



The Center for Stem Cell Biology & Regenerative Medicine

Presents

- Bridging the Translational Divide:
Formation of a Public-Private Stem
Cell Technology Consortium

Objective

- To accelerate the development of stem cell technologies toward novel strategies for diagnostics and treatments for a myriad of human diseases and disorders.

Human Embryonic Stem Cells

Properties

Immortal

Self-renewing

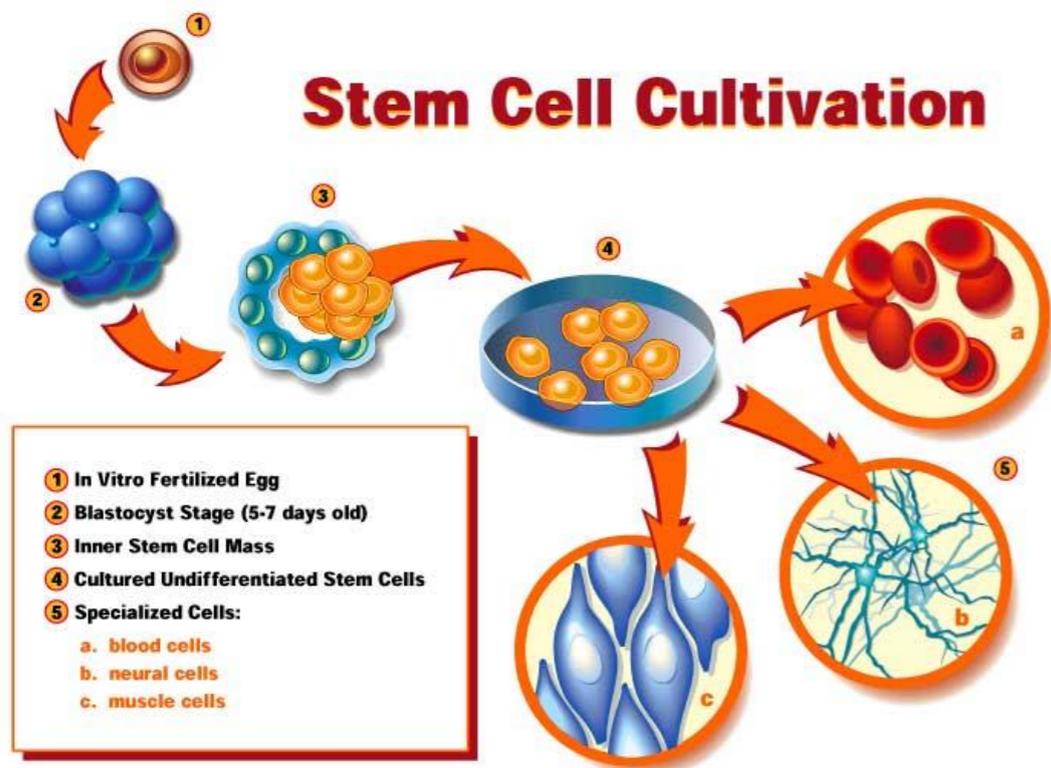
Differentiate

Promise

Can study human development in a dish

Can be transplanted to treat human disease

Can be used to generate tissues and organs



Problems

Ethical issues

Difficult to study specific human diseases

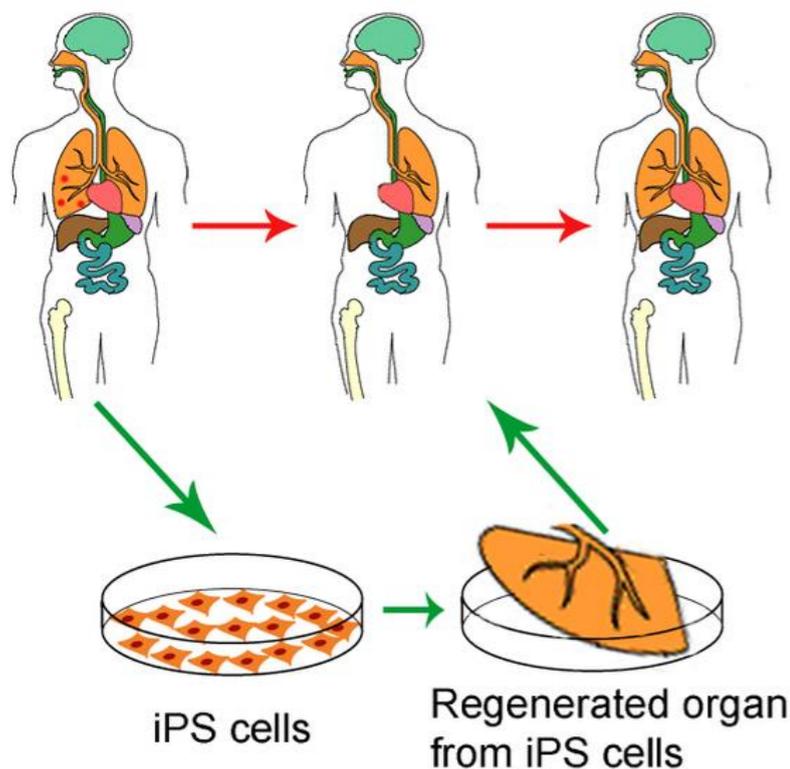
Difficult to obtain

Can be rejected after transplantation

Human embryonic stem cells are the *most difficult* cells to grow and modify in the laboratory.

Induced Pluripotent Stem Cells (iPSCs)

iPSCs are cells from adults that are “reprogrammed” in the laboratory into an early developmental state. These cells can be used to create virtually any cell, tissue, or organ in the body.



Promise

Circumvent many ethical issues

Transplanted cells will not be rejected

Can easily be used for studying human diseases and for drug discovery

Like human embryonic stem cells, iPSCs are *extremely difficult* to grow and modify in the laboratory.

This difficulty is a barrier for scientists wishing to use iPSCs to study and cure human diseases.

iPSCs are an emerging technology critical to addressing human diseases and disorders.

739 articles listed on PubMed since 2006 (yr of original iPSC publication). This does not include previous work on cellular reprogramming.

Several states have taken the lead in iPSC research with significant investments in research.

- *New York.*
- *Massachusetts.*
- *California.*

Many academic institutions in other states have planned or existing stem cell and iPSC core facilities.

Need...

Many researchers are using iPSCs to model disease processes and develop therapeutic interventions (gene modification, drug discovery, etc.).

In many cases, iPSCs are the ONLY research model available to study human diseases.

iPSCs are among the most difficult cell types to create and use in the laboratory, creating a barrier for researchers.

There is no core facility in the State of Maryland that is available for the production of iPSCs, or for training researchers to create and use iPSCs.

Solution...

Core laboratories facilitate high throughput research by providing technical expertise and economies of scale that are impossible to achieve in a single laboratory.

