omnium

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THE NORTH CAROLINA WESLEYAN INTERDISCIPLINARY WRITING COMPETITION

The NCWC Writing Center, Writing Minor, and Sigma Tau Delta invite all North Carolina Wesleyan students to submit up to two writing projects completed for classes at NCWC to our annual Interdisciplinary Writing Competition.

You may submit papers to different categories, including categories outside of your major. You do not have to have written the paper this year.

Competition winners will receive a cash prize and be published online in Omnium, our undergraduate research journal.

We strongly encourage revising before submitting to ensure that your work meets the competition submission guidelines.

Submission Guidelines

To help with the judging and publication process, please make sure that your submissions follow these guidelines:

- Submissions must be your own work.
- Submissions must have been submitted to a class at NCWC for a grade. Major papers only.
- All work must be submitted as a .doc or .docx Word file.
- Any outside material (books, articles, etc.) used must be cited correctly in the citation style dictated by the field of study (MLA, APA, CSE, Chicago, etc.).
- Writing should conform to correct academic grammar and spelling unless the use of dialects, etc. is an explicit goal.

If your work wins, but does not strictly follow these guidelines, you will be asked to revise before the Omnium editors will publish your work. In extreme cases, such as plagiarism, your work will be disqualified.

Call for Spring 2020 Submissions

We are now accepting submissions for the 2020 Interdisciplinary Writing Competition. Entries must be received by 9 PM April 3, 2020. Winners will be announced on Spring 2020 Reading Day.

Click this link to begin the submission process: IWC Submission Form

EDITORS' NOTE

WELCOME

to the first issue of *Omnium*, the Undergraduate Research Journal at North Carolina Wesleyan College. *Omnium* is a collaboration between the Writing Program and the Writing Center at NC Wesleyan, providing our undergraduate students with the opportunity to explore the major genres of academic writing, join in scholarly conversations, share their ideas, perform original research, and see their work published in a professional venue. What is more, *Omnium* serves as a teaching resource for NC Wesleyan faculty—and faculty at other institutions—as the essays and research articles published here reflect the skill and knowledge of real-life students across various stages of their academic careers, from first-year composition essays to projects created in senior seminars. The materials assembled lend themselves well to in-class discussion, analysis, and emulation, and we hope that students will be energized when they realize that there isn't a single arcane secret to writing well—all it takes is practice, motivation, and direction.

The lineup of essays before you is a result of the first Interdisciplinary Writing Competition held at North Carolina Wesleyan College in the Spring semester of 2019. We, the editors of *Omnium*, invited students from all areas of our College—from every academic major and field—to submit their best work written in the academic year 2018-19. More than ten percent of our student body responded to our call, and,

along with the generous support of more than a dozen faculty readers who reviewed papers in their own professional disciplines, we selected the best three essays in each of our five categories, following the structure of our College's division of subjects.

- First-Year Composition,
- Humanities,
- Social Sciences & Education,
- Business & Computer Information Sciences,
- Natural Sciences & Mathematics.

We look forward to establishing the Interdisciplinary Writing Competition as an annual tradition at NC Wesleyan and to selecting a new batch of extraordinary student writing for our next issue.

Please find our Call for Papers for the 2020 issue at https://omniummedia.wordpress.com/submit-to-omnium-2020 or in the first verso page of the 2019 *Omnium* issue.

We hope you enjoy reading and working with these pieces as much as we enjoyed putting them together.

The *Omnium* Editors,
Doreen Thierauf
Keely Mohon-Doyle
Julie Perino
Assistant Professors of English,
North Carolina Wesleyan College

North Carolina **wesleyan**

CONTENTS

FIRST YEAR COMPOSITION

JENNA DAVIS

DEATH OF A PARENT: WHAT HAPPENS NOW?

Losing a parent at any age can be a one of the toughest situations you can ever go through. Losing a parent while you are still very young can be traumatic. Being that my father died when I was only eleven years old, I was hurt, dazed, lost, and sometimes quite angry. How dare God take my father away from me is what I would think on a daily basis for weeks. How dare my father leave me alone here, stuck in this cruel world? I slowly began to notice that the way I thought and acted was starting to change in a very unhealthy way. That got me thinking. Could I have turned into a completely different person because my father died? Are there any negative side effects that I hadn't thought about before? I was curious to know if this happened to other kids around my age. Did their demeanor change? Did anything permanent happen to them? I also wanted to know if there were any long-term effects. How are children affected by the death of a parent? Can the death of a parent lead to declining health? Are there any psychological effects due to the loss of a parent? If there are psychological effects, what are they? That's where I wanted to start my research.

From my own prior experience, I knew that the death of loved one can take a serious toll on someone, specifically if that loved one was a primary caregiver and loving parent. That toll can lead to even bigger issues. This is what I refer to as the psychological effects. It can affect the physical, mental, and emotional states of a person. The transition from having your parent physically present to them not being there at all can affect one, if not all three of these areas. The morning that I found out my father had passed away, I felt sick to my stomach. I did not want to eat or drink anything for days, maybe even weeks. I couldn't care less about how long I went without feeding myself or properly taking care of myself at the time. Eventually, I got so sick that I started to look malnourished. I could not move my lips to speak. I could not raise my head to look at anyone. I stood frozen as if paralysis had just struck my spine. All I could do was cry for weeks. I shut myself out from the world, or at least tried to until my mother made me open the doors. I would go from angry to crying to depressed to anxious all within the same hour. That was my physical, mental, and emotional health being negatively affected by the event that had occurred.,

My effects were mild considering how bad they get for some people. Many adults who suffered parental death as an adolescent or younger develop psychological disorders. Some may develop bipolar disorder, anxiety disorders, trauma and stress related disorders, dissociative disorders, somatic related disorders, and eating disorders. This can only be expected when something so agonizing happens in one's life. Some people die from a broken heart because their parent or parents are no longer among the living. Some take their own life because of stress and pressure. People often make themselves outcasts to cope with the pain they feel. They will blame each and every person in their lives, hoping to get some kind of answer. Some will blame themselves for what

Photo by Pixabay

happened, even if their parent's death had nothing to do with outside factors.

Most of these disorders are defensive coping mechanisms. This means that the disorder is their way of coping without involving others. Personally, the stress from the trauma made me question my religion and from what I was told, that was relatively normal. The person I blamed for my father's death was God. Then I took the blame that I had bestowed on God and put it on myself. If only I had been there maybe he would still be alive today. I do not know what I could have done that I had not already attempted, but I would have done anything to keep him here. In no way is this healthy. Putting blame on yourself for someone's death, especially if you had nothing to do with their passing, is what leads some people to commit suicide.

Not all people are blessed or lucky enough to have both parents survive until their adult years. According to Dr. Elizabeth Weller, the director of Ohio State University Hospitals who contributed to the studies of facts and statistics of grief, "1.2 million children will lose a parent to death before age 15" (Weller). Losing a parent at a young age can mean different things for every one of those children. It may have similar effects, but some may be greater than others in some children. Some children experience difficulty sleeping, angry outbursts, nervous actions, irritability and mood swings, denial, or alcohol or drug abuse (Weller).

I, for example, suffered sleeping difficulty. On many occasions, I woke up in the middle of the night almost every hour or sometimes never went to sleep at all. Nothing worked to help me sleep. I would get up for the day exhausted and without energy because I was deprived of a decent night's sleep. My mother often commented on my attitude. She said that I would often yell out of nowhere at my brother and sister for nothing. I was terribly irritable with them. If my brother sneezed, I would give him what my mother called a death stare. I did not deny that my father was dead but it was difficult not knowing how I would move on with my life.

Several doctors and psychologists have conducted studies to examine the psychological or health issues that develop after an adolescent experiences the death a parent. There have been several cases conducted. According to these studies, experiencing early parental death can contribute to long-term clinical depression. "Certain current provoking agents determine when an episode of

depression takes place" (Rutter et al. 252). Provoking agents are events that make you recall significant loss. It may be a place, their favorite food, a song, a memory that the two of you shared, or even the simplest phrase. These components can make a person vulnerable and they open the doors to an episode of clinical depression.

My father passed away in his mother's house which is located on the main street in my hometown. I often drive or ride pass it going through downtown. It reminds me of when I was last there, when I last saw my father alive. For a while, whenever I said "Goodnight, I love you," I thought that it would be the last thing I'd ever hear from that person because it was the last words that I exchanged with my father. I can smell his scent every now and then as if my dad had walked right past me. These provoking agents automatically made me think of my dad. The thought of him used to bring me to tears. It's gotten a lot easier since then.

Psychologists find that studying people who lost a parent at a young age can be of "substantial clinical, social, and research importance" (Dietrich 901). Dietrich studied 96 men and women, ages 18-26, who went through the death of a parent at least a year before the study initially began. He came to the conclusion that there may be a relationship between the age of a child of their parent's death and psychopathology. Some of the subjects developed schizophrenia, anxiety around people, and the tendency to withdraw from people. Schizophrenia is a disorder that affects a person's ability to think, feel, and behave clearly. Symptoms associated with schizophrenia alone can include hallucinations, delusions, disorganized speech, and disoriented thought processing. When you lose someone, some people tend to shut down and shut themselves out from the world and from others. I didn't want to be around anyone when my father first died. I could not explain why but being around people made me nervous and somewhat withdrawn. I wanted to ignore people as much as I could because I did not want anyone's sympathy. I did not want people hovering nearby, asking me the same question every single day. "Are you okay?" "How've you been?" "Do you need anything?" I wanted to be left alone.

Some psychologists use theories as a way to explain their initial findings. Marks and her fellow authors wrote an article entitled "Death of Parents and Adult Psychological and Physical Well-Being: A Prospective U.S. National Study"

and used different theories to study the impacts that the death of a parent can have. They used attachment theory and the gender theory as their basis. Their study focused on physical well-being and psychological well-being. The attachment theory explains the strong emotional and physical connection with a primary caregiver or caregivers. This theory helps explain why children and adults either react very torn up or nonchalantly about the death of a parent. The theory explains that the younger the child the is, the deeper the attachment to their parents. If that bond is broken due to death, the child will experience extreme pain and will exhibit signs of multiple symptoms of grief. The well-being of that child will decline. I was very close with my dad. I thought the world of him growing up. He was like my superhero. When he passed, it felt as if a piece of me left with him. This was the man who showed me unconditional love and support until the day that he no longer could. On top of that, I was his baby girl. Not that I was spoiled or anything like that, but I absolutely loved having his attention. We were inseparable. Well, at least I thought we were. When our bond was broken, I felt like my childhood had ended.

The gender theory explains the biological difference between males and females. Discovering the effects among each sex is significant because it gives psychologists room to explore whether men or women are more affected by the passing of a parent. Gender theorists believe that children are born to "identify with their same-gender parent and thereby create somewhat more distance from the opposite-gender parent" (Marks et al. 1613). In other words, when a boy's father passes, he experiences more loss than his sister. The same goes for a girl when her mother passes. Research suggests that the mother-daughter relationship and the father-son relationship grows stronger with time. By the time a child reaches the adolescent stage, the connection is intense. Death not only puts a dampener on that bond, but it also damages the child.
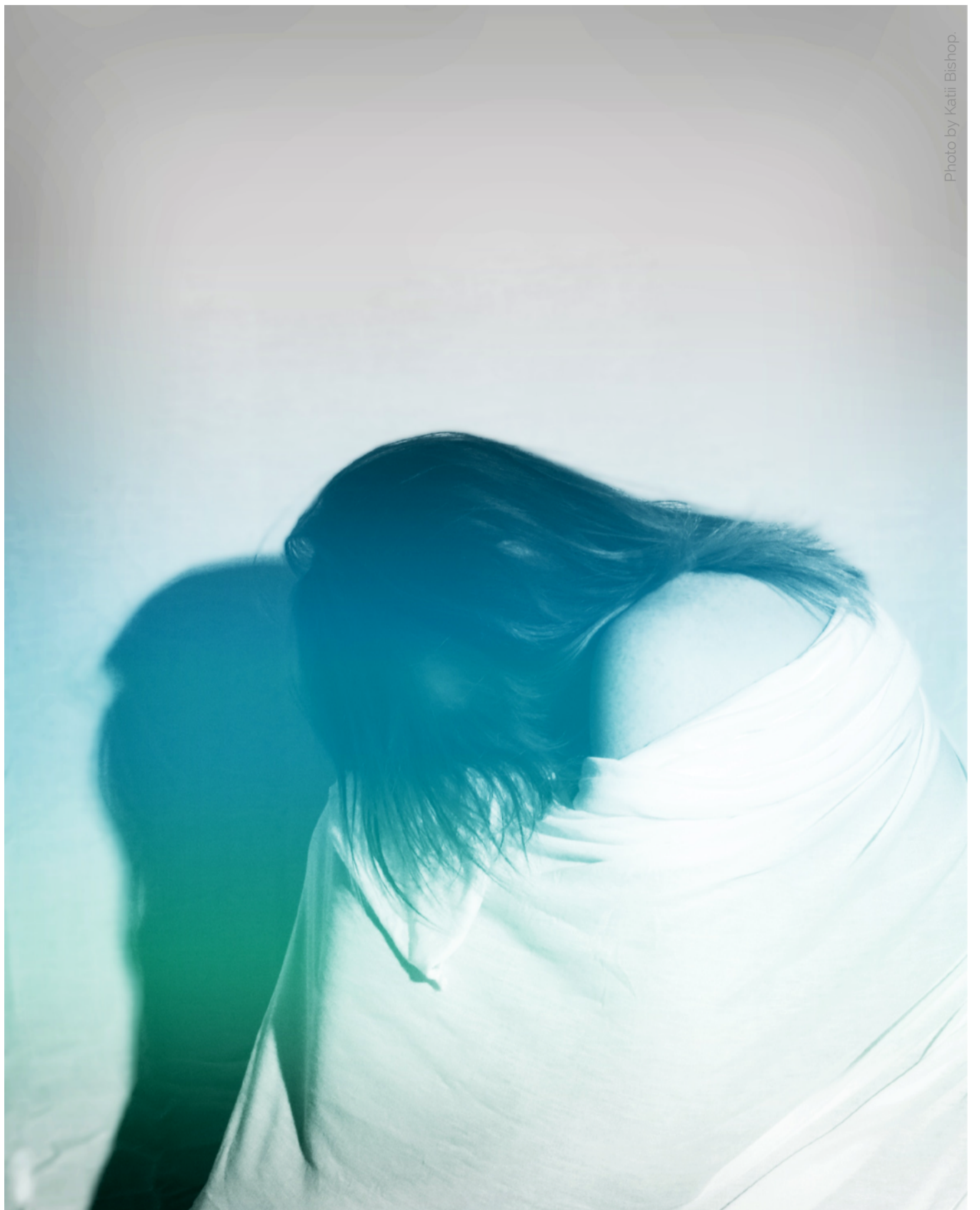
Marks and others explored more clinical responses to the death of a parent. In 1991, a clinical psychologists named Sharlach evaluated 220 adults who went through bereavement. The following summarizes Sharlach's result.:

His results suggested that bereaved adult children report a wide range of initial symptoms related to parent death, including difficulties sleeping and working and getting along with certain people; residual reactions included becoming upset when thinking about the parent, finding it painful to recall the parent's memory, inability to avoid thinking about the parent, and crying when thinking about the parent. Sharlach did not find differences in initial or residual grief reactions to mothers in contrast to fathers. (Marks et al.)

Growing up into adulthood with only one living biological parent can be difficult at times. Many adults who went through this often feel little to no satisfaction in life. Many adults feel as though they have no purpose or that their purpose was stripped from them, along with the life of their parent.

Some long-term effects of the death of a mother include premarital pregnancy among the daughters of the departed. Young women enter into early marriages and engage in premarital sex before the age of 20 (Rutter et al. 270). Losing a mother at an early age can also affect their social class. Women who lost their mothers at a young age have a strong dependency of their spouse. They yearn for the attention and intimacy of their husband. Dietrich concluded that the death of a parent at an early age has a greater effect on males, however, and the death of a parent at a later age has a greater effect on females (Dietrich 907). Dietrich's findings influenced other psychologists to follow up on the assumption that the experience of early parental death relates to the emergence of schizophrenia.

Leopold and Lechner are two sociologists who studied how gender and age relate to the level of satisfaction in life after the death of a parent. They found that the loss of a mother is more traumatic than the loss of a father. Mothers are typically the primary caregivers of children. In the world today, mothers may be the only caregivers in the household. This makes the relationship between the mother and child way more intense and special. Gender does impact the bereavement of a child. To reiterate from a previous study, daughters are more likely to be more negatively affected by the death of their mother and sons are more likely to be more negatively affected by the death of their father.

Leopold and Lechner also drew their conclusions from results of other similar studies conducted by psychologists Bernice Neugarten and Elder, summarizing their results as saying that age impacts the bereavement of an individual as well because "timing of this transition is crucial in determining its consequences" (758). The younger a person experiencing the death of a parent, the more likely it is for that child to endure long-term decline in their well-being. The results of the study were that losing a parent early in life can result in significant drops in satisfaction in life, which can only be expected, especially if the mother if the primary caregiver to the child. My mother has always been my primary caregiver and the head of the household even with my father helping to raise me. They raised me in two different homes, but I spent the majority of my time at my mother's home and spent my weekends and summers at my father's home. I love both of my parents equally, and I miss my father terribly, but if something were to ever happen to my mother I do believe that I would be more devastated.

When you lose someone so near and dear to your heart, you may feel like a huge part of your life has been taken away as well. You may feel like your identity has been stripped away from your very soul. The decisions you make in life develop from who you identify yourself as and who identify yourself with. Schafer, a sociology professor at the University of Toronto, states that "A long tradition in social psychology suggests that identifying with a socially valued ideal is a self-enhancing strategy" (80). Schafer tested two hypotheses. The first hypothesis was the death of a parent during childhood is associated with an older subjective age in adulthood. The second hypothesis was the death of a parent during childhood is more consequential for subjective age than is parental death during adulthood. These hypotheses were tested to prove if the death of a parent influenced the social roles of an adult. They were both partially confirmed. Often times, adults who never properly dealt with the death of their parent become isolated or have trouble in the real world. Children feel as though they have to raise themselves once their ideal passes away. This is not effective because sometimes they are simply too young. They get confused in life and it shows. They have isolated jobs or

maybe no job at all. Some may not be able to keep a steady job. Once their ideal leaves them, so does their sense of who they really are or who they can become. Their adult life could amount to very little. This means that their future could be in jeopardy. They could resort to a life of crime or alcohol or drug abuse. There is no future in that. A parental figure is not only just a caregiver, but they give the child a template of who they can be. If you take that away and the child feels like they are forced to become self-reliant, there is no telling where they might end up. This also goes back to the gender theory that Marks and her coauthors explained. If a daughter loses her mother, she has lost her template of who she should be as a woman. If a son loses his father, he has lost his template of who he would be as a man. Losing that model is detrimental to a child's future. I would rather I did not lose either of my parents, but if my mother had died back then instead of my father, I could not honestly say where I would be right now. I cannot fathom the thought of not having my mother around to model for me the woman I should strive to be. My father could not have taught me how to act or dress like a lady. He could not have shown me how to carry myself or become an independent woman. I would have lost myself even more than I had already did.

There are so many things that children and adolescents go through when the death of a parent occurs. Many become lost in their own world and have no idea how to get back to reality. I was almost this lost and I can attest to the fact that it is not a good feeling. No one in their right mind should want to lose out on the countless opportunities this world has to offer. I know from my own experience, even at an age so young, that it is exhausting trying to peel yourself out of bed every morning when you may not have the energy to stand. It is difficult trying to understand how to pick up the pieces of a broken heart and move on without your father there to cheer you on.

I came this close to not recognizing the little girl I saw in the mirror. It is still hard to deal with today. Sometimes I look in the mirror and I see my father staring back at me. Sometimes I see my eleven-year old self again. I remember the pain and, yes, I want to cry. I am just trying my best every day not to dwell on it and become one of the statistics in another psychologists research like the ones I have mentioned.

For every young person who has lost a father, mother, or both, do not dwell in your sorrow too long. Don't let your sorrow consume you. You may find that you will lose yourself, the people around you, and you could put your future at risk. No one should have to go through this, but death is a part of life. I am still coping to this very day and my father died almost nine years ago. It definitely isn't something you forget or get over if your parents were a huge influence on you, but I remind myself of a quote by Terry Pratchett to help me get by. "Do you not know that a man is not dead while his name is still spoken?" ❖

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The citation system used in this essay is MLA 8th.

CHASADIE SEARCY
STAGNANT BECAUSE OF STIGMA: AFRICAN AMERICANS AND MENTAL HEALTH

Mental illnesses know no color; every race experiences them just the same, but it just so happens that African Americans may suffer a little bit more. The Health and Human Services Office of Minority Health have found that 20% of African Americans are more likely to experience mental health problems than the general population ("NAMI") and that 1 in 5 adults and children live with some kind of mental condition (Bryant). In addition to this number, many other people suffer in silence. In the black community, there are major stigmas surrounding mental health. In fact, these stigmas prevent many from

Photo by Jacob Prose.

seeking professional help. Research reveals that by seeking help or even talking about these issues one may risk being considered "crazy" within their social circles, and it would even be considered inappropriate to share one's troubles with family members ("Black and African American"). The mental health disorders that African Americans mostly suffer from are depression, anxiety, ADHD, and especially high levels of PTSD due to greater exposure to violence. This research paper's purpose is to explore a few questions on the subject of mental health in the black community. First, what causes the stigma around mental health in the black community? There are many factors that have gone to the creation of this stigma, and this paper will delve into them. Next, why is unrealistic strength romanticized? Everyone is human and everyone has a breaking point, so why do so many African Americans suffer pretending that they're oh-so strong and life's problems don't get to them? Lastly, what keeps African Americans from seeking mental help if they sense something is wrong? It's been said that many blacks are not fond of the healthcare system or seeking professional health because of the past. This paper will look into this and see why that is.

Mental health stigmas have stemmed, like many of the problems African Americans face today, from slavery. Back in the days of slavery black people were expected to weather the storm. They were expected to work long days from sunrise to sunset, with little breaks and time for leisure activities. They were taught to suck it up, and complaining was not allowed. They were forced to do their work and take disrespect and mistreatment from their "masters" without saying a word. If they tried to complain they would be immediately shut down, not only by their "masters," but also by their families. That was just the way things were and no one was allowed to question it. They were supposed to accept the pain inflicted upon them and not speak up about it or how they felt. This has carried in to this day and age. Many black people are taught to deal with what they're going through and not to ask questions

about it or complain. Back in the days of slavery, black people had to be three times as strong to do their duties, deal with the hatred inflicted upon them, and their own life issues. So if one is caught complaining in this day and age, they're reminded of their ancestors' past. Some may even hear things like this, "We are the descendants of those who survived the Middle Passage and slavery. Whatever you're going through cannot be that bad" (Parker). Many are reminded of their strong ancestors who bore so much more and made it through the tough times, but no one talks about the unseen struggles they faced as well. African Americans are taught to be strong, and talking about the issues you face and your feelings makes you weak. They are not allowed to be weak because being strong comes from their ancestors who were never weak. So, if your ancestors could take on something as intense as slavery, you should be able to handle life situations with ease. It makes sense, once you consider where these stigmas have come from. Slaves couldn't be weak. If they were, they were killed. If they slacked on work, they were whipped; if they complained they were beaten. Sometimes they were even forced to fight each other to the death for rewards like food, and the "master's" approval. But this wasn't healthy for them then and it isn't healthy for African Americans now. Everyone is afraid to be a weak link. Many end up suffering in silence because of this.

As mentioned before, being strong is a highly valued quality in the black community. "For black people, 'strength' means being too proud to accept help. It means taking on a heavy load of stress and suffering silently" (Zielinski). Talking about the things that ail you, especially your feelings, are a huge no-no. Many feel as though no one really cares about their feelings, and that you must move forward because there are bigger things in life that need to be done and accomplished. Talking about how you feel does not help to get those things done. But going and going without taking time to address this mental stress or these mental problems is not good. This stress can manifest as depression, and suicidal thoughts or even attempts of suicide. But people don't like to acknowledge depression because it equals being weak, and, as mentioned before, being weak is not a favorable trait in the black community. But sooner or later people burn out, and instead of them just being considered crazy or weird for sharing their feelings, they actually

become "crazy" from all the mental demise they've caused themselves.

So, even if African Americans know they are having a problem or sense something is wrong with them mentally, why don't they seek professional help? Again, it stems from the issues of back in the day. The majority of those who work in the health profession are white, and research shows that many African Americans aren't willing to seek help because they feel like white people aren't capable of helping them with their problems. They feel as though the two different races go through different types of problems, and white people wouldn't be as capable at helping them as someone black would be. But the mistrust of medical professionals really comes from the work of people like J. Marion Sims, a gynecologist during the days of slavery who worked to fix vesicovaginal fistula, a very big problem for women going through childbirth. He would operate on black women who were slaves without their consent and sometimes even without anesthetics (Wall). Enslaved women were used as guinea pigs, and Sims would do surgeries on them as experiments and practice runs before the real surgeries for white women. Not only caused this distrust, but during the 1930s African Americans suffered by the hands of trusted medics again, for example during the Tuskegee Syphilis Study which happened in Macon, Alabama. 600 African American men (399 with latent syphilis and 201 who were healthy) were studied and told they would be treated with a vaccine that would protect them from syphilis. Instead of getting a vaccine, they were infected with syphilis (Nix). This took place for about 30 years until the study was shut down, and a class-action lawsuit was filed against those overseeing the project. A $10 million out-of-court settlement was given to the participants and their families ("U.S. Public Health"). But many more people were infected with the virus in addition to those who were test subjects.

Another issue is that many feel like they're not being truly cared for. Many African Americans feel as though they don't receive the same healthcare as their Caucasian counterparts. Researchers have found that doctors dominate conversations with African American patients, pay less attention to their personal and psychosocial needs, and make patients feel less involved in making decisions about their health (Anderson). This study I can relate to. Even though it's not related directly to

mental health, I can attest to the fact that the "professionals" didn't pay attention to my needs, and I almost suffered because of it. Back in 2010, I suffered from severe chest tightness and shortness of breath on night. My mom rushed me to the emergency room because I had a lot of trouble breathing. By the time we got there, it calmed down but I was still having trouble breathing. After waiting for a while, the nurses finally took me to the back and asked me a few questions. I was in the back talking to the nurses for about 10 minutes when they quickly came to the conclusion that I had a sprained chest. They gave me some Tylenol and sent me on my way. After a week I had a follow up doctor's appointment, so my personal doctor could do a routine checkup and make sure I was doing okay after my recent emergency room visit. I had a long conversation with my doctor and explained my symptoms to her, and after some tests she came to the conclusion that I was asthmatic. Her specific words were, "I don't know what those nurses were saying, but you're far from a sprained chest." The nurses in the emergency room were white and my personal physician was black. It could be said that the nurses in the ER could have had a rough night and were in a rush, but this mistake could have caused more damage if we just taken them at their word and if I hadn't seen my personal doctor. This happens to many African Americans whose doctors are white, and they have trouble consulting with their doctors because they're often misunderstood and not given the medical attention they need.

These two factors caused African Americans to have major trust issues with doctors. In both instances they gave their full trust to these professionals and were betrayed and left to deal with the health issues inflicted upon them with minimal help to recover. I've even had an experience where doctors have mislead me, and it wasn't even something as grave as a mental issue. This legacy of mistrust has carried into the 21st century, and there is a continuation of distrust in the medical profession (Okeke 4). It had been taught to African American from young ages that doctors aren't ones to be trusted. Many African Americans feel as though white doctors don't have their best interest in mind when treating them, or that they are out to harm them just like they did to their ancestors. Which is why many just lean on other coping methods instead, which leads into the next point.

Instead of going to doctors who aren't much trusted in the black community, many lean on their religion instead. Since the times of slavery black people have relied heavy on Christianity. The church has been very instrumental and influential in the black community. Slaves would create and sing Negro spirituals to get them through their tough times. A big part of Christianity is faith and always believing that something better will come. Instead of going to a doctor who is human, many

simply go to their church and rely on their faith in God who, to them, is greater and more powerful than all humans. They ask, why would we trust man, when we know someone greater than all man? Research has shown that they rely more on their religion, rather than medical help. They use their religion as emotional support, as treatment, rather than getting professional help that may sometimes be necessary ("NAMI"). But sometimes people are mislead in thinking that faith is the only source of help that they need. Professional help can provide medicine necessary to help control or manage mental illnesses occurring. It can refer patients to therapists or psychiatrists who specialize in helping them talk about their feelings or things that ail them mentally. In the black community, talking about your mental issues are taboo, and not a common topic of conversation. So, many people are forced to deal with these issues alone, and it's nerve-wrecking for people who are really struggling.

African Americans suffer from mental illnesses just like any other race, and sometimes they suffer a little bit more from higher levels of depression, PTSD, and anxiety. But due to the stigmas and stereotypes that paint mental disorders as a sign of weakness, many do not speak up about the difficulties they face and don't get help. Due to these stigmas, in addition to distrusting medical professionals, some may decide to stay silent and not share what they face. Although this is a huge problem, and other races are able to address it, tragically, African Americans have a tough time doing so. ❖

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JUAN MARIA NORDIO

HOW SPORT WAS USED AS A POLITICAL TOOL

Sport is an activity involving physical exertion and skill in which an individual or a team competes against another or others for entertainment. It has played a very important role since the Greek period, and it has evolved into a global phenomenon. Sport is a vital thread that connects civilizations, governments, cultures, and, most importantly, people. So, sport is not an isolated activity from the social and political context in which it is developed. It has often been linked to political manipulation by the established power, thus reproducing the dominant social values. However, we also come across the opposite side, cases in which sport is used as a tool against the hegemonic power. So, in this set of materials I am going to analyze how sport can be politically utilized by the powerful against disadvantaged or oppressed groups.

These days, sport has a political role in many countries whose objective is more than what is happening on the playing field, and many authors notice this manipulation. Critical sociologist Jean-Marie Brohm Ridge uses the quotation of Karl Marx, "Religion is the opium of the People," in several of his works, "applying to the spectacle in general and especially to the sport as the typical example of Opium of the people, given the dominating place that it has achieved in our society" (Ubeda, 3). According to this perspective, both religion and sport would have the effect of a drug, which diverts the people from their real interests using various means: to channel collective energies towards an end that is not the defense of their interests, to manipulate their intelligence in favor of the interest of the dominant classes, and satisfying desires associated with the deep affections of individuals. Within this parallelism between religion and sport, there are two important aspects. The first has to do with the processes of adhesion and identity that, both on a sport team and in religion, are conformed to at very early

ages. They are chosen in childhood and, once this choice is made, few adults change religion or teams (and less than the eternal rival). At most, there is abandonment, disenchantment. It is a passion choice that caters to beliefs rather than reasons. The second aspect is to observe how, within the various celebrations after the achievement of some title, the directors, coaches, and players ascend to the corresponding saints. Although the religious use of sport would also be interesting to address in an article, with this I want to analyze only the use of sport as a political tool.

Sport as a social phenomenon has become what it is today by a series of choices that have driven it. Consciously or unconsciously, it transmits and reproduces a series of dominant social values. The political use of sport is based on the creation of a collective identity, frequently associated with patriotism or nationalism, on a team. The countries, communities, and localities are represented by their teams and their citizens are proud to belong to the team. Brohm Ridge calls this sport nationalism and its essential function is to ensure national cohesion.

