

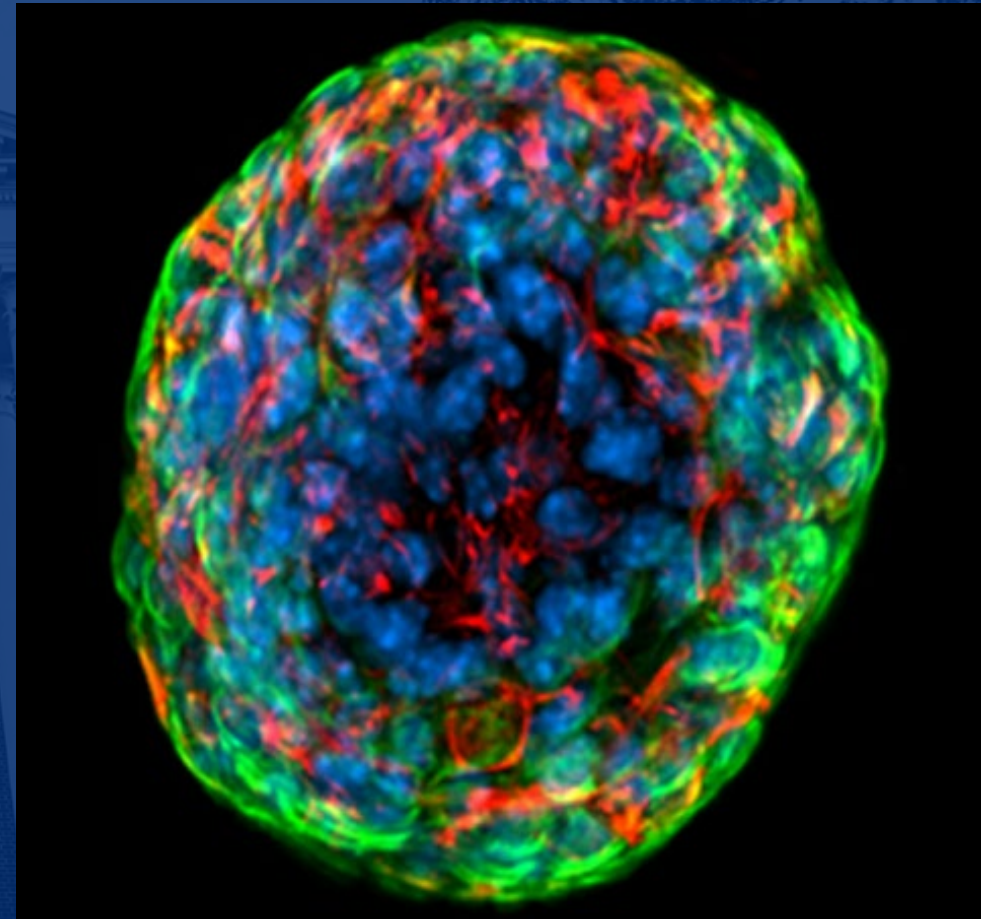


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WHITING SCHOOL
of ENGINEERING

