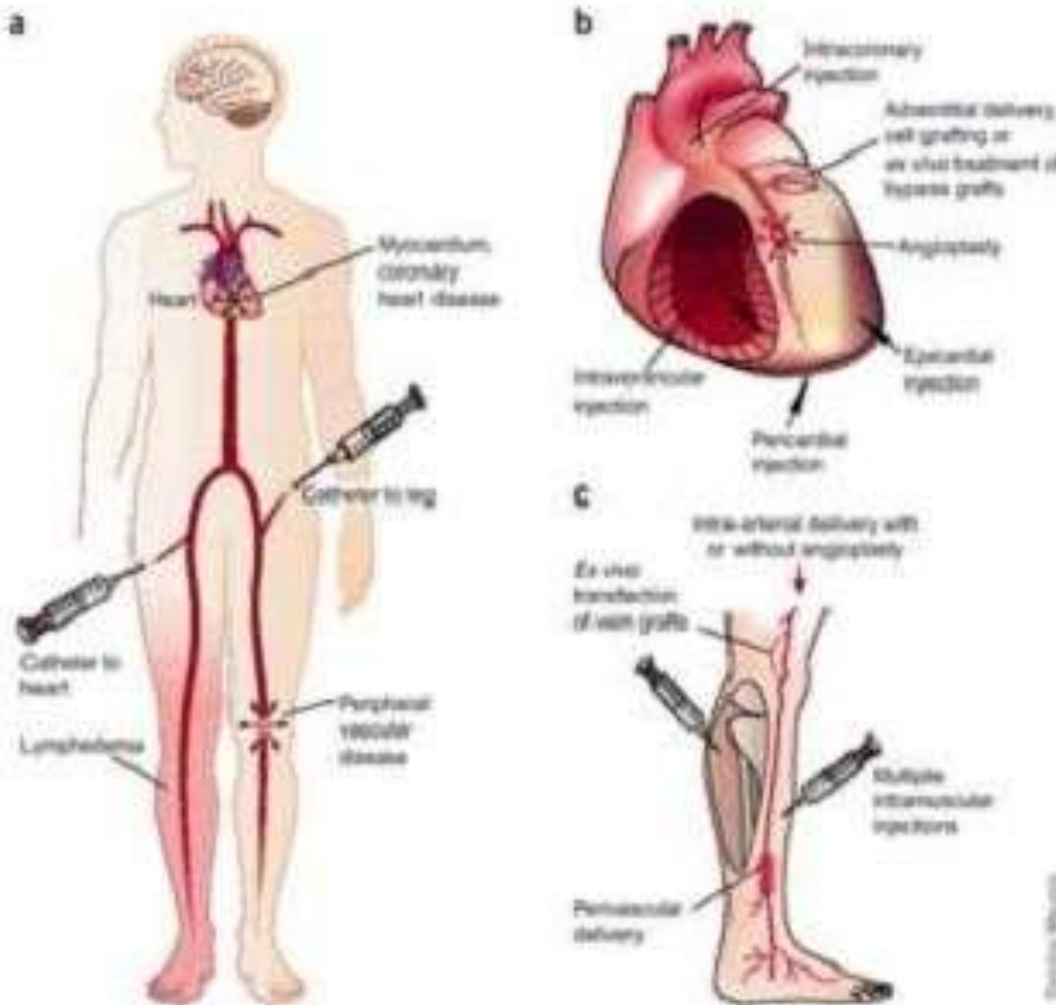


Regenerative Medicine

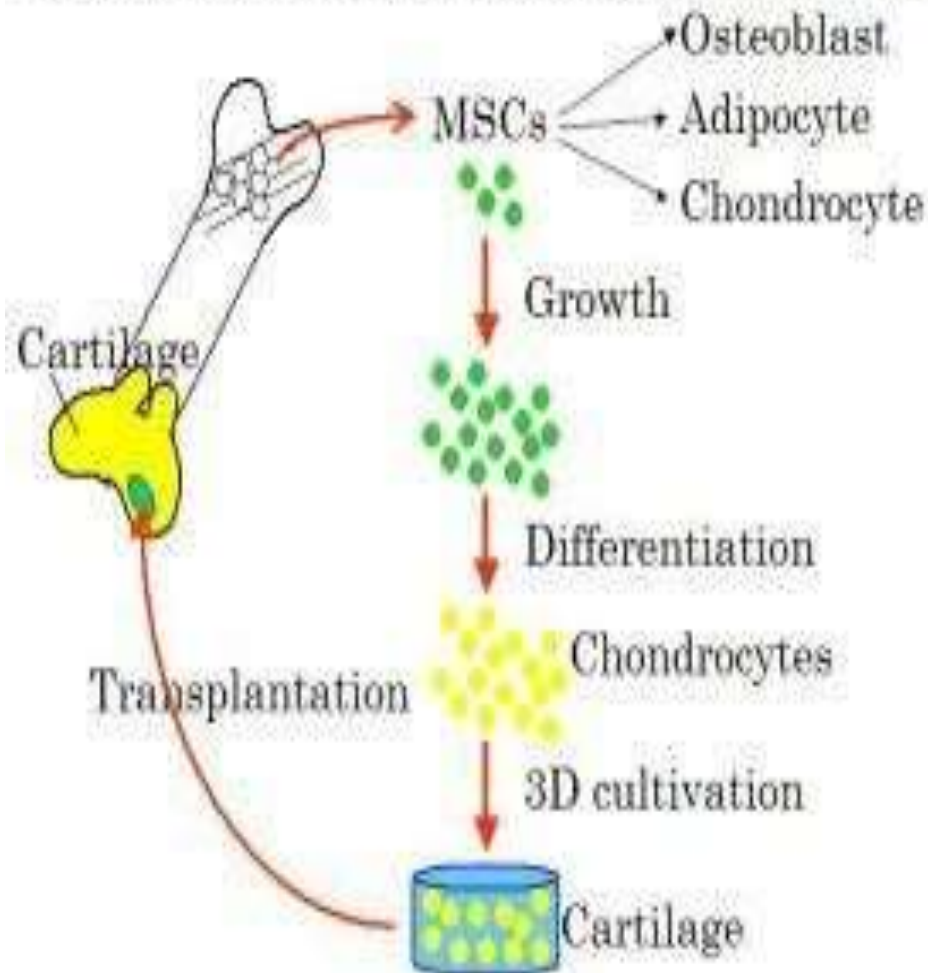
Dr. K. Premkumar
Associate Professor
Dept of Biomedical Science
