Dr Md Enamul Hoque
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Department of Mechanical, Materials & Manufacturing Engineering
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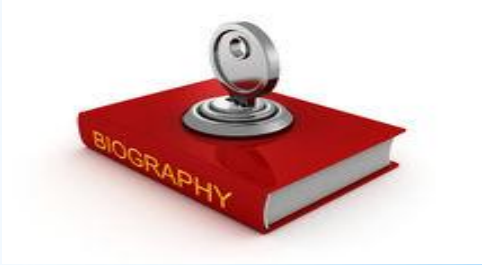
Editorial Board Member

Automatic Control of Physiological State and Function

CAREER HISTORY



January 2011 – To date Associate Professor, Department of Mechanical, Materials & Manufacturing Engineering; University of Nottingham Malaysia Campus

August 2007 – December 2010 Assistant Professor, Department of Mechanical, Materials & Manufacturing Engineering; University of Nottingham Malaysia Campus

May 2000 – July 2007 Research Scholar, Division of Bioengineering, Department of Mechanical Engineering National University of Singapore

March 1999 – April 2000 System Support Engineer, Spectra Solutions Limited, Bangladesh

RESEARCH INTEREST

- Rapid Prototyping Technology
- Biomaterials
- Tissue Engineering
- Stem Cells
- Bioenergy
- Polymeric Composites
- Nanomaterials
- Food Technology

RECENT PUBLICATIONS (Selected)

Md Enamul Hoque, Terrence Teh Hooi Meng, Leng Chuan Yong, Moniruddin Chowdhury, Gunnaeswara Prasad Rangabhatala. Hybrid 3D scaffolds for potential tissue engineering applications: Fabrication and characterization. Materials Letters, Vol. 131, pp. 255, 2014;doi: http://dx.doi.org/10.1016/j.matlet.2014.05.111

Azizeh-Mitra Yousefi, Md Enamul Hoque, R.G.S.V.Prasad, Nicholas Uth. Current Strategies in Gradient-based Scaffold Design for Osteochondral Tissue Engineering: A Review. Journal of Biomedical Materials Research: Part A (Published online on 01 October 2014); DOI: 10.1002/jbm.a.35356

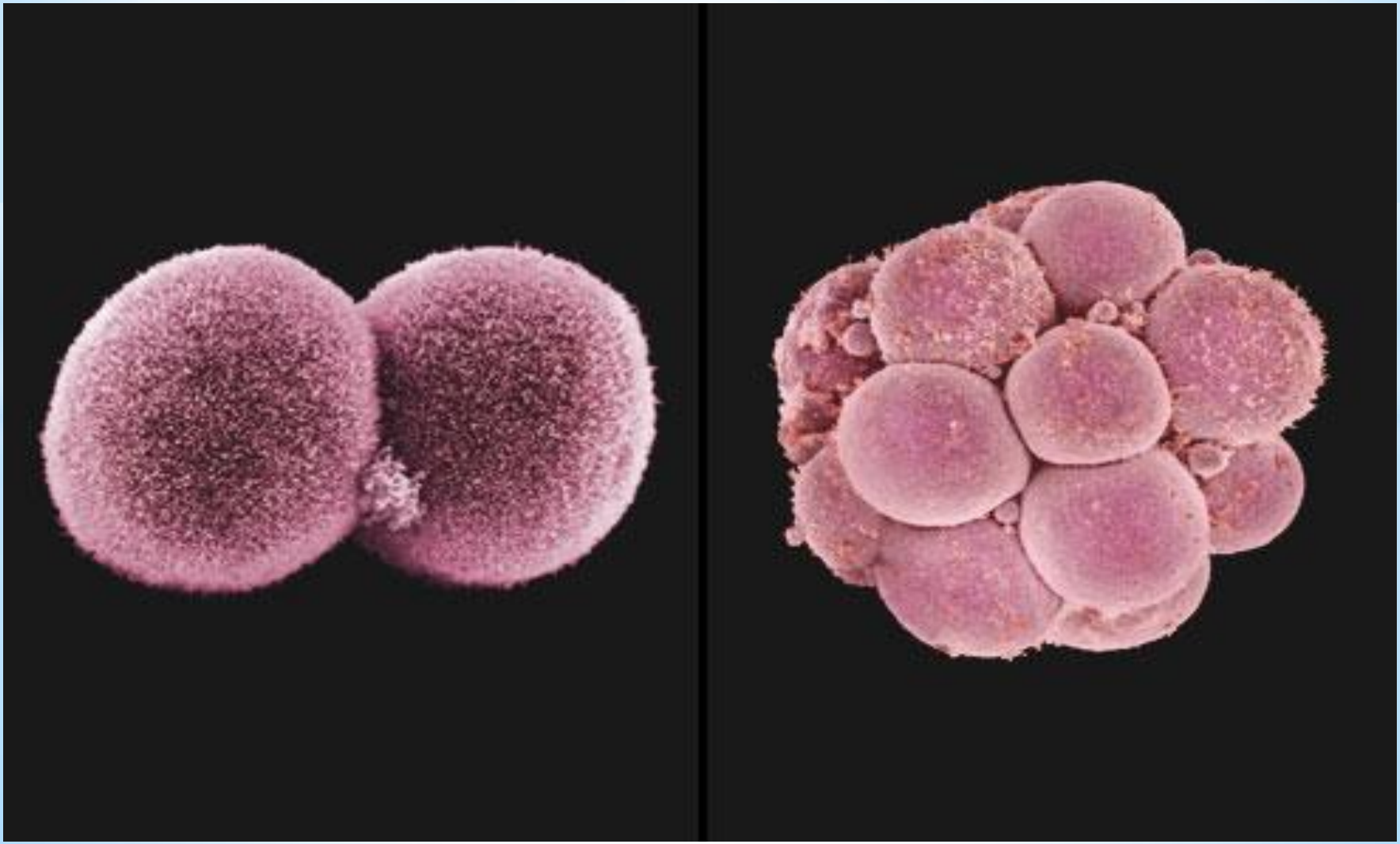
M. Enamul Hoque, M. A. I. M. Aminudin, M. Jawaid, M. S. Islam, Naheed Saba, M. T. Paridah. Physical, Mechanical, and Biodegradable Properties of Meranti Wood Polymer Composites. Materials and Design, Vol. 64, pp. 743, 2014.