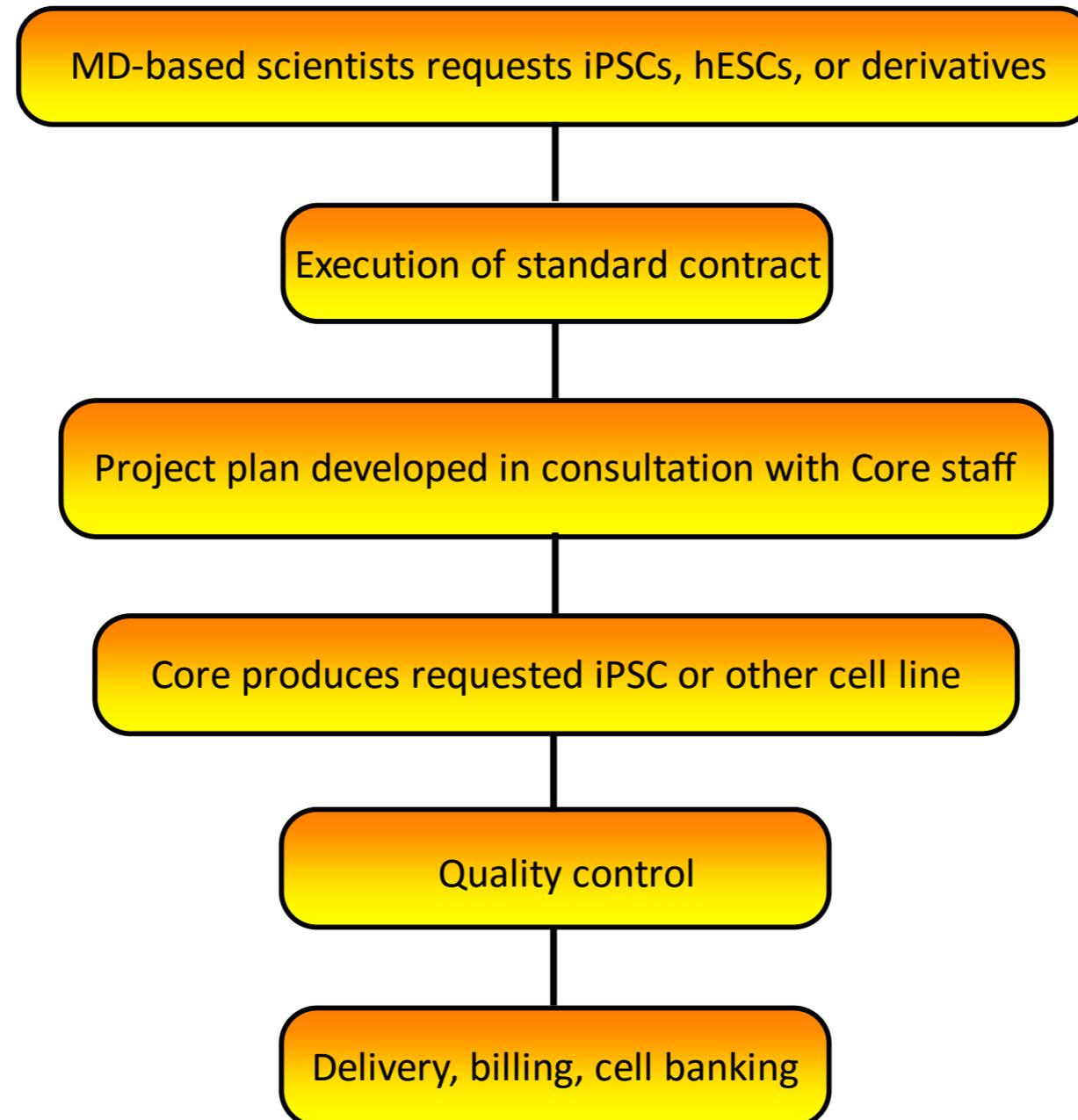
We will establish a GMP Core Facility for the creation, expansion, and banking of iPSCs.

