

**HUMAN  
CLONING  
IS CLOSER  
THAN YOU  
THINK**

For couples who can't have a child—  
or who have lost one—the unthinkable  
may soon be possible. **Here are the perils**

# The Ethics of Human Reproductive Cloning and Genetic Engineering

Reed Jobs

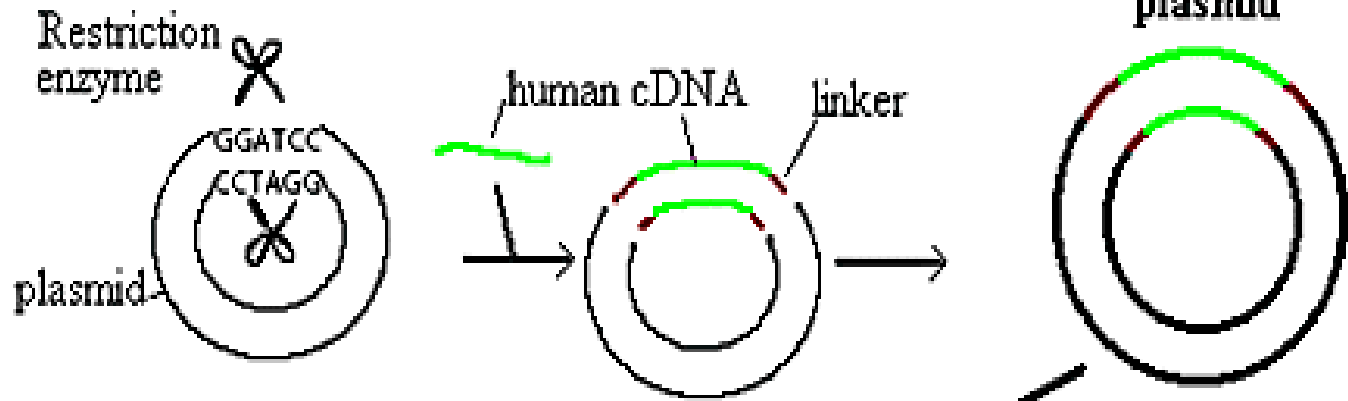
Genomics and Medicine 2011

Prof. Doug Brutlag

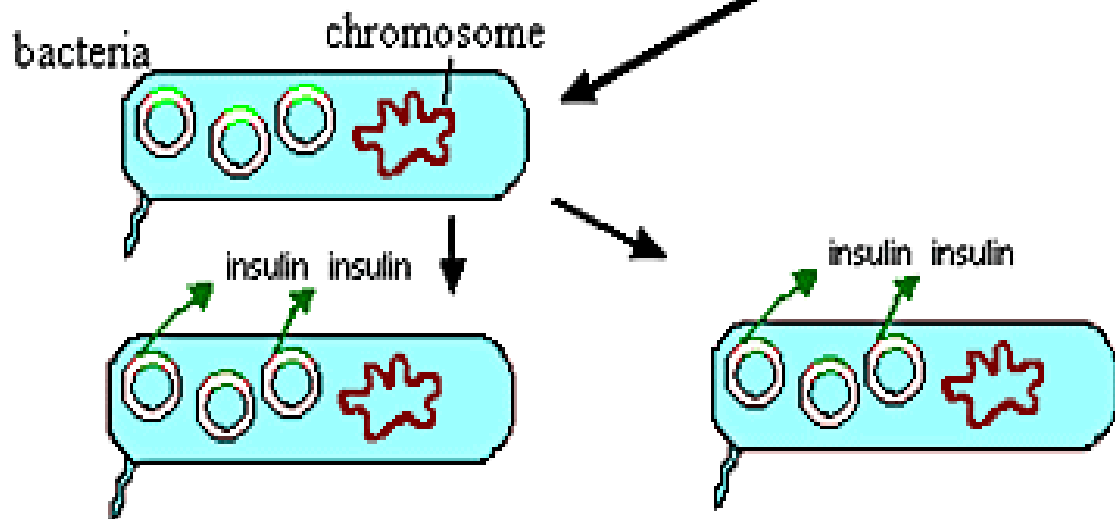
# Types of Cloning

- Therapeutic: cloning cells for regenerative medicine
- Reproductive: cloning of an individual, full body