http://dx.doi.org/10.1016/j.matdes.2014.08.024

Sheikh Imranudin Sheikh-Ali, Akil Ahmad, Siti-Hamidah Mohd-Setapar, Zainul Akmal Zakaria, Norfahana Abdul-Talib, Aidee Kamal Khamis, Md Enamul Hoque. The Potential Hazards of Aspergillus sp. in Food and Feeds, and the Role of Biological Treatment: A Review. Journal of Microbiology, Vol. 52(10), pp. 807-818, 2014; DOI: 10.1007/s12275-014-4294-7

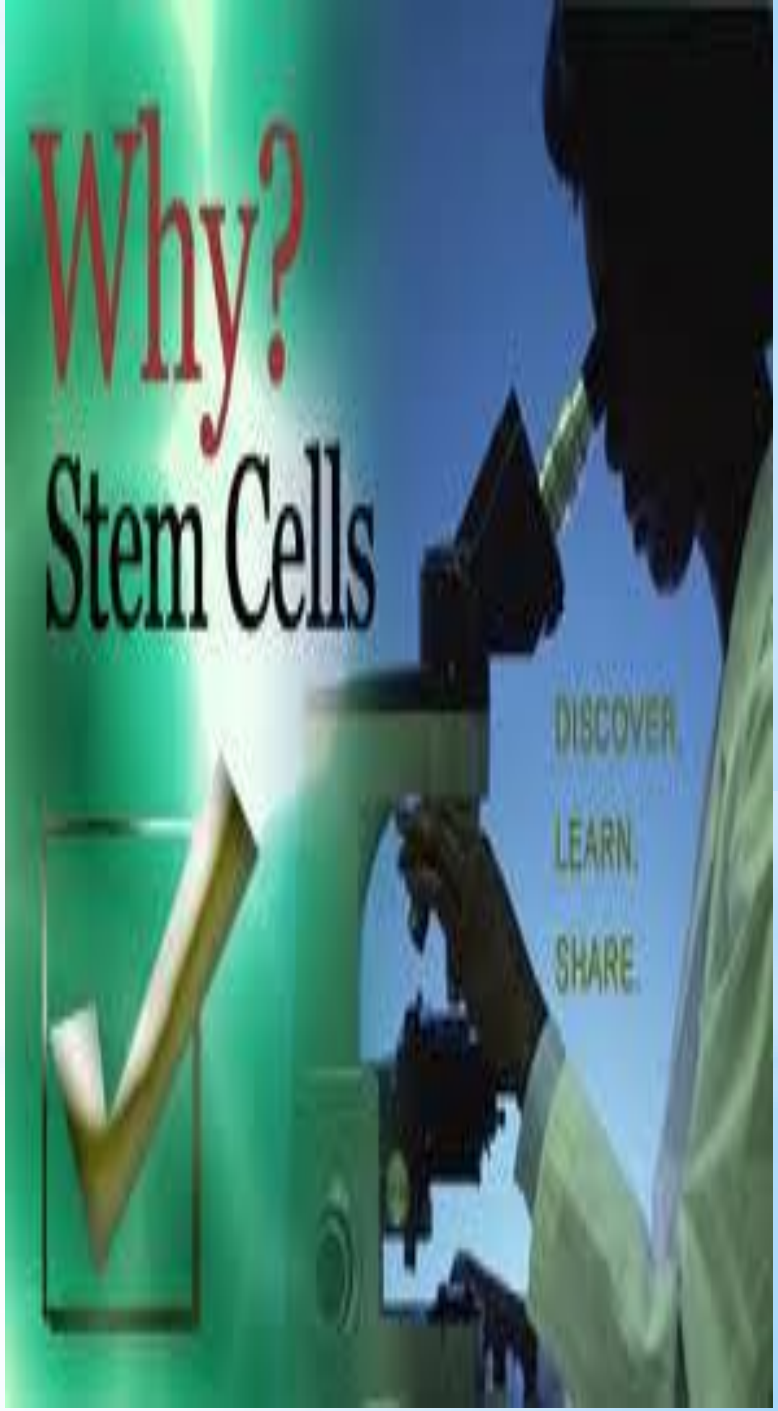
Sheik Mohideen Mohamed Nainar, Shahida Begum, M. N. M. Ansari, Md. Enamul Hoque, S. Sharen Aini, M. H. Ng, B. H. I. Ruszymah. Effect of compatibilizers on in vitro biocompatibility of PLA-HA bioscaffold. Bioinspired, Biomimetic and Nanobiomaterials (Published online on 07 August 2014); DOI: 10.1680/bbn.14.00014

