

Special Spotlight  
Magazine Issue

***How divisions between people***

*(racial, economic, and educational inequality)*

***can affect the division of cells***

*(in research labs around the world and inside our own bodies)*

# CELL BIOLOGY & SOCIETY

## WINTER 2017

### *INSIDE THIS ISSUE:*

*Scientific Stories from the Past, Present, and Future*

***The Untold History  
of Henrietta Lacks***

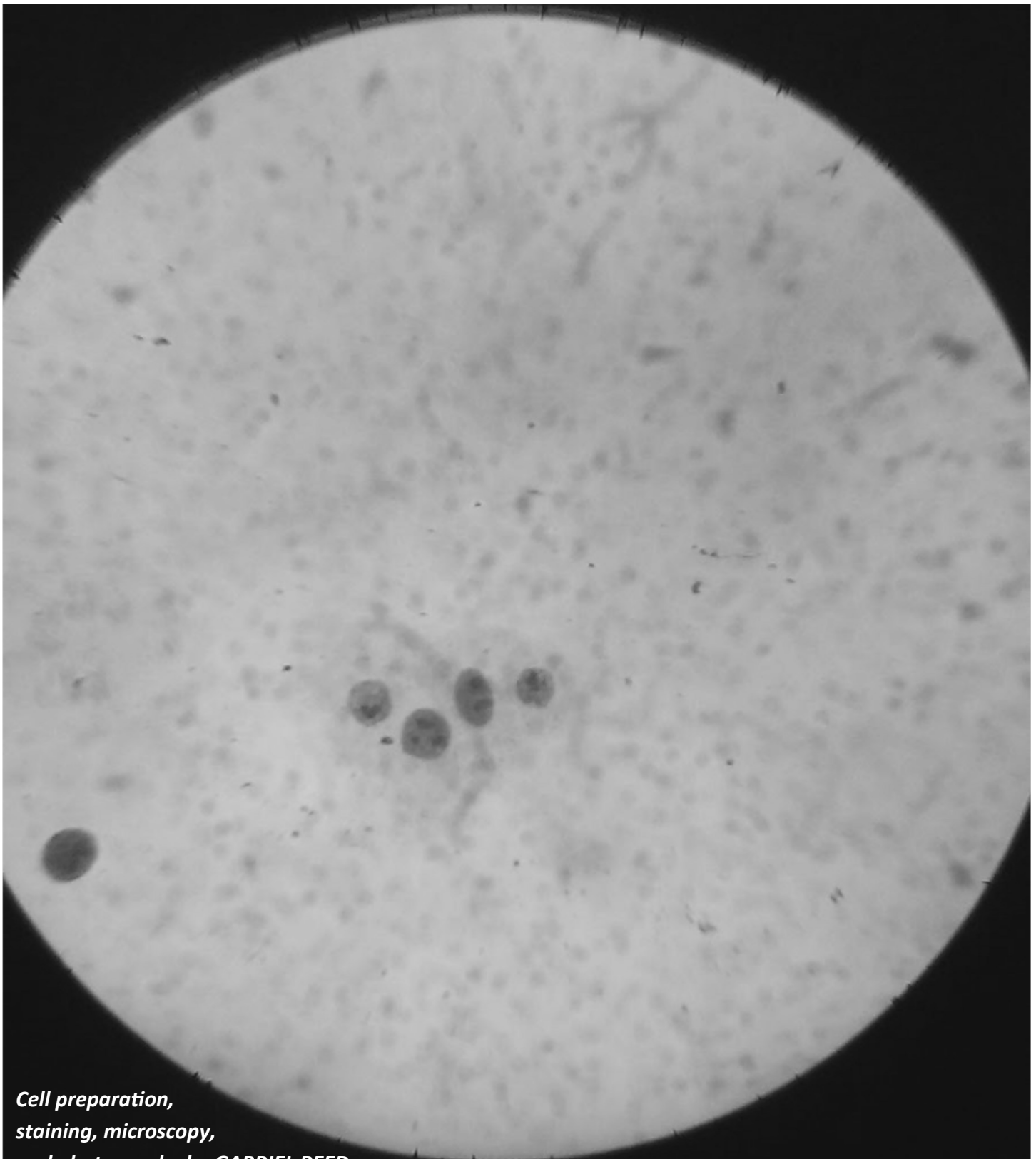
How cancer cells  
taken from a poor  
African American  
woman in the 1950s  
changed scientific  
research forever

***Stress, Discrimination,  
and Cellular Aging***

Is the stress of living  
in an unjust society  
causing the cells in  
your body to age  
faster?

***A Prescription Drug  
for Immortality?***

A tiny new pill that  
could stop the  
biological aging  
process raises big  
questions



***Cell preparation,  
staining, microscopy,  
and photography by GABRIEL REED***

This photograph was taken through a microscope in the new science laboratory at Common Ground High School. The large circular shapes in the center are real cells descended from those taken from Henrietta Lacks in 1951 that are sold for laboratory use around the world. The darker, sharply defined specks inside these cells (and also throughout the field of view) are the immortal chromosomes of DNA that made these cells so special.

# Our Future Generation of Scientists

by **MADYSON VALENTIN**

In a biology class at Common Ground High School, young scientists are made. With the guidance of our teacher Mr. Sinusas, we study the questions of why we age, if people have the right to take DNA without permission, how stress could shorten your lifespan, and if people should be allowed to take a prescription drug that may or may not greatly increase the length of life.

Why do we age? A challenging question to answer, many people have different answers and believe different things. But the most common explanation that scientists believe involves telomeres. Telomeres are at the ends of a chromosome like in the image below.

Telomeres are basically nonsense DNA that allows cells to keep dividing to make copies even as a small amount of that DNA is lost each time a new copy is made. Telomeres' main purpose is to protect the genes inside the chromosome. See how it works is the more you age the more of your telomeres you lose but once it starts taking away from the genes inside is when you start to age and die. Basically, the length of telomeres is what determines how long you live. It's a tricky situation because there are other factors that can shorten your telomeres beside aging. Things like stress can cause your telomeres to shorten which is one of the topics that will be covered in this magazine.

