

# Veritas



Honors Journal  
Nassau Community College  
2020 - 2021



# Veritas

Go home and write  
a page tonight.  
And let that page come out of you—  
Then, it will be true.

Langston Hughes  
“Theme for English B”

An Interdisciplinary Journal  
of the Honors Club  
of Nassau Community College

Volume 14  
2020 - 2021

## *Dedication*

The Director, Faculty, and Staff of the Honors Program  
dedicate this volume of *Veritas* to all students  
who persevered through a global pandemic in pursuit of their studies.  
You have set a standard for all generations to follow.



### *What we are missing* Catherine Pahs

What goes on behind a mask?  
That eraser of faces, painting us blank  
Except for our eyes, and they reveal no music—  
Barley a hint of the soul beneath—just the latent buzz  
Of a life that once was, but now is hidden.  
Our world is spinning, we are lost at sea.

We have altered our fabric from sea to shining sea  
And sewn our society, our economy into a mask  
To protect us from a threat so hidden  
I wonder if it is there at all. Life feels blank  
And heavy, and there's this white-noise buzz  
Where there used to be thriving music

I thought after a few weeks, months, the music  
Would return, but they lied, and overseas  
It's just as dead, the media's jaded buzz  
Has not changed, their message: "Wear a mask!  
"Stop the spread! Wash your life until you feel blank,  
And we're all tucked safely, lonely, inside, hidden."

They said it's to keep our elderly safe, but they'd hidden  
The fact that they were dying anyway, by dozens, no music  
At their funerals—if they had them. Death tally left blank  
To hide how many we lost, and no family called to see  
Their loved ones one last time. They died alone behind the mask,  
The world spinning on without a murmur, without a buzz.

“Do you know what makes our nerves buzz?”  
The old ones, dear ones would ask, smiles unhidden.  
They’d say—if we’d take a minute to take off the mask—  
“We long to be with you, to learn your soul’s music.  
We long to sit with you, to tell you our stories, to see  
Your beautiful smiles...but instead we sit alone, staring blank.”

“No youthful conversation, no childish dreams, just blank  
Sighs, ‘good-mornings’, ‘how are you’s’ and the buzz  
Of pleasantries that shows no one cares to know the deeper sea  
Of our hearts. You have put us away, hidden  
Us in ‘safe’ plexiglass cages that cannot hold music,  
And there we died, nameless, behind the mask.”

Can you fill the blank with conversation, take off the mask?  
There is a beautiful sea of life you’ve hidden,  
It’s time for music again to venture into dead air with a joyful buzz . . .

## **Acknowledgements**

The Honors Club and Faculty Advisors to Veritas would like to thank all student contributors, Susan Naftol of the Honors Office, Leeann Lundgren and Tom Conigliaro of Printing and Publications for their hard work.

A special note of thanks goes to Dr. Elizabeth Hynes-Musnisky, Honors Program Directors for her continued support of the journal and the Annual Honors Colloquium, and to Dr. Carol Farber, Professor Emeritus and former Honors Program Director, who was a vital resource in the journal's creation and production.

We would also like to thank Honors faculty for providing inspiration to those students whose exemplary work is showcased herein: Dr. Joel Vessels (History), Dr. Birgit Woelker (Biology), Prof. David Pecan (English), and Dr. Virginia Hromulak (English).

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***Veritas: The Interdisciplinary Honors  
Journal of the Honors Club of  
Nassau Community College***

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## About *Veritas*: The Interdisciplinary Honors Journal of the Honors Club of Nassau Community College

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Members of the Honors Club, its Faculty Advisors, and the Directors of the Honors Program take pride in issuing the interdisciplinary research journal of the Honors Club at Nassau Community College. While the works included in *Veritas* are predominantly critical in nature -- critical analyses, expository essays, research papers, and research projects from various disciplines -- the journal also proudly showcases creative contributions -- poetry, art, and journal entries. Contributors to the journal are Honors students whose writings are found to be exemplary by Honors faculty and Faculty Advisors to the journal.

The goals of *Veritas* are to provide a venue for Honors students to publish their finest academic work as undergraduates, to inspire them to continue to write with a view toward publication, and to further prepare them for scholarship at four-year institutions.

*Veritas* extends a call to all Honors students who wish to submit critical as well as creative work for publication and to Honors faculty who wish to see their students' writings publicly showcased. Submissions should reflect the author's name, mailing address, email address, and the name of the professor for whom the work was written or created. Work should be saved as Microsoft Word documents or as JPG files (for illustrations) and emailed as an attachment to the Faculty Advisors of the journal at the following locations:

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Alternatively, students may submit their work directly to the Honors Office, Bradley Hall (Y Building), Room 2.

Those of us associated with the creation and production of *Veritas* hope you enjoy reading the journal, that you find it enriching, and that you are inspired to contribute to it in the future.

Faculty Advisors to this journal and the Honors student editorial staff review all work submitted to *Veritas*. The views expressed herein do not necessarily reflect the opinions of the editors or of the college.

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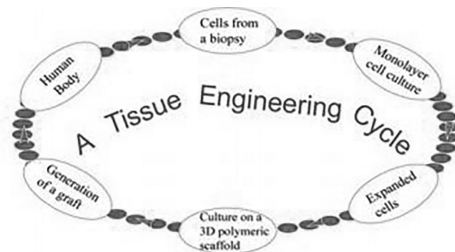
## Tissue Engineering

Farishta Ali

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### What is tissue engineering defined as in regenerative medicine?

Tissue engineering has been defined as the application of biological and engineering principles to construct functional tissues to supplement or replace diseased or defective body parts. More recently, the broader term of 'regenerative medicine' has been coined to encompass the creation, replacement and repair of tissues or organs by a range of therapeutic strategies. Engineered tissue is formed by a scaffold (natural or a biodegradable synthetic structure) that usually has human cells implanted prior to the implantation of the scaffold in the patient. The source of cells varies, but the preferred sources are cells derived from the patient (such as bone marrow or muscle biopsy) to avoid any immune response issues by using the patient's own cells.



### Fields in which tissue engineering is used:

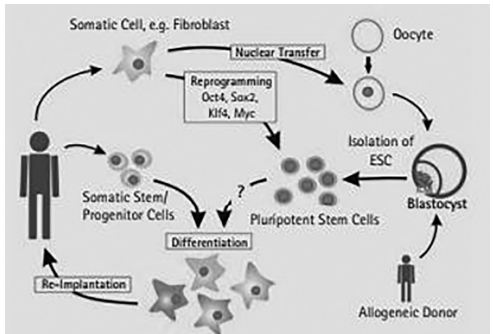
#### Bladder disease:

(1) Urology was one of the first specialties to report the introduction of regenerative medicine into clinical practice and has been at the forefront of scientific innovation. There are more than 100,000 cases reported annually in Europe that report bladder cancer, idiopathic bladder dysfunction, painful bladder syndrome, bladder exstrophy and urethral valves bladder. To cure these diseases tissue engineering has proposed many cures which can be beneficial in the future. In addition to haematopoietic SCs (HSCs) and bone marrow-derived (Stem Cells) SCs, multi-potent or uni-potent adult SCs are intrinsic to many adult tissues, where they have a crucial role in maintaining homeostasis during tissue turnover and repair. Alternatively, fetal/placental-derived SCs may be derived from the placenta, amniotic fluid (AFSCs), or cord blood. These cell types show remarkable plasticity, but although AFSCs were shown to produce markers of all three germ layers in vitro, they are by definition multi-potent, as they seem not

to form teratomas (mass of cells) after xenotransplantation. These cells may have the potential for future tissue engineering applications, as they are more easily accessible (e.g. amniocentesis) and less problematic ethically than human ESCs. The creation of SC banks derived from fetal/placental tissue to cover large parts of the population with genetically matched cell lines has been proposed.

Pluripotent cells are mixed-cell tumors contain cells with unlimited capacity for self-renewal and the potential to give rise to differentiated cells and tissues characteristic of all three germ layers. However, their tumorigenic phenotype prevents therapeutic use. Pluripotent Embryonic Stem Cells (ESCs) can be isolated from the inner cell mass (ICM) of the embryonic blastocyst, which develops 5 days after fertilization, ESCs have the potential to differentiate into tissues of all three germ layers, ectoderm, mesoderm and endoderm, although specific pathways for directed differentiation are often unrevealed. The potential therapeutic benefits of ESCs were indicated in animal models, with reports of successful treatment of Parkinson’s disease, retinal disease and spinal cord damage, amongst others. ESCs also have the benefit of high plasticity and putative potential to form differentiated tissue of all three germ layers, i.e. liver, muscle and neurones. A major disadvantage of using human ESCs clinically is that a genetic match between recipient and donor is required to avoid a host-vs-graft reaction.

Somatic Cell Embryonic Transfer (SCNT) describes the replacement of the nucleus of an oocyte by a donor nucleus from a somatic cell, such as fibroblasts. When the reconstructed embryo reaches the blastocyst stage in vitro, cells from the ICM can be isolated and expanded in culture. As a result, donor-specific and genetically identical pluripotent cells can potentially be obtained.



**Skin:**

(2) Skin, the largest organ of the human body, acts as a barrier for outside pollutants and microbes; hence, serving as the body’s first line of defense. In addition, skin performs various functions like thermoregulation, moisture retention, immune protection, imparting sensation, and self-healing response. Burns, acute trauma, chronic wounds, intensive surgeries, infections, and genetic abnormalities are the most common factors responsible for causing variable

extents of damage to the skin. Tissue engineering skin substitutes for wound healing have evolved tremendously over the last couple of years. Engineered skin substitutes are developed from acellular materials or can be synthesized from autologous, allograft, xenogenic, or synthetic sources. This make it easy to manufacture products which are cheaper, have a longer shelf life and user friendly.

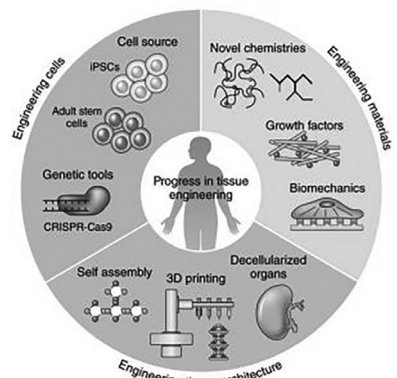
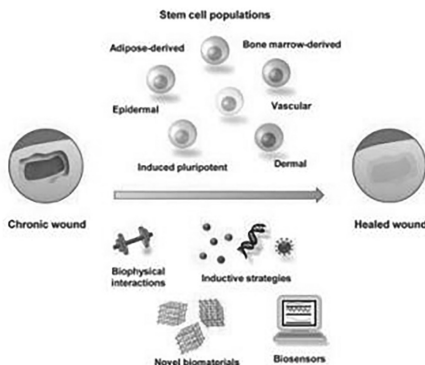
(3) The epidermal skin constructs comprise of keratinocytes cultured on a layer of irradiated feeder cells of murine fibroblasts. The autologous keratinocytes isolated from the patient usually take 2-3 weeks in expansion media to develop cell sheets of stratified keratinocytes, commonly termed as cultured epithelial autografts. However, they are not very effective for curing burns and are fragile to handle. They need to be replaced which can take a lot of time and may not be very effective.

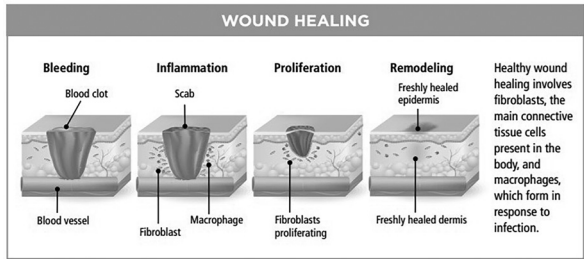
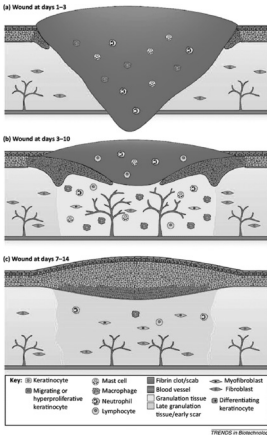
Dermal Skin constructs are epithelial skin constructs in which the reticular dermis has shown a positive progress because its replacement is free and act as an initial framework for facilitating infiltration of cells and blood vessels from the host tissue. This is mainly due to low fabrication cost, easy storage, and low immunogenic response.

The close association between keratinocytes and fibroblasts in the epidermal-dermal skin grafts triggers a cascade of biological moieties (growth factors, cytokines) to expedite tissue healing. Significant enhancement in wound closure has been observed where these epidermal-dermal skin constructs have been used to cure chronic injuries and ulcers.

