

Science & Technology

By Dr. Abhishek Sir



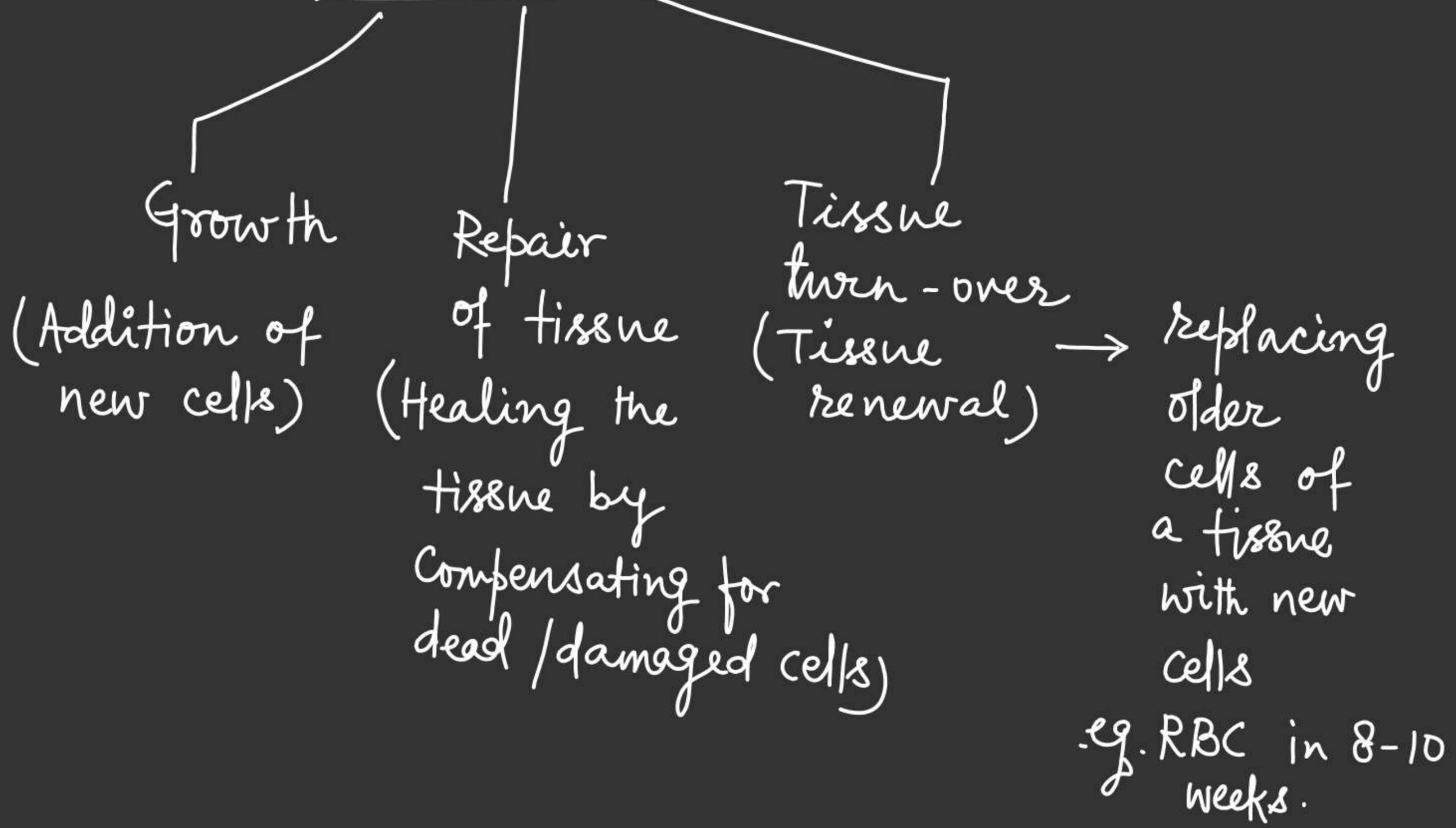
Stem Cells

- ✓ 1) What
- ✓ 2) Need
- ✓ 3) Types
- ✓ 4) Sources
- 5) How are they used
- 6) Applications
- 7) Limitations
- 8) Regulation in India

1) What?

