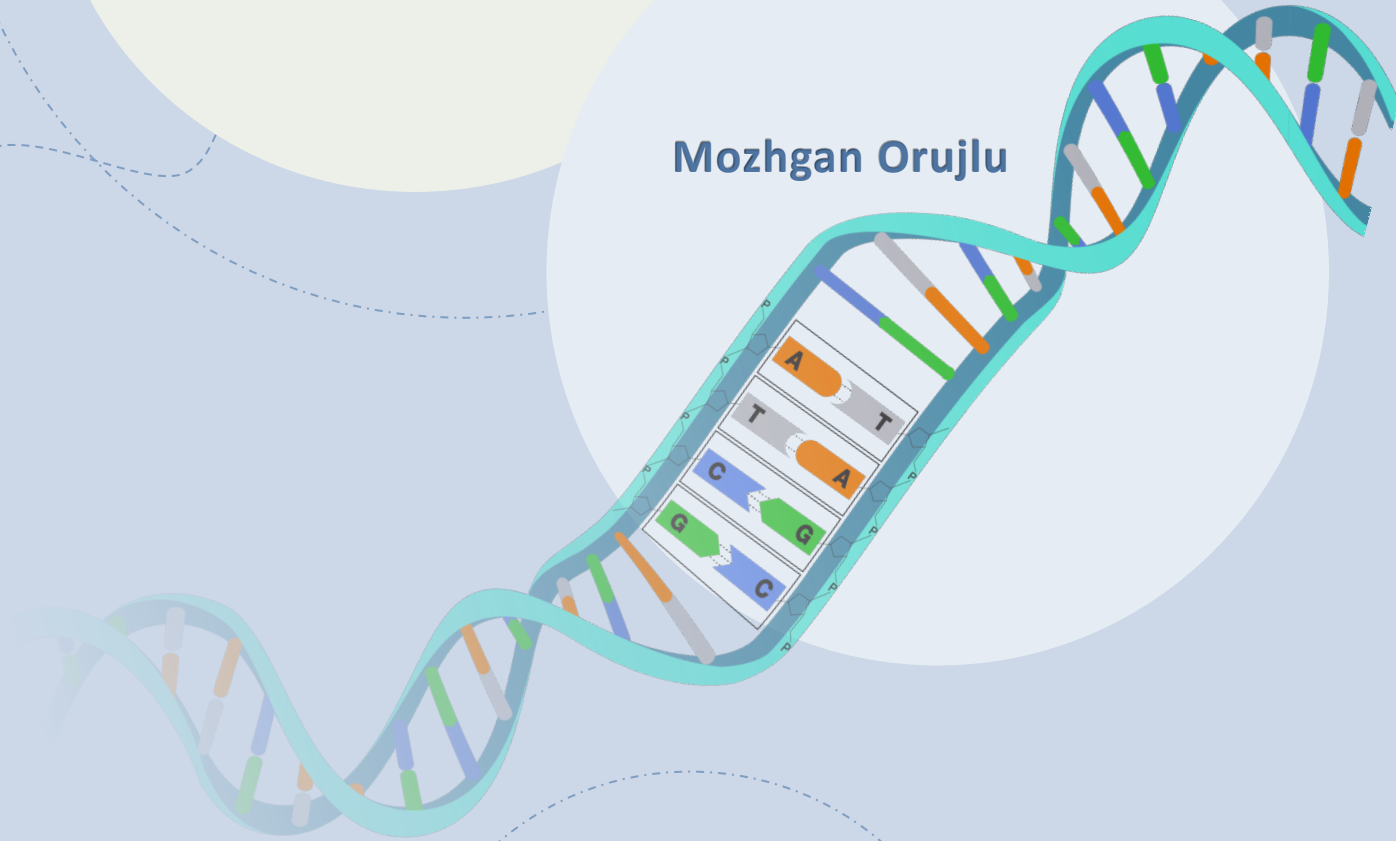


An Introduction to
**Single-Cell
RNA
Sequencing
Data**

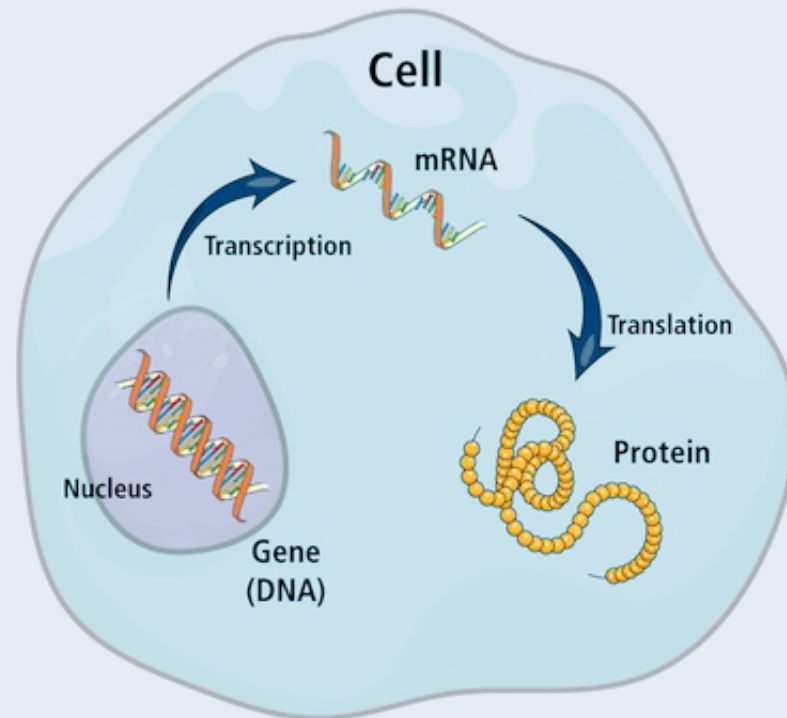
**Cell
Development**

