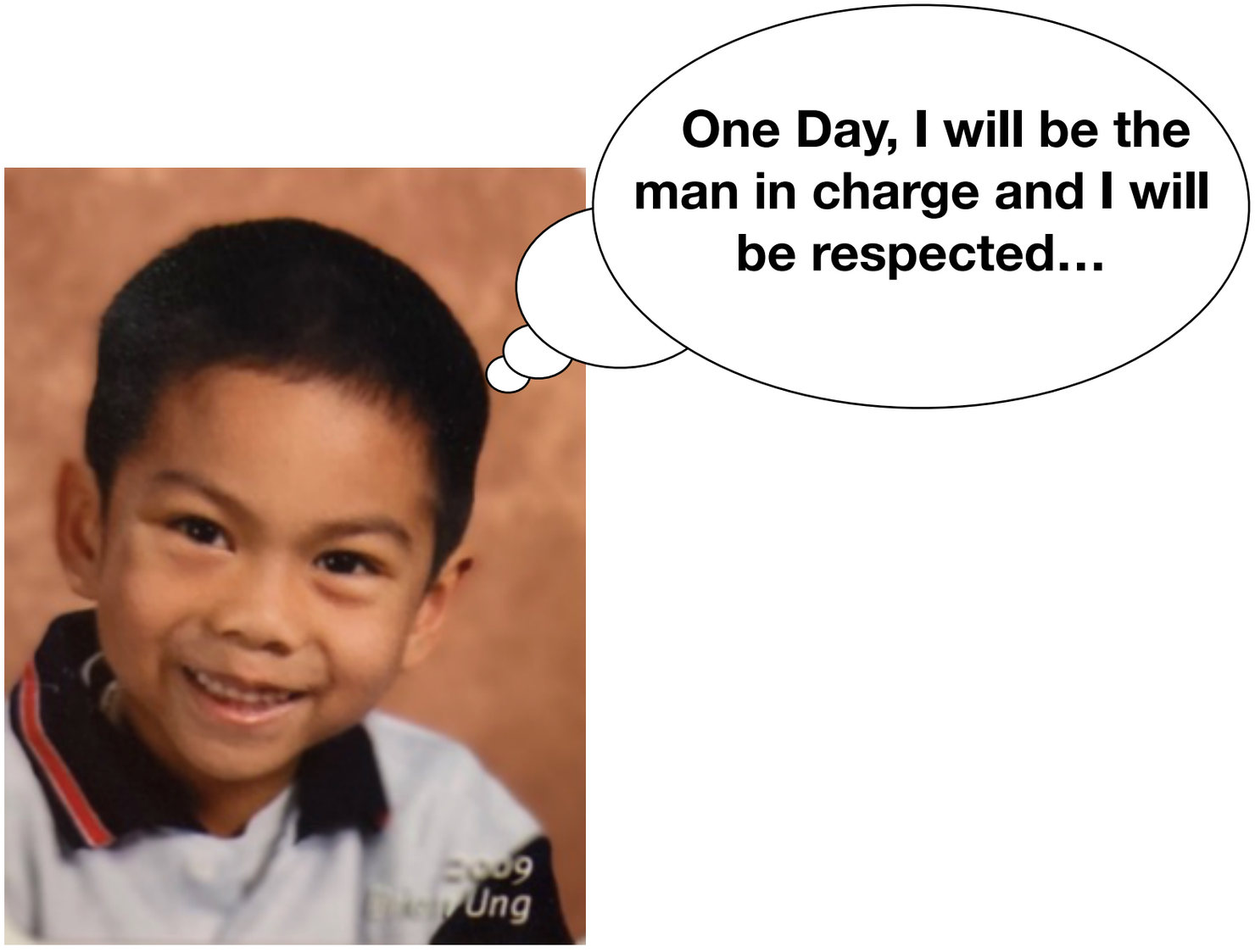
CLONING



Twin Formation

Identical twins are twins that form from one zygote or a single fertilization. In this case, the developing Zygote splits into two embryos. In essence, **a clone** has been formed. Both embryos begin with the same genome.

Fraternal twins however, are the result of two separate fertilizations.

Twins on the other hand, will not necessarily look identical. They will have differences… WHY

Twins on the other hand, will not necessarily look identical. They will have different…

- different environmental exposures
- different expressions of certain gene. eg fingerprints.

