



The Coloniality of Power in Immunology

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Introduction

The dominant language of modern immunology is one of perpetual conflict. This language describes a biological war waged at the microscopic level, where the body's defenses mount a sophisticated attack against microbial invaders. The system maintains a vigilant surveillance for foreign antigens, deploying specialized armies of lymphocytes, phagocytes, and natural killer cells to patrol the body's frontiers.

This conceptual arsenal, solidified in scientific imagination, is so deeply embedded in biological, medical, and public discourse that it is often mistaken for a literal description of reality rather than a guiding metaphor (Tauber 1994). Cohen (2009) demonstrates that the very concept of immunity had been a legal and political category for two millennia before its biological sequestration, suggesting that the dominant model of defense is a cultural artifact rather than a self-evident biological fact (Martin 1994).

This paper questions the origins, assumptions, and consequences of the immunological metaphor of warfare. The objective is not to invalidate the vast and valuable empirical discoveries of immunology but to undertake a decolonial analysis of its core axioms. Is warfare the only, or the most accurate, way to understand our intricate and ancient relationship with the microbial world? Where does this metaphor come from? What other possibilities does it foreclose?

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Theoretical Background

Modern immunology functions as a powerful artifact of the modern/colonial world system (Mignolo 2000; Quijano 2000). Its foundational logic is predicated on a distinct political and philosophical worldview that privileges sovereignty and purity, mirroring the nineteenth-century consolidation of the European nation-state (Cohen 2009). Thus, health became synonymous with the violent exclusion of the other and the strict policing of bodily frontiers (Anderson 1996; Martin 1994).

This paper dissects the host–pathogen relationship drawing on a synthesis of decolonial theory (Quijano 2000; Mignolo 2000), post-structuralist thought on bio-power (Foucault 1978), and Science and Technology Studies (STS) critiques of objectivity (Haraway 1988). The analysis is conducted using a postdigital approach: a critical attitude and research methodology that examines our messy, unpredictable reality where the digital and the biological, the technological and the non-technological, are inextricably intertwined (Jandrić et al. 2018; Jandrić 2022, 2023). Within the postdigital condition, biology cannot be divorced from information and society (Peters 2012; Jandrić 2021). The postdigital lens reveals hidden assumptions that structure immunological knowledge and traces pathological consequences of the immunological metaphor of warfare.

The argument proceeds in five stages. First, it traces the historical co-construction of the immunological self and the political sovereign self of the nation-state, showing how anxieties about borders and foreignness shaped biological theory. Second, it explores how this paradigm produced an epistemicide (see MacKenzie 2023) of alternative, symbiotic models of health, particularly those found in non-Western traditions. Third, the paper analyzes the recent discovery of the microbiome and the concept of the holobiont as a fundamental, internal challenge to immunology's colonial foundations. Fourth, it connects this inherited worldview to pressing contemporary health crises. The paper concludes by outlining the principles of a pluriversal immunology, better suited to the challenges of an interconnected world.

The Construction of the Sovereign Self

The central question of classical immunology is the distinction between self and non-self. In this framework, the immune system's primary function is to maintain biological integrity by identifying and violently eliminating all that is perceived as foreign. This logic, which reached its zenith in the late nineteenth and early twentieth centuries, is not a self-evident biological fact. Cohen (2009) argues that it was developed from conceptual sequestration, where biology adopted the legal-political logic of immunity; originally a Roman term for exemption from civic duties (see also Tauber 1994; Martin 1994). According to Schmitt (1996), the essence of politics lies in the distinction between friend and enemy. This determination is the foundational act of the sovereign entity, the nation-state, which defines itself by policing its borders, identifying external threats, and claiming a monopoly on violence to preserve its territorial integrity. The immunological concepts of self and non-self

function as direct biological analogues to the political concepts of friend and enemy (Cohen 2009).

The late nineteenth century saw both the consolidation of the European nation-state and the rise of germ theory, championed by figures like Louis Pasteur and Robert Koch. In this environment, as Martin (1994) observes, the microbe was easily cast as a microscopic enemy combatant; an invisible, alien invader threatening the sanctity of both the individual body and the body politic. The body was reimagined as sovereign territory, with skin and mucous membranes serving as heavily fortified borders (Cohen 2009). Within this militarized framework, the immune system was conceptualized as a standing army and intelligence agency tasked with the violent preservation of the biological self (Tauber 1994).