Mozhgan Orujlu



Overview

- Cell fate



New system of gene therapy by introducing mRNA-loaded nanomachine



Image from Diverse Applications of mRNA Technology,
www.escolifesciences.com

Cell cycle

- Cell division
- Cell differentiation

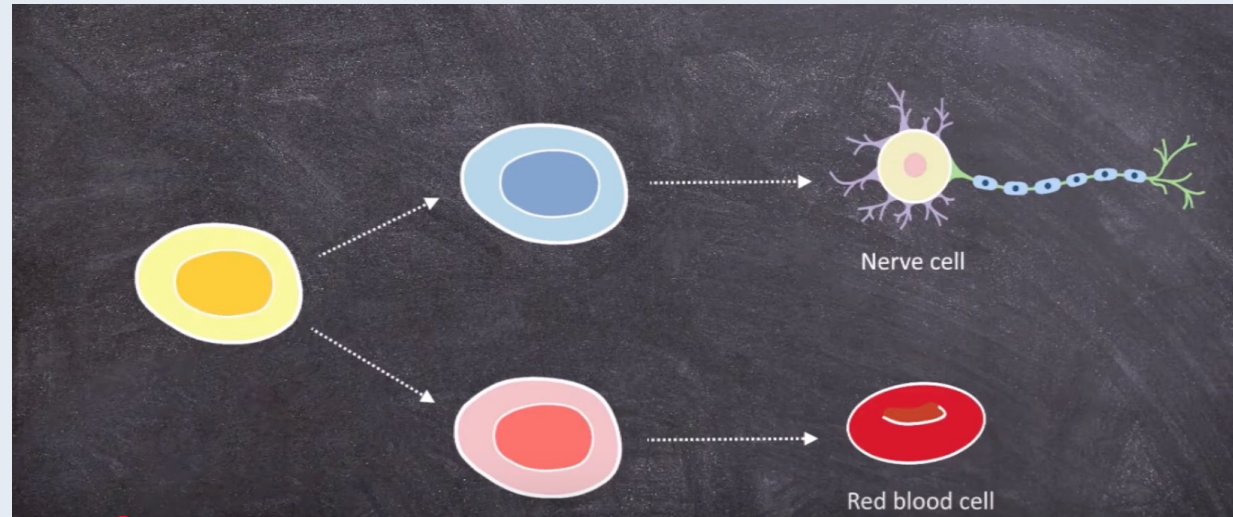
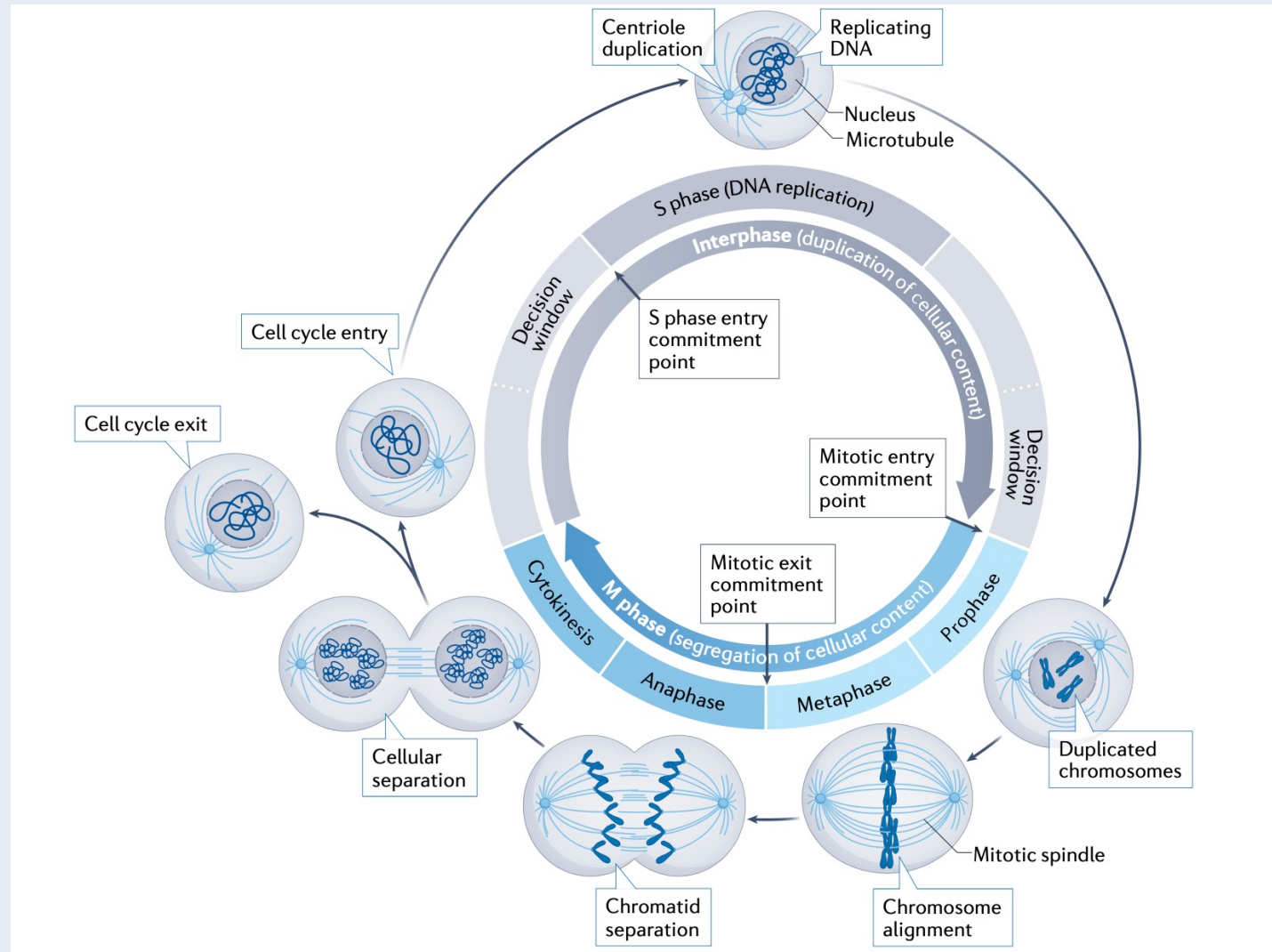