Another important topic we cover is the story of Henrietta Lacks: a woman who

died of cancer but kept living. Scientist took her cells without any permission from her or her family. They even changed her cells' name to HeLa cells to cover up their tracks, because there was something very special about her cells that helped change medicine forever. But the questions remains: Was it okay to take her cells without permission for the sake of science? Should her cells even be considered human or a new species? But it's up to you to read our articles and decide for yourself.

Lastly, if you had the chance to live longer would you take it? We will consider the consequences of one supplement that will either help you live without end or the rest of a short life with cancer. Is it worth the risk? Would you take the chance? You'll be able to hear some of the opinions from us future scientists and if we would take the risk or not. You'll also be able to read about what this supplement, called TA-65, really is and how it works, and even see some ads selling TA-65. Most of all, we hope our magazine helps you to come up with some of your own theories and opinions and we hope you enjoy hearing ours.

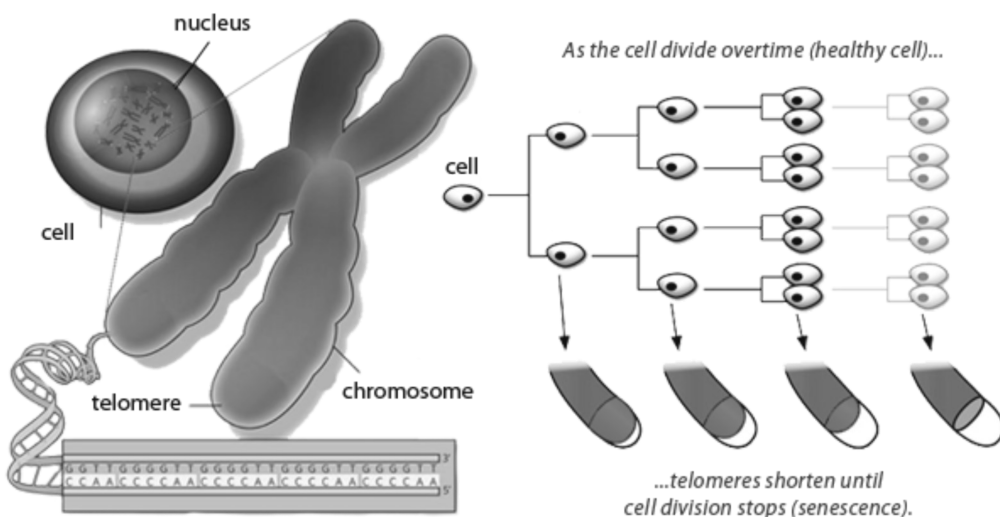


Image source: weekly global research online

# Why Do We Age?

by ELLIOT FAULKNER

**D**eath is an event that eventually affects everybody. At some point in a person's life, they have to face death. This fact, depending on who you are, may affect you in a number of ways. Some may become afraid. Some may not care. Some may wonder if there is a way around death, and if you are one of these people, this article is for you.

Age is a scary thing, but it is an idea that we all have to face at some point in our lives. What if you could completely halt the progress of aging? Is it even possible? Well, you're about to find out. Before we can go into the process of aging, we need to define some terms that are necessary for the understanding of age.

Cells are the building blocks of life. Our bodies are constructed out of them, plants are made up of them, every living thing is made out of cells. Located inside these cells are the nuclei, which contain one of the most im-

portant biological chemicals that exist inside humans: DNA. DNA stands for deoxyribonucleic acid. DNA holds the information for almost every part of your body in a secret code of chemical pieces called bases. There are four different versions of these bases, abbreviated as "A," "T," "C," and "G," and the order in which they are put together determines factors such as hair color and eye color by sending this information as an RNA copy to create amino acids. These amino acids then form together to create different types of proteins. Inside cells, DNA gets neatly curled and stored inside chromosomes.

Now that you know the basics, you may still be wondering why people age. The cells in our body replicate, creating two sets of duplicate chromosomes, one for each new cell. After every replication, however, small parts of the chromosome get cut off. When the DNA is curled up inside the chromosome, the

parts of the DNA on the end are apparently useless, and these parts are the first to go. These pieces of nonsense DNA are called telomeres and actually serve a protective role, sacrificing themselves for the good of the chromosome. When all of our telomeres get destroyed, the important parts of the chromosome then start falling off, and this is what eventually causes us to die from old age.

Now you might be thinking: what if we could regrow our telomeres? Would that let us live forever? Coincidentally, there is a chemical called *telomerase*, which regrows telomeres. There are large amounts of this chemical in human egg and sperm cells, and small amounts of this chemical in other normal human cells. The problem with this chemical is that it causes cells to replicate uncontrollably. If you cannot control the cell replication, it may cause chronic cancer. However, if somebody were able to control the cell replication and use telomerase to extend their life, theoretically they would be able to live forever.

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## Cancer is like a Runaway Car

by MARGEAUX IVY

**A** way you can think about cancer and understand

it better is by comparing it to three different aspects of a runaway car.

First, imagine a car with an accelerator that is stuck to the floorboard. This is similar to the activation of mitosis-promoting genes that drive

cancer cells to divide rapidly even when not needed.

Now think of a car that in addition to a stuck accelerator, there is a broken brake. This, in cancer cells, is the loss of cell cycle checkpoint molecules. These "brake" mole-

# What is Cancer?

by **AZIZ MUHAMMAD**

**C**ancer is a disease which forms overgrowing cells. This disease takes the lives of many people each year. According to the National Cancer Institute, "In 2016, an estimated 1,685,210 new cases of cancer will be diagnosed in the United States and 595,690 people will die from the disease." Approximately 8 million people worldwide die from cancer. Many people contract this disease each year. It's estimated that by the next two decades, more than 22 million cancer cases will surface.

There are more than 100 different types of cancer, they're typically named after where they start, such as Lung Cancer. Cancer is most often combatted with surgery, chemotherapy, and radiation. Radiation treatment sends high dosages of radiation to the specific location of the cancer, which has a good chance of killing cancer, but can also affect nearby healthy

cells. There are other new methods of treatment such as hormone therapy and biologic therapy. Hormone therapy uses the female hormones, estrogen and progesterone, to treat symptoms related to the cancer. Biological therapy is the use of living organisms, substances derived from living organisms, or laboratory produced versions of such a substance to treat the cancer.

Cancer's starting point is within the cells which are the building blocks of your body. When properly functioning, the body forms fresh cells as you require them to replace your old cells that eventually die off. Cancer is the result of this process failing. New cells begin to grow even when you don't need them, and old cells don't die off when they should. When this happens, the extra growth of cells that develops is called a tumor.