This framing is a manifestation of Foucault's (1978) biopower. Foucault argued that the eighteenth century marked a crucial shift in the exercise of power: from the older model of sovereign power, defined by the right to take life or let live, to a new form of power, dedicated to fostering life or disallowing it to the point of death. Biopower manages populations, optimizes health, and regulates bodies to create a healthy, productive, and governable citizenry. Public health campaigns, sanitation projects, and the science of immunology had become key instruments of this new form of governance. According to Foucault (2009), this represents a shift in focus from the exclusion of the leper to the meticulous management of the plague town. While the leper was cast out of society to maintain purity, the plague model introduced quarantine as one of inclusion and continuous surveillance, where every individual is partitioned, assessed, and fixed in their place (Elden 2003). In a postdigital age, Foucault's (2009) management of the plague town translates into the notion of viral modernity (Peters et al. 2022c).

Scientific quests to understand immunity provided a natural, biological justification for political ideals of the modern self: autonomous, bounded, and defined by a defensive posture towards the world (Cohen 2009). Immunology internalized the emergency plan of the plague town, transforming the body into a site of administrative control where policing occurs through constant surveillance of lymphocytes. In a postdigital age, this control is further complicated by the datafication of the body, where immunological responses are quantified and integrated into global systems of surveillance and profit (Peters 2012; Neilson and Enright 2022). Theories of viral modernity reveal that the immune system is not just biological defense, but also a node in a bioinformational network where information and pathogens are dialectically intertwined (Jandrić et al. 2018; Peters et al. 2022a, b).

This convergence of biology and politics was particularly potent in the context of European colonialism. The colonial project was rife with anxieties about contamination, degeneration, and the breaching of racial and cultural boundaries. The other, be it a microbe from the tropics or a colonized subject, was constructed as a source of pollution and a threat to the purity and integrity of the European self and society (Anderson 1996). The language of immunology, therefore, did not merely describe cellular processes; it reinforced a political worldview in which health, order, and identity depended on the constant surveillance and violent expulsion of foreignness.

The Epistemicide of Symbiosis

The focus on the pathogenic invader and the sovereign self results in systematic destruction of rival knowledge systems or epistemicide (MacKenzie 2023). The modern/colonial project, argues de Sousa Santos (2014), operates through a form of abyssal thinking that draws a radical line between Western science and all other forms of knowledge. Knowledge from the Western side of the line is deemed universal, objective, and true, while knowledge from the other side is relegated to the realm of belief, superstition, tradition, or non-existence. Decolonial perspective and postdigital theories reinforce this critique by challenging the very binaries, such as the division between the analog-biological and the digital-informational, that have anchored colonial logic (Jandrić 2022; MacKenzie 2023). The imposition of the bio-medical model of immunological warfare is a key part of this epistemic violence.

Across the globe, this process actively erased or delegitimized countless traditions that understood health not as the absence of invaders but as a state of relational balance. Many Indigenous Amazonian medical systems, for example, are built upon a sophisticated understanding of ethnobotany, where health is maintained through complex interactions with plants, spirits, and the wider forest ecology. Illness is often seen as a consequence of broken relationships or ecological disharmony, and healing involves restoring that equilibrium (Gamlin 2023). Similarly, traditional African medical philosophies frequently conceptualize the human body as a porous social body, deeply interconnected with the health of the community and the land (Schoenbrun 2006). Within this worldview, health is not an internal state of a closed organism but a reflection of one's harmonious relationship with social, ancestral, and ecological forces (Ngubane 1977). These are not models of defense but frameworks of dynamic coexistence, where the individual is seen as an extension of the cosmos rather than a bounded unit to be protected (Livingston 2021; Gugulethu 2025).

Such epistemic violence also takes place within European traditions. For instance, knowledge of symbiosis was historically marginalized by the essentialist conception of individuality (Gilbert et al. 2012). Long-standing cultural practices, from the use of fermented foods like yogurt, kefir, and sauerkraut to sustain gut health, to agricultural techniques that promoted soil biodiversity, were sophisticated forms of folk ecological knowledge (Moore et al. 2018). These practices, often described as multispecies wisdom, operated on an implicit understanding that health depends on cultivating a thriving community of microorganisms rather than sterilization (Mutlu Sirakova 2023). Consequently, these traditions were not based on eradication but on stewardship (Janišová et al. 2021).

