

Feb. 2023



**Opportunities for development of new *in vitro* skin 3D models  
for toxicity and molecules screening  
in the cosmetic,  
medical device and pharma fields?**

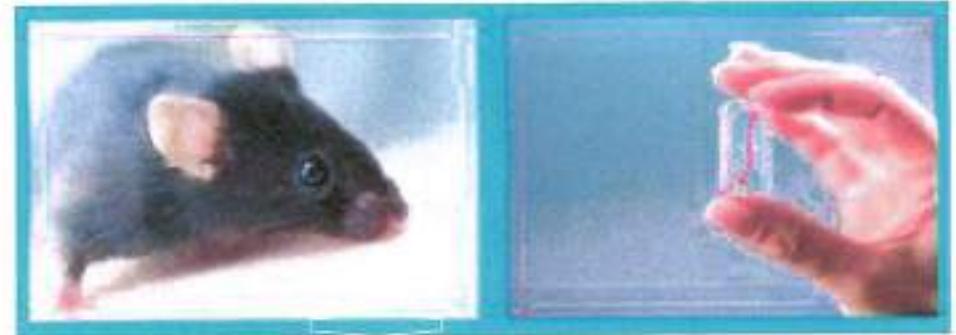


Pr Edith Filaire  
Scientific Director



# CONTEXT AND CHALLENGES

115 million  
animals: for  
scientific purposes  
every year,  
worldwide



## Testing substances

- *Cosmetic*
- *Industrial chemicals*
- *Drugs*
- *Pesticides, food additives, biocides*
- *Medical devices*

## Environmental changes

## Surgical techniques

or other ways of  
altering the  
physiology and/or  
behavior of a live  
animal.



## The 3Rs and Alternative Methods

### The 3 R's of Animal Research



RockStep



### The regulatory context

Directive 2010/63/EU on the protection of animals used for scientific purposes:

- Applies to all uses (basic, applied research, efficacy and hazard assessment of substances)
- Applies to vertebrate animals, including embryonic forms and cephalopods
- Reinforces the 3Rs principle



Problem of the reliability of the methods already developed ?

Need to develop new alternative methods and strategy



New Approach Methodologies (NAMs)



Organoids, mini organs with max-  
powers:  
new way to  
screen molecules  
and toxicology?

