第23回日本再生医療学会総会
JSRM The 23rd Congress of the Japanese Society for Regenerative Medicine

3月21日（木）8:30～10:30
@第11会場（ホテル日航新潟4F 朱鷺B）

シンポジウム16
標準 ～アカデミアと産業界をつなぐためのツール～

細胞の特性評価と試験-創薬支援ツールMPSへの水平展開

Cell characterization and testing -horizontal expansion into drug discovery support tools (MPS)

筑波大学 生命環境系
伊藤 弓弦

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Cell characterization and testing -horizontal expansion into drug discovery support tools (MPS)

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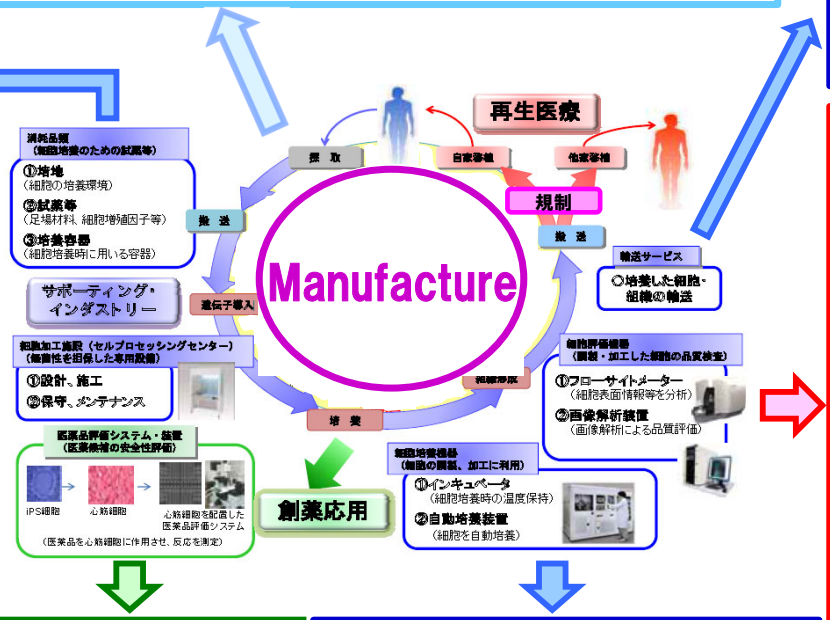
筆頭演者は、過去１年間（1月～12月）において、
本演題の発表に関して開示すべきCOIはありません。

Overview of Standards in Regenerative Medicine

Cellular starting materials

Supporting industries

Supporting industries



Analytical methods

Related field
(Gene delivery System)