Trilayered skin constructs include the hypodermal adipose tissue along with the dermis and the epidermis. It can be considered as the closest mimic to the native human skin for full-thickness wounds.

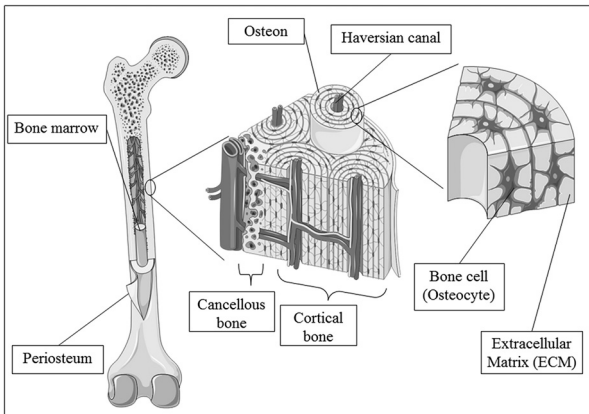
Pigmentation is not only an important cosmetic property of the skin, but melanin in the skin also protects against ultraviolet (UV) radiation. An off-the-shelf product, ReCell®, makes use of fresh skin biopsy to prepare a spray-on cell suspension comprising of a combination of autologous keratinocytes, melanocytes, and fibroblasts for treating vitiligo.





### Diseases and treatments of bones:

(4) Autografts are bone grafts that are harvested from one site and implanted into another site within the same individual. They are optimally osteogenic (forms bones), osteoinductive (having growth factors that attract osteoblasts and activates bone growth), and osteoconductive( provides scaffolding for a bone to grow onto) and has no risks of immunogenicity and disease transmission.

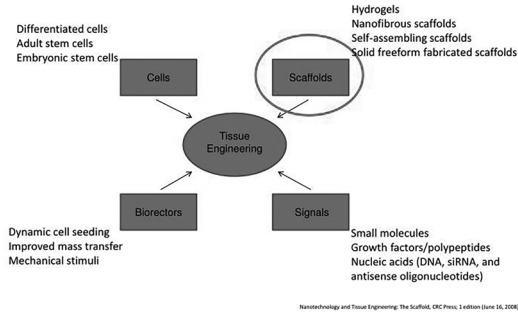


Allografts are harvested from one individual and implanted into another individual of the same species. They are readily available in various shapes and sizes, no need to sacrifice host tissues, and no challenges of donor site morbidity. Allografts have variable osteoinductive and osteoconductive properties but lack viable cells and, therefore, have lower osteogenic potential than autografts.

Xenografts are harvested from one individual and transplanted into another individual of a different species. They are osteoinductive and osteoconductive, easily available and inexpensive.

To conclude, tissue engineering has a bright future in bringing relief to humans. With the help of tissue engineering we can generate healthy skin in order to replace damaged flesh, we can cure many harmful and minor bone diseases and disorders. We can save lives of people who have bladder cancer and many other disorders which can make people disable.

## Tissue Engineering



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## The Eradication of Innocence in *L'Enfant du Regiment*

Emily Huber

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The stylistic choices a painter employs when creating his or her art rarely go uncalculated. As the viewer begins to untangle the maze of brushstrokes, different perspectives are uncovered and serve as a guide to the painting's cardinal message. In Sir John Everett Millais' painting *L'Enfant du Regiment*, created in 1854, the visual elements of color, light, and texture are all employed to indicate the central theme of the painting: the deterioration of a child's innocence resulting from the barbarity of war.

In *L'Enfant du Regiment*, Sir John Everett Millais utilizes vivid colors to highlight the innocence of a child being shrouded by the damaging effects of war. In this work of art, the viewer sees a young girl laying within the confines of a crypt. The child is sleeping against a sarcophagus, which bears the statue of a medieval knight atop it. The statue is stretched in a supine position on a raised stone platform. The painting as a whole is predominantly monochromatic; the statue, its platform, and the surrounding architecture are all rendered with a gentle cream color. However, at the center of Millais' work we see the girl, who is painted with intense hues of color. The viewer may notice her golden hair, blue dress, or rosy cheeks... but what is particularly prominent is a jacket which has been draped over her. The jacket is navy blue with rich, red trim, and it is easily surmised that it is a piece of a soldier's uniform. These bright colors are in stark contrast to her dull surroundings, and purposefully so. While the girl may have been able to find temporary asylum within the comforting cream walls, the distinctness of the girl and the soldier's jacket reminds the viewer that the merciless hands of war are still

upon her. Furthermore, a bright white bandage is wrapped around the girl's right arm, indicating that she has suffered an injury. While this injury is on a physical level, the viewer may deduce that it is symbolic of a much deeper injury: the deterioration of her innocence. By using bold colors to highlight these features -- the girl, the coat covering her, and the bandage wrapping her arm -- Millais successfully depicts the detrimental consequences of war on the most innocent.

Additionally, Millais employs the visual element of vertical lines to further accentuate the disintegration of the girl's innocence. The stone platform above the sarcophagus, the statue atop this platform, and the detailing above these features are all horizontally aligned. The horizontal manner of these elements distinguishes the painting to be of a primarily uniform, landscape orientation. However, the body of the girl draws a vertical contour at the center of the painting. By placing the girl perpendicularly to these horizontal lines in the painting, Millais draws further attention to her. It is also important to note that the coat placed atop the little girl is also of a vertical nature, diverging from the painting's horizontal alignment. The jacket from a soldier's uniform symbolically acts as a contrast to the purity of the child and represents the intrusion of war upon her. Millais drapes the blue sleeve of the jacket vertically down the painting in order to highlight the importance that the coat holds. Moreover, the viewer may notice that in the background behind the feet of the sarcophagus is a window in which two soldiers are visible. They are wearing blue coats with red trim, just like the coat which has been placed on the little girl, allowing the viewer to assume that these are the soldiers who placed the little girl in the crypt. One of the men is on a ladder, drawing another vertical line within the painting. This soldier, the girl, and the jacket atop the girl are purposefully placed perpendicularly in order to accentuate their paramount importance within the painting. By creating these contrasting lines, Millais again successfully highlights the encroachment of war upon the child's innocence.

Lastly, the visual element of texture is used by Millais to draw attention to another key meaning within the painting: the historical significance of war. This element is especially noticeable within the crypt the little girl is laying in. The intricate shadowing of the details found on the statue of the medieval knight, its platform, and the walls of the crypt create a deep texture. Perhaps this rich texture is representative of the rich history which lies within the crypt. It is not by random chance Millais uses a knight to be placed within the crypt. Knights in their nature are men revered for their selflessness and integrity in fighting for their nation and its principles. The girl is finding comfort in the ornate statue of the knight, as it is acting as a place for her to rest. In a way, she is finding tranquility by resting on the foundations of those who have fought before her lifetime. Although the girl's innocence is evidently being marred by the combat occurring around her, it may be a necessary evil. She is collateral damage in an effort to preserve what is right; she is suffering through this war for the sake of history. Millais' usage of texture to accentuate the adornment of the crypt shows that war can be crucial to the conservation of a nation and its people, as well as exalted by generations to come.

The interpretation of the visual elements in *L'Enfant du Regiment* which

I brought to light within this essay (bold colors, vertical lines, and texture) are of a subjective manner. But then again, isn't every interpretation of art? We as viewers attempt to make sense of the elements within these ancient works, but we are incapable of truly knowing the intent behind them. Just as the painters make intricate choices when creating their painting, we all create intricate opinions which are reflections of our own minds. I now ask you the question- what do you see in this painting?

### **Works Cited**

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## **Robot Technology: The Threat to Humanity**

Ayjah McGowan

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Man is to technology what the bee is to a flower. Over the years we have remained loyal to developing artificial intelligence. Technological advancements in robotics have revolutionized the modern world in diverse ways that could only be imagined a few decades ago. These technologies have shown that human innovations are limitless, with the future promising more advanced robotics than humanity has ever experienced. From self-driving cars to intelligent robots that can perform different duties better than humans, the issues have raised critical concerns regarding whether humanity will lose its essence if the trends are not regulated. While there are notable advantages that robotics has brought to human life, the question of where the line should be drawn remains an issue of debate among proponents and opponents. The signs are already there and cannot be wished away or ignored. I believe robot technology will inevitably rob man of his own essence and his own humanity. The loss of human essence through robotics is already evident in the replacement of human beings in the workplace, unclear liabilities on legal and human rights violations by intelligent robots, and the erosion of human morals.

The issue of robots replacing human beings in the workplace has been widely debated in recent years. Proponents of the trend claim that there is a need to enhance efficiency in the workplace, and intelligent robots are best placed to achieve this objective. In a world where economic challenges have been a consistent problem, opponents of the trend argue that such opportunities should be left for human beings as a way of promoting socio-economic development. When the need to create more jobs for human beings has been a headache for multiple economies, robots take away these jobs and leave millions of people in desperation. In addition to this, this trend supports the argument of robots robbing humanity of its essence. Preferring robots to human beings in the workplace shows that employers are more concerned about profits and reducing labor costs at the expense of capable employees. The majority of people affected by such robots are low-skilled employees whose roles can be easily replaced through automation. Rasim Ozcan suggests that “Robots may replace humans as they are more efficient. They can perform tasks in a much faster and more cost-effective way, therefore displacing much of labor. As a result, there will be fewer jobs for humans, portending challenging times, especially for the low-skilled labor-intensive economies” (1). From a humanity point of view, eliminating the poor from the workforce means that poverty levels will rise, and the gap between the rich and poor will only increase. It is also worth noting that only the wealthy and

huge corporations can manage to invest in such robotic technologies. This also means that robots can potentially rob humanity of its sense of compassion and care for fellow human beings in the pursuit of profits and wealth.

Even the best or most intelligent robots are created and programmed by human beings. The level of autonomy given to these robots is a contentious issue in relation to legal liability. For instance, where does the liability lay when a self-driving vehicle causes a fatal accident? Since time immemorial, humanity has been governed by legal provisions and norms that determine what is right or wrong and where liability is placed. What are the legal provisions put in place to protect human beings from legal violations caused by robots? In addition to this, robots can be made with the intention of causing harm. The issue is even more controversial as robots are not subject to criminal law in most jurisdictions. Even if they were, arresting a robot for legal violations would not yield justice to humanity as is conventionally the norm when an actual human being is held liable. Since intelligent robots are considered to be self-governed and control their own affairs, the scope of liability becomes contentious when issues such as human rights are violated. In “Dangerous Robots–Artificial Intelligence vs. Human Intelligence,” the author acknowledges the fear people may have towards robots: “People’s fear of AI robots, in most cases, is based on the fact that AI robots are not considered to be subject to the law, specifically to criminal law” (Hallevy 2). This means that robots can potentially disrupt the order that humanity has taken ages to develop in terms of legal liability and responsibility.

The fact that robots can be made to be more intelligent than human beings could spell doom for humanity in the future. Critics have raised concerns that the sophisticated nature of modern intelligent robots could pose an existential threat to humanity. Man is an emotional being that is capable of expressing social cues such as love, compassion, and empathy, among others. On the other hand, the same cannot be said for robots that can be made to be smarter than human beings. John Danaher argues some of these points in “The rise of the robots and the crisis of moral patiency.” Danaher implies, “The rise of the robots could lead to a crisis of moral patiency. That is to say, it could compromise both the ability and willingness of humans to act in the world as responsible moral agents, and consequently could reduce them to moral patients (Danaher 2). The very existence of humanity is governed by morals that determine how people interact with one another. In this regard, these morals are the very foundation of humanity. For instance, if robots were made to show qualities such as intimate affection, it would have the impact of eroding how intimate relationships are conventionally perceived. This could also create a trend where humanity turns to robots for social solutions that were traditionally solved through the interaction of the very morals replaced by robots. Additionally, this creates an ethical and religious dilemma where human beings no longer rely on each other but on intelligent robots. If such trends were to become significantly common, the future of ethics and morals in humanity would be significantly jeopardized.

The robotics revolution has gained center stage in recent times. The benefits that robotics technologies have had on humanity are undeniable. Some

challenges that have riddled humanity have indeed been solved using robotics technologies. However, these technologies have the potential to pose a significant threat to the very human that they are meant to aid. In the quest to enhance life and life experiences, these technologies are doing more harm than good regarding issues such as respect for human life, compassion, empathy, and love. The signs are already there and can, therefore, not be wished away. And, there is an absence of limits to which robot technology can be used. It is therefore important to establish both explicit and implied guidelines that these technologies should not cross. Otherwise, continued advancements without limits can only mean doom for future generations.

