

Lecture for Wednesday

Dr. Prince

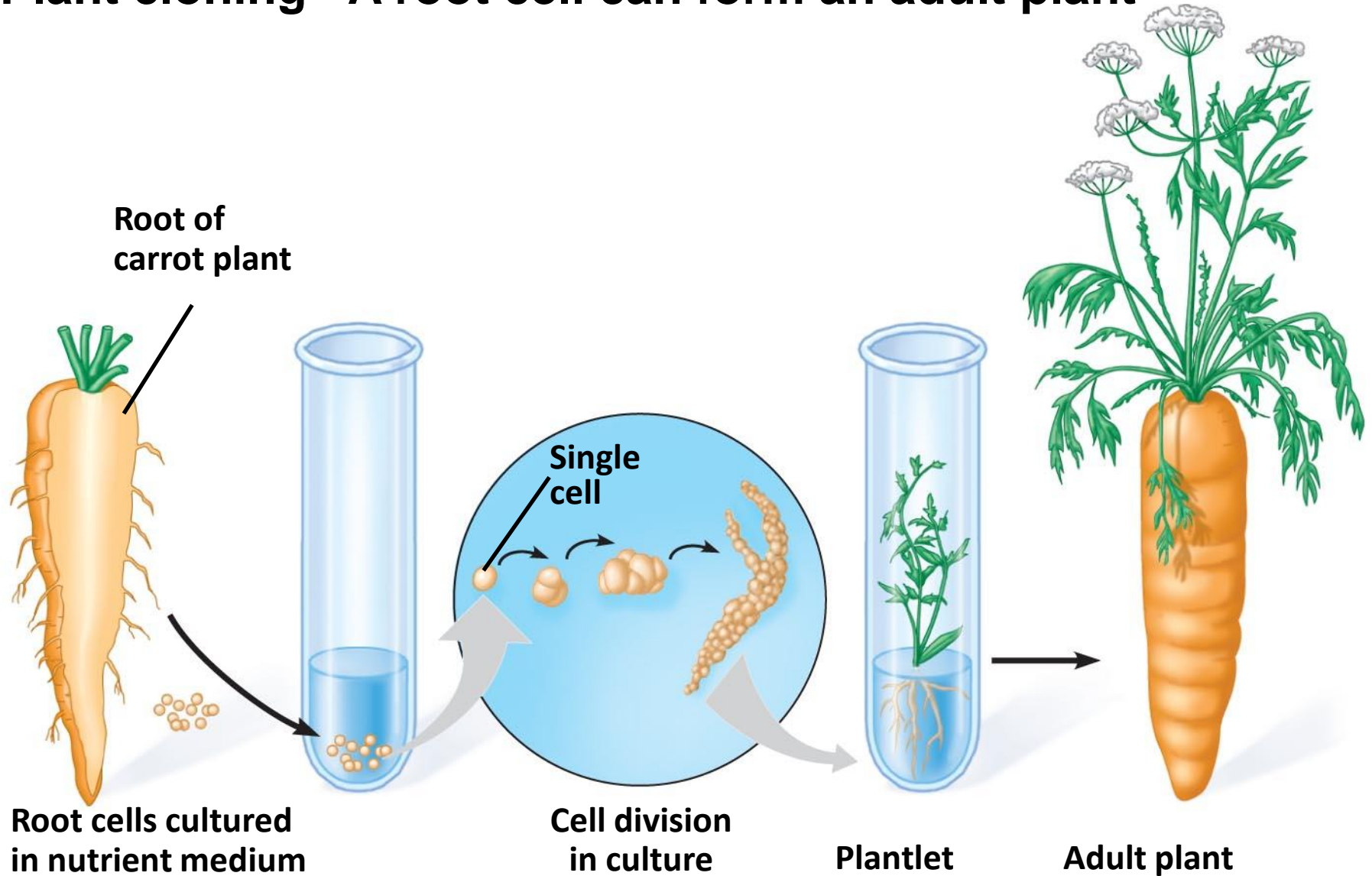
Do we really want another Dr. Prince
on the planet?