→ Class notes

2. Need

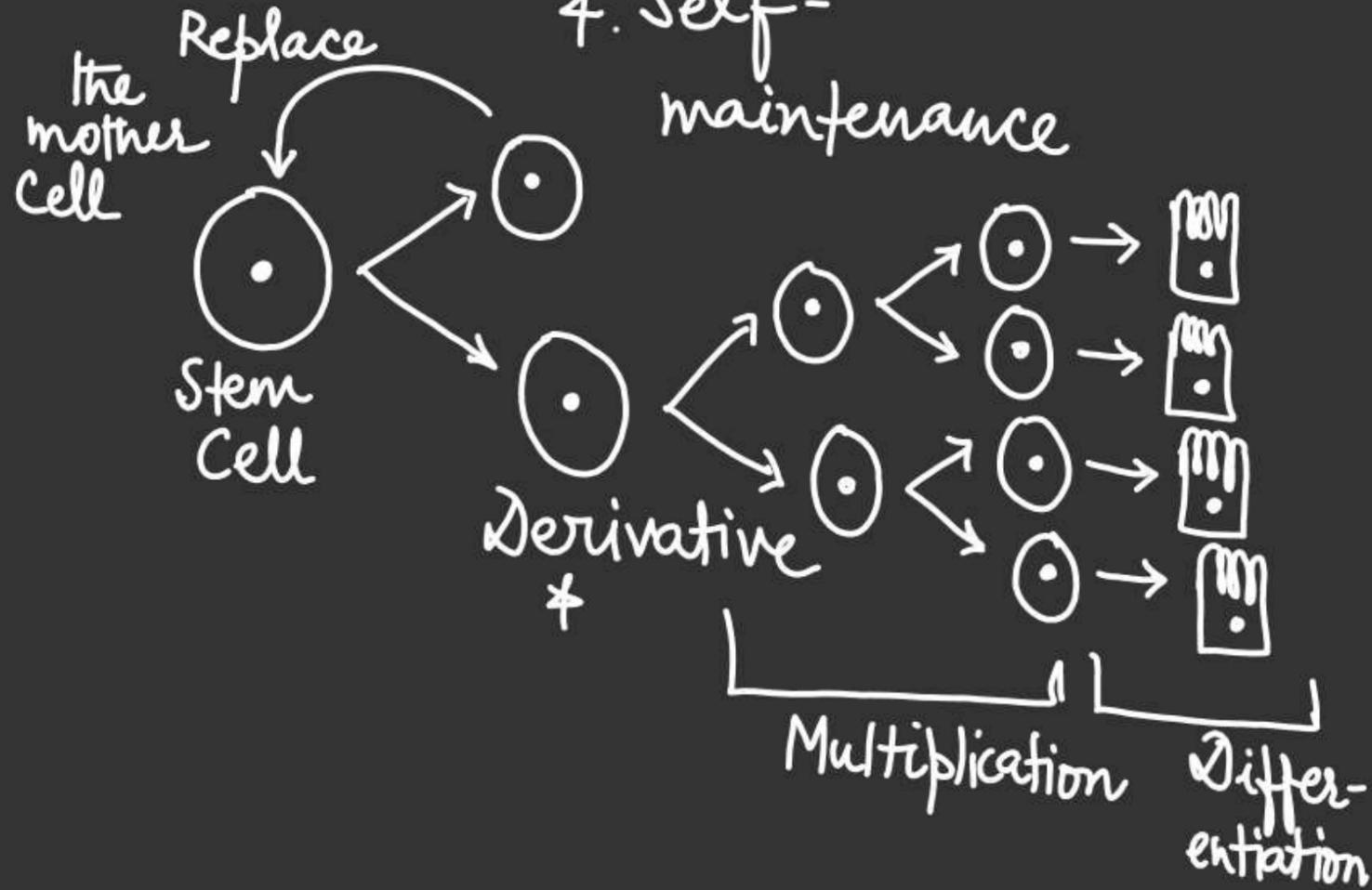


1. Small size

2. Relatively undifferentiated

3. Actively dividing
or
Have capacity to divide

4. Self-maintenance



Totipotent

Can give rise to all cell types / entire organism.

eg. Zygote.

Pluripotent

- Can give rise to a wide range of unrelated cell types

- medically most important

↳ Embryonic Stem cells

Multipotent

- can form several cell type but related to each other

↳ Bone marrow stem cells

4. Oligopotent

(only some cell types — eg. skin stem cells)

