Orozco: Gods of the Modern World:
Dartmouth College Library Murals: The Epic of Civilization 1932-34

SENCER & Your Academic Career

A Twenty Year Case Study

Katayoun Chamany
Associate Professor of Biology
Chair of the Interdisciplinary Science Program
Mohn Family Professor of Natural Sciences and Mathematics
Director of the University Science Labs
Eugene Lang College of Liberal Arts at The New School

Science Education for New Civic Engagements Leadership Fellow

August 6, 2017
Stony Brook University

SCAC CC NYSTEM THE NEW SCHOOL

1997

Trace Jordan

SENCER Journal Editor

STEM for All

2003

John Jungck

SENCER Scholar

Democratizing Data

2005

Monica Devanas

SENCER Model

Global Learning

2009

Marion Fass

SENCER Scholar

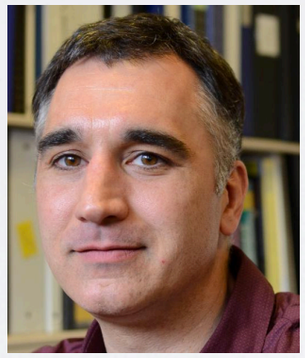
Healthy Places

2011

Ellen Goldey

SENCER Model

Perry's Model (ethics)



2014

Tom Higgins

SENCER Model

STEAMD & Diversity

2015

Karen Kashmanian Oates

SENCER Scholar

Chairs & Careers

2016

Eliza Reilly

SENCER Exec Director

STEM & Humanities

SENCER
civic engagement
responsibility

The New School
social justice
deliberative democracy

SENCER
Leadership Fellow

Faculty Representative
University Social Justice
Committee

Awards

Research

Infrastructure

Training

Education

Development and Implementation of College and University Curricula Concerning Stem Cell Science and Related Ethical, Legal and Societal Implications - 2009

RFA #: 0809080957

Institution	PI	Amount	Title
The New School	Katayoun Chamany	$212,914	The Development, Implementation, and Assessment of an Interdisciplinary Stem Cell Curriculum for Non-Majors
Columbia University	Daniel Kalderon	$291,061	Implementation of a New Undergraduate Course, "Stem Cells: Biology, Applications and Ethics" at Columbia University
University of Rochester	Dina Markowitz	$272,448	The Science and Ethics of Stem Cells: A Case Study-Based Course for Undergraduates
Syracuse University	John Russell	$324,000	Development of an Interdisciplinary Portable Course on Stem Cells
SUNY Binghamton University	Robert Van Buskirk	$287,823	The Business and Biology of Stem Cells in Cell Therapy

The Development, Implementation, and Assessment of an Interdisciplinary Stem Cell Curriculum for Non-Majors

Katayoun Chamany, Ph.D.
The New School
$212,914

We intend to develop, implement, and assess a set of curricular modules centered on stem cell science and its related ethical, legal and social implications (ELSI) with special attention to social justice. These modules can be used in combination or separately, in a range of undergraduate courses, as the content of the modules will span biological topics such as cloning, chimeras and nuclear reprogramming, in addition to social themes such as competing values and equity, and access to stem cell science and technology. Case studies that require a firm understanding of the science and ELSI will serve as capstone activities for each module. The interdisciplinary Stem Cells Across The Curriculum (SCAC) Faculty Working Group will be charged with developing the textual and visual content for the modules and inquiry-oriented learning activities. All modules

Communication Design

Religious Studies

Health Policy

Disability Studies

stem cells across the curriculum

The New School & NYSTEM

Basic Science of SCR

Feminist Bioethics

Feminist Literature

Feminist Health Psychology

COMPETANCIES	CHECK
Differentiate the various methods of developing stem cell lines and the implications for research, ethics, and therapy.	Assignments, Exams, Case Studies
Critically analyze evidence-based arguments for and against the liberalization of SCR and the ways in which policy has been shaped by these competing positions.	Case Studies
Recognize the dominant narrative in which scientific research is positioned as progress and question the benefits and dangers associated with SCR as compared to other approaches used to promote social good.	Case Studies
Trace the history of: cell research; human subjects research; forms of compensation to balance the risks and benefits of research participation; and the formation of regulatory structures to oversee emerging practices.	Visual Narratives Case Studies
Identify the scientific method, the social justice principles, and any misrepresentations that relate to a particular SCR method in artwork, advertisements, film, news, scientific papers.	EXAMS

Procedural Justice

Ethics Committee Composition

Clinical Trials & Regulation

Oocyte Payment

Embryo Research

stem cells across the curriculum

Basic Science of SCR

Social Justice Framework

Disability Discrimination

Commercialization and Patents

Public & Private Biobanks

SC Registries & Licenses

Distributive Justice

Critical Thinking

Balancing Subjective and Objective Views

Questioning Normative Assumptions

Ability to Demythologize Experts

Tolerance of Ambiguity

interdisciplinary case studies

Stories Using Counter Narratives

Cognitive Flexibility

Consider Different Kinds of Evidence

Include Those Not at the Table

Ability to See Multiple Points of View

Sensitivity to Ethical Dimensions

Empathetic Thinking

Rhoten, et al. 2006. Interdisciplinary Education at Liberal Arts Institutions. Teagle White Paper