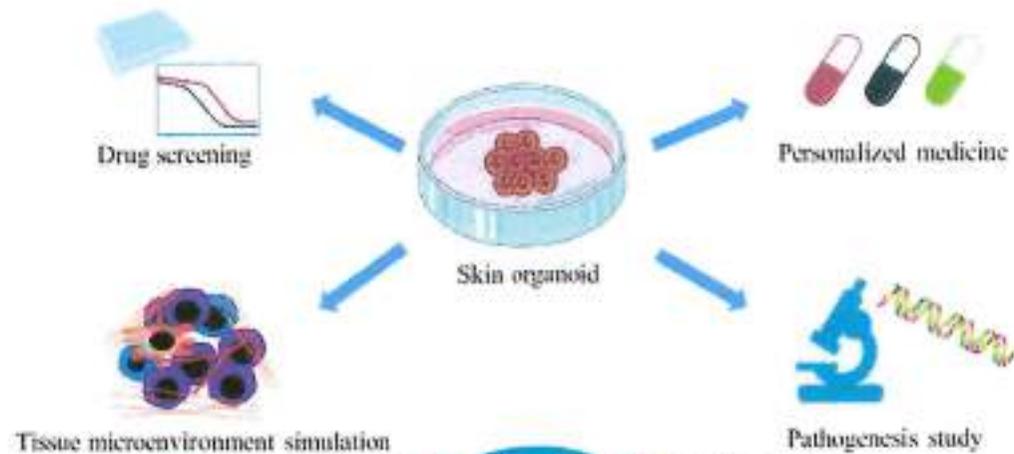


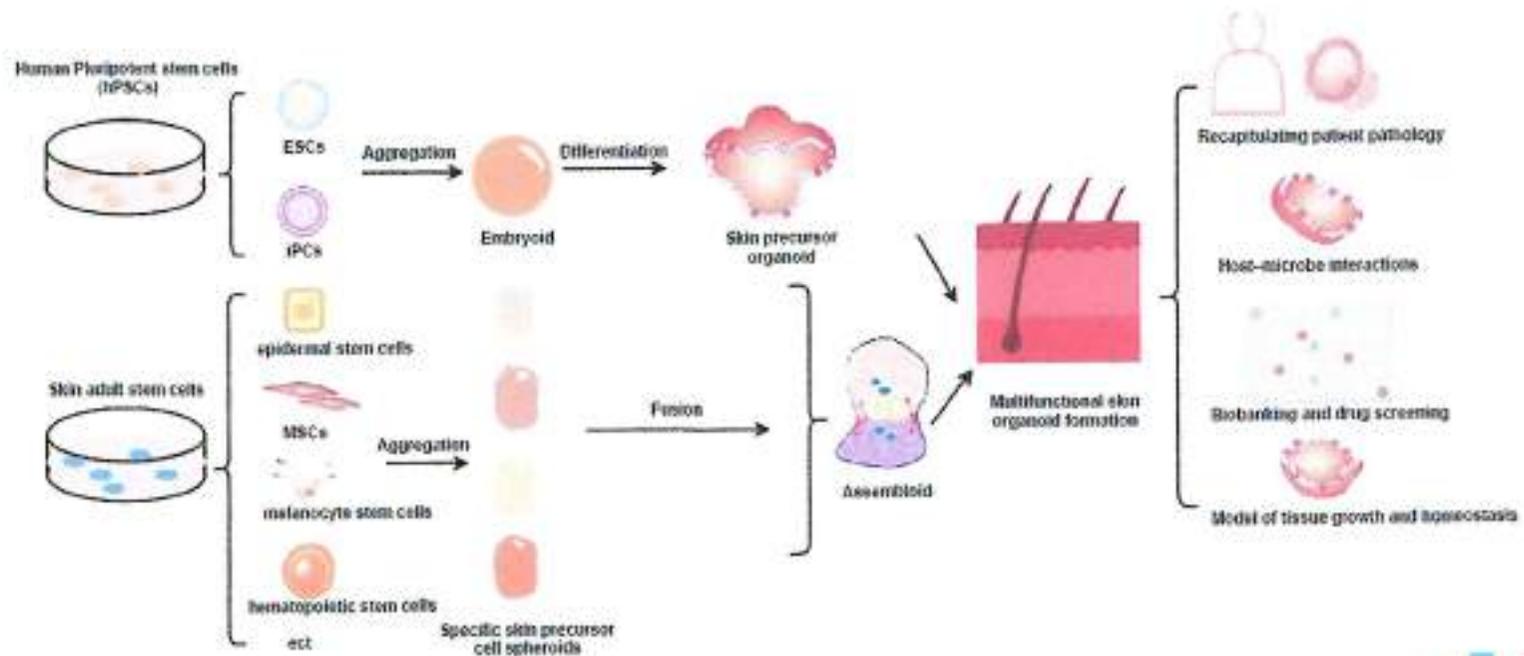
Figure 1. Schematic representation of application of skin organoid.

Li et al., (2021)

- Few millimeters long
- Three-dimensional structure
- Reproduce some of its functions
- PSCs, adult stem cells, tumor tissues...
- Need appropriate environmental background for development

