the MEDICAL HUMANITIES JOURNAL of Boston College

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The Medical Humanities Journal of Boston College seeks to: • Initiate and engage in conversation in the Boston College community and beyond about the emergent field of Medical Humanities, Health and Culture. • Provide students at Boston College with the opportunity to publish original work.• Feature a variety of work from several disciplines. • Examine critically and represent creatively ideas of health, illness, caregiving, and medicine. • Connect students with alumni, professionals, and other Medical Humanities programs to extend and to engage in conversation beyond Boston College.

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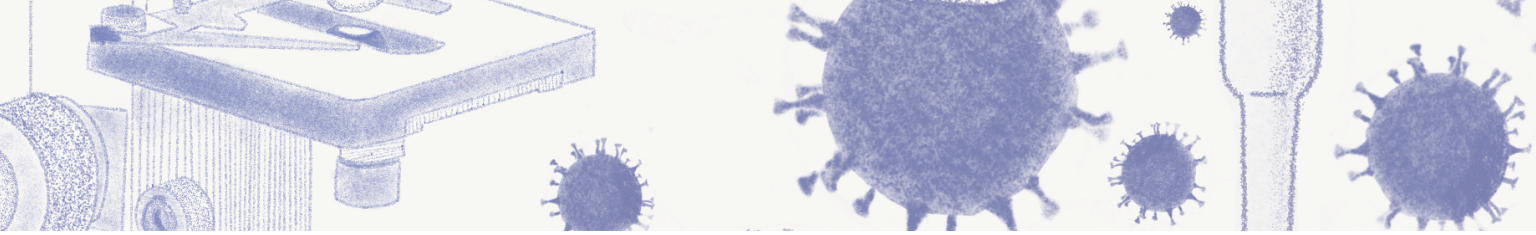
Editor's Note

To begin, we would like to reflect on the roots of the Medical Humanities Journal, which were planted in 2016.

Derek Xu and Sarah Ramsey, the first editor-in-chief and managing editor of the journal, respectively, aptly expressed in their editor's note of the Spring 2017 issue that "[o]ur time as college students is largely spent observing and constructing our world view in a microcosm of society." Although neither of us have met Derek or Sarah, that sentiment still deeply resonates with the both of us, and—we think—with you, too. Between classes and studying, time allotted for extracurricular activities and catching up with friends, we are in a special time of our lives that can never be replicated again. We begin to appreciate the differences in lived experiences around us, and start to look at the world more critically. Yet, we also hope that our innate curiosity about the ever-changing world and our place in it continues to alter and reshape our perspective beyond college, as scary as that may seem at times. *The Medical Humanities Journal*, which includes all of the authors, editorial board, and general editors, have played a formative role in redefining and altering our worldview during our time here at Boston College.

The Medical Humanities Journal has seen many changes since 2017, including weathering a global pandemic and navigating a recent transition to the online platform Open Journal Systems where articles will be given their own DOI (don't worry, our website is still up and running!). Despite the many challenges we've faced along the way, we are grateful that this journal continues to function as a place where members of the Boston College community and beyond feel safe voicing their faith, hopes, dreams, and memories.

The pieces in this issue matter to us, and we hope that they matter to you, too. Most of all, the unsung efforts that made this issue possible matter to us. Behind each word published in the Journal is the labor and collaboration of the writers, editors, and everyone else involved in the publication process.



A single publication celebrates the design, publicity, editing, and organization that went into the making of each issue. The final Journal, whether on a digital monitor or a physical copy in your hands, is a manifestation of the nebulous ideas once concocted during Ignacio lounge meetings. That is all to say, we are immeasurably grateful for the dedication and hard work of our editorial board and general editors. Once again this year, the pieces submitted to the journal remind us that we share our stories with others because that is a fundamental part of being human.

We see ourselves in an frightened eight-year-old boy who leans on his mother and father for support when he confronts a needle. In "The Butterfly, 25 Gauge," author Raquel Cohen reminds us that all too often, our fears are "self-imposed barriers" from which "we must emerge" so that we can set ourselves free.

In Mehdi Kayi's essay "Religiosity During Lockdown: The Role of Faith-Based Communities During the Covid-19 Pandemic," we are reminded of the uncomfortable truth of the fragility of our social structures, and even the fragility of our ties with others, in a post-COVID-19 world. The strength of Medhi's faith inspires us to foster our own sources of resilience so that we can find purpose and meaning even in the face of catastrophe.

When all's said and done, this journal could not exist without one key ingredient: human connection. The stories that we find in this journal, time and time again, remind us that we are not alone. That we have never been alone. Thank you, truly, for putting your hearts into these works of art.

Jenny Zeng and Tristan Leitz
Co-Editors-in-Chief

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22 years of pacing back and forth is enough pacing to lose yourself in your own kitchen

Cecilia Durcan

When the sun shines through
the glass door in the kitchen
around ten in the morning it
makes a perfect square
of light on the wood.

I used to lie in the box of light, the warmth of the floor touching my bones.
I'd lie there and watch her familiar movements – the soft opening and closing of cupboards, the habitual cleaning of countertops, returning every so often to her cooling cup of coffee next to the stove.
She would open the window and turtle dove songs would fill the room, carried in on a breeze so crisp that I could know without looking: oak leaves covered the grass outside.
Now, there are fruit flies all over the kitchen.
I stand in the entryway and stare at the floor – the paths worn into those yellow pine boards, the wood stain has all but rubbed away, revealing ghostly footsteps of a figure who exists only in my mind's eye.
Through the glass, I can see an old windchime in the yard that makes the occasional attempt at music, but the strings are all knotted together; the fall weather has rusted the bells.

A spider in the sill spins its web
and reminds me that
I do not live in this house anymore.
Someone else has made a home
of my sunlit sanctuary,
and I am trespassing here.

The Butterfly, 25 Gauge

Raquel Cohen

Through the hospital window, daybreak brought the serene renewal of day,
but inside this patient there was a pervading hurricane.
Tormenting emotions whirled and anxiety rained
In the eight-year-old boy petrified of needles.
I was tasked with drawing his blood,
which flooded faster, frantically through his river of nerves.
He asked if he could sit on his mother's lap.
And if his father could hold his hands.
He asked to see the dreaded needle that would puncture his vein
A pediatric needle, a butterfly, 25 gauge.
I told him he was brave.
"Our nerves are sticky webs that trap us,
But through these self-imposed barriers we must emerge."
And in that moment, there was a change.
His eyes went from crying to courageous,
Ready to take flight straight into his fear
As the needle went straight into his vein.
He sailed past his river of nerves
And soared into a new valiant state of mind.

Minseo Cho

Encouraging Healthy Growth

Cecilia Durcan

Hunching over the sink, I begin
To cut away drooping leaves and browning stems
Just like my mother taught me to do

I snip, and each flower becomes shorter
A little less complete than it was the moment before
The rotting roots already forgotten

Sacrificing an iris petal, I pare, I shear, I whittle
So that what remains will last a moment longer
In the vase, on the shelf, in my mind

I fade

I survive

Eradicating the Phantom Disparities Between Evolution and Creation

Felix Gottlieb

We, as humans, seem to perpetually covet answers to questions that we don't quite understand. As our social structures, technology, and natural understandings have progressed, we are still left requiring a firm explanation to the origins of our ancestry. The innate intricacies of this query have historically veiled our criticisms, and the development of scientific theories aimed to clear the murky water has been met with institutionalized backlash from religions that claim to have had the answer for centuries. This cyclic climate has been long-considered binary: an individual will either side with science and Darwinian evolution, or with The Book of Genesis, where the origins of humanity are outlined in the story of Adam and Eve. However, there are those who have enabled themselves to consider both sides of this complex argument. A great example of this coming to fruition is Adam and the Genome, co-authored by geneticist Dennis R. Venema and New Testament scholar Scot McKnight, which analyzes the contention between contemporary evolutionary science and biblical interpretations of the origins of the human race. The authors are able to ascertain a common ground between sides through the discussion of the historical origins of scripture compounded with the scientific restrictions surrounding evolutionary theory. While the route of consideration can be left somewhat subjective, I assert that the religious story of creation can be in productive dialogue with evolutionary biology.