Another important aspect of the political use of sport is the hope of success. The victories of the team we identify with and of which we are loyal followers are our victories. And with them, we show that we are superior to our rivals. To be the best, you have to strive support the team and investing time and money in it. In times of crisis, sport fans come to make personal and also public sacrifices for the benefit of the team, their lifelong, or soul, team. Sport players become heroes who are taken care of and are rewarded by senior officials of the government

of the nation, the community, or the city. The critical vision of the sport, in addition to denouncing the function of distraction, also locates an affinity between the modern sport and capitalist society, "with the competition and the performance as main traits, emphasizing that modern sport will transfer to the space of leisure the value of the capitalist competitiveness in the productive activities, but in a playful form alienated and exalting, in this way, the competitive modality, fact of capitalism, as the only form of coexistence or social organization" (Ubeda, 4). The sport, with its values of competitiveness and of classification of athletes according to their results will reproduce the form of social organization of capitalism, that advocates for ascent in the social hierarchy, presumably through self-effort. "This current of thought influences the close relationship that the sport holds with the organization of industrial capitalism (regulation, specialization, competitiveness and performance) and how they both grow by the hand to set up modern society" (Reichlmayr, 2).

The Italian fascist dictatorship of Benito Mussolini is possibly the most relevant case of the political use of sport, since it will serve later as a model for Nazi Germany and for Franco's regime in Spain. Mussolini took control of national sport and, going beyond the national physical culture or the propaganda use of the sporting feats, he also used it as a means of indoctrination of the youth, to succeed in implanting a totalitarian system of lasting form. Italian sport was politicized in all its fields, being a reflection of the party that controlled and organized both the competitive sport and the

leisure time of the people (Ubeda). One of the fundamental aspects that the regime intended to inculcate was the Italian nationalist sentiment, a task for which the national soccer team had a critical importance, which should be able to ignite the passions of the people and legitimize the idea or fascism through athletic victory. "Thus, the successes of the Italian combined in the World Cups of 1934 and 1938 were sold as evidence of the superiority of fascism on the democracies" (Ubeda, 9). With identical purposes, Hitler used German sport but, in addition, he created the idea of the race as a fundamental element in his particular conception of sport and physical education; thus the physical culture that was implanted was intended to demonstrate "Aryan" superiority and, of course, to serve the military interests of the nation. In this way, "the Olympic Games in Berlin of 1936 became a great propaganda platform that sought to legitimize the image of the regime against the international community, as well as to show the alleged superiority of the aryan race" (Zeyneb, 1).

However, then we find a totally opposite side which is also noteworthy; situations in which sport "has had significant importance in the construction of claims against hegemonic power so that, far from sleeping political consciences, has greatly stimulated them" (Reichlmayr 25). Sometimes sport has also served as a tool of counter-power. There have been situations in which sport has contributed to the construction of claims against hegemonic power, stimulating political consciences rather than working to anesthetize them. The analysis of these realities can help us to become aware of the political use of sports and be able to position ourselves in this respect. We must remember that the most hidden and unconscious level of an ideology is achieved when it becomes hegemonic, that is, when its ideas, beliefs, values, commitments and practices are accepted completely and are considered as natural, normal or common sense (Ubeda, 7).

Few are the teams around the world that have a symbolic vindication and a great importance in the construction of a collective identity like FC Barcelona. It is like the unarmed symbolic army of Catalan nationalism. The first historical key moment to understand the consolidation of the symbolic burden of this club against the hegemonic power is found on September 13, 1923—the arrival of the dictatorship of Miguel Primo de Rivera. The persecution and suppression of Catalan

language and culture and its symbols provoked a reaction to reinforce the ideological representativeness of Catalanist institutions, especially Barca, given its great popularity in Catalan society. Franco's victory in the Spanish Civil War definitively consolidated the ideological and symbolic connotations that it had in that time and in our days. So "Barca became, not only a symbol of Catalan nationalism and anti-centralism, but also of resistance to the Franco regime for the rest of the Spanish State" (Reichlmayr, 40). While the president of the club at that time, Josep Sunyol, was shot by Franco's troops at the beginning of the Civil War, the players undertook an American tour in 1937 to disseminate the republican cause and to collect money for the Spanish Civil War.

All the cases and examples that I have exposed, in both ways, allow to get us an idea of how complicated it is to reckon with sport in a strict way when we talk about relations of power. There are processes with different, even contradictory, orientations and therefore they cannot be interpreted in a unique or reductive way. To consider the spectacle of sport "opium of the people" would forget many aspects and dimensions of analysis of this mass phenomenon. We cannot, then, pigeonhole sport as a simple tool of manipulation for the service of others' interests. Sport is nothing more than a game and, in itself, it is neither good nor bad—it depends on its use. Sport is a mass social phenomenon that can be a double-edged political weapon. It can be used as a tool of social reproduction in the service of the ruling class, but it can also be used as a counterhegemonic tool for social change on the part of citizens. ❖

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HUMANITIES

Photo by Leo Cardelli

LIBBY EDWARDS

THE FANTASY OF PUNISHMENT:
MASOCHISM IN FRANZ KAFKA'S *THE METAMORPHOSIS*

To a reader with only a passing familiarity with Freudian symbolism, the sexual subtext in Kafka's most famous work, *The Metamorphosis*, is still rather obvious. However, not all Kafka scholars have welcomed a discussion on the subject. An initial biographical portrait of the author, largely created and maintained by his close friend and literary executor, Max Brod, established "an iconized picture of [Kafka] as a suffering artist, a suffering son, a suffering Jew or all of the above," a literary sainthood carefully expurgated of the slightest whiff of prurience (Woods 249). It should be noted, however, that Kafka had a deep interest in erotica, and while later academics have duly acknowledged this, with evidence gleaned from his letters and diary entries as well as more recent access to his private collection of erotic literature, the trend among Kafka scholars has been to downplay the author's erotic interests in favor of his Jewish identity, particularly the possibility that he had foreseen the coming Holocaust and prophesied it in his work. In 2008, when British author James

Hawes published a Kafka biography that explored his erotic tastes—including speculation as to whether his extensive collection of erotic literature and illustrations could be considered "pornography" or not—there was a marked backlash from Kafka academics accusing Hawes of "prudishness, sensationalism and even antisemitism," with one researcher calling Hawes "a preacher of hate" (Connolly). The possibility that Kafka may have predicted the coming Holocaust is apparently seen by many scholars as incompatible with an interest in erotic topics, and therefore that revealing evidence has been largely ignored. The two, however, need not be mutually exclusive. Without making a judgment on Kafka's prophetic skill, an exploration of his interest in the erotic is rather necessary for a true understanding of his literary output, and quite aside from his private collection, Kafka's personal correspondence and diaries make it clear that his interest in the erotic was largely academic; he was fascinated with how taboo

subjects could be explored in writing. Furthermore, as a Modernist author influenced by the writings of Sigmund Freud, Kafka was equally interested in how symbolism and metaphor could be used to explore the "forbidden" in literature. Of apparent and particular interest to Kafka was masochism as a literary theme; it was an idea to which he would return frequently in multiple works. Perhaps no other work by Kafka best illustrates this marriage of interests than *The Metamorphosis*, where Kafka explores themes of masochism and submission through a Modernist lens utilizing Freudian symbolism.

In her essay on Kafka and the erotic, Anna Katharina Schaffner writes that "among the major European modernists, there are few who engage as extensively with the erotic as does Franz Kafka," an interest she believes was jointly formed by Kafka's preferential reading of erotic literature and his fascination with Freudian psychoanalysis ("Seasick" 80). Kafka's considerable collection of erotica included periodicals such as *Der Amethyst* and *Die Opale*, literary anthologies that encompassed a broad spectrum of genres and explored a variety of sexual topics, their literary offerings interspersed with sexually grotesque Art Nouveau illustrations. (One drawing, for example, *Le Gourmand* by Maurice Besnaux—a pseudonym for accomplished German artist Marcus Behmer—features a toad-like creature with a simian face fellating a plant shaped like a bouquet of penises.) Kafka commented favorably on these periodicals in his diaries and in letters to friends; ironically, the literary executor who worked so feverishly to sanctify Kafka's place in literary history was also a regular contributor to these erotic collections. Kafka's interest, however, appears to have been largely artistic and literary, with less emphasis on the sexual. Whatever Kafka's personal proclivities may have been, his enthusiasm for erotica seems to have been focused on how taboo subjects—including "sado-masochism . . . sexual violence, animality, incest, fetishism and homoeroticism"—could be subversively explored in art through symbolism and metaphor (82). Unsurprisingly, Kafka would explore these same taboos in *The Metamorphosis*, but with a far subtler touch than that shown in *Der Amethyst* and *Die Opale*, mainly through his use of metaphor and Freudian symbols.

As with his interest in erotica, Kafka frequently wrote about Freud in personal correspondence, and "regularly attended an introductory seminar series on psychoanalysis" (Schaffner, "Seasick" 80). One work with which Kafka was no doubt familiar was Freud's *Three Essays on the Theory of Sexuality*, published in 1905, in which Freud first discussed his theories on the phenomenon of masochism. Masochism, in the Freudian view, is firmly linked with subconscious guilt and a need to be punished—usually for what the masochist perceives to be sexual transgressions. This need to be punished exists along a broad spectrum. On one end, it can manifest as a desire for mild humiliation and physical chastisement, gradually increasing in force and scope. On the other, it can manifest in what Freud termed "the death instinct," or a desire for literal execution (Freud, "Economic" 160). Kafka wrote the masochistic urge and the desire for chastisement into his characterization of Gregor Samsa; he even intended at one point to publish *The Metamorphosis* as part of a collection entitled *Punishments* (Kafka, "Letter" 64). In *The Metamorphosis*, the protagonist's sexual transgressions are threefold: his incestuous desire for his mother, represented by her repeated appearances in a state of undress and associations with ladies' underwear (Kafka, *Metamorphosis* 13, 32-33); his incestuous desire for his sister, hinted throughout but more or less explicit in his fantasy of imprisoning her in his room and kissing her naked throat (39); and in his desire for the picture of the woman in furs (3, 28-29). Gregor Samsa is humiliated and punished repeatedly—by his employers, his family, their lodgers, and the charwoman; even his metamorphosis from man to "monstrous insect" is a humiliation and a punishment (3). He is subjected to beatings by his father as a punishment for frightening his mother and sister (17, 31-32), and eventually dies from a combination of the final beating, starvation, and general neglect (43), an anticlimactic death that fulfills Freud's "death instinct" in the ultimate act of submission. Quite apart from specific textual details, the main arc of the story is a near-perfect illustration of Freud's theories on the nature of masochistic tendencies.

The Metamorphosis also plays on Freud's concept of the Oedipal complex and all its characteristics and permutations, many of which can result in masochistic desires. The Oedipal complex—a child desiring the parent of the opposite sex, with subconscious hostility toward the other—was considered a normal stage of psychosexual development in Freudian theory. However, Freud noted that it was possible to

become arrested in that development, a condition which contributed to "passive fantasies (which later become masochistic)" (Freud, "Child" 203). The male child desires the mother—in itself a passive role, that of the child submissive to the parent—and therefore despises the father, yet he is powerless against him. This impotence against the dominating father is seen in Kafka's work from the very beginning: Gregor Samsa is trapped in a job he hates, contributing to feelings of stagnation and helplessness, yet he continues in the job due to the needs of his family and the expectations of his father. His metamorphosis and subsequent beating at the hands of his father would understandably deepen any Oedipal resentment. Gregor's profound passivity, however, makes that resentment difficult to articulate. When he discovers that his father had a "nest egg" laid by all the time, Gregor thinks:

> To be sure, he might have used this surplus to pay off more of his father's debts with his boss, and the day on which he would have been able to divest himself of his post would no longer have been nearly so far off, but as things stood, his father's arrangements were no doubt for the best. (Kafka, *Metamorphosis* 23)

Despite being more than justified in his feelings —of indignation, at the very least—Gregor can only articulate his resentment through a type of passive-aggressive submission.

According to Freud, the passive principle of the Oedipal complex includes a fear of symbolic castration at the hands of the father-adversary; it is this fear that keeps a male child from acting on their desire for the mother (Barfi 108). When Gregor rushes out to stop the general manager from leaving, he terrifies his mother, who "shriek[s] and [flees] from the table into the arms of Gregor's father" (Kafka, *Metamorphosis* 16). Gregor's father, having "won" the Oedipal conflict by the mother choosing his protection over a confrontation with Gregor, proceeds to drive Gregor from the room in a scene replete with phallic imagery and overtones of homosexual, incestuous rape—a final symbolic domination by the father-adversary:

> [Gregor] began, with constant anxious glances back at his father, to turn around as quickly as he could . . . Perhaps his father discerned his good intentions, for he did not hinder him in this operation but instead even guided his rotation . . . from a distance, using the tip of his stick . . . What Gregor heard at his back no longer resembled the voice of merely a single father . . . Gregor thrust himself—come what would—into the doorway. [Then] his father administered a powerful shove from behind, a genuinely liberating thrust that sent [Gregor] flying, bleeding profusely, into the far reaches of the room. The door was banged shut with the stick, and then at last all was still. (16-17)

The father's cane, used to beat Gregor back into his room and slam the door behind him—thereby closing the door on Gregor's access to the mother and the domestic "kingdom"—is the more obvious of Kafka's phallic symbols, yet the frequent and careful descriptions of Gregor's new, insectile legs have phallic undertones as well (Barfi 108). These legs are described as tiny and uncooperative; they flail about "in an unnerving frenzy" (Kafka, *Metamorphosis* 6). Despite bearing his new insect weight rather well—Gregor is delighted by their efficiency (15) —they are rendered ineffectual by the father's attack with his superior phallus: the cane. In his flight from his father, Gregor is wedged in the doorway of his room while "his little legs dangled trembling in midair, while on the other they were crushed painfully beneath him"; the attack leaves "one of these diminutive legs" with such "grievous injuries [that it] now trailed lifelessly behind him" (17). Gregor has been symbolically castrated by his father; in "castrating" Gregor, his father reasserts his claim over the mother, the sister, and the domestic kingdom as well. Gregor had stepped into the role of the father by working for the family's maintenance, and assuming the responsibility of providing for his mother and sister. With the beating, Gregor's father therefore emasculates his son and reclaims the role of patriarch and provider for himself.

What is particularly interesting about this resolution to the Oedipal conflict is the possibility of Gregor's complicity in his punishment. Freud's theory of the Oedipal complex included a "fantasy of punishment," the need to be absolved from guilt from a perceived (and typically sexual) transgression (Barfi 108). In Gregor's case, that transgression would be his subconscious sexual desire for his mother and sister. As previously noted, Freud theorized that this normal stage of psychosexual development —or psychosexual awareness, part of the identity-forming process—could be arrested for various reasons, leaving the individual mired in

subconscious guilt which then manifested in masochism or a pathological desire to be punished (Freud, "Child" 185, 198). Guilt and emotional indebtedness were of interest to Kafka for personal reasons; his relationship with his own father was apparently an exercise in guilt and dominance that may have been mirrored in the relationship between Gregor and his father. By all accounts, Kafka's father was a domestic tyrant to Kafka's mother and sisters alike, while Kafka's relationship with his mother was a close and loving one (Barfi 108). Kafka also suffered from a lack of self-confidence and blamed this on his father; in one letter to him, Kafka wrote: "Out of these many occasions where, in your clearly expressed opinion, I deserved a thrashing but was spared by your mercy—again, intense feelings of guilt. From every side, I was in your debt" (qtd. in Barfi 109). Kafka's interest in Freudian psychoanalysis being well-established, it seems inevitable that Kafka would have examined his own life against Freud's theories, and while there is apparently no overt evidence that Kafka harbored masochistic tendencies, he would have been well aware of Freud's linking of guilt with the masochistic impulse. There is also ample intertextual evidence that masochistic punishment was of particular interest to Kafka.

Beyond Kafka's letters, diary entries, and written commentaries on erotic literature, there is a clear connection between *The Metamorphosis* and Leopold von Sacher-Masoch's influential masochistic novella *Venus in Furs* (Schaffner, "Seasick" 80). The male protagonist of the latter desires to become the slave of the female object of his infatuation—a "slavery" that becomes progressively more humiliating at the protagonist's request. Masochism was a repeated theme in Sacher-Masoch's works, of which *Venus in Furs* was the most famous; Austrian psychiatrist Richard Freiherr von Krafft-Ebing noted that his patients "referred to *Venus im Pelz* as the most accurate portrayal of their own desires," and coined the term "masochism" from the author himself (Lang 22). There has been some disagreement among scholars regarding Sacher-Masoch's influence on Kafka, largely due to a perceived lack of evidence—although, given the backlash surrounding James Hawes's work on Kafka's collection of erotica, the preservation of Kafka as an object of literary veneration cannot be discounted. Nevertheless, and despite this apparent whitewashing of Kafka's thematic interests, there are two important details that connect Kafka's work with Sacher-Masoch: Gregor Samsa's framed picture of the woman in

furs (Kafka, *Metamorphosis* 3), and the very name of his protagonist.

The significance of the picture of the woman in furs is one of the less subtle details in the novella, heavy in its sexual symbolism, particularly its centrality to the scene where Grete and her mother set about clearing the furniture from Gregor's room:

> His sister immediately noticed the new entertainment [of crawling about the room, that] Gregor had devised for himself—his peregrinations left behind sticky trails here and there—and [when] she got it into her head [to remove] the furniture that impeded his movement . . . he burst out of hiding . . . changing direction four times as he raced about, for he really didn't know what to save first, but then his eyes lit on the picture of the lady clad all in furs . . . and quickly he made his way up to it and pressed himself against the glass, which adhered to him, pleasantly cool against his hot belly. (26, 28-29)

The sexual connotations in the scene are almost comedic; they briefly transform Kafka's work into something approaching bawdy farce—Kafka's broad wink at *Venus in Furs.* In addition, the name of his protagonist has a further connection with Sacher-Masoch's work. The main character of *Venus in Furs,* Severin, has a metamorphosis of his own. He is transformed from "an independent gentleman into a butler, complete with livery and servant quarters and obliged to obey the most outrageous commands of his mistress" and takes the new name of Gregor; Sacher-Masoch takes pains to explain that the new name—and therefore the new identity and subsequent loss of self—marks the beginning of the protagonist's "descent into humiliation" (Angress 746). Gregor Samsa, of course, suffers his own loss of self and humiliations as a result of his metamorphosis; Gregor's transformation is the "punishment for his servile character and sado-masochistic tastes, to which the Venus in furs picture alludes" (Schaffner, "Seasick" 85). The connection between Kafka's work and *Venus in Furs,* and the transformations of its like-named protagonists, suggests that Gregor Samsa's metamorphosis was subconsciously willed by Gregor himself—the ultimate act of masochism, submission, and punishment for his "sins."

It is important to note, however, that despite some scattered outrage over its content when the novella was originally published, *Venus in Furs* was not considered erotica per se, but a "respectable text, written by a prized author in a key fictional form favored by the German middle class" (28, 38). Like Kafka, Sacher-Masoch appeared to have an alternative, literary motive; his interest in masochistic tendencies was less an exploration of erotic desire than a commentary on the imbalance of power in romantic relationships. The male protagonist of *Venus in Furs* "literally forces the heroine to mistreat him and educates her to be his tyrant," inverting the power balance; when a submissive forces an intimate partner to act as the dominant, the lines between dominance and submission are necessarily blurred (37). A similar power inversion can also be seen in *The Metamorphosis,* particularly between Gregor and his sister Grete. Gregor's transformation forces Grete into the role of caregiver; she provides food for him and takes on his maintenance with a jealous fixation that brooks no interference (Kafka, *Metamorphosis* 19, 35). However, it is a fixation that soon results in resentment, neglect, and Gregor's eventual death from inattention and starvation (43). If Gregor's transformation was self-willed—unconsciously initiated by Gregor's deep-seated guilt for his sexual transgressions—then Gregor essentially forces Grete into the role of dominant mistress, compelling her to fulfill his incestuous fantasy. In relinquishing control, Gregor asserts control over the object of his desire.

Why did Kafka choose to weave these themes of dominance and submission through his works? They are not solely in *The Metamorphosis;* other Kafka works that share these themes include *The Man Who Disappeared,* "In the Penal Colony," and *The Trial* (Schaffner, "Seasick" 82). It is simplistic to say that his personal tastes were the deciding factor; given his easy familiarity with and private discourse on erotica, it is likely that Kafka would have been less metaphorical in his writing if titillation had been his literary object. In his writings, however, there is nearly always an imbalance of power, and explorations of dominance and submission were frequent in Modernist literature (82-83). For many Modernist writers, guilt had been largely freed from the Judeo-Christian concept of sin, but it still required punishment; ironically, the search for the absolution and catharsis of punishment permitted the punished to regain control over their lives—a control that many felt they lacked in the atmosphere of post-WWI Europe (83). If again, Gregor Samsa's metamorphosis is seen as self-willed, albeit subconsciously, it is a

punishment that nevertheless restores some of Gregor's control; he is, after all, freed from the burden of his humiliating job and the necessity of caring for an apparently ungrateful family (Kafka, *Metamorphosis* 22). Modern psychoanalytic thought on masochism, building even today on the work of Freud, theorizes that masochistic fantasy and practice can be a response to the search for meaning—a Modernist characteristic with which Kafka likely identified. In the post-WWI shattering of culture and traditions, and a general apostasy from Judeo-Christian concepts of justification, masochism created a new deity in the form of the dominant "partner," who in turn supplied their own form of justification (Shpancer). In true Modernist fashion, Grete becomes Gregor's "goddess," his justification in the absence of meaning, with whom he feels "a nearly monstrous urge to . . . throw himself at [her] feet, and beg" (Kafka, *Metamorphosis* 19). It is the crowning paradox of masochism that in relinquishing control voluntarily, control is thereby restored. In subconsciously willing his transformation, Gregor is freed from his servile life and given an animalistic one where his transgressive desires for his mother and sister may be expressed. Unfortunately, his subconscious need to be punished for these desires, symbolized by his family's rejection, leave him with no recourse but death, the final masochistic release.

Kafka's interest in Freud's psychoanalytic theories and psychosexual symbolism was both personal and artistic. While he no doubt saw elements of his own tense, guilt-laden relationship with his dominant father in the Freudian Oedipal complex and its accompanying masochistic potential, it was as a Modernist writer that Kafka's exploration of masochism through a Freudian lens saw its fullest realization. Efforts to suppress Kafka's interest in masochism for the sake of maintaining some rarified literary status are doing the author a disservice. Analyzing his work with a thorough understanding of his erotic interests is necessary to truly grasp the multiple layers in the cumulative body of his fiction, but most particularly in his most famous work, *The Metamorphosis.* Kafka's exploration of taboo topics through metaphor—both subtle and not— marks a modernist effort to make sense of and comment on life in post-WWI Europe. Freud's psychoanalytic theories gave Kafka the tools and the symbolic language he required to explore Modernist themes of dominance,

submission, and the relinquishing and restoration of control in a world where all traditional boundaries had changed. ❖

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ANNA EVANS
RHETORIC IN TIMES OF CRISIS

In a world that is ever-changing, it is natural to hold on to aspects of life that one is familiar with. Ideas of hope and peace become a safe haven for people in the midst of a catastrophe; however, what does one do when all hope is lost? When the world begins to crumble and no longer resembles life as it once was, people are expected to rebuild. When all that is left is rubble, people must rely on their use of words and rhetorical skills to reconstruct society. For even though technology and government structures may fail, words withstand the test of time. The idea of rhetoric being able to transcend catastrophes can be found throughout the genre of post- apocalyptic television series. This is seen in post-apocalyptic television shows like *The Walking Dead* and *The 100* where leaders emerge to help reconstruct society. As fallen structures lead to chaos, morality is put into question and people often seek security and reassurance in the form of a rhetorically skilled leader.

Defining the Post-Apocalyptic Genre

The genre of post-apocalyptic fiction became increasingly popular after World War II. With the decimation of the Jews, people realized how fragile human life was in addition to how easily rights could be taken away. People were left frightened as the idea of humanity was questioned. With the Cold War on the horizon, "the potential global annihilation of nuclear war threatened to bring a final end from which there would be no rebirth" (Stifflemire, 2017). People wanted to know if something worse was on its way. The post-apocalyptic genre reflects overall cultural worry and attitudes about the possibility of a bleak future.

While many consider the apocalypse to be a time of devastation, Samuel Stifflemire suggests that it not only marks the end of a world, but the beginning of a new one. This is an important distinction, since it marks the opportunity for a new beginning. He explains the term post-apocalypse, stating that, "The post-

Photo by Francesco Paggiaro

apocalypse is a gap, a dilation, between one ordered existence and the post-apocalyptic revealing of the next" (p. 4). The post-apocalypse becomes the idea of a world between times of order. This is relevant when considering the television genre as it embodies the idea that characters must become survivors during this post-apocalyptic time of chaos. Their fragmented lives, once filled with order, are now unpredictable, and, as a result, they must navigate this new terrain until the unveiling of the next world. It is during this time that many of these television series take place. This is a defining factor of the post-apocalyptic genre as it seems to focus on a world that has not only lost structure but hope as well. As a unit, the survivors of such catastrophes must come together to face this loss of hope. They do so by seeking out a leader whose character imbues morality back into the broken systems of the fallen world. Under the leadership of such moral characters, the post-apocalyptic genre shows a battle of human nature where people must fight to keep their humanity intact when all else is lost.

Molthagn-Schnoring (2013) suggests that people form a sense of collective identity in the face of fear through this transition from disaster to the potential unveiling of the next world; this identity is based on fear and mistrust. In turn, this forms what the author refers to as a "risk society" where people evaluate their lives based on how secure they are. People base this notion on past events. In fact, the author suggests that memories of past events help imbue the present with meaning. For this reason, it is through epideictic, or commemorative, speeches that disasters are remembered. This can often be seen throughout the post-apocalyptic television genre as emerging leaders attempt to restore order by comparing their ideas to the mistakes of past leaders (Molthangn-Schoring, 2013). This idea is exemplified in the post-apocalyptic television show *The 100*.

The 100

Within this show, two opposing characters use rhetoric to lead armies against each other. However, these two conflicting characters utilize rhetoric in vastly different ways. While Octavia is a brutal leader who uses fear to employ effective persuasion, Kane opposes her in the way that he uses his eloquence to his advantage.

As post-war radiation has destroyed the Earth, a group of 1200 survivors were sent to live in an underground bunker. The two opposing clans from the outside world, Skycrew and the Grounders, were forced to come together and form one crew (Wonkru), but, as supplies dwindled, conditions became brutal and political relations worsened. Now that Octavia Blake is the leader of Wonkru, she is forced to calm rising tensions. However, she strategically uses fear to her advantage by relating the past to the present. This is the idea of Molthagn-Schnoring (2013). She reminds her people of past times of chaos and compares where they were then to where they are now. By doings so, she attempts to lead them in a new direction by encouraging them to not repeat their past.

By commemorating past events, people can generate ideas for the future, since "Catastrophes often incite an environmental consciousness and deliberative acts of rhetoric that generate action" (Molthagn-Schnoring, 2013). Depictions of the past in turmoil allow the orator to paint a picture of a new future. This then creates public awareness and a desire to produce change. One can begin to see the rhetorical power of commemorative speeches when orators begin to step forward and use the idea of fear to sell their ideas, specifically since "causes of social anxiety are often exaggerated by agents who view such fears as a means to advance certain measures of social control and political consensus" (Molthagn-Schnoring, 2013). This is evident in the show *The 100*. Because of tensions between groups fighting for what little resources remain, Octavia uses the threat of death to ensure order. She repeats the mantra, "You are Wonkru, or you are the enemy of Wonkru. Choose" (Rothenberg, 2018). This is important as it demonstrates her goal to unite the two opposing clans; however, if the person does not choose to abide by the rules of Wonkru, they are sentenced to a bloody death.

Octavia's internal struggles as a leader are demonstrated in Season Five, Episode Two, when Octavia speaks to another character, stating that she is not a political leader, but a warrior and a fighter, which is evident through her actions. While she is able to use rhetoric effectively, she is a brutal leader. This directly contrasts the idea that Quintilian was making when he said that the perfect orator is "a good man, skilled in speaking" (p. 2). Octavia was never schooled in the way of words; however, she knew how to use intimidation to her advantage. One way she did this was by

attending court dressed in the blood of her people. For this reason, she became known as Blood Reigna (Blood Queen). In addition, her reputation and morality were put into question when she commanded her subjects to consume the bodies of their dead. While this instilled fear in those who dared question her rule, it kept the crime rate down in addition to keeping her people fed. While effective, her actions were in no way considered moral; rather, they were actions of a person doing everything within her power to keep herself and her people alive, even if that meant sacrificing a part of her humanity. Her actions do, however, coincide with the ideas of Peter Ramus (2010) who stated that, "The definition of an artist which covers more than is included within the limits of the art is faulty" (p. 4). Therefore; Octavia proves that one can be a successful orator without having to hold fast to strong morals. She was an effective leader as she was able to keep her people alive during their time in the bunker. Ramus continues to say that rhetoric is not the art of being virtuous. To ask Octavia to be both a good leader and virtuous would be to go beyond the realm of rhetoric. In this way, she rules by fear, for no one dares to question Blood Reigna, except one man, known as Marcus Kane, who is tired of her brutality.

The actions of Marcus Kane embody another rhetorical aspect of commemorative speeches, specifically the idea that orators can question the ethos of past leaders. As blame is placed on those responsible for disaster, trust is manipulated for people to feel secure in their current situations. This is also demonstrated in *The 100* when Kane calls into question Octavia's leadership. After blindly following orders, he begins to resist by questioning the length that they will blindly follow orders. When another character makes the excuse that they have only done what it takes to survive, he responds by saying, "No, that's what we say to justify the horror that we inflict on each other" (Rothenburg, 2018). These words are the beginning of a rebellion.

After being wrongfully accused of a crime, Kane is condemned to fight for his life in the fighting pits. During his time there, he does something extraordinary. He refuses to fight. Inside the arena he cries out, "I will not kill this man!" He then goes on to explain why he refuses to fight for his life. He insists that life without virtue is not a life worth living. He calls out to the audience, justifying his reasoning by saying, "somehow, we allowed justice to

become vengeance and vengeance to become sport . . . My complicity ends today" (Rothenberg, 2018). This directly corresponds to ideas that Cicero was teaching during his time. In fact, Cicero stated "For who is ignorant that the highest power of an orator consists in exciting the minds of men to anger, or to hatred, or to grief, or in recalling them from these more violent emotions to gentleness and compassion?" (p. 11). However, the most powerful part of this idea is that he states that an orator not only has the power to put an audience into a state of mind, but that he has the power to recall them from the more violent emotions and persuade them to those that are gentler. This is Cicero's idea that the power of an orator lies in the ability to excite and calm thoughts and emotions. This is exactly what Kane is doing at this time. He is inciting feelings of rebellion while calming the peoples' thirst for blood.

What separates Kane from Octavia is his eloquence. "For the proper concern of an orator, as I have already often said, is language of power and elegance accommodated to the feelings and understandings of mankind" (Cicero, 1875). While Octavia uses her actions and position as a warrior, Kane uses his skill at speaking to lead the masses against her reign. Through Kane's mercy and gifted speech, he converts people to his side. Cicero (1875) said that there is nothing "more noble than to be able to fix the attention of assemblies of men by speaking, to fascinate their minds, to direct their passions to whatever object the orator pleases, and to dissuade them from whatsoever he desires" (p. 6). He then follows up by saying what is greater than an audience being swayed by the words of one man. This is exactly the power that Marcus Kane is able to hold over the masses of *The 100*.

Pestilence

While epideictic speeches arise in times of crisis, other forms of rhetoric, such as the rhetoric of fear, can be seen in the idea of pestilence. Although pestilence is another common theme within the post-apocalyptic television genre, the ideas of pestilence originated much earlier. The article "Infectious Fear: The Rhetoric of Pestilence in Middle English Didactic Texts on Death" suggests that pestilence opens the gateway for fear. As disease spreads and pandemonium is inevitable, people will then begin to see a rise in fear rhetoric. As this article looks at the Medieval period, it is important to remember that Christian teaching was widely

Photo by Tookapic.

lives on Earth in addition to their spiritual future. Lawrence states that Chaucer "seeks to frighten the pilgrims into believing that death targets the sinful and, in doing so, profit from the selling of pardons" (p .4). This creates a sense of urgency that spurs the audience to action. As the Black Plague spreads, it takes people off guard. What is worse than dying without being pardoned from one's sins? For sudden death without absolution could lead to eternal suffering. This idea reiterated the teachings of the church and thus, Lawrence argues, was the didactic purpose of the story. This idea represents the notion of the apocalypse, as for these people, the plague and potential death was a disastrous end to the world as they knew it.

