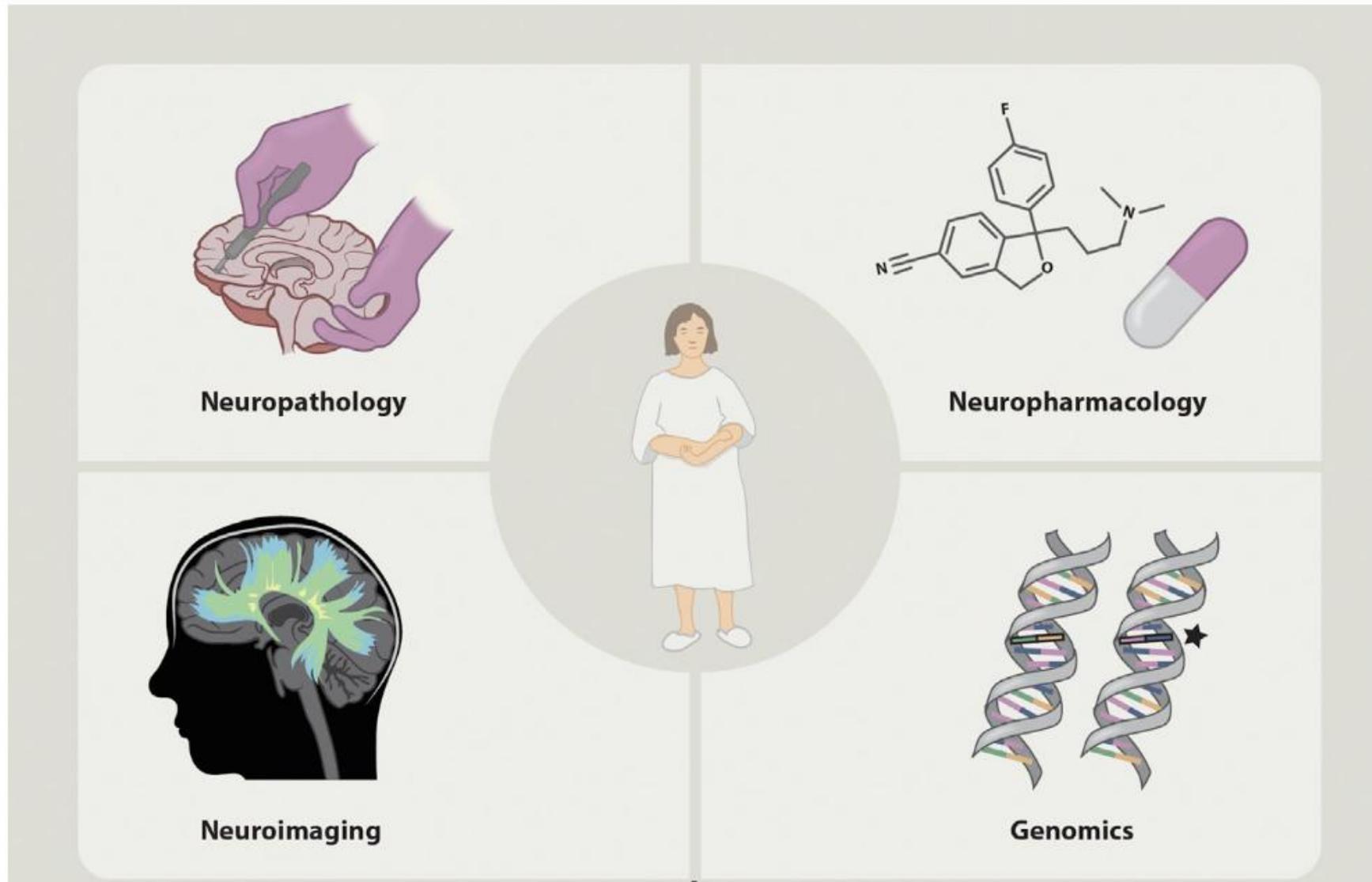
# Recent methodological advances in brain organoids. Multiple methods have been used to improve the maturation of brain organoids.