Adam and the Genome is partitioned into two sections based on the corresponding two authors involved in its creation. The first part was written by Venema; it delves into the world of evolutionary science, and contains responses

to its religious backlash. The second is written by McKnight where he postulates solutions for theologians trying to make sense of the disparity between scripture and evolution. In Venema's half, he explains the reasoning behind the scientific method, and underscores the importance of uncertainty in this process. To elaborate, a scientific theory such as evolution is a conglomeration of thoughtful analyses - just because it exists does not preclude it from being disproved. In fact, Venema rightfully claims that evolution's very existence as a theory is indicative that it has yet to be disproven. This nature of the scientific process makes it seem "... wishy-washy—and leads many Christians to think that they're better off sticking to the plain truth of the Bible" (Venema and McKnight 5). A large contention of evolution theory lies in its assertion that humans did not come directly from a creator, but that we came from lower life forms under environmental pressure. An assumption of this contention is that the evolution of a species is a continuous, not incremental, process. A monkey did not give birth to a human, and therefore there must be evidence of species that displayed intermediary genotypic and phenotypic characteristics.

A fun comparison that Venema makes to this phenomena is the evolution of a language, and he specifically analyzes the differences between Anglo-Saxon and Modern English. He referenced John 14:6, showing a translation in Anglo-Saxon from 990 AD, as well as the commonly used English version from today. Venema stresses how "Anglo Saxon incrementally became Modern English over generations, within a continuous population of speakers" (Venema and McKnight 20). Understanding that evolution is a population phenomena is critical in readjusting the notion that every human being came from Adam and Eve. In fact, Venema points out that through the statistical study of gene allele frequencies, and taking into account the current population size, scientific literature projects that there has never been fewer than 10,000 individuals in the human population.

In the early 2000s, a comprehensive sequencing of the human genome was published. Since then, studies comparing the human genome and other species have become widespread. From

these studies, it has been found that we share common ancestry with all life and that all genetic material has traveled phylogenetically from the first organisms (which were single celled and had little to no cellular machinery). The idea of natural selection must inherently be considered when discussing the genetic evolution of a species; there is the notion that nature does not create genetic diversity but simply acts upon it.

For example, consider a trait such as size to be normally distributed across a population. Individuals with a larger stature may use their size to be successful in hunting prey, while the small individuals may use theirs to hide from predators. This leaves the medium-sized individuals–too small to hunt and too big to hide–to die out naturally over time. The normal distribution will thus split down the middle, and eventually this species will evolve into two separate species; a larger one that exclusively hunts and a smaller one that exclusively hides, in this case. Venema's language example fits well into the context of this thought experiment; a population of speakers can be physically separated over a period of time time, and once they are brought back together, they may not recognize the phonetics of the other group's evolved language.

Of course, size is a pleiotropic trait that is derived from many genetic and environmental factors, but this example can be extended to the molecular scale, with genes and, more specifically, with genetic mutations. There are many types of mutations, ranging from a single base-pair substitution to the deletion of the majority of a genetic locus. Another type is a genetic duplication, where a gene is randomly duplicated in a cell division error. If there are two copies of the same gene, over time, one may be irreversibly altered;this can result in a gene of new function. Over a few billion years, the original genetic material has gotten more complex through this cyclic process of duplication and mutation, and allowed for the formation of the complex quilt of life that we interact with today. This accepted phenomena for how genetic diversity arose discredits any notion that life forms were spontaneously "created" by God. Therefore, genetic studies, along with many more that are not explicitly discussed in this writing, have allowed us

to construct a set of genomic guidelines that span the era of life on Earth. However, they have also severely challenged our interpretations of The Book of Genesis.

Throughout the transition to the latter half of the book, I expected a formal theological rebuttal from Scot McKnight. Instead, I found that McKnight believes the evidence for evolution, and, in fact, offers ways to consider theology with the benefit of modern scientific discovery. It was explained that the story of Adam and Eve not only generates a convenient lore for the creation of mankind, but also subsidizes the gospel of salvation. McKnight contends for the necessity of The Book of Genesis as "...without [their] sinning and passing on that sin nature to all human beings, not all human beings would be in need of salvation" (Venema and McKnight 189). In this statement, McKnight is referencing the Christian doctrine of Original Sin which holds that humans, through the fact of birth, are held responsible for Adam and Eve's sin of consuming the forbidden fruit. It is accepted that this sin opened death's doors to humanity, and is why we are in need of saving. If the Book of Genesis is to be completely discredited, this would prove troublesome for the foundations of Christianity as whole. Thus, there must be some way in which scientific thought and the Christian doctrine can coexist in a mutually exclusive, yet non-inhibitory, fashion.

In a vacuum, a literal interpretation of Genesis is able to go unquestioned by believers in the faith. However, scientific research can cause believers to either desperately cling to the faith which they were endowed with, or flee in disbelief. Bradley C. Hanson's Introduction to Christian Theology can give insight into this phenomena. This text is designed to introduce the foundations of the Christian religion. Bradley componetizes faith into three pillars: belief, commitment, and trust; he cites that belief as an aspect of faith is "commonly communicated through story" (Hanson 2). Since he also defines belief as holding something to be true, there is a distinct idea that sacred texts must be "true" or historical, and that believing in them is what causes a religion to be effective and widespread. Bradley's opinion may give key structure to the bipolar nature of science's footprint on faith, and explain why many may consider

believing in one over the other. Venema makes a connection to this train of thought when he explains that "the 'science' [they see] in the newspaper day to day is always changing and constantly contradicting itself" (Venema and McKnight 7). As science is a conglomeration of analyses drawn from evidence-based research, the assumptions that are utilized to obtain data may be subsequently disproven, and this may cause the conclusions drawn from research to seem redundant. Those who are ill-versed in scientific thought and/or literature may take these conclusions as falsalities, and thus, a solid faith in science is hard to stabilize.

McKnight had a very interesting response to truth-based faith, and it lies in reworking our preconceived notions of The Bible, and what we regard as historical. To be more exact, the Adam of Judaism, McKnight explains, is considered more of a literary construct exploited for theological purposes. The Apostle Paul references Adam in his writings, and in the second half of Adam and the Genome, McKnight analyzes both the assumptions Paul used when he discussed Genesis 1-3, as well as the conclusions he drew from the biblical story. The idea McKnight makes tangible is that it matters not if Adam truly lived or was historical; it only matters that Adam is used as an archetype to display how humans were made "in God's image," and shows how those who fail to achieve what God has commanded are expelled for their sins. When we read scripture today, we do not try to twist it to conform to our personal belief; instead, we allow it to grow and shape our own beliefs. In this line of thought, McKnight's general opinion is that we may be reading and analyzing The Bible incorrectly, and projecting modern problems and ideas onto an ancient text. This would be especially confounding if the writers of these sections of scripture did not even intend their writings to be "historical." When Paul spoke of Adam, he did not have to consider the confounding truths that have been presented through science; advanced scientific developments are relatively recent in history when considering the evolution of religion.

It seems as though we expect institutionalized religion to have the answers to all big questions, and the same can be said about scientists regarding the natural world. These two groups are not all that

different in this sense. Nonetheless, the times have changed a great deal since sacred texts came into existence, and it is our expectations that cause the large contention between science and scripture. We expect rigid answers to amorphous questions, and become distracted in minute detail when we fail to even fully grasp the overarching themes of our existence. Religious traditions are deeply rooted in scripture, and if scripture is deeply rooted in belief, I understand why faithful Christians are confused when science seemingly removes the ground from under it. In this case, I believe that if the parameters of belief are tweaked, there can be harmony between preexisting scripture and continuously evolving scientific thought.

