

# Embryo Stem Cell Policy: The Intersection of Values, Science, and Law

Professor Lori B. Andrews, J.D.

Chicago-Kent College of Law

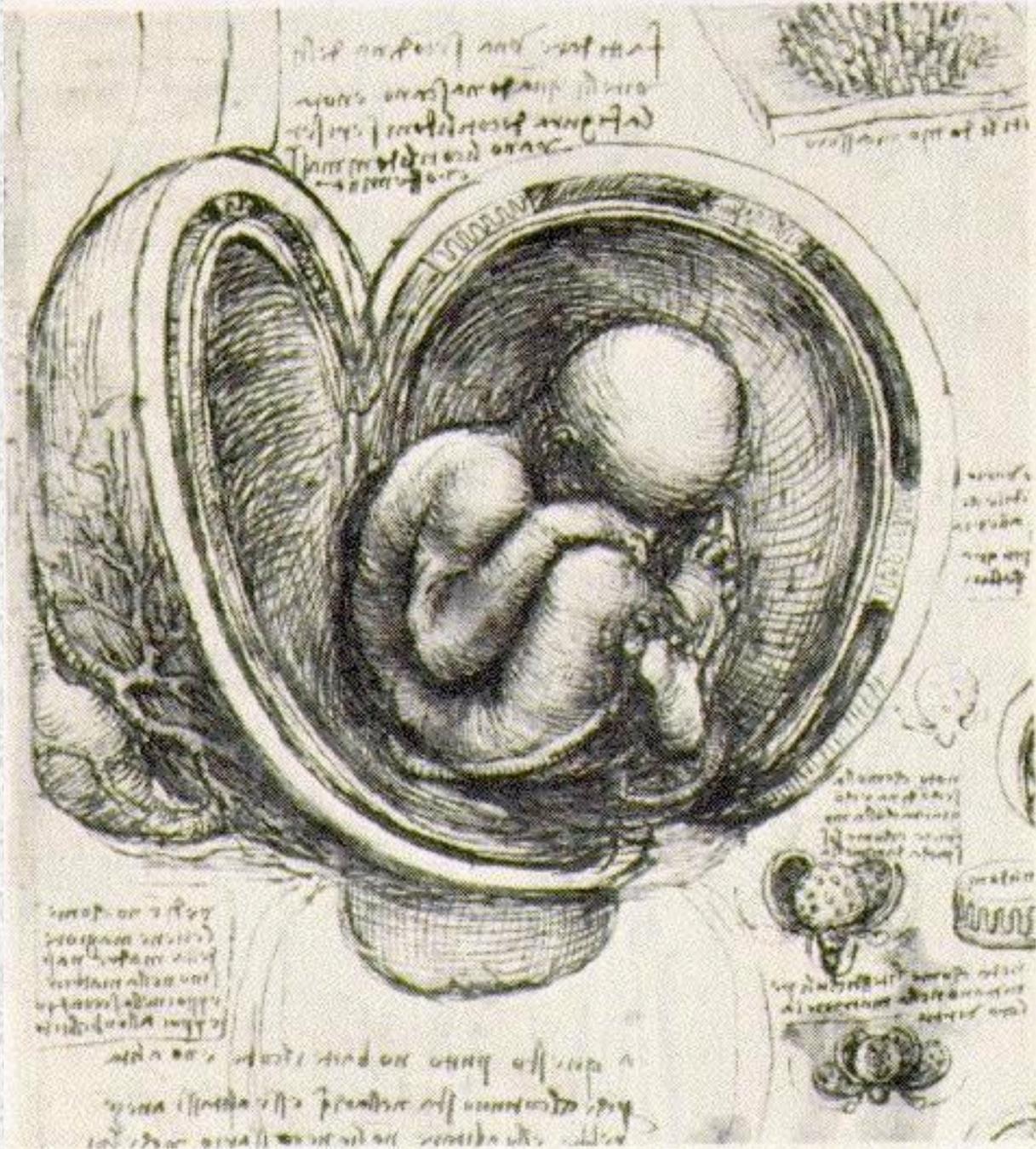


**We  
Want Your  
DNA**

**BioCom**



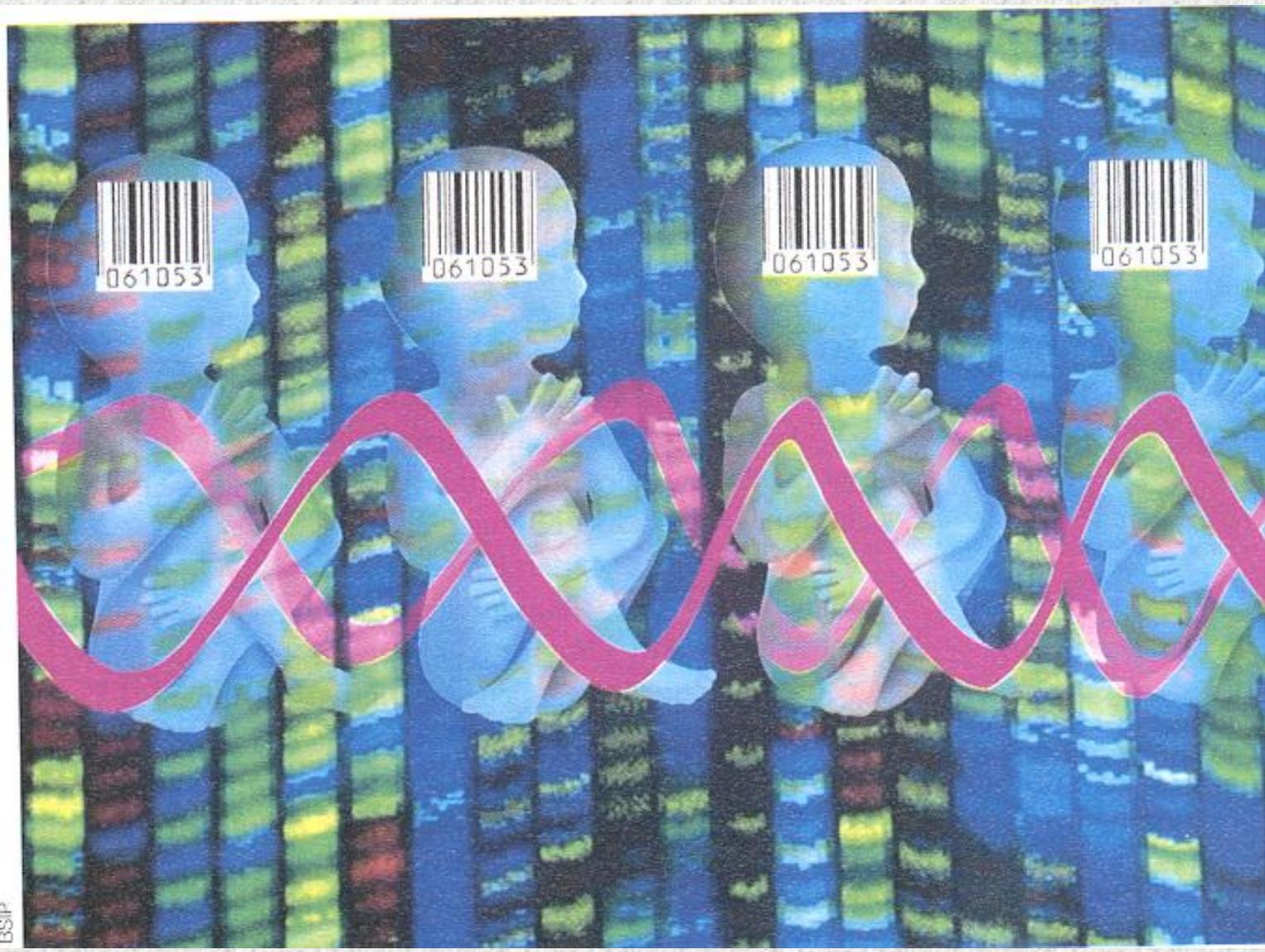
Dr. Lior Gepstein says researchers have grown heart cells from human embryonic stem cells, an important step toward harnessing the transformational qualities of these primitive master cells to regenerate tissue damaged by cardiac disease. Gepstein is shown in his laboratory in Haifa, Israel. (Technion-Institute Of Technology via Reuters)

