Recent findings in epigenetics have been attracting much attention from social scientists and bioethicists because they reveal the molecular mechanisms by which exposure to socioenvironmental factors, such as pollutants and social injustice, can influence the expression of genes throughout life. This epigenetic programming that happens during embryogenesis, fetal development, and early childhood consists largely in long-lasting changes in the three-dimensional structure of DNA at specific genes, turning them “on” (through gene activation) or “off” (through gene silencing). It thus creates substantial biological variability among individuals and populations. Most surprisingly, some epigenetic modifications may also be heritable via germ cells across generations.

Epigenetic programming and inheritance have reignited discussions about environmental and social justice duties to protect future generations from avoidable harm. Epigenetics, as we have previously discussed, can provide a convincing argument for biomedically inclined individuals and organizations to acknowledge the importance of addressing environmental living conditions and tackling social inequalities to improve public health. It may be the missing molecular evidence of the importance of using preventive strategies at the policy level to reduce the incidence and prevalence of common diseases. But while this “policy translation” of epigenetics introduces new arguments in favor of public health strategies and policy-making, a more “clinical translation” of epigenetics is also emerging. It focuses
on the biochemical mechanisms and epigenetic variants at the origin of disease, leading to novel biomedical means of assessing epigenetic susceptibility and reversing detrimental epigenetic variants. This clinical translation thus provides additional avenues for understanding diseases and developing treatments at the molecular level.

Although environmental and social activists have gained a powerful vocabulary to promote environmental awareness and social justice, we should remain aware of what might be lost in translation when we shift from a focus on external etiology of disease (social, cultural, behavioral, and political factors) to a focus on the internal molecular bridge between social determinants of health and common diseases. As Martyn Pickersgill notes, “[T]he logic underlying this [appreciation of the value of epigenetics] is worth mapping; so, too, are the contexts and instances where such celebratory discourse is accepted, rejected, or even ignored.”

While epigenetics have been enthusiastically mobilized by some scholars, we should remain critical of the reasons underlying the endorsement of molecular evidence as potentially having more power than epidemiological studies to stimulate political will.

In this paper, we argue that the impetus to create new biomedical interventions to manipulate and reverse epigenetic variants is likely to garner more attention than effective social and public health interventions and therefore also to garner a greater share of limited public resources. This is likely to happen, we argue, because of the current biopolitical context in which scientific findings are translated. This contemporary neoliberal “regime of truth,” to use a term from the historian and philosopher Michel Foucault,8 greatly influences the ways in which knowledge is being interpreted and implemented. Building on sociologist Thomas Lemke’s Foucauldian “analytics of biopolitics” and on literature from the field of science and technology studies,9 we present two sociological trends that may impede the policy translation of epigenetics: molecularization and biomedicization. These trends, we argue, are likely to favor the clinical translation of epigenetics—in other words, the development of new clinical tools fostering what has been called “personalized” or “precision” medicine.

In addition, we argue that an overemphasized clinical translation of epigenetics may further reinforce this biopolitical landscape through four processes that are closely related to neoliberal pathways of thinking: the internalization and isolation (aspects of liberal individualism) of socioenvironmental determinants of health and increased opportunities for commodification and technologicalization (aspects of economic liberalism) of health care interventions. Hence, epigenetics may end up promoting the mobilization of resources toward technological innovation at the expense of public health and social strategies. Our analysis therefore first presents how the current biopolitical landscape may bias scientific knowledge translation and then circles around to explain how, in return, the outcome of a biased translation of epigenetics may strengthen our contemporary neoliberal “regime of truth.”

The issue of what public health measures should be implemented—those targeting individuals’ sense of responsibility and empowerment or collective strategies to protect vulnerable populations—is beyond the scope of this paper. Other scholars have already begun reflecting on the possible benefits and adverse consequences of specific public health measures. Our argument is rather a call for precaution against a misguided emphasis on the clinical translation of epigenetics. Our analysis is descriptive and speculative, demonstrating why this scenario is likely to occur, but also normative in that it offers a critique of this scenario and cautions against it. We argue that an unbalanced knowledge translation—in a context of limited resources—would fail to recognize the urgent need for public policy interventions that promote and facilitate the adoption of healthy behaviors by informed citizens and reduce health inequities.