Bharathidasan University

Stem Cells in Regenerative Medicine



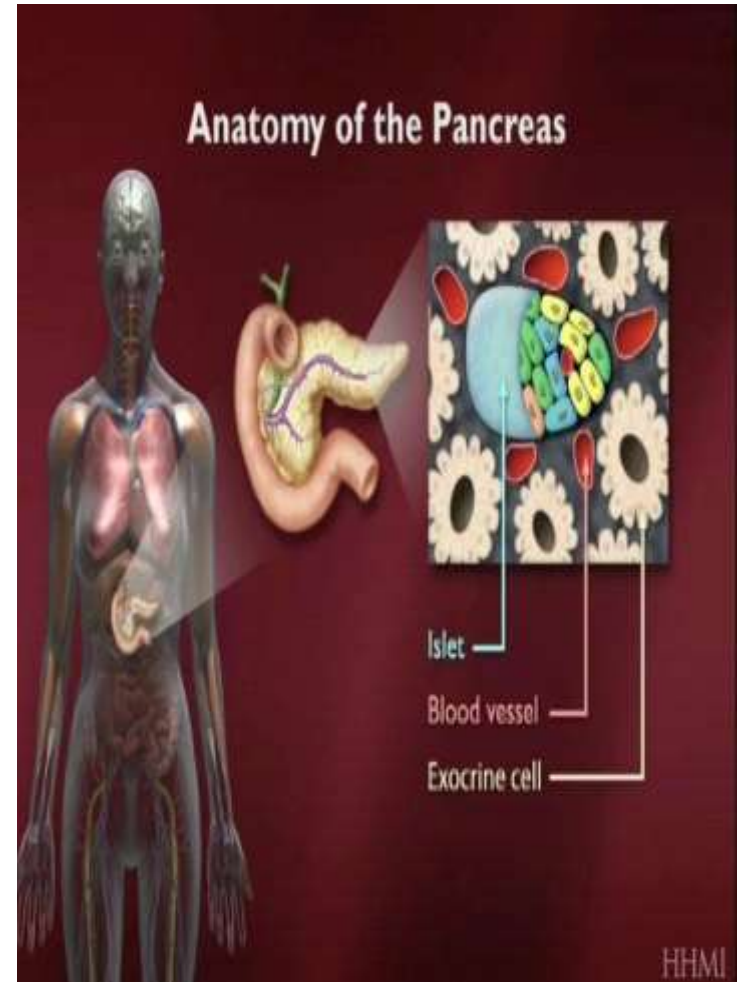
Bone Regeneration

Regeneration of cartilage from mesenchymal stem cells (MSCs)