Related field

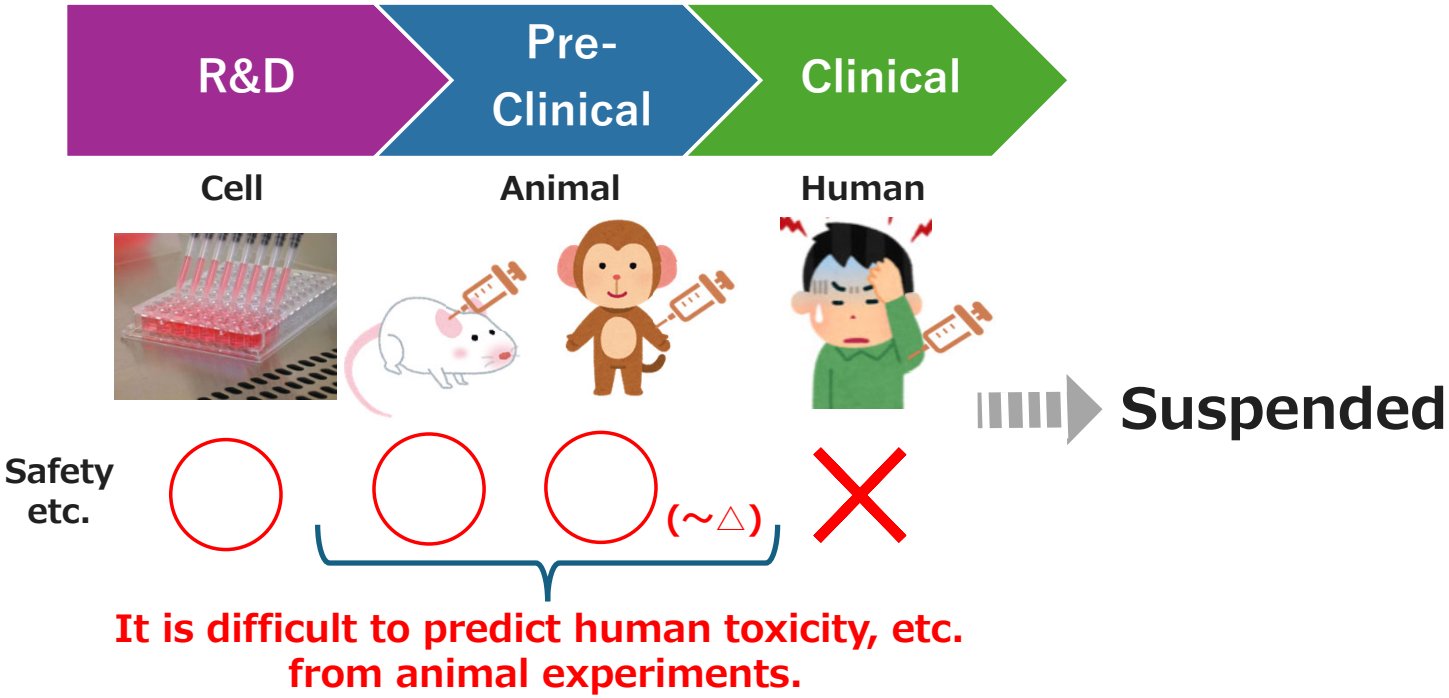
SY-16-2

Supporting industries

Drug discovery support

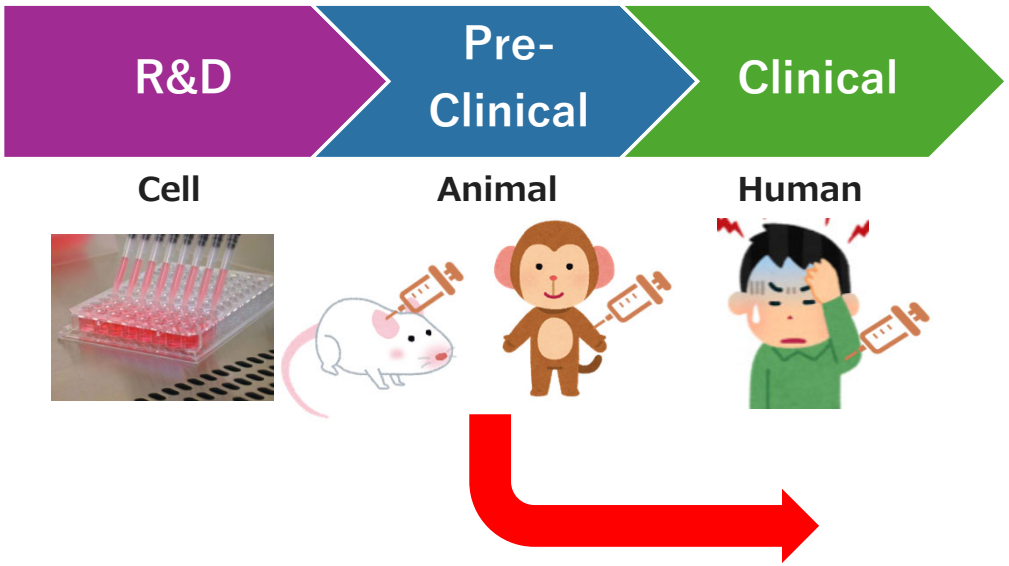
- In recent years, drug development in new modality fields has been active, but there have been frequent cases in which serious side effects have appeared in clinical trials, leading to discontinuation of development.

- The key to international competitiveness in drug development is the availability of technologies for detecting toxicity, etc., which are difficult to predict in animal experiments.…



