

Differentiation

Biology

How identical cells become different, with the same genome.

The process by which a less specialised cell becomes a specialised type, driven by differential gene expression rather than by any change in the DNA sequence.

CELL TYPES

~200 in humans

SAME GENOME

yes

DIFFERS BY

expression

- All somatic cells carry the same genome.
- Differentiation is regulated by transcription factors.
- Epigenetic marks — methylation, histone modification — lock in the state.
- Homeobox genes control body plan across animals.
- Differentiation is usually stable but can be reversed experimentally.
- Dolly the sheep demonstrated that a differentiated nucleus retains full potential.

LOOK FOR IT

A neuron and a liver cell contain identical DNA and express entirely different subsets of it.

Epigenetic marks are heritable through cell division, which is what keeps a liver cell producing liver cells.