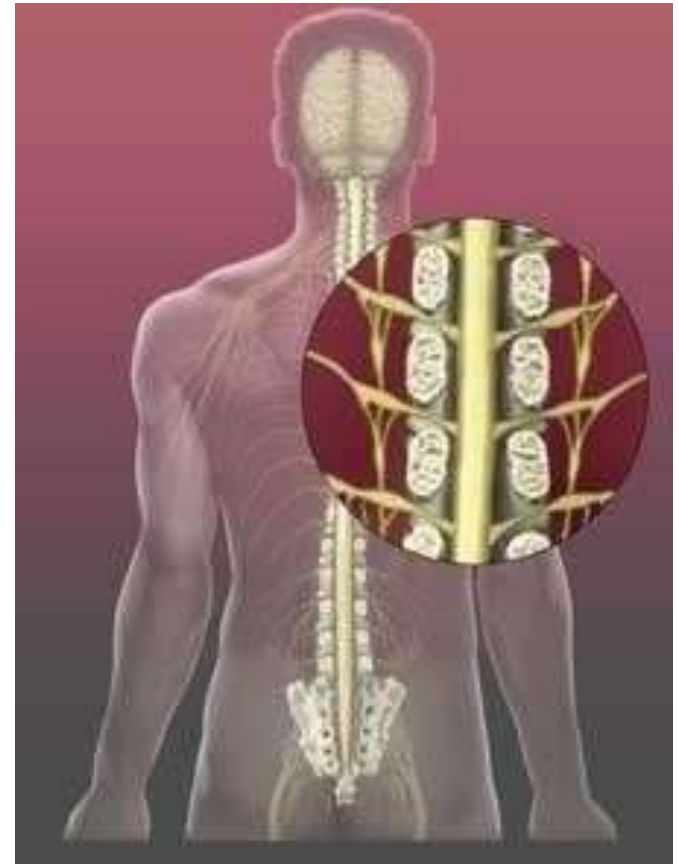
Insulin Independence

- There is insulin independence for Type 1 diabetes patients
- A study showed patients receiving injections with adult stem cells were able to go as long as four years without having to rely on insulin shots.