5. Uni / Mono-potent

(only a single cell type)

eg. → • Neuronal Stem Cells

• Muscle Stem Cells

• Gametic stem cells

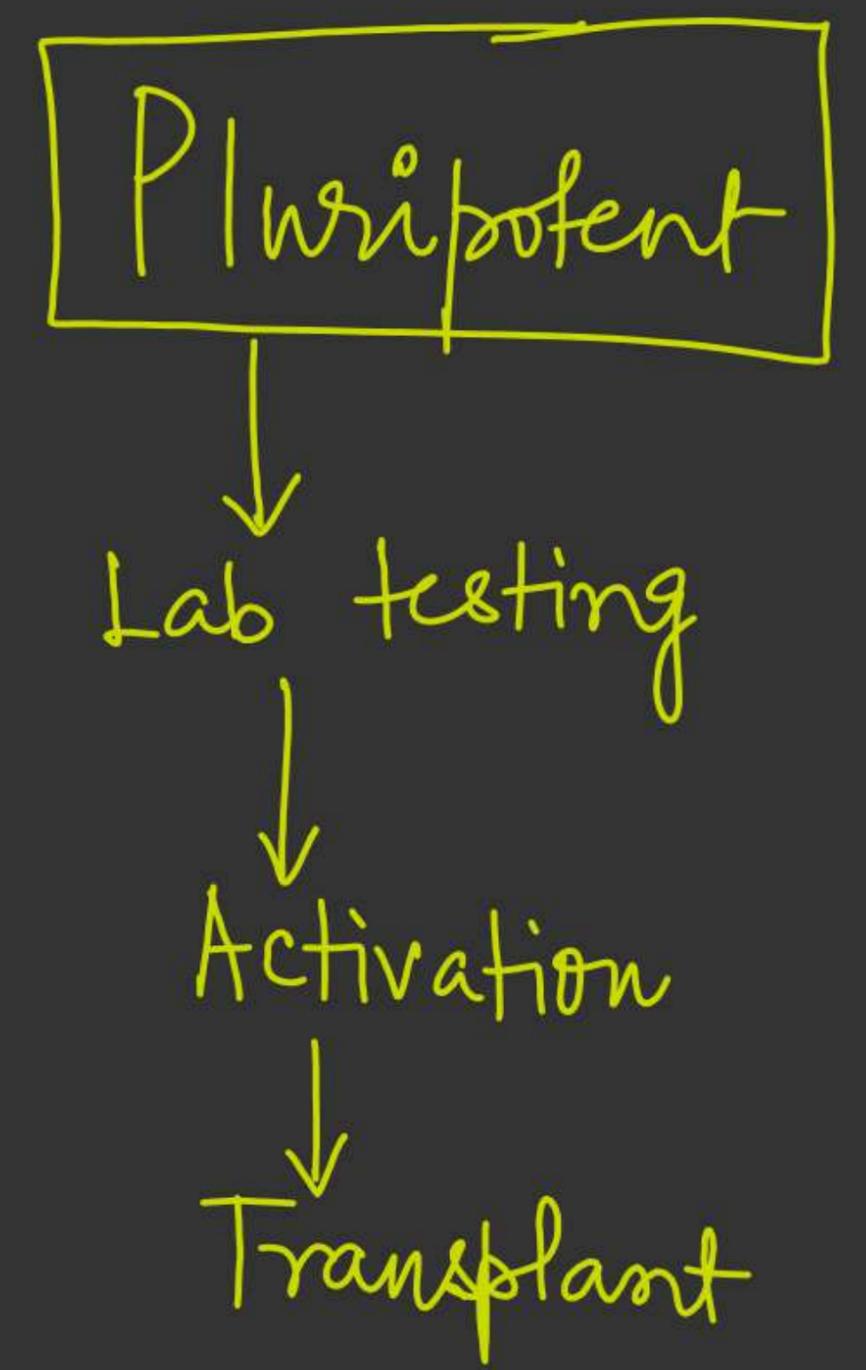