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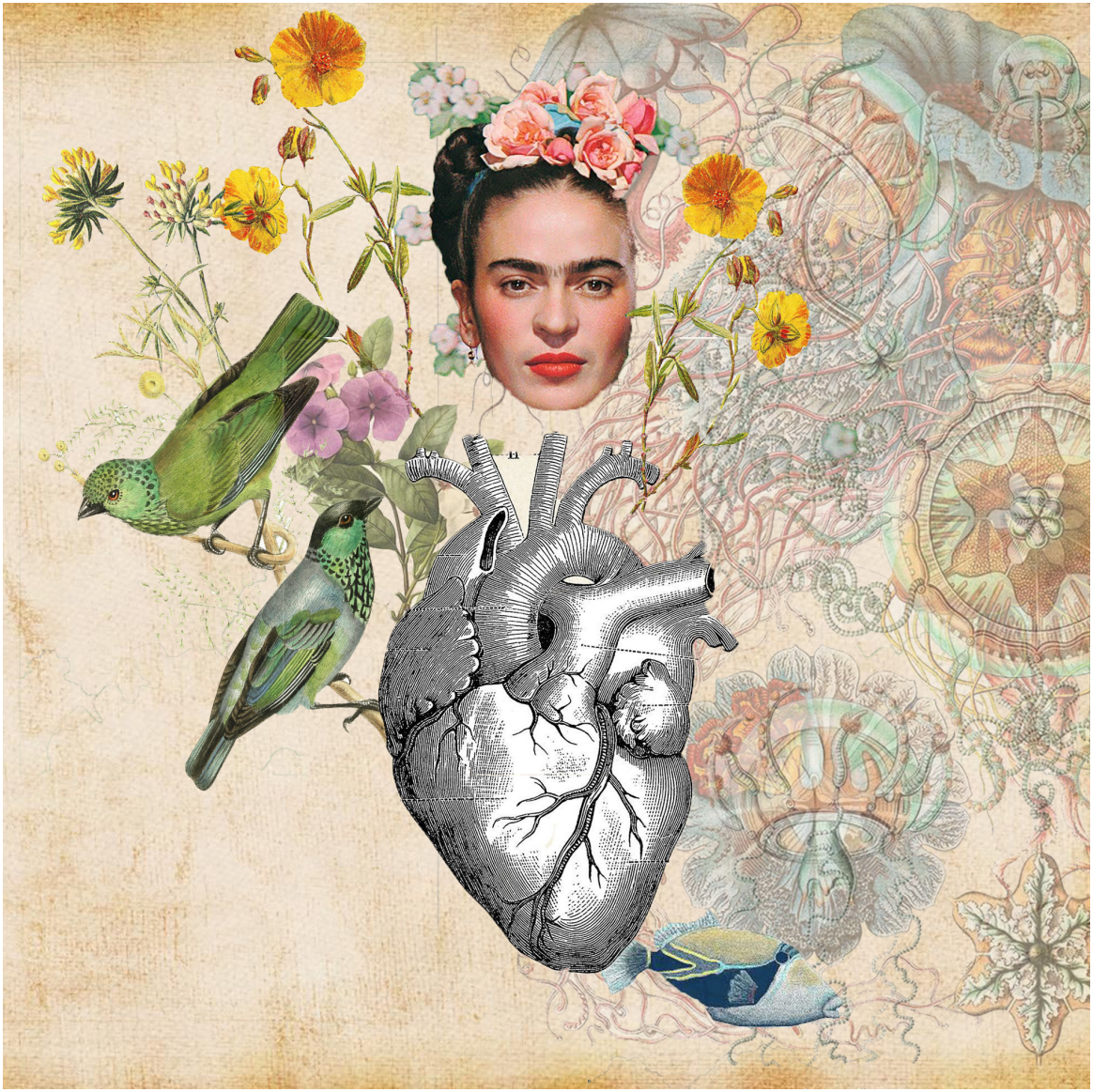

Jenny Zeng

An Exploration Of Human's Internalized Relationship With Perfection

Marlena Kruman

Nathaniel Hawthorne's "The Birthmark" is a short story about an alchemist, Aylmer, who pursues a chemical cure to remove the birthmark on his wife's face. The story centers around Aylmer's obsession with removing his wife Georgianna's singular flaw. But upon finding and applying the chemical solution to the birthmark, which Aylmer has relentlessly pursued, Georgiana passes away. Hawthorne's "The Birthmark" presents the complexity of the human condition by revealing the implications of imperfection on personal relationships and societal structures.

Aylmer's relentless pursuit of perfection is fueled by his aversion to Georgiana's birthmark, which stems from humans' natural aversion to flaws. These flaws, as dictated by social trends of our time, are subconsciously seen as a natural yet concerning manifestation of faults in a person's character. Aesthetic defects, in particular, are wrongfully perceived as being a consequence of some failing on the part of whoever bears those physical "defects." As such, Alymer is overcome by the revulsion that this mark arouses within him because he believes that Georgiana, an otherwise perfect human, would possess no flaws if the birthmark were removed. He says that "[Georgiana] came so nearly perfect from the hand of Nature that this slightest possible defect, which we hesitate whether to term a defect or a beauty, shocks me, as being the visible mark of earthly imperfection" (Hawthorne 29). Aylmer is haunted by Georgiana because the presence of her birthmark is an incessant reminder that she is a flawed person. As such, Aylmer believes that the removal of Georgiana's

birthmark will be "[his] triumph when [he] shall have corrected what Nature left imperfect in her fairest world" (Hawthorne 32). And while this would be an impressive feat, he sees this cure as the culmination of his life's work as an alchemist not only because it would resolve his reservations about his wife, but also because this cure would offer him some reprieve from the human condition that plagues him. This universal desire for perfection is not only demonstrated by Aylmer's disgust of the birthmark but also through Georgiana's changing relationship with herself. When her husband identifies her birthmark as a flaw, she begins to detest her birthmark and believes that "[not] even Aylmer now hated [the birthmark] so much as she" (Hawthorne 37). Thus, Georgiana's previously impassive attitude towards the birthmark transforms into feelings of personal disgust as she reevaluates her birthmark. This demonstrates that Aylmer's desire to achieve perfection is not singular but, rather, that discomfort with imperfection is a universal human experience.

While Hawthorne establishes early in the story that people are inherently uncomfortable with flaws, he uses Aylmer's pursuit of and the aftermath of finding the cure to demonstrate that obsession with an ideal standard can be disastrous. In the story, Aylmer and Georgiana pursue the cure via Aylmer's extremist scientific investigations. Safety becomes a secondary consideration in their search for a cure, with Georgiana proclaiming that "[danger] is nothing for me, for life, while this hateful mark makes me the object of [Aylmer's] horror and disgust– life is a burden which I would fling down with joy" (Hawthorne 32). Aylmer and Georgiana value the achievement of aesthetic perfection more than they value life, and both are willing to prioritize this pursuit and face possible uncertain side effects. Georgiana pleads for Aylmer to "remove it, whatever be the costs" (Hawthorne 40). But as Alymer's cure fades the birthmark, it also takes Georgiana's life. Thus, in removing her birthmark and consequently losing her life, Georgiana has exchanged her flaw for something most would consider far more dreadful: death. As Aylmer grieves for his wife, he realizes that "[the] momentary circumstance was too strong for him; he

failed to look beyond the shadowy scope of time… to find the perfect future in the present" (Hawthorne 43). In the wake of his wife's must confront the undeniable truth that his all-consuming desire to remove the birthmark had distracted him from properly assessing the death, Aylmer must confront the undeniable truth that his all-consuming desire to remove the birthmark had distracted him from properly assessing the potential dangers of his treatment. Only when faced with the consequences of his recklessness did Aylmer acknowledge that physical flaws are an innate part of the human condition. In this way, Hawthorne again shows how dangerous it can be for people to fixate on their perceived flaws- particularly regarding pursuits of aesthetic perfection.

While "The Birthmark" is a fictional story, it has real implications for people's lives. Humans use social constructs of beauty, success, and health to define an ideal existence, and they possess the self-awareness to identify how their lives compare to those ideal standards. In a culture of social comparison, people learn to fixate on their perceived flaws and seek to eliminate them. Exacerbated by the aforementioned human condition that pushes people to seek perfection, we ruminate on what we believe ourselves to be lacking. This can easily descend into feelings of loathing and self-deprecation that, with consistent behavioral and cognitive repetition that influence one's perception of self, decreases the quality of a person's life. If people are unaware of or are reluctant to admit their discomfort towards imperfection, they may blindly let their fears and insecurities lead them toward what is broadly considered the "ideal" way to live, rather than a fulfilling way to live. Given how pervasive the pressure is to achieve a more perfect existence, which stems from our aversion to flaws, people instead constrain themselves from living genuine, if imperfect, lives.

Hawthorne's "The Birthmark" is a telling story that explores humanity's perennial relationship with perfection and imperfection. Through Aylmer and Georgiana's vision and pursuit of a cure for Georgiana's birthmark, it can be seen that the human habit of comparison instills people with the universal desire to seek perfection. As Aylmer and Georgiana willingly risk Georgiana's life

to make her appear perfect, and then as Aylmer laments her death and realizes his mistake in pursuing a cure, aesthetic perfection becomes more inconsequential than he initially believed. Our uncomfortable relationship with imperfection has important implications for our relationship with ourselves and, putting this realization in the context of Hawethorne's "The Birthmark," demonstrates how harmful the pursuit of unattainable perfection can be if carried out to an extreme.