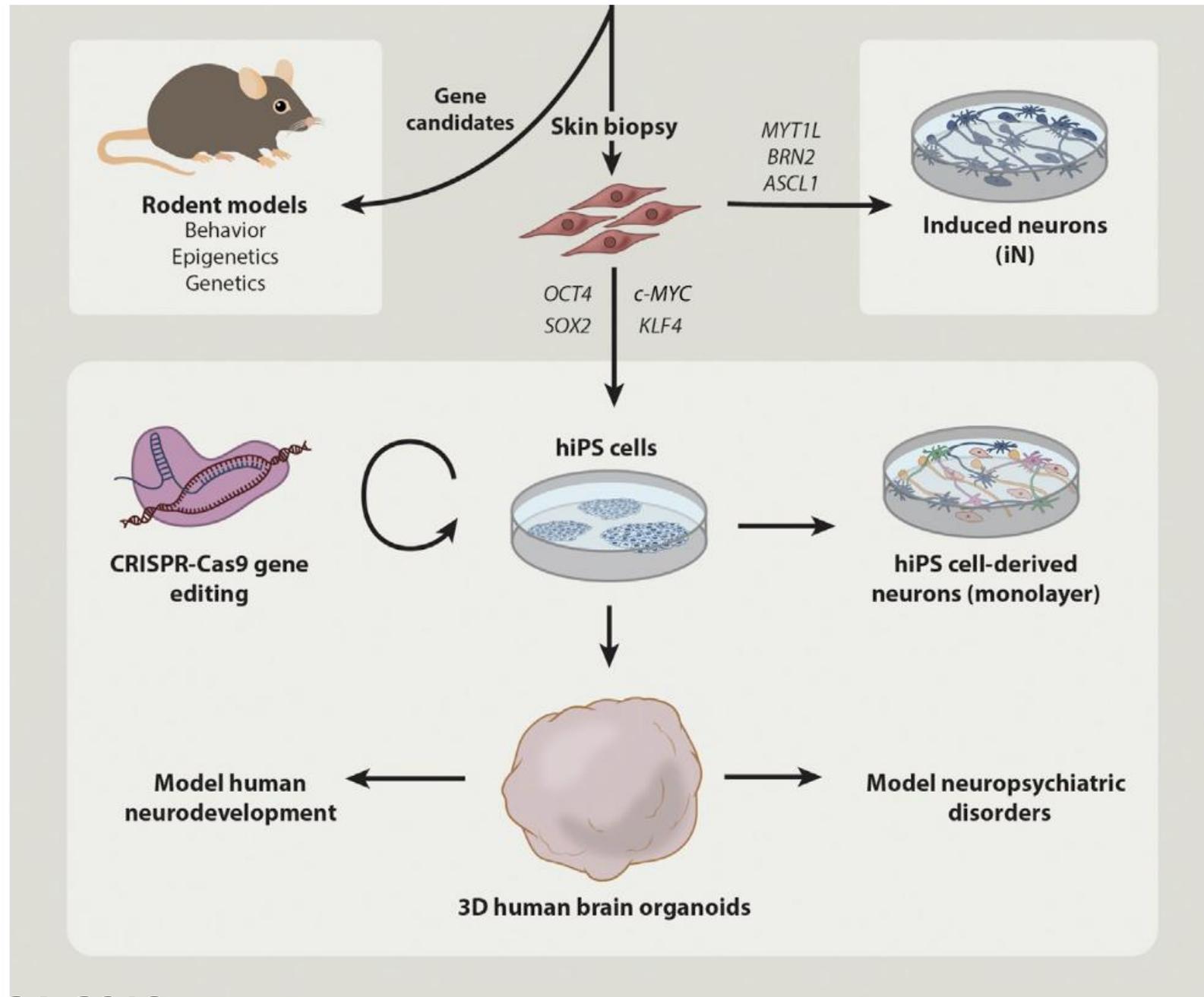


# Application of brain organoids as disease models. Brain organoids have been used to model neurodevelopmental and degenerative diseases.