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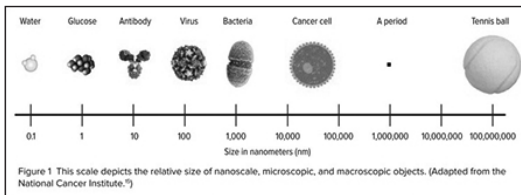
# Nanotechnology- based Drug Delivery

Kylar Hoge

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## Introduction:

According to the National Nanotechnology Initiative (NNI), nanotechnology is defined as: the understanding and control of matter at the nanoscale, ranging between approximately 1 nanometer to 100 nanometers in any given dimension (“What It Is and How It Works”, 2020). While this upper boundary of 100 nanometers is frequently cited, the value doesn’t seem to correspond to any notable change in the biological characteristics of a material, and thus, “nanotechnology” can sometimes refer to structures as large as several hundred nanometers in diameter (Farokhzad & Langer, 2009). One of the most exciting areas of research in this domain involves finding ways to manipulate nanoscopic particles in order to optimize the delivery of drug treatments within the body. Nanotechnology-based drug delivery systems offer several potential benefits over traditional drug delivery, including: more specific drug targeting, lower toxicity while maintaining therapeutic effects, and greater safety/biocompatibility (De, 2008).

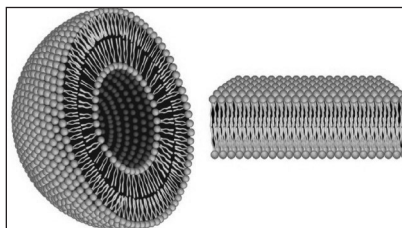


(Ventola, 2012)

## Delivery Vehicles:

Nanotechnology-based drug delivery systems typically function by using nanoparticles as vehicles to carry and deliver drugs to their target location. There are several different types of nanoparticles currently being used for this purpose, sometimes referred to as nanocarriers, including: nanocrystals, liposomes, polymeric micelles, protein-based nanoparticles, dendrimers, polymer-drug conjugates, and carbon nanotubes. Of these, liposomes are the most clinically established for drug delivery (Bamrungsap, et al., 2012). Liposomes are composed of a phospholipid bilayer, very similar in structure to a cell membrane, with hydrophilic heads and hydrophobic tails (Bozzuto & Molinari, 2015). Figure 2 below contains a diagram of a liposome. They are considered ideal drug-carriers, due to their similarity to human cell membranes and their

ability to incorporate various substances. These nanomedical liposomes are typically coated in polyethylene glycol (PEG), in order to reduce the chances of the body's reticuloendothelial system (RES) from targeting them for clearance from the bloodstream. These PEG-coated liposomes, otherwise known as "stealth liposomes", are thus able to circulate in the blood for a much longer period of time than would otherwise be possible (Nunes, et al., 2019). In fact, nanocarriers in general tend to have longer circulation times compared to free drugs (Yoo, et al., 2019). Nanocarriers confer several other important benefits. They have the potential to improve the stability of hydrophobic drugs, improve biodistribution, and reduce toxicity among other adverse effects (Bamrungsap, et al., 2012). They can also improve the delivery of poorly water-soluble drugs (Farokhzad & Langer, 2009).



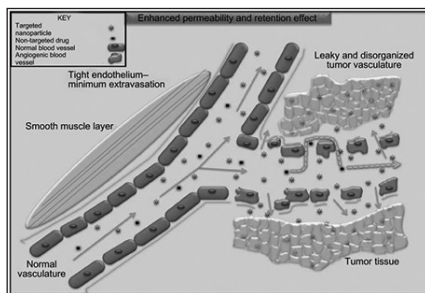
(Bozzuto & Molinari, 2015)

### **Targeting:**

Targeting is a key feature of any nanotechnology-based drug delivery system. "Targeting" in this sense refers to the way nanoparticles are designed to ensure that they end up at their intended location within the body. There are two main types of targeting: active and passive (Yoo, et al., 2019). The term "passive targeting", which is typically used when nanotechnology is being applied to aid in chemotherapeutic drug delivery, refers to the fact that nanoparticles are disproportionately likely to end up in tumor tissue. This phenomenon, known as the Enhanced Permeability and Retention (EPR) effect, occurs because the rapid growth of tumor cells often leads them to have porous or "leaky" blood vessels ("Benefits of Nanotechnology", 2017). As a result of this effect, nanocarriers exhibit between 10 and 200 times higher concentrations in tumor tissues compared to "normal" tissues (Yin, et al., 2014). The exact concentration differential varied depending on the particular type of nanocarrier used. By contrast, "active targeting" refers to attempts to engineer nanoparticles so that they bind to their intended targets with more specificity. This typically involves affixing affinity ligands to the surface of our nanocarrier. Affinity ligands are molecules that are capable of binding to receptors in the target cell with a high degree of specificity. Ligands are selected in order to target, and bind, our nanocarrier to the types of molecules that are overexpressed on the surface of target cells (Yao, et al., 2020). There are several classes of ligands, including: proteins, polysaccharides, peptides, aptamers, and small molecules, each with their own associated benefits and drawbacks (Yoo, et al., 2019). Although active targeting is a promising avenue



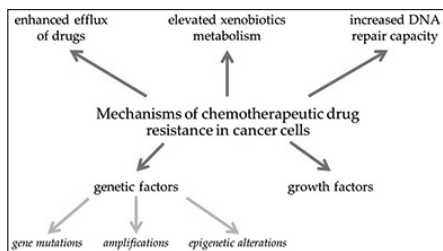
for future research, its clinical use is nowhere near as well supported as passive targeting (Bamrungsap, et al., 2012).



(Ranganathan, et al., 2012)

### Layering:

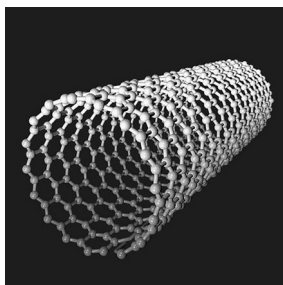
Another key benefit of nanotechnology-based drug delivery systems is that they create the potential for several drugs to be delivered at once, typically separated by layers within the nanocarrier (Farokhzad & Langer, 2009). This feature of these systems in particular has the potential to revolutionize medicine, most notably our treatment of complex diseases such as cancer. One of the main reasons cancer is difficult to treat, is that tumor cells often develop some degree of resistance against a wide range of chemotherapeutic drugs. This phenomenon is referred to in the medical literature as multiple drug resistance, or MDR for short (Mansoori, et al., 2017). Multiple drug resistance is believed to be responsible for over 90% of cancer related deaths (Wang, Zhang & Chen, 2014). There are multiple mechanisms by which MDR is able to occur, including: enhanced efflux of drugs, enhanced xenobiotics metabolism, increased DNA repair capacity, growth factors, as well as various genetic changes (Bukowski, et al., 2020). Of these mechanisms, the way tumors flush out, or efflux, chemotherapeutic drugs through the use of the p-glycoprotein (aka p-gp or MDR1) transporter is the most well-studied (Nanayakkara, et al., et al., 2014). This is where nanotechnology comes in. Recently, researchers have had success with deploying multi-layered nanocarriers, containing both the chemotherapeutic drug as well as curcumin, which is designed to block transporters from causing drug efflux (National Institute of Biomedical Imaging and Bioengineering, 2016). Experiments on mice have shown that these multi-layered nanocarriers were effective at attaching to tumor cells in much higher concentrations, and optimized the chemotherapeutic drug's ability to kill tumors (National Institute of Biomedical Imaging and Bioengineering, 2016).



(Bukowski, et al., 2020)

### Drawbacks/Concerns:

Despite the exciting potential of nanotechnology-based drug delivery systems to revolutionize medicine, there are also some drawbacks and concerns worth noting. Logistically, nanotechnology is very expensive to develop, and difficult to manufacture (Radwan, 2018). As of 2015, there were only 2 FDA approved cancer treatments that employed the use of nanoparticles (Crist & McNeil, 2015). The safety profile of nanoparticles hinges on relatively minute changes to particle morphology (Wolfam, et al., 2015). Many samples of nanomaterials exhibit contamination with endotoxins, which can interfere with the ability of researchers to interpret their safety profiles based on data (Crist & McNeil, 2015). Carbon-based nanocarriers, such as carbon nanotubes, in particular have been shown to exhibit “asbestos-like” toxicity, and may even induce mesothelioma (Wolfram, et al., 2015). See the diagram below for a visualization of a carbon nanotube.



(Ren, 2018)

### Conclusion:

Nanotechnology-based drug delivery systems have the potential to revolutionize medicine. They allow us the ability to target diseased tissue with greater specificity, counteract the resistance of tumors to treatment, and increase the amount of time drugs spend circulating the body. Although there are some logistical difficulties involved with the research, development, and production of technology, as well as some concerns about the toxicity of certain nanoparticles, these challenges are ultimately outweighed by the enormous potential benefits conferred by nanotechnology-based drug delivery systems.

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## Behind Black Power

Chloee-Gabrielle Louis

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The fight for African-American rights has been an issue in the United States for centuries, but it wasn't until the 1950s and the Civil Rights Movement that the issue became prominent across the country. This social movement, led by the likes of Dr. Martin Luther King, Jr. and Rosa Parks, fought for black rights and the end of segregation and discrimination in the United States. King, inspired by Indian activist Mohandas Gandhi, adopted non-violence as a way to unite both black and white Americans in the fight for racial equality. Using non-violent demonstrations such as boycotts, sit-ins, and marches, the movement played a massive part in crucial civil rights legislation being passed, such as the Civil Rights Act of 1964, which made discrimination of sex, race, and religion unlawful.

Despite the positive impact of the Civil Rights Movement, it still did not solve many problems facing the black community, such as unemployment, racial violence, and lack of education. As a result of the movement's shortcomings, a new movement called the Black Power Movement emerged in the mid-1960s. The Black Power Movement emphasized black pride, self-sufficiency, and economic empowerment. Arguably the most prominent black nationalist was Malcolm X, who, unlike Dr. King felt that integration would leave black people without the proper "spiritual and material resources" necessary to thrive (Cole, Hymes 959). Unlike the civil rights movement's inclusive and peaceful approach, Black Power took a much more militant and confrontational stance. The movement's most popular group was the Black Panther Party of Self-Defense. Black Panthers were known to be "in-your-face" – they were black nationalists who believed that black

people must fight for and defend their rights and freedoms by any means necessary, even if that meant using violence. As a result, Black Power sparked a great deal of controversy and was deemed the “evil twin” of the civil rights movement (Joseph 752). Because of this controversy, the stereotypes around Black Power include violence, anti-whiteness, and radicalism. However, the narrative surrounding this movement and the way it was, and still is, negatively portrayed by the media is not fair. While the movement seemed very hostile, Black Power activists are unfairly portrayed as angry, uncivilized beings. The movement is so much more than black men in black leather coats and berets holding firearms. Like the civil rights movement, Black Power was led by black activists whose primary goal was to fight for the rights of African Americans. Many worked tirelessly in an attempt of changing the system in order to protect the freedoms of black people and help them thrive.

One of the main issues Black Power focused on was racial violence against black people. The Black Panther Party of Self-Defense was founded in 1966 by African Americans Huey Newton and Bobby Seale in response to “brutal and violent” conditions in the ghettos of Oakland, California (Joseph 762). However, the issue surrounding racial violence goes back many decades. For over 100 years following the American Civil War, white supremacists terrorized, tortured, and murdered black people. Between 1956 and 1966, white supremacists committed “over 1000 documented violent incidents” to maintain segregation, including bombing, burning, abduction, castration, and murder (Bermazohn 31). One form of violence used by white supremacist groups like the Ku Klux Klan (KKK) was lynching. Lynching is mob murder without a legal trial, and after Reconstruction, lynchings occurred often in the south. Between 1882 and 1968, newspapers reported 4742 lynch murders in the US, with 73% of lynching victims (3345 individuals) being black and 81% (3848 cases) “occurred in 12 Southern States” (Bermazohn 34). These lynchings could not have happened without government complicity. Authorities, including police, jailers, and mayors, frequently “facilitated, or at least did not impede racist mobs” (Bermazohn 34). For instance, in 1959, a black name named Mack Charles Parker was awaiting trial for raping a white woman. While in jail, he was dragged from his cell and murdered by white men. The FBI investigation concluded that “local police and jailers cooperated with the murderers”, but all men were found not guilty by a state jury (Bermazohn 34). One of the most infamous cases was the murder of 14-year-old Emmett Till. Till, who was from Chicago on vacation in Mississippi, was telling his cousins about his integrated schools and his white female friends. He then said “bye baby” to a white woman in Mississippi, which cost him his life. Later that night, two men took Till from his uncle’s home, beat him to death, and threw him into the river. An all-white jury acquitted the murderers, despite “overwhelming evidence” (Bermazohn 38).