Cell and Tissue Engineering

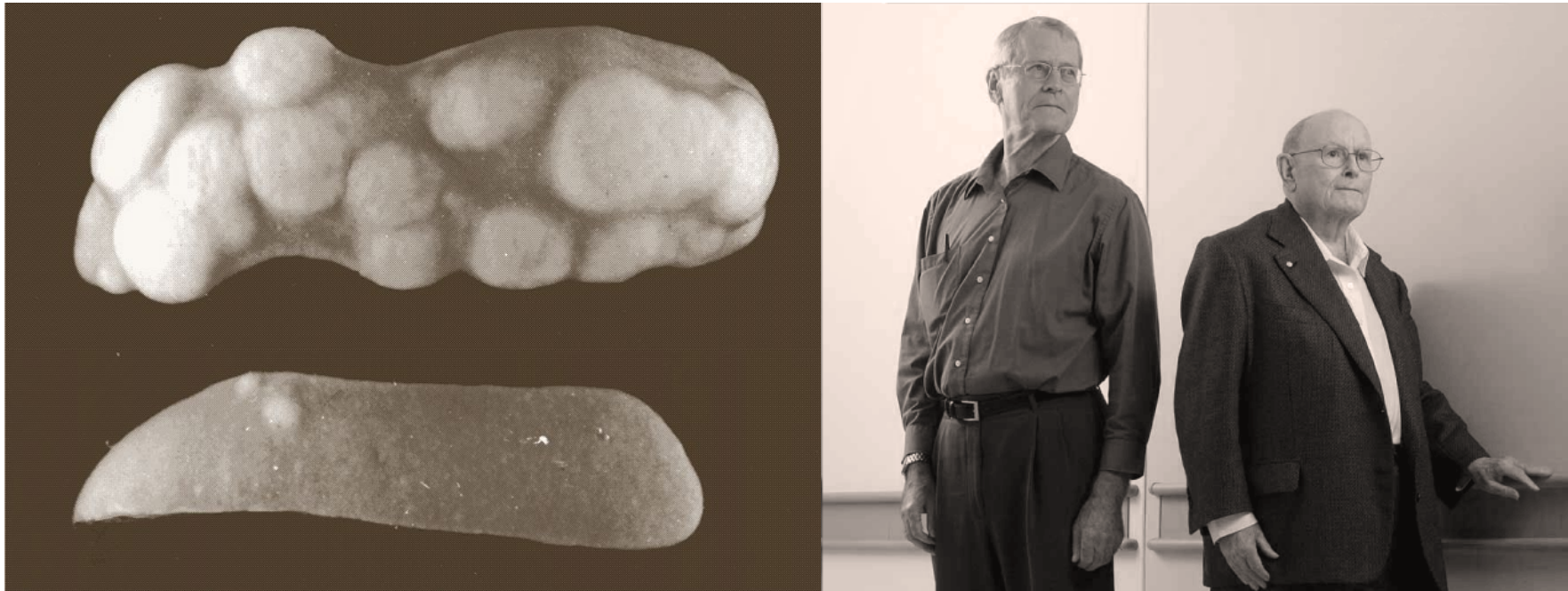
Stem Cell History and Regulation, Part 1