We should remain aware of what might be lost in translation when we shift from a focus on external etiology of disease to a focus on the internal molecular bridge between social determinants of health and common diseases.

The emerging field of molecular epigenetics provides further scientific evidence that genetics—the linear combination of nucleotides forming the twisted helix of DNA—is not the sole determinant of biological identity, health, and disease. With the advancement of knowledge in this field, we are beginning to develop a more comprehensive picture of the molecular mechanisms behind gene expression (the production of structural and functional proteins based on the plans located in the genes). Epigenetic variants (such as methylated DNA and acetylated histones) have been proven to play a pivotal role in phenotypic variation and disease development.

Following the human genome project and genome-wide association studies, large-scale epigenome-wide association studies are now being undertaken through vast collaborative...
projects such as the Encyclopedia of DNA Elements Consortium, the U.S. National Institutes of Health Epigenomics Roadmap, and the International Human Epigenome Consortium. Their aim is to characterize the human epigenome (the methylome and the histone code). The expected outcome of these ambitious investigations lies largely in a better understanding of the role epigenetic mechanisms play in the activation and silencing of genes that were previously associated with susceptibility to specific conditions and in allowing control over these threats to health and well-being. Such epigenetic studies are in a sense contributing to the further development of a medical paradigm that mostly focuses on the internal molecular etiology of diseases and the biomedical means to cure them.

Yet, other experiments, mainly in animals, have focused on how the environments to which individuals are exposed during development (in utero and during early life) can affect their epigenetic programming. It has been shown that fetal exposure to an adverse in-utero environment (resulting from the mother’s living conditions during pregnancy) could affect epigenetic programming and result in impaired health later in life. For instance, the mother’s nutrition during pregnancy is thought to exercise an important influence on epigenetic programming during fetal development.

Animal studies have also documented the epigenetic effects of parental behavior on programming of the health of offspring. A widely cited study examined how the maternal behavior of rodents (such as licking and grooming pups) affects the offspring’s management of stress later in life, mediated through an epigenetic alteration. Specifically, it has been shown that a deficit in emotional development correlates with impairment of histone acetylation and a decrease in DNA methylation in the region of the glucocorticoid receptor gene in hippocampus cells.

By extension, this would increase the vulnerability to stress of the offspring receiving less affection from the mother. It has also been proposed that the behavior of fathers—as well as the interaction between parents—may have a role in the epigenetic programming of offspring.

Rodents’ exposure to various traumatic events early in life, such as early separation from their mothers or certain forms of abuse, have led to persistent effects on the epigenome of the rodents. This evidence suggests a significant influence of family environment on epigenetic programming and health. More broadly, recent publications report a significant influence of the broader social environment during early life development on offspring’s epigenetic programming, the effects of which would be exhibited later in life. For example, social adversity may have an epigenetic effect on cognitive development and future response to stress. More studies in humans are now required, since premature animal-to-human transpositions may be misleading.

In humans, one of the most cited studies explored the persistent influence of fetal exposure to a famine known as the Dutch Hunger Winter of 1944 to 1945. Bastiaan Heijmans and colleagues found that individuals whose mothers were pregnant during this famine suffered from disrupted levels of methylation in certain genes associated with metabolic disorders and obesity even six decades after their birth. Heijmans et al. suggest that these changes in methylation might account for the higher rates of obesity and other diseases observed in these individuals. Such findings create incentives to think of the epigenome as an “archive of the prenatal environment.” Moreover, longitudinal studies involving monozygotic twins have shown that some epigenetic changes can also occur after birth and may explain variations between twins with regards to susceptibility to certain diseases, depending on exposure to different environments during childhood and adulthood.

Policy translation of epigenetics. The influence of the social, cultural, political, ecological, and economic environments on the development and health of individuals and populations has long been recognized by public health researchers. In the past decade, the study of the social determinants of health has found its biological corollary in the study of molecular epigenetics. Elements of the social environment, such as socioeconomic status, were suggested to have an influence on DNA methylation in some genes and potentially by extension on the mental health of disadvantaged populations. These findings have offered new avenues for research in health, such as environmental epigenomics and epigenetic epidemiology.