If Frankenstein Used His Knowledge For Good: Examining Lab-Grown Organ Systems as a Viable Solution to Animal Testing

Daniel Kabanovsky

The darkened glass of the gas chamber betrays the panic inside. A mouse is suffocating on carbon monoxide filling the space, scrambling around the enclosure in mortal anguish as the chemical burns its eyes and lungs before losing consciousness. A week ago, it began showing symptoms of glioblastoma it was genetically engineered to develop, huddling away in the corner of its cage in pain and refusing food. Its body will be dissected, subjected to cold, impassive analysis, and then incinerated, erasing the traces of its short life, suffering, and death.

Years later, a twelve-year-old boy is sleeping on a hospital bed, IV tubes dripping fluid into his blood, a plush rabbit reclining in the gentle embrace of his arms. His body is frail and emaciated, thinner than any child his age should be. His mother is there with him, lulled into uneasy sleep by the monotonous beeping of his vital signs monitor, her weary face a history of seemingly unending angst-filled days and sleepless nights. She wakes up at once at the sound of the surgeon coming into the room. "Good news," he says, smiling warmly. "The new treatment appears to be working. We are observing complete remission."

Twentieth-century science had us believe that you could not have one without the other – to develop effective treatments, compounds must be tested on animals. Face it or get out of biomedical research. This realisation had a profound impact on me – as an ethical vegan, the thought of experimenting on animals was unbearable, no matter the moral benefits it would bring. However, the same scientific

field that spawned this ethical dilemma also gave birth to its solution, as recent breakthroughs in molecular biology, bioinformatics, and bioengineering resulted in the development of viable alternatives to animal research. Soon, organs-on-chips - structured colonies of tissue cells in carefully controlled microenvironments – and lab-grown organ surrogates may replace animals in investigations of biological drug effects, eliminating the need for sentient creatures to experience fear, pain, and anguish as a stepping stone to making life-saving biological discoveries.

It is futile to deny the importance of animal testing, a bedrock of biological research that has yielded innumerable cures that continue to save millions of patients around the world, and yet it is equally impossible to deny the inherent problems of this approach. While ethical concerns were a personal motivating factor for me in researching this topic, they carry a significant degree of subjectivity and therefore present a poor ground for arguing against animal testing, especially when most people (including myself) would allow animals to die if that would yield a treatment to save a loved one. Nonetheless, there are concrete, objective reasons for replacing or minimising this practice that go beyond moral consideration.

Specifically, while common animal models such as mice share a vast number of important physiological features with humans, there are certain biological and evolutionary differences that may cause the results obtained from these organisms to be inapplicable in biomedical research; for instance, a drug that appears to be effective and safe in animal models may prove to be toxic once administered to patients. Such was the case of TGN1412, a therapeutic antibody developed as a treatment for B-cell lymphoma and rheumatoid arthritis. In his 2010 review "TGN1412: From Discovery to Disaster," Husain Attarwalla, a researcher at Northeastern University's Department of Pharmaceutical Sciences, details the catastrophic conclusion of the drug's development. While preclinical trials in cynomolgus and rhesus monkeys showed no adverse effects to the drug at doses as high as 50 mg/kg, the phase I trial in human volunteers ended disastrously: within an hour of receiving a therapeutic dose of 0.1 mg/kg, all six test subjects

developed cytokine release syndrome, a life-threatening immune response that resulted in multiorgan failure and hospitalisation (Attarwalla 332-5).

Cases like this contribute to the erosion of trust that the scientific community puts in animal testing. According to Dr. Aysha Akthar, a neurologist and a fellow at the Oxford Centre for Animal Ethics, "as medical research has explored the complexities and subtle nuances of biological systems, problems have arisen because the differences among species along these subtler biological dimensions far outweigh the similarities, as a growing body of evidence attests. These profoundly important—and often undetected—differences are likely one of the main reasons human clinical trials fail" (Akthar 413, emphasis in original). Therefore, while the use of animals for drug testing has historically been the foundation of the pharmaceutical industry and has given rise to many successful medications, it is clear that the significant challenge posed by the species gap cannot be left unaddressed as the field evolves, prompting the search for non-animal alternatives that can model the human organism more accurately.

While this challenge may have appeared unsolvable several decades ago, the tremendous advances in a range of scientific disciplines over the last few decades resulted in technological developments that hold new promise for replacing or minimising animal testing. The first such technology, dubbed "organ-on-a-chip" (OoC), consists of an artificial cell system in a highly controlled environment that can be used to study disease development or test novel therapeutics. These devices reveal a complex internal microenvironment that "reflects the structural and functional characteristics of human tissue and can predict response to an array of stimuli including drug responses and environmental effects," write Qirui Wu and colleagues in their 2020 review "Organ-On-a-Chip: Recent Breakthroughs and Future Prospects" (Wu et al. 1). Organs-on-chips typically feature a small chamber engineered to create the desired biophysical conditions and filled with cells of interest. The internal state of the chip is regulated through tubes connected to external pumps that control the flow of media

through the chamber and monitored through arrays of sensors mounted into the casing (Wu et al. 3-5). Together, these features grant the researchers the "ability to regulate key parameters including concentration gradients, shear force, cell patterning, tissue-boundaries, and tissue–organ interactions" (Wu et al. 1-2).

In a 2012 study that serves as a prime example of the possibilities offered by this technology, Dongeun Hu and his co-workers at the Wyss Institute for Biologically Inspired Engineering used the OoC approach to investigate drug toxicity-induced pulmonary oedema (a severe lung inflammation characterised by accumulation of fluid in alveoli). The researchers used chemical etching to create microcapillaries in a polymer substrate, which were subsequently seeded with pulmonary epithelial cells to mimic the oxygen-exchange surface in human lungs. Lung motion was simulated with periodic mechanical stretching of the cell layer by applying vacuum to both sides of the chamber. This lifelike recreation of a human lung enabled the researchers to simulate a dangerous side-effect of the cancer immunotherapy agent interleukin-2 without the need for animal models: "this on-chip pulmonary edema model effectively reproduces the intra-alveolar fluid accumulation, fibrin deposition, and impaired gas exchange that have been observed in living edematous lungs following 2 to 8 days of IL-2 therapy in humans." (Huh et al. 4). As such, despite their seemingly trivial operation principle, organs-on-chips deserve serious consideration as the next-generation biomedical modelling technology.

While OoCs serve as an excellent way to simulate the environment of a human organ, they are by no means the only one. While this may seem like pure science fiction, researchers have devised a way to grow organoids – simpler replicas of human organs – in a laboratory setting. This concept harnesses the ability of a certain kind of stem cell to differentiate into any other cell type in the body – a quality known as pluripotency. To take advantage of this trait for the process of growing organoids, researchers use induced pluripotent stem cells (iPSCs) – regular stem cells treated with particular signalling molecules that revert them to a "blank slate" state – or pluripotent stem

cells harvested from human embryos. At first glance, organoid development seems like a long, complicated process. Surprisingly, this is not the case. Edward Kessler, a PhD student at Harvard Medical School studying cortical organoids, reveals that the procedure is not particularly difficult: "it's essentially a sequence of media changes," he told me in a personal interview, albeit noting that the composition of each media is strictly controlled. He explains that, in the process of creating an organoid, a monolayer of stem cells grown in a Petri dish is reaggregated into a clump called an embryoid body, which is then placed into growth media containing factors that induce desired differentiation in the cells. "You can imagine a stem cell as sitting on top of a hill, with many different paths it can take. By combining different signal factors in the media, you can push it in the right direction, and then just let the cells self-organise" (Kessler).

This technology has given rise to stunning biotechnological achievements. In a landmark 2013 project, Madeline Lancaster and her colleagues at the Institute of Molecular Biotechnology at the Austrian Academy of Science developed the first iPSC-derived cerebral organoid with separate brain regions. The researchers cultured stem cells in media containing fibroblast growth factor (a signaling protein inducing cell division), followed by a transfer to neural induction media to facilitate cell differentiation into neurons. Next, neural embryoid bodies were injected into gel droplets that acted as semi-solid scaffolds for more complex 3D tissue formation, after which the maturation process in stirring liquid media was completed in just 20-30 days. While the organoids grown in this experiment hardly resemble human brains – at most 4 mm in diameter and looking more like misshapen berries than real cortices – they nonetheless represent a monumental breakthrough in this field. Using fluorescent staining for biomarker proteins expressed by cells in different brain regions, Lancaster's team was able to identify complex cell organisation and the development of several distinct areas, bearing close similarity to the development of real human cortical tissue (Lancaster 373-80). Scientific advances such as this provide fertile ground for the exploration of organoids as suitable models for study-

ing disease pathways and drug toxicity.

