

# History of HeLa Cells

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CHEM E 467 Biochemical Engineering

# Today we will be discussing some sensitive topics.

We will be discussing topics related to racism, inequity, and injustice, some of which includes historical context surrounding slavery and violence against marginalized communities.

I recognize that my positionality as a white woman limits my ability to fully understand the experience of those who may be more directly affected by these topics or this conversation. But I think it's important that we as engineers have these discussions.

Today will also be discussion-heavy, so we will set some ground rules.

## Community Guidelines for Discussion

[Avoid Assumptions](#)

[Use “I” Language](#)

[Treat Others How They Ask to Be Treated](#)

[Be Curious and Ask Respectfully](#)

[Listen Actively](#)

[Ideas, Not Individuals](#)

[Encourage Learning](#)

[Acknowledge and Apologize for Mistakes](#)

[Make Space for Everyone to Speak](#)

# Lesson Objectives

By the end of this lesson, you will be able to...

1. Identify the source of HeLa cells.
2. Describe the impact of HeLa cells on modern technology.
3. Explain the history of HeLa cells.
4. Analyze who benefits from the resulting technologies and industry.
5. Interrogate the historical context that impacted the acquisition of HeLa cells and continued injustice.
6. Assess what role we as engineers play in stopping or perpetuating injustice.

## W Lecture 21 Poll 1

Have you ever heard of HeLa cells and/or Henrietta Lacks?

Yes

No

Total Results: 0

# HeLa cells are a commonly used cell line in research.

## Quick facts

Cancer cell line  
Grow quickly (24hrs)  
Immortal – keep dividing without hitting a limit

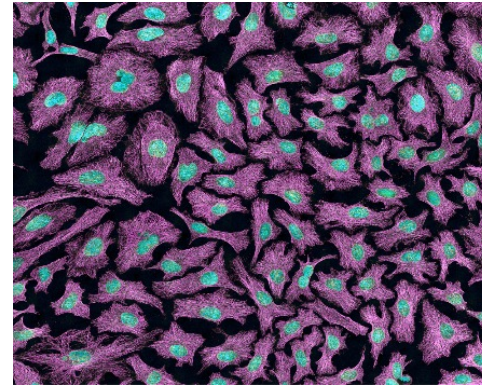
All properties that make them a convenient model system for human cell biology

- Can store and propagate

- Can share materials

- Everyone works on the same cell line to help with reproducibility

- Field develops resources around them (i.e. genome sequences)



<https://www.tebu-bio.com/blog/hela-cells-the-first-cell-line/>

# HeLa cells have had a massive impact on modern medicine.

## Just a few examples

HeLa cells were the first human biological materials ever bought and sold, which helped launch a multi-billion-dollar industry.

HeLa cells are now one of the most important and are the most widely used cell lines in medical research.

HeLa cells have been used to develop a polio vaccine, went up in the first space missions to determine how zero gravity affects cells, have been used to study the human genome, and helped in studying in vitro fertilization

# What are your thoughts on these impacts?

## Just a few examples

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# Who primarily benefits from these technologies? Why might BIPOC communities not have equal access to them?

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# HeLa cells originally came from a Black woman named Henrietta Lacks.

“For scientists, one of the lessons is that there are human beings behind every biological sample used in the laboratory.”

Rebecca Skloot, author of *The Immortal Life of Henrietta Lacks*



Image by Kadir Nelson, National Portrait Gallery  
<https://www.si.edu/newsdesk/releases/national-portrait-gallery-presents-portrait-henrietta-lacks-co-acquisition-national-museum->

# Let's take a look at the timeline of the history of HeLa cells.

**1951 - [Henrietta Lacks](#) was a Black woman who sought treatment for cervical cancer from Johns Hopkins Hospital in Baltimore, Maryland in 1951.**

During this time, researchers were looking for a way to culture cells *ex vivo*, and [a sample of her cells were taken from a biopsy](#) during treatment and cultured by George Otto Gey [without her knowledge](#).

The family was later told the samples were taken [after her death](#).

