

21A.303J / STS.060J

Anthropology of Biology

Spring 2022

Professor Stefan Helmreich

Course Description

If the twentieth century was the century of physics, the twenty-first has become the century of biology. This subject examines the cultural, political, and economic dimensions of biology in the age of genomics, biotechnological enterprise, biodiversity conservation, pharmaceutical bioprospecting, synthetic biology, global pandemic, and more. Although we examine such social concerns as genetic modification and reproductive rights, this is not a class in bioethics, but rather an anthropological inquiry into how the substances and explanations of biology — increasingly cellular, molecular, genetic, viral, and informatic — are changing, and with them broader ideas about the relationship between “nature” and “culture.” Looking at such scientific forms as cell lines, CRISPR, and epidemiological models, and drawing upon primary sources in biology, social studies of the life sciences, and literary and cinematic materials, we rephrase Erwin Schrödinger’s famous 1944 question, “What Is Life?” to ask, in the 2000s, “What Is Life Becoming?”

“Western culture is deeply committed to the idea that there are only two sexes.” Why? bound up with ideas about marriage, family, labor, morality

Biologist Anne Fausto-Sterling in “The Five Sexes” from 1993 argued that there are *not* simply two sexes, even “biologically” considered.

This is because sex is not just one thing; there are many different variables that go into making it:

- GENES: X and Y chromosomes
- HORMONES: estrogen, androgens
- GONADS: ovaries, testes
- GENITAL: clitoris, penis
- SECONDARY: hair, breasts

These don’t always line up; there is a spectrum. So, Fausto-Sterling suggested a “five sex model” naming three intersexed categories:

- herms: so-called true hermaphrodites, who possess one testis and one ovary
- merms: male pseudohermaphrodites, XYs who have testes and aspects of female genitals
- ferms: female pseudohermaphrodites, XXs who have ovaries and aspects of male genitals

In “The Five Sexes Revisited,” from 2000, she recognized MORE — but also that she STILL took two sexes as the model.



Fausto-Sterling, Anne. “[The Five Sexes: Why Male and Female Are Not Enough.](#)” *The Sciences* 33, no. 2 (1993): 20–24. © The New York Academy of Sciences. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>.



Fausto-Sterling, Anne. “[The Five Sexes, Revisited.](#)” *The Sciences* 40, no. 4 (2000): 18–23. © The New York Academy of Sciences. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>.

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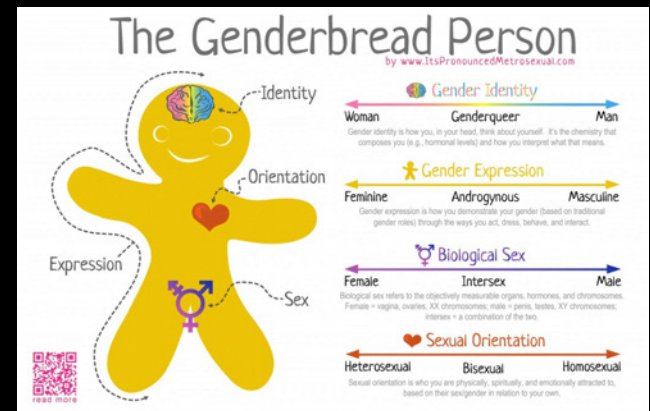
In “The Five Sexes Revisited,” from 2000, she recognized MORE — but also that she STILL took two sexes as the model.

BUT / AND

GENDER

And is intersex the same as transgender?

NO



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FLAGS OF THE LGBTIQ COMMUNITY

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Flags have always been an integral part of the LGBTIQ community. They are a visible representation of identity that people use in celebration, in protest, or even as a casual adornment. There have been many LGBTIQ flags over the years. Some have evolved, like the original Pride flag created in 1978 by Gilbert Baker and flown at the San Francisco Gay Freedom Day parade. While others are constantly being conceptualized and created.

What follows is a non-exhaustive list of flags used by the LGBTIQ community and their allies. As mentioned previously, new flags are constantly being conceptualized and used, so the ones mentioned here are subject to change. It is also important to provide a disclaimer that by no means are LGBTIQ flags necessary to achieve progress in recognition and protection of the human rights of LGBTIQ people. In some places, it may be unsafe to use these flags, and/or more culturally relevant symbols representing the LGBTIQ community may exist instead.