Both organs-on-chips and organoids possess significant advantages over other drug testing methods such as animal models or in vitro human cell cultures. Specifically, the use of human cells in both OoCs and organoids bridges the species gap and makes data obtained from drug experiments more applicable to human patients. Furthermore, the complex internal structure of organs-on-chips make it possible to "control cellular and specific tissue architecture to emulate chemical gradients and biomechanical forces," according to Lucie Low and co-workers at the National Institutes of Health (Low et al. 347). It is also possible to re-create blood vessel networks in OoCs by introducing microscopic channels into the chip, which enables researchers to supply the cells with nutrients in a lifelike manner. The high degree of control over the cellular architecture present in the OoC technology makes it possible to repeat the same experiment numerous times with a high degree of fidelity. Meanwhile, the construction of the chip allows extensive monitoring of the experimental set-up through optical microscopy, microelectrodes, and other sensors, facilitating massive biochemical data harvesting (Low et al. 347-50).

Organoids approach the question of mimicking a living system from a different angle, and therefore present a set of completely different benefits. Firstly, the use of pluripotent stem cells that self-organise under exposure to different growth factors closely mirrors the natural developmental process of organs. This allows for a much more realistic cellular environment than OoCs, which are entirely artificial and feature extensive human intervention in natural biological processes ("Dan Huh's Organs-on-Chips and Organoids: Best of Both Worlds" 0:45). Furthermore, allowing cells to form structures by themselves results in a much more complex arrangement of cell types and tissue structures than could be obtained by a simple 2D culture of cells in vitro, which is a key advantage for research on organs with highly specific structures such as kidneys or the brain (Hofer and Lutolf, 402).

While it may seem like organoids and organs-on-chips are perfect models for biological experimentation,

it is important to recognise a number of shortcomings associated with both. Crucially, the main approach to creating OoCs includes "reverse-engineering" human organs by considering the elements that comprise them and re-creating them on a chip. Therefore, a lack of understanding about certain biological processes, as well as financial and logistical constraints, place a limit on how accurately these systems can represent anatomical structures. Furthermore, while the combination of several discrete organs-on-chips into one unified "human-on-a-chip" opens new opportunities for research on compound biological systems, such as considering the effects of a drug on the organism as a whole, the new level of complexity inherent in this technology brings with it challenges that are absent in single OoCs. For instance, different tissue types in a multi-organ system need to be supplied with different nutrients and signal factors, which presents difficulties when a single universal medium is circulated through the system (Low et al. 349-50).

On the other hand, the organoid technology suffers from a high degree of variability. In a 2020 review of organoids that replicate brain tissue, Silvia Velasco and co-workers at Harvard University's Department of Stem Cell and Regenerative Biology recognise that allowing cells to self-organise is a process that inherently carries a high degree of unpredictability and randomness, though noting that several projects have attained promising levels of reproducibility (Velasco et al. 380). Similar to OoCs, the process of inducing cell differentiation is largely a result of reverse engineering the corresponding natural processes and attempting to recreate them in vitro. As such, gaps in existing knowledge about organ formation inevitably result in organoids that lack some biological features of full organs: "...noticeable omissions include the organization of cells into defined anatomical structures (e.g., cortical lamina, thalamic nuclei), regional patterning, and the formation of cell type–specific long- distance and local connectivity" (Velasco et al. 382).

The aforementioned issues are a testament to the novelty of the organoid and organ-on-chip technologies, as we are witnessing a new field of research unfold before our very eyes. While animal

testing will continue to dominate the field of biological research in the observable future due to problems associated with artificial models and the established nature of animal experimentation, there is a significant push for greater exploration and development of alternatives in the scientific community. In an interview for Nature Reviews Materials, Dr. Donald Ingber, the founding director of the Wyss Institute for Bioinspired Engineering, explains the need for raising greater awareness of the existing non-animal testing technology: "There is … a proposal to start a new institute in the National Institutes of Health (NIH) focusing on in vitro models, which may help to build up the number of people familiar with this opportunity … Engaging more researchers may help to push the technology over the top, such that people start looking beyond animal models" (Horejs 373).

As more scientists are drawn into this field, one can imagine further breakthroughs. Merging organoids and organs-on-chips into one technology, combining several organs-on-chips into a unified "human-on-a-chip", improving methods for real-time data collection in OoCs, and developing more complex differentiation and growth protocols for creating more lifelike organs are all targets of ongoing research. On a personal note, I can say that in the course of writing this work, I have regained my faith in biotechnology as a way of harnessing human knowledge to do good. I hope that this review has also sparked some measure of interest in my reader, perhaps serving as an inspiration to look deeper into this topic or share it with others, thereby answering Dr. Ingber's call for greater involvement in the field and continuing to drive a revolution in biomedicine.

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Chloe Chen

Innocent Breaths

Davina Finney

I stood within the walls of an operating room under glaring lights, masked faces, and pulsating monitors, watching the anesthesiologists persistently try to insert an epidural into a mother's spinal fluid. Anguished cries, encouraging words, and rustling scrubs amalgamated to produce bustling sounds as the young girl's uterus remained exposed on the table seconds later. Observing the eventual delivery of a new life into this world through the hands of the obstetrician, I was flooded with joy. The baby boy's silky skin, dewy lips, and glowing eyes represented a sense of untarnished hope and promise in humanity. I observed as the newborn's Apgar scores were recorded and as his body curled up in fetal position on the scale. I knew then that baby Thomas deserved the best this world has to offer, but that "best" was not guaranteed.

Tommy's tranquil semblance was soon disrupted as the thermometer approached his flushed cheeks and the muslin cloth touched his skin. Light, heat, and touch became enemies fighting against the cells of Thomas' skin and the corneas of his eyes. He trembled, twitched, and seized within a span of time that seemed to be outside the boundaries of time itself. Any effort made by the physicians and surgical assistants in the room to suppress the seizure proved ineffective. I watched as the child was suddenly introduced to all the cruelty in the world—his neck turned blue, his mouth produced a thick flow of froth, and his taut body bounced in all directions. No swaddle, pacifier, or milk bottle could offer him what he needed at that moment. Tommy was grasping for help that could not be provided.

As the hour passed and Thomas stopped seizing, the physicians soon discovered that he was one of the 0.7% of newborns that suffer from neonatal abstinence syndrome (NAS), withdrawal

symptoms observed in babies born to mothers who are drug addicts. The doctor I was shadowing looked defeated, as she scanned over the umbilical cord blood toxicology report with the word POSITIVE plastered across all margins and under all sections. I would later find out that Tommy's mother was a 16-year-old grappling with substance abuse, facing pregnancy on her own. I remember feeling a plethora of emotions attack me at once. Questions bombarded my brain, most of which began with the word "why." Why did Leah, Thomas' mom, decide to introduce her baby to the world in this manner? Was it even her decision? Why did her family abandon her when she needed them the most? The skin expander hung from the inner layer of Leah's stomach, which was left unattended during the 15 minutes it took to control Tommy's seizures and establish a course of action. Leah eventually made it out of the C-section, and the obstetrician discarded her surgical gloves and mask in the nearest trash can, unclasped her head light, and scrubbed out hastily. Reflecting on the scene in front of me, I came to understand the physician's behavior as a product of years in the field: navigating an emotional minefield by suppressing the burden associated with emotional processing. Thomas remained in the intensive care unit, craving an influx of opioids he did not need. His innocent breaths were now burdened, strained, and uneven. He had experienced more in his first hour of life than I had in my 17 years on this Earth.

When I arrived the next morning, all my fears came to fruition. I was told that Thomas left the world as speedily as he entered it, but with further complications. He had suffered another seizure late at night and died at 2:45 a.m. from SIDS (sudden infant death syndrome), a complication caused by NAS. Leah was unresponsive to the news. The silence was alarmingly loud. Within a few hours, a social worker arrived with pamphlets in hand to inform Leah of her options for rehab and recovery. The hospital moved onwards with Thomas now out of the picture. Actions that ignored the day before. All focus was diverted to Leah in an attempt to support her in the few ways possible. The hospital itself was an impersonal entity servicing patients, in the midst of pieces of Leah being lost forever.