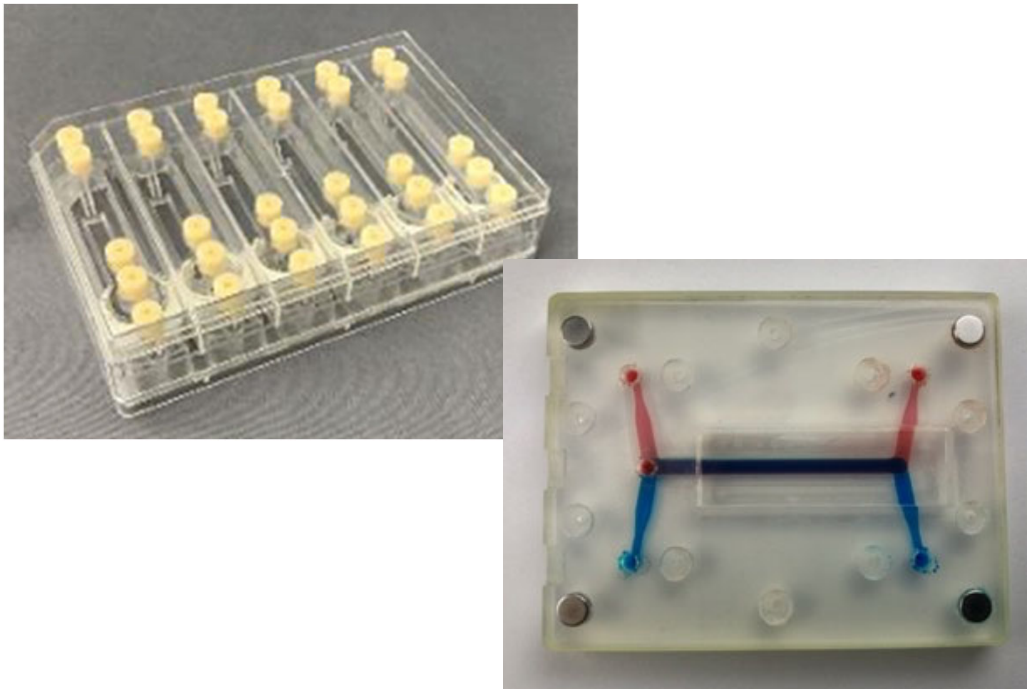
Drug discovery support

- **Therefore, there are high expectations for assay technology that mimics the human organism (MPS: Micro-Physiological System).**



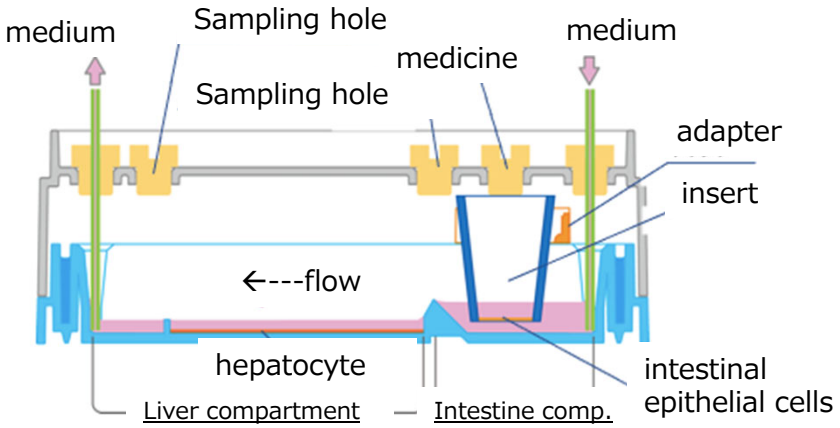
Application of regenerative medicine technology to simulate the whole human body

Micro-physiological System (MPS)

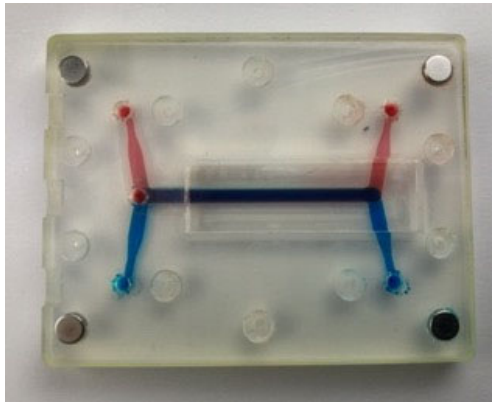


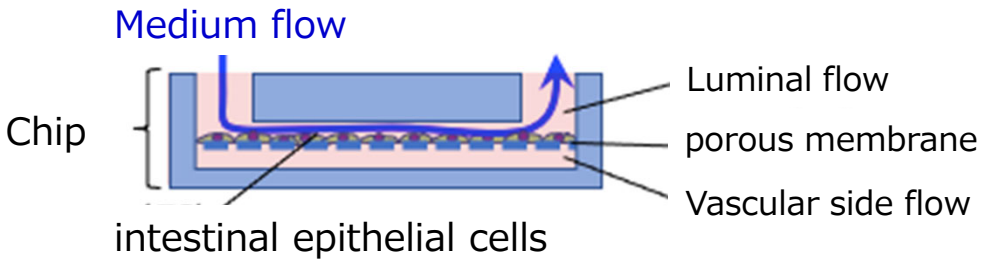
Demonstration of MPS under development

- **Kinetic data from absorption in the small intestine to metabolism in the liver**



- **Kinetics and toxicity data at the time of first passage through the small intestine**