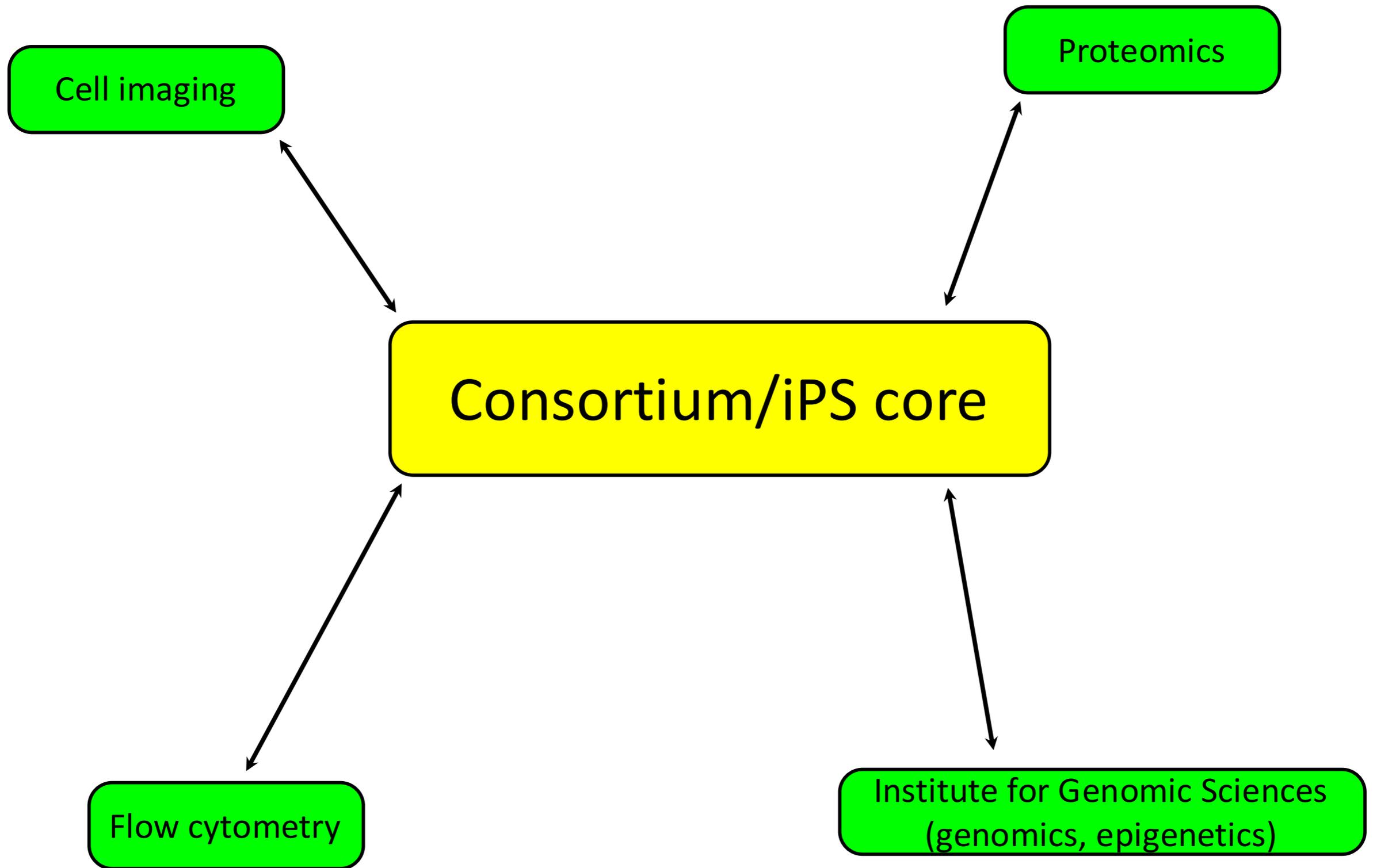
The core facility will be available to all Maryland academic, industry, and government researchers on a fee-for-service basis.

The Center for Stem Cell Biology & Regenerative Medicine

- **Mission:** to create a stem cell research environment that fosters a broad range of interdisciplinary work designed to fully understand stem cell biology, while at the same time affecting human health and disease.
- **Center faculty (40):**
 - Founding Members: 26 (MSCRF/TEDCO grantees)
 - Full Members: 39 (includes Founding members)
 - Associate Members: 2 (e.g. unfunded clinical BMT focus)
- **Research funding of Center faculty:**
 - \$24M total current year direct costs (all grants of faculty)
 - \$13M total from MSCRF/TEDCO (all years of active grants)

WORKFLOW





Benefits: The proposed Consortium will facilitate the development of biotech jobs and cures for human diseases.

- Research
- Corporate development
- Clinical trials

UMB

Stem Cell Center - research and characterization
IRB - human subjects
IACUC - animal subjects
Extensive core facilities
Hospitals - clinical trials and samples

Paragon Bioservices, Inc.

Physical proximity
History of interaction with UMB
GMP facilities
Expertise in human cell culture for clinical use
Expertise in cell banking

State of MD

DBED

Academia
Industry
NIH
Military

Future Directions

Training facility

New technologies for iPSC growth and modification

New academic and industrial partners

Corporate development

DBED funding is necessary for establishing
the proposed consortium.

There is no other source of funding to obtain this equipment and salary support.

We anticipate a 3 year process for the
Core Facility to become self-supporting.