There are two types of tumors: malignant and benign. Cancer tumors are considered malignant. This means they

can spread to, or invade other tissues, which consist of groups of cells with a similar structure working together for a specific function. As tumors grow, cancer cells are able to break off and travel to farther places in the body through the blood flow or lymph system to form additional tumors. Benign tumors, on the other hand, can be large, but when removed, it's unlikely that they'll grow back. Benign tumors usually aren't the lethal ones.

There are factors that determine who's more likely to attain this disease. It's proven that African Americans have a higher chance of getting cancer than any other ethnic group. It was also found that, according to the American Cancer Society, "African Americans have the highest death rate and shortest survival of any racial and ethnic group in the US for most cancers." There are things you do in your everyday life that can affect your chances of attaining the disease as well. These include alcohol use, diet, tobacco use, radiation exposure, and sunlight.

cules normally stop a malfunctioning cell from dividing to prevent any new copies of the bad cell from being made.

With these two problems, the driver now can only hope to avoid a collision long enough for the gas to run out

and steer the car to the side of the road safely. Imagine, however, that the car has a unlimited fuel supply. This final problem is telomerase activation. Telomerase is an enzyme that adds length back to a cell's telomeres, adding

"youth" back to the cell, making it able to divide more times. Just as avoiding a collision of a car in this unlimited fuel situation becomes much more difficult, so too does stopping a cancer cell with these three problems.

# PAST

## Who Was Henrietta Lacks?

by YELEENA MARRERO

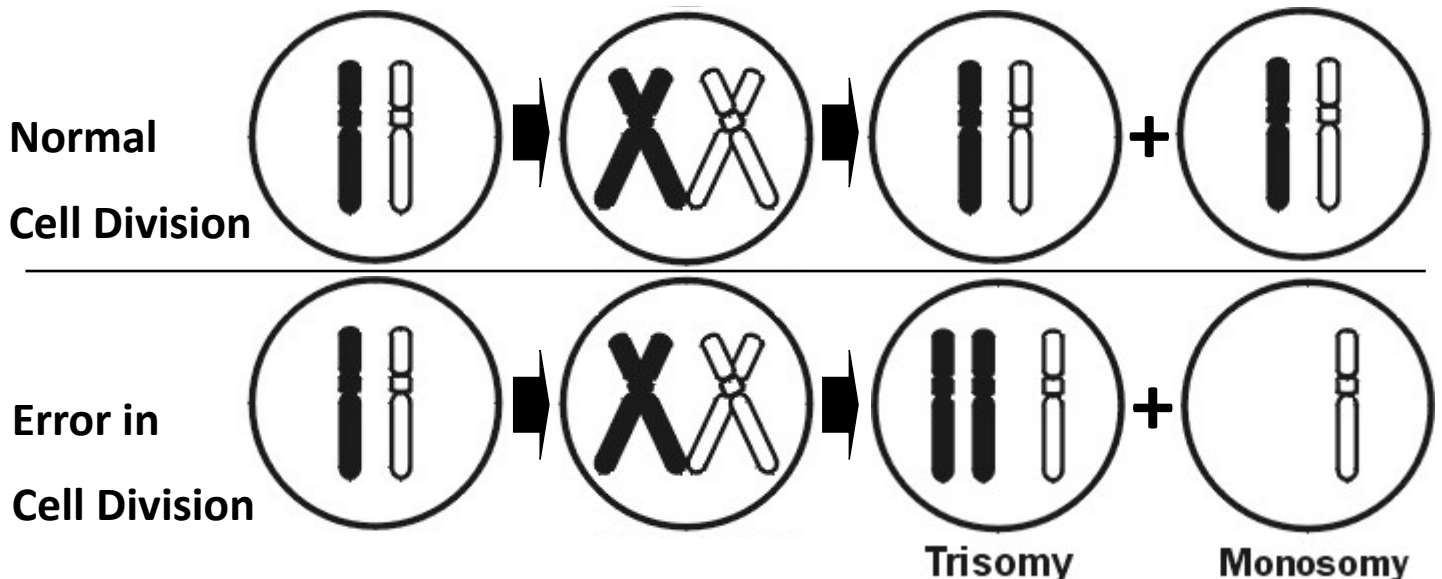
**H**enrietta Lacks was an African American woman whose cells never stopped replicating. Unfortunately for her, these overly reproducing cells killed Henrietta in 1951 at the age of 31 in the form of cervical cancer. Her husband David Lacks also died that same year. She was buried in the Lacks family cemetery in Virginia. It is believed that a sexually transmitted infection called HPV is what caused Henrietta's cancer. Henrietta Lacks's family didn't know anything about her cells until about 20 years after her death. After she died her cells were named HeLa so she the public wouldn't know who she really was.

When HeLa cells were first introduced to the public, scientists told people that they came from a woman named Helen Lane, they lied because they were worried they would get sued by Henrietta's family so they wanted to hide her identity. They feared being sued

because they didn't have her family's permission to use the cells in the ways that they did. Scientists didn't always use Lack's cells for good. They injected them into prisoners to see if they would get cancer. Lack's family did not receive any benefits from her cells because they didn't get any money or even credit.

Her cells lived on through the years even to this day. Some scientists consider her cells as immortal because her cells replicated more than the average human which is 70 times. Henrietta's are never ending. Her cells have made a major breakthrough in science throughout the years because scientists are still questioning why no other human has had cells with the ability to keep dividing like Henrietta Lacks's. Her cells were used to create a line of human cells able to be easily grown in a laboratory and were used for medical research.

## How Cells Become Strange: Errors in Cell Division



# What Was Special about her Cells?

by DYLAN O'DONNELL

**Y**ou probably have not heard of “HeLa.” Many people in the scientific profession have heard of and work with HeLa, but most outside haven’t. Scientists know HeLa as the name for the cells to use whenever they want or need to study human cells. HeLa cells are actually a special group of human cancer cells. Why are they special, you may ask? HeLa cells keep on replicating outside of the body, which isn’t usually possible.

What many of the scientists who work with these cells do not know is that HeLa cells were taken from the cervical cancer of a woman named Henrietta Lacks, who died shortly afterwards from said cancer. Apparently they also got a lot more cells after she died, and according to the assistant who got the cells, Henrietta was about 90% tumor, which is an extremely disturbing thought.