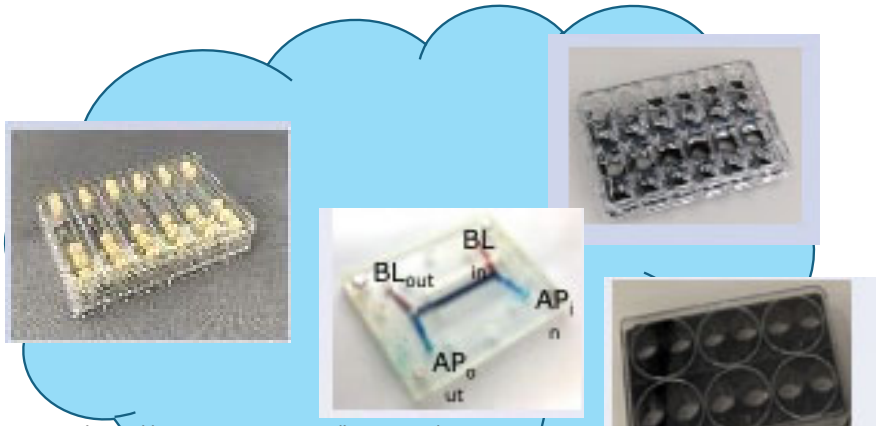


Toward Assay Method Construction

- **We need to determine if the MPS is appropriate for our intended purpose/COU.**

https://www.thermofisher.com/order/catalog/product/HMCPQC
https://bioivt.com/human-cryoplateable-hepatocytes

What specifications are required for hepatocytes?

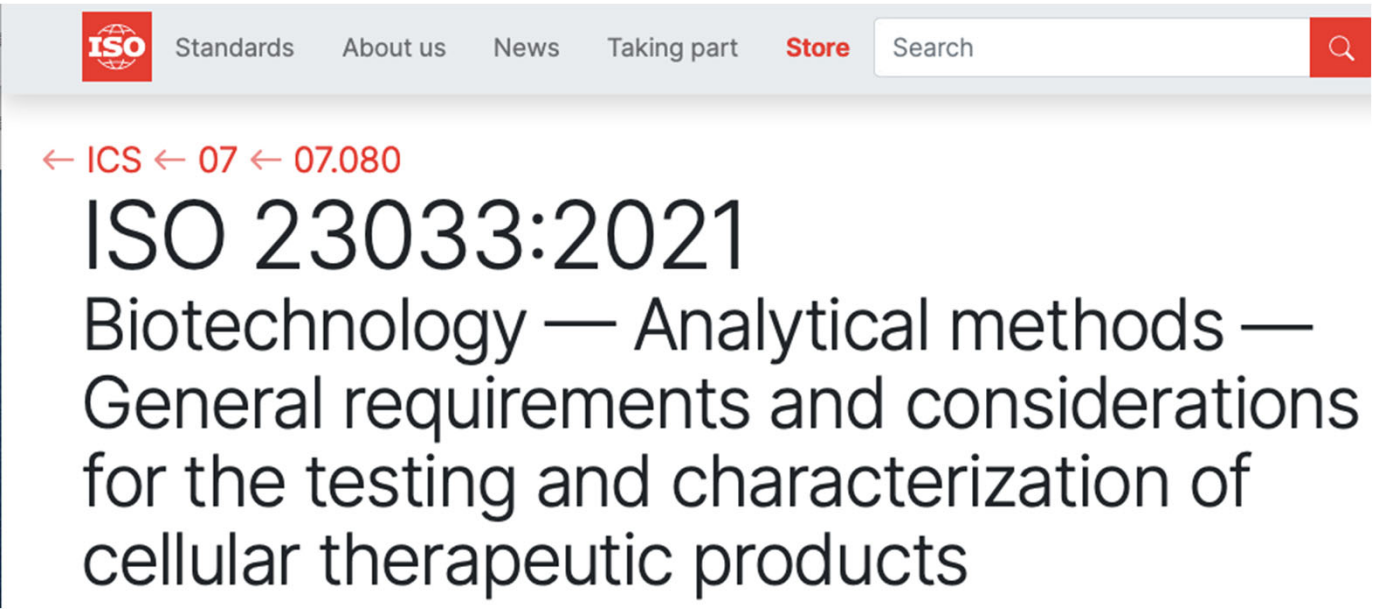


http://www.scetra.or.jp/business/#section-5

What device should be selected for the assay?

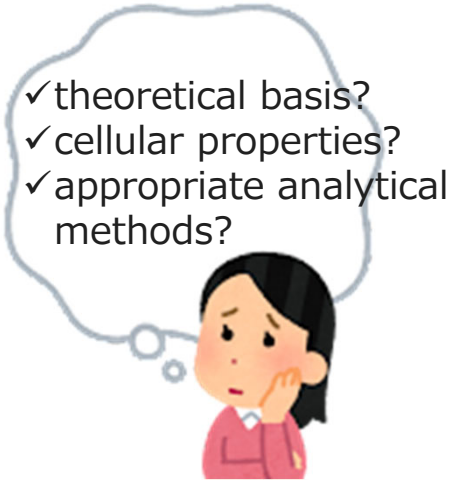
We need a guideline for such process!