Case Modules

Making Biology Relevant

HeLa Cells & HPV Genes: Immortality & Cancer

Eggs & Blood: Gifts & Commodities

Disease & Disability: Hope & Hype

Stem Cell Research Policy: Values & Religion

Narrative Story Telling → Visual Narratives

Temporal & Spatial Understanding

History

Sequencing

Environment

Interactions

Scale

infographic thinking

Organizing for Retrieval

Visual Literacy

Purpose

Audience

Graphical Abstracts

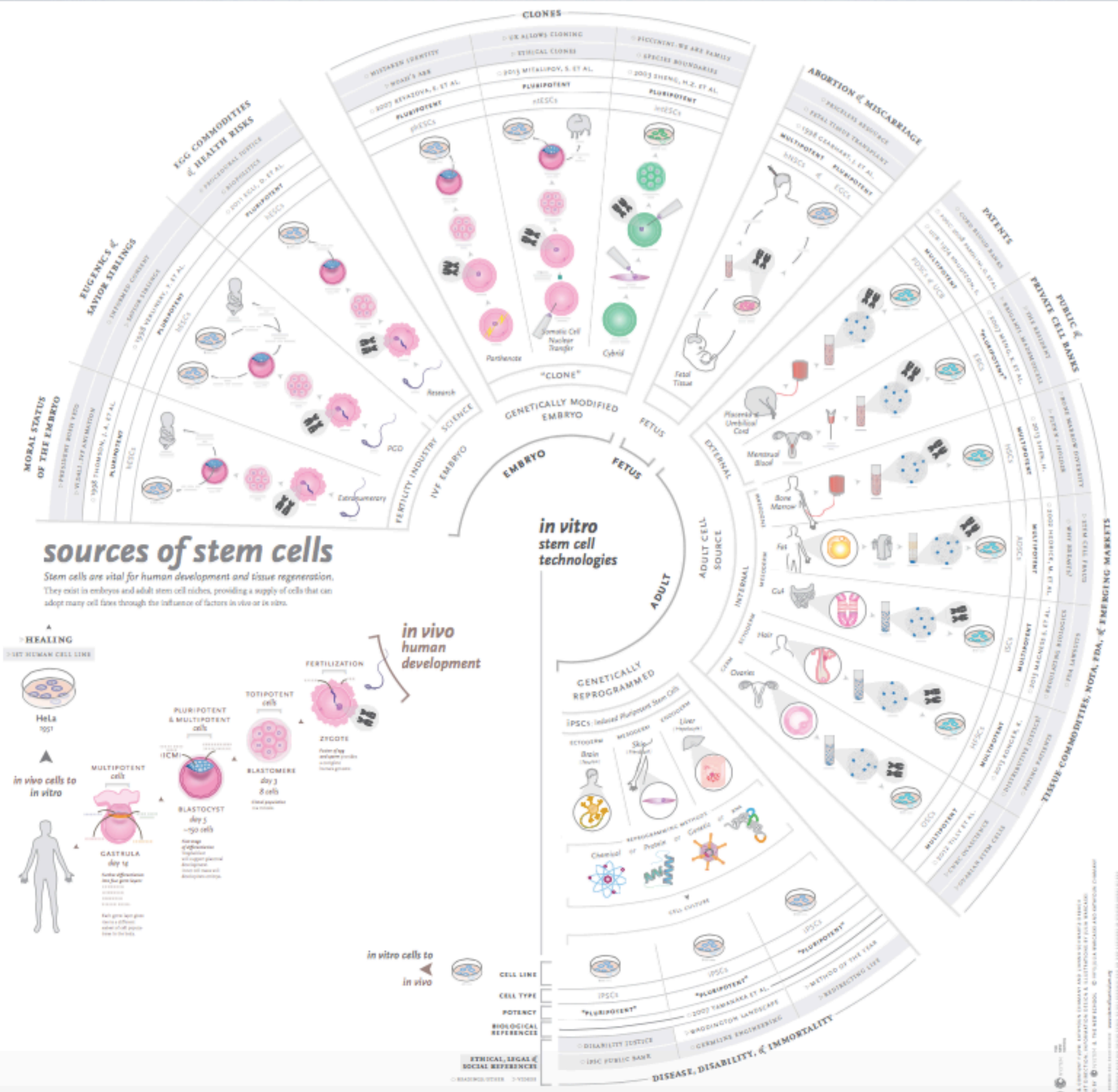
Salient vs. Peripheral Information

Communication Skills

sources of stem cells

Stem cells are vital for human development and tissue regeneration.

They exist in embryos and adult stem cell niches, providing a supply of cells that can adopt many cell fates through the influence of factors in vivo or in vitro.



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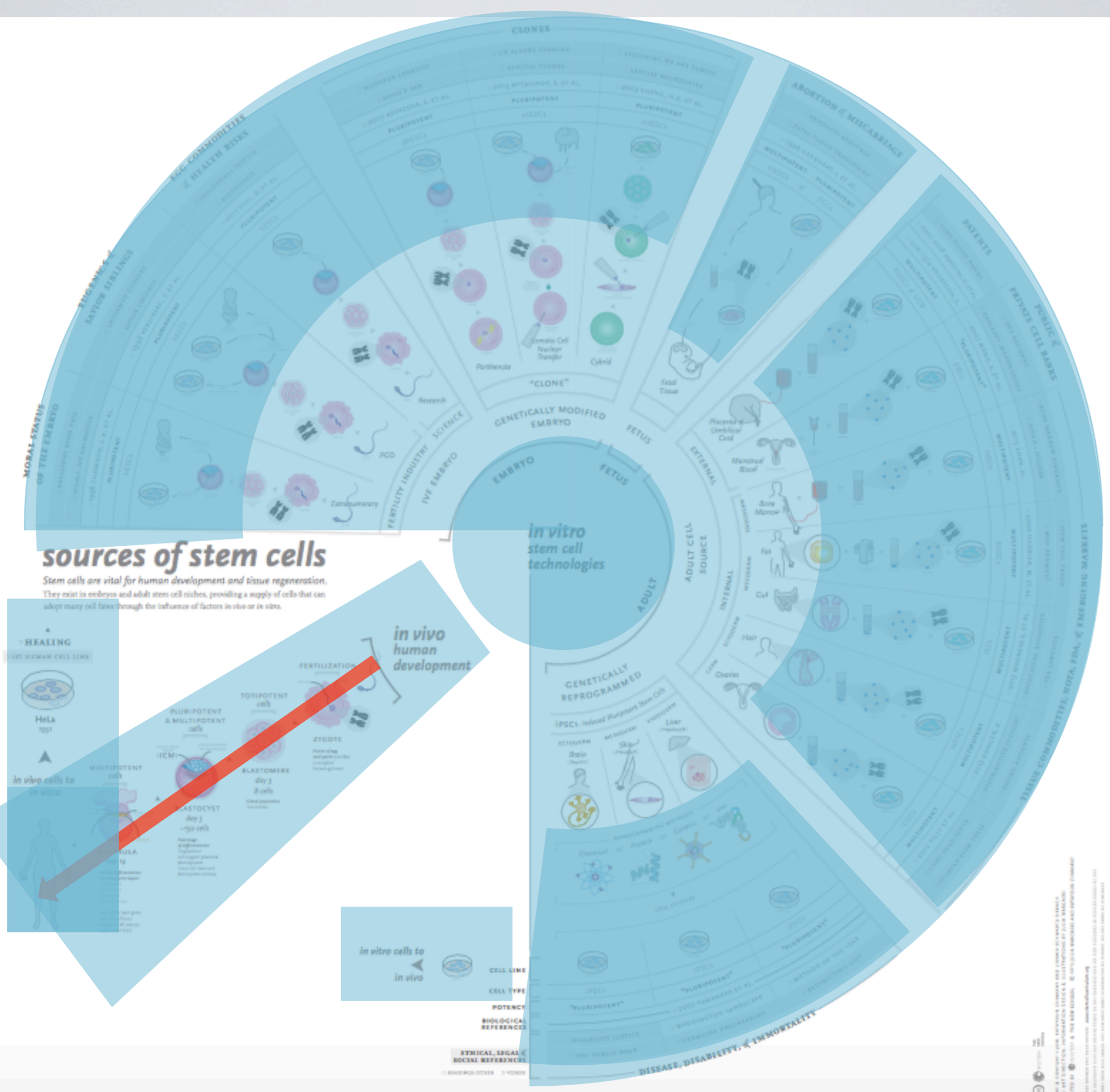
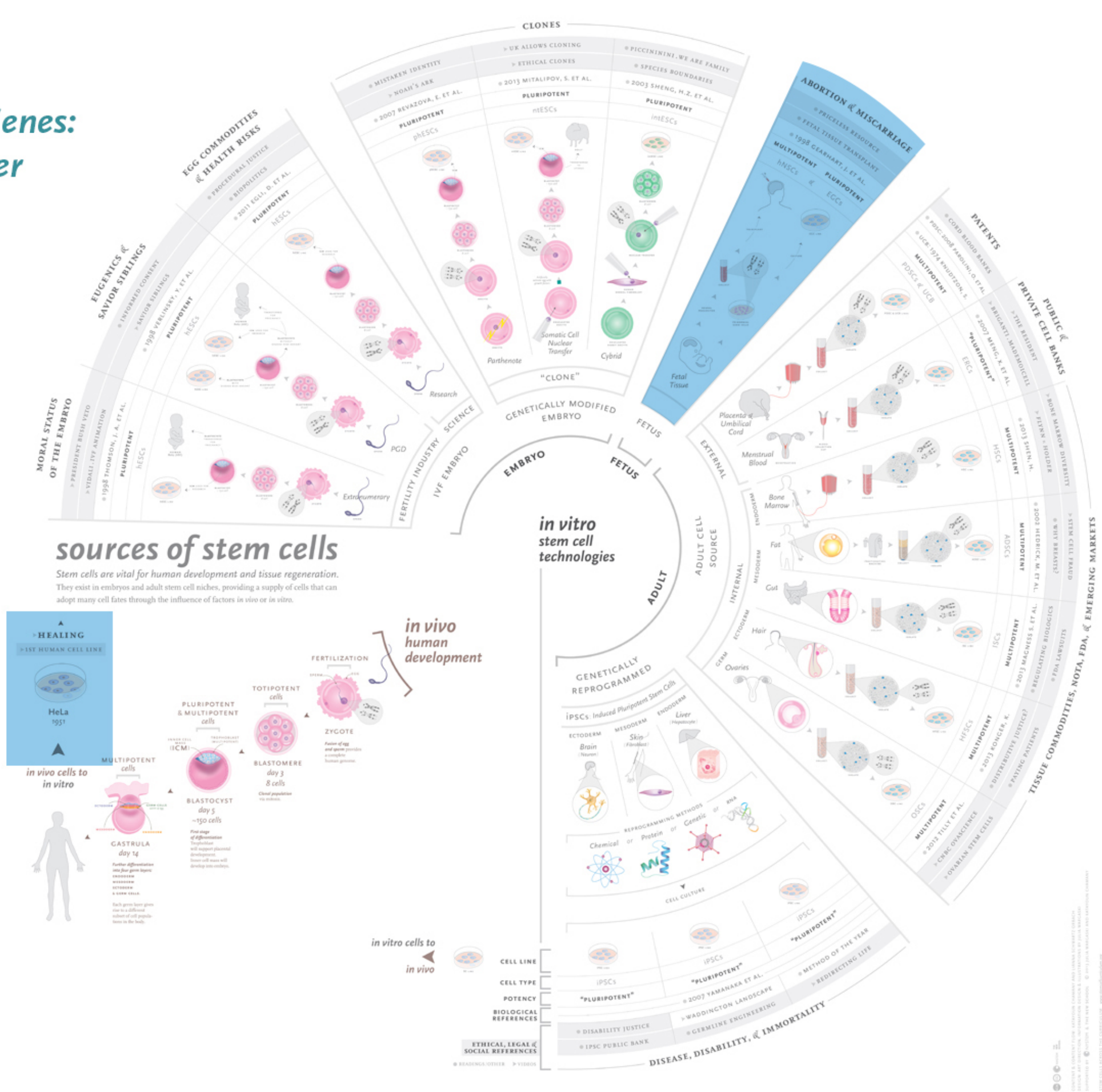