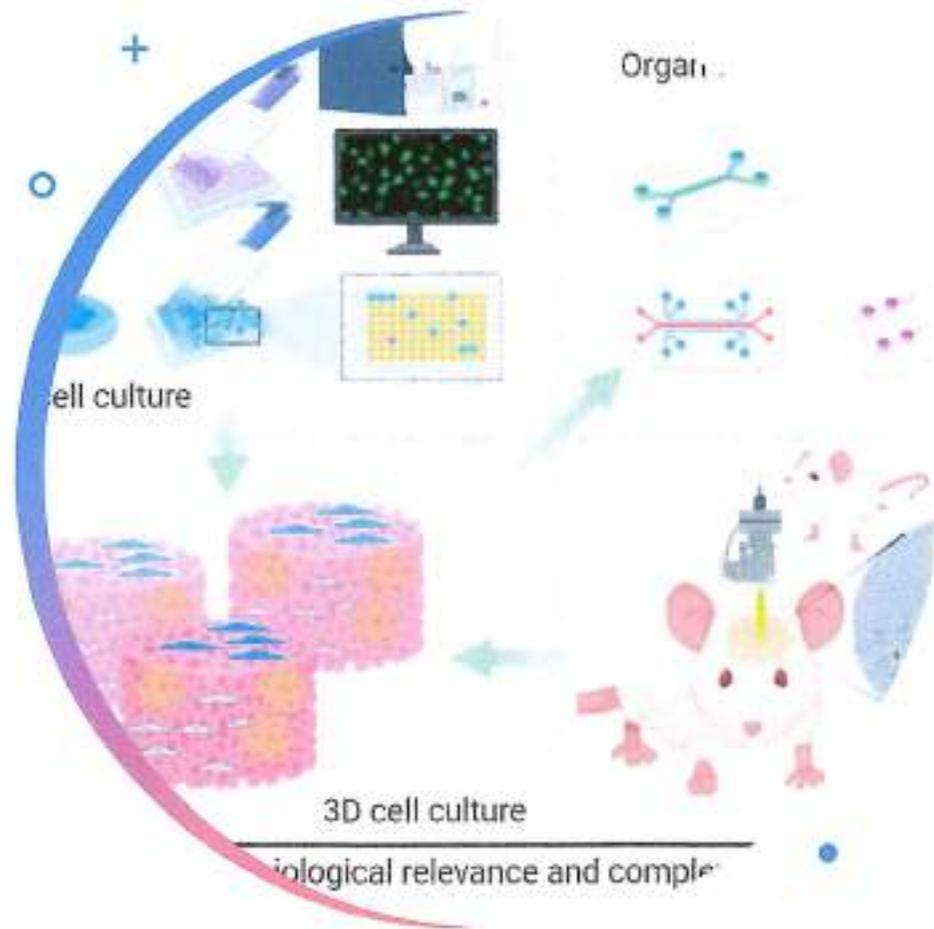


## Generation of Skin Organoids: Potential Opportunities and Challenges



Sun et al., (2021)





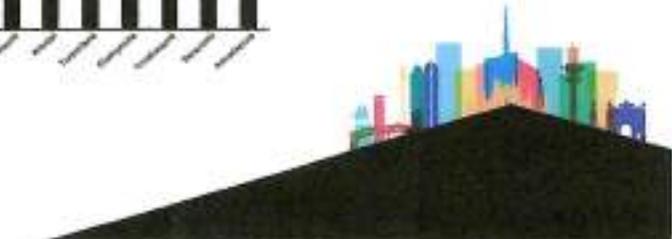
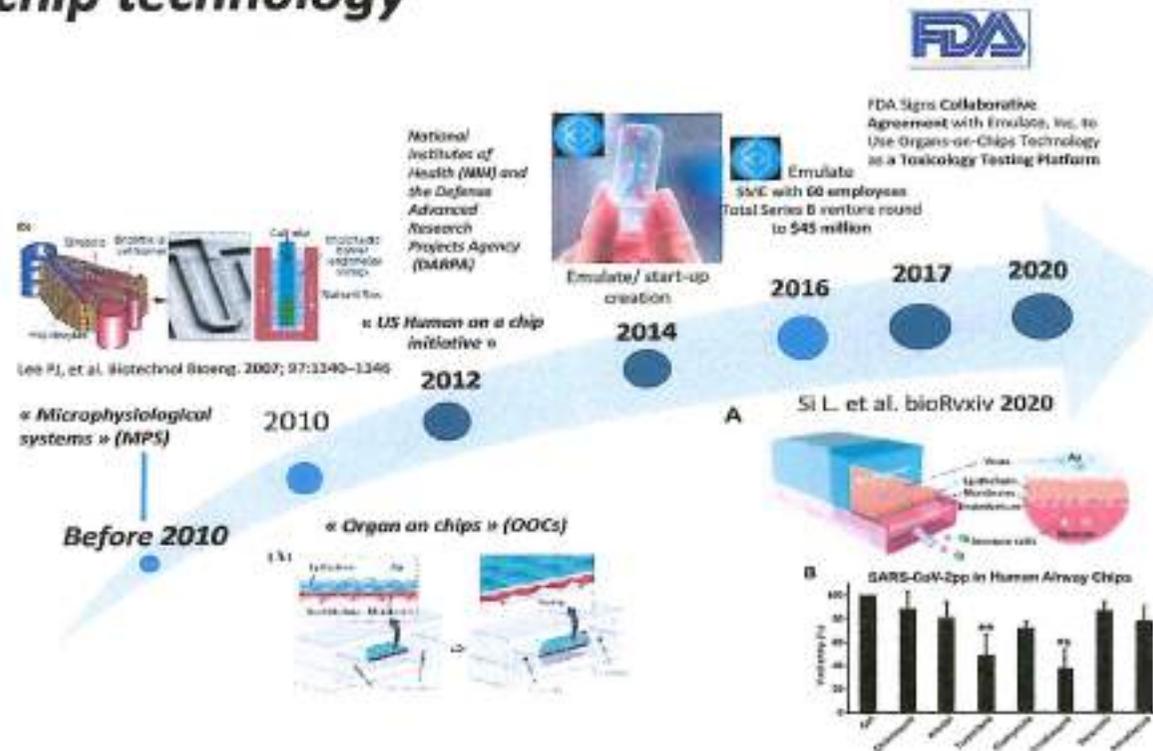
Compared to animal, model organoids represent a major advance.