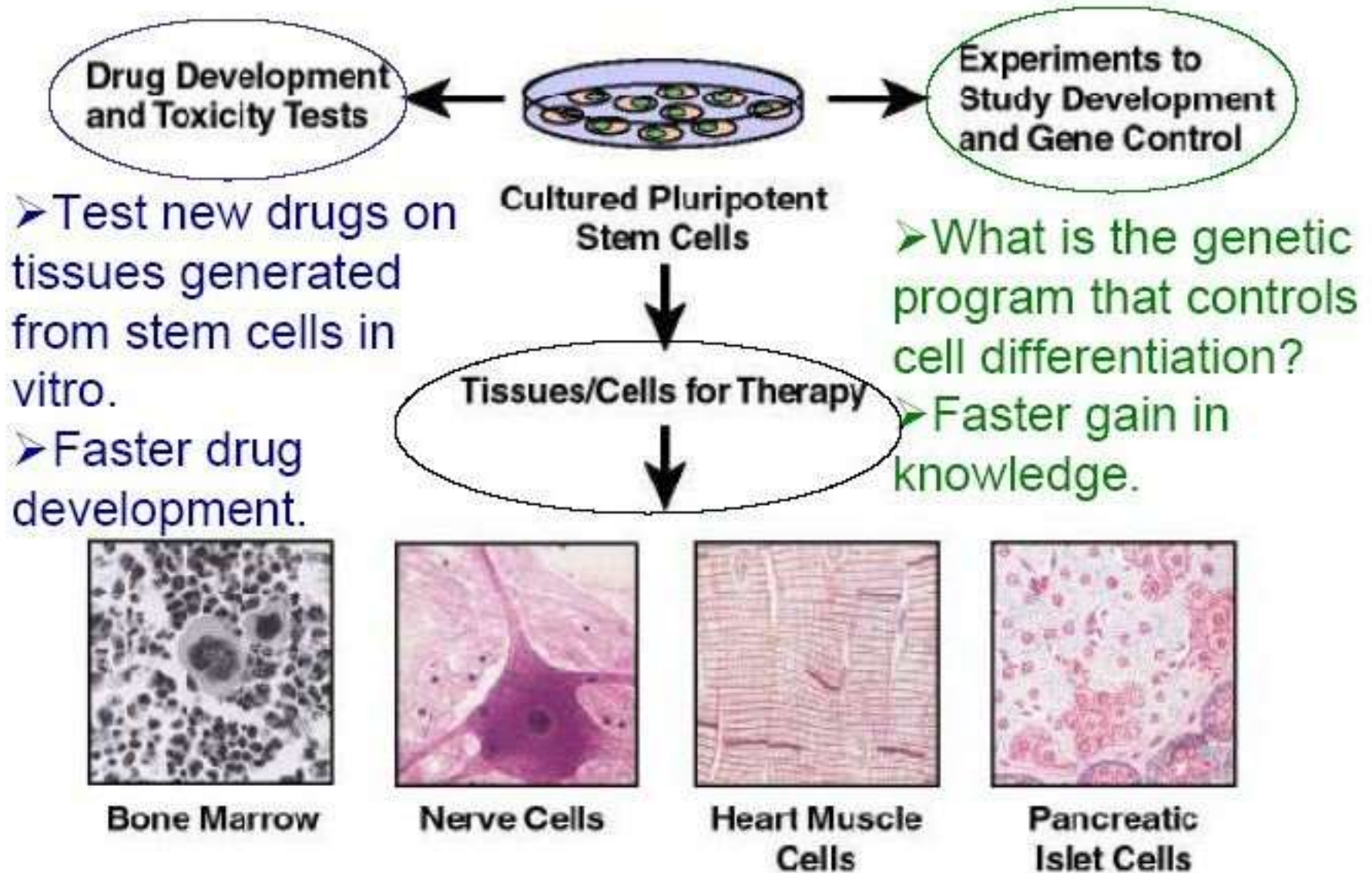


Process of stem cells for spinal cord injury

- Bone Marrow taken from the hip 6 weeks of cultivating the adult stem cells to increase total to 100 million.
- Adult Stem Cells injected at injury site (C3-C4) in a surgical procedure