Because authorities failed to protect African-Americans, Southern blacks’ recourse was “self-reliance, defending themselves” (Bermazohn 35). Many of them practiced using weapons to hunt and defend themselves and their families, but armed self-defense was not openly discussed during the civil rights

movement – with the exception of Robert F. Williams. Williams, who was raised in Monroe, North Carolina, and a veteran who served in the Marine Corps in the 1950s, became one of the first prominent activists for black-self defense. In 1956, he returned to Monroe and became the leader of the “nearly defunct local NAACP [National Association for the Advancement of Colored People] chapter”, whose membership “grew from six to two-hundred”, with many new members being “veterans trained in the use of arms” like him (Williams 1). After southern officials failed to address white-on-black violence, Williams became increasingly frustrated and started advocating for African Americans to be armed with guns for self-defense. As a result, Williams was denounced by leaders of the NAACP such as Dr. Martin Luther King, Roy Wilkins, and future Supreme Court Justice Thurgood Marshall. In his book *Negroes with Guns*, Williams discussed the southern black community’s struggle to defend themselves from racist attacks. Specifically, in Chapter 3, Williams described a racist riot in Monroe:

On that same day, after we had gone home, a mob dragged a colored man from his car and took him out into the woods where they beat him, stood him up against a tree and threatened to shoot him... Later on this Negro was unable to indict anyone who had attacked him even though he recognized some of the members of the would-be lynch mob. The FBI refused to demand any indictments for kidnapping. (Williams 5).

There was another time in which Williams’ house was attacked by a sergeant of the State National Guard. Williams recognized him, but no action was taken because the chief of police claimed that no attack took place. He was subjected to numerous threats and there were four attempts to assassinate him in the span of three weeks, with these “would-be assassins” being aided by the local officials and offered immunity by the same federal offices that ignored Williams when he asked for “normal protective services” (Williams 5). After a massive riot in which Freedom Riders, non-violent students, and blacks were attacked and jailed, Williams felt that he had no other choice but to fight back with violence. Williams called the chief of police and threatened to march with others to the police station if the victims of the attack were not medically treated. Williams received a call shortly after confirming that the people received medical treatment (Williams 10).

Robert F. Williams’ was a proponent for armed self-defense during a time in which many black activists lobbied for non-violence. He laid the foundation for the pro-gun Black Panther Party of Self-Defense. The Black Panthers appealed more to the “lower classes and their lack of power” and their philosophy involved socialism, anti-colonization, and revolution (Leonardatos 958). The Panthers heavily advocated for gun use in order for black people to protect themselves. Prominent Panther Stokely Carmichael told the media that blacks must be the “executioners of our executioners” and even “toured black colleges in the South” in the spring of 1967, inciting riots and telling students to “fight for liberation by any means necessary” (Leonardatos 964). Despite these seemingly radical statements,



the Black Panthers' advocacy for armed self-defense was a direct result of violent and even deadly attacks on the black community, often perpetrated by the KKK and aided by the willful ignorance of local law enforcement. Regardless of how one feels about the Black Panthers, it is very clear that the African Americans were unforgivably targeted by white supremacists. There is overwhelming evidence that proves that blacks were not only the victims of racial violence but were not given protection by the local, state, and federal governments.

Regardless of their reasoning, most people did not take kindly to black militancy – especially the government. The Federal Bureau of Investigation (FBI)'s counterintelligence program (COINTELPRO) was used to destroy the Black Panthers from within. Using counterintelligence methods, the FBI infiltrated the Panthers with African American informant William O'Neal, who supposedly played a part in the assassination of Chicago Panther Fred Hampton in 1969. O'Neal acted as a fake Panther by using “falsified records to acquire firearms” in 1969 and “initiated a weapons training program” for Party members. O'Neal is also the one that “provided a sketch of Hampton's apartment”, which the FBI gave to the Chicago Police Department (Leonardatos 967). The state of California also took action against the Panthers. In 1967, it was legal for a person to carry loaded firearms in California. Despite this, police confiscated guns from Black Panthers and arrested them for “disturbing the peace” (Leonardatos 969). In spite of this, Panthers abided by California's Penal Code regarding weapon possession and continued to carry firearms in a lawful way. As a result, California passed the Mulford Act in 1967, which made carrying or exhibiting guns in public places unlawful. The Panthers were obviously unhappy with the legislation and protested by invading the Capitol. On the day the Assembly scheduled to hear the Mulford Act bill, Panthers “actively protested by walking into the Assembly Chamber” in Sacramento carrying “pistols, rifles, and shotguns” (Leonardatos 970). Bobby Seale gave a statement while police unloaded Panther weapons, in short calling on Americans to “take note of racist California legislature” to keep blacks unarmed after many blacks “begged, prayed” and “petitioned” for the end to systemic racism, along with justifying armed self-defense for black people.

Black self-defense wasn't just about defending black bodies. As mentioned before, Malcolm X was a black nationalist who emphasized that black people must provide “defenses” against “white dominance” by “renewing their “commitment to their own heritage” and creating black businesses for “economic autonomy” (Cole, Symes 959). The Black Panthers themselves wrote and distributed the *Ten Point Plan*, which called for several things, such as full employment of black people, decent housing, and education for blacks in American history. For a very long time, the black community has fallen behind in terms of education. Children in Harlem, New York performed anywhere from two and four years behind national and citywide academic norms, and according to a 1964 study, less than half of Central Harlem's youth was expected to graduate from high school, and the ones that did graduate would most likely gain “no vocational skills, no developed talents... and no future” (Rickford 39). It wasn't until 1954 that segregation within public schools was deemed illegal after the

groundbreaking U.S Supreme Court case *Brown v. Board of Education (Brown I)*. Prior to then, segregated schools were common because of the 1896 Supreme Court case *Plessy v. Ferguson*, which upheld segregation in public facilities, as long as those facilities were “separate, but equal” (McNair 1099). *Brown I* provided “moral encouragement” for those fighting for civil rights (McNair 1107), but in the end, failed to end school segregation. The first problem was that segregation wasn’t enforced enough throughout the country. A second *Brown v. Board of Education (Brown II)* court case, which “articulated the ‘with all deliberate speed’ formula” to end segregation did little to solve this issue. President Eisenhower failed to back the Court’s decrees with “full federal authority” in the face of intense opposition from whites (McNair 1108). It wasn’t until the late 1960s and 70s after black parents and community leaders fought for desegregation that the Supreme and federal courts ordered desegregation. The lack of supervision of court-ordered school desegregation signaled “weak commitment to change”. Black children were “lonely pioneers” thrown into “extremely hostile” white environments (McNair 1114). Black children were bullied and harassed by both students and parents – they were spat on, called racial slurs, and their belongings destroyed. This, as a result, decreased self-esteem and self-confidence in students. (McNair 1115)

Working-class African Americans largely viewed school integration as a way for their children to have access to educational resources reserved for white students (Rickford 40), which, unfortunately, was not the case. The New York Board of Education did little to actually solve segregation. For instance, Intermediate School (I.S.) 201 was built in a “fringe” area to attract both white and black students. However, the school was located near “elevated railroad tracks in a gritty section of East Harlem” and the building lacked windows to “mute the rumble of passing trains” and to keep the parents from looking and seeing that the school wasn’t integrated. The final straw came when the Board announced in 1966 that “integration” at I.S. 201 would be “50-50” black and Puerto Rican (Rickford 41). With I.S. 201’s student body remaining mostly black and Hispanic, the conversation shifted from integration to black self-determination and educational excellence. As one local antipoverty worker declared, “We must no longer pursue the myth that integrated education is equated with quality education” (Rickford 43).

African American people recognized that an “accurate and significant” representation of African American life was necessary for public school curricula (Rickford 62). High school students in Chicago, Philadelphia, and Boston organized boycotts demanding the inclusion of black history in schools while African American parents, educators, and other community leaders criticized New York City’s Central Board of Education for its dismissal and disrespect for African and Puerto Rican history. These actions led to reforms in the city. Several urban schools required “multiethnic” textbooks and classroom coverage on minority-related topics, and after a student-led march on school headquarters in Philadelphia, authorities mandated that each student in the city must complete a program of African American history (Rickford 63). Other than simply educating

students on black history, the goal of this curriculum was to get students to take pride in their blackness. Nation of Islam (NOI) schools' goal was to prepare black children to "know self," "love self," and "do for self," with black activist and leader of the NOI Elijah Muhammad stating that public schools were designed by slave masters for black people to be dependent and that the black man "cannot build a future with white people in his mind" (Rickford 91).

Unfortunately, despite the significant impact of these black schools, most of them have since folded, and the fight to end segregation continues. Half a century after Brown I, separate and unequal schools based on race still exist in big cities, like Milwaukee, Wisconsin. Desegregation has forced white officials to deal with "insufficient funds" for historically black schools. When schools are integrated, school funding increases, but when schools resegregate, per-student expenditure differentials "increase sharply". Per capita, school expenditures for Milwaukee's children of color were far lower than that for suburban (mostly white) children. The differential is considered more than \$1000. Not only has Wisconsin allowed the funding gulf between Milwaukee and its suburban counterparts, but has "instituted policies that allow the gap to widen" (McNair 1111-1112). White teachers also play a part in maintaining racism within the education system. A study was done that explores white teachers' life experiences and how they influenced understandings of race and difference. Eight white female pre-service teachers were studied and placed into a course on multicultural education to explore their own racial identity and class privilege, and the findings were shocking. One participant named Diane claimed that when she was in high school, she was fearful of the "big black football players" that went to a school near her predominantly white school and claimed that she would probably cross the street if they walked her way (Picower 202-203). The participants' student teaching placements were often individuals experiencing their first time interacting with communities of color. Another participant named Amanda was fearful of going to a job interview in Harlem and had to "reassure" her mother it was safe before her mother "passed out" (Picower 203-204). These findings show an alarming amount of ignorance and internalized racism that these future white teachers had. Their way of thinking can, and often do, lead to black students being mistreated in the classroom consciously and subconsciously. For black activists, it was important for there to be all-black schools taught by all-black staff because black teachers often sympathize and empathize with black students, unlike white teachers, who are often ignorant to the black struggle or even project their racial biases onto their black students, which can negatively affect their self-esteem and school experience for years.

The Black Power movement was nothing short of an undervalued movement. The movement and its activists were not perfect. There were many scandals and there were several reasons for its downfall, such as the FBI and the leaders within their own movement. However, the movement's portrayal by the media is not very accurate either. The idea that Black Power is the civil rights movement's evil sister, that it was anti-white, radical, and violent is unfair. The truth is, like the civil rights movement, the Black Power movement fought for the freedom of African Americans. The movement instilled a certain level of black

pride into many blacks that, arguably, the civil rights movement was not able to do. It encouraged black people to put themselves first, to take pride in and protect themselves, their black families, and their communities when no one else was willing to do that. The militancy within the Black Power movement was simply a response to centuries of mistreatment and a lack of protection under the United States Constitution. Instead of relying on an “integrated” society to help them, Black Power took matters into their own hands by providing services, such as medical care and free breakfast programs, to the black community, along with opening up black schools in order to properly educate black children to grow up to understand their history and take pride in their heritage. Perhaps, the United States wants her people to think of the Black Power Movement in a negative light because the idea of black people becoming powerful, free, and united greatly frightens her.

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## Honestly, Why Not?

Mikhaela James

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Humans are naturally weak. We are outrun by thousands of animals, can easily succumb to the strength of others, and have absolutely no natural armor that would protect us in the wild. How did we become the fiercest competitor in the animal kingdom? It's simple: technology. For thousands of years, we have been creating new types of technology to help us conquer "natural selection" and problems that arise because of them. With current developments in robotics and artificial intelligence (AI) we can give disabled children proper speech therapy, care for the elderly, and even improve how we perform life-saving medical procedures. Through these advances, we haven't become less human; we are allowed the freedom to experience the full potential of humanness.