When analyzing HeLa cells for cancer research reasons, they discovered what it is that these cells do. They replicate very, very fast and without ever stopping. HeLa cells helped jumpstart the national “War on Cancer” declared by Richard Nixon and are thus responsible for much of the focus on cancer now. We can also thank them for many medical

advancements, like the polio vaccine.

You might be wondering, “why does HeLa do what it does?” Well, the answer to that is in the fact that Henrietta Lacks got HPV (a sexually transmitted viral infection) multiple times. More specifically, she got HPV-18, which causes cancer as a method to help spread itself. The virus needs to have its DNA copied in order to spread. Cancer causes increased division of cells, and therefore turns on all the “machinery” needed to copy DNA. This not only creates new copies of the DNA for each new cancer cell but also the HPV DNA hitching a ride inside. Remember, Henrietta had HPV *multiple times*, all at the same time! That probably contributed to how strange her cells are.

HeLa cells have some problems with their chromosomes. Some are missing, others have way too many, and some have only one when they should have two. Did I mention that most of those problems are normally fatal? Her cells are still in scientific use, and will probably stay in scientific use. They are very useful for determining how things affect human cells without experimenting on humans. HeLa cells are strange, but a massive help for medicine and science.

**In normal cell division, the DNA in each chromosome is copied and that copy is attached directly to the original resulting in an “X” shape. The copied chromosomes all line up in the middle of the cell to be ripped in half, making sure each new daughter cell gets exactly one copy of each chromosome. Sometimes, however, a mistake called “nondisjunction” can happen. Nondisjunction is when the X is not split apart as it should, resulting in one daughter cell with a missing chromosome and one daughter cell with an extra chromosome.**

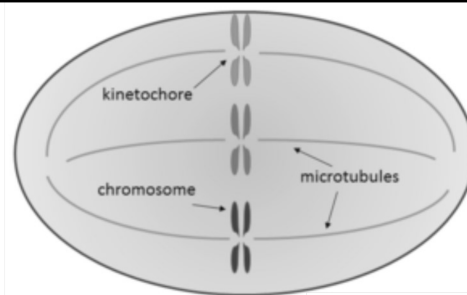
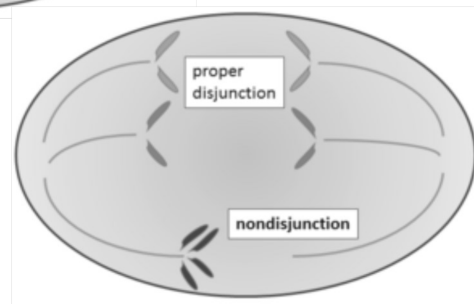


Image sources:

University of  
Michigan Medicine

Online Medical Dictionary



# If you could have stopped Henrietta Lack's cells from being taken, would you?

# YES

by NATHALIE YNFANTE

If I could stop Henrietta's cells from being taken, I would. She was a person like all of us and when she passed instead of letting her rest in peace they tested on her. Imagine how her family feels. After getting through her death, they thought for a long time that she was resting peacefully but really the whole time she was in a lab getting tested on. Yes, it helped some people but it doesn't make it right and Henrietta's family didn't get anything out of it, not even the truth that HeLa cells were their mother or sister.

We should let the dead rest in peace because they already went through a lot. When her body shut down completely because of disease, it is not fair that scientists then cut her up to take her cells. Her family probably went through a lot of distress when they think of their relative getting used and not being stable in one place where she wouldn't be bothered. Some people will find it disrespectful.

Henrietta's family should have gotten paid or been given help to get medicine. Some of her family members were sick and couldn't afford to pay for medical help. They had to struggle to get the money while people out here were using their mother's cells without permission and getting the help they need while Henrietta's family didn't get anything out of it but the name. At one point her family had no idea she was even being used that is why they changed the name to "HeLa" cells instead of her name, Henrietta Lacks.

## Timeline of Events

by JAYVON EDWARDS and  
SHAWN WILLIAMS-WELLONS

- 
- 1889**—Johns Hopkins Hospital is founded, the hospital where Henrietta Lacks went for treatment, where she died, and where her cells were initially taken.
- 1912**—Alex Carrel claims to have successfully grown the first "immortal" cells from chicken hearts.
- 1920**—Henrietta Lacks is born in Roanoke, Virginia.
- 1951**—Henrietta Lacks died of an unusually aggressive strain of cervical cancer.
- 1951**—George Gey successfully grows the first immortal human cells from Henrietta's cervix. The cell name, HeLa, is created from the first two letters of her first and last name.
- 1952**—HeLa cells become the first living cells shipped in the mail.
- 1952**—Scientists used HeLa cells to help develop the polio vaccine.
- 1953**—HeLa cells be-

# NO

by NATALIE LEONFFU

I, personally, wouldn't have stopped Henrietta's cells from being taken. The positives of her cells being taken greatly outweighs the negatives, in my opinion. However, I would have changed the process of how they were taken. They would have been taken with informed consent.

Informed consent is the essential information about a procedure that is told to a patient. This allows the patient to voluntarily accept or deny the treatment. Informed consent is under a patient's bill of rights. The first bill of rights was produced in the 1970's. However the bill has changed since then, "In 2010, a new Patient's Bill of Rights was created along with the Affordable Care Act. This bill of rights was designed to give new patient protections in dealing with health coverage by insurance companies."

Henrietta's cells have been a large revolution in the scientific world. With her cells, we've been able to have medicines we never imagined to be able to create. During the worst year of the polios epidemic, Henrietta's cells helped to make a vaccine against the disease. The cells helped us figure out the amount of chromosomes there are in our body (23 pairs, 46 chromosomes in all). Even allowing scien-

tists to be able to test medications without the use of human test subjects. I believe it was great to have her cells! However, her doctor's methods to collecting the cells were highly unfair and inappropriate; taking the cells without permission and in secret.

Henrietta's identity died when she did. Only her family and friends remember her. Meanwhile, the science world is celebrating the immortal cells named HeLa. No one knew who the cells really came from. Many believe they came from a woman named, "Helen Lane." The doctor gave the name HeLa (the first two letters from her names, He-nrietta La-cks) to avoid being sued. He got away with it. Her family was left in the dust without any knowledge on how they had been ripped off. Henrietta helped to create many different types of medicine, however, her family was too poor to afford them. The family didn't even know about what happened until many years later. It was all revealed when some scientists wanted to check to see if the family's cells had some of the same traits as HeLa. They tried to sue, but there just wasn't any laws for their situation. Instead, they raised awareness publicly.