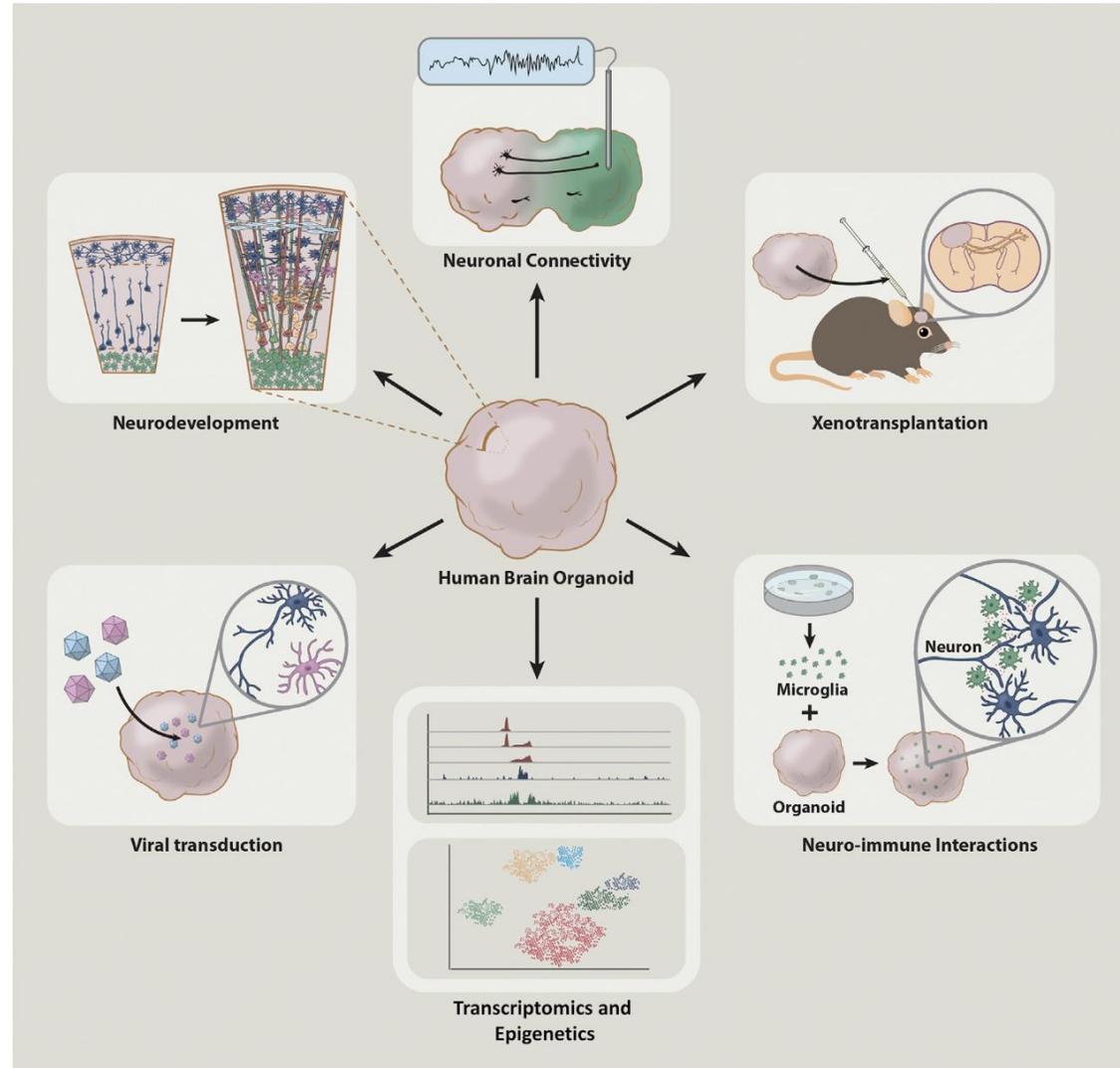


# Investigating Neuropsychiatric Disorders.-

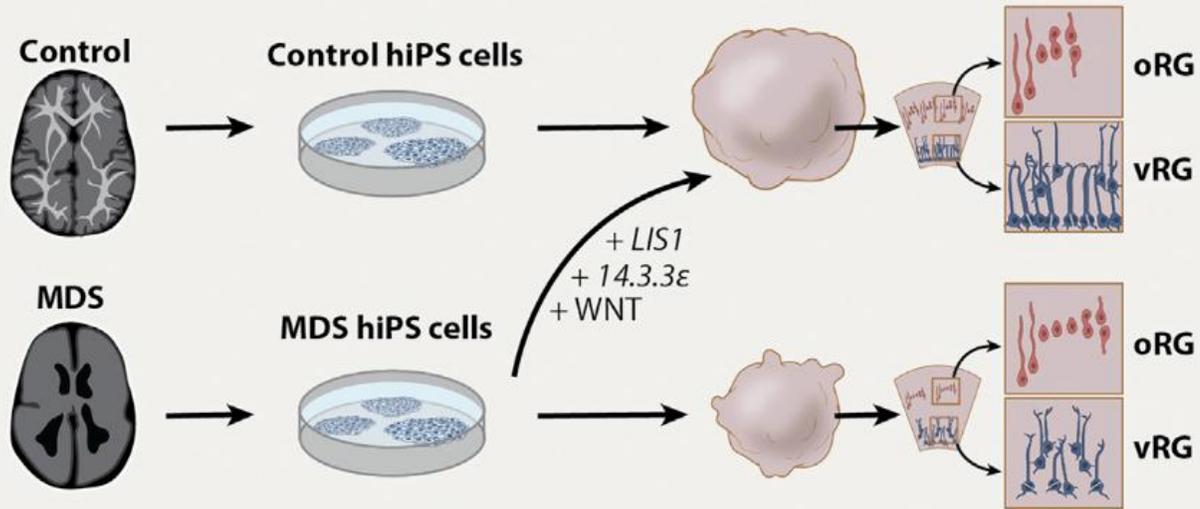