HeLa Cells & HPV Genes: Immortality & Cancer



sources of stem cells

Stem cells are vital for human development and tissue regeneration.
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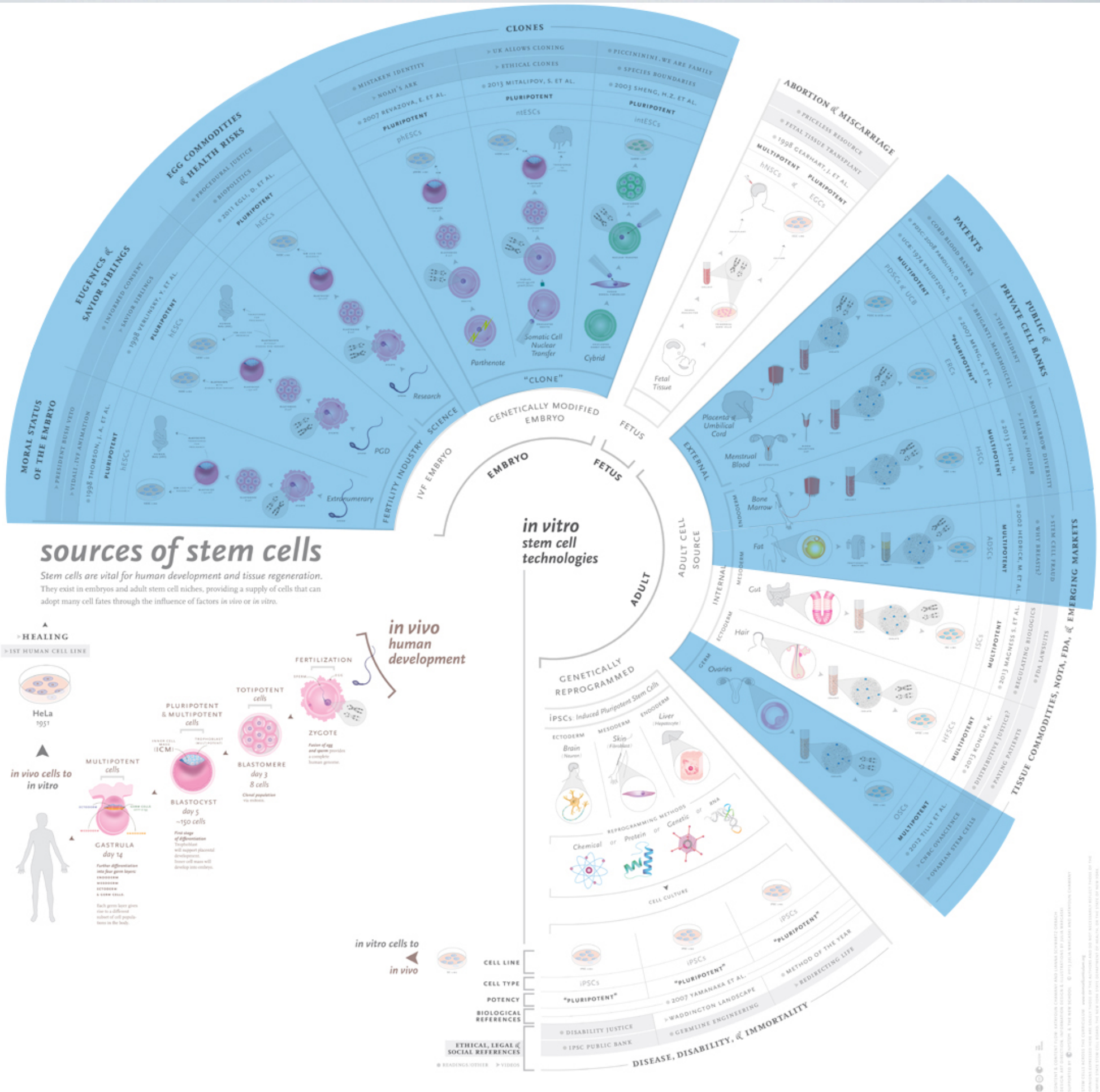
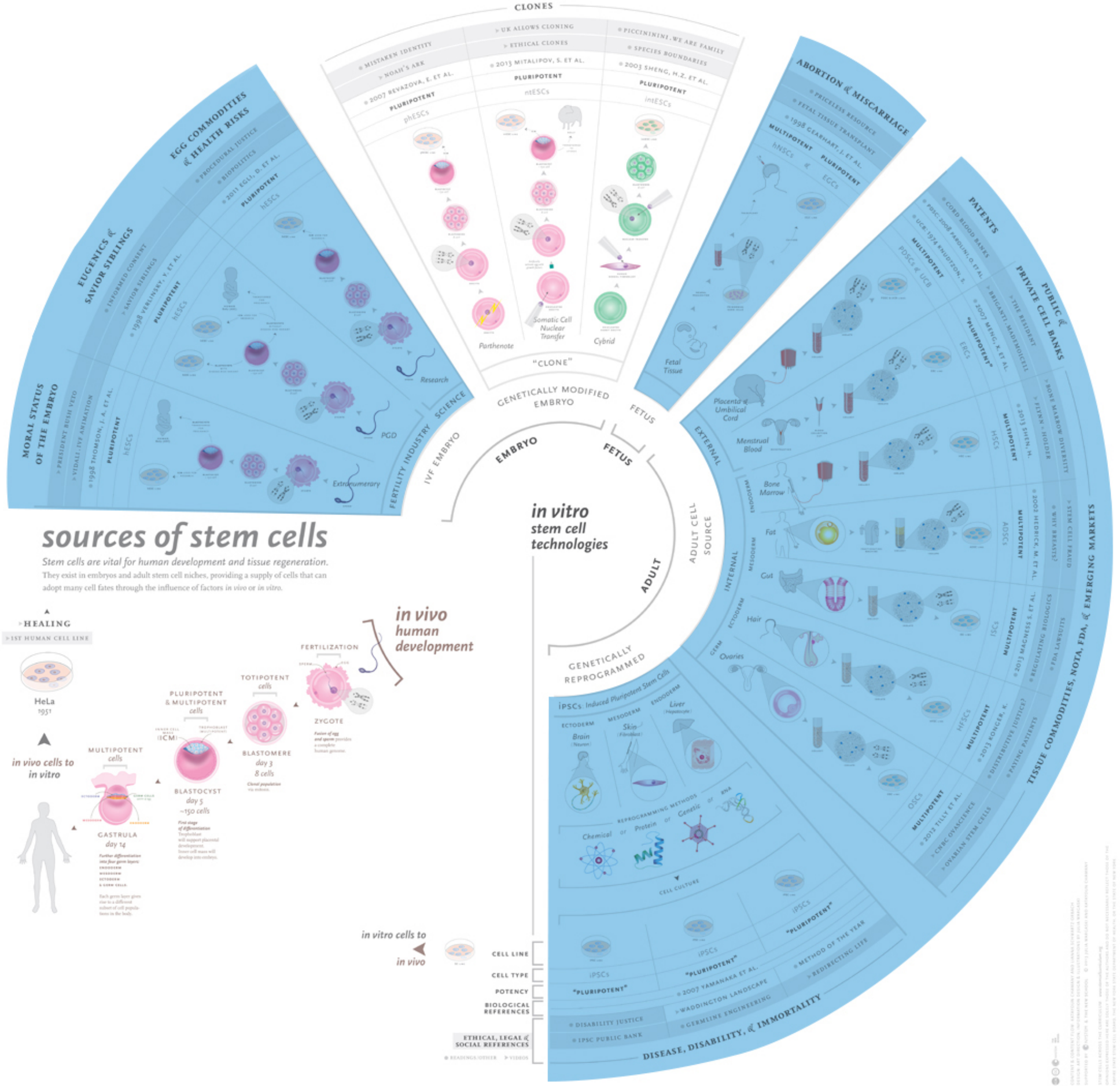
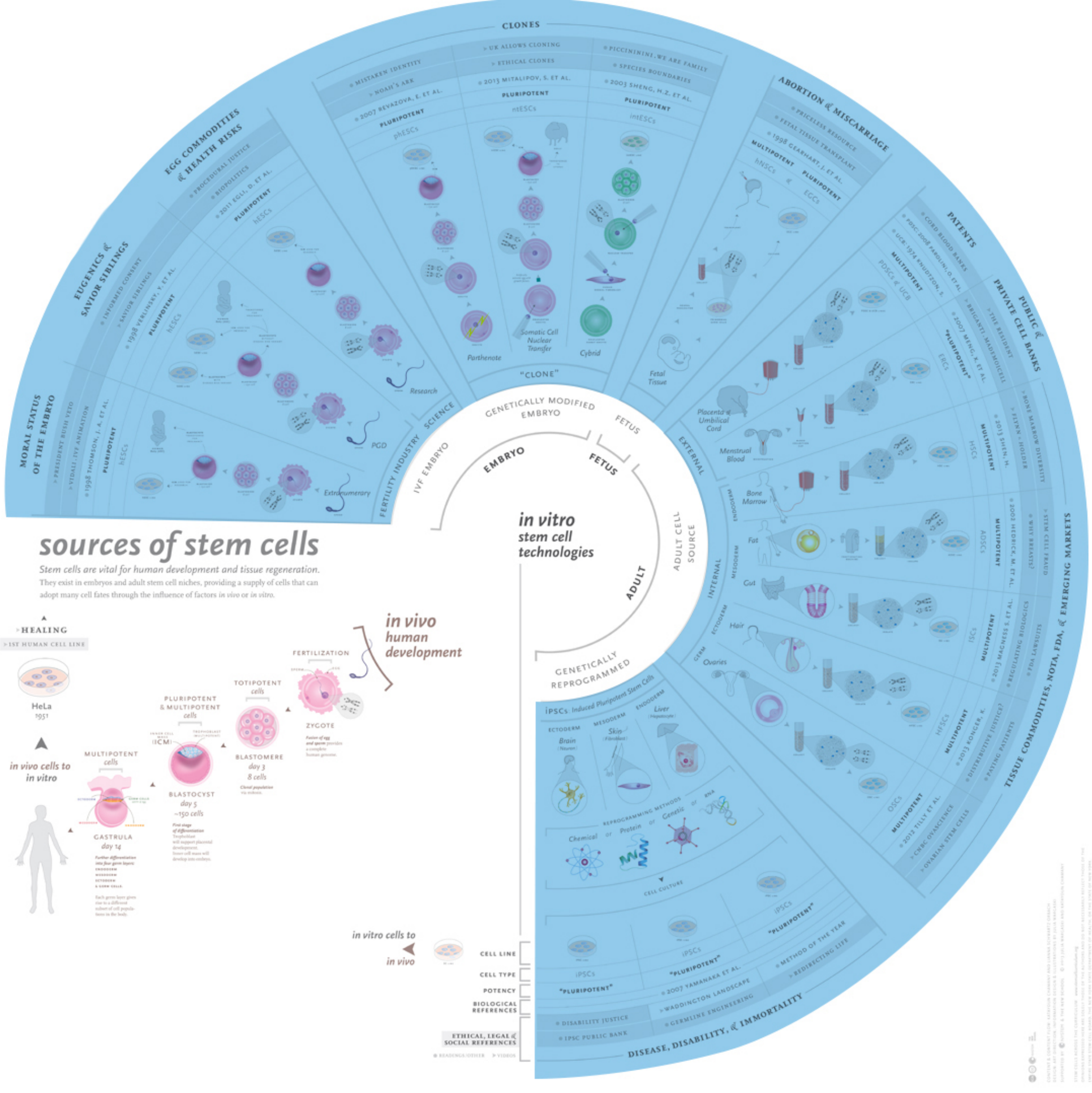
Oocytes & Blood: Gifts & Commodities



Disease & Disability: Hope & Hype



Stem Cells & Policy: Values & Religion



sources of stem cells

Stem cells are vital for human development and tissue regeneration.
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sources of stem cells

in vitro
stem cell technologies

MORAL STATUS OF THE EMBRYO

EMBRYO

FETUS

SCIENCE

FERTILITY INDUSTRY

IVF EMBRYO

EGG COMMODITIES & HEALTH RISKS

EUGENICS & SAVIOR SIBLINGS

GENETICALLY MODIFIED EMBRYO

"CLONE"

- PRESIDENT BUSH VETO
- VIDALI . IVF ANIMATION