STEM CELLS



STEM CELLS

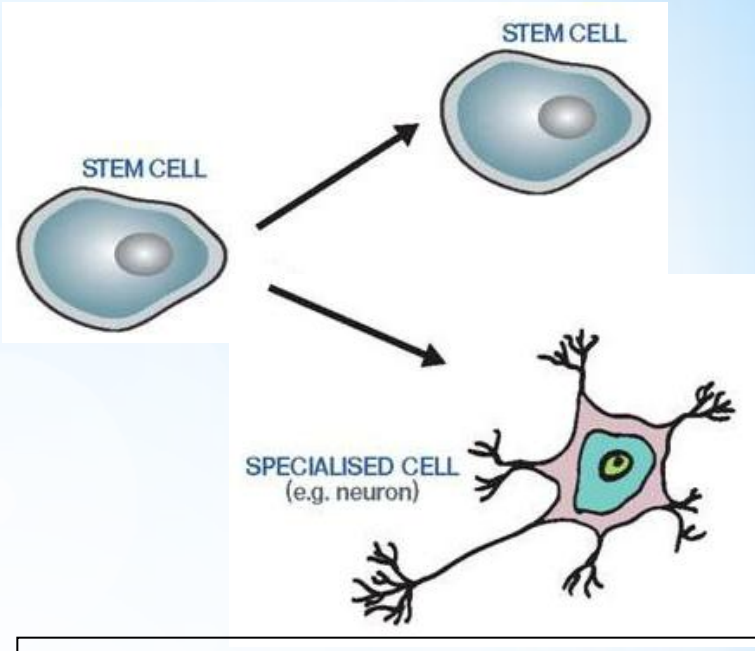
- The body is made up of about 200 different kinds of specialised cells such as muscle cells, nerve cells, fat cells and skin cells etc.
- All cells in the body come from stem cells
- A stem cell is a cell that is not yet specialised
- The process of specialisation is called differentiation
- Once the differentiation pathway of a stem cell has been decided, it can no longer become another type of cell on its own



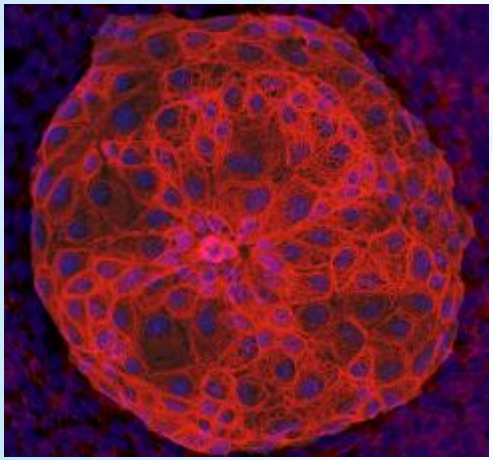
Why are Stem Cells Special?