The Walking Dead

The idea of pestilence can be seen in modern post-apocalyptic television series. Specifically, in the show *The Walking Dead* pestilence is presented in the form of zombies. Once again, the idea of pestilence is rhetorical in the sense that pestilence serves the purpose of instilling fear into the audience to get them to consider their morality. Morality becomes a central focus of the show as characters must choose what is right or wrong in a world that has no rules. As the survivors learn to navigate the post-apocalyptic terrain, people fight for the position of leader, but one man's use of language and moral character causes him to stand out above the rest. In *The Walking Dead*, this character is Rick Grimes.

upheld, and, for this reason, people associated the idea of pestilence with sin. In fact, it was believed that to avoid divine punishment in the form of pestilence, one must abstain from sin. Tom Lawrence (2017), states that this very idea "may have been deployed by medieval authors for rhetorical purposes" (p. 2). He suggests that authors during this time period used the outbreak of the Bubonic Plague to their advantage; authors such as Geoffrey Chaucer wrote to audiences who were entirely unprepared to die.

As the epidemic of plague took the people by storm, authors wrote about impending death. This potential apocalypse is demonstrated in Chaucer's "The Pardoner's Tale." Essentially, Lawrence (2017) suggests that Chaucer is using pestilence rhetorically in the sense that he is urging his readers to reflect on their fleeting

Now that the remaining community has become a "risk society" that lives in constant fear for their safety, the group must collectively draw upon past ideas of morality to determine what is best for the group. This is stated by the author of "Rhetoric in Times of Crisis: How Financial Institutions Try to Restore Confidence" when she says that "By drawing on past experiences, we can generate an understanding of ethos and character and in turn assess the trust we have in those in charge of providing the value of security in risk society" (Molthagn-Schnoring, 2013). For the characters of *The Walking Dead*, trust is given to Rick Grimes.

Because of his ethos, people seem to look to him as a natural leader. As Quintilian stated, "vileness and virtue cannot inhabit jointly the selfsame heart" (p. 357) This is true when observing the character Rick Grimes. Even before the destruction of the world, Grimes was depicted as an honorable man, for he was a sheriff, and, as an enforcer of the law, he was encouraged to live by a strict moral code. He embodied the idea presented by Quintilian in the way that only virtue resided in the heart of Rick Grimes. This becomes evident in his actions and reactions to the destruction of the world. Grimes recollects that "The first time I saw a walker, it was just half a body, snapping at me from the ground, and my first inclination wasn't to kill it" (Darabont, 2010). While many people would have immediately shot the potential threat, Rick showed mercy by not killing the creature he encountered. Even though it was repulsive and potentially dangerous, he stilled viewed it as a life that deserved respect. This act shows that Rick was less susceptible to the loss of humanity that occurred after the apocalypse. While others lost those aspects that distinguished humans from walkers, Rick Grimes remained human by holding on to his moral character.

In addition, he further separated himself from the beasts by using the very gift that Quintilian suggests distinguishes humankind from other living creatures—the gift of speech. He used the idea of ethos, logos, and pathos throughout the series' first season and incorporates these methods of persuasion into his language to effectively persuade his fellow survivors. For instance, in Episode 2, the group is forced to mask their scents by chopping up a dead walker. However, before members of the survivors begin brutally chopping up the dead body, Rick stops them by pulling out the man's wallet. He takes a moment to remind the group that the dead walker was once a living person who still deserves to be respected. He then promises that he will forever remember the walker's sacrifice for the survival of his group. In fact, he states that "If I ever find my family, I'm going to tell them about Wayne" (Darabont, 2010). This use of ethical appeal falls in line with Quintilian's belief that no orator is effective unless he is a good man. Without virtue, Rick Grimes would not be as persuasive and effective in evoking emotions.

At the end of Season One, Episode 5, Rick's use of pathos becomes evident as the group of survivors travel to the Centers of Disease Control. As they find the doors locked, many members of the group begin to lose hope; however, Grimes fights to restore the group's sense of security. When he sees the camera move, he calls out to the one survivor left in the CDC. He then successfully uses pathos to allow him access through the door. He does this by calling out, "Please, we are desperate. Please help us. We have women and children. We have no food" (Mazzara, 2010). When these pleas do not work he then cries out, "You are killing us," and with those words, the doors are open (Mazzara, 2010). Because Rick Grimes successfully used pathos by appealing to the emotions of the CDC survivor, he was able to ensure the safety for his group. His raw emotions were an appeal at what humanity was left in the survivor hiding in the CDC, thus Rick successfully caused another character to consider morality in a world rapidly losing such ideals.

Conclusion

As *The Walking Dead* and *The 100* are both examples of worlds between times of chaos and order, they provide examples of how morality can be lost in times of post-apocalyptic crisis. Without the emergence of powerful leaders with the ability to use rhetoric effectively, humans begin to see a loss of humanity in a world without rules. With the techniques of such outstanding men and women, structure is able to be restored, and the survivors are able to endure the transition between one ordered existent to the next. ❖

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SARAH GROSSMAN

WUTHERING HEIGHTS: A FAIRY TALE AFTER ALL

In Emily Brontë's *Wuthering Heights*, written in 1846, she challenges the concepts and ideas found in traditional fairy tales. The traditional fairy tale includes a hero, damsel, villain, and a dilemma throughout the story. Older fairy tales, or folk tales, do not typically have a happy ending but simply have a conclusion, while more modern fairy tales have a happy ending to their story (Hintz 2). *Wuthering Heights* combines the two to make a different kind of fairy tale. The first half of the novel, focusing on Heathcliff and Catherine, evokes the older fairy tale, while the second half of the novel, which focuses on Cathy and Hareton, follows the contemporary version of a fairy tale. The novel follows the same story line as *Beauty and the Beast*, written a century prior to Brontë's novel. They are similar in describing men with beastly features, and the female characters choosing to love the beast for their inner qualities rather than their outside appearances. After comparing these two stories and looking at the female characters and at how the men interact with the women, we can conclude that the fairy-tale theme becomes very prominent. Brontë uses *Beauty and the Beast* as a model for *Wuthering Heights* to challenge the role of men and women in society by representing the characters as beasts and damsels. The male characters' beast-like attributes directly correlate with winning the love of a woman—or not. *Wuthering Heights* meets all the requirements of a fairy tale, while showing both sides of how the love of a woman can turn a man into a beast or save him from his beast-like characteristics.

Photo by Cheryl Wee.

Defining Fairy Tales

Fairy tales or folk tales have always been a way of building tradition, connecting people, and teaching lessons to children (Korneeva; Hintz; Lerer). Pier Paolo Piciucco wrote in his article "*Wuthering Heights* as a Fairy Tale," that the villain "generally appears as a cruel, aggressive, greedy and wicked character with dark eyes . . . with a hair-covered body" (223). The physical description of villains is how we recognize them in the text; they typically resemble werewolves, ogres, or beasts, and are extremely unattractive and cruel.

The modern fairy tale usually has a happy ending, with the prince getting the princess and a happy conclusion to the story. Older stories, however, such as the Grimm Brothers' stories, did not have this feature. The older fairy tales were used as lessons to teach children morals and codes of life (Lerer 1). For example, Hansel and Gretel are left in the woods and meet a witch who kidnaps them and tries to eat them. The moral of this story for children was to not put their trust in the wrong hands. In the original version of this story, the children were eaten, but in the more modern version they make it home safely. The differences between the tales shows that people's intentions changed over time because the dangers children should fear changed as well. Victorian fairy tales differ from the Grimm Brothers', too, in that they focus on courtship rituals between men and women.

They show women's perspective of being forced to love men they do not want and not having a choice in who they love. The fairy tale that will be compared to Victorian *Wuthering Heights* in this paper is the fairy tale *Beauty and the Beast.* They both have similar fairy-tale elements, such as a beast or villain and a damsel with a dilemma both characters must overcome.

Beauty and the Beast

Gabrielle-Suzanne Barbot de Villeneuve wrote *Beauty and the Beast* in 1740. This fairy tale contains the essential fairy-tale elements discussed earlier, although Villeneuve presents a complex, ambiguous picture of both the stereotypical "beast" and "damsel." Beauty, the protagonist, agrees to save her father by switching places with him in the beast's castle to be his prisoner. The beast possesses the outward characteristics of a villain: he is hairy, dark, and gruesome looking. The dilemma centers on the fact that the beast only has a small window of time left before he remains a beast forever unless a woman comes to loves him. Beauty identifies the redeeming qualities within him and slowly begins falling in love with him, and eventually he turns back into a prince because of her love. Cristina Bacchilega states that Beauty's choice to love the beast saves both herself and the beast, in addition to challenging society's current gender roles:

> Beauty gains far more than most fairy tale heroines, active or not, because her submission and sacrifice transform another being, and more specifically, a sexually and/or socially threatening male. A virtuous, insightful, determined woman can change a beast into a person—such is Beauty's power. Ancient and clearly related to our ability to produce new life, this belief in women's transformative powers has been reduced within patriarchal ideology to the popular "kiss a frog" motif. (78)

Even though Beauty follows some of the constructs of the fairy-tale damsel—partly through her name because she is a beautiful, young woman, and because she's fated to stay with the beast against her will—she also challenges it by choosing to love him, therefore transforming him from a beast. Tatiana Korneeva states in her article "Desire and Desirability in Villeneuve and Leprince de Beaumont's 'Beauty and the Beast'" that fairy tales turn women into objects of desire: "[They] also determine what kind of woman *men* should find desirable. Thus, the [fairy tale] genre implies two distinct aspects

of desire, a desired object, and a subject who desires the object" (235). Beauty turns into the object of desire in the story, and the beast becomes the subject who desires her. By describing Beauty's features and personality, Barbot de Villeneuve constructs gender stereotypes for the reader, reinforcing existing social norms about what makes women beautiful or attractive.

The story, however, complicates previous gender roles because Beauty is depicted as well read and knowledgeable, impressing the beast. At the time, women were not educated unless they taught themselves, and most women did not have access to resources to do so. Korneeva adds to this argument that one of Villeneuve's goals of the fairy tale was to challenge the role of women and their education:

> Villeneuve [was] proposing an educational curriculum capable of producing a woman endowed with psychological depth rather than being merely a physically attractive surface, a woman who would excel in qualities that differentiate her in terms other than her family's wealth and title. By displaying tireless concern for wellbeing of others, Villeneuve's protagonist embodies moral rather than material values or idle sensuality. (245)

Beauty cares for the beast, along with his health and safety, which also makes her different from other women in fairy tales. The beast complicates the gender roles of male characters who are hideous and cruel suitors. Contrary to modern interpretations of the Beast which argue that his outside is made to reflect his inner personality defects, Villeneuve portrays the Beast as a kind and thoughtful character who just happens to be cursed; a depiction which runs counter to the nature of villains presented in fairy tales. The Beast shows kindness to Beauty by giving her permission to go home to see her father and assure him of her health. Through these representations of the two characters, Villeneuve questions the development of the fairy tale and proves that no character completely falls into the restrictions of their gender roles.

Beauty still has the choice of whether she will love the beast or not. This is interesting because women at this time did not typically have a choice of who they could love. Barbot de Villeneuve thus questions the way society controls women's choices on courtship and love. The beast's hideous nature can only be seen when viewing his outward appearances, but he

remains nice and caring to Beauty as she stays with him. She learns to love him for what she sees on the inside, and she hates to see him in pain from his curse, telling her sisters: "I would die to save him from pain. I assure you it is not his fault he is so ugly" (Barbot de Villeneuve 23). She talks to a prince in her dreams, and it becomes clear, even though the prince's outward appearance is attractive, his inner qualities are ugly and grotesque. He tells her to leave the beast to die and asks why she should care if he dies. Barbot de Villeneuve does an excellent job in showing both sides in the fairy tale of women being forced into unwanted marriages, but the power of love in a relationship. Richard Conway defends this idea because Beauty chose the beast instead of the wealthy, handsome prince, arguing for Beauty's "renunciation of wealth and her recognition that goals beyond mere social position should be the focus of a woman's powers" (304). This means that by choosing the Beast and not the Prince, Beauty shows that women have the power to choose someone to love for more than money, beauty, and social position. By learning to love the beast for more than these qualities, Beauty breaks the restrictions fairy tales placed on female characters by choosing to stay and love the beast when he sets her free. Love does not have to equal beauty or social

position for her. She learns to love the beast even though he is isolated, cruel, and grotesque but, with her love, he transforms from a beast to a man. Beauty's decision to love the beast demonstrates the power of women's choices in courtship rituals.

The characters and plot of *Beauty and the Beast* directly compares with those of *Wuthering Heights*. Brontë creates her novel as a revision of *Beauty and the Beast* to further explore the ambiguities present through the two different plots in *Wuthering Heights*. Carrie Hintz discusses the concept of revising fairy tales in her book *Reading Children's Literature,* in which she explains that many fairy tales are revised from previous ones with a fresh element in the plot, setting, and/or characters (60). *Wuthering Heights* and *Beauty and the Beast* are very similar, making *Wuthering Heights* seem like a revision of *Beauty and the Beast.* The beast correlates to Heathcliff because they both represent villains with their cruel and gruesome nature. Beauty's character reflects both Catherine and Cathy as the damsel in distress. In "Beautiful Maidens, Hideous Suitors: Victorian Fairy Tales and the Process of Civilization," Laurence Talairach-Vielmas explores the way Victorian fairy tales were

Photo by Cheryl Vee.

written at the time, showing the ways Victorian writers reconfigured villains and damsels:

> The ambiguous reading that the illustration offers, simultaneously suggesting Beauty's wild nature and her relationship with the Beast, on the one hand, and the construction of the Victorian lady, fated to be objectified and sold in marriage, on the other, was developed further in Victorian tales figuring beautiful maidens and hideous suitors. (Talairach-Vielmas 8)

This adds to Brontë 's notion of the beast-like characters and damsels in *Wuthering Heights.* In the beginning of the novel, Heathcliff is almost saved from transforming into a monster by Catherine's love; this is similar to the beast being saved from staying a monster because of Beauty's love. Heathcliff and Catherine demonstrate what could have happened if Beauty had not fallen in love with the beast and had instead picked the prince – the rich, handsome man. Michael Popkin explains in his essay "*Wuthering Heights* and Its 'Spirit'" that the difference between Catherine's failure and Beauty and Cathy's success comes with the immaturity and maturity of the characters. He determines that maturity equals human fulfillment because the characters discover that loving someone for more than money or looks creates a greater happiness (Popkin 3). He explains that Beauty grows while staying with the beast and discovers that viewing the beast as only a beast is immature, and she feels love and fulfillment when she chooses to love him completely (3). This directly correlates with Cathy's love for Hareton because she must accept his beast-like features and imperfections before she can genuinely love him.

Wuthering Heights: First Generation

Wuthering Heights can be seen as a fairy tale by examining the two plots contained within the story. In the beginning of the novel, the first plot focuses on Heathcliff and Catherine. When Heathcliff, the beast or villain in the story, first arrives at Wuthering Heights, he looks like a "dirty, ragged, black-haired child," and Mr. Earnshaw keeps referring to him by the pronoun "it" instead of "he" (Brontë 29). This is the first introduction to Heathcliff as a beast. He becomes a close companion to Catherine as a child, so the reader feels optimistic that Catherine's love will save him from his beast-like characteristics, such as his cruel and untamed nature toward others. But once Catherine picks

Edgar Linton to marry instead, Heathcliff loses all redeeming characteristics. As Catherine says:

> Tell her what Heathcliff is—an unclaimed creature, without refinement, without cultivation; an arid wilderness of furze and whinstone. (. . .) He's not a rough diamond —a pearl-containing oyster of a rustic; he's a fierce, pitiless, wolfish man. (79-80)

Heathcliff turns from a man into a beast because he lost the love of the one woman he cared about. Heathcliff and Catherine show that a man transforms for the worse when he loses the love of a woman. The two have an overly complicated relationship that is more that just about love, and, as K. C. Belliappa says in her article, their relationship is "more than love, passion, commitment; it is a craving, a need of a more fundamental kind" (41). By growing up together, Catherine sees his redeeming qualities and loves Heathcliff. However, despite knowing his redeeming qualities, Catherine rejects them by choosing status over love. Nelly accuses Catherine of only loving Edgar because he is "handsome, and young, and cheerful, and rich," and if he did not have those qualities, she would not want him (Brontë 61). Brontë shows that Catherine 's choice of money over love not only destroys Heathcliff, damning him to monstrosity, but also herself because her decision to choose security results in her becoming a damsel in distress emotionally.

Even with her love for Heathcliff, Catherine chooses Edgar because she says, "[i]t would degrade me to marry Heathcliff now; so he shall never know how I love him: and that, not because he's handsome, Nelly, but because he's more myself than I am. Whatever our souls are made of, his and mine are the same" (62). Popkin argues that, by betraying her own heart and choosing Edgar for his outward appearances, Catherine also turns into a beast by not seeking true love (10). This creates a new dilemma in the fairy tale if both man and woman are beasts. Brontë deliberately fosters this monstrous ambiguity in her portrayal of these characters. Scholar Jacqueline Simpson describes "Heathcliff as a rebellious demon and Catherine as an ineffective wizard" because neither of them keeps any redeeming qualities in the novel (52). Catherine's description as a wizard correlates to her ability to manipulate others with her constant changing emotions. The characters and the reader never know what she is thinking or what her true intentions are. Samantha Przybylowicz defends the theory of Catherine being a villain because she

manipulates and antagonizes the other characters:

> One of the reasons I believe we find it hard to pinpoint Catherine as a villain, other than her being overshadowed by Heathcliff, is because of her agency in constantly changing her identity. At any time in the novel, we are unable to label her as filling any one role; she repeatedly shifts into other manifestations of herself. (12)

The reader becomes confused and struggles to keep track of Catherine's different identities, so they do not know whether to sympathizes with her or condemn her. Catherine's quixotic nature demonstrates her choice causing in the ending she has. Brontë creates all of her characters in this manner, so no one is completely good or bad; therefore, she rejects the fairy tale concept that there is a perfect prince for a perfect princess.

Wuthering Heights continues to follow the fairy tale theme that men make the damsels feel distressed. Brontë complicates this notion by implying a woman's love can save the man, rather than the man saving the women. While fairy tales and *Wuthering Heights* show the redeeming qualities of a woman's love, Catherine's decision to choose Edgar over Heathcliff shows the other side of that narrative aspect in that men who do not receive women's love go unsaved and become monsters. Heathcliff watches Catherine's house to assure himself of her safety, while her husband, Edgar, watches her inside the house; effectively, the two men become the guards of Catherine's prison, and they control all of her actions. In response to her own unhappiness from her choices and the monstrous behavior of the men, Catherine becomes extremely ill and dies while giving birth to a daughter, Cathy. After Catherine's death, Cathy takes over as the protagonist in the novel, starting the second plot. When she becomes a teenager, Heathcliff kidnaps Cathy to marry his son, Linton Heathcliff, who later dies, but now Cathy must stay with Heathcliff forever since her own father died. While Cathy's role is to show what Catherine could have been, Brontë uses Hareton Earnshaw in the same way to represent Heathcliff's unrealized potential goodness. Cathy gives Hareton Earnshaw love and kindness, which reverses his beast-like traits and turns him into a perfect suitor with whom she falls in love and marries. The two plots connect, making a full fairy tale with the failed happy ending of a fairy tale between Catherine and Heathcliff and a

fulfilled happy ending with Cathy and Hareton when he receives the love of a woman. The contrast between the two endings and the ways the characters' choices define their roles as villains or damsels reflects the ways that Brontë's society allowed for more complexity and ambiguity than the public for whom Villeneuve wrote.

Wuthering Heights: Second Generation

The birth of Cathy and death of Catherine represents rebirth and potential re-balance in the fairy tale because Cathy becomes the only character without beast-like qualities at this time. Joseph Carrol argues that this second generation has the same characteristics and potential of the first, but Cathy chooses to do better, while Linton does not:

> By rising above that snobbery and forming a beneficial bond with [Hareton], [Cathy] resolves the conflict between social ambition and personal attachment that had riven the previous generation. Linton Heathcliff had embodied the worst personal qualities of the older generation— the viciousness of Heathcliff and the weakness of the Lintons—and Hareton and the younger Cathy together embody the best qualities: generosity and strength combined with fineness and delicacy. (15)

As Carrol notes, Linton takes the path of his father and refuses to accept Cathy's love even when she tries to take care of him while he's sick. Because he does not accept or return her love, he keeps his beast-like characteristics and is described as turning into a "wretched creature" (Brontë 213). Here, Brontë uses ambiguity to play with the portrayal of male characters in fairy tale. Both Heathcliff and Linton want to claim dominance in their lives and do so by trying to control the women around them. Both men find dominance over the women by kidnapping them. Similarly to *Beauty and the Beast*, the men treat women like property and try to remove their identity and sense of self. Unlike *Beauty and the Beast*, the male characters in *Wuthering Heights* do not respect the females because they hold them against their will and speak negatively toward them. Heathcliff and Linton constantly degrade Catherine and Cathy throughout the novel and never respect them as human beings.

Although fairy tales reinforce the gender role of men being strong physically and mentally, Brontë undermines that part of the

fairy tale structure through her portrayal of Linton Heathcliff. Examining Linton and Heathcliff's response to him, the notion that male characters are not supposed to show any kind of weakness becomes clear. Therefore, Linton's sickness makes Heathcliff resent him, and his father's rejection makes Linton harsher to Cathy. Heathcliff wants to keep the men in power, and he uses cruelty and violence to do so. He teaches this lesson to Linton, who then treats Cathy with cruelty to control her and keep her prisoner:

> [Heathcliff] says I'm not to be soft with Catherine; she's my wife, and it's shameful that she should wish to leave me! He says, she hates me, and wants me to die, that she may have my money, but she shan't have it; and she shan't go home! She never shall! She may cry, and be sick as much as she pleases! (Brontë 212).

He believes by controlling her and keeping her prisoner, she will relent and accept her place as his wife. The men try to use control and brutality to remove the woman's choice in who to marry and love—Brontë uses this portrayal to create the underlying monstrosity of the male characters. She develops the theme that women save men by choosing to love them, while men become monsters by removing women's choice. Richard Conway describes the conflict between the male characters and their need to control the women by noting that Brontë's portrayal of Heathcliff and Linton shows that a woman must be disciplined "'else she'll get so masterful, there'll be no holding her'" (296). He continues to argue fairy tales use this portrayal of men/villains to keep the social structure of society with men in power. If men bring women down continuously, they will not fight or challenge the rules as they grow up.

Older fairy tales present women as passive and easily manipulated because they are weak and uneducated; a notion that Brontë critiques through Cathy's determination to become educated. When Heathcliff kidnaps Cathy and traps her in his house to marry his son, the only resource she has to defend herself is her education. Many feminist critics believe this type of story is portrayed in fairy tales and these stories "reinforce gender stereotypes such as female passivity and an emphasis on stereotyped female beauty" (Hintz 141). Unlike the older fairy tale models, Cathy, however, does not fit this stereotype; because of her thorough education, she argues and fights back against Heathcliff any chance she gets. The lack

Photo by Abigail Keenan.

of education connects to Carrol's postmodern perspective that "these components theories emphasize the exclusively cultural character of symbolic constructs" because the women cannot fight back without an education (7). This theory states that men placed themselves in power through social construction and push women down in order to stay in control. Nancy Armstrong contends that fairy tales have a direct correlation to the social construction of society between men and women:

> During the eighteenth century, one author after another discovered that the customary way of understanding social experience actually misrepresented human value. In place of the intricate status system that had long dominated British thinking, these authors began to represent an individual's value in terms of his, but more often in terms of her, essential qualities of mind. Literature devoted to producing the domestic woman thus appeared to ignore the political world run by men. Of the female alone did it presume to say that neither birth nor the accoutrements of title and status accurately represented the individual; only the more subtle nuances of behavior indicated what one was really worth. (Armstrong 12)

Brontë does what Armstrong states by showing the female characters as well-educated and strong. The characters in *Wuthering Heights* show the relationship culture of the time period of how men and women interact with each other; men like Heathcliff and Linton constantly try to degrade the women while taking their social positions, and women like Cathy fight back against the way they are being treated and restrained.

Similarly to Linton, Cathy starts to take the older generation's path when she is first forced to live under the same roof as Hareton. Brontë does this to show that the characters' happy ending depends on their own personal choices. Cathy mocks Hareton for being uneducated and refuses to see anything but the beast-like characteristics on the outside:

> "Miss Catherine! I can read yon, nah."
> "Wonderful," I exclaimed. "Pray let us hear you – you are grown clever!"
> He spelt and drawled over by syllables, the name –
> "Hareton Earnshaw."
> "And the figures?" I cried, encouragingly, perceiving that he came to a dead halt.

> "I cannot tell them yet," he answered.
> "Oh, you dunce!" I said, laughing heartily at his failure.' (Brontë 190)

As Cathy continues to make fun of his lack of education, Hareton tries harder to prove his capability by taking her books and trying to teach himself to read. Cathy ignores his efforts at first until she finally becomes so harsh toward him that he gives up completely. He gives all of the books to Cathy, but, as she continues to mock him, he "gathered the books and hurled them on the fire" (229). Cathy's following in her mother's footsteps is due to her position as a damsel trapped by the monstrous Heathcliff. In attempting to reject the role of damsel, she gives into more monstrous impulses herself. Through her attempts to reject the role of damsel, she does everything she can to provoke the people around her. Here, Cathy's choice to be cruel and unloving have direct consequences on those around her. Her harshness starts to turn Hareton more into a beast than he was previously presented.

However, Cathy changes from the previous generation and starts to show kindness and love towards Hareton. She starts to appreciate his efforts in trying to learn and better himself and admits she does not want to hinder his education when Nelly, the housekeeper, says, "I saw she was sorry for his persevering sulkiness and indolence. Her conscience reproved her for frightening him off improving himself" (Brontë 237). She then feels guilty for the way she treated him and decides to try to teach him to read. As she teaches him, she falls in love with him, transforming him from a beast to a man, and Przbylowicz says, "Cathy falls in love with Hareton and accepts him—the act that her mother could not perform when she decides that to marry Heathcliff would be degrading" (18). Cathy chooses love over money and social class, unlike her mother in the first plot of the novel. Hareton loses all of his beast-like characteristics as he was described in the beginning of the novel, with "his dress and speech were both rude (. . .) his thick, brown curls were rough and uncultivated, his whiskers encroached bearishly over his cheeks, and his hands embrowned like those of a common laborer" (Brontë 9). However, once Cathy chooses to love him and he chooses to love her in return, he loses all of his beast-like characteristics and is described as "a young man, respectably dressed, and seated at a table, having a book before him" (233). Cathy's love completely erased all his beast-like

characteristics, including his rough looks, his rude manners, and his lack of education. The difference between Linton Heathcliff's failure and Hareton's success in the novel is Hareton accepted and loved a woman while Linton refused to.

Conclusion

Looking at the two different plots of the novel it is clear to see the difference in the beast-like characters when they lose and gain love. The villain throughout the novel, Heathcliff, changes from man to beast because of external factors: "Hero-Heathcliff of the introductory sections becomes the villain-Heathcliff in the second part of the novel" explains Piciucco (222). Piciucco also notes that Heathcliff has redeeming characteristics in the beginning of the novel and continuously tries to save Catherine from the external factors that keep trying to hurt the two of them, such as her father, money, and Edgar (225). Once Catherine picks Edgar, Heathcliff loses her love, causing him to also lose his redeeming hero qualities and turn into the villain of the novel. Brontë describes him as looking like a beast with dark skin, thick hair, and a stocky build, making him larger than other male characters in the novel. Catherine is portrayed as the damsel in the novel because she constantly becomes sick or depressed and needs to be saved from herself and her choices. The last time she becomes sick, she refuses to eat or come out of her room for even her husband. When she dies and Cathy is born, Cathy replaces her in the role as the damsel. Edgar constantly protects her and will not let her go see Heathcliff until he lures her to Wuthering Heights and kidnaps her to marry his son.

The two fairy tales, *Beauty and the Beast* and *Wuthering Heights*, have remarkably similar story lines and both reject the stereotypical depiction of women in fairy tales. Beauty and Cathy rely on their education rather than their looks to succeed in their intended goals. By not focusing on appearances or social position, they achieve their own true happiness with beasts who other women would normally reject. This rejects the idea that women are forced into relationships they do not want, or they only care about money, social class, and appearances. Fairy tales portray men as being dominant and forcing themselves to be in charge as can be seen through Heathcliff and Linton. They use power and cruelty to push women down to keep their social positions. In *Wuthering Heights*, both monstrous male characters end up dying;

Brontë shows that power and money mean nothing without love. Hareton, who has nothing, lives and falls in love with Cathy so he becomes wealthy in a different way. Brontë helps to create a new kind of fairy tale by questioning and rejecting previous fairy tale values and ideals. She revises the fairy tale to show that choices determine who deserves a happy ending. ❖

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SOCIAL
SCIENCES &
EDUCATION

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BRAIN DISORDERS AND GIFTEDNESS IN CHILDREN

In every sector of education, key terms used to define certain ideologies or concepts assist in categorizing a subject. The same is true in physiological psychology, including when addressing the definition of giftedness. This is an area of particular concern because an institution's means of defining giftedness will determine whether a child is labeled as such and thus, whether they are given the treatment they need to flourish. Because this definition can vary from place to place, children who may be identified as 'highly intelligent' in one institution may not be similarly identified in another. This discrepancy, some may argue, can invariably put some children at a disadvantage.

In the 20th century, giftedness in children was initially perceived as only valid if the child excelled in all areas of academics. This form of giftedness is defined as 'global giftedness.' The first known study identifying global giftedness occurred in 1921, when researcher Lewis Terman tested 1,500 children who were all about 11 years old and achieved a 135+ on an intelligence test known as the Stanford-Binet IQ test (Little, 2001). Because of this experiment, Terman was able to statistically support the notion that gifted children were not always weak, unobservant, socially apt individuals, but could very well be healthy and require social adjustments in order to better function in society. Sadly, those who reviewed this study took Terman's results to indicate that gifted children did not need supplemental assistance in order to excel, which is wholly inaccurate. Issues with experimental design, however, were prominent throughout this study. Because Terman's sample pool was selected by teachers, professor bias towards students who were more talkative and less problematic in the classroom was highly likely. Moreover, Terman's selection of students were only representative of one group of students since they all came from the middle class (Little, 2001). As such, the above study does not accurately identify what giftedness could be for all members of society.

As evidenced by Terman's study, defining giftedness is also an issue because of human bias towards more socially acceptable persons. Those with disabilities that make social networking difficult may be overlooked in education because of the belief that they are incapable of doing well. Hence, eliminating this

Photo by Praqyan Bezbaruah

bias is one of the first steps towards first identifying giftedness and then nurturing it. In a way, then, one could say that giftedness needs to be addressed on both a global or institutional scale as well as on an individual scale.

Another issue with defining intelligence besides individual and institutional biases comes with the environment that a child finds him or herself in. If situated in a more supportive area that allows a child to express him or herself freely, or if situated in conditions that are specific to a certain subject (such as science, technology, or mathematics), a child's intelligence may be more easily shown than in a more repressive environment (Flavell & Markman, 1983). Therefore, environmental factors play a significant role in identifying giftedness.

