

The lethal implications of terrain theory and anti-vaccine wellness influencers

Scrolling through Jinmee Graham's Instagram account is a strange experience. Warm, aesthetically pleasing, and easy-to-read infographics draw the eye. Intimate videos of Graham talking directly to the camera invokes a sense of being seen and connected. Her bio states, "Helping holistic moms raise kids with strong and resilient health & immunity, naturally", followed by her credentials, "Naturopathic doctor, [Master of Public Health]."

Amongst several infographics and posts that communicate facts rooted in scientific evidence (such as an infographic that compares adaptive and innate immunity), there are dozens of posts that do just the opposite. In one video, Graham looks into the camera with a soft smile across her face as words type across the screen, "Reminder: Immune systems have been protecting humans since the beginning of time." The caption of the post reads, "If [immune systems] were so flawed, we wouldn't be here." One infographic states, "Trust your immune system" followed by "Your immune system doesn't need additional, special training – it already knows what to do." Another video describes three ways to "immunize your child...naturally" and lists "1. Breast milk 2. Organic, whole foods diet 3. Love and attention."

There are countless Instagram accounts like Graham's who's main message is that natural immunity is not only safer, but better than the "synthetic immunity" that comes from getting vaccinated against disease-causing microorganisms. Microinfluencer accounts like @hellomama.nutrition, @mindfuljasmin_, and @dr.catherineclinton tout similar claims whose common thread is that proper care and nourishment of the body is enough to prevent disease. This proper care and nourishment includes things like getting enough sleep, spending time outdoors, reducing stress, eating unprocessed foods, breastfeeding your children, exercising daily, and eating lots of fruits and vegetables. These practices are widely accepted in the medical community as ways to improve overall health and wellness. However, these accounts are also riddled with claims that certain non-FDA approved supplements, essential oils, movement practices, and other alternative medicine practices will protect against disease or boost immunity.

One common belief amongst anti-vaccine wellness influencers, including Graham (@drjinmeegraham), Clinton (@dr.catherineclinton), Samantha (@hellomama.nutrition), and Jasmin (@mindfuljasmin_) is terrain theory. Terrain theory was first proposed by Antoine Béchamp in the 19th century, establishing an historical rivalry with Louis Pasteur's germ theory of disease. Béchamp argued that the building blocks of life were "molecular granulations" suspended in biological fluids. He called these granulations microzymas and claimed that they were the source of life. When a person's "host microzyma" were compromised by unfavorable conditions in the body or environment, the microzyma would spontaneously produce pathogenic bacteria, thus causing disease. Béchamp argued that "germs seek their natural habitat – diseased tissue – rather than being the cause of disease."¹ Pasteur's experiments disproved this theory and established the germ theory of disease which says that disease is caused by the invasion of microorganisms into host tissues.² For over a century, acceptance of Pasteur's germ theory of disease, supported by previous experiments by Robert Koch, has been the scientific consensus and arguably the most important medical discovery in history.³

Despite the scientific consensus on the germ theory of disease, many wellness communities and alternative medicine practitioners are skeptical or flat out reject it. Instead, many members of these communities rationalize their anti-vaccination stance with terrain theory. Although the details differ slightly from Béchamp's microzymian theory, the idea behind terrain theory is that if the body and surrounding environment are healthy and balanced, germs cannot

take hold and cause disease. Acceptance of terrain theory over germ theory by anti-vaccine advocates is often accompanied by the idea that exposure to “toxins”, “chemicals”, or anything “synthetic” will disrupt the body’s “native terrain” and hinder proper immune function, thus the only way to combat disease is through a “natural” lifestyle. Clinton frequently uses the hashtag, #TENDYOURTERRAIN in her posts and primarily focuses on promoting her “quantum terrain” ideology. In contrast to Clinton’s comparatively subtle approach to spreading anti-vaccine rhetoric, Graham and Samantha actively sow distrust in scientific and medical institutions in conjunction with their beliefs about natural living and terrain theory.

Certain elements of terrain theory are sound and supported by scientific evidence. For example, cortisol, a hormone secreted by the adrenal glands, is involved in the stress response and other processes that are critical for maintaining normal homeostasis. When cortisol levels are chronically high, often due to chronic stress, normal immune function is suppressed and weakened.⁴ When the defense system is weakened, microorganisms have an easier time entering the body and proliferating. Additionally, pathogens with a latent infection cycle (i.e. a period of time where a microorganism is present in the body, but inactive or dormant, resulting in no symptoms) like *Mycobacterium tuberculosis*, herpes-simplex virus, and HIV, can be triggered to reactivate and replicate in response to chemical signals from their host that essentially tell the pathogen, “Now’s your chance!” In terms of diet and immune function, eating balanced meals and all of the essential nutrients and vitamins the body needs has long been tied to improved health and wellness.^{5,6} The scientific consensus is that malnourishment is linked to a weaker immune system; immune cells are constantly dying and being remade, so the body needs enough nutrients to fuel the growth and division of billions of cells each day.⁶ Just like a well-balanced, nutritious diet, exercise has also been shown countless times to improve overall health. Not only does exercise release endorphins and reduce stress, it also promotes circulation of the blood and lymph which is critical for efficient and robust immune function.⁷