Stem cells can:

- self-renew to make more stem cells
- differentiate into a specialized cell type

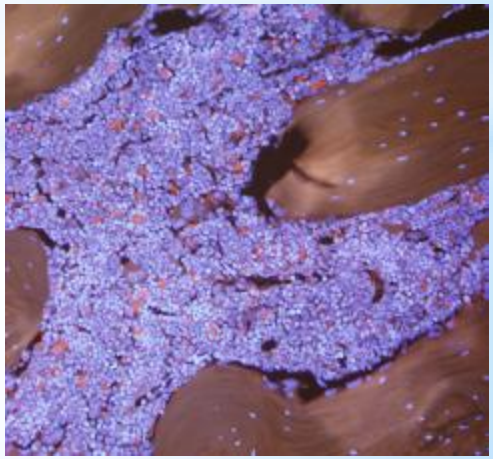


Stem cells that can become <u>many</u> types of cells in the body are called **pluripotent**



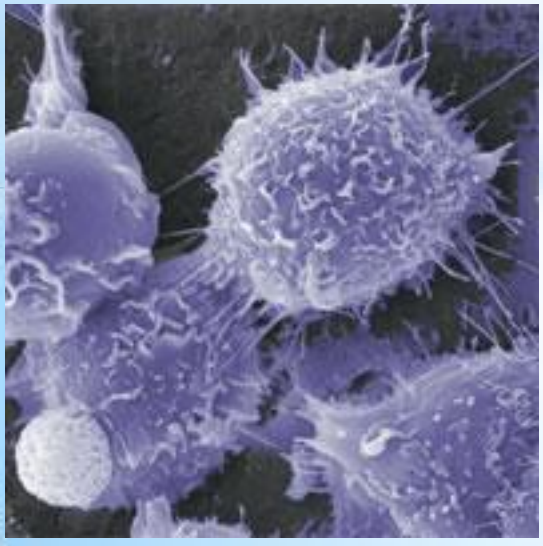
Embryonic stem cells (pluripotent)

Stem cells that can become only <u>a few</u> types of cells are called **multipotent**



Tissue stem cells (multipotent)

A Life Story…



Stem Cell History

1998 - Researchers first extract stem cells from human embryos

1999 - First Successful human transplant of insulin-making cells from cadavers

2001 - President Bush restricts federal funding for embryonic stem-cell research

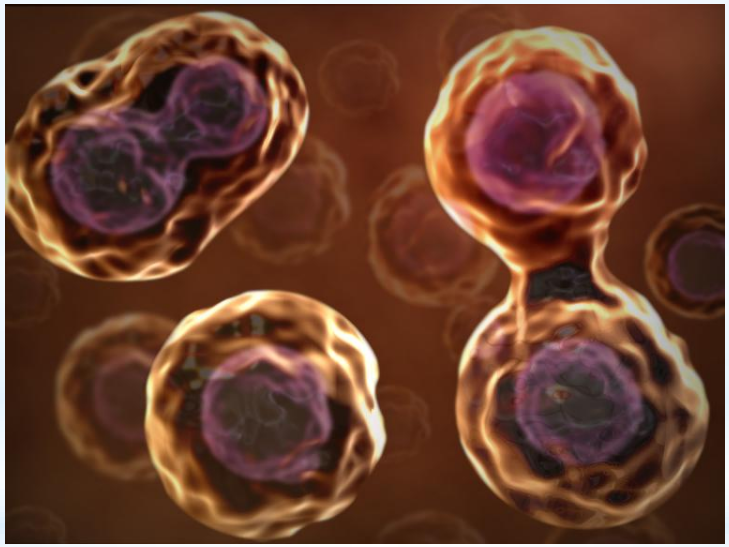
2002 - Juvenile Diabetes Research Foundation International creates $20 million fund-raising effort to support stem-cell research