Rebooted pride flag by Daniel Quasar



This is a rebooted pride flag by Daniel Quasar. Representation matters — especially for the most marginalized communities. The reboot is meant to be inclusive of queer people of color and trans people. Learn more about the redesigned flag: <https://www.them.us/story/pride-flag-redesign>

Trans Pride Flag



Trans Pride Flag — Monica Helms, an openly transgender American woman, created the flag in 1999. The light blue and light pink are the traditional colors for baby girls and baby boys, respectively, while the white represents intersex, transitioning, or a neutral or undefined gender. According to Helms, the flag is symmetrical so “no matter which way you fly it, it is always correct, signifying us finding correctness in our lives.”

Intersex Pride Flag



Intersex Pride Flag — Created in July 2013 by [OII Australia](#), the intersex pride flag utilizes yellow and purple, which are considered “hermaphrodite” colors, according to the organization. The purple central circle is “unbroken and ornamented, symbolising wholeness and completeness, and our potentialities.”

Bisexual Pride Flag



Bisexual Pride Flag — Created in 1998 by Michael Page, the bisexual pride flag has a pink on the top and royal blue on the bottom, with an overlapping purple stripe in the middle. The pink is intended to represent attraction to the same sex only, the royal blue to the opposite sex only, and the purple attraction to all genders / more than one.

KEYWORDS

STORIES

LESBIANS

PRIDE

TRANSGENDER

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Pansexual Pride Flag



Pansexual Pride Flag — The pansexual pride flag has three horizontal stripes: pink, yellow, and blue. According to [most definitions](#), the pink represents people who are female identified, the blue represents people who are male identified, while the yellow represents nonbinary attraction.

Nonbinary Pride Flag



Nonbinary Pride Flag — Kye Rowan created the [nonbinary pride flag](#), which has yellow, white, purple, and black horizontal stripes, in 2014. It is intended to represent nonbinary people who did not feel that the genderqueer flag represents them and be used alongside Roxie's design. The yellow stripe represents people whose gender exists outside of the binary, the white stripe, people with many or all genders, the purple, people with genders considered a mix of male and female, and the black people who identify as not having a gender.

Asexual Pride Flag



Asexual Pride Flag — In August 2010, the [asexual pride flag](#) after a period of debate over having a flag and how to set up a system to create one, as many asexual communities as possible were contacted and a flag was announced as the asexual pride flag by one of the teams involved. The flag consists of four horizontal stripes: black, grey, white, and purple from top to bottom. The black stripe represents asexuality, the grey stripe representing the grey area between sexual and asexual, the white stripe sexuality, and the purple stripe community.

Genderfluid Pride Flag



Genderfluid Pride Flag — JJ Poole created [this flag](#) in 2012. It has five horizontal stripes: pink for femininity, blue for masculinity, purple for both masculinity and femininity, black for the lack of gender, and white for all genders.

Agender Pride Flag



Agender Pride Flag — The [agender pride flag](#), created by Salem X in 2014, has seven horizontal stripes. The black and white stripes represent an absence of gender, the gray represents semi-genderlessness, and the central green stripe represents nonbinary genders.

Genderqueer Pride Flag



Genderqueer Pride Flag — This flag was designed in 2011 by Marilyn Roxie, a genderqueer writer and advocate, and features a lavender, white, and chartreuse stripe. According to [Roxie](#), the lavender stripe is a mix of blue and pink—colors traditionally associated with men and women—and represents androgyny as well as queer identities. The white stripe, like in the transgender pride flag, represent agender or gender neutral identities. The chartreuse stripe is the inverse of lavender and represents third gender identities and identities outside the gender binary.

Lesbian Pride Flag



(Latest) Lesbian Pride Flag — The original was a red kiss superimposed on six shades of red and pink colors and a white bar in the center was introduced in a weblog in 2010. It was modified by removing the kiss. In a 2018 article on [Medium](#), an author proposed this flag as “[A Lesbian Flag for Everyone](#)”. The flag seen here, has been voted on by approx. 5000 people as a possibility for [new lesbian flag](#).