Some resources may correlate high intelligence with creativity. As such, defining creativity is also important for the public. Researcher Alice Flaherty describes creativity as a specific state of the brain during which the individual in question creates new actions that further a community in some aspect (Flaherty, 2011). She believes that the level of creativity found in a child or adult varies depending on how much motivation and talent he or she has. Authors Flavell and Markman address this idea as well, labeling traits like motivation and persistence as non-intellective components of intelligence as a whole (Flavell & Markman, 1983). If a child is highly motivated or is aware of some form of meaning behind the work they do, they are more likely to produce more creative work and may thus more likely be identified as 'talented' or 'gifted.' This definition shows that giftedness is a trait that can be built over time instead of one based on a child's innate capabilities.

Nevertheless, many students who have certain brain illnesses tend to exhibit high creativity and thus high intelligence. Examples of these include those with moderate hypomania, as said individuals tend to be significantly self-confident and express hyper-association. Because of these traits, children with moderate hypomania tend to also be goal-driven and highly intelligent. One widespread misconception about brain illness and giftedness is that children with Attention-Deficit Hyperactivity Disorder (ADHD) are always gifted. This is not always the case and there is no research to support that claim (Flaherty, 2011). The issue here comes with associating hyperactivity with creativity. Children

with ADHD do not selectively focus on a goal like a child with moderate hypomania would, and thus the former would not produce more novel, useful tools for society (Flaherty's definition of creativity) than the latter would (Flaherty, 2011).

Physiologically, interactions between the frontal lobe and temporal lobe highly influence the level of creativity in an individual. This is true because the frontal lobe is correlated with the production complex actions, while the temporal lobe is correlated with language recognition and social understanding (see **Figure 1**). These two lobes inhibit one another which is supported by the fact that lesions in the temporal lobe (such as those that take place in Wernicke aphasia) that occur by promoting frontal lobe activity will augment the amount of motivation the individual in question exhibits (Flaherty, 2011). However, those with Wernicke aphasia specifically cannot understand speech as well as their counterparts and tend to move and speak more. Conversely, those with Broca aphasia (lesions found in the frontal lobe rather than the temporal lobe) produce less movement and speech than their peers.
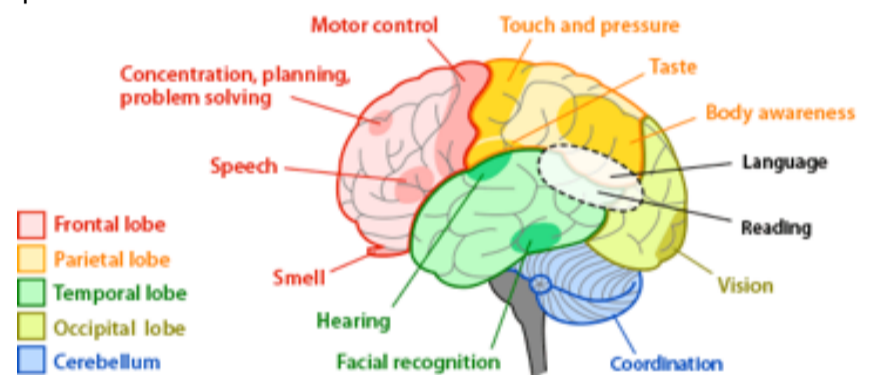
Figure 1. Regions of the brain. The frontal lobe (indicated in red) is associated with producing complex actions, while the temporal lobe (indicated in green) is associated with understanding speech and social cues. Lesions in either of these lobes produce lowered abilities in one and heightened behaviors in the other, but the interaction between these lobes influences a child's output to society (what Flaherty identifies as creativity). This output to society may be used as a measurement of giftedness. Image from Syzmik, 2011.

Learning, Memory, and Intelligence

Giftedness tends to be highly associated with learning disabilities that enhance the functionalities of one part of the brain, but hamper those of another. There are three overarching categories of children with learning disabilities are also identified as gifted: (1) those with almost imperceptible learning disabilities but who have been labeled as gifted; (2) those with average abilities that obscure underlying gifts or disabilities. These children are not labeled as 'gifted' because they are not believed

to be so; (3) and those with discernible learning disabilities that have been labeled as gifted.

Children with almost imperceptible learning disabilities are not as difficult to identify as gifted because they have high IQ test scores or do exceptionally well in comparison to their peers. Usually this form of exception is in the area of speech, while complementary skills like spelling are poor. Many of these students are not identified as having learning disabilities because their giftedness is used as an excuse for their behavior. This knowledge gap makes achieving greater goals difficult for said pupils because they are at a loss for why they function the way that they do. Hence, screening for learning disabilities could be an important step for all students to take regardless of capabilities in the classroom. One could argue, however, that screening all children for learning disabilities increases the likelihood that false positives may take place. Nevertheless, just knowing that a disorder might exist is more beneficial than being completely unaware of it. Parents and educators can request additional testing to support claims made by a screening as well.

Children with average abilities that obscure underlying gifts or disabilities are usually not identified as gifted despite being so. This is the case because many of these children do not exhibit bombastic, exceptional behavior plainly for their teachers to see but are typically shy in the classroom (Little, 2001). Hence, educators may not pay as much attention to them as compared to a student who continuously answers or poses questions. In order to address this issue, teachers should first realize that each student – no matter how quiet he or she is – can be just as gifted as the next. Using different techniques and carrying out more one-on-one sessions with students can be helpful in identifying individual intelligence.

Lastly, children with discernible learning disabilities who have been labeled as gifted are firstly seen as handicapped because of what hindrances they have. These children have more clear learning disabilities and thus, teachers and parents find it difficult to look past the disability and see the gift. Usually, these students cause the most disruption in school and are the most distracted, which may put them in a negative limelight in the eyes of an institution (Little, 2001). Identifying these children as gifted, therefore, takes elimination of poor biases towards a student and the decision to see bad behavior in a fresh perspective. Interestingly,

then, one could say that identifying giftedness for these children depends mostly on the teacher's willingness to do so and not whether or not the child is intelligent.

In order to promote success in gifted children with learning disabilities, their self-efficacy must be enhanced (Little, 2001). Self-efficacy is the belief that one can carry out certain actions and therefore reach some level of achievement. Despite the general nature of this term, self-efficacy varies quite substantially depending on the child since achievement is intrinsically based. Children with learning disabilities, for instance, may have different perceptions of what a challenge is and, thus, what counts as an achievement. As a more specific example, non-gifted children may see remedial courses as challenging while gifted children may not. Both of these groups may be placed in the same classroom; however, their level of personal achievement—and hence, success—would vary.

When attempting to determine what a child's strengths and weaknesses are in the classroom to identify what they would regard as a challenge, teachers and parents should first start out by observing what a child finds most interesting to do (Little, 2001). Hobbies sprout from intrinsic creativity and motivation, all of which can fuel the production of novel tools for society as previously addressed. Programs that will help gifted children with learning disabilities should have four structural guidelines in mind: (1) spend less time trying to fix weaknesses and more time developing the student's strengths. Doing so increases their self-esteem and decreases stress. (2) Create a nurturing environment for the student that highlights the importance of diversity. Here, diversity does not denote culture but rather differences in communicative skills. Examples of these are in writing essays, creating videos, drawing, or playing music. All of these skills are methods of communication and some students may excel in one format more prominently than in another. (3) Have compensation strategies for types of learning. If a student is struggling with handwriting, allowing him or her to learn how to type on a computer may be better than undergoing handwriting classes. (4) Finally, push students towards understanding their strengths and weaknesses so that they can make personalized decisions for their futures (Little, 2001).

Savant Syndrome: A Classic Example of Giftedness in Children

Savant syndrome (savant coming from the French term *savoir*, or "to know") is a developmental disorder in which children experience disabilities related to the brain and spinal cord (which comprises the central nervous system). Autism is an example of such a disability, but it is not the only hallmark of this syndrome. Savant syndrome can either be congenital (occur during the earlier stages of life) or acquired (develop later). The incidence of this syndrome takes place about 4-6 times more often among males than among females (Treffert, 2014).

Affected individuals usually have heightened skills in one or more of five areas: music, art, calculating, mathematics, and mechanical or visual-spatial work, although other skill areas may be relatively augmented. More generally there are three categories of savants based on what kinds of skills they exhibit: splinter skill savants are those who have oriented memory towards specific areas like sports trivia, birthdays, or maps. Talented savants have conspicuous gifts, while the third category of savants—prodigious savants—have notably apparent skills that a prodigy would be identified as having if in a person without a disability (Treffert, 2014).

As widespread as savants can be, there seems to be the general inaccurate notion among the public sphere that all individuals with Savant syndrome are autistic. This is the case especially in the media, where shows like "The Good Doctor" and movies like *Rain Man* (1989) perpetuate the idea that to have Savant is to be autistic. In reality, nine out of ten people do not have autism but are still categorized as having Savant (Treffert, 2014). Acknowledging that diseases related to heightened intelligence like Savant syndrome are not always associated with a specific learning disability like autism, therefore, is important both for accurate diagnosis of the illness and for establishing a supportive environment to grow a child's gift.

Real-World Examples of Gifted Children

Giftedness is a skill that tends to be more highly associated with learning in the classroom, but this is not always the case. Intelligence takes place in all areas of life, including in the classroom, in music, in art, and more. An example of a gifted child who contributed substantially to the advancement of society is Albert Einstein. Einstein, a renowned physicist for the theory of relativity and his work on energy (Biography.com, 2019), is a classic example of giftedness. Despite his high intelligence, Einstein was not able to speak until he turned 4 years old and even then he could not read until he turned 7 years old. Another gifted scientist, Thomas Edison, acclaimed for inventing the lightbulb, was believed to be intellectually below average when growing up, yet he excelled in the area of creativity. Winston Churchill, the British prime minister during World War 2, did not pass the sixth grade (Little, 2001). These examples of successful children showcase that the concept of global giftedness is not always accurate. One can do poorly in one subject area but, given the right environment, overcome barriers to achieve great success.

Conclusion

The issue of giftedness is one that requires both internal and external searching in order to eliminate any biases of what a child with high intelligence looks like. Once these children are identified through careful attention and analysis of holistic testing, teachers and parents should spend most of their time creating nurturing environments in order to avoid focusing on certain learning disabilities that may also exist. Arguably most important, though, is the process of letting gifted and 'non-gifted' children know that they are special, since raising self-esteem can do wonders for a person's future. ❖

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JESSICA BRABBLE
SHELL-SHOCK AND SHRAPNEL SCARS: TREATING THE "WAR WOUNDED" OF WORLD WAR I

World War I—"the war to end all wars"—left the world looking much different than it had before. By its end in 1918, World War I had caused over 37.4 million casualties worldwide.[1] Millions of soldiers were sent home missing a part of themselves—whether it was their arm, their sight, or their sanity—and they faced the difficult task of re-learning how to live without what they had lost. As these soldiers returned, their home countries scrambled to find the best way to treat them. Through medical treatment, pensions, and rehabilitation, countries aimed to reintroduce their "war wounded" successfully back into society and return them to their former lives. This comparative study of three combatant nations—the United States, Great Britain, and Germany—seeks to shed light on the medical and social successes of rehabilitating the war's disabled men.

Due to advancing medical treatment, sanitation, and vaccinations, more soldiers than ever were able to recover from their injuries. Most of these soldiers were able to return to the front after a short stay in a field hospital. However, if a soldier was unable to return to the front—even after a prolonged period of rest—he was returned home. Most often, these were soldiers who had been mutilated to an extent that made them unable to perform well if returned to battle. These "war wounded" were commonly disabled by loss of one or more limbs, blindness, deafness, and psychological ailments. Although an increase in medical advancements allowed for most of these men to return to normalcy, many had to face the new reality of being permanently disabled.

British and German Wounded, Bernafay Wood, 19 July 1916. Photo by Ernest Brooks.

The United States

On April 6, 1917, the United States officially entered World War I. By the time it ended in November 1918, nearly 1.3 million Americans had served in some capacity.[2] In that timespan, hundreds of thousands of American soldiers were hospitalized; their injuries ranged from muscle fatigue to psychological breaks to shrapnel injuries. Luckily, "a very large proportion—about eighty percent—of men handled through the hospitals overseas successfully recover and return to the front for further service."[3] According to William C. Gorgas, the U.S. Army surgeon general of the time, this high percentage of soldiers returning could be attributed to advances in preventive medicine and modern sanitation.[4] But what about the twenty percent that couldn't return to the front? "Of those returned from overseas, almost ninety percent are candidates for physical reconstruction only. About twenty percent are permanently disabled, partially or totally. . ."[5] This volume of disabled veterans wasn't entirely new for the United States—the nation's experience with the Civil War had brought in a high number of wounded—but its leaders felt it was imperative to find a better way of helping these men deal with their disabilities. This help came in four main forms: pensions, physical rehabilitation, mental rehabilitation, and vocational rehabilitation.

Pensions

Although pensions were not a new concept for the United States, the government felt they had spiraled out of control by World War I. Because of the number of veterans from previous wars— the Civil War and the Spanish-American War in particular—"pensions accounted for nearly half of federal expenditures."[6] Therefore, the United States government took several steps to improve the function of pensions during World War I; the first of these was the War Risk Insurance Act (WRIA). In October of 1917, the WRIA was presented by Julian Mack; it "introduced the principle of insurance as part of the contract of employment between the government of the United States and its men and women in uniform."[7] Because of the War Risk Insurance Act, soldiers were able to "purchase short-term insurance policies in case of disability or death."[8] This act also granted the disabled soldier the "right to receive medical care until he was maximally restored."[9]

Congress also established systems for disability compensation and vocational rehabilitation post-war. In June 1918, the Vocational Rehabilitation Act was passed. This act provided "extensive physical treatment and vocational training for all disabled ex-servicemen."[10] Those who qualified would receive free medical care, prosthetics, school tuition, and a monthly stipend. By the 1920s, three different federal agencies were in place to help administer benefits: the Veterans Bureau, the Bureau of Pensions of the Interior Department, and the National Home for Disabled Volunteer Soldiers.[11]

Physical Rehabilitation

With the War Risk Insurance Act and the Vocational Rehabilitation Act in place, the United States set forth to make good on their promise to rehabilitate soldiers. First, they knew they had to provide returning soldiers with the proper medical professionals to help them overcome any physical disabilities they had gained. The best people for the job were orthopedic surgeons; however, these were few and far between. Before World War I, there were only about 100 orthopedic surgeons in the United States; most of these were pediatric surgeons. These surgeons quickly became leaders in the rehabilitation movement, but they needed more hands than were available.[12] To remedy this, the military began to recruit women into the field of physical therapy.

Women were desired for the field of physiotherapy because male orthopedic surgeons felt they posed "less of a threat"[13] to them than male physical therapists would. Additionally, women would be less likely to stay in the job field long-term; once their duty was done, they would most likely return to their home life. Comparatively, men that entered the field would create competition for the surgeons who had already established their practices. The ideal candidate, in the surgeons' opinions, would be a woman with a "background in physical education, a profession that until that time had not been part of medical practice. Such a woman, they believed, would be more of a drill sergeant than a bedside nurturer."[14]

By 1918, the physical therapy industry had exploded. By the summer of that year, Reed College in Portland, Oregon, had accepted more than 200 women for its first four-month course in physiotherapy reconstruction.[15] Once they completed their training, these women would

receive $50 per month[16] and housing[17] in exchange for their work. Comparatively, women in the cotton manufacturing industry earned approximately $62 per month, but had to find their own housing.[18] These newly trained physical therapists used a variety of new techniques on disabled veterans; "hydrotherapy, mechanotherapy, electrotherapy, massage, and exercise"[19] were all commonly practiced by physical therapists. "By the fall of 1918, the War Department allotted approximately $3,000 to each hospital for the purpose of constructing permanent curative workshops"[20] to accommodate these newfound techniques.

Physical therapy was most often used for men who had suffered from wounds to the appendages. However, not all these injuries called for such drastic action as amputation. Many men with partial paralysis or other, milder difficulties that did not require amputation had the option of using other means to improve their lives. For these soldiers, "all kinds of supports, braces, and the like, of great ingenuity and in wide variety, have been devised."[21] They would be fitted with a support or a brace, and then begin physical therapy in order to attain the best possible range of motion with their paralyzed limb.

Those who did have to have a limb amputated were fitted with a prosthetic piece. Although the hope was that prosthetic limbs would help soldiers return to their normal lives, the process was far more grueling than many soldiers wanted to go through. Amputee-soldiers would first have to be led through a series of "stump pounding" drills by physical therapists in order to toughen the skin around their amputation site.[22] Once the soldier made it through this ordeal, he would have to keep the residual limb "healthy and free of infection."[23] They would then be fitted with a prosthetic limb, most likely the "Liberty Limb." This was a mass-produced prosthetic piece made of modular parts composed of compressed wood fibers.[24] Once the limb was on, it could cause the site to get "hot, sweaty, and . . . get sores if it doesn't fit properly."[25] Because of this, some soldiers simply chose not to wear prosthetics.

For deaf or blind men, physical rehabilitation was a matter of re-learning how to read. Blind men had to learn how to read Braille; "one year is considered as the average length of time required to teach a blind man Braille. . ."[26] For deaf men, lip-reading was a necessity. "It has been the experience of all who have studied the problem that the best way to help the deafened soldier is by teaching him lip-reading."[27] Once they had been sufficiently instructed in lip-reading, deaf men were considered cheerful, confident, social beings once more.

Mental Rehabilitation

Rehabilitating men with shell-shock was more of a mental than a physical process. Because of its later entry into war, America was able to analyze how other countries treated their shell-shocked men and apply what they learned back at home. For example, after witnessing how British physicians treated their patients, Dr. Thomas Salmon urged American forces to ensure that they hired properly trained, compassionate doctors for the care of shell-shocked soldiers. "The commissioned medical officers should all be men with excellent training in neurology and psychiatry . . . of importance almost equal . . . is their character and tact, and no man who is unable to adjust his personal problem should be selected for this work."[28]

First, doctors had to determine what was "worrying" their patients. "He may use the simple method of sympathetic questioning or the modern psychoanalysis, but his aim is always to bring to light the hidden complex which is at the root of their nervous systems."[29] Then, men with shell-shock would be prescribed "rest in bed, good food, and cheerful surroundings."[30] In addition to this, soldiers may be prescribed additional physical treatment, like electric currents, massage, and baths.[31] If, after all this, the soldier was still suffering from "nervous diseases," he might be sent to a "Home of Recovery" until he was deemed cured.[32]

Vocational Rehabilitation

Once men were sufficiently rehabilitated in the physical sense, the focus then turned to returning them to work. The top priority for "war wounded" men was to ensure that they could return to work. Many believed that once a man made it through vocational rehabilitation, he would be able to succeed in finding a well-paying job. Depending upon the type of disability the man had, he would be trained in anything from basket weaving to piano tuning. "The plan of re-education is to train a man for a job in which he can perform one hundred percent."[33]

Vocational specialists believed that, first and foremost, a "soldier's decision to pursue vocational training had to be voluntary."[34] If the

soldier did not have the motivation to be trained to work, then he would not be successful in finding a job. Once the soldier had shown that he was willing to pursue vocational training, then he could begin his journey in re-education. Most often, effort was made to "return the man to his former trade."[35] Vocational directors felt that it was vital to return men to their former trade, or as close to their former trade as possible. This, they believed, would give them a sense of normalcy. If they could not be returned to their previous trade, then training was offered for a variety of other work forces.

For crippled soldiers, the most popular trade taught was motor mechanics.[36] Men would be trained to repair and operate engines, even without the use of one of their arms or legs. However, because of the popularity of this field of work, vocational directors feared that the job market would become too saturated and had to encourage men to choose other lines of work. Other fields popular for crippled soldiers were electrical work, moving picture operation, cobbling, and, ironically, artificial limb creation and repair.[37]

For the blind, "two satisfactory occupations which are almost traditional . . . are massage and piano tuning."[38] Those who were trained in the field of massage often went on to be employed in military orthopedic hospitals, helping their fellow disabled soldiers.[39] Also common was the training of the blind in basket-making, brush-making, and rope-making.[40] Blind men who

were previously employed in clerical work or on farms were also often able to return to their work with little difficulty.

Men with shell-shock were not usually offered any type of vocational training. Doctors generally believed that once a man recovered from whatever nervousness he was suffering, he could return to his former occupation without problem.[41] Therefore, soldiers suffering from mental illness were usually given time to "restore their health"[42] before being asked to return to work.

Germany

Between 1914 and 1918, Germany mobilized over 11 million troops.[43] Of those 11 million, approximately 4.3 million men were wounded during their service.[44] At the beginning of war, treatment for wounded soldiers was often poor and not available for the common soldier. "At the outbreak of war, there was no standardized system of long-term medical care in place for soldiers severely or permanently injured in combat . . . Furthermore, although a few facilities existed which were dedicated to the long-term care of invalided soldiers . . . these institutions offered limited space."[45] However, as the war progressed, plans were implemented to ensure better treatment options were available for the increasingly high number of war wounded.

Pensions

Germany, in general, had plans for how to distribute pensions when the war started. However, there were still some veterans who felt that the government wasn't acting quickly enough. Both during World War I and afterwards, veterans formed groups to advocate for their rights and their desire for assistance in returning to their former lives.[46] In response to these groups, Germany passed the "National War Victims Benefits Law, answering most of the demands of the groups, including very generous pension plans and reintegration help."[47] Interestingly, the government decided to include all veterans in this plan—not just disabled ones; this later caused a strain on the economy.

As part of this pension plan, soldiers would be paid according to their level of disability, pre-war income, family size, and location.[48] Those living with more severe disabilities would be given larger pension plans. Similarly, men living in larger cities or with more children would be given more money to support their lives.

Physical Rehabilitation

Given their long history of war, Germany had some experience in physically rehabilitating its soldiers. What changed over the years, however, were the methods they used in treating soldiers. In the nineteenth century, therapeutic gymnastics and medico-mechanical therapies were often prescribed to war wounded men. After World War I, orthopedists instead began to prescribe work-therapy; this combined bodily exercise with vocational training in an attempt to "train the physically disabled body to work."[49] This idea came from previous work with disabled children and was intended to prepare them for life after they were released.

Much like efforts in the United States, Germany focused physical rehabilitation efforts on those who had arm or leg wounds. They believed that most injured soldiers would be able to return to a normal life after some rehabilitation. Hard work and dedication were vital to the soldiers attempting to regain their sense of normalcy. Often, the options offered for those who had lost an arm or leg were cumbersome to use, and soldiers had to work hard to get used to them. "Walking with crutches was exhausting and awkward, and artificial limbs were nearly as tiring and painful as crutches."[50]

When disabled soldiers first began coming home from war, designs for prosthetics were concentrated on creating a "universal prostheses." These artificial limbs were intended to "fulfil all the functions of the human arm and which could be indiscriminately distributed to the wounded."[51] Those creating the artificial limbs soon realized that a universal prosthetic was unrealistic. Instead of being designed for discretion, prosthetics would have to be designed along vocational lines, allowing for specialized movements and practicality.[52] A multitude of individualized artificial limbs were created for different vocations. For example, certain arms connected the worker to machinery to allow them to continue working in industrialized jobs. "The Siemens arm, Jagenberg arm, and Rota arm physically attached these men to their work, binding their bodies to the machinery or tool in the effort to ensure efficient, smooth production."[53] All in all, the Germans invented over 300 new kinds of arms, legs, and other prosthetics.[54]

In addition to the shift to creating prosthetics specifically for vocations, the military also involved themselves in ensuring the best possible limbs were being created for soldiers. The War Ministry created the Centre for Artificial Limb Testing in Berlin. This institution used "recovering amputees . . . as test subjects for determining the suitability of these limbs for the industrialised workplace."[55] They also took steps towards creating a more "patriotic" prosthetic limb. "Orthopaedists sought to remove German doctors and patients from their dependency on foreign imports emphasizing the need to produce domestic limbs which did not stem from their belligerent foes."[56]

Blind soldiers in Germany were generally regarded to have one of the most debilitating and difficult disabilities.[57] To help them to return to their normal lives, guide dogs began to be trained. In 1916, the world's first guide dog training school opened in Oldenburg.[58] Between 1923 and 1929, nearly 6,000 dogs were trained as guides for the blind; in keeping with the trend towards "patriotism," most of the dogs trained were German Shepherds.[59] These dogs helped blind soldiers in a variety of tasks, and ultimately became regarded as a type of prosthesis.[60]

Mental Rehabilitation

Soldiers with physical ailments were not the only problem that Germany faced; hundreds of thousands of soldiers returned with shell-shock. Unfortunately, shell-shock was rarely taken seriously by German doctors. "With few

exceptions, doctors had refused during the war to acknowledge shell-shock as a legitimate war disability."[61] German doctors and psychiatrists are often accused by historians of not actually caring about their patients. The harsh tactics used by psychiatrists have lead historians to believe that "the psychiatric profession was subverted for the purpose of the war machinery and that psychiatrists were under pressure to return as many soldiers as possible back to the front line."[62] Although it is unclear if this is true or not, psychiatric help was certainly harsher in Germany than elsewhere.

A wide range of treatment programs were adopted by German psychiatrists during the war. Most often, electro-suggestive therapy was the therapy of choice. This form of treatment called for the use of electrocution in combination with suggestions from the doctor.[63] Psychiatrists also used systems of reward and punishment in an attempt to reinforce and deter desirable and undesirable behavior. Rewards like baths, massages, garden walks, and praise were given for successful therapy sessions. Punishment, on the other hand, most often came in the form of painful electrical shocks.[64] If a patient was still unwilling to comply to therapy, he would be isolated and confined to his bed and not allowed to read, write, smoke, have visitors, or even talk to the nurses.[65] Ultimately, Germans tended to combine an array of treatment methods for each patient. Most treatments for shell-shock and other psychiatric dysfunctions were a combination of the above items in addition to physical therapy, a high calorie diet, and work therapy.

Vocational Training

For Germans, returning war wounded soldiers to their previous vocations was a top priority. "Employment was regarded as crucial to the restoration of veterans' dignity and self-esteem; work was regarded both as a duty and a right, and a prerequisite for full participation in society."[66] Every effort was made to return soldiers to whatever job they previously held rather than training them for a new one. "From the outset of the war, orthopaedists had been vocal about the necessity of returning the war disabled to their pre-war professions."[67] Prosthetic design was focused on returning a soldier to work rather than restoring his physical appearance. Therefore, the Germans put more effort into creating a prosthetic to return a man

to his former line of work rather than training him for a new one.

While they were recovering from their injuries and learning how to use their new prosthetic pieces, physically disabled soldiers would be employed in "orthopaedic workshops."[68] Here, the wounded would work in blacksmithing, cabinet-making, and saddlery to prove that they were capable of working, and eventually of returning to the same workload they had previously. If injuries were so severe that a man could not be returned to his previous position, then arrangements would be made to place him into a job closely related to his former one. Special job counsellors "were to investigate whether the disabled man might be found an auxiliary position or posting in a sub-field of his former profession."[69] These job counsellors could also recommend that the men attend additional workshops, such as those in West Prussia created by the Divisions for Disabled Workmen in the War Administration Office in Danzig. There, the men could work under masters for two years, earning 3.50 marks a day in addition to their pensions. At the end of the two years, the men would be allowed to take a journeyman's examination.[70]

For blind men, the ability to use guide dogs assisted them in returning to the vocational field. Guide dogs provided these men with the ability to get to their workplaces without the help of family, friends, or paid attendants. They also essentially replaced the eyes of the soldiers, allowing them to return to work with relative ease.[71] For men who couldn't return to their former occupations, instruction in music, typewriting, basket weaving, piano tuning, massage, and telephone service were all common.[72]

Great Britain

When Britain entered the war, it did not expect a four-year long struggle resulting in over 3.1 million casualties in their country alone.[73] Over two million men returned to their country wounded in some way, leaving a government that had previously relied on the generosity of charities and private giving for its disabled scrambling to figure out how best to return its newly disabled veterans to normalcy.

Pensions

Great Britain, for most of its history, had relied on works of charity to provide for disabled soldiers.

"In Great Britain, as in most foreign countries, the interests of disabled sailors and soldiers were for many centuries left to private charity."[74] However, during the 19th and 20th centuries, Britain began to make a shift towards providing actual pensions for their war disabled. "During the summer of 1915, the Ministry of Pensions instituted a more systematic system with the aim of providing disabled men with financial security, health care, and re-education or training, if required."[75] In 1918, an estimated £23,000,000 a year were given in British pensions.[76] During World War I, pensions were allotted depending on where the soldier fell on a scale of disability. Generally, those who fell into the "total disablement" category had lost some combination of two or more limbs, hands, feet, or eyes. To these men, the maximum amount of 27 shillings and 6 pence was given.[77]

Nevertheless, the pension system still had several problems. Disabled soldiers had to regularly go before medical boards to continue to receive their pension entitlements. These boards were generally suspicious of the men, and if they believed that the men's symptoms had gotten better, then they could reduce the amount of pensions the men received.[78] There was also still a tendency to lean on charity at the local level to help take care of the disabled. "In Britain, the state treatment system had been complemented by private charity from the very beginning."[79] In particular, funds for helping shell-shocked men came from the public. In one instance, £7,700 of a desired £10,000 were raised by the public, rather than the government, to help fully equip and run a hospital for shell-shocked men.[80] These same men could also go to local committees to seek disability assistance when they could not get help at a federal level.[81]

Physical Rehabilitation

As was the trend in 1918, Britain also tended towards using new techniques like hydro-therapy and electro-therapy for its war wounded. Special emphasis was put on hydro-therapy; baths, steam, and douching, it was believed, could remedy any number of ailments. For example, according to Robert Fortescue Fox, a proponent for hydro-therapy, baths could be used for a wide variety of problems, including cleansing deep wounds, promoting healing of wounds, easing muscle spasms, relieving pain, increasing circulation, and stretching fibrous tissues.[82] Additionally, baths—specifically

whirlpool baths—were used in relieving the pain of "phantom limbs."[83]

In addition to baths, physical therapy included the use of a variety of apparatuses for rehabilitating weakened limbs. Depending on his specific disability, a man would be walked through a series of exercises in which their movements were aided by a "weight placed upon a lever or suspended from a pulley."[84] By using an exercise machine, a more consistent, smoother force would be placed upon the limbs.

Massage and electro-therapy were also widely used. Massage was especially helpful in aiding with stiffened joints, preventing atrophy, and helping sprains.[85] Electricity, on the other hand, was helpful in soothing pain, contracting muscles, and increasing metabolism.[86] Neither of these would be used alone; most forms of therapy were used in conjunction with one another. In general, when using a combination of techniques, soldiers could expect to spend an average of forty days in treatment for their ailment.[87]

Mental Rehabilitation

British medical officers were the first to begin to use the term "shell-shock" after witnessing impaired sight and hearing, fatigue, tremors, confusion, and nightmares in their soldiers. The term was typically used when no obvious, physical cause could be identified.[88] According to pension reports, 18,596 men were awarded for nervous complaints, shell-shock, and neurasthenia in 1918. By 1921, this number had skyrocketed to 65,000.[89] Although they had tens of thousands of men suffering from the psychological effects of war, Britain struggled to understand how to best help them.

Similar to the Germans, the British had difficulty taking shell-shock victims seriously. In general, the opinion was that those that suffered from nervous or neurological ailments lacked the "moral fiber" to stay on the front.[90] They believed that having a psychological problem was somehow less honorable than having a physical problem—even one that wasn't visible.[91] "There is a strong tendency to adopt an entirely different attitude towards insane soldiers than the wonderfully generous one which the nation has adopted towards the wounded and those suffering from physical disease."[92]

When men first returned with symptoms of shell-shock, they were usually committed to local "pauper" asylums if their families were

unwilling to take them in.[93] These asylums usually treated shell-shock victims poorly; their rooms had very little light or heating, and they were rarely offered fresh produce or dairy in their meals.[94] In response to the poor treatment of these soldiers, the Ex-Servicemen's Welfare Society (ESWS) formed in May 1919. "The ESWS aimed to set up homes which would provide care, treatment, recreation, and a level of vocational training to mentally broken men, and so ensure that no veteran—regardless of his pre-war history—need fear the asylum."[95] The ESWS also advocated for the improvement of public asylums—not only for veterans, but for anyone who might be committed.