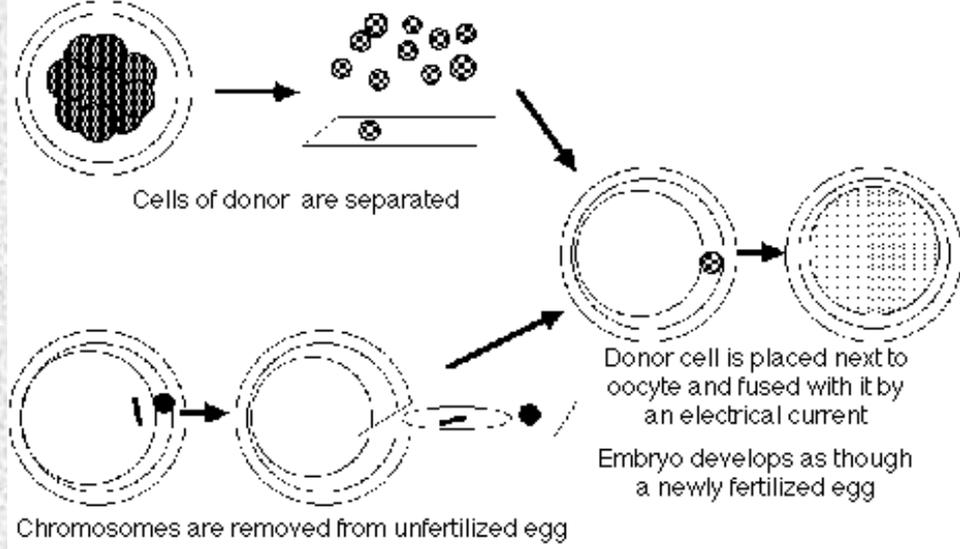




Anti-abortion activist Randall Terry, the founder of Operation Rescue, talks about his opposition to stem cell research during a demonstration in Lafayette Park across from the White House Wednesday, Aug. 1, 2001 in Washington. The demonstrators were asking President Bush to ban embryonic stem cell research. (AP Photo/Stephen J. Boitano)

DSIP





## HOW DOLLY WAS CREATED

Finn Dorset ewe

Donor cell

**1** Cells taken from the udder of a Finn Dorset ewe are placed in a culture with very low concentrations of nutrients. Thus starved, the cells stop dividing and switch off their active genes.

TIME Diagram by Joe Lertola

Blackface ewe

Egg cell

DNA

**2** Meanwhile, an unfertilized egg cell is taken from a Scottish Blackface ewe. The nucleus (with its DNA) is sucked out, leaving an empty egg cell containing all the cellular machinery necessary to produce an embryo.

TIME Diagram by Joe Lertola

Fused cell

**3** The two cells are placed next to each other and an electric pulse causes them to fuse together like soap bubbles. A second pulse mimics the burst of energy at natural fertilization, jump-starting cell division.