Natural cloning of plants is common and exists readily in agriculture.

- root vegetables like potatoes and garlic can be cloned by cutting and separating into pieces
- plants like strawberry, or spider plants produce clone offspring allowing them to spread.

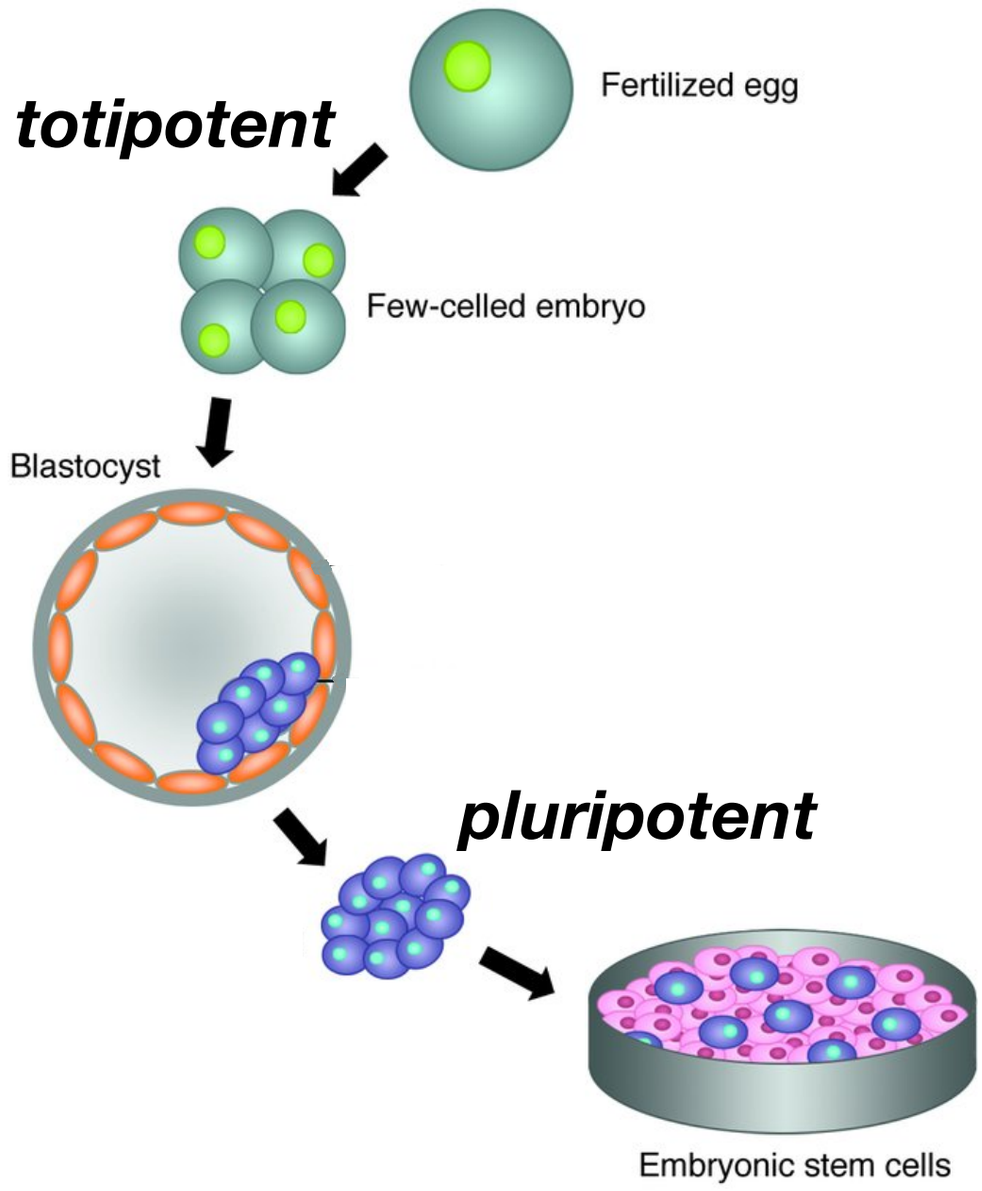

© Scot Nelson/Flickr

<u>Natural cloning</u> has the advantage of the ease of reproduction of desirable traits. Clones will also have equally undesirable outcomes.

eg. Bananas are seedless, but equally susceptible to disease

Animal Cloning

Recall that ***totipotent*** cells, have the ability to differentiate into any type of cell, while ***pluripotent*** cells can differentiate into almost any kind of cell. These are embryonic stem cells with the greatest potential.