CLONING OF PLANTS AND ANIMALS

Evidence that all is present but not all is used: Plant cloning

- Most differentiated cells retain a full set of genes, even though only a subset may be expressed (Remember the “What should I wear today?” lecture)
 - Evidence is available from
 - Plant cloning
 - A root cell can form an adult plant
 - Animal **regeneration**
 - Remaining cells divide to form replacement structures

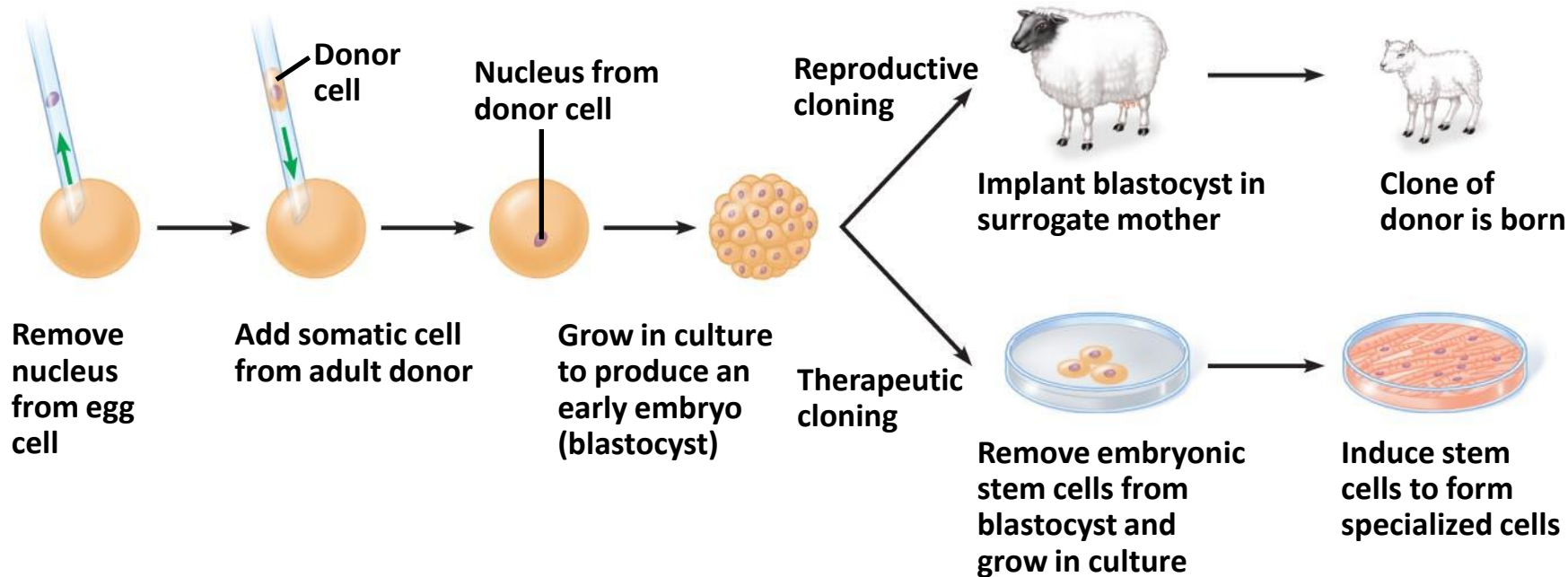
Plant cloning - A root cell can form an adult plant



Transplantation of the Genetic Instructions

– Nuclear transplantation

- Replacing the nucleus of an egg cell or zygote with a nucleus from an adult somatic cell
- Early embryo (blastocyst) can be used in
 - **Reproductive cloning**
 - Implant embryo in surrogate mother for development
 - New animal is genetically identical to nuclear donor
 - **Therapeutic cloning**
 - Remove **embryonic stem cells** and grow in culture for medical treatments
 - Induce stem cells to differentiate



Reproductive Cloning

- Cloned animals can show differences from their parent due to a variety of influences during development
- Reproductive cloning is used to produce animals with desirable traits
 - Agricultural products
 - Therapeutic agents
 - Restoring endangered animals
- Human reproductive cloning raises ethical concerns

Therapeutic Cloning

- Stem cells can be induced to give rise to differentiated cells
 - Embryonic stem cells can differentiate into a variety of types
 - **Adult stem cells** can give rise to many but not all types of cells
- Therapeutic cloning can supply cells to treat human diseases
- Research continues