TIME Diagram by Joe Lertola

Embryo

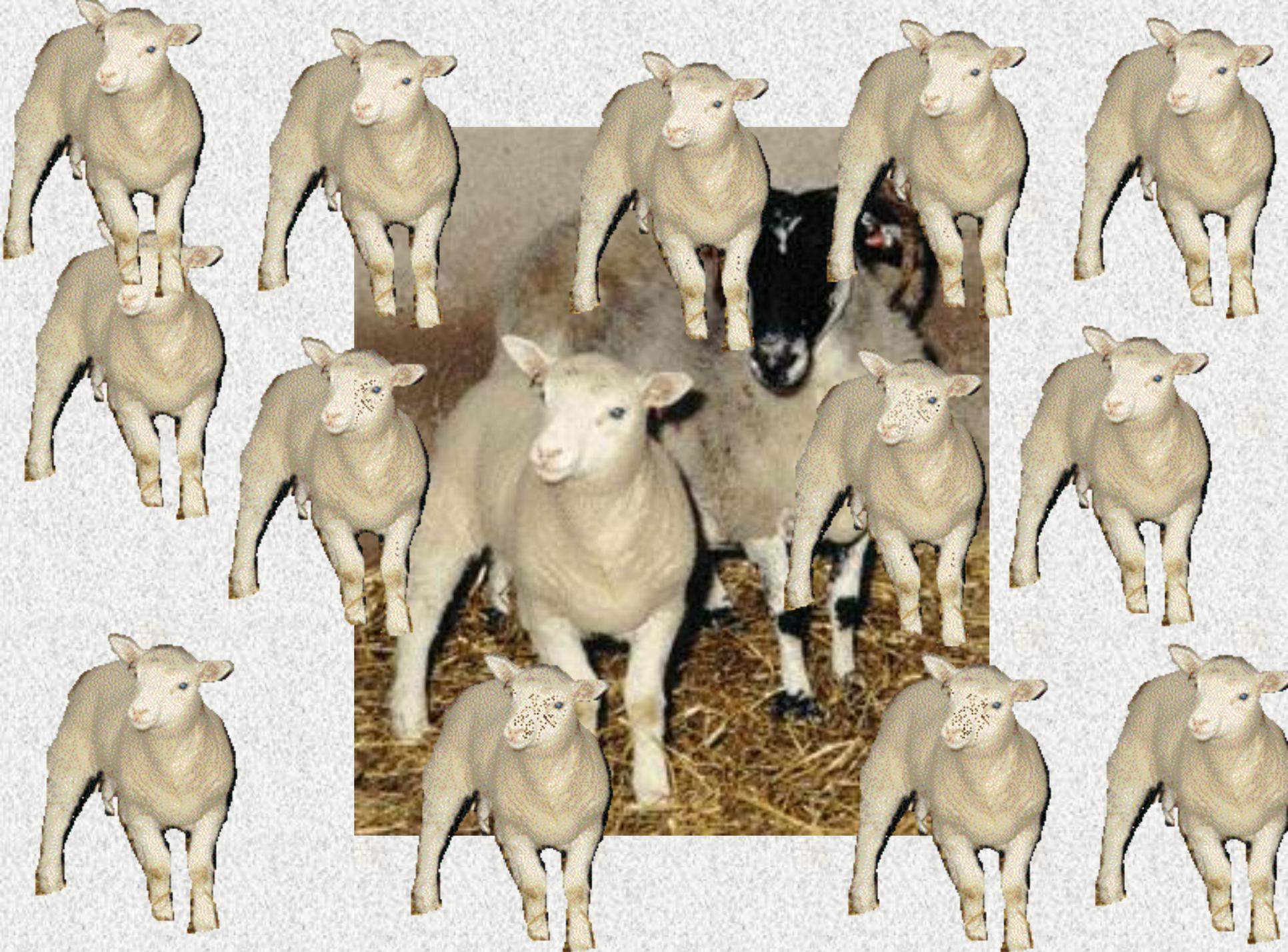
**4** After about six days, the resulting embryo is implanted in the uterus of another Blackface ewe.