Postdigital understanding of epistemic violence (MacKenzie et al. 2023), and postdigital research in more general (Jandrić et al. 2023a, b), acts as decolonial allies by recognizing that these ancient practices are not outdated relics but complex systems where the biological, social, and informational converge (Cormier et al. 2019).

The Holobiont as a Decolonial Subject

Recent advances in genetic sequencing have revealed that the human body is not a unitary entity but a teeming, multi-species ecosystem. For every human cell, there is at least one microbial cell; for every human gene in our genome, there are roughly 100 microbial genes. This collective of human and microbial elements is now referred to as the holobiont (Gilbert et al. 2012). Resident microbes are not passive bystanders or potential invaders; they are essential co-creators of our biology. They digest our food, synthesize essential vitamins, and, most crucially, play a fundamental role in educating and calibrating our immune systems from the moment of birth.

The existence of the holobiont fundamentally destabilizes the oppositional boundary between self and non-self. If our bodies are constituted by, and utterly dependent upon, this teeming microbial other, then who is the self that the immune system is meant to be defending? The very cells of our immune system tolerate and even nurture trillions of microbial organisms. This biological reality shatters the foundational metaphor of the body as a sovereign nation-state. In the words of Yong (2016), we contain multitudes.

This resonates powerfully with poststructuralist and feminist critiques of the bounded, autonomous individual. Donna Haraway (1991, 2016) has long argued against the myth of the self-made individual, proposing instead that all beings are constituted through relationships. Her concept of *sympoiesis*, or making-with, offers a far more accurate description of the holobiont than the classical idea of *autopoiesis*, or self-making. This paradigm aligns with the postdigital bioinformational shift, where biology is treated as digital information and information as biology (Peters et al. 2022a; Jandrić et al. 2018).

Human body is not a static biological unit but a postdigital hybrid assemblage (Price 2022) of information and biology (Peters et al. 2022b). We are constantly being made and remade in collaboration with our microbial partners. This symbiotic reality was anticipated decades earlier by Margulis (1998), whose theory of endosymbiosis demonstrated that the eukaryotic cell itself, the foundation of all complex life, arose from ancient acts of microbial incorporation. This process of endogenization (Johnson et al. 2022) serves as the biological foundation for viral modernity, a concept that draws a close association between viral biology and information science (Peters 2022).

The biological model of holobiont is relational, interdependent, and ecological. It functions not as a sovereign entity with fixed borders but as a fluid ecology of selves. Holobiont is less congruent with classical Western biology than with many Indigenous cosmologies, resulting in a forced scientific reckoning with a relational worldview that colonialism sought to erase.

Pathologies of Coloniality

Tangible consequences of the colonial mindset manifest in some of the most pressing global health crises of our time. The paradigm of a total war against bacteria, waged through the indiscriminate use of broad-spectrum antibiotics, is a direct strategic outcome of this sovereign logic. This scorched-earth tactic has resulted in the emergence of multi-drug-resistant organisms, a crisis that the O'Neill Report (2016) projects could lead to 10 million deaths annually by 2050. As Blaser (2014) argues in *Missing Microbes*, this failure to think ecologically has created a biological vacuum, where the violent elimination of commensal flora provides an evolutionary fitness test that only the most resistant survive.

This logic of sovereign exclusion is the precursor to what Peters et al. (2022a, b) define as viral modernity. The connection lies in the collapse of the very borders that the colonial model sought to protect; in viral modernity, biological pathogens and non-biological information are dialectically intertwined within the same global infrastructure. Just as humans declared war on microbes only to face their natural selection, our contemporary postdigital condition reveals that threats, whether viral or informational, cannot be contained by traditional walls.