Treatment methods for the shell-shocked men generally included some combination of baths, hypnosis, electrotherapy, and exercise. In homes like those opened by the ESWS, work was also used as a form of treatment. Generally, no treatment method was used on its own; much like in Germany and America, doctors believed that a combination of methods was best for curing men.

For shell-shocked men, pool baths were the most common form of hydro-therapy. Pool baths could "accommodate ten to twelve soldiers at once, who are seated in the water, which covers their shoulders."[96] "Sleep" or "sedative" baths were also used for men suffering from psychological conditions. In 1919,

one "sleep bath" center opened that allowed for up to 150 men to lie in hammocks in warm water to "soothe their jangled nerves."[97] Baths were often used in conjunction with hypnosis or exercise.

Hypnosis, some believed, was the key to "relieving many of the acute symptoms" of shell-shock, particularly in the early stages.[98] Exercise—particularly exercise in gymnasiums—was useful for the treatment of neuroses-related paralysis. By having the soldier "project his mind" into the paralyzed limb while exercising his other limbs, doctors believed that paralysis would eventually go away.[99]

Lastly, work—whether recreational or vocational—was used to treat shell-shocked individuals. "Diversion of the mind by useful occupation in the workshop, in the garden, and on the farm, have been most successful in restoring health and strength to functionally disabled men."[100] Work was considered central for the recovery process; not only did it help the man recover his identity and self-worth, but it helped him in restoring his financial security.[101]

Vocational Rehabilitation

Much like in the United States, Britain made efforts to re-train men in fields that worked with their disability. The Minister of Pensions devised a plan to train disabled soldiers and return them

World War I hospital patients. Postcard by Otto Seitz. Photo by Michael Kassube.

to proper employment; training was provided by the Ministry for free to soldiers.[102] Although preference was given to returning men to their former occupations, less than half were generally able to do so. According to the Employment Bureau of Roehampton Hospital, 42 percent of men were able to return to their former occupations.[103] Nonetheless, a physician's main goal was to return men to some form of work and avoid putting any further strain on the pension system.[104]

For amputees, their type of amputation affected what vocation they were placed in. For example, "the loss of a hand rarely necessitates change of occupation; the same holds true in the case of a forearm if the stump measures more than 4 cm from the bend of the elbow."[105] For men who had lost their arms above their elbow, bookbinding, stone-carving, tailoring, and printing were suitable occupations. If a man had any artistic talents, training in engraving, lace-designing, lithography, and photographic retouching was popular.[106] This allowed men to go into a wide variety of fields without oversaturating any one area. The Disabled Soldiers' Aid Committee was also founded in order to help place men—even those with "difficult" disabilities—into jobs. By 1917, they had placed over 500 men into jobs ranging from butlers to gardeners to chauffeurs.[107]

Blind men were usually taken to St. Dunstan's, a specialized hospital for blind veterans. There, they would be taught how to read Braille and how to return to the vocational world. As was usual for blind men, massage and basket-weaving were popular trades to learn.[108] Uniquely, however, poultry farming was also a common occupation for the blind in Britain.[109] Men who went into this field would be taught how to distinguish different breeds purely by touch.

Exploring the Differences

After World War I, an unprecedented number of war wounded soldiers returned home. Because of worldwide medical advancements—particularly on the battlefield—men were surviving their battlefield injuries at higher rates than had been thought possible. "Successes include the widespread vaccination policies, the more effective use of X-rays, the improvements in sanitation and infection control and, most notably, the tremendous progress in maxilla-facial surgery and orthopaedics."[110] The implementation of the triage system also created a more orderly, systematic process by which to evacuate the wounded.[111] Regardless of their country of origin, soldiers were provided with significantly better medical care in cleaner, more advanced facilities, allowing them to return home—even if they were missing a part of themselves. But once they returned home, did one country have any advantages over the other? Was there a "better" system?

Ultimately, it seems that the United States triumphed over Britain and Germany; even though all three countries shared similarities in their methods, the United States was able to better implement veteran care. There are several reasons for this. First, the United States delayed entry into the war meant that significantly fewer American troops saw battle, and significantly fewer disabled soldiers returned home. Only 8.1% of American mobilized forces were casualties; in Britain and in Germany, this rate was 35.8% and 64.9%, respectively.[112] By having only a couple hundred thousand instead of millions of wounded returning home, America was able to concentrate its resources on helping a smaller number of men.

Additionally, joining the War later meant that America had the opportunity to observe methods of treatment used by Germany and Britain in the early years of the war, and improve upon them. Many of the primary documents written by American doctors—like John McDill and Thomas Salmon—are observations of how German and British soldiers were treated, and recommendations on what America can do to improve upon their methods.

Regardless of who gave better treatment to its soldiers, how much did any of it really matter? Physicians in all three countries focused, first and foremost, on returning their war wounded to work. Even though there were some successes, not all workplaces were willing to accept disabled soldiers as employees. In 1919, Douglas Murtie noted that some employers attempted to pay disabled soldiers a smaller salary, arguing that their pension meant that they should be paid less.[113] In Britain, there was evidence that able-bodied employees were "resentful" of wounded veterans in the workplace. One employer, when asked, admitted that "we cannot take in a lot of cripples—the men won't have it."[114] Whether these men disliked having to face a reminder of the war every day, or that they felt the disabled workers wouldn't be able to carry their full workload is unclear. Ultimately, it would be the economy

that hurt disabled veterans the most. In America, for example, the economy slipped into recession only a few months after the Armistice was signed. "By April 1919, the War Department estimated that 41 percent of ex-soldiers were out of work."[115] Only ten years later, this economic problem would only be worsened with the onset of the Great Depression.

Although World War I brought more disabled soldiers than ever home, Germany, Great Britain, and the United States all had relative success in reintegrating them back into society. Despite future economic problems, rehabilitation and pensions provided disabled soldiers a way to return to a sense of normalcy once they came back from the horrors of war. Ultimately, these countries were able to bring men back to their countries, their families, and their friends at a rate formerly unheard of, and return them to their former lives despite what they had lost in the war. ❖

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ANNA EVANS

THE POWER OF MINDFULNESS AND MEDITATION: USING MINDFULNESS TO TREAT INSOMNIA

When pain and suffering become routine, it is easy to fall into a pattern of taking medications prescribed by a doctor. For some, these medications can become addictive and only provide a temporary fix to a long-term problem. For reasons such as these, alternative solutions to pharmaceuticals have become increasingly popular to treat chronic medical issues. By combining mindfulness with meditation, certain disorders such as psoriasis, cancer, depression, and anxiety have been effectively treated (Kabat-Zinn, 2003). With such promising results, it can be assumed that mindfulness and meditation could potentially be combined in an attempt to treat symptoms of chronic insomnia.

The purpose of this literature review is to address whether mindfulness and meditation can be combined as an effective treatment for symptoms of chronic insomnia. The following information will guide the reader through some of the most current studies conducted on the effectiveness of mindfulness-based interventions. The first section will provide basic definitions of concepts such as meditation and mindfulness, and explain why it may be beneficial to use a combination of these ideas as a treatment for certain illnesses. The following section provides insight into why sleep is important and how insomnia contributes to daily dysfunction. Within the subsequent section, the reader will find a compilation of past studies that demonstrate the extent to which mindfulness-based interventions have been effective. Finally, the concluding section will guide the reader towards areas of future research that may include making direct comparisons between mindfulness-based interventions and traditional pharmaceutical interventions to determine which method is more beneficial to the patient.

Meditation and Mindfulness

Today's Western concept of meditation developed from Eastern Buddhist traditions. The concept of meditation is characterized as an intentional shift in awareness. By shifting one's awareness, people thought to rid themselves of unwanted characteristics such as greed, hatred, and unawareness. These behaviors were

Photo by Spencer Selover.

believed to be the cause of human suffering, and meditation was believed to be the cure (Kabat-Zinn, 2003).

From meditation, the concept of mindfulness developed. Mindfulness is defined as an awareness that is cultivated by being attuned to one's present surroundings. Part of being mindful is understanding that certain aspects of life are out of one's control. Therefore, a person must let situations unfold while maintaining a non-judgmental attitude. Mindfulness is maintained through the act of meditation, as it is believed that an untrained mind is the root of human suffering. By disciplining the mind through mindfulness practices, such as meditation, it is believed that emotions can be maintained, because meditation is thought to reduce suffering by calming the mind and refocusing one's attention (Kabat-Zinn, 2003).

Components of mindfulness include non-judgment, trust, non-striving, acceptance, and letting go. With these basic concepts, John Kabat-Zinn (2003) attempted to use the concept of mindfulness as an intervention for certain medical disorders. To test his hypothesis as to whether mindfulness was an effective treatment, Kabat-Zinn opened a clinic where he trained people in mindfulness. As his staff underwent extensive training, they began to treat patients who were not responding to traditional forms of treatment. This intervention later became known as mindfulness-based stress reduction. Because clinical trials were so successful, this 8-week training program began to be incorporated into hospitals and clinics as a form of treatment for disorders where stress, emotional issues, and physical pain were primary concerns.

Mindfulness-based stress reduction showed promising results in a study conducted by Kabat-Zinn who wanted to know whether this new form of therapy could influence the healing process. In a 12-week study on psoriasis, a skin disorder associated with high physiological stress, Kabat-Zinn divided participants into two groups. While both groups received traditional ultraviolet treatments (phototherapy or photo-chemotherapy), group one received additional treatment in the form of mindfulness. Three times a week, during UV treatments, group one listened to guided mindfulness practices in the form of audiotapes. Because the second group was the control group, they did not receive any mindfulness training. At the end of the study, results indicated that the group who received

mindfulness training improved four times faster than those who only received UV therapy. Later studies were conducted to determine that mindfulness was in fact clinically effective in treating symptoms of psoriasis, fibromyalgia, and cancer (Kabat-Zinn, 2003).

With results indicating that mindfulness was a promising treatment for chronic physical conditions, it could be assumed that it could provide relief from mental illnesses. As a result, other forms of therapy, such as mindfulness-based cognitive therapy, developed as a means of combating depression. Because mindfulness-based cognitive therapy was also successful in trials, people began to question whether mindfulness-based therapy could provide relief for patients who were suffering from chronic sleep disorders (Ong, Shapiro, & Manber, 2008).

Sleep Dysfunction

Because sleep and wakefulness are interdependent, a person's inability to sleep can have a direct impact on their physical states. Problems sleeping can result in sleepiness, irritability, and a loss of coordination. Sleep dysfunction also plays a role on a person's emotional health as it is common for emotional disturbances to proceed and produce sleep disturbances. It has also been discovered that those who are predisposed to emotional distress are more susceptible to developing insomnia (Pollak, Thorpy, & Yager, 2010).

Insomnia is a chronic sleep disorder characterized by a lack of sleep. This disorder affects approximately 10% of the population (Ong, Shapiro, & Manber, 2008). Insomnia is usually associated with high levels of pre-sleep cognitive activity; this is referred to as hyperarousal. Hyperarousal is a person's inability to turn off their thoughts prior to sleeping. A person's hyperarousal is often measured by the amount of time it takes them to fall asleep. The time it takes to transition from a wakeful state to a sleeping state is called sleep onset latency. However, this time is usually associated with an increase in intrusive and unwanted thoughts (Pollak et al., 2010).

To test whether these invasive thoughts influence day-to-day functioning, Ong, Carde, Gross, and Manber (2009) hypothesized that affective states of good and poor sleepers would differ. To determine how underlying emotional states impact people, researchers divided participants into groups of good sleepers and poor sleepers. Each category of

sleeper was given two tests to measure affective states during the day and affective states for the previous night. Both tests were self-report measures. The Pittsburg Sleep Quality Index was used to assess sleep quality and measure sleep disturbances over a period of a month, while the Self-Assessment Manikin measured affective states. Poor sleepers reported more negative affect and arousal during the evenings, in addition to reporting negative affect during the day. It was also found that among good sleepers, sleep medication was correlated with more daytime dysfunction and negative affect during the day. These results suggest that emotions can impact both sleep and wakeful states.

Further research suggests that emotionally charged thoughts trigger a ruminative preoccupation with those unwanted thoughts. One study, conducted by Harvey (2003), demonstrated that, despite the natural tendency to suppress unwanted thoughts, suppression may not be the best way to manage those thoughts. Within this study, participants were made up of sleepers who slept very well and those who met the diagnostic criteria for insomnia. They were then divided into two groups; each group was told to choose a

thought that would naturally occur at nighttime. The suppression group was told to suppress the thought immediately as it entered their mind. The non-suppression group was encouraged to think freely without any restrictions. Rather than firmly dismissing the thought from their mind, they were encouraged to let it come and go while they focused on relaxation until they achieved sleep. Insomniacs in the suppression group reported feeling less in control of their thoughts during pre-sleep; they were also more inclined to suppress their thoughts. In addition, sleep onset latency was longer and resulted in poorer sleep quality when poor sleepers attempted forcefully to suppress their thoughts. These results demonstrate that intentional thought control is unsuccessful when compared to practices of mindfulness such as accepting the thoughts as they come, not striving for sleep when it does not come naturally, and letting go of the desire to control every thought.

In addition to uncontrollable emotional thoughts, another aspect of insomnia is attributed to a decreased response to sleep-provoking stimuli. Because emotional thoughts can keep people awake at night, the stimuli that are supposed to cause drowsiness in the bedroom can become less effective. For

instance, low light and lying in bed should cause sleepiness, but when this setting is associated with being unable to sleep, it loses its effectiveness. Other behaviors, such as spending excessive time in bed, taking naps, and getting up and going to bed at irregular times can heighten symptoms of insomnia (Pollak et al., 2010). To reduce these symptoms, research has been conducted to develop alternative treatment options.

Mindfulness-Based Interventions

The following section of this literature review will address several non-pharmaceutical interventions that target underlying causes of sleep disorders. Many of these methods have shown to be clinically effective at treating sleep disorders. Within this section, the reader will be introduced to several interventions, including mindfulness-based stress reduction, cognitive behavioral therapy for insomnia, and mindfulness-based therapy for insomnia. Current studies review the effectiveness of both subjective and objective measures as they relate to the effectiveness of each therapy.

Stress Reduction

By taking a closer look at how the emotions may contribute to the underlying cause of insomnia, results from one study, conducted by Davidson, Kabat-Zinn, Schumacher, Rosenkranz, Muller, Santoelli, et al. (2003), may explain why mindfulness-based stress reduction is a potential solution to insomnia. Because the left anterior brain region has been associated with positive emotions and positive affect, researchers wanted to measure whether mindfulness influenced activity in that part of the brain. After being divided into two groups, the group of meditators received an eight-week training session that included one class, three hours a week, in addition to at-home meditation practices of one hour. Findings suggest that meditation increases activity in the left side anterior region of the brain and that such brain activity is related to positive emotions.

Further research demonstrates the effectiveness of mindfulness as one group of researchers found that meditation was associated with better sleep patterns and higher scores in mindfulness. By dividing participants into groups of long-term meditators and novice meditators, Brand, Holsboer-Trachsler, Naranjo, and Schmidt (2012) compared cortisol samples of the two groups in order to measure

hypothalamus-pituitary adrenocortical system activity, since cortisol has been linked to stress reduction. Long-term meditators provided cortisol samples at the beginning and at the end of a single meditation session. Novice meditators did the same, but they also participated in an eight-week course on mindfulness. After learning specific mindfulness techniques, samples were again taken from novices at the beginning and end of the last session of the course. Two questionnaires were given, one to assess sleep quality and another to measure self-perception and mindfulness. At the conclusion of this study, novice meditators showed an improvement in sleep quality.

Cognitive Behavioral Therapy for Insomnia

One other type of alternative treatment is known as cognitive behavioral therapy for insomnia. This form of therapy has shown to be effective in treating sleep onset latency and improving sleep efficiency. By providing sleep education and cognitive restructuring, patients are guided through tips on how to control thoughts and behaviors that contribute to sleeplessness. One aspect of cognitive therapy is known as stimulus control. Patients are typically instructed to get out of bed if they cannot fall asleep within 15-20 minutes of lying down. Part of stimulus control is instructing patients not to go to bed until sleepy. This helps keep stimuli, such as the bedroom, responsible for controlling sleep responses. Another aspect of cognitive therapy is sleep restriction. Typically, patients are told to limit the total time that they spend in bed; some ways of doing this is by avoiding sleep-compensating behaviors such as napping. Also, setting a specific time to wake up and go to bed can be beneficial to overcoming the symptoms of insomnia (Ong, Shapiro, & Manber, 2008).

While cognitive behavioral therapy has been effective at reducing the amount of time it takes a person to fall asleep, this form of therapy requires a person to alter their perceptions about sleep through cognitive reconstructing. This requires a person to change how they feel about sleep. This contradicts ideas of mindfulness where patients are encouraged to simply change their relationship with a thought, and to let that thought come and go freely. Because research has been unable indicate whether cognitive behavioral therapy for insomnia has any benefit to overall quality of life or daytime functioning in patients, researchers have looked at combining practices of mindfulness-based stress reduction with

aspects of cognitive behavioral therapy for insomnia.

In one study conducted by Ong et al. (2008) participants participated in a six-week study, where they met once a week for 90-120 minutes to undergo treatment for insomnia. Participants were told to meditate at home for 30 minutes each and to keep a meditation diary. They were also told to keep a sleep diary where they documented their progress with adapting to stimulus control and sleep restrictions. Stimulus control included getting out of bed after 20 minutes if the participant did not fall asleep, while sleep restrictions included setting a bed time and wake time. Although there were some issues with compliance, results indicated that there were improvements in nighttime symptoms of insomnia, pre-sleep arousal, and reductions in sleep related distress. Results lead one to believe that mindfulness meditation and cognitive behavioral therapy for insomnia can be successfully combined to treat insomnia. However, it is difficult to separate whether the aspects of cognitive therapy or the principles of mindfulness were responsible for the improvements of the participants considering there were such issues with compliance.

After listening to feedback from participants from the original trial, Ong and Sholtes (2010) made several revisions to the intervention. As a result, researchers decided to conduct an eight-week study instead of a six-week one and an all-day retreat was added. The tests and procedures remained the same, except participants were given additional material to assist them in their meditations at home. This addition of new materials was per request of the participants in the previous study who reported a need for greater guidance during home meditation sessions (Ong et al., 2008). As a result, this second trial appeared to be more effective as it followed a participant named Maria. Emphasis was placed on changing her relationship with her thoughts rather than putting effort into pushing the thoughts away. From her sleep diary, results showed that her total sleep time doubled, and she reported a 200-minute decrease in the amount of time she spent awake each night. It is important to note that when the relationship between attitudes about sleep and thoughts were changed, she began to show improvements.

Therapy for Insomnia

Ong developed mindfulness-based therapy for insomnia with a goal of reducing wakefulness and managing emotional reactions to sleep disturbances. This therapy was created based on concepts of mindfulness-based stress reduction as Ong et al. (2008) suggested that the principles of mindfulness fall in line with goals of reducing hyperarousal. Additionally, behavioral components from cognitive behavioral therapy for insomnia allow participants to learn how to recondition their bodies to react to stimuli that should invoke responses of sleepiness. It is through these studies that he demonstrates the effectiveness of this combination of treatments.

Such developments are promising as they pave the way to potentially replacing pharmaceutical methods of treatment for insomnia. While typical forms of medication provide immediate relief, they only present a temporary fix to a long-term problem. Traditional medications do not target the underlying cause of insomnia. Rather, they only treat the symptoms. For this reason, mindfulness-based therapy for insomnia can be beneficial to those who suffer from insomnia as it targets behaviors that cause the symptoms. By targeting the underlying cause, mindfulness-based interventions may be effective at providing long-term solutions.

Research conducted by Ong et al. (2009) concluded that people on sleep medication had higher levels of daytime dysfunction and negative daytime valence. Ong and Sholtes (2010) provide information on the original pilot study using mindfulness techniques where researchers concluded that even after six months, 61% of participants reported no symptoms of relapse. In another study, the number of participants on sleep medications for insomnia decreased from 85.7% to 64.3% after treatment because the mindfulness-based intervention was effective. In this study, Heidenreich, Tuin, Pflug, Michal, and Michalak (2006) tested the effectiveness of mindfulness-based cognitive therapy for insomnia. Specifically, researchers were looking at how it affected the total time that participants slept and if it decreased sleep onset latency. Participants were instructed to keep sleep diaries and complete psychological questionnaires before and after the treatment process. The diaries measured total sleep time and sleep latency in the participants. Prior to treatment, participants recorded 5.5 hours of sleep each night; however,

after treatment, participants reported total sleep time of 6.5 hours per night. In addition, sleep onset latency was reduced from 30 minutes prior to treatment to 26 after treatment.

Additionally, further research concluded that alternative treatments of insomnia are effective even after six months. For instance, Edinger, Wohlgemuth, Radtke, and Quillian (2001) hypothesized that cognitive behavioral therapy would provide both long-term and short-term improvements in those with sleep problems. To test this hypothesis, participants diagnosed with insomnia were divided into three different treatment groups. One group received cognitive behavior therapy, another group received muscle relaxation training, and the last group was a placebo group. Results showed that cognitive behavioral therapy recipients showed a reduction of 54% in average wake time after sleep onset by the conclusion of the study. There also appeared to be an increase in total sleep time of about 30 minutes in those who were given cognitive behavioral therapy. cognitive behavioral therapy outperformed the other forms of therapy, and provided evidence that it does provide long-term positive effects on symptoms of insomnia.

Conclusion

Current research suggests that mindfulness-based interventions may be an effective way to treat symptoms of insomnia. Because mindfulness targets the emotional aspects that underlie symptoms of insomnia, it offers a long-term solution to a condition that has traditionally been treated with medication. As medication can only treat the symptoms, people who suffer from insomnia only improve while taking medications, but once pharmaceutical intervention has been stopped, symptoms will return. Findings from Ong and colleagues support the hypothesis that mindfulness based interventions, when combined with cognitive therapy, has shown to be successful at treating symptoms of insomnia. This may be influential in the future as people who suffer from sleep disorders may be able to incorporate the behavioral components of cognitive behavioral therapy, such as sleep restriction and stimulus control, with aspects of mindfulness-based stress reduction that suggest adopting principles of acceptance, non-striving, and non-judgement (Ong et. al., 2008).

In the future, it may be beneficial to conduct studies with a larger sample size. As

mindfulness-based therapy for insomnia is relatively new, some of these original pilot studies had very small samples, including studies from Brand et al. (2012), Davidson et al. (2003), Harvey (2003), Heidenreich et al. (2016) and Kabat-Zinn (2003). Additionally, many of these experiments did not use a control group to compare their results, including studies from Davidson et al. (2003), Heidenreich et al. (2016), Ong et al. (2008) and Ong and Sholtes (2009). Further, when reporting sleep, it is difficult to gather data that is objective and not completely reliant upon self-reports. However, because self-reports can be inaccurate, future research should attempt to seek alternative ways to observe and measure sleep such as those researchers applied in studies conducted by Brand et al. (2012) and Davidson et al. (2003).

While mindfulness-based treatments have shown promising results, it is unclear as to whether it is the best approach when compared to traditional pharmaceutical methods. More research needs to be conducted to determine whether the benefits of mindfulness-based interventions outweigh those of more traditional methods. It also may be beneficial to include studies that directly compare the effectiveness of mindfulness, both short-term and long-term, to traditional pharmaceutical treatments such as using medications to help maintain sleep patterns. ❖

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BUSINESS & INFORMATION COMPUTER SCIENCES

CONNOR HAYES

EMERGENCY PROCEDURES OF CARE CENTERS DURING HURRICANE FLORENCE

When Hurricane Florence devastated North Carolina, the city of Rocky Mount faced some of its wrath. As a result, the care centers Spring Arbor of Rocky Mount and Brookdale had to implement emergency procedures to keep their residents and staff safe. However, from a managing perspective, the safety measures that both facilities followed, though very successful and effective, could still be rendered more efficient for future hurricanes. These procedures, nevertheless, are not improved by merely hiring more people. Instead, the answers lie in management, raising awareness, and receiving aid from the federal government.

Following interviews with Executive Director Keith Rivers, Spring Arbor's emergency procedure during Hurricane Florence will be centered here. They involve two main components, consisting of evacuations and a procedure called "Shelter in Place." In the case of an evacuation, Spring Arbor's goal is to "[move] residents safely out of harm's way" (K. Rivers, personal communication, November 8, 2018). The facility accomplishes this by having agreements with communities in other areas that can provide relief for their residents when hazardous conditions arise, such as high wind and flooding. One example of this is Ridgecrest Church, which is a local building in Rocky Mount that provides additional shelter for Spring Arbor and allows the elderly to circumvent danger if the center becomes unfit as a habitation during natural disasters like Hurricane Florence.

However, before an actual evacuation can happen during a hurricane, a series of steps has to be taken first, including notifying families of residents' intentions of leaving the facility, relaying the information to the residents and

Photo by Wade Austin Ellis

staff via the intercom by calling out "code green," and following a safety guideline list that corresponds with the code in the "Emergency and Crisis Management" binder that is provided near the front of the building. Other steps involve calling ahead to have a bus company on stand-by, lining up the residents, helping them into the buses, and safely gathering medicine carts and medication. Food, clothing, and water supplies are also loaded, too. Additionally, the staff has to care separately of their higher-risk patients living in a separate building in the back called "The Cottage," which houses elderly with dementia. These residents, along with those who have other disabilities, may complicate the center's efforts in terms of putting residents on buses and making sure they are stable and have required medication (K. Rivers, personal communication, November 8, 2018).

This advocates Spring Arbor's idea of being proactive instead of reactive. Since the center is licensed for 84 people, and 70 of them are residents, it is important to "make the decision early" and be prepared before any major storm reaches the Rocky Mount area (K. Rivers, personal communication, November 8, 2018). This eliminates stress and provides more time to deal with patients, remember all the supplies needed, and make sure the whole process is followed through completely.

The next component of Spring Arbor's emergency procedure is "Shelter in Place." This safety process proved to be vital during Hurricane Florence because the center decided not to evacuate. Because of this, Director Rivers and his staff had to make sure Spring Arbor was prepped and ready. This involved many tasks; one of which included plugging in two gasoline-powered generators when power was lost by shutting down the panel box and plugging them in. This allowed lights to be turned back on and refrigerators to work. Other responsibilities included stocking up on a three-day food supply for all residents and stocking up water for toilet use, showers, and drinking. Additionally, the staff used calling posts to notify families of the decision to not evacuate, kept radios tuned into the emergency broadcast station that helped provide updates on the storm, and made sure gas tanks were filled for generator use and any transportation if needed (K. Rivers, personal communication, November 8, 2018).

To make this all possible, Director Rivers and his staff stayed in nearby places in the community to help their residents. What goes unnoticed, according to Director Rivers, is that the employees who still came to work during that scary time "[made] a lot of sacrifices" by leaving their families at home and caring for the residents instead. This supports Spring Arbor's philosophy: "If it was my mother, I would. If it was my father, I would" (K. Rivers, personal communication, November 8, 2018). Through the caring spirit of every worker in the center, all the residents remained safe. In this way, Spring Arbor gave back to those who have given everything to their children years ago.

On the other hand, when looking at improvements for Spring Arbor's emergency plan, Director Rivers stated, "You can never run enough drills" (personal communication, November 8, 2018). Even though they are not directly mentioned as a part of the emergency process, drills do prove effective in getting the residents and staff prepared to execute the needed tasks in the most efficient way possible. However, according to Director Rivers, drills can be difficult to run for a hurricane because they are challenging to simulate. This is problematic because residents and staff will not be prepared for all the conditions, the amount of safety guidelines, and steps involved. This, in turn, limits how ready they truly are when extreme weather conditions occur.

A solution to this issue can be found by increasing the number of hurricane drills performed each month. Additionally, Spring Arbor could execute specialized drills during stormy weeks, where residents and staff go through an entire evacuation procedure during unfavorable weather conditions. By doing this, everyone will be more prepared for hurricanes in the future, which will increase the efficiency of the current evacuation plan that is used at Spring Arbor.

However, there are some potential obstacles to this solution. More time, effort, and resources will be used to perform these drills; flexibility and freedom of residents' schedules will be limited more often; weather may prove to be unpredictable and not follow the forecast; and higher-risk patients, such as those with physical disabilities and dementia, will be very difficult to work with.

Nevertheless, the reward of preparation outweighs the risk of struggle. Another facility that aims to receive this reward, regardless of the hardships, is Brookdale. As Hurricane Florence moved into the Rocky Mount area, the facility did not have to evacuate either. Just like Spring Arbor, the staff prepared needed supplies for their residents and waited out the

storm. Executive Director Brian O'Hara mentioned that they also had back-up generators that could be hooked up, which could restore any power lost within an hour and maintain a well-lit environment for their residents and staff. Likewise, Brookdale had a three-day supply of food and water, as well as extra medicine, mattresses, and other necessities. In order to increase the accessibility and efficiency of their care, Director O'Hara, his maintenance engineer, and other staff also "stayed in town to be ready for any possible problems or issues that could arise" (B. O'Hara, personal communication, November 8, 2018). In addition, they made sure families of the residents knew of their intentions during Hurricane Florence by calling them using the available contact information from each resident. This preparation kept Brookdale one step ahead of danger and one step closer to achieving maximum safety for all residents and staff.

Still, if an evacuation were ever to be in progress, Brookdale would also be prepared for that. By remaining in contact with upper management and keeping up with local weather reports, Director O'Hara would know when to evacuate his residents and staff; he mentioned that he has access to approximately six other Brookdale facilities within an hour that could provide shelter from the storm if their center was under extreme duress (B. O'Hara, personal communication, November 8, 2018).

Overall, Brookdale retains an organized environment that runs through the procedures in a fluid manner by having an efficient and effective line of management. Director O'Hara states that his nurse works right under him, providing residential care in addition to carrying out direct orders given to her. Next in line is the residential care coordinator, Wanda Wagstaff, who helps implement events and projects for the residents and provides any necessary care when required. These staff, along with the maintenance, sales, activity, and business directors, create one big, unified team that works together to accomplish the goal of providing a safe environment for everyone (B. O'Hara, personal communication, November 8, 2018).

Yet, even with a great line of management, their emergency procedure is not perfect. The main issue is that they only have one bus in their possession. According to Director O'Hara, this makes it "hard to transport all the residents and all their belongings at one time" (personal communication, November 8, 2018). With this in mind, there are solutions to solve this problem. Two smart options include fundraising and applying for grants. Fundraising is a great way to get Brookdale's name out in the community. This strategy allows them to receive money from the people of Rocky Mount and other surrounding cities. This strategy could potentially increase their markets and awareness to those who never knew about them; one way this could be done is by reaching out to North Carolina Wesleyan College. Many faculty, students, and donors would be readily available and willing to help out. Not to mention there could be a possibility of the college allowing Brookdale to borrow a bus for free or at a reduced price.

Moreover, grants could be another way to receive money for additional transportation. This solution has several steps. First, Brookdale would need to figure out how much money is needed for another bus. After that, the facility would have to reach out to organizations that could provide the grants; some possibilities include:

> [Calling] local and federal government agencies, which can be major sources of funding, or [visiting] their websites for preliminary information; [contacting] via phone or [emailing the] state agency that handles services for the aging, usually a subsection of [the] state's department of social services; [and calling] the U.S. Department of Health and Human Services' Administration on Aging, which has a host of grants available to both public and private nonprofit entities. ("How to Get Grant Money")

These agencies would provide Brookdale with the perfect opportunities to accomplish their goal of having more transportation readily available. After this step, they would only have to fill out applications, verifying their eligibility and potentially proposing their intentions for the grants.

The downfall to these solutions, though, would be the time and effort needed to raise awareness and fill out applications. Furthermore, there would be potential obstacles in having another bus. Some would consist of finding another certified CDL driver and risking the safety of the residents by having multiple buses traveling in dangerous road conditions at the same time.