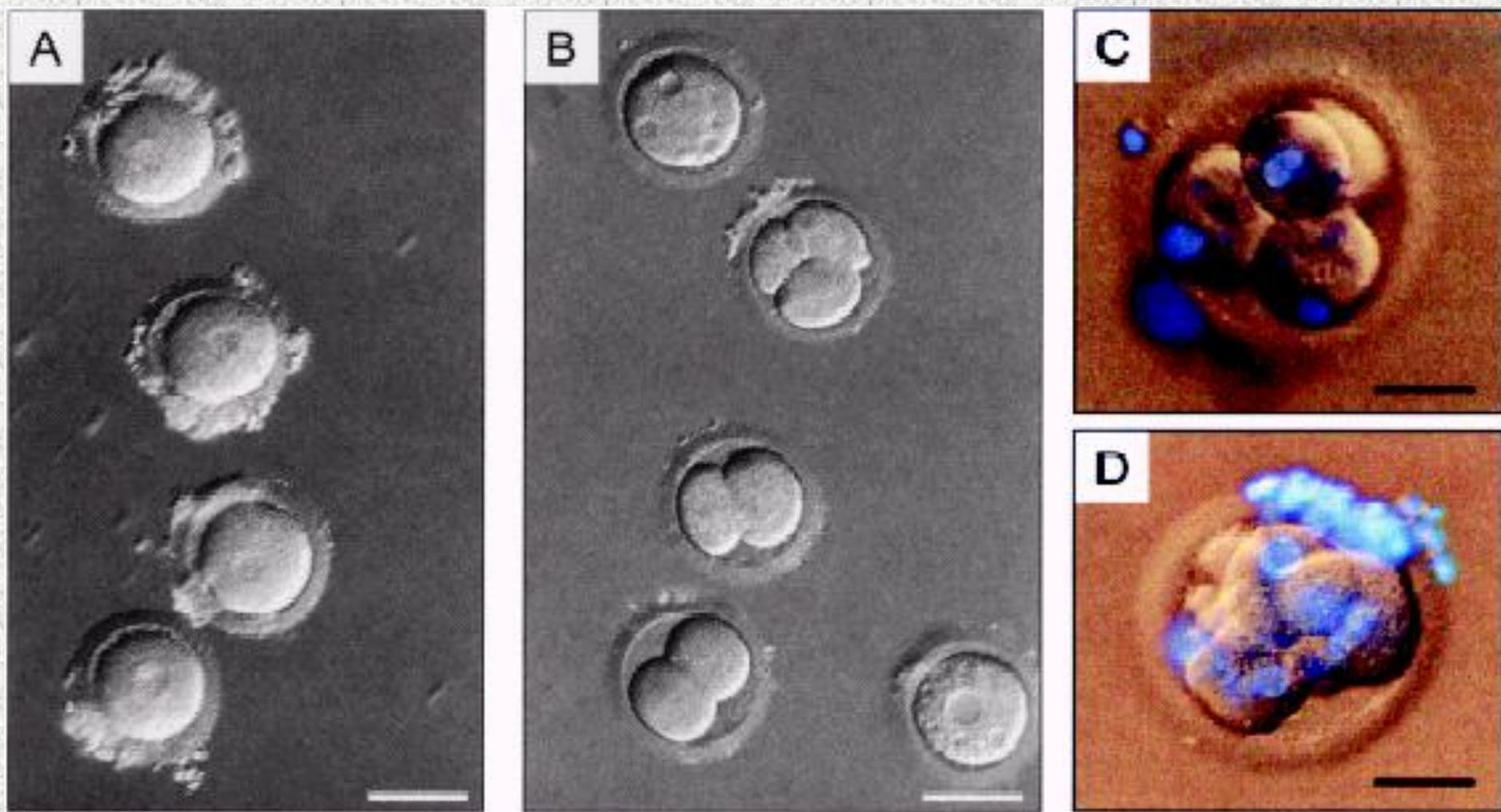
TIME Diagram by Joe Lertola

Baby Finn Dorset

**5** After a gestation period, the pregnant Blackface ewe gives birth to a baby Finn Dorset lamb, named Dolly, that is, genetically, identical to the original donor.

TIME Diagram by Joe Lertola





**FIG. 2.** NT-derived human embryos reconstructed with cumulus cells. Pronuclear-stage embryos at (A) 12 and (B) 36 h, (C) a four-cell embryo at 72 h, and (D) a six-cell embryo at 72 h. In C and D the nucleus of the embryos were stained with bisbenzimidazole (Sigma) and visualized under UV light. Scale bars = 100  $\mu\text{m}$  for A and B and 50  $\mu\text{m}$  for C and D.