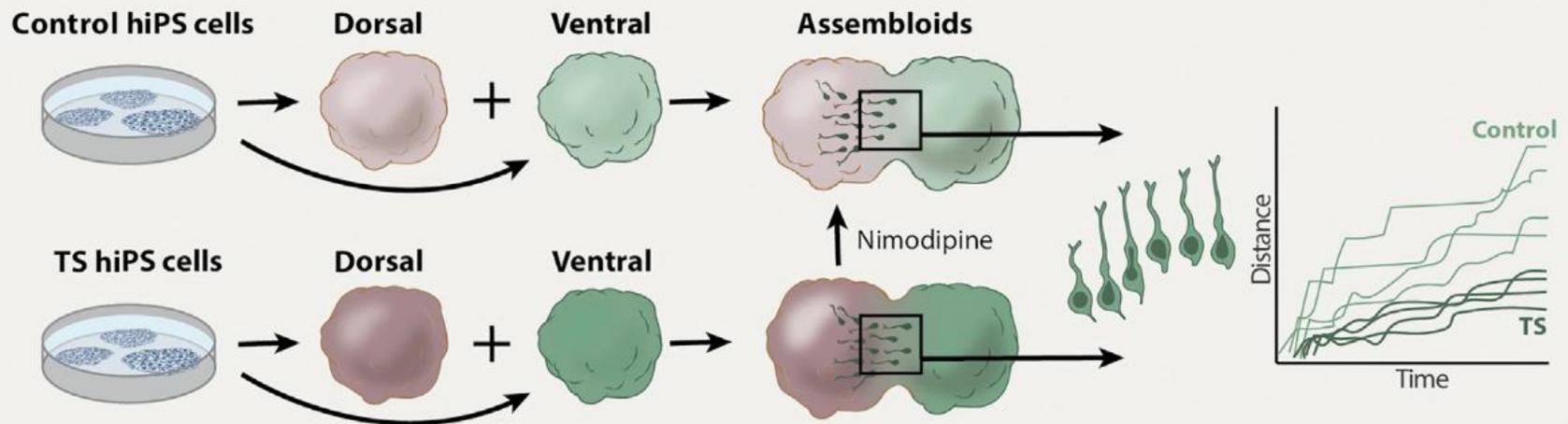
# Human Brain Organoids Are Versatile and Accessible Cellular Models