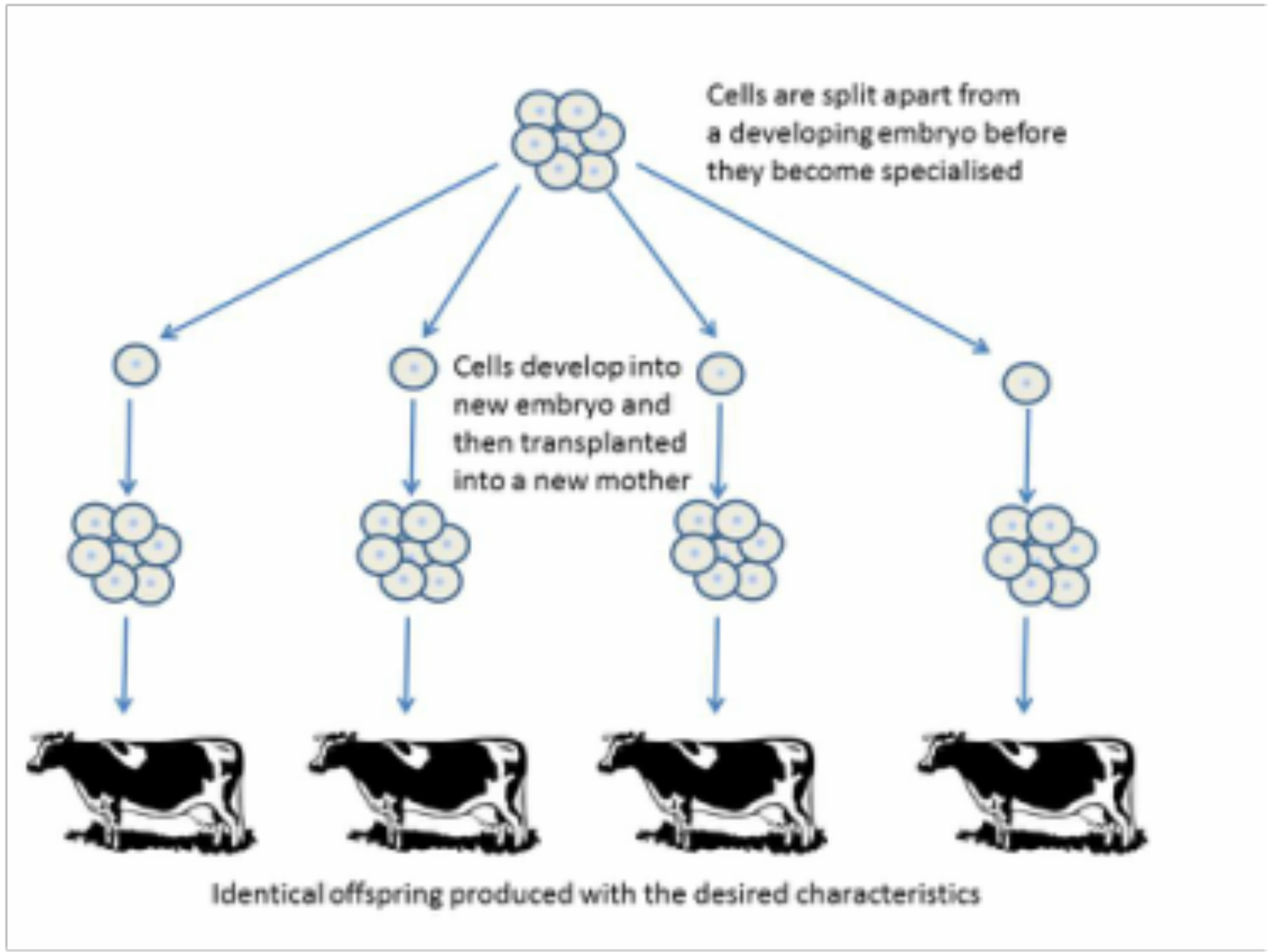


Animal Cloning

• Cloning of animals can/ typically be done using embryos consisting of pluripotent