Nonetheless, when looking at all the advantages and disadvantages of Brookdale's

emergency procedure and solutions, as well as that of Spring Arbor, it is clear that both care centers succeed in providing a safe environment for their residents. This, however, all starts and ends with good managing. Director Keith Rivers of Spring Arbor states, "You have to have a caring spirit, [and] you have to be willing to put [the] residents at the forefront" (personal communication, November 8, 2018). By leading people in a way that seeks the betterment of others first, a successful care center can be created, even during times of danger. Director Brian O'Hara of Brookdale adds to this by saying that a good manager needs to be "level-headed and a good communicator" (personal communication, November 8, 2018). These characteristics allow staff and residents to be led in a calming and logical way during all situations. Furthermore, Director O'Hara suggests that a manager needs to follow the behavioral viewpoint by having a more personal connection with his employees. This allows trust to be built and improves productivity within the center.

Conclusively, Spring Arbor and Brookdale show that good managing and preparation are the keys to overcoming any obstacle. Even though the emergency procedures in both centers are not perfect, it only takes a little more time and effort to execute more elaborate drills and raise the funds necessary to provide additional transportation. Great managers, such as Director Rivers and O'Hara, know how to lead logically, build relationships, and put others before them. As a result, both centers will continue to improve on the weaknesses of their safety plans and be more prepared when the next hurricane reaches Rocky Mount in the future. ❖

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Appendix

Your Thoughts During Hurricane Florence

This questionnaire is intended to collect information from the residents of Spring Arbor and Brookdale regarding the safety, communication standards, and performance of the emergency procedures executed during Hurricane Florence:

1. Did you evacuate during Hurricane Florence? Circle Yes or No
2. Were your family or friends informed about the storm hitting Rocky Mount? Circle Yes or No
3. How safe did you feel during the storm? (Circle a rating between 1-5; 1=Unsafe and 5=Safe)
4. How helpful was the staff during the storm? (Circle a rating between 1-5; 1=Unsafe and 5=Safe)
5. How did the care center help you stay safe?

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NATURAL
SCIENCES &
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KAYLA LAVAN

RHEUMATOID ARTHRITIS: PATHOGENESIS, BIOMARKERS AND PHARMACEUTICAL TREATMENTS

Abstract

Rheumatoid arthritis (RA) is an incurable, chronic autoimmune disease that causes progressive damage of bones and synovial joints. Reactive oxygen species (ROS) play a role in the pathogenesis of the disease as oxidative stress and inflammation are present in individuals with an imbalance of ROS and antioxidants. Cytokines, specifically tumor necrosis factor (TNF), also contribute to the progression of RA by mediating the inflammation process. Antibodies and the citrullination of proteins also play a vital role in the autoimmune response seen in RA patients. Blood tests, which look for the presence of given antibody biomarkers, including rheumatoid factor and anti-cyclic citrullinated peptide, are the most common method used to diagnose RA. If the blood tests give a positive result, treatment is started immediately to slow the progression of the disease. Common pharmaceuticals include disease-modifying antirheumatic drugs, biological agents, and nonsteroidal anti-inflammatory drugs (NSAIDs).

Introduction

Rheumatoid arthritis (RA) is a chronic autoimmune disease that causes inflammation at the synovial joints. Normal joints are surrounded by the synovium, a membrane that produces lubricating synovial fluid. In patients affected by RA, the synovium becomes inflamed and produces excess fluid, causing the joints to swell and feel warm to the touch. The major symptoms of RA occur during relapsing flare-ups, often caused by over-exertion, during which patients experience joint pain, swelling, and fatigue. Over time, RA causes progressive destruction of bone and articular cartilage. Around 1% of the world's population is affected by RA and women are 3 times more likely to experience symptoms than men. Overall, autoimmune diseases are more common in women, and it is speculated that the changes in estrogen after menopause contribute to the increased risk of RA, although the exact connection between estrogen and RA is not fully understood.[1]

Historically, the first diagnosis of RA was made in 1800. Today around 24.5 million people are affected. Symptoms usually onset between ages 40 and 50, so individuals often suffer from this disease for nearly half their lives. Additionally, treatment of RA and consequential disability has significant economic impact on patients and their families, as some more effective medications are not covered by insurance, and severe disability because of RA often prevents patients from working. As seen in **Figure 1**, the cost associated with RA increases with disease duration and declining health. These high RA-related costs are attributed to costs in professional time, testing, procedures, medication and hospital admissions.[2]
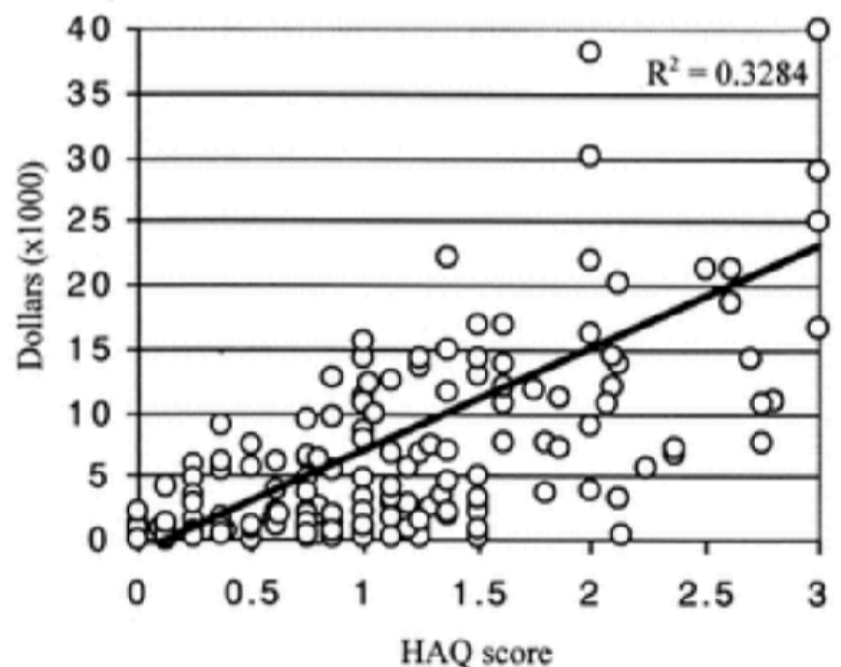
Figure 1. Cost vs. Health Assessment Questionnaire (HAQ) score. The cost associated with RA increases with declining health (increasing HAQ score). The average RA-related costs per year was found to be $10,419.[2]

The exact causes and pathogenic mechanisms of RA are not fully known, but it is established that a combination of genetic and environmental factors contributes to its development. While there is no cure for RA, there is a benefit in early diagnosis and treatment in the disease course. The goal of pharmaceuticals used in the treatment of RA is not to cure the disease, but to control joint damage, prevent loss of function, and decrease

pain.[3] Patients often benefit from a balance of rest and exercise and the use of joint braces.

The purpose of this paper is to review the pathogenesis, biomarkers, and pharmaceutical treatments of rheumatoid arthritis. Topics covered include the phases of progression, role of reactive oxygen species and antioxidants in oxidative stress, roles of cytokines and other inflammatory molecules in the progression of RA, importance of the citrullination of proteins in pathogenesis, and major biochemical markers identified via blood tests. Further, the primary prescribed medications will be discussed, including disease-modifying antirheumatic drugs, biological agents, and nonsteroidal anti-inflammatory drugs.

Causes and Phases of the Disease

Causes of Rheumatoid Arthritis

While the exact causes of RA remain to be elucidated, it is known that a combination of genetic and environmental factors contribute to the manifestation of symptoms. Genetic loci associated with the susceptibility and severity of RA include HLA-DR4 alleles, PTPN22, PAD14, CTLA4, and other cytokine and cytokine-receptor loci.[4] Occurrence of RA in a primary family member, such as a parent or sibling, makes an individual three times more likely to develop RA.

Environmental factors also contribute to the development of RA. The primary environmental factor that contributes to RA is smoking. Nicotine and cigarette smoke contain high concentrations of free radicals which increase oxidative stress and the levels of inflammatory cytokines in the body.[5] The high levels of free radicals react with and impair the function of vital antioxidants, leading to an imbalance of antioxidants and reactive oxygen species. This imbalance, which leads to oxidative stress and joint damage, will be discussed in detail further on. Additionally, smoking causes the citrullination of proteins which leads to protein unfolding and loss of structure, another topic that will be expanded on when looking at the pathogenesis of RA.[5]

Other environmental causes of RA include infections by microorganisms including Porphyromonas gingivalis (periodontal disease), Proteus mirabilis (urinary tract infection), Epstein-Barr virus (infectious Mononucleosis), and mycoplasma.[6] For instance, P. gingivalis contains peptidylarginine deiminase (PAD), an enzyme necessary for the citrullination of

proteins and consequential loss of tolerance seen in the autoimmune response, a topic that will addressed later.[6] As such, these microbes can initiate the autoimmune response seen in RA patients.

Phases of Progression

The three phases of RA include the pre-articular, transition, and articular phases (**Figure 2**). In the pre-articular phase, physical symptoms are not yet present. Instead, autoimmunity or the immune responses of an organism against healthy cells is detectable within an individual.[4] During this phase, the body produces antibodies specific for IgG (rheumatoid factor) and cyclic citrullinated peptides, both of which are biomarkers of inflammation in RA patients.[4] Further, major cellular components of the immune response, namely B and T cells, lose their tolerance during the pre-articular phase.[4] Tolerance is the process of eliminating cells that are autoreactive, thereby ensuring that the immune system does not attack self-peptides. As such, a breach in tolerance is seen in the pre-articular phase, leading to the autoimmune response seen in RA patients. The autoimmune processes occurring during the pre-articular phase can last for many years before physical symptoms become present and the body transitions to the articular phase.[4]
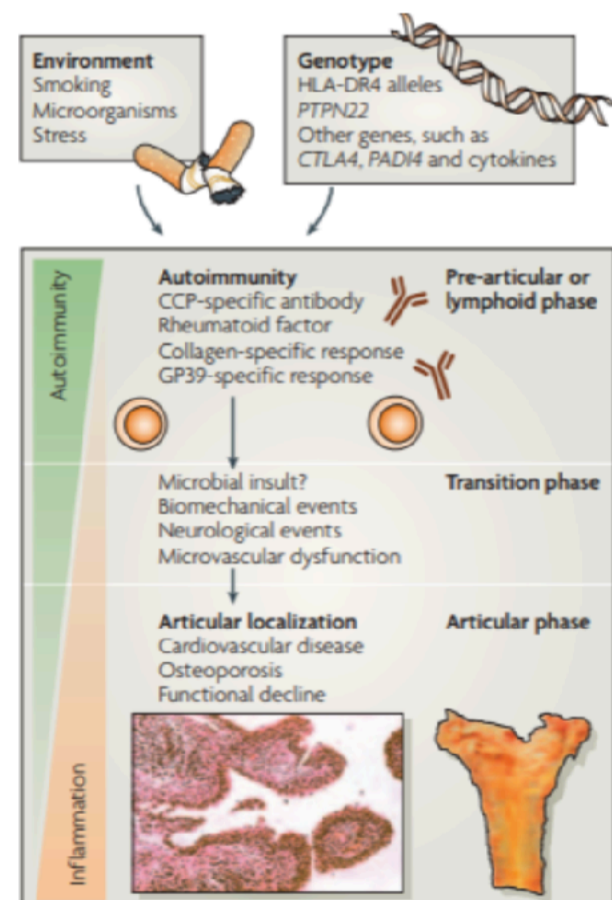

Figure 2. Phases and pathogenesis of RA. A combination of genetic and environmental factors contribute to the occurrence of RA in an individual. The progression of RA accompanies a transition from high levels of autoimmunity to

increased levels of inflammation. In the pre-articular phase, which can last for many years, autoimmunity causes an increase in the level of antibodies. The transition from the pre-articular to articular phase, where physical symptoms begin to manifest, is not well understood.[4]

Once the body experiences the autoimmune response present during the pre-articular phase, a trigger is necessary to onset inflammation at the synovial joints. This transition phase between the pre-articular and articular phases is not fully understood, but it is believed that a combination of biomechanical factors, neurological events, and altered articular microvascular functions is responsible.[4] The following articular phase is characterized by chronic inflammation, joint destruction, and functional decline.[4] Thus, the articular phase is where the characteristic symptoms of arthritis are evident.

Pathogenesis of Rheumatoid Arthritis

Reactive Oxygen Species and Antioxidants

Many biochemical pathways are involved in the pathogenesis of rheumatoid arthritis. One such pathway involves reactive oxygen species (ROS), oxidative stress, and antioxidants. ROS are known to be involved in the pathophysiology of various diseases such as major depressive disorder, cancer, Alzheimer's disease, multiple sclerosis, rheumatoid arthritis, and aging.[7] While oxidative stress is the primary cause of some types of diseases, it is more common for oxidative stress to be secondary to the main disease pathway. ROS are a type of free radical that contain an oxygen with an unpaired electron, such as $O_2^{\bullet-}$ and $^{\bullet}OH$ causing these molecules to be highly reactive.[8] Other reactive oxygen species include non-radical derivatives of oxygen including H_2O_2 and HOCl.[8]

At certain levels, ROS are important in essential neurobiological processes; however, excess amounts of ROS can cause oxidative stress which often leads to damage of cellular components, proteins, lipids, and DNA.[8] For instance, the hydroxyl radical ($^{\bullet}OH$) removes a deoxyribose hydrogen from DNA, leading to cleavage of the DNA, thereby inducing the strands to break.[9] In unstressed conditions, the levels of ROS are balanced by antioxidants. These antioxidants react with the ROS, thereby reducing the reactivities of ROS. Common antioxidants include vitamins A and C, reduced glutathione, superoxide dismutase, catalase, glutathione peroxidase, glutathione reductase and glutathione-S-transferase.[10] For instance, antioxidant superoxide dismutase (SOD) serves

as an enzyme that increases the rate of dismutation (simultaneous oxidation and reduction that breaks down compounds) of the radical $O_2^{\bullet-}$.[8] Further, the antioxidant glutathione peroxidase serves as an enzyme that reduces H_2O_2, while oxidizing reduced glutathione (GSH), producing water and oxidized glutathione (GSSG) (**Equation 1**).

Equation 1. $\quad 2GSH + H_2O_2 \rightarrow GSSG + 2H_2O$
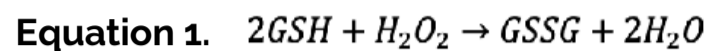
Thus, enzyme antioxidants are necessary to balance ROS by reducing them and decreasing their reactivities.[8]

Excessive amounts of ROS are produced at sites of inflammation, leading to an imbalance in the body between ROS and antioxidants, causing oxidative stress. Tissue damage releases neutrophils, immune cells that travel to the site of infection and produce $O_2^{\bullet-}$, H_2O_2, and HOCl, thus contributing to this imbalance of ROS and antioxidants.[8] As such, a significant decrease in the levels of these antioxidants is observed when comparing individuals with RA to the healthy control.[10] While mild oxidative stress is offset in the body by increased production of antioxidant enzymes and protective proteins, extreme oxidative stress leads to cellular and DNA damage.[8]

Patients with RA have been shown to have elevated ROS production, lipid peroxidation, protein oxidation, DNA damage, and impaired antioxidant defense, symptoms all associated with oxidative stress.[10] In a recent study by Mateen et al. (2016), the production of ROS was monitored by performing a 2',7'-dichlorofluorescein-diacetate (DCFH-DA) assay on lymphocytes. A DCFH-DA assay utilizes a non-fluorescent probe that can easily cross the cell membrane.[11] As seen in **Figure 3**, once inside the cell, the DCFH-DA probe is hydrolyzed to DCFH before reacting with ROS to produce DCF (dichlorofluorescein), a highly fluorescent marker.[11] Thus, the levels of DCF present in an individual correlate with the quantity of ROS in the body.

When comparing the levels of DCF in control and RA patients, those with RA had significantly higher levels of DCF, indicating that they had higher levels of ROS (**Figure 4**).[10] When comparing individuals with RA according to the duration of the disease, ROS production and DNA damage increased and levels of antioxidants decreased when comparing those who were newly diagnosed, had RA for less than 2 years, and had RA for between 2 and 5 years

(**Figure 4**).[10] This change over time shows the progressive nature of RA and its detrimental effects on the body.
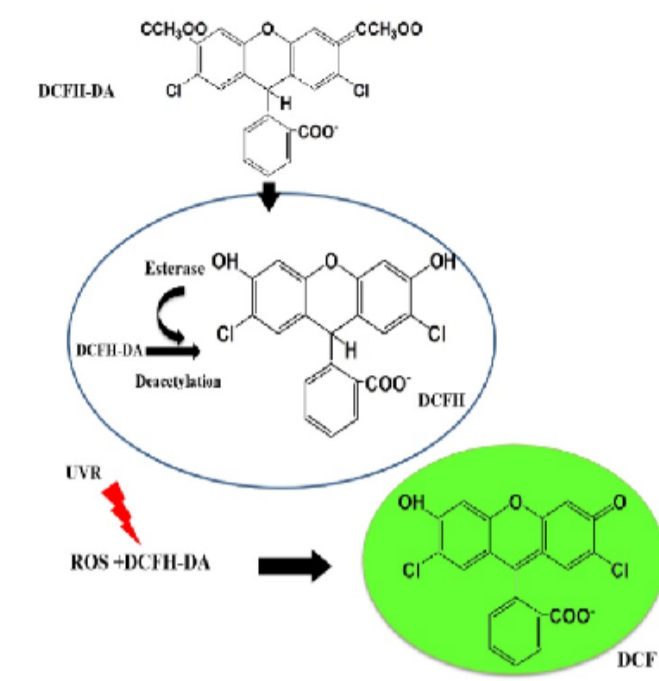

Figure 3. DCFH-DA assay reaction used to identify the presence of ROS. 1) DCFH-DA crosses the cell membrane and enters the cell. 2) The probe is hydrolyzed by cellular esterase to DCFH. 3) DCFH is oxidized to the highly fluorescent DCF by ROS. Thus, the more ROS present, the more DCF are detected.[11]
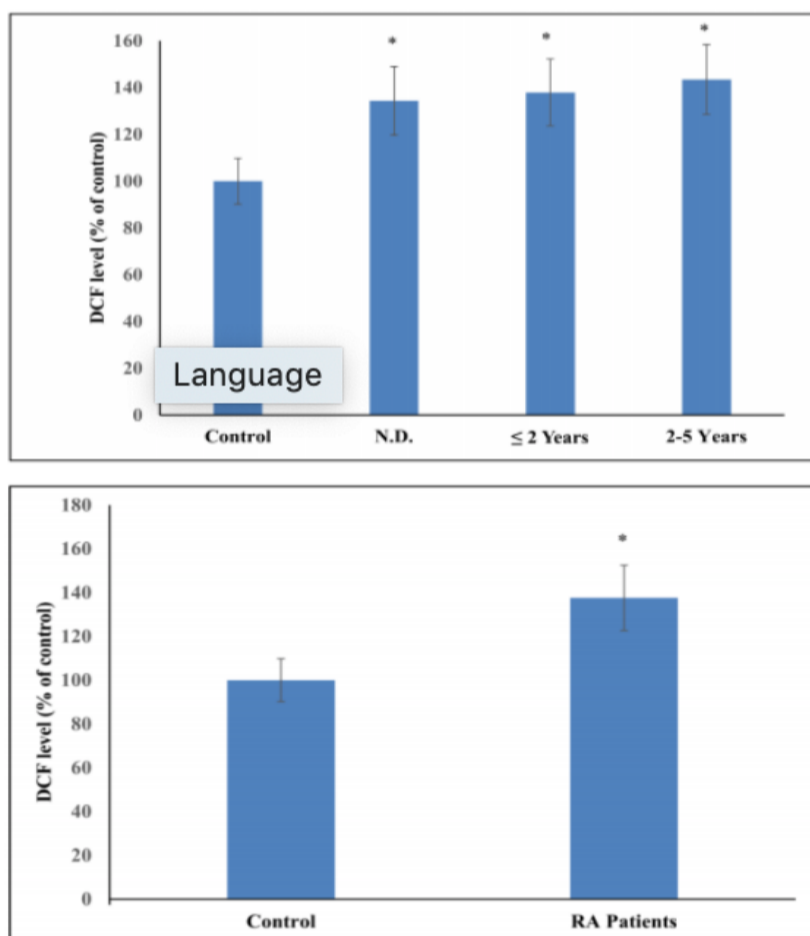

Figure 4. Comparison of DCF between control and RA patients (left) and between patients depending on the duration of the disease (right). The levels of DCF indicate the presence of ROS in the body. Thus, RA patients are known to have higher levels of ROS. Further, levels of ROS have been found to increase over time, evidenced when comparing RA patients who were newly diagnosed, had RA for less than 2 years, and had RA for between 2 and 5 years. This supports the hypothesis that RA is a progressive disease that increases in severity and physical symptoms over time.[10]

Since it is known that RA patients have higher levels of ROS, it is expected that higher levels of DNA damage will be seen. ROS have genotoxic effects which lead to genetic mutations. The tumor suppressor gene p53 is activated because of DNA damage, causing the arrest of cell growth and allowing more time for DNA to repair. Alternatively, cells may undergo apoptosis if DNA damage is too severe. As such, ROS damage leads to either DNA repair or cell death.[12]

The role of ROS in the pathogenesis of RA is vital, as an imbalance between ROS and antioxidants causes oxidative stress which can lead to DNA damage and cell death. Other important molecules and processes involved in autoimmunity include cytokines, B and T cells, antibodies, and the citrullination of proteins. These molecules, including the antibody rheumatoid factor, anti-cyclic citrullinated protein, and C-reactive protein, are often used as biomarkers to identify and diagnose RA in individuals. These molecules, biomarkers, and pharmaceuticals used to treat RA patients will be discussed.

Cytokines and Tumor Necrosis Factor

Cytokines are small proteins secreted by cells of the immune system and are involved in cell signaling. It is known that various cytokines are present in the joints of individuals with RA and that they play a role in autoimmunity, inflammation, and articular destruction. These cytokines include tumor necrosis factor alpha (TNF-alpha), interleukin (IL)-6, and interleukin (IL)-1 beta.[13] Macrophages primarily produce cytokines in the joints of affected individuals. More specifically, an imbalance between pro-inflammatory and anti-inflammatory cytokines within the synovial tissue causes chronic inflammation and joint damage.[4] Cytokines are present in each phase of progression and they mediate the autoimmunity and destruction of tissue seen in patients with RA.[4]

Cytokines interact with activated B and T cells, white blood cells that are vital in cell-mediated immunity and are present in the synovial membrane of individuals affected by RA (**Figure 5**). B cells express antibodies that respond to specific antigens (foreign bodies that induce an immune response). In order to recognize foreign antigens and not attack self-antigens, B cells must undergo maturation before becoming fully active. During maturation, B cells develop central tolerance, which

prevents them from being reactive to self by recognizing that self-antigens are not foreign microbes. The absence tolerance leads to autoimmune responses in which B cells recognize their self-antigens as foreign and attack themselves. Cytokines are known to regulate the phenotype of T cells in the synovium. As such, RA is often referred to as a T helper 1- and T helper 17-cell mediated disorder, meaning that the pathogenesis is driven by T cells that produce inflammatory cytokines and chemokines (cytokines that attract white blood cells to the cites of infection).[4] The pathways involving B cells, T cells, cytokines and antibodies is seen in **Figure 5**.
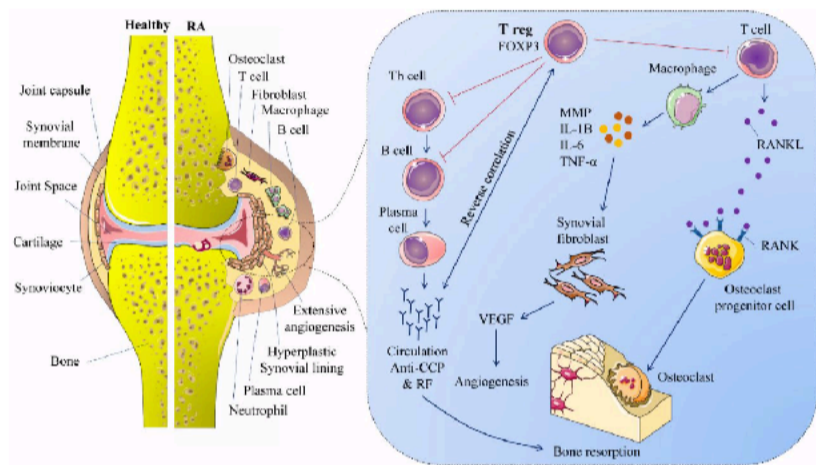

Figure 5. Interactions and pathways between B cells, T cells, cytokines, and antibodies. In the joints of RA patients, T cells induce macrophages to produce cytokines including MMP, IL-1B, IL-6, and TNF-α. Also, T helper cells induce B cells to produce antibodies including anti-cyclic citrullinated protein (CCP) and rheumatoid factor (RF). These inflammatory molecules contribute to the inflammation seen in the synovial joints.[14]

Tumor necrosis factor (TNF) is one such inflammatory cytokine produced primarily by macrophages in the synovial membrane during acute inflammation. It is known that TNF-α and its receptors are expressed in RA joint tissue and contribute to the overall inflammation process.[15] As seen in **Figure 6**, TNF-α induces the production of other inflammatory molecules, such as interleukin (IL) 1 and 6, along with chemokines.[15] TNF-α also upregulates other integrins and adhesion molecules, such as E-selectin and vascular cell adhesion molecules (VCAM-1), both of which mediate the adhesion of molecules to the endothelium during the inflammation process.[15] As such, TNF blockers are currently being researched as pharmaceutical treatments for RA.
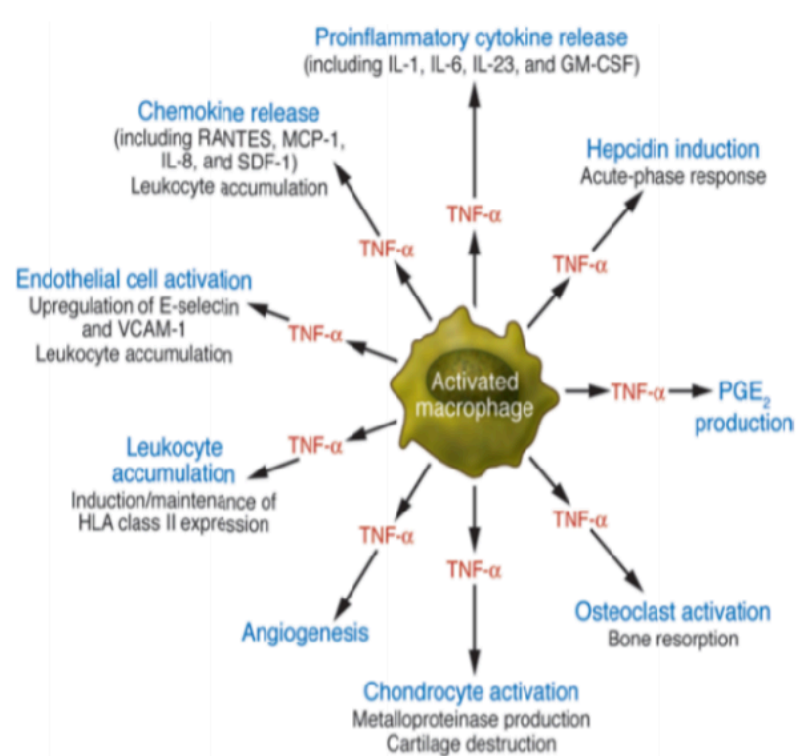
Figure 6. Roles of TNF-α in RA. TNF-α, an inflammatory cytokine present in patients with RA, is produced primarily in the synovial membrane tissue by activated macrophages. TNF-α induces the production and upregulation of additional inflammatory molecules, namely IL-1 and 6, chemokines, and other integrins and adhesion molecules.[15]

Citrullination of Proteins

Citrullination is a post-translational modification associated with the autoimmune response in RA patients.[16] With citrullination, the conversion of the amino acid arginine to citrulline is catalyzed by the calcium-enzyme peptidylarginine deiminases (PADs) (**Figure 7**). As a result, the peptide loses a positive charge and becomes more hydrophobic, thereby affecting its conformation, binding properties, and the function of the protein.
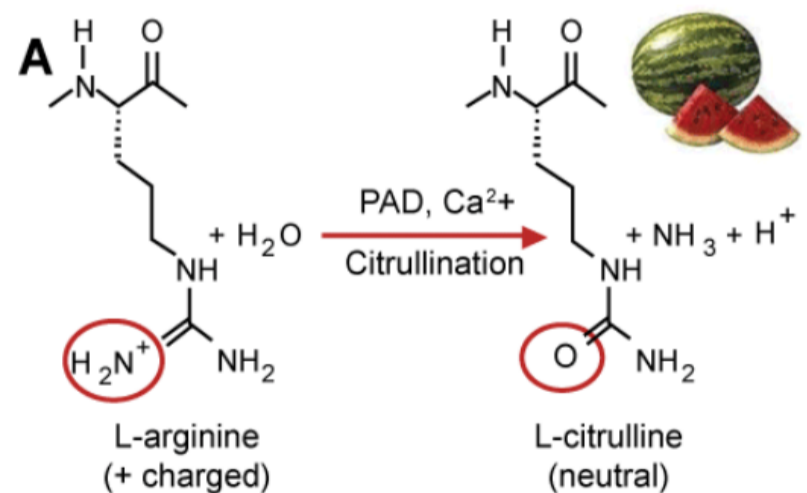
Figure 7. In the citrullination of a peptide, the amino acid arginine group is converted into citrulline. This post-translational modification is mediated by peptidylarginine deiminases (PADs) in the presence of calcium and results in an increase in the hydrophobicity of the peptide and a neutralization of the charge. Thus, protein unfolding, degradation, and reduction in intramolecular interactions is observed in citrullinated proteins. As a result, the proteins lose

their shape and function and the immune system no longer recognizes the protein, leading to autoimmunity.[17]

It has been suggested that the citrullination of proteins exposes unique epitopes, parts of the antigen molecules to which antibodies attach, that were not accessible on the cell surface prior to this post-translational modification.[16] Further, it has been hypothesized that no effective tolerance exists to these unique epitopes, thus stimulating the autoimmune response seen in RA patients.[16]

Biochemical Markers

RA is usually diagnosed based on symptoms and the presence of specific biomarkers which are frequently detected through blood tests. Common blood tests include rheumatoid factor, anti-cyclic citrullinated peptide, erythrocyte sedimentation rate, and C-reactive protein. Rheumatoid factor and anti-cyclic citrullinated peptide (anti-CCP) are antibodies produced in the synovial joints by macrophages during the pre-articular phase of RA. Rheumatoid factor is an antibody that works against IgG/IgM, immunoglobins produced when the immune system attacks healthy tissue, while anti-CCP is an antibody produced when inflammation is present. Thus, testing for rheumatoid factor and anti-CCP allows for early diagnosis of RA because they may be present in the body before the manifestation of physical symptoms.[4]

Further, erythrocyte sedimentation rate (ESR) is used to detect RA in patients by measuring the presence of inflammation. With ESR, a sample of red blood cells is placed in a glass tube and the rate at which the cells clump and fall together to the bottom is recorded. Because inflammation makes cells heavier, those with inflammation will have faster rates of sedimentation. Another biomarker of inflammation is C-reactive protein (CRP). CRP is a protein produced by the liver when inflammation is present. Similar to anti-CCP testing, CRP allows for the early diagnosis of RA since CRP levels increase even before symptoms develop.

Pharmaceuticals

While there is no cure for RA, treatments aim to improve symptoms, slow progression of joint damage, prevent loss of function, and control pain. Common pharmaceuticals are disease-modifying antirheumatic drugs, biological agents, and nonsteroidal anti-inflammatory drugs.