Many social scientists are thus beginning to look at the implications of epigenetics for health policies and society. For some, the development of this knowledge calls for increased attention to inequalities in the distribution of social determinants of health through policy-making. These authors have argued that molecular epigenetics may provide novel grounds for scientific advocacy in favor of public health policies that shape individuals’ and populations’ environment and living conditions, especially during pregnancy and infancy when epigenetic programming is highly active.

Mark Rothstein and colleagues distinguish two types of justice in connection with exposure to disruptive epigenetic programming: “environmental justice” and “inter-generational equity.” First, considering the importance of the natural, sociocultural, and economic environments for epigenetic health, we should be concerned that some people are privileged over others with regards to geographical location, financial condition, or access to healthy food. Second, the potential heritability of epigenetic programming raises important questions regarding the impact on future generations. Building on recent findings from molecular...
epigenetics, Maria Hedlund argues that the “epigenetic responsibility” for addressing such potential sources of injustice belongs primarily to the state, through public health strategies and policy-making.27

We call this socioenvironmental and largely preventive perspective—focused on the importance of the management of social inequalities and external determinants of health through public policies—the “policy translation” of knowledge from molecular epigenetics.

Clinical translation of epigenetics. The development of knowledge in molecular epigenetics is also attracting the attention of the biomedical community, since specific epigenetic variants have been associated with cardiovascular disease, cancer, asthma, and diabetes, as well as several neurological and psychiatric disorders.28 The understanding of epigenetic variants as health risks leads to novel avenues for the development of individualized clinical interventions.

In the near future, next-generation sequencing technologies might include epigenomic technologies.29 The sequencing of the methylome and detection of histone modifications in specific cells or tissues can provide more information regarding individual biological specificity, enhancing our capacity to offer personalized medicine. First, predictive epigenomics may emerge, building on associations between epigenetic variants and diseases.30 Individuals may have their epigenome sequenced and their personal epigenetic susceptibilities revealed, as was the case with genetic testing, in order to orient their lives accordingly. Second, variability regarding drug-metabolism pathways may also be associated with epigenetic variability. Some findings from epigenetics may lead to development of pharmacogenomics to improve the performance of certain drugs or minimize undesirable side effects.31

Third, novel strategies of epigenetic therapy may emerge.32 The reversible nature of certain deleterious epigenetic variants suggests that biomedical interventions could reverse epigenetic risks that have been previously programmed by adverse environments or by parents’ behavior.33 In sum, the knowledge emerging from epigenetics studies could be paving the way for additional paths to personalized medicine, or high-tech precision medicine, targeting individuals’ programmed or inherited biological specificities. We call this focus on the clinical utility of epigenetics research—centered on the internal determinants of health and biological inequalities—and the development of technology to reveal or manipulate it the “clinical translation” of knowledge from molecular epigenetics.

In order to be translated into concrete interventions, both the policy and the clinical promises emerging from epigenetics require the mobilization of important public resources. Even if these two perspectives seem to operate at distinct and independent levels, they still compete for the same limited resources. Financial resources deployed for biomedical research (clinical translation) cannot be used for public health strategies or coping with social health inequalities (policy translation). In the following sections, we explore this tension between the policy and the clinical translations of epigenetics, demonstrating why the current biopolitical context in Western societies is very likely to favor the clinical translation.

The Landscape of Contemporary Biopolitics

Biopolitics is a sociological concept that has been ascribed various meanings. Broadly speaking, it refers to the political, social, and economic context that shapes—and is shaped by—the way science is understood and applied in contemporary societies. Lemke presents a variety of polarized perspectives on biopolitics described in the literature and points to the actual merging and intertwining of these different perspectives. Similarly to Foucault, he argues for an “analytics of biopolitics,”34 a critical and interdisciplinary endeavor that focuses attention on the identification of a “regime of truth”—that is, the identification of a “truth discourse” made of a specific vocabulary (a lexical field) that is perceived to be more convincing during a given period of time and the authority that is perceived to be competent to use that vocabulary. A regime of truth dominates the way knowledge is being produced, interpreted, and transformed into normative claims, leading to a particular set of collective strategies and inviting people to modify their behavior accordingly.35

It is within such a perspective of biopolitics that we frame our analysis of the most likely scenario for the translation of knowledge from epigenetics. Our analysis indicates that the biopolitical landscape and clinical translation are intertwined in a positive feedback relationship, strengthening each other. We argue, first, that the translation of scientific knowledge is exposed to two important sociological trends—molecularization and biomedicalization—that make it more likely for our society to favor the clinical translation of epigenetics; second, our analysis explores how an...
emphasis on this clinical translation has the potential to reinforce this biopolitical landscape.