TABLE 3. SOMATIC CELL NUCLEAR TRANSFER IN HUMAN EGGS

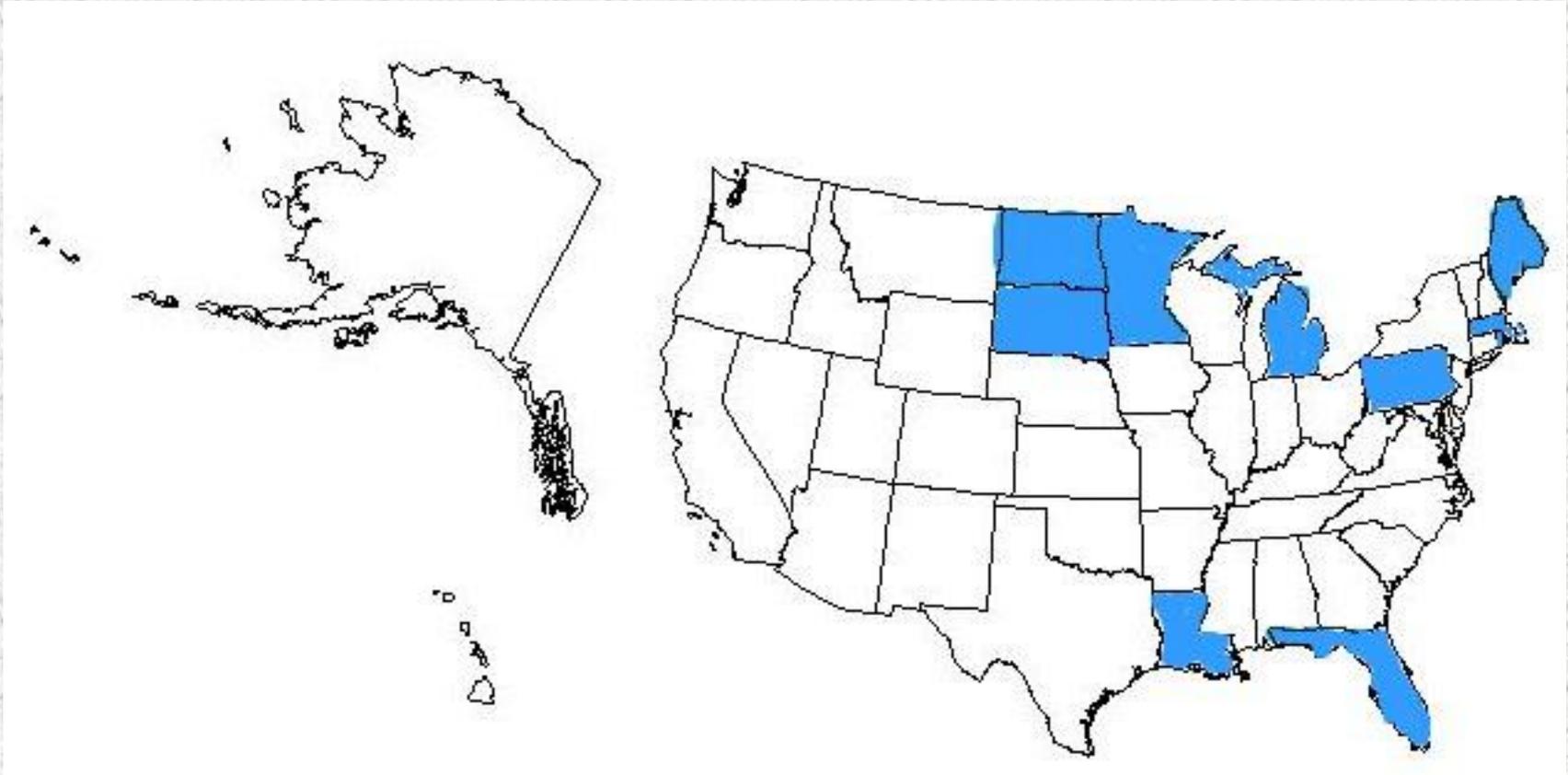
<i>Donor</i>	<i>Cell type</i>	<i>Reconstructed eggs</i>	<i>Pronucleus (%)<sup>a</sup></i>	<i>Cleaved (%)<sup>b</sup></i>
3	Fibroblast	2	0	0
4		5	4 (80)	0
5	Cumulus	4	3 (75)	0
6		5	3 (60)	3 (100)
7		3	1 (33)	0
Total		19	11 (58)	3 (27)

<sup>a</sup>As a percentage of reconstructed eggs.

<sup>b</sup>As percentage of pronuclear embryos.

# States With Laws That Could Be Used to Stop Embryo Stem Cell Research:

Florida, Louisiana, Maine, Massachusetts, Michigan, Minnesota, North Dakota, Pennsylvania, Rhode Island, South Dakota



## Minnesota Statutes Annotated – Chapter 145. Public Health Provisions

### § 145.421. Human conceptus, experimentation, research or sale; definitions

Subdivision 1. Terms. As used in this section and section 145.422, the terms defined in this section shall have the meanings given them.

Subd. 2. Human conceptus. "Human conceptus" means any human organism, conceived either in the human body or produced in an artificial environment other than the human body, from fertilization through the first 265 days thereafter.

Subd. 3. Living. "Living", as defined for the sole purpose of this section and section 145.422, means the presence of evidence of life, such as movement, heart or respiratory activity, the presence of electroencephalographic or electrocardiographic activity.

## §145.422 Experimentation or sale

Subdivision 1. Penalty. Whoever uses or permits the use of a living human conceptus for any type of scientific, laboratory research or other experimentation except to protect the life or health of the conceptus, or except as herein provided, shall be guilty of a gross misdemeanor.