- 1998 THOMSON, J. A. ET AL.
- PLURIPOTENT
- hESCs
- hESC LINE
- ICM USED FOR RESEARCH
- BLASTOCYST ~150 cell
- BLASTOMERE 8 cell
- ZYGOTE
- SPERM
- HUMAN Baby (ASC)
- BLASTOCYSTS TRANSFERRED FOR PREGNANCY
- Extranumerary
- PGD
- BLASTOCYSTS WITHOUT DISEASE RISK VARIANT
- BLASTOCYSTS WITH DISEASE RISK VARIANT
- TRANSFERRED FOR PREGNANCY
- 1998 VERLINSKY, Y. ET AL.
- SAVIOR SIBLINGS
- INFORMED CONSENT
- ?
- 2011 EGLI, D. ET AL.
- BIOPOLITICS
- PROCEDURAL JUSTICE
- NOAH'S ARK
- MISTAKE
- 2007 REVAZOVA, E. ET AL.
- phESCs
- phESC LINE
- Research
- 2013 MITALIPOV, S. ET AL.
- ntESCs
- ntESC LINE
- DOLLY
- TRANSFERRED TO UTERUS
- Artificially activate egg with growth factors
- OOCYTE
- ENUCLEATED OOCYTE
- Parthenote
- Somatic Cell Nuclear Transfer
- Cybrid
- 2003 SH
- intESCs
- NUCLEAR TRANSFER
- HUMAN DERMAL FIBROBLAST
- ENUCLEATED RABBIT OOCYTE
- FETUS