Examples of standard documents that can be utilized



https://www.iso.org/standard/74367.html

- ✓Approaches for designing and evaluation of analytical methods for cell therapy products
- ✓General considerations for determining cell therapy product specifications



Examples of standard documents that can be utilized

ISO Standards About us News Taking part Store Search

← ICS ← 07 ← 07.080

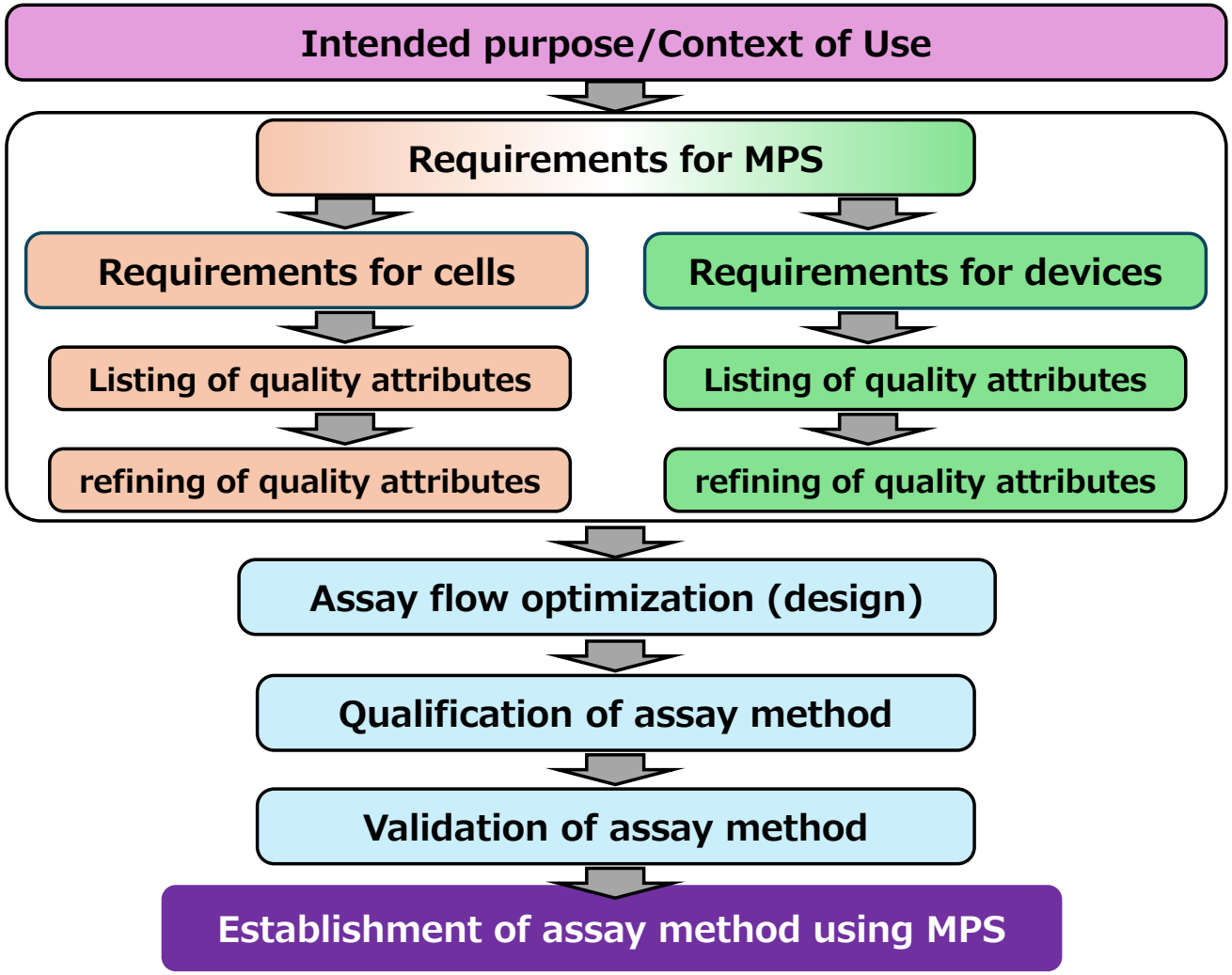
ISO 23033:2021

Biotechnology — Analytical methods — General requirements and considerations for the testing and characterization of cellular therapeutic products

https://www.iso.org/standard/74367.html

- ✓ Approaches for designing and evaluation of MPS for Candidate drugs
- ✓ General considerations for determining Organ cells specifications