This systemic dysregulation is further evidenced by the hygiene hypothesis (Pfefferle et al. 2021). This hypothesis posits that an immune system underexposed to a rich diversity of microbes in early life fails to be properly calibrated. The immune system's T-regulatory cells, which are crucial for teaching tolerance, require training by exposure to a wide array of environmental and commensal bacteria. In the absence of this microbial education, a direct consequence of sanitized urban environments, processed diets, and antibiotic overuse, the immune system becomes dysregulated. It is an army with insufficient training and no clear external enemy, so it begins to attack harmless substances like pollen or, tragically, the body's own tissues. This is a pathology born of an obsession with purity; a direct legacy of the hygienist model that severed our ancient, symbiotic connection to a rich microbial world. The hygiene hypothesis (Pfefferle et al. 2021) therefore suggests that the dramatic increase in autoimmune diseases in the Global North is a direct result of an immune system underexposed to microbial diversity, losing its ability to distinguish between self and others.

The emergence of diseases like Covid-19, Ebola, and avian influenzas is often framed through simplistic and xenophobic narratives of foreign threats emerging from unclean places. Within the framework of viral modernity, however, these outbreaks reveal rifts between evidence and truth (Peters et al. 2022a, b). A decolonial and ecological analysis reveals their emergence as a predictable consequence of industrial spillover driven by a global colonial/capitalist system of extraction. The relentless destruction of forests for industrial agriculture and mining does not merely damage nature; it systematically dismantles the biodiverse buffers, the natural ecological firewalls that historically restricted the contact between animal pathogens and human populations (Jolly 2022).

This extractivist logic reached its peak during the Covid-19 pandemic, where global management of lockdowns exposed and reinforced coloniality of the Global

North's scientific infrastructures (Jandrić et al. 2020, 2021). By prioritizing Western-centric knowledge production and technological solutions over local ecological realities, these infrastructures validated a state of exception that further marginalized the Global South. The problem, therefore, is not the “invading pathogen” in isolation, but a global economic system that cultivates the conditions for its emergence and rapid spread.

Conclusion

Modern immunology is not a universal, objective science; it is a historical and politically contingent construction, deeply entangled with the coloniality of power. Its foundational metaphor of war created a powerful but dangerously incomplete framework for understanding health, one whose pathological consequences are now obvious. Reflecting on these findings, it becomes clear that immunology is a primary site of bioinformational convergence.

Transition from the sovereign self to the holobiont represents a post-disciplinary rupture that necessitates a radical rethinking of the human subject (Peters and Jandrić 2019). This ontogenetic shift provides a biological foundation for knowledge socialism; a model of open, radical collaboration that transcends individualistic neoliberal frameworks (Peters et al. 2022d). If human life is a multispecies assemblage rather than a bounded, autonomous unit, then knowledge production is not an individual race for intellectual property but a collective metabolic process. Within the postdigital condition, knowledge acts as a common where, much like the exchange of genetic and metabolic information within the holobiont, the sharing of intelligence becomes a prerequisite for the resilience of the whole system (see Jandrić 2025).

A decolonized, pluriversal approach to immunology acknowledges that there are many worlds, many ways of knowing, and many ways of being healthy (Santos 2014; Mignolo 2000). This approach does not discard the hard-won empirical immunological knowledge of the last century. Instead, it reframes that knowledge within a more capacious, ecological, and just philosophy. This entails moving away from the metaphor of war and toward other metaphors such as gardening, diplomacy, or ecosystem stewardship. Immunology's primary focus thus shifts from the eradication of individual pathogens to the cultivation of resilient, biodiverse holobionts and the restoration of healthy ecosystems.

This fundamental shift in understanding immunology implies redirecting research priorities from a focus on developing new weapons to investing in strategies that promote balance (microbiome therapies, phage therapy, nutritional science, and public health policies). It prioritizes prevention over late-stage intervention, understanding that health is maintained through the stewardship of internal and external ecologies rather than just the containment of outbreaks. It demands institutional humility and a genuine dialogue of knowledges (Santos 2014) with the traditional and Indigenous medical systems, recognizing them as sophisticated repositories of ecological wisdom. It requires transforming medical

education, ensuring that future clinicians understand the body not as a fortress to be defended, but as a complex community to be tended.

The future of postdigital scholarship lies at the fertile intersection of biology, information, and society (Jandrić 2021). By deconstructing the myth of the sovereign self, we open a pathway toward knowledge ecologies where the true measure of our immunity is no longer found in the violence of what we exclude, but in the radical hospitality of how we coexist.

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Data Availability No datasets were generated or analyzed during the current study.

Declarations

Competing interests The authors declare no competing interests.

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