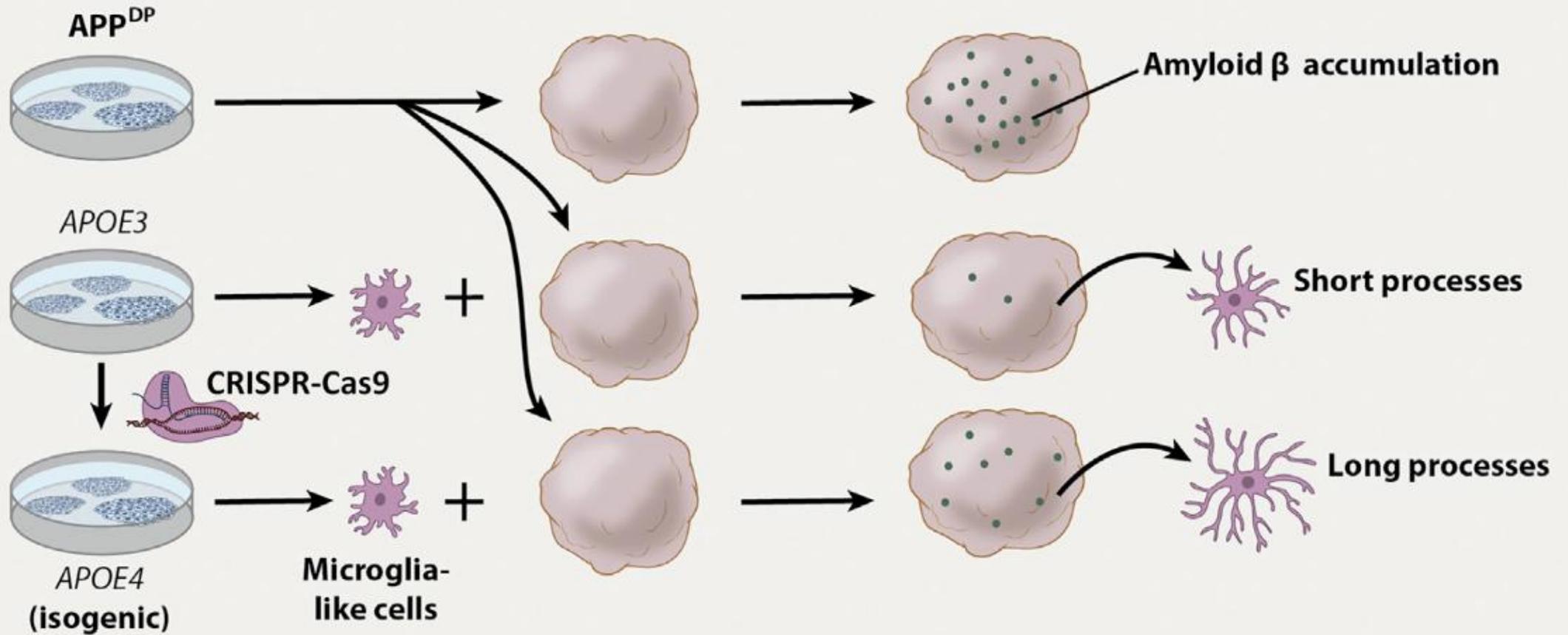
## Miller-Dieker syndrome



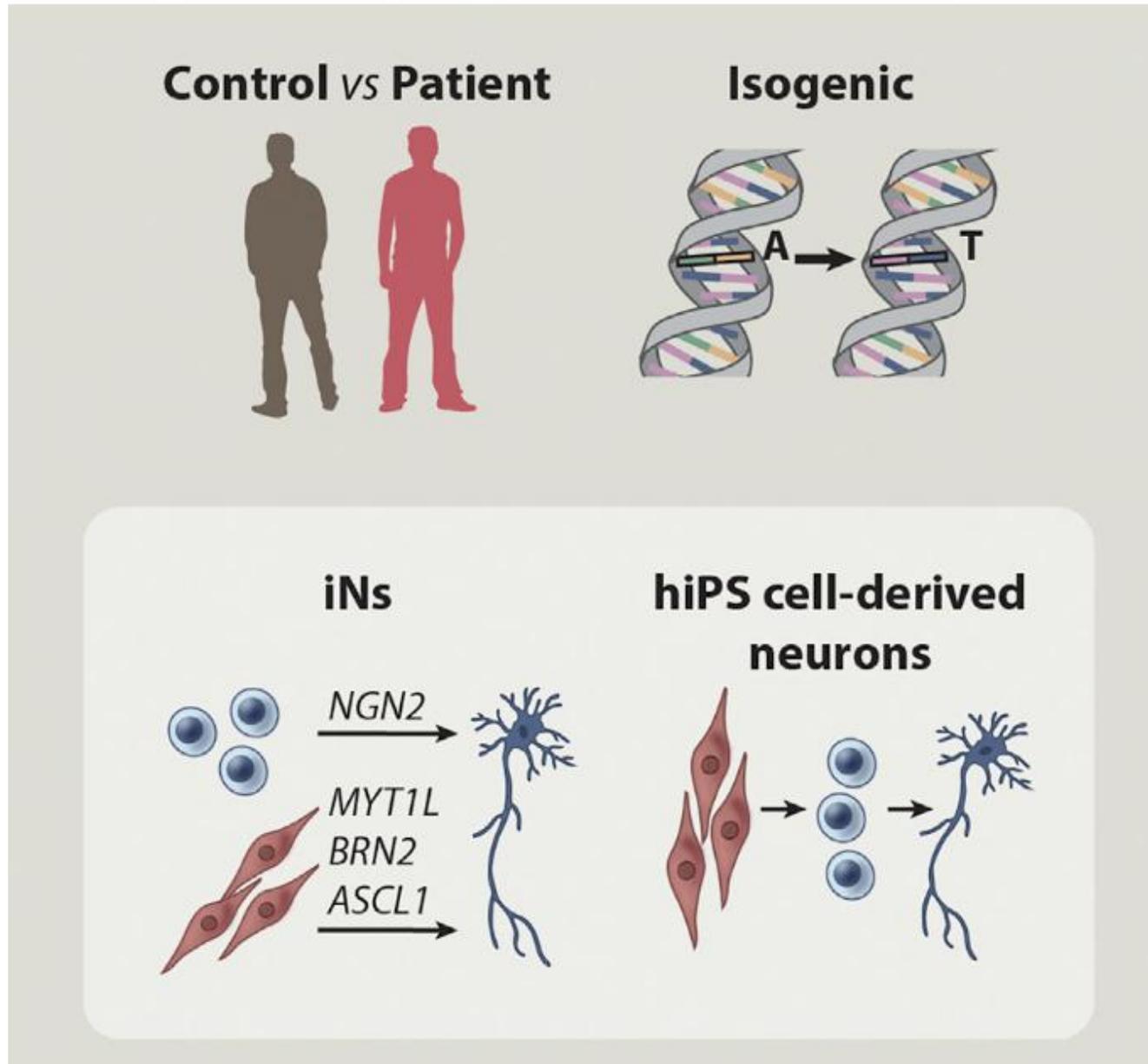
## Timothy syndrome



# Alzheimer's disease



# Considerations in Stem Cell-Based Experimental Design



# Center of organoid systems

## Bausch Lab

*Heinz Nixdorf Endowed Professorship*  
Organoid self-organization & micromechanics