The 7E Learning Cycle

Meeting Students Where They Are

Elicit

Engage

Explore

Explain

Elaborate

Evaluate

Extend

Henrietta Lacks & HeLa Cells

Elicit & Engage

sent: Genomics Video

1. What aspects of the case did you find most ENGAGING; provide comments and questions?

2. How does the case ELICIT prior knowledge and create cognitive dissonance?

3. Which STEM concepts and principles could be taught *through* this video?

4. What are some ETHICAL challenges that may emerge as a result of this work?

5. Could the case prompt students to become involved in SHAPING POLICY or activism?

6. Who are some of the STAKEHOLDERS that influence RESEARCH DIRECTIONS like this one?

7. Who are some of the STAKEHOLDERS who might influence POLICY regarding this research?

8. Which STAKEHOLDERS struggle to have a VOICE in this arena?

Congressional Records

IN MEMORY OF HENRIETTA LACKS

HON. ROBERT L. EHRLICH, JR.

OF MARYLAND

IN THE HOUSE OF REPRESENTATIVES

Wednesday, June 4, 1997

Mr. EHRLICH. Mr. Speaker, I rise today to pay tribute to Henrietta Lacks, a woman whose contributions to medical science and research have gone relatively unnoticed for the past 46 years. Ms. Lacks provided a crucial sample of cells that has furthered our knowledge of medical science and disease prevention, and for this contribution, we are all grateful.

Henrietta Lacks was born in 1920 in Clover, VA. At the age of 23 she moved to Turner's Station, near Baltimore, MD, joining her husband David. She had five children, four of whom—Deborah, David Jr., Lawrence, and Zakariyya—still survive. Ms. Lacks was known as pleasant and smiling, and always willing to lend a helping hand.

After the birth of her fifth child, Ms. Lacks was admitted to the hospital at Johns Hopkins

HONORING HENRIETTA PLEASANT-LACKS

HON. THOMAS S.P. PERRIELLO

OF VIRGINIA

IN THE HOUSE OF REPRESENTATIVES

Friday, May 28, 2010

Mr. PERRIELLO. Madam Speaker, today I wish to commemorate the Memorial Dedication Service in honor of Henrietta Pleasant-Lacks, which will take place this weekend at St. Matthews Baptist Church in Clover, Virginia. At this ceremony, the descendents of Henrietta Lacks will at last be able to dedicate a headstone for a woman who has for too long been buried in an unmarked grave.

Henrietta Lacks was born Loretta Pleasant on August 1, 1920, in Roanoke Virginia. The granddaughter of slaves, she was raised by her grandfather on a tobacco farm. She married David Lacks in Halifax County, Virginia in 1941, and moved to Baltimore County, Maryland, in search of work. Henrietta and David had five children: Lawrence, Elsie, David, Deborah and Joseph. In February of 1951,

Popular Blogs

Open Letter to 1st Yr Faculty

AUG 28

An Open Letter to Those Colleges and Universities that have Assigned Rebecca Skloot's The Immortal Life of Henrietta Lacks as the "Common" Freshmen Reading for the Class of 2016

By Rebecca Kumar

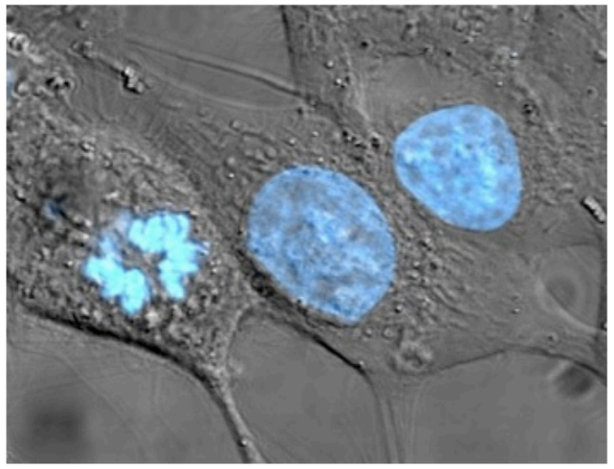
With immense thanks to Sheri Davis-Faulkner and Moya Baily of The Crunk Feminist Collective.

23andMe Spittoon Blog

23andMeBlog HOME CATEGORIES ALL POSTS

The Story of Henrietta Lacks: A Lesson in Biology and Ethics

January 30, 2009 By ErinC under 23andMe Research, News & Announcement



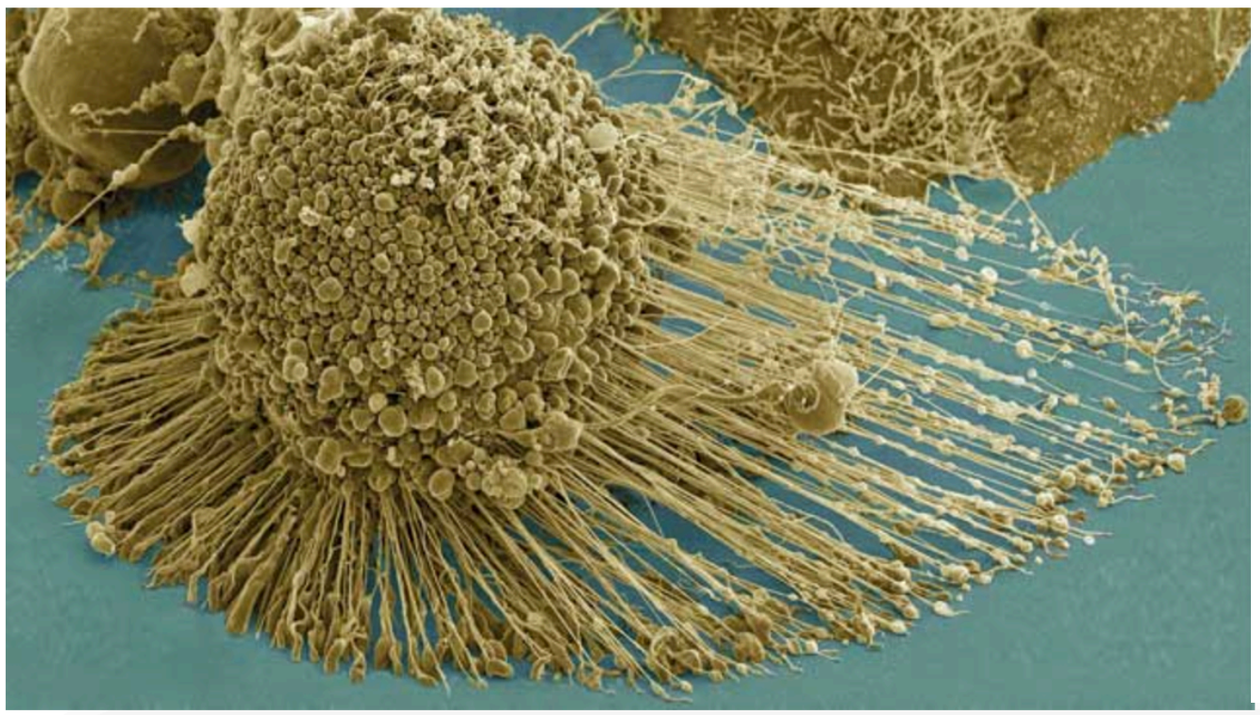
Editor's note: We posted this a couple of years ago, but in light on the historic agreement between the family of Henrietta Lacks and National Institutes of Health, we thought it worthy of re-posting. Also read Carl Zimmer's great piece in the New York Times. The post has been slightly changed from the original. Henrietta Lacks was only 31 years old when she died on October 4, 1951. But thanks to one of the more shameful, yet at the same time scientifically beneficial, episodes in the history of medical science, cells from the tumor that killed her grow today in laboratories all over the world.Henrietta Lacks' story is a powerful scientific and ethical lesson for researchers who work with human subjects. It all started in February 1951, when Dr. George Gey of Johns Hopkins was given a sample of cervical cancer cells that had been taken from a young African American woman who was dying of cervical cancer.Gey

Science Reviews

Seeded by Weeds

More than 50 years after cross-contamination of cultured cell lines was recognized, the problem continues to plague the scientific community.