*"Because they are obtained from human material, they are more predictive:*

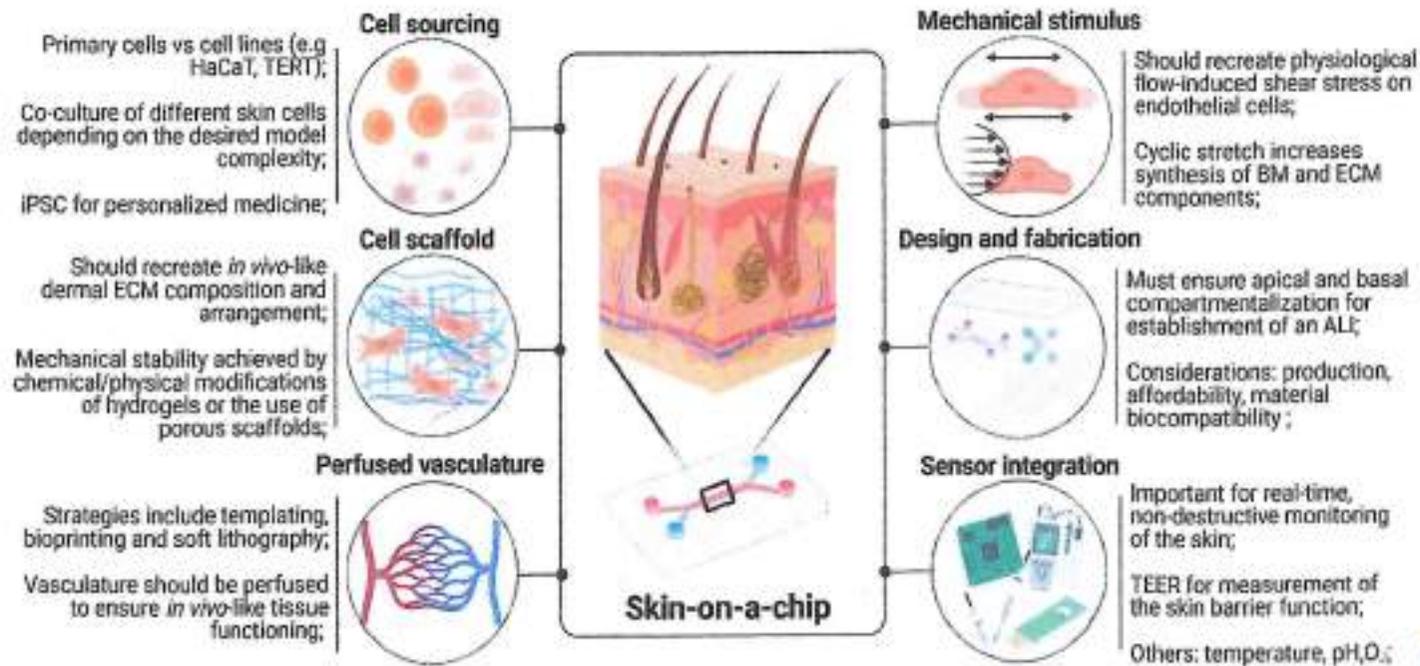
- *of how a disease develops in humans,*
- *of their response to an infection*
- *or to drug treatments"*