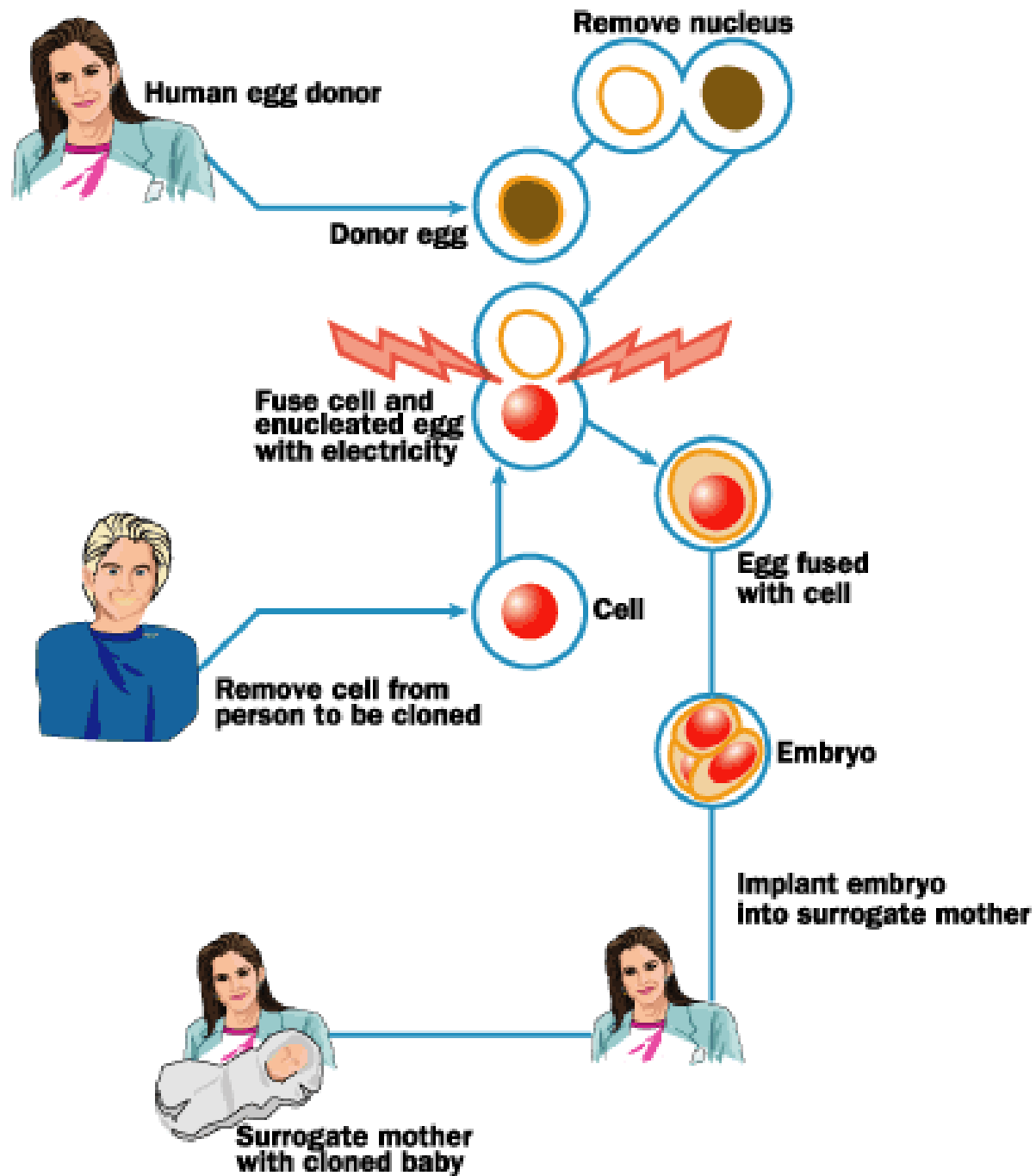
## Transfer of the Insulin gene



## Cloning the Insulin Gene



## Transfer and cloning of the Insulin gene



# Problems with Reproductive Cloning

- Aging (telomeres)
- Ethics
- Efficiency

# Efficiency

- Dolly: 0.4%, 1 live birth out of 277 embryos
- Cloned mice: 0.8%, 5 live births out of 613 embryos
- Cloned rabbits: 0.3%, 6 live births out of 1852 embryos
- Cloned pigs: 7%, 5 live births out of 72 embryos
- Health risk for surrogate mother – large offspring
  - Data from David A. Prentice, Ph.D., Indiana State University

# Ethics

- “By waiting until the first clone is among us or about to be born, we complicate the problem immensely and guarantee that we will not be able to have the national and international conversation and debate to arrive at particularly good decisions like using protection.” – Lewis Eigen
- “Member States are called upon to prohibit all forms of human cloning inasmuch as they are incompatible with human dignity and the protection of human life” – United Nations Declaration on Human Cloning



# Possibilities on the horizon

- Sex selection
- Muscle enhancement
- Memory enhancement
  - Sandel

# Arguments for

- People are inherently genetically mismatched
- Genetic enhancing is nothing new
- In 1996, 40% of HGH prescriptions were unrelated to any medical problems
  - Sandel

# Arguments against

- Violation of right to autonomy
- Goes beyond simple gene therapy to search for enhancement
- Equal access
- Hubris
- Religious

# Are the lines being drawn very clearly?

- Is there a difference between a parent who tries to mold a child through sports, school, tutoring, etc. and one who genetically engineers a child?
- Why not share the genetic bounty with those less fortunate?

- <http://www.youtube.com/watch?v=Ok3YjypQ-848>
- (Sorry for the Mandarin Subtitles)

# Is it right in the first place?

- Why do we have such moral objections?
- Diminished admiration for ability and achievement
- Value on earning vs. inheritance
- Quest for perfection
- Parenting, and the relationship of parents to children; parental “hubris”
  - Sandel

# Eugenics?

- Freely made genetic choice should counter the principles of eugenics....but practically do they?
- Social pressures/conformity
- Problem lies in coercion
- Balance between playing God and giving the best opportunities

# Stay tuned in, its starting already



Deregulation of genetically engineered agricultural products is beginning in the U.S.