By K. John Morrow Jr. | May 1, 2015



nature International weekly journal of science

comments on this story

Stories by subject
- Biotechnology
- Cell and molecular biology
- Genetics
- Health and medicine
- Lab life

Stories by keywords
- Cell culture
- ATCC
- Standardization
- Cancer cell lines

This article elsewhere
Blogs linking to this article

Add to Digg

Published online 2 June 2010 | *Nature* **465**, 537 (2010) | doi:10.1038/465537a

News

Biologists tackle cells' identity crisis

DNA fingerprinting scheme aims to make sure researchers are working on the right cells.

Alla Katsnelson

Ever since biologists learned how to grow human cells in culture half a century ago, the cells have been plagued by a problem of identity: many commonly used cell lines are not actually what researchers think they are.

Cell-line misidentification has led to mistakes in the literature, misguided research based on those results and millions wasted in grant money. Last year, *Nature* described the situation as a scandal[1].

Breast cancer cells: not always what they're supposed to be.

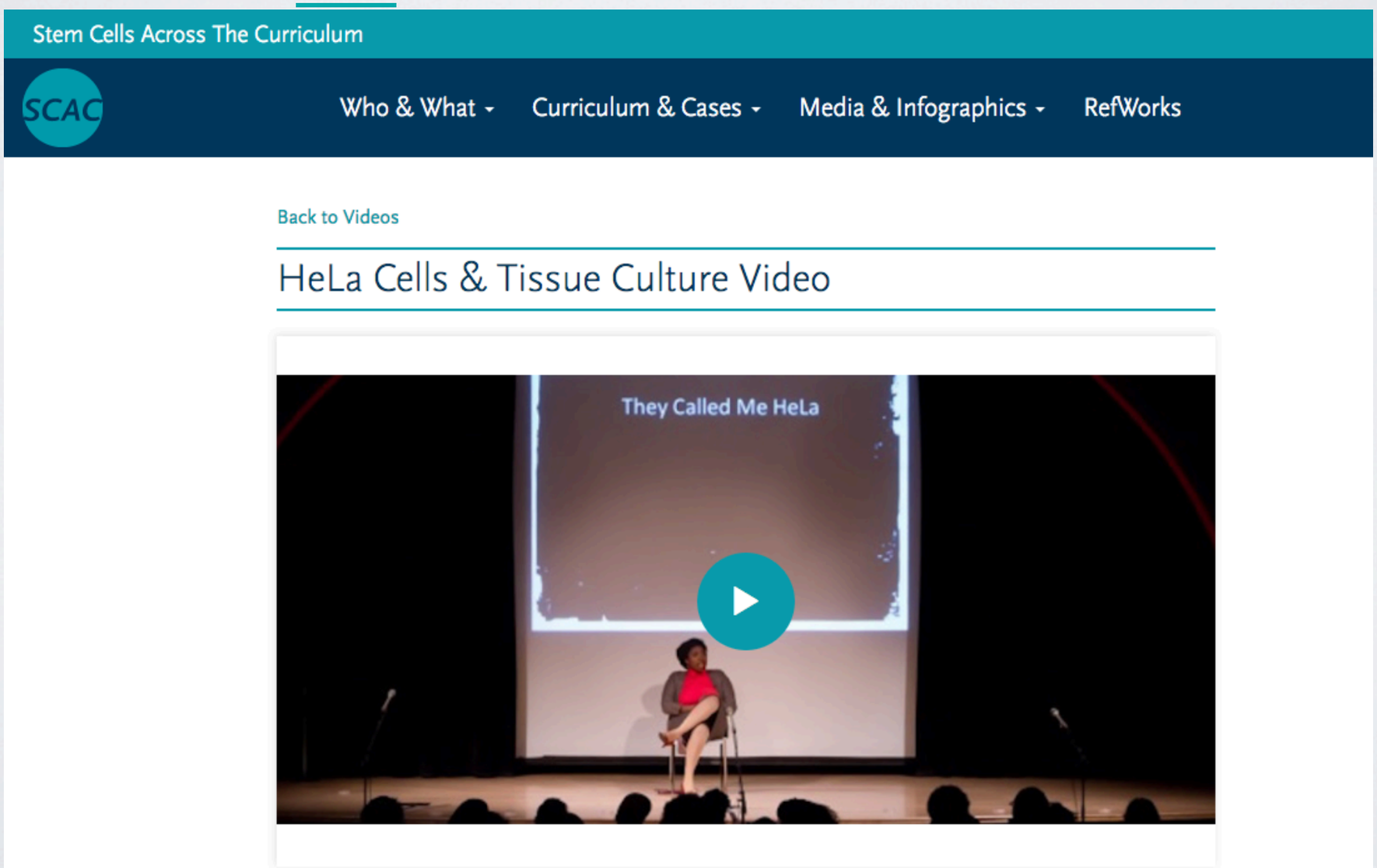
S. GSCHMEISSNER/SPL

Film &Theater

STEAM & Humanities

Curtis, A. 1997. Modern Times: The Way of All Flesh. Aired on BBC. Modern Times Series , Editor Stephen Lambert. 52 min link

Covert, Chamany, & Elie. They Called Me HeLa. *Stem Cells Across the Curriculum.* 15 min Link



Characters in HBO Film of Skloot's Book

The Oprah Effect

Vance plays Sir Lord Keenan Kester Cofield, a slick Southern con artist

Uggams is Sadie, Henrietta's cousin and best friend

Cathey plays Zakariyya, Henrietta's youngest son/Deborah's (Winfrey) brother

Birney is Dr. George Gey, scientist who harvested the HeLa cells from Henrietta (Goldsberry)

Santiago-Hudson is Dr. Pattillo, a doctor and professor of gynecology who facilitated Rebecca Skloot's (Byrne) communication with the Lacks family

Thompson plays Lawrence, Henrietta's oldest son/Deborah's older brother

Robinson is Day Lacks, Henrietta's widower and father of their children

Lenox is Barbara, Lawrence's wife who helped raised Deborah and Sonny (Carroll) after Henrietta's death