Gay Pride Flag



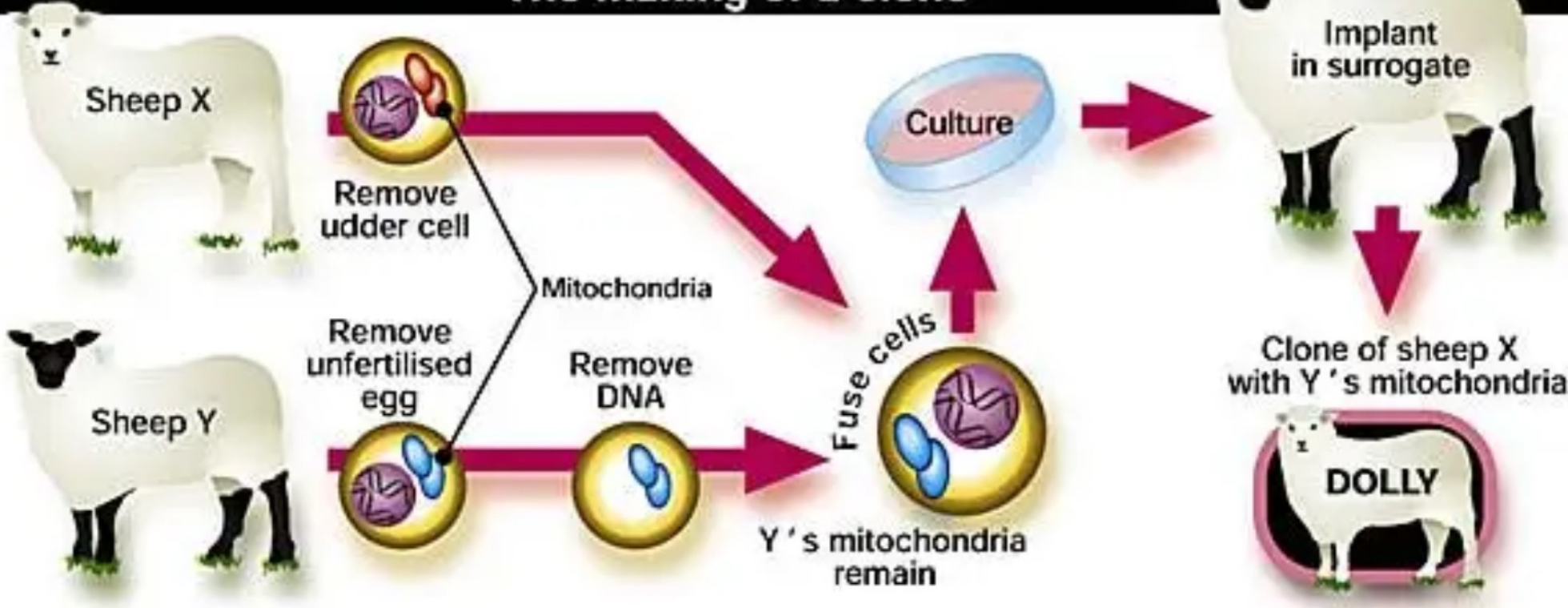
Gay Pride Flag — Gilbert Baker created the [gay pride flag](#) in 1978, and it originally had eight stripes. The colors in order, were hot pink to represent sex, red for healing, yellow for sun, green for serenity with nature, turquoise for art, indigo for harmony, and violet for spirit. In the years since, the flag has been reduced to six colors: the flag no longer uses hot pink, and the turquoise and indigo have been replaced with royal blue.

This piece was written by Rachel Alatalo in 2017 and edited by Matthew Solomon in 2021