Properly educating our children is how we expand the knowledge of humankind. Children with disabilities are no exception. E. J. Hyun, S. Y. Kim, and S. K. Jang have suggested that education focuses more on the relationship between the education tool and the learner than ever before. However, many disabled children struggle with verbal communication, which rules out many two-way interactive tools. It puts an early development teacher in a tough position: how do you teach someone who can't show you what they are learning? iRobiQ, from Yujin Robot Co., Korea, was specially designed to remedy this problem. iRobiQ is a service robot that provides the opportunity for "general learned language skill acquisition" (Lee and Hyun 100) for disabled children. Studies by Ira L. Cohen in 1994, Kerstin Dautenhahn and Aude Billard in 2002, and David Fiel-Seifer and Maja J. Mataric in 2008 have proven that autistic children tend to play with humanoid robots or moving toys, rather than other human children. Disabled children find it more difficult to interact with people because we often use complicated language cues, facial expressions, et cetera that may send mixed signals. With iRobiQ, a disabled child can have the interactions they crave without missing out on crucial language development. In the findings of the 2015 study, it was concluded that iRobiQ "plays very necessary functions in treatment and caring in the education environment, because both parents and experts can reliably check on the disabled preschoolers' ability to communicate with other normal preschoolers, and their behavior for diagnosis outside of the education center and home environments" (110). In five-years time, there is no telling of the progress that could be made with these children.

We have succeeded in creating long lives for a majority of people on Earth, but once they become dependent upon others in their old age, we fall short of properly taking care of their needs. Increasingly, the problem is how expensive

it can become to take care of those needs. Older adults are disproportionately affected by debilitating health issues, which can be pricey to address; in fact, a 2018 Genworth study found that elderly care could cost between \$4000 to \$8000 per month, depending on a specific person's needs. According to U.S. Census Bureau data from 2018 (the latest release) the median household income was \$63,179. Even considering the less expensive end of elderly care, it would consume nearly 75% of the median household income. Thankfully, technology is providing alternative models of care for aging adults, such as voice assistants, ride-sharing services, and connected-device networks. When older adults have access to these kinds of technical innovations, they can remain better connected to medical professionals, caregivers, and family members (Turner-Lee 88). Voice assistants can take on the management of routine care like scheduling appointments, reminding older patients to take medicine, and confirming dosages to prevent accidental over- or under-doses. A study by Carlsbad by the Sea (qtd. in Turner-Lee 88), a continuing-care retirement community in Carlsbad, California, found that 70 percent of study participants, who were mostly in their eighties, found voice activated devices helpful, and 75 percent used these smart home devices daily. Ride-sharing services make it easier to arrange rides for older Americans to get to and from doctor's appointments, run their errands, and visit friends and family. Nicol Turner-Lee recounts: "My mother relied heavily upon ride-sharing services to travel to her physical therapy appointments and, in some cases, we were able to call [ride-share services] for her and monitor trip routes." (91). The Apple Watch and Fitbit are among many products that are able to use biometrics to monitor patients. Microphones in smartphones are acting as spirometers that measure airflow in and out of lungs for patients with chronic obstructive pulmonary disease (Turner-Lee 91). The variety of products work in tandem to collect the data that is then used by doctors to remotely monitor disease progression in patients in real-time. Overall, these technologies can help older adults in every step of the process.

Innovative technological advances made in the field of surgery over the last two decades have been heavily robo-centered. This year, surgeons and residents at UC San Diego Health have been able to test out a new technological resource: video recordings of themselves performing operations, analyzed by artificial intelligence. The video recordings of procedures are uploaded for analysis, then the surgeons involved in the project and their surgical residents receive videos of their minimally invasive procedures (in which a surgeon performs a procedure using tiny cuts, rather than traditional open surgery that often requires large incisions) divided into critical steps with a dashboard that compares the operation to previous procedures (Cohen). The last major technological advancement in surgery was approximately 20 years ago, not-so-coincidentally also related to robotics; the practice introduced by Intuitive Surgical's "da Vinci" system. It involves "robots" that are operated by a human surgeon to help steady the user's hand for more precise movements. AI-assisted surgery has been an area of gradual growth, starting with tools that support teams with preoperative planning and postoperative evaluation—but it's laying the groundwork for the next phase

of surgical innovation, which could include real-time intra-operative clinical decision support and even some automation, experts say (Cohen). When asked about what the future held, one doctor in particular beamed about the possibilities: “Surgery and AI will go hand-in-hand,” said Dr. Vipul Patel, medical director of AdventHealth’s Global Robotics Institute, “I think you’re going to have to have artificial intelligence [in order] for surgery to evolve” (Cohen). Certainly, current practices at UC San Diego Health mimic his optimistic sentiments.

Despite how positively these new technologies have impacted our society, there are those who remain skeptical. According to Jack Harlow’s “Future of Work Study, Preparing for Robot Colleagues: A New Decade of Robomageddon,” 76 percent of employees surveyed feel that advanced technologies make their work easier—but 55 percent don’t agree with the claim that robots are better at doing that work than they are. In fact, 57 percent of workers believe that “robots and automation are bad for American workers.” However, these employees do not take the concept of human collaboration with robots as seriously as they should. In the instance of the Korean robot iRobiQ, the robot is collaborating with human experts and parents to ensure their disabled child is developing at an ideal pace. When it comes to dealing with the elderly, artificial intelligence exists merely to extend human contact, not replace it. Nor does the medical industry intend on letting robots replace human surgeons; AI and human surgery will go “hand in hand” (1), to quote Dr. Vipul Patel. The uncertainty of the poll-takers comes from a panicked misunderstanding of what the future of robotics holds.

Humans have come to a point in our evolution where it is time to move to the next stage. We have used robotics and artificial intelligence to overcome childhood disabilities, to take care of elderly loved ones remotely, and even to temporarily improve surgeons’ fine motor skills to save lives. No one claims that man lost his humanity when the sparks of the first fire ever built flew; as we develop and manipulate the world around us, we discover more about ourselves and our humanity. The only logical step is to continue forward and beat the final boss: our own mortality.

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## Yellow

Catherine Pahs

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The cat followed her into the kitchen. It had been a long day staring at the computer screen, and her brain was tired. She opened the dirty microwave in the computer chip-sized kitchen of the apartment and balanced her earthenware mug on the round handle of the lid of an old Pyrex dish. She never bothered to take the lid out, and most of the time the coffee survived its brief rotation of a minute, perhaps, or 30 seconds, in the microwave without toppling off its precarious perch. She added a quick 30 plus 30 seconds onto the timer, intending to pull out the coffee at around 41 seconds. She turned away from the disgruntled hum and faced the open window, spring air floating in from between maple tree leaves and a mess of telephone wires stretching out from a pole that seemed its own sort of tree. The cat slinked around her ankles and leapt onto the counter to eat a sad bowl of sardines (boneless, of course). The girl paced along the linoleum line as if she was a tight-rope walker. Her toe hit the wheel of the antique wicker coffee cart. She looked up from the tenuous, imagined journey of her bare feet and rested her elbows on the coffee cart. By the open window, it smelled of superglue (from a failed attempt to repair an “I \*heart\* NY” magnet from the fridge) and pollen, and diesel from the delivery trucks and the faint perfume of hyacinth, perhaps from the apartment window-box above her.

She wasn’t thinking about anything or much of anything but was startled out of some reverie by the accusatory beep of the microwave. She sighed inside her head—she’d forgotten to take it out—and retrieved the probably-burned coffee. Turning to the small refrigerator, bare now without its token—broken—magnet, she grabbed a plastic container of “Holy Hummus” and set it on the counter. She took a loaf of her own brown bread and sliced off a thick heel from one end, hoping it wasn’t stale. She didn’t have time (she really did, she really just didn’t have the energy) to toast it. Taking a wide spreader from the morning’s jelly toast, she spread soft, yellow butter onto it and then heaped a few spreads of hummus on top of that. Taking the little earthenware mug of probably-burned coffee and the slice of bread, she ventured out onto the tiny fire escape, leaning into a patch of sun as she clambered atop a rain barrel.

Why there was a rain barrel on a third-story fire escape, she had no idea. She had moved to this apartment a few months ago, after the lockdown had happened and rent plummeted in the city. She had arrived in Penn Station that day feeling independent and a little terrified of living on her own. She sort of regretted it, now, but was also sort of proud of herself for taking such a wild, unmeditated step. She worked from home, like everyone did these days, it seemed. It was

boring work when she was in the office, but it seemed even more futile now that it was confined to her computer screen. Still, she made a satisfactory living off of it. She took a bite of her hummus toast and surveyed the sky. It was too blue. Too serene. She wished there were some dramatic clouds or perhaps some steam from the subways floating up into it. She'd always imagined New York City to be this place that was so alive it felt like it was breathing. Now, it felt as though it had breathed its last, and like some great, buried dragon corpse, grew daffodils and hyacinth out of cracks in the sidewalk and harbored little migratory birds like herself in the branches of its skyscrapers and apartment buildings.

She contemplated the hummus toast and felt the dryness of it in her mouth. Deciding it needed more, she dropped off the rain barrel that was as blue as the sky and slid back inside. Back into the fridge to get the hummus before setting the toast on the counter. Picking up the spreader again, she placed another dollop on the half-eaten piece. Then, on a whim, she turned to get a pinch of Himalayan salt from a wooden bowl by the stove. When she turned back to the counter the cat was tentatively licking the hummus. She nudged him with her elbow and delivered the salt, then added a shake of black pepper. While she put the hummus away, the cat sampled her toast again. He didn't like the pepper and jumped off the counter. She wondered if she would like the pepper.

Back outside on her too-blue rain barrel under the too-blue sky, she finished her toast. The cat was right—it was not as good. The pepper drew out a sort of bitterness from the chickpeas. The girl continued to swallow mouthfuls of coffee, each time considering the flavor. It did not improve—in fact it got worse—yet she began to get used to it. She noticed rings of foam on the inside of the earthenware mug and thought of how they marked the time that had passed as she sat drinking. It looked almost like layers in sedimentary rock, or the lauded evolutionary deposition of strata, full of history and time past. She thought of how they said they found fossils of humans deeper than fossils of fish and how there must have been an earthquake that flipped the whole thing upside down and got it all out of order. Perhaps it was more likely that everything had begun all at once and been buried alive all at once, just like the pandemic had begun all at once and the city had died all at once.

As she looked down, she noticed an older woman trudging across the sidewalk, laden with plastic grocery bags. The woman came every day, always with the same burden of grocery bags, and into the apartment across the street. She tasted the probably-burned coffee, still steaming. It tasted like a dark, malty beer, only hot. An alkaline flavor lingered in the back of her mouth like the base notes of an earthy perfume. She decided it was an experiential flavor, even if it was not delightful, and took another sip, dispersing the steam with a gentle breath through pursed lips.

The girl watched for the woman in the window of the apartment across the street. Every afternoon, she had watched through the window as the woman cooked a meal and carried the food away on a tray. She wasn't sure if the woman lived there, but she had seen another, very old woman watering a cactus by the window one morning. That was a while ago, though, back when the girl had

first moved in. Today, the woman made pasta and some kind of sauce. The girl could smell the garlic and cream of mushroom from across the street. She swilled another sip of coffee in her mouth.

The woman came out of the apartment across the street and passed by again on the sidewalk below, this time empty-handed. Her shoulders seemed weary, but the girl couldn't see her face. The woman plodded down the street away before getting into a car she had double-parked. The blinkers turned off after a few seconds, and the little silver Camry chugged to life and glided past the girl's window. The girl shook her head and took another sip of coffee. What kind of person goes grocery shopping, cooks without eating, and then leaves home again? What a waste of energy, what a waste of gas.

She swallowed the dregs of coffee and saw that there were grains of cardamum at the bottom. She had forgotten that she'd shaken some in that morning when it was brewing. Going inside, she set the mug in the sink without washing it—though it would have taken her a few seconds at most—and stepped into the tiny living room. The cat was playing with the tassel on a pillow. The girl decided she was too tired to go out for dinner, or even get dinner ordered in, and slumped down next to the cat. She fell asleep watching Netflix.

The next morning, the girl woke up in her bed when her phone alarm went off at 6:30 a.m. She must have moved from the couch in the middle of the night. She snoozed her alarm and was jolted awake exactly nine minutes later, feeling no more rested than she had nine minutes ago. The rain had been tapping against the windows during all night, and a chill had seeped into the apartment. She buried herself deeper in the duvet. The cat sauntered in, grumbling at her and hopping onto the bed. She kept her eyes closed and ignored him, but eventually he prowled toward her head and began attacking her hair.

“Valerian!” She swatted at him, and he made a funny noise in the back of his throat, halfway between a purr and a growl. “Ugh, you crazy boy—come here.” She scooped him into her arms and scratched his head between his ears. Through half-shuttered eyelids, she looked around the room. The grey light had a conniving feel to it. With all the willpower she could muster, she pulled herself out of bed and hastily changed into a casual business shirt, cardigan, elegant hoop earrings and a simple necklace, and pajama pants. She ducked into the bathroom to brush her teeth, wash her face, and whisk her reddish hair into an artful French twist, then slipped into cozy socks and slippers. She finished with tortoise-shell glasses that had been her mother's.