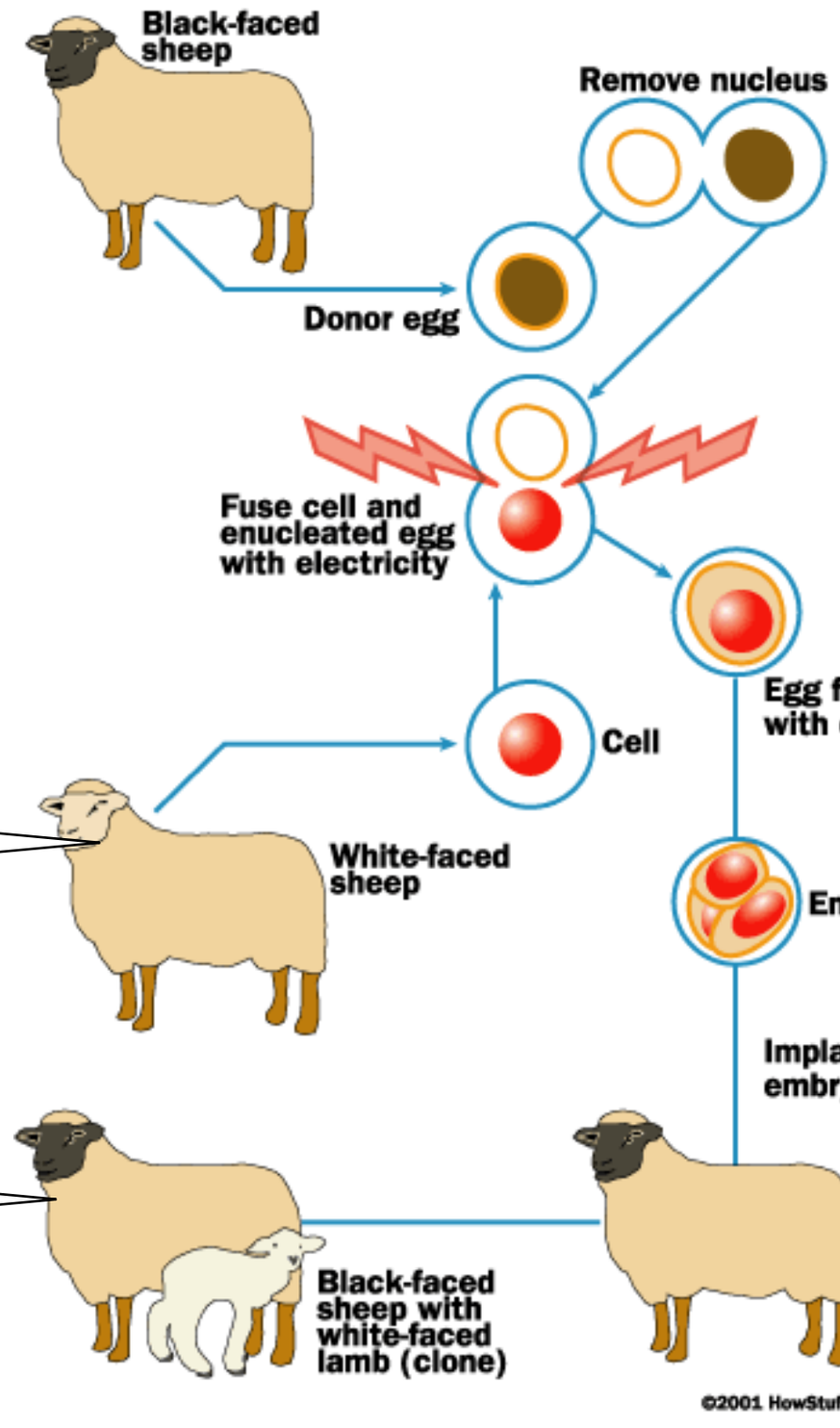
• a single embryo can be separated in vitro (lab dish), as long as the cells remain pluripotent.

• clones are implanted into surrogate mothers



Animal Cloning

• cloning using differentiated cells was first achieved with Dolly the sheep
• was revolutionized by Ian Wilmut
• 276 attempt before success, in that 1/29 embryos implanted
• Medical benefits —> regenerated tissues genetically identical to donor



Donor somatic cells take from the utter of a *Finn Dorset* ewe.

Clone implanted into a Scottish Blackface ewe

Animal Cloning