Published on September 20, 2021

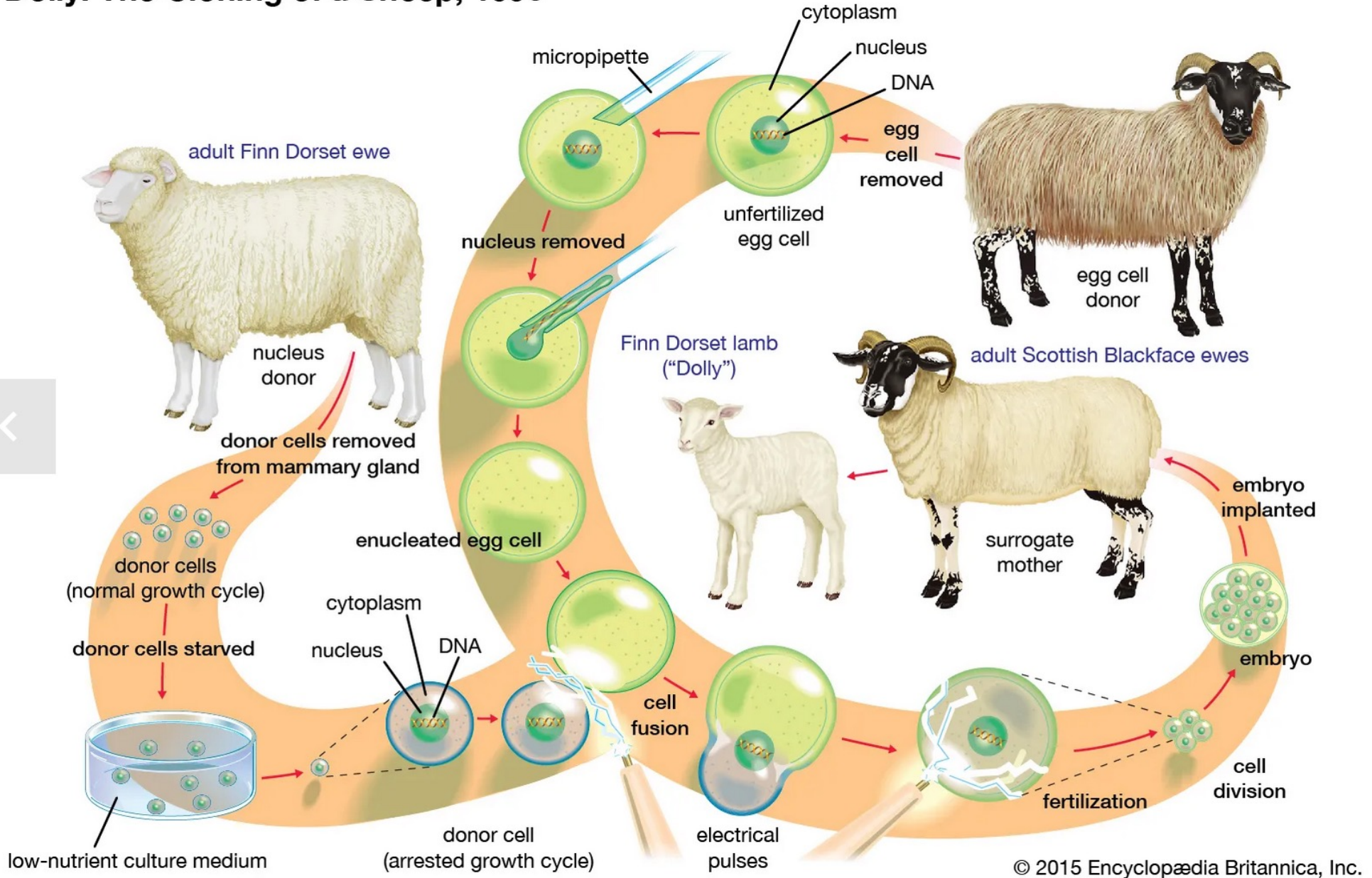
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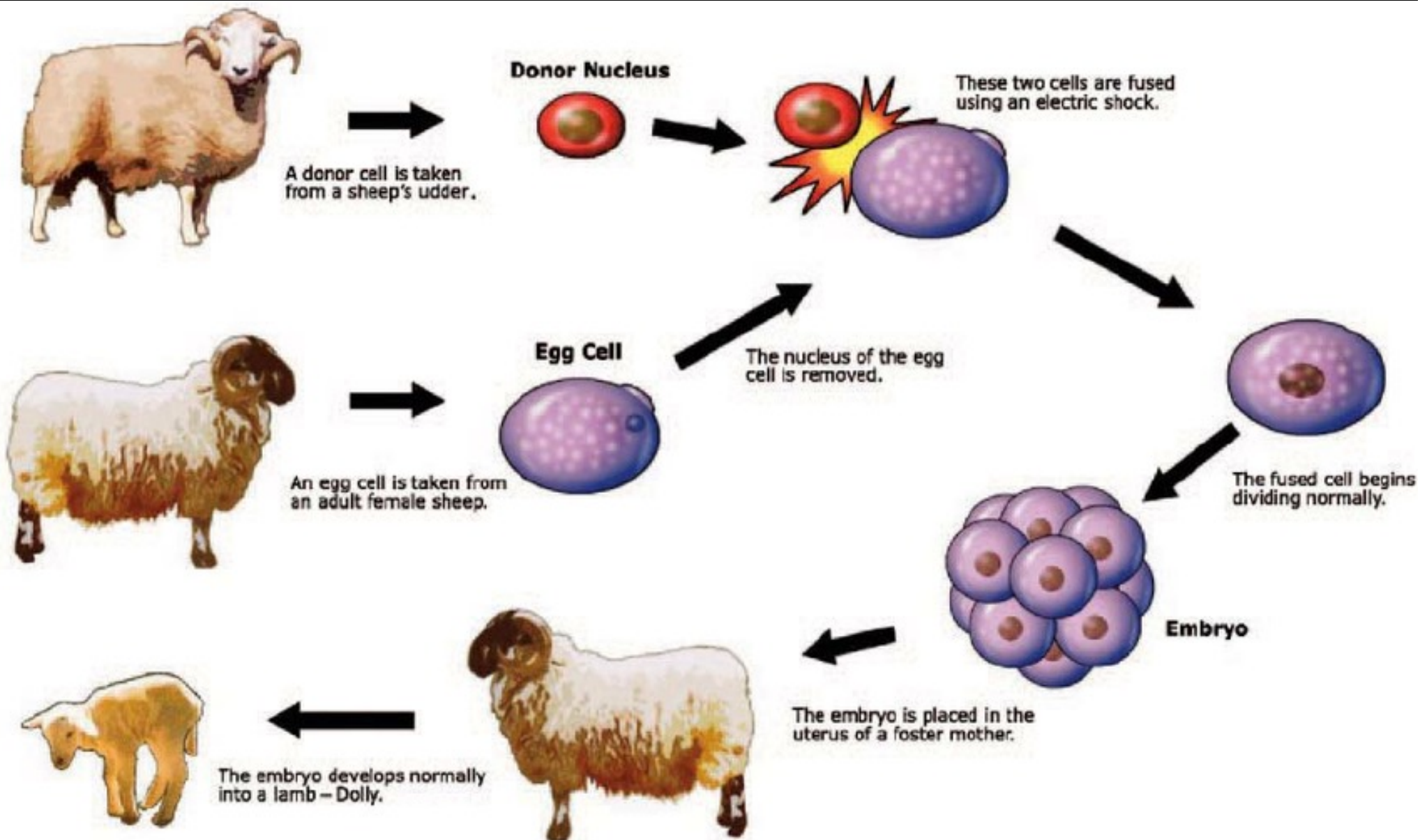
The making of a clone