Image from Cell Differentiation & Gene Expression | Cell Biology, sci-ology

Cell division



Cell differentiation

Hematopoiesis

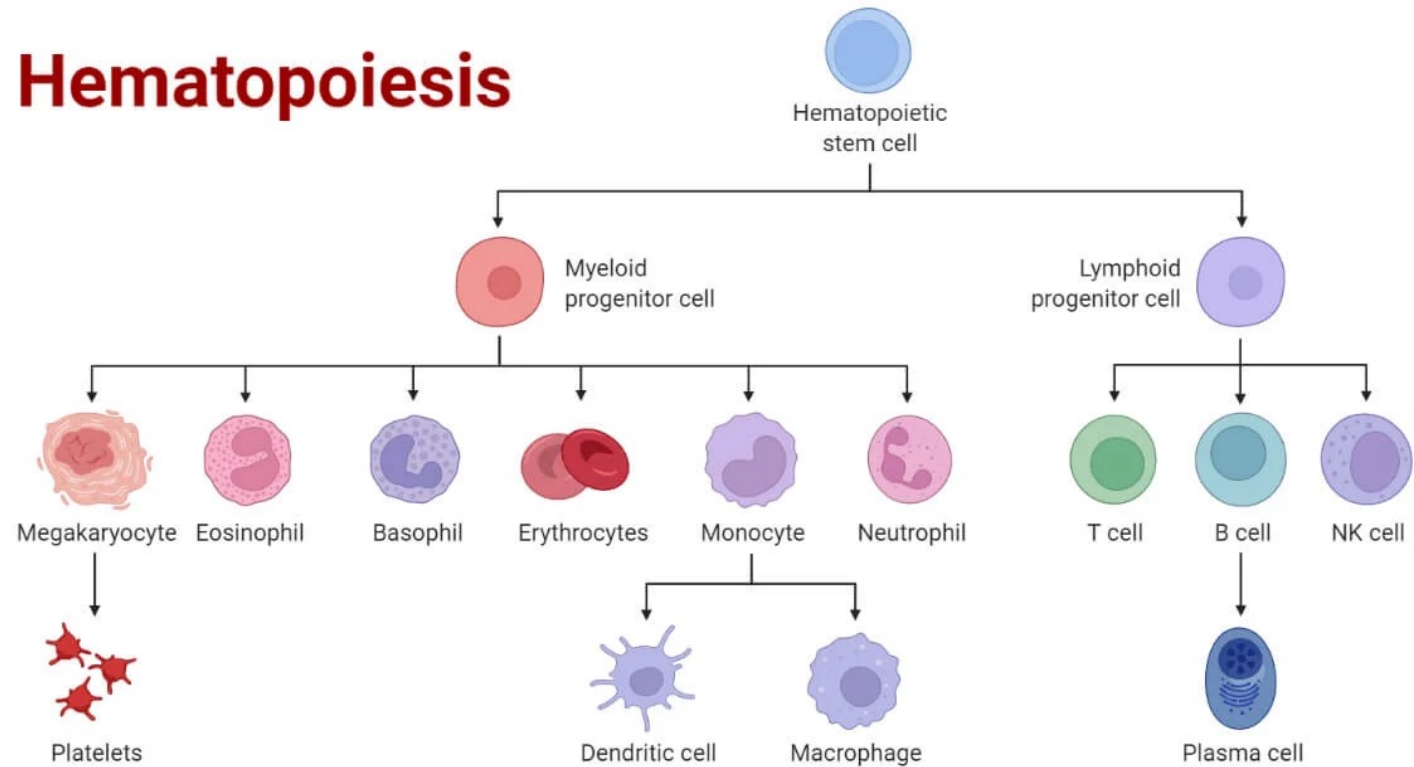


Image from Hematopoiesis- Definition, Cells, Growth Factors, Regulation