**Molecularization.** Molecularization is a central trend within the contemporary transformation of medicine and biopolitics. For Nikolas Rose, not only is molecularization framing a new dominant discourse of science, but it also literally represents—using Ludwik Fleck’s notion—a new “style of thought” in “advanced liberal societies”. “It is now at the molecular level that human life is understood, at the molecular level that its processes can be anatomized, and at the molecular level that life can now be engineered.”35 Knowledge about health and diseases is being created and disseminated increasingly using the molecular language and molecular modes of thinking. What we find convincing are molecular explanations. For this reason, the molecularization of life has gained significant political power and can now be understood as part of a potent regime of truth.

The convincing power of molecular-scale arguments was observed by Sara Shostak in the field of environmental health sciences. She reports concerns among environmental justice activists about the reconceptualization of environmental risks in genetic and molecular terms. With such a shift, they fear that the focus on the need to care for the environment will be replaced by a focus on the responsibilities of individuals living with genetic susceptibilities under certain specific environmental circumstances.38 Similarly, according to Lemke, an overemphasized focus on genetics reduces the importance of external determinants of health by locating the cause of disease within the individual: “Unlike the ‘invisible’ social and economic risks, genetic risks can be verified by testing devices. However, genetic diagnostics contributes to ensuring the social and economic risks remain ‘in the dark’, by re-coding these as biological risks and presenting them as a matter for the individual. Thus, the recourse to the molecular text blots out the social context.”39

Personalized medicine, grounded in molecular biology, has been perceived as threatening public policy interventions and a more ecological representation of health by monopolizing attention and resources from a limited budget. As Duana Fullwiley mentions, “The danger of such a prospect potentially includes a biological reification of health disparities—allowing for an eclipse of the social, medical market and ecological determinants of disease that social science health researchers suspect are at issue.”40 Other limitations of a molecular approach have been discussed in the context of nutritional sciences, emphasizing the recognition that a mechanistic view of health and disease is too simplistic.41 Molecularization is thus a powerful trend shaping our biopolitical landscape, posing significant challenges to a balanced approach toward the management of health and disease.

**Biomedicalization.** The “medicalizing of society,” a major transformation of the roles and influences of medicine that occurred between the 1930s and the 1980s, was first described by Abby Lipmann in the seminal article “Medicine as an Institution of Social Control.”42 The trend of “medicalization” was later qualified by Peter Conrad and Joseph Schneider as a passage from “badness to sickness,” as we are increasingly “defining a problem in medical terms, usually as an illness or disorder, or using a medical intervention to treat it.”44 By the end of the twentieth century, many social phenomena seemed to be medicalized, including aging, homelessness, race, and unhappiness.45

Since the mid-1980s, a second transformation of American medicine was identified: the “biomedicalization of life,” described by Adele Clarke and colleagues as “a shift from enhanced control over external nature (that is, the world around us) to the harnessing and transformation of internal nature (that is, biological processes of human and nonhuman life forms), often transforming ‘life itself’.”46 Thus, in a context of biomedicalization, the identification of health risks, as well as the preferred choice of intervention to guard against these risks, naturally focuses on internal sources of health inequalities (genetic variants, for example) rather than external ones (such as social determinants of health).

Hence, biomedicalization—or the “shifting engines” of medicalization—is closely associated with “[t]he extension of medical jurisdiction over health itself (in addition to illness, disease, and injury) and the commodification of health.”48 This trend is influenced by “the development and promotion of new technologies, consumer demand, and the emergence of new medical markets.”49 Indeed, today’s predominance of the market economy and the rise of economic liberalism (globalization, international free-trade agreements, and increasingly competitive markets) are thought to be closely related to the growing trend of biomedicalization.