Cohen, Philip. "Dolly's Mixture." *New Scientist* 2202, September 4, 1999. © New Scientist Ltd. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>.

Dolly: The Cloning of a Sheep, 1996

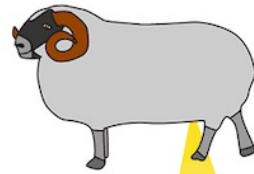




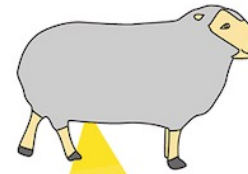
Armstrong, Lyle, Majlinda Lako, et al. Figure 7 in "[Epigenetic Modification Is Central to Genome Reprogramming in Somatic Cell Nuclear Transfer.](#)" *Stem Cells* 24 (4):805–14. © John Wiley & Sons, Inc. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>.

The Story of Dolly

Scottish Blackface
(Egg Donor)



Finn-Dorset
(Nuclear Donor)

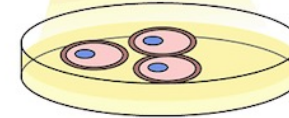


Remove a donor

Egg Cell

Remove cells from a sheep udder

Mammary Cell



Remove the nucleus from the egg

Enucleation

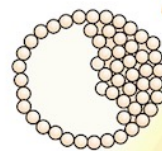
Select a single cell

Combine Cells
using an electric shock.

Blastocyst

The combined cell begins to divide normally to become a blastocyst.

The combined cell now has a single nucleus from the nuclear donor.