(Galzi, 2022)

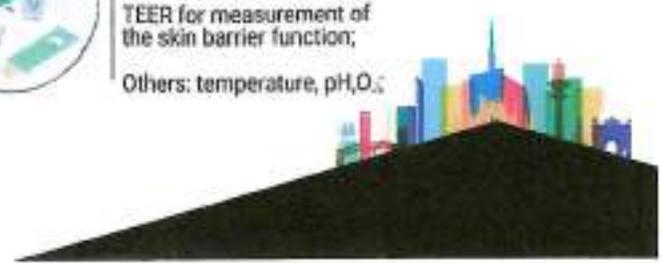
# Microphysiological system *Organ-on-chip technology*



# Organ-on-a-Chip Technology

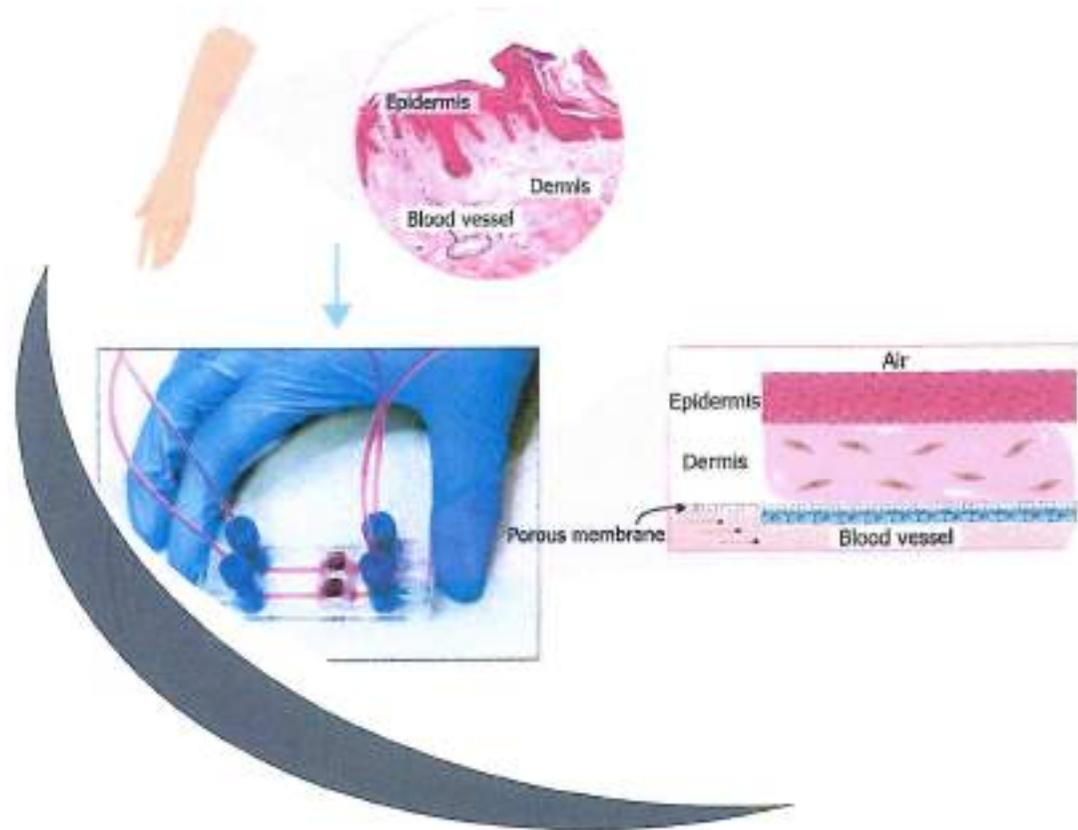


Zoio et al., (2022)



# Next Step: Organoid-on chip-Challenges





**Grazie mille**