So, some of terrain theory does check out according to scientific evidence. Eating healthy, getting adequate sleep, exercising daily, and reducing stress are some of the most important lifestyle habits that support a functional immune system. However, many supporters of terrain theory also promote the consumption of a slew of vitamins, supplements, oils, herbs, and tinctures, most of which are not FDA approved or lack supporting evidence for their alleged “immunity boosting” capabilities. Boosting the immune system implies that the immune system is kicked into overdrive to fight off potential threats. But, an immune system in overdrive is actually not what we want. Unchecked, out of control, or “boosted,” your immune system can kill you in just a few minutes.⁶ One tragic example is a 2006 clinical trial where cancer patients were injected with extremely low concentrations of TGN1412, an antibody that binds the CD28 receptor on T cells and triggers their activation. Within minutes of injection, all patients rapidly descended into multi-system organ failure as millions of activated T cells triggered a cytokine storm and massive inflammation.⁸ Fortunately, there are few substances marketed as “immune boosting” supplements that cause the level of damage that TNG1412 did, and many are just money siphoning placebos. Aside from very limited evidence that a few supplements (e.g. Vitamin D) can “boost” immune function, there is no evidence that anything beyond proper nutrition, exercise, sleep, and stress reduction can strengthen our immune response.^{6,9}

One of the biggest problems with the wide support of terrain theory in wellness circles is the idea that “natural immunity” and taking care of your “terrain” is the only way to prevent disease. The idea that raising your children with a “natural lifestyle” (i.e. breastfeeding, organic food, emotional and spiritual support, time outdoors, a variety of supplements, etc.) will

“naturally immunize” them against lethal diseases like measles or whooping cough. Not only is this ideology unsupported by the scientific consensus surrounding vaccination, but it also reflects an important point about the highly individualistic culture of the United States. Getting vaccinated is not just an important health decision for the individual, but it protects elderly, disabled, and immunocompromised populations that may be unable to receive immunizations. Terrain theory also places blame on the individual for the occurrence of disease and illness; if you get sick, it’s your fault. Of course it is important for individuals to feel empowered to make the best choices for their own health, but disease can still rear its ugly head in the “healthiest” individuals. Not to mention, not every person has access to healthy foods, safe outdoor spaces for their children to play, or even time in the day to exercise.

Since the dawn of human life, we have coexisted with trillions of microorganisms. Some were present as the immune system evolved, providing it with a baseline for detecting self versus non-self. Some developed mutualistic relationships with us such that we each could not survive without the other (e.g. certain bacteria that live in the colon and synthesize essential vitamins for us in exchange for a warm, moist, nutrient-dense home to live in). There is also some evidence that certain microorganisms offered the immune system a specific molecule or process that allowed for the acquisition of a new capability.¹⁰ Since the paleolithic age, the human genome, and consequently the human immune system, has changed very little.¹¹ John Bowlby (1969) proposed the Environment of Evolutionary Adaptedness (EEA) theory which says that modern humans are *genetically* more adapted to the hunter-gatherer era than to modern life. For example, there haven’t been changes to our genome at the molecular level that allow us to live in cold places. Rather, we have learned how to make coats and how to heat and insulate buildings.¹⁰

In the same way, our genome has been adapted to coexistence with a number of microorganisms for nearly two million years. In contrast, the microorganisms that cause disease in humans are relatively new to our genome. The speed at which humans have altered the environment and our relationship to the world around us does not match the nearly imperceptible change that has occurred at the genetic level. Many of the pathogens that have wreaked havoc throughout history are actually younger than us. Our genome has never seen these organisms before and thus we do not have the ability to coexist with them unless we acquire immunity by surviving direct infection or through immunization. Because human evolution at the genetic level is so slow, pathogens that first emerged thousands of years ago are still “new” to us.¹⁰ This is why people are not born with immunity to *Yersinia pestis*, the causative agent of the Black Plague, even though it first swept through Europe over 700 years ago. On an evolutionary time scale, 700 years is less than a brief blip in time.

Bowlby’s EEA theory describes how humans “detect a gene-environment misfit easily within the physical environment and invent appropriate technological adaptations”.¹⁰ In the same way that humans have developed coats, heat, and insulation to be able to thrive in the cold, we have also developed vaccines that protect us against deadly pathogens. Humans’ inability to survive smallpox, measles, polio, and other deadly diseases was the gene-environment misfit and vaccines are the technological adaptation.

Given that the invention of vaccines is considered one of the greatest medical innovations in human history and the scientific consensus around the importance of vaccinating children against deadly diseases like measles remains strong, what makes terrain theory so tantalizing to members of wellness communities? The wellness industry and small communities led by wellness influencers are skilled at enrapturing people who have varying levels of distrust in western science and medicine. People are promised quick-fixes and alternative approaches that

are wrapped up in intriguing, spiritual jargon that makes people feel seen and special. In a Washington Post article that describes the reasons why anti-vaccine rhetoric spreads so easily in online wellness communities, Chiu and Nakhlawi write, “Some voices within the wellness space are adept at building connection, gaining trust and sowing doubt – all while appealing to widely held beliefs about healthy living.”¹²

Vague, catchy, and incendiary phrases like “Health cannot be injected” (@mindfuljasmin_) or “A child’s immune system is not made in a lab” (@drjinmeegraham) are tossed around frequently on social media. Often, anti-vaccine wellness influencers are self-proclaimed “truth-seekers at constant risk of being silenced by mainstream authorities or online moderators.”¹² A confusing and dangerous cocktail of fear, distrust, self-realization, freedom, and an appeal to natural, holistic living is presented to followers, many of whom have a desire to escape the mainstream and find communities where they feel seen and heard.

Sometimes, science does not provide satisfying answers to our questions, while many wellness communities and influencers can appear to have all the answers. It may start as an innocent interest in essential oils or meditation or yoga. It may start out by seeking advice online after your child’s pediatrician scoffed at you and ignored your concerns about a particular vaccine. Or, perhaps you found comfort in a spiritual community during a time in your life where you felt lost, invisible, or harmed in some way by society as a whole. There are countless scenarios that can end in a staunch belief in terrain theory and an anti-vaccination stance. But, what many of them have in common is people seeking answers to questions that science could not provide satisfying answers to, often on social media.

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