2002 - California ok stem cell research

2004 - Harvard researchers grow stem cells from embryos using private funding

2004 - Ballot measure for $3 Billion bond for stem cells

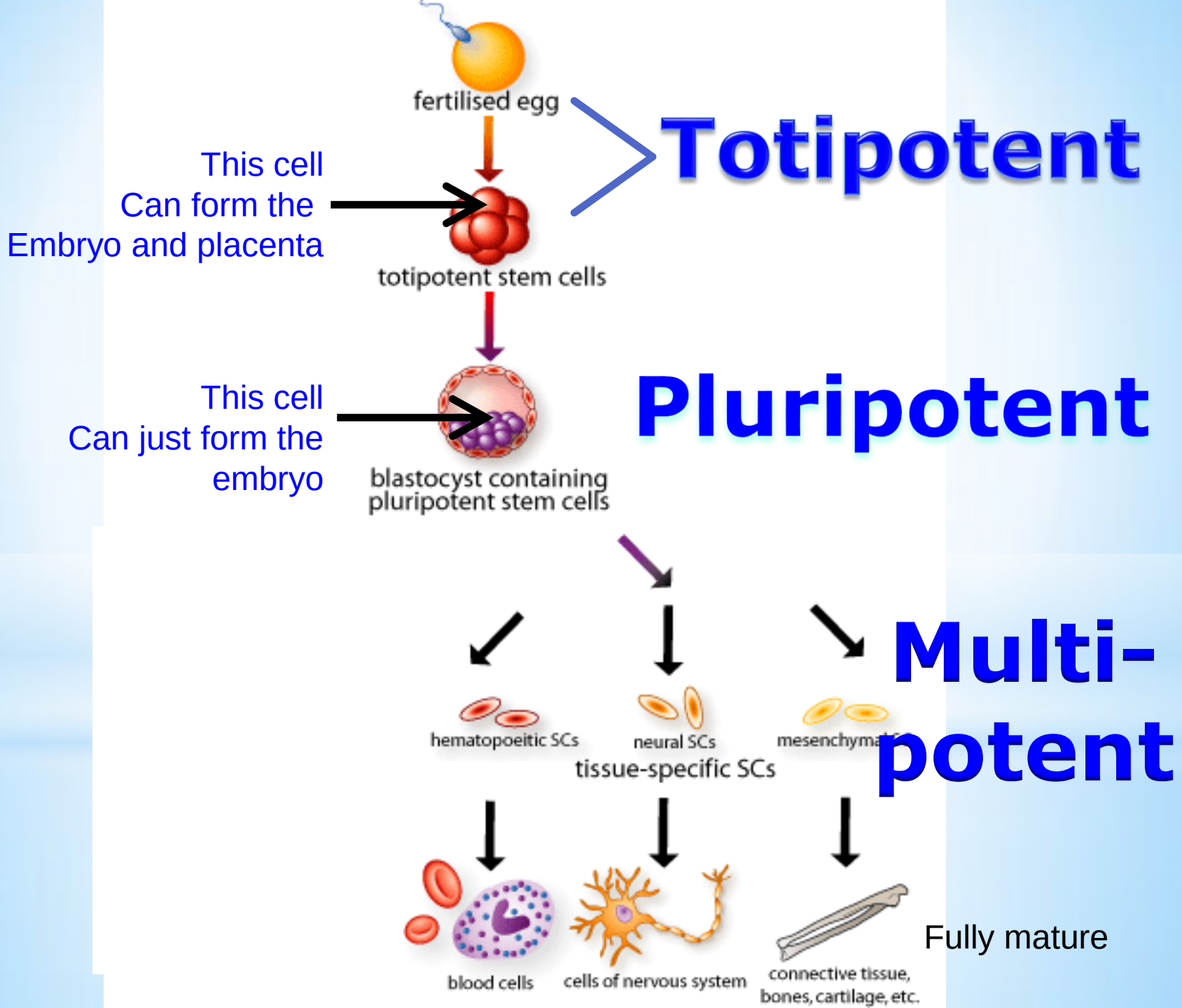
Stem Cell –Definition



A cell that has the ability to continuously divide and differentiate (develop) into various other kind(s) of cells/tissues

Kinds of Stem Cells

Stem Cell Type	Description	Examples
Totipotent	Each cell can develop into a new individual cell	Cells from early (1-3 days) embryos
Pluripotent	Cells can form any (over 200) cell types	Some cells of blastocyst (5 to 14 days)
Multipotent	Cells can form only a few types of cells	Fetal tissue, cord blood, and adult stem cells


fertilised egg
This cell
Can form the
Embryo and placenta
totipotent stem cells
Totipotent
This cell
Can just form the
embryo
blastocyst containing
pluripotent stem cells
Pluripotent
hematopoeitic SCs
neural SCs
tissue-specific SCs
Multi-
potent
blood cells
cells of nervous system
connective tissue,
bones, cartilage, etc.
Fully mature