Disease-Modifying Antirheumatic Drugs

Disease-modifying antirheumatic drugs (DMARDs) are prescribed to patients with RA as a first treatment option to slow disease progression. These drugs lower immune response within an individual, leading to decreased joint inflammation. DMARDs produce the best results when prescribed early in the progression of the disease and administered aggressively. DMARDs include methotrexate, hydroxychloroquine, sulfasalazine, and leflunomide. The most common DMARD, methotrexate (MTX), is widely prescribed because it is safe for use over extended periods of time.[18] In a study looking at the safety of MTX over the course of 12 years, it was found that only 3.7% of patients stop MTX treatment due to liver toxicity.[18] Common prescription of MTX requires the weekly injection or oral use of low doses to treat RA and inflammatory diseases. Between 7.5 and 40 mg of MTX is used weekly as a normal maintenance dosage.[3]

In the treatment of RA, not all DMARDs act through the same mechanism of action. The primary mechanism of action of MTX involves the enzyme dihydrofolate reductase. MTX competes with folate for binding sites on dihydrofolate reductase and irreversibly binds to the enzyme.[19] As seen in **Figure 8**, MTX enters the cell where cytosolic folylpolyglutamate synthase modifies it by adding glutamate resides to produce methotrexate polyglutamate.[19] The glutamate-bound MTX is an analog of dihydrofolate and thus acts as a tight-binding, competitive inhibitor of dihydrofolate reductase. By binding to the enzyme in place of dihydrofolate, the conversion of dihydrofolate to tetrahydrofolate is prevented.[19] By blocking the conversion to tetrahydrofolate, MTX prevents the formation of nucleotide precursors and stops production of DNA, RNA, and proteins, thereby slowing the proliferation of inflammatory molecules.[19]

Methotrexate has also been shown to relieve RA inflammation by decreasing the production of inflammatory cytokines.[13] The drug does so by causing macrophages in the joints to enter a more tolerant state. This tolerance results in a decrease in the production of inflammatory cytokines, tumor necrosis factor, and synovial fluid.[13] Macrophage tolerance was found to be dependent on the expression of the gene TNFAIP3, which codes for the protein A20.[13] MTX increases the expression of A20, a suppressor of the transcription factor Nuclear Factor (NF-κB).[13] NF-κB is translocated to the

nucleus during conditions of oxidative stress where it can either induce cytoprotective effects or activate other inflammatory cascades.[20] So, by upregulating the expression of A20 and thus decreasing NF-κB, MTX reduces inflammation in the joints. Overall, in all mechanisms MTX works by immunosuppression to reduce the progressive joint and bone damage caused by the disease.
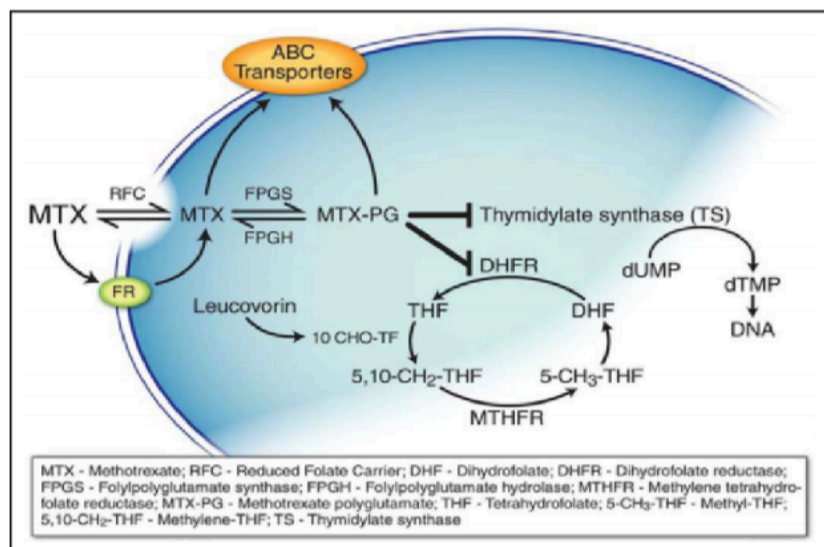

Figure 8. Mechanism of action of methotrexate (MTX). MTX is a competitive, irreversible inhibitor of dihydrofolate reductase (DHFR) and thus serves as an analog of folate. The blocking of DHFR prevents the formation of tetrahydrofolate (THF) synthesis by stopping the conversion of dihydrofolate (DHF) to THF. As a result, the formation of nucleotide precursors is inhibited and the production of DNA, RNA, and other proteins is stopped.[19]

Biological Agents

Biological agents are often the second treatment option prescribed to patients with RA. A biological drug is a substance that is made from living organisms or their products that blocks specific inflammation pathways of immune cells.[21] Biological agents are genetically engineered to behave like normal proteins in the immune system. As such, these agents are more expensive than DMARDs because the manufacturing process involving live organisms is more complicated and the materials required are more expensive. Additionally, biological agents are often associated with higher risks of infection and other side effects. As a result, this form of treatment is only prescribed if treatment with DMARDs has not begun to be effective after a period of three months. Common biologics include TNF-α blockers, IL-1 blockers, and IL-6 blockers.[15] To increase the effectiveness of biologics alone, methotrexate is often prescribed in conjunction with TNF blockers.

Adalimumab (Humira) is a common TNF blocker prescribed to patients with RA. As seen in **Figure 9**, Humira is a genetically engineered human antibody that binds to TNF-α and prevents it from attacking healthy cells.[15] Other TNF-α blockers include infliximab, entanercept, certolizumab, and golimumab.[21] Additionally, IL-1 blockers such as anakinra and canakinumab serve as competitive inhibitors of IL-1.[22] By binding to IL-1 receptors and preventing the binding of IL-1, these blockers prevent the inflammatory response induced by the normal binding of IL-1.[22]
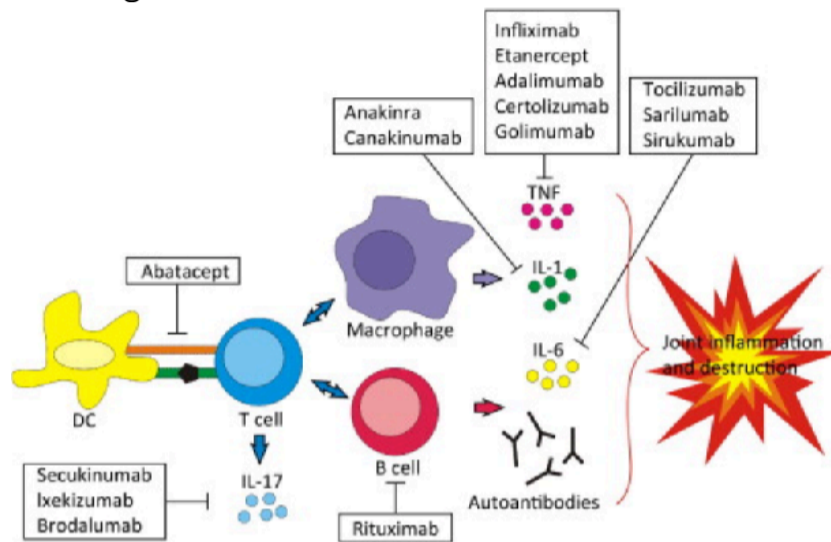
Figure 9. Biological agents target pro-inflammatory molecules including TNF-α, IL-1, IL-6, IL-17, and antibody-producing B cells. For instance, adalimumab (Humira) targets TNF-α, thereby halting the inflammatory cascade and reducing joint inflammation and destruction.[21]

Nonsteroidal Anti-Inflammatory Drugs

Nonsteroidal anti-inflammatory drugs (NSAIDs) are medications that reduce inflammation and relieve pain. Common NSAIDs include aspirin, ibuprofen, and naproxen. The primary mechanism by which NSAIDs work involves the inhibition of cyclooxygenase (COX) which ultimately reduces the production of prostaglandins, molecules that cause inflammation, pain, and fever.[24] As seen in **Figure 10**, COX is responsible for performing the first step in the synthesis of prostaglandins by adding two molecules of O_2 to arachidonic acid which further reacts to produce prostaglandin G_2 and prostaglandin H_2. NSAIDs prevent COX from functioning by binding to the catalytic site within a COX dimer (**Figure 11**). In doing so, arachidonic acid is blocked from entering the catalytic site, and prostaglandin synthesis is halted.[25]
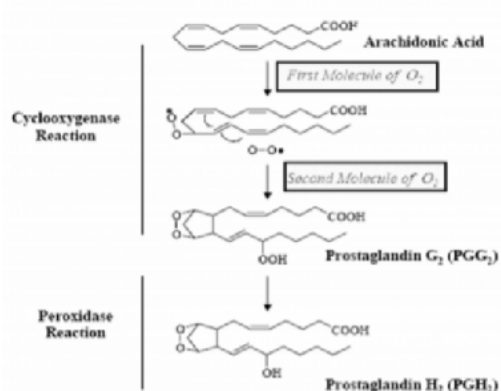
Figure 10. Cyclooxygenase catalyzes the addition of two molecules of O_2 to arachidonic acid. The cyclooxygenase reaction is followed by the peroxidase reaction where prostaglandin G_2 is converted to prostaglandin H_2. Prostaglandins produce inflammation, pain, and fever. NSAIDs inhibit COX from acting in the production of prostaglandins, thereby reducing inflammation and pain in RA patients.[23]
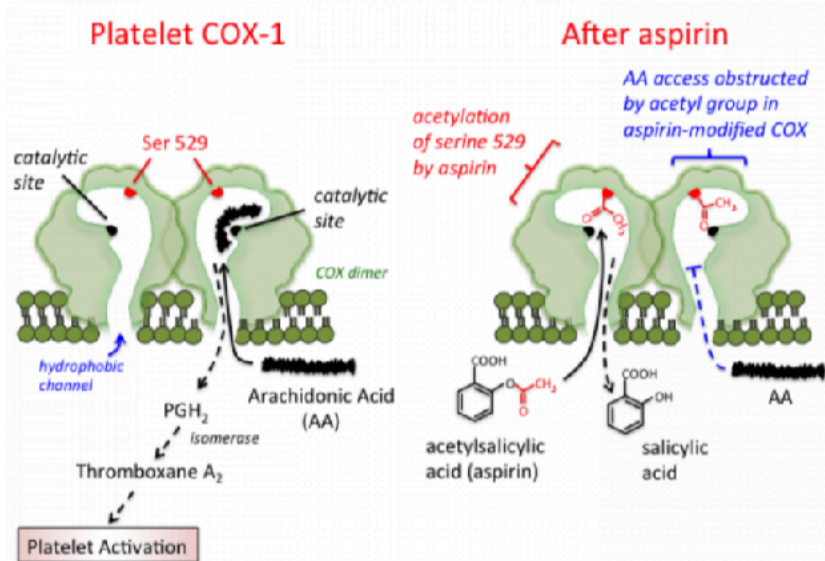
Figure 11. Aspirin prevents the normal binding of arachidonic acid (AA) to the catalytic site, thus halting the production of prostaglandins. Normally, AA binds to the catalytic site and prostaglandin H_2 (PGH_2) is produced. The NSAID aspirin binds to and acetylates serine 529, thereby blocking the access of AA to the catalytic site. As a result, prostaglandins are not produced.[25]

There are two isoforms of the COX enzyme: COX-1 and COX-2. COX-1 is produced constitutively in the body and contributes to the maintenance of stomach lining. COX-2 is a cytokine-induced isozyme that produces the prostaglandins responsible for inflammation and pain. Most NSAIDs inhibit both forms of COX which is undesirable because inhibition of COX-1 can lead to gastrointestinal bleeding, kidney problems, peptic ulcers, and damage to the upper gastrointestinal tract.[26] Thus, it is advantageous to take NSAIDs that selectively target COX-2. Coxibs, or COX-2 inhibitors, are slow tight-binding inhibitors that target COX-2 and are desirable to treat inflammation caused by RA.[27] Because of this selectivity, coxibs cause less stomach and gut irritation than other nonselective NSAIDs because they are not

blocking the beneficial effects of COX-1.[26] Coxibs, such as celecoxib and meloxicam, are thus safer to use for extended periods of time because they are associated with lower rates of gastric ulcers and are generally preferred over traditional NSAIDs. While NSAIDs, specifically coxibs, are beneficial to individuals with RA because they decrease inflammation, pain, and stiffness, they do not treat the underlying disease. NSAIDs have no effect on the long-term disease course, and thus must be prescribed in addition to another pharmaceutical to prevent disease progression.

Conclusion

Overall, rheumatoid arthritis is an incurable autoimmune disease that affects 24.5 million people around the world. Further research is needed to elucidate the exact cause and biochemical progression of RA. It is known that ROS play a role in RA by causing oxidative stress when levels of ROS exceed that of antioxidants. Additionally, cytokines contribute to the inflammation process through cell signaling and the production and upregulation of other inflammatory molecules. Antibodies and the citrullination of proteins also contribute to the pathogenesis of the disease. RA is commonly diagnosed using blood tests that look for specific biomarkers associated with RA and general inflammation in the body. Finally, pharmaceuticals aim to slow the progression of the disease and reduce inflammation and pain. Research is needed to develop more effective pharmaceuticals that treat RA with fewer side effects. In the end, additional research is necessary to develop a drug that cures RA. ❖

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THE ROLE OF GLUTATHIONE IN THE NEUROPROGRESSIVE NATURE OF MAJOR DEPRESSIVE DISORDER

Abstract

Neuroprogressive disorders, like Major Depressive Disorder, are characterized by the presence of apoptotic cells, increased autoimmune responses, and decreased neuronal plasticity. Loss of reduction-oxidation homeostasis has a role in all 3 of these, as oxidative stress can either directly or indirectly stimulate the progression of these characteristics. Glutathione, the most important antioxidant in the body and in the brain, protects neurons against loss of plasticity, apoptosis induction, and the body's inflammatory response. Glutathione, then, is physiologically important in protecting against neuroprogressive disorders. Loss of glutathione removes the protective functions it has in the neurons, providing a more favorable environment for neuroprogression.

Introduction

Reactive Oxygen Species, or ROS, are radical and non-radical oxygen molecules that are formed by the partial reduction of oxygen. Some common reactive oxygen species include the superoxide anion (O_2^-), hydrogen peroxide (H_2O_2) and the hydroxyl radical ($HO\cdot$). These species are extremely reactive and can bind to many different cellular components and oxidize them. If ROS bind to DNA or RNA, they can cause changes in gene expression, and they can denature proteins or react with lipids producing lipid peroxides, extremely cytotoxic molecules that can result in structural damages in the cell membrane.[1] The effects of ROS can also result in the promotion of inflammation and the stimulation of apoptotic pathways. Because of this, the body has a natural defense to reactive oxygen species—antioxidants. Antioxidants can reduce ROS, resulting in much fewer reactive molecules. The overproduction of ROS or the loss of ability for antioxidants to scavenge them can result in oxidative stress. Oxidative stress is an imbalance between ROS and antioxidants which disrupts the Reduction-Oxidation (Redox)

homeostasis of the cellular environment. The body's most important antioxidant is glutathione, a tripeptide molecule that can reduce pro-oxidants to help maintain Redox homeostasis. If glutathione is inhibited, the state of oxidative stress can flourish. Oxidative stress and other impacts of ROS have been implicated in the progression of Major Depressive Disorder. Glutathione, then, can help inhibit the progression of this disorder.

The roles of glutathione in the body, and specifically how it may affect the neurological disorder Major Depressive Disorder, are discussed through analysis of the literature on the molecular effects of glutathione depletion, how these effects impact disease progression, and how this is clinically relevant to treatment of this disorder.

Major Depressive Disorder

Major Depressive Disorder (MDD) is a neuroprogressive disorder with a global lifetime prevalence of 12%.[2] While some patients with MDD suffer from only one depressive episode, it is much more likely that the illness presents like a progressive illness.[3] These neuroprogressive cases exhibit longer and more frequent depressive episodes correlating with a functional decline over time. As it is also probable that such episodes result in brain tissue damage. There is an increased dementia risk as well as other effects of altered physiological functioning.[3] Currently, the diagnosis of MDD mainly relies on behavioral observations and clinical examination resulting in a subjective evaluation of depressive symptoms.[4] This means that, currently, there is no biomarker that has been approved as a diagnostic criterion in Major Depressive Disorder. Treatment of MDD currently focuses mainly on monoamine neurotransmission, though current treatments are lacking in both treatment response and remission rates.[5] New information regarding the pathophysiology, however, is suggesting a shift from monoaminergic

hypothesis to new mechanisms as the primary issue in the progression of MDD.[5] A novel hypothesis instead relates the pathophysiology of MDD to neuroprogression as defined by stage-related neurodegeneration, cell death in the form of both necrosis and apoptosis, reduced neurogenesis and neuronal plasticity, and increased autoimmune responses.[1]
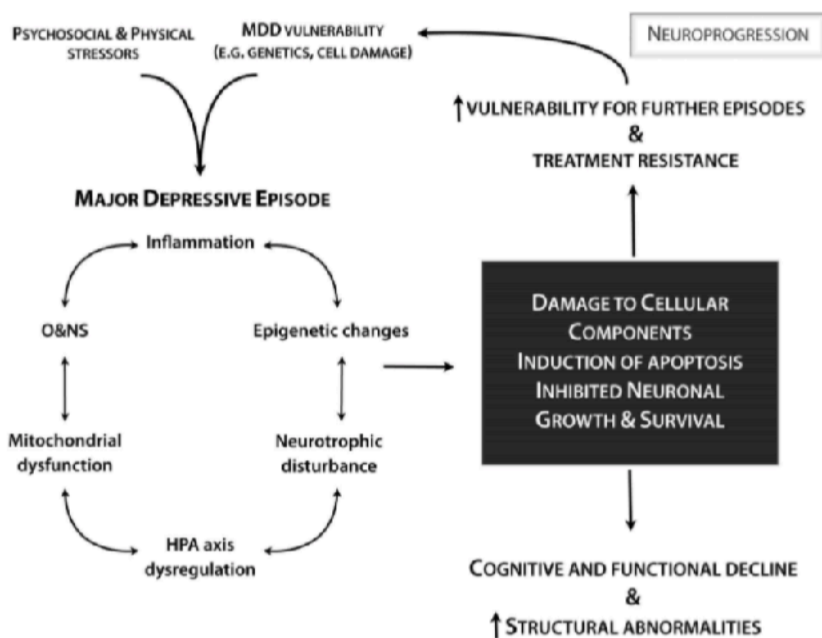
Figure 1. A flowchart illustrating the relationship between depressive episodes and neuroprogression. A depressive episode can induce many physiological changes in cells beginning with inflammation which can then induce oxidative stress and epigenetic changes. These effects can eventually result in cellular component damage which also leads to the induction of apoptosis and inhibited neuronal survival and growth. As is the nature of MDD, neuroprogression then indicates that with each depressive episode, the risk for further episodes is increased.[3]

Many of these characteristics of neuroprogression, such as an increase in apoptotic cells, increased autoimmune responses and reduced neuronal plasticity can be directly related to an imbalance in the redox homeostasis of the cell and its surrounding environment.[1,2,6–8] A direct relationship arises then between oxidative stress and the progression of major depressive disorder. Oxidative stress is an important factor in both the pathophysiology and progression of MDD.

Glutathione's Antioxidant Properties

Glutathione is a tripeptide containing glutamic acid, cysteine, and glycine residues. Most importantly, the cysteine residue contains a thiol functional group, at which many of the reactions resulting in the reduction of the reactive oxygen species will occur. Seen below is the structure of the tripeptide, with the three separate domains outlined for easy recognition.[9]
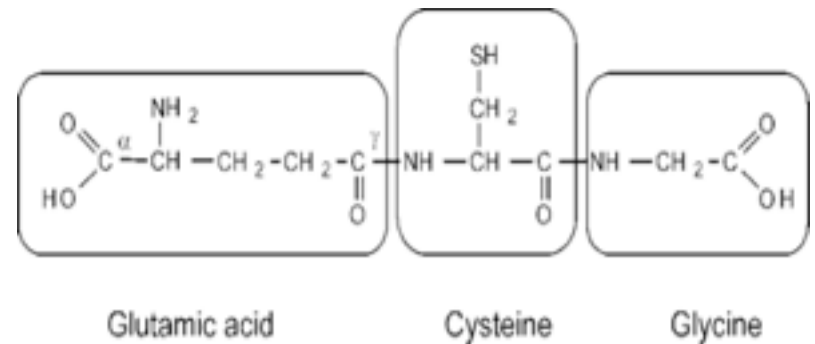
Figure 2. Glutathione's 3 domains. Glutathione exists in cells as a tripeptide made up of a glutamic acid residue, a cysteine residue, and a glycine residue. The abbreviation for glutathione, GSH, comes from the thiol functional group present on the cysteine domain.[9]

The glutathione molecule exists in cells in two forms: the reduced glutathione molecule, abbreviated GSH to emphasize cysteine's thiol group, and the oxidized glutathione molecule, abbreviated GSSG, emphasizing the disulfide bridge formed between two glutathione molecules. The structure of oxidized glutathione, GSSG, can be seen in **Figure 3** below.[10]
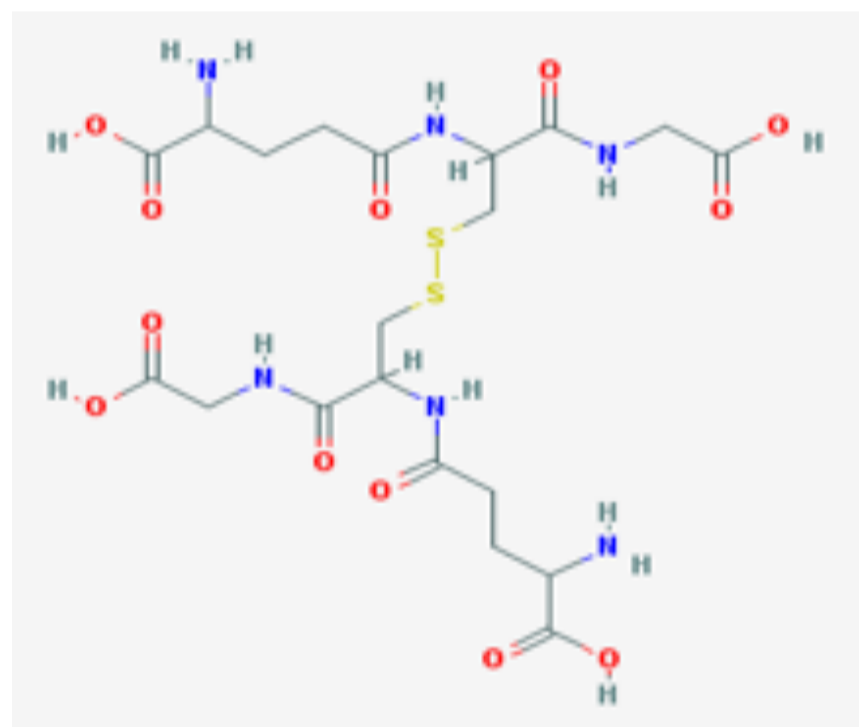
Figure 3. The structure of oxidized glutathione, GSSG. When two glutathione molecules bind to each other, they release 2 protons and 2 electrons that can be used for detoxifying reactions in the cell. The two molecules then form a disulfide bridge using the sulfurs from the thiol group on the cysteine residue of glutathione, producing the structure seen here.[10]

When a potentially harmful oxidant, like hydrogen peroxide, is present in the cell, GSH will scavenge the free radicals in order to reduce them. As a result of this reaction, the glutathione molecule becomes oxidized, and the reactive oxygen species loses its reactive quality, saving the cell from further damage by the ROS molecule. The reduction of hydrogen peroxide can be seen in **Figure 4**.[11]

Figure 4. The reduction of hydrogen peroxide using glutathione. Hydrogen peroxide, one of the common reactive oxygen species, can cause damage in the cell by oxidizing proteins, nucleic acids, or lipids. Glutathione helps to reduce the stress put on the cell by hydrogen peroxide by reducing the molecule to H_2O via its own oxidation catalyzed by glutathione peroxidase.

However, when the oxidized form of glutathione heavily outweighs the reduced form, GSSG can be recycled via NADH and glutathione reductase. This reaction reverts the oxidized GSSG form back to its reduced GSH form, allowing the same molecules to be used again. This reaction can be seen below in **Figure 5**.[12,13]

Figure 5. Equilibrium reaction between reduced form of glutathione (GSH) and the oxidized form of glutathione (GSSG) with structures. When a potentially harmful oxidant enters the cell, GSH will become oxidized to protect the more important structures of the cell, like DNA or RNA. To reduce the oxidized form back to restore protective antioxidant functions, NADPH works in collaboration with glutathione reductase. The balance between these two forms is known as the GSH/GSSG redox couple system—a vital buffer system to peak cellular performance.[12,13]

The Relationship between Oxidative Stress and Inflammation

Oxidative stress has been implicated in the neuroprogressive nature of Major Depressive Disorder in many studies, resulting in its acceptance as the general hypothesis for depression pathophysiology.[1,3,4,6,7,14,15] Additional factors both related to and independent of ROS imbalance that lead to depression include inflammation and the resulting tissue damage caused by inflammation. Oxidative stress can also induce inflammatory responses. During times of oxidative stress, nuclear factor-kB (NF-kB), usually complexed with inhibitory protein-kB, is translocated into the nucleus after IkB is phosphorylated by IKK-kinase.[1] Interestingly, NF-kB has both pro-oxidant and antioxidant targets, which typically allow for maintenance of Redox homeostasis. NF-kB is also imperative in

the synthesis and secretion of pro-inflammatory cytokines like Tumor Necrosis Factor-α (TNF-α, interleukins 1B, 6, and 8 (IL-1B, IL-6, IL-8).[16] Reactive oxygen species levels in inflammation is typically highly regulated by Negative Response ROS (NRROS).[1] NRROS degrades NOX2, which is member of the NADPH oxidase complex, through which many ROS are produced in response to inflammatory stimuli.[1]

Figure 6. A closed loop of the proposed relationship between inflammation and Reactive Oxygen Species (ROS) production. Inflammation can down-regulate Negative Response Reactive Oxygen Species (NRROS) protein, which then is not able to degrade NOX2. NOX2 is then able to produce more ROS in higher levels as a response to the inflammatory stimuli. The ROS then stimulate transcription factor Nuclear Factor kB (NF-kB) which closes the positive feedback loop by promoting inflammation.[1]

Therefore, down-regulation of NRROS leads to increased ROS levels, which was confirmed in a study by Liu et al.[17] Should NRROS be depleted as a result of depressive episodes in patients, a positive feedback loop is established increasing ROS production and stimulation of inflammation.

Similarly, when glutathione levels are low, oxidative stresses cannot be neutralized, again resulting in a higher level of inflammation as well as a compounding effect in oxidative stress levels. This was confirmed in a 2011 study showing that glutathione biosynthetic enzyme activity was significantly lower in depressed patients.[15] This suggests that the oxidative stress being experienced by these patients is the direct result of a glutathione depletion. This assertion is supported by the 2017 study by Freed et al. who observed a lower glutathione level in adolescents with MDD, though it may not correlate with severity of the disease.[18] This led to the tentative conclusion that a lowered glutathione level might be useful as a biomarker in early onset of major depressive disorder. These depleted antioxidant levels allowed for

the increase in inflammation which then continually increased levels of oxidative stresses. Alternatively, antioxidants like glutathione can become overwhelmed by the ever-increasing levels of reactive oxygen species. This results in the inability to reduce ROS, again creating a positive feedback loop and perpetuating the cycle to further exacerbate oxidative stress and inflammation. These proposed feedback loops speak to the progressive nature of depression: following a depressive episode, the brain becomes more susceptible to further degradation as the oxidative stress level continually increases since antioxidants are unable to reduce them, again resulting in increased inflammation.

The Relationship between Oxidative Stress and the Cell Cycle

It is evident that cells are exceptionally sensitive to their Redox state, since an imbalance in homeostasis can have devastating effects. In fact, the cell cycle itself also houses a Redox cycle as the regulatory link between oxidative metabolic processes and cell-cycle functions.[19] Perhaps the most evident link between ROS and the cell cycle is that an increase in oxidant and prooxidant levels is necessary in the G_1 phase to send the cell in to the S phase, the next phase in the cycle. This assertion is supported by the presence of many classic proliferative markers, like cyclin D1, CDK4, and Ki67, having been observed in degenerating neurons.[20] However, if the highly oxidized state of the cell cannot be reduced to further the cell cycle past the S phase, the cell could stall while attempting to rectify the oxidative stress.

Alternatively, should a buildup of ROS be present following the completion of the mitosis, it is possible that terminally differentiated neurons will reenter the cell cycle. This hypothesis is supported by the presence of Cyclin B1, CDK5, and tau proteins in patients with neurodegenerative disorders.[19] This unscheduled entry into the proliferative cycle has been shown to potentially activate cell-death pathways like apoptosis in the event that proper redox control is missing.[19] Aborted cell cycles can also result in a loss of neuronal cells. This speaks to the progressive nature of neurodegenerative and neuroprogressive disorders. Having fewer functioning neurons, the brain no longer functions the same way. If redox homeostasis continues to fall out of balance,

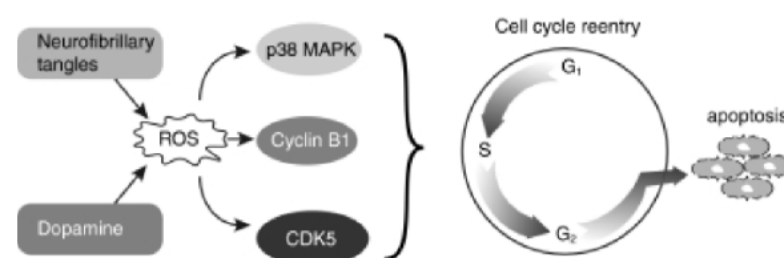more neurons will suffer the same fate and cognitive impairment is a risk.

Figure 7. The effects of reactive oxygen species on cell cycle reentry in neurons. Elevated ROS in neurons has been implicated in inducing growth-promoting signaling pathways (p38 MAPK, Cyclin B1, CDK5) resulting in unscheduled entry in to the cell cycle. This accidental reentry can result in apoptosis of the cell, a hallmark of neuroprogressive disorders.[19]

Again, loss of neurons is a hallmark of neuroprogressive disorders. While the definition earlier stated explicitly describes the loss of neurons through apoptosis, this is only one way in which neurons can degenerate. In any case, by helping maintain Redox homeostasis and limit oxidative stress, glutathione protects from neuron loss.