Timeline – proving existence of stem cells

1961

James Till & Ernest McCulloch



Timeline – first bone marrow transplant

1968

**First bone marrow
transplant performed**



Timeline – America debates fetal tissue research

1973

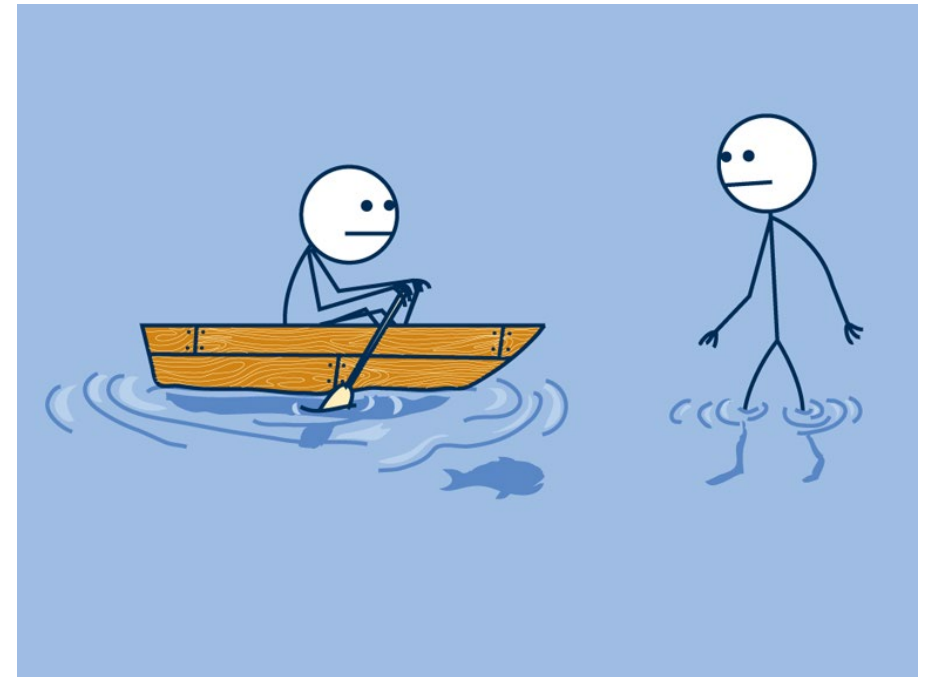
Roe v. Wade

1974

Congress bans all federally funded fetal tissue research

1975

Ethics advisory board established



Timeline – cord blood, mice, primates

1978

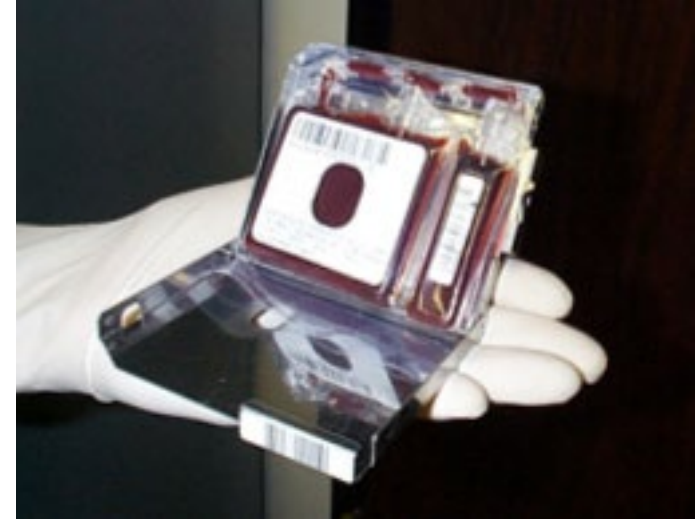
Stem cells discovered in human cord blood

1981

First *in vitro* stem cell line developed from mice

1995

First embryonic stem cell line derived from a primate



Timeline – Dicky-Wicker Amendment

1996

Dicky-Wicker Amendment

- (1) The creation of a human embryo or embryos for research purposes
- (2) Research in which a human embryo or embryos are destroyed, discarded, or knowingly subjected to risk of injury or death greater than that allowed for research on fetuses in utero

“incompatible with human dignity and the protection of human life.” – *United Nations*