By now it was 6:59 and she knew she was going to be late for her meeting, but she shuffled into the kitchen and made an espresso anyway. Since the lockdown, the coffee had seemed to become as distasteful to her as the news, but she kept drinking it. It was what you did, it was what kept you moving throughout the day, in the little world of your apartment, isolated from the stimulus of the wind and the trees and the birds, and especially from the stimulus of human contact, and especially contact with strangers. Perhaps the world had forgotten how important those brief moments of connection are between two humans who don't know each other, smile once and never see each other again. How many

smiles have been stolen? She wondered. She didn't really, though, she was too busy sipping the coffee that now almost burned her lips. She licked her probably-burned lips and stepped into the living room.

In a corner was an IKEA desk she had bought off E-bay and had delivered to the apartment when she moved to the city a few months ago. She hadn't set foot outside, of course, except onto the fire escape to sit on the rain barrel and watch the woman with her too-many groceries. She was afraid to leave, of course, even though she'd heard that there was a 99.9% recovery rate from the virus. But she also remembered a phone conversation she'd had with her mother a few days ago.

"Rue, I don't want you leaving that apartment, even to get groceries!"

"What happened?"

"Didn't you hear? Did you see it on Facebook? Mrs. Lacey's friend's daughter just died from the virus, and she was thirty-five, and perfectly healthy."

"Oh! My goodness, was it sudden?"

"I mean she was sick for a few weeks and lost her taste and smell and then next thing she knew she was having trouble breathing, so they took her to the hospital, and she died last night."

Rue had shaken her head, unmoved by the tragedy but feeling vindicated in her fear (which she masked as caution) of the virus. She agreed with her mother—it was safer not to leave the apartment, even to get groceries.

It was 7:04 when she sat down in front of her laptop and logged onto the meeting. Everyone else was late, too, and she sat in the waiting room until 7:05. Her boss opened the meeting with pleasantries and then, because there were no donuts to socialize over or handshakes to spark conversation, they plunged into business. Rue took notes on statistics and graphs and quotas, and listened to the "office" gossip about the sedentary nature of the upper classes, how our bones are crumbling (with osteoporosis) before we are even dead. She sat in her chair, as she did every day until her advent to the couch in the evening and shook her head at this. Bones crumbling and no one doing anything about it. What a shame. Instead, they exchanged proposals about implementing solar energy in the office building no one used anymore. Rue gazed out the window at the rain, still feeling half-asleep, as she nodded along to the proposal.

At 8:00, the meeting took a coffee break. Rue turned off her camera with everyone else and paced to the kitchen, where she made another espresso, got a bowl of cereal, and fed the cat. She sat down at the IKEA desk with her cereal and coffee and scrolled through social media. She ordered more hand sanitizer—vanilla and cinnamon-scented—online from an ad she saw. They even had a pocket-size with a clip to attach to your purse. She clicked "buy now" and then scrolled back to the news, distributing her likes and hearts on posts she agreed with and ignoring the ones she didn't. Nine minutes later, she turned her camera on for the meeting, noticing the greyish light of the other boxes as they flickered on like opening eyes. She felt no more rested from her nine-minute break as she had before it began and didn't remember any of the things she had read on social media, though she had aggressively distributed a pixelated translation of her anemic passions through her "likes" and "hearts."

The rest of the day passed very much the same, in and out of meetings, making and microwaving coffee, eating snacks out of her fridge—but never a meal—and though she talked in the meetings, she didn't have a single conversation. Well, she texted her friends. She talked to her cat, Valerian. She thought about calling her mother but then decided against it, because that was always at least an hour-long conversation, and she just didn't have *time* for that today. *Maybe tomorrow*, she thought. At 4:59 pm, her last meeting logged off and she breathed deep for the first time in hours, stretching and hearing her bones crackle. She wondered if they were crumbling, like they had talked about in the meeting. She would have to call her mother about that and ask her what to do.

Gathering her scattered dishes and half-empty coffee mug, she went into the kitchen. It was still drizzling and was the same color as the grey dawn of the morning outside. She set the dishes into the sink and ran the water to heat it up, then turned to the microwave to perform her ritual of balancing and re-heating the coffee. Valerian traipsed in from some nook he'd been sleeping in and looked up at her with moon eyes. She picked him up and held him over her shoulder, sort of dancing as she rubbed his head. Out the window, she saw the little silver Camry pull up, just as it usually did. The yellow blinkers flicked on and seemed a warm, throbbing glow in the rain, like a heartbeat of light. The woman, wrapped in a yellow raincoat, got out of the car with her usual burden of groceries and walked below Rue on the sidewalk.

This time, though, she sort of slogged to a halt, as if she had gotten stuck in mud and couldn't walk any farther. Rue's eyebrows drew together, and the cat squirmed out of her arms, falling to the floor with a thud. The rivulets of rain on the window blurred her view, but Rue watched as the woman dropped her groceries and pulled a fist to her chest, as if to steady herself. Rue was inches away from the window, now, and her breath fogged the glass. When she had cleared the window with her fist, the woman was face down on the sidewalk, not moving, her yellow raincoat making her look like a plastic wrapper forgotten on the street. The sink water running behind her rushed in her ears. Rue's heart was pounding. The microwave beeped but she didn't hear it. Her eyes were on the grocery-woman. *What should I do? Should I call 911? I don't know what I would say! Should I go down and help her? But no, I can't leave the apartment, I might catch the virus. But if I wear my mask, I might be safe and it would only be for a few minutes anyway. But it's raining and it's so cold outside. Maybe someone else will help her—what could I do anyway? I don't know what to do. Maybe I should call 911, I don't know, I don't know!* Rue covered her mouth with her hand and stood shaking, screaming inside. Her gaze darted around the apartment, looking for her phone. She saw it on the counter under the microwave and stumbled across the kitchen. Picking it up with shaking hands she fumbled with her password and opened Instagram out of habit before she remembered she needed her phone to just be a phone. But when she saw the numbers on the number pad staring up at her, she could not bring herself to press the 9. *I should go down there. What good can I do up here? I should go down there and do something!* She glanced at the door, then back at the woman. She scrubbed her face with one hand and pressed

the 9, then the 1, 1.

A woman's voice crackled steadily from the other end, "911, what's your emergency?"

Rue gripped her hair with one hand and stifled a sob as she stared down at the woman prone on the streets of New York City. "I—I um—there is a woman who just passed out on the sidewalk."

"Ok, please stay calm. Where are you located?"

Rue told the woman on the other line her address and phone number.

"We are sending an ambulance to you shortly. Is there anything being done for the woman? Have you tried waking her up?"

Rue shook her head as she stared at the woman's yellow coat through her window. "No, I—"

"Can you try shaking her shoulder and trying to get her to open her eyes or groan?"

"I—" Rue stared at the door. Then back down at the woman. She didn't answer.

"Hello? Ma'am?"

The blinkers from the silver Camry seemed to be flashing slower and slower and the raindrops running down the window made Rue feel dizzy.

"Hello? Ma'am, can you hear me?"

Rue felt paralyzed. She clutched the phone to her ear and her hair in her hand and stared through wide eyes at the woman's still figure on the street below her.

"Hello?"

The call went dead.

Suddenly, she saw movement below her—a mailman ran toward the woman, throwing his bag off his shoulder, knelt by her side, then pulled out his phone. He turned the woman onto her back and unbuttoned her coat and shirt. Rue stood transfixed as he began pumping her chest with two interlocked hands, and the blinkers washed them in pulses of yellowish light, and the world was grey and the woman's masked face was white. She saw as the mailman took off the woman's mask and bent over her face, tilting her head back and breathing into her. Her chest rose and fell, but Rue felt to her crumbling bones that the woman was not breathing.

Rue watched, but she did not move, and the rain came down harder, and the mailman cried into the empty street, but no one came. She almost did, but she was afraid.

She thought she heard the microwave beep again, but then realized it was sirens, and then blue and red lights glimmered across the woman's yellow raincoat and the scattered groceries and the mailman's back. The medics brought a defibrillator and Rue jumped when the woman's body jolted on the street below her. The mailman did not leave her side but kept pumping her chest with his two clenched hands, earth-brown against her white skin. The medics had pulled out tubing and medicine and soon the street was filled with bags and plastic wrappers and the woman's groceries, and the mailman's bag of mail.

More red and blue lights reflected across the soaked street as the police arrived. They knelt on the glistening pavement next to the medics. Rue watched as one of the medics put a hand on the mailman's shoulder. It took them a couple tries to get him to stop. They sat in the rain. The woman lay there in the street, still as the sidewalk stones beneath her. And Rue stood rooted to her dry, warm linoleum floor and slowly her tears blurred the whole scene from her mind. She lowered her phone from her face and slowly uncurled her clenched fingers until it dropped to the floor. She covered her face with both hands and turned away from the window. Shaking, she fell to the floor and curled her knees under her, and she sobbed. After a few minutes she heard the sirens again and stumbled to the window. The ambulance pulled past below her and turned at the end of the block. The Camry was still there, the blinkers washing the near-dark street in yellow... yellow...yellow.

The phone buzzed. Rue watched her mother's name flash across the screen. It fell still, flashing dark. It buzzed again. Rue walked across the lines of the linoleum to the microwave, pulled out her coffee, and poured it down the drain. She did not pick up the phone. She washed the dishes. She put the broken magnet back on the refrigerator. She looked for her raincoat and boots and found them in an unopened cardboard moving box. She unbolted her door, stepped into the hall, and breathed in the dank, mossy smell. She walked down the stairs and stood in front of the wooden door in the foyer of the apartment. The floor beneath her was tiny black and white tiles. The last of the grey daylight shone through the half-moon of the window above the door. She raised her hand and pulled the brass knob toward her, stepping onto the sidewalk. Outside, she stood with her eyes closed, feeling the stimulus of the wind and the rain and the sound of the trees blowing, hoping for the stimulus of human contact. Especially the smile of a stranger. Her face naked in the soft drizzle, she breathed deeper than she had in months and wondered if by her breathing the city might start breathing, too, and wake up, like the woman should have. She wished she had passed her in the street, known her name, seen her eyes—her smile. It was too late now. Maybe tomorrow. Rue started walking into the night as if to go in search of the morning...

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## Cancer Immunotherapy

Ryan Murphy

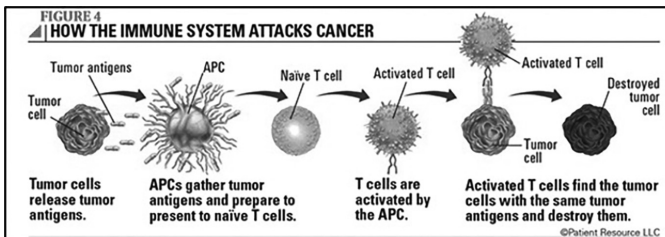
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### The immune system's interaction with cancerous cells:

Cancer cells are considered transposed- that is, they went through some change that facilitates a loss of cell cycle control that allows them to multiply at a massive, uncontrolled rate. Cancerous cells do not follow the normal cell formation process and can quickly form tumors that can grow into healthy tissue or organs, creating malignant tumors that can spread to other parts of the body through metastasis. Different forms of cancers are a result of various factors: Genetic predisposition, carcinogens like chemicals found in cigarettes or UV light, lifestyle, and viruses.

The immune system can detect and eliminate malignant cells during “immune surveillance”(Rouzbahani 2018). When they are transposed, neoplastic cells (those that compose a tumor- a neoplasm) also produce foreign neo-antigens (protein tags on the tumor surface) that should render them detectable by the immune system's antibodies(Rouzbahani 2018). However, cancer cells manage to evade and suppress immune recognition, allowing a tumor to strengthen its roots and multiply. Tumors develop multiple resistance mechanisms to escape the radar of the immune system's antibodies.

Cancer immunotherapy has taken a strong grip and further research has conveyed great prospects for the success of defeating certain cancers. Cancer immunotherapy aids the immune system in recognizing cancer cells and bolsters its response in eliminating tumors(Cance 2019). Chimeric Antigen Receptor T-cell therapy, Checkpoint inhibitors, Monoclonal Antibodies, and Oncolytic Viruses, among others, are immunotherapies that are relatively well studied to produce durable responses to cancer treatment.