Strategies for establishing assay methods using MPS

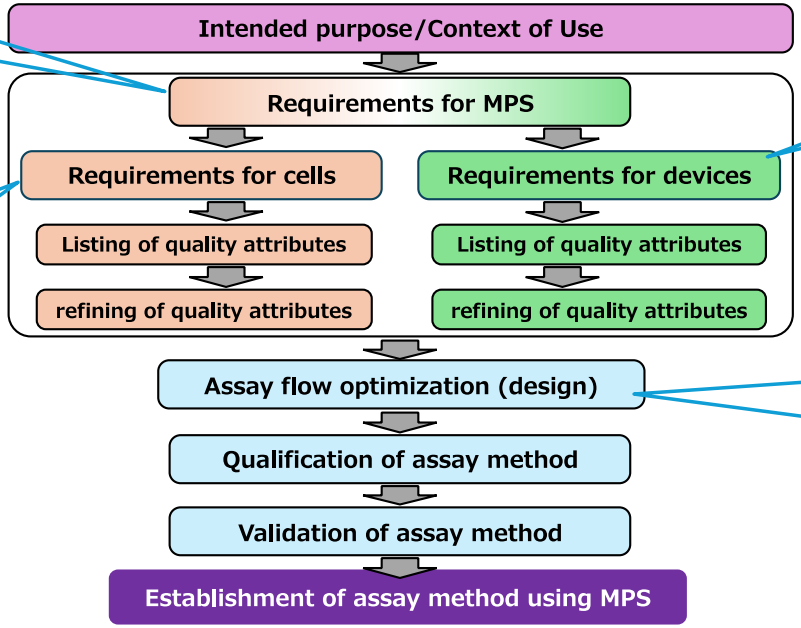


- ✓ Clarify MPS requirements based on the COU.
- ✓ Decomposite MPS requirements into cell and device requirements.
- ✓ Design assays based on the COU.
- ✓ Validation

Examples of issues identified

Cell Adhesion
Organoids
Medium for multi-organ culture
.....

liquid leakage
Flow velocity during perfusion
Sorption/adsorption
.....



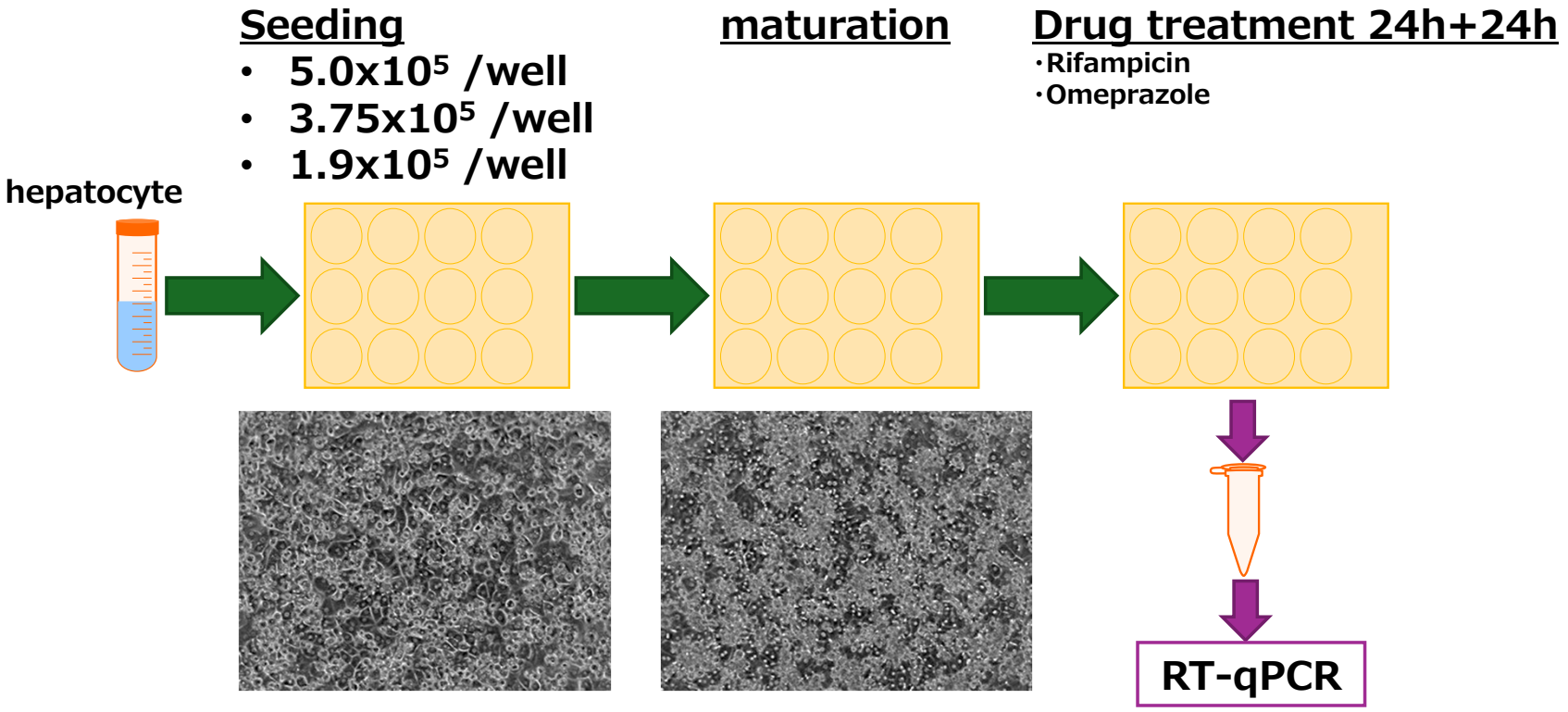
specification of organ cells
Lot in raw materials
Availability of standard cells
Ensuring stable supply
.....