I heard comments circulating the hallways of the delivery floor, many of them invoking a sense of insensitivity and disregard. It was difficult not to make the implicit assumption regarding the apathy of healthcare professionals in what seems to be a cruel profession. My mind was telling me that doctors are intelligent and precise operators in a stressful environment, but my heart was telling me that they had thrown away their morality to do so. In a way, doctors must possess the ability to foresee the future five steps ahead of where they stand. To make astute decisions regarding complex diagnoses whilst maintaining their sanity and mental well-being. This harrowingly emotional moment was among many that were both ethereal and vivid, yet the hospital manages to progress forward, showing no signs of psychological distress.

As a student trailing the physician, my perception of the medical field underwent an alteration. I came to understand the emotional complexities involved in a profession that was strongly anchored in the principles of science and predictability. Sitting stationary in the physician's office, waiting for the next C-section, circumcision, or delivery procedure to observe, I found myself unable to move past Thomas. I blinked. Still the images of Leah unresponsive and Thomas inert stuck and flashed. I grappled with the fact that a pure soul, free from tarnish or stains, and full of possibility was lost before he could make his first decision or utter his first word. Simply unfair was all my novice mind had the capacity to conclude.

The case binder was closed and shelved away when I came back a week later. Nurses reverted to their workplace gossip in the cubicles, attracted to the next big medical case. The physicians had no information on Leah's whereabouts or her situation, except for the fact that foster care was mentioned. Thomas remained a distant memory. A bump in the road that was now passed. While the humanitarian within me yearns to call out the healthcare professionals for not dedicating more of their morality to a case such as Leah's, the human within me understands the difficulties in living up to such expectations.

Language and words themselves do not capture the true extent of irrationality that characterized Thomas' passing from this world. However, being hope-

ful requires work and energy. It requires a sense of awareness. What I witnessed that week in the hospital continues to shape my perspective on life today. I've learned to appreciate the fact that hope is promised and can be worked towards—for doctors, patients, and families alike. Thomas' life held and continues to hold moral weight. It is my longing that amidst the fumes of tragedy and the workplace demands for moral disengagement, physicians exercise empathy and hang on to the traces of hope that make their profession so unquestionably rewarding. The neonatologist later informed me that Tommy's last declaration to the world was delivered in the form of a smile—one that would light up the NICU with warmth, joy, and hope for days to come.

Regarding Poetry as a Tool For Personal Healing

Marlena Kruman

In comparison to other forms of literature, poetry remains one of the most unique literary styles because of its distinct writing and reading experiences. The nature of poetry is to remain ambiguous and provide the readers with space to explore the poet's questions and ideas. This ambiguity is not only the result of the poet's prose and metric, but it also reflects the potential reservations that draw both writers and readers to poetry. It is the healing nature of poetry that particularly attracts those with inner conflicts, as poetry can be a way to articulate ideas and feelings, find community with those who may share similar experiences, and discover new perspectives on things that people may be struggling with. In providing these tools, poetry becomes a place where people can emotionally and socially heal, which is particularly important for those who are facing medical ailments.

Poetry provides suggestions and questions for readers, rather than directly informing and reasoning through a persuasive claim. Even if the poet means to make a point or elucidate particular emotions, it is only subtle cues in the poet's writing through which the poet's intentions become clear. Spacing and cadence are particularly useful in emphasizing an idea or question that the poet has deemed important. Repetition of a word or phrase can cause a change in the cadence, which can alter the tone of the piece– thus impressing a different picture upon the readers. Similarly, spaces left in between certain phrases also create a figurative space for the reader to pause and digest the writing. It is possible that spacing and cadence also reflect the poet's organic thought processes during

the writing process, thus providing unbiased potential insight into how the writer is feeling without forcing these thoughts onto the readers. Similarly, poetry often uses imagery to portray ideas, people, or feelings. Imagery is an excellent tool for engaging the readers with a literary work and making the resultant feelings and thoughts from an image or scene a more visceral experience. Readers view a snapshot of a moment without an understanding of what that moment is meant to portray. As a result, readers are left with an obligation to draw their own conclusions about what that moment means– again inspiring more questions about the poetry and what that poem means to the reader. This, more than anything else, allows the ambiguity of poems to become a space for introspection and, consequently, healing.

One of the reasons that poems often lack immediate clarity is that the poets themselves use writing as a way to disentangle inner conflicts and questions that they may hold. Through the process of recording and transcribing one's feelings and perspectives, the poets can see their thoughts both completed and shared for others to read and reflect upon. This is advantageous, and even therapeutic, for multiple reasons.

On an individual level, poetry forces writers to confront their innermost questions and transform those feelings into a more tangible belief. One such example of the therapeutic nature of poetry is in Bettina Judd's collection of poems: *Patient: Poems*. Throughout the collection, she tries to grapple with the realization that much of modern gynecology was founded on the scientific discoveries made by exploiting three enslaved women. And as she struggles with her own gynecological issues, Judd faces both grief and guilt through her poems, writing in her poem "In 2006 I Had an Ordeal with Medicine":

In 2006 I had an ordeal with medicine. /
I must have been found guilty of something. I don't *feel* /
innocent here lurking with ghosts.
See it happens like /
that. I start at a thought that is quite
benign and end up /
peccant, debased.
I had an ordeal with medicine and was
found innocent /

or guilty. It feels the same because I live in a haunted /
house. A house can be a dynasty, a bloodline, a body.
There was punishment. Like the way the body is /
murdered by its own weight when lynched. Not that I /
was wrong but that verdicts come in a bloodline. /
In 2006 I had an ordeal with medicine. To recover, I /
learn why ghosts come to me. The research question is: /
Why am I patient?

Themes of guilt and grief pervade her poems as she grapples with her illness and the burdens of that sickness, as is clear in those first few lines. Yet it is also apparent throughout the rest of her writing that she is trying to reconcile with these feelings and, through this process, she realizes what questions she is truly struggling with. This is healing because Judd, like all poets, can gain a newfound level of self-awareness that may allow them to critically analyze their feelings and questions—which is the critical first step of any healing process.

In a more collective sense, poetry is a way for writers to find a community of those who share similar experiences and questions. By sharing their perspectives and personal experiences with others, they counteract the isolating thoughts and feelings that they may be harboring. For example, Sylvia Plath's "Tulips" was written just after Plath had an appendectomy, shortly following a miscarriage. It is clear that she is struggling throughout the poem, and that she still feels an incredible amount of loss. She writes about her hospital experience, and in one stanza she writes:

I didn't want any flowers, I only wanted /
To lie with my hands turned up and be utterly empty. /
How free it is, you have no idea how free—— /
The peacefulness is so big it dazes you, /
And it asks nothing, a name tag, a few trinkets. /
It is what the dead close on, finally; I imagine them /
Shutting their mouths on it, like a Communion tablet. /

In this, she hints towards suicide as she describes that "[she] only wanted / To lie with [her] hands turned up and be utterly empty" (Plath, lines 29-30). But it is possible that by putting her grief into writing, Plath may have been able to prolong these thoughts and find comfort that she is not the only person with such experiences. Hence, when poets explore their feelings through writing and find people who relate to them, poets can use this act of emotional purging and their newfound community as tools to find healing.

Reading poetry is a completely different experience than writing. Rather than writing down one's thoughts and feelings, as a poet does, those thoughts and feelings can be discovered through the process of reading poetry. This is often beneficial for those who may be resistant to intentional introspection, or for those who are seeking to improve their outlook on a particular subject. By virtue of the ambiguous nature of poetry, the vague suggestions and unanswered questions give readers the grace to form their thoughts regarding these points independently from that of the poet. For example, in Judd's poem "The Researcher Discovers Anarcha, Betsey, Lucy" she compares her medical experiences with those of Lucy, Anarcha, and Betsey's experiences: Judd is "[sent] *home with oxycodone, ibuprofen*" while people like Lucy, Anarcha, and Betsey are "[unanesthetized] thetized], addicted to opium" (Judd, lines 9 and 18). Judd forces readers to face the disturbing abuse these women suffered, and she draws comparisons to both her and the readers' experiences with medicine and gynecology to illustrate the differences in care. Moreover, as readers read the conflicted musings that she voices regarding these women and their sacrifices, they subconsciously compare their feelings with hers. As a result, readers engage with the poetry and its meanings without direct prompting.