HeLa Cells & HPV: Immortality & Cancer

Character Roles for Simulated Conference Session

Character	Perspective	Affiliation
1. Kimberly Lacks	Grandaughter	Recipient of Skloot Foundation Grant
2. David Lacks Jr.	Grandson	Member of Henrietta Lacks Genome Access Working Group
3. Christoph Lengauer	Scientist Entrepeneur	Helped Lacks Family/ Blueprint
4. Larry Palmer	Legal/Bioethics	Questions Reparations
5. Darrell Salk	Son of Jonas Salk	Pro medicine and health
7. Jimmy Sarkett	Human Subject	Polio virus vaccine source
8. Kara Saxby	Daughter of John Moore	
9. Wendy Chung (ACLU)	Legal/Patents Genes	ACLU
9. Mary Claire King	Geneticist/Activist	U of Washington
10. Jill Peters	Native American	PAR
11. MoreMarrowDonors.org	NPO	Compensate for Bone Marrow Diversity
12. Sergey Brin	Pro Biobank	Google Founder
13. Nix or Yeampierre	CommunityParticipation	UPROSE
14. Ruha Benjamin	Social Justice	UPenn Academia
15. Kimberly Koss	Biomedical Scientist	Triple Negative Breast Cancer

Eggs & Blood: Gifts & Commodities

Explore, Explain,
Elaborate, Evaluate, Extend

Role Play: *One Perspective*

Character Statement:

- 500 word position
- 2 questions to others
- 300 word Counterargument

▼

Conference Session: *All Perspectives*

Instructor Moderates:

- Explicit position & Address of Questions
- Dialogue Debate

▼

Policy Proposal: *Personal Perspective*

Rubrics

- Science
- Policy and ethical issues
- Personal Values

Argue for one position Compromise

Competing Values, Evidence, Benefits, & Trade Offs

Debate, Discussion, Deliberative Dialogue

Deliberation is a particular kind of talk. It is the kind of talking that people do when they realize that they are responsible for making decisions and choices—or giving guidance to others who will make those decisions—that will not only affect them but will affect others and will also have costs and consequences along with the good things that may happen. Deliberation is hard work. People work at looking at the pros and cons of each approach, or perspective. That means making a real effort to find out how other people see the issue and, more importantly, *why* they see it the way they do. In deliberation, this means listening to the people you don't agree with as carefully as to the people you do agree with.

It is, of course, possible to have a great discussion about issues and problems; sharing opinions, personal experiences, and favorite solutions. And that's a fine, and often satisfying, thing to do. Or it is possible to debate an issue; presenting evidence supporting your chosen view, countering and undercutting the arguments that others present for their chosen views, persuading, and trying to win by presenting the best and most eloquent argument. But with deliberation, talk goes beyond just discussion or debate to trying to understand the problem together and to finding solutions that will be best for everyone. Deliberation happens when a group of people work on a problem as if solving it is up to them and no one else, and when they recognize that they and others will be living with the consequences, both good and bad, of the choices they make.

Debate

- Winners and losers
- Search for glaring differences
- Search for weaknesses in others' positions
- Counter another's position at the expense of the relationship
- Invest wholeheartedly in your beliefs
- Listen to find flaws and counterarguments
- Is oppositional and seeks to prove the other wrong
- The goal is winning
- Defends assumptions as truth

Most useful when: A position or course of action is being advocated and winning is the goal.

Discussion

- Back and forth exchange of information, stories, experiences, viewpoints,…
- May focus on a topic, theme, idea, problems, issues, etc., may be broad or focused
- A generic term meaning talking together
- Focuses on the experience of talking without any particular goal or desired outcomes
- May be between two people or among many
- May mean many kinds of talking together (such as a deliberative discussion, informative discussion, debate, dialogue, etc.)
- Usually implies participants are not adversarial or competing as in debate

Most useful when: People want to talk together about something without desiring any particular outcome from the conversation.

Deliberative Dialogue

- Goal is shared understanding of the issue/problem
- Examining costs and consequences of even most favored approaches
- Assumes that many people have pieces of an answer and a workable solution
- Listening to understand and find meaning
- Presents assumptions for re-evaluation
- Opens possibilities for new solutions
- Leads to mutual understanding of differences and ways to act even with those differences
- People explore what's important to them and others by asking questions

Most useful when: A decision or criteria for a decision, about the best way(s) to approach an issue or problem is needed.

Dialogue Not Debate

Perry's Model of Ethical Reasoning
Interface of intellect & identity

- Dualism: Gut Reactions
- Multiplicity
  Recognizing multiple views and strategies
  Cognitive Dissonance ; temporary regression to dualism
- Contextualized Relativism
- Values Affirmation and Analysis
- Contextualized Commitments

ELSI→BESLD

Module Title	Biological Concepts & Principles	Ethical, Legal, & Social Dimensions
HeLa Cells & Genes: Immortality & Cancer	cell structure, cell cycle, mitosis, cancer, cell line registry, cell differentiation, viral integration, telomerase, and cell signaling	history of cell culture, bodily goods, privacy, ownership, compensation, human subjects research, public health efforts to prevent cancer
Eggs & Blood: Gifts & Commodities	reproductive biology, meiosis, fertilization, IVF, immunology, embryogenesis, PGD, ESCs, fetal, cord, ovarian, and menstrual blood SCs, adipose-derived stem cells	history of gamete payment, bodily goods, IRB, FDA, OHSS, eugenics, saviour siblings, bioethnicity, public v. private banking, clones, cybrids
Disease, Disability & Immortality: Hope & Hype	neurodegenerative disease pathways, extracellular matrix, stem cell niches, nuclear reprogramming factors, iPSCs, immunology, scientific method	FDA, patents, ISSCR, stem cell fraud, snake oil treatments, cure vs. care, autonomy, saviour siblings disability rights and justice,
Stem Cells & Policy: Values & Religion	cybrids, SCNT, gastrulation, primitive streak, microarray gene expression technology, nuclear reprogramming factors, ESC, ASC, iPSC	religious pluralism, moral status of the embryo, ethics committee composition, stem cell registries, social justice, international/ national/local policies, injunctions, lawsuits

Hollstlc Developmental Learnlng:

Mapping to Bloom's, Krathwohl, Harrow, and Perry's Models

Meeting Students Where They Are

Learning Activity	Pedagogical Value
Activity One Social Impact: Discussion or Reflection	Stimulates and maintains interest by having students read news articles or reviews and form questions about the ethical and social aspects of the topic for reflection or discussion. Affect; Prior knowledge; Perry; Dualism
Activity Two Reading, Data Analysis and Interpretation	Requires students to use study guides to analyze primary literature and data to give coherent oral and written summaries and critiques of the research. Cognitive
Activity Three Visual Narratives/ Labs	Encourages students to use cooperative learning to understand temporal and spatial relationships of STEM processes by role-playing molecules, building models or doing labs. Relationships; Analyzing
Activity Four Capstone Dilemma and Decision-Making	Presents dilemmas and asks students to formulate a solution that incorporates the needs of different parties through role-play, written proposals, small group work, or peer review. Interpersonal Skills; Applying; Developmental