## Schäfer Lab

Immuno-brain organoids for disease modeling and regeneration



## Grünewald Lab

CRISPR gene editing in cardiovascular disease



## Moretti Lab

Human stem cell-derived cardiac organoids

## Wolfrum Lab

Neuroelectronic interfaces, neurotechnology and microfabrication



## Dowbaj Lab

Integrated organoid models in aging and disease



## Schirmer Lab

Microbiome and host-microbe interactions



## Reichert Lab

Patient-derived pancreatic cancer organoids



## Heinz Nixdorf Core Facility

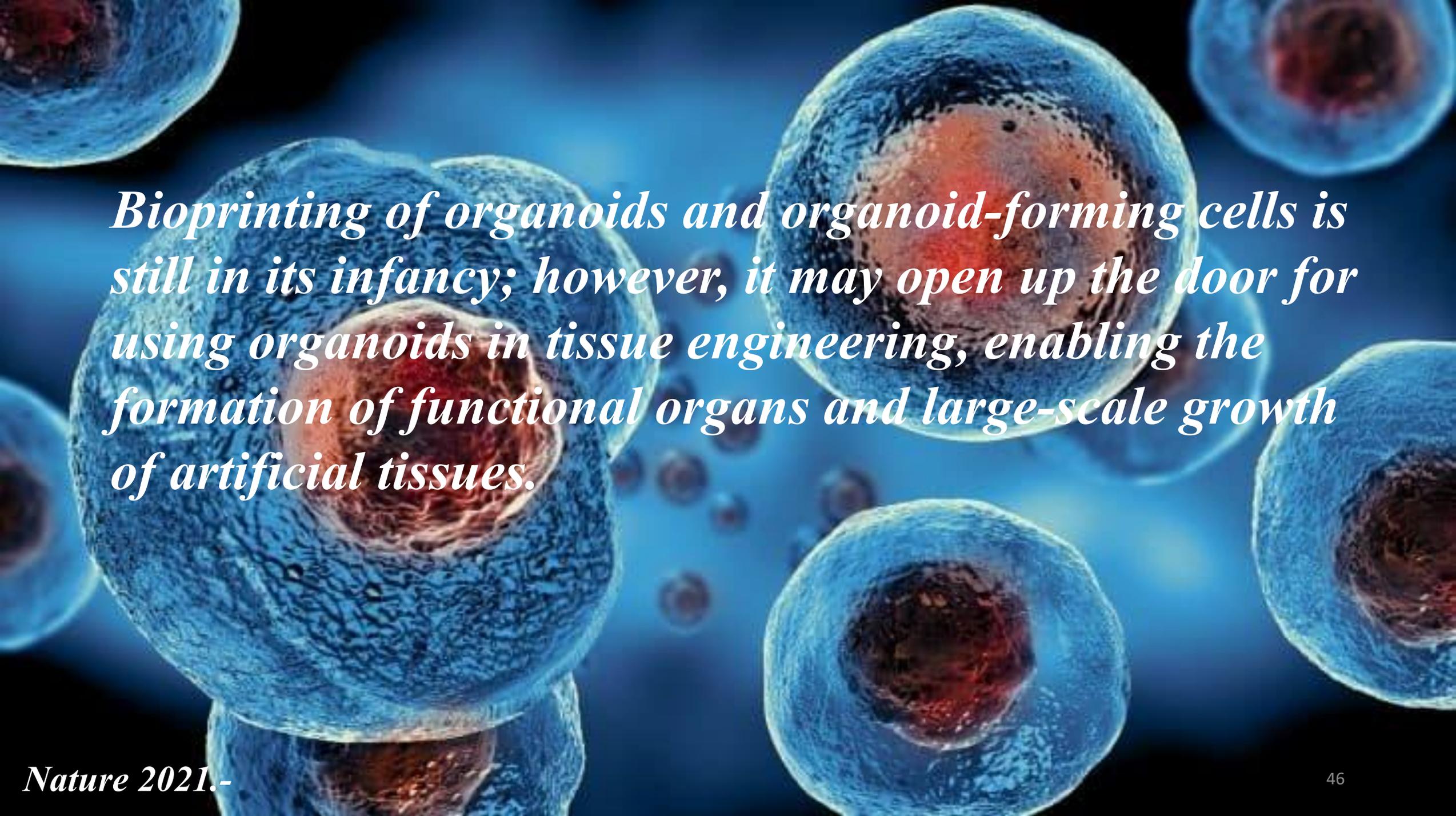
For AI supported organoid system analytics



## Hebrok Lab

Applied stem cell-derived pancreas organoids



A microscopic view of several organoids, which are small, spherical clusters of cells. The organoids are primarily blue in color, with some showing a reddish-brown core. They are set against a dark blue background with a bokeh effect of light spots.

*Bioprinting of organoids and organoid-forming cells is still in its infancy; however, it may open up the door for using organoids in tissue engineering, enabling the formation of functional organs and large-scale growth of artificial tissues.*



**THANK YOU.-**