Henrietta's cells have saved thousands, if not millions, of lives. We will forever be in debt to her. Yet she was ripped off. I wouldn't have changed taking her cells, however. They've caused much more positive than negative. Nevertheless, using informed consent would allow her and her family to be okay with the actions. They'd have money; her family would be set after she died - Just in exchange for a bit of her cells to save others.

come the first cells ever cloned.

**1954**—The incorrect name "Helen Lane" first appears in print as the source of HeLa cells.

**1954**—Experiments are carried out without patient consent to see whether or not injections of HeLa cells could cause cancer.

**1957**—The idea of "informed consent" first appears in court documents.

**1965**—HeLa cells are combined with mouse cells, creating the first animal-human hybrid cells.

**1973**—The Lacks family learns for the first time that Henrietta's cells are still alive. They receive NO money at all. Her cells keep on reproducing and multiplying.

**1973**—Researchers from Johns Hopkins take samples from Henrietta's children to further HeLa research, without informed consent.

# Should HeLa cells still

HeLa cells have been used to test new medicine, makeups, and other products. HeLa cells are immortal cells that came from a tumor in an African American woman named Henrietta Lacks. When scientists took her cells to test, they noticed that they never stopped splitting. They were immortal and continue to reproduce. Doctors realized that they could use her cells to test medicines, drugs, and other things. Even though her cells were a major discovery, they shouldn't be considered human cells because they don't have the same number of chromosomes.

Normal human cells have 23 pairs (46 total) of chromosomes. Chromosomes are packed threads of DNA that can be found in the nucleus (which is located in the cell and contains a majority of all genetic information found in cells). As you can see from the chart below, HeLa cells have 3 chromosomes in the first section, compared to a normal human cell which has 2. Some sections also have less than 2, such as 2, 3 and 6. Number 13 doesn't even have any chromosomes! This isn't what normal human cells have, and HeLa cells shouldn't be

# NO

by ALFIA ANSARI

considered human.

HeLa cells are also cancer cells. Cancer is when cells can't stop splitting, they rapidly produce more of themselves, which then end up destroying body tissue. Normal human cells aren't cancerous, so doing tests using HeLa cells can affect the outcome of the tests. Henrietta

Lacks had cervical cancer, which occurs in the lower part of the uterus. Her cells were cancerous, so using them to test how products might affect normal human cells isn't the best idea.

**“We here propose, in all seriousness, that [HeLa cells] have become a separate species... HeLa cells are evolving separately from humans, and having a separate evolution is really what a species is all about.”**

**—Leigh Van Valen, evolutionary biologist**

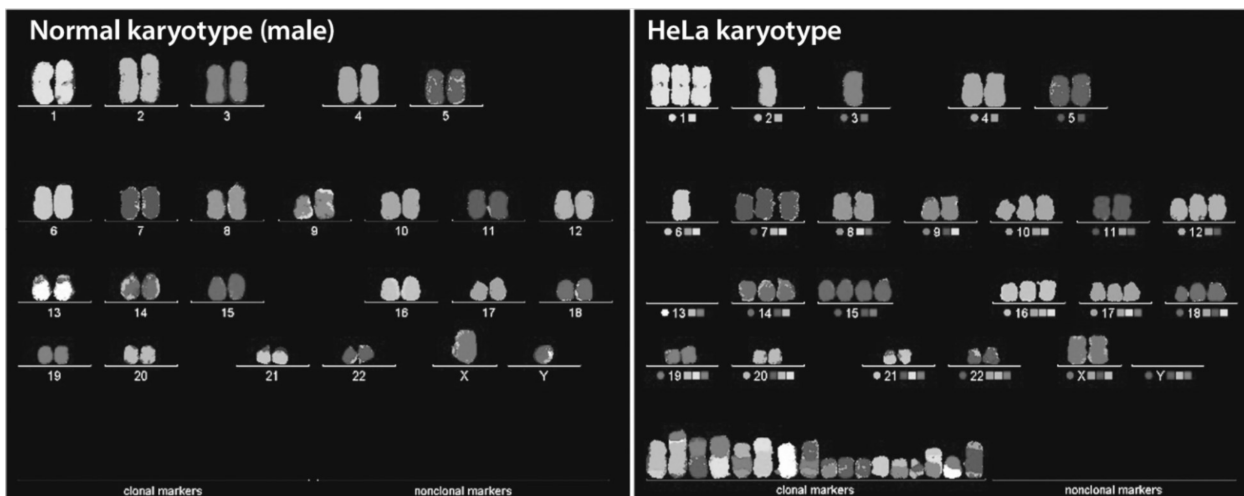


Image source: The Berkeley Science Review

# be considered human?

I believe cells from Henrietta Lacks grown in the lab are still human because the cells came from another human being. The cells were taken on February 8, 1951 and are still used to this day. The cells were cancerous cells that had a virus inside that made them keep constantly dividing even to this day. The cells never lose this ability to keep dividing due to the fact that they are constantly making more telomeres. The slow loss of telomeres is what

by **MATTHEW TORRES**

# YES

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and by **ANGELA  
FERNANDEZ AYALA**

**H**eLa cells should still be considered human cells. HeLa cells come from Henrietta Lacks. They were unusual because they had more chromosomes, and her cells were able to keep dividing forever.

Chromosomes are packages of DNA. Human cells normally have 23 chromosome pairs. There are exceptions like people with down syndrome have 47 chromosome pairs.

Some people may say HeLa cells are not human cells because they have more chromosomes than normal but in reality there are examples of people with extra chromosomes like people with down syndrome. Just like the cells of these people are still human, so are HeLa cells.

causes cells to eventually lose the ability to divide. The cancer cells have highly active telomerase that makes them immortal by constantly adding back to the shortening telomeres.

These cells came straight from a human, someone just like you and me. People think that HeLa cells are no longer human cells because of how many mutations they have experienced and how many experiments they have been through. These people are forgetting where the cells come from. All human cells have some mutations like HeLa cells. Most humans can drink milk now but it wasn't like this all the time. We had a mutation that let us be able to drink milk past the infant stage. People who do not have the mutation are called lactose intolerant. Mutations and differences are part of all human cells, including HeLa cells.