Glutathione's Role in the Brain

Glutathione has even more specific functions in the brain and central nervous system (CNS). Not only does it function as an antioxidant within cells, but it also works as a neuromodulator and promotes neuronal survival.[14] As a neuromodulator, glutathione interacts with the redox sensitive site on N-methyl-D-aspartate (NMDA) receptors to modulate glutamate ionotropic receptors to protect against excitotoxicity.[14] Glutathione also displaces glutamate from its binding site on α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid (AMPA) receptors and can displace kainate from its receptor in both the pre- and post-synaptic neuron. Since these receptors are on ligand-gated channels that allow the passage of sodium or calcium ions when bound by their ligands, glutathione disallows the passage of sodium and calcium ions through these channels. As the flow of ions leads to the depolarization of the neuronal plasma membrane and the start of an electrical current, by closing the channels, the neurons are allowed to repolarize.[21]
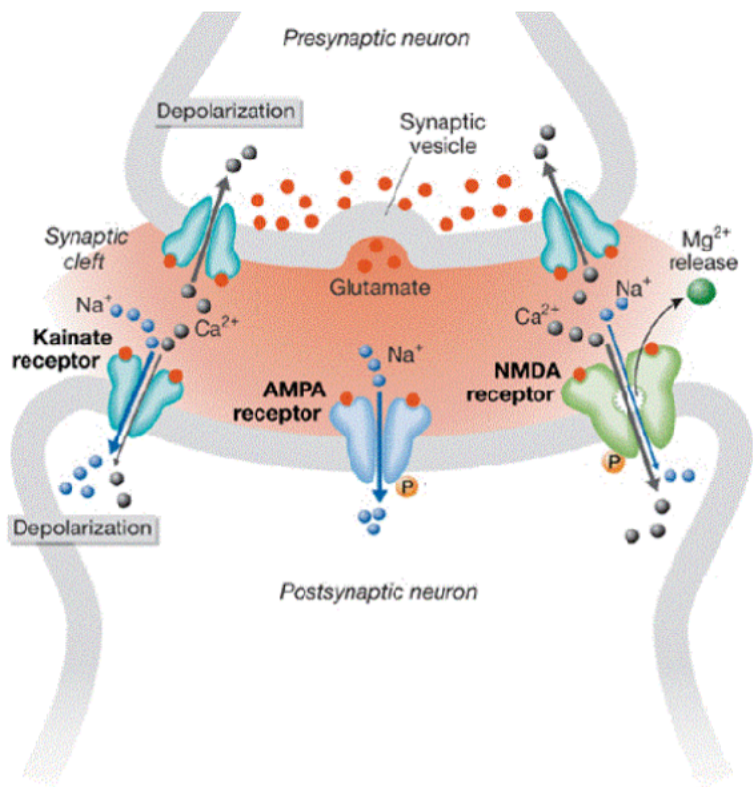
Figure 8. A diagram showing the normal function of ion channels in presynaptic and postsynaptic neurons. Glutathione can interrupt the depolarization and propagation of an action potential by inhibiting the binding of ligands to their respective receptors. In doing so, calcium and sodium flow is also interrupted, and repolarization can occur. Without glutathione, calcium homeostasis would halt, and neurons would suffer from excitotoxicity as they would keep firing without regulation.[21]

In doing so, glutathione appears to confer neuroprotection against excitotoxicity by maintaining Ca^{2+} homeostasis.[14] It stands to reason then, that a depletion of glutathione could lead to disastrous effects such as dysfunctions in organs and cellular functions that are observed at the onset of neurological disorders such as depression. Glutathione helps to maintain neuronal plasticity by protecting against the harmful effects of excitotoxicity that can occur from hypercalcemia in the central nervous system. This means that, as loss of neuronal plasticity is a hallmark of neuroprogressive disorders, glutathione helps to prevent neuroprogression by inhibiting excitotoxicity of neurons.

Glutathione Depletion and its Effects

Consequences of Depleted Glutathione on the Immune Response

As previously mentioned, glutathione is possibly the most important protector of detoxification of oxidative stress and therefore is vital in cellular antioxidant systems. Naturally it can be inferred that a compromised glutathione system can lead to a buildup of oxidative stressors as the balance between pro- and antioxidants is tipped toward the pro-oxidants. This alone will have a

negative impact on the brain, which leads to neuroprogressive disorders like MDD. Since glutathione has a generally inhibitory effect on the Nuclear Factor $_{\kappa}$B (NF-$_{\kappa}$B) transcription factor, which was earlier discussed for its important role in inflammation, without glutathione, NF-$_{\kappa}$B will no longer be properly inhibited.[14] NF-$_{\kappa}$B is activated by oxidative stress, but glutathionylation, or the addition of glutathione to the molecule, inhibits DNA binding, preventing the transcription of proteins necessary for the inflammatory pathway. Again, NF-$_{\kappa}$B is also redox sensitive. So, in the absence of glutathione, the redox state of the cell is thrown off and NF-$_{\kappa}$B will bind readily and be increasingly activated by the higher levels of oxidative stress. This also increases inflammation as a result of the upregulation of pro-inflammatory cytokines Tumor Necrosis Factor-α (TNFα) and interleukins 1β, 6, and 8 (IL-1β, IL-6, IL-8). It is also important to note that TNFα upregulates NF-$_{\kappa}$B as it enhances I$_{\kappa}$B function.[16] This is illustrated below in **Figure 9**.[22]
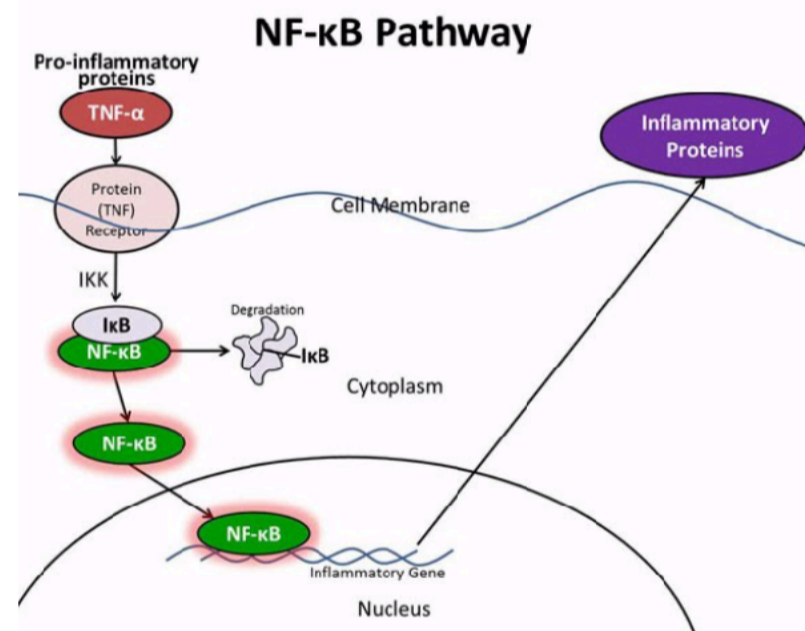
Figure 9. Activation of Nuclear Factor $_{\kappa}$B (NF-$_{\kappa}$B) by Tumor Necrosis Factor-α (TNFα). TNFα activates NF-$_{\kappa}$B by stimulating the phosphorylation of Inhibitor $_{\kappa}$B (I$_{\kappa}$B), causing its degradation and allowing NF-$_{\kappa}$B to translocate in to the nucleus and transcribe inflammatory genes resulting in the synthesis of inflammatory mediators like TNFα and interleukins 1β, 6, and 8.[22]

Additionally, the redox state of the cell governs transcription of these same interleukins (IL-6, IL-8) and TNFα.[14] Glutathione therefore affects the signaling pathways which are activated by these cytokines, and so depletion of glutathione not only enhances transcription of the IL family, but also increases the deleterious effects that these cytokines harbor.[14] One additional downstream effect of this interaction could also be the increase in protein misfolding that results as the NF-$_{\kappa}$B continually binds DNA

and induces transcription. Misfolded proteins lose functionality and could interfere with the regular physiological function of cells. In this sense, chronic oxidative stress that both induces this state and is a result of this state produces similar positive feedback loops as previously mentioned. This hypothesis has been corroborated as there have been observed cases of such chronic oxidative stress in patients with neuroimmune disorders.[14] Additionally, the ratio of reduced to oxidized glutathione (GSH/GSSG) can determine the activation level of both the MAP and Janus Kinase pathways, which are both involved in the inflammatory pathway.[14] Therefore, an improper ratio of reducing and oxidizing agents can also influence proinflammatory cytokine levels.[14] Notably, glutathione depletion can also lead to increased blood-brain barrier permeability, which can increase CNS immune-inflammatory responses as immune cells can now extravasate through the blood-brain barrier.[14]

Autoimmune responses are a trademark of neuroprogressive disorders. As illustrated, a disruption of the Redox homeostasis can result in an increase in autoimmune responses in the brain and CNS. Glutathione regulates both the Redox homeostasis as well as directly helping maintain the integrity of inflammatory pathways. It can be said, then, that glutathione plays a role in protecting from neuroprogressive disorders by protecting from consequences of autoimmune responses in the nervous system.

Consequences of Glutathione Depletion on the Cell Cycle

As the cell cycle is heavily dependent on an underlying redox cycle, loss of glutathione can have detrimental effects on the cell cycle. Since glutathione is a major player in maintaining appropriate redox homeostasis, if this is lost, cells will not progress through the cell cycle normally. Glutathione depletion can impact the redox mechanisms which regulate DNA synthesis in the G_1 phase of mitosis and can impair proliferation of all cell types, including neuronal cells.[14] Specifically, having reduced amounts of glutathione prevents the shift from G_1 to S phase and therefore hinders proliferation of cells.[14] These stalled cells, if unable to be recovered, undergo apoptosis so that other, working neurons can use the components they harbor.

Conversely, oxidative stress can stimulate terminally differentiated neurons to reenter the cell cycle. This oxidative stress, while it can occur in the presence of normal physiological glutathione levels, is exacerbated when glutathione levels are low. Reentry to the cell cycle is dangerous, as it can result in apoptosis. Since neuronal cells have limited regenerative capacity, as the number of apoptotic neurons increases, function overall begins to suffer simply because there are fewer working neurons.

Conclusion

Glutathione and Depression

Major Depressive Disorder is a mood disorder that is neuroprogressive in nature. This means that it is characterized by three of the main hallmarks of neuroprogressive disorders: reduced neuronal plasticity, increase in apoptosis of cells, and increased autoimmune responses. Oxidative stress has been implicated in the pathophysiology of MDD, likely because increased levels of reactive oxygen species can induce all of these responses in the body. Depletion of glutathione can result in a loss of neuronal plasticity as the ROS overwhelm the antioxidants, rendering what glutathione is present incapable of fulfilling its role as a neuromodulator. This then leads to excitotoxicity of neurons and neuronal plasticity is greatly reduced. ROS can also directly induce autoimmune responses by activating the NF-$_\kappa$B pathway. This pathway feeds into a positive feedback loop, only further increasing the oxidative stress on the cell which, in turn, canonically activates the NF-$_\kappa$B pathway. Glutathione inhibits this directly by keeping NF-$_\kappa$B from binding to DNA, which downregulates the release of pro-inflammatory cytokines like TNF-α and interleukins. If glutathione is not present, not only will the redox balance lean heavily to the pro-oxidant side, thus activating the NF-$_\kappa$B pathway, but the glutathione's regulatory check on NF-$_\kappa$B is also lost, only confounding the issue. Finally, reactive oxygen species can alter neurons' progress through the cell cycle, even causing them to reenter the cycle spontaneously. This reentry is particularly dangerous as it can later induce apoptosis. As loss of neurons continues in response to chronic oxidative stress, neuroprogression flourishes. Glutathione helps to maintain the cell cycle's integrity through the underlying redox cycle embedded within it. If glutathione is depleted, this protective measure is lost, and apoptotic cells increase in the CNS.

The bottom line is that when glutathione is depleted, in many ways the environment becomes favorable for neuroprogressive disorders like MDD.

Clinical Relevance and Future Directions

If depleted glutathione is a main factor in the pathophysiology and progression of neurodegenerative disorders, treatment options could focus on supplementation of glutathione in order to replenish the molecule to normal levels. While treatment with oral glutathione sounds attractive, the absorption and effectiveness make this treatment less promising, since it is readily hydrolyzed in the gastrointestinal tract, and because it is difficult for any molecule to easily cross the blood-brain barrier in to the CNS, where it would be needed to have any impact on the progression of MDD. This would also hinder the use of glutathione supplementation via infusion. This was supported by the findings of a study that reported that only about 0.5% of glutathione injected in to the carotid space of rats was later detectable in the brain.[14] Perhaps a comforting thought is that many currently used antipsychotic medications do appear to increase the glutathione levels in the brain.[14] This is confirmed in the reduction of serum superoxide dismutase activities following antidepressant therapy.[6] This enzyme is involved in the breakdown of reactive oxygen species, and a decrease in its activity indicates that there is a lower level of oxidative stress stimulating it. That is, since there are fewer ROS present, the body needs less of the superoxide dismutase to reduce them.

While currently glutathione treatment may not be an option, altered glutathione levels could be useful as a biomarker for early onset of MDD.[18] Further research should focus on new vehicles to help provide supplemental glutathione or its synthetic enzymes in to the brain. Other avenues of research could be the applications of this knowledge to neuroprogressive disorders other than Major Depressive Disorder. For instance, new research implicates oxidative stress in the progression of Alzheimer's.[23] Perhaps by finding novel treatments or by supporting early diagnosis of these disorders, the incidence of neuroprogressive disorders like depression can be dramatically decreased. ❖

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JAWUANNA MCALLISTER

CLINICAL REPORT: A COMPLEX CASE OF NEUROSARCOIDOSIS PRESENTING AS A NEUROGENIC DIABETES INSIPIDUS SECONDARY TO OBSTRUCTIVE HYDROCEPHALUS

Abstract

We present a complex case of neurosarcoidosis in a 22-year old male. The patient presented initially with polydipsia, polyuria, nausea, vomiting, headache, and blurry vision, but his symptoms progressed over the course of his illness. He had a previous history of head trauma from a concussion. Blood and metabolic tests revealed hypothalamic and pituitary dysfunction. Imaging studies showed hydrocephalus that was thought to be the cause of hypothalamic and pituitary abnormalities. However, additional imaging studies revealed several lesions on his hypothalamus, brain stem, and optic nerves of his left eye. Surgical resection was not recommended because of the location and extent of the lesions. At the most recent follow-up 10 months later, there was no evidence of recurrence or progression. The patient is currently maintained on low dose mycophenolate mofetil.

Key words: Central Nervous System, Neurosarcoidosis, Sarcoidosis

Literature Review

Neurosarcoidosis

Sarcoidosis is an idiopathic systemic noncaseating granulomatous inflammatory disease (James, 2000; Hoyle et al, 2014). Sarcoidosis affects people of all races, but in the United States, the incidence is 11/ 100,000 in Caucasians and 36/ 100,000 in African Americans (Hoyle et al 2014). When the nervous system is involved (seen clinically in approximately 5-10% of sarcoidosis cases), the disease is termed neurosarcoidosis (NS) (Lacomis, 2011) (**Figure 1**). NS usually occurs with other forms of sarcoidosis and it can affect the central and peripheral nervous systems. NS has a wide range of clinical manifestations that may be dependent upon the areas of the nervous system affected, making diagnosis challenging. Common clinical manifestations include facial nerve paralysis, vision loss, headache, seizure, diplopia, dysarthria, and paraparesis (Smith et al, 2004; Pawate & Moses, 2009). Symptoms of diabetes insipidus, such as intense thirst and polyuria, stemming from hypothalamic or posterior pituitary involvement and hydrocephalus have been reported (Smith et al, 2004; Hoyle et al, 2014). Additionally, spinal cord involvement may present clinically with weakness in the lower extremities and other signs of myelopathy (Smith et al, 2004; Hoyle et al, 2014).

While the precise cause of NS in unknown, it is suspected that affected individuals are genetically predisposed to an exaggerated response to a specific occupational or environmental antigen (most likely airborne) (Bathla et al, 2017). Perivascular and vascular granulomas are characteristic of sarcoidosis in the brain, so CNS involvement is suspected to be hematogenous (Bathla et al, 2017). Finally, Vitamin D deficiency, which is more prevalent in African Americans, may also play a role in NS pathogenesis (Hoyle et al 2014).

Granulomatous inflammation (GI) is a form of chronic inflammation characterized by inflammatory lesions (granulomas) that form to contain harmful substances (**Figure 1**). In the case of immune granulomas, the offending agent is a persistent microbe or self-antigen. The offending agent triggers T cell and macrophage activation. Antigen presenting cells release cytokines and chemokines to recruit and activate other immune cells at the affected area. Activated T_H1 lymphocytes release interleukin-1 (IL-1), which acts on macrophages to facilitate diapedesis. T cells in the affected area secrete cytokines like interferon gamma (INF-γ) to recruit and activate more macrophages (James, 2000). INF-γ increases the expression of major histocompatibility complex II (MHC II) molecules on macrophages. Once the macrophage is activated, its receptors carry an Fc fraction of immunoglobin G (IgG) to increase their phagocytic ability (James, 2000). Granulomas form when areas inflammation or immunological

reactivity attract macrophages that fuse into multinucleate giant cells or adapt into epithelioid cells to protect healthy tissues (Braun & Anderson, 2017). CD4+ T helper 1 (T$_H$1) lymphocytes recognize peptides presented to them by classically activated macrophages expressing major MHC II molecules (James, 2000). CD8+ T cells also downregulate their expression of inhibitory receptors, impairing control of the cell-mediated response, and promoting the inflammatory response. When CD4+ and CD8+ T cells and B cells form a rim around the granuloma, the inflamed area becomes encased in fibroblasts, mast cells, collagen fibers, and proteoglycans, forming a destructive region of fibrosis (James, 2000; Hoyle et al, 2014). The positive feedback loop that results from T cell activation is an extremely effective response to infections and foreign invaders. However, when this response is misdirected or exaggerated, it can also be an incredibly destructive cause of chronic inflammation.
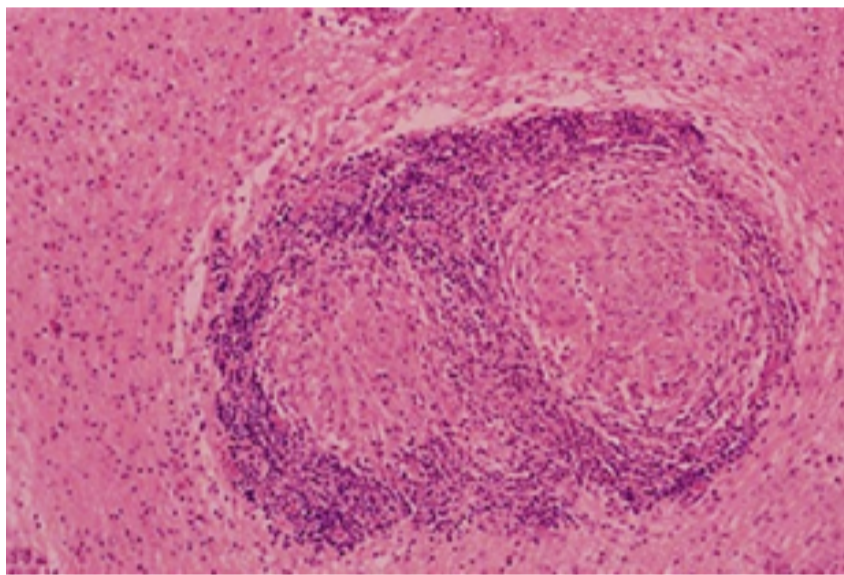

Figure 1. Noncaseating granulomatous lesion in the cerebral white matter (H&E original magnification 40x) (Szabo et al, 2011).

The Central Nervous System

The central nervous system (CNS) consists of the brain and spinal cord and has several integrative and control centers that regulate activity throughout the body. The structures of particular interest when considering clinical signs of neurosarcoidosis include the brainstem and associated cranial nerves, the optic nerves (II), and the hypothalamus (Hoyle, 2014).

The brainstem has three anatomical regions (the midbrain, pons, and medulla oblongata) that work together to produce rigidly programmed, automatic behaviors necessary for survival (Marieb and Hoehn, 2016). Its nuclei are associated with cranial nerves III-XII. Cranial

nerves that originate at the brainstem and are of particular interest include the oculomotor and trochlear nerves (III and IV) vestibulocochlear nerves (VIII), glossopharyngeal nerves (IX), vagus nerves (X), and hypoglossal nerves (XII). The oculomotor and trochlear nerves stem from the midbrain and innervate the extrinsic and intrinsic muscle of the eye (Marieb and Hoehn, 2016). The vestibulocochlear nerves, arise from the pons-medulla border and have afferent fibers that are critical to hearing and equilibrium (Marieb and Hoehn, 2016). The medulla oblongata is associated with the vagus nerves which are help regulate heart rate, breathing, digestive system activity, blood pressure, taste, speech, and swallowing (Marieb and Hoehn, 2016). The hypoglossal nerves also originate from the medulla and control the intrinsic and extrinsic muscle of the tongue, necessary for chewing, swallowing, and speech (Marieb and Hoehn, 2016). The optic nerve fibers arise from the retina and carry afferent impulses necessary for vision (Marieb and Hoehn, 2016). Thus, paralysis or dysfunction of these nerves due to trauma or injury could lead to a myriad of physiological disruptions and life-threatening conditions, ranging from diplopia, blindness, dizziness, and difficulty swallowing to difficulty regulating blood pressure, arrhythmia, and respiratory arrest.

Another important component of the CNS is the hypothalamus, the chief regulator of the autonomic nervous system (Marieb and Hoehn, 2016; Higham et al, 2016). It controls the hormonal output of the anterior pituitary, but it also acts as an endocrine organ by producing oxytocin and antidiuretic hormone (ADH) to be released from the posterior pituitary.

Diabetes Insipidus and Hydrocephalus

Diabetes insipidus (DI) is a hereditary or acquired polyuria and polydipsia disease that is associated with inadequate secretion of or inadequate renal response to ADH. ADH is a neurohypophyseal nanopeptide that regulates body water and homeostasis by activating V2R at the basolateral membrane of the principle cells in the distal convoluted tubule and collecting duct of the kidney (Kalra et al, 2016). V2R activation leads to the activation of protein kinase A, which phosphorylates aquaporin 2 (AGP2) water channels that increase collecting duct water permeability and leads to increased water resorption (Kalra et al, 2016). DI leads to decreased water resorption, polyuria, dilute urine, and increased thirst. If left untreated, DI

can also cause hypovolemia, dehydration, and electrolyte imbalances, and nausea (Kalra et al, 2016).

Neurogenic DI occurs when the posterior pituitary gland releases abnormally low amounts of ADH. Neurogenic DI is usually caused by hypothalamic or posterior pituitary injury (from traumatic brain injury, surgery, or tumors), which can result in issues producing and/or releasing ADH (Kalra et al, 2016; Higham 2016). Hydrocephalus, a build-up of cerebrospinal fluid in the ventricular system, is a rare but recognized cause of neurogenic DI (Menzies, 1998; Walton et al, 1985).

Patient History

The patient, David Harris, is a 160lb, 22-year-old African-American male who attends the University of Maryland in Baltimore, Maryland. In addition to maintaining 18 semester hours and participating in multiple clubs and service-oriented activities within his community, David is also a gifted soccer player. He sustained a serious concussion during a soccer game 12 months ago. He seemed to recover quickly after the incident, but, approximately 10 months ago, he began to experience nausea, vomiting, excessive thirst, and mild fatigue. A few days later, he developed a generalized headache and his vision became blurry. The patient's vitals were within normal limits, but his metabolic panel revealed low sodium levels and urinalysis showed a low specific gravity. Endocrine revealed abnormally low ADH levels, but all other endocrine levels were normal. The patient's history of head trauma prompted a head CT, which showed enlargement of the lateral ventricles with global effacement of the sulci, characteristic of hydrocephalus. The patient was diagnosed with diabetes insipidus secondary to obstructive hydrocephalus. A ventriculoperinoneal (VP) shunt was placed and the ventricles seemed to return to normal. The patient was discharged but returned 2 weeks later with similar symptoms. MRI showed 3 lesions on his brain stem, and a fourth small lesion near the optic nerves of his left eye. The patient was treated with steroids and plasmapheresis. His symptoms improved, and he was discharged 2 days later. Upon his third hospitalization 9 days later, he presented with dyspnea, dysarthria, dysphagia, dystaxia, and nausea. New MRI scans revealed that the lesions had grown dramatically. Their rapid growth led to a differential diagnosis of malignant brain cancer, which could not be confirmed without a brain biopsy. The patient's condition quickly deteriorated to total body paralysis.

Case Mechanics

David Harris was diagnosed with neurosarcoidosis. The specific etiology of his disease is unknown. The pathogenesis of his disease involves the formation of noncaseating granulomas, inflammatory lesions. A detailed patient history including previous illnesses, diagnoses, and treatments was obtained. The patient was initially diagnosed with diabetes insipidus secondary to obstructive hydrocephalus (prompted by brain trauma); however, his symptoms progressed after the hydrocephalus was corrected and he was incorrectly diagnosed with brain cancer. Further analysis and imaging by new physicians revealed that the enhancing parenchymal mass lesions (commonly mistaken for primary or metastatic tumors or tumefactive demyelination) were not cancerous.

A new CBC with differential was obtained to rule out common signs of neurologic dysfunction (vitamin B-12 deficiency, hyperglycemia, metabolic abnormalities, etc.). Systemic WBC count was slightly elevated and blood-sodium levels were low. Additional endocrine studies revealed hypothalamic dysfunction and pituitary failure, as a host of hormones (antidiuretic hormone, adrenocorticotropic hormone, thyroid hormone, and gonadotropin) were present at insufficient levels (Murialdo & Tamagno, 2002). A chest x-ray revealed accumulation in the patient's lungs, but no other abnormalities were observed. Elevated leukocyte count and total protein were observed in the patient's CSF. Glucose and angiotensin converting enzyme (ACE) levels, were also elevated in CSF, indicating central nervous system sarcoidosis (Silverstein et al, 1979; Bridel et al, 2015). (ACE, a critical component of the CNS renin-angiotensin system (RAS), is involved in CNS immune response and is secreted by epithelioid and giant cells of granulomas) (Silverstein et al, 1979).

The diagnostic criteria for NS include a compatible clinical presentation, histological identification of a noncaseating granuloma, and laboratory tests or imaging that support the diagnosis. If histological analysis is not available (in the case of high-risk biopsies), other disorders that have similar clinical

manifestations should be excluded. Diagnostic criteria with various levels of certainty are commonly used (Lacomis et al, 2011). From least to most certain, these diagnoses are possible, probable, and definitive NS (**Table 1**).

Table 1 – Proposed Diagnostic Criteria for Neurosarcoidosis	
Definite	• clinical presentation that is suggestive of NS • positive nervous system histology • exclusion of other diagnoses

Probable	• clinical presentation that is suggestive of NS
	• evidence of inflammation in the CNS*
	• evidence of systemic involvement through histology, Kveim test, and/or two of the following indicators:
	   – suggestive Gallium scan
	   – suggestive chest imaging
	   – suggestive serum ACE
	• exclusion of other diagnoses

Possible	• clinical presentation that is suggestive of NS • exclusion of other diagnoses

*Evidence of inflammation in the CNS includes elevated protein and/or cells in CSF, the presence of oligoclonal band, and abnormal brain MRI (Lacomis et al, 2011; Nozaki & Judson, 2012).

This patient's possible diagnosis of NS was obtained primarily from and T2 weighted MRI scans (in which CSF and other fluids are white, grey matter is grey, and white matter is light grey) and negative results from other tests. T2 weighted MRI of the patient's brain revealed two grey matter lesions on his hypothalamus, three grey matter lesions on his medulla, and a fourth lesion posterior to his left eye. Histological study was not possible, as biopsies of the affected regions were extremely high risk.

One of the disorders that must commonly be excluded to diagnose neurosarcoidosis is multiple sclerosis (MS). MS is a demyelinating disorder of the white matter in the central nervous system that is commonly confused with NS. Both diseases may have the following clinical signs: relapsing-remitting neuritis, myelopathy, dystonic spasms, sensory abnormalities, paraparesis, and hemiparesis (**Table 2**). Additionally, treatment with corticosteroids or other immunosuppressants usually improves symptoms in both cases. Finally, brain images for both diseases may have similar manifestations (ex. periventricular white matter changes) (Nozaki & Judson, 2012).

Table 2 - Differentiating features of central nervous system (CNS) sarcoidosis from multiple sclerosis (MS)		
	CNS sarcoidosis	MS
CLINICAL MANIFESTATIONS		
Relapsing/ remitting course	Common	Very common
Diverse neurological findings	Common	Very common
Extraneural involvement	Highly suggestive	Possible (esp. rheumatologic)
Visual apparatus	Anterior segment >Optic nerve	Optic nerve >Anterior segment
Cranial neuropathy	Highly suggestive	Possible, but not common
MAGNETIC RESONANCE (MR) FINDINGS		
Leptomeningeal enhancement	Highly suggestive	Rare
Dural enhancement	Highly suggestive	Rare
Enhancing mass adjacent to meninges	Highly suggestive	Rare
Enhancement of parenchymal lesions	Persistent (more than a few weeks)	Transient (within a few weeks)
Hydrocephalus	Highly suggestive	Rare
Involvement of hypothalamus/ pituitary	Highly suggestive	Rare
Non-enhancing periventricular white matter (WM) lesions	Common	Common
Spinal cord	Intradural extramedullary> Intramedullary	Intramedullary
CSF FINDINGS		
Lymphocytosis, Elevated protein level	Common	Common
Hypoglycorrhachia	Suggestive	Rare
Elevated ACE level	Suggestive	Possible
Oligoclonal bands	Possible	Highly suggestive

(Nozaki & Judson, 2012)

The patient was treated with oral mycophenolate mofetil (CellCept) at 600 mg/day and prednisone for 6 months, until his leukocyte count returned to normal. Mycophenolate mofetil (MMF, CellCept) is a prodrug of mycophenolic acid (MPA), which inhibits inosine-5'-monophosphate dehydrogenase (Allison, 2005). MMF is converted to its active form, MPA, in the liver. MPA suppresses cell-mediated immune response and antibody formation by inhibiting T and B cell proliferation through depletion of their

guanosine nucleotides. MPA also inhibits lymphocyte and monocyte recruitment and glycosylation of adhesion molecules (critical for adaptive immune response (**Figure 2**) (Wolfert & Boons, 2013). MPA also decreases the local production of nitric oxide produced by activated macrophages, thereby exerting another anti-inflammatory effect (Allison, 2005).
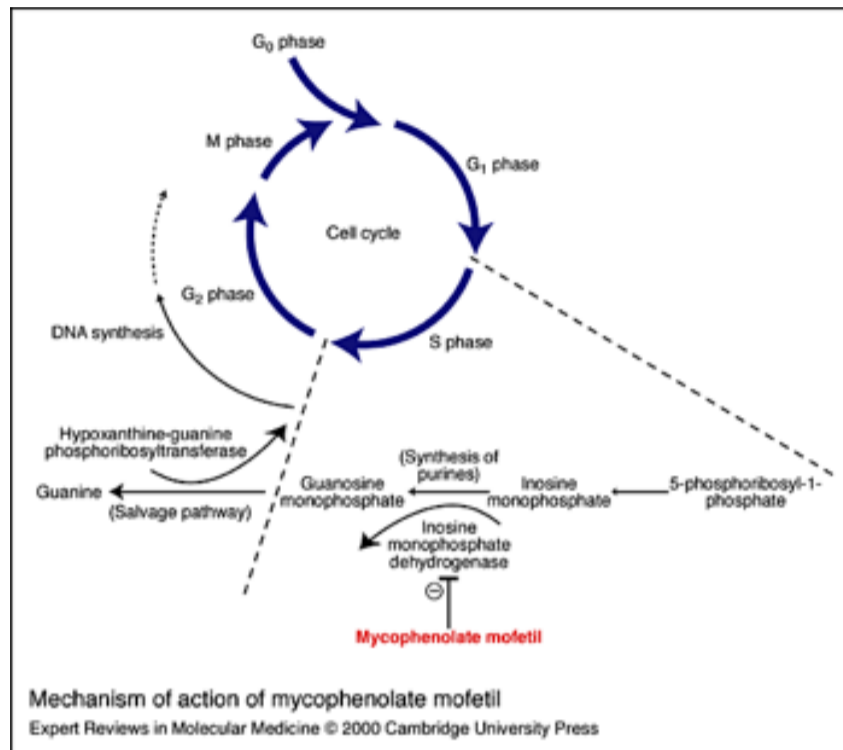

Figure 2. Myophenolate mofetil mechanism of action.

The patient underwent physical therapy to regain motor function, particularly in his lower extremities. He was also treated with muscle relaxers and anti-nausea medication to manage his symptoms and aid his recovery. Ten months after the presentation of his illness, the patient is and able to work, travel, and exercise without difficulty. He occasionally experiences mild balance disturbances but is otherwise asymptomatic. He is maintained on 25 mg of mycophenolate mofetil. ❖

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