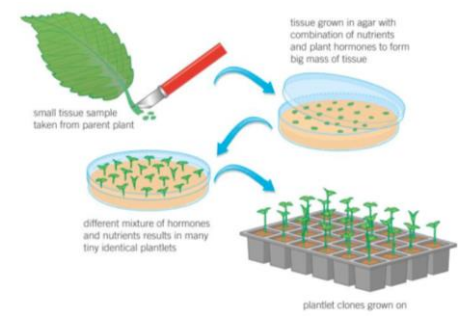


# Biology 14: Variation and evolution (Triple)

## 1. Cloning (TRIPLE ONLY)


**Tissue cloning**

Using groups of cells from a plant to grow identical new plants



The diagram shows a 'small tissue sample taken from parent plant' being placed on a petri dish with 'tissue grown in agar with combination of nutrients and plant hormones to form big mass of tissue'. From this mass, 'different mixture of hormones and nutrients results in many tiny identical plantlets'. These 'plantlet clones grown on' a tray.

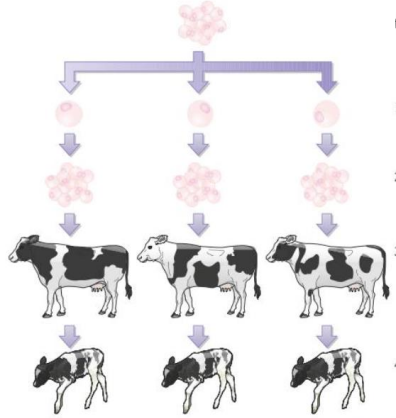
**Cuttings**



Old fashioned simple method of growing a new plant from part of an old plant

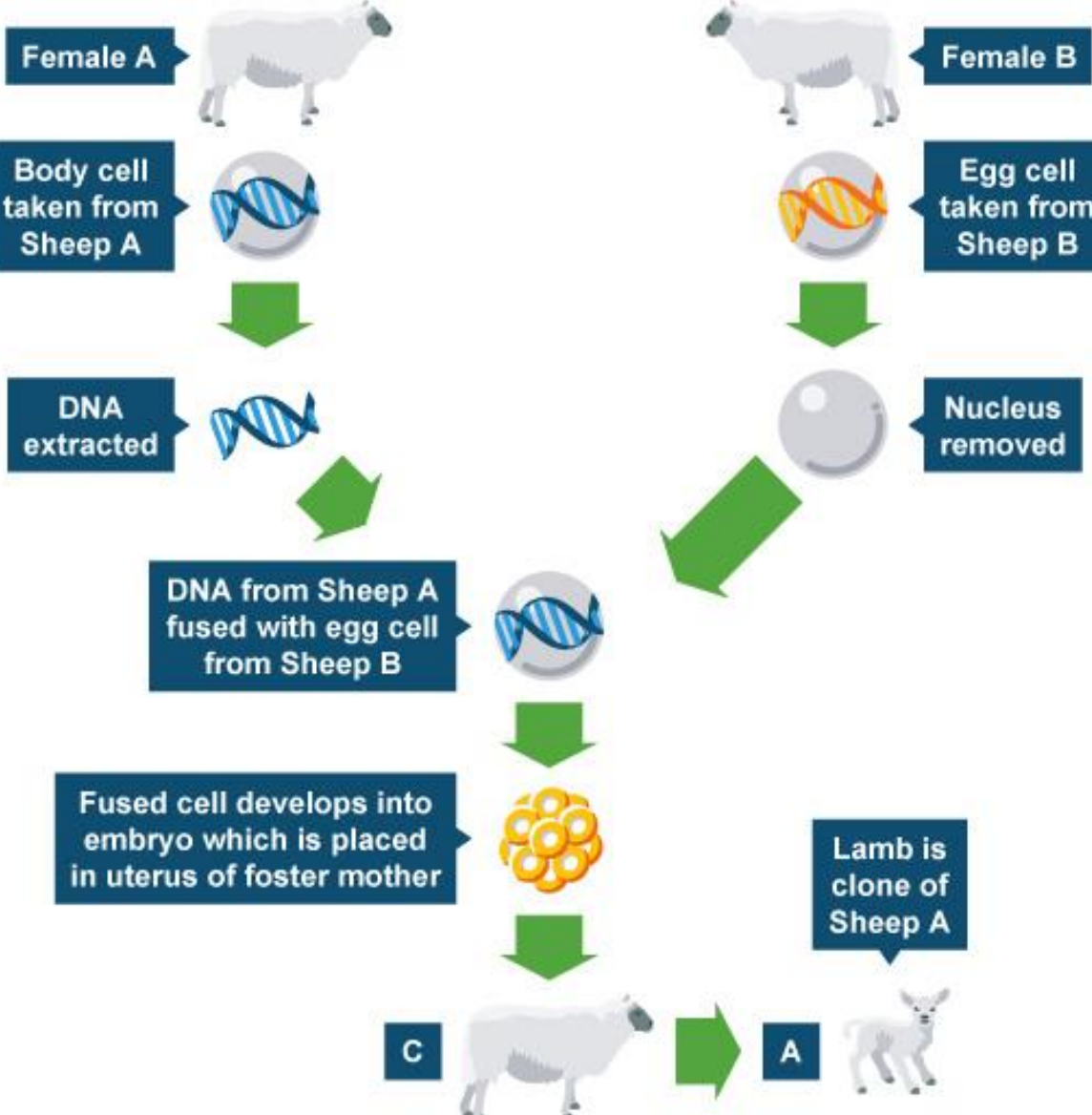
**Embryo transplant**

Splitting apart un specialised animal cells from an embryo and transplanting them into host mother



The diagram shows an embryo being split into three parts. Each part is transplanted into a different cow (labeled C, B, and A). Each cow then gives birth to a calf, illustrating how one embryo can produce multiple clones.

## 2. Adult cell cloning (TRIPLE ONLY)



The flowchart illustrates the process of adult cell cloning:

- Female A** and **Female B** are the starting points.
- Body cell taken from Sheep A** and **Egg cell taken from Sheep B** are collected.
- DNA extracted** from the body cell and **Nucleus removed** from the egg cell.
- DNA from Sheep A fused with egg cell from Sheep B** to create a fused cell.
- Fused cell develops into embryo which is placed in uterus of foster mother**.
- The foster mother (labeled **C**) gives birth to a **Lamb is clone of Sheep A** (labeled **A**).