The concept of geneticization is an excellent illustration of the power and impact of molecularization and biomedicalization. Geneticization was first described by Abby Lipmann as “the ongoing process by which priority is given to differences between individuals based on their DNA codes, with most disorders, behaviors and psychological variations defined, at least in part, as genetic in origin.”50 This new approach to health, based on genetic susceptibilities, now looks for cutting-edge technology that may apply to a genetics-grounded personalized medicine including predictive genetics, which centers on “the use of a genetic test in an asymptomatic person to predict future risk of disease.”51 Pharmacogenomics, which “aims to capitalize on [genomics] insights to discover new therapeutic targets and interventions and to elucidate the constellation of genes that determine the efficacy and toxicity of specific medications”;52 and gene
therapy, direct biomedical interventions aimed at replacing detrimental genetic variants to prevent or cure disease.

These individualized clinical approaches reflect the trends of molecularization and biomedicalization because they focus their attention on internal biological determinants of health and endorse solutions that rely on the development of technoscience rather than on social policies that would protect the most vulnerable in our society. By analogy, we argue that similar approaches are likely to be developed based on findings in epigenetics. The current biopolitical landscape could significantly favor the clinical translation of epigenetics because it coheres with a focus on individual biological determinants of health and the imperatives of technological innovation that are inherent in the health economy of neoliberal societies—that is, the development, sale, and consumption of pharmaceutical goods.

Epigenetics as Reinforcing the Neoliberal Regime of Truth

Internalizing the determinants of health. The perceived location of health risks—inside versus outside the body—can have a significant impact on collective choices about the allocation of resources to different preventive or curative health interventions. For instance, focusing on the fact that environmental pollutants have a significant impact on population health may lead to interventions that are different from those that would follow from focusing on individual susceptibility (for example, genetic susceptibility) to such pollutants. Shostak observes that in the context of molecularization, “the isolation of the determinants of health inside the human body” [and that] “a potential biopolitical future is of increasing concern to environmental justice activists.”51 In treating problems as existing primarily inside the body, at the molecular level, we neglect to address their origin at the external level (for example, in relation to social inequalities).

Recent discoveries in molecular epigenetics allow us to identify causal relationships between health and the physical exposure of individuals and populations to various living conditions. This new perspective, together with “sociogenomics”—the study of the interaction between human genes and social life—aims to translate social life into molecular terms.54 Hence, such findings have great potential to contribute to the internalization of social determinants of health. As Jörg Niewöhner notes, “[C]onnections in the practice of doing epigenetic biology contribute to a molecularization of biopower and milieu.”55 Thus epigenetics, possibly more than any other biological science, transforms external determinants of health into internal ones. The health impact of environmental and social inequalities, phenomena that occur outside the body, is now identifiable, measurable, and potentially treatable within the body.56 Socioenvironmental inequalities can be discussed using a molecular language, and the adoption of this language can arguably lead to greater recognition and public acknowledgment.

However, locating within the human body, or internalizing, problems that in fact have a much larger scope may lead us to disregard some of the most important issues of our time, such as social justice, biodiversity, and the protection of ecosystems. Such challenges are not located inside the human body and have various consequences for human health and well-being. As Margaret Lock has recently pointed out, environmental epigeneticists are at risk of biological “neoreductionism” when molecularizing the environment.57 Hence, by emphasizing internal determinants of individual health (epigenetic variants) rather than external environments that surround the individual body and social constructs that underlie inequalities in health, the clinical translation of epigenetics can help reinforce the neoliberal regime of truth and feed the ongoing trend of molecularization.

Isolating the determinants of health. Isolation is a necessary condition for scientific investigation and, more generally, for positivist enterprises. To study the physical properties of an object, one must first control the object’s environment to ensure that it is stabilized. Otherwise, it will be impossible for the investigator to know whether a specific feature belongs to the object or is induced by its environment. Isolation is also necessary for the study of biology at the molecular level. In order to understand the role of a precise molecule in complex systems, researchers must isolate the molecule or rigorously control all other potentially influential factors. Such empirical inquiries reveal associations between molecules and biological functions (phenotypes). While the scientific value of separating life or reality into isolated entities is of undisputable value, this methodology may also impair the understanding of health and diseases as a more complex interrelation between these entities.