**“It’s just ridiculous, scientists don’t like to think of HeLa cells as being little bits of Henrietta because it’s much easier to do science when you disassociate your materials from the people they come from. But if you could get a sample from Henrietta’s body today and do DNA fingerprinting on it, her DNA would match the DNA in HeLa cells.”**

**—Robert Stevenson, cell biologist**

# Stress Explains How Divisions Between People Can Affect the Division of Cells

by MARGEAUX IVY

The word stress itself means, "a state of mental or emotional strain from adverse or very demanding circumstances." When people stress, "it creates that fight-or-flight reaction in an unrelenting way, and as a result, stress chemicals are released into the body. What we know so far is that the release of those stress chemicals creates biological changes," Dr. Vivian Diller, Ph.D., tells the Huffington Post.

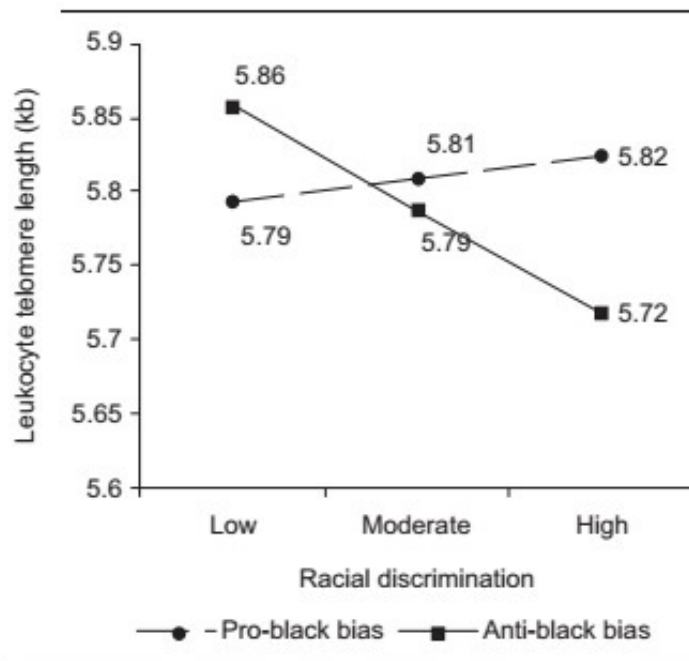
In a 2012 study, that was published in a journal called PLoS ONE, researchers had measured the length of DNA sections called telomeres, and found that individuals with the most job stress had the shortest telomeres — and when telomeres become too short, the cells can die or become damaged. Those who did not experience work exhaustion had longer telomeres.

Along with the stress from jobs, stress can be a big outcome of racism. When you think about people, the first thing that comes to mind is gender and race. When race is brought up, sometimes it causes a commotion. Sometimes race is brought up to bring others down, which is racism (discrimination against someone of a different race based on the belief that one's own race is superior). Scientists have put together stressful racist encounters using manipulations of social situations, to see how much racism affects people, mostly of African American descent. Harvard researchers documented that a mere 1% increase in incidences of racial disrespect translates to an increase in 350 deaths per 100,000 African Americans. Since people are on the receiving end of racism it increases constant stress that aggravates the heart and cells causing your cells to multiply more, aging you in the process.

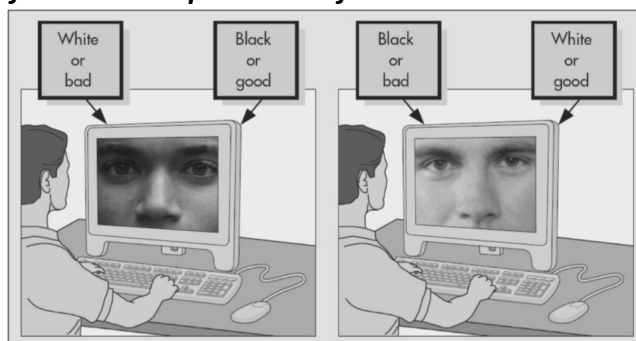
## PRESENT

### Discrimination, Racial Bias, and Telomere Length in African-American Men

David H. Chae, ScD, MA, Amani M. Nuru-Jeter, PhD, Nancy E. Adler, PhD, Gene H. Brody, PhD, Jue Lin, PhD, Elizabeth H. Blackburn, PhD, Elissa S. Epel, PhD



**African-American men that had internalized a negative view of African-Americans (as measured by having an anti-black bias on an "implicit association test") had cells that aged more quickly (as measured by telomere length). The more experiences of discrimination that they reported, the shorter their telomeres were. Interestingly, having a pro-black bias was protective: The African-American men that had internalized a positive view of African-Americans had longer telomeres in general and were much more resilient when faced with experiences of racial discrimination.**



# Underlying Biases and How To Prevent Them

## by BRANDI OCASIO

There is a fairly new and interesting test called the “Implicit Association Test” that measures an individual’s hidden bias. The test has a picture of a white person with the word “Good” and a picture of a black person with the word “Bad,” and vice versa. The point of the test is to match things with “Good” or “Bad,” like joy, war, happiness, starvation, etc. After they successfully do this with one of the pictures, they then attempt to switch the wording on the pictures and test for underlying racism and see how long and difficult it is for the people to match the words. For most people of all races, it’s easier to match the words with negative connotations to a black person than a white person.

In 2002, 48% of white, black, and Asian people taking the test had scored a “strong” preference for whites over blacks. In 2008, after they changed the system to account to differences in reflex, only about 27% of those people fell in that “strong” category.

In today’s society, it’s very likely that you yourself have a bias against a certain race, sexuality, or religion, because of stereotypes that are constantly blasted over the media. Obviously, we all know that these things are not the case, but those are always in your head. This doesn’t make you a bad person, though. It’s a subconscious effect. We all use stereotypes and use prejudice, all the time, without meaning it.

Why is this? Well, for some people, this may be hard to understand. According to some studies, people who had their childhoods surrounded by people of their same race tend to have a higher racial bias than someone who grew up in more diverse settings.

No one in the world has the same subconscious bias, because no one in the world has the same limited view of reality;

for example, an omnisexual Asian woman in her early twenties who grew up in New York would have had a completely different experience and view than a white straight cis male that same age who lived his whole life in North Branford.

