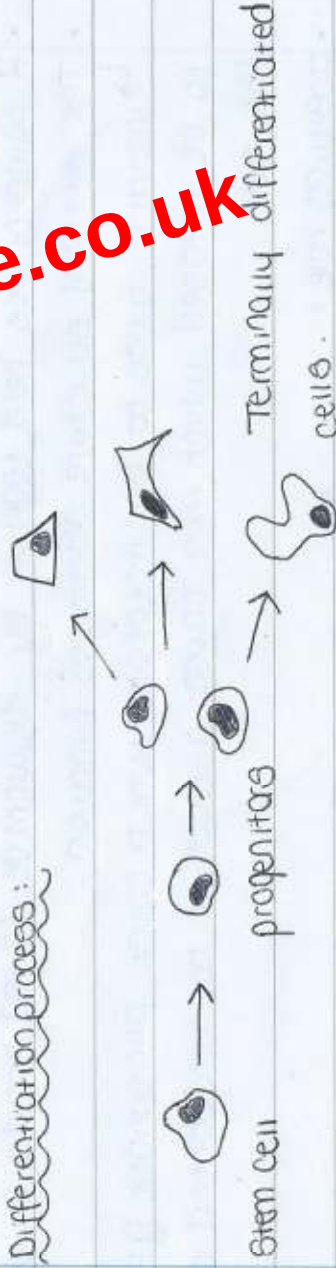


Cell specification.

- All cells differentiate from embryonic stem cells.
 - Differentiated cells have different patterns of protein expression and distribution, and different patterns of gene expression = different jobs.
- Almost all cells contain the same genes, proven by reproductive cloning. *DNA in a cell can express proteins to make whole organisms.*
- Different cell-types express the same proteins. Common proteins and enzymes include tubulin, RNA polymerase, and histones.
 - 'House keeping genes' = expressed the same in all cells.
- Proteins expressed only by one or other tissue = specialised gene.

Differentiation process:



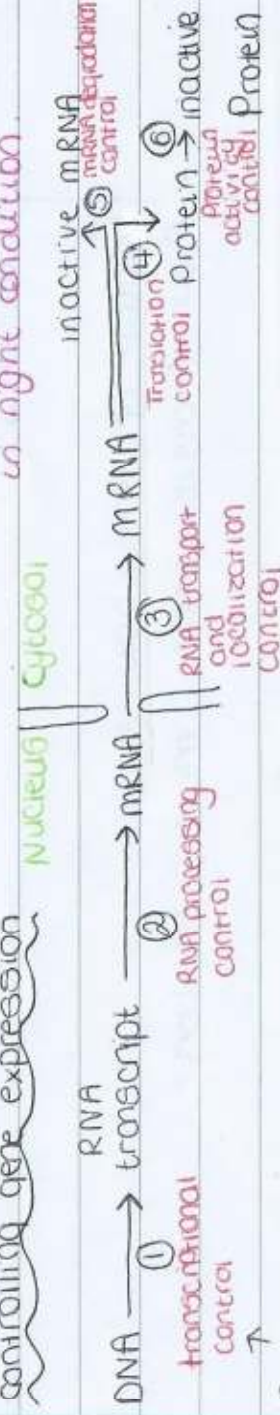
Gene expression

- Most cells express 10,000 - 15,000 genes.
- Not all genes are expressed at an equal rate → some are abundant and some are scarce.

Genes can be either: ① Constitutively expressed *always on*

② Conditionally expressed. *inducible → switches on*

controlling gene expression



The predominant level of control