, www.microbenotes.com

Stem Cell

- Embryonic stem cells
- Somatic (adult) stem cells
- IPS cells

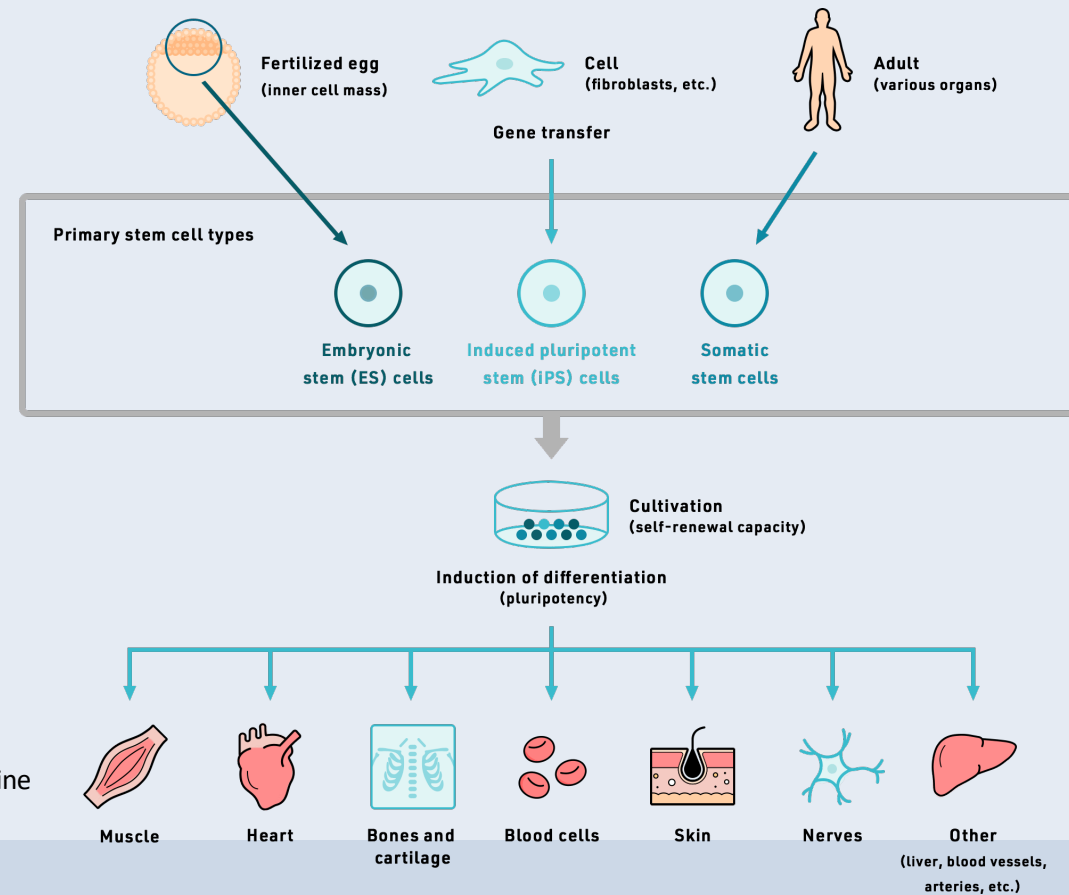
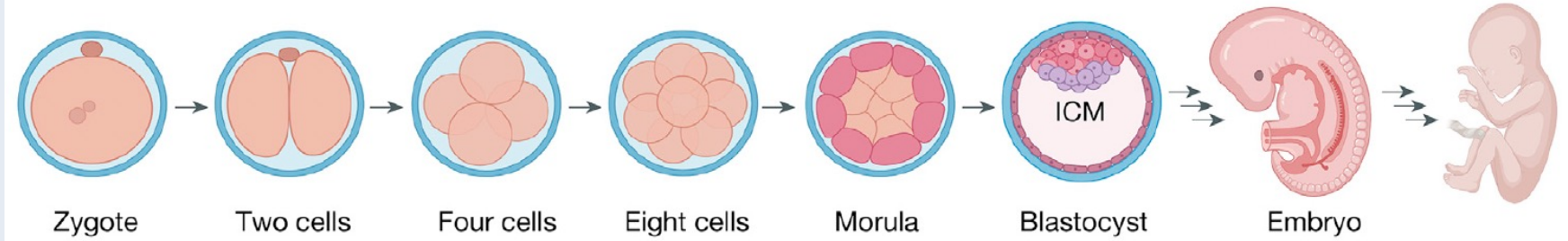