Practice at the time [allowed the sample to be cultured without patient consent](#) as long as the patient's name was removed; they became known as HeLa cells, taking the first two letters of her first and last name.

This cell line became [the first immortalized human cell line](#) and researchers were able to purchase a sample of HeLa cells for research use.

# Let's take a look at the timeline of the history of HeLa cells.

**1970 - Researchers learned of the origins of the cell line in 1970 when [other cell lines were becoming contaminated by HeLa cells](#).**

The press had previously been speculating about the origins of the cell line and identity of the donor, and once [the media got close to finding the Lacks family](#), the pseudonym “Helen Lane” or “Helen Larson” was used to throw the media off track. According to a [Rolling Stones article in 1976](#), “Helen Lane” was thought to be a black woman, but [Henrietta's real name was not recognized until the 1970s \(1971\)](#).

# Let's take a look at the timeline of the history of HeLa cells.

## 1973 - The Lacks family is contacted for blood samples

In order to determine if a contamination was present, the [sample in question needed to be genetically compared to DNA representative of the HeLa cell line](#), so researchers began [soliciting blood samples from Henrietta Lacks's family](#) members without explaining what the samples were for, often telling them it was to check to see if they themselves had cancer.

# Let's take a look at the timeline of the history of HeLa cells.

1975 - The Lacks family learns about the existence of the HeLa cell line and [its use in medical research](#).

1980 - [Lacks family medical records were published without family consent](#).

March 2013 - [Researchers published the DNA sequence of the genome of a strain of HeLa cells without the Lacks' family's knowledge](#), making the genetic information public, thus giving the public potential access to genetic information about the entire family.

August 2013 - the [NIH came to an agreement with the family](#) to give them some control over access to the cells' DNA sequence and acknowledgement in scientific papers.

This agreement however [does not give the family any financial compensation](#)

# Let's discuss the NIH's response.

August 2013 - the [NIH came to an agreement with the family](#) to give them some control over access to the cells' DNA sequence and acknowledgement in scientific papers.

This agreement however [does not give the family any financial compensation](#)

## Discussion

Do you think the Lacks family's concerns have been adequately addressed by the NIH? If not, what other steps do you think need to be taken?

There have been some attempts at giving Henrietta and her family recognition for their contribution.

**Attempts at non-financial compensation-based recognition include:**

[Baltimore mayor declares October 4th as Henrietta Lacks Day](#)

October 11th 1996 being declared Henrietta Lacks Day by the mayor of Atlanta following the first annual HeLa Women's Health Conference

[Johns Hopkins announcing in 2018 their plans to name a research building in honor of the Lacks.](#)



There have been some attempts at giving Henrietta and her family recognition for their contribution.

Author [Rebecca Skloot](#) is the author of best-selling book later turned movie *The Immortal Life of Henrietta Lacks*, which took a decade of research and interaction with the family to write, and she later became the founder, funder, and president of The Henrietta Lacks Foundation. However, it is worth noting the press covering the ethics of HeLa, lack of compensation, and even the book/movie have [caused a strong divide within the family](#).

None of these attempts have included financial compensation based on the profits of the cells themselves.

# Most recently, in August of 2023, the Lacks family won a settlement against Thermo Fisher Scientific.

Per a [Science news article](#):

In August 2023, “the family of Henrietta Lacks settled its lawsuit against the huge biotechnology company Thermo Fisher Scientific over its claim that [the company had been “unjustly enriched”](#) by its use of her cells....No financial payments or other terms of the settlement were disclosed, and no judge ruled on the fundamentals of the unusual claim. But some have nevertheless hailed it as precedent setting. And the family’s lawyers have said they may go after other companies marketing the HeLa cells, which are widely used in medical research, or products based on them.”

This is a *huge* and long-awaited win!

# John's Hopkins has made various statements on their involvement and justification over taking of the HeLa cells.

February 2010, Hopkins released [the following statement](#):

*"Johns Hopkins Medicine sincerely acknowledges the contribution to advances in biomedical research made possible by Henrietta Lacks and HeLa cells. It's important to note that at the time the cells were taken from Mrs. Lacks' tissue, the practice of obtaining informed consent from cell or tissue donors was essentially unknown among academic medical centers. Sixty years ago, there was no established practice of seeking permission to take tissue for scientific research purposes. The laboratory that received Mrs. Lacks's cells had arranged many years earlier to obtain such cells from any patient diagnosed with cervical cancer as a way to learn more about a serious disease that took the lives of so many. Johns Hopkins never patented HeLa cells, nor did it sell them commercially or benefit in a direct financial way. Today, Johns Hopkins and other research-based medical centers consistently obtain consent from those asked to donate tissue or cells for scientific research."*

# John's Hopkins has made various statements on their involvement and justification over taking of the HeLa cells.

Additionally, Johns Hopkins continues to deny wrongdoing. [The following statement is on their website:](#)

*“Although these were the first cells that could be easily shared and multiplied in a lab setting, Johns Hopkins has never sold or profited from the discovery or distribution of HeLa cells and does not own the rights to the HeLa cell line. Rather, Johns Hopkins offered HeLa cells freely and widely for scientific research.”*

[Here](#), Johns Hopkins compares their medical practices surrounding patient treatment and consent and how it evolved after Henrietta Lacks.

Let's have a quick discussion regarding the taking of the cells and follow-up recognition.

## Discussion

What could have been done differently if anything?

Do you think this is enough?

Let's now think about the historical context that enabled this to happen in the first place.

## Discussion

What prompted these researchers to take her cells without her consent?

How is her race as a Black woman tied to this?

# Black men and women have experienced a long history of abuse by the medical community.

It was (incorrectly) [believed that Black people had physiological differences from that of white people](#), including thicker skin, higher pain tolerance, smaller skulls, and inferior lungs; doctors at the time used experiments and went to great lengths to try to find proof of these differences. These beliefs were then published in medical journals and made their way to the broader public. Some of these beliefs are still held by doctors in training today.

[James Marion Sims, the “father of modern gynecology”, performed experimental surgery on enslaved Black women](#) without anesthesia (or consent) because he, and many white men, believed that Black women did not feel pain.

# This historical context still pervades modern medicine, research, and medical treatment.

A variety of studies have been done showing that people still hold these beliefs to be true and that they result in a lack of proper and equitable medical care for Black people.

One study found that people, including medical professionals, assume Black people feel less pain. The study discusses “racial empathy gap” thought to cause some of these beliefs, and is discussed [here](#) and [here](#).

This [study published in The Journal of Pain in 2014](#) found that Black veterans were less likely to receive treatment with opioids than white veterans for moderate or high levels of pain.



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This [study published in JAMA Pediatrics in 2015](#) found that Black children admitted to the emergency room with appendicitis were less likely to receive any pain medication for moderate pain and less likely to receive opioids for severe pain.

The [CDC reports](#) that Black, Indigenous, and Alaska Native (AI/AN) women are two to three times more likely to die from pregnancy-related causes than white women.

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This [study published in PNAS in 2016](#) examined the beliefs associated with racial bias in pain management and found that white laypeople and medical students and residents not only believe but actively make treatment recommendations based on false beliefs about biological differences between Black and white people and that Black people don't feel as much pain.

The FDA acknowledges that there is [a lack of diversity in clinical trials](#).

# Let's discuss what trends we see here and how this relates to continued injustices in society.

## Discussion

What trends did you see in these studies?

How does this relate to the case of the HeLa cells?

How do you think this lack of diversity in FDA clinical trials impacts BIPOC communities?

How do you think this is compounded by members of BIPOC communities receiving [unequal access to healthcare](#)?

And finally, let's think about how we as biological engineers play a part in this.

## Discussion

As an engineer, how would you approach the use of HeLa Cells in research?

What other cell lines might you use?

**Thank you, sincerely, for participating in this discussion.**

**It's important that we talk about these things.**

**Thank you for engaging in this conversation.**

**I hope you continue to learn about this topic and other related/similar topics in engineering/science.**

**Furthering science broadly is different than furthering science equitably.**