Kinds of Stem Cells

Embryonic stem cells

- five to six-day-old embryo
- Tabula rasa

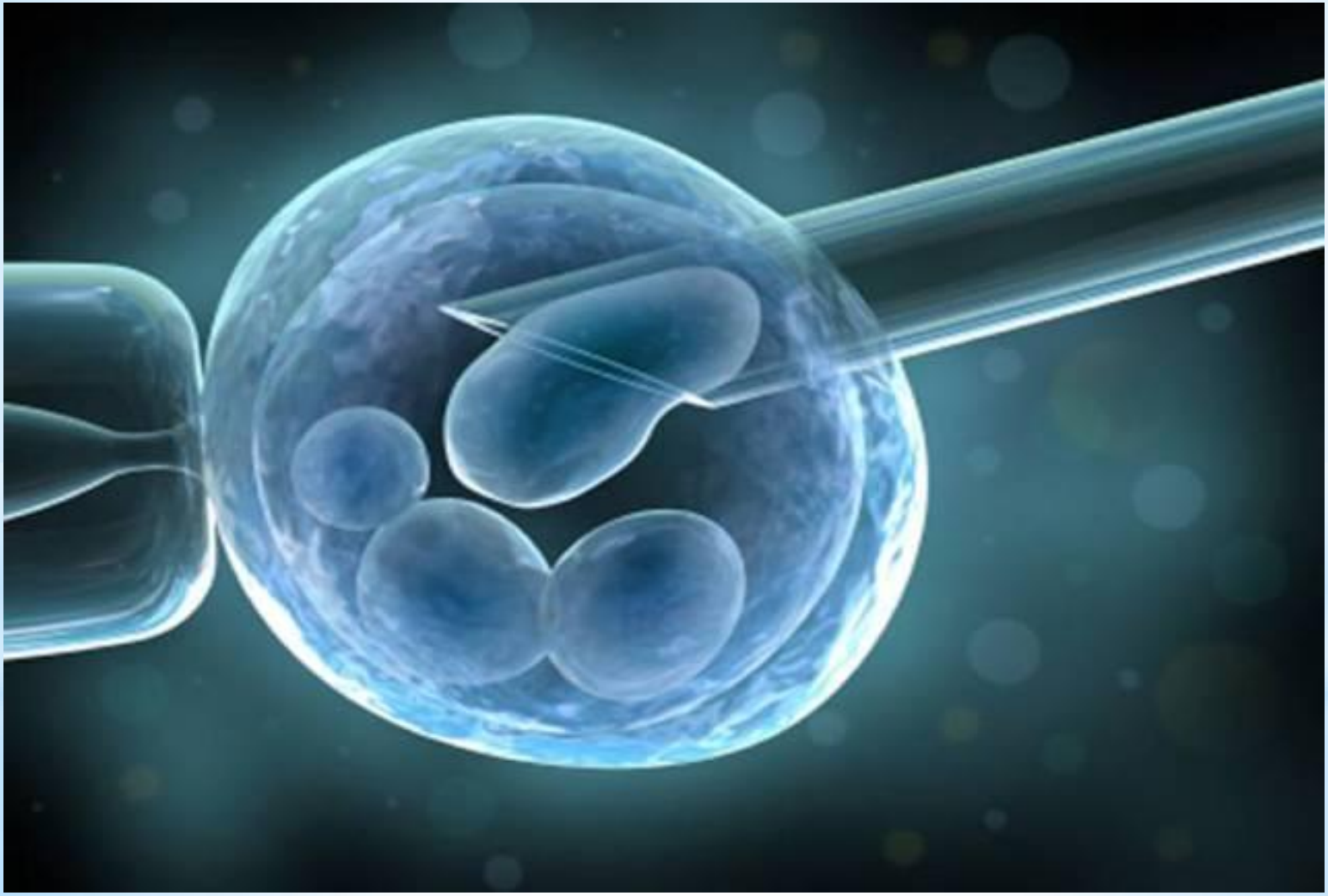
Embryonic germ cells

- derived from the part of a human embryo or fetus that will ultimately produce eggs or sperm (gametes).