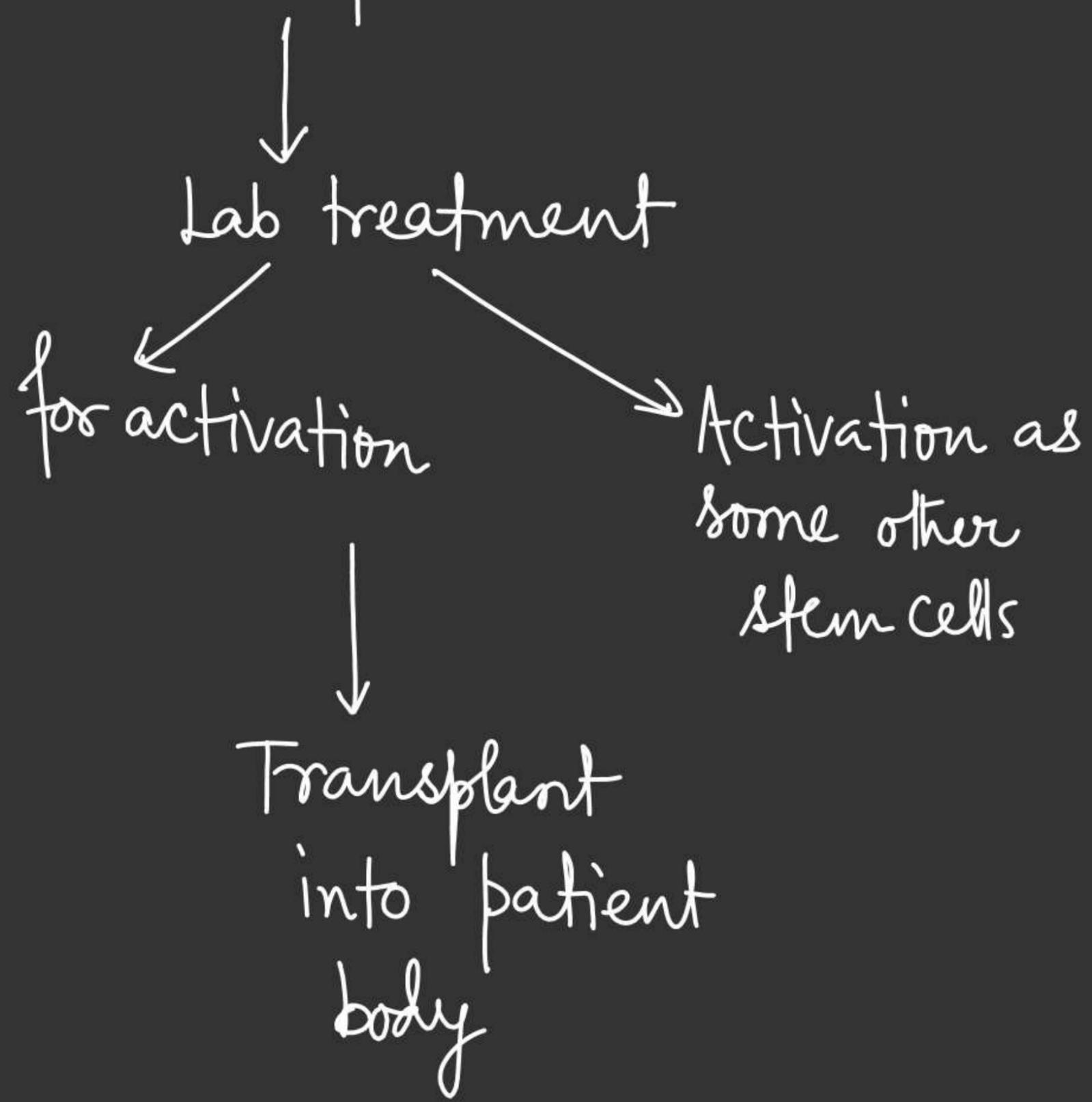
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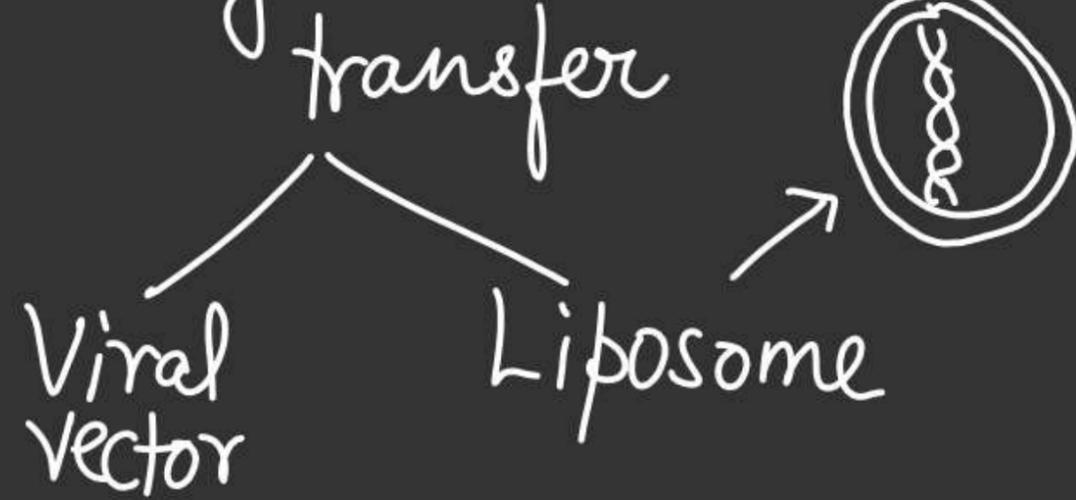
Developed in