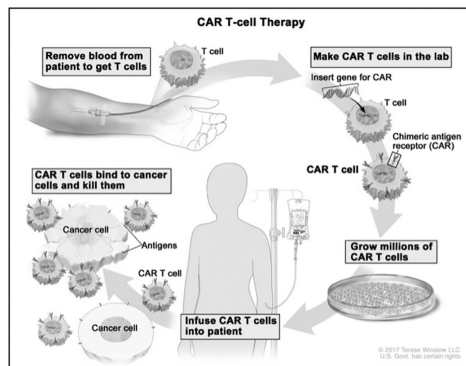
Note: From *Understanding the Immune system*

(<https://www.sitcancer.org/clinician/resources/melanoma/immune-system>)



## Chimeric Antigen Receptor T-cell therapy: a “living drug”:

In 1960, T cells were shown to protect mice from cancer by researchers Eva and George Klein, and the field of cancer immunotherapy originated (June et al. 2018). Chimeric Antigen Receptor T-cells (CAR T-cells) are T cells, which are called the workhorses of the immune system because of their critical role in orchestrating the immune response and killing cells infected by pathogens, which are extracted from a cancer patient’s blood and genetically engineered by the insertion of DNA from inactive viruses into the T cells genome that cause them to produce CAR receptors(LaRussa 2015). CAR receptors allow the T cells to recognize antigens on specified tumors. After many CAR T cells are produced in a lab, they are infused back into a patient’s blood. Each CAR T cell can destroy cancer cells at a rate much greater than 1:1 making them extremely effective at wiping out tumors(LaRussa 2015). Significantly, CAR T cells promote immune surveillance to prevent tumor recurrence(June et al. 2018). Therefore, CAR T cells bolster both adaptive immunity, which is the active immunity that lasts throughout a person’s life, and innate immunity which is the body’s natural ability to stage an immune response. In terms of efficacy, several large studies have reported CAR T cell therapy facilitated a 70-93% complete remission rate in patients(June et al. 2018). Although the field is still young and results have been relatively a periodic in terms of success across cancer types, the general premise of designing and enhancing T cells to have specific functions holds massive implications for further cancer treatments involving synthetic biology and genetic engineering.

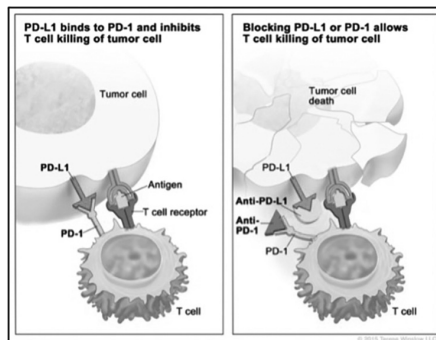


*Note.* From *Chimeric Antigen Receptor(CAR) T-Cell Therapy*, A. LaRussa, 2015 (<https://www.lls.org/treatment/types-of-treatment/immunotherapy/chimeric-antigen-receptor-car-t-cell-therapy>)

[A video explaining CAR T cell therapy from Carl June, MD, a cancer researcher at the University of Pennsylvania is available at; <https://youtu.be/7qWvVcBZzRg>]

### Checkpoint inhibitors:

Tumors evade recognition, in addition, when recognized, they can suppress immunological response. The progression of a productive immune response requires that a number of immunological checkpoints be passed. T cells have specific checkpoint proteins that, when bound to certain molecules, provide additional excitatory costimulatory activity for progression of immune priming or activation, or inhibitory effects on immune response (Korman et al. 2006). These mechanisms exist to avoid over-activity of T cells and subsequent destructive autoimmune response on self-antigens (those on one's own cells) (Korman et al. 2006). Other than characteristic antigens, some tumors produce proteins on their surface which bind to T cell check point proteins and "turn off", preventing the immune system from destroying cancer cells, effectively warding off the immune system. In response to this phenomenon, doctors provide specific drugs that bind to corresponding checkpoint proteins on T cells to prevent the inhibitory effect corresponding tumor proteins would have on immune response, like an inhibitor binding to the active site of an enzyme preventing the substrate from binding (Immune Checkpoint Inhibitors 2020). Ultimately, this allows the T cells to drive a prolonged immune response towards tumor destruction. Checkpoint inhibitors are imperative for treating certain cancer types using immunotherapies for their facilitation of a robust, uninhibited immune response. Clinical studies, although they are in their infancy, have shown that checkpoint inhibition when paired with other therapeutic interventions produced exciting responses in patients with advanced stage cancers (Korman et al. 2020).

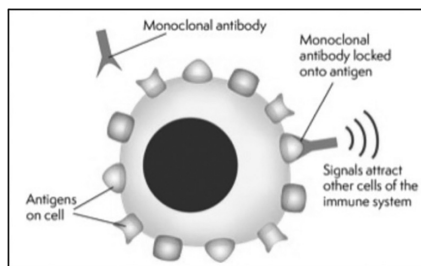


*Note.* From *Immune Checkpoint Inhibitors*, 2020  
<https://www.cancer.gov/about-cancer/treatment/types/immunotherapy/checkpoint-inhibitors>

### Monoclonal antibodies:

Antibodies are a tool of the immune system for eliminating damaged or abnormal cells, such as cancer cells. An antibody attaches itself to antigens on the surface of a problematic cell, serving as a red flag to attract disease fighting molecules, or to trigger cell destruction by other immune processes (Scott et al. 2012). Monoclonal antibodies are produced in a laboratory and engineered to serve as substitute antibodies that restore or enhance the immune system's attack

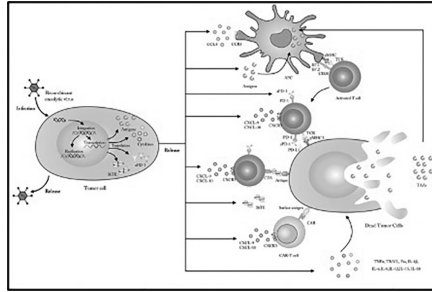
on cancer cells(Scott et al. 2012). To develop a potential therapeutic monoclonal antibody, scientists must first identify target antigens expressed in tumors to engineer antibody-antigen specificity(Pruthi 2019). When introduced to a patient with a specific tumor type, monoclonal antibodies have a myriad of mechanisms by which they halt tumor growth, including directly destroying cancer cells, flagging cancer cells for attack, and preventing blood vessel growth to cancerous tumors, hindering certain tumors from receiving nutrients. Furthermore, because of their ability to target and bind to cancer cells. Monoclonal antibodies are used for the precise delivery of radiation treatment, chemotherapy, as well as certain immune cells to combat tumor growth(Scott et al. 2012). Ultimately, monoclonal antibody based treatment of cancer has been established as one of the most successful therapeutic strategies in the last 20 years and its success is built on decades of scientific research aimed at the interplay between the immune system and cancer cells(Pruthi 2019).



*Note.* From *Monoclonal Antibodies in Cancer Therapy*, Scott, A, 2012 (<https://jhoonline.biomedcentral.com/articles/10.1186/s13045-020-00922-1>)

### **Oncolytic(tumor selective) Viruses:**

An oncolytic virus infects and breaks down cancer cells, but not normal cells(Lippman et al. 2020). Naturally occurring viruses can be genetically engineered in a laboratory to have advantageous properties that allow them to kill cancer cells, and avoid healthy cells, producing oncolytic viruses that are harnessed for cancer treatment. Once produced for a specific tumor type, these viruses can be introduced to tumors and infect them. After infection, these oncolytic viruses can cause cancer cells to “burst”—killing the cancer cells and releasing cancer antigens. These antigens can then stimulate immune responses that can seek out and eliminate any remaining tumor cells nearby, and potentially anywhere else in the body(Bell 2020). Scientists have utilized several different viruses for cancer therapy. Although the prospects of oncolytic virus efficacy are positive as preclinical data for oncolytic viruses is impressive and clinical data have shown efficacy, more potent treatment strategies are needed to achieve long-term tumor control in patients(Lippman et al. 2020). Nonetheless, the foundation is set for more impactful research to build on the understanding of oncolytic viruses.



Note. From *Oncolytic Viruses For Cancer Immunotherapy*, E. Lippman, 1970 (<https://jhoonline.biomedcentral.com/articles/10.1186/s13045-020-00922-1>)

### Conclusion:

Ultimately, by harnessing the body’s natural immune response, the medical world has seen positive results in cancer patients in terms of remission and its durability. Cancer immunotherapy is ever blossoming into greater and more effective treatments, but it is still young, and further research must be done to make treatments more reliable.

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## Mirror Mirror on the Wall

Matthew Burger

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In reading Charlotte Perkins Gilman's short story "The Yellow Wallpaper," we learn of the protagonist, Jane, whilst we see her mental condition rapidly deteriorate. This deterioration becomes clearer to the readers as we gain further knowledge from the story in regard to her current living situation. Jane has been restricted to bedrest in an old nurse's room inside of the summer house leased by her physician husband, John, because of what we would now call postpartum depression, but in the story, is repeatedly referred to by John as "nervousness" (Gilman 649). Apparently, this was a fairly common practice amongst physicians at the time. By using the psychoanalytic theories of Jacques Lacan, particularly his mirror stage theory, we can further examine the psychological condition of the protagonist.

Lacan's theory of the mirror stage occurs "somewhere between six and eighteen months of age, [and is when] the baby sees its own reflection and begins to perceive a state of separation between itself and the surrounding world..." (*Psychological Criticism* 20-21). The first instance where we can use this theory to further examine Jane's psychological condition is when, she sees a woman trapped in the yellow wallpaper which lines the walls of her room. This can be seen when Jane says, "There are things in that paper that nobody knows but me, or ever will. Behind that outside pattern the dim shapes get clearer every day. It is always the same shape, only very numerous. And it is like a woman stooping down and creeping about behind that pattern" (652). Clearly Jane is seeing a reflection of herself, which as we know, is indicative of Lacan's aforementioned theory. This becomes increasingly clearer when we see Jane refer to the things within the wallpaper that nobody will ever know of but her. What Jane is referring to is her "other", which is developed during the mirror stage, and according to Lacan, "is always manufactured by the mistaken acceptance of an external image for an internal identity" (21). With that said, we know for a fact that Jane is experiencing a stage which Lacan claims occurs at a very young age; it is therefore indicative of her experiencing a reverse Lacanian development. To best define a reverse Lacanian development, we can first examine the situation which sparked this to occur. As we know, Jane is experiencing what we would now call postpartum depression but was consistently referred to as "nervousness" by her husband (649). To try to cure this, patients in the 19th century were prescribed strict bedrest, which we now know would only deepen the postpartum depression because, getting out and doing activities or socializing are some of the best natural ways to offset the side effects of any kind of depression. Thus, common sense tells us that, committing someone to strict bedrest would only worsen their psychological condition, and in some cases,

like Jane's, lead to a psychotic episode. The psychotic episode that we see Jane experience, results in her mentally transitioning backwards into the psychological state of a toddler. As we know, this is due to the fact that we see Jane experiencing Lacan's mirror stage again as an adult. With that said, the backwards transition into Lacan's mirror stage, a stage which one experiences as a toddler, is how we can best define a reverse Lacanian development. Having defined this key term, we can move towards discussing two additional instances within Gilman's short story, where Lacan's mirror stage theory can be used to further examine Jane's psychological condition.

As Jane's becomes more obsessed with the wallpaper, we see her come to the conclusion that the figure she sees on the wall, is in fact that of a woman. In Lacan's terms, the reason for this is that Jane is manufacturing and mistaking the image of the woman on the wall as herself. We see this when Jane says, "I didn't realize for a long time what the thing was that showed behind, that dim sub-pattern, but now I am quite sure it is a woman. By daylight she is subdued, quiet. I fancy it is the pattern that keeps her so still. It is so puzzling. It keeps me quiet by the hour" (653). The woman Jane sees here can again be expanded upon based on Lacan's mirror stage theory. That woman is better known as Jane's 'other,' due to the fact that the image, in this case of a woman, "is not the actual self, only an image outside of the self" (21). Jane is essentially saying that the woman she sees on the wall mirrors herself. We see this best when Jane says that the woman is subdued by the daylight, much like herself. An instance similar to this can be seen later on in the text when Jane says, ". . . in the very bright spots she keeps still, and in the very shady spots she just takes hold of the bars and shakes them hard. And she is all the time trying to climb through. But nobody could climb through that pattern - it strangles so..." (654). In this instance, the actions taken by the woman on the wall mirror Jane's current struggles and feelings, in that she feels trapped in her room much like the woman she sees on the wall trapped behind bars.

Having gained further insight into Jane's life and psychological state, we gain similar insight into many other women's sufferings, at the time of Gilman's writing of this story. That being said, one may wonder how those other women fared.