Timeline – cloned lamb

1997

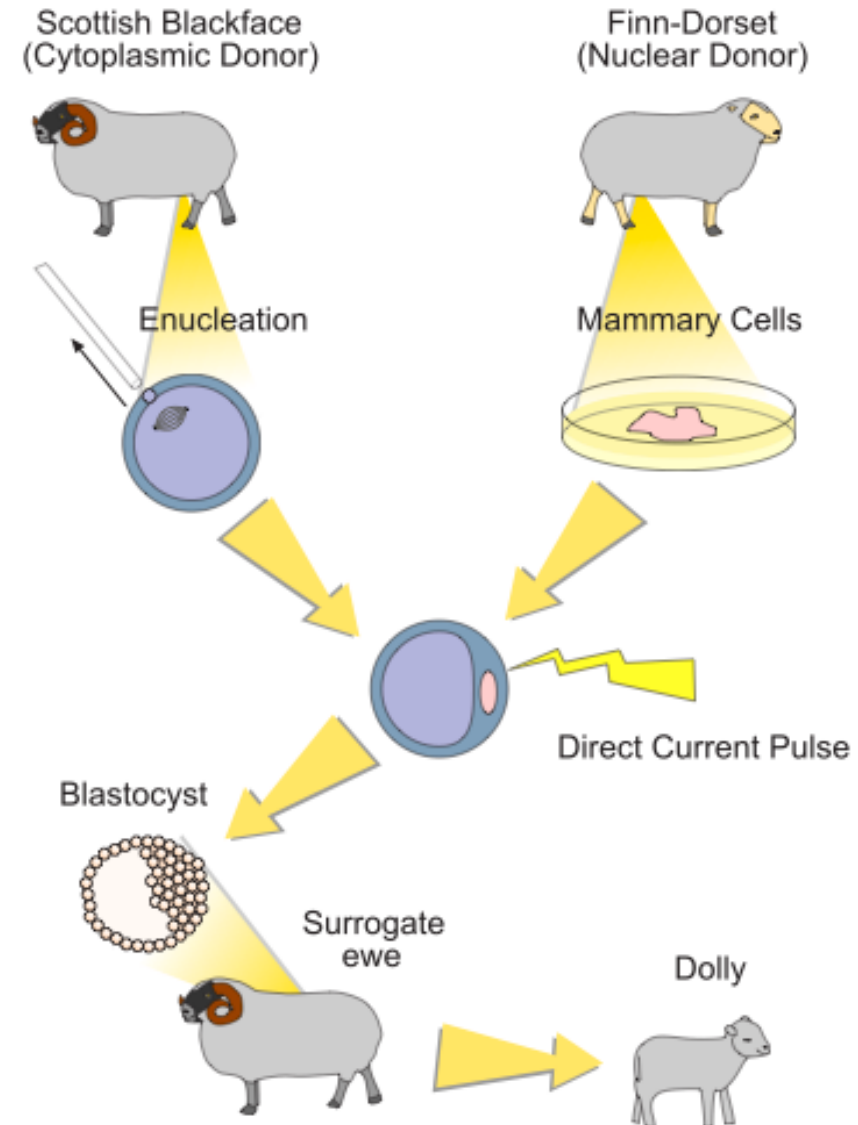
Leukemia origin found in hematopoietic stem cells indicating possible proof of cancer stem cells

Cloned lamb from stem cells



How was Dolly made?

Somatic Cell Nuclear Transfer (SCNT)



Timeline – Cloning Prohibition Act

1997

Leukemia origin found in hematopoietic stem cells indicating possible proof of cancer stem cells