Some readers seek poetry with more intentionality; because poems express their writers' perspectives without forcibly impressing them upon their readers, readers will often seek poems to gain insight into problems they may be struggling with. Similar to how poets use their writing to seek out a community and combat certain isolating feelings, readers may seek out poems that offer different

perspectives. In Emily Dickinson's poem "Because I could not stop for Death," death is personified and "[he] knew no haste / And I had to put away / My labour and my leisure too, / For His Civility" (Dickinson, lines 4-7). While death is typically a feared fate and a dreadful topic to discuss, Dickinson makes death seem peaceful, if a little eerie. While the portrayal of death is not immediately clear, and thus may cause readers to interpret the poem as they wish, one interpretation of the poem is that death is not necessarily something to be feared. Instead, for those who fear death and seek the poem as a way to overcome this fear, this interpretation would offer them a portion of comfort. In providing this alternative perspective, the poem could give readers a sense of peace. By resolving such an internal conflict, it is clear that there is clarity and relief in understanding one's thoughts and adopting healthier perspectives. It also becomes clear, as any reader of poetry can attest, that this personal healing is a common reward for engaging in the therapeutic nature of poetry.

Writers have predominantly focused on the psychological and social effects of their various medical ailments and disabilities. While the physical obstacles are expected, the consistent fixation on the emotional and social consequences that accompanies a diagnosis implies that these are what weigh more heavily on the writers in their later reflection on their illness. Whether it is in Susanna Kaysen's *Girl, Interrupted*, where Kaysen describes how she was mistreated by others as an institutionalized patient, or in Charlotte Perkins Gilman's *The Yellow Wallflower*, as a woman explains how her experience with hysteria made others both isolate and dehumanize her, it is clear that fixation with how our illness affects other is a common experience. However, this makes poetry a perfect vehicle for healing, particularly for those who have suffered from a medical condition. Whether it is through writing poetry, where one can reconcile with their emotions and digest personal experiences and struggles, or if it is through reading poetry, where one can learn to identify their emotions and adjust their perspectives, poetry is healing. Additionally, the vague and suggestive nature of poetry also makes it an incredibly inclusive form of literature; the

emotions and turmoil that the poet may be trying to reconcile with can often be generalized and applied to one's own experiences. As a result, poetry is an incredible space where writers and readers can experience social and emotional healing.

The nature of poetry is to remain ambiguous, letting both the reader and writer check in on and reconnect with their emotional and social well-being. Poetry does not force interpretations or feelings upon the readers, but merely provides the space for personal reflection and is suggestive of alternative interpretations. In doing so, reading and writing poetry becomes a therapeutic activity where everyone, particularly those who struggle with illnesses or are socially and emotionally dissatisfied, can begin to heal.

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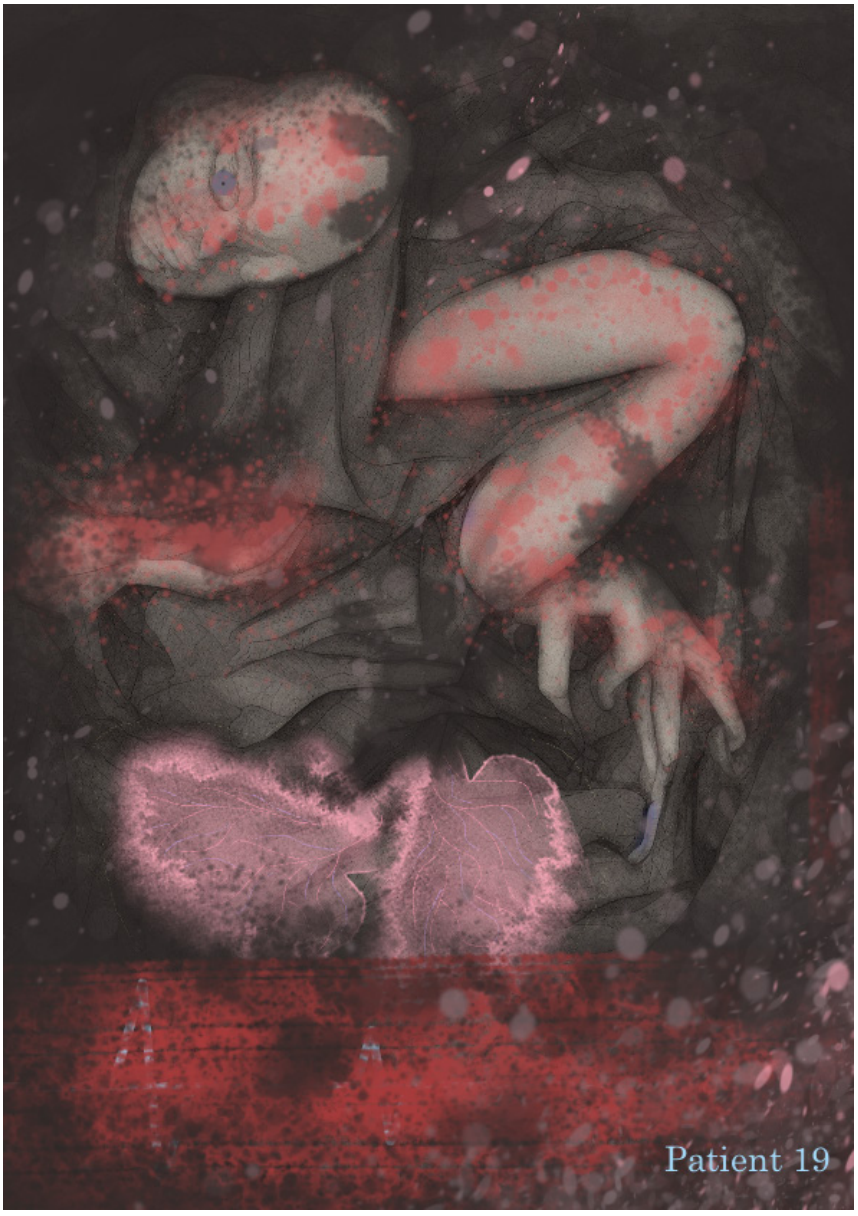


Jennifer Wei Wang
Patient 19

Religiosity During Lockdown: The Role of Faith-Based Communities During the Covid-19 Pandemic

Mehdi Kayi

Bismillah Irrahman Irraheem. In the name of God, the most gracious, and the most merciful.

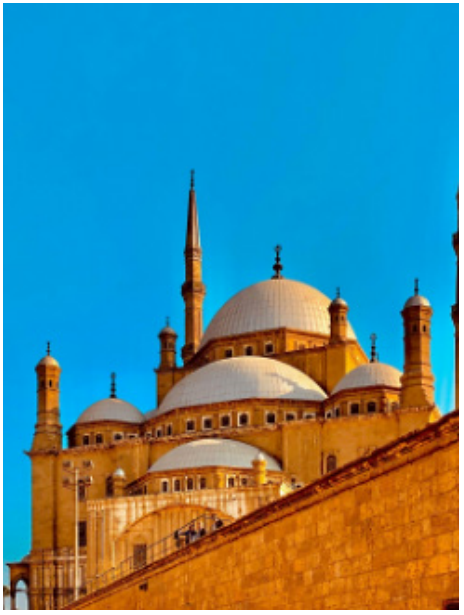
In the Quran, Allah states, "so be patient; indeed, the (best) outcome is for the righteous." [11:49]. Few would deny that patience is a virtue, and in my faith tradition, I am called to believe that God promises good tidings to those who look beyond the trials and troubles of the world around, maintain perspective, and aspire for a peace of mind rooted in faith. Surprisingly, such verses have real health implications as well.

Public health emerged as a pivotal and invaluable discipline during the pandemic. What was before confined to public health departments and academic spaces became dinner table conversations for Americans all over the country. From mask mandate ethics to the benefits of vaccination, people became increasingly versed in the language of public health and how its core functions — assessment, policy development, assurance — are employed to keep populations healthy.

Although many consider income, housing, and education to be the most prominent social determinants of health, religion is often overlooked for carrying equal weight. Religiosity and spiritual practices have been shown to predict favorable social, physical, and psychological health. Especially among youth, mindfulness and spirituality should be fostered, encouraged, and taught as a mode of ensuring positive health outcomes. Although such a shift in perspective

can offer benefits at any point in life, it is especially potent during trying times.

The pandemic has demonstrated the fragility of our dunya — the temporal world and its materialistic concerns. In the blink of an eye, social structures including our educational institutions and occupations crumbled under our feet. We became isolated amid the forceful turbulence of an ever-changing world. Even now, as we begin to return to 'normal conditions', COVID-19 has left its mark on the world; surgical masks remain in parts of the world, as do vaccination requirements and quarantine enforcements. The world we once knew will likely never be fully returned to.