SOP
Training
Data Management
.....

In each phase, there are several problems to consider

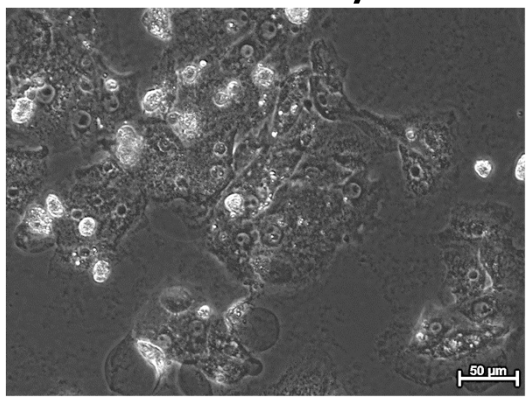
Evaluation of the impact of seeding density

The ability of hepatocytes seeded at three different densities to induce CYP mRNA was analyzed for various hepatocyte cell lots.

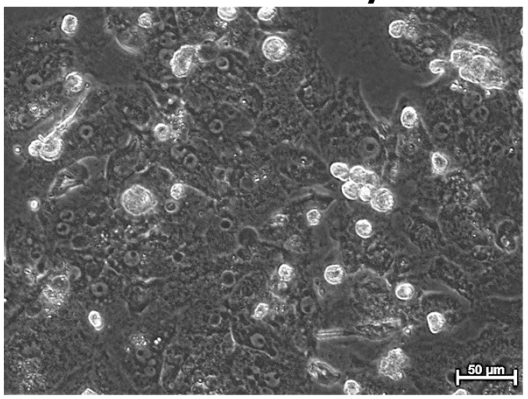


Evaluation of the impact of seeding density

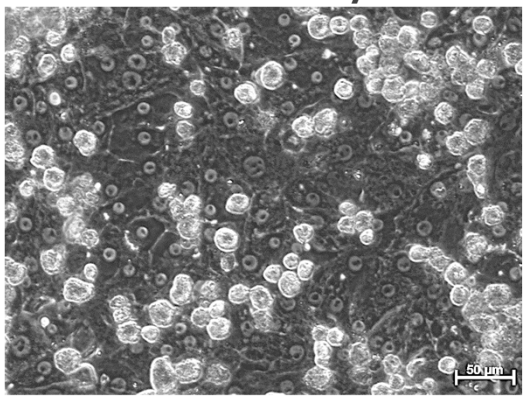
1.9 x 10^5 cell/well

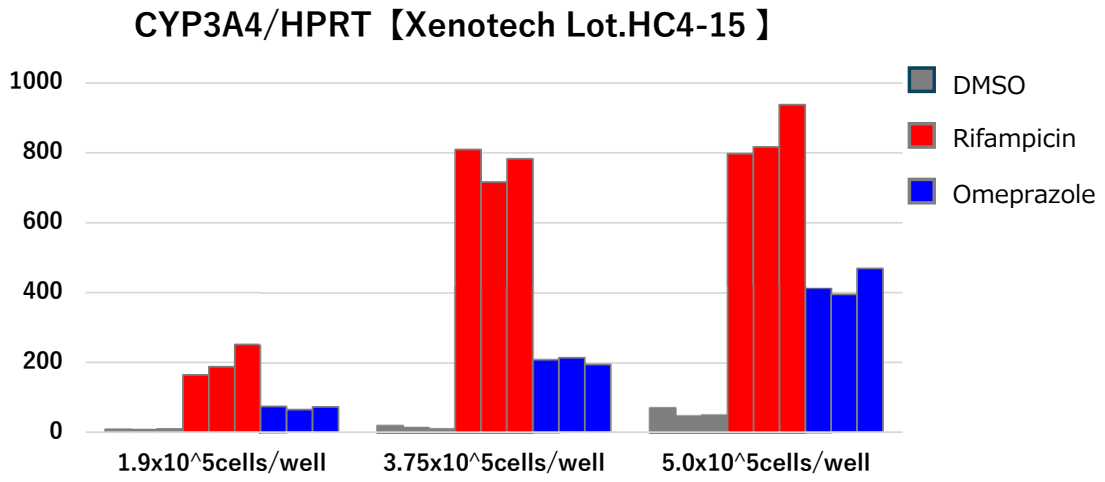


3.75 x 10^5 cell/well



5.0 x 10^5 cell/well

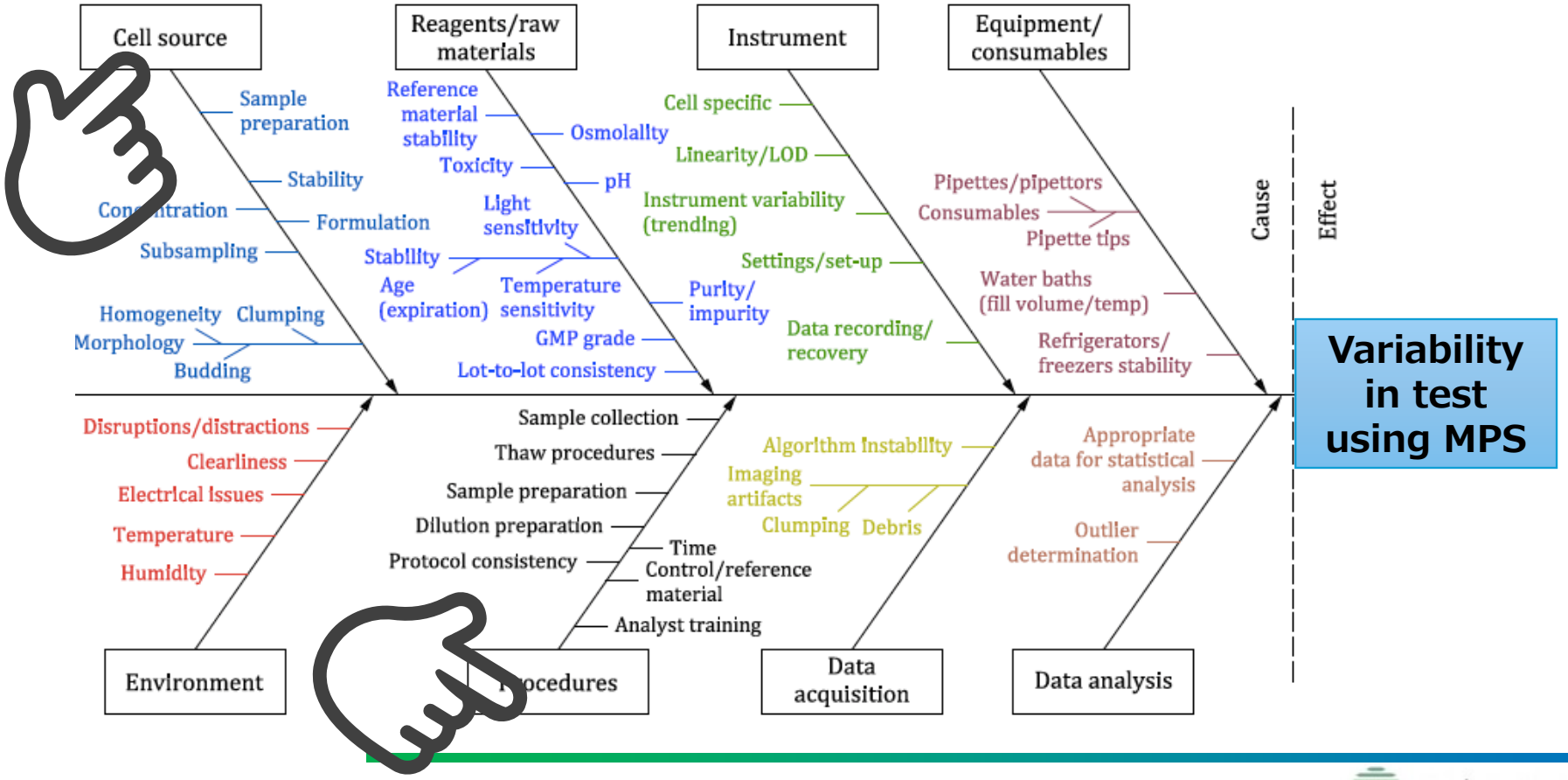




There is an optimal seeding density.

Ishikawa diagram for finding variable factors

Linking cell measurement variability and its factors is useful in building management strategies



Variable factors in the assay process

- ✓The number of seeded cells & induction period were found to affect the performance of hepatocytes.
- ✓It was shown that consideration of cell adhesion is necessary.
- ✓It is necessary to consider the properties of frozen hepatocytes, which are the raw material.

⇒**Toward construction of a robust assay system**

Summary

- Even if there is no MPS-specific standard, existing documents, such as concepts, may be utilized.
- On the other hand, standards specific to MPS are also necessary. First of all, it is necessary to promote international standardization using white papers, etc.

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