Adult stem cells

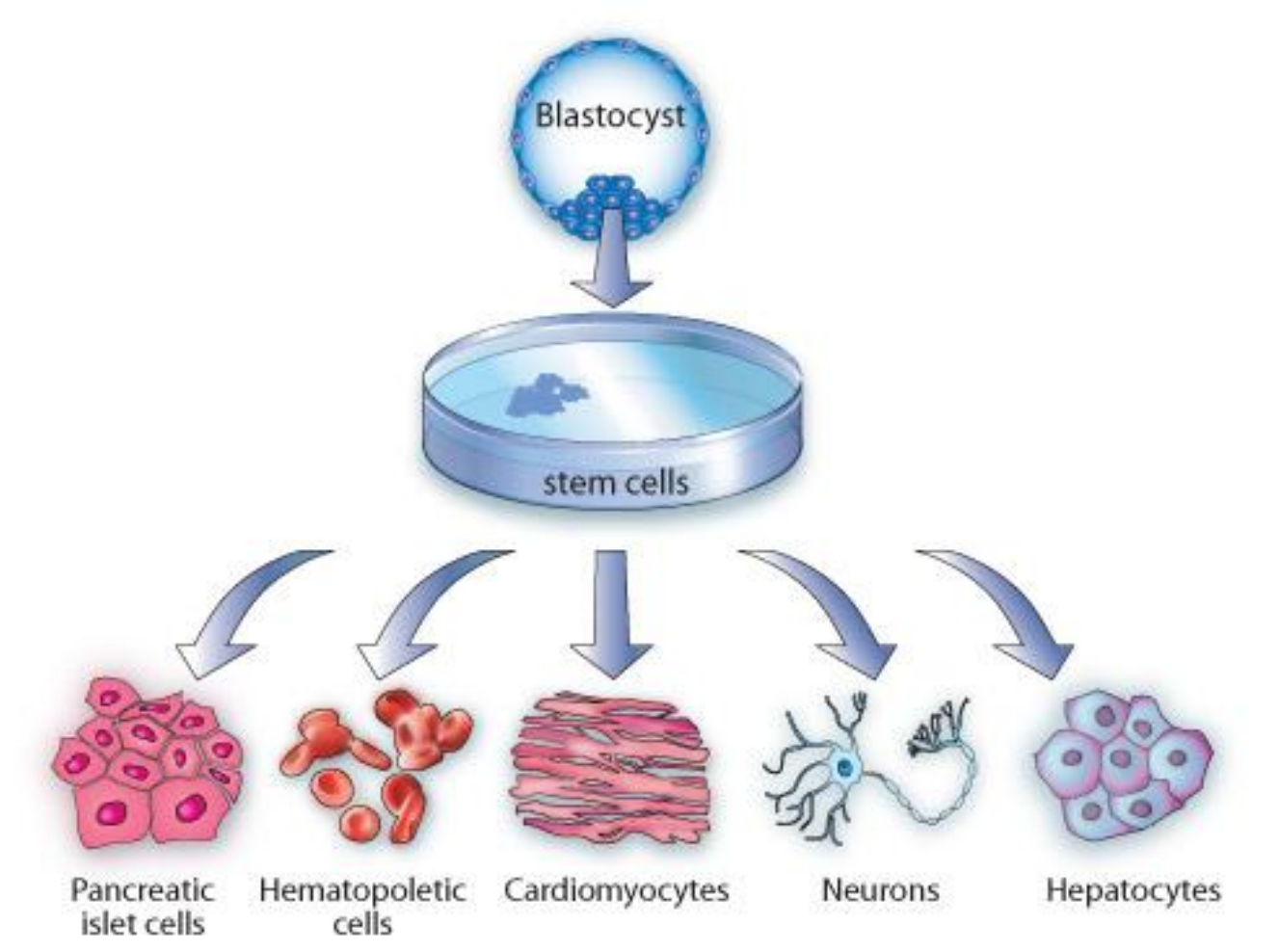
- undifferentiated cells found among specialized or differentiated cells in a tissue or organ after birth
- appear to have a more restricted ability to produce different cell types and to self-renew.