The Promise of Stem Cell Research

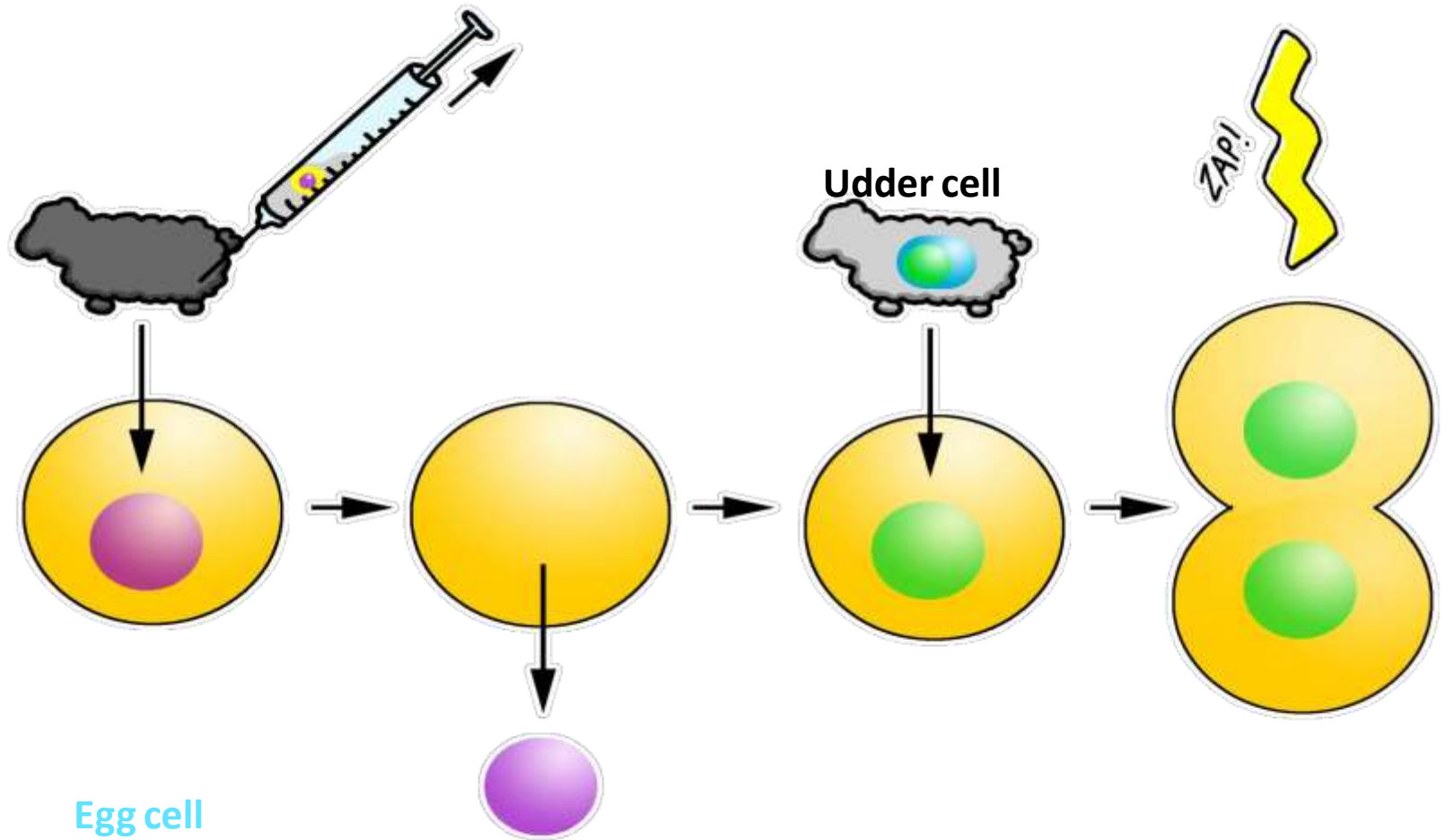


What are stem cell technologies?

- Cloning technologies
 - Is human cloning a technology?
 - What is different about cloning embryonic stem cells?
- Induced Pluripotent Stem cells
 - New ways to potentially avoid the use of embryos
 - Disease-specific stem cell lines created
 - The promise and potential pitfalls of this approach

Somatic Cell Nuclear Transfer (SCNT)

Cloning of embryonic stem cells

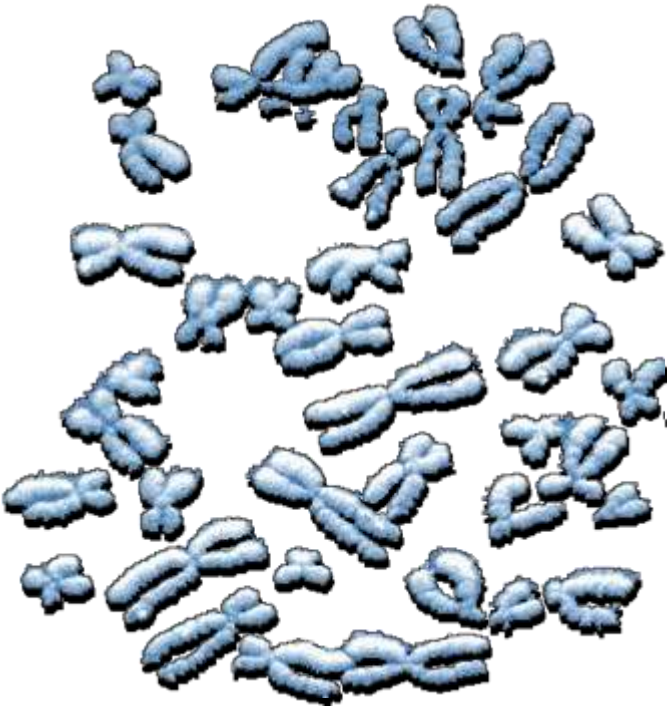


Unknowns in Stem Cell/Cloning Research



- It is uncertain that human embryonic stem cells *in vitro* can give rise to all the different cell types of the adult body.
- It is unknown if stem cells cultured *in vitro* (apart from the embryo) will function as the cells do when they are part of the developing embryo

Challenges to Stem Cell/Cloning Research



- Stem cells need to be differentiated to the appropriate cell type(s) *before* they can be used clinically.
- Recently, abnormalities in chromosome number and structure were found in three human ESC lines.

Challenges to Stem Cell/Cloning Research

- Stem cell development or proliferation must be controlled once placed into patients.
- Possibility of rejection of stem cell transplants as foreign tissues is very high.

Challenges to Stem Cell/Cloning Research

- Contamination by viruses, bacteria, fungi, and Mycoplasma possible.
- The use of mouse “feeder” cells to grow ESC could result in problems due to xenotransplantation (complicating FDA requirements for clinical use).

ETHICS &
POLITICS

Ethics



How far can we go with this?
Is it morally right?



The two of us!
There'll always be
Just you and me-
The two of us!



Are humans playing god?



Will embryo farms be around in the future?

DOCTOR FUN

19 Jan 98



Igor visits the Mad Scientist Shopping Club

Copyright © 1998 David Farley, d.farley@netnet.com
<http://www.netnet.com/~d.farley/d.farley.html>
This cartoon is made available for internet use without charge only.
All other rights reserved for the author. Please do not repost.

Health care costs

- Who will pay for all this?



Will cloning factories produce human organs?