The isolation of the determinants of health and etiology of disease, we argue, is characterized by their fragmentation into their most indivisible components. This is reflected by the attribution of disease causation to the
disruption of small biological entities rather than to the systemic interactions of these entities and their environment. For instance, isolation is consistent with the understanding of—or a greater focus on—environmental problems from the perspective of the individuals who are genetically susceptible to specific pollutants, rather than on the socioeconomic status of vulnerable populations that are overexposed to these pollutants due to their geographical location.

Although the translation of social health inequalities into molecular terms by epigenetics findings is perceived to be a step toward a greater recognition of social phenomena, we are concerned that it may further reinforce our societies’ biopolitical commitment to the process of isolation. Neoliberalism is often seen as a threat to social cohesion because it actively participates in the fragmentation of society, hindering the adoption of public policies that aim to promote the common good. Similarly, the reconfiguration of complex social determinants of health as simplistic epigenetic variants at the molecular level, although of interest for clinical purposes, can be problematic at the policy level because it minimizes the importance of interactions and systems, thus skewing our understanding of the etiology of disease. We therefore see isolation as metaphorically analogous to liberal individualism, which assumes the independence of autonomous individuals, perceived as free to act independently rather than as embedded in their physical and sociocultural environments.

**Commodifying the epigenome.** The commodification of determinants of health and etiology of disease is characterized by the transformation of health into a marketable product, as well as the complete integration of health care into the market economy. Not only is the availability of cures dependent on the market, but the market itself is also dependent on the health economy. The reconfiguration of health as a consumer product, and the patient as a consumer, is closely associated with the expansion of medicalization. In both cases, the neoliberal context plays a central role by promoting the individual as a single and unique entity whose consumption needs for health products are also unique.

The promise of personalized medicine is a good example of isolating consumers and commodifying their genome (or parts of it). By identifying genetic variants that may affect health or metabolism of drugs in patients, we are constructing novel needs that are specific to individuals (or at least to target populations), possibly neglecting other efforts that arguably ought to be deployed to cope with the more common needs of the most vulnerable populations, such as lack of access to water and healthy food, safe shelter, basic medical care, and other fundamental human rights.

The creation of new products of consumption is central to economic liberalism, without which economic growth would slow down. In this context, health care consumers are increasingly expected to be aware of their specific individual needs and become active consumers. As Clarke and colleagues observe,

> The biomedical governmentality to “know thyself” that is associated with such bodily techniques often relies on a neoliberal consumer discourse that promotes being “proactive” and “taking charge” of one’s health. . . . This new regime of biomedical governance allows the further stratified customization of medical services, technologies, and pharmaceuticals to “manage” such differences, thus further biomedicalizing them.

The influence of the market—and to some extent of expanded globalization—on the interpretation of science and uses of scientific findings is not reserved to health. It is also observed in the area of agricultural biotechnology, where plant genes are being patented and transformed into tradable commodities that can be owned, in order to maximize production and profits.

In a similar fashion, the association of epigenetic variants with common diseases may be subject to this commercialization pressure. Unlike social determinants of health, epigenetic biomarkers can be precisely measured and thus potentially reversed in order to improve the health of patients, a technique that could be patented and profitable. In fact, with the dissection of the human epigenome, companies have new material that offers numerous opportunities for commodification. Moreover, such materialization of social determinants of health into patentable objects and marketable goods would allow researchers to identify and offer biomedical solutions to societal problems. Such a transition in focus would be coherent with the implicit requirements for lucrative solutions that help create jobs and profits in a biomedicalized world operating under neoliberal economic assumptions.

**Technologizing health care interventions.** Over the past century, technoscientific approaches to medicine have contributed to the development of impressive diagnostic techniques (such as computerized tomography scans and functional magnetic resonance imaging) and curative solutions (including surgery and synthetic drugs). They also led to the development of predictive tools allowing the assessment of individual risk to some diseases (such as Alzheimer’s and breast cancer), as well as the spread of preventive strategies (such as vaccination). This ongoing technologization of health care interventions could be characterized by a dominant focus on the development and implementation of biotechnology as the preferred tool for prevention, prediction, diagnosis, and treatment of disease.