Embryonic Stem Cells



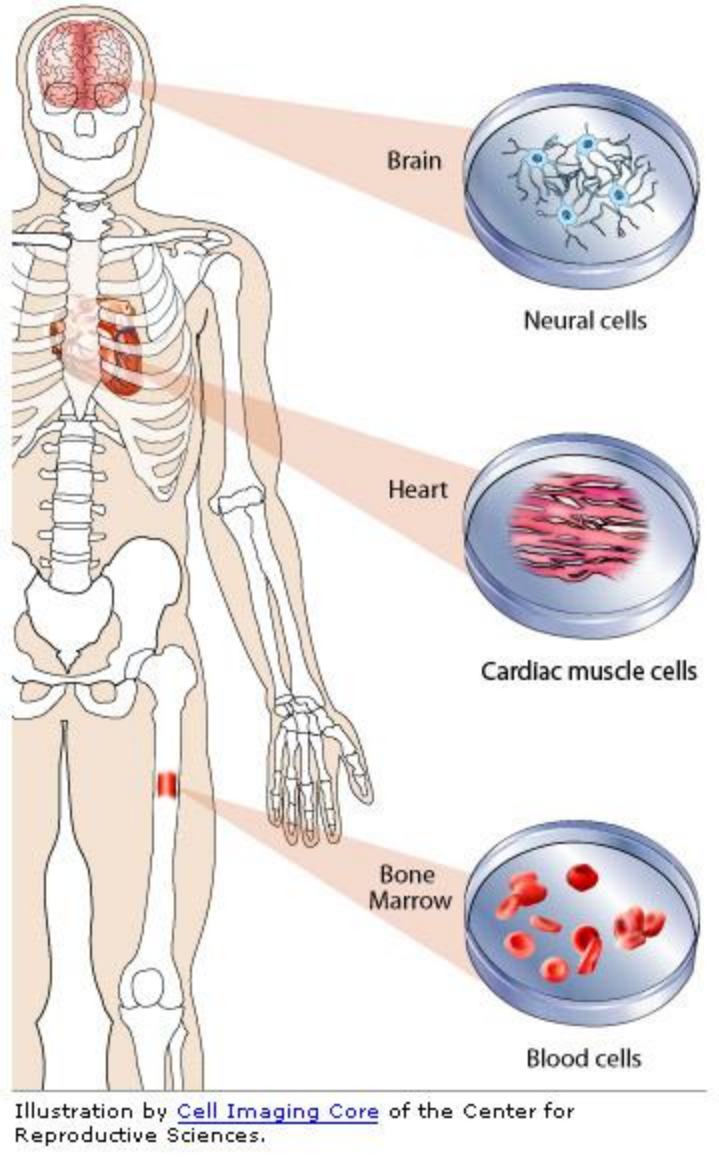
Mainly from IVF

Pluripotent Stem Cells –More potential to become any type of cell



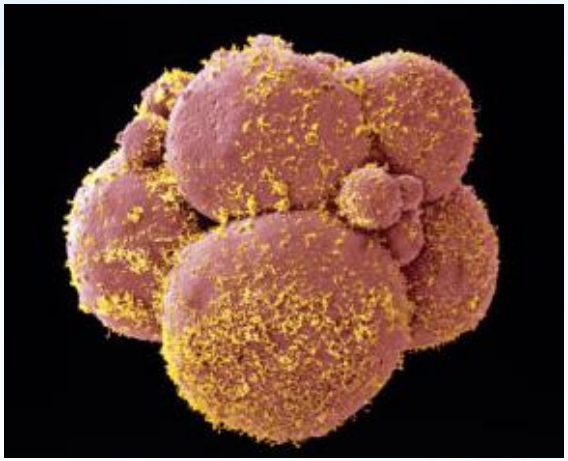
Multipotent stem cells

- Multipotent stem cells – limited in what the cells can become



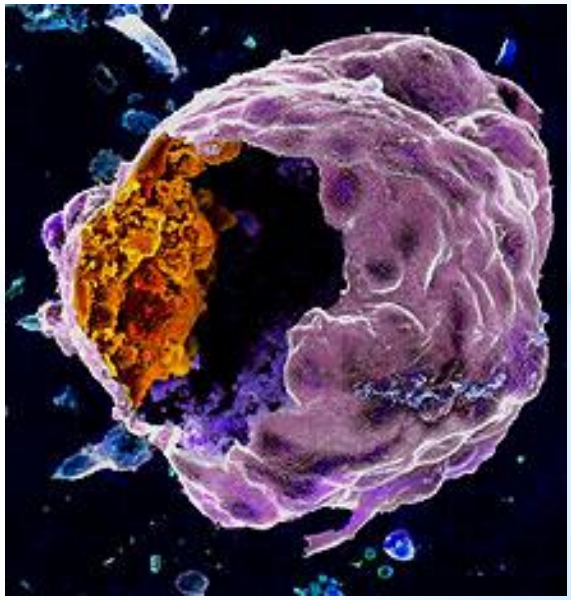
Stages of Embryogenesis

cleavage



8-cell stage

blastocyst



Blastocyst inner mass cells

Approved By

M. Enamul Hoque

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