Mosques throughout the world were closed during the pandemic, leaving a spiritual gap in the lives of people of faith. For many, this resulted in negative health outcomes.

Yet, during a period when stability was all but a recent memory, and during a time when we often questioned the true meaning of life, two polar paths arose: to lose faith or to strengthen it. As we found difficulty in navigating our new lives, many of us found ourselves either straying away from or growing closer to our respective faiths. Many Muslims in and around Boston, though, were exceedingly fortunate to have Arkanum: a faith-based youth program that was on a mission to ameliorate the consequences of the pandemic, and offer its community members an unmatched growth experience.

Many Muslim youth call Boston and the surrounding towns home. On Saturdays, a number of these youth choose to spend their day with Arkanum, which serves to develop religiosity and global mindedness holistically in our community's upcom-

ing generation of leaders. As minorities on many fronts in their respective neighborhoods, time spent with those who hold the same faith is cherished. Typically, Arkanum hosts sessions and events at the Islamic Society of Boston Cultural Center (ISBCC). Resting on the corner of Malcolm X Boulevard and Elmwood Street in Roxbury, this mosque is known as a hub for community events and scholastic pursuits. However, the rapid emergence of Covid-19 forced the mosque to close, and with tighter social distancing and social gathering regulations, Arkanum transitioned to Zoom. Guided by an ethos of educating the youth and building community, the Arkanum leadership team was determined to make this lockdown a memorable, spiritual experience.

Mahmoud El-Rifai, a research scientist at Harvard Medical School and a Master's in Psychology candidate, is also a mentor at Arkanum. As someone who I hold in high esteem, I have enjoyed reflecting with Mahmoud on our shared pandemic experience. His perspective was educational. "The pandemic forced us as humans to act against our natures. We are social beings — we like to have friends, leave our homes, and be active in our communities. I personally know people who were devastated. People were depressed, people lost their jobs, and people became isolated — especially students who moved to the U.S. to study and ended up alone at home."

When I raised the topic of Arkanum's response to the pandemic, the mood of the conversation shifted.

"For people who wanted to connect, the creativity button was pushed. We had to come up with an exceptional and creative way to let people socialize safely. We created games online for seventy to eighty people on Zoom. For people who didn't show up virtually, we reached out to them and checked on them."

As Mahmoud spoke, I reminisced about the many nights I spent with my Muslim peers digitally, playing trivia games, having animated debates, and learning from scholars about Islamic jurisprudence for hours. It was an experience marked by personal growth. Especially during Rama-

dan, the holiest month for Muslims, it was a privilege being able to connect with beloved community members during the lockdown period of the pandemic.

As a former mentee and current mentor of this youth group, I am confident that the pandemic was a truly formative experience. While grappling with constant change during my senior year of high school — much of it spent at home — and beginning my transition into college, having those long nights on Zoom with my Boston-based friends and Islamic scholars from across the sea allowed me to reflect, introspect, and make sense of my experiences. Arkanum helped me realize that although everything in the material world is fluid and irregular, and although circumstances may abruptly change, faith is constant. In a world of moving parts, one can always lean on religion for stability. Taking agency over my faith and spirituality rooted me, despite balancing on unsteady ground.

Inevitably, the spiritual experiences of the Muslim community varied widely during the pandemic. Even today, the

A momentous socially-distanced Eid prayer during the pandemic. Program director Abubakr Fakhry is pictured leading the prayer and reciting the Quran through a Zoom call.

pandemic is far from over, and friends and loved ones may still struggle with its consequences. Those fortunate enough to have pillars of support in their lives and faith-based circles to turn to may have seized the opportunity to grow. As observed with Arkanum, people and community leaders found a silver lining within the gloomy picture of the pandemic. Yet, for the majority of religious people in the United States, this was not the case.

For the latter, losing a loved one to COVID-19 may have catalyzed their loss of faith. Job insecurity and financial hardships may have propelled others into a mental prison of anxiety and stress, leaving no room for the calming serenity of religious remembrance. The lack of human connection and amplification of pre-existing personal qualms may have been an agent for melancholy and hopelessness. In my conversation with Mahmoud, such stories emerged.

"There was a student from Gaza, Palestine, who was here all alone and suddenly got stuck at home. During Ramadan, we distributed some food to people in the community to show our love, and when we appeared at his doorstep, he told us 'you don't know how much this means to me'. The pandemic made us appreciate the little things."

The leadership team was able to orchestrate a socially distanced Eid prayer and invited the Gazan brother to join. He remarked that it was one of the best experiences he has had. Despite the importance of this holiday prayer, no one would have been surprised if this event was not organized. The logistics were challenging and the time to prepare was limited, especially considering the health and safety concerns. The need for spiritual uplifting, though, was too great. The team instructed everyone in the community to drive to the Soldier's Field Park parking lot in Allston, tune into a group call, and pray in their cars while listening to the imam recite from their phone speakers. The sense of camaraderie and resiliency was profound. For the majority of the youth, hope and faith reigned in their hearts as they overcame the challenges of this era and practiced their faith.

Looking forward, we must learn from this time in order to benefit in the future. We must dissect the positive and negative stories that emerged from the pandemic, and prepare ourselves to always make the best of inevitable hardship. All faith communities in the United States and the world must find ways to unite in the face of adversity, bind together to elevate those in need, and design ways to foster religiosity from the confines of home. We must challenge ourselves to be creative, solution-driven, and cognizant of the magnitude of influ-

ence community and faith can have in one's life. A religious perspective allows us to see the meaning behind catastrophe. It gives purpose to our struggles and lights an unquenchable fire of hope during the most dire times. For people who lead lives of faith, it can be the difference between triumph and despair during the next inescapable pandemic. enerally, religious traditions allow us to transcend our wills and desires in light of the common good. It strengthens our conviction in the validity of selflessness and service, and prompts us to reject the self-interestedness that our society and culture promotes. Instead of living in competition with one another in an endless race for wealth and honors, faith teaches us to uphold human dignity, become appreciative of the blessings we were favored with, subordinate materialism and the mundane to eternal virtuousness, and extend help to those who need it most because it is our duty to use our gifts as a tool to serve others. In public health ethics, as was elucidated by this ruthless pandemic, such a mindset could have a magnitude of influence.

I leave you with this message. When the world seems like it contains chaos at every turn and when the toxic drops of distress have seeped into the deepest crevices of your being, "Do not lose heart nor fall into despair! You shall triumph if you are believers." [Quran 3:139].

About the Authors & Artists

Raquel Cohen, Boston College Class of '25, is an English major, Chemistry minor on the pre-med track. Raquel enjoys playing her violin and jamming on the acoustic guitar late nights on campus. Raquel draws her inspiration for this poem from her work as a phlebotomist in a local hospital.

Cecilia Durcan is a senior in MCAS majoring in both Biology and Philosophy. She hopes to go on to find environmental work, practice sustainable living, and utilize her skills from Boston College to care for our common natural home. She's been an avid member of both Climate Justice and The Stylus student groups during her time here, enjoying the civic engagement and literary allure that they cultivate as clubs, respectively. Her favorite poem is "Love Is Not All: It Is Not Meat Nor Drink" by Edna St. Vincent Millay (her favorite poet), and her favorite flavor of milkshake is huckleberry.

Daniel Kabanovsky is a junior in MCAS studying biochemistry and minoring in computer science. He is currently conducting research on using bioinformatics to identify novel cancer-associated cysteine mutations as part of Eranthie Weerapana's lab in the chemistry department. Equally passionate about animal rights and heavy metal, in his free time he can be found volunteering at the local cat shelter or slaying on bass with his band "Reigning Scarlet."

Marlena Kruman is a junior from Homer, NY studying Biology at Boston College. In her free time, you can find her reading, playing tennis, or traveling (she is currently planning a cross-country road trip for this summer!). After taking a Medical Humanities course at Boston College, she was inspired by pieces she read to begin writing herself. Now, she hopes to continue to engage in the Medical Humanities discipline through writing and reading as she pursues a career in the dental field.

Morgan Costa is a sophomore in MCAS majoring in Sociology and minoring in Chemistry. Originating from Scranton, Pennsylvania, she has been horseback riding for ten years and often enjoys reading, drawing, and crocheting in her free time. When Morgan was young, she was diagnosed with immunological and hematological diseases, which have inspired her to pursue medicine after graduation. She has found a love for immunology which is represented in the cover art for this issue.

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