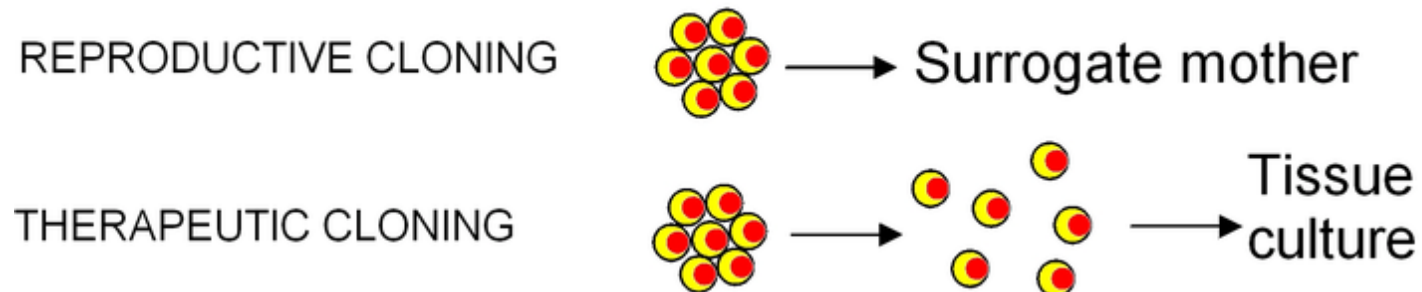
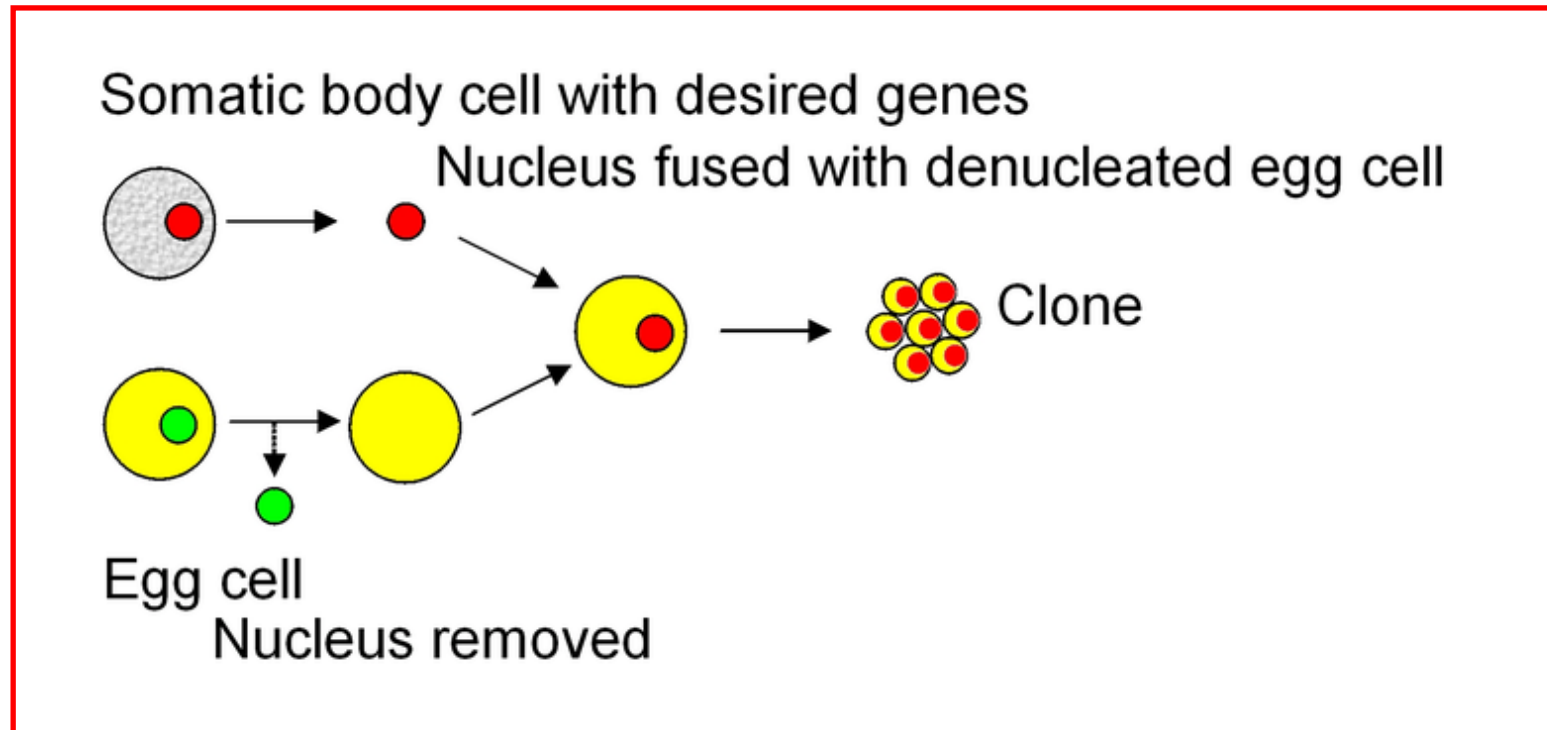
Cloned lamb from stem cells

Cloning Prohibition Act – *failed!*

...Severely delay progress in the development of very important therapeutic treatments of major public health diseases - AAAS



Reproductive vs. therapeutic cloning



Why use reproductive cloning?



Cloning for a better food supply

2008 FDA risk assessment
Concludes that...



"Meat and milk from cow, pig, and goat clones, and the offspring of any clones, are as safe as food we eat everyday"

Cloning for research purposes

Reproducible

Reliable

Invariant over time and space



Timeline - reproductive cloning fears

1998 South Korean claims 4-cell clone

2004 Woo-Suk Hwang, National
University South Korea publish 30
cloned human embryos in *Science*
Retracted in 2006



Despite being exposed as a fraud, Dr. Kwang Woo-Suk continues to claim cloning human stem cells is possible



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