2006, 2007

by Yamanaka & Gurdon

Nobel in 2012



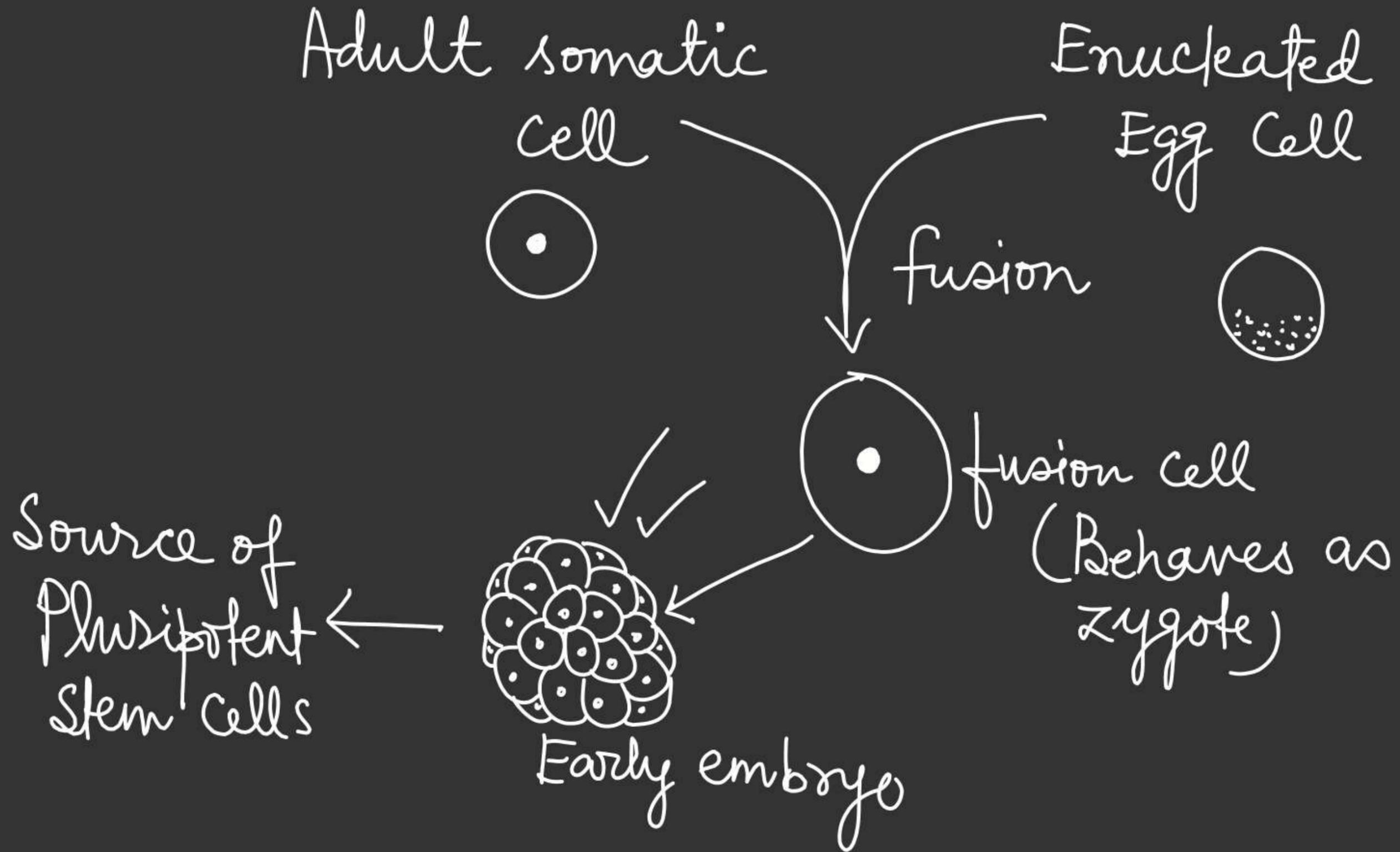


Gene transfer

↓ to
Stem cell

↓
GM Stem Cell

↓
Transplantation



7. Limitations

1) High failure rates if MpSC is used for some other type of cell regeneration

2) PSCs are very hard to obtain

3) Very expensive

1) ~~Final~~ National Guidelines for
Stem Cell Research, 2017

2) New Drugs and Clinical Trial
Rules, 2019

New Drugs

- Stem Cell Therapies
- Gene Therapies
- Xenotransplantation.