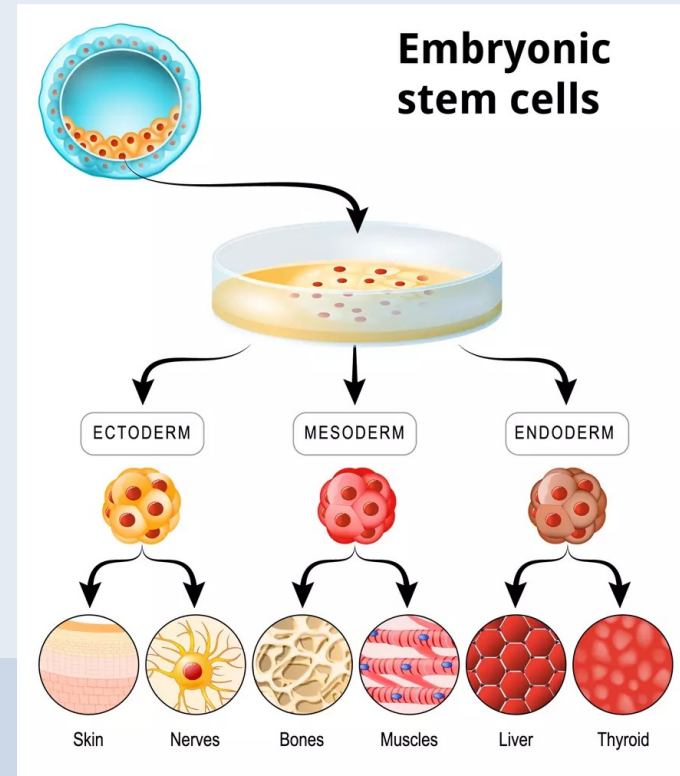
Image from Regenerative Medicine
www.sanbio.com