Subd. 2. Permitted act. The use of a living human conceptus for research or experimentation which verifiable scientific evidence has shown to be harmless to the conceptus shall be permitted.

Subd. 3. Penalty; permitted payments. Whoever buys or sells a living human conceptus or nonrenewable organ of the body is guilty of a gross misdemeanor. Nothing in this subdivision prohibits (1) the buying and selling of a cell culture line or lines taken from a nonliving human conceptus; (2) payments for reasonable expenses associated with the removal, storage, and transportation of a human organ, including payments made to or on behalf of a living organ donor for actual expenses such as medical costs, lost income, or travel expenses that are incurred as a direct result of the donation of the nonrenewable organ; or (3) financial assistance payments provided under insurance and medicare reimbursement programs.

## Massachusetts General Laws Annotated – Chapter 112

§12J. Experimentation on human fetuses prohibited; medical procedures authorized; consent; approval; civil and criminal liability and proceedings; severability

(a) I. No person shall use any live human fetus whether before or after expulsion from its mother's womb, for scientific, laboratory, research or other kind of experimentation.

\* \* \*

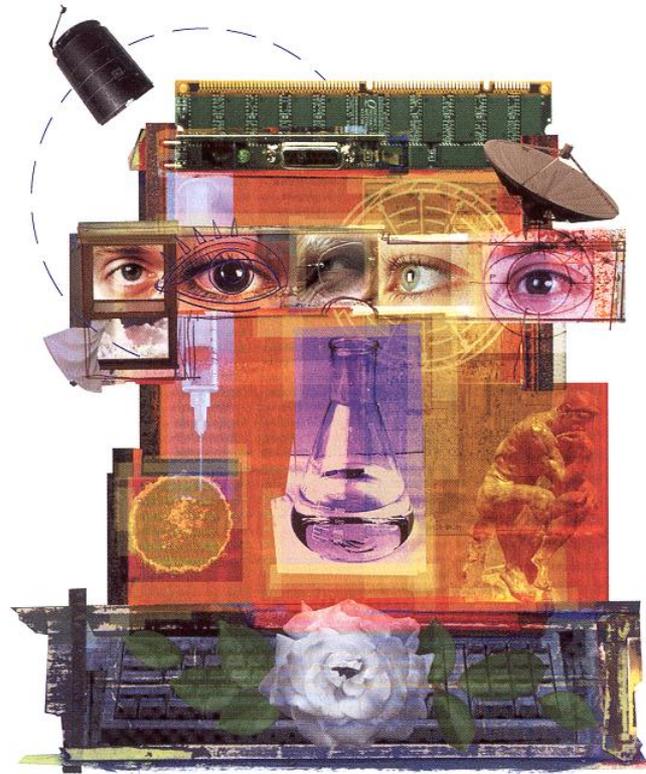
(a)IV. No person shall knowingly sell, transfer, distribute or give away any fetus for a use which is in violation of the provisions of this section. For purposes of this section, the word "fetus" shall include also an embryo or neonate.

\* \* \*

(b)II. Any person or institution which has performed, is performing, or is about to perform, a procedure, may file a complaint in the Superior Court seeking a determination of whether said procedure violates the provision of this statute. Said determination may be sought irrespective of whether said procedure has been approved by an institutional review board. The complaint, which shall have attached thereto a copy of any protocol relative to said procedure, shall describe the procedure and state the reason or reasons which cause the plaintiff to seek the judicial determination. The complaint shall name the District Attorney for the district where the procedure is performed as defendant in the action and he shall be served with a copy of the complaint, including the attached protocol, if any, and the summons in accordance with the provisions of Rule 4 of the Massachusetts Rules of Civil Procedure. Service shall be made by delivery to the office of said District Attorney; or by mailing by certified or registered mail to said office. Upon receipt of service, notice shall be given by the District Attorney, by certified or registered mail, to the Commissioner of Public Health who in turn shall give notice to those institutions who in the judgment of said commissioner may be affected by a judgment in the action, and in any event to all of the licensed medical schools in the Commonwealth.

(b)III. Any person or institution desiring to intervene in the action may file a motion to intervene with the court in which the action is pending within ten days from the mailing of such notice, except that the court, for good cause shown, may allow said motion after the ten-day period.

\* \* \*



# A Human Face for Technology