Activity One
Social Impact: Discussion or Reflection

Activity Two
Reading, Data Analysis and Interpretation

Activity Three
Visual Narratives/Labs

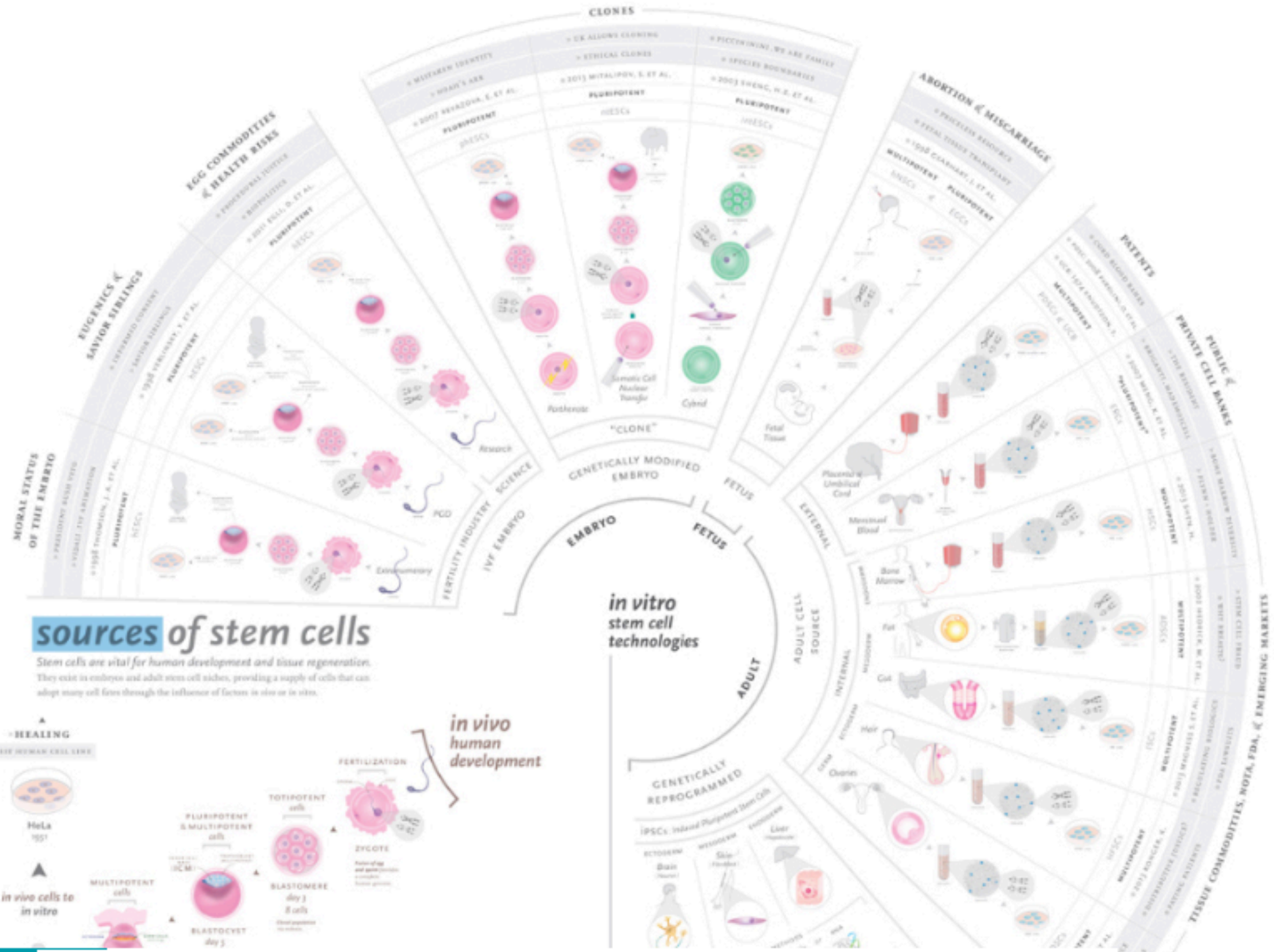
Activity Four
Capstone Dilemma and Decision-Making

Cognitive Introductory; Understanding

Cognitive Advanced; Synthesizing/ Creating; Perry Committed Values Based Stance, Harrow Psychomotor gestures body language

Curricular Components

Synopsis:	A quick snapshot of the disciplinary perspectives, topics, and cases associated with the module.
Readings & Resources:	A bibliography with secondary and primary resources appropriate in length, scope, and depth for undergraduates and organized by media format.
Learning Activities:	A list of learning activities highlighting specific learning goals, pedagogies, and time needed to execute the activity. Assignments are downloadable and accompanied by teaching notes that provide step-by-step implementation. Because they are intended to be flexible the teaching notes provide alternatives and choices, and instructors are encouraged to modify the activities, swap components, or simply use the suggested media resources to complement a course.
Timelines	Historical maps of events that allow students *to see* the field take shape across space and time and emphasizing the importance of facing our past and imagining a different future.
Infographics	Graphics address visual literacy by highlighting the dynamic and interrelated nature of basic science and its applications and give details for biological techniques such that each infographic serves as a mini-visual textbook chapter.
Discussion Questions	A list of questions that are under investigation, spanning biology, feminism, disability, social justice, policy, values, and economics.
Power Point Slide Sets	Editable slide shows making the invisible *visible* and containing embedded links to video, animations, interactive websites, and Notes Pages for further learning.
Case Studies	Peer-reviewed case studies explore real-world controversies, maintain student engagement, motivate deeper learning, and incorporate discussion, role-play and/or critical essay writing, and are accompanied by grading rubrics and teaching notes.
Primer:	A synthesis of the essential interdisciplinary content designed to ground instructors in disciplines outside their expertise and to be useful as “references chapters” containing bibliographies that point to literature and multimedia, for quick in-depth learning.



+ Information design

Making Biology Visible.

Outcomes

External Funding State Contract→ SENCER MODEL
Connection with Faculty and Students on Campus
AdoptConnections to SENCER faculty
Connections to Biosocial Symbioses Group
Connections to Narrative Health, & Social Justice Seminar
Kalamazoo Arcus STEM and Social Justice
Endowment from Parents of an alumna for SJ + STEM
Science+Art+Design Lab Workshops
Adopters and Adaptors of the SCAC Curriculum
Editorial Boards of Journals and Collections
NEH Grant for Summer Institute
Creating Change Agents

Acknowledgements

SCAC Team:

Adrienne Asch, Ethics, Yeshiva University
Katayoun Chamany, Biology, Eugene Lang College for Liberal Arts
Michael Pettinger, Religious Studies, Eugene Lang College for Liberal Arts
Lisa Rubin, Health Psychology/ Gender, The New School for Public Engagement
Ann Snitow, Gender Studies, Eugene Lang College for Liberal Arts
Julia Wargaski, Communication Design, Parsons School of Design
Emmanuel Nunez, Parsons School of Design
Chelsea Briganti Alumna, Product Design, Parsons School of Design
Alexa Riggs, Science, Gender and Psychology, Eugene Lang College The New School
Lianna Schwartz-Orbach, Science & Gender, Eugene Lang College The New School

Adopters/Adapters:

Fordham University: Daisy Deomampo Anthropology
The New School: Jessica Mozersky, Anthropology
Vassar College: Nancy Pokrywka
San Francisco State University: Tatiane Russo-Tait, Carmen Domingo, & Jonathan Knight: Bioethics, General Education, Cell biology

NATIONAL CENTER FOR CASE STUDY TEACHING IN SCIENCE

SENCER
SCIENCE EDUCATION FOR NEW CIVIC ENGAGEMENTS AND RESPONSIBILITIES

NYSTEM
New York State Stem Cell Science

Contract # C026077

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Stemcellcurriculum.org

Challenges

- Different Ways of Knowing
  - Language/Multiple Meanings
  - "Kindergarten"

- Different Ways of Doing
  - Book v. Modular Curriculum:
    - Linear v. Non-linear
    - Depth v. Breadth
    - Individual v. Collaborative Team
    - Long Time Scale v. Short Time Scale
    - Work to do v. Scholarship that Informs
    - Proprietary v. Non-Proprietary

- Finalized Product v. Works in Progress
  - Final Deadline v. Intermediate Deadlines
  - Static v. Dynamic
  - Book Reviews/Readings v. Conferences/Posters

HeLa Cells & HPV Genes: Immortality & Cancer

Evolution of Teaching Notes

Stakeholders Persona

Research, Deep Dive

One Perspective

Character Statement 3 parts

500 word essay

2 questions

300 word rebuttal

▼

Conference Session

Dialogue Debate

All perspectives

Use Prompts: Explicit position & Q

▼

Essay

Argue for one position

Two perspectives

Rubrics Scientific Evidence

Competing Values, Evidence, Benefits, & Trade Offs