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## *The Virtue of Solitude*

Jack Fridman

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“To one man, solitude is the flight of the sick one; to another, it is the flight from the sick ones” (Nietzsche 148). This quote by renowned philosopher Friedrich Nietzsche from his book *Thus Spoke Zarathustra* on the idea of loneliness is not applicable to everyone. However, many do see virtue in a statement such as this as self-isolation from the masses of society, one that resides as an aspect of their lives. A prime example of such a person would be Mr. James Duffy, the main character in James Joyce’s short story “A Painful Case.” Mr. Duffy’s attitude towards lonesomeness fluctuates throughout the story as he undergoes experiences which one can deduce are fairly new to him, and as a result, a concise understanding of Mr. Duffy’s psychological interpretation of solidarity becomes clear with the ending. Mr. Duffy’s psychological motivation for his solitude demonstrates the idea, with the help of literary devices such as mood and diction, that it is his own emotional state that constrains him to this never ending loneliness.

The beginning of the story repetitively establishes Duffy’s animosity towards social interactions and other people in general. This begins with the very first sentence of the story as Joyce writes, “. . . he wished to live as far as possible from the city of which he was a citizen and because he found all the other suburbs of Dublin mean, modern and pretentious” (1). This statement emphasizes the hatred of people and society that Duffy feels right from the get go. This introduction sets the mood for the story as a bitter and skeptical feeling arises towards just about everyone else in Duffy’s life. The reader then continues to learn about Duffy as a person with the quote, “Mr. Duffy abhorred anything which betokened physical or mental disorder. A medieval doctor would have called him saturnine” (Joyce 1). This statement expresses the same attitude of bitterness in Duffy’s life with a new example explaining how he even resents those who are handicapped to disorders that are out of their own control. This sense of antagonism towards his life and all those in it again explains his prolonged solidarity as a “saturnine” or gloomy person. The word choice in this statement must be noted as it perpetuates the way in which Joyce wants the reader to perceive Duffy as he continues to set this gruesome mood. At this point, merely a page into the story, it seems as though there is zero light in Duffy’s life, as Joyce writes “His liking for Mozart’s music brought him sometimes to an opera or a concert: these were the only dissipations of his life” (2). While a taste of compassion in Duffy’s life arises with this quote, the word choice still overshadows this feeling. The first portion of the story is therefore filled with descriptions of Duffy which set a sour mood to the story



through the use of distinct word choice.

Despite being portrayed at the beginning of the story as a depressed, lonesome man, Mr. Duffy's life seemingly begins to turn around soon. It is when he meets Mrs. Sinico by chance on a number of occasions that a genuine interest becomes evident in his life, quite possibly for the first time ever (Joyce 2-3). He even moves forward to ask her on a date despite her already being married to another man. A sense of boldness and charisma now emerges in light of the contentious attitude that is first seen in the behavior of Duffy, and it seems as though he may be a changed man, at least in the way that he perceives himself. He continues to even open himself up to her as the narrator states, "Little by little he entangled his thoughts with hers. He lent her books, provided her with ideas, shared his intellectual life with her" (3). With this statement, Joyce portrays the breakthrough that Duffy has in becoming an extrovert with this woman after always being an introvert. By sharing his thoughts and interests with Mrs. Sinico, Duffy's life starts to finally become filled with a hopeful mood, but this mood is still plagued with his acrimony towards the rest of society. This is seen as Mrs. Sinico suggests that he publicizes his intelligent thoughts to which he replies the following:

For what,' he asked her, with careful scorn. 'To compete with phrase mongers, incapable of thinking consecutively for sixty seconds? To submit himself to the criticisms of an obtuse middle class which entrusted its morality to policemen and its fine arts to impresarios?' (3-4)

Again, a strong choice of words foreshadows the idea that this malice will never fully dissipate from Duffy's life. Regardless of this, the mood remains warm figuratively, but the darkness still remains within Duffy in a figurative and literal manner as well. At this point in the story, the warmth of the relationship begins to merge with the darkness that Duffy is so used to, which causes the reader to potentially interpret the foreshadowing of a conflict in the near future of this affair. The narrator observes that "Many times she allowed the dark to fall upon them, refraining from lighting the lamp. The dark discreet room, their isolation, the music that still vibrated in their ears united them" (4). Again, the contrasting word choices in that statement add to the mood of the story as well as the psychological state of Duffy in the moment. Therefore, the mood of the story has seemingly brightened up, but the darkness of Duffy's life also seems to be inescapable.

As Mr. Duffy begins to see light, it does in fact fall back into the lonely world that it is so accustomed to. Following some time together, the relationship between James Duffy and Mrs. Sinico crumbles. This separation does not occur at the ferocity of a fight as most do, however. Rather, the narrator clarifies the situation: "The end of these discourses was that one night during which she had shown every sign of unusual excitement, Mrs. Sinico caught up his hand passionately and pressed it to her cheek" (4). Being the introvert that he is, Mr. Duffy takes this gift of affection with overwhelming discomfort, and with this, his love story and the first signs of humanity seen within him die away. Thus, the mood again shifts into this gruesome state as Mr. Duffy is as lonely as ever. It

is years later that he reads an article in the daily newspaper describing the death of Mrs. Sinico by train. This news, coming to Duffy as a shock, was followed by statements by his ex-mistress's husband and daughter. These statements signified that Mrs. Duffy became "rather intemperate in her habits" and succumbed to a drinking problem over the previous couple of years (6). Duffy first took it as a personal embarrassment to ever be involved with someone who is seemingly such a wretch. He even thought to himself, "Not merely had she degraded herself; she had degraded him" (7). By reacting in this way, it is evident that the selfish, lonesome Mr. Duffy refuses to accept the death of a person whom he truly once felt affection for because it is in his nature to be lonely. After soaking in all this information, he continues to think of what this all means when the sound of a passing train filled his ears. The train passed "but still he heard in his ears the laborious drone of the engine reiterating the syllables of her name" (7). Once tunneling out this emphatic train engine screaming the name of Mrs. Sinico, Mr. Duffy, according to the narrator, ". . . could hear nothing: the night was perfectly silent. He listened again: perfectly silent. He felt that he was alone" (8). The silence was perfect. In other words, he belongs in silence regardless of how much he wants to escape it because that is his psychological motivation. The idea of not being alone torments him more than being in solitude. The story ends in a gruesome mood once again, and Mr. Duffy is as lonely as ever.

It is the psychological motivation to be miserable at his own expense that James Duffy inevitably chooses as followed by the sour mood that he carries with him throughout the story, even in the brighter moments. The wordplay mentioned early in the story reemerges as the darkness exists not just within Mr. Duffy, but as an irreplaceable part of his entire life. One may argue that Mr. Duffy has every right to be happy if he chooses to and that he is not stranded in this life of misery. This may be true in that it is his choice if he wishes to be living in this way, but this life of misery is more pleasing to him due to his emotional state as seen with his brief moments of happiness only causing more misery in his life. He is psychologically incapable of experiencing the joys of social interaction in the same capacity that others do, and rather it is his solitude which allows him to enjoy himself. Therefore, Mr. James Duffy sees himself as someone who flees from the sick ones, as Friedrich Nietzsche put it.

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## From This Day Forward

Christian Vera

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In *To Have and To Hold*, an image taken by Jean Christian Bourcart, we are brought into the wedding day of a couple. In this image, Bourcart makes use of many semiotic and artistic elements, such as use of foreground and light. Both of these elements serve to highlight the idea that marriage is not an equal union between husband and wife.

The first thing I noticed about this image was the positioning between the husband and wife. It does not resemble a traditional wedding photo because Bourcart places the husband in the foreground and places the wife in the background. To make this pose work, Bourcart moves the wife further from the camera, making the wife smaller than the husband, both literally and figuratively. As we can see, the husband appears to be holding his wife in his outstretched hands. This implies that Bourcart feels women are being held or carried by the man in a marriage because they are not the breadwinner of the family. Figuratively speaking, the wife is made smaller or lesser by presumably losing her last name. That is because it is common in most marriages that the wife takes the name of the husband. Also, something to note is how far away the wife is. She is so far in the background that we cannot see her face. It is indistinguishable, which means her identity doesn't matter. The groom's face is clear enough to notice that he is looking at her. However, the couple is not making eye contact in this image, which is also strange for a wedding photo.

The next element that Bourcart includes in the image is light. When I first looked at this image, I noticed a difference between the shadows of the

couple. There is a visible shadow under the husband, meaning that the light is shining on him, so his shadow can appear. However, when I look at the wife, she casts no shadow. This does not happen by accident. All objects made of matter cast a shadow when light shines on it. The wife does not cast a shadow. Does she not consist of matter? Is she too small to matter? Does she not matter to him? These are all questions that a wife has, or will have in marriage. Bourcart also implements the absence of light to signify that the wife is in the dark. Bourcart does this to illustrate how the wife is at times overlooked and underappreciated in marriage. Even though she might have a career, the odds are that she will still do most of the work, such as caring for children, her husband, maintaining the home, and other “wifely duties,” while the husband gets the focus or light because the demands of his career will be privileged over hers.

Finally, the title itself references the exchange of vows that occurs at the wedding ceremony. In fact it’s a play on words of the vows that happen during the wedding ceremony. During this part of the ceremony, the couple expresses their love for one another. For some, this is their favorite part of the wedding. But in the image, no love is seen between the couple. Or is it because she knows that this is the beginning of the end for her?

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## Bringing Attention to the Struggles Women Face

Sean Therrien

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Women have come a long way in such a short time. Over the years, it has been a constant struggle for women to be seen as equals and earn the same rights that men have, some rights still not being granted to them today. Many things can be attributed to the huge steps taken on behalf of women in the last two centuries. One large contributor to the aid of women's issues has been literature, where many stories have not so subtly showcased the mistreatment of women and the struggles they face every day. In "The Story of an Hour" by Kate Chopin, the theme of women's issues are addressed through the use of symbolism, irony, and personification in explaining the momentary freedom Louise Mallard feels after hearing the news of her husband's death.

The symbolism in the story comes from the main character's name. In the beginning of the story, she is only referred to as Mrs. Mallard. This may seem insignificant to the reader but the meaning behind it is further proof of how she felt shackled by her husband. The name of Mrs. Mallard symbolizes how she is seen as nothing more than her husband's property. As she starts to think of how she will live her life without her husband, she is overcome with the feeling of freedom, even letting the words "free, free, free!" (Chopin 46) escape from under her breath. While her husband didn't seem to mistreat her, Mrs. Mallard still felt trapped being married to him, which goes to show how women in 1894 felt when the story was written. It was frowned upon for a woman to dream of doing anything other than assisting her husband. When Mrs. Mallard's name changes to Louise, it symbolizes her realization that she can be her own person again, not just an extension of her husband. The change between Mrs. Mallard, a devoted wife who does what her husband tells her to and Louise, a woman who sees limitless possibilities for her future, reinforces the theme of women's issues by giving an example of a woman whose potential can't be expressed due to the way society viewed women at the time.

Irony is another tool used by Chopin to show the flurry of emotions Louise Mallard feels once she is told her husband has died. At first, she feels sad and grieves for her husband, seemingly feeling lost and scared. It is not until she is alone, however, that the reader realizes that she feels a great burden lifted off of her. The narrator states that "She saw beyond that bitter moment a long procession of years to come that would belong to her absolutely. And she opened and spread her arms out to them in welcome" (46). The situational irony in the joy that Louise feels is another example of the oppression women faced from their husbands. The joy she feels from her husband's death is not a wife's normal reaction to hearing

that kind of news. That reaction would not be uncommon, however, for someone hearing the news that they are no longer being oppressed. And while her husband didn't seem to mean to put her through this type of subjection, as it was the normal way that husbands treated their wives at the time, it shows the inequality and subjugation that women faced in their everyday lives, conditions that they had to live with for so many years.

Personification is used to exemplify how women had to hide their true feelings during the time the story was written. Freedom of expression is another thing that wasn't given to women at the time of this story's conception; it was frowned upon and seen as "acting out." However, when Louise is alone in her room, the reader learns that "a little whispered word escaped her slightly parted lips" (46). The words in this sentence are personified because words cannot escape from anywhere. This sentence thus shows how Louise wishes to keep her true feelings at bay, even while she is alone. Yet, despite her best efforts, the words end up "escaping" and reveal those feelings of newfound freedom as a result of her husband's death. Although this is how Louise truly feels, the way her words are personified shows the guilt she feels for wanting to act on her own.

Chopin does an excellent job of subtly addressing the issues that 19th-century women faced in "The Story of an Hour." Women's inability to live as their own person and have their own thoughts is something that has been remedied over the last century, thanks in part to the work of many great writers who wanted to spark change. The theme of women's issues is something that should continue to be covered until women no longer feel oppressed and fearful to be themselves.

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