Embryonic stem cell



- Morphogens
- Signal factors

🔍: will be discussed



Stem Cell Reports,
Laleh Haghverdi and Leif S. Ludwig

Image from stem cells, www.biorbyt.com

Somatic stem cell

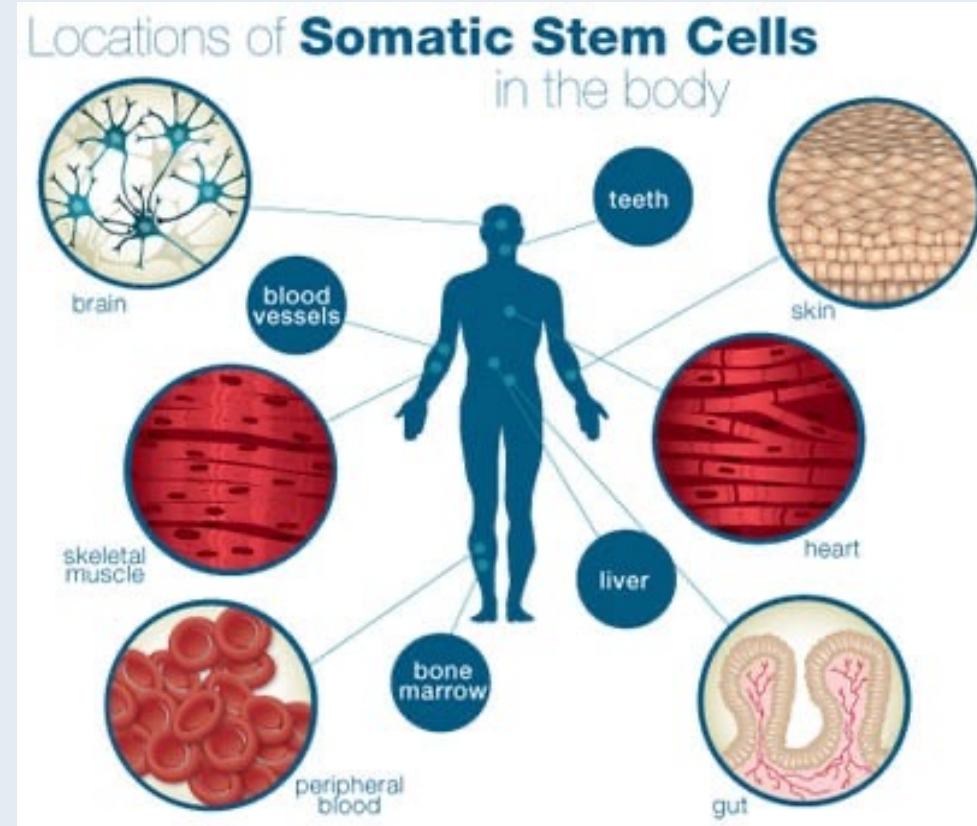
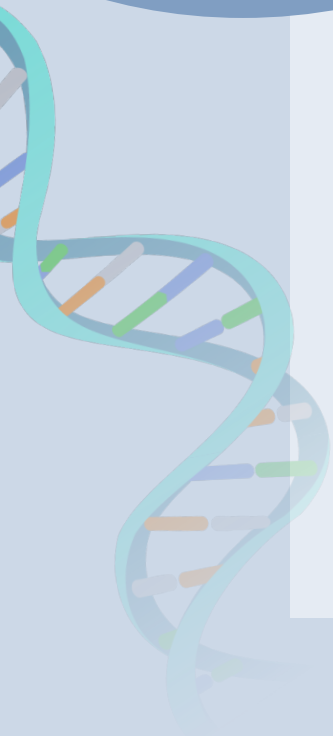


Image from learn.genetics

comparing
somatic stem cells
and
embryonic stem
cells



Feature	Somatic Stem Cells (Adult Stem Cells)	Embryonic Stem Cells
Origin	Found in specific tissues (e.g., bone marrow, brain, skin)	Derived from the inner cell mass of a blastocyst (early embryo)
Potency	Multipotent – can become only a limited range of cell types related to their tissue of origin	Pluripotent – can differentiate into any cell type in the body
Function	Tissue maintenance and repair	Formation of all body tissues during development
Availability	Harder to isolate, limited in number	Easier to grow in large quantities in the lab
Proliferation	Limited self-renewal, may lose potency with age	Can divide indefinitely under proper conditions
Therapeutic Use	Used in regenerative medicine, but with limited applications	High potential for regenerative medicine, but ethical issues limit use

Next session

- **Gene regulation**

- DNA and mRNA
- Gene expression
- Transcription factors
- Chromatin remodelers