We all stereotype; that’s just a part of human nature. Most people even apply stereotypes to themselves. You yourself have likely stuck yourself into a stereotype, intentional or not.

There is something called the “Devil Effect” or the “Horn Effect” which shows that when someone is particularly bad in one area, it is automatically assumed that the person is bad in every other area as well. For example, if a student continuously turns in their homework late, the teacher and their classmates will assume the student doesn’t care as much, or that they’re not as smart.

There are a number of different reasons as to why the Devil Effect affects our lives so heavily. It does, however, seem to form in a cognitive bias. The Devil Effect always seems to come up through Superficial Misperception (instead of seeing a person for a person, we see a race, a sexuality, an ethnicity, etc), Social Bias (a person who is connected with people with good traits or high up in society), Demographic Bias (the person targeted by the Devil Effect is presumed to be “just like” all the others of that race, sexuality, ethnicity, etc), Lasting First Impression (a bad first impression is always stuck in a person’s head, and affects every interaction after that), or the Yard Affect (all the good characteristics are ignored in a person because of a biological thing they can’t change).

A handful of black men were given the test I described up above under different circumstances. Prior to the test, they were asked something that most of the general participants weren’t; how much racial discrimination do you experience? They answer on a scale from “low,” “moderate,” or “high.” Generally, the men with a high experience tended to have a high negative

bias towards blacks. Surprisingly, quite a few of the people who claimed to only experience a low or moderate amount of discrimination due to their race also showed to have a negative bias towards their own race.

Something that all the participants who say to have experienced a high amount of racial discrimination had something terrifying in common- their leukocyte telomere length were much shorter than they should be for someone of these people’s ages. Telomeres are very important in cell division because they protect the end-sequences and get shorter and shorter with each division and eventually lost. With each lost telomere, you get older. So, basically, experiencing discrimination can actually make you older.

So, how do we change this? Well, obviously, we as a society, can’t. At least, not overnight. It will take years and years. *It has taken us many years. Hundreds, in fact. And we still haven’t figured out this foreign concept called “equality.” However, you as an individual can likely make a few changes in your life to stop discrimination, or at least make it so you are aware of your subconscious biases and actions.*

Firstly, you should identify what you believe, and know where those beliefs originated. Maybe your family or your religion? Who knows, but that’s always a good first step in the right direction. Secondly, ask questions. Try to meet people with different lifestyles than you. Challenge yourself! Also, listen! When you ask your questions, most people are happy to answer your questions. Just be prepared to listen.

Take change-promote action! Nothing is ever going to change if someone doesn’t stand up and become a voice. Who knows, that someone could be you. Do and say what’s important to you. That’s the most important. Even if you can’t change the world, make conscious choices and work to make your and someone else’s reality a little bit broader.

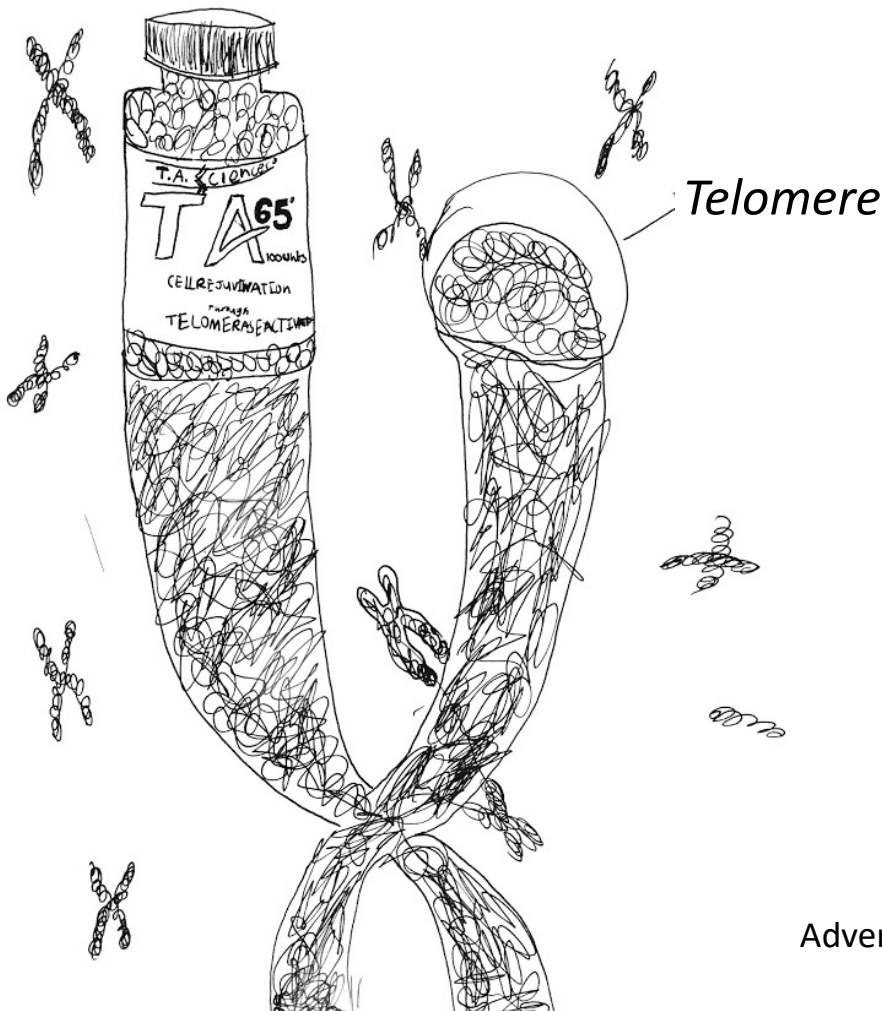
**The average life expectancy in the US is 79 years old.**

**Let's make it 200.**

**At the ends of the chromosomes is what's called the telomere.** The telomere is designed to protect the chromosome from damage. This is important because when the chromosome is damaged, the aging process begins. It is possible to rebuild damaged or lost telomeres with an all natural enzyme called *telomerase*.

**With our new drug, TA-65, a naturally derived substance activating telomerase will be supplied to the body, making it so that the length of the telomeres heighten WHICH LEADS TO A HEIGHTENED LIFE.**

This drug is the closet chance you have to acquire **IMMORTALITY**. For the low price of \$100 for your first 30 capsule bottle, the path towards immortality is the path you'll be following.\*



TA-65 makes you live longer\* by rejuvenating your telomeres, the part of your DNA that slows aging!

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\*Taking TA-65 may also cause or greatly worsen cancer by giving cancer cells "unlimited fuel" for reproduction.

# FUTURE

## TA-65: Is It Really Worth it?

by ADAIAH STEVENS

**A**s a society we should not allow TA-65 to be sold, because it can cause other hidden health issues in the body. TA-65 is a supplement that's supposed to extend your lifespan and allow you to appear younger than you may be, essentially this pill is a fountain of youth in a little oval. However, the fact that TA-65 has evidence that suggest it can cause cancer, is what's really troubling to me. Mutations in your cells can occur within the DNA from the effect of now having 'immortal' cells. This mutation is why the pill is linked to and may cause certain cancers. If you're taking something to prolong your life, but in effect develop cancer, is it really something you want to put inside your body?

The bottle suggests that you should take more pills based on age to benefit more, but with the price already being so high is this really worth it? TA-65 can cost anywhere between \$500 to \$100. However, besides TA-65, there are many other natural remedies that can prolong life without causing you health problems. I think that in the long run, TA-65 is one of those 'too good to be true' types of things that are just out to collect your money. If I were you, instead of buying a supplement that could be a down payment on a car, I'd spend more time outdoors being active, enjoying life, being less

stressed, and eating a clean diet.

Out of the few habits I listed to increase your lifespan without the help of supplements, reducing stress is probably the most beneficial one. Different types of stress have a number of effects on your body, but whatever the type may be, stress over a long period of time will shorten your telomeres. With age, our telomeres naturally shorten, but if you're say, twenty years old and you're under constant stress, your telomeres would portray the length of someone much older. Physically you might not be older, but what would be affected is called your cellular age. Stress is very natural, and is something everyone goes through based on various circumstance. With all this being said, instead of giving away your money and possibly your health for TA-65, try cutting down on stress first and see what happens.

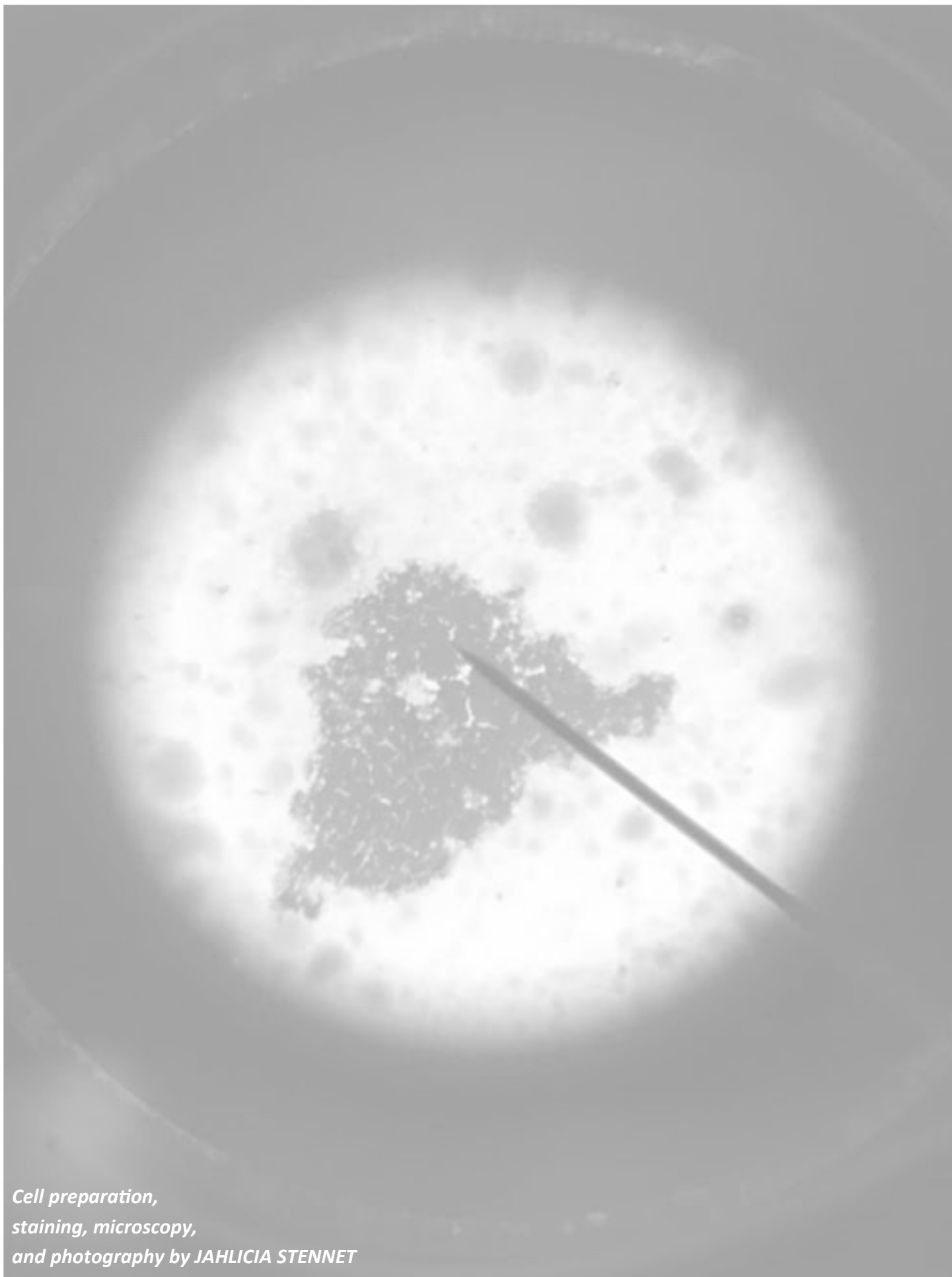
## The Cost of TA-65 Success

by TYRON KNIGHT

If TA-65 works and stays as expensive as it is, then it would allow privileged white people to live longer or forever because they have the money to afford it. Many black people may not really be able to afford it so they would die naturally. I think that government should pay for everyone to have it because it would be unfair for only the rich to be able to have it.



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