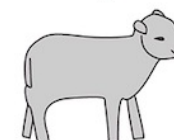
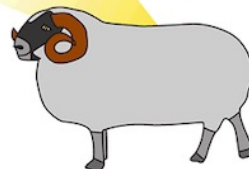


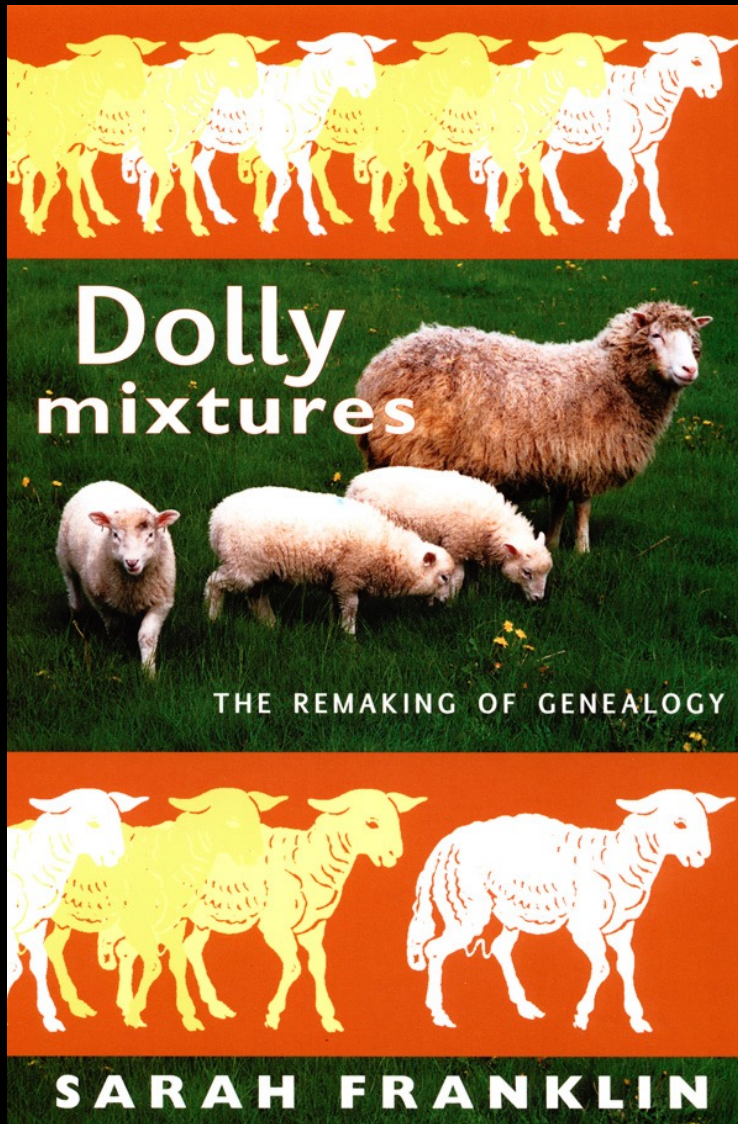
The blastocyst is placed in the uterus of a

Surrogate Ewe

The blastocyst develops into a fetus and in about five months a lamb is born -

Dolly





“Dolly is syntactically noncompliant within the normative arboreal grammars of reproduction and descent: her queer genealogy haunts the very basis of the formal biological categories that once affirmed the stability of a known sexual and reproductive order” (28)?

“Does Dolly’s viability challenge the basic genealogical syntax on which so much normative social and biological categorization, or ordering, has been based? Or, in contrast, does her creation reveal how little that model ever really explained?”

What does Franklin mean?



CLONE SHOCK

CLONE SHOCK



Ewe copycat... cloned sheep Dolly last night. Her birth has caused huge ethical storm

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Sheep Dolly first mammal 'copied' from adult animal

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A SHEEP has been cloned, scientists announced last night.

The ewe, named Dolly, is the first mammal produced from an adult cell.

By JEAN COPPIE

She is named after busy country star Dolly Parton, because she was cloned from a mammary cell.

But the breakthrough at Edinburgh's Roslin Insti-

tute has caused fury. It is feared if the technology is used on humans, a dictator could replace himself.

That would echo the nightmarish movie The Boys From Brazil, where mini-Hitlers were created.

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I LOOK LIKE EWE: PAGES 4 & 5

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Published: 18 February 2003

Obituary: Dolly the sheep

John Whitfield

Nature (2003) | Cite this article

809 Accesses | 1 Citations | 155 Altmetric | Metrics

Celebrity clone dies of drug overdose.

For over six years, every bleat of the world's most famous sheep has been analysed for biological significance and hints of decrepitude.

No longer: Dolly was put down by a lethal anaesthetic injection last Friday. She was six and a half years old, and suffering from lung cancer caused by a virus.



Dolly leaves a few surviving lambs. Credit: © AP.

Whitfield, J. Obituary: Dolly the sheep. Nature (2003). <https://doi.org/10.1038/news030217-6>. Used by permission.

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