However, it is largely recognized that biotechnology has not been the most significant cause of reductions in disease burden or increase in life expectancy over the past century. As Paul Rabinow and Nikolas Rose note,
“Despite the contemporary focus on the individuated body, action on the collective pole has been the main motor of increases in longevity and quality of life. [Most of the time], the causes and the remedies are known, and require no further scientific advance or technological innovation, but only political will.”62 Indeed, even today, a significant improvement in the overall level of health could be achieved through facilitated access to healthy food and safe water, reduction of toxic chemicals in the environment, better sanitary strategies, and improved social conditions such as level of education.

Notwithstanding the crucial importance of technology in our lives, scientific knowledge translation can be undermined by the “technological imperative,” in other words, a culturally engrained preference for technological solutions. This “imperative” is due, among other things, to the fact that physicians are “imprinted during training to provide the best possible medical care, generally meaning the newest and most technological care.”63 Two types of arguments have been mobilized to characterize the possible mechanisms at work behind the technological imperative: It is seen as the result of a slippery slope leading us to progressively apply technology where it may not be required or where its risks are greater than its benefits. Alternatively, it is considered the result of the inevitability thesis, according to which slowing down the development and use of technology is improbable because of the will humanity has to master its future evolution.64

Research in the field of epigenetics is now offering a new material substrate—the epigenome—that biotechnology may be able to manipulate. In targeting internal rather than external determinants of health, a clinical translation of epigenetics—allogous to a genetics-based personalized medicine—can encourage the prioritization of individualized and technoscientific approaches at the expense of public health and social policy approaches to address health inequalities. The translation of these findings into clinically oriented interventions such as predictive epigenetics, pharmacoepigenetics, or even epigene therapy encourages the use of innovative and lucrative technology, for example, epigenome-wide sequencing or the development of drugs that target specific epigenetic variants that are detrimental to the health of individuals. In doing so, it reinforces the current biopolitical context.

Translating Knowledge for the Common Good

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e have identified two dominant sociological trends that can significantly affect the interpretation of scientific evidence from the field of epigenetics and its subsequent implementation into health interventions, in other words, the translation of this scientific evidence. We argued that molecularization and biomedicalization are both likely to favor a clinical translation of epigenetics at the expense of a policy one. In addition, we presented four processes, or pathways of thinking, that are supported by the rise of liberal individualism and economic liberalism—through which a largely clinical translation of epigenetics could contribute to the further consolidation of the current biopolitical landscape. These processes are internalization, isolation, commodification, and technologization.

Despite our contemporary neoliberal regime of truth, we should not neglect public policy interventions that facilitate informed citizens’ adoption of healthy behaviors (for example, policies that increase access to healthy food or create less stressful living conditions) and that reduce social inequalities that affect health (such as the socioeconomic gap tied to exposure to pollution). We must remain aware of and cautious regarding barriers that may undermine the public policy management of social determinants of health in neoliberal Western societies,65 such as the dominance of positivist approaches in health sciences, liberal individualism, and the strong influence of the market on medicine.66

We should keep in mind that research in epigenetics highlights the external etiology of disease, shedding light on factors located outside the body, in the living conditions of individuals and populations. Epigenetics should thus stimulate ecosystemic and population approaches to multifactorial and complex etiology of disease and not focus solely on fragmented and isolated entities. It should promote strategies based on social responsibilities and collective goals, which regard health as a common good. High-tech interventions are not always the most efficient promoters of health. Our tendency to favor their implementation is often linked to economic pressure, lobbying, or subtle pressures inherent in the development of the technology itself, such as the technological imperative.

In a context of limited resources, when deciding how to prioritize and choose the most efficient and ethically sound health strategies, a fair account of knowledge translation requires that we take potential contextual biases into consideration. Epigenetics is increasingly—and mostly aptly—mobilized to promote public health strategies and social policies...
to better address health inequalities. However, the success of this endeavor in stimulating political will depends on more than scientific evidence. It must also take into account the powerful biopolitical landscape in which the translation of epigenetics is embedded